North Mercer Island Interceptor and Enatai Interceptor Upgrade Project
Geotechnical Data Report for 60 Percent Design
King County, Washington

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TABLE OF CONTENTS

Page

1.0 INTRODUCTION 1

2.0 SITE AND PROJECT DESCRIPTION 1

3.0 SUBSURFACE EXPLORATION PROGRAM 2
- 3.1 Existing Subsurface Explorations 2
- 3.2 Current Explorations 3
- 3.3 Drilling Methods 4
- 3.4 Soil Sampling 5
  - 3.4.1 Split-Spoon Sampling 5
  - 3.4.2 Sonic Core Sampling 6
- 3.5 Geologic Units and Descriptions 6
- 3.6 Boring Logs 7

4.0 HYDROGEOLOGIC TESTING 7
- 4.1 Observation Well Installation 7
- 4.2 Vibrating Wire Piezometer (VWP) Installation 7
- 4.3 Groundwater Monitoring 8

5.0 LABORATORY TESTING 8
- 5.1 Visual Classification 9
- 5.2 Water Content Determination 9
- 5.3 Grain Size Analyses 9
  - 5.3.1 Sieve Analysis 9
  - 5.3.2 Combined Analysis 10
- 5.4 Atterberg Limits Determination 10
- 5.5 One-Dimensional Consolidation Testing 10
- 5.6 Corrosion Testing 10
- 5.7 Microbiological Testing 11
- 5.8 Analytical Testing 11

6.0 LIMITATIONS 12

7.0 REFERENCES 13

FIGURES

1 Vicinity Map
2 Site and Exploration Plan, Package B Conveyance
3 Site and Exploration Plan, Package A North Mercer Pump Station

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APPENDICES

A Subsurface Explorations
B Hydrogeologic Data
C Geotechnical Laboratory Testing
D Corrosion, Microbiological, and Analytical Laboratory Testing
E Existing Subsurface Explorations

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NORTH MERCER ISLAND INTERCEPTOR AND ENATAI INTERCEPTOR UPGRADE PROJECT GEOTECHNICAL DATA REPORT FOR 60 PERCENT DESIGN KING COUNTY, WASHINGTON

1.0 INTRODUCTION

This draft geotechnical data report (GDR) presents the results of our field explorations and field and laboratory testing performed for the 60 percent design of the North Mercer Island Interceptor and Enatai Interceptor Upgrade Project (Project). Our scope of services included compiling existing geotechnical data, drilling and sampling 45 borings, preparing descriptive field logs of the explorations, performing geotechnical and chemical analytical tests on samples obtained from the field explorations, and preparing this draft GDR.

2.0 SITE AND PROJECT DESCRIPTION

The Project is located on Mercer Island and in the Enatai neighborhood of Bellevue (Figure 1). The primary objective of the Project is to increase the reliability and capacity of the existing North Mercer Island Interceptor and Enatai Interceptor components of the regional wastewater system by increasing capacity and replacing the conveyance from the North Mercer Pump Station (NMPS) to the Sweyolocken Pump Station (SPS). For construction purposes, the Project has been separated into two contract packages, designated as Package A and Package B. Package A includes upgrades to the NMPS and City of Mercer Island Lift Station 11. Package B includes the new conveyance from the NMPS to the SPS.

The upgrades to the existing NMPS (Package A) include a new generator building, BIOXIDE® storage, fuel storage, transformer, odor control vessel, and about 165 feet of dual force mains. The Project will also include new retaining walls and rockeries along the west side of the Project site. In addition to these permanent facilities, the Project will require a temporary pump station manhole, valve vault, and bypass force main. The proposed NMPS facilities are presented in the Site and Exploration Plan, Package A North Mercer Pump Station, Figure 3.

The new conveyance (Package B) will consist of dual force mains that extend from the NMPS to the cul-de-sac at the end of 90th Place SE. The force main alignment will run primarily along the right-of-way of SE 22nd Street, SE 22nd Place, 78th Avenue SE, SE 24th Street, 81st Avenue SE, N Mercer Way, the Mountains to Sound Greenway Trail (I-90 Trail), and 90th Place SE. At the end of 90th Place SE, the force mains transition to a gravity sewer that continues southeasterly

along the I-90 Trail to just west of E Mercer Way, where the gravity sewer transitions to a triple-barrel siphon. The triple-barrel siphon extends to the east along SE 35th Place and the Washington State Department of Transportation boat ramp property to the west shoreline of the East Channel of Lake Washington (East Channel). The triple-barrel siphon then crosses the East Channel to the north of the I-90 East Channel bridge as shallow in-water pipelines to the east shoreline of the East Channel. From the east shoreline in Enatai, the new pipeline proceeds as a deep siphon to the SPS located just east of Bellevue Way SE. The proposed pipeline alignment is presented in the Site and Exploration Plan, Package B Conveyance, Figure 2.

As part of Package B, there are several new structures and additional sewer, siphon, and force main connections that will be required to collect and divert existing flows into or out of the new conveyance system. The new structures along the conveyance include a force main discharge, rock catcher, East Channel siphon inlet, East Channel siphon outlet, flow diversion, Enatai siphon inlet, Enatai siphon outlet and three odor control structures each located near the force main discharge, East Channel siphon inlet, and East Channel siphon outlet structures. The additional pipeline connections include (a) a new section of force main along 97th Avenue SE to carry flows from the City of Mercer Island Lift Station No. 11 to the new gravity sewer, (b) the conversion of an existing pipeline beneath I-90 into a siphon that diverts flow into the new gravity sewer at 96th Avenue SE, and (c) a new diversion sewer in Enatai Beach Park that diverts flows from the new conveyance pipeline to the existing Enatai Interceptor. In addition to these pipeline sections, the existing Enatai Interceptor from Enatai Beach Park to SPS will be rehabilitated primarily using cured-in-place pipe methods. The proposed locations for the structures and additional pipeline connections are shown in Figure 2.

The vertical datum for this Project is the King County (KC) Metro datum. The KC Metro datum is 100 feet above the National Geodetic Vertical Datum of 1929 and 96.41 feet above the National Geodetic Vertical Datum of 1988.

3.0 SUBSURFACE EXPLORATION PROGRAM

Shannon & Wilson conducted geotechnical explorations to evaluate the subsurface soil and groundwater conditions present along current and previous alternative project alignments. The geotechnical explorations included collecting and reviewing existing geotechnical data and a field exploration program.

3.1 Existing Subsurface Explorations

The existing subsurface explorations in the Project vicinity include 43 previous borings and test pits. The existing exploration logs were collected from the Washington State Division of

Geology and Earth Resources Subsurface Database, Washington State Department of Transportation, KC records, and Shannon & Wilson's files. Since the existing explorations were conducted by others or for unrelated nearby projects, the information cannot be verified. Consequently, the existing exploration logs are provided for reference only and as such the Contractor should not rely exclusively on the data, interpretation, or assessments provided in these logs. The approximate locations of the existing subsurface explorations are shown for the conveyance alignment (Package B) and the NMPS site (Package A) in Figures 2 and 3, respectively. The existing exploration logs are presented in Appendix E.

3.2 Current Explorations

The subsurface exploration program included a total of 45 geotechnical borings drilled and sampled to characterize the subsurface conditions for the Project. Nine borings were performed at the NMPS (Package A) and 36 borings were performed along the conveyance alignment (Package B). The borings were performed by Holt Services, Inc. and CN Drilling, Inc. under subcontract to Shannon & Wilson. A Shannon & Wilson field representative was present to observe the drilling and sampling of the borings. The exploration designation, date completed, depth, whether the boring location was surveyed, ground surface elevation, coordinates, type of drill rig, drilling method, and drilling subcontractor for each boring are summarized in Table A-1 in Appendix A. The locations of the current borings, determined by global positioning system equipment and land survey, are shown for the conveyance alignment (Package B) and the NMPS site (Package A) in Figures 2 and 3, respectively.

Under subcontract to Shannon & Wilson, Holt performed vacuum excavation of selected borings to check for the presence of buried utilities prior to the start of drilling. Vacuum excavation, using a vacuum truck, was performed in the upper approximate 1 to 7 feet at five boring locations (NME-4, NME-6, NME-14, NME-15, and NME-21). Vacuum excavation consists of an "air knife" (compressed air directed through a small-diameter, valved hose/pipe) to loosen the in situ soil and a vacuum with a hose to remove the loosened soil. The conditions in the excavation sidewalls and bottom of these excavations were observed and logged by the Shannon & Wilson field representative. Grab samples of disturbed soils were collected from the vacuum extraction hole for geological characterization. The remaining 40 borings were not excavated prior to drilling as no utilities were identified within 4 feet of the boring based on our review of utility maps or by the one-call utility locates.

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3.3 Drilling Methods

Holt used a combination of a truck-mounted drill rig (Mobile B-60), a track-mounted drill rig (LDS-57), a Terra Sonic track-mounted sonic drill rig, and a Terra Sonic track-mounted sonic drill rig on a barge, as shown in Table A-1 in Appendix A. CN Drilling used a hand operated, portable Acker Soil Mechanic (Acker) drill rig to conduct the borings.

Holt drilled 12 borings using sonic core drilling methods. This method uses high-frequency vibratory motion applied to the top of the drill column, along with down-pressure and rotation, to obtain nearly continuous core samples in soil. Soil samples were obtained using a 4.5-inch or a 6.5-inch outside diameter (O.D.) core barrel. The core barrel was advanced into the ground a specific distance (termed a core "run") and then retrieved for extraction of the sample core. Following retrieval of the core barrel, a temporary casing was advanced to the bottom of the sampled interval. The casing was then cleared of slough, and the next core sample was collected, starting at the bottom of the temporary casing. In some situations, soil heave occurred during withdrawal of the core barrel. To counter the heave, the drillers applied a head of water to the temporary casing and cleaned out the casing. If the heave was not excessive, the subsequent core run was advanced through the heave and into the next sampling interval. If identified in the field, the heave was separated from the sample during sample extraction.

Four of the 12 sonic borings were drilled over water on a barge in the East Channel. The drilling method is as described above; however, before drilling and sampling began, a casing was pushed below the mudline to create a seal isolating the water column and drill cuttings in the casing.

Holt performed three borings using a truck-mounted Mobile B-60 drill rig using mud-rotary drilling techniques. Mud-rotary drilling utilizes a bentonite drilling mud to flush out soil cuttings as the 6-inch-diameter drill bit advances. The circulating drilling mud carries soil cuttings to the surface where they are screened and removed as the mud returns to the mud-tank reservoir. The drilling mud also serves to stabilize the borehole sidewalls and prevent heave of the borehole bottom. As discussed later, soil samples were obtained by replacing the tricone drill bit with a split-spoon sampler.

Holt performed 27 borings using a track-mounted LDS-75 drill rig using hollow-stem auger drilling techniques. The LDS-75 used a continuous-flight auger with a 4.25-inch-diameter hollow stem to advance the boring. This method uses applied down-pressure and rotation to the top of the continuous-flight auger. Soil samples were obtained by lowering a split-spoon sampler through the hollow stem of the auger.

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CN Drilling drilled three borings using a portable Acker drill rig using hollow-stem auger drilling techniques. The Acker used a continuous-flight auger with a 2.25-inch-diameter hollow stem to advance the boring. This method uses applied down-pressure and rotation to the top of the continuous-flight auger. Soil samples were obtained by lowering a split-spoon sampler through the hollow stem of the auger.

All cuttings from the borings were placed into 55-gallon drums and disposed of offsite by the drilling contractors.

3.4 Soil Sampling

Soil samples were collected from each current exploration for purposes of engineering classification, geologic evaluation, and laboratory testing. Two different sampling methods, split-spoon sampling and sonic core sampling, were used. The sampling methods are indicated in the exploration logs included in Appendix A and are described in the following sections.

3.4.1 Split-Spoon Sampling

For the borings drilled using mud-rotary and hollow-stem auger drilling techniques, soil samples were typically obtained in conjunction with Standard Penetration Tests (SPTs). The SPTs were performed in general accordance with the ASTM Designation: D1586-11, Test Method for Penetration Test and Split-Barrel Sampling of Soils (ASTM, 2011a). For the SPT, a 2-inch O.D., 1.375-inch inside diameter (I.D.) split-spoon sampler is driven with a 140-pound hammer falling 30 inches. The number of blows required to achieve each of three 6-inch increments of sampler penetration is recorded. The number of blows required to achieve the last 12 inches of penetration is termed the Standard Penetration Resistance (N-value). When penetration resistances exceeded 50 blows for 6 inches or less of penetration, the test was terminated, and the number of blows along with the penetration distance was recorded on the boring log. The N-value is a useful parameter for determining the relative density or consistency of the soils. Density or consistency, as it is related to the N-value, is shown in Figure A-1 in Appendix A. The recorded N-values are included in the boring logs in Appendix A.

Two borings at the NMPS site, designated as NME-26A and NME-27A, were inadvertently sampled using a 2-inch O.D., 1.375-inch I.D., split-spoon sampler and a 310-pound hammer falling 30 inches. Since the penetration tests from these samples were not in accordance with SPT requirements (use of a 140-pound hammer falling 30 inches), two replacement borings, designated as NME-26 and NME-27, were drilled and soil samples were obtained in conjunction with SPTs.

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In addition to the borings drilled using mud-rotary and hollow-stem auger drilling techniques, split-spoon samples were also obtained in conjunction with SPTs in the four sonic borings drilled over water in the East Channel (NME-17 through NME-20). The samples were obtained at depth intervals of 5 feet by removing the core barrel, lowering the split-spoon sampler to the bottom of the temporary casing, and conducting an SPT.

After each split-spoon sampler was removed from the borehole, a Shannon & Wilson field representative opened the sampler and visually examined the soil sample. The field representative then described and classified the sample, removed it from the split-spoon sampler, and sealed the sample in a jar. The jars were stored in boxes and returned to the Shannon & Wilson laboratory for further examination and testing.

3.4.2 Sonic Core Sampling

For the borings drilled using sonic core drilling methods, soil core samples were typically extracted from the core barrel using a combination of gravity and vibration to extrude the soil into flexible plastic bags. The plastic bags were then placed into wooden core boxes that were labeled with the boring designation, core run number, and depths. Cohesive, hard soils were difficult to extract and occasionally required the use of pressurized air to force the soil out of the core barrel. Disturbance of the core samples (e.g., fragmented cobbles and gravel and distorted bedding planes) results from the coring and extraction process.

For the four sonic borings drilled over water in the East Channel (NME-17 through NME-20), the sonic core samples were taken using a core barrel with a hard Lexan (translucent plastic) liner. After each core run, the Lexan liner with soil core was extracted from the core barrel, capped, and labeled with the boring designation, core run number, and depths.

Once in the warehouse, the soil cores were opened, photographed, and logged by a Shannon & Wilson geologist. The geologist also obtained grab samples of the soil from the core at depth intervals of about 5 feet; however, additional grab samples were obtained where variable soil conditions were encountered in the core. For the four sonic borings drilled over water in the East Channel, composite samples were also taken for analytical testing, as described below in Section 5.8. The sonic core photographs are provided in a separate electronic format.

3.5 Geologic Units and Descriptions

Based on the review of the samples and the available geologic maps for the Project area, a list of geologic soil units encountered was developed. Geologic soil units were defined based on their geologic history and engineering properties. These geologic soil units are interpretive and are

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based on the grouping of complex sediments and soil types into units. The geologic soil unit designations are shown in conjunction with the descriptions on the boring logs. A list and description of geologic soil units encountered in the current geotechnical explorations, from youngest to oldest, is presented in Table A-2 in Appendix A.

3.6 Boring Logs

The boring logs for the current explorations are presented in Appendix A. A boring log is a written record of the subsurface conditions encountered in the boring. It graphically shows the geologic units (layers) encountered in the boring and the Unified Soil Classification System (USCS) symbol of each geologic layer. It also includes the natural water content, penetration resistance, percent fines, and the Atterberg Limits of soil samples at various depths within the boring where tests were performed. Other information shown in the boring logs includes the most recent groundwater level measurement, ground surface elevation, coordinates, and types and depths of sampling. A soil description and log key for the current boring logs is presented in Figure A-1 in Appendix A.

4.0 HYDROGEOLOGIC TESTING

Observation wells and/or vibrating wire piezometers (VWPs) were installed in selected borings. The installation details for the observation wells and VWPs are summarized in Appendix B, Tables B-1 and B-2, respectively.

4.1 Observation Well Installation

Holt installed observation wells with a threaded, 2-inch I.D., polyvinyl chloride (PVC) well casing and a slotted portion (screen) to allow for the inflow of water. CN Drilling installed one observation well with a threaded, 1.25-inch I.D., PVC well casing and screen. For all observation well installations, an end cap (sump) was attached to the bottom of the slotted section. A filter pack consisting of No. 10-20 silica sand was placed around the screen to act as a filter against the adjacent soil. The depth of the screen was selected based on soil units encountered in the boring; anticipated groundwater levels; and our understanding of the anticipated depths of the structures, pipelines, and related facilities at the time the well was installed. Flush-mounted steel monuments, ranging from 5 to 12 inches in diameter, were installed at the ground surface to protect the top of the observation wells.

4.2 Vibrating Wire Piezometer (VWP) Installation

A VWP consists of a vibrating wire pressure transducer contained in a stainless-steel housing (Geokon Model No. 4500S). A low-air-entry filter is located at one end of the housing to allow

the outside water pressure to act on the transducer. The transducer is connected to a signal cable that is routed up the borehole to the ground surface. During installation, each VWP was either placed within a filter pack of No. 10-20 silica sand at specified depths or was grouted in place using tremied bentonite-cement grout. Multiple VWPs were installed in selected borings. At each installation, an 8- or 12-inch-diameter, flush-mounted steel monument was installed at the ground surface to protect the VWP signal cables.

4.3 Groundwater Monitoring

Observation wells were measured using an electronic water level indicator. These readings were converted to groundwater elevations using well casing installation measurements and the ground surface elevation. VWP measurements were obtained using a vibrating wire readout box connected to the signal cable. These readings were converted to pressure heads using conversion factors from the manufacturer-supplied calibration sheets and baseline readings collected before installation. The pressure heads were then converted to water level elevations using VWP installation depths and the ground surface elevation.

Groundwater measurements were taken on an approximate seasonal basis. The calculated water elevations for the observation wells and VWPs are included in Appendix B. The most recent measured water depths are also shown in the boring logs in Appendix A.

5.0 LABORATORY TESTING

Geotechnical, corrosion, microbiological, and analytical laboratory tests were performed on selected soil and groundwater samples retrieved from the borings. The geotechnical laboratory testing program included visual classification and tests to determine the natural water content, grain size distributions, Atterberg Limits, and one-dimensional consolidation properties. The corrosion laboratory testing program included tests to determine moisture content, pH, redox potential, sulfides, chlorides, and resistivity. The microbiological laboratory testing program included tests to determine the concentration of low-nutrient, iron-related, anaerobic, acid-producing, and sulfate-reducing bacteria. Analytical laboratory tests were also performed on soil samples retrieved from the East Channel borings (NME-17 through NME-20) for disposal characterization. Results from the geotechnical laboratory tests are included in Appendix C. The results from the corrosion, microbiological, and analytical laboratory tests are included in Appendix D.

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5.1 Visual Classification

Soil samples retrieved from the borings were visually classified using a system based on ASTM D2487-11, Standard Practice for Classification of Soils for Engineering Purposes (Unified Soil Classification System) (ASTM, 2011b), and ASTM D2488-09a, Standard Practice for Description and Identification of Soils (Visual-Manual Procedure) (ASTM, 2009). A summary of the classification system used is presented in Figure A-1 in Appendix A. In general, visual classification assigns a USCS group name and symbol to each soil sample based on particles finer than 76.2 millimeters (3 inches). The visual classifications are then revised, if applicable, using results from index tests (grain size analyses and Atterberg Limits) as discussed below.

5.2 Water Content Determination

Water content was determined on selected samples in general accordance with ASTM Designation: D2216-10, Standard Test Methods for Laboratory Determination of Water (Moisture) Content of Soil and Rock by Mass (ASTM, 2010a). Water contents are plotted as data points on each boring log in Appendix A and included in the Laboratory Test Summary table in Appendix C.

5.3 Grain Size Analyses

Grain size distribution analyses separate soil particles through mechanical or sedimentation processes. Grain size distributions are used to classify the granular component of soils and can correlate with soil properties, including frost susceptibility, permeability, shear strength, liquefaction potential, capillary action, and sensitivity to moisture. Grain size distribution analysis results are plotted per boring in Appendix C. The plots provide tabular information about each specimen, including USCS group symbol and group name; water content; constituent (i.e., gravel, sand, and fines) percentages; coefficients of uniformity and curvature, if applicable; personnel initials; ASTM standard designation; and testing remarks. The constituent percentages and coefficients of uniformity and curvature are also included in the Laboratory Test Summary table in Appendix C. The fines contents are also plotted as data points on the borings logs in Appendix A.

5.3.1 Sieve Analysis

Mechanical sieve analyses were performed on selected soil specimens to determine the grain size distribution of coarse-grained soil particles in accordance with ASTM C136/C136M-14, Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates (ASTM, 2014).

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5.3.2 Combined Analysis

Combined analyses (mechanical and sedimentation) were performed on selected soil specimens to determine the grain size distribution of coarse- and fine-grained soil particles in accordance with ASTM D422-63 (2007)e2, Standard Test Method for Particle-Size Analysis of Soils (ASTM, 2007). We assumed a specific gravity of 2.7 for hydrometer calculations, unless otherwise indicated on the grain size distribution plots.

5.4 Atterberg Limits Determination

Soil plasticity was determined by performing Atterberg Limits tests on selected samples in accordance with ASTM D4318-10e1, Standard Test Method for Liquid Limit, Plastic Limit, and Plasticity Index of Soils, Method A (Multi-Point Liquid Limit) (ASTM, 2010b). The Atterberg Limits include liquid limit (LL), plastic limit (PL), and plasticity index (PI=LL-PL). These limits can assist soil classification, indicate soil consistency (when compared to natural water content), provide correlation to soil properties, evaluate clogging potential, and estimate liquefaction potential.

Soil plasticity test results are plotted per boring on the plasticity charts in Appendix C. Plasticity charts provide the liquid limit, plastic limit, plasticity index, USCS group symbol, sample description, water content, and percent passing the No. 200 sieve (if a grain size distribution analysis was performed). Soil plasticity test results are also included in the Laboratory Test Summary table in Appendix C and shown graphically on the boring logs in Appendix A.

5.5 One-Dimensional Consolidation Testing

We performed one-dimensional consolidation tests in a fixed-ring consolidometer on relatively undisturbed samples in accordance with ASTM D2435, Standard Test Methods for One Dimensional Consolidation Properties of Soils Using Incremental Loading, Test Method B (ASTM, 2011c) (loaded to 100 percent primary consolidation with time-deformation readings on all load increments). One-dimensional consolidation results presented in Appendix C include summary, settlement plots, and incremental plots.

5.6 Corrosion Testing

Corrosion testing was performed on selected soil and groundwater samples collected along the dual force main alignment between the NMPS and the end of 90th Place SE and along the Lift Station 11 force main alignment. Corrosion testing was also performed on soil and groundwater samples collected in two borings, designated as PA-1 and PA-2, that were drilled adjacent to a section of the existing Enatai Interceptor that is supported on concrete-filled steel monotube

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piles. The corrosion testing was performed by Norton Corrosion Limited, under subcontract to Tetra Tech. The testing included moisture content, pH, redox potential, sulfides, chlorides, and soil resistivity. The results of the tests are presented in Table D-1 in Appendix D.

5.7 Microbiological Testing

Microbiological testing was performed on selected soil and groundwater samples collected from borings PA-1 and PA-2, which are located next to a section of the existing Enatai Interceptor that is supported on concrete-filled steel monotube piles. The microbiological testing was performed by Norton Corrosion Limited, under subcontract to Tetra Tech. The testing program included tests to determine the concentration of low-nutrient, iron-related, anaerobic, acid-producing, and sulfate-reducing bacteria. The results of the tests are presented in Table D-2 in Appendix D.

5.8 Analytical Testing

Analytical testing was performed on composite sediment samples retrieved from the East Channel borings (NME-17 through NME-20). The testing was conducted to characterize the sediments for disposal in Elliot Bay. The sediment sampling and testing methods were conducted in concurrence with the East Channel Sampling and Analysis Plan (Tetra Tech, 2017).

Two sets of composite sediment samples were collected from each of the East Channel borings (NME-17 through NME-20). Sediments were collected from 0 to 4 feet below the mudline and 4 to 7 feet below the mudline from each boring and then were composited into two dredge material management unit samples, designated as NME: 0-4c and NME: 4-7c.

Each of the composite sediment samples was analyzed for the following:

- Dioxins by U.S. Environmental Protection Agency (USEPA) Method 1613;
- Total Metals, Antimony, Arsenic, Cadmium, Chromium, Copper, Lead, Selenium, Silver, Mercury, and Zinc by USEPA Method 6020/7471;
- Organochlorine Pesticides by USEPA Method 8081;
- Polychlorinated Biphenyls by USEPA Method 8082; and
- Semi-Volatile Organic Compounds by USEPA Method 8270.

The analytical testing was performed by Fremont Analytical and Analytical Resources Incorporated, both under subcontract to Shannon & Wilson. Summaries of the results are presented in Tables D-3 and D-4 and a copy of the analytical laboratory reports are also included in Appendix D. Detailed results of the analytical testing can be found in the East Channel Sediment Characterization Report (Shannon & Wilson, 2018).

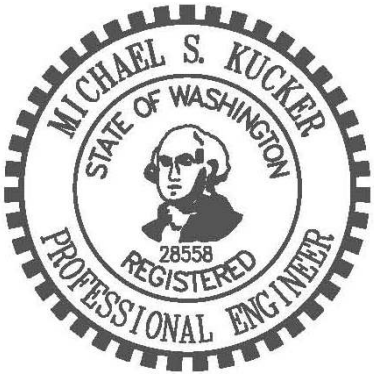
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6.0 LIMITATIONS

This GDR presents the data from field explorations and laboratory testing of the subsurface conditions at the specific locations and depths indicated, using the means and methods described herein. No other representation is made. This report should be made available to the prospective contractors for information on factual data only. Subsurface conditions that are interpreted from the data included in this report may not be construed as a guarantee or warranty of such interpreted conditions.

Natural processes of human activity may alter subsurface conditions. Construction decisions should not be based on a report whose adequacy may have been affected by time, because a geotechnical report is based on conditions that existed at the time of the subsurface explorations, unless verified. Unanticipated soil conditions are commonly encountered and cannot fully be determined by merely taking soil samples from borings.

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MSK/msk

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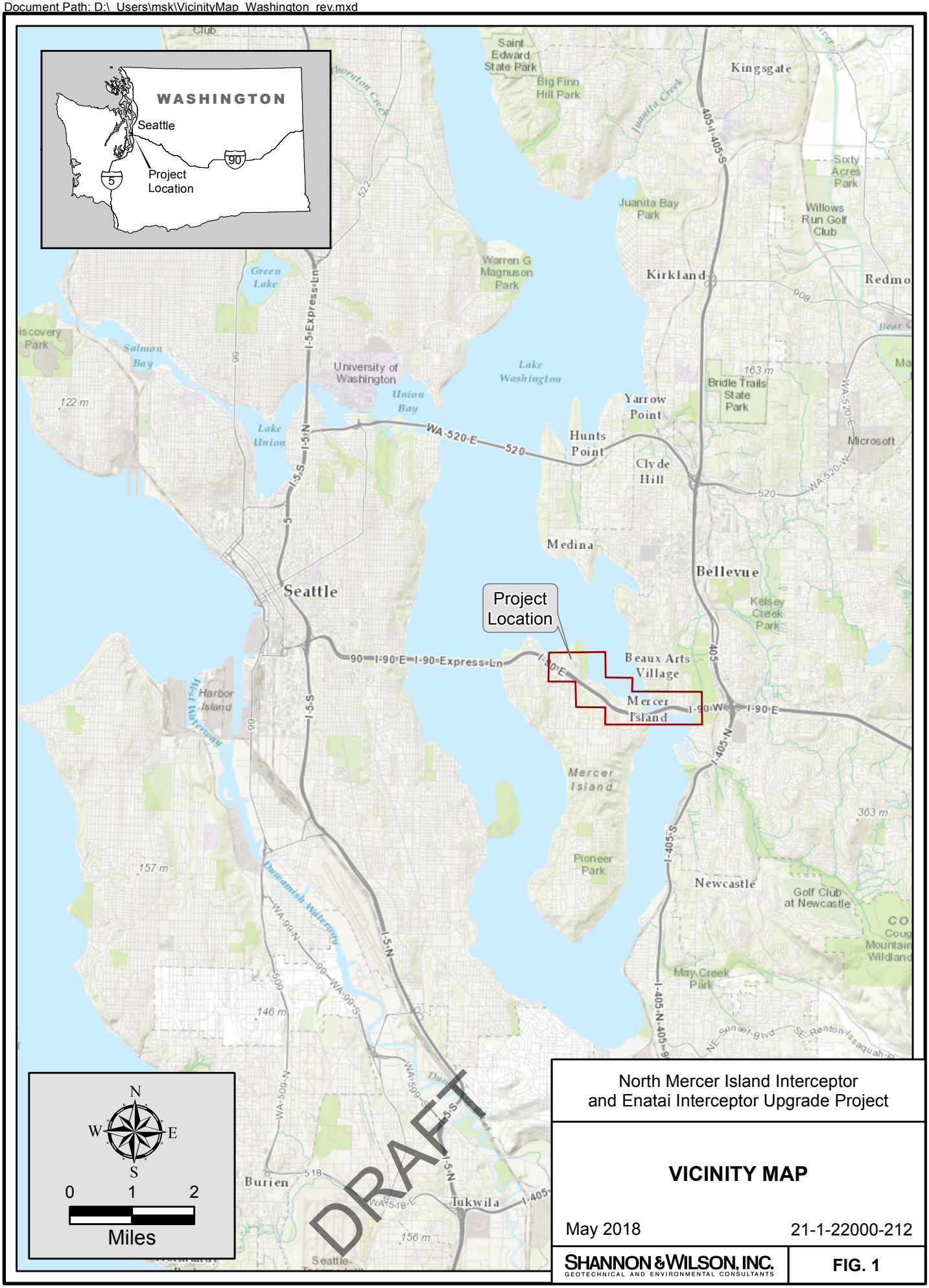
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Tetra Tech, Inc. (Tetra Tech), 2017, North Mercer Island Interceptor and Enatai Interceptor upgrade project, East Channel sampling and analysis plan, King County, Washington: Report prepared by Tetra Tech, Seattle, Wash., Tetra Tech Project #135-12539-16001, for King County, King County, Wash.

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North Mercer Island Interceptor and Enatai Interceptor Upgrade Project

VICINITY MAP

May 2018

21-1-22000-212

SHANNON & WILSON, INC.
GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS

FIG. 1

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NOTE

Figure adapted from JACOBS' file *2018-04-06_Overall.dwg and Tetra Tech's file E00306E13dtm_EAST.dwg dated 2018-05-03.*

LEGEND

NME-1 — Current Exploration Designation and Approximate Location (Completed by Shannon & Wilson)

B-1, TP-1 — Existing Exploration Designation and Approximate Location (Completed by Others)

0 200 400

Scale in Feet

DRAFT

North Mercer Island Interceptor and Enatai Interceptor Upgrade Project
King County, Washington

SITE AND EXPLORATION PLAN PACKAGE B CONVEYANCE

May 2018 21-1-22000-212

SHANNON & WILSON, INC. GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS

FIG. 2
Sheet 1 of 5

Filename: I:\EF\21-1 SEA\22000s\22000 North Mercer Enatai\Drafting\212\21-1-22000-212 Plans.dwg Layout: Layout1 Date: 05-25-2018 Login: mjm



NOTE

Figure adapted from JACOBS' file *2018-04-06_Overall.dwg and Tetra Tech's file E00306E13dtm_EAST.dwg dated 2018-05-03.*

LEGEND

NME-1 — Current Exploration Designation and Approximate Location (Completed by Shannon & Wilson)

B-1, TP-1 — Existing Exploration Designation and Approximate Location (Completed by Others)

0 200 400

Scale in Feet

DRAFT

North Mercer Island Interceptor and Enatai Interceptor Upgrade Project
King County, Washington

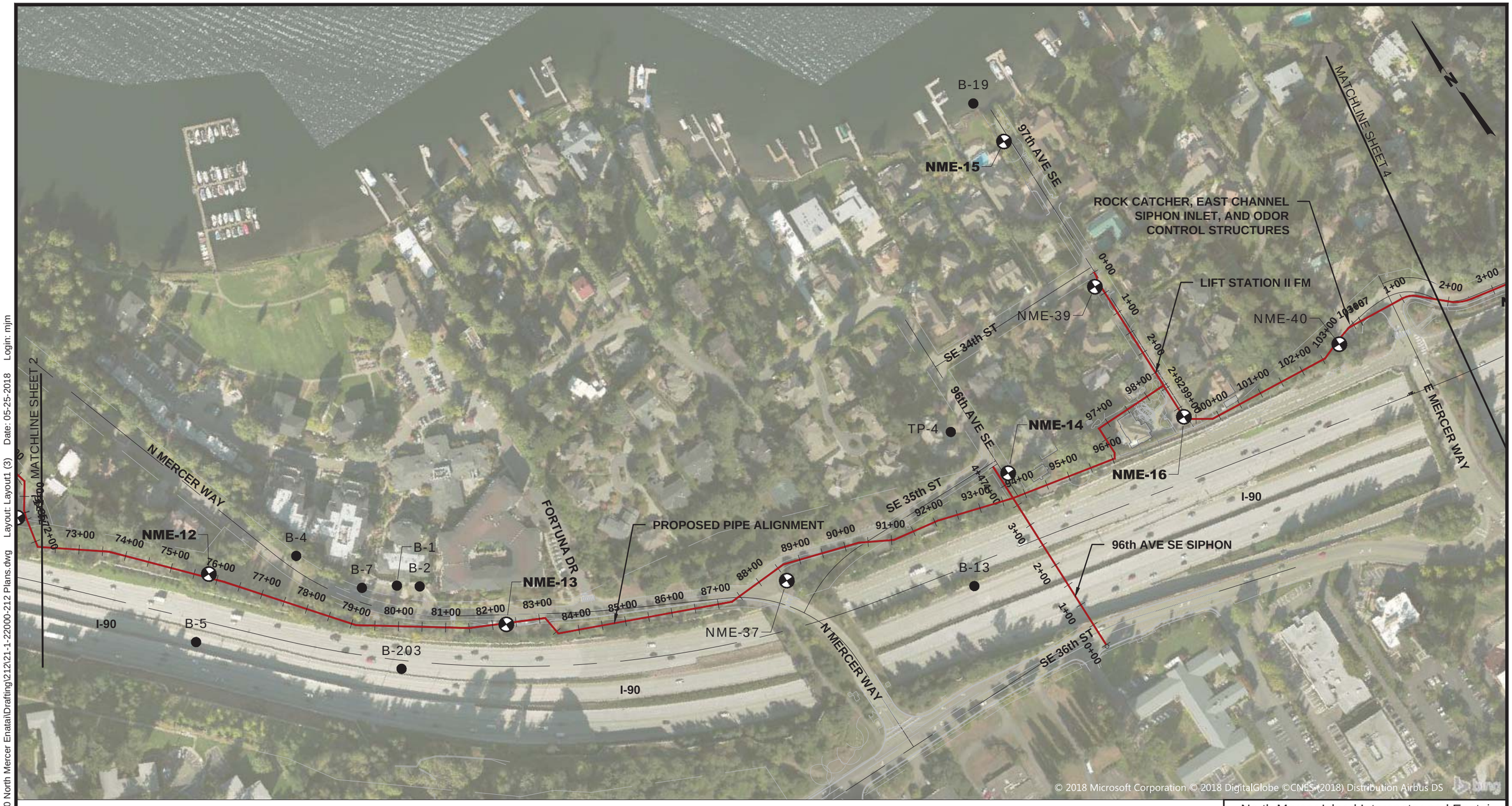
SITE AND EXPLORATION PLAN PACKAGE B CONVEYANCE

May 2018 21-1-22000-212

SHANNON & WILSON, INC. GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS

FIG. 2
Sheet 2 of 5

Filename: i:\ER\21-1 SEA\22000s\22000 North Mercer Enatai\Drafting\212\21-1-22000-212 Plans.dwg Layout: Layout1 (2) Date: 05-25-2018 Login: mjm



NOTE

Figure adapted from JACOBS' file *2018-04-06_Overall.dwg and Tetra Tech's file E00306E13dtm_EAST.dwg dated 2018-05-03.*

LEGEND

NME-1 — Current Exploration Designation and Approximate Location (Completed by Shannon & Wilson)

B-1, TP-1 — Existing Exploration Designation and Approximate Location (Completed by Others)

0 200 400

Scale in Feet

DRAFT

North Mercer Island Interceptor and Enatai Interceptor Upgrade Project
King County, Washington

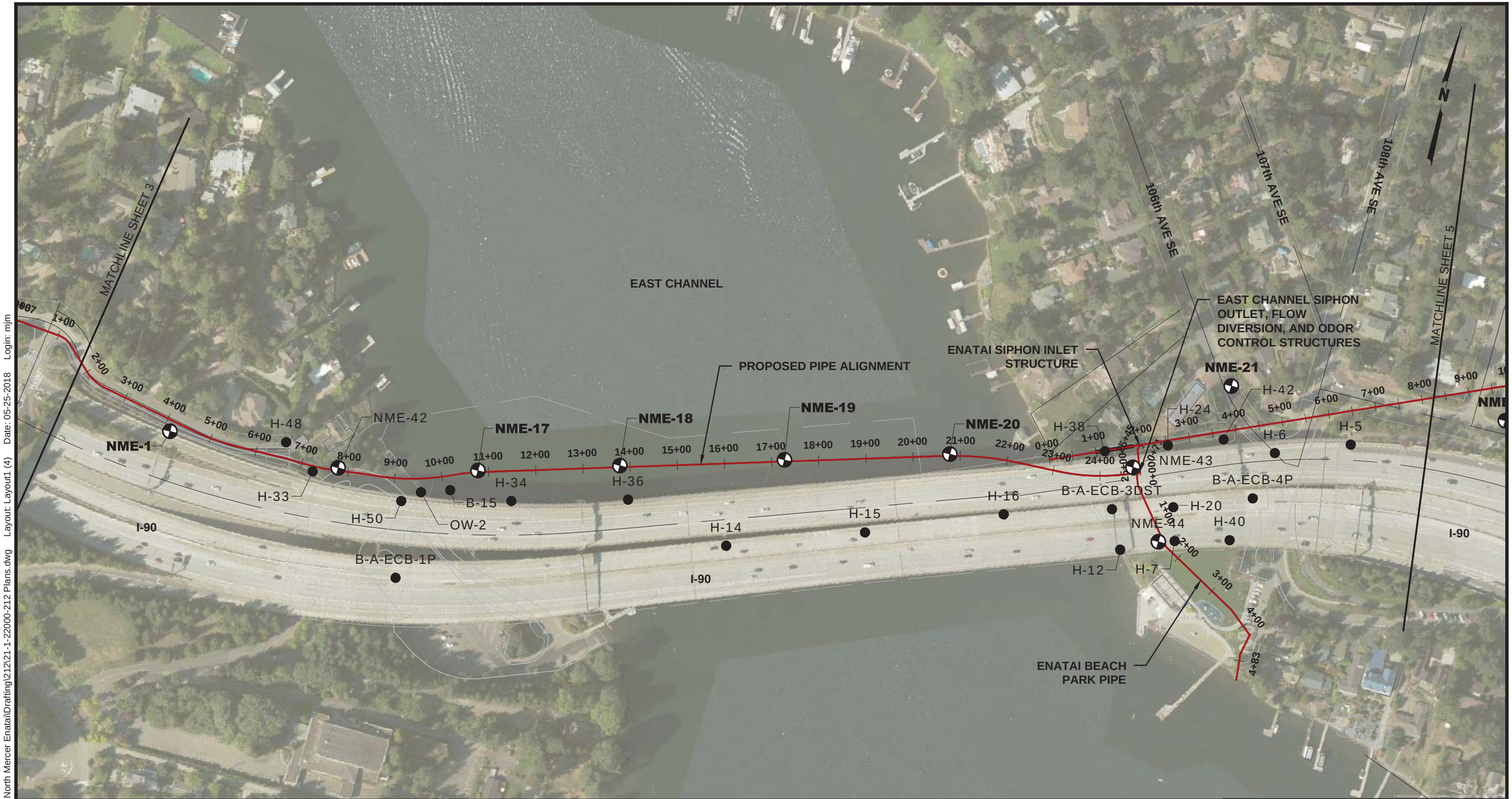
SITE AND EXPLORATION PLAN PACKAGE B CONVEYANCE

May 2018 21-1-22000-212

SHANNON & WILSON, INC. GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS

FIG. 2
Sheet 3 of 5

Filename: I:\EF\21-1 SEA\22000s\22000 North Mercer Enatai\Drafting\212\21-1-22000-212 Plans.dwg Layout: Layout1 (3) Date: 05-25-2018 Login: mjm



NOTE

Figure adapted from JACOBS' file *2018-04-06_Overall.dwg and Tetra Tech's file E00306E13dtm_EAST.dwg dated 2018-05-03.*

LEGEND

NME-1 — Current Exploration Designation and Approximate Location (Completed by Shannon & Wilson)

B-1, TP-1 — Existing Exploration Designation and Approximate Location (Completed by Others)

0 200 400

Scale in Feet

DRAFT

North Mercer Island Interceptor and Enatai Interceptor Upgrade Project
King County, Washington

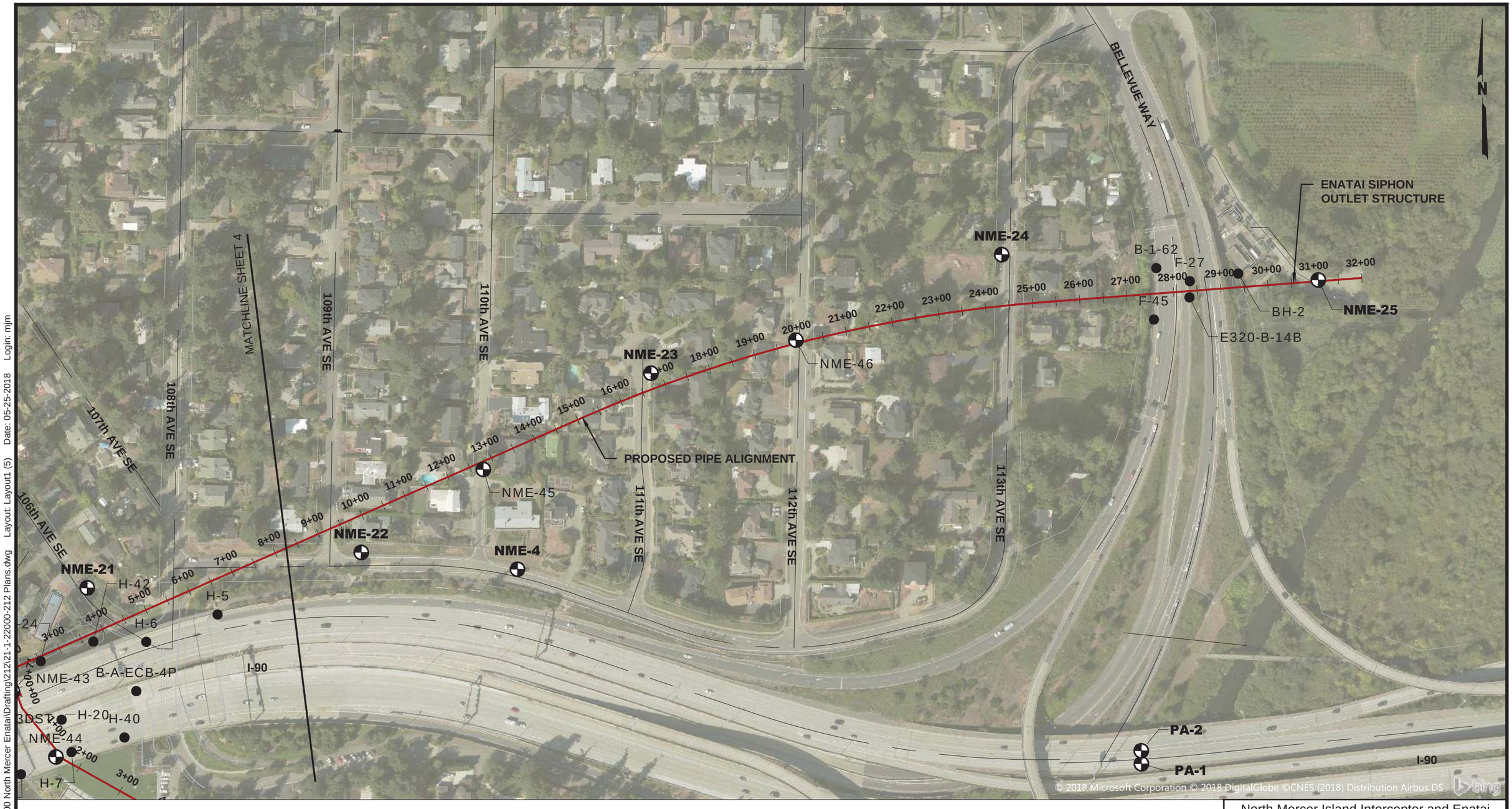
SITE AND EXPLORATION PLAN PACKAGE B CONVEYANCE

May 2018 21-1-22000-212

SHANNON & WILSON, INC. GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS

FIG. 2
Sheet 4 of 5

Filename: I:\EF\21-1 SEA\22000s\22000 North Mercer Enatai\Drafting\212\21-1-22000-212 Plans.dwg Layout: Layout1 (4) Date: 05-25-2018 Login: mjm



NOTE

Figure adapted from JACOBS' file *2018-04-06_Overall.dwg and Tetra Tech's file E00306E13dtm_EAST.dwg dated 2018-05-03.*

LEGEND

NME-1 Current Exploration Designation and Approximate Location (Completed by Shannon & Wilson)

B-1, TP-1 Existing Exploration Designation and Approximate Location (Completed by Others)

0 200 400

Scale in Feet

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North Mercer Island Interceptor and Enatai Interceptor Upgrade Project
King County, Washington

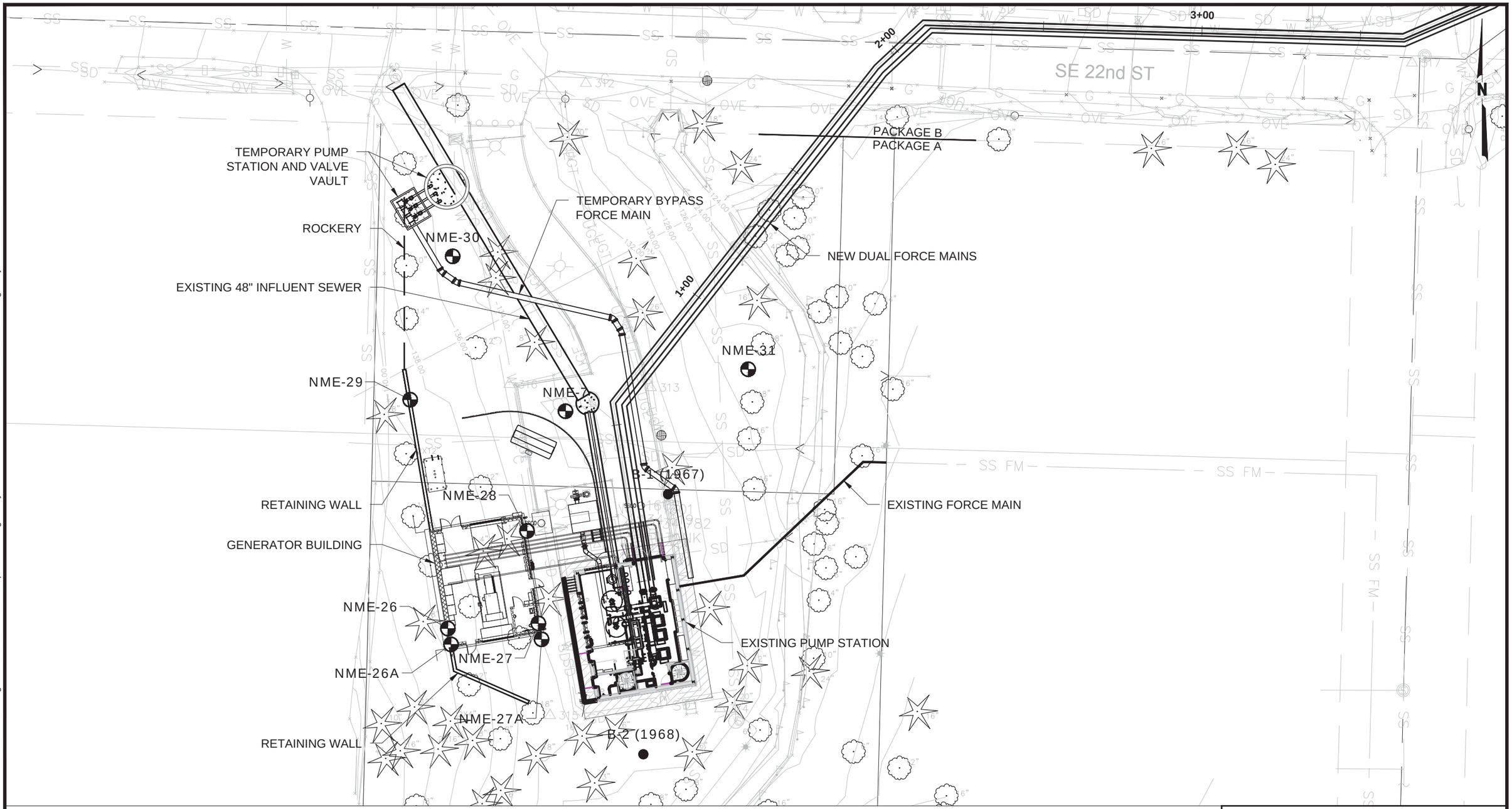
SITE AND EXPLORATION PLAN PACKAGE B CONVEYANCE

May 2018 21-1-22000-212

SHANNON & WILSON, INC. GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS

FIG. 2
Sheet 5 of 5

Filename: I:\EF\21-1 SEA\22000s\22000 North Mercer Enatai\Drafting\212\21-1-22000-212 Plans.dwg Layout: Layout1 (5) Date: 05-25-2018 Login: mjm



NOTE

Figure adapted from JACOBS' file *2018-04-06_Overall.dwg and Tetra Tech's file E00306E13dtm_EAST.dwg dated 2018-05-03.*

LEGEND

NME-1 — Current Exploration Designation and Approximate Location (Completed by Shannon & Wilson)

B-1, TP-1 — Existing Exploration Designation and Approximate Location (Completed by Others)

0 30 60

Scale in Feet

DRAFT

North Mercer Island Interceptor and Enatai Interceptor Upgrade Project
King County, Washington

SITE AND EXPLORATION PLAN PACKAGE A NORTH MERCER PUMP STATION

May 2018 21-1-22000-212

SHANNON & WILSON, INC. GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS

FIG. 3

Filename: I:\ER\21-1 SEA\22000s\22000 North Mercer Enatai\Drafting\212\21-1-22000-212 Pump Station.dwg Layout: PUMP STATION Date: 05-25-2018 Login: mjm

APPENDIX A

SUBSURFACE EXPLORATIONS

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APPENDIX A

SUBSURFACE EXPLORATIONS

TABLES

A-1 Summary of Project Explorations
A-2 Geologic Units and Descriptions

FIGURES

A-1 Soil Description and Log Key (3 sheets)
A-2 Log of Boring NME-1 (14 sheets)
A-3 Log of Boring NME-4 (12 sheets)
A-4 Log of Boring NME-5 (9 Sheets)
A-5 Log of Boring NME-6 (7 Sheets)
A-6 Log of Boring NME-7 (2 Sheets)
A-7 Log of Boring NME-8 (2 Sheets)
A-8 Log of Boring NME-9 (2 Sheets)
A-9 Log of Boring NME-10 (2 Sheets)
A-10 Log of Boring NME-11 (2 Sheets)
A-11 Log of Boring NME-12 (2 Sheets)
A-12 Log of Boring NME-13 (2 Sheets)
A-13 Log of Boring NME-14 (2 Sheets)
A-14 Log of Boring NME-15 (3 Sheets)
A-15 Log of Boring NME-16 (2 Sheets)
A-16 Log of Boring NME-17
A-17 Log of Boring NME-18
A-18 Log of Boring NME-19
A-19 Log of Boring NME-20
A-20 Log of Boring NME-21 (7 Sheets)
A-21 Log of Boring NME-22 (9 Sheets)
A-22 Log of Boring NME-23 (10 Sheets)
A-23 Log of Boring NME-24 (7 Sheets)
A-24 Log of Boring NME-25 (3 Sheets)
A-25 Log of Boring NME-26 (2 Sheets)
A-26 Log of Boring NME-26A (2 Sheets)
A-27 Log of Boring NME-27 (2 Sheets)
A-28 Log of Boring NME-27A (3 Sheets)
A-29 Log of Boring NME-28 (2 Sheets)

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FIGURES (cont.)

A-30 Log of Boring NME-29 (2 Sheets)
A-31 Log of Boring NME-30 (3 Sheets)
A-32 Log of Boring NME-31 (2 Sheets)
A-33 Log of Boring NME-32 (2 Sheets)
A-34 Log of Boring NME-34 (2 Sheets)
A-35 Log of Boring NME-35 (2 Sheets)
A-36 Log of Boring NME-36
A-37 Log of Boring NME-37 (2 Sheets)
A-38 Log of Boring NME-39 (2 Sheets)
A-39 Log of Boring NME-40 (2 Sheets)
A-40 Log of Boring NME-42 (2 Sheets)
A-41 Log of Boring NME-43 (3 Sheets)
A-42 Log of Boring NME-44 (2 Sheets)
A-43 Log of Boring NME-45 (8 Sheets)
A-44 Log of Boring NME-46 (10 Sheets)
A-45 Log of Boring PA-1
A-46 Log of Boring PA-2

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TABLE A-1
SUMMARY OF PROJECT EXPLORATIONS

Exploration No.	Date Completed	Approximate Hole Depth (feet)	Surveyed	Ground Surface or Monument Elevation[a] (feet)	Exploration Coordinates[b]		Drill Rig[c]	Drilling Method[d]	Drilling Contractor
					Northing	Easting			
NME-1	01/07/15	200.0	No	165	214014.3301	1301643.3090	Terra Sonic	S	Holt
NME-2[e]	--	--	--	--	--	--	--	--	--
NME-3[e]	--	--	--	--	--	--	--	--	--
NME-4	12/19/14	230.0	No	195	214713.0945	1304707.6280	Terra Sonic	S	Holt
NME-5	04/15/15	171.5	No	200	217804.0597	1295644.8264	Mobile B-60	MR	Holt
NME-6	04/22/15	121.5	No	148	217263.4909	1296551.9000	Mobile B-60	MR	Holt
NME-7	10/27/16	35.9	No	134	218747.5200	1294299.4072	LDS-75	HSA	Holt
NME-8	10/28/16	26.5	No	191	218143.3950	1294881.5030	LDS-75	HSA	Holt
NME-9	12/05/16	31.5	No	180	217068.2260	1296376.1680	LDS-75	HSA	Holt
NME-10	12/02/16	26.5	No	180	216053.2790	1297679.7600	LDS-75	HSA	Holt
NME-11	10/31/16	31.5	No	256	215400.6513	1298667.8677	LDS-75	HSA	Holt
NME-12	12/02/16	21.5	No	215	215075.3180	1298938.4500	LDS-75	HSA	Holt
NME-13	10/31/16	29.0	No	189	214635.6200	1299402.6240	LDS-75	HSA	Holt
NME-14	12/01/16	21.5	No	179	214309.3180	1300464.3340	LDS-75	HSA	Holt
NME-15	11/30/16	41.5	No	125	214897.8400	1300848.2890	LDS-75	HSA	Holt
NME-16	11/01/16	21.5	No	179	214200.9400	1300840.1320	LDS-75	HSA	Holt
NME-17	08/08/16	16.5	Yes	99	214098.2017	1302296.0480	Terra Sonic	SB	Holt
NME-18	08/08/16	15.8	Yes	92	214184.0795	1302584.3960	Terra Sonic	SB	Holt
NME-19	08/09/16	16.4	Yes	76	214283.7308	1302918.9910	Terra Sonic	SB	Holt
NME-20	08/09/16	15.8	Yes	93	214383.8186	1303255.0510	Terra Sonic	SB	Holt
NME-21	07/26/16	100.0	No	157	214673.6540	1303796.0009	Terra Sonic	S	Holt
NME-22	07/15/16	165.0	No	187	214748.7720	1304376.5860	Terra Sonic	S	Holt
NME-23	07/20/16	185.0	No	211	215128.5013	1304990.5923	Terra Sonic	S	Holt
NME-24	07/22/16	135.0	No	159	215379.7363	1305733.8429	Terra Sonic	S	Holt
NME-25	07/14/16	55.8	No	121	215326.0530	1306404.8510	Mobile B-60	MR	Holt
NME-26	02/02/18	21.5	No	145	218678.9732	1294262.2961	LDS-75	HSA	Holt
NME-26A	01/30/18	26.5	No	145	218673.9732	1294263.2960	LDS-75	HSA	Holt
NME-27	02/01/18	31.5	No	137	218680.5916	1294290.8543	LDS-75	HSA	Holt
NME-27A	01/31/18	36.5	No	137	218675.5916	1294291.8543	LDS-75	HSA	Holt
NME-28	02/01/18	31.5	No	137	218709.7629	1294287.2765	LDS-75	HSA	Holt
NME-29	02/05/18	21.5	No	140	218751.1389	1294250.4028	LDS-75	HSA	Holt
NME-30	02/05/18	51.5	No	136	218796.3625	1294263.8230	LDS-75	HSA	Holt
NME-31	03/28/18	21.5	No	129	218760.7488	1294357.0561	Acker	HSA	CN

TABLE A-1
SUMMARY OF PROJECT EXPLORATIONS

Exploration No.	Date Completed	Approximate Hole Depth (feet)	Surveyed	Ground Surface or Monument Elevation[a] (feet)	Exploration Coordinates[b]		Drill Rig[c]	Drilling Method[d]	Drilling Contractor
					Northing	Easting			
NME-32	02/06/18	21.5	No	159	219025.0400	1294770.2700	LDS-75	HSA	Holt
NME-33[e]	--	--	--	--	--	--	--	--	--
NME-34	04/05/18	21.5	No	170	216550.5300	1296946.4000	LDS-75	HSA	Holt
NME-35	04/05/18	36.5	No	208	215802.1400	1298062.9600	LDS-75	HSA	Holt
NME-36	02/08/18	15.0	No	233	215777.6600	1298607.1500	LDS-75	HSA	Holt
NME-37	02/07/18	25.0	No	196	214381.4800	1299947.9300	LDS-75	HSA	Holt
NME-38[e]	--	--	--	--	--	--	--	--	--
NME-39	02/08/18	20.0	No	152	214534.9300	1300836.9400	LDS-75	HSA	Holt
NME-40	04/04/18	36.5	No	174	214145.2700	1301199.3700	LDS-75	HSA	Holt
NME-41[e]	--	--	--	--	--	--	--	--	--
NME-42	04/23/18	31.5	No	144	214029.2100	1302007.8800	LDS-75	HSA	Holt
NME-43	04/18/18	56.3	No	126	214454.4344	1303637.4561	LDS-75	HSA	Holt
NME-44	04/23/18	26.4	No	130	214315.4500	1303729.5000	LDS-75	HSA	Holt
NME-45	03/07/18	155.0	No	199	214924.6140	1304635.2736	Terra Sonic	S	Holt
NME-46	03/12/18	190.0	No	225	215198.5996	1305297.7363	Terra Sonic	S	Holt
NME-47[e]	--	--	--	--	--	--	--	--	--
NME-48[e]	--	--	--	--	--	--	--	--	--
PA-1	03/27/18	16.5	No	120	214301.0000	1306030.0000	Acker	HSA	CN
PA-2	03/27/18	16.5	No	120	214328.4848	1306029.6048	Acker	HSA	CN

Notes:

[a] Ground surface elevation is from "2018-04-06_Overall.dwg" from Jacobs, "E00306E13dtm_EAST.dwg" from Tetra Tech, and "333-E00306E13-PS-D- 2017 -Floor Plan - Export - SITE PLAN.dwg" from Tetra Tech dated 2018-05-03.

[b] Coordinates for the borings was measured using a GPS unit.

[c] All borings were drilled by Holt Services, Inc.

[d] S = sonic

[e] Boring deleted from program

HSA = hollow-stem auger

MR = mud rotary

SB = sonic from a barge

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TABLE A-2
GEOLOGIC UNITS AND DESCRIPTIONS

Unit Name	Abbrev.	General Unit Description	Soil Description
HOLOCENE UNITS			
Fill	Hf	Fill placed by humans, both engineered and nonengineered	Various materials, including debris; cobbles and boulders common; commonly dense or stiff if engineered, but very loose to dense or very soft to stiff if non-engineered
Alluvium	Ha	River or creek deposits, normally associated with historic streams, including overbank deposits	Sand, silty Sand, gravelly Sand, clayey Sand; very loose to very dense
Lacustrine	Hl	Depression fillings of fine grained soils	Silt, clayey Silt, silty Clay; commonly with scattered organics; very soft to stiff or very loose to medium dense
Peat	Hp	Depression fillings of organic materials	Peat to Organic Silt, very soft to medium stiff
Landslide Deposits	Hls	Deposits of landslides, normally at and adjacent to the toe of slopes	Disturbed, heterogeneous mixture of several soil types; loose or soft, with random dense or hard pockets
VASHON UNITS			
Recessional Outwash	Qvro	Glaciofluvial sediment deposited as glacial ice retreated	Clean to silty Sand, gravelly Sand, sandy Gravel; cobbles and boulders common; loose to very dense
Ice-Contact Deposits	Qvri	Heterogeneous soils deposited against or adjacent to ice during the wasting of glacial ice; commonly reworked	Stratified to irregular bodies of Gravel, Sand, Silt, and clay; loose to dense
Recessional Lacustrine Deposits	Qvrl	Glaciolacustrine sediment deposited as glacial ice retreated	Fine Sand, Silt Clay; soft to very hard
Ablation Till	Qvat	Heterogeneous soils deposited against or adjacent to ice during the wasting of glacial ice; generally not reworked	Gravelly silty Sand, silty gravelly Sand, with some clay; cobbles and boulders; loose to very dense or soft to hard
Till	Qvt	Lodgment till laid down along the base of the glacial ice	Gravelly silty Sand, silty gravelly Sand ("hardpan"); cobbles and boulders; very dense
Advance Outwash	Qva	Glaciofluvial sediment deposited as the glacial ice advanced through the Puget Lowland	Clean to silty Sand, gravelly Sand, sandy Gravel; dense to very dense
Glaciolacustrine Deposits	Qvgl	Fine-grained glacial flour deposited in proglacial lake in Puget Lowland	Silty Clay, clayey Silt with interbeds of Silt and fine Sand; locally laminated; scattered organic fragments near base; hard or dense to very dense
Till-like Deposits (diamict)	Qvd	Glacial deposit intermediate between till and outwash, subglacially reworked	Silty gravelly Sand, silty Sand, sandy Gravel; highly variable over short distances; cobbles and boulders common; dense to very dense

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TABLE A-2
GEOLOGIC UNITS AND DESCRIPTIONS

Unit Name	Abbrev.	General Unit Description	Soil Description
PRE-VASHON UNITS			
Fluvial Deposits	Qpnf	Alluvial deposits of rivers and creeks	Clean to silty Sand, gravelly Sand, sandy Gravel; very dense
Lacustrine Deposits	Qpnl	Fine-grained lake deposits in depressions, large and small	Fine sandy Silt, silty fine Sand, clayey Silt; scattered to abundant fine organics; dense to very dense or very stiff to hard
Till-like Deposits (diamict)	Qpgd	Glacial deposit intermediate between till and outwash; subglacially reworked	Silty gravelly Sand, silty Sand, sandy Gravel; highly variable over short distances; cobbles and boulders common very dense
Glaciolacustrine Deposits	Qpgl	Fine-grained glacial flour deposited in proglacial lake in Puget Lowland	Silty Clay, clayey Silt, with interbeds of Silt and fine Sand; very stiff to hard or very dense
Glaciomarine Deposits	Qpgm	Till-like deposit with clayey matrix deposited in proglacial lake by icebergs, floating ice, and gravity currents	Heterogeneous and variable mixture of Clay, Silt, Sand, and gravel; rare shells; cobles and boulders common; very dense or hard
Outwash	Qpgo	Glaciofluvial sediment deposited as the glacial ice advanced through the Puget Lowland	Clean to silty Sand, gravelly Sand, sandy Gravel; very dense
Till	Qpgt	Lodgment till laid down along the base of the glacial ice	Gravelly silty Sand, silty gravelly Sand ("hardpan"); cobbles and boulders; very dense

Note:
The geologic units are interpretive and based on our opinion of the grouping of complex sediments and soil types into units appropriate for the project. The description of each geologic unit includes only general information regarding the environment of deposition and basic soil characteristics. For example, cobbles and boulders are only included in the description of those units where they are most prominent.

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Shannon & Wilson, Inc. (S&W), uses a soil identification system modified from the Unified Soil Classification System (USCS). Elements of the USCS and other definitions are provided on this and the following pages. Soil descriptions are based on visual-manual procedures (ASTM D2488) and laboratory testing procedures (ASTM D2487), if performed.

S&W INORGANIC SOIL CONSTITUENT DEFINITIONS

CONSTITUENT[2]	FINE-GRAINED SOILS (50% or more fines)[1]	COARSE-GRAINED SOILS (less than 50% fines)[1]
Major	***Silt, Lean Clay, Elastic Silt,*** or ***Fat Clay***[3]	***Sand*** or ***Gravel***[4]
Modifying (Secondary) Precedes major constituent	30% or more coarse-grained: ***Sandy*** or ***Gravelly***[4]	More than 12% fine-grained: ***Silty*** or ***Clayey***[3]
Minor Follows major constituent	15% to 30% coarse-grained: ***with Sand*** or ***with Gravel***[4]	5% to 12% fine-grained: ***with Silt*** or ***with Clay***[3]
	30% or more total coarse-grained *and* lesser coarse-grained constituent is 15% or more: ***with Sand*** or ***with Gravel***[5]	15% or more of a second coarse-grained constituent: ***with Sand*** or ***with Gravel***[5]

[1]All percentages are by weight of total specimen passing a 3-inch sieve.
[2]The order of terms is: *Modifying Major with Minor*.
[3]Determined based on behavior.
[4]Determined based on which constituent comprises a larger percentage.
[5]Whichever is the lesser constituent.

MOISTURE CONTENT TERMS

Dry	Absence of moisture, dusty, dry to the touch
Moist	Damp but no visible water
Wet	Visible free water, from below water table

STANDARD PENETRATION TEST (SPT) SPECIFICATIONS

Hammer:	140 pounds with a 30-inch free fall. Rope on 6- to 10-inch-diam. cathead 2-1/4 rope turns, > 100 rpm NOTE: If automatic hammers are used, blow counts shown on boring logs should be adjusted to account for efficiency of hammer.
Sampler:	10 to 30 inches long Shoe I.D. = 1.375 inches Barrel I.D. = 1.5 inches Barrel O.D. = 2 inches
N-Value:	Sum blow counts for second and third 6-inch increments. Refusal: 50 blows for 6 inches or less; 10 blows for 0 inches.

NOTE: Penetration resistances (N-values) shown on boring logs are as recorded in the field and have not been corrected for hammer efficiency, overburden, or other factors.

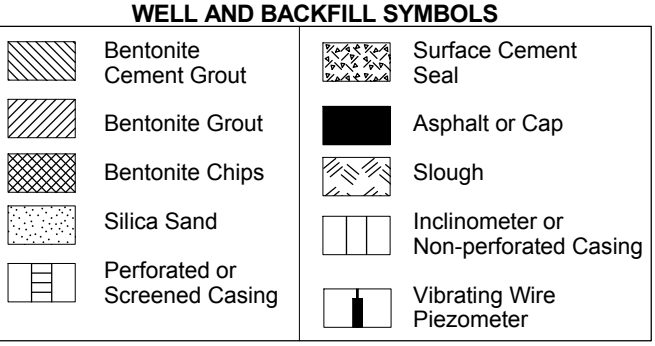
PARTICLE SIZE DEFINITIONS

DESCRIPTION	SIEVE NUMBER AND/OR APPROXIMATE SIZE
FINES	< #200 (0.075 mm = 0.003 in.)
SAND	
Fine	#200 to #40 (0.075 to 0.4 mm; 0.003 to 0.02 in.)
Medium	#40 to #10 (0.4 to 2 mm; 0.02 to 0.08 in.)
Coarse	#10 to #4 (2 to 4.75 mm; 0.08 to 0.187 in.)
GRAVEL	
Fine	#4 to 3/4 in. (4.75 to 19 mm; 0.187 to 0.75 in.)
Coarse	3/4 to 3 in. (19 to 76 mm)
COBBLES	3 to 12 in. (76 to 305 mm)
BOULDERS	> 12 in. (305 mm)

RELATIVE DENSITY / CONSISTENCY

COHESIONLESS SOILS		COHESIVE SOILS	
N, SPT, BLOWS/FT.	RELATIVE DENSITY	N, SPT, BLOWS/FT.	RELATIVE CONSISTENCY
< 4	Very loose	< 2	Very soft
4 - 10	Loose	2 - 4	Soft
10 - 30	Medium dense	4 - 8	Medium stiff
30 - 50	Dense	8 - 15	Stiff
> 50	Very dense	15 - 30	Very stiff
		> 30	Hard

WELL AND BACKFILL SYMBOLS



PERCENTAGES TERMS [1, 2]

Trace	< 5%
Few	5 to 10%
Little	15 to 25%
Some	30 to 45%
Mostly	50 to 100%

[1]Gravel, sand, and fines estimated by mass. Other constituents, such as organics, cobbles, and boulders, estimated by volume.

[2]Reprinted, with permission, from ASTM D2488 - 09a Standard Practice for Description and Identification of Soils (Visual-Manual Procedure), copyright ASTM International, 100 Barr Harbor Drive, West Conshohocken, PA 19428. A copy of the complete standard may be obtained from ASTM International, www.astm.org.

North Mercer Island Interceptor and
Enatai Interceptor Upgrade Project
King County, Washington

SOIL DESCRIPTION AND LOG KEY

May 2018 21-1-22000-212

SHANNON & WILSON, INC.
Geotechnical and Environmental Consultants

FIG. A-1
Sheet 1 of 3

SOIL_CLASS_KEY_PG1 21-22000.GPJ SHAN_WIL.GDT 5/11/18

UNIFIED SOIL CLASSIFICATION SYSTEM (USCS)
(Modified From USACE Tech Memo 3-357, ASTM D2487, and ASTM D2488)

MAJOR DIVISIONS			GROUP/GRAPHIC SYMBOL		TYPICAL IDENTIFICATIONS
COARSE-GRAINED SOILS *(more than 50% retained on No. 200 sieve)*	Gravels *(more than 50% of coarse fraction retained on No. 4 sieve)*	Gravel *(less than 5% fines)*	GW		Well-Graded Gravel; Well-Graded Gravel with Sand
			GP		Poorly Graded Gravel; Poorly Graded Gravel with Sand
		Silty or Clayey Gravel *(more than 12% fines)*	GM		Silty Gravel; Silty Gravel with Sand
			GC		Clayey Gravel; Clayey Gravel with Sand
	Sands *(50% or more of coarse fraction passes the No. 4 sieve)*	Sand *(less than 5% fines)*	SW		Well-Graded Sand; Well-Graded Sand with Gravel
			SP		Poorly Graded Sand; Poorly Graded Sand with Gravel
		Silty or Clayey Sand *(more than 12% fines)*	SM		Silty Sand; Silty Sand with Gravel
			SC		Clayey Sand; Clayey Sand with Gravel
FINE-GRAINED SOILS *(50% or more passes the No. 200 sieve)*	Silts and Clays *(liquid limit less than 50)*	Inorganic	ML		Silt; Silt with Sand or Gravel; Sandy or Gravelly Silt
			CL		Lean Clay; Lean Clay with Sand or Gravel; Sandy or Gravelly Lean Clay
		Organic	OL		Organic Silt or Clay; Organic Silt or Clay with Sand or Gravel; Sandy or Gravelly Organic Silt or Clay
	Silts and Clays *(liquid limit 50 or more)*	Inorganic	MH		Elastic Silt; Elastic Silt with Sand or Gravel; Sandy or Gravelly Elastic Silt
			CH		Fat Clay; Fat Clay with Sand or Gravel; Sandy or Gravelly Fat Clay
		Organic	OH		Organic Silt or Clay; Organic Silt or Clay with Sand or Gravel; Sandy or Gravelly Organic Silt or Clay
HIGHLY-ORGANIC SOILS	Primarily organic matter, dark in color, and organic odor		PT		Peat or other highly organic soils (see ASTM D4427)

NOTE: No. 4 size = 4.75 mm = 0.187 in.; No. 200 size = 0.075 mm = 0.003 in.

NOTES

1. Dual symbols *(symbols separated by a hyphen, i.e., SP-SM, Sand with Silt)* are used for soils with between 5% and 12% fines or when the liquid limit and plasticity index values plot in the CL-ML area of the plasticity chart. Graphics shown on the logs for these soil types are a combination of the two graphic symbols (e.g., SP and SM).

2. Borderline symbols *(symbols separated by a slash, i.e., CL/ML, Lean Clay to Silt; SP-SM/SM, Sand with Silt to Silty Sand)* indicate that the soil properties are close to the defining boundary between two groups.

North Mercer Island Interceptor and
Enatai Interceptor Upgrade Project
King County, Washington

SOIL DESCRIPTION AND LOG KEY

May 2018 21-1-22000-212

SHANNON & WILSON, INC.
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FIG. A-1
Sheet 2 of 3

SOIL_CLASS_KEY_PG2 21-22000.GPJ SHAN_WIL.GDT 5/11/18

GRADATION TERMS

Poorly Graded	Narrow range of grain sizes present or, within the range of grain sizes present, one or more sizes are missing (Gap Graded). Meets criteria in ASTM D2487, if tested.
Well-Graded	Full range and even distribution of grain sizes present. Meets criteria in ASTM D2487, if tested.

CEMENTATION TERMS[1]

Weak	Crumbles or breaks with handling or slight finger pressure.
Moderate	Crumbles or breaks with considerable finger pressure.
Strong	Will not crumble or break with finger pressure.

PLASTICITY[2]

DESCRIPTION	VISUAL-MANUAL CRITERIA	APPROX. PLASITICITY INDEX RANGE
Nonplastic	A 1/8-in. thread cannot be rolled at any water content.	< 4
Low	A thread can barely be rolled and a lump cannot be formed when drier than the plastic limit.	4 to 10
Medium	A thread is easy to roll and not much time is required to reach the plastic limit. The thread cannot be rerolled after reaching the plastic limit. A lump crumbles when drier than the plastic limit.	10 to 20
High	It takes considerable time rolling and kneading to reach the plastic limit. A thread can be rerolled several times after reaching the plastic limit. A lump can be formed without crumbling when drier than the plastic limit.	> 20

ADDITIONAL TERMS

Mottled	Irregular patches of different colors.
Bioturbated	Soil disturbance or mixing by plants or animals.
Diamict	Nonsorted sediment; sand and gravel in silt and/or clay matrix.
Cuttings	Material brought to surface by drilling.
Slough	Material that caved from sides of borehole.
Sheared	Disturbed texture, mix of strengths.

PARTICLE ANGULARITY AND SHAPE TERMS[1]

Angular	Sharp edges and unpolished planar surfaces.
Subangular	Similar to angular, but with rounded edges.
Subrounded	Nearly planar sides with well-rounded edges.
Rounded	Smoothly curved sides with no edges.
Flat	Width/thickness ratio > 3.
Elongated	Length/width ratio > 3.

ACRONYMS AND ABBREVIATIONS

ATD	At Time of Drilling
Diam.	Diameter
Elev.	Elevation
ft.	Feet
FeO	Iron Oxide
gal.	Gallons
Horiz.	Horizontal
HSA	Hollow Stem Auger
I.D.	Inside Diameter
in.	Inches
lbs.	Pounds
MgO	Magnesium Oxide
mm	Millimeter
MnO	Manganese Oxide
NA	Not Applicable or Not Available
NP	Nonplastic
O.D.	Outside Diameter
OW	Observation Well
pcf	Pounds per Cubic Foot
PID	Photo-Ionization Detector
PMT	Pressuremeter Test
ppm	Parts per Million
psi	Pounds per Square Inch
PVC	Polyvinyl Chloride
rpm	Rotations per Minute
SPT	Standard Penetration Test
USCS	Unified Soil Classification System
q_u	Unconfined Compressive Strength
VWP	Vibrating Wire Piezometer
Vert.	Vertical
WOH	Weight of Hammer
WOR	Weight of Rods
Wt.	Weight

STRUCTURE TERMS[1]

Interbedded	Alternating layers of varying material or color with layers at least 1/4-inch thick; singular: bed.
Laminated	Alternating layers of varying material or color with layers less than 1/4-inch thick; singular: lamination.
Fissured	Breaks along definite planes or fractures with little resistance.
Slickensided	Fracture planes appear polished or glossy; sometimes striated.
Blocky	Cohesive soil that can be broken down into small angular lumps that resist further breakdown.
Lensed	Inclusion of small pockets of different soils, such as small lenses of sand scattered through a mass of clay.
Homogeneous	Same color and appearance throughout.

[1]Reprinted, with permission, from ASTM D2488 - 09a Standard Practice for Description and Identification of Soils (Visual-Manual Procedure), copyright ASTM International, 100 Barr Harbor Drive, West Conshohocken, PA 19428. A copy of the complete standard may be obtained from ASTM International, www.astm.org.

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North Mercer Island Interceptor and
Enatai Interceptor Upgrade Project
King County, Washington

SOIL DESCRIPTION AND LOG KEY

May 2018 21-1-22000-212

SHANNON & WILSON, INC.
Geotechnical and Environmental Consultants

FIG. A-1
Sheet 3 of 3

SOIL_CLASS_KEY_PG3 21-22000.GPJ SHAN_WIL.GDT 5/11/18

Total Depth:	*200 ft.*	Northing:	*~ 214,014 ft.*	Drilling Method:	*Sonic Core*	Hole Diam.:	
Top Elevation:	*~ 165 ft.*	Easting:	*~ 1,301,643 ft.*	Drilling Company:	*Holt*	Rod Diam.:	*NWJ*
Vert. Datum:	*KC Metro*	Station:	~	Drill Rig Equipment:	*Terra Sonic*	Hammer Type:	*Automatic*
Horiz. Datum:	*NAD83*	Offset:	~	Other Comments:			

SOIL DESCRIPTION

Refer to the report text for a proper understanding of the subsurface materials and drilling methods. The stratification lines indicated below represent the approximate boundaries between material types, and the transition may be gradual.

Depth, ft. | Symbol | Samples | Ground Water | Depth, ft.

Mottled, brown to gray-brown, *Sandy Silt (ML)* to *Sandy Lean Clay (CL)*; moist; 5 to 10% subrounded to subangular gravel; fine to coarse sand; nonplastic to medium plasticity fines; diamict, few pockets with iron-oxide staining.
(Qvri)

- Layer of silty fine to medium sand from 6.1 to 6.7 feet.

8.3

Brown to gray-brown, *Sandy Silt (ML)*; moist; 5 to 10% fine to coarse, subrounded to subangular gravel; fine to coarse sand; nonplastic fines; trace iron-oxide pockets; diamict.
(Qvri)

10.0

Brown to gray-brown, *Sandy Silt (ML)* to *Silt with Sand (ML)*; moist; less than 5% fine, subrounded gravel; fine to medium sand; nonplastic to low plasticity fines, few to little pockets and seams with iron-oxide staining, few silty, fine sand pockets, trace clay pockets.
(Qvgl)

R-1

0 20 40 60

5

10

CONTINUED NEXT SHEET

0 20 40 60

LEGEND

- Sample Recovery
- * Sample Not Recovered
- Sonic Core Sample
- Ground Water Level in VWP
- ◇ % Fines (<0.075mm)
- ● % Water Content
- Plastic Limit ⊢●⊣ Liquid Limit
- Natural Water Content

NOTES

1. Refer to KEY for explanation of symbols, codes, abbreviations and definitions.
2. Groundwater level, if indicated above, is for the date specified and may vary.
3. USCS designation is based on visual-manual classification and selected lab testing.
4. The hole location was measured from existing site features and should be considered approximate.

North Mercer Island Interceptor and Enatai Interceptor Upgrade Project
King County, Washington

LOG OF BORING NME-1

May 2018 | 21-1-22000-212

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FIG. A-02
Sheet 1 of 14

REV 3 - Approved for Submittal

MASTER_LOG_BFW_21-22000.GPJ_SHAN_WIL.GDT 5/17/18 Log: JCS Rev: EAS Typ: CLP

Total Depth:	*200 ft.*	Northing:	*~ 214,014 ft.*	Drilling Method:	*Sonic Core*	Hole Diam.:	
Top Elevation:	*~ 165 ft.*	Easting:	*~ 1,301,643 ft.*	Drilling Company:	*Holt*	Rod Diam.:	*NWJ*
Vert. Datum:	*KC Metro*	Station:	~	Drill Rig Equipment:	*Terra Sonic*	Hammer Type:	*Automatic*
Horiz. Datum:	*NAD83*	Offset:	~	Other Comments:			

SOIL DESCRIPTION

Refer to the report text for a proper understanding of the subsurface materials and drilling methods. The stratification lines indicated below represent the approximate boundaries between material types, and the transition may be gradual.

Depth, ft. | Symbol | Samples | Ground Water | Depth, ft.

16.8

Gray *Silt (ML)*; moist; less than 10% fine to medium sand; nonplastic fines; few silty, fine to medium sand pockets and seams with iron-oxide staining above 19 feet.
(Qvgl)

21.0

Gray-brown, *Sandy Silt (ML)*; moist; fine to medium sand; nonplastic fines; few seams and pockets with iron-oxide staining, few to little silty, fine sand seams and pockets.
(Qvgl)

- Moist to wet below 25 feet.

- Layer of wet, silty, fine sand with fine sandy silt seams from 27.5 to 28.3 feet.

- Little to some silty sand seams with less than 5% fine gravel below 29 feet.

R-2

R-3

03/12/18 P2

03/12/18 P1

0 20 40 60

20

25

CONTINUED NEXT SHEET

DRAFT

LEGEND

- Sample Recovery
- * Sample Not Recovered
- Sonic Core Sample
- Ground Water Level in VWP

◇ % Fines (<0.075mm)
● % Water Content
Plastic Limit ⊢●⊣ Liquid Limit
Natural Water Content

NOTES

1. Refer to KEY for explanation of symbols, codes, abbreviations and definitions.
2. Groundwater level, if indicated above, is for the date specified and may vary.
3. USCS designation is based on visual-manual classification and selected lab testing.
4. The hole location was measured from existing site features and should be considered approximate.

North Mercer Island Interceptor and
Enatai Interceptor Upgrade Project
King County, Washington

LOG OF BORING NME-1

May 2018 21-1-22000-212

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FIG. A-02
Sheet 2 of 14

REV 3 - Approved for Submittal

MASTER_LOG_BFW_21-22000.GPJ SHAN_WIL.GDT 5/17/18 Log: JCS Rev: EAS Typ: CLP

Total Depth:	*200 ft.*	Northing:	*~ 214,014 ft.*	Drilling Method:	*Sonic Core*	Hole Diam.:	
Top Elevation:	*~ 165 ft.*	Easting:	*~ 1,301,643 ft.*	Drilling Company:	*Holt*	Rod Diam.:	*NWJ*
Vert. Datum:	*KC Metro*	Station:	~	Drill Rig Equipment:	*Terra Sonic*	Hammer Type:	*Automatic*
Horiz. Datum:	*NAD83*	Offset:	~	Other Comments:			

SOIL DESCRIPTION

Refer to the report text for a proper understanding of the subsurface materials and drilling methods. The stratification lines indicated below represent the approximate boundaries between material types, and the transition may be gradual.

Depth, ft. | Symbol | Samples | Ground Water | Depth, ft.

31.0

Gray, *Silty Sand (SM)* and *Sandy Silt (ML)*; wet; fine to medium sand; nonplastic fines; interbedded, 1- to 7-inch-thick interbeds. (Qva)

35

36.0

Gray, *Silty Sand (SM)* to *Sandy Silt (ML)*; moist; less than 10% fine to coarse, subrounded to subangular gravel; fine to coarse sand; nonplastic fines; diamict. (Qvd)

- Silty, fine to medium sand seam at 37.9 feet.
- Interbedded silty sand seams below 38.5 feet.

39.2

Gray, *Poorly Graded Sand with Silt (SP-SM)* to *Poorly Graded Sand (SP)*; wet; less than 10% fine, subrounded gravel; fine to coarse sand; nonplastic fines. (Qva)

40

43.0

Gray, *Poorly Graded Sand with Gravel (SP)* to *Poorly Graded Sand with Silt and Gravel (SP-SM)*; wet; fine, rounded to subrounded gravel, fine to coarse sand; nonplastic fines. (Qva)

CONTINUED NEXT SHEET

0 20 40 60

0 20 40 60

LEGEND

- I Sample Recovery
- * Sample Not Recovered
- Sonic Core Sample
- Ground Water Level in VWP
- ◇ % Fines (<0.075mm)
- ● % Water Content
- Plastic Limit ⊢●⊣ Liquid Limit
- Natural Water Content

NOTES

1. Refer to KEY for explanation of symbols, codes, abbreviations and definitions.
2. Groundwater level, if indicated above, is for the date specified and may vary.
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North Mercer Island Interceptor and Enatai Interceptor Upgrade Project
King County, Washington

LOG OF BORING NME-1

May 2018 | 21-1-22000-212

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FIG. A-02
Sheet 3 of 14

REV 3 - Approved for Submittal

MASTER_LOG_BFW_21-22000.GPJ SHAN_WIL.GDT 5/17/18 Log: JCS Rev: EAS Typ: CLP

Total Depth:	*200 ft.*	Northing:	*~ 214,014 ft.*	Drilling Method:	*Sonic Core*	Hole Diam.:	
Top Elevation:	*~ 165 ft.*	Easting:	*~ 1,301,643 ft.*	Drilling Company:	*Holt*	Rod Diam.:	*NWJ*
Vert. Datum:	*KC Metro*	Station:	~	Drill Rig Equipment:	*Terra Sonic*	Hammer Type:	*Automatic*
Horiz. Datum:	*NAD83*	Offset:	~	Other Comments:			

SOIL DESCRIPTION

Refer to the report text for a proper understanding of the subsurface materials and drilling methods. The stratification lines indicated below represent the approximate boundaries between material types, and the transition may be gradual.

Depth, ft. | Symbol | Samples | Ground Water | Depth, ft.

46.0

Gray, *Poorly Graded Sand with Silt (SP-SM)* to *Silty Sand (SM)*; wet; less than 10% fine, subrounded to subangular gravel; fine to coarse sand; nonplastic fines.
(Qva)

51.8

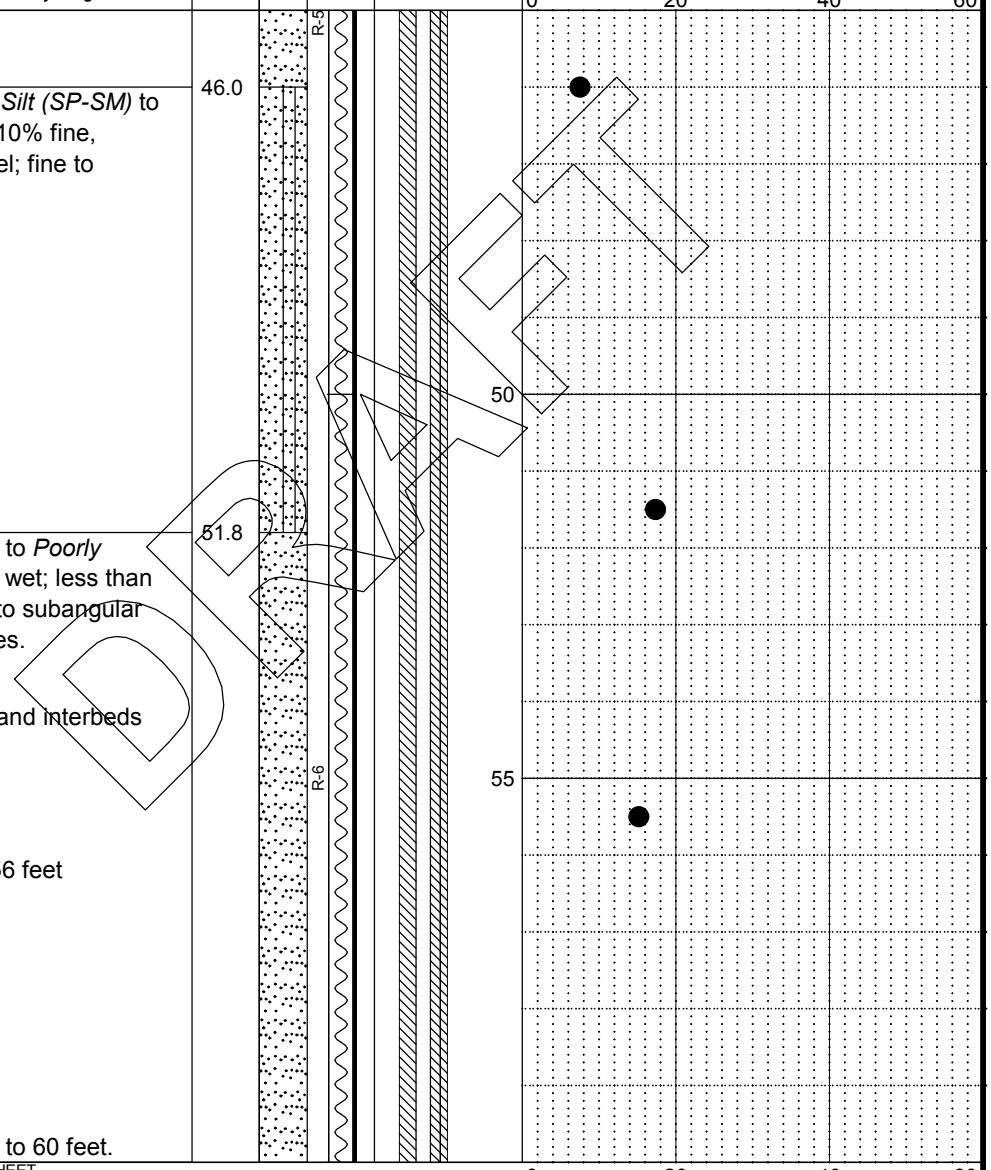
Gray, *Poorly Graded Sand (SP)* to *Poorly Graded Sand with Silt (SP-SM)*; wet; less than 5% fine to coarse, subrounded to subangular gravel; fine sand; nonplastic fines.
(Qva)

- Few to little sandy silt seams and interbeds from 54 to 55 feet.

- Few sandy silt seams below 56 feet

- Silt with sand seam from 59.6 to 60 feet.

CONTINUED NEXT SHEET



LEGEND

- Sample Recovery
- * Sample Not Recovered
- Sonic Core Sample
- Ground Water Level in VWP
- ◇ % Fines (<0.075mm)
- ● % Water Content
- Plastic Limit ⊢●⊣ Liquid Limit
- Natural Water Content

NOTES

1. Refer to KEY for explanation of symbols, codes, abbreviations and definitions.
2. Groundwater level, if indicated above, is for the date specified and may vary.
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North Mercer Island Interceptor and Enatai Interceptor Upgrade Project
King County, Washington

LOG OF BORING NME-1

May 2018 | 21-1-22000-212

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FIG. A-02
Sheet 4 of 14

REV 3 - Approved for Submittal

MASTER_LOG_BFW_21-22000.GPJ_SHAN_WIL.GDT 5/17/18 Log: JCS Rev: EAS Typ: CLP

Total Depth:	*200 ft.*	Northing:	*~ 214,014 ft.*	Drilling Method:	*Sonic Core*	Hole Diam.:	
Top Elevation:	*~ 165 ft.*	Easting:	*~ 1,301,643 ft.*	Drilling Company:	*Holt*	Rod Diam.:	*NWJ*
Vert. Datum:	*KC Metro*	Station:	~	Drill Rig Equipment:	*Terra Sonic*	Hammer Type:	*Automatic*
Horiz. Datum:	*NAD83*	Offset:	~	Other Comments:			

SOIL DESCRIPTION

Refer to the report text for a proper understanding of the subsurface materials and drilling methods. The stratification lines indicated below represent the approximate boundaries between material types, and the transition may be gradual.

Depth, ft. | Symbol | Samples | Ground Water | Depth, ft.

60.0

Gray, *Poorly Graded Sand with Silt (SP-SM)* to *Poorly Graded Sand (SP)*; wet; fine sand; nonplastic fines.
(Qpnf)
- 5 feet of heave encountered at 60 feet.

- Layer of silty, fine to coarse sand with little organics from 69 to 69.4 feet.

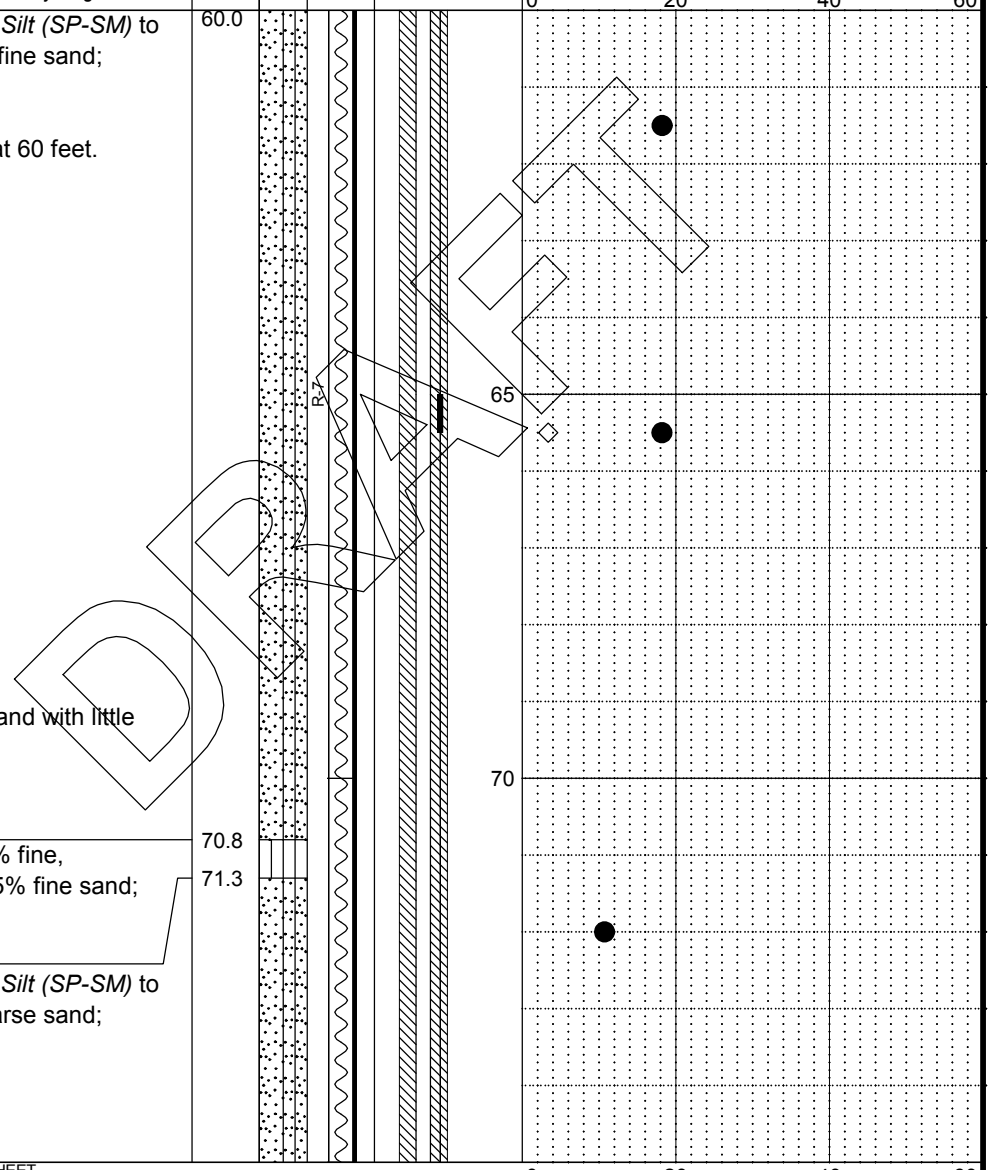
70.8

71.3

Gray *Silt (ML)*; wet; less than 5% fine, subrounded gravel, less than 15% fine sand; nonplastic fines.
(Qpnl)

Gray, *Poorly Graded Sand with Silt (SP-SM)* to *Silty Sand (SM)*; wet; fine to coarse sand; nonplastic fines.
(Qpnf)

CONTINUED NEXT SHEET



DRAFT

LEGEND

- Sample Recovery
- * Sample Not Recovered
- Sonic Core Sample
- Ground Water Level in VWP
- ◇ % Fines (<0.075mm)
- ● % Water Content
- Plastic Limit ⊢●⊣ Liquid Limit
- Natural Water Content

NOTES

1. Refer to KEY for explanation of symbols, codes, abbreviations and definitions.
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North Mercer Island Interceptor and Enatai Interceptor Upgrade Project
King County, Washington

LOG OF BORING NME-1

May 2018 | 21-1-22000-212

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FIG. A-02
Sheet 5 of 14

REV 3 - Approved for Submittal

MASTER_LOG_BFW_21-22000.GPJ SHAN_WIL.GDT 5/17/18 Log: JCS Rev: EAS Typ: CLP

Total Depth:	*200 ft.*	Northing:	*~ 214,014 ft.*	Drilling Method:	*Sonic Core*	Hole Diam.:	
Top Elevation:	*~ 165 ft.*	Easting:	*~ 1,301,643 ft.*	Drilling Company:	*Holt*	Rod Diam.:	*NWJ*
Vert. Datum:	*KC Metro*	Station:	~	Drill Rig Equipment:	*Terra Sonic*	Hammer Type:	*Automatic*
Horiz. Datum:	*NAD83*	Offset:	~	Other Comments:			

SOIL DESCRIPTION

Refer to the report text for a proper understanding of the subsurface materials and drilling methods. The stratification lines indicated below represent the approximate boundaries between material types, and the transition may be gradual.

Depth, ft. | Symbol | Samples | Ground Water | Depth, ft.

0 20 40 60

76.9

Gray *Silt (ML)* to *Silt with Sand (ML)*; moist; fine sand; nonplastic fines.
(Qpnl)
- Slightly blocky texture from 78 to 79 feet.

80.0

Gray, *Silty Sand (SM)* to *Silty Sand with Gravel (SM)*; moist to wet; fine to coarse, rounded to subrounded gravel; fine to coarse sand; nonplastic fines; diamict.
(Qpgd)

83.5

Gray *Silt with Sand (ML)* to *Silt (ML)*; moist; less than 5% fine, subangular gravel; fine sand; nonplastic fines.
(Qpgl)

R-8

R-9

80

85

CONTINUED NEXT SHEET

0 20 40 60

LEGEND

- Sample Recovery
- * Sample Not Recovered
- Sonic Core Sample
- Ground Water Level in VWP
- ◇ % Fines (<0.075mm)
- ● % Water Content
- Plastic Limit ⊢●⊣ Liquid Limit
- Natural Water Content

NOTES

1. Refer to KEY for explanation of symbols, codes, abbreviations and definitions.
2. Groundwater level, if indicated above, is for the date specified and may vary.
3. USCS designation is based on visual-manual classification and selected lab testing.
4. The hole location was measured from existing site features and should be considered approximate.

North Mercer Island Interceptor and Enatai Interceptor Upgrade Project
King County, Washington

LOG OF BORING NME-1

May 2018 | 21-1-22000-212

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FIG. A-02
Sheet 6 of 14

REV 3 - Approved for Submittal

DRAFT

MASTER_LOG_BFW_21-22000.GPJ_SHAN_WIL.GDT 5/17/18 Log: JCS Rev: EAS Typ: CLP

Total Depth:	*200 ft.*	Northing:	*~ 214,014 ft.*	Drilling Method:	*Sonic Core*	Hole Diam.:	
Top Elevation:	*~ 165 ft.*	Easting:	*~ 1,301,643 ft.*	Drilling Company:	*Holt*	Rod Diam.:	*NWJ*
Vert. Datum:	*KC Metro*	Station:	~	Drill Rig Equipment:	*Terra Sonic*	Hammer Type:	*Automatic*
Horiz. Datum:	*NAD83*	Offset:	~	Other Comments:			

SOIL DESCRIPTION

Refer to the report text for a proper understanding of the subsurface materials and drilling methods. The stratification lines indicated below represent the approximate boundaries between material types, and the transition may be gradual.

- Layer of wet, silty, fine to medium sand from 90 to 90.3 feet
- Wet, silty, fine to medium sand seam at 90.5 feet.

Gray, *Sandy Silt (ML)* to *Silty Sand (SM)*; moist; less than 5% fine, subrounded to subangular gravel; fine to medium sand; nonplastic to low plasticity fines; trace organics; diamict. (Qpgm/Qpgt)

90.5

Gray, *Silty Sand (SM)* to *Silty Sand with Gravel (SM)*; wet; 5 to 15% fine gravel; fine to medium sand; nonplastic fines. (Qpgo)

94.8

- Few sandy silt seams below 95.5 feet.

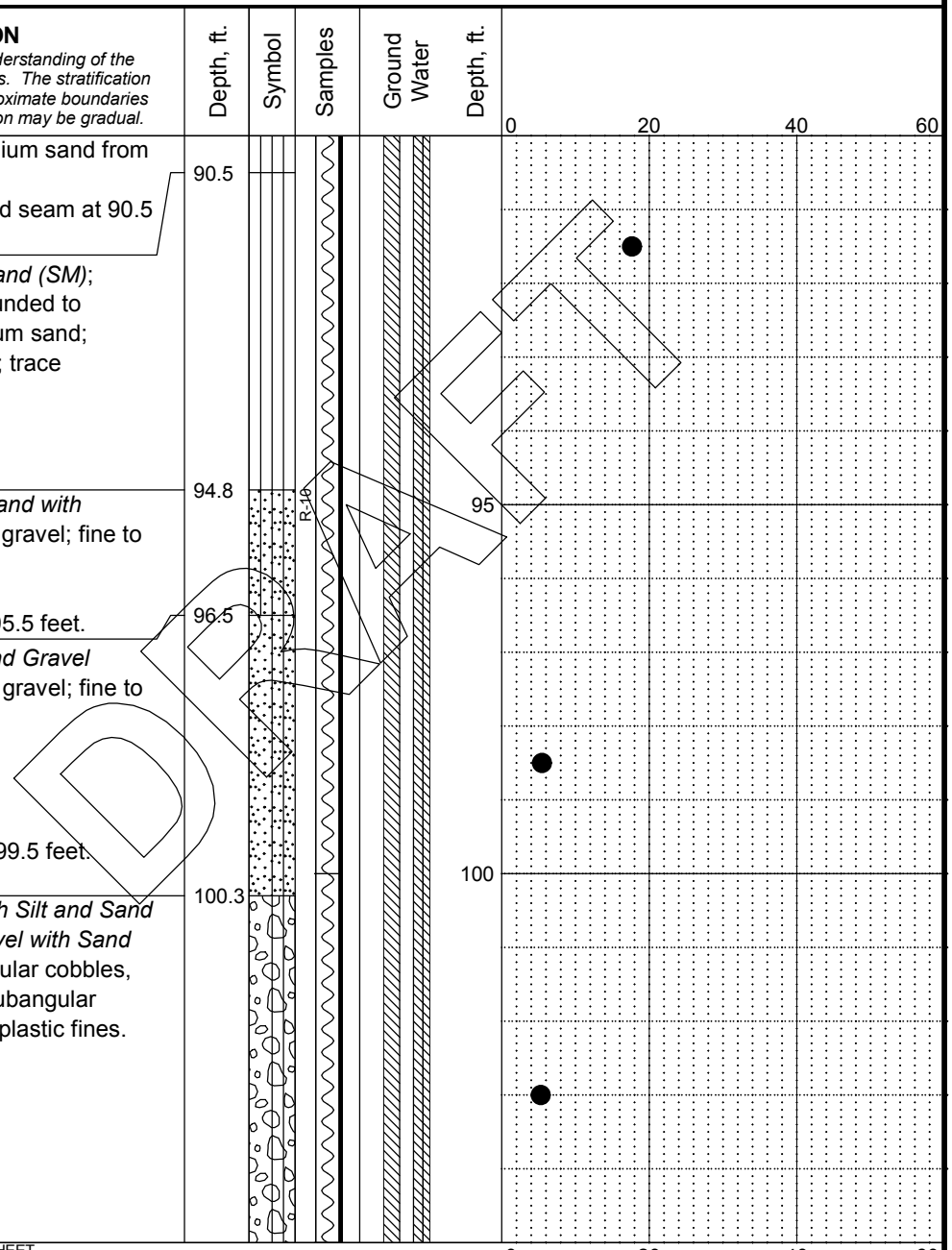
96.5

Poorly Graded Sand with Silt and Gravel (SP-SM); wet; fine, subrounded gravel; fine to coarse sand; nonplastic fines. (Qpgo)

- Trace diamict pockets below 99.5 feet.

100.3

Gray, *Poorly Graded Gravel with Silt and Sand (GP-GM)* to *Poorly Graded Gravel with Sand (GP)*; wet; less than 5% subangular cobbles, fine to coarse, subrounded to subangular gravel; fine to coarse sand; nonplastic fines. (Qpgo)



CONTINUED NEXT SHEET

LEGEND

- I Sample Recovery
- * Sample Not Recovered
- Sonic Core Sample
- Ground Water Level in VWP
- ◇ % Fines (<0.075mm)
- ● % Water Content
- Plastic Limit ⊢●⊣ Liquid Limit
- Natural Water Content

NOTES

1. Refer to KEY for explanation of symbols, codes, abbreviations and definitions.
2. Groundwater level, if indicated above, is for the date specified and may vary.
3. USCS designation is based on visual-manual classification and selected lab testing.
4. The hole location was measured from existing site features and should be considered approximate.

North Mercer Island Interceptor and Enatai Interceptor Upgrade Project
King County, Washington

LOG OF BORING NME-1

May 2018 | 21-1-22000-212

SHANNON & WILSON, INC.
Geotechnical and Environmental Consultants

FIG. A-02
Sheet 7 of 14

REV 3 - Approved for Submittal

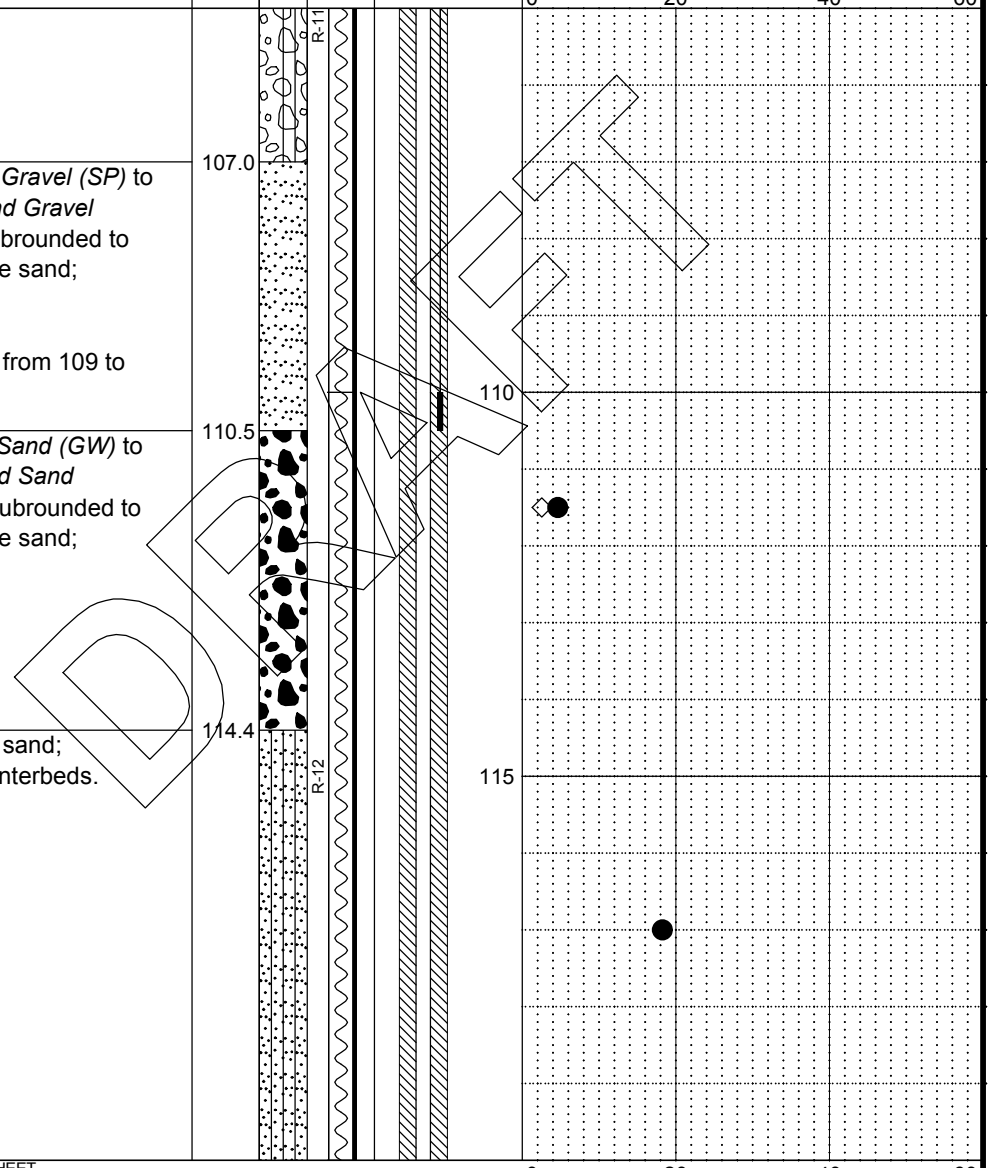
MASTER_LOG_BFW_21-22000.GPJ SHAN_WIL.GDT 5/17/18 Log: JCS Rev: EAS Typ: CLP

Total Depth:	*200 ft.*	Northing:	*~ 214,014 ft.*	Drilling Method:	*Sonic Core*	Hole Diam.:	
Top Elevation:	*~ 165 ft.*	Easting:	*~ 1,301,643 ft.*	Drilling Company:	*Holt*	Rod Diam.:	*NWJ*
Vert. Datum:	*KC Metro*	Station:	~	Drill Rig Equipment:	*Terra Sonic*	Hammer Type:	*Automatic*
Horiz. Datum:	*NAD83*	Offset:	~	Other Comments:			

SOIL DESCRIPTION

Refer to the report text for a proper understanding of the subsurface materials and drilling methods. The stratification lines indicated below represent the approximate boundaries between material types, and the transition may be gradual.

Depth, ft. | Symbol | Samples | Ground Water | Depth, ft.



Gray, *Poorly Graded Sand with Gravel (SP)* to *Poorly Graded Sand with Silt and Gravel (SP-SM)*; wet; fine to coarse, subrounded to subangular gravel; fine to coarse sand; nonplastic fines.
(Qpgo)
- Layer of poorly graded gravel from 109 to 109.3 feet.

Gray, *Well-Graded Gravel with Sand (GW)* to *Well-Graded Gravel with Silt and Sand (GW-GM)*; wet; fine to coarse, subrounded to subangular gravel; fine to coarse sand; nonplastic fines.
(Qpgo)

Gray, *Silty Sand (SM)*; wet; fine sand; nonplastic fines; few sandy silt interbeds.
(Qpgo/Qpgl)

CONTINUED NEXT SHEET

DRAFT

LEGEND

- Sample Recovery
- * Sample Not Recovered
- Sonic Core Sample
- Ground Water Level in VWP
- ◇ % Fines (<0.075mm)
- ● % Water Content
- Plastic Limit ⊢●⊣ Liquid Limit
- Natural Water Content

NOTES

1. Refer to KEY for explanation of symbols, codes, abbreviations and definitions.
2. Groundwater level, if indicated above, is for the date specified and may vary.
3. USCS designation is based on visual-manual classification and selected lab testing.
4. The hole location was measured from existing site features and should be considered approximate.

North Mercer Island Interceptor and Enatai Interceptor Upgrade Project
King County, Washington

LOG OF BORING NME-1

May 2018 | 21-1-22000-212

SHANNON & WILSON, INC.
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FIG. A-02
Sheet 8 of 14

REV 3 - Approved for Submittal

MASTER_LOG_BFW_21-22000.GPJ_SHAN_WIL.GDT 5/17/18 Log: JCS Rev: EAS Typ: CLP

Total Depth:	*200 ft.*	Northing:	*~ 214,014 ft.*	Drilling Method:	*Sonic Core*	Hole Diam.:	
Top Elevation:	*~ 165 ft.*	Easting:	*~ 1,301,643 ft.*	Drilling Company:	*Holt*	Rod Diam.:	*NWJ*
Vert. Datum:	*KC Metro*	Station:	~	Drill Rig Equipment:	*Terra Sonic*	Hammer Type:	*Automatic*
Horiz. Datum:	*NAD83*	Offset:	~	Other Comments:			

SOIL DESCRIPTION

Refer to the report text for a proper understanding of the subsurface materials and drilling methods. The stratification lines indicated below represent the approximate boundaries between material types, and the transition may be gradual.

Depth, ft. | Symbol | Samples | Ground Water | Depth, ft.

120.5

Gray, *Sandy Silt (ML)* to *Silty Sand (SM)*; wet; fine sand; nonplastic fines; trace organics. (Qpnl)

- Seam of wet, silty, fine sand at 123.5 feet.

124.5

Gray, *Silty Sand (SM)*; wet; fine sand; nonplastic fines; few sandy silt seams. (Qpnf)

R-15

134.0

Gray, *Sandy Lean Clay (CL)*; moist; 10% fine, subangular gravel, fine to coarse sand;

CONTINUED NEXT SHEET

DRAFT

0 20 40 60

125

130

0 20 40 60

LEGEND

- Sample Recovery
- * Sample Not Recovered
- Sonic Core Sample
- Ground Water Level in VWP
- ◇ % Fines (<0.075mm)
- ● % Water Content
- Plastic Limit ⊢●⊣ Liquid Limit
- Natural Water Content

NOTES

1. Refer to KEY for explanation of symbols, codes, abbreviations and definitions.
2. Groundwater level, if indicated above, is for the date specified and may vary.
3. USCS designation is based on visual-manual classification and selected lab testing.
4. The hole location was measured from existing site features and should be considered approximate.

North Mercer Island Interceptor and Enatai Interceptor Upgrade Project
King County, Washington

LOG OF BORING NME-1

May 2018 | 21-1-22000-212

SHANNON & WILSON, INC.
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FIG. A-02
Sheet 9 of 14

REV 3 - Approved for Submittal

MASTER_LOG_BFW_21-22000.GPJ_SHAN_WIL.GDT 5/17/18 Log: JCS Rev: EAS Typ: CLP

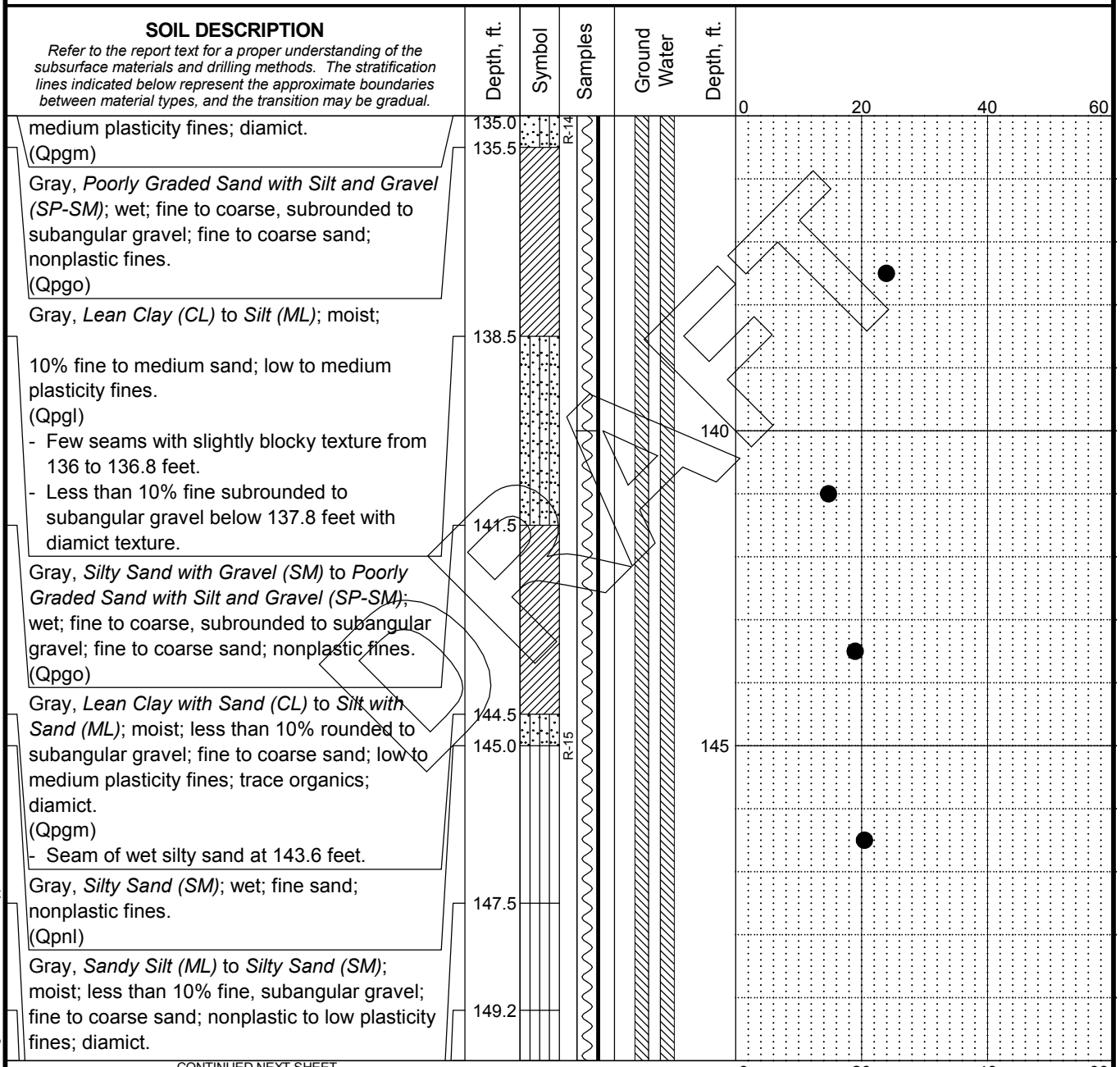
Total Depth:	*200 ft.*	Northing:	*~ 214,014 ft.*	Drilling Method:	*Sonic Core*	Hole Diam.:	
Top Elevation:	*~ 165 ft.*	Easting:	*~ 1,301,643 ft.*	Drilling Company:	*Holt*	Rod Diam.:	*NWJ*
Vert. Datum:	*KC Metro*	Station:	~	Drill Rig Equipment:	*Terra Sonic*	Hammer Type:	*Automatic*
Horiz. Datum:	*NAD83*	Offset:	~	Other Comments:			

SOIL DESCRIPTION

Refer to the report text for a proper understanding of the subsurface materials and drilling methods. The stratification lines indicated below represent the approximate boundaries between material types, and the transition may be gradual.

Depth, ft.	Soil Description
135.0	medium plasticity fines; diamict. (Qpgm)
135.5	Gray, *Poorly Graded Sand with Silt and Gravel (SP-SM)*; wet; fine to coarse, subrounded to subangular gravel; fine to coarse sand; nonplastic fines. (Qpgo)
138.5	Gray, *Lean Clay (CL)* to *Silt (ML)*; moist; 10% fine to medium sand; low to medium plasticity fines. (Qpgl) - Few seams with slightly blocky texture from 136 to 136.8 feet. - Less than 10% fine subrounded to subangular gravel below 137.8 feet with diamict texture.
141.5	Gray, *Silty Sand with Gravel (SM)* to *Poorly Graded Sand with Silt and Gravel (SP-SM)*; wet; fine to coarse, subrounded to subangular gravel; fine to coarse sand; nonplastic fines. (Qpgo)
144.5	Gray, *Lean Clay with Sand (CL)* to *Silt with Sand (ML)*; moist; less than 10% rounded to subangular gravel; fine to coarse sand; low to medium plasticity fines; trace organics; diamict. (Qpgm) - Seam of wet silty sand at 143.6 feet.
145.0	
147.5	Gray, *Silty Sand (SM)*; wet; fine sand; nonplastic fines. (Qpnl)
149.2	Gray, *Sandy Silt (ML)* to *Silty Sand (SM)*; moist; less than 10% fine, subangular gravel; fine to coarse sand; nonplastic to low plasticity fines; diamict.

CONTINUED NEXT SHEET



LEGEND

- Sample Recovery
- * Sample Not Recovered
- Sonic Core Sample
- Ground Water Level in VWP
- ◇ % Fines (<0.075mm)
- ● % Water Content
- Plastic Limit ⊢●⊣ Liquid Limit
- Natural Water Content

NOTES

1. Refer to KEY for explanation of symbols, codes, abbreviations and definitions.
2. Groundwater level, if indicated above, is for the date specified and may vary.
3. USCS designation is based on visual-manual classification and selected lab testing.
4. The hole location was measured from existing site features and should be considered approximate.

North Mercer Island Interceptor and Enatai Interceptor Upgrade Project
King County, Washington

LOG OF BORING NME-1

May 2018 | 21-1-22000-212

SHANNON & WILSON, INC.
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FIG. A-02
Sheet 10 of 14

REV 3 - Approved for Submittal

MASTER_LOG_BFW_21-22000.GPJ_SHAN_WIL.GDT 5/17/18 Log: JCS Rev: EAS Typ: CLP

Total Depth:	*200 ft.*	Northing:	*~ 214,014 ft.*	Drilling Method:	*Sonic Core*	Hole Diam.:	
Top Elevation:	*~ 165 ft.*	Easting:	*~ 1,301,643 ft.*	Drilling Company:	*Holt*	Rod Diam.:	*NWJ*
Vert. Datum:	*KC Metro*	Station:	~	Drill Rig Equipment:	*Terra Sonic*	Hammer Type:	*Automatic*
Horiz. Datum:	*NAD83*	Offset:	~	Other Comments:			

SOIL DESCRIPTION

Refer to the report text for a proper understanding of the subsurface materials and drilling methods. The stratification lines indicated below represent the approximate boundaries between material types, and the transition may be gradual.

(Qpgt)
- Layer of wet, silty, fine to medium sand at 146.9 feet.

Gray, *Sandy Silt (ML)* to *Silty Sand (SM)*; moist; fine to medium sand; nonplastic fines.
(Qpgo)
- Layer of moist, silty, fine sand from 148.2 to 148.5.
- Layer of silty sand with gravel at 148.5 feet.

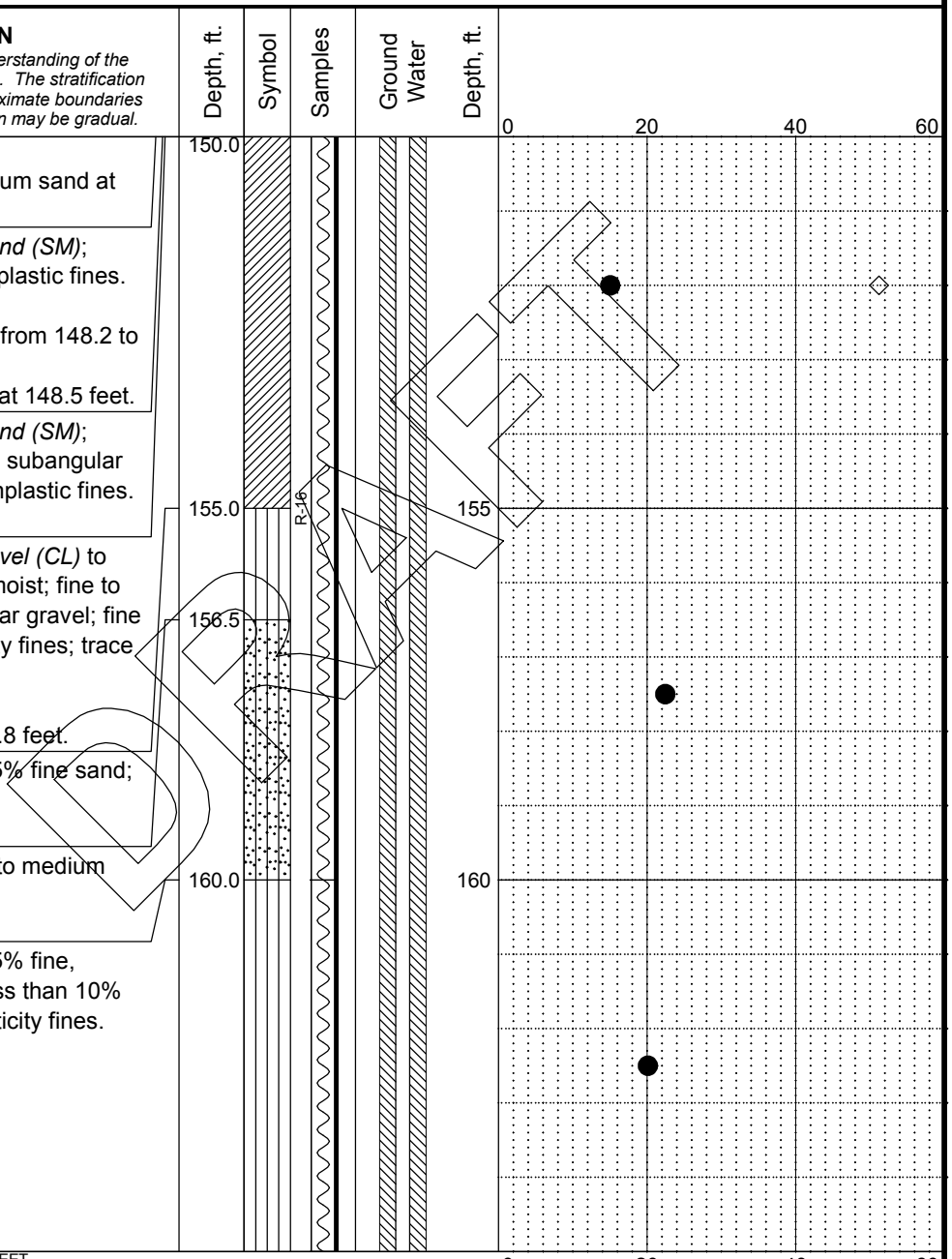
Gray, *Sandy Silt (ML)* to *Silty Sand (SM)*; moist to wet; less than 10% fine, subangular gravel; fine to medium sand; nonplastic fines.
(Qpgl)

Gray, *Sandy Lean Clay with Gravel (CL)* to *Clayey Sand with Gravel (SC)*; moist; fine to coarse, subrounded to subangular gravel; fine to coarse sand; medium-plasticity fines; trace organics; diamict.
(Qpgm)
- Mostly wood fragments at 154.8 feet.

Gray *Silt (ML)*; moist; less than 5% fine sand; nonplastic to low plasticity fines.
(Qpgl)

Gray, *Silty Sand (SM)*; wet; fine to medium sand; nonplastic fines.
(Qpgo)

Gray *Silt (ML)*; moist; less than 5% fine, subangular to angular gravel; less than 10% fine sand; nonplastic to low plasticity fines.
(Qpgl)



CONTINUED NEXT SHEET

LEGEND

- Sample Recovery
- * Sample Not Recovered
- Sonic Core Sample
- Ground Water Level in VWP
- ◇ % Fines (<0.075mm)
- ● % Water Content
- Plastic Limit ⊢●⊣ Liquid Limit
- Natural Water Content

NOTES

1. Refer to KEY for explanation of symbols, codes, abbreviations and definitions.
2. Groundwater level, if indicated above, is for the date specified and may vary.
3. USCS designation is based on visual-manual classification and selected lab testing.
4. The hole location was measured from existing site features and should be considered approximate.

North Mercer Island Interceptor and Enatai Interceptor Upgrade Project
King County, Washington

LOG OF BORING NME-1

May 2018 21-1-22000-212

SHANNON & WILSON, INC.
Geotechnical and Environmental Consultants

FIG. A-02
Sheet 11 of 14

REV 3 - Approved for Submittal

MASTER_LOG_BFW_21-22000.GPJ SHAN_WIL.GDT 5/17/18 Log: JCS Rev: EAS Typ: CLP

Total Depth:	*200 ft.*	Northing:	*~ 214,014 ft.*	Drilling Method:	*Sonic Core*	Hole Diam.:	
Top Elevation:	*~ 165 ft.*	Easting:	*~ 1,301,643 ft.*	Drilling Company:	*Holt*	Rod Diam.:	*NWJ*
Vert. Datum:	*KC Metro*	Station:	~	Drill Rig Equipment:	*Terra Sonic*	Hammer Type:	*Automatic*
Horiz. Datum:	*NAD83*	Offset:	~	Other Comments:			

SOIL DESCRIPTION

Refer to the report text for a proper understanding of the subsurface materials and drilling methods. The stratification lines indicated below represent the approximate boundaries between material types, and the transition may be gradual.

- Layer of moist, silty sand with gravel, diamict texture from 168.8 to 169.5 feet.
- Layer of wet, silty, fine to medium sand from 170 to 170.3 feet.

170.8

Gray, *Fat Clay with Sand (CH)*; moist; less than 10% fine, subrounded to subangular gravel; fine to coarse sand; high plasticity fines; diamict.
(Qpgm)

173.8

Gray, *Silty Sand (SM)*; wet; less than 5% subrounded to subangular gravel; fine to medium sand; low-plasticity fines; little sandy silt interbeds.
(Qpgo)

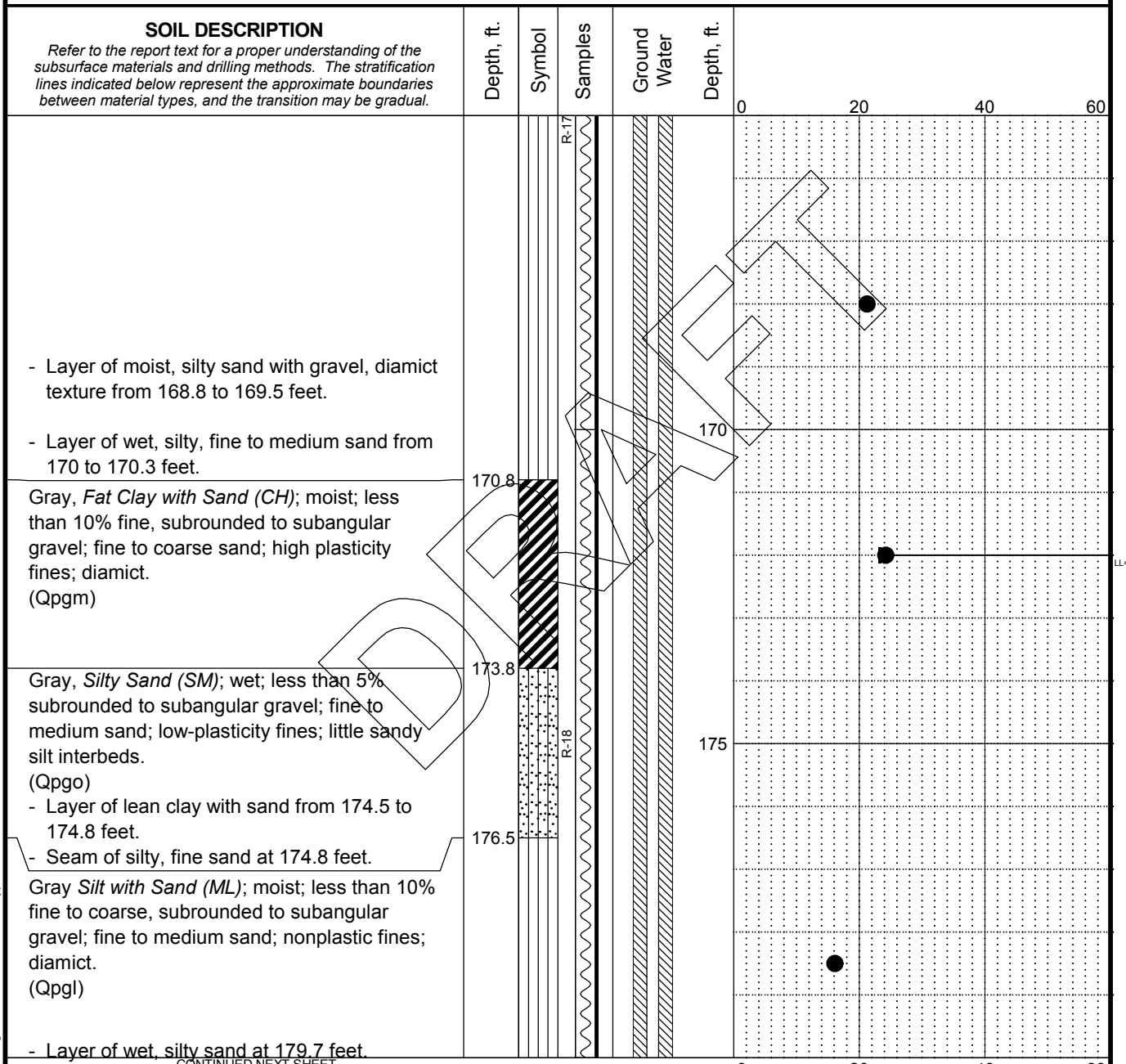
- Layer of lean clay with sand from 174.5 to 174.8 feet.
- Seam of silty, fine sand at 174.8 feet.

176.5

Gray *Silt with Sand (ML)*; moist; less than 10% fine to coarse, subrounded to subangular gravel; fine to medium sand; nonplastic fines; diamict.
(Qpgl)

- Layer of wet, silty sand at 179.7 feet.

CONTINUED NEXT SHEET



LEGEND

- Sample Recovery
- * Sample Not Recovered
- Sonic Core Sample
- Ground Water Level in VWP
- ◇ % Fines (<0.075mm)
- ● % Water Content
- Plastic Limit ⊢●⊣ Liquid Limit
- Natural Water Content

NOTES

1. Refer to KEY for explanation of symbols, codes, abbreviations and definitions.
2. Groundwater level, if indicated above, is for the date specified and may vary.
3. USCS designation is based on visual-manual classification and selected lab testing.
4. The hole location was measured from existing site features and should be considered approximate.

North Mercer Island Interceptor and Enatai Interceptor Upgrade Project
King County, Washington

LOG OF BORING NME-1

May 2018 21-1-22000-212

SHANNON & WILSON, INC.
Geotechnical and Environmental Consultants

FIG. A-02
Sheet 12 of 14

REV 3 - Approved for Submittal

MASTER_LOG_BFW_21-22000.GPJ SHAN_WIL.GDT 5/17/18 Log: JCS Rev: EAS Typ: CLP

Total Depth:	*200 ft.*	Northing:	*~ 214,014 ft.*	Drilling Method:	*Sonic Core*	Hole Diam.:	
Top Elevation:	*~ 165 ft.*	Easting:	*~ 1,301,643 ft.*	Drilling Company:	*Holt*	Rod Diam.:	*NWJ*
Vert. Datum:	*KC Metro*	Station:	~	Drill Rig Equipment:	*Terra Sonic*	Hammer Type:	*Automatic*
Horiz. Datum:	*NAD83*	Offset:	~	Other Comments:			

SOIL DESCRIPTION

Refer to the report text for a proper understanding of the subsurface materials and drilling methods. The stratification lines indicated below represent the approximate boundaries between material types, and the transition may be gradual.

Depth, ft. | Symbol | Samples | Ground Water | Depth, ft.

Gray, *Lean Clay (CL)*; moist; less than 5% fine, subangular gravel; less than 5% fine to medium sand; medium plasticity fines. (Qpgl)

180.0

184.1

Gray, *Lean Clay (CL)* to *Silt (ML)*; moist; less than 5% fine to coarse, subangular gravel; less than 5% fine to medium sand; low to medium plasticity fines; diamict. (Qpgl)

R-19

185

190.0

Gray, *Lean Clay (CL)*; moist; less than 5% fine, subangular to angular gravel, less than 5% fine to coarse sand, medium plasticity fines. (Qpgl)

190

CONTINUED NEXT SHEET

0 20 40 60

0 20 40 60

LEGEND

- Sample Recovery
- * Sample Not Recovered
- Sonic Core Sample
- Ground Water Level in VWP
- ◇ % Fines (<0.075mm)
- ● % Water Content
- Plastic Limit ⊢●⊣ Liquid Limit
- Natural Water Content

NOTES

1. Refer to KEY for explanation of symbols, codes, abbreviations and definitions.
2. Groundwater level, if indicated above, is for the date specified and may vary.
3. USCS designation is based on visual-manual classification and selected lab testing.
4. The hole location was measured from existing site features and should be considered approximate.

North Mercer Island Interceptor and Enatai Interceptor Upgrade Project
King County, Washington

LOG OF BORING NME-1

May 2018 | 21-1-22000-212

SHANNON & WILSON, INC.
Geotechnical and Environmental Consultants

FIG. A-02
Sheet 13 of 14

DRAFT

MASTER_LOG_BFW_21-22000.GPJ SHAN_WIL.GDT 5/17/18 Log: JCS Rev: EAS Typ: CLP

REV 3 - Approved for Submittal

Total Depth:	*200 ft.*	Northing:	*~ 214,014 ft.*	Drilling Method:	*Sonic Core*	Hole Diam.:	
Top Elevation:	*~ 165 ft.*	Easting:	*~ 1,301,643 ft.*	Drilling Company:	*Holt*	Rod Diam.:	*NWJ*
Vert. Datum:	*KC Metro*	Station:	~	Drill Rig Equipment:	*Terra Sonic*	Hammer Type:	*Automatic*
Horiz. Datum:	*NAD83*	Offset:	~	Other Comments:			

SOIL DESCRIPTION

Refer to the report text for a proper understanding of the subsurface materials and drilling methods. The stratification lines indicated below represent the approximate boundaries between material types, and the transition may be gradual.

Depth, ft. | Symbol | Samples | Ground Water | Depth, ft.

195.8

Gray *Silt (ML)*; moist; less than 5% fine to coarse sand; low plasticity fines. (Qpgl)

200.0

BOTTOM OF BORING
COMPLETED 1/7/2015

R-20

0 20 40 60

200

205

DRAFT

0 20 40 60

LEGEND

- Sample Recovery
- * Sample Not Recovered
- Sonic Core Sample
- Ground Water Level in VWP

◇ % Fines (<0.075mm)
● % Water Content
Plastic Limit ⊢●⊣ Liquid Limit
Natural Water Content

NOTES

1. Refer to KEY for explanation of symbols, codes, abbreviations and definitions.
2. Groundwater level, if indicated above, is for the date specified and may vary.
3. USCS designation is based on visual-manual classification and selected lab testing.
4. The hole location was measured from existing site features and should be considered approximate.

North Mercer Island Interceptor and
Enatai Interceptor Upgrade Project
King County, Washington

LOG OF BORING NME-1

May 2018 21-1-22000-212

SHANNON & WILSON, INC.
Geotechnical and Environmental Consultants

FIG. A-02
Sheet 14 of 14

REV 3 - Approved for Submittal

MASTER_LOG_BFW_21-22000.GPJ SHAN_WIL.GDT 5/17/18 Log: JCS Rev: EAS Typ: CLP

Total Depth:	*230 ft.*	Northing:	*~ 214,713 ft.*	Drilling Method:	*Sonic Core*	Hole Diam.:	
Top Elevation:	*~ 195 ft.*	Easting:	*~ 1,304,708 ft.*	Drilling Company:	*Holt*	Rod Diam.:	*NWJ*
Vert. Datum:	*KC Metro*	Station:	~	Drill Rig Equipment:	*Terra Sonic*	Hammer Type:	*Automatic*
Horiz. Datum:	*NAD83*	Offset:	~	Other Comments:			

SOIL DESCRIPTION

Refer to the report text for a proper understanding of the subsurface materials and drilling methods. The stratification lines indicated below represent the approximate boundaries between material types, and the transition may be gradual.

Depth, ft. | Symbol | Samples | Ground Water | Depth, ft.

Brown, *Poorly Graded Sand with Gravel (SP)*; moist; fine to coarse, subangular to subrounded gravel; fine to coarse sand; less than 5% nonplastic fines.
(Hf)

1.0

Gray-brown, *Silty Sand with Gravel and Cobbles (SM)*; less than 5% subangular cobbles; fine to coarse, subrounded to subangular gravel; fine to coarse sand; nonplastic fines; diamict.
(Qvt)

R-1

15.0

Gray-brown, *Silty Sand with Gravel (SM)*; moist; fine to coarse, subrounded to subangular gravel; fine to coarse sand; nonplastic fines; diamict pockets.
(Qvd)

17.0

Brown, *Poorly Graded Sand with Silt, Gravel and Cobbles (SP-SM)* to *Silty Sand with Gravel (SM)*; moist; less than 5% subangular cobbles; fine to coarse, subrounded to

R-2

CONTINUED NEXT SHEET

DRAFT

0 20 40 60

5

10

15

0 20 40 60

◇ % Fines (<0.075mm)
● % Water Content

LEGEND

Sample Recovery	▼ Ground Water Level in Well
* Sample Not Recovered	
⊠ Sonic Core Sample	

NOTES

1. Refer to KEY for explanation of symbols, codes, abbreviations and definitions.
2. Groundwater level, if indicated above, is for the date specified and may vary.
3. USCS designation is based on visual-manual classification and selected lab testing.
4. The hole location was measured from existing site features and should be considered approximate.

North Mercer Island Interceptor and
Enatai Interceptor Upgrade Project
King County, Washington

LOG OF BORING NME-4

May 2018 | 21-1-22000-212

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FIG. A-03
Sheet 1 of 12

REV 3 - Approved for Submittal

MASTER_LOG_BFW_21-22000.GPJ_SHAN_WIL.GDT 5/17/18 Log: JCS Rev: EAS Typ: CLP

Total Depth:	*230 ft.*	Northing:	*~ 214,713 ft.*	Drilling Method:	*Sonic Core*	Hole Diam.:	
Top Elevation:	*~ 195 ft.*	Easting:	*~ 1,304,708 ft.*	Drilling Company:	*Holt*	Rod Diam.:	*NWJ*
Vert. Datum:	*KC Metro*	Station:	~	Drill Rig Equipment:	*Terra Sonic*	Hammer Type:	*Automatic*
Horiz. Datum:	*NAD83*	Offset:	~	Other Comments:			

SOIL DESCRIPTION

Refer to the report text for a proper understanding of the subsurface materials and drilling methods. The stratification lines indicated below represent the approximate boundaries between material types, and the transition may be gradual.

Depth, ft. | Symbol | Samples | Ground Water | Depth, ft.

subangular gravel; fine to coarse sand; nonplastic fines.
(Qva)
- Silty, fine sand seam from 18.8 to 19.5 feet.
- Moist to wet below 19.5 feet.

20.0

Gray-brown to gray, *Silty Sand (SM)* to *Silty Sand with Gravel (SM)*; moist; fine to coarse, subrounded to subangular gravel; fine to coarse sand; nonplastic fines; diamict.
(Qvt)

R-3

R-4

29.4

30.0

Gray, *Silty Sand with Gravel (SM)*; moist; fine to coarse, subrounded to subangular gravel; fine to coarse sand; nonplastic fines; diamict pockets.
(Qvd)

Gray, *Silty Sand with Gravel (SM)*; moist; fine to coarse, subrounded to subangular gravel; fine to coarse sand; nonplastic fines; diamict.
(Qvd)

35.0

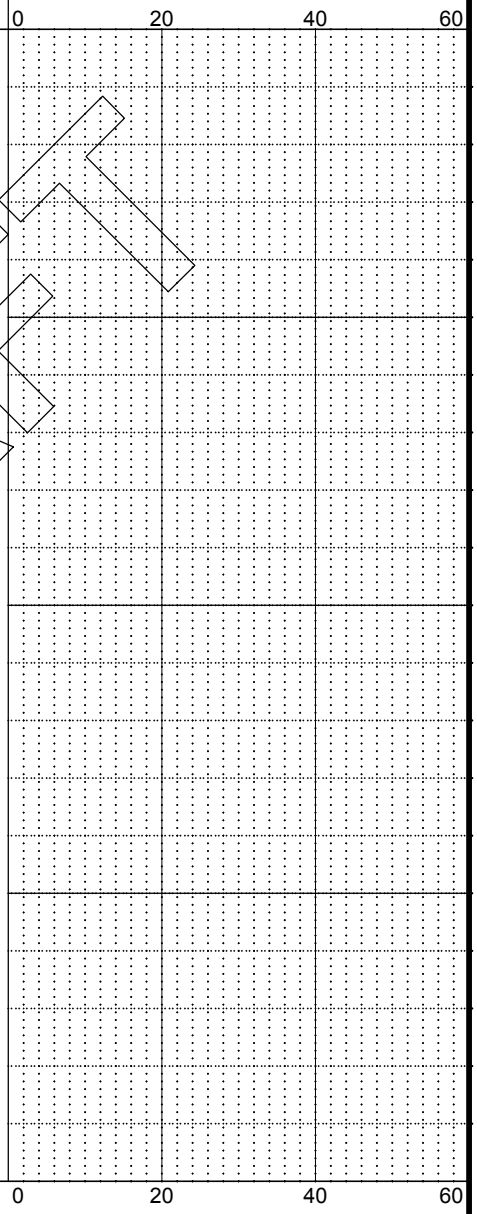
R-5

Gray-brown, *Silty Sand with Gravel (SM)*; moist; fine to coarse, subrounded to subangular gravel; fine to coarse sand; nonplastic fines; diamict pockets.
(Qva)

37.5

Gray, *Silty Sand with Gravel and Cobbles (SM)*; moist; less than 5% subrounded cobbles; fine to coarse, subrounded to subangular gravel; fine to coarse sand;

CONTINUED NEXT SHEET



LEGEND

I	Sample Recovery	▼	Ground Water Level in Well
*	Sample Not Recovered		
⊠	Sonic Core Sample		

NOTES

1. Refer to KEY for explanation of symbols, codes, abbreviations and definitions.
2. Groundwater level, if indicated above, is for the date specified and may vary.
3. USCS designation is based on visual-manual classification and selected lab testing.
4. The hole location was measured from existing site features and should be considered approximate.

North Mercer Island Interceptor and Enatai Interceptor Upgrade Project
King County, Washington

LOG OF BORING NME-4

May 2018 | 21-1-22000-212

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FIG. A-03
Sheet 2 of 12

REV 3 - Approved for Submittal

Log: JCS Rev: EAS Typ: CLP

MASTER_LOG_BFW_21-22000.GPJ SHAN_WIL.GDT 5/17/18

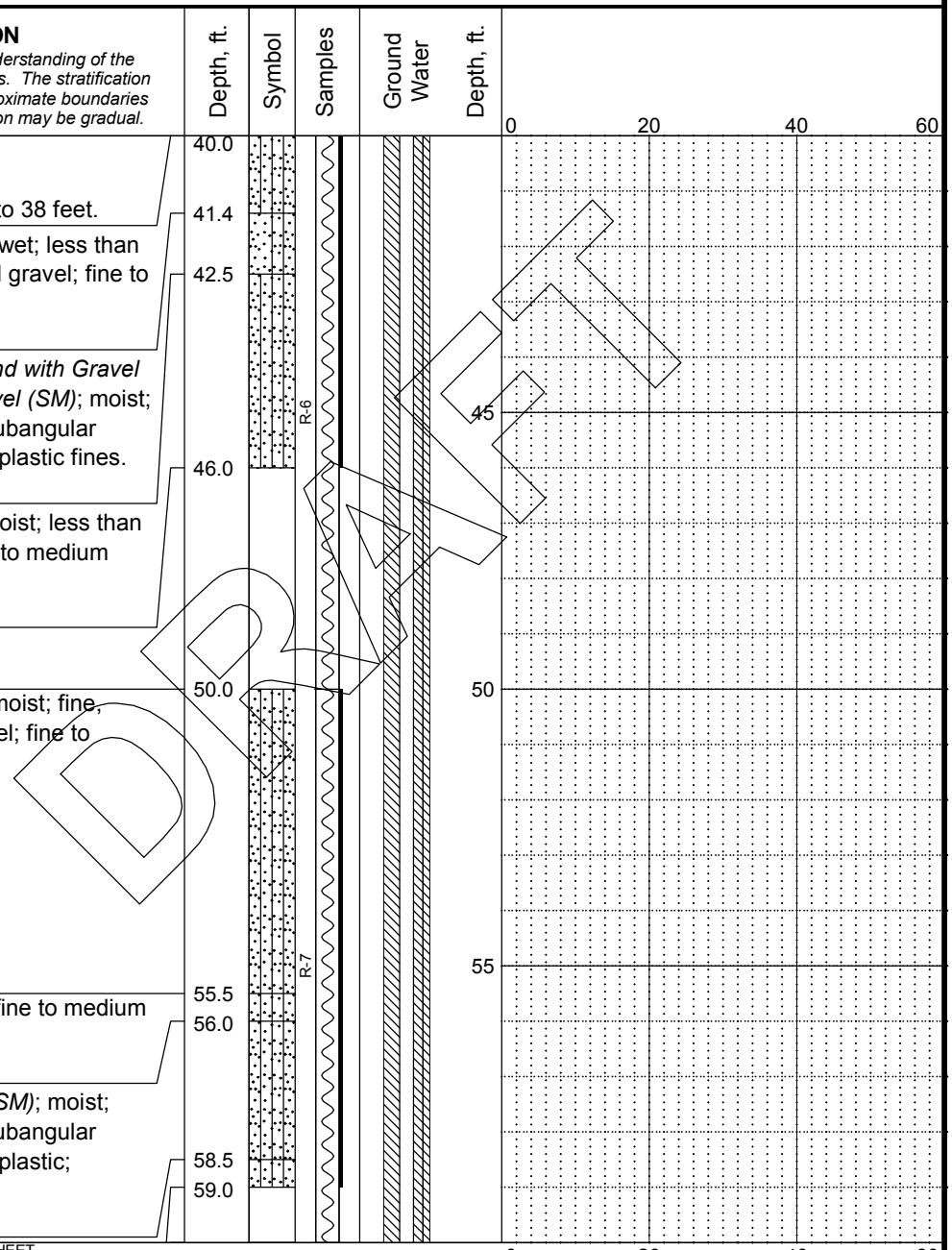
Total Depth:	*230 ft.*	Northing:	*~ 214,713 ft.*	Drilling Method:	*Sonic Core*	Hole Diam.:	
Top Elevation:	*~ 195 ft.*	Easting:	*~ 1,304,708 ft.*	Drilling Company:	*Holt*	Rod Diam.:	*NWJ*
Vert. Datum:	*KC Metro*	Station:	~	Drill Rig Equipment:	*Terra Sonic*	Hammer Type:	*Automatic*
Horiz. Datum:	*NAD83*	Offset:	~	Other Comments:			

SOIL DESCRIPTION

Refer to the report text for a proper understanding of the subsurface materials and drilling methods. The stratification lines indicated below represent the approximate boundaries between material types, and the transition may be gradual.

Depth, ft.	Soil Description
40.0	nonplastic fines; diamict. (Qvd) - Iron-oxide staining from 37.5 to 38 feet.
41.4	Gray, *Silty Sand (SM)*; moist to wet; less than 10% fine to coarse, subrounded gravel; fine to coarse sand; nonplastic fines. (Qva)
42.5	Gray-brown, *Poorly Graded Sand with Gravel (SP-SM)* to *Silty Sand with Gravel (SM)*; moist; fine to coarse, subrounded to subangular gravel; fine to coarse sand; nonplastic fines. (Qva)
46.0	Gray-brown, *Silty Sand (SM)*; moist; less than 5% fine, subangular gravel;fine to medium sand; nonplastic fines. (Qva)
	No recovery from 46 to 50 feet
50.0	Brown, *Silty Sand (SM)*; dry to moist; fine, subrounded to subangular gravel; fine to medium sand; nonplastic. (Qva)
55.5	Brown, *Silty Sand (SM)*; moist; fine to medium sand; nonplastic fines. (Qva)
56.0	Brown, *Silty Sand with Gravel (SM)*; moist; fine to coarse, subrounded to subangular gravel; fine to coarse sand; nonplastic; diamict. (Qvd)
58.5	
59.0	

CONTINUED NEXT SHEET



LEGEND

- Sample Recovery
- * Sample Not Recovered
- Sonic Core Sample
- Ground Water Level in Well
- ◇ % Fines (<0.075mm)
- ● % Water Content

NOTES

1. Refer to KEY for explanation of symbols, codes, abbreviations and definitions.
2. Groundwater level, if indicated above, is for the date specified and may vary.
3. USCS designation is based on visual-manual classification and selected lab testing.
4. The hole location was measured from existing site features and should be considered approximate.

North Mercer Island Interceptor and Enatai Interceptor Upgrade Project
King County, Washington

LOG OF BORING NME-4

May 2018 21-1-22000-212

SHANNON & WILSON, INC.
Geotechnical and Environmental Consultants

FIG. A-03
Sheet 3 of 12

REV 3 - Approved for Submittal

Log: JCS Rev: EAS Typ: CLP

MASTER_LOG_BFW_21-22000.GPJ SHAN_WIL.GDT 5/17/18

Total Depth:	*230 ft.*	Northing:	*~ 214,713 ft.*	Drilling Method:	*Sonic Core*	Hole Diam.:	
Top Elevation:	*~ 195 ft.*	Easting:	*~ 1,304,708 ft.*	Drilling Company:	*Holt*	Rod Diam.:	*NWJ*
Vert. Datum:	*KC Metro*	Station:	~	Drill Rig Equipment:	*Terra Sonic*	Hammer Type:	*Automatic*
Horiz. Datum:	*NAD83*	Offset:	~	Other Comments:			

SOIL DESCRIPTION

Refer to the report text for a proper understanding of the subsurface materials and drilling methods. The stratification lines indicated below represent the approximate boundaries between material types, and the transition may be gradual.

Depth, ft. | Symbol | Samples | Ground Water | Depth, ft.

60.0 — Brown, *Silty Sand with Gravel (SM)*; fine to coarse, subrounded to subangular gravel; fine to coarse sand; nonplastic fines. (Qva)

61.5 — No recovery from 59 to 60 feet.

62.5 — Brown, *Silty Sand (SM)*; moist; less than 10% fine to coarse, subrounded to subangular gravel; fine to coarse sand; nonplastic fines; diamict. (Qvd)

Brown, *Silty Sand with Gravel (SM)*; moist; fine to coarse, subrounded to subangular gravel; fine to coarse sand; nonplastic fines. (Qva)

Gray-brown, *Silty Sand (SM)* to *Silty Sand with Gravel (SM)*; moist; 10 to 15% fine to coarse, subrounded to subangular gravel; fine to coarse sand; nonplastic fines; diamict pockets. (Qvd)

- Layer of moist poorly graded fine to medium sand with silt from 65.5 to 66 feet.

72.5 — Gray-brown, *Silty Gravel with Sand (GM)* to *Poorly Graded Gravel with Silt and Sand (GP-GM)*; moist; fine to coarse, subrounded to subangular gravel; fine to coarse sand; nonplastic fines. (Qva)

73.3 — Brown, *Poorly Graded Sand with Silt (SP-SM)*; moist to wet; less than 10%, fine to coarse, subrounded gravel; fine to medium sand; nonplastic fines. (Qva)

- Wet below 77.5 feet

79.0

R-8 R-9 03/07/18 03/12/18

0 20 40 60 65 70 75

CONTINUED NEXT SHEET

LEGEND

I Sample Recovery
* Sample Not Recovered
Sonic Core Sample
Ground Water Level in Well
◇ % Fines (<0.075mm)
● % Water Content

NOTES

1. Refer to KEY for explanation of symbols, codes, abbreviations and definitions.
2. Groundwater level, if indicated above, is for the date specified and may vary.
3. USCS designation is based on visual-manual classification and selected lab testing.
4. The hole location was measured from existing site features and should be considered approximate.

North Mercer Island Interceptor and Enatai Interceptor Upgrade Project
King County, Washington

LOG OF BORING NME-4

May 2018 21-1-22000-212

SHANNON & WILSON, INC.
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FIG. A-03
Sheet 4 of 12

REV 3 - Approved for Submittal

MASTER_LOG_BFW_21-22000.GPJ SHAN_WIL.GDT 5/17/18 Log: JCS Rev: EAS Typ: CLP

Total Depth:	*230 ft.*	Northing:	*~ 214,713 ft.*	Drilling Method:	*Sonic Core*	Hole Diam.:	
Top Elevation:	*~ 195 ft.*	Easting:	*~ 1,304,708 ft.*	Drilling Company:	*Holt*	Rod Diam.:	*NWJ*
Vert. Datum:	*KC Metro*	Station:	~	Drill Rig Equipment:	*Terra Sonic*	Hammer Type:	*Automatic*
Horiz. Datum:	*NAD83*	Offset:	~	Other Comments:			

SOIL DESCRIPTION

Refer to the report text for a proper understanding of the subsurface materials and drilling methods. The stratification lines indicated below represent the approximate boundaries between material types, and the transition may be gradual.

Depth, ft. | Symbol | Samples | Ground Water | Depth, ft.

Gray, *Silty Sand with Gravel (SM)*; moist; fine to coarse, subrounded to subangular gravel; fine to coarse sand; nonplastic fines; diamict. (Qvt)

80.0

81.5

82.0

Gray-brown, *Silty Sand (SM)*; moist to wet; less than 10% fine, subrounded to subangular gravel; fine to coarse sand; nonplastic fines; diamict pockets. (Qvd)

84.0

85.0

Gray-brown, *Silty Sand with Gravel (SM)*; wet; fine to coarse, subrounded to subangular gravel; fine to coarse sand; nonplastic fines. (Qva)

86.3

Gray-brown, *Poorly Graded Sand (SP)*; wet; less than 15% fine to coarse, subrounded to subangular gravel; fine to coarse sand; less than 5% nonplastic fines. (Qva)

Gray-brown, *Poorly Graded Gravel with Sand (GP)*; wet; fine to coarse, subrounded to subangular gravel; fine to coarse sand; less than 5% nonplastic fines. (Qva)

Gray-brown, *Poorly Graded Sand with Silt and Gravel (SP-SM)*; wet; fine to coarse, subrounded to subangular gravel; fine to coarse sand; nonplastic fines. (Qva)

Gray-brown to gray, *Silty Sand with Gravel (SM)*; moist; fine to coarse, subrounded to subangular gravel; fine to coarse sand; nonplastic fines; diamict. (Qvd)

- Iron-oxide staining at 90.8 feet.

R-10

R-11

03/12/18

0 20 40 60

85

90

95

0 20 40 60

CONTINUED NEXT SHEET

LEGEND

- I Sample Recovery
- * Sample Not Recovered
- Sonic Core Sample
- Ground Water Level in Well
- ◇ % Fines (<0.075mm)
- ● % Water Content

NOTES

1. Refer to KEY for explanation of symbols, codes, abbreviations and definitions.
2. Groundwater level, if indicated above, is for the date specified and may vary.
3. USCS designation is based on visual-manual classification and selected lab testing.
4. The hole location was measured from existing site features and should be considered approximate.

North Mercer Island Interceptor and Enatai Interceptor Upgrade Project
King County, Washington

LOG OF BORING NME-4

May 2018 21-1-22000-212

SHANNON & WILSON, INC.
Geotechnical and Environmental Consultants

FIG. A-03
Sheet 5 of 12

REV 3 - Approved for Submittal

MASTER_LOG_BFW_21-22000.GPJ_SHAN_WIL.GDT 5/17/18 Log: JCS Rev: EAS Typ: CLP

Total Depth:	*230 ft.*	Northing:	*~ 214,713 ft.*	Drilling Method:	*Sonic Core*	Hole Diam.:	
Top Elevation:	*~ 195 ft.*	Easting:	*~ 1,304,708 ft.*	Drilling Company:	*Holt*	Rod Diam.:	*NWJ*
Vert. Datum:	*KC Metro*	Station:	~	Drill Rig Equipment:	*Terra Sonic*	Hammer Type:	*Automatic*
Horiz. Datum:	*NAD83*	Offset:	~	Other Comments:			

SOIL DESCRIPTION

Refer to the report text for a proper understanding of the subsurface materials and drilling methods. The stratification lines indicated below represent the approximate boundaries between material types, and the transition may be gradual.

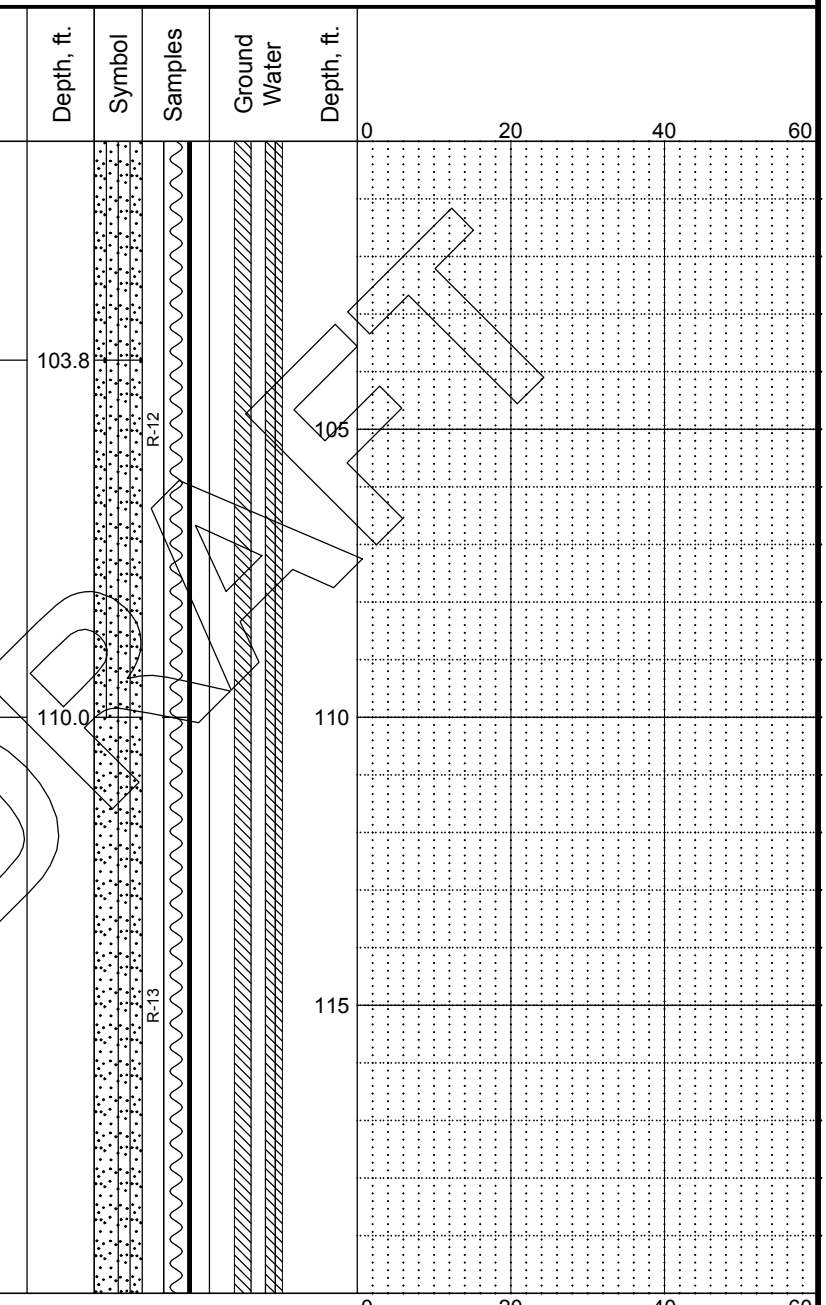
- Few pockets of poorly graded fine to medium sand from 101 to 102.5 feet.

103.8

Gray, *Silty Sand with Gravel (SM)*; wet; fine to coarse, subrounded to subangular gravel; fine to coarse sand; nonplastic fines.
(Qva)

110.0

Gray, *Poorly Graded Sand with Silt, Gravel and Cobbles (SP-SM)*; wet; less than 5% subangular cobbles, fine to coarse, subrounded to subangular gravel; fine to coarse sand; nonplastic fines.
(Qva)



CONTINUED NEXT SHEET

LEGEND

- I Sample Recovery
- * Sample Not Recovered
- Sonic Core Sample
- Ground Water Level in Well
- ◇ % Fines (<0.075mm)
- ● % Water Content

NOTES

1. Refer to KEY for explanation of symbols, codes, abbreviations and definitions.
2. Groundwater level, if indicated above, is for the date specified and may vary.
3. USCS designation is based on visual-manual classification and selected lab testing.
4. The hole location was measured from existing site features and should be considered approximate.

North Mercer Island Interceptor and Enatai Interceptor Upgrade Project
King County, Washington

LOG OF BORING NME-4

May 2018 | 21-1-22000-212

SHANNON & WILSON, INC.
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FIG. A-03
Sheet 6 of 12

REV 3 - Approved for Submittal

MASTER_LOG_BFW_21-22000.GPJ_SHAN_WIL.GDT 5/17/18 Log: JCS Rev: EAS Typ: CLP

Total Depth:	*230 ft.*	Northing:	*~ 214,713 ft.*	Drilling Method:	*Sonic Core*	Hole Diam.:	
Top Elevation:	*~ 195 ft.*	Easting:	*~ 1,304,708 ft.*	Drilling Company:	*Holt*	Rod Diam.:	*NWJ*
Vert. Datum:	*KC Metro*	Station:	~	Drill Rig Equipment:	*Terra Sonic*	Hammer Type:	*Automatic*
Horiz. Datum:	*NAD83*	Offset:	~	Other Comments:			

SOIL DESCRIPTION

Refer to the report text for a proper understanding of the subsurface materials and drilling methods. The stratification lines indicated below represent the approximate boundaries between material types, and the transition may be gradual.

Depth, ft. | Symbol | Samples | Ground Water | Depth, ft.

- Few cobbles below 120 feet.

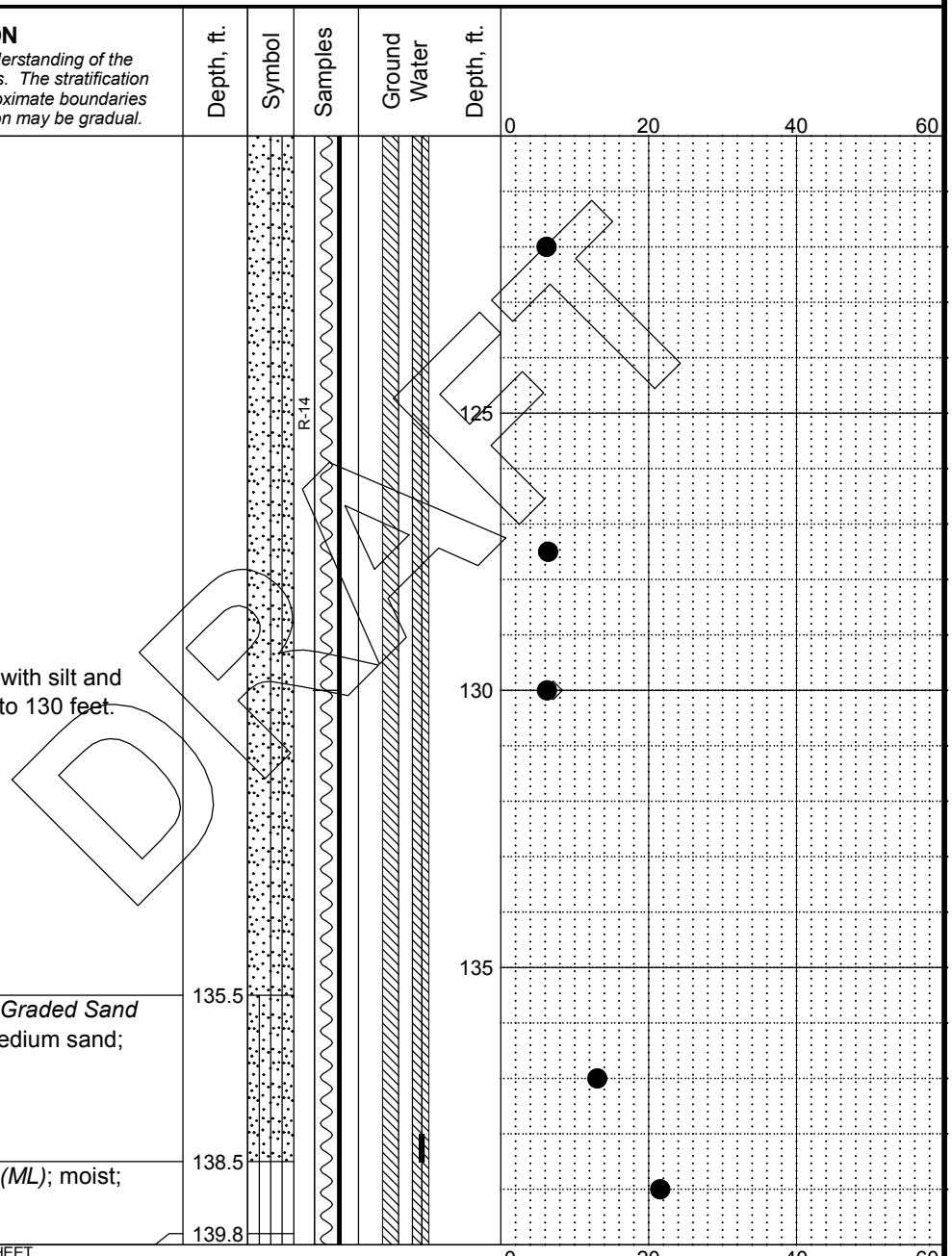
- Layer of poorly graded gravel with silt and sand and cobbles from 129.5 to 130 feet.

135.5 Gray, *Silty Sand (SM)* to *Poorly Graded Sand with Silt (SP-SM)*; wet; fine to medium sand; nonplastic fines. (Qva)

138.5 Gray, *Silt (ML)* to *Silt with Sand (ML)*; moist; fine sand; low plasticity fines. (Qpnl)

139.8

CONTINUED NEXT SHEET



LEGEND

- I Sample Recovery
- * Sample Not Recovered
- Sonic Core Sample
- Ground Water Level in Well

NOTES

1. Refer to KEY for explanation of symbols, codes, abbreviations and definitions.
2. Groundwater level, if indicated above, is for the date specified and may vary.
3. USCS designation is based on visual-manual classification and selected lab testing.
4. The hole location was measured from existing site features and should be considered approximate.

North Mercer Island Interceptor and Enatai Interceptor Upgrade Project
King County, Washington

LOG OF BORING NME-4

May 2018 | 21-1-22000-212

SHANNON & WILSON, INC.
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FIG. A-03
Sheet 7 of 12

REV 3 - Approved for Submittal

MASTER_LOG_BFW_21-22000.GPJ_SHAN_WIL.GDT 5/17/18 Log: JCS Rev: EAS Typ: CLP

Total Depth:	*230 ft.*	Northing:	*~ 214,713 ft.*	Drilling Method:	*Sonic Core*	Hole Diam.:	
Top Elevation:	*~ 195 ft.*	Easting:	*~ 1,304,708 ft.*	Drilling Company:	*Holt*	Rod Diam.:	*NWJ*
Vert. Datum:	*KC Metro*	Station:	~	Drill Rig Equipment:	*Terra Sonic*	Hammer Type:	*Automatic*
Horiz. Datum:	*NAD83*	Offset:	~	Other Comments:			

SOIL DESCRIPTION

Refer to the report text for a proper understanding of the subsurface materials and drilling methods. The stratification lines indicated below represent the approximate boundaries between material types, and the transition may be gradual.

Depth, ft. | Symbol | Samples | Ground Water | Depth, ft.

Gray, *Sandy Silt (ML)* to *Silt with Sand (ML)*; wet; fine sand; nonplastic fines.
(Qpnl)

- Layer of silty, fine sand from 145 to 145.7 feet.

148.7

Gray, *Silty Sand (SM)*; moist to wet; fine sand; nonplastic fines.
(Qpnl)

151.3

Gray, *Sandy Silt (ML)* and *Silty Sand (SM)*; moist to wet; less than 5% fine gravel; fine sand; nonplastic fines.
(Qpnl)

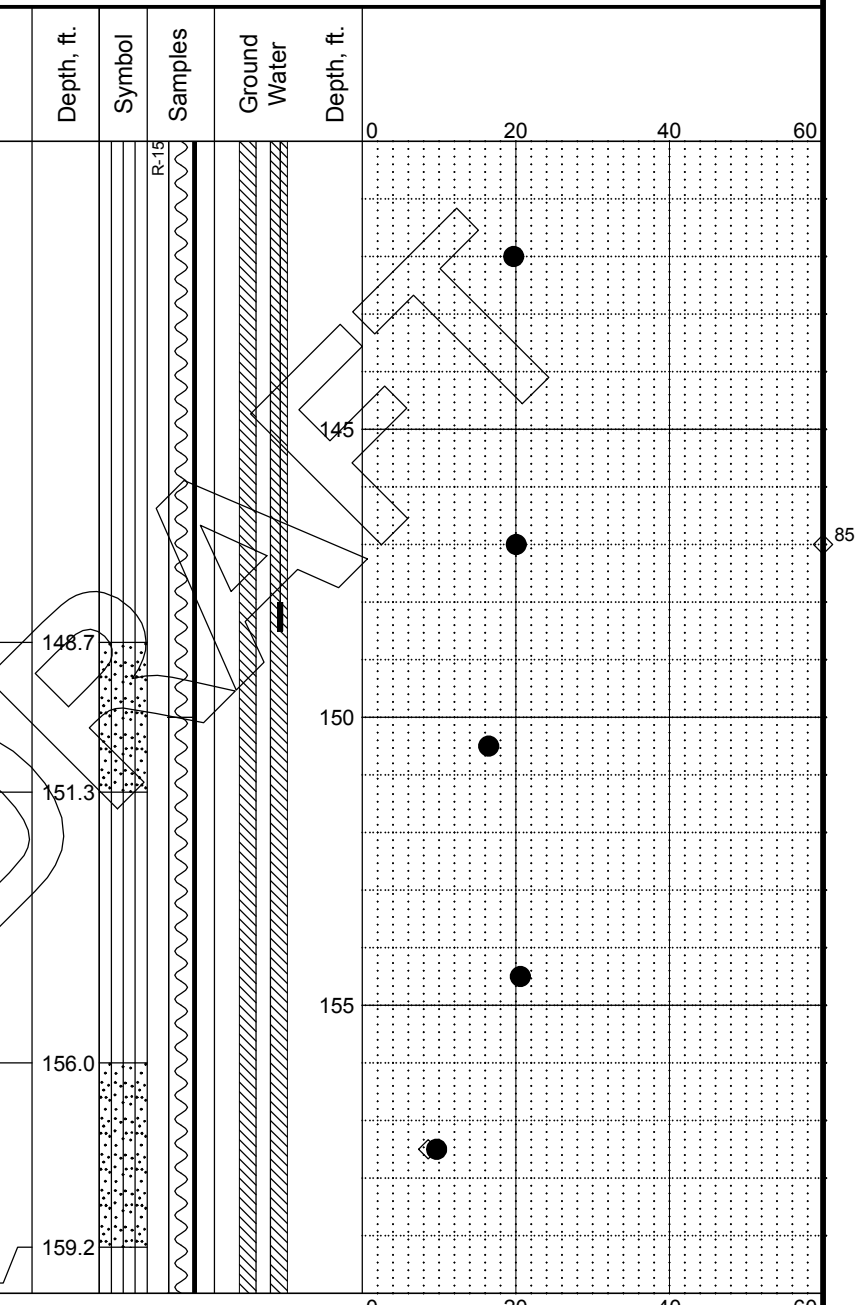
156.0

Gray, *Poorly Graded Sand with Silt and Gravel (SP-SM)*; wet; fine to coarse, subrounded gravel; fine to coarse sand; nonplastic fines.
(Qpnf)

- Layer of low-plasticity silt from 158.2 to 158.4 feet.
- Cobble at 159 feet.

159.2

CONTINUED NEXT SHEET



LEGEND

- I Sample Recovery
- * Sample Not Recovered
- Sonic Core Sample
- Ground Water Level in Well

NOTES

1. Refer to KEY for explanation of symbols, codes, abbreviations and definitions.
2. Groundwater level, if indicated above, is for the date specified and may vary.
3. USCS designation is based on visual-manual classification and selected lab testing.
4. The hole location was measured from existing site features and should be considered approximate.

North Mercer Island Interceptor and
Enatai Interceptor Upgrade Project
King County, Washington

LOG OF BORING NME-4

May 2018 | 21-1-22000-212

SHANNON & WILSON, INC.
Geotechnical and Environmental Consultants

FIG. A-03
Sheet 8 of 12

REV 3 - Approved for Submittal

Log: JCS Rev: EAS Typ: CLP

MASTER_LOG_BFW_21-22000.GPJ SHAN_WIL.GDT 5/17/18

Total Depth:	*230 ft.*	Northing:	*~ 214,713 ft.*	Drilling Method:	*Sonic Core*	Hole Diam.:	
Top Elevation:	*~ 195 ft.*	Easting:	*~ 1,304,708 ft.*	Drilling Company:	*Holt*	Rod Diam.:	*NWJ*
Vert. Datum:	*KC Metro*	Station:	~	Drill Rig Equipment:	*Terra Sonic*	Hammer Type:	*Automatic*
Horiz. Datum:	*NAD83*	Offset:	~	Other Comments:			

SOIL DESCRIPTION

Refer to the report text for a proper understanding of the subsurface materials and drilling methods. The stratification lines indicated below represent the approximate boundaries between material types, and the transition may be gradual.

Gray, *Sandy Silt (ML)* to *Silt with Sand (ML)*; wet; fine sand; nonplastic to low-plasticity fines.
(Qpnl)

160.5

Gray, *Sandy Silt (ML)* to *Silt with Sand (ML)*; moist; fine sand; nonplastic fines.
(Qpnl)

162.3

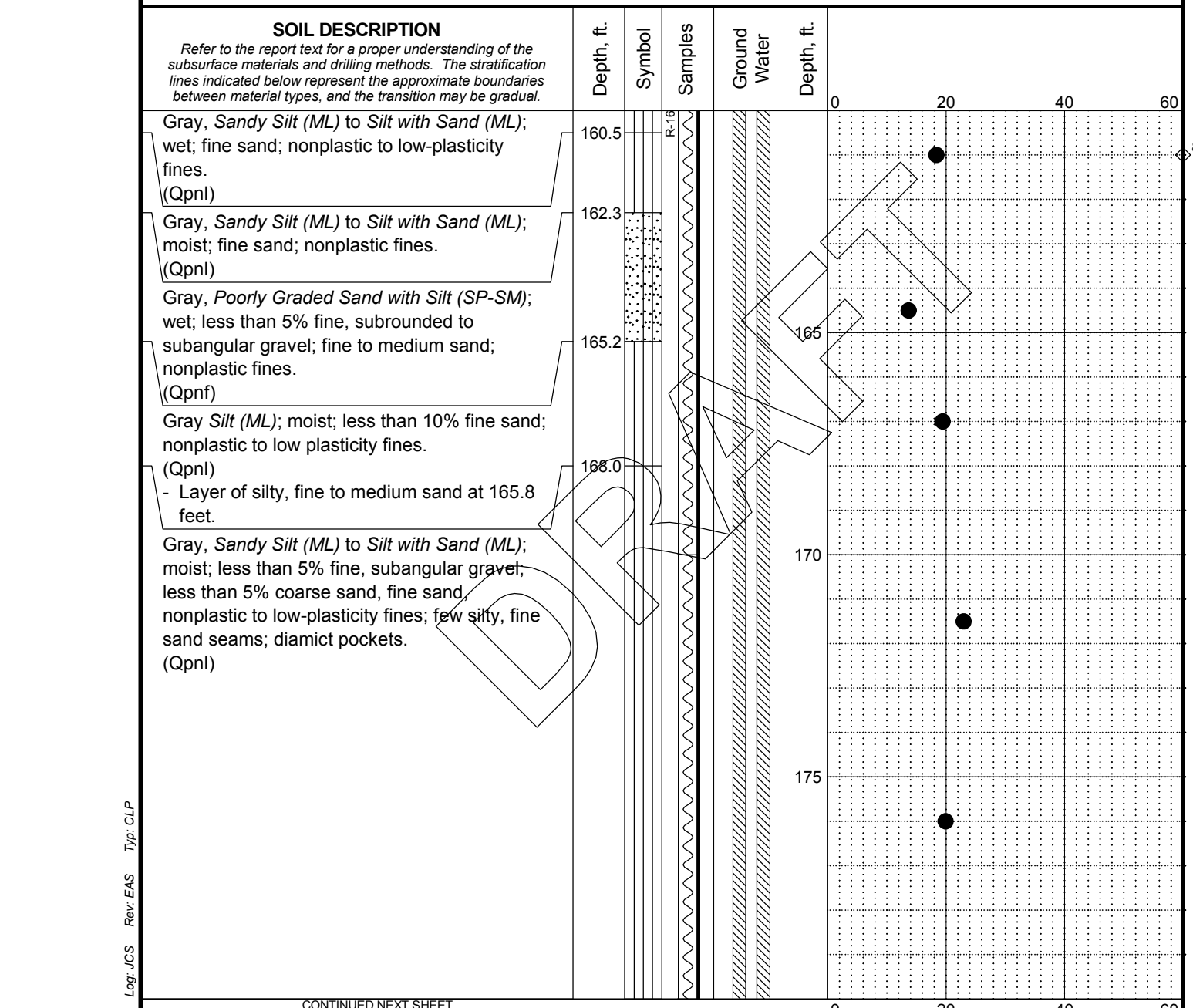
Gray, *Poorly Graded Sand with Silt (SP-SM)*; wet; less than 5% fine, subrounded to subangular gravel; fine to medium sand; nonplastic fines.
(Qpnf)

165.2

Gray *Silt (ML)*; moist; less than 10% fine sand; nonplastic to low plasticity fines.
(Qpnl)
- Layer of silty, fine to medium sand at 165.8 feet.

168.0

Gray, *Sandy Silt (ML)* to *Silt with Sand (ML)*; moist; less than 5% fine, subangular gravel; less than 5% coarse sand, fine sand, nonplastic to low-plasticity fines; few silty, fine sand seams; diamict pockets.
(Qpnl)



CONTINUED NEXT SHEET

LEGEND

- I Sample Recovery
- * Sample Not Recovered
- Sonic Core Sample
- Ground Water Level in Well
- ◇ % Fines (<0.075mm)
- ● % Water Content

NOTES

1. Refer to KEY for explanation of symbols, codes, abbreviations and definitions.
2. Groundwater level, if indicated above, is for the date specified and may vary.
3. USCS designation is based on visual-manual classification and selected lab testing.
4. The hole location was measured from existing site features and should be considered approximate.

North Mercer Island Interceptor and Enatai Interceptor Upgrade Project
King County, Washington

LOG OF BORING NME-4

May 2018 21-1-22000-212

SHANNON & WILSON, INC.
Geotechnical and Environmental Consultants

FIG. A-03
Sheet 9 of 12

REV 3 - Approved for Submittal

MASTER_LOG_BFW_21-22000.GPJ SHAN_WIL.GDT 5/17/18 Log: JCS Rev: EAS Typ: CLP

Total Depth:	*230 ft.*	Northing:	*~ 214,713 ft.*	Drilling Method:	*Sonic Core*	Hole Diam.:	
Top Elevation:	*~ 195 ft.*	Easting:	*~ 1,304,708 ft.*	Drilling Company:	*Holt*	Rod Diam.:	*NWJ*
Vert. Datum:	*KC Metro*	Station:	~	Drill Rig Equipment:	*Terra Sonic*	Hammer Type:	*Automatic*
Horiz. Datum:	*NAD83*	Offset:	~	Other Comments:			

SOIL DESCRIPTION

Refer to the report text for a proper understanding of the subsurface materials and drilling methods. The stratification lines indicated below represent the approximate boundaries between material types, and the transition may be gradual.

Depth, ft. | Symbol | Samples | Ground Water | Depth, ft.

180.0

Gray *Silt (ML)* to *Silt with Sand (ML)*; moist; fine sand; nonplastic fines; few silty, fine sand pockets.
(Qpnl)

183.8

Gray, *Sandy Silt (ML)*; moist; less than 5% fine to coarse, subangular gravel; fine to coarse sand; nonplastic fines.
(Qpnl)

185.0

Gray, *Sandy Silt with Gravel (ML)* to *Sandy Silt (ML)* to *Silty Sand with Gravel (SM)*; moist; fine to coarse, subrounded gravel; fine to medium sand; nonplastic fines; diamict pockets.
(Qpgd)

190.0

Gray, *Silty Sand (SM)* to *Poorly Graded Sand with Silt (SP-SM)*; moist to wet; fine sand; nonplastic fines.
(Qpgo)
- Sandy silt seam at 191 feet.

R-17

R-18

0 20 40 60

185

190

195

0 20 40 60

CONTINUED NEXT SHEET

LEGEND

- I Sample Recovery
- * Sample Not Recovered
- Sonic Core Sample
- Ground Water Level in Well
- ◇ % Fines (<0.075mm)
- ● % Water Content

NOTES

1. Refer to KEY for explanation of symbols, codes, abbreviations and definitions.
2. Groundwater level, if indicated above, is for the date specified and may vary.
3. USCS designation is based on visual-manual classification and selected lab testing.
4. The hole location was measured from existing site features and should be considered approximate.

North Mercer Island Interceptor and Enatai Interceptor Upgrade Project
King County, Washington

LOG OF BORING NME-4

May 2018 21-1-22000-212

SHANNON & WILSON, INC.
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FIG. A-03
Sheet 10 of 12

REV 3 - Approved for Submittal

DRAFT

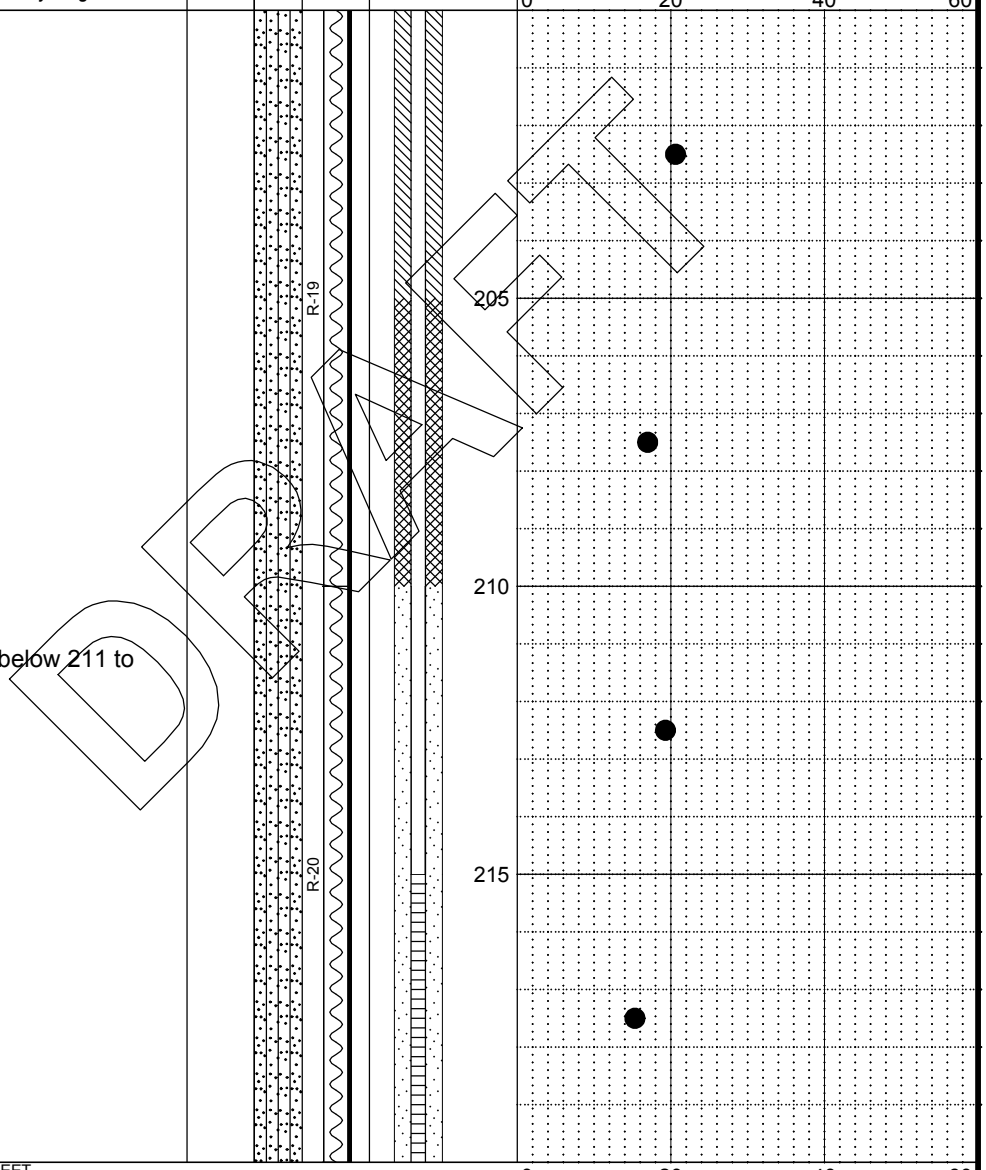
MASTER_LOG_BFW_21-22000.GPJ_SHAN_WIL.GDT 5/17/18 Log: JCS Rev: EAS Typ: CLP

Total Depth:	*230 ft.*	Northing:	*~ 214,713 ft.*	Drilling Method:	*Sonic Core*	Hole Diam.:	
Top Elevation:	*~ 195 ft.*	Easting:	*~ 1,304,708 ft.*	Drilling Company:	*Holt*	Rod Diam.:	*NWJ*
Vert. Datum:	*KC Metro*	Station:	~	Drill Rig Equipment:	*Terra Sonic*	Hammer Type:	*Automatic*
Horiz. Datum:	*NAD83*	Offset:	~	Other Comments:			

SOIL DESCRIPTION

Refer to the report text for a proper understanding of the subsurface materials and drilling methods. The stratification lines indicated below represent the approximate boundaries between material types, and the transition may be gradual.

Depth, ft. | Symbol | Samples | Ground Water | Depth, ft.



- Trace fine, subangular gravel below 211 to 212 feet.

DRAFT

CONTINUED NEXT SHEET

0 20 40 60

◇ % Fines (<0.075mm)
● % Water Content

LEGEND

I Sample Recovery
* Sample Not Recovered
Sonic Core Sample
Ground Water Level in Well

NOTES

1. Refer to KEY for explanation of symbols, codes, abbreviations and definitions.
2. Groundwater level, if indicated above, is for the date specified and may vary.
3. USCS designation is based on visual-manual classification and selected lab testing.
4. The hole location was measured from existing site features and should be considered approximate.

North Mercer Island Interceptor and
Enatai Interceptor Upgrade Project
King County, Washington

LOG OF BORING NME-4

May 2018 21-1-22000-212

SHANNON & WILSON, INC.
Geotechnical and Environmental Consultants

FIG. A-03
Sheet 11 of 12

MASTER_LOG_BFW_21-22000.GPJ SHAN_WIL.GDT 5/17/18 Log: JCS Rev: EAS Typ: CLP

REV 3 - Approved for Submittal

Total Depth:	*230 ft.*	Northing:	*~ 214,713 ft.*	Drilling Method:	*Sonic Core*	Hole Diam.:	
Top Elevation:	*~ 195 ft.*	Easting:	*~ 1,304,708 ft.*	Drilling Company:	*Holt*	Rod Diam.:	*NWJ*
Vert. Datum:	*KC Metro*	Station:	~	Drill Rig Equipment:	*Terra Sonic*	Hammer Type:	*Automatic*
Horiz. Datum:	*NAD83*	Offset:	~	Other Comments:			

SOIL DESCRIPTION

Refer to the report text for a proper understanding of the subsurface materials and drilling methods. The stratification lines indicated below represent the approximate boundaries between material types, and the transition may be gradual.

Depth, ft. | Symbol | Samples | Ground Water | Depth, ft.

- Increasing silt from 226.5 to 229 feet.

R-21

230.0

BOTTOM OF BORING
COMPLETED 12/19/2014

DRAFT

0 20 40 60

225

230

235

0 20 40 60

LEGEND

- Sample Recovery
- * Sample Not Recovered
- Sonic Core Sample
- Ground Water Level in Well
- ◇ % Fines (<0.075mm)
- ● % Water Content

NOTES

1. Refer to KEY for explanation of symbols, codes, abbreviations and definitions.
2. Groundwater level, if indicated above, is for the date specified and may vary.
3. USCS designation is based on visual-manual classification and selected lab testing.
4. The hole location was measured from existing site features and should be considered approximate.

North Mercer Island Interceptor and
Enatai Interceptor Upgrade Project
King County, Washington

LOG OF BORING NME-4

May 2018 21-1-22000-212

SHANNON & WILSON, INC.
Geotechnical and Environmental Consultants

FIG. A-03
Sheet 12 of 12

REV 3 - Approved for Submittal

MASTER_LOG_BFW_21-22000.GPJ SHAN_WIL.GDT 5/17/18 Log: JCS Rev: EAS Typ: CLP

Total Depth:	*171.5 ft.*	Northing:	*~ 217,804 ft.*	Drilling Method:	*Mud Rotary*	Hole Diam.:	*6 in.*
Top Elevation:	*~ 200 ft.*	Easting:	*~ 1,295,645 ft.*	Drilling Company:	*Holt*	Rod Diam.:	*NWJ*
Vert. Datum:	*KC Metro*	Station:	~	Drill Rig Equipment:	*CME*	Hammer Type:	*Automatic*
Horiz. Datum:	*NAD83*	Offset:	~	Other Comments:	~		

SOIL DESCRIPTION

Refer to the report text for a proper understanding of the subsurface materials and drilling methods. The stratification lines indicated below represent the approximate boundaries between material types, and the transition may be gradual.

Asphalt

0.3

Dense to very dense, mottled gray-brown, *Silt (ML)*; moist; less than 5% fine to coarse, subrounded to subangular gravel; less than 5% fine to coarse sand, low to medium plasticity fines; trace iron-oxide stains.
(Qvgl)

10.7

Hard, gray, *Lean Clay with Sand (CL)*; moist; 5% fine to coarse, subrounded to subangular gravel; 10% fine to coarse sand; medium plasticity fines; diamict.
(Qvgl)

14.5

Hard to very dense, gray, *Silt with Sand (ML)*; moist; less than 5% fine, subrounded to subangular gravel; fine to coarse sand; low plasticity fines; diamict.
(Qvgl)

- Seam of silt with gravel from 15 to 17 feet based on drill action.

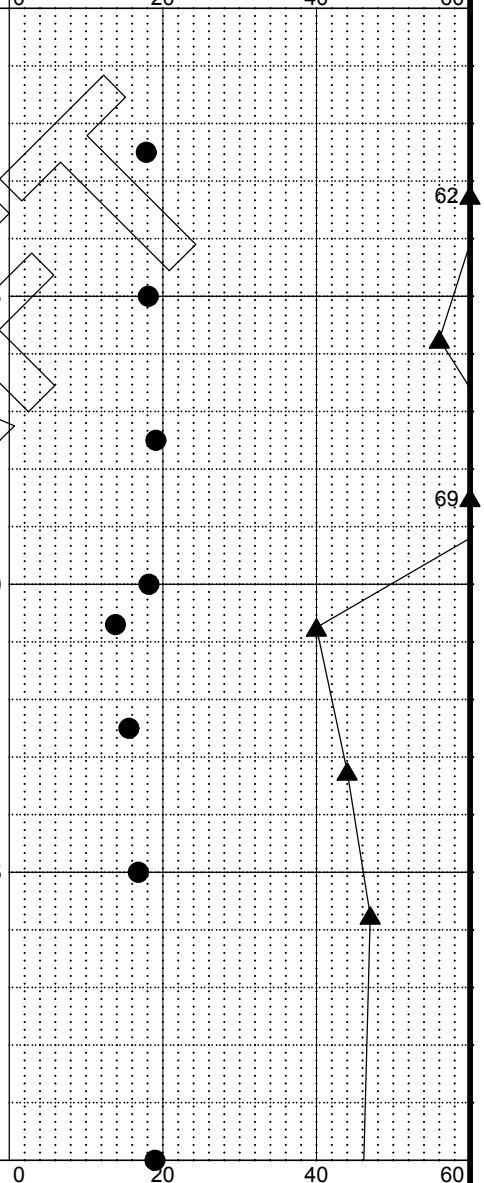
CONTINUED NEXT SHEET

Depth, ft. | Symbol | Samples | Ground Water | Depth, ft.

S-1 S-2 S-3 S-4 S-5 S-6

PENETRATION RESISTANCE (blows/foot)

▲ Hammer Wt. & Drop: *140 lbs / 30 inches*



◇ % Fines (<0.075mm)
● % Water Content
Plastic Limit ⊢●⊣ Liquid Limit
Natural Water Content

LEGEND

- Sample Recovery
- * Sample Not Recovered
- Sonic Core Sample
- 2.0" O.D. Split Spoon Sample
- Ground Water Level in VWP

NOTES

1. Refer to KEY for explanation of symbols, codes, abbreviations and definitions.
2. Groundwater level, if indicated above, is for the date specified and may vary.
3. USCS designation is based on visual-manual classification and selected lab testing.
4. The hole location was measured from existing site features and should be considered approximate.

North Mercer Island Interceptor and Enatai Interceptor Upgrade Project
King County, Washington

LOG OF BORING NME-5

May 2018 | 21-1-22000-212

SHANNON & WILSON, INC.
Geotechnical and Environmental Consultants

FIG. A-04
Sheet 1 of 9

REV 3 - Approved for Submittal

MASTER_LOG_BFW_21-22000.GPJ SHAN_WIL.GDT 5/17/18 Log: EAS Rev: EAS Typ: CLP

Total Depth:	*171.5 ft.*	Northing:	*~ 217,804 ft.*	Drilling Method:	*Mud Rotary*	Hole Diam.:	*6 in.*
Top Elevation:	*~ 200 ft.*	Easting:	*~ 1,295,645 ft.*	Drilling Company:	*Holt*	Rod Diam.:	*NWJ*
Vert. Datum:	*KC Metro*	Station:	~	Drill Rig Equipment:	*CME*	Hammer Type:	*Automatic*
Horiz. Datum:	*NAD83*	Offset:	~	Other Comments:	~		

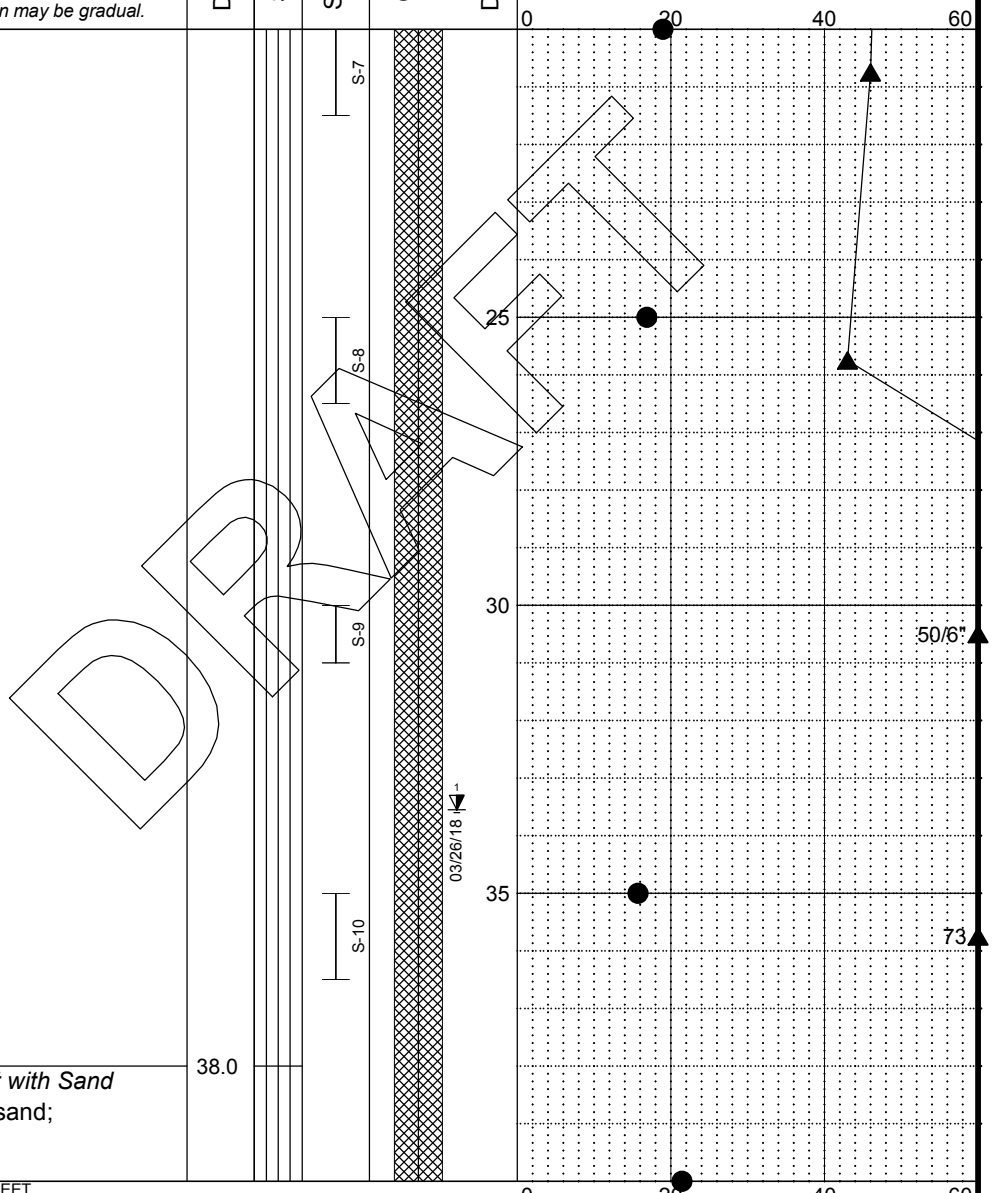
SOIL DESCRIPTION

Refer to the report text for a proper understanding of the subsurface materials and drilling methods. The stratification lines indicated below represent the approximate boundaries between material types, and the transition may be gradual.

Depth, ft. | Symbol | Samples | Ground Water | Depth, ft.

PENETRATION RESISTANCE (blows/foot)

▲ Hammer Wt. & Drop: *140 lbs / 30 inches*



38.0

Very dense, gray *Silt (ML)* to *Silt with Sand (ML)*; moist; less than 15% fine sand; nonplastic to low plasticity fines.

CONTINUED NEXT SHEET

LEGEND

- Sample Recovery
- * Sample Not Recovered
- Sonic Core Sample
- 2.0" O.D. Split Spoon Sample
- Ground Water Level in VWP
- ◇ % Fines (<0.075mm)
- ● % Water Content
- Plastic Limit ⊢●⊣ Liquid Limit
- Natural Water Content

NOTES

1. Refer to KEY for explanation of symbols, codes, abbreviations and definitions.
2. Groundwater level, if indicated above, is for the date specified and may vary.
3. USCS designation is based on visual-manual classification and selected lab testing.
4. The hole location was measured from existing site features and should be considered approximate.

North Mercer Island Interceptor and Enatai Interceptor Upgrade Project
King County, Washington

LOG OF BORING NME-5

May 2018 | 21-1-22000-212

SHANNON & WILSON, INC.
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FIG. A-04
Sheet 2 of 9

REV 3 - Approved for Submittal

MASTER_LOG_BFW_21-22000.GPJ SHAN_WIL.GDT 5/17/18 Log: EAS Rev: EAS Typ: CLP

Total Depth:	*171.5 ft.*	Northing:	*~ 217,804 ft.*	Drilling Method:	*Mud Rotary*	Hole Diam.:	*6 in.*
Top Elevation:	*~ 200 ft.*	Easting:	*~ 1,295,645 ft.*	Drilling Company:	*Holt*	Rod Diam.:	*NWJ*
Vert. Datum:	*KC Metro*	Station:	~	Drill Rig Equipment:	*CME*	Hammer Type:	*Automatic*
Horiz. Datum:	*NAD83*	Offset:	~	Other Comments:	~		

SOIL DESCRIPTION

Refer to the report text for a proper understanding of the subsurface materials and drilling methods. The stratification lines indicated below represent the approximate boundaries between material types, and the transition may be gradual.

Depth, ft. | Symbol | Samples | Ground Water | Depth, ft.

PENETRATION RESISTANCE (blows/foot)

▲ Hammer Wt. & Drop: *140 lbs / 30 inches*

(Qvgl)

S-11

S-12

48.0

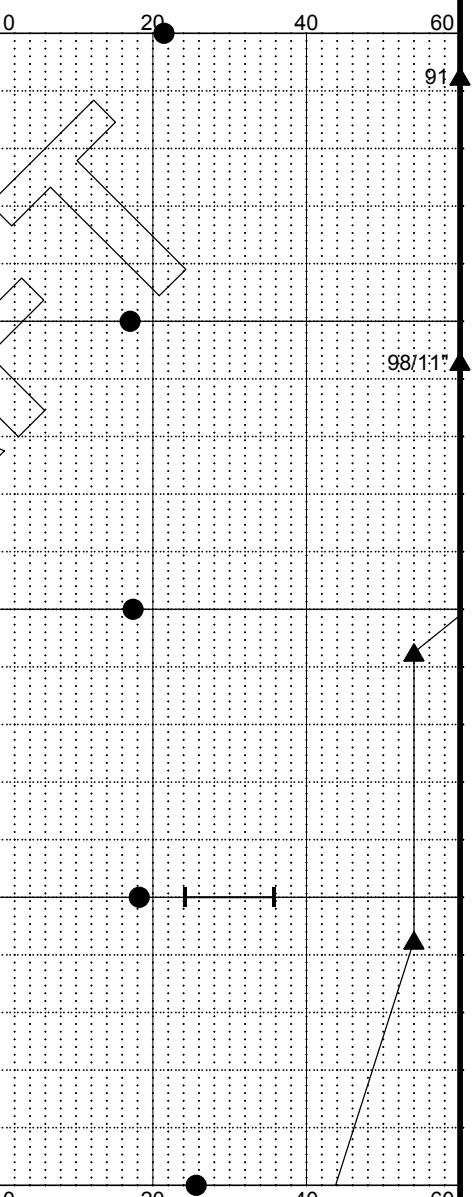
Hard, gray, *Lean Clay with Sand (CL)* to *Lean Clay (CL)*; moist; fine sand; low to medium plasticity fines.
(Qvgl)

S-13

- Few sand seams and pockets below 55 feet.

S-14

CONTINUED NEXT SHEET



◇ % Fines (<0.075mm)
● % Water Content
Plastic Limit ⊢●⊣ Liquid Limit
Natural Water Content

LEGEND

- Sample Recovery
- * Sample Not Recovered
- Sonic Core Sample
- 2.0" O.D. Split Spoon Sample
- Ground Water Level in VWP

NOTES

1. Refer to KEY for explanation of symbols, codes, abbreviations and definitions.
2. Groundwater level, if indicated above, is for the date specified and may vary.
3. USCS designation is based on visual-manual classification and selected lab testing.
4. The hole location was measured from existing site features and should be considered approximate.

North Mercer Island Interceptor and
Enatai Interceptor Upgrade Project
King County, Washington

LOG OF BORING NME-5

May 2018 | 21-1-22000-212

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FIG. A-04
Sheet 3 of 9

REV 3 - Approved for Submittal

DRAFT

MASTER_LOG_BFW_21-22000.GPJ_SHAN_WIL.GDT 5/17/18 Log: EAS Rev: EAS Typ: CLP

Total Depth:	*171.5 ft.*	Northing:	*~ 217,804 ft.*	Drilling Method:	*Mud Rotary*	Hole Diam.:	*6 in.*
Top Elevation:	*~ 200 ft.*	Easting:	*~ 1,295,645 ft.*	Drilling Company:	*Holt*	Rod Diam.:	*NWJ*
Vert. Datum:	*KC Metro*	Station:	~	Drill Rig Equipment:	*CME*	Hammer Type:	*Automatic*
Horiz. Datum:	*NAD83*	Offset:	~	Other Comments:	~		

SOIL DESCRIPTION

Refer to the report text for a proper understanding of the subsurface materials and drilling methods. The stratification lines indicated below represent the approximate boundaries between material types, and the transition may be gradual.

Depth, ft. | Symbol | Samples | Ground Water | Depth, ft.

PENETRATION RESISTANCE (blows/foot)

▲ Hammer Wt. & Drop: *140 lbs / 30 inches*

63.0

Dense to very dense, gray *Silt with Sand (ML) to Sandy Silt (ML)*; moist; less than 10% fine, subrounded to subangular gravel; 10 to 30% fine to coarse sand; nonplastic to low plasticity fines; few diamict pockets.
(Qvgl)

S-15

S-16

03/26/18

S-17

S-18

65

84

70

69

75

0 20 40 60

DRAFT

CONTINUED NEXT SHEET

LEGEND

- Sample Recovery
- * Sample Not Recovered
- Sonic Core Sample
- 2.0" O.D. Split Spoon Sample
- Ground Water Level in VWP
- ◇ % Fines (<0.075mm)
- ● % Water Content
- Plastic Limit ⊢●⊣ Liquid Limit
- Natural Water Content

NOTES

1. Refer to KEY for explanation of symbols, codes, abbreviations and definitions.
2. Groundwater level, if indicated above, is for the date specified and may vary.
3. USCS designation is based on visual-manual classification and selected lab testing.
4. The hole location was measured from existing site features and should be considered approximate.

North Mercer Island Interceptor and Enatai Interceptor Upgrade Project
King County, Washington

LOG OF BORING NME-5

May 2018 | 21-1-22000-212

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FIG. A-04
Sheet 4 of 9

MASTER_LOG_BFW_21-22000.GPJ_SHAN_WIL.GDT 5/17/18 Log: EAS Rev: EAS Typ: CLP

REV 3 - Approved for Submittal

Total Depth:	*171.5 ft.*	Northing:	*~ 217,804 ft.*	Drilling Method:	*Mud Rotary*	Hole Diam.:	*6 in.*
Top Elevation:	*~ 200 ft.*	Easting:	*~ 1,295,645 ft.*	Drilling Company:	*Holt*	Rod Diam.:	*NWJ*
Vert. Datum:	*KC Metro*	Station:	~	Drill Rig Equipment:	*CME*	Hammer Type:	*Automatic*
Horiz. Datum:	*NAD83*	Offset:	~	Other Comments:	~		

SOIL DESCRIPTION

Refer to the report text for a proper understanding of the subsurface materials and drilling methods. The stratification lines indicated below represent the approximate boundaries between material types, and the transition may be gradual.

Depth, ft. | Symbol | Samples | Ground Water | Depth, ft.

PENETRATION RESISTANCE (blows/foot)

▲ Hammer Wt. & Drop: *140 lbs / 30 inches*

0 20 40 60

S-19 — 50/6"

S-20 — 85 — 50/5"

S-21 — 90 — 50/4"

S-22 — 95 — 50/5"

DRAFT

- Silt with gravel pockets at 95 feet.

97.0

Very dense, *Sandy Silt (ML)*; moist; less than 15% fine, subrounded to subangular gravel; fine to coarse sand; nonplastic fines; diamict. (Qvgl)

CONTINUED NEXT SHEET

0 20 40 60

◇ % Fines (<0.075mm)

● % Water Content

Plastic Limit ⊢●⊣ Liquid Limit

Natural Water Content

LEGEND

- I Sample Recovery
- * Sample Not Recovered
- ⊠ Sonic Core Sample
- ⌶ 2.0" O.D. Split Spoon Sample
- ▼ Ground Water Level in VWP

NOTES

1. Refer to KEY for explanation of symbols, codes, abbreviations and definitions.
2. Groundwater level, if indicated above, is for the date specified and may vary.
3. USCS designation is based on visual-manual classification and selected lab testing.
4. The hole location was measured from existing site features and should be considered approximate.

North Mercer Island Interceptor and Enatai Interceptor Upgrade Project
King County, Washington

LOG OF BORING NME-5

May 2018 | 21-1-22000-212

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FIG. A-04
Sheet 5 of 9

MASTER_LOG_BFW_21-22000.GPJ SHAN_WIL.GDT 5/17/18 Log: EAS Rev: EAS Typ: CLP

REV 3 - Approved for Submittal

Total Depth:	171.5 ft.	Northing:	~ 217,804 ft.	Drilling Method:	Mud Rotary	Hole Diam.:	6 in.
Top Elevation:	~ 200 ft.	Easting:	~ 1,295,645 ft.	Drilling Company:	Holt	Rod Diam.:	NWJ
Vert. Datum:	KC Metro	Station:	~	Drill Rig Equipment:	CME	Hammer Type:	Automatic
Horiz. Datum:	NAD83	Offset:	~	Other Comments:	~		

SOIL DESCRIPTION

Refer to the report text for a proper understanding of the subsurface materials and drilling methods. The stratification lines indicated below represent the approximate boundaries between material types, and the transition may be gradual.

Depth, ft. | Symbol | Samples | Ground Water | Depth, ft.

PENETRATION RESISTANCE (blows/foot)

▲ Hammer Wt. & Drop: *140 lbs / 30 inches*

- Wet, silty sand seam at 100 feet.

- Moist, silty sand seams at 105 feet.

S-23 — 50/5"

S-24 — 105 — 50/4"

S-25 — 110 — 50/5"

S-26 — 115 — 50/6"

0 20 40 60

DRAFT

CONTINUED NEXT SHEET

LEGEND

- I Sample Recovery
- * Sample Not Recovered
- Sonic Core Sample
- 2.0" O.D. Split Spoon Sample
- Ground Water Level in VWP
- ◇ % Fines (<0.075mm)
- ● % Water Content
- Plastic Limit ⊢●⊣ Liquid Limit
- Natural Water Content

NOTES

1. Refer to KEY for explanation of symbols, codes, abbreviations and definitions.
2. Groundwater level, if indicated above, is for the date specified and may vary.
3. USCS designation is based on visual-manual classification and selected lab testing.
4. The hole location was measured from existing site features and should be considered approximate.

North Mercer Island Interceptor and Enatai Interceptor Upgrade Project
King County, Washington

LOG OF BORING NME-5

May 2018 | 21-1-22000-212

SHANNON & WILSON, INC.
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FIG. A-04
Sheet 6 of 9

MASTER_LOG_BFW_21-22000.GPJ SHAN_WIL.GDT 5/17/18 Log: EAS Rev: EAS Typ: CLP

REV 3 - Approved for Submittal

Total Depth:	*171.5 ft.*	Northing:	*~ 217,804 ft.*	Drilling Method:	*Mud Rotary*	Hole Diam.:	*6 in.*
Top Elevation:	*~ 200 ft.*	Easting:	*~ 1,295,645 ft.*	Drilling Company:	*Holt*	Rod Diam.:	*NWJ*
Vert. Datum:	*KC Metro*	Station:	~	Drill Rig Equipment:	*CME*	Hammer Type:	*Automatic*
Horiz. Datum:	*NAD83*	Offset:	~	Other Comments:	~		

SOIL DESCRIPTION

Refer to the report text for a proper understanding of the subsurface materials and drilling methods. The stratification lines indicated below represent the approximate boundaries between material types, and the transition may be gradual.

Depth, ft. | Symbol | Samples | Ground Water | Depth, ft.

PENETRATION RESISTANCE (blows/foot)

▲ Hammer Wt. & Drop: *140 lbs / 30 inches*

0 20 40 60

S-27 50/6"

S-28 125 50/3"

128.0

Hard, gray, *Fat Clay (CH)*; moist; less than 5% fine sand; high plasticity fines.
(Qvgl)

S-29 130

S-30 135

DRAFT

CONTINUED NEXT SHEET

0 20 40 60 LL=74

LEGEND

- I Sample Recovery
- * Sample Not Recovered
- Sonic Core Sample
- 2.0" O.D. Split Spoon Sample
- Ground Water Level in VWP
- ◇ % Fines (<0.075mm)
- ● % Water Content
- Plastic Limit ⊢●⊣ Liquid Limit
- Natural Water Content

NOTES

1. Refer to KEY for explanation of symbols, codes, abbreviations and definitions.
2. Groundwater level, if indicated above, is for the date specified and may vary.
3. USCS designation is based on visual-manual classification and selected lab testing.
4. The hole location was measured from existing site features and should be considered approximate.

North Mercer Island Interceptor and
Enatai Interceptor Upgrade Project
King County, Washington

LOG OF BORING NME-5

May 2018 21-1-22000-212

SHANNON & WILSON, INC.
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FIG. A-04
Sheet 7 of 9

REV 3 - Approved for Submittal

MASTER_LOG_BFW_21-22000.GPJ SHAN_WIL.GDT 5/17/18 Log: EAS Rev: EAS Typ: CLP

Total Depth:	*171.5 ft.*	Northing:	*~ 217,804 ft.*	Drilling Method:	*Mud Rotary*	Hole Diam.:	*6 in.*
Top Elevation:	*~ 200 ft.*	Easting:	*~ 1,295,645 ft.*	Drilling Company:	*Holt*	Rod Diam.:	*NWJ*
Vert. Datum:	*KC Metro*	Station:	~	Drill Rig Equipment:	*CME*	Hammer Type:	*Automatic*
Horiz. Datum:	*NAD83*	Offset:	~	Other Comments:	~		

SOIL DESCRIPTION

Refer to the report text for a proper understanding of the subsurface materials and drilling methods. The stratification lines indicated below represent the approximate boundaries between material types, and the transition may be gradual.

Depth, ft. | Symbol | Samples | Ground Water | Depth, ft.

PENETRATION RESISTANCE (blows/foot)

▲ Hammer Wt. & Drop: *140 lbs / 30 inches*

0 20 40 60

S-31

S-32

145

148.0

Hard, gray, *Lean Clay with Sand (CL)*; moist; fine sand; medium plasticity fines. (Qvgl)

S-33

150

153.0

Very dense, gray, *Sandy Silt (ML)*; moist to wet; fine sand; nonplastic fines. (Qvgl)

- Few clay seams with blocky texture and slickensides at 155 feet.

S-34

155

74

CONTINUED NEXT SHEET

0 20 40 60

◇ % Fines (<0.075mm)

● % Water Content

Plastic Limit ⊢●⊣ Liquid Limit

Natural Water Content

LEGEND

I Sample Recovery	▼ Ground Water Level in VWP
* Sample Not Recovered	
⊠ Sonic Core Sample	
⊥ 2.0" O.D. Split Spoon Sample	

NOTES

1. Refer to KEY for explanation of symbols, codes, abbreviations and definitions.
2. Groundwater level, if indicated above, is for the date specified and may vary.
3. USCS designation is based on visual-manual classification and selected lab testing.
4. The hole location was measured from existing site features and should be considered approximate.

North Mercer Island Interceptor and Enatai Interceptor Upgrade Project
King County, Washington

LOG OF BORING NME-5

May 2018 21-1-22000-212

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FIG. A-04
Sheet 8 of 9

REV 3 - Approved for Submittal

MASTER_LOG_BFW_21-22000.GPJ SHAN_WIL.GDT 5/17/18 Log: EAS Rev: EAS Typ: CLP

Total Depth:	*171.5 ft.*	Northing:	*~ 217,804 ft.*	Drilling Method:	*Mud Rotary*	Hole Diam.:	*6 in.*
Top Elevation:	*~ 200 ft.*	Easting:	*~ 1,295,645 ft.*	Drilling Company:	*Holt*	Rod Diam.:	*NWJ*
Vert. Datum:	*KC Metro*	Station:	~	Drill Rig Equipment:	*CME*	Hammer Type:	*Automatic*
Horiz. Datum:	*NAD83*	Offset:	~	Other Comments:	~		

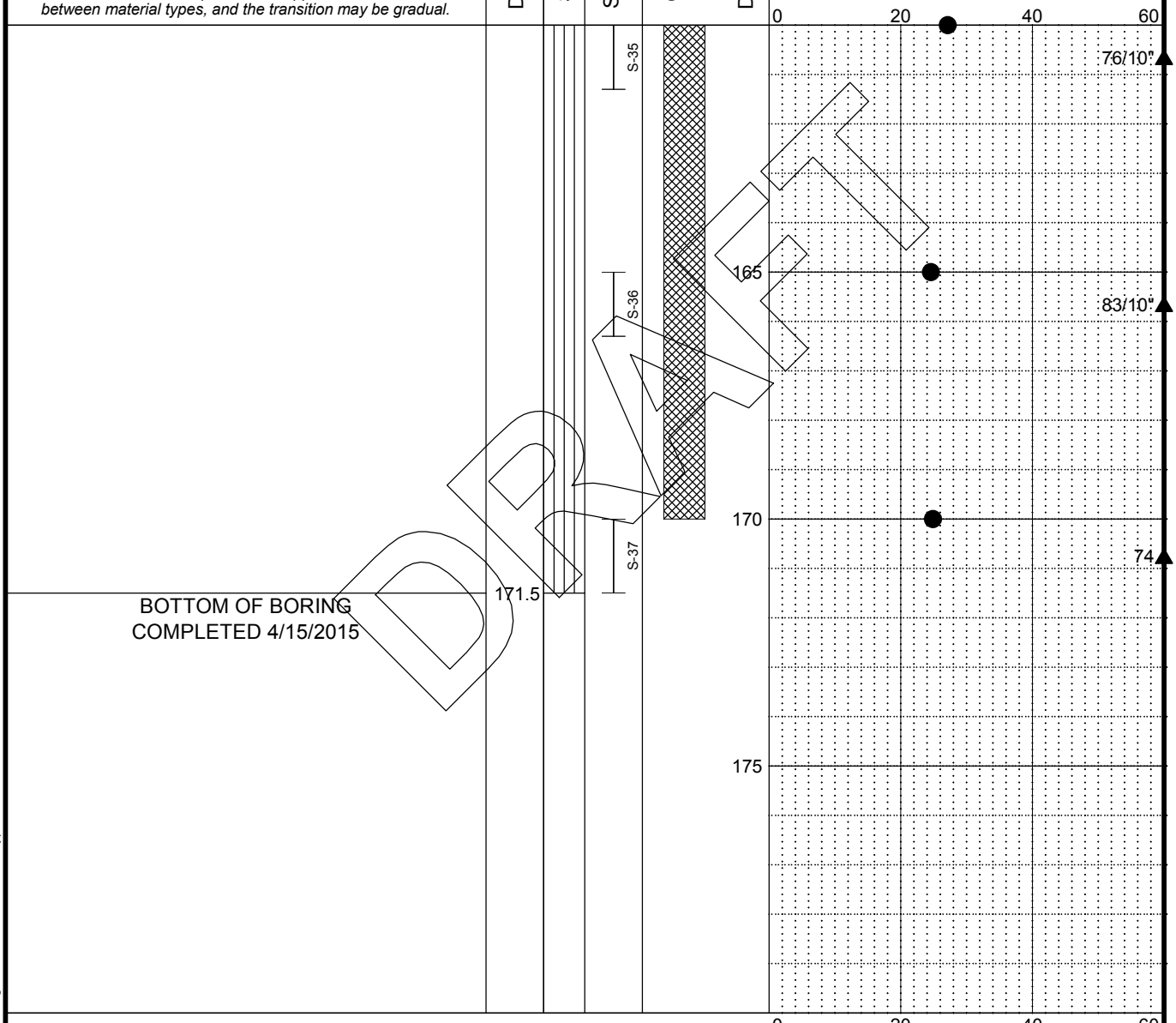
SOIL DESCRIPTION

Refer to the report text for a proper understanding of the subsurface materials and drilling methods. The stratification lines indicated below represent the approximate boundaries between material types, and the transition may be gradual.

Depth, ft. | Symbol | Samples | Ground Water | Depth, ft.

PENETRATION RESISTANCE (blows/foot)

▲ Hammer Wt. & Drop: *140 lbs / 30 inches*



LEGEND

- Sample Recovery
- * Sample Not Recovered
- Sonic Core Sample
- 2.0" O.D. Split Spoon Sample
- Ground Water Level in VWP
- ◇ % Fines (<0.075mm)
- ● % Water Content
- Plastic Limit ⊢●⊣ Liquid Limit
- Natural Water Content

NOTES

1. Refer to KEY for explanation of symbols, codes, abbreviations and definitions.
2. Groundwater level, if indicated above, is for the date specified and may vary.
3. USCS designation is based on visual-manual classification and selected lab testing.
4. The hole location was measured from existing site features and should be considered approximate.

North Mercer Island Interceptor and
Enatai Interceptor Upgrade Project
King County, Washington

LOG OF BORING NME-5

May 2018 | 21-1-22000-212

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FIG. A-04
Sheet 9 of 9

REV 3 - Approved for Submittal

MASTER_LOG_BFW_21-22000.GPJ_SHAN_WIL.GDT 5/17/18 *Log: EAS Rev: EAS Typ: CLP*

Total Depth:	*121.5 ft.*	Northing:	*~ 217,263 ft.*	Drilling Method:	*Mud Rotary*	Hole Diam.:	*6 in.*
Top Elevation:	*~ 148 ft.*	Easting:	*~ 1,296,552 ft.*	Drilling Company:	*Holt*	Rod Diam.:	*NWJ*
Vert. Datum:	*KC Metro*	Station:	~	Drill Rig Equipment:	*Mobile B-84*	Hammer Type:	*Automatic*
Horiz. Datum:	*NAD83*	Offset:	~	Other Comments:	~		

SOIL DESCRIPTION

Refer to the report text for a proper understanding of the subsurface materials and drilling methods. The stratification lines indicated below represent the approximate boundaries between material types, and the transition may be gradual.

Asphalt.

Gray, *Well-Graded Sand with Gravel (SW)*; moist.
(Hf)

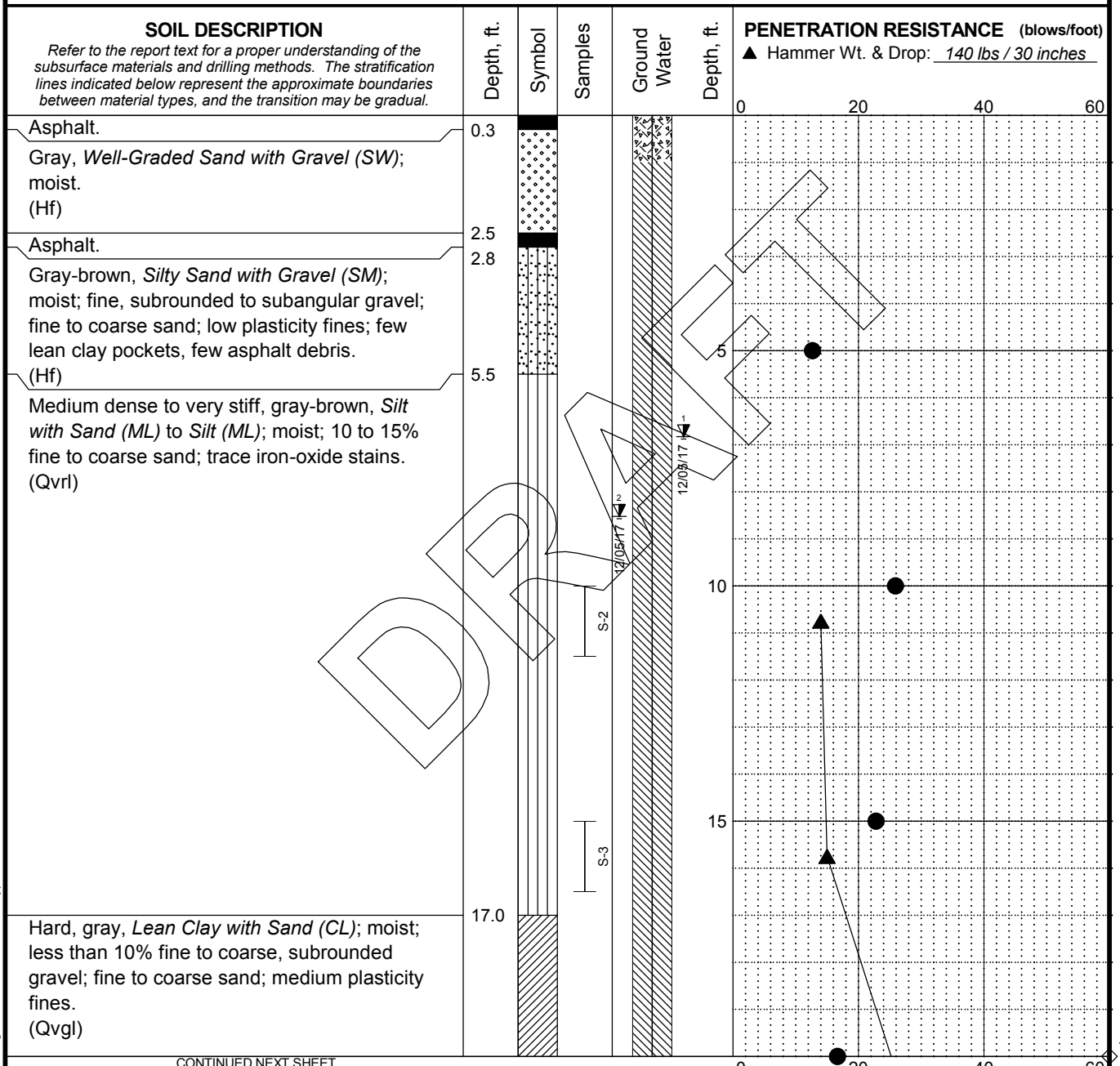
Asphalt.

Gray-brown, *Silty Sand with Gravel (SM)*; moist; fine, subrounded to subangular gravel; fine to coarse sand; low plasticity fines; few lean clay pockets, few asphalt debris.
(Hf)

Medium dense to very stiff, gray-brown, *Silt with Sand (ML)* to *Silt (ML)*; moist; 10 to 15% fine to coarse sand; trace iron-oxide stains.
(Qvrl)

Hard, gray, *Lean Clay with Sand (CL)*; moist; less than 10% fine to coarse, subrounded gravel; fine to coarse sand; medium plasticity fines.
(Qvgl)

CONTINUED NEXT SHEET



DRAFT

LEGEND

- Sample Recovery
- * Sample Not Recovered
- Sonic Core Sample
- 2.0" O.D. Split Spoon Sample
- Ground Water Level in VWP

NOTES

1. Refer to KEY for explanation of symbols, codes, abbreviations and definitions.
2. Groundwater level, if indicated above, is for the date specified and may vary.
3. USCS designation is based on visual-manual classification and selected lab testing.
4. The hole location was measured from existing site features and should be considered approximate.

North Mercer Island Interceptor and Enatai Interceptor Upgrade Project
King County, Washington

LOG OF BORING NME-6

May 2018 | 21-1-22000-212

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FIG. A-05
Sheet 1 of 7

REV 3 - Approved for Submittal

MASTER_LOG_BFW_21-22000.GPJ SHAN_WIL.GDT 5/17/18 Log: GBB Rev: EAS Typ: LKN

Total Depth:	*121.5 ft.*	Northing:	*~ 217,263 ft.*	Drilling Method:	*Mud Rotary*	Hole Diam.:	*6 in.*
Top Elevation:	*~ 148 ft.*	Easting:	*~ 1,296,552 ft.*	Drilling Company:	*Holt*	Rod Diam.:	*NWJ*
Vert. Datum:	*KC Metro*	Station:	~	Drill Rig Equipment:	*Mobile B-84*	Hammer Type:	*Automatic*
Horiz. Datum:	*NAD83*	Offset:	~	Other Comments:	~		

SOIL DESCRIPTION

Refer to the report text for a proper understanding of the subsurface materials and drilling methods. The stratification lines indicated below represent the approximate boundaries between material types, and the transition may be gradual.

Depth, ft. | Symbol | Samples | Ground Water | Depth, ft.

PENETRATION RESISTANCE (blows/foot)

▲ Hammer Wt. & Drop: *140 lbs / 30 inches*

0 20 40 60 77

- Silt with gravel from 27 to 32 feet based on drill action.

33.0

Dense to very dense to hard, gray *Silt with Sand (ML)* to *Lean Clay with Sand (CL)*; moist, 5% fine to coarse, subrounded to subangular gravel; fine to coarse sand; low to medium plasticity fines; diamict-like.
(Qvgl)

S-4 S-5 S-6 S-7

25 30 35

0 20 40 60

CONTINUED NEXT SHEET

DRAFT

LEGEND

- Sample Recovery
- * Sample Not Recovered
- Sonic Core Sample
- 2.0" O.D. Split Spoon Sample
- Ground Water Level in VWP

◇ % Fines (<0.075mm)
● % Water Content
Plastic Limit ⊢●⊣ Liquid Limit
Natural Water Content

NOTES

1. Refer to KEY for explanation of symbols, codes, abbreviations and definitions.
2. Groundwater level, if indicated above, is for the date specified and may vary.
3. USCS designation is based on visual-manual classification and selected lab testing.
4. The hole location was measured from existing site features and should be considered approximate.

North Mercer Island Interceptor and Enatai Interceptor Upgrade Project
King County, Washington

LOG OF BORING NME-6

May 2018 | 21-1-22000-212

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FIG. A-05
Sheet 2 of 7

MASTER_LOG_BFW_21-22000.GPJ SHAN_WIL.GDT 5/17/18 Log: GBB Rev: EAS Typ: LKN

REV 3 - Approved for Submittal

Total Depth:	*121.5 ft.*	Northing:	*~ 217,263 ft.*	Drilling Method:	*Mud Rotary*	Hole Diam.:	*6 in.*
Top Elevation:	*~ 148 ft.*	Easting:	*~ 1,296,552 ft.*	Drilling Company:	*Holt*	Rod Diam.:	*NWJ*
Vert. Datum:	*KC Metro*	Station:	~	Drill Rig Equipment:	*Mobile B-84*	Hammer Type:	*Automatic*
Horiz. Datum:	*NAD83*	Offset:	~	Other Comments:	~		

SOIL DESCRIPTION

Refer to the report text for a proper understanding of the subsurface materials and drilling methods. The stratification lines indicated below represent the approximate boundaries between material types, and the transition may be gradual.

Depth, ft. | Symbol | Samples | Ground Water | Depth, ft.

PENETRATION RESISTANCE (blows/foot)

▲ Hammer Wt. & Drop: *140 lbs / 30 inches*

0 20 40 60

S-8

S-9

S-10

S-11

45

76

50

55

53.0

Very stiff to hard, gray, *Fat Clay (CH)* to *Lean Clay (CL)*; moist; medium to high plasticity fines.
(Qvgl)

DRAFT

CONTINUED NEXT SHEET

0 20 40 60

◇ % Fines (<0.075mm)
● % Water Content
Plastic Limit ⊢●⊣ Liquid Limit
Natural Water Content

LEGEND

- I Sample Recovery
- * Sample Not Recovered
- ⊠ Sonic Core Sample
- ⊥ 2.0" O.D. Split Spoon Sample
- ▼ Ground Water Level in VWP

NOTES

1. Refer to KEY for explanation of symbols, codes, abbreviations and definitions.
2. Groundwater level, if indicated above, is for the date specified and may vary.
3. USCS designation is based on visual-manual classification and selected lab testing.
4. The hole location was measured from existing site features and should be considered approximate.

North Mercer Island Interceptor and
Enatai Interceptor Upgrade Project
King County, Washington

LOG OF BORING NME-6

May 2018 21-1-22000-212

SHANNON & WILSON, INC.
Geotechnical and Environmental Consultants

FIG. A-05
Sheet 3 of 7

REV 3 - Approved for Submittal

MASTER_LOG_BFW_21-22000.GPJ SHAN_WIL.GDT 5/17/18 Log: GBB Rev: EAS Typ: LKN

Total Depth:	*121.5 ft.*	Northing:	*~ 217,263 ft.*	Drilling Method:	*Mud Rotary*	Hole Diam.:	*6 in.*
Top Elevation:	*~ 148 ft.*	Easting:	*~ 1,296,552 ft.*	Drilling Company:	*Holt*	Rod Diam.:	*NWJ*
Vert. Datum:	*KC Metro*	Station:	~	Drill Rig Equipment:	*Mobile B-84*	Hammer Type:	*Automatic*
Horiz. Datum:	*NAD83*	Offset:	~	Other Comments:	~		

SOIL DESCRIPTION

Refer to the report text for a proper understanding of the subsurface materials and drilling methods. The stratification lines indicated below represent the approximate boundaries between material types, and the transition may be gradual.

Depth, ft. | Symbol | Samples | Ground Water | Depth, ft.

PENETRATION RESISTANCE (blows/foot)

▲ Hammer Wt. & Drop: *140 lbs / 30 inches*

63.0

Very dense to hard, *Lean Clay with Sand (CL)* to *Sandy Lean Clay (CL)*; less than 5% fine, subrounded to subangular gravel, fine to coarse sand, low to medium plasticity fines; diamict.
(Qvgl)

S-12 S-13 S-14 S-15

0 20 40 60

65 70 75

61

DRAFT

CONTINUED NEXT SHEET

0 20 40 60

LEGEND

- Sample Recovery
- * Sample Not Recovered
- Sonic Core Sample
- 2.0" O.D. Split Spoon Sample
- Ground Water Level in VWP

◇ % Fines (<0.075mm)
● % Water Content
Plastic Limit ⊢●⊣ Liquid Limit
Natural Water Content

NOTES

1. Refer to KEY for explanation of symbols, codes, abbreviations and definitions.
2. Groundwater level, if indicated above, is for the date specified and may vary.
3. USCS designation is based on visual-manual classification and selected lab testing.
4. The hole location was measured from existing site features and should be considered approximate.

North Mercer Island Interceptor and Enatai Interceptor Upgrade Project
King County, Washington

LOG OF BORING NME-6

May 2018 | 21-1-22000-212

SHANNON & WILSON, INC.
Geotechnical and Environmental Consultants

FIG. A-05
Sheet 4 of 7

MASTER_LOG_BFW_21-22000.GPJ_SHAN_WIL.GDT 5/17/18 Log: GBB Rev: EAS Typ: LKN

REV 3 - Approved for Submittal

Total Depth:	*121.5 ft.*	Northing:	*~ 217,263 ft.*	Drilling Method:	*Mud Rotary*	Hole Diam.:	*6 in.*
Top Elevation:	*~ 148 ft.*	Easting:	*~ 1,296,552 ft.*	Drilling Company:	*Holt*	Rod Diam.:	*NWJ*
Vert. Datum:	*KC Metro*	Station:	~	Drill Rig Equipment:	*Mobile B-84*	Hammer Type:	*Automatic*
Horiz. Datum:	*NAD83*	Offset:	~	Other Comments:	~		

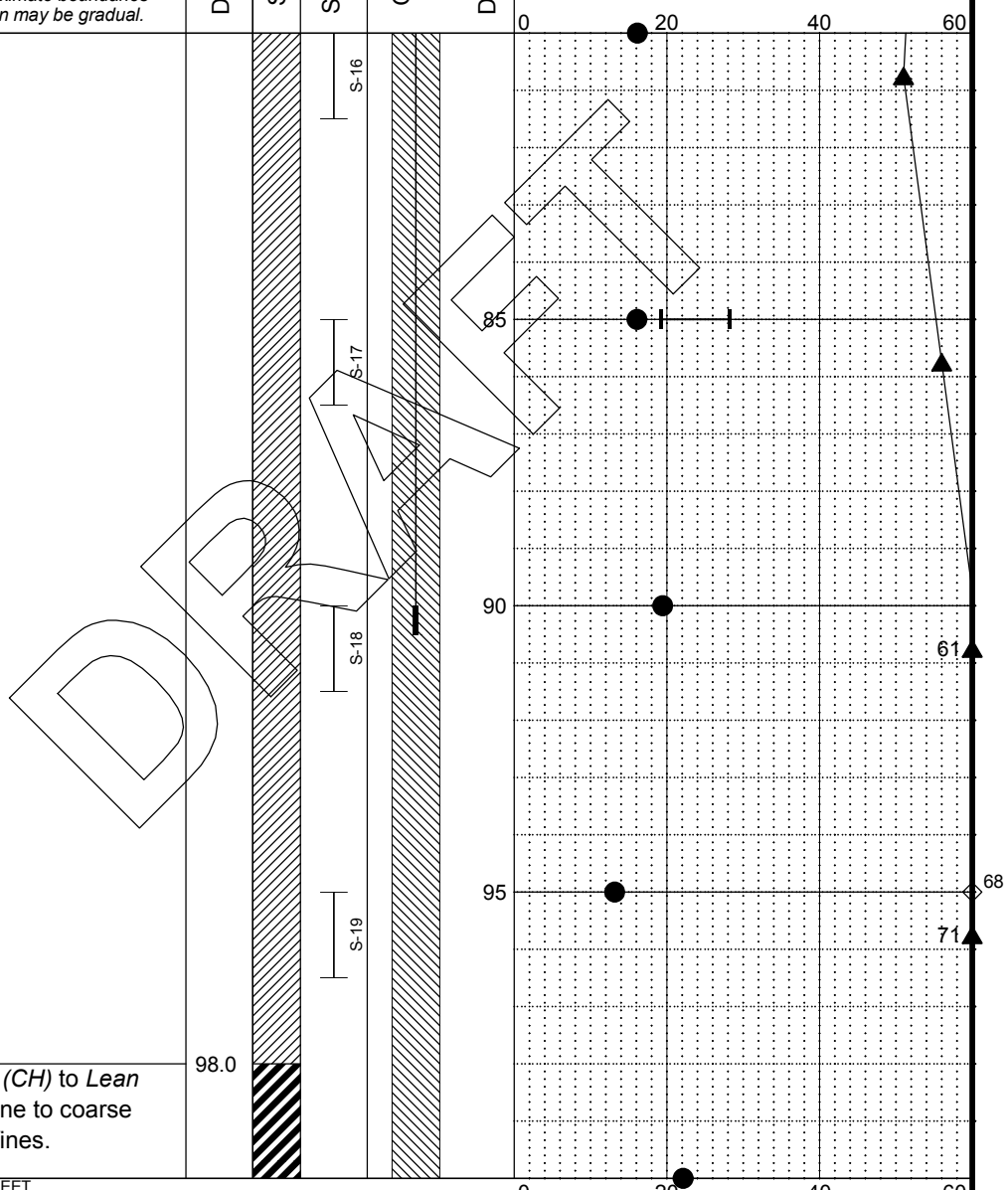
SOIL DESCRIPTION

Refer to the report text for a proper understanding of the subsurface materials and drilling methods. The stratification lines indicated below represent the approximate boundaries between material types, and the transition may be gradual.

Depth, ft. | Symbol | Samples | Ground Water | Depth, ft.

PENETRATION RESISTANCE (blows/foot)

▲ Hammer Wt. & Drop: *140 lbs / 30 inches*



98.0

Very stiff to hard, gray, *Fat Clay (CH)* to *Lean Clay (CL)*; moist; less than 5% fine to coarse sand; medium to high plasticity fines.

CONTINUED NEXT SHEET

LEGEND

- I Sample Recovery
- * Sample Not Recovered
- Sonic Core Sample
- 2.0" O.D. Split Spoon Sample
- Ground Water Level in VWP
- ◇ % Fines (<0.075mm)
- ● % Water Content
- Plastic Limit ⊢●⊣ Liquid Limit
- Natural Water Content

NOTES

1. Refer to KEY for explanation of symbols, codes, abbreviations and definitions.
2. Groundwater level, if indicated above, is for the date specified and may vary.
3. USCS designation is based on visual-manual classification and selected lab testing.
4. The hole location was measured from existing site features and should be considered approximate.

North Mercer Island Interceptor and Enatai Interceptor Upgrade Project
King County, Washington

LOG OF BORING NME-6

May 2018 | 21-1-22000-212

SHANNON & WILSON, INC.
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FIG. A-05
Sheet 5 of 7

REV 3 - Approved for Submittal

MASTER_LOG_BFW_21-22000.GPJ SHAN_WIL.GDT 5/17/18 Log: GBB Rev: EAS Typ: LKN

Total Depth:	*121.5 ft.*	Northing:	*~ 217,263 ft.*	Drilling Method:	*Mud Rotary*	Hole Diam.:	*6 in.*
Top Elevation:	*~ 148 ft.*	Easting:	*~ 1,296,552 ft.*	Drilling Company:	*Holt*	Rod Diam.:	*NWJ*
Vert. Datum:	*KC Metro*	Station:	~	Drill Rig Equipment:	*Mobile B-84*	Hammer Type:	*Automatic*
Horiz. Datum:	*NAD83*	Offset:	~	Other Comments:	~		

SOIL DESCRIPTION

Refer to the report text for a proper understanding of the subsurface materials and drilling methods. The stratification lines indicated below represent the approximate boundaries between material types, and the transition may be gradual.

Depth, ft. | Symbol | Samples | Ground Water | Depth, ft.

PENETRATION RESISTANCE (blows/foot)

▲ Hammer Wt. & Drop: *140 lbs / 30 inches*

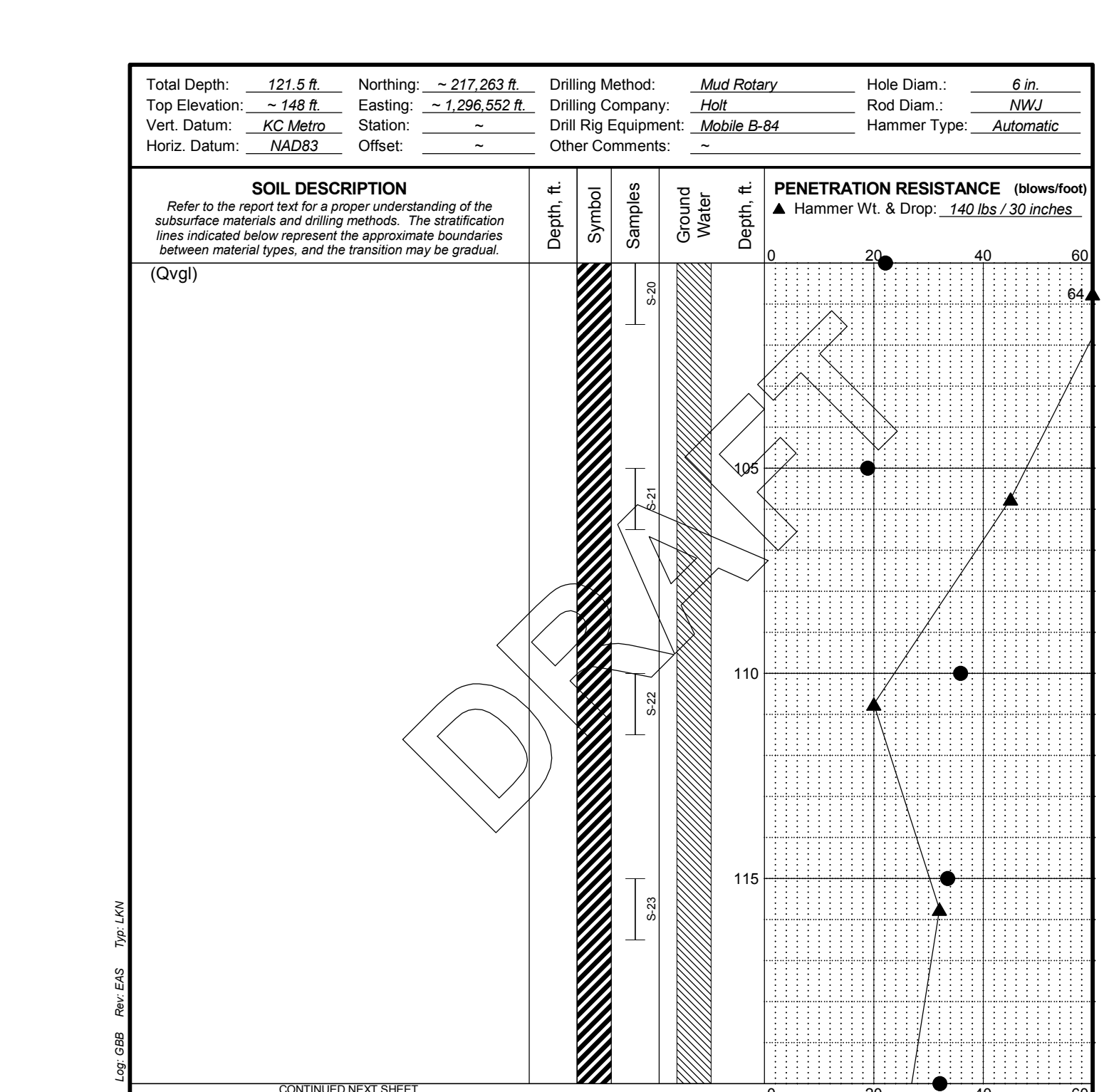
(Qvgl)

S-20

S-21

S-22

S-23



DRAFT

CONTINUED NEXT SHEET

LEGEND

- Sample Recovery
- * Sample Not Recovered
- Sonic Core Sample
- 2.0" O.D. Split Spoon Sample
- Ground Water Level in VWP
- ◇ % Fines (<0.075mm)
- ● % Water Content
- Plastic Limit ⊢●⊣ Liquid Limit
- Natural Water Content

NOTES

1. Refer to KEY for explanation of symbols, codes, abbreviations and definitions.
2. Groundwater level, if indicated above, is for the date specified and may vary.
3. USCS designation is based on visual-manual classification and selected lab testing.
4. The hole location was measured from existing site features and should be considered approximate.

North Mercer Island Interceptor and Enatai Interceptor Upgrade Project
King County, Washington

LOG OF BORING NME-6

May 2018 | 21-1-22000-212

SHANNON & WILSON, INC.
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FIG. A-05
Sheet 6 of 7

REV 3 - Approved for Submittal

MASTER_LOG_BFW_21-22000.GPJ SHAN_WIL.GDT 5/17/18 Log: GBB Rev: EAS Typ: LKN

Total Depth:	*121.5 ft.*	Northing:	*~ 217,263 ft.*	Drilling Method:	*Mud Rotary*	Hole Diam.:	*6 in.*
Top Elevation:	*~ 148 ft.*	Easting:	*~ 1,296,552 ft.*	Drilling Company:	*Holt*	Rod Diam.:	*NWJ*
Vert. Datum:	*KC Metro*	Station:	~	Drill Rig Equipment:	*Mobile B-84*	Hammer Type:	*Automatic*
Horiz. Datum:	*NAD83*	Offset:	~	Other Comments:	~		

SOIL DESCRIPTION

Refer to the report text for a proper understanding of the subsurface materials and drilling methods. The stratification lines indicated below represent the approximate boundaries between material types, and the transition may be gradual.

Depth, ft. | Symbol | Samples | Ground Water Depth, ft.

PENETRATION RESISTANCE (blows/foot)

▲ Hammer Wt. & Drop: *140 lbs / 30 inches*

0 20 40 60

121.5

S-24

BOTTOM OF BORING
COMPLETED 4/22/2015

125

130

135

DRAFT

0 20 40 60

LEGEND

- Sample Recovery
- * Sample Not Recovered
- Sonic Core Sample
- 2.0" O.D. Split Spoon Sample
- Ground Water Level in VWP

◇ % Fines (<0.075mm)

● % Water Content

Plastic Limit ⊢●⊣ Liquid Limit

Natural Water Content

NOTES

1. Refer to KEY for explanation of symbols, codes, abbreviations and definitions.
2. Groundwater level, if indicated above, is for the date specified and may vary.
3. USCS designation is based on visual-manual classification and selected lab testing.
4. The hole location was measured from existing site features and should be considered approximate.

North Mercer Island Interceptor and
Enatai Interceptor Upgrade Project
King County, Washington

LOG OF BORING NME-6

May 2018 | 21-1-22000-212

SHANNON & WILSON, INC.
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FIG. A-05
Sheet 7 of 7

REV 3 - Approved for Submittal

MASTER_LOG_BFW_21-22000.GPJ_SHAN_WIL.GDT 5/17/18 Log: GBB Rev: EAS Typ: LKN

Total Depth:	35.9 ft.	Northing:	~ 218,748 ft.	Drilling Method:	Hollow Stem Auger	Hole Diam.:	8 in.
Top Elevation:	~ 134 ft.	Easting:	~ 1,294,299 ft.	Drilling Company:	Holt	Rod Diam.:	NWJ
Vert. Datum:	KC Metro	Station:	~	Drill Rig Equipment:	Mobile B-57	Hammer Type:	Automatic
Horiz. Datum:	NAD83	Offset:	~	Other Comments:	~		

SOIL DESCRIPTION

Refer to the report text for a proper understanding of the subsurface materials and drilling methods. The stratification lines indicated below represent the approximate boundaries between material types, and the transition may be gradual.

Depth, ft. | Symbol | Samples | Ground Water | Depth, ft.

PENETRATION RESISTANCE (blows/foot)

▲ Hammer Wt. & Drop: 140 lbs / 30 inches

0 | 20 | 40 | 60

Asphalt. 0.3

Loose to medium dense, gray-brown, *Well-Graded Sand with Silt (SW-SM)*; moist; less than 10% fine, subrounded to subangular gravel; fine to coarse sand; nonplastic fines. Fill (Hf)

9.5

Loose to medium dense, gray-brown, *Poorly Graded Sand with Silt (SP-SM)* to *Silty Sand (SM)*; wet; less than 10% fine, subrounded to subangular gravel; fine to coarse sand; nonplastic fines. (Hf)

15.8

Very loose to loose, gray-brown, *Poorly Graded Sand with Silt (SP-SM)* to *Poorly Graded Sand (SP)*; wet; less than 5% fine, subrounded to subangular gravel; fine to coarse sand; nonplastic fines. (Hf)

S-1 S-2 S-3 S-4 S-5 S-6 S-7 S-8

03/07/18 During Drilling

5 10 15

CONTINUED NEXT SHEET

0 | 20 | 40 | 60

◇ % Fines (<0.075mm)

● % Water Content

LEGEND

- I Sample Recovery
- * Sample Not Recovered
- Sonic Core Sample
- 2.0" O.D. Split Spoon Sample
- ▽ Ground Water Level ATD
- ▼ Ground Water Level in Well

NOTES

1. Refer to KEY for explanation of symbols, codes, abbreviations and definitions.
2. Groundwater level, if indicated above, is for the date specified and may vary.
3. USCS designation is based on visual-manual classification and selected lab testing.
4. The hole location was measured from existing site features and should be considered approximate.

North Mercer Island Interceptor and Enatai Interceptor Upgrade Project
King County, Washington

LOG OF BORING NME-7

May 2018 | 21-1-22000-212

SHANNON & WILSON, INC.
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FIG. A-06
Sheet 1 of 2

REV 3 - Approved for Submittal

MASTER_LOG_BFW_21-22000.GPJ_SHAN_WIL.GDT 5/17/18 Log: SDN Rev: EAS Typ: LK

Total Depth:	*35.9 ft.*	Northing:	*~ 218,748 ft.*	Drilling Method:	*Hollow Stem Auger*	Hole Diam.:	*8 in.*
Top Elevation:	*~ 134 ft.*	Easting:	*~ 1,294,299 ft.*	Drilling Company:	*Holt*	Rod Diam.:	*NWJ*
Vert. Datum:	*KC Metro*	Station:	~	Drill Rig Equipment:	*Mobile B-57*	Hammer Type:	*Automatic*
Horiz. Datum:	*NAD83*	Offset:	~	Other Comments:	~		

SOIL DESCRIPTION

Refer to the report text for a proper understanding of the subsurface materials and drilling methods. The stratification lines indicated below represent the approximate boundaries between material types, and the transition may be gradual.

Depth, ft. | Symbol | Samples | Ground Water | Depth, ft.

PENETRATION RESISTANCE (blows/foot)

▲ Hammer Wt. & Drop: *140 lbs / 30 inches*

0 20 40 60

Very loose to very dense, gray, *Poorly Graded Sand with Silt and Gravel (SP-SM)*; wet; fine, subrounded to subangular gravel; fine to coarse sand; nonplastic fines; trace wood fragments.
(Hf)

23.0

S-9

S-10

S-11

S-12

25

30

35

50/5"

Wood fragments at 35.7 feet.

35.9

BOTTOM OF BORING
COMPLETED 10/27/2016

DRAFT

0 20 40 60

◇ % Fines (<0.075mm)
● % Water Content

LEGEND

- I Sample Recovery
- * Sample Not Recovered
- Sonic Core Sample
- 2.0" O.D. Split Spoon Sample
- ▽ Ground Water Level ATD
- ▼ Ground Water Level in Well

NOTES

1. Refer to KEY for explanation of symbols, codes, abbreviations and definitions.
2. Groundwater level, if indicated above, is for the date specified and may vary.
3. USCS designation is based on visual-manual classification and selected lab testing.
4. The hole location was measured from existing site features and should be considered approximate.

North Mercer Island Interceptor and
Enatai Interceptor Upgrade Project
King County, Washington

LOG OF BORING NME-7

May 2018 21-1-22000-212

SHANNON & WILSON, INC.
Geotechnical and Environmental Consultants

FIG. A-06
Sheet 2 of 2

REV 3 - Approved for Submittal

MASTER_LOG_BFW_21-22000.GPJ SHAN_WIL.GDT 5/17/18 Log: SDN Rev: EAS Typ: LK

Total Depth:	26.5 ft.	Northing:	~ 218,143 ft.	Drilling Method:	Hollow Stem Auger	Hole Diam.:	8 in.
Top Elevation:	~ 191 ft.	Easting:	~ 1,294,882 ft.	Drilling Company:	Holt	Rod Diam.:	NWJ
Vert. Datum:	KC Metro	Station:	~	Drill Rig Equipment:	Mobile B-57	Hammer Type:	Automatic
Horiz. Datum:	NAD83	Offset:	~	Other Comments:	~		

SOIL DESCRIPTION

Refer to the report text for a proper understanding of the subsurface materials and drilling methods. The stratification lines indicated below represent the approximate boundaries between material types, and the transition may be gradual.

Depth, ft. | Symbol | Samples | Ground Water | Depth, ft.

PENETRATION RESISTANCE (blows/foot)

▲ Hammer Wt. & Drop: 140 lbs / 30 inches

0 — 20 — 40 — 60

Dense, dark brown, *Poorly Graded Gravel with Sand (GP)*; moist; fine to coarse, subrounded to subangular gravel; fine to coarse sand; less than 5% nonplastic fines.
(Hf)

2.9

Dense, brown to dark brown, *Sandy Silt (ML)*; moist; less than 5% fine, subrounded to subangular gravel; fine to coarse sand; nonplastic to low plasticity fines; diamict; slightly weathered.
(Qvt)

- Layer of poorly graded sand from 8.6 to 9 feet.

9.0

Very dense, gray-brown, *Sandy Silt (ML)* to *Silty Sand (SM)*; less than 5% fine, subrounded to subangular gravel; fine to coarse sand; nonplastic fines; trace iron-oxide-staining; diamict.
(Qvd)

-Layer of wet silty sand at 15 feet.

15.3

Very dense, gray and brown, *Silt (ML)*; wet; less than 5% fine to medium sand; nonplastic fines.
(Qvgl)

16.5

Dense, brown, *Silty Sand (SM)*; wet; fine to medium sand; nonplastic fines.
(Qva)

18.0

19.0

S-1, S-2, S-3, S-4, S-5, S-6, S-7, S-8

08/12/18

During Drilling

5 — 63

10 — 69

15 — 50/5"

0 — 20 — 40 — 60

CONTINUED NEXT SHEET

LEGEND

- I Sample Recovery
- * Sample Not Recovered
- Sonic Core Sample
- 2.0" O.D. Split Spoon Sample
- Ground Water Level ATD
- Ground Water Level in Well
- ◇ % Fines (<0.075mm)
- ● % Water Content
- Plastic Limit ⊢●⊣ Liquid Limit
- Natural Water Content

NOTES

1. Refer to KEY for explanation of symbols, codes, abbreviations and definitions.
2. Groundwater level, if indicated above, is for the date specified and may vary.
3. USCS designation is based on visual-manual classification and selected lab testing.
4. The hole location was measured from existing site features and should be considered approximate.

North Mercer Island Interceptor and Enatai Interceptor Upgrade Project
King County, Washington

LOG OF BORING NME-8

May 2018 | 21-1-22000-212

SHANNON & WILSON, INC.
Geotechnical and Environmental Consultants

FIG. A-07
Sheet 1 of 2

REV 3 - Approved for Submittal

Log: SDN Rev: EAS Typ: LK

MASTER_LOG_BFW_21-22000.GPJ SHAN_WIL.GDT 5/17/18

Total Depth:	*26.5 ft.*	Northing:	*~ 218,143 ft.*	Drilling Method:	*Hollow Stem Auger*	Hole Diam.:	*8 in.*
Top Elevation:	*~ 191 ft.*	Easting:	*~ 1,294,882 ft.*	Drilling Company:	*Holt*	Rod Diam.:	*NWJ*
Vert. Datum:	*KC Metro*	Station:	~	Drill Rig Equipment:	*Mobile B-57*	Hammer Type:	*Automatic*
Horiz. Datum:	*NAD83*	Offset:	~	Other Comments:	~		

SOIL DESCRIPTION

Refer to the report text for a proper understanding of the subsurface materials and drilling methods. The stratification lines indicated below represent the approximate boundaries between material types, and the transition may be gradual.

Depth, ft. | Symbol | Samples | Ground Water | Depth, ft.

PENETRATION RESISTANCE (blows/foot)

▲ Hammer Wt. & Drop: *140 lbs / 30 inches*

0 20 40 60

Very dense, gray, *Sandy Silt (ML)*; moist; less than 5% fine, subrounded to subangular gravel; fine to coarse sand; nonplastic to low plasticity fines. (Qvgl)

22.0

Hard, gray, *Lean Clay with Sand (CL)*; moist; fine to coarse sand; medium plasticity fines. (Qvgl)

Very dense, gray, *Sandy Silt (ML)*; moist; less than 5% fine, subrounded to subangular gravel; fine to coarse sand; nonplastic to low plasticity fines. (Qvgl)

26.5

BOTTOM OF BORING
COMPLETED 10/28/2016

S-9 S-10

50/2"

25 65 75

30

35

0 20 40 60

DRAFT

LEGEND

- I Sample Recovery
- * Sample Not Recovered
- Sonic Core Sample
- 2.0" O.D. Split Spoon Sample
- ▽ Ground Water Level ATD
- ▼ Ground Water Level in Well

◇ % Fines (<0.075mm)
● % Water Content
Plastic Limit ⊢●⊣ Liquid Limit
Natural Water Content

NOTES

1. Refer to KEY for explanation of symbols, codes, abbreviations and definitions.
2. Groundwater level, if indicated above, is for the date specified and may vary.
3. USCS designation is based on visual-manual classification and selected lab testing.
4. The hole location was measured from existing site features and should be considered approximate.

North Mercer Island Interceptor and
Enatai Interceptor Upgrade Project
King County, Washington

LOG OF BORING NME-8

May 2018 21-1-22000-212

SHANNON & WILSON, INC.
Geotechnical and Environmental Consultants

FIG. A-07
Sheet 2 of 2

Log: SDN Rev: EAS Typ: LK

MASTER_LOG_BFW_21-22000.GPJ SHAN_WIL.GDT 5/17/18

REV 3 - Approved for Submittal

Total Depth:	*31.5 ft.*	Northing:	*~ 217,068 ft.*	Drilling Method:	*Hollow Stem Auger*	Hole Diam.:	*8 in.*
Top Elevation:	*~ 180 ft.*	Easting:	*~ 1,296,376 ft.*	Drilling Company:	*Holt*	Rod Diam.:	*NWJ*
Vert. Datum:	*KC Metro*	Station:	~	Drill Rig Equipment:	*Mobile Drill*	Hammer Type:	*Automatic*
Horiz. Datum:	*NAD83*	Offset:	~	Other Comments:	~		

SOIL DESCRIPTION

Refer to the report text for a proper understanding of the subsurface materials and drilling methods. The stratification lines indicated below represent the approximate boundaries between material types, and the transition may be gradual.

Dense, brown, *Silty Sand with Gravel (SM)*; moist; fine, subrounded to subangular gravel; fine to coarse sand; nonplastic fines.
(Hf)

9.5

Very dense, brown, *Poorly Graded Gravel with Sand (GP)*; moist; fine to coarse, subrounded to subangular gravel; fine to coarse sand; less than 5% nonplastic fines.
(Hf)

12.0

Dense to very dense, brown, *Well-Graded Sand with Silt and Gravel (SW-SM)* to *Silty Sand with Gravel (SM)*; moist; fine to coarse, subrounded to subangular gravel; fine to coarse sand; nonplastic fines.
(Hf)

17.0

Dense to very dense, brown, *Silty Sand with Gravel (SM)* to *Poorly Graded Sand with Silt and Gravel (SP-SM)*; moist to wet; fine, subrounded to subangular gravel; fine to coarse sand; nonplastic fines; trace organics.

CONTINUED NEXT SHEET

Depth, ft. | Symbol | Samples | Ground Water | Depth, ft.

S-1 S-2 S-3 S-4 S-5 S-6 S-7

None Observed During Drilling

PENETRATION RESISTANCE (blows/foot)

▲ Hammer Wt. & Drop: *140 lbs / 30 inches*

0 20 40 60

5 10 15

79 70

0 20 40 60

◇ % Fines (<0.075mm)

● % Water Content

LEGEND

- Sample Recovery
- * Sample Not Recovered
- Sonic Core Sample
- 2.0" O.D. Split Spoon Sample

NOTES

1. Refer to KEY for explanation of symbols, codes, abbreviations and definitions.
2. Groundwater level, if indicated above, is for the date specified and may vary.
3. USCS designation is based on visual-manual classification and selected lab testing.
4. The hole location was measured from existing site features and should be considered approximate.

North Mercer Island Interceptor and Enatai Interceptor Upgrade Project
King County, Washington

LOG OF BORING NME-9

May 2018 21-1-22000-212

SHANNON & WILSON, INC.
Geotechnical and Environmental Consultants

FIG. A-08
Sheet 1 of 2

REV 3 - Approved for Submittal

MASTER_LOG_BFW_21-22000.GPJ_SHAN_WIL.GDT 5/17/18 *Log: JAA Rev: EAS Typ: LKN*

Total Depth:	*31.5 ft.*	Northing:	*~ 217,068 ft.*	Drilling Method:	*Hollow Stem Auger*	Hole Diam.:	*8 in.*
Top Elevation:	*~ 180 ft.*	Easting:	*~ 1,296,376 ft.*	Drilling Company:	*Holt*	Rod Diam.:	*NWJ*
Vert. Datum:	*KC Metro*	Station:	~	Drill Rig Equipment:	*Mobile Drill*	Hammer Type:	*Automatic*
Horiz. Datum:	*NAD83*	Offset:	~	Other Comments:	~		

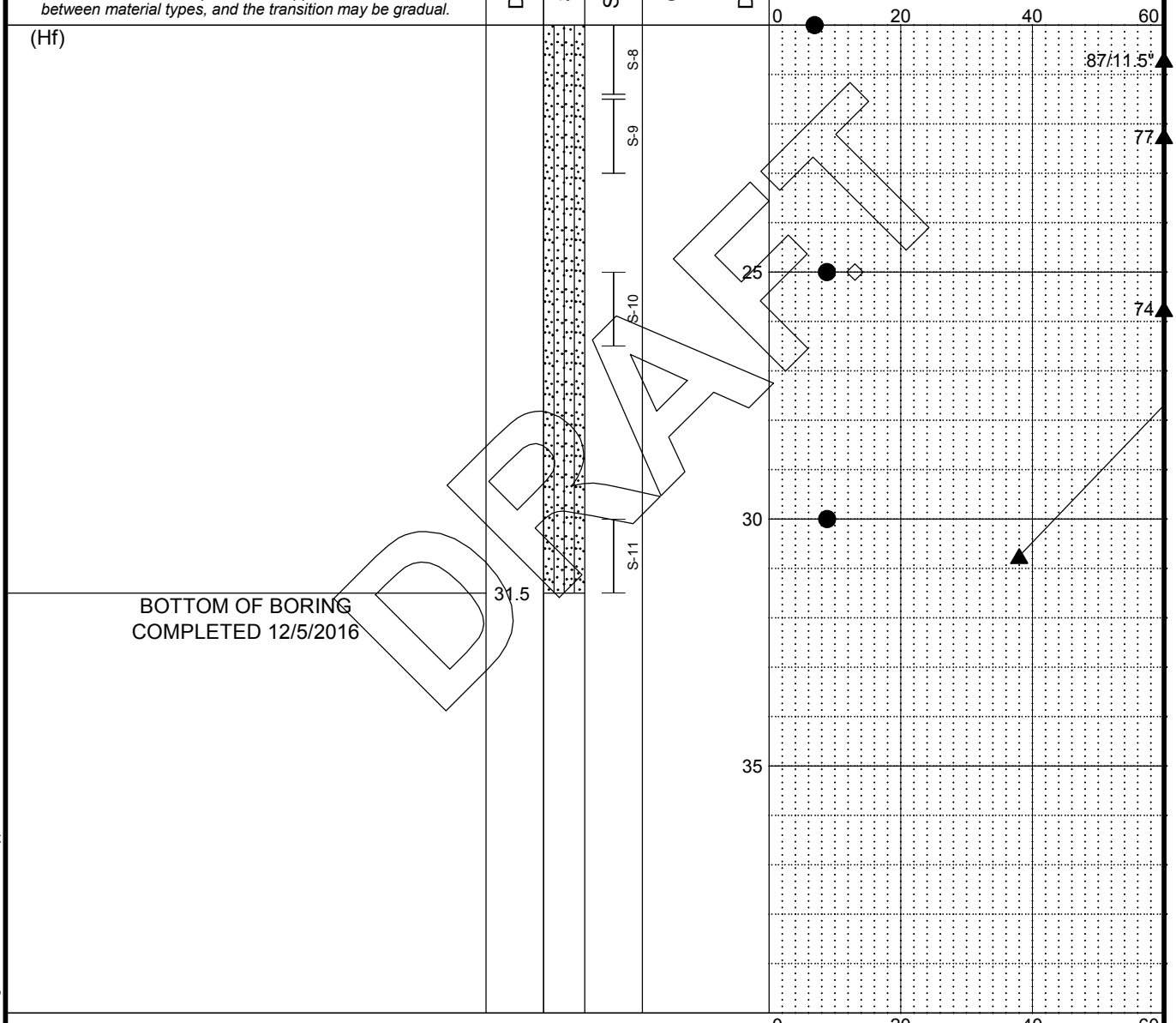
SOIL DESCRIPTION

Refer to the report text for a proper understanding of the subsurface materials and drilling methods. The stratification lines indicated below represent the approximate boundaries between material types, and the transition may be gradual.

Depth, ft. | Symbol | Samples | Ground Water Depth, ft.

PENETRATION RESISTANCE (blows/foot)

▲ Hammer Wt. & Drop: *140 lbs / 30 inches*



LEGEND

- I Sample Recovery
- * Sample Not Recovered
- Sonic Core Sample
- 2.0" O.D. Split Spoon Sample

NOTES

1. Refer to KEY for explanation of symbols, codes, abbreviations and definitions.
2. Groundwater level, if indicated above, is for the date specified and may vary.
3. USCS designation is based on visual-manual classification and selected lab testing.
4. The hole location was measured from existing site features and should be considered approximate.

North Mercer Island Interceptor and
Enatai Interceptor Upgrade Project
King County, Washington

LOG OF BORING NME-9

May 2018 | 21-1-22000-212

SHANNON & WILSON, INC.
Geotechnical and Environmental Consultants

FIG. A-08
Sheet 2 of 2

REV 3 - Approved for Submittal

MASTER_LOG_BFW_21-22000.GPJ_SHAN_WIL.GDT 5/17/18 *Log: JAA Rev: EAS Typ: LKN*

Total Depth:	*26.5 ft.*	Northing:	*~ 216,053 ft.*	Drilling Method:	*Hollow Stem Auger*	Hole Diam.:	*8 in.*
Top Elevation:	*~ 180 ft.*	Easting:	*~ 1,297,680 ft.*	Drilling Company:	*Holt*	Rod Diam.:	*NWJ*
Vert. Datum:	*KC Metro*	Station:	~	Drill Rig Equipment:	*Mobile Drill B-57 Track Rig*	Hammer Type:	*Automatic*
Horiz. Datum:	*NAD83*	Offset:	~	Other Comments:	~		

SOIL DESCRIPTION

Refer to the report text for a proper understanding of the subsurface materials and drilling methods. The stratification lines indicated below represent the approximate boundaries between material types, and the transition may be gradual.

Dense, brown, *Poorly Graded Gravel with Sand (GP)*; moist; fine to coarse, subrounded to subangular gravel; fine to coarse sand; less than 5% nonplastic fines; few organics and roots.
(Hf)

4.5

Medium dense, brown, *Well-Graded Sand with Silt and Gravel (SW-SM)*; wet; fine, subrounded to subangular gravel; fine to coarse sand; nonplastic fines; trace silt seams.
(Hf)

9.5

Loose to dense, brown, *Poorly Graded Sand with Gravel (SP)*; wet; fine subrounded to subangular gravel; fine to coarse sand; less than 5% nonplastic fines.
(Hf)

13.0

Medium stiff to hard, *Lean Clay with Sand (CL)*; moist; less than 5% fine, subrounded to subangular gravel; fine to coarse sand; low plasticity fines; diamict.
(Qvgl)

18.0

Very stiff, gray, *Fat Clay (CH)* to *Lean Clay (CL)*; moist; less than 5% fine to medium sand; low to medium plasticity fines; few silt seams.

CONTINUED NEXT SHEET

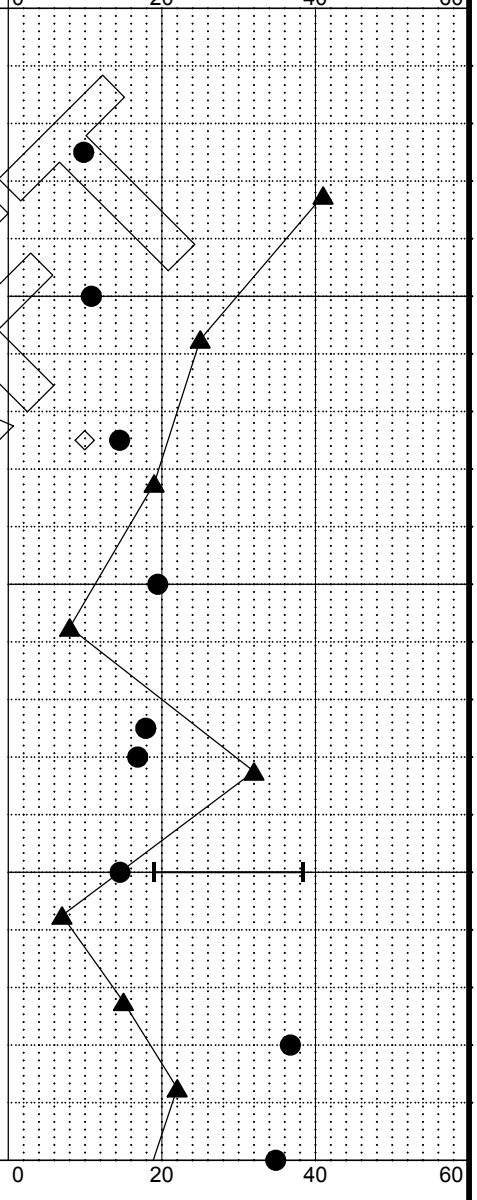
Depth, ft. | Symbol | Samples | Ground Water Depth, ft.

Samples: S-1, S-2, S-3, S-4, S-5, S-6, S-7, S-8

None Observed During Drilling

PENETRATION RESISTANCE (blows/foot)

▲ Hammer Wt. & Drop: *140 lbs / 30 inches*



◇ % Fines (<0.075mm)
● % Water Content
Plastic Limit ⊢●⊣ Liquid Limit
Natural Water Content

LEGEND
- Sample Recovery
- * Sample Not Recovered
- Sonic Core Sample
- 2.0" O.D. Split Spoon Sample

NOTES
1. Refer to KEY for explanation of symbols, codes, abbreviations and definitions.
2. Groundwater level, if indicated above, is for the date specified and may vary.
3. USCS designation is based on visual-manual classification and selected lab testing.
4. The hole location was measured from existing site features and should be considered approximate.

North Mercer Island Interceptor and Enatai Interceptor Upgrade Project
King County, Washington

LOG OF BORING NME-10

May 2018 | 21-1-22000-212

SHANNON & WILSON, INC.
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FIG. A-09
Sheet 1 of 2

REV 3 - Approved for Submittal

DRAFT

MASTER_LOG_BFW_21-22000.GPJ_SHAN_WIL.GDT 5/17/18 Log: JAA Rev: EAS Typ: LKN

Total Depth:	*26.5 ft.*	Northing:	*~ 216,053 ft.*	Drilling Method:	*Hollow Stem Auger*	Hole Diam.:	*8 in.*
Top Elevation:	*~ 180 ft.*	Easting:	*~ 1,297,680 ft.*	Drilling Company:	*Holt*	Rod Diam.:	*NWJ*
Vert. Datum:	*KC Metro*	Station:	*~*	Drill Rig Equipment:	*Mobile Drill B-57 Track Rig*	Hammer Type:	*Automatic*
Horiz. Datum:	*NAD83*	Offset:	*~*	Other Comments:	*~*		

SOIL DESCRIPTION

Refer to the report text for a proper understanding of the subsurface materials and drilling methods. The stratification lines indicated below represent the approximate boundaries between material types, and the transition may be gradual.

Depth, ft. | Symbol | Samples | Ground Water | Depth, ft.

PENETRATION RESISTANCE (blows/foot)

▲ Hammer Wt. & Drop: *140 lbs / 30 inches*

(Qvgl)

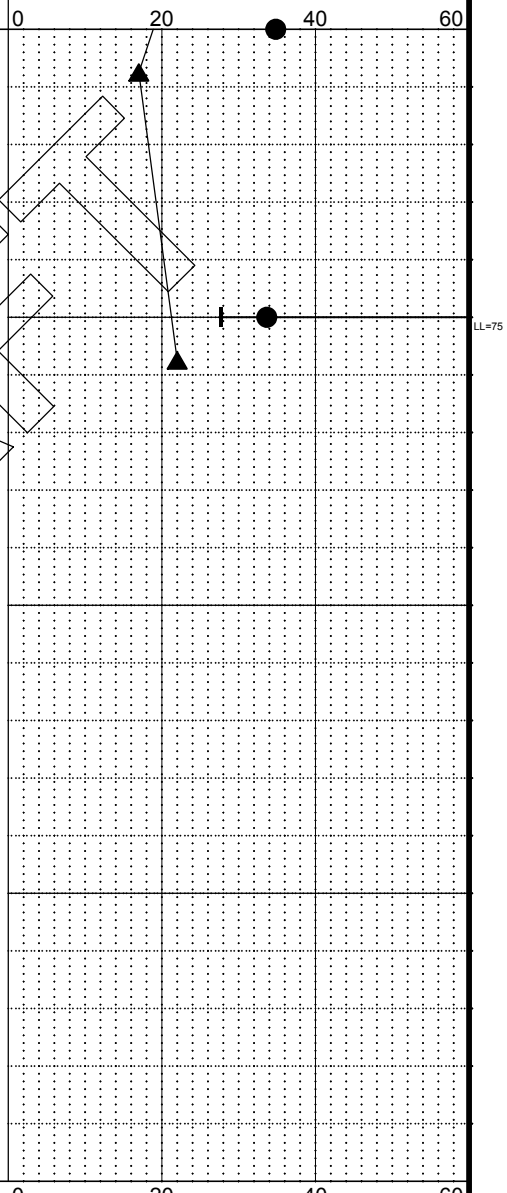
S-9

S-10

26.5

BOTTOM OF BORING
COMPLETED 12/2/2016

DRAFT



LEGEND

- Sample Recovery
- * Sample Not Recovered
- Sonic Core Sample
- 2.0" O.D. Split Spoon Sample

◇ % Fines (<0.075mm)

● % Water Content

Plastic Limit ⊢●⊣ Liquid Limit

Natural Water Content

NOTES

1. Refer to KEY for explanation of symbols, codes, abbreviations and definitions.
2. Groundwater level, if indicated above, is for the date specified and may vary.
3. USCS designation is based on visual-manual classification and selected lab testing.
4. The hole location was measured from existing site features and should be considered approximate.

North Mercer Island Interceptor and
Enatai Interceptor Upgrade Project
King County, Washington

LOG OF BORING NME-10

May 2018 | 21-1-22000-212

SHANNON & WILSON, INC.
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FIG. A-09
Sheet 2 of 2

REV 3 - Approved for Submittal

MASTER_LOG_BFW_21-22000.GPJ_SHAN_WIL.GDT 5/17/18 Log: JAA Rev: EAS Typ: LKN

Total Depth:	*31.5 ft.*	Northing:	*~ 215,401 ft.*	Drilling Method:	*Hollow Stem Auger*	Hole Diam.:	*8 in.*
Top Elevation:	*~ 256 ft.*	Easting:	*~ 1,298,668 ft.*	Drilling Company:	*Holt*	Rod Diam.:	*NWJ*
Vert. Datum:	*KC Metro*	Station:	~	Drill Rig Equipment:	*Mobile B-57*	Hammer Type:	*Automatic*
Horiz. Datum:	*NAD83*	Offset:	~	Other Comments:	~		

SOIL DESCRIPTION

Refer to the report text for a proper understanding of the subsurface materials and drilling methods. The stratification lines indicated below represent the approximate boundaries between material types, and the transition may be gradual.

Asphalt. — 0.3

Dense to very dense, brown to gray-brown, *Sandy Silt (ML)* to *Silty Sand (SM)* to *Silty Sand with Gravel (SM)*; moist; fine to coarse, subrounded to subangular gravle; fine to coarse sand; nonplastic to low plasticity fines; diamict; slightly weathered; few silt pockets; trace iron-oxide staing.
(Qvt)

Very dense, gray *Sandy Silt (ML) to Silty Sand (SM)*; moist; less than 5% fine, subrounded gravel; fine to coarse sand; nonplastic to low plasticity fines; diamict. — 11.1
(Qvt)
- Diamict layer of brown silty sand at 12.5 feet.

- 1-inch bed of clean, wet sand at 18 feet. — 18.1

Hard, gray *Silt (ML)*; moist; less than 5% fine to medium sand; low plasticity fines; few lean — 19.0

CONTINUED NEXT SHEET

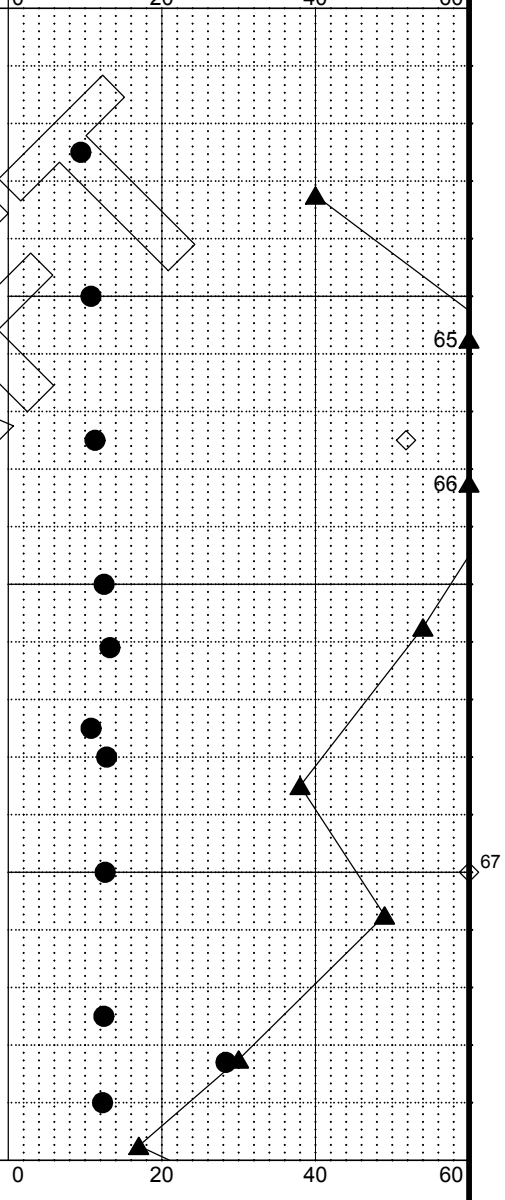
Depth, ft. | Symbol | Samples | Ground Water | Depth, ft.

Samples: S-1, S-2, S-3, S-4, S-5, S-6, S-7, S-8

Ground Water: 03/07/18 ▼; During Drilling ▽

PENETRATION RESISTANCE (blows/foot)

▲ Hammer Wt. & Drop: *140 lbs / 30 inches*



◇ % Fines (<0.075mm)
● % Water Content
Plastic Limit ⊢●⊣ Liquid Limit
Natural Water Content

LEGEND

Sample Recovery	Ground Water Level ATD
* Sample Not Recovered	Ground Water Level in Well
Sonic Core Sample	
2.0" O.D. Split Spoon Sample	

NOTES

1. Refer to KEY for explanation of symbols, codes, abbreviations and definitions.
2. Groundwater level, if indicated above, is for the date specified and may vary.
3. USCS designation is based on visual-manual classification and selected lab testing.
4. The hole location was measured from existing site features and should be considered approximate.

North Mercer Island Interceptor and Enatai Interceptor Upgrade Project
King County, Washington

LOG OF BORING NME-11

May 2018 — 21-1-22000-212

SHANNON & WILSON, INC.
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FIG. A-10
Sheet 1 of 2

REV 3 - Approved for Submittal

MASTER_LOG_BFW_21-22000.GPJ SHAN_WIL.GDT 5/17/18 Log: SDN Rev: EAS Typ: LK

Total Depth:	*31.5 ft.*	Northing:	*~ 215,401 ft.*	Drilling Method:	*Hollow Stem Auger*	Hole Diam.:	*8 in.*
Top Elevation:	*~ 256 ft.*	Easting:	*~ 1,298,668 ft.*	Drilling Company:	*Holt*	Rod Diam.:	*NWJ*
Vert. Datum:	*KC Metro*	Station:	~	Drill Rig Equipment:	*Mobile B-57*	Hammer Type:	*Automatic*
Horiz. Datum:	*NAD83*	Offset:	~	Other Comments:	~		

SOIL DESCRIPTION

Refer to the report text for a proper understanding of the subsurface materials and drilling methods. The stratification lines indicated below represent the approximate boundaries between material types, and the transition may be gradual.

Depth, ft. | Symbol | Samples | Ground Water | Depth, ft.

PENETRATION RESISTANCE (blows/foot)

▲ Hammer Wt. & Drop: *140 lbs / 30 inches*

clay seams.
(Qvgl)

Dense to very dense, gray, *Sandy Silt (ML)* to *Sandy Lean Clay (CL)*; moist; less than 10% fine to coarse, subrounded to subangular gravel; fine to coarse sand; low to medium plasticity fines; diamicts.
(Qvt)

S-9

S-10

S-11

31.5

BOTTOM OF BORING
COMPLETED 10/31/2016

DRAFT

0 20 40 60

25

30

35

0 20 40 60

◇ % Fines (<0.075mm)
● % Water Content
Plastic Limit ⊢●⊣ Liquid Limit
Natural Water Content

LEGEND

- I Sample Recovery
- * Sample Not Recovered
- Sonic Core Sample
- 2.0" O.D. Split Spoon Sample
- ▽ Ground Water Level ATD
- ▼ Ground Water Level in Well

NOTES

1. Refer to KEY for explanation of symbols, codes, abbreviations and definitions.
2. Groundwater level, if indicated above, is for the date specified and may vary.
3. USCS designation is based on visual-manual classification and selected lab testing.
4. The hole location was measured from existing site features and should be considered approximate.

North Mercer Island Interceptor and
Enatai Interceptor Upgrade Project
King County, Washington

LOG OF BORING NME-11

May 2018 21-1-22000-212

SHANNON & WILSON, INC.
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FIG. A-10
Sheet 2 of 2

REV 3 - Approved for Submittal

MASTER_LOG_BFW_21-22000.GPJ_SHAN_WIL.GDT 5/17/18 Log: SDN Rev: EAS Typ: LK

Total Depth:	*21.5 ft.*	Northing:	*~ 215,075 ft.*	Drilling Method:	*Hollow Stem Auger*	Hole Diam.:	*8 in.*
Top Elevation:	*~ 215 ft.*	Easting:	*~ 1,298,938 ft.*	Drilling Company:	*Holt*	Rod Diam.:	*NWJ*
Vert. Datum:	*KC Metro*	Station:	~	Drill Rig Equipment:	*Mobile Drill B57 Track Rig*	Hammer Type:	*Automatic*
Horiz. Datum:	*NAD83*	Offset:	~	Other Comments:	~		

SOIL DESCRIPTION

Refer to the report text for a proper understanding of the subsurface materials and drilling methods. The stratification lines indicated below represent the approximate boundaries between material types, and the transition may be gradual.

Loose to very dense, brown, *Poorly Graded Sand with Silt and Gravel (SP-SM)* to *Silty Sand with Gravel (SM)*; moist; fine, subrounded to subangular gravel; fine to coarse sand; nonplastic fines.
(Hf)

7.0

Very soft to stiff, mottled gray and brown *Silt (ML)* and *Fat Clay (CH)*; moist; 5 to 10% fine, subrounded to subangular gravel; fine to coarse sand; low plasticity fines; pockets with diced or blocky texture; trace organics.
(Hls)

Depth, ft. | Symbol | Samples | Ground Water Depth, ft.

S-1 S-2 S-3 S-4 S-5 S-6 S-7

None Observed During Drilling

PENETRATION RESISTANCE (blows/foot)

▲ Hammer Wt. & Drop: *140 lbs / 30 inches*

0 20 40 60

5 10 15

0 20 40 60

◇ % Fines (<0.075mm)

● % Water Content

Plastic Limit ⊢●⊣ Liquid Limit

Natural Water Content

DRAFT

CONTINUED NEXT SHEET

LEGEND

- Sample Recovery
- * Sample Not Recovered
- Sonic Core Sample
- 2.0" O.D. Split Spoon Sample

NOTES

1. Refer to KEY for explanation of symbols, codes, abbreviations and definitions.
2. Groundwater level, if indicated above, is for the date specified and may vary.
3. USCS designation is based on visual-manual classification and selected lab testing.
4. The hole location was measured from existing site features and should be considered approximate.

North Mercer Island Interceptor and Enatai Interceptor Upgrade Project
King County, Washington

LOG OF BORING NME-12

May 2018 21-1-22000-212

SHANNON & WILSON, INC.
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FIG. A-11
Sheet 1 of 2

MASTER_LOG_BFW_21-22000.GPJ SHAN_WIL.GDT 5/17/18 Log: JAA Rev: EAS Typ: LKN

REV 3 - Approved for Submittal

Total Depth:	*21.5 ft.*	Northing:	*~ 215,075 ft.*	Drilling Method:	*Hollow Stem Auger*	Hole Diam.:	*8 in.*
Top Elevation:	*~ 215 ft.*	Easting:	*~ 1,298,938 ft.*	Drilling Company:	*Holt*	Rod Diam.:	*NWJ*
Vert. Datum:	*KC Metro*	Station:	~	Drill Rig Equipment:	*Mobile Drill B57 Track Rig*	Hammer Type:	*Automatic*
Horiz. Datum:	*NAD83*	Offset:	~	Other Comments:	~		

SOIL DESCRIPTION

Refer to the report text for a proper understanding of the subsurface materials and drilling methods. The stratification lines indicated below represent the approximate boundaries between material types, and the transition may be gradual.

Depth, ft. | Symbol | Samples | Ground Water Depth, ft.

PENETRATION RESISTANCE (blows/foot)

▲ Hammer Wt. & Drop: *140 lbs / 30 inches*

0 20 40 60

21.5

S-8

BOTTOM OF BORING
COMPLETED 12/2/2016

25

30

35

DRAFT

0 20 40 60

LEGEND

- I Sample Recovery
- * Sample Not Recovered
- Sonic Core Sample
- 2.0" O.D. Split Spoon Sample

◇ % Fines (<0.075mm)

● % Water Content

Plastic Limit ⊢●⊣ Liquid Limit

Natural Water Content

NOTES

1. Refer to KEY for explanation of symbols, codes, abbreviations and definitions.
2. Groundwater level, if indicated above, is for the date specified and may vary.
3. USCS designation is based on visual-manual classification and selected lab testing.
4. The hole location was measured from existing site features and should be considered approximate.

North Mercer Island Interceptor and
Enatai Interceptor Upgrade Project
King County, Washington

LOG OF BORING NME-12

May 2018 21-1-22000-212

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FIG. A-11
Sheet 2 of 2

REV 3 - Approved for Submittal

MASTER_LOG_BFW_21-22000.GPJ SHAN_WIL.GDT 5/17/18 Log: JAA Rev: EAS Typ: LKN

Total Depth:	*29 ft.*	Northing:	*~ 214,636 ft.*	Drilling Method:	*Hollow Stem Auger*	Hole Diam.:	*8 in.*
Top Elevation:	*~ 189 ft.*	Easting:	*~ 1,299,403 ft.*	Drilling Company:	*Holt*	Rod Diam.:	*NWJ*
Vert. Datum:	*KC Metro*	Station:	~	Drill Rig Equipment:	*Mobile B-57*	Hammer Type:	*Automatic*
Horiz. Datum:	*NAD83*	Offset:	~	Other Comments:	~		

SOIL DESCRIPTION

Refer to the report text for a proper understanding of the subsurface materials and drilling methods. The stratification lines indicated below represent the approximate boundaries between material types, and the transition may be gradual.

Asphalt. 0.4

Very loose to loose, brown, *Silty Sand (SM)*; moist; less than 10% fine, subrounded to subangular gravel; fine to coarse sand; nonplastic fines; trace organics; traced iron-oxide staining; trace clay and silt pockets. (Hls)

- Wet below 12 feet.

- Wood fragments at 18.5 feet. 19.0

CONTINUED NEXT SHEET

Depth, ft. | Symbol | Samples | Ground Water | Depth, ft.

S-1 S-2 S-3 S-4 S-5 S-6 S-7

During Drilling ▽

03/07/18 ▼

PENETRATION RESISTANCE (blows/foot)

▲ Hammer Wt. & Drop: *140 lbs / 30 inches*

0 20 40 60

5 10 15

0 20 40 60

◇ % Fines (<0.075mm)

● % Water Content

DRAFT

LEGEND

I Sample Recovery	▽ Ground Water Level ATD
* Sample Not Recovered	▼ Ground Water Level in Well
Sonic Core Sample	
2.0" O.D. Split Spoon Sample	

NOTES

1. Refer to KEY for explanation of symbols, codes, abbreviations and definitions.
2. Groundwater level, if indicated above, is for the date specified and may vary.
3. USCS designation is based on visual-manual classification and selected lab testing.
4. The hole location was measured from existing site features and should be considered approximate.

North Mercer Island Interceptor and Enatai Interceptor Upgrade Project
King County, Washington

LOG OF BORING NME-13

May 2018 21-1-22000-212

SHANNON & WILSON, INC.
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FIG. A-12
Sheet 1 of 2

REV 3 - Approved for Submittal

MASTER_LOG_BFW_21-22000.GPJ SHAN_WIL.GDT 5/17/18 Log: SDN Rev: EAS Typ: LK

Total Depth:	*29 ft.*	Northing:	*~ 214,636 ft.*	Drilling Method:	*Hollow Stem Auger*	Hole Diam.:	*8 in.*
Top Elevation:	*~ 189 ft.*	Easting:	*~ 1,299,403 ft.*	Drilling Company:	*Holt*	Rod Diam.:	*NWJ*
Vert. Datum:	*KC Metro*	Station:	~	Drill Rig Equipment:	*Mobile B-57*	Hammer Type:	*Automatic*
Horiz. Datum:	*NAD83*	Offset:	~	Other Comments:	~		

SOIL DESCRIPTION

Refer to the report text for a proper understanding of the subsurface materials and drilling methods. The stratification lines indicated below represent the approximate boundaries between material types, and the transition may be gradual.

Dense, gray, *Poorly Graded Gravel (GP)*; wet; fine to coarse, subrounded to subangular gravel; fine to coarse sand; less than 5% nonplastic fines.
(Qvro)

22.7

Medium dense, gray *Silt (ML)* to *Silt with Sand (ML)*; moist to wet; fine sand; nonplastic fines; dilatant; trace silt partings and clay interbeds; laminated.
(Qvgl)

29.0

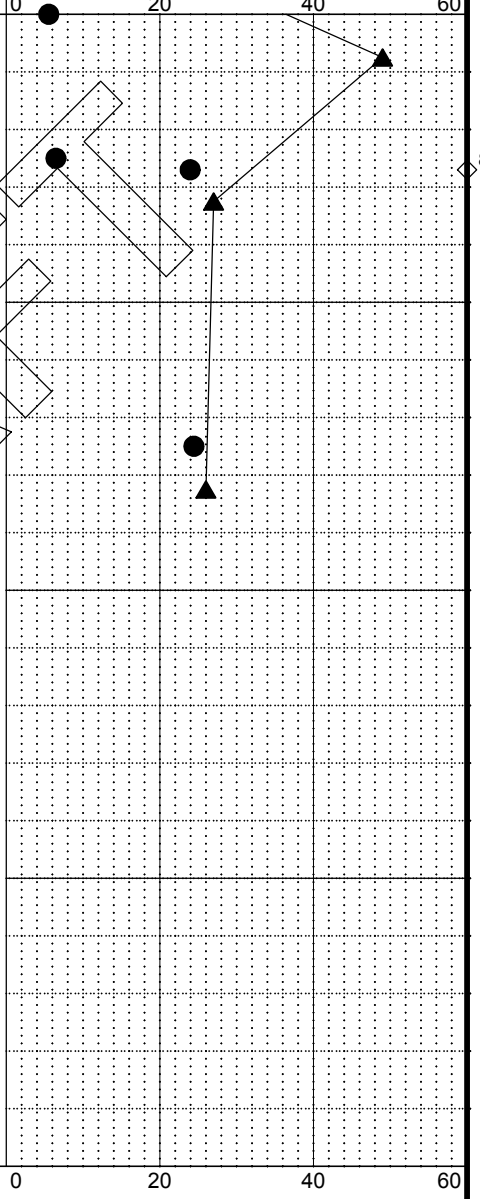
BOTTOM OF BORING
COMPLETED 10/31/2016

Depth, ft. | Symbol | Samples | Ground Water | Depth, ft.

S-8 | S-9 | S-10

PENETRATION RESISTANCE (blows/foot)

▲ Hammer Wt. & Drop: *140 lbs / 30 inches*



DRAFT

LEGEND

- I Sample Recovery
- * Sample Not Recovered
- Sonic Core Sample
- 2.0" O.D. Split Spoon Sample
- ▽ Ground Water Level ATD
- ▼ Ground Water Level in Well

NOTES

1. Refer to KEY for explanation of symbols, codes, abbreviations and definitions.
2. Groundwater level, if indicated above, is for the date specified and may vary.
3. USCS designation is based on visual-manual classification and selected lab testing.
4. The hole location was measured from existing site features and should be considered approximate.

North Mercer Island Interceptor and
Enatai Interceptor Upgrade Project
King County, Washington

LOG OF BORING NME-13

May 2018 | 21-1-22000-212

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FIG. A-12
Sheet 2 of 2

REV 3 - Approved for Submittal

MASTER_LOG_BFW_21-22000.GPJ_SHAN_WIL.GDT 5/17/18 Log: SDN Rev: EAS Typ: LK

Total Depth:	*21.5 ft.*	Northing:	*~ 214,309 ft.*	Drilling Method:	*Hollow Stem Auger*	Hole Diam.:	*8 in.*
Top Elevation:	*~ 179 ft.*	Easting:	*~ 1,300,464 ft.*	Drilling Company:	*Holt*	Rod Diam.:	*NWJ*
Vert. Datum:	*KC Metro*	Station:	*~*	Drill Rig Equipment:	*Mobile Drill B57 Track Rig*	Hammer Type:	*Automatic*
Horiz. Datum:	*NAD83*	Offset:	*~*	Other Comments:	*~*		

SOIL DESCRIPTION

Refer to the report text for a proper understanding of the subsurface materials and drilling methods. The stratification lines indicated below represent the approximate boundaries between material types, and the transition may be gradual.

Asphalt.

0.4

Medium dense, brown *Silt with Sand (ML)* to *Sandy Silt (ML)*; moist; less than 5% fine, subrounded to subangular gravel; fine to coarse sand; nonplastic to low plasticity fines; trace organics; trace pockets with iron-oxide staining; trace asphalt clasts.
(Hf)

7.5

Dense, brown, *Silt with Sand (ML)*; to *Sandy Silt (ML)*; moist; fine sand; nonplastic fines; trace partings with iron-oxide staining.
(Qvgl)

12.5

Medium dense, brown *Silt (ML)*; moist; less than 10% fine sand; nonplastic to low plasticity fines; trace partings with iron-oxide staining.
(Qvgl)

17.0

Medium dense, gray *Silt with Sand (ML)*; moist; fine sand; nonplastic fines.
(Qvgl)

CONTINUED NEXT SHEET

Depth, ft. | Symbol | Samples | Ground Water | Depth, ft.

S-2 | S-3 | S-4 | S-5 | S-6 | S-7

None Observed During Drilling

Dry (03/07/18)

PENETRATION RESISTANCE (blows/foot)

▲ Hammer Wt. & Drop: *140 lbs / 30 inches*

0 20 40 60

5

10

15

0 20 40 60

◇ % Fines (<0.075mm)

● % Water Content

Plastic Limit ⊢●⊣ Liquid Limit

Natural Water Content

DRAFT

LEGEND

- I Sample Recovery
- * Sample Not Recovered
- Sonic Core Sample
- 2.0" O.D. Split Spoon Sample
- ▼ Ground Water Level in Well

NOTES

1. Refer to KEY for explanation of symbols, codes, abbreviations and definitions.
2. Groundwater level, if indicated above, is for the date specified and may vary.
3. USCS designation is based on visual-manual classification and selected lab testing.
4. The hole location was measured from existing site features and should be considered approximate.

North Mercer Island Interceptor and Enatai Interceptor Upgrade Project
King County, Washington

LOG OF BORING NME-14

May 2018 | 21-1-22000-212

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FIG. A-13
Sheet 1 of 2

REV 3 - Approved for Submittal

MASTER_LOG_BFW_21-22000.GPJ_SHAN_WIL.GDT 5/17/18 Log: JAA Rev: EAS Typ: LKN

Total Depth:	*21.5 ft.*	Northing:	*~ 214,309 ft.*	Drilling Method:	*Hollow Stem Auger*	Hole Diam.:	*8 in.*
Top Elevation:	*~ 179 ft.*	Easting:	*~ 1,300,464 ft.*	Drilling Company:	*Holt*	Rod Diam.:	*NWJ*
Vert. Datum:	*KC Metro*	Station:	*~*	Drill Rig Equipment:	*Mobile Drill B57 Track Rig*	Hammer Type:	*Automatic*
Horiz. Datum:	*NAD83*	Offset:	*~*	Other Comments:	*~*		

SOIL DESCRIPTION

Refer to the report text for a proper understanding of the subsurface materials and drilling methods. The stratification lines indicated below represent the approximate boundaries between material types, and the transition may be gradual.

Depth, ft. | Symbol | Samples | Ground Water Depth, ft.

PENETRATION RESISTANCE (blows/foot)

▲ Hammer Wt. & Drop: *140 lbs / 30 inches*

0 20 40 60

21.5 — BOTTOM OF BORING COMPLETED 12/1/2016

S-8

25

30

35

DRAFT

0 20 40 60

LEGEND

- I Sample Recovery
- * Sample Not Recovered
- Sonic Core Sample
- 2.0" O.D. Split Spoon Sample
- ▼ Ground Water Level in Well

◇ % Fines (<0.075mm)

● % Water Content

Plastic Limit ⊢●⊣ Liquid Limit

Natural Water Content

NOTES

1. Refer to KEY for explanation of symbols, codes, abbreviations and definitions.
2. Groundwater level, if indicated above, is for the date specified and may vary.
3. USCS designation is based on visual-manual classification and selected lab testing.
4. The hole location was measured from existing site features and should be considered approximate.

North Mercer Island Interceptor and Enatai Interceptor Upgrade Project
King County, Washington

LOG OF BORING NME-14

May 2018 | 21-1-22000-212

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FIG. A-13
Sheet 2 of 2

REV 3 - Approved for Submittal

MASTER_LOG_BFW_21-22000.GPJ_SHAN_WIL.GDT 5/17/18 Log: JAA Rev: EAS Typ: LKN

Total Depth:	*41.5 ft.*	Northing:	*~ 214,898 ft.*	Drilling Method:	*Hollow Stem Auger*	Hole Diam.:	*8 in.*
Top Elevation:	*~ 125 ft.*	Easting:	*~ 1,300,848 ft.*	Drilling Company:	*Holt*	Rod Diam.:	*NWJ*
Vert. Datum:	*KC Metro*	Station:	~	Drill Rig Equipment:	*Mobile Drill B57 Track Rig*	Hammer Type:	*Automatic*
Horiz. Datum:	*NAD83*	Offset:	~	Other Comments:	~		

SOIL DESCRIPTION

Refer to the report text for a proper understanding of the subsurface materials and drilling methods. The stratification lines indicated below represent the approximate boundaries between material types, and the transition may be gradual.

Depth, ft. | Symbol | Samples | Ground Water | Depth, ft.

PENETRATION RESISTANCE (blows/foot)

▲ Hammer Wt. & Drop: *140 lbs / 30 inches*

0 — 20 — 40 — 60

Dark brown, *Silt with Sand and Boulders (ML)*; moist; less than 10% subangular boulders; less than 5% fine, subrounded to subangular gravel; fine to coarse sand; low plasticity fines; few organics; blocky to diced texture.
Fill (Hf)

7.0

Medium dense, brown *Silt (ML)*; moist; less than 5% fine sand; nonplastic to low plasticity fines; trace partings with iron-oxide staining.
(Qvgl)

9.5

Medium dense, gray *Silt (ML)*; moist; less than 5% fine sand; nonplastic to low plasticity fines; trace iron-oxide staining.
(Qvgl)

17.0

Medium dense, gray *Silt with Sand (ML)* to *Silt (ML)*; moist; fine sand; nonplastic fines.
(Qvgl)

S-3 S-4 S-5 S-6 S-7

03/07/18 ▼

During Drilling ▽

5 10 15

0 — 20 — 40 — 60

CONTINUED NEXT SHEET

LEGEND

- I Sample Recovery
- * Sample Not Recovered
- Sonic Core Sample
- 2.0" O.D. Split Spoon Sample
- ▽ Ground Water Level ATD
- ▼ Ground Water Level in Well
- ◇ % Fines (<0.075mm)
- ● % Water Content
- Plastic Limit ⊢●⊣ Liquid Limit
- Natural Water Content

NOTES

1. Refer to KEY for explanation of symbols, codes, abbreviations and definitions.
2. Groundwater level, if indicated above, is for the date specified and may vary.
3. USCS designation is based on visual-manual classification and selected lab testing.
4. The hole location was measured from existing site features and should be considered approximate.

North Mercer Island Interceptor and Enatai Interceptor Upgrade Project
King County, Washington

LOG OF BORING NME-15

May 2018 | 21-1-22000-212

SHANNON & WILSON, INC.
Geotechnical and Environmental Consultants

FIG. A-14
Sheet 1 of 3

REV 3 - Approved for Submittal

MASTER_LOG_BFW_21-22000.GPJ SHAN_WIL.GDT 5/17/18 Log: JAA Rev: EAS Typ: LKN

Total Depth:	*41.5 ft.*	Northing:	*~ 214,898 ft.*	Drilling Method:	*Hollow Stem Auger*	Hole Diam.:	*8 in.*
Top Elevation:	*~ 125 ft.*	Easting:	*~ 1,300,848 ft.*	Drilling Company:	*Holt*	Rod Diam.:	*NWJ*
Vert. Datum:	*KC Metro*	Station:	~	Drill Rig Equipment:	*Mobile Drill B57 Track Rig*	Hammer Type:	*Automatic*
Horiz. Datum:	*NAD83*	Offset:	~	Other Comments:	~		

SOIL DESCRIPTION

Refer to the report text for a proper understanding of the subsurface materials and drilling methods. The stratification lines indicated below represent the approximate boundaries between material types, and the transition may be gradual.

Depth, ft. | Symbol | Samples | Ground Water | Depth, ft.

PENETRATION RESISTANCE (blows/foot)

▲ Hammer Wt. & Drop: *140 lbs / 30 inches*

0 20 40 60

S-8

S-9

S-10

S-11

25

30

35

NP

33.0

Medium dense, gray, *Sandy Silt (ML)* to *Silt with Sand (ML)*; wet; fine sand; nonplastic fines.
(Qvgl)

CONTINUED NEXT SHEET

0 20 40 60

LEGEND

- I Sample Recovery
- * Sample Not Recovered
- Sonic Core Sample
- 2.0" O.D. Split Spoon Sample
- Ground Water Level ATD
- Ground Water Level in Well

◇ % Fines (<0.075mm)

● % Water Content

Plastic Limit ⊢●⊣ Liquid Limit

Natural Water Content

NOTES

1. Refer to KEY for explanation of symbols, codes, abbreviations and definitions.
2. Groundwater level, if indicated above, is for the date specified and may vary.
3. USCS designation is based on visual-manual classification and selected lab testing.
4. The hole location was measured from existing site features and should be considered approximate.

North Mercer Island Interceptor and Enatai Interceptor Upgrade Project
King County, Washington

LOG OF BORING NME-15

May 2018 21-1-22000-212

SHANNON & WILSON, INC.
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FIG. A-14
Sheet 2 of 3

REV 3 - Approved for Submittal

DRAFT

MASTER_LOG_BFW_21-22000.GPJ_SHAN_WIL.GDT 5/17/18 Log: JAA Rev: EAS Typ: LKN

Total Depth:	*41.5 ft.*	Northing:	*~ 214,898 ft.*	Drilling Method:	*Hollow Stem Auger*	Hole Diam.:	*8 in.*
Top Elevation:	*~ 125 ft.*	Easting:	*~ 1,300,848 ft.*	Drilling Company:	*Holt*	Rod Diam.:	*NWJ*
Vert. Datum:	*KC Metro*	Station:	~	Drill Rig Equipment:	*Mobile Drill B57 Track Rig*	Hammer Type:	*Automatic*
Horiz. Datum:	*NAD83*	Offset:	~	Other Comments:	~		

SOIL DESCRIPTION

Refer to the report text for a proper understanding of the subsurface materials and drilling methods. The stratification lines indicated below represent the approximate boundaries between material types, and the transition may be gradual.

Depth, ft. | Symbol | Samples | Ground Water Depth, ft.

PENETRATION RESISTANCE (blows/foot)

▲ Hammer Wt. & Drop: *140 lbs / 30 inches*

0 20 40 60

41.5

S-12

BOTTOM OF BORING
COMPLETED 11/30/2016

45

50

55

DRAFT

0 20 40 60

LEGEND

- I Sample Recovery
- * Sample Not Recovered
- Sonic Core Sample
- 2.0" O.D. Split Spoon Sample
- ▽ Ground Water Level ATD
- ▼ Ground Water Level in Well

◇ % Fines (<0.075mm)

● % Water Content

Plastic Limit ⊢●⊣ Liquid Limit

Natural Water Content

NOTES

1. Refer to KEY for explanation of symbols, codes, abbreviations and definitions.
2. Groundwater level, if indicated above, is for the date specified and may vary.
3. USCS designation is based on visual-manual classification and selected lab testing.
4. The hole location was measured from existing site features and should be considered approximate.

North Mercer Island Interceptor and
Enatai Interceptor Upgrade Project
King County, Washington

LOG OF BORING NME-15

May 2018 21-1-22000-212

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FIG. A-14
Sheet 3 of 3

REV 3 - Approved for Submittal

MASTER_LOG_BFW_21-22000.GPJ_SHAN_WIL.GDT 5/17/18 Log: JAA Rev: EAS Typ: LKN

Total Depth:	*21.5 ft.*	Northing:	*~ 214,201 ft.*	Drilling Method:	*Hollow Stem Auger*	Hole Diam.:	*8 in.*
Top Elevation:	*~ 179 ft.*	Easting:	*~ 1,300,840 ft.*	Drilling Company:	*Holt*	Rod Diam.:	*NWJ*
Vert. Datum:	*KC Metro*	Station:	~	Drill Rig Equipment:	*Mobile B-57*	Hammer Type:	*Automatic*
Horiz. Datum:	*NAD83*	Offset:	~	Other Comments:	~		

SOIL DESCRIPTION

Refer to the report text for a proper understanding of the subsurface materials and drilling methods. The stratification lines indicated below represent the approximate boundaries between material types, and the transition may be gradual.

Asphalt

0.6

Loose, mottled gray and brown *Silt with Sand (ML)*; moist; less than 5% fine, subangular gravel; fine sand; nonplastic to low plasticity fines; iron-oxide staining; trace silty fine sand seams.
(Hf)

4.5

Medium dense, brown, *Sandy Silt with Gravel (ML)*; moist; fine, subrounded gravel; fine to coarse sand; low plasticity fines.
(Hf)

7.0

Dense, brown, *Sandy Silt (ML)*; moist; fine to coarse sand; nonplastic fines; trace iron-oxide staining; diamict.
(Qvgl)

9.5

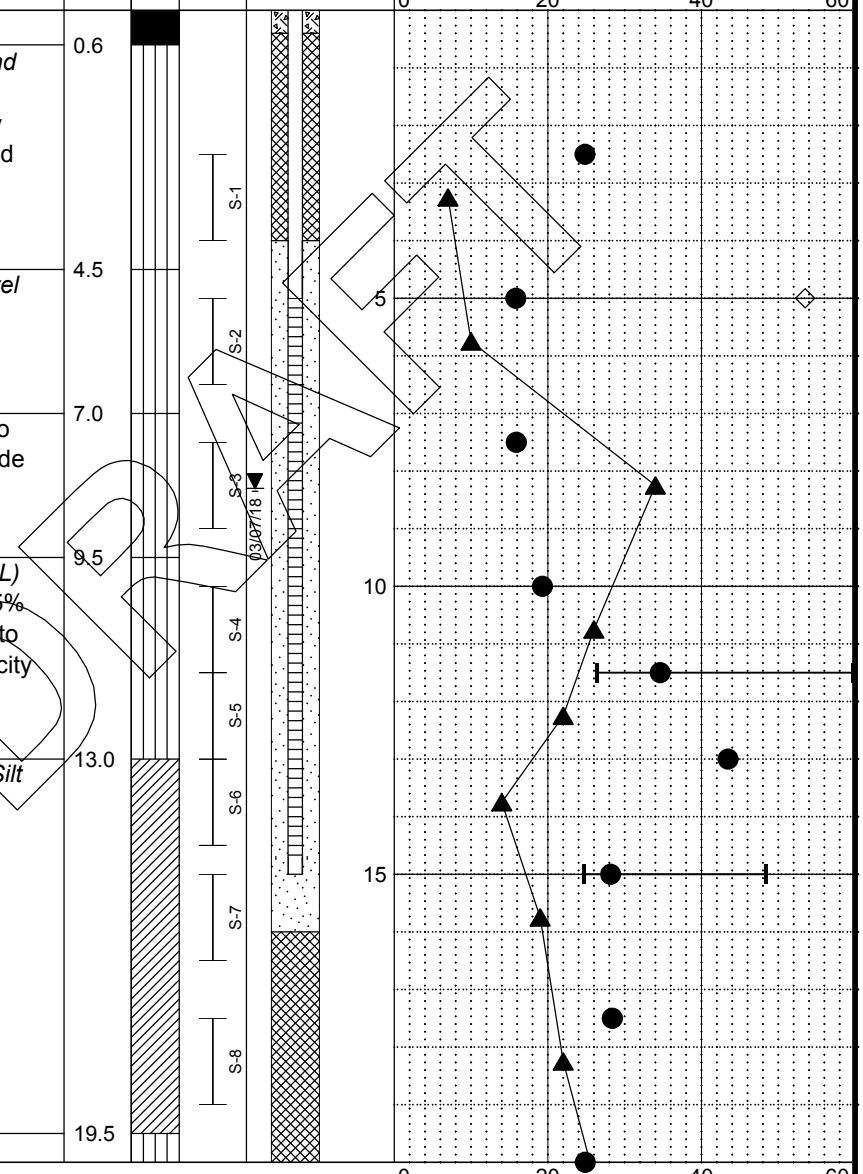
Very stiff, brown *Silt (ML)* and *Sandy Silt (ML)* and *Sandy Fat Clay (CH)*; moist; less than 5% fine, subrounded to subangular gravel; fine to coarse sand; low plasticity to medium plasticity fines; interbedded; trace iron-oxide staining.
(Qpgl)

13.0

Stiff to very stiff, gray, *Lean Clay (CL)* and *Silt (ML)*; moist; less than 5% fine sand; low to medium plasticity fines; few fat clay seams; interbedded.
(Qvgl)

19.5

CONTINUED NEXT SHEET



LEGEND

- Sample Recovery
- * Sample Not Recovered
- Sonic Core Sample
- 2.0" O.D. Split Spoon Sample
- Ground Water Level in Well
- ◇ % Fines (<0.075mm)
- ● % Water Content
- Plastic Limit ⊢●⊣ Liquid Limit
- Natural Water Content

NOTES

1. Refer to KEY for explanation of symbols, codes, abbreviations and definitions.
2. Groundwater level, if indicated above, is for the date specified and may vary.
3. USCS designation is based on visual-manual classification and selected lab testing.
4. The hole location was measured from existing site features and should be considered approximate.

North Mercer Island Interceptor and Enatai Interceptor Upgrade Project
King County, Washington

LOG OF BORING NME-16

May 2018 21-1-22000-212

SHANNON & WILSON, INC.
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FIG. A-15
Sheet 1 of 2

REV 3 - Approved for Submittal

MASTER_LOG_BFW_21-22000.GPJ SHAN_WIL.GDT 5/17/18 Log: SDN Rev: EAS Typ: LK

Total Depth:	*21.5 ft.*	Northing:	*~ 214,201 ft.*	Drilling Method:	*Hollow Stem Auger*	Hole Diam.:	*8 in.*
Top Elevation:	*~ 179 ft.*	Easting:	*~ 1,300,840 ft.*	Drilling Company:	*Holt*	Rod Diam.:	*NWJ*
Vert. Datum:	*KC Metro*	Station:	~	Drill Rig Equipment:	*Mobile B-57*	Hammer Type:	*Automatic*
Horiz. Datum:	*NAD83*	Offset:	~	Other Comments:	~		

SOIL DESCRIPTION

Refer to the report text for a proper understanding of the subsurface materials and drilling methods. The stratification lines indicated below represent the approximate boundaries between material types, and the transition may be gradual.

Depth, ft. | Symbol | Samples | Ground Water | Depth, ft.

PENETRATION RESISTANCE (blows/foot)

▲ Hammer Wt. & Drop: *140 lbs / 30 inches*

0 20 40 60

Very stiff, gray *Silt (ML)*; moist; less than 5% fine sand; low plasticity fines. (Qvgl)

21.5

BOTTOM OF BORING
COMPLETED 11/1/2016

S-9

25

30

35

DRAFT

0 20 40 60

LEGEND

- I Sample Recovery
- * Sample Not Recovered
- Sonic Core Sample
- 2.0" O.D. Split Spoon Sample
- ▼ Ground Water Level in Well

◇ % Fines (<0.075mm)
● % Water Content
Plastic Limit ⊢●⊣ Liquid Limit
Natural Water Content

NOTES

1. Refer to KEY for explanation of symbols, codes, abbreviations and definitions.
2. Groundwater level, if indicated above, is for the date specified and may vary.
3. USCS designation is based on visual-manual classification and selected lab testing.
4. The hole location was measured from existing site features and should be considered approximate.

North Mercer Island Interceptor and
Enatai Interceptor Upgrade Project
King County, Washington

LOG OF BORING NME-16

May 2018 21-1-22000-212

SHANNON & WILSON, INC.
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FIG. A-15
Sheet 2 of 2

REV 3 - Approved for Submittal

MASTER_LOG_BFW_21-22000.GPJ_SHAN_WIL.GDT 5/17/18 Log: SDN Rev: EAS Typ: LK

Total Depth:	16.5 ft.	Northing:	214,098 ft.	Drilling Method:	Sonic Core	Hole Diam.:	
Top Elevation:	99.0 ft.	Easting:	1,302,296 ft.	Drilling Company:	Holt	Rod Diam.:	NWJ
Vert. Datum:	KC Metro	Station:	-	Drill Rig Equipment:	Terra Sonic	Hammer Type:	Automatic
Horiz. Datum:	NAD83	Offset:	-	Other Comments:			

SOIL DESCRIPTION

Refer to the report text for a proper understanding of the subsurface materials and drilling methods. The stratification lines indicated below represent the approximate boundaries between material types, and the transition may be gradual.

Depth, ft. | Symbol | Samples | Ground Water | Depth, ft.

PENETRATION RESISTANCE (blows/foot)

▲ Hammer Wt. & Drop: 140 lbs / 30 inches

0 to 3.0 ft.: Loose, gray, *Silty Sand with Gravel (SM)*; moist to wet; fine to coarse, subrounded to subangular gravel; fine to coarse sand; nonplastic to low plasticity fines; diamict. (Qvat/WeatheredQvt)

3.0 to 10.0 ft.: Loose, gray-brown, *Silty Sand with Gravel and Cobbles (SM)*; moist; less than 10% subrounded to subangular cobbles; fine to coarse, subrounded to subangular gravel; fine to coarse sand; nonplastic to low plasticity fines; diamict. (Qvat)

10.0 to 16.5 ft.: Very dense, gray, *Silty Sand with Gravel (SM)*; moist; fine to coarse, subrounded to subangular gravel; fine to coarse sand; nonplastic fines; diamict. (Qvt)

16.5: BOTTOM OF BORING COMPLETED 8/8/2016

R-1, R-2, R-3, S-1, S-2, S-3

76/11"

98

0 20 40 60

◇ % Fines (<0.075mm)

● % Water Content

DRAFT

LEGEND

- Sample Recovery
- * Sample Not Recovered
- Sonic Core Sample
- 2.0" O.D. Split Spoon Sample

NOTES

1. Refer to KEY for explanation of symbols, codes, abbreviations and definitions.
2. Groundwater level, if indicated above, is for the date specified and may vary.
3. USCS designation is based on visual-manual classification and selected lab testing.

North Mercer Island Interceptor and Enatai Interceptor Upgrade Project
King County, Washington

LOG OF BORING NME-17

May 2018 | 21-1-22000-212

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FIG. A-16

Log: EAS Rev: EAS Typ: LKN

MASTER_LOG_BFW_21-22000.GPJ SHAN_WIL.GDT 5/17/18

REV 3 - Approved for Submittal

Total Depth:	15.8 ft.	Northing:	214,184 ft.	Drilling Method:	Sonic Core	Hole Diam.:	
Top Elevation:	92.0 ft.	Easting:	1,302,584 ft.	Drilling Company:	Holt	Rod Diam.:	NWJ
Vert. Datum:	KC Metro	Station:	-	Drill Rig Equipment:	Terra Sonic	Hammer Type:	Automatic
Horiz. Datum:	NAD83	Offset:	-	Other Comments:			

SOIL DESCRIPTION

Refer to the report text for a proper understanding of the subsurface materials and drilling methods. The stratification lines indicated below represent the approximate boundaries between material types, and the transition may be gradual.

Depth, ft. | Symbol | Samples | Ground Water | Depth, ft.

PENETRATION RESISTANCE (blows/foot)

▲ Hammer Wt. & Drop: 140 lbs / 30 inches

0 20 40 60

Gray, *Poorly Graded Gravel with Sand (GP)*; wet; fine to coarse, subrounded to subangular gravel; fine to coarse sand; nonplastic fines. (Qvro)

1.0

Dense, gray to gray-brown, *Silty Sand with Gravel (SM)*; wet; fine to coarse, subrounded to subangular gravel; fine to coarse sand; nonplastic fines; diamict. (Qvt)

R-1, S-1, R-2, S-2

11.5

Dense, gray-brown, *Silty Sand with Gravel (SM)*; wet; fine to coarse, subrounded to subangular gravel; fine to coarse sand; nonplastic fines. (Qva)

12.5

R-3

Dense to very dense, gray-brown, *Silty Sand with Gravel and Cobbles (SM)*; moist; less than 10% subrounded cobbles; fine to coarse, subrounded to subangular gravel; fine to coarse sand; nonplastic fines; diamict. (Qvt)

15.8

S-3

50/11"

BOTTOM OF BORING
COMPLETED 8/8/2016

0 20 40 60

◇ % Fines (<0.075mm)

● % Water Content

DRAFT

LEGEND

- I Sample Recovery
- * Sample Not Recovered
- Sonic Core Sample
- 2.0" O.D. Split Spoon Sample

NOTES

1. Refer to KEY for explanation of symbols, codes, abbreviations and definitions.
2. Groundwater level, if indicated above, is for the date specified and may vary.
3. USCS designation is based on visual-manual classification and selected lab testing.

North Mercer Island Interceptor and
Enatai Interceptor Upgrade Project
King County, Washington

LOG OF BORING NME-18

May 2018 21-1-22000-212

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FIG. A-17

Log: EAS Rev: EAS Typ: LKN

MASTER_LOG_BFW_21-22000.GPJ SHAN_WIL.GDT 5/17/18

REV 3 - Approved for Submittal

Total Depth:	*16.4 ft.*	Northing:	*214,284 ft.*	Drilling Method:	*Sonic Core*	Hole Diam.:	
Top Elevation:	*76.0 ft.*	Easting:	*1,302,919 ft.*	Drilling Company:	*Holt*	Rod Diam.:	*NWJ*
Vert. Datum:	*KC Metro*	Station:	-	Drill Rig Equipment:	*Terra Sonic*	Hammer Type:	*Automatic*
Horiz. Datum:	*NAD83*	Offset:	-	Other Comments:			

SOIL DESCRIPTION

Refer to the report text for a proper understanding of the subsurface materials and drilling methods. The stratification lines indicated below represent the approximate boundaries between material types, and the transition may be gradual.

Dense, gray-brown, *Poorly Graded Gravel with Silt and Sand (GP-GM)* to *Silty Sand with Gravel (SP-SM)*; wet; fine to coarse, subrounded to subangular gravel; fine to coarse sand; nonplastic fines; diamict pockets. (Qvro)

5.0

Dense, gray-brown, *Silty Sand (SM)*; wet; less than 10% fine, subrounded to subangular gravel; fine to coarse sand; nonplastic fines. (Qvro)

8.0

Medium dense, green, *Silty Gravel with Sand (GM)*; moist; fine to coarse, subrounded to subangular gravel; fine to coarse sand; nonplastic fines; diamict. (Qvat)

11.5

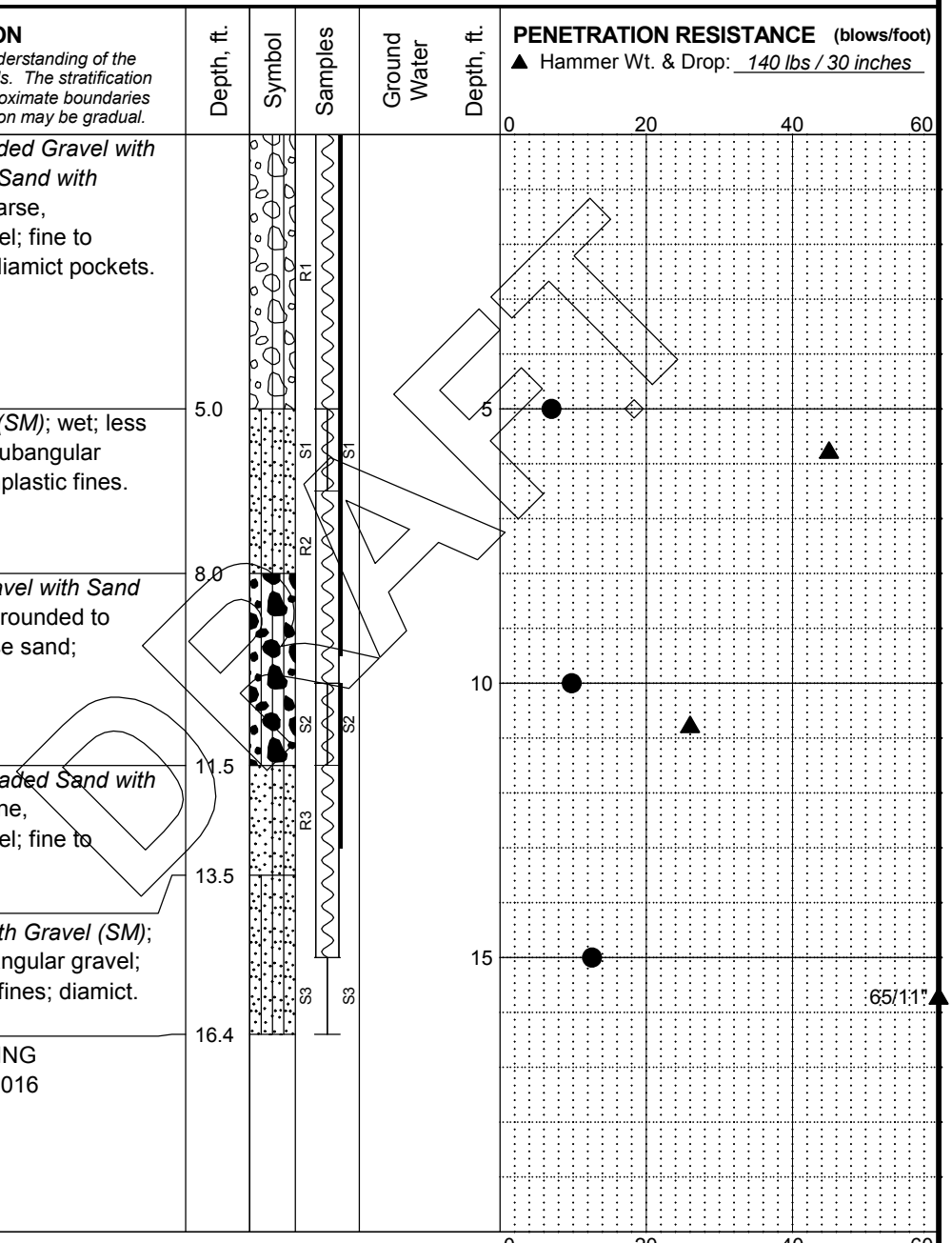
Medium dense, gray, *Poorly Graded Sand with Silt and Gravel (SP-SM)*; wet; fine, subrounded to subangular gravel; fine to coarse sand; nonplastic fines. (Qva)

13.5

Very dense, gray, *Silty Sand with Gravel (SM)*; moist; fine, subrounded to subangular gravel; fine to coarse sand; nonplastic fines; diamict. (Qvt)

16.4

BOTTOM OF BORING
COMPLETED 8/9/2016



DRAFT

LEGEND

- Sample Recovery
- * Sample Not Recovered
- Sonic Core Sample
- 2.0" O.D. Split Spoon Sample

NOTES

1. Refer to KEY for explanation of symbols, codes, abbreviations and definitions.
2. Groundwater level, if indicated above, is for the date specified and may vary.
3. USCS designation is based on visual-manual classification and selected lab testing.

North Mercer Island Interceptor and
Enatai Interceptor Upgrade Project
King County, Washington

LOG OF BORING NME-19

May 2018 21-1-22000-212

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FIG. A-18

REV 3 - Approved for Submittal

MASTER_LOG_BFW_21-22000.GPJ SHAN_WIL.GDT 5/17/18 Log: EAS Rev: EAS Typ: LK

Total Depth:	15.8 ft.	Northing:	214,384 ft.	Drilling Method:	Sonic Core	Hole Diam.:	
Top Elevation:	93.0 ft.	Easting:	1,303,255 ft.	Drilling Company:	Holt	Rod Diam.:	NWJ
Vert. Datum:	KC Metro	Station:	-	Drill Rig Equipment:	Terra Sonic	Hammer Type:	Automatic
Horiz. Datum:	NAD83	Offset:	-	Other Comments:			

SOIL DESCRIPTION

Refer to the report text for a proper understanding of the subsurface materials and drilling methods. The stratification lines indicated below represent the approximate boundaries between material types, and the transition may be gradual.

Blue-gray to green-gray, *Lean Clay (CL)*; moist; less than 5% fine, subrounded to subangular gravel; less than 5% fine to coarse sand; low to medium plasticity fines. (Hl)

1.5

2.0

Gray *Silt (ML)*; moist; dilatent, nonplastic fines. (Qvrl)

Mottled blue and green, *Fine Clay (CH)*; moist; less than 5% fine, subrounded to subangular gravel; less than 10% fine to coarse sand; medium plasticity fines. (Qvrl)

5.0

Medium dense, brown, *Silty Gravel with Sand (GM)* to *Poorly Graded Gravel with Silt and Sand (GP-GM)*; wet; fine to coarse, subrounded to subangular gravel; fine to coarse sand; low plasticity fines; few fine to coarse sand seams. (Qvro)

9.5

Medium dense, brown, *Poorly Graded Sand with Gravel (SP)*; wet; fine to coarse, subrounded to subangular gravel; fine to coarse sand; less than 10% nonplastic fines. (Qvro)

14.0

Medium dense, brown, *Poorly Graded Sand with Silt (SP-SM)* to *Silty Sand (SM)*; wet; fine to medium sand; nonplastic fines. (Qvro)

15.0

15.8

Very dense, gray-brown, *Silty Sand with Gravel (SM)*; moist; fine, subrounded to subangular gravel; fine to coarse sand; nonplastic fines; diamict. (Qvt)

BOTTOM OF BORING
COMPLETED 8/9/2016

Depth, ft. | Symbol | Samples | Ground Water | Depth, ft.

R1 S1 S1 R2 S2 S2 R3 S3 S3

PENETRATION RESISTANCE (blows/foot)

▲ Hammer Wt. & Drop: *140 lbs / 30 inches*

0 20 40 60

5

10

15

50/4"

0 20 40 60

◇ % Fines (<0.075mm)

● % Water Content

LEGEND

- Sample Recovery
- * Sample Not Recovered
- Sonic Core Sample
- 2.0" O.D. Split Spoon Sample

NOTES

1. Refer to KEY for explanation of symbols, codes, abbreviations and definitions.
2. Groundwater level, if indicated above, is for the date specified and may vary.
3. USCS designation is based on visual-manual classification and selected lab testing.

North Mercer Island Interceptor and
Enatai Interceptor Upgrade Project
King County, Washington

LOG OF BORING NME-20

May 2018 21-1-22000-212

SHANNON & WILSON, INC.
Geotechnical and Environmental Consultants

FIG. A-19

REV 3 - Approved for Submittal

MASTER_LOG_BFW_21-22000.GPJ SHAN_WIL.GDT 5/17/18 Log: EAS Rev: EAS Typ: LK

Total Depth:	*100 ft.*	Northing:	*~ 214,674 ft.*	Drilling Method:	*Sonic Core*	Hole Diam.:	*6 in.*
Top Elevation:	*~ 157 ft.*	Easting:	*~ 1,303,796 ft.*	Drilling Company:	*Holt*	Rod Diam.:	*NWJ*
Vert. Datum:	*KC Metro*	Station:	~	Drill Rig Equipment:	*Terra Sonic*	Hammer Type:	*Automatic*
Horiz. Datum:	*NAD83*	Offset:	~	Other Comments:	~		

SOIL DESCRIPTION

Refer to the report text for a proper understanding of the subsurface materials and drilling methods. The stratification lines indicated below represent the approximate boundaries between material types, and the transition may be gradual.

Hand-excavated to 6 feet.

Brown, *Poorly Graded Gravel with Silt and Sand (GP-GM)* to *Silty Gravel with Sand (GM)*; moist to wet; fine to coarse, subrounded to subangular gravel; fine to coarse sand; low plasticity fines.
(Qvro/Qva/Hf)

6.0

Brown, *Silty Sand (SM)*; moist; less than 5% fine sand; fine to coarse sand; nonplastic fines.
(Qvro)

9.0

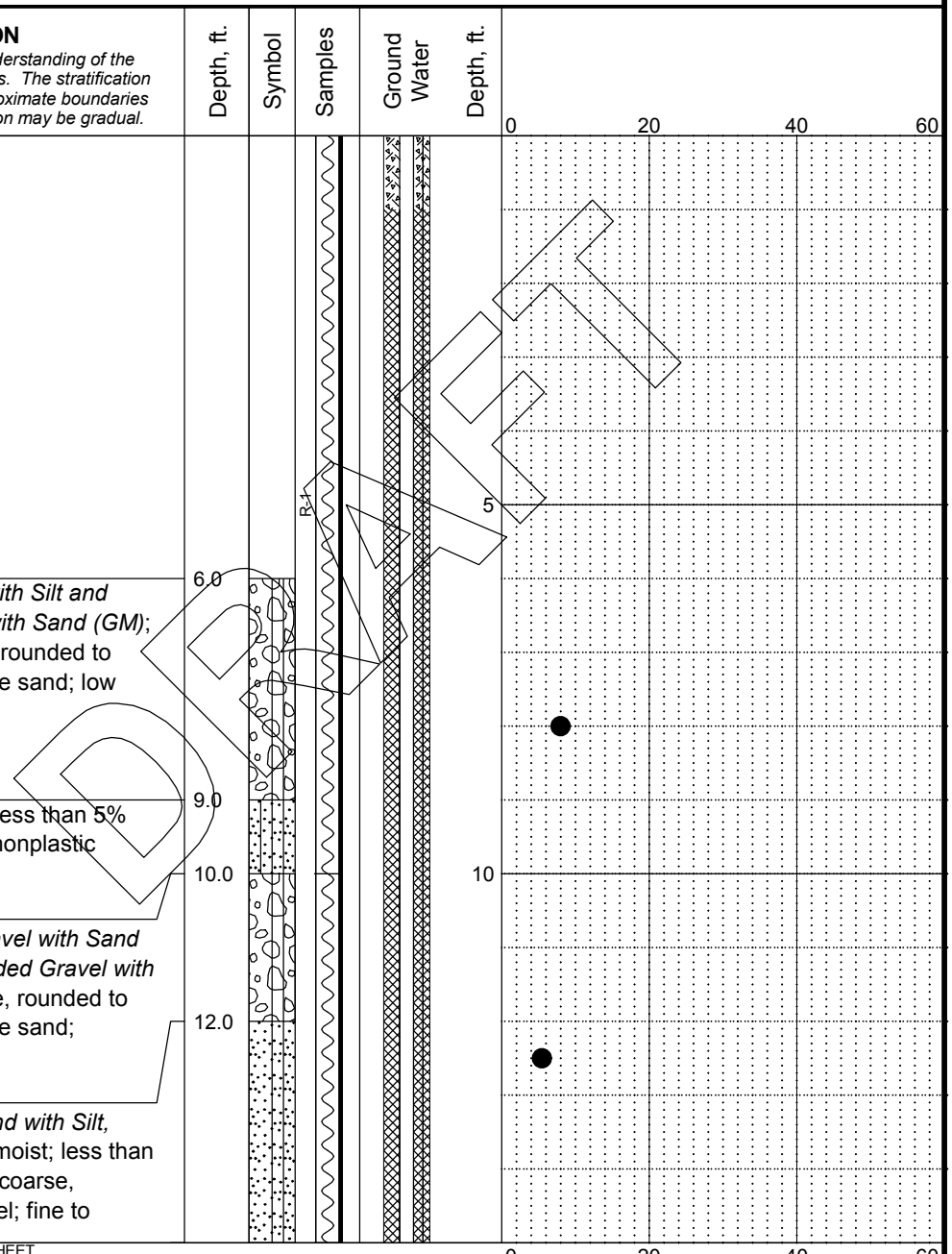
10.0

Gray-brown, *Poorly Graded Gravel with Sand and Silt (GP-GM)* to *Poorly Graded Gravel with Sand (GP)*; moist; fine to coarse, rounded to subangular gravel; fine to coarse sand; nonplastic fines.
(Qvro)

12.0

Gray-brown, *Poorly Graded Sand with Silt, Gravel, and Cobbles (SP-SM)*; moist; less than 5% subangular cobbles; fine to coarse, subrounded to subangular gravel; fine to

CONTINUED NEXT SHEET



LEGEND

- I Sample Recovery
- * Sample Not Recovered
- ⍁ Sonic Core Sample
- ▼ Ground Water Level in Well

NOTES

1. Refer to KEY for explanation of symbols, codes, abbreviations and definitions.
2. Groundwater level, if indicated above, is for the date specified and may vary.
3. USCS designation is based on visual-manual classification and selected lab testing.
4. The hole location was measured from existing site features and should be considered approximate.

North Mercer Island Interceptor and
Enatai Interceptor Upgrade Project
King County, Washington

LOG OF SONIC CORE NME-21

May 2018 21-1-22000-212

SHANNON & WILSON, INC.
Geotechnical and Environmental Consultants

FIG. A-20
Sheet 1 of 7

REV 3 - Approved for Submittal

MASTER_LOG_BFW_21-22000.GPJ SHAN_WIL.GDT 5/17/18 Log: JCS Rev: EAS Typ: LK

Total Depth:	*100 ft.*	Northing:	*~ 214,674 ft.*	Drilling Method:	*Sonic Core*	Hole Diam.:	*6 in.*
Top Elevation:	*~ 157 ft.*	Easting:	*~ 1,303,796 ft.*	Drilling Company:	*Holt*	Rod Diam.:	*NWJ*
Vert. Datum:	*KC Metro*	Station:	~	Drill Rig Equipment:	*Terra Sonic*	Hammer Type:	*Automatic*
Horiz. Datum:	*NAD83*	Offset:	~	Other Comments:	~		

SOIL DESCRIPTION

Refer to the report text for a proper understanding of the subsurface materials and drilling methods. The stratification lines indicated below represent the approximate boundaries between material types, and the transition may be gradual.

coarse sand; nonplastic fines.
(Qvro)
- Layer of gray, silty sand with gravel at 14.6 feet.

15.0

Gray-brown, *Poorly Graded Gravel with Sand (GP)*; moist; fine to coarse, subrounded to subangular gravel; fine to coarse sand; less than 5% nonplastic fines.
(Qvro)

16.5

Brown, *Sandy Silt (ML)* to *Silt with Sand (ML)*; moist; fine sand; nonplastic fines; few pockets with iron-oxide; few silty, fine sand seams.
(Qvgl)

21.0

Brown, *Silty Sand (SM)*; moist; less than 5% fine, subrounded to angular gravel; fine to coarse sand; nonplastic fines.
(Qva)

22.5

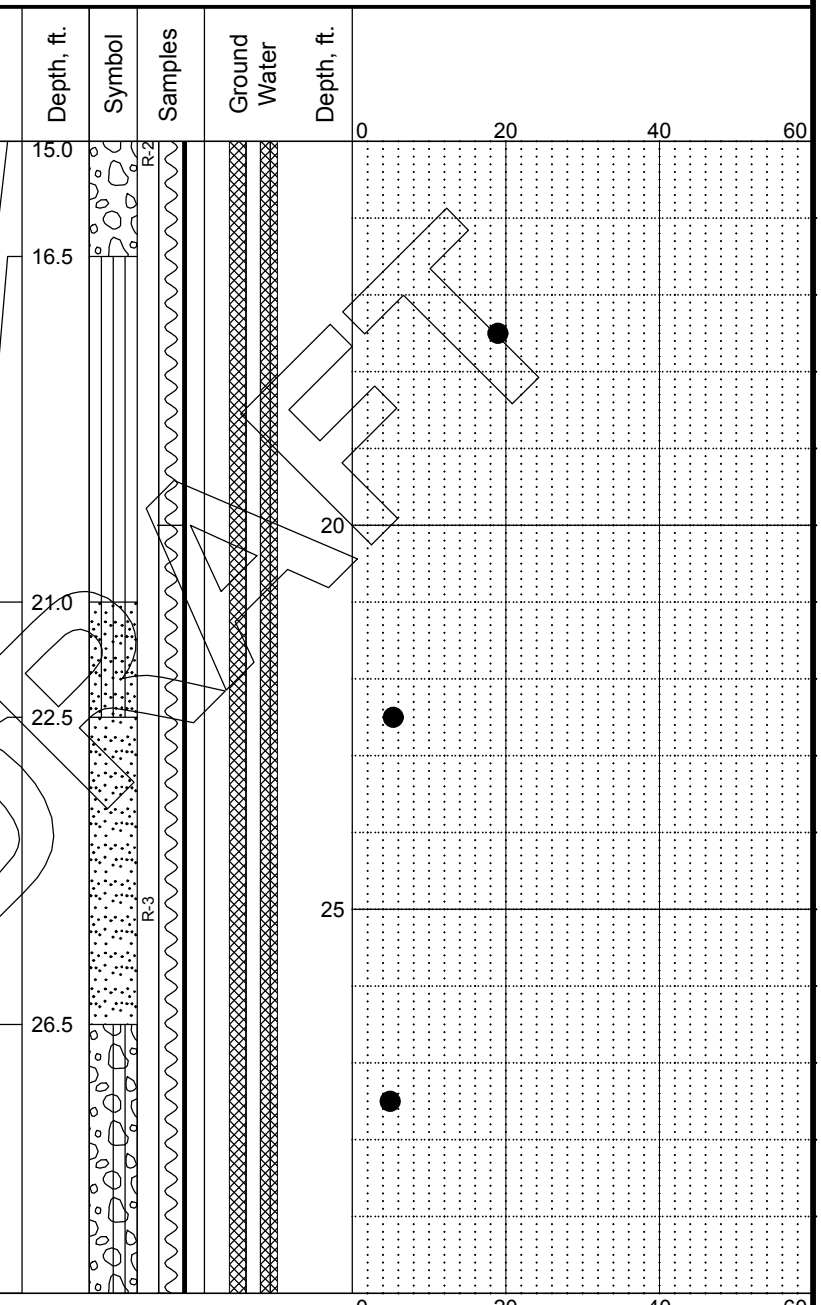
Gray-brown, *Poorly Graded Sand (SP)*; moist; less than 5% fine, subrounded gravel; fine to medium sand; less than 5% nonplastic fines.
(Qpnf)

- Layer of poorly graded sand with gravel from 25 to 25.7 feet.
- Layer of silty sand from 25.7 to 26.5 feet.

26.5

Gray-brown, *Poorly Graded Gravel with Silt and Sand (GP-GM)* to *Silty Gravel with Sand (GM)*; moist; fine to coarse, subrounded to subangular gravel; fine to coarse sand; nonplastic fines.
(Qpnf/Qva)

CONTINUED NEXT SHEET



LEGEND

I Sample Recovery
* Sample Not Recovered
Sonic Core Sample
Ground Water Level in Well

NOTES

1. Refer to KEY for explanation of symbols, codes, abbreviations and definitions.
2. Groundwater level, if indicated above, is for the date specified and may vary.
3. USCS designation is based on visual-manual classification and selected lab testing.
4. The hole location was measured from existing site features and should be considered approximate.

North Mercer Island Interceptor and
Enatai Interceptor Upgrade Project
King County, Washington

LOG OF SONIC CORE NME-21

May 2018 21-1-22000-212

SHANNON & WILSON, INC.
Geotechnical and Environmental Consultants

FIG. A-20
Sheet 2 of 7

REV 3 - Approved for Submittal

MASTER_LOG_BFW_21-22000.GPJ SHAN_WIL.GDT 5/17/18 Log: JCS Rev: EAS Typ: LK

Total Depth:	*100 ft.*	Northing:	*~ 214,674 ft.*	Drilling Method:	*Sonic Core*	Hole Diam.:	*6 in.*
Top Elevation:	*~ 157 ft.*	Easting:	*~ 1,303,796 ft.*	Drilling Company:	*Holt*	Rod Diam.:	*NWJ*
Vert. Datum:	*KC Metro*	Station:	~	Drill Rig Equipment:	*Terra Sonic*	Hammer Type:	*Automatic*
Horiz. Datum:	*NAD83*	Offset:	~	Other Comments:	~		

SOIL DESCRIPTION

Refer to the report text for a proper understanding of the subsurface materials and drilling methods. The stratification lines indicated below represent the approximate boundaries between material types, and the transition may be gradual.

Depth, ft. | Symbol | Samples | Ground Water | Depth, ft.

30.0 Gray-brown, *Poorly Graded Gravel with Sand (GP)*; moist; fine, subrounded to angular gravel; fine to coarse sand; less than 5% nonplastic fines.
(Qpnf)

32.0 - Layer of poorly graded, fine to medium sand from 30.5 to 31.3 feet.

Brown, *Silty Sand (SM)*; moist; less than 5% coarse sand; fine to medium sand; nonplastic fines.
(Qpnf)
- Layer of poorly graded, fine to medium sand from 33.5 to 34.3 feet.
- Layer of poorly graded, fine to medium sand from 35 35.5 feet.

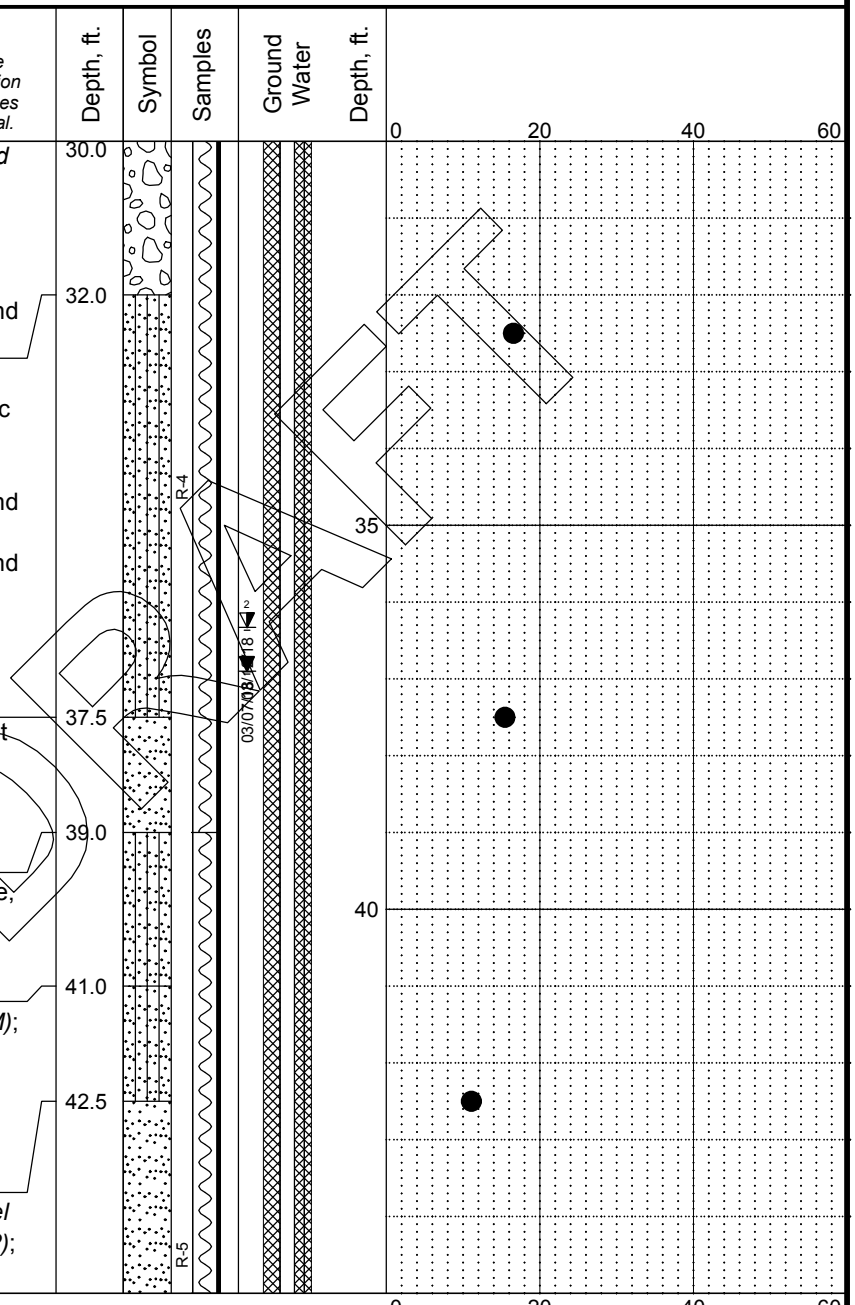
37.5 Gray-brown, *Poorly Graded Sand (SP)*; moist to wet; less than 10% fine, subrounded to subangular gravel; fine to coarse sand; less than 5% nonplastic fines.
(Qpnf)

39.0 Gray, *Silty Sand with Gravel (SM)*; moist; fine, subrounded to subangular gravel; fine to coarse sand; nonplastic fines; diamict.
(Qpgt)

41.0 Orange-brown to gray-brown, *Silty Sand (SM)*; moist; less than 10% fine, subrounded to subangular gravel; fine to coarse sand; nonplastic fines; diamict pockets; iron-oxide staining.
(Qpgd)

42.5 Gray-brown, *Poorly Graded Sand with Gravel (SP)* to *Poorly Graded Gravel with Sand (GP)*; wet; fine, subrounded to subangular gravel;

CONTINUED NEXT SHEET



LEGEND

I	Sample Recovery	▼	Ground Water Level in Well
*	Sample Not Recovered		
⊠	Sonic Core Sample		

NOTES

1. Refer to KEY for explanation of symbols, codes, abbreviations and definitions.
2. Groundwater level, if indicated above, is for the date specified and may vary.
3. USCS designation is based on visual-manual classification and selected lab testing.
4. The hole location was measured from existing site features and should be considered approximate.

North Mercer Island Interceptor and
Enatai Interceptor Upgrade Project
King County, Washington

LOG OF SONIC CORE NME-21

May 2018 | 21-1-22000-212

SHANNON & WILSON, INC.
Geotechnical and Environmental Consultants

FIG. A-20
Sheet 3 of 7

REV 3 - Approved for Submittal

MASTER_LOG_BFW_21-22000.GPJ_SHAN_WIL.GDT 5/17/18 Log: JCS Rev: EAS Typ: LK

Total Depth:	*100 ft.*	Northing:	*~ 214,674 ft.*	Drilling Method:	*Sonic Core*	Hole Diam.:	*6 in.*
Top Elevation:	*~ 157 ft.*	Easting:	*~ 1,303,796 ft.*	Drilling Company:	*Holt*	Rod Diam.:	*NWJ*
Vert. Datum:	*KC Metro*	Station:	~	Drill Rig Equipment:	*Terra Sonic*	Hammer Type:	*Automatic*
Horiz. Datum:	*NAD83*	Offset:	~	Other Comments:	~		

SOIL DESCRIPTION

Refer to the report text for a proper understanding of the subsurface materials and drilling methods. The stratification lines indicated below represent the approximate boundaries between material types, and the transition may be gradual.

fine to coarse sand; less than 5% nonplastic fines.
(Qpgo)

45.5

Gray-brown, *Poorly Graded Sand (SP)*; wet; less than 5% fine, subrounded to subangular gravel; fine to medium sand; less than 5% nonplastic fines.
(Qpgo)
- Layer of poorly graded sand with gravel from 47.5 to 48.1 feet.

50.0

Gray-brown, *Poorly Graded Sand with Gravel (SP)*; wet; fine to coarse, rounded to subangular gravel; fine to coarse sand; less than 5% nonplastic fines; few silty sand pockets.
(Qpgo)

52.0

Gray-brown, *Silty Sand (SM)*; wet; fine to coarse, subrounded to subangular gravel; fine sand; nonplastic fines; trace organics.
(Qpgo)

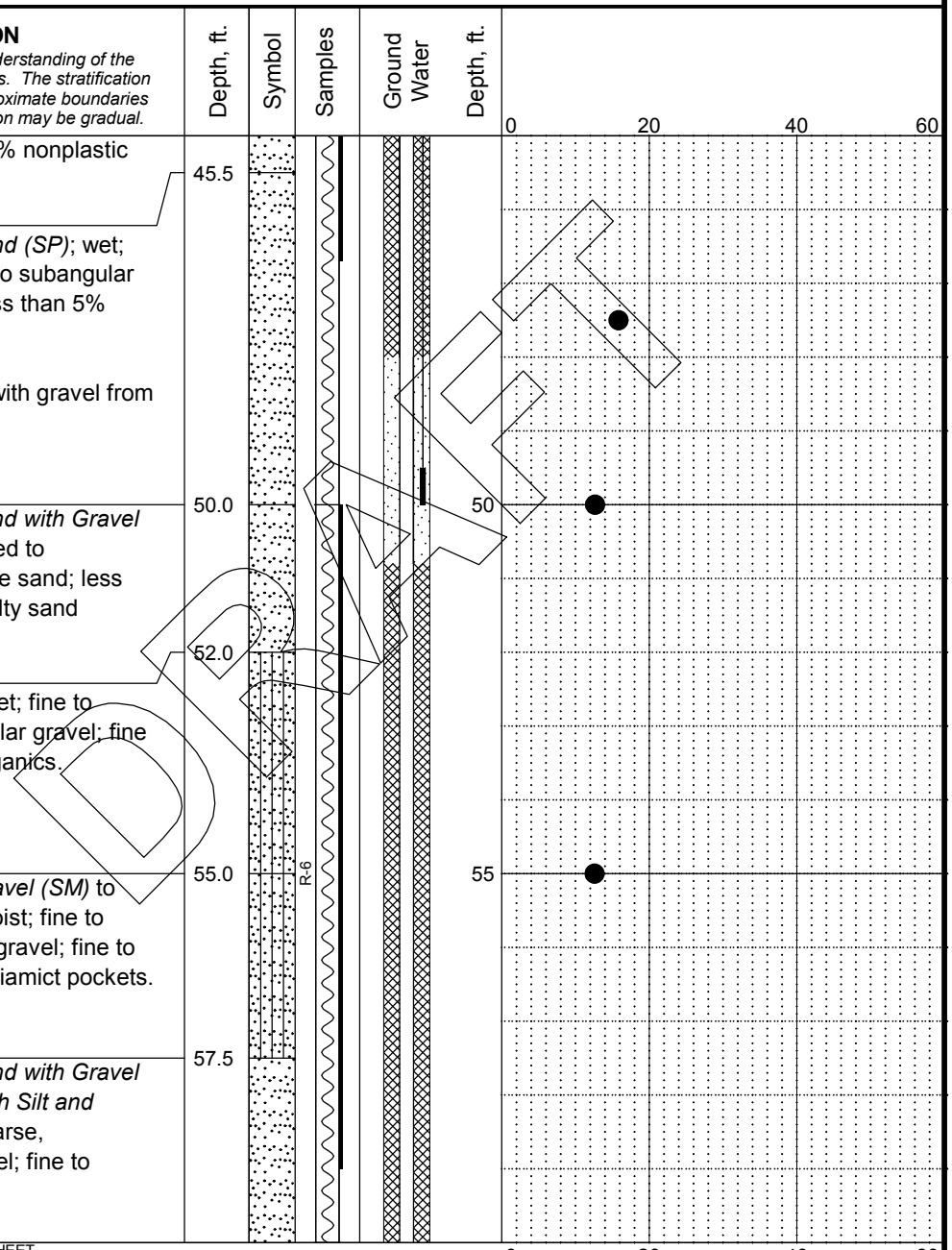
55.0

Gray-brown, *Silty Sand with Gravel (SM)* to *Silty Gravel with Sand (GM)*; moist; fine to coarse, subrounded to angular gravel; fine to coarse sand; nonplastic fines; diamict pockets.
(Qpgd)

57.5

Gray-brown, *Poorly Graded Sand with Gravel (SP)* to *Poorly Graded Sand with Silt and Gravel (SP-SM)*; wet; fine to coarse, subrounded to subangular gravel; fine to coarse sand; nonplastic fines.
(Qpgo)

CONTINUED NEXT SHEET



LEGEND

I	Sample Recovery	▼	Ground Water Level in Well
*	Sample Not Recovered		
⊠	Sonic Core Sample		

NOTES

1. Refer to KEY for explanation of symbols, codes, abbreviations and definitions.
2. Groundwater level, if indicated above, is for the date specified and may vary.
3. USCS designation is based on visual-manual classification and selected lab testing.
4. The hole location was measured from existing site features and should be considered approximate.

North Mercer Island Interceptor and
Enatai Interceptor Upgrade Project
King County, Washington

LOG OF SONIC CORE NME-21

May 2018 | 21-1-22000-212

SHANNON & WILSON, INC.
Geotechnical and Environmental Consultants

FIG. A-20
Sheet 4 of 7

REV 3 - Approved for Submittal

MASTER_LOG_BFW_21-22000.GPJ_SHAN_WIL.GDT 5/17/18 Log: JCS Rev: EAS Typ: LK

Total Depth:	*100 ft.*	Northing:	*~ 214,674 ft.*	Drilling Method:	*Sonic Core*	Hole Diam.:	*6 in.*
Top Elevation:	*~ 157 ft.*	Easting:	*~ 1,303,796 ft.*	Drilling Company:	*Holt*	Rod Diam.:	*NWJ*
Vert. Datum:	*KC Metro*	Station:	~	Drill Rig Equipment:	*Terra Sonic*	Hammer Type:	*Automatic*
Horiz. Datum:	*NAD83*	Offset:	~	Other Comments:	~		

SOIL DESCRIPTION

Refer to the report text for a proper understanding of the subsurface materials and drilling methods. The stratification lines indicated below represent the approximate boundaries between material types, and the transition may be gradual.

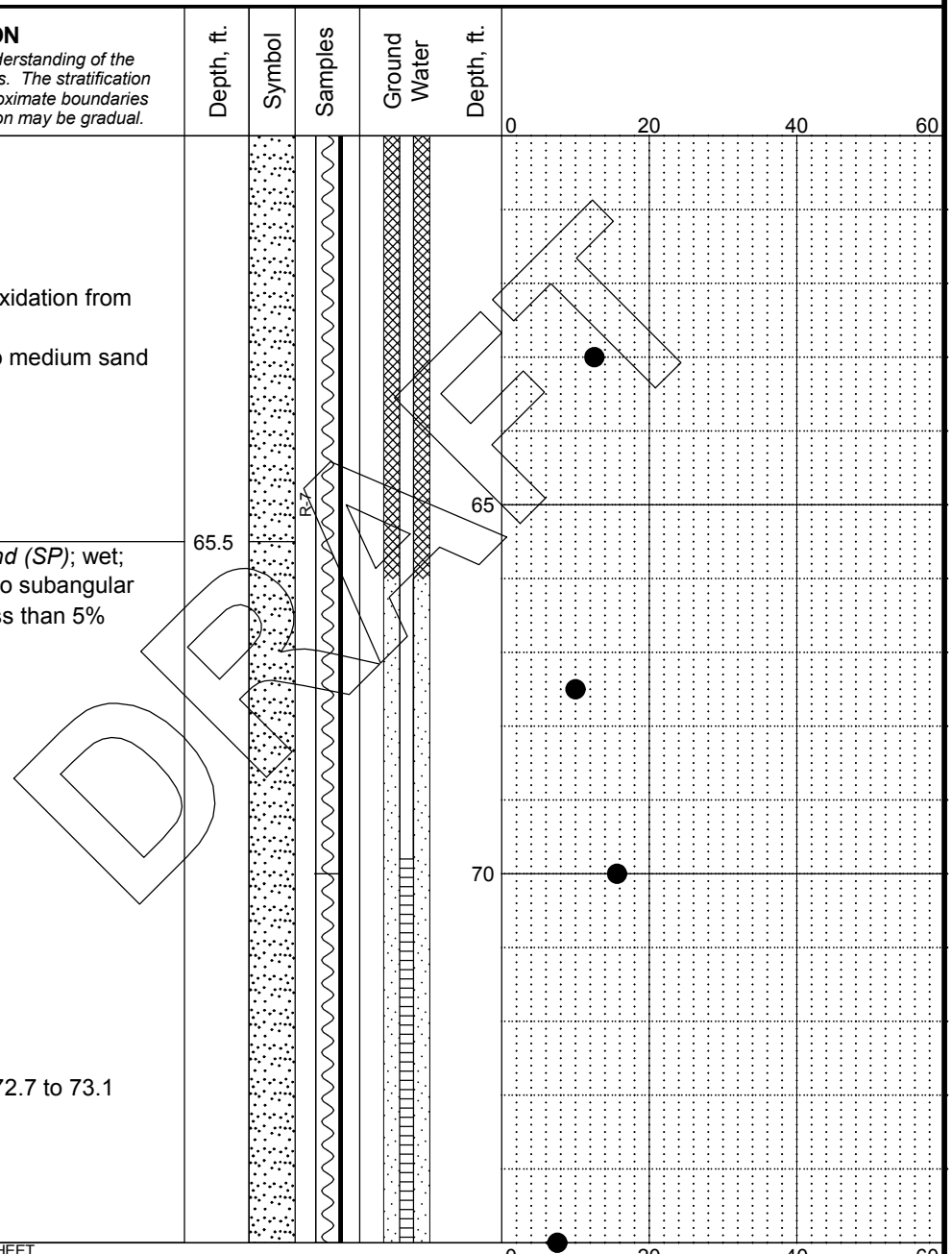
- Layer of silty, fine sand with oxidation from 62 to 62.3 feet.
- Layer of poorly graded, fine to medium sand from 62.5 to 63 feet.

65.5

Gray-brown, *Poorly Graded Sand (SP)*; wet; less than 5% fine, subrounded to subangular gravel; fine to medium sand; less than 5% nonplastic fines.
(Qpgo)

- Layer of silty, fine sand from 72.7 to 73.1 feet.

CONTINUED NEXT SHEET



DRAFT

LEGEND

- I Sample Recovery
- * Sample Not Recovered
- Sonic Core Sample
- Ground Water Level in Well

NOTES

1. Refer to KEY for explanation of symbols, codes, abbreviations and definitions.
2. Groundwater level, if indicated above, is for the date specified and may vary.
3. USCS designation is based on visual-manual classification and selected lab testing.
4. The hole location was measured from existing site features and should be considered approximate.

North Mercer Island Interceptor and
Enatai Interceptor Upgrade Project
King County, Washington

LOG OF SONIC CORE NME-21

May 2018 21-1-22000-212

SHANNON & WILSON, INC.
Geotechnical and Environmental Consultants

FIG. A-20
Sheet 5 of 7

MASTER_LOG_BFW_21-22000.GPJ SHAN_WIL.GDT 5/17/18 Log: JCS Rev: EAS Typ: LK

REV 3 - Approved for Submittal

Total Depth:	*100 ft.*	Northing:	*~ 214,674 ft.*	Drilling Method:	*Sonic Core*	Hole Diam.:	*6 in.*
Top Elevation:	*~ 157 ft.*	Easting:	*~ 1,303,796 ft.*	Drilling Company:	*Holt*	Rod Diam.:	*NWJ*
Vert. Datum:	*KC Metro*	Station:	~	Drill Rig Equipment:	*Terra Sonic*	Hammer Type:	*Automatic*
Horiz. Datum:	*NAD83*	Offset:	~	Other Comments:	~		

SOIL DESCRIPTION

Refer to the report text for a proper understanding of the subsurface materials and drilling methods. The stratification lines indicated below represent the approximate boundaries between material types, and the transition may be gradual.

Depth, ft. | Symbol | Samples | Ground Water | Depth, ft.

75.0 — Gray-brown, *Poorly Graded Sand with Silt and Gravel (SP-SM)* to *Poorly Graded Gravel with Silt and Sand (GP-GM)*; wet; fine to coarse, subrounded to subangular gravel; fine to coarse sand; less than 5% nonplastic fines; few silty sand seams.
(Qpgo)

79.0 — Gray-brown, *Silty Sand (SM)*; wet; fine sand; nonplastic fines.
(Qpnf)

82.0 — Orange-brown, *Silty Sand with Gravel (SM)*; moist to wet; fine, subrounded to subangular gravel; fine to coarse sand; nonplastic fines; iron-oxide staining; few light gray silt pockets.
(Qpnf)

82.5 — Gray, *Poorly Graded Gravel with Sand (GP)*; wet; fine, subrounded to subangular gravel; fine to coarse sand; less than 5% nonplastic fines.
(Qpnf)

83.5 — Gray-brown, *Poorly Graded Sand (SP)* and *Silty Sand (SM)*; wet; less than 5% fine, subrounded to subangular gravel; fine to medium sand; nonplastic fines; trace seams with iron-oxide staining.
(Qpnf)

87.5 — Gray-brown, *Poorly Graded Gravel with Sand (GP)*; wet; fine, subrounded to subangular gravel; fine to coarse sand; less than 5%

CONTINUED NEXT SHEET

R-8 R-9

0 20 40 60

80 85

0 20 40 60

◇ % Fines (<0.075mm)
● % Water Content

LEGEND

Sample Recovery	Ground Water Level in Well
* Sample Not Recovered	
Sonic Core Sample	

NOTES

1. Refer to KEY for explanation of symbols, codes, abbreviations and definitions.
2. Groundwater level, if indicated above, is for the date specified and may vary.
3. USCS designation is based on visual-manual classification and selected lab testing.
4. The hole location was measured from existing site features and should be considered approximate.

North Mercer Island Interceptor and Enatai Interceptor Upgrade Project
King County, Washington

LOG OF SONIC CORE NME-21

May 2018 | 21-1-22000-212

SHANNON & WILSON, INC.
Geotechnical and Environmental Consultants

FIG. A-20
Sheet 6 of 7

REV 3 - Approved for Submittal

MASTER_LOG_BFW_21-22000.GPJ_SHAN_WIL.GDT 5/17/18 Log: JCS Rev: EAS Typ: LK

Total Depth:	*100 ft.*	Northing:	*~ 214,674 ft.*	Drilling Method:	*Sonic Core*	Hole Diam.:	*6 in.*
Top Elevation:	*~ 157 ft.*	Easting:	*~ 1,303,796 ft.*	Drilling Company:	*Holt*	Rod Diam.:	*NWJ*
Vert. Datum:	*KC Metro*	Station:	~	Drill Rig Equipment:	*Terra Sonic*	Hammer Type:	*Automatic*
Horiz. Datum:	*NAD83*	Offset:	~	Other Comments:	~		

SOIL DESCRIPTION

Refer to the report text for a proper understanding of the subsurface materials and drilling methods. The stratification lines indicated below represent the approximate boundaries between material types, and the transition may be gradual.

nonplastic fines; few silty sand seams.
(Qpgo)

92.0

Gray, *Poorly Graded Sand with Silt and Gravel (SP-SM)*; wet; fine to coarse, subrounded to angular gravel; fine to coarse sand; nonplastic fines.
(Qpgo)

93.0

Orange, *Silty Sand (SM)*; wet; fine to medium sand; nonplastic fines.
(Qpgo)

94.5

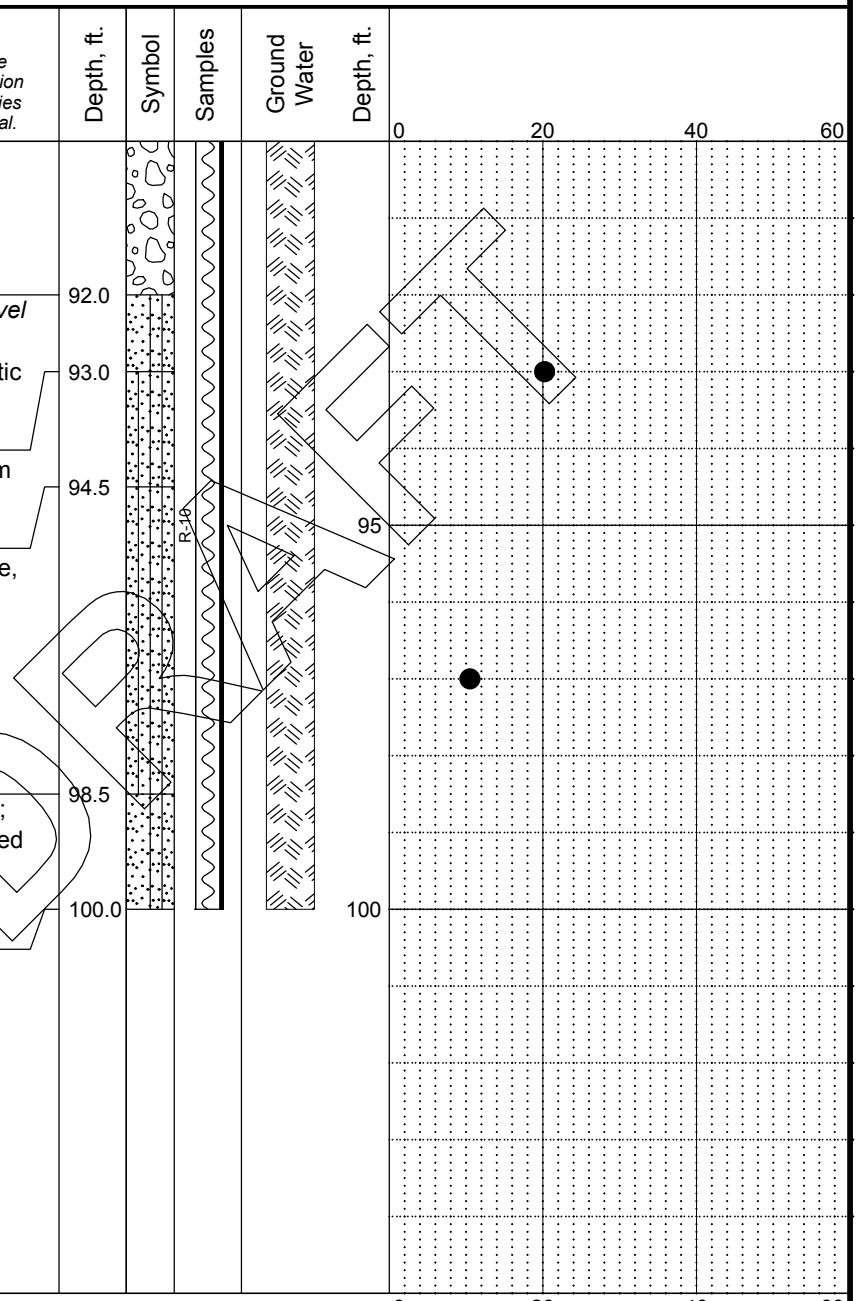
Gray, *Silty Sand with Gravel (SM)*; moist; fine, subrounded to subangular gravel; fine to coarse sand; nonplastic fines; diamict.
(Qpgd)

98.5

Gray, *Poorly Graded Sand with Silt (SP-SM)*; wet; less than 10% fine to coarse, subrounded to subangular gravel; fine to coarse sand; nonplastic fines.
(Qpgo)

100.0

BOTTOM OF BORING
COMPLETED 7/26/2016



LEGEND

- I Sample Recovery
- * Sample Not Recovered
- Sonic Core Sample
- Ground Water Level in Well
- ◇ % Fines (<0.075mm)
- ● % Water Content

NOTES

1. Refer to KEY for explanation of symbols, codes, abbreviations and definitions.
2. Groundwater level, if indicated above, is for the date specified and may vary.
3. USCS designation is based on visual-manual classification and selected lab testing.
4. The hole location was measured from existing site features and should be considered approximate.

North Mercer Island Interceptor and
Enatai Interceptor Upgrade Project
King County, Washington

LOG OF SONIC CORE NME-21

May 2018 21-1-22000-212

SHANNON & WILSON, INC.
Geotechnical and Environmental Consultants

FIG. A-20
Sheet 7 of 7

REV 3 - Approved for Submittal

MASTER_LOG_BFW_21-22000.GPJ SHAN_WIL.GDT 5/17/18 *Log: JCS Rev: EAS Typ: LK*

Total Depth:	*165 ft.*	Northing:	*~ 214,749 ft.*	Drilling Method:	*Sonic Core*	Hole Diam.:	*6 in.*
Top Elevation:	*~ 187 ft.*	Easting:	*~ 1,304,377 ft.*	Drilling Company:	*Holt*	Rod Diam.:	*NWJ*
Vert. Datum:	*KC Metro*	Station:	~	Drill Rig Equipment:	*Terra Sonic*	Hammer Type:	*Automatic*
Horiz. Datum:	*NAD83*	Offset:	~	Other Comments:	~		

SOIL DESCRIPTION

Refer to the report text for a proper understanding of the subsurface materials and drilling methods. The stratification lines indicated below represent the approximate boundaries between material types, and the transition may be gradual.

Brown, *Silty Gravel with Sand and Cobbles (GM)*; dry; less than 10% subangular cobbles; fine to coarse, subrounded to subangular gravel; fine to coarse sand; nonplastic fines; few roots above 1.5 feet.
(Hf)

2.5

Brown to dark brown, *Silty Gravel with Sand and Cobbles (GM)*; moist; less than 25% subrounded to subangular cobbles; fine to coarse, subrounded to subangular gravel; fine to coarse sand; nonplastic to low plasticity fines; diamict pockets.
(Hf/Qvat)

5.5

Gray-brown, *Silty Sand with Gravel (SM)* to *Silty Gravel with Sand (GM)*; moist; fine to coarse, subrounded to subangular gravel; fine to coarse sand; nonplastic fines; diamict.
(Qvt)

10.0

Brown, *Silty Sand (SM)*; moist; few fine, subrounded to subangular gravel; fine to medium sand; nonplastic fines; diamict.
(Qvd)

11.5

Brown, *Poorly Graded Sand (SP)*; moist; fine to medium sand; less than 5% nonplastic fines.
(Qva)

12.5

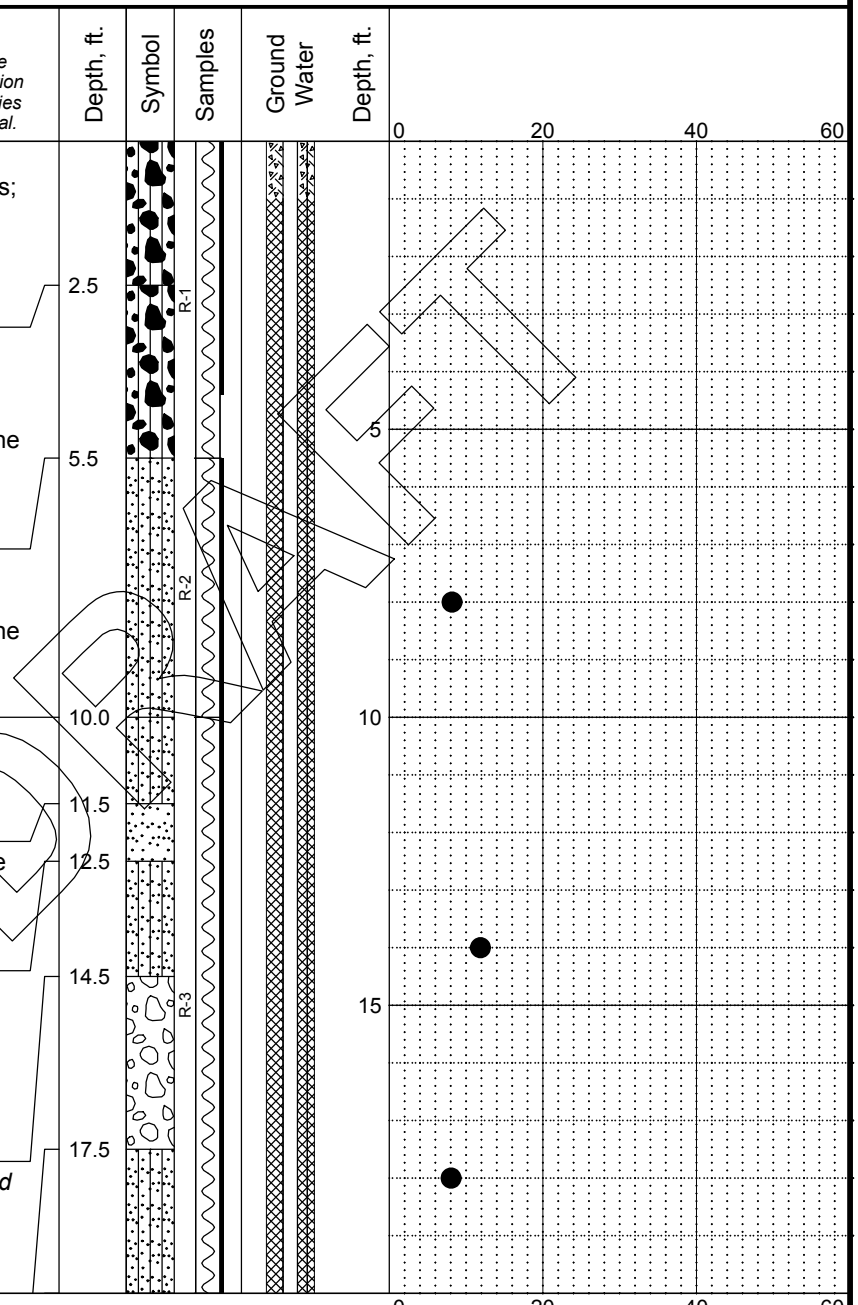
Gray-brown, *Silty Sand with Gravel (SM)*; moist; fine to coarse, subrounded to subangular gravel; fine to coarse sand; nonplastic to low plasticity fines; diamict pockets; few sandy silt seams.
(Qvd)

14.5

Gray-brown, *Poorly Graded Gravel with Sand (GP)*; moist; fine to coarse, subrounded to subangular gravel; fine to coarse sand; less than 5% nonplastic fines.

17.5

CONTINUED NEXT SHEET



LEGEND

- I Sample Recovery
- * Sample Not Recovered
- ⊠ Sonic Core Sample
- ▼ Ground Water Level in Well

NOTES

1. Refer to KEY for explanation of symbols, codes, abbreviations and definitions.
2. Groundwater level, if indicated above, is for the date specified and may vary.
3. USCS designation is based on visual-manual classification and selected lab testing.
4. The hole location was measured from existing site features and should be considered approximate.

North Mercer Island Interceptor and
Enatai Interceptor Upgrade Project
King County, Washington

LOG OF SONIC CORE NME-22

May 2018 21-1-22000-212

SHANNON & WILSON, INC.
Geotechnical and Environmental Consultants

FIG. A-21
Sheet 1 of 9

REV 3 - Approved for Submittal

Log: EAS Rev: EAS Typ: LKn

MASTER_LOG_BFW_21-22000.GPJ SHAN_WIL.GDT 5/17/18

Total Depth:	*165 ft.*	Northing:	*~ 214,749 ft.*	Drilling Method:	*Sonic Core*	Hole Diam.:	*6 in.*
Top Elevation:	*~ 187 ft.*	Easting:	*~ 1,304,377 ft.*	Drilling Company:	*Holt*	Rod Diam.:	*NWJ*
Vert. Datum:	*KC Metro*	Station:	~	Drill Rig Equipment:	*Terra Sonic*	Hammer Type:	*Automatic*
Horiz. Datum:	*NAD83*	Offset:	~	Other Comments:	~		

SOIL DESCRIPTION

Refer to the report text for a proper understanding of the subsurface materials and drilling methods. The stratification lines indicated below represent the approximate boundaries between material types, and the transition may be gradual.

(Qva)

Gray-brown, *Silty Sand (SM)*; moist; fine to medium sand; nonplastic fines. (Qva)

Gray-brown, *Poorly Graded Sand with Silt and Gravel (SP-SM)* to *Poorly Graded Sand with Gravel (SP)*; moist; fine, subrounded to subangular gravel; fine to coarse sand; nonplastic fines; few silty sand with gravel seams. (Qva)

Gray-brown, *Poorly Graded Sand with Silt (SP-SM)* to *Poorly Graded Sand (SP)*; moist; fine to medium sand; nonplastic fines. (Qva)

- Layer of brown, fine sandy silt with iron-oxide staining from 24.5 to 25 feet.

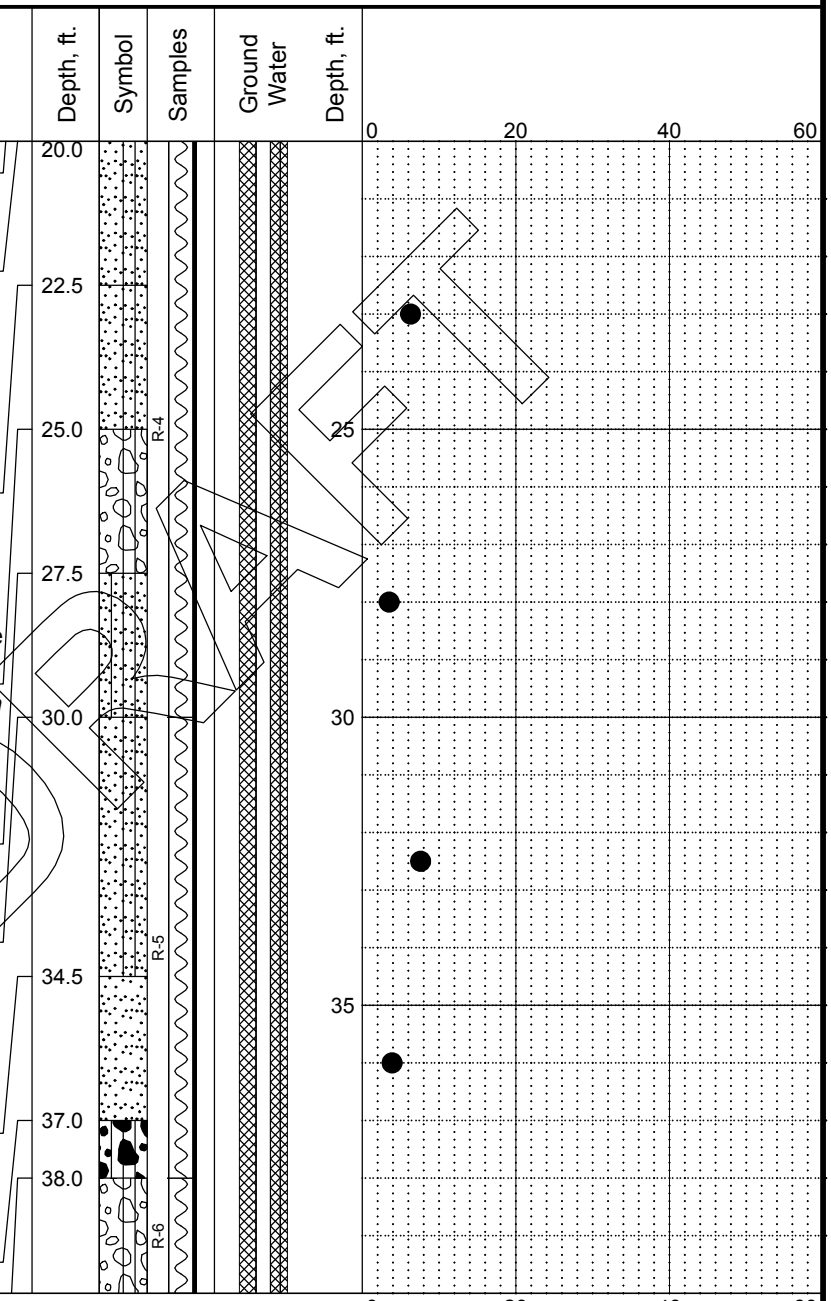
Gray to gray-brown, *Poorly Graded Gravel with Silt and Sand (GP-GM)*; moist; fine to coarse, subrounded to angular gravel; fine to coarse sand; nonplastic fines; few diamict pockets. (Qva)

Gray-brown, *Silty Sand (SM)*; moist; fine to medium sand; nonplastic fines. (Qva)

Gray-brown, *Poorly Graded Sand with Silt (SP-SM)* to *Silty Sand (SM)*; moist; few fine, subrounded to angular gravel; fine to medium sand; nonplastic fines; few silty sand diamict pockets. (Qva)

Gray-brown, *Poorly Graded Sand (SP)* to *Poorly Graded Sand with Silt (SP-SM)*; moist; fine to medium sand; nonplastic fines. (Qva)

CONTINUED NEXT SHEET



LEGEND

I Sample Recovery
* Sample Not Recovered
Sonic Core Sample
Ground Water Level in Well

NOTES

1. Refer to KEY for explanation of symbols, codes, abbreviations and definitions.
2. Groundwater level, if indicated above, is for the date specified and may vary.
3. USCS designation is based on visual-manual classification and selected lab testing.
4. The hole location was measured from existing site features and should be considered approximate.

North Mercer Island Interceptor and Enatai Interceptor Upgrade Project
King County, Washington

LOG OF SONIC CORE NME-22

May 2018 21-1-22000-212

SHANNON & WILSON, INC.
Geotechnical and Environmental Consultants

FIG. A-21
Sheet 2 of 9

REV 3 - Approved for Submittal

Log: EAS Rev: EAS Typ: LKn

MASTER_LOG_BFW_21-22000.GPJ SHAN_WIL.GDT 5/17/18

Total Depth:	*165 ft.*	Northing:	*~ 214,749 ft.*	Drilling Method:	*Sonic Core*	Hole Diam.:	*6 in.*
Top Elevation:	*~ 187 ft.*	Easting:	*~ 1,304,377 ft.*	Drilling Company:	*Holt*	Rod Diam.:	*NWJ*
Vert. Datum:	*KC Metro*	Station:	~	Drill Rig Equipment:	*Terra Sonic*	Hammer Type:	*Automatic*
Horiz. Datum:	*NAD83*	Offset:	~	Other Comments:	~		

SOIL DESCRIPTION

Refer to the report text for a proper understanding of the subsurface materials and drilling methods. The stratification lines indicated below represent the approximate boundaries between material types, and the transition may be gradual.

Depth, ft. | Symbol | Samples | Ground Water | Depth, ft.

Gray-brown, *Silty Sand (GM)*; moist; less than 5% fine, subrounded to subangular gravel; fine to medium sand; nonplastic fines; iron-oxide staining at 37.8 feet.
(Qva)

41.0

42.0

Gray-brown, *Poorly Graded Gravel with Silt and Sand (GP-GM)* to *Silty Gravel with Sand (GM)*; moist; fine to coarse, subrounded to subangular gravel; fine to coarse sand; nonplastic fines.
(Qva)

45.5

Gray-brown, *Silty Sand (SM)*; moist; fine to medium sand; nonplastic fines.
(Qva)

Gray-brown, *Silty Sand with Gravel (SM)*; moist; fine, subrounded to subangular gravel; fine to coarse sand; nonplastic fines; diamict.
(Qvd)

Gray-brown, *Poorly Graded Gravel with Silt, Sand, and Cobbles (GP-GM)* to *Poorly Graded Sand with Silt, Gravel, and Cobbles (SP-SM)*; moist; less than 10% subangular cobbles; fine to coarse, subrounded to subangular gravel; fine to coarse sand; less than 5% nonplastic fines.
(Qva)
- Layer of silty sand with gravel at 47 feet.

51.5

Gray, *Silty Gravel with Sand (GM)* to *Poorly Graded Gravel with Silt and Sand (GP-GM)*; dry to moist; fine to coarse, subrounded to subangular gravel; fine to coarse sand; nonplastic fines.
(Qva)

55.0

57.0

Gray-brown, *Poorly Graded Sand with Gravel (SP)*; moist; fine to coarse, subrounded to subangular gravel; fine to coarse sand; less

59.0

CONTINUED NEXT SHEET

R-7 R-8 R-9

0 20 40 60

45 50 55

0 20 40 60

◇ % Fines (<0.075mm)
● % Water Content

LEGEND

Sample Recovery	▼ Ground Water Level in Well
* Sample Not Recovered	
Sonic Core Sample	

NOTES

1. Refer to KEY for explanation of symbols, codes, abbreviations and definitions.
2. Groundwater level, if indicated above, is for the date specified and may vary.
3. USCS designation is based on visual-manual classification and selected lab testing.
4. The hole location was measured from existing site features and should be considered approximate.

North Mercer Island Interceptor and Enatai Interceptor Upgrade Project
King County, Washington

LOG OF SONIC CORE NME-22

May 2018 | 21-1-22000-212

SHANNON & WILSON, INC.
Geotechnical and Environmental Consultants

FIG. A-21
Sheet 3 of 9

REV 3 - Approved for Submittal

MASTER_LOG_BFW_21-22000.GPJ_SHAN_WIL.GDT 5/17/18 Log: EAS Rev: EAS Typ: LKn

Total Depth:	*165 ft.*	Northing:	*~ 214,749 ft.*	Drilling Method:	*Sonic Core*	Hole Diam.:	*6 in.*
Top Elevation:	*~ 187 ft.*	Easting:	*~ 1,304,377 ft.*	Drilling Company:	*Holt*	Rod Diam.:	*NWJ*
Vert. Datum:	*KC Metro*	Station:	~	Drill Rig Equipment:	*Terra Sonic*	Hammer Type:	*Automatic*
Horiz. Datum:	*NAD83*	Offset:	~	Other Comments:	~		

SOIL DESCRIPTION

Refer to the report text for a proper understanding of the subsurface materials and drilling methods. The stratification lines indicated below represent the approximate boundaries between material types, and the transition may be gradual.

than 5% nonplastic fines.
(Qva)

Gray-brown, *Silty Sand (SM)*; moist; fine to medium sand; nonplastic fines.
(Qva)

Gray, *Silty Sand with Gravel (SM)*; dry to moist; fine to coarse, subrounded to subangular gravel; fine to coarse sand; nonplastic fines; diamict pockets.
(Qvd?)

63.5

Gray-brown, *Poorly Graded Sand with Silt (SP-SM)* to *Poorly Graded Sand (SP)*; wet; fine to coarse sand; nonplastic fines.
(Qva)

67.0

Gray-brown, *Poorly Graded Gravel with Sand (GP)*; wet; fine, subrounded to subangular gravel; fine to coarse sand; less than 5% nonplastic fines; few silty gravel with sand diamict pockets.
(Qva)

70.0

Gray-brown, *Poorly Graded Sand with Gravel (SP)*; wet; fine, subrounded to subangular gravel; fine to coarse sand; less than 5% nonplastic fines.
(Qva)

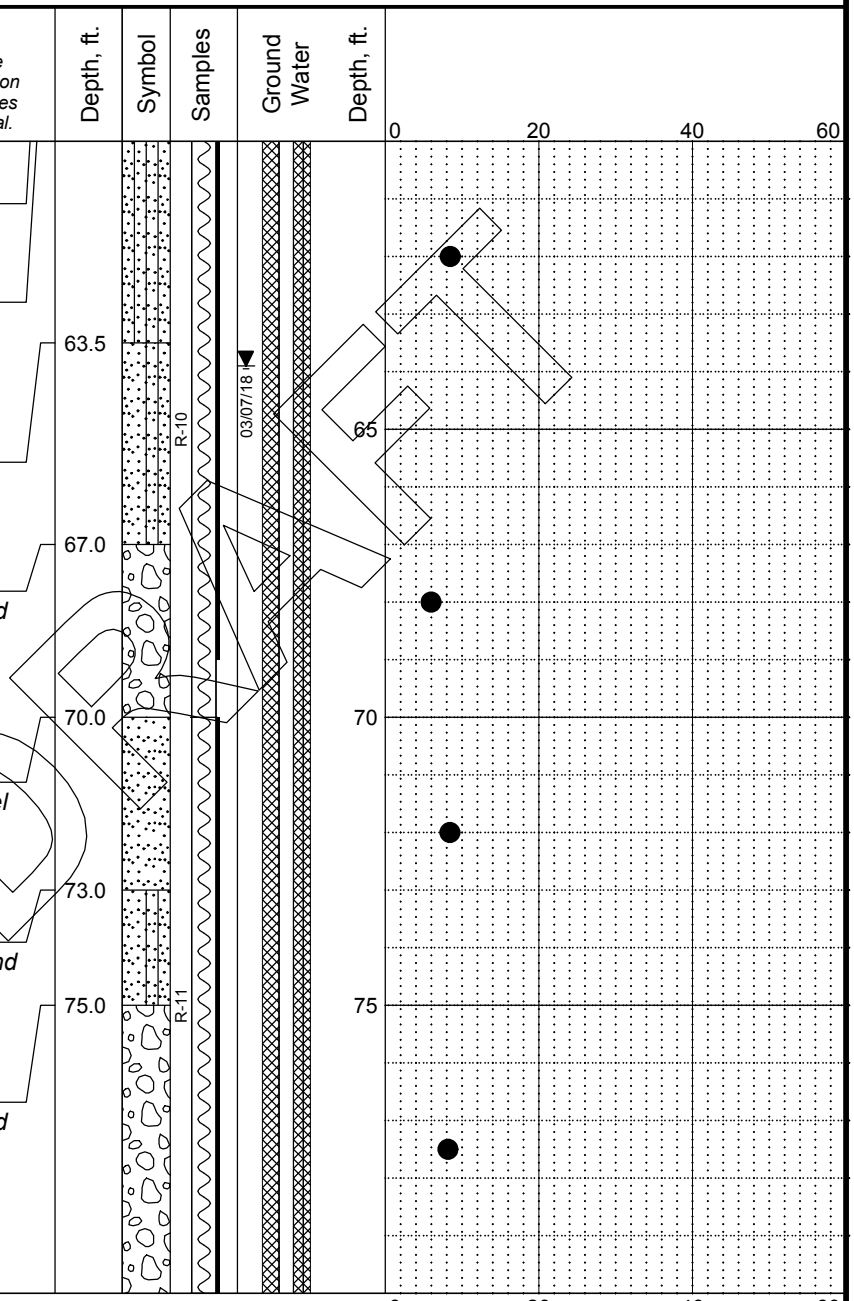
73.0

Gray-brown, *Poorly Graded Sand with Silt and Gravel (SP-SM)*; wet; fine, subrounded to subangular gravel; fine to coarse sand; nonplastic fines.
(Qva)

75.0

Gray-brown, *Poorly Graded Gravel with Sand (GP)*; wet; fine to coarse, subrounded to subangular gravel; fine to coarse sand; less than 5% nonplastic fines.
(Qva)

CONTINUED NEXT SHEET



LEGEND

I Sample Recovery
* Sample Not Recovered
Sonic Core Sample
Ground Water Level in Well

NOTES

1. Refer to KEY for explanation of symbols, codes, abbreviations and definitions.
2. Groundwater level, if indicated above, is for the date specified and may vary.
3. USCS designation is based on visual-manual classification and selected lab testing.
4. The hole location was measured from existing site features and should be considered approximate.

North Mercer Island Interceptor and
Enatai Interceptor Upgrade Project
King County, Washington

LOG OF SONIC CORE NME-22

May 2018 21-1-22000-212

SHANNON & WILSON, INC.
Geotechnical and Environmental Consultants

FIG. A-21
Sheet 4 of 9

REV 3 - Approved for Submittal

MASTER_LOG_BFW_21-22000.GPJ SHAN_WIL.GDT 5/17/18 Log: EAS Rev: EAS Typ: LKn

Total Depth:	*165 ft.*	Northing:	*~ 214,749 ft.*	Drilling Method:	*Sonic Core*	Hole Diam.:	*6 in.*
Top Elevation:	*~ 187 ft.*	Easting:	*~ 1,304,377 ft.*	Drilling Company:	*Holt*	Rod Diam.:	*NWJ*
Vert. Datum:	*KC Metro*	Station:	~	Drill Rig Equipment:	*Terra Sonic*	Hammer Type:	*Automatic*
Horiz. Datum:	*NAD83*	Offset:	~	Other Comments:	~		

SOIL DESCRIPTION

Refer to the report text for a proper understanding of the subsurface materials and drilling methods. The stratification lines indicated below represent the approximate boundaries between material types, and the transition may be gradual.

Depth, ft. | Symbol | Samples | Ground Water | Depth, ft.

81.0

Gray-brown, *Poorly Graded Sand with Silt and Gravel (SP-SM)* to *Poorly Graded Sand with Gravel (SP)*; wet; fine, subrounded to subangular gravel; fine to coarse sand; nonplastic fines.
(Qva)

82.5

Gray-brown, *Poorly Graded Gravel with Sand (GP)* to *Poorly Graded Sand with Silt and Gravel (SP-SM)*; wet; fine to coarse, subrounded to angular gravel; fine to coarse sand; nonplastic fines.
(Qva)
- Layer of silty sand with gravel from 85 to 86.5 feet.

90.3

Gray-brown, *Sandy Silt (ML)* to *Silty Sand (SM)*; wet; less than 5% fine, subrounded to subangular gravel; fine to medium sand; nonplastic fines; diamict pockets; few silt pockets.
(Qvd)

97.5

Gray-brown, *Poorly Graded Sand with Silt and Gravel (SP-SM)* to *Silty Sand with Gravel (SM)*; wet; fine, subrounded to subangular gravel; fine to coarse sand; nonplastic fines.

R-12

R-13

Dry (03/12/18)

0 20 40 60

85

90

95

61

0 20 40 60

◇ % Fines (<0.075mm)
● % Water Content

CONTINUED NEXT SHEET

LEGEND

I	Sample Recovery	▼	Ground Water Level in Well
*	Sample Not Recovered		
⊠	Sonic Core Sample		

NOTES

1. Refer to KEY for explanation of symbols, codes, abbreviations and definitions.
2. Groundwater level, if indicated above, is for the date specified and may vary.
3. USCS designation is based on visual-manual classification and selected lab testing.
4. The hole location was measured from existing site features and should be considered approximate.

North Mercer Island Interceptor and
Enatai Interceptor Upgrade Project
King County, Washington

LOG OF SONIC CORE NME-22

May 2018 | 21-1-22000-212

SHANNON & WILSON, INC.
Geotechnical and Environmental Consultants

FIG. A-21
Sheet 5 of 9

MASTER_LOG_BFW_21-22000.GPJ SHAN_WIL.GDT 5/17/18 Log: EAS Rev: EAS Typ: LKn

REV 3 - Approved for Submittal

Total Depth:	*165 ft.*	Northing:	*~ 214,749 ft.*	Drilling Method:	*Sonic Core*	Hole Diam.:	*6 in.*
Top Elevation:	*~ 187 ft.*	Easting:	*~ 1,304,377 ft.*	Drilling Company:	*Holt*	Rod Diam.:	*NWJ*
Vert. Datum:	*KC Metro*	Station:	~	Drill Rig Equipment:	*Terra Sonic*	Hammer Type:	*Automatic*
Horiz. Datum:	*NAD83*	Offset:	~	Other Comments:	~		

SOIL DESCRIPTION

Refer to the report text for a proper understanding of the subsurface materials and drilling methods. The stratification lines indicated below represent the approximate boundaries between material types, and the transition may be gradual.

(Qva)
- Iron-oxide staining from 98.5 to 99 feet.
- Diamict layer of silty sand with gravel from 100 to 100.5 feet.

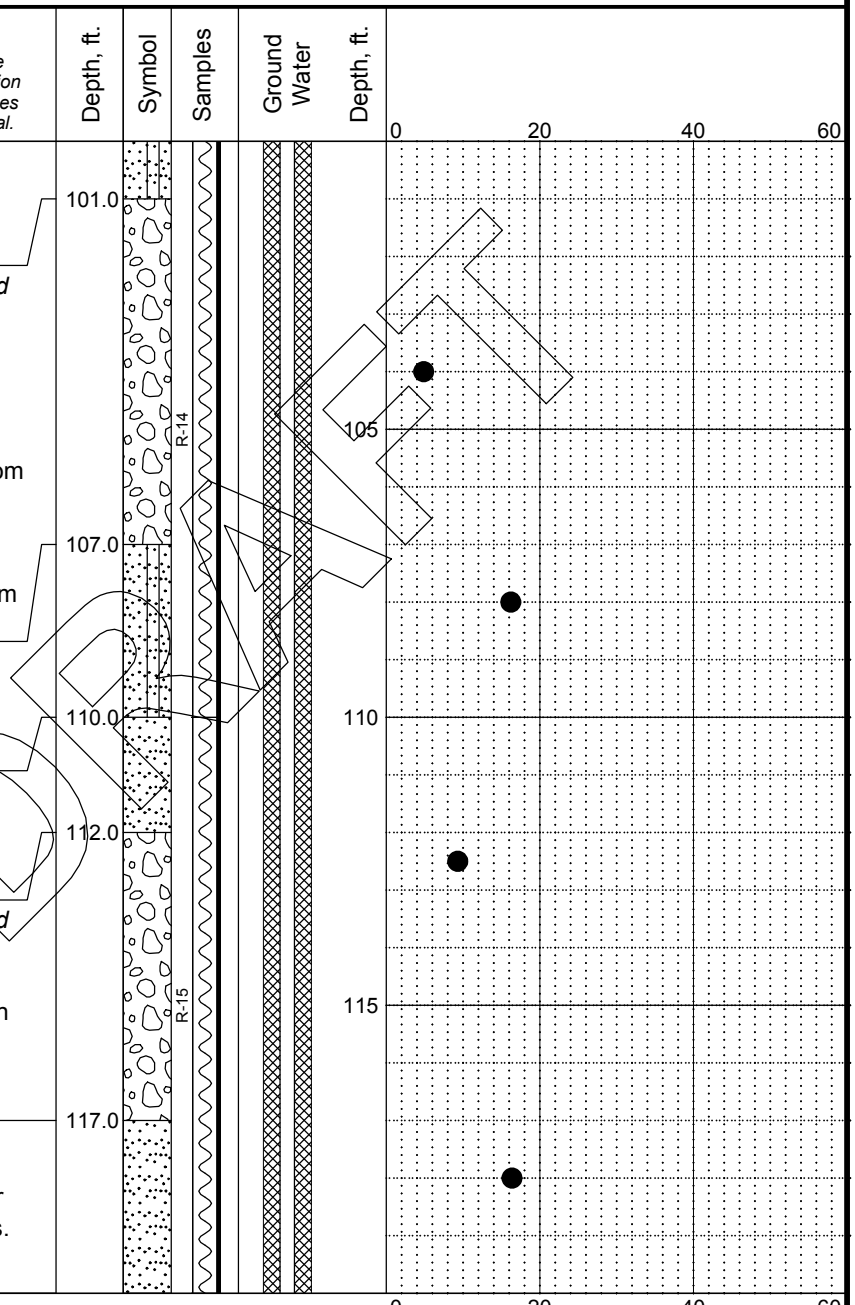
Gray-brown, *Poorly Graded Gravel with Sand (GP)* to *Poorly Graded Gravel with Silt and Sand (GP-GM)*; wet; fine to coarse, subrounded to subangular gravel; fine to coarse sand; nonplastic fines.
(Qva)
- Layer of poorly graded sand with gravel from 102.5 to 103 feet.
- Layer of poorly graded sand with silt and sand from 105.5 to 106 feet.
- Diamict pocket of silty sand with gravel from 106.5 to 107 feet.

Gray-brown, *Poorly Graded Sand with Silt (SP-SM)* to *Poorly Graded Sand (SP)*; wet; fine to medium sand; nonplastic fines.
(Qva)

Gray-brown, *Poorly Graded Sand (SP)*; wet; fine to coarse sand; less than 5% nonplastic fines.
(Qva)

Gray-brown, *Poorly Graded Gravel with Sand (GP)*; wet; fine to coarse, subrounded to subangular gravel; fine to coarse sand; less than 5% nonplastic fines; few silty gravel with sand pockets.
(Qva)

Gray-brown, *Poorly Graded Sand (SP)* to *Poorly Graded Sand with Silt (SP-SM)*; wet; less than 5% fine, subrounded to subangular gravel; fine to medium sand; nonplastic fines.
(Qva)



CONTINUED NEXT SHEET

LEGEND

- I Sample Recovery
- * Sample Not Recovered
- Sonic Core Sample
- Ground Water Level in Well
- ◇ % Fines (<0.075mm)
- ● % Water Content

NOTES

1. Refer to KEY for explanation of symbols, codes, abbreviations and definitions.
2. Groundwater level, if indicated above, is for the date specified and may vary.
3. USCS designation is based on visual-manual classification and selected lab testing.
4. The hole location was measured from existing site features and should be considered approximate.

North Mercer Island Interceptor and Enatai Interceptor Upgrade Project
King County, Washington

LOG OF SONIC CORE NME-22

May 2018 | 21-1-22000-212

SHANNON & WILSON, INC.
Geotechnical and Environmental Consultants

FIG. A-21
Sheet 6 of 9

REV 3 - Approved for Submittal

MASTER_LOG_BFW_21-22000.GPJ SHAN_WIL.GDT 5/17/18 Log: EAS Rev: EAS Typ: LKn

Total Depth:	*165 ft.*	Northing:	*~ 214,749 ft.*	Drilling Method:	*Sonic Core*	Hole Diam.:	*6 in.*
Top Elevation:	*~ 187 ft.*	Easting:	*~ 1,304,377 ft.*	Drilling Company:	*Holt*	Rod Diam.:	*NWJ*
Vert. Datum:	*KC Metro*	Station:	~	Drill Rig Equipment:	*Terra Sonic*	Hammer Type:	*Automatic*
Horiz. Datum:	*NAD83*	Offset:	~	Other Comments:	~		

SOIL DESCRIPTION

Refer to the report text for a proper understanding of the subsurface materials and drilling methods. The stratification lines indicated below represent the approximate boundaries between material types, and the transition may be gradual.

Gray, *Poorly Graded Gravel with Silt and Sand (GP-GM)*; wet; fine to coarse, subrounded to subangular gravel; fine to coarse sand; nonplastic fines; few silty gravel with sand diamict pockets.
(Qva)

120.0

123.0

Gray, *Poorly Graded Sand with Silt and Gravel (SP-SM)* to *Silty Sand with Gravel (SM)* to *Poorly Graded Sand with Silt (SP-SM)*; wet; fine to coarse, subrounded to subangular gravel; fine to coarse sand; nonplastic fines.
(Qva)

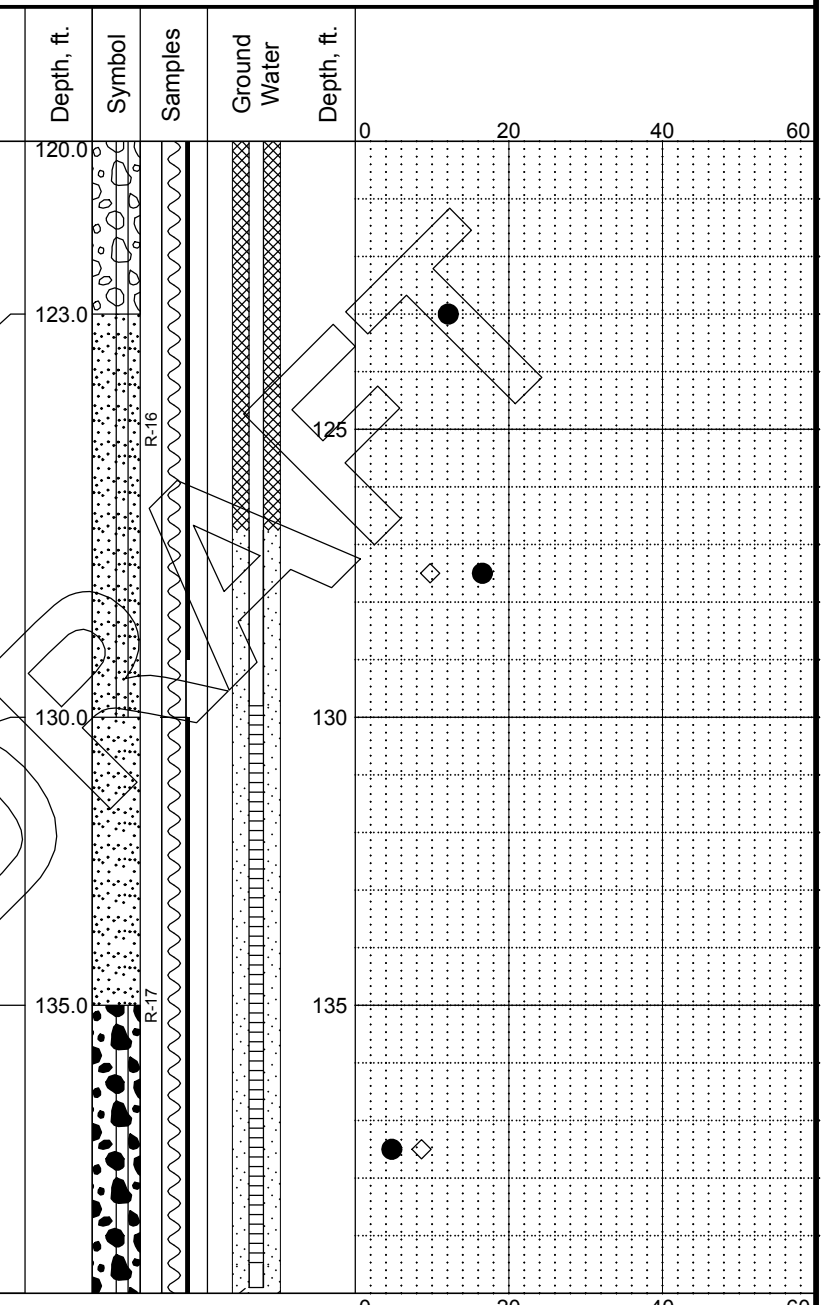
- Diamict layer of silty sand with gravel from 129.5 feet.

130.0

Gray, *Poorly Graded Sand with Gravel (SP)* to *Poorly Graded Sand with Silt and Gravel (SP-SM)*; wet; fine, subrounded to subangular gravel; fine to coarse sand; less than 5% nonplastic fines.
(Qva)

135.0

Gray, *Well-Graded Gravel with Silt and Sand (GW-GM)*; wet; fine to coarse, subrounded to subangular gravel; fine to coarse sand; nonplastic fines.
(Qva)



CONTINUED NEXT SHEET

LEGEND

- I Sample Recovery
- * Sample Not Recovered
- Sonic Core Sample
- Ground Water Level in Well
- ◇ % Fines (<0.075mm)
- ● % Water Content

NOTES

1. Refer to KEY for explanation of symbols, codes, abbreviations and definitions.
2. Groundwater level, if indicated above, is for the date specified and may vary.
3. USCS designation is based on visual-manual classification and selected lab testing.
4. The hole location was measured from existing site features and should be considered approximate.

North Mercer Island Interceptor and
Enatai Interceptor Upgrade Project
King County, Washington

LOG OF SONIC CORE NME-22

May 2018 21-1-22000-212

SHANNON & WILSON, INC.
Geotechnical and Environmental Consultants

FIG. A-21
Sheet 7 of 9

MASTER_LOG_BFW_21-22000.GPJ_SHAN_WIL.GDT 5/17/18 Log: EAS Rev: EAS Typ: LKn

REV 3 - Approved for Submittal

Total Depth:	*165 ft.*	Northing:	*~ 214,749 ft.*	Drilling Method:	*Sonic Core*	Hole Diam.:	*6 in.*
Top Elevation:	*~ 187 ft.*	Easting:	*~ 1,304,377 ft.*	Drilling Company:	*Holt*	Rod Diam.:	*NWJ*
Vert. Datum:	*KC Metro*	Station:	~	Drill Rig Equipment:	*Terra Sonic*	Hammer Type:	*Automatic*
Horiz. Datum:	*NAD83*	Offset:	~	Other Comments:	~		

SOIL DESCRIPTION

Refer to the report text for a proper understanding of the subsurface materials and drilling methods. The stratification lines indicated below represent the approximate boundaries between material types, and the transition may be gradual.

Depth, ft. | Symbol | Samples | Ground Water | Depth, ft.

140.0

Gray, *Poorly Graded Gravel with Sand (GP)*; wet; fine to coarse, subrounded to subangular gravel; fine to coarse sand; less than 5% nonplastic fines; few poorly graded gravel with silt and sand seams.
(Qva)

R-18

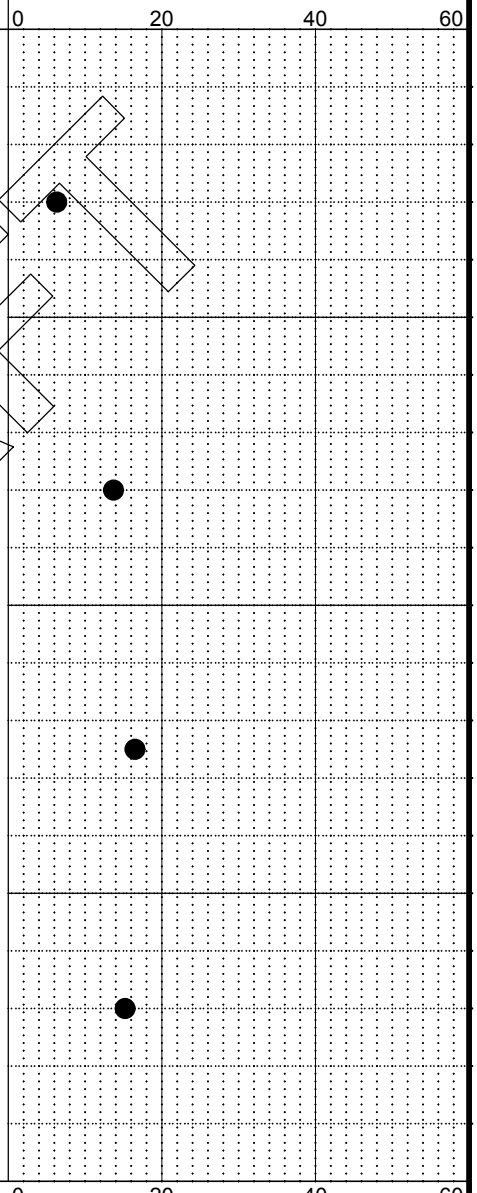
145.0

Gray, *Poorly Graded Sand (SP)*; wet; less than 5% fine, subrounded gravel; fine to medium sand; less than 5% nonplastic fines; few silty sand seams.
(Qva)

R-19

- Layer of silty, fine to medium sand from 157 to 157.5 feet.

DRAFT



◇ % Fines (<0.075mm)
● % Water Content

CONTINUED NEXT SHEET

LEGEND

- I Sample Recovery
- * Sample Not Recovered
- Sonic Core Sample
- Ground Water Level in Well

NOTES

1. Refer to KEY for explanation of symbols, codes, abbreviations and definitions.
2. Groundwater level, if indicated above, is for the date specified and may vary.
3. USCS designation is based on visual-manual classification and selected lab testing.
4. The hole location was measured from existing site features and should be considered approximate.

North Mercer Island Interceptor and
Enatai Interceptor Upgrade Project
King County, Washington

LOG OF SONIC CORE NME-22

May 2018 | 21-1-22000-212

SHANNON & WILSON, INC.
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FIG. A-21
Sheet 8 of 9

REV 3 - Approved for Submittal

MASTER_LOG_BFW_21-22000.GPJ_SHAN_WIL.GDT 5/17/18 *Log: EAS Rev: EAS Typ: LKn*

Total Depth:	*165 ft.*	Northing:	*~ 214,749 ft.*	Drilling Method:	*Sonic Core*	Hole Diam.:	*6 in.*
Top Elevation:	*~ 187 ft.*	Easting:	*~ 1,304,377 ft.*	Drilling Company:	*Holt*	Rod Diam.:	*NWJ*
Vert. Datum:	*KC Metro*	Station:	~	Drill Rig Equipment:	*Terra Sonic*	Hammer Type:	*Automatic*
Horiz. Datum:	*NAD83*	Offset:	~	Other Comments:	~		

SOIL DESCRIPTION

Refer to the report text for a proper understanding of the subsurface materials and drilling methods. The stratification lines indicated below represent the approximate boundaries between material types, and the transition may be gradual.

Depth, ft. | Symbol | Samples | Ground Water | Depth, ft.

160.0

Gray, *Silty Sand with Gravel (SM)*; moist to wet; fine to coarse, subrounded to subangular gravel; fine to coarse sand; nonplastic fines; few diamict pockets; trace organics.
(Qva)

163.0

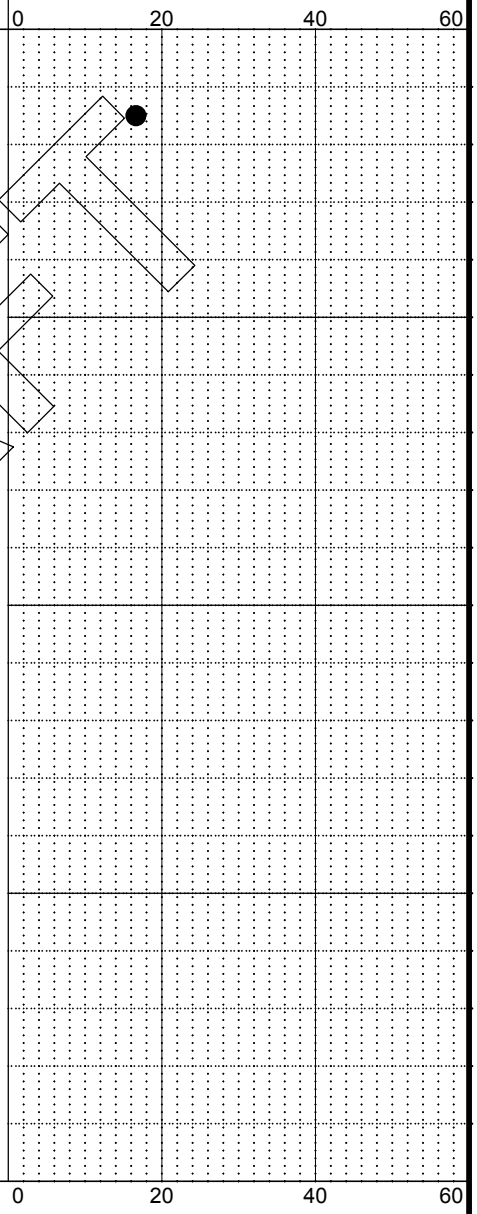
- Layer of poorly graded sand from 162.5 to 163 feet.

165.0

Gray, *Poorly Graded Gravel with Sand (GP)*; wet; fine to coarse, subrounded to subangular gravel; fine to coarse sand; less than 5% nonplastic fines.
(Qva)

BOTTOM OF BORING
COMPLETED 7/15/2016

DRAFT



LEGEND

- I Sample Recovery
- * Sample Not Recovered
- Sonic Core Sample
- Ground Water Level in Well

NOTES

1. Refer to KEY for explanation of symbols, codes, abbreviations and definitions.
2. Groundwater level, if indicated above, is for the date specified and may vary.
3. USCS designation is based on visual-manual classification and selected lab testing.
4. The hole location was measured from existing site features and should be considered approximate.

North Mercer Island Interceptor and
Enatai Interceptor Upgrade Project
King County, Washington

LOG OF SONIC CORE NME-22

May 2018 | 21-1-22000-212

SHANNON & WILSON, INC.
Geotechnical and Environmental Consultants

FIG. A-21
Sheet 9 of 9

REV 3 - Approved for Submittal

MASTER_LOG_BFW_21-22000.GPJ SHAN_WIL.GDT 5/17/18 Log: EAS Rev: EAS Typ: LKn

Total Depth:	*185 ft.*	Northing:	*~ 215,129 ft.*	Drilling Method:	*Sonic Core*	Hole Diam.:	*6 in.*
Top Elevation:	*~ 211 ft.*	Easting:	*~ 1,304,991 ft.*	Drilling Company:	*Holt*	Rod Diam.:	*NWJ*
Vert. Datum:	*KC Metro*	Station:	~	Drill Rig Equipment:	*Terra Sonic*	Hammer Type:	*Automatic*
Horiz. Datum:	*NAD83*	Offset:	~	Other Comments:	~		

SOIL DESCRIPTION

Refer to the report text for a proper understanding of the subsurface materials and drilling methods. The stratification lines indicated below represent the approximate boundaries between material types, and the transition may be gradual.

Gray-brown, *Silty Sand with Gravel (SM)*; moist; fine to coarse, subrounded to subangular gravel; fine to coarse sand; nonplastic fines; diamict; few silty sand seams. (Qvd)

10.0

Gray-brown, *Silty Sand with Gravel (SM)*; moist; fine to coarse, subrounded to subangular gravel; fine to coarse sand; nonplastic fines. (Qva)

11.5

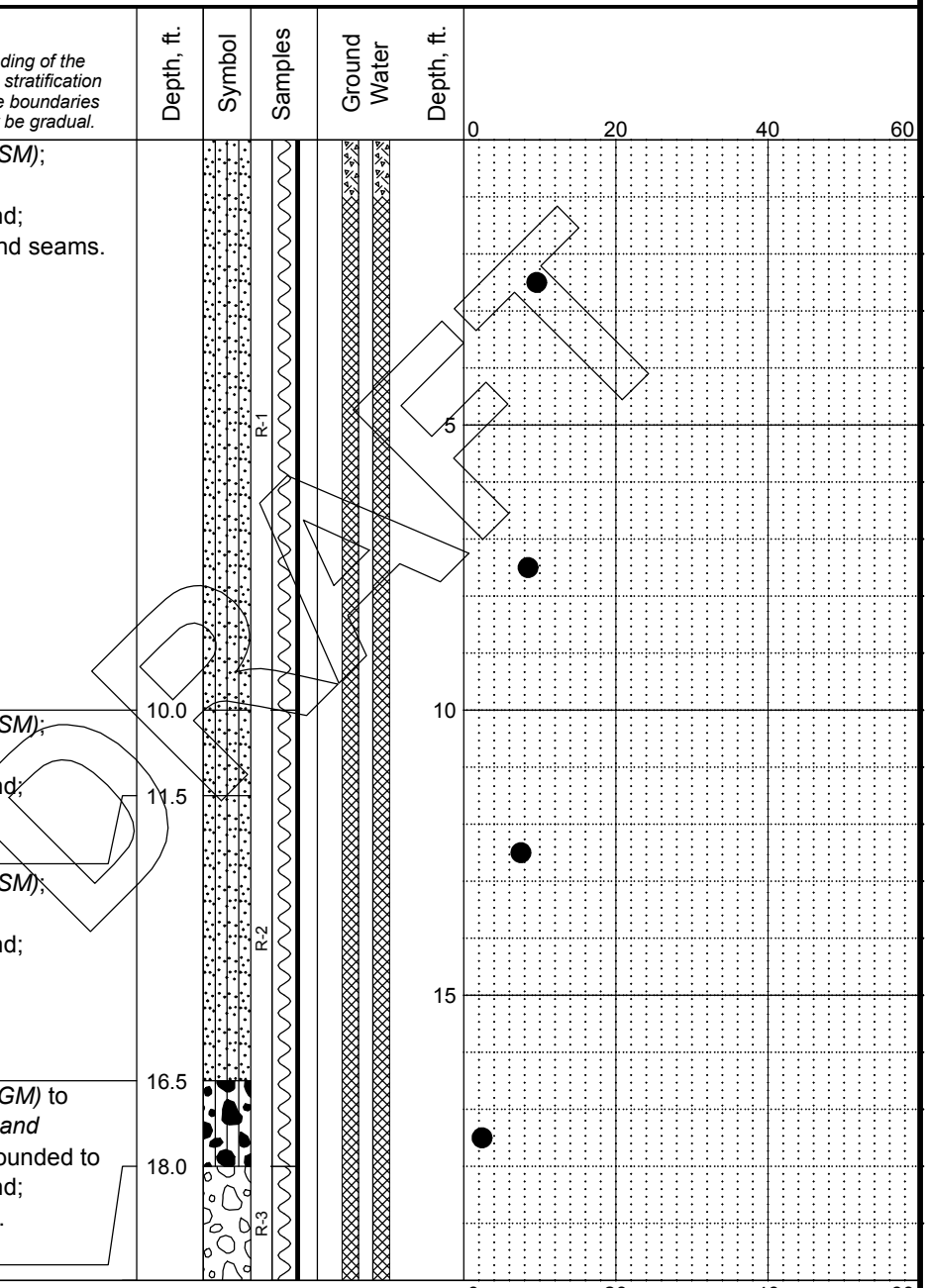
Gray-brown, *Silty Sand with Gravel (SM)*; moist; fine to coarse, subrounded to subangular gravel; fine to coarse sand; nonplastic fines; diamict pockets. (Qvd)

16.5

Gray-brown, *Silty Gravel with Sand (GM)* to *Poorly Graded Gravel with Silt and Sand (GP-GM)*; moist; fine to coarse, subrounded to subangular gravel; fine to coarse sand; nonplastic fines; few diamict pockets. (Qva)

18.0

CONTINUED NEXT SHEET



LEGEND

- I Sample Recovery
- * Sample Not Recovered
- ⍁ Sonic Core Sample
- ▼ Ground Water Level in Well

NOTES

1. Refer to KEY for explanation of symbols, codes, abbreviations and definitions.
2. Groundwater level, if indicated above, is for the date specified and may vary.
3. USCS designation is based on visual-manual classification and selected lab testing.
4. The hole location was measured from existing site features and should be considered approximate.

North Mercer Island Interceptor and Enatai Interceptor Upgrade Project
King County, Washington

LOG OF SONIC CORE NME-23

May 2018 | 21-1-22000-212

SHANNON & WILSON, INC.
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FIG. A-22
Sheet 1 of 10

REV 3 - Approved for Submittal

MASTER_LOG_BFW_21-22000.GPJ_SHAN_WIL.GDT 5/17/18 *Log: JAA Rev: EAS Typ: LK*

Total Depth:	*185 ft.*	Northing:	*~ 215,129 ft.*	Drilling Method:	*Sonic Core*	Hole Diam.:	*6 in.*
Top Elevation:	*~ 211 ft.*	Easting:	*~ 1,304,991 ft.*	Drilling Company:	*Holt*	Rod Diam.:	*NWJ*
Vert. Datum:	*KC Metro*	Station:	~	Drill Rig Equipment:	*Terra Sonic*	Hammer Type:	*Automatic*
Horiz. Datum:	*NAD83*	Offset:	~	Other Comments:	~		

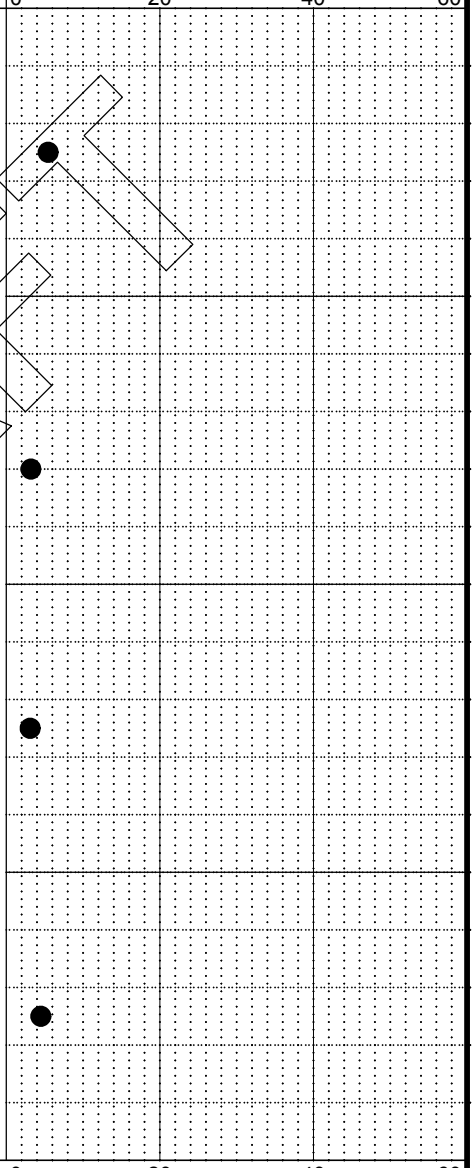
SOIL DESCRIPTION

Refer to the report text for a proper understanding of the subsurface materials and drilling methods. The stratification lines indicated below represent the approximate boundaries between material types, and the transition may be gradual.

Depth, ft.	Soil Description
20.0	Gray-brown, *Poorly Graded Gravel with Sand (GP)*; moist; fine to coarse, subrounded to subangular gravel; fine to coarse sand; less than 5% nonplastic fines. (Qva)
21.5	Gray-brown, *Silty Sand with Gravel (SM)*; moist; fine to coarse, subrounded to subangular gravel; fine to coarse sand; nonplastic fines. (Qva)
26.5	Gray-brown, *Poorly Graded Sand with Silt and Gravel (SP-SM)*; moist; fine to coarse, subrounded to subangular gravel; fine to coarse sand; nonplastic fines. (Qva)
	Gray-brown, *Silty Sand with Gravel (SM)*; moist; fine to coarse, subrounded to subangular gravel; fine to coarse sand; nonplastic fines; diamict pockets; few poorly graded sand with gravel seams. (Qva)
37.5	Gray-brown, *Poorly Graded Sand with Silt (SP-SM)*; moist; fine to medium sand; nonplastic fines. (Qva)
39.5	

Symbol: R-4, R-5

Ground Water: Depth, ft.



CONTINUED NEXT SHEET

LEGEND

- I Sample Recovery
- * Sample Not Recovered
- Sonic Core Sample
- Ground Water Level in Well

NOTES

1. Refer to KEY for explanation of symbols, codes, abbreviations and definitions.
2. Groundwater level, if indicated above, is for the date specified and may vary.
3. USCS designation is based on visual-manual classification and selected lab testing.
4. The hole location was measured from existing site features and should be considered approximate.

North Mercer Island Interceptor and Enatai Interceptor Upgrade Project
King County, Washington

LOG OF SONIC CORE NME-23

May 2018 | 21-1-22000-212

SHANNON & WILSON, INC.
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FIG. A-22
Sheet 2 of 10

REV 3 - Approved for Submittal

MASTER_LOG_BFW_21-22000.GPJ_SHAN_WIL.GDT 5/17/18 Log: JAA Rev: EAS Typ: LK

Total Depth:	*185 ft.*	Northing:	*~ 215,129 ft.*	Drilling Method:	*Sonic Core*	Hole Diam.:	*6 in.*
Top Elevation:	*~ 211 ft.*	Easting:	*~ 1,304,991 ft.*	Drilling Company:	*Holt*	Rod Diam.:	*NWJ*
Vert. Datum:	*KC Metro*	Station:	~	Drill Rig Equipment:	*Terra Sonic*	Hammer Type:	*Automatic*
Horiz. Datum:	*NAD83*	Offset:	~	Other Comments:	~		

SOIL DESCRIPTION

Refer to the report text for a proper understanding of the subsurface materials and drilling methods. The stratification lines indicated below represent the approximate boundaries between material types, and the transition may be gradual.

Depth, ft. | Symbol | Samples | Ground Water | Depth, ft.

Gray-brown, *Silty Sand (SM)*; moist; fine to medium sand; nonplastic fines. (Qva)

40.5

Gray-brown, *Poorly Graded Sand with Silt (SP-SM)* to *Silty Sand (SM)*; moist; fine to medium sand; nonplastic fines. (Qva)

43.5

Gray-brown, *Silty Sand (SM)*; moist; fine to medium sand; nonplastic fines. (Qva)

R-6

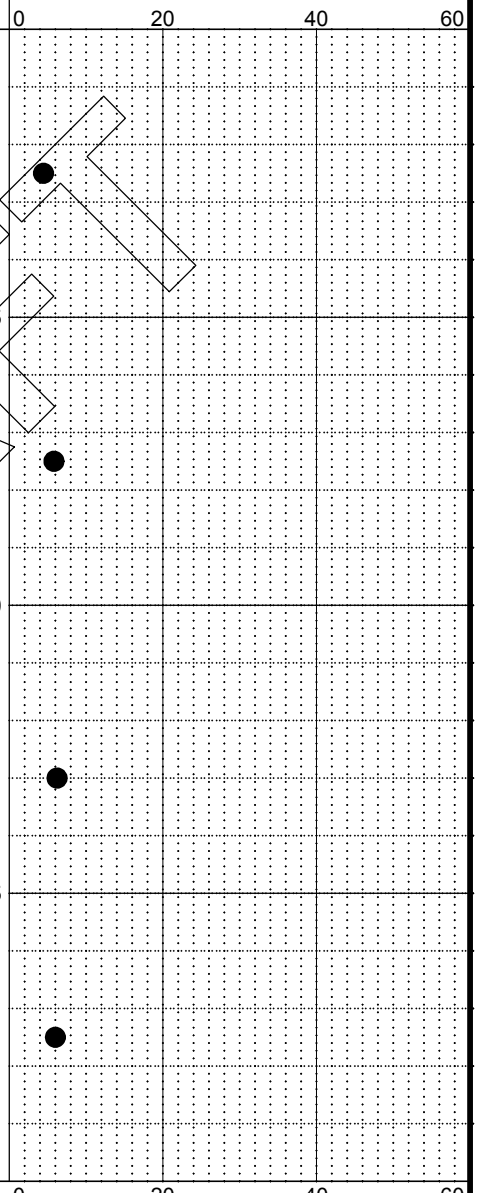
- Layer of poorly graded, fine to medium sand with silt from 52.5 to 53 feet.

R-7

57.5

Gray-brown, *Poorly Graded Sand with Silt (SP-SM)* to *Silty Sand (SM)*; moist; fine to medium sand; nonplastic fines. (Qva)

CONTINUED NEXT SHEET



LEGEND

- I Sample Recovery
- * Sample Not Recovered
- ⊠ Sonic Core Sample
- ▼ Ground Water Level in Well

NOTES

1. Refer to KEY for explanation of symbols, codes, abbreviations and definitions.
2. Groundwater level, if indicated above, is for the date specified and may vary.
3. USCS designation is based on visual-manual classification and selected lab testing.
4. The hole location was measured from existing site features and should be considered approximate.

North Mercer Island Interceptor and Enatai Interceptor Upgrade Project
King County, Washington

LOG OF SONIC CORE NME-23

May 2018 | 21-1-22000-212

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FIG. A-22
Sheet 3 of 10

REV 3 - Approved for Submittal

MASTER_LOG_BFW_21-22000.GPJ SHAN_WIL.GDT 5/17/18 Log: JAA Rev: EAS Typ: LK

Total Depth:	*185 ft.*	Northing:	*~ 215,129 ft.*	Drilling Method:	*Sonic Core*	Hole Diam.:	*6 in.*
Top Elevation:	*~ 211 ft.*	Easting:	*~ 1,304,991 ft.*	Drilling Company:	*Holt*	Rod Diam.:	*NWJ*
Vert. Datum:	*KC Metro*	Station:	~	Drill Rig Equipment:	*Terra Sonic*	Hammer Type:	*Automatic*
Horiz. Datum:	*NAD83*	Offset:	~	Other Comments:	~		

SOIL DESCRIPTION

Refer to the report text for a proper understanding of the subsurface materials and drilling methods. The stratification lines indicated below represent the approximate boundaries between material types, and the transition may be gradual.

Depth, ft. | Symbol | Samples | Ground Water | Depth, ft.

62.0

Gray-brown, *Silty Sand (SM)*; moist; fine to medium sand; nonplastic fines.
(Qva)

71.5

Gray-brown, *Poorly Graded Sand with Silt (SP-SM)*; moist; fine to medium sand; nonplastic fines.
(Qva)

72.5

Gray-brown, *Silty Sand (SM)* to *Poorly Graded Sand with Silt (SP-SM)*; moist; fine to medium sand; nonplastic fines.
(Qva)

76.0

Gray-brown, *Silty Sand (SM)*; moist; fine to medium sand; nonplastic fines.
(Qva)

R-8

R-9

0 20 40 60

65

70

75

CONTINUED NEXT SHEET

0 20 40 60

LEGEND

- I Sample Recovery
- * Sample Not Recovered
- Sonic Core Sample
- Ground Water Level in Well
- ◇ % Fines (<0.075mm)
- ● % Water Content

NOTES

1. Refer to KEY for explanation of symbols, codes, abbreviations and definitions.
2. Groundwater level, if indicated above, is for the date specified and may vary.
3. USCS designation is based on visual-manual classification and selected lab testing.
4. The hole location was measured from existing site features and should be considered approximate.

North Mercer Island Interceptor and
Enatai Interceptor Upgrade Project
King County, Washington

LOG OF SONIC CORE NME-23

May 2018 | 21-1-22000-212

SHANNON & WILSON, INC.
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FIG. A-22
Sheet 4 of 10

REV 3 - Approved for Submittal

MASTER_LOG_BFW_21-22000.GPJ SHAN_WIL.GDT 5/17/18 Log: JAA Rev: EAS Typ: LK

Total Depth:	*185 ft.*	Northing:	*~ 215,129 ft.*	Drilling Method:	*Sonic Core*	Hole Diam.:	*6 in.*
Top Elevation:	*~ 211 ft.*	Easting:	*~ 1,304,991 ft.*	Drilling Company:	*Holt*	Rod Diam.:	*NWJ*
Vert. Datum:	*KC Metro*	Station:	~	Drill Rig Equipment:	*Terra Sonic*	Hammer Type:	*Automatic*
Horiz. Datum:	*NAD83*	Offset:	~	Other Comments:	~		

SOIL DESCRIPTION

Refer to the report text for a proper understanding of the subsurface materials and drilling methods. The stratification lines indicated below represent the approximate boundaries between material types, and the transition may be gradual.

- Layer of fine to medium, poorly graded sand with silt from 84 to 84.5 feet.

Gray-brown, *Silty Sand (SM)*; moist to wet; fine sand; few organic-rich seams.
(Qva)

84.7

Gray-brown, *Silty Sand (SM)*; wet; fine sand; nonplastic fines.
(Qva)

90.0

Brown *Silt with Gravel (ML)*; moist; fine, subrounded to subangular gravel; less than 10% fine to coarse sand; nonplastic fines.
(Qva)

93.5

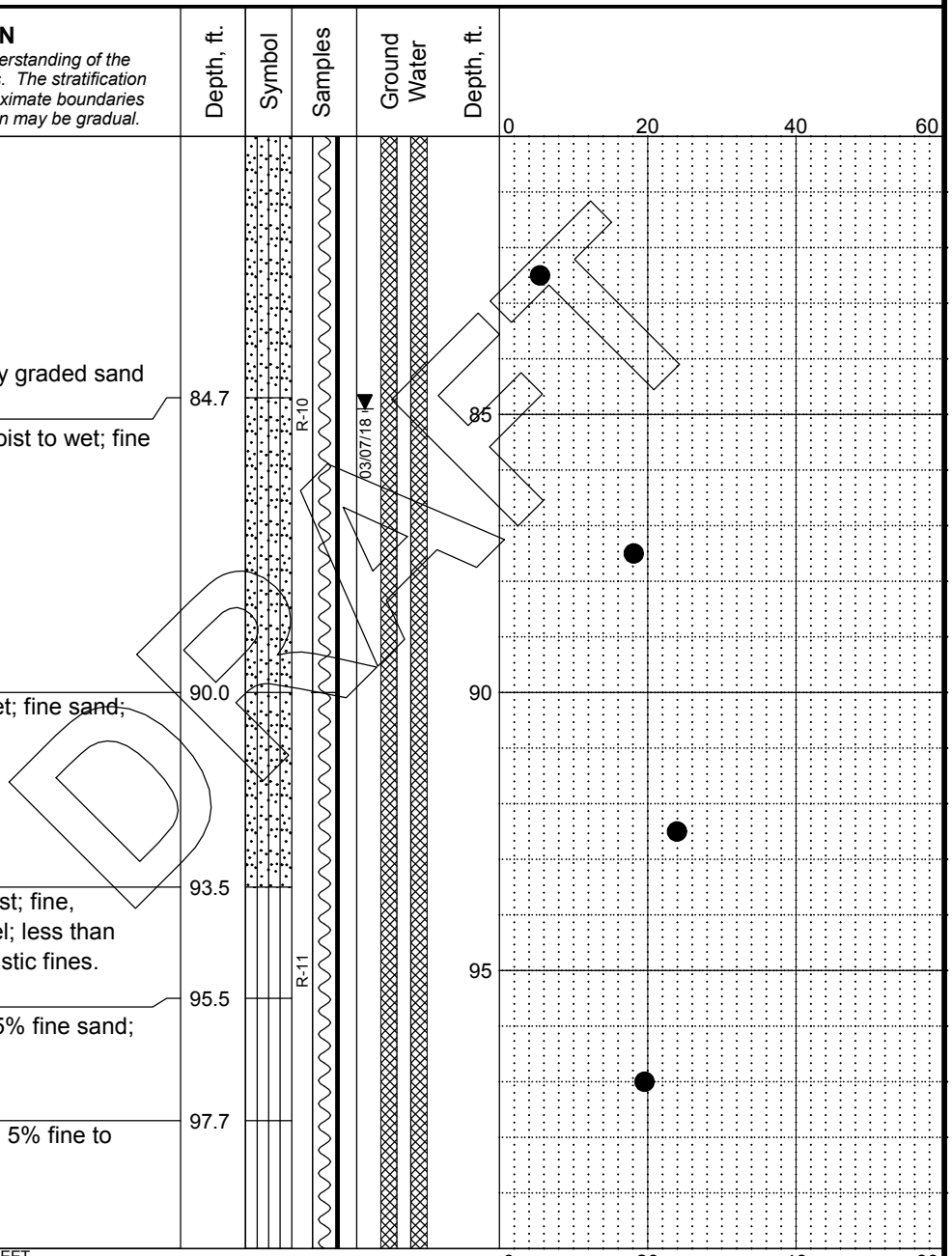
Gray *Silt (ML)*; moist; less than 5% fine sand; nonplastic fines.
(Qpnl)

95.5

Brown *Silt (ML)*; moist; less than 5% fine to medium sand; nonplastic fines.
(Qpnl)

97.7

CONTINUED NEXT SHEET



LEGEND

I	Sample Recovery	▼	Ground Water Level in Well
*	Sample Not Recovered		
⊠	Sonic Core Sample		

NOTES

1. Refer to KEY for explanation of symbols, codes, abbreviations and definitions.
2. Groundwater level, if indicated above, is for the date specified and may vary.
3. USCS designation is based on visual-manual classification and selected lab testing.
4. The hole location was measured from existing site features and should be considered approximate.

North Mercer Island Interceptor and
Enatai Interceptor Upgrade Project
King County, Washington

LOG OF SONIC CORE NME-23

May 2018 | 21-1-22000-212

SHANNON & WILSON, INC.
Geotechnical and Environmental Consultants

FIG. A-22
Sheet 5 of 10

REV 3 - Approved for Submittal

MASTER_LOG_BFW_21-22000.GPJ_SHAN_WIL.GDT 5/17/18 Log: JAA Rev: EAS Typ: LK

Total Depth:	*185 ft.*	Northing:	*~ 215,129 ft.*	Drilling Method:	*Sonic Core*	Hole Diam.:	*6 in.*
Top Elevation:	*~ 211 ft.*	Easting:	*~ 1,304,991 ft.*	Drilling Company:	*Holt*	Rod Diam.:	*NWJ*
Vert. Datum:	*KC Metro*	Station:	~	Drill Rig Equipment:	*Terra Sonic*	Hammer Type:	*Automatic*
Horiz. Datum:	*NAD83*	Offset:	~	Other Comments:	~		

SOIL DESCRIPTION

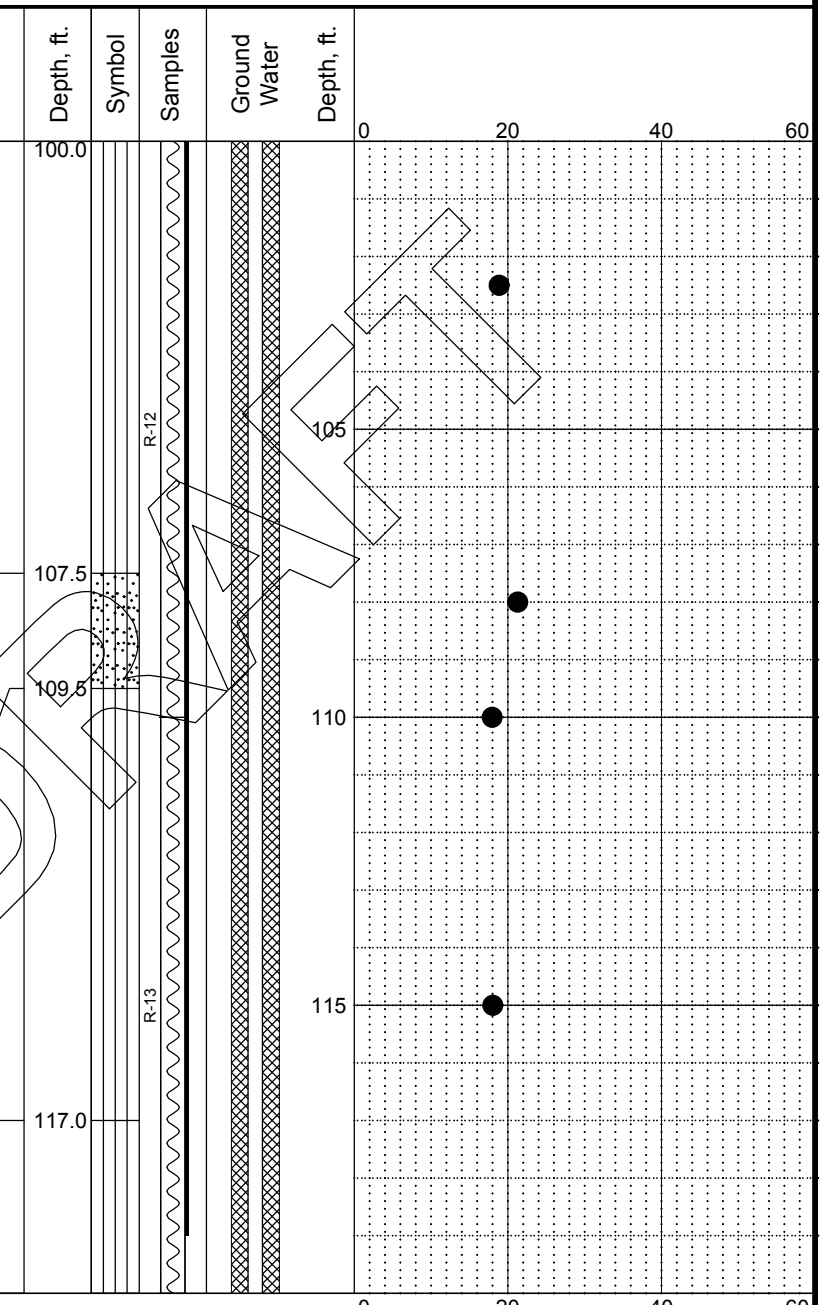
Refer to the report text for a proper understanding of the subsurface materials and drilling methods. The stratification lines indicated below represent the approximate boundaries between material types, and the transition may be gradual.

Gray *Silt (ML)*; moist; less than 5% fine sand; nonplastic fines; few silty sand pockets.
(Qpnl)

Gray, *Silty Sand (SM)*; moist to wet; less than 10% fine, subrounded to subangular gravel; fine to coarse sand; nonplastic fines; few diamict pockets.
(Qpnf)

Gray *Silt (ML)* to *Silt with Sand (ML)*; moist; fine sand; nonplastic to low plasticity fines.
(Qpnl)

Gray *Silt with Sand (ML)* to *Sandy Silt (ML)*; moist; less than 5% fine, subrounded to subangular gravel; fine to medium sand; nonplastic fines.
(Qpnl)



CONTINUED NEXT SHEET

LEGEND

- I Sample Recovery
- * Sample Not Recovered
- Sonic Core Sample
- Ground Water Level in Well
- ◇ % Fines (<0.075mm)
- ● % Water Content

NOTES

1. Refer to KEY for explanation of symbols, codes, abbreviations and definitions.
2. Groundwater level, if indicated above, is for the date specified and may vary.
3. USCS designation is based on visual-manual classification and selected lab testing.
4. The hole location was measured from existing site features and should be considered approximate.

North Mercer Island Interceptor and
Enatai Interceptor Upgrade Project
King County, Washington

LOG OF SONIC CORE NME-23

May 2018 21-1-22000-212

SHANNON & WILSON, INC.
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FIG. A-22
Sheet 6 of 10

REV 3 - Approved for Submittal

MASTER_LOG_BFW_21-22000.GPJ SHAN_WIL.GDT 5/17/18 Log: JAA Rev: EAS Typ: LK

Total Depth:	*185 ft.*	Northing:	*~ 215,129 ft.*	Drilling Method:	*Sonic Core*	Hole Diam.:	*6 in.*
Top Elevation:	*~ 211 ft.*	Easting:	*~ 1,304,991 ft.*	Drilling Company:	*Holt*	Rod Diam.:	*NWJ*
Vert. Datum:	*KC Metro*	Station:	*~*	Drill Rig Equipment:	*Terra Sonic*	Hammer Type:	*Automatic*
Horiz. Datum:	*NAD83*	Offset:	*~*	Other Comments:	*~*		

SOIL DESCRIPTION

Refer to the report text for a proper understanding of the subsurface materials and drilling methods. The stratification lines indicated below represent the approximate boundaries between material types, and the transition may be gradual.

Gray, *Sandy Silt (ML)*; moist; less than 10% fine, subrounded to subangular gravel; fine to coarse sand; nonplastic fines; diamict. (Qpnl)

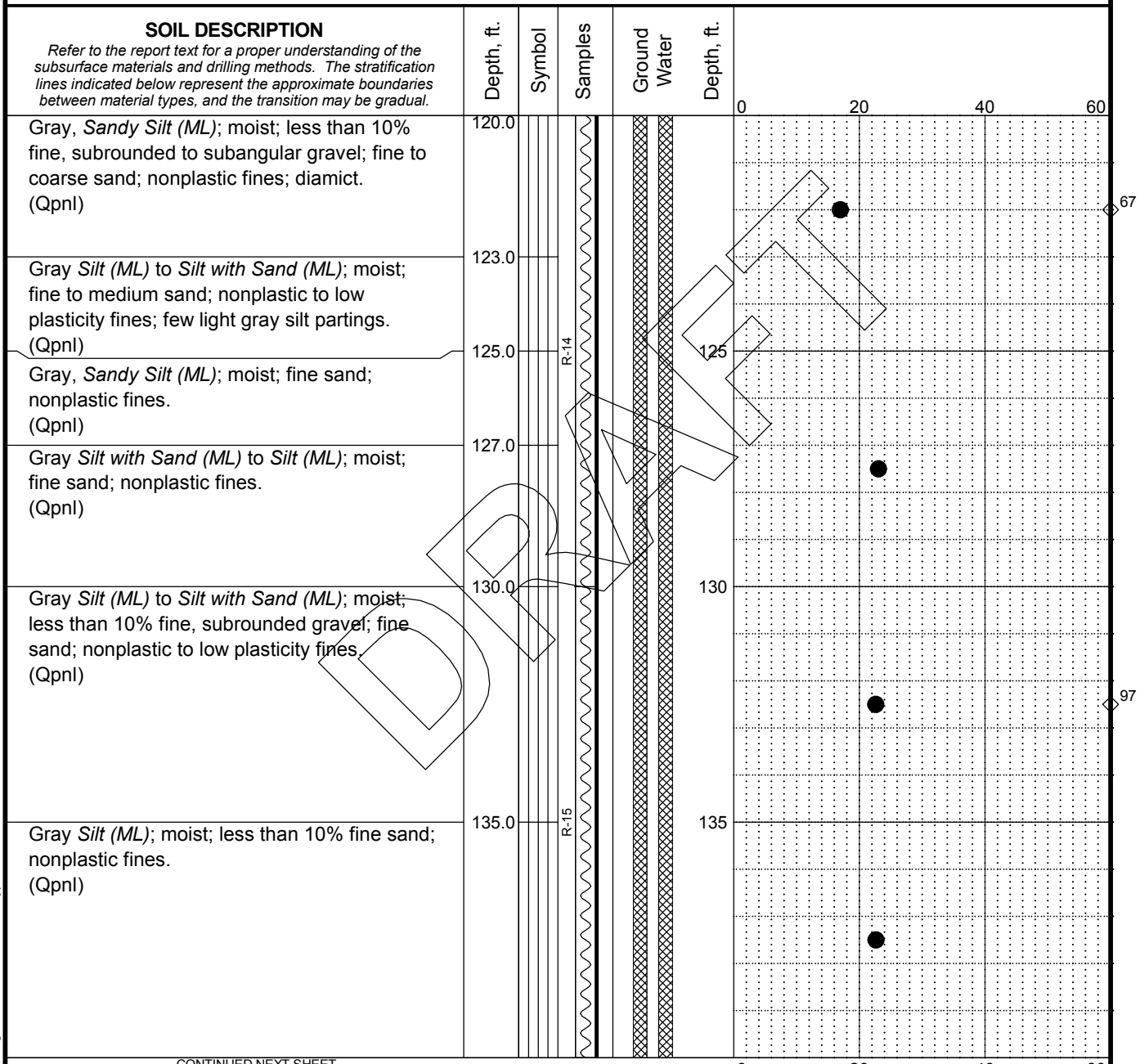
Gray *Silt (ML)* to *Silt with Sand (ML)*; moist; fine to medium sand; nonplastic to low plasticity fines; few light gray silt partings. (Qpnl)

Gray, *Sandy Silt (ML)*; moist; fine sand; nonplastic fines. (Qpnl)

Gray *Silt with Sand (ML)* to *Silt (ML)*; moist; fine sand; nonplastic fines. (Qpnl)

Gray *Silt (ML)* to *Silt with Sand (ML)*; moist; less than 10% fine, subrounded gravel; fine sand; nonplastic to low plasticity fines. (Qpnl)

Gray *Silt (ML)*; moist; less than 10% fine sand; nonplastic fines. (Qpnl)



CONTINUED NEXT SHEET

LEGEND

- I Sample Recovery
- * Sample Not Recovered
- Sonic Core Sample
- Ground Water Level in Well
- ◇ % Fines (<0.075mm)
- ● % Water Content

NOTES

1. Refer to KEY for explanation of symbols, codes, abbreviations and definitions.
2. Groundwater level, if indicated above, is for the date specified and may vary.
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North Mercer Island Interceptor and Enatai Interceptor Upgrade Project
King County, Washington

LOG OF SONIC CORE NME-23

May 2018 | 21-1-22000-212

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FIG. A-22
Sheet 7 of 10

REV 3 - Approved for Submittal

MASTER_LOG_BFW_21-22000.GPJ_SHAN_WIL.GDT 5/17/18 Log: JAA Rev: EAS Typ: LK

Total Depth:	*185 ft.*	Northing:	*~ 215,129 ft.*	Drilling Method:	*Sonic Core*	Hole Diam.:	*6 in.*
Top Elevation:	*~ 211 ft.*	Easting:	*~ 1,304,991 ft.*	Drilling Company:	*Holt*	Rod Diam.:	*NWJ*
Vert. Datum:	*KC Metro*	Station:	~	Drill Rig Equipment:	*Terra Sonic*	Hammer Type:	*Automatic*
Horiz. Datum:	*NAD83*	Offset:	~	Other Comments:	~		

SOIL DESCRIPTION

Refer to the report text for a proper understanding of the subsurface materials and drilling methods. The stratification lines indicated below represent the approximate boundaries between material types, and the transition may be gradual.

Gray, *Sandy Silt (ML)* to *Silt with Sand (ML)*; wet; fine sand; nonplastic fines. (Qpnl)

142.0

Gray, *Silty Sand (SM)* to *Sandy Silt (ML)*; wet; fine sand; nonplastic fines. (Qpnf)

144.5

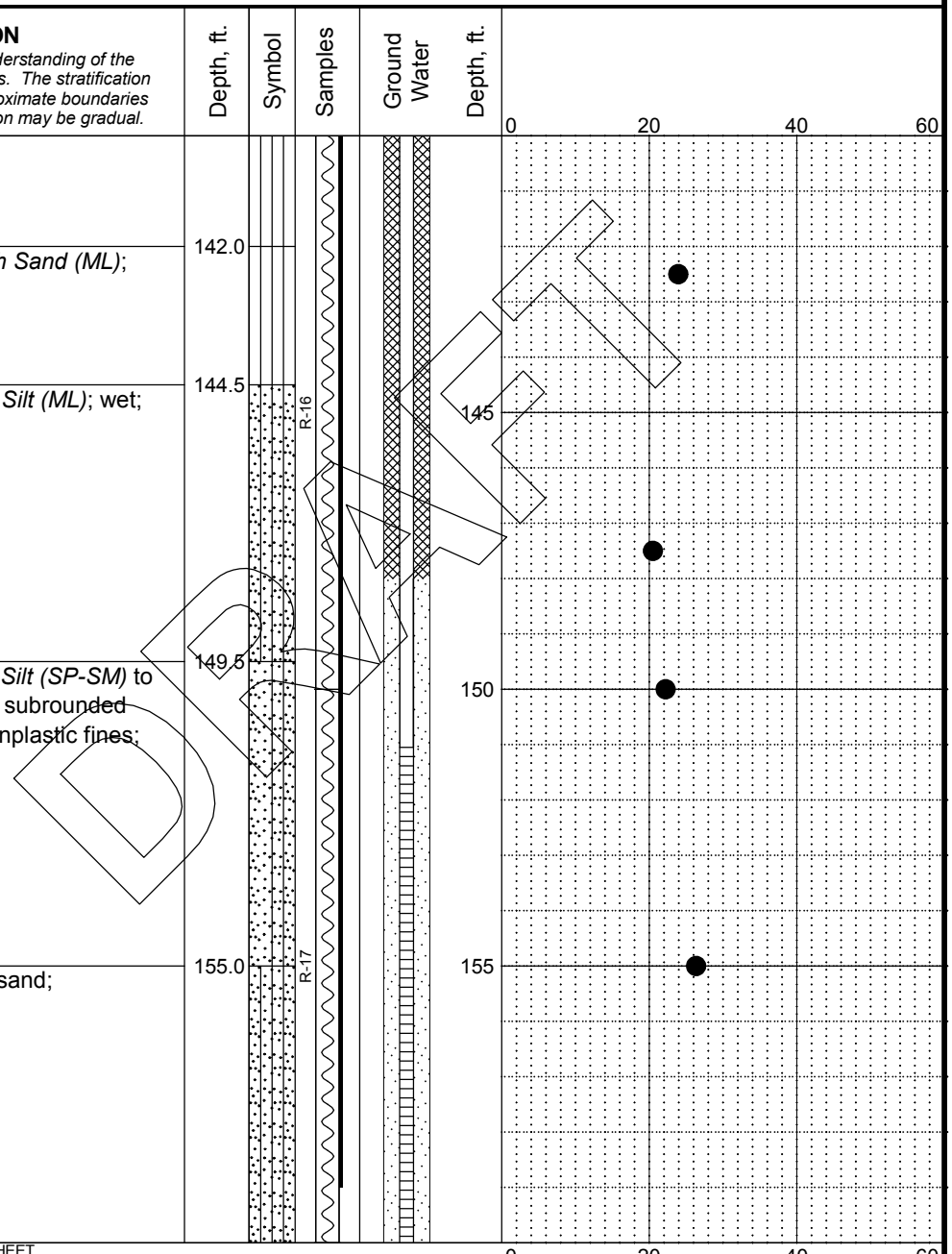
Gray, *Poorly Graded Sand with Silt (SP-SM)* to *Silty Sand (SM)*; wet; trace fine, subrounded gravel; fine to medium sand; nonplastic fines; trace silt pockets. (Qpnf)

149.5

Gray *Silty Sand (SM)*; wet; fine sand; nonplastic fines. (Qpnf)

155.0

CONTINUED NEXT SHEET



LEGEND

- I Sample Recovery
- * Sample Not Recovered
- Sonic Core Sample
- Ground Water Level in Well
- ◇ % Fines (<0.075mm)
- ● % Water Content

NOTES

1. Refer to KEY for explanation of symbols, codes, abbreviations and definitions.
2. Groundwater level, if indicated above, is for the date specified and may vary.
3. USCS designation is based on visual-manual classification and selected lab testing.
4. The hole location was measured from existing site features and should be considered approximate.

North Mercer Island Interceptor and Enatai Interceptor Upgrade Project
King County, Washington

LOG OF SONIC CORE NME-23

May 2018 21-1-22000-212

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Geotechnical and Environmental Consultants

FIG. A-22
Sheet 8 of 10

REV 3 - Approved for Submittal

MASTER_LOG_BFW_21-22000.GPJ SHAN_WIL.GDT 5/17/18 Log: JAA Rev: EAS Typ: LK

Total Depth:	*185 ft.*	Northing:	*~ 215,129 ft.*	Drilling Method:	*Sonic Core*	Hole Diam.:	*6 in.*
Top Elevation:	*~ 211 ft.*	Easting:	*~ 1,304,991 ft.*	Drilling Company:	*Holt*	Rod Diam.:	*NWJ*
Vert. Datum:	*KC Metro*	Station:	~	Drill Rig Equipment:	*Terra Sonic*	Hammer Type:	*Automatic*
Horiz. Datum:	*NAD83*	Offset:	~	Other Comments:	~		

SOIL DESCRIPTION

Refer to the report text for a proper understanding of the subsurface materials and drilling methods. The stratification lines indicated below represent the approximate boundaries between material types, and the transition may be gradual.

- Few fine, sandy silt layers from 161 to 164.5 feet.

Gray, *Silty Sand (SM)* to *Sandy Silt (ML)*; wet; fine sand; nonplastic fines. (Qpnf)

165.0

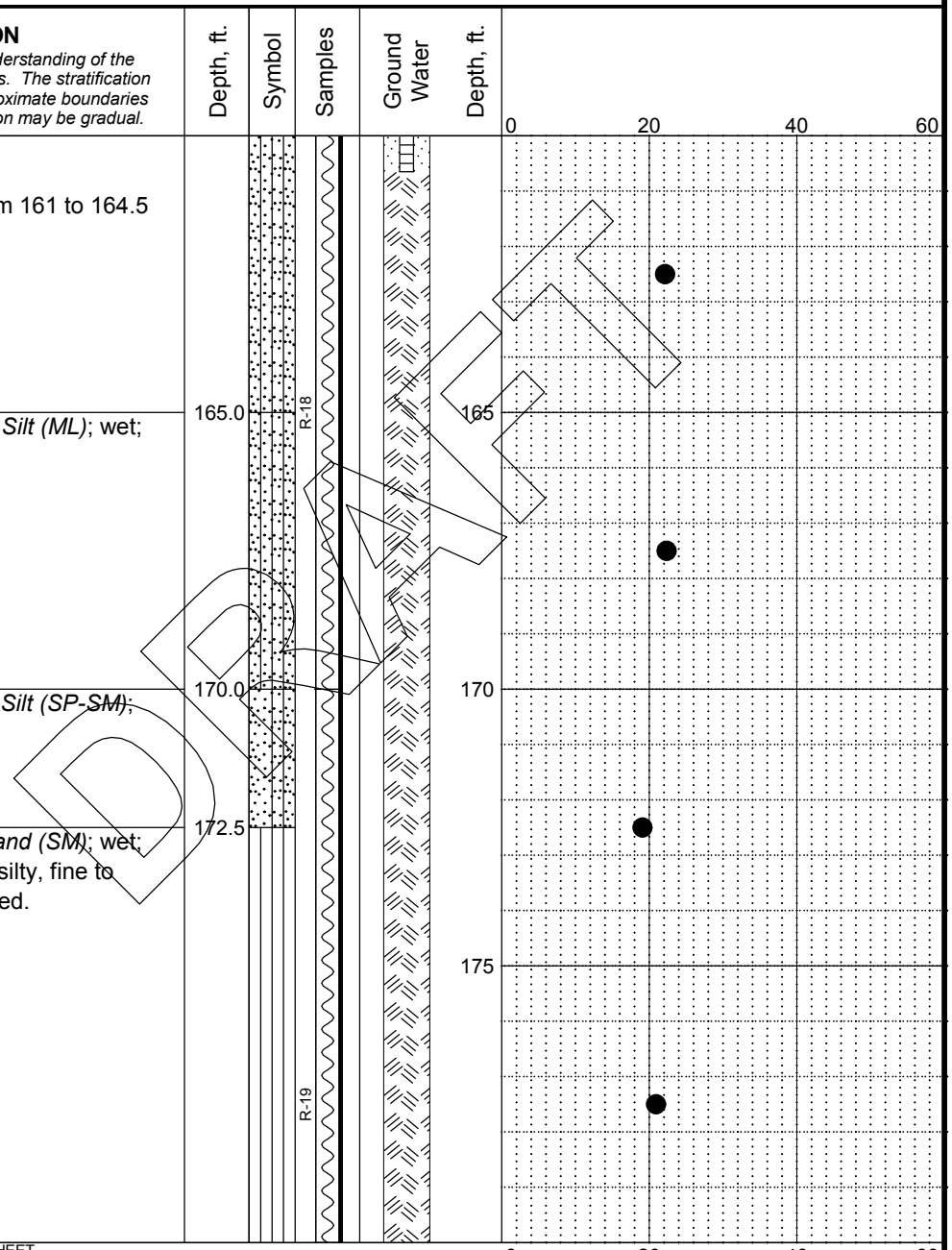
Gray, *Poorly Graded Sand with Silt (SP-SM)*; wet; fine sand; nonplastic fines. (Qpnf)

170.0

Gray, *Sandy Silt (ML)* to *Silty Sand (SM)*; wet; fine sand; nonplastic fines; few silty, fine to medium sand seams; interbedded. (Qpnl)

172.5

CONTINUED NEXT SHEET



LEGEND

- I Sample Recovery
- * Sample Not Recovered
- Sonic Core Sample
- Ground Water Level in Well
- ◇ % Fines (<0.075mm)
- ● % Water Content

NOTES

1. Refer to KEY for explanation of symbols, codes, abbreviations and definitions.
2. Groundwater level, if indicated above, is for the date specified and may vary.
3. USCS designation is based on visual-manual classification and selected lab testing.
4. The hole location was measured from existing site features and should be considered approximate.

North Mercer Island Interceptor and Enatai Interceptor Upgrade Project
King County, Washington

LOG OF SONIC CORE NME-23

May 2018 | 21-1-22000-212

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FIG. A-22
Sheet 9 of 10

MASTER_LOG_BFW_21-22000.GPJ_SHAN_WIL.GDT 5/17/18 Log: JAA Rev: EAS Typ: LK

REV 3 - Approved for Submittal

Total Depth:	*185 ft.*	Northing:	*~ 215,129 ft.*	Drilling Method:	*Sonic Core*	Hole Diam.:	*6 in.*
Top Elevation:	*~ 211 ft.*	Easting:	*~ 1,304,991 ft.*	Drilling Company:	*Holt*	Rod Diam.:	*NWJ*
Vert. Datum:	*KC Metro*	Station:	*~*	Drill Rig Equipment:	*Terra Sonic*	Hammer Type:	*Automatic*
Horiz. Datum:	*NAD83*	Offset:	*~*	Other Comments:	*~*		

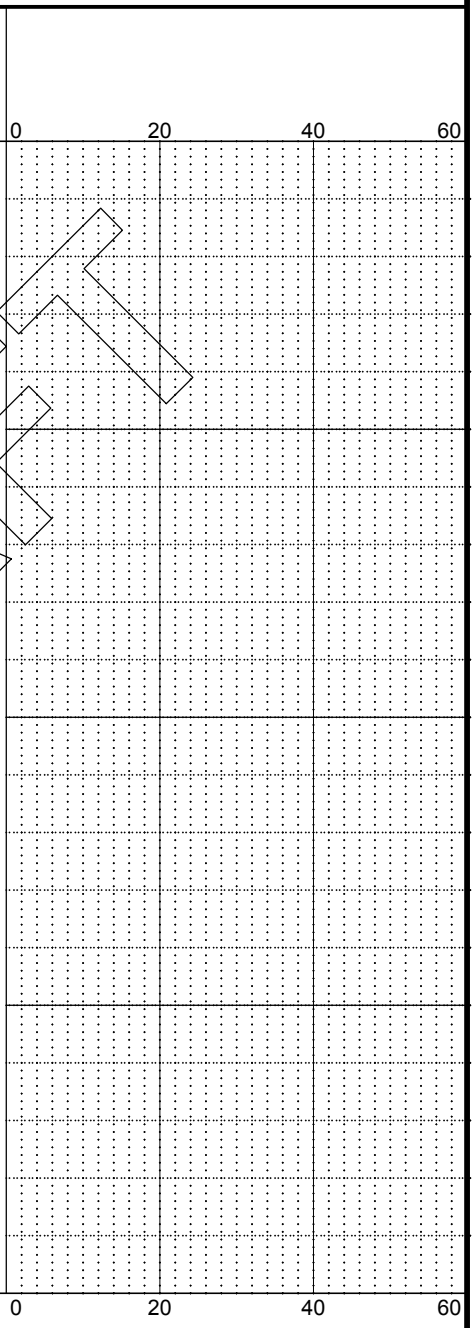
SOIL DESCRIPTION

Refer to the report text for a proper understanding of the subsurface materials and drilling methods. The stratification lines indicated below represent the approximate boundaries between material types, and the transition may be gradual.

Depth, ft. | Symbol | Samples | Ground Water | Depth, ft.

BOTTOM OF BORING
COMPLETED 7/20/2016

185.0



DRAFT

LEGEND

- I Sample Recovery
- * Sample Not Recovered
- Sonic Core Sample
- Ground Water Level in Well
- ◇ % Fines (<0.075mm)
- ● % Water Content

NOTES

1. Refer to KEY for explanation of symbols, codes, abbreviations and definitions.
2. Groundwater level, if indicated above, is for the date specified and may vary.
3. USCS designation is based on visual-manual classification and selected lab testing.
4. The hole location was measured from existing site features and should be considered approximate.

North Mercer Island Interceptor and
Enatai Interceptor Upgrade Project
King County, Washington

LOG OF SONIC CORE NME-23

May 2018 | 21-1-22000-212

SHANNON & WILSON, INC.
Geotechnical and Environmental Consultants

FIG. A-22
Sheet 10 of 10

REV 3 - Approved for Submittal

MASTER_LOG_BFW_21-22000.GPJ_SHAN_WIL.GDT 5/17/18 Log: JAA Rev: EAS Typ: LK

Total Depth:	*135 ft.*	Northing:	*~ 215,380 ft.*	Drilling Method:	*Sonic Core*	Hole Diam.:	*6 in.*
Top Elevation:	*~ 159 ft.*	Easting:	*~ 1,305,734 ft.*	Drilling Company:	*Holt*	Rod Diam.:	*NWJ*
Vert. Datum:	*KC Metro*	Station:	~	Drill Rig Equipment:	*Terra Sonic*	Hammer Type:	*Automatic*
Horiz. Datum:	*NAD83*	Offset:	~	Other Comments:	~		

SOIL DESCRIPTION

Refer to the report text for a proper understanding of the subsurface materials and drilling methods. The stratification lines indicated below represent the approximate boundaries between material types, and the transition may be gradual.

Brown, *Silty Sand (SM)*; moist; few fine to coarse, subrounded to subangular gravel; fine to coarse sand; nonplastic fines.
(Hf)

3.5

Mottled, gray and brown, *Lean Clay (CL)* to *Fat Clay (CH)*; moist; less than 5% fine, subrounded to subangular gravel; less than 5% fine to coarse sand; medium to high plasticity fines.
(Qvrl)
- Subrounded cobbles at 3.5 feet.

7.0

Mottled gray and brown *Silt (ML)*; moist to wet; less than 5% fine sand; nonplastic to low plasticity fines; slight dilatant; trace organics.
(Qvrl)

12.0

Gray-brown, *Silty Sand (SM)*; moist to wet; fine to coarse sand; nonplastic to low plasticity fines.
(Qvro)

13.5

Gray-brown to brown, *Silty Sand with Gravel (SM)*; moist to wet; fine to coarse, subrounded to subangular gravel; fine to coarse sand; low plasticity fines; diamict.
(Qva)

15.0

Gray, *Silty Sand with Gravel and Cobbles (SM)* to *Clayey Sand with Gravel and Cobbles (SC)*; moist; fine, subrounded to subangular cobbles; fine, subrounded to subangular gravel; fine to coarse sand; low to medium

CONTINUED NEXT SHEET

Depth, ft. | Symbol | Samples | Ground Water | Depth, ft.

R-1 R-2

0 20 40 60

5 10 15

0 20 40 60

◇ % Fines (<0.075mm)
● % Water Content

LEGEND

I Sample Recovery
* Sample Not Recovered
Sonic Core Sample
Ground Water Level in Well

NOTES

1. Refer to KEY for explanation of symbols, codes, abbreviations and definitions.
2. Groundwater level, if indicated above, is for the date specified and may vary.
3. USCS designation is based on visual-manual classification and selected lab testing.
4. The hole location was measured from existing site features and should be considered approximate.

North Mercer Island Interceptor and
Enatai Interceptor Upgrade Project
King County, Washington

LOG OF SONIC CORE NME-24

May 2018 | 21-1-22000-212

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FIG. A-23
Sheet 1 of 7

REV 3 - Approved for Submittal

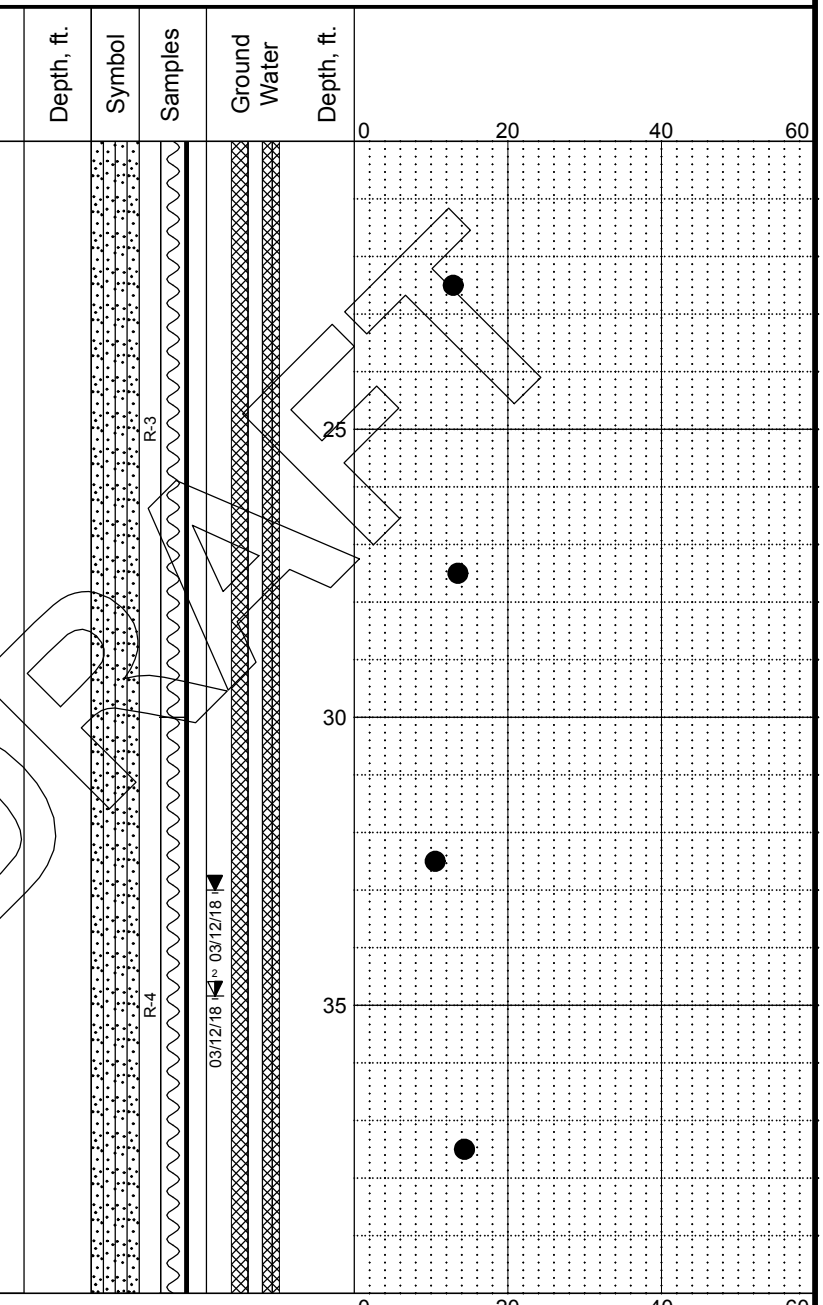
MASTER_LOG_BFW_21-22000.GPJ_SHAN_WIL.GDT 5/17/18 Log: JAA Rev: EAS Typ: LK

Total Depth:	*135 ft.*	Northing:	*~ 215,380 ft.*	Drilling Method:	*Sonic Core*	Hole Diam.:	*6 in.*
Top Elevation:	*~ 159 ft.*	Easting:	*~ 1,305,734 ft.*	Drilling Company:	*Holt*	Rod Diam.:	*NWJ*
Vert. Datum:	*KC Metro*	Station:	~	Drill Rig Equipment:	*Terra Sonic*	Hammer Type:	*Automatic*
Horiz. Datum:	*NAD83*	Offset:	~	Other Comments:	~		

SOIL DESCRIPTION

Refer to the report text for a proper understanding of the subsurface materials and drilling methods. The stratification lines indicated below represent the approximate boundaries between material types, and the transition may be gradual.

plasticity fines; diamict.
(Qvt)



DRAFT

CONTINUED NEXT SHEET

LEGEND

- I Sample Recovery
- * Sample Not Recovered
- Sonic Core Sample
- Ground Water Level in Well
- ◇ % Fines (<0.075mm)
- ● % Water Content

NOTES

1. Refer to KEY for explanation of symbols, codes, abbreviations and definitions.
2. Groundwater level, if indicated above, is for the date specified and may vary.
3. USCS designation is based on visual-manual classification and selected lab testing.
4. The hole location was measured from existing site features and should be considered approximate.

North Mercer Island Interceptor and
Enatai Interceptor Upgrade Project
King County, Washington

LOG OF SONIC CORE NME-24

May 2018 21-1-22000-212

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FIG. A-23
Sheet 2 of 7

REV 3 - Approved for Submittal

MASTER_LOG_BFW_21-22000.GPJ SHAN_WIL.GDT 5/17/18 Log: JAA Rev: EAS Typ: LK

Total Depth:	*135 ft.*	Northing:	*~ 215,380 ft.*	Drilling Method:	*Sonic Core*	Hole Diam.:	*6 in.*
Top Elevation:	*~ 159 ft.*	Easting:	*~ 1,305,734 ft.*	Drilling Company:	*Holt*	Rod Diam.:	*NWJ*
Vert. Datum:	*KC Metro*	Station:	~	Drill Rig Equipment:	*Terra Sonic*	Hammer Type:	*Automatic*
Horiz. Datum:	*NAD83*	Offset:	~	Other Comments:	~		

SOIL DESCRIPTION

Refer to the report text for a proper understanding of the subsurface materials and drilling methods. The stratification lines indicated below represent the approximate boundaries between material types, and the transition may be gradual.

Depth, ft. | Symbol | Samples | Ground Water | Depth, ft.

40.0 — Gray-brown, *Silty Sand (SM)*; moist to wet; fine to medium sand; nonplastic to low plasticity fines.
(Qva)

45.0 — Gray *Silt with Sand (ML)*; moist to wet; fine sand; nonplastic fines.
(Qpnl)

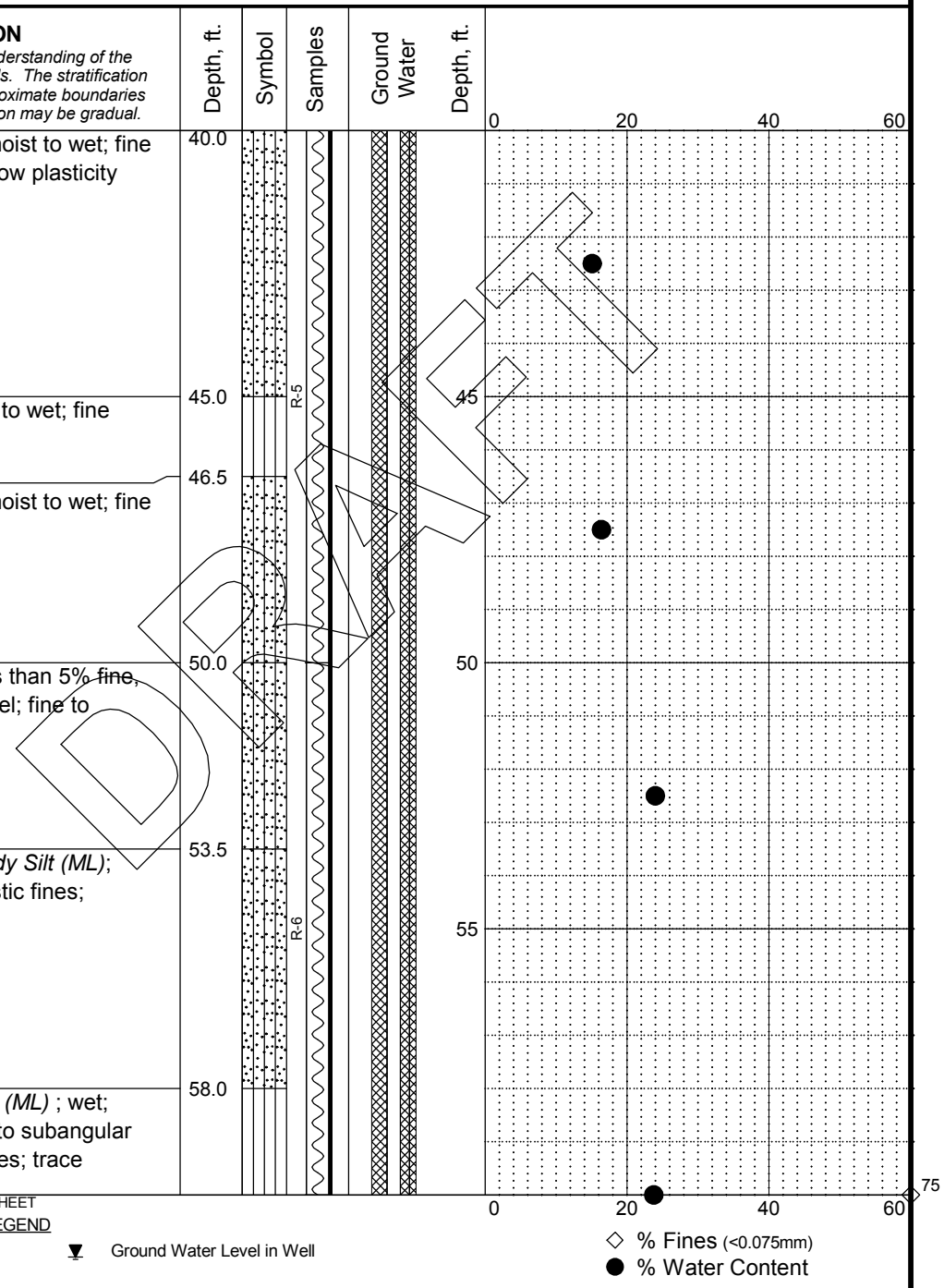
46.5 — Gray-brown, *Silty Sand (SM)*; moist to wet; fine sand; nonplastic fines.
(Qpnf)

50.0 — Gray, *Silty Sand (SM)*; wet; less than 5% ~~fine~~, subrounded to subangular gravel; fine to medium sand; nonplastic fines.
(Qpnf)

53.5 — Gray, *Silty Sand (SM)* and *Sandy Silt (ML)*; wet; fine sand; dilatent, nonplastic fines; interbedded trace organics.
(Qpnf)

58.0 — Gray, *Silt (ML)* to *Silt with Sand (ML)* ; wet; less than 5% fine, subrounded to subangular gravel; fine sand; nonplastic fines; trace

CONTINUED NEXT SHEET



LEGEND

I	Sample Recovery	▼	Ground Water Level in Well
*	Sample Not Recovered		
⊠	Sonic Core Sample		

NOTES

1. Refer to KEY for explanation of symbols, codes, abbreviations and definitions.
2. Groundwater level, if indicated above, is for the date specified and may vary.
3. USCS designation is based on visual-manual classification and selected lab testing.
4. The hole location was measured from existing site features and should be considered approximate.

North Mercer Island Interceptor and
Enatai Interceptor Upgrade Project
King County, Washington

LOG OF SONIC CORE NME-24

May 2018 | 21-1-22000-212

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FIG. A-23
Sheet 3 of 7

MASTER_LOG_BFW_21-22000.GPJ_SHAN_WIL.GDT 5/17/18 Log: JAA Rev: EAS Typ: LK

REV 3 - Approved for Submittal

Total Depth:	*135 ft.*	Northing:	*~ 215,380 ft.*	Drilling Method:	*Sonic Core*	Hole Diam.:	*6 in.*
Top Elevation:	*~ 159 ft.*	Easting:	*~ 1,305,734 ft.*	Drilling Company:	*Holt*	Rod Diam.:	*NWJ*
Vert. Datum:	*KC Metro*	Station:	*~*	Drill Rig Equipment:	*Terra Sonic*	Hammer Type:	*Automatic*
Horiz. Datum:	*NAD83*	Offset:	*~*	Other Comments:	*~*		

SOIL DESCRIPTION

Refer to the report text for a proper understanding of the subsurface materials and drilling methods. The stratification lines indicated below represent the approximate boundaries between material types, and the transition may be gradual.

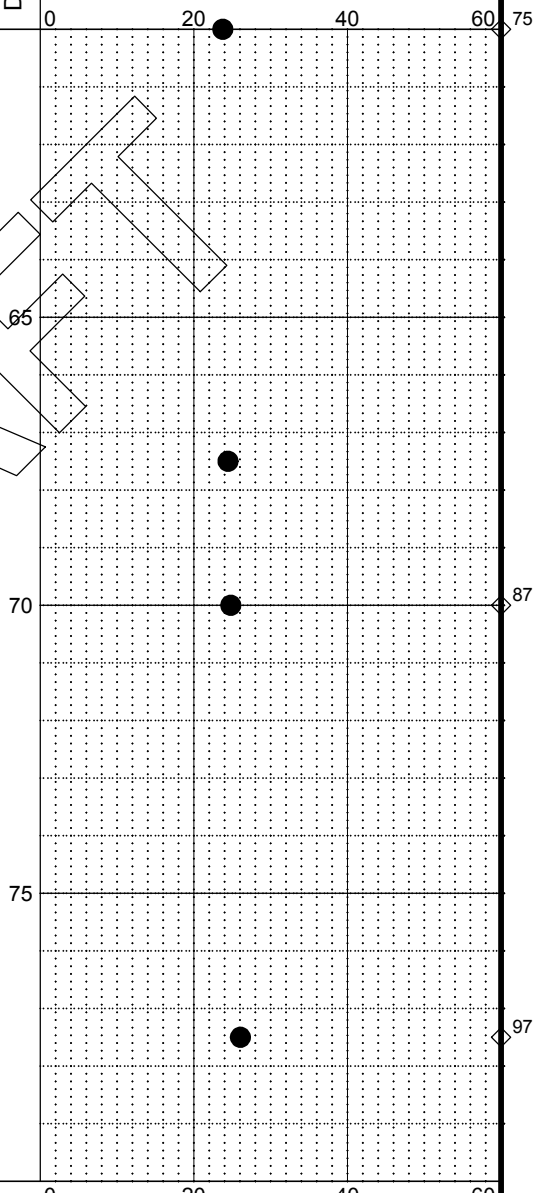
Depth, ft. | Symbol | Samples | Ground Water | Depth, ft.

organics; few silty sand seams.
(Qpnl)

R-7

R-8

DRAFT



CONTINUED NEXT SHEET

LEGEND

- I Sample Recovery
- * Sample Not Recovered
- Sonic Core Sample
- Ground Water Level in Well

NOTES

1. Refer to KEY for explanation of symbols, codes, abbreviations and definitions.
2. Groundwater level, if indicated above, is for the date specified and may vary.
3. USCS designation is based on visual-manual classification and selected lab testing.
4. The hole location was measured from existing site features and should be considered approximate.

North Mercer Island Interceptor and
Enatai Interceptor Upgrade Project
King County, Washington

LOG OF SONIC CORE NME-24

May 2018 | 21-1-22000-212

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FIG. A-23
Sheet 4 of 7

REV 3 - Approved for Submittal

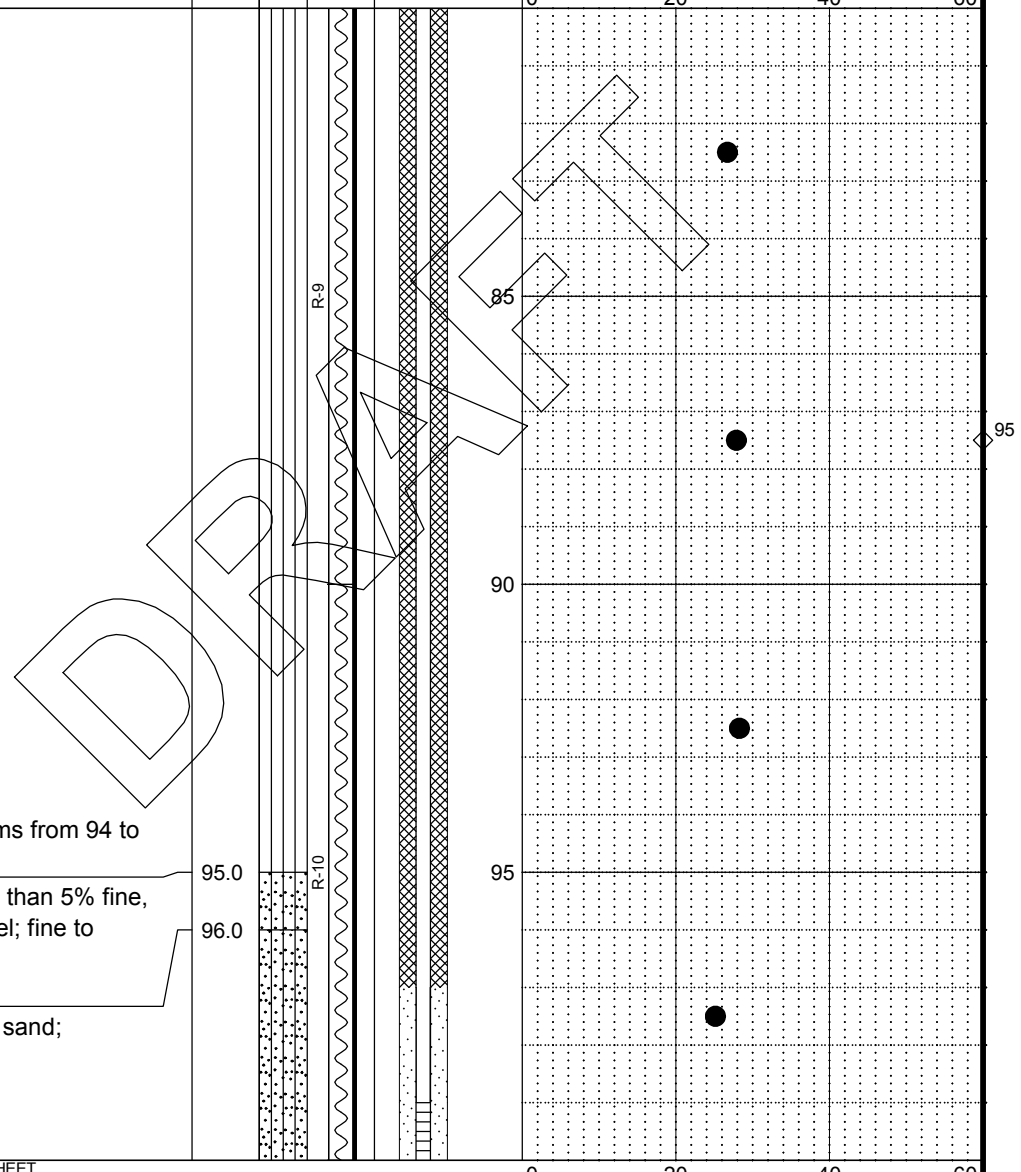
MASTER_LOG_BFW_21-22000.GPJ_SHAN_WIL.GDT 5/17/18 Log: JAA Rev: EAS Typ: LK

Total Depth:	*135 ft.*	Northing:	*~ 215,380 ft.*	Drilling Method:	*Sonic Core*	Hole Diam.:	*6 in.*
Top Elevation:	*~ 159 ft.*	Easting:	*~ 1,305,734 ft.*	Drilling Company:	*Holt*	Rod Diam.:	*NWJ*
Vert. Datum:	*KC Metro*	Station:	~	Drill Rig Equipment:	*Terra Sonic*	Hammer Type:	*Automatic*
Horiz. Datum:	*NAD83*	Offset:	~	Other Comments:	~		

SOIL DESCRIPTION

Refer to the report text for a proper understanding of the subsurface materials and drilling methods. The stratification lines indicated below represent the approximate boundaries between material types, and the transition may be gradual.

Depth, ft. | Symbol | Samples | Ground Water | Depth, ft.



DRAFT

- Scattered silty, fine sand seams from 94 to 95 feet.

95.0 — Gray, *Silty Sand (SM)*; wet; less than 5% fine, subrounded to subangular gravel; fine to medium sand; nonplastic fines. (Qpnf)

96.0 — Gray, *Silty Sand (SM)*; wet; fine sand; nonplastic fines. (Qpnf)

CONTINUED NEXT SHEET

0 20 40 60

◇ % Fines (<0.075mm)
● % Water Content

LEGEND

- I Sample Recovery
- * Sample Not Recovered
- ⊠ Sonic Core Sample
- ▼ Ground Water Level in Well

NOTES

1. Refer to KEY for explanation of symbols, codes, abbreviations and definitions.
2. Groundwater level, if indicated above, is for the date specified and may vary.
3. USCS designation is based on visual-manual classification and selected lab testing.
4. The hole location was measured from existing site features and should be considered approximate.

North Mercer Island Interceptor and Enatai Interceptor Upgrade Project
King County, Washington

LOG OF SONIC CORE NME-24

May 2018 | 21-1-22000-212

SHANNON & WILSON, INC.
Geotechnical and Environmental Consultants

FIG. A-23
Sheet 5 of 7

REV 3 - Approved for Submittal

MASTER_LOG_BFW_21-22000.GPJ_SHAN_WIL.GDT 5/17/18 Log: JAA Rev: EAS Typ: LK

Total Depth:	*135 ft.*	Northing:	*~ 215,380 ft.*	Drilling Method:	*Sonic Core*	Hole Diam.:	*6 in.*
Top Elevation:	*~ 159 ft.*	Easting:	*~ 1,305,734 ft.*	Drilling Company:	*Holt*	Rod Diam.:	*NWJ*
Vert. Datum:	*KC Metro*	Station:	~	Drill Rig Equipment:	*Terra Sonic*	Hammer Type:	*Automatic*
Horiz. Datum:	*NAD83*	Offset:	~	Other Comments:	~		

SOIL DESCRIPTION

Refer to the report text for a proper understanding of the subsurface materials and drilling methods. The stratification lines indicated below represent the approximate boundaries between material types, and the transition may be gradual.

- Few hard silt and clay clasts at 102.3 feet.

103.0

Gray *Silt with Sand (ML)*; moist to wet; fine sand; nonplastic fines; few silty, fine to medium sand seams.
(Qpnl)

107.5

Gray *Silt (ML)*; moist; less than 5% fine sand; nonplastic fines.
(Qpnl)

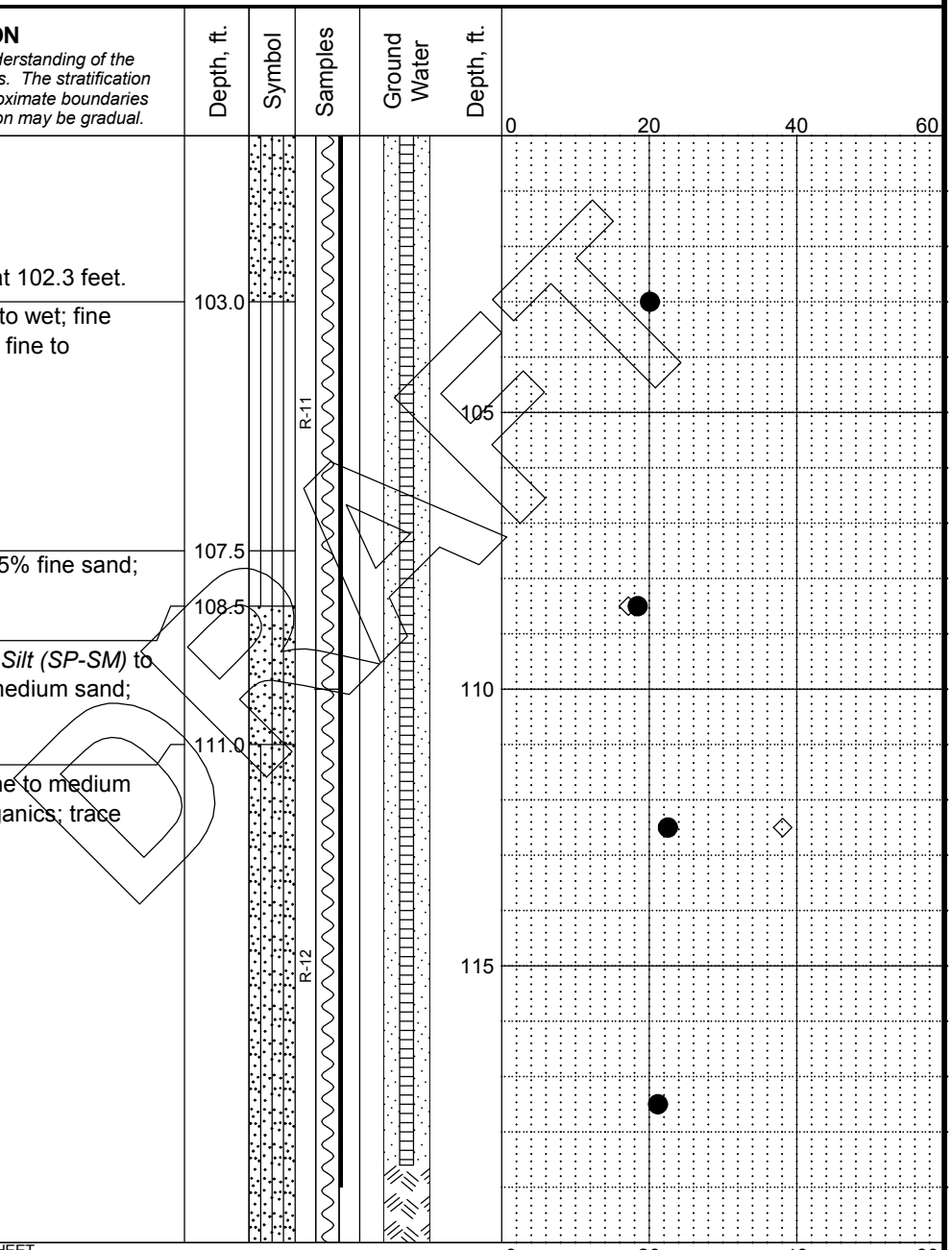
108.5

Gray, *Poorly Graded Sand with Silt (SP-SM)* to *Silty Sand (SM)*; moist; fine to medium sand; nonplastic fines.
(Qpnf)

111.0

Gray, *Silty Sand (SM)*; moist; fine to medium sand; nonplastic fines; trace organics; trace hard, silty sand nodules.
(Qpnf)

CONTINUED NEXT SHEET



LEGEND

- I Sample Recovery
- * Sample Not Recovered
- Sonic Core Sample
- Ground Water Level in Well

NOTES

1. Refer to KEY for explanation of symbols, codes, abbreviations and definitions.
2. Groundwater level, if indicated above, is for the date specified and may vary.
3. USCS designation is based on visual-manual classification and selected lab testing.
4. The hole location was measured from existing site features and should be considered approximate.

North Mercer Island Interceptor and Enatai Interceptor Upgrade Project
King County, Washington

LOG OF SONIC CORE NME-24

May 2018 | 21-1-22000-212

SHANNON & WILSON, INC.
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FIG. A-23
Sheet 6 of 7

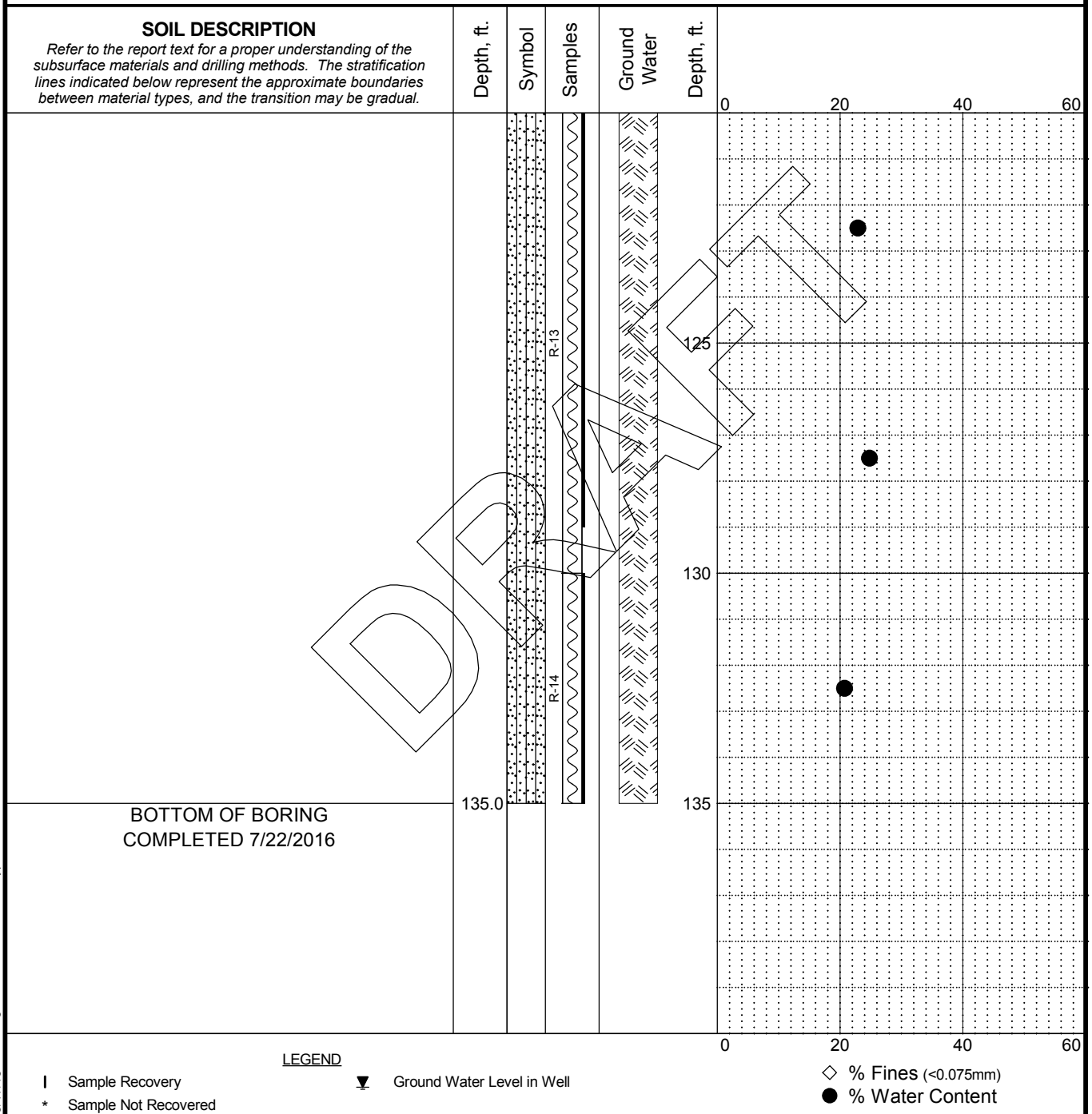
REV 3 - Approved for Submittal

MASTER_LOG_BFW_21-22000.GPJ_SHAN_WIL.GDT 5/17/18 Log: JAA Rev: EAS Typ: LK

Total Depth:	*135 ft.*	Northing:	*~ 215,380 ft.*	Drilling Method:	*Sonic Core*	Hole Diam.:	*6 in.*
Top Elevation:	*~ 159 ft.*	Easting:	*~ 1,305,734 ft.*	Drilling Company:	*Holt*	Rod Diam.:	*NWJ*
Vert. Datum:	*KC Metro*	Station:	~	Drill Rig Equipment:	*Terra Sonic*	Hammer Type:	*Automatic*
Horiz. Datum:	*NAD83*	Offset:	~	Other Comments:	~		

SOIL DESCRIPTION

Refer to the report text for a proper understanding of the subsurface materials and drilling methods. The stratification lines indicated below represent the approximate boundaries between material types, and the transition may be gradual.



LEGEND

- I Sample Recovery
- * Sample Not Recovered
- Sonic Core Sample
- Ground Water Level in Well

NOTES

1. Refer to KEY for explanation of symbols, codes, abbreviations and definitions.
2. Groundwater level, if indicated above, is for the date specified and may vary.
3. USCS designation is based on visual-manual classification and selected lab testing.
4. The hole location was measured from existing site features and should be considered approximate.

North Mercer Island Interceptor and
Enatai Interceptor Upgrade Project
King County, Washington

LOG OF SONIC CORE NME-24

May 2018 21-1-22000-212

SHANNON & WILSON, INC.
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FIG. A-23
Sheet 7 of 7

MASTER_LOG_BFW_21-22000.GPJ SHAN_WIL.GDT 5/17/18 Log: JAA Rev: EAS Typ: LK

REV 3 - Approved for Submittal

Total Depth:	*55.8 ft.*	Northing:	*~ 215,326 ft.*	Drilling Method:	*Mud Rotary*	Hole Diam.:	*6 in.*
Top Elevation:	*~ 121 ft.*	Easting:	*~ 1,306,405 ft.*	Drilling Company:	*Holt*	Rod Diam.:	*NWJ*
Vert. Datum:	*KC Metro*	Station:	~	Drill Rig Equipment:	*Mobile B-60*	Hammer Type:	*Automatic*
Horiz. Datum:	*NAD83*	Offset:	~	Other Comments:	~		

SOIL DESCRIPTION

Refer to the report text for a proper understanding of the subsurface materials and drilling methods. The stratification lines indicated below represent the approximate boundaries between material types, and the transition may be gradual.

Loose, gray, *Poorly Graded Gravel with Cobbles (GP)*; less than 10% subrounded to subangular cobbles; fine to coarse, subrounded to subangular gravel; less than 10% medium to coarse sand; less than 5% nonplastic fines; trace organics.
(Hf)

7.0

Loose, gray, *Silty Gravel with Sand (GM)* to *Poorly Graded Gravel with Silt and Sand (SP-SM)*; wet; fine, subrounded to subangular gravel; fine to coarse sand; low plasticity fines.
(Hf)

9.0

Medium dense, gray, *Silty Gravel with Sand (GM)*; moist to wet; fine to coarse, subrounded to subangular gravel; fine to coarse sand; nonplastic to low plasticity fines.
(Hf)

12.0

Dense, gray-brown, *Silty Sand with Gravel (SM)*; moist to wet; fine, subrounded to subangular gravel; fine to coarse sand; nonplastic fines; diamict.
(Qvat)

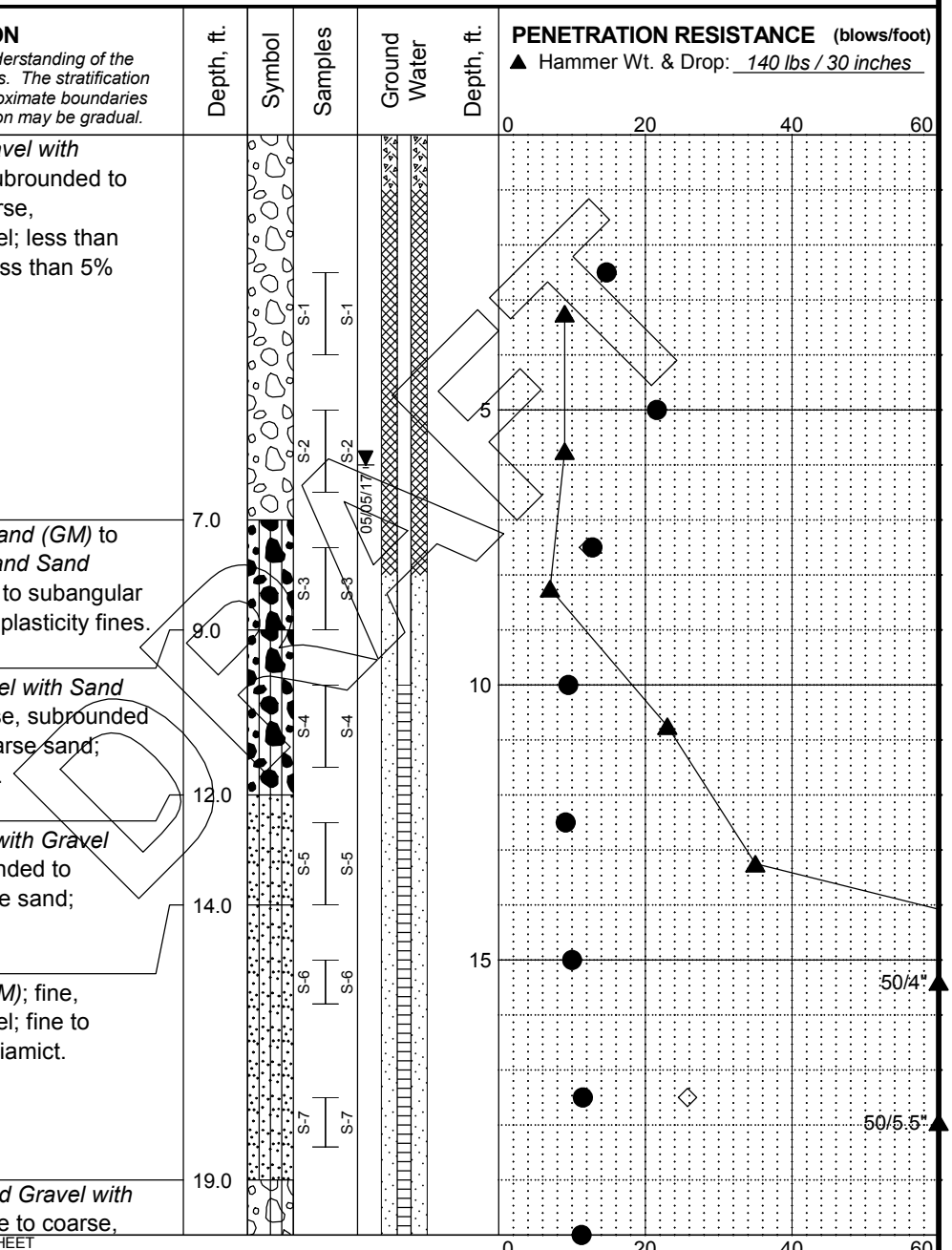
14.0

Very dense, gray, *Silty Sand (SM)*; fine, subrounded to subangular gravel; fine to coarse sand; nonplastic fines; diamict.
(Qvt)

19.0

Very dense, gray, *Poorly Graded Gravel with Silt and Sand (GP-GM)*; wet; fine to coarse,

CONTINUED NEXT SHEET



LEGEND

- I Sample Recovery
- * Sample Not Recovered
- Sonic Core Sample
- 2.0" O.D. Split Spoon Sample
- ▼ Ground Water Level in Well

NOTES

1. Refer to KEY for explanation of symbols, codes, abbreviations and definitions.
2. Groundwater level, if indicated above, is for the date specified and may vary.
3. USCS designation is based on visual-manual classification and selected lab testing.
4. The hole location was measured from existing site features and should be considered approximate.

North Mercer Island Interceptor and Enatai Interceptor Upgrade Project
King County, Washington

LOG OF BORING NME-25

May 2018 21-1-22000-212

SHANNON & WILSON, INC.
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FIG. A-24
Sheet 1 of 3

REV 3 - Approved for Submittal

MASTER_LOG_BFW_21-22000.GPJ_SHAN_WIL.GDT 5/17/18 Log: JAA Rev: EAS Typ: LK

Total Depth:	*55.8 ft.*	Northing:	*~ 215,326 ft.*	Drilling Method:	*Mud Rotary*	Hole Diam.:	*6 in.*
Top Elevation:	*~ 121 ft.*	Easting:	*~ 1,306,405 ft.*	Drilling Company:	*Holt*	Rod Diam.:	*NWJ*
Vert. Datum:	*KC Metro*	Station:	~	Drill Rig Equipment:	*Mobile B-60*	Hammer Type:	*Automatic*
Horiz. Datum:	*NAD83*	Offset:	~	Other Comments:	~		

SOIL DESCRIPTION

Refer to the report text for a proper understanding of the subsurface materials and drilling methods. The stratification lines indicated below represent the approximate boundaries between material types, and the transition may be gradual.

subrounded to subangular gravel; fine to coarse sand; nonplastic fines. (Qva)

23.0

Very dense, gray, *Silty Sand with Gravel (SM)*; moist; fine to coarse, subrounded to subangular gravel; fine to coarse sand; nonplastic fines; diamict. (Qvt)

33.0

Very dense, gray, *Silty Sand with Gravel (SM)*; wet; fine, subrounded to subangular gravel; fine to coarse sand; nonplastic fines. (Qva)

38.0

Very dense, gray, *Silty Sand with Gravel (SM)*; moist; fine to coarse, subrounded to subangular gravel; fine to coarse sand;

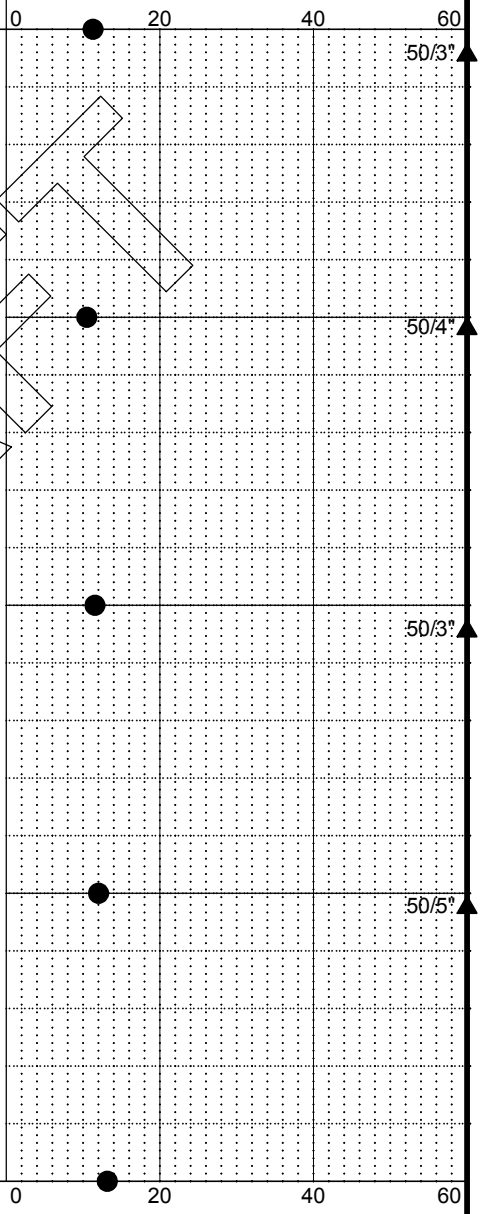
CONTINUED NEXT SHEET

Depth, ft. | Symbol | Samples | Ground Water | Depth, ft.

S-8 S-8 S-9 S-9 S-10 S-10 S-11 S-11

PENETRATION RESISTANCE (blows/foot)

▲ Hammer Wt. & Drop: *140 lbs / 30 inches*



◇ % Fines (<0.075mm)

● % Water Content

DRAFT

LEGEND

- I Sample Recovery
- * Sample Not Recovered
- Sonic Core Sample
- 2.0" O.D. Split Spoon Sample
- Ground Water Level in Well

NOTES

1. Refer to KEY for explanation of symbols, codes, abbreviations and definitions.
2. Groundwater level, if indicated above, is for the date specified and may vary.
3. USCS designation is based on visual-manual classification and selected lab testing.
4. The hole location was measured from existing site features and should be considered approximate.

North Mercer Island Interceptor and Enatai Interceptor Upgrade Project
King County, Washington

LOG OF BORING NME-25

May 2018 | 21-1-22000-212

SHANNON & WILSON, INC.
Geotechnical and Environmental Consultants

FIG. A-24
Sheet 2 of 3

REV 3 - Approved for Submittal

MASTER_LOG_BFW_21-22000.GPJ SHAN_WIL.GDT 5/17/18 Log: JAA Rev: EAS Typ: LK

Total Depth:	*55.8 ft.*	Northing:	*~ 215,326 ft.*	Drilling Method:	*Mud Rotary*	Hole Diam.:	*6 in.*
Top Elevation:	*~ 121 ft.*	Easting:	*~ 1,306,405 ft.*	Drilling Company:	*Holt*	Rod Diam.:	*NWJ*
Vert. Datum:	*KC Metro*	Station:	~	Drill Rig Equipment:	*Mobile B-60*	Hammer Type:	*Automatic*
Horiz. Datum:	*NAD83*	Offset:	~	Other Comments:	~		

SOIL DESCRIPTION

Refer to the report text for a proper understanding of the subsurface materials and drilling methods. The stratification lines indicated below represent the approximate boundaries between material types, and the transition may be gradual.

Depth, ft. | Symbol | Samples | Ground Water | Depth, ft.

PENETRATION RESISTANCE (blows/foot)

▲ Hammer Wt. & Drop: *140 lbs / 30 inches*

0 20 40 60

nonplastic to low plasticity fines; diamict.
(Qvt)

S-12 S-12 — 50/3"

45 — S-13 S-13 — 50/5"

50 — S-14 S-14 — 50/4.5"

55 — S-15 S-15 — 50/3"

55.8

BOTTOM OF BORING
COMPLETED 7/14/2016

DRAFT

0 20 40 60

◇ % Fines (<0.075mm)
● % Water Content

LEGEND

- I Sample Recovery
- * Sample Not Recovered
- Sonic Core Sample
- 2.0" O.D. Split Spoon Sample
- ▼ Ground Water Level in Well

NOTES

1. Refer to KEY for explanation of symbols, codes, abbreviations and definitions.
2. Groundwater level, if indicated above, is for the date specified and may vary.
3. USCS designation is based on visual-manual classification and selected lab testing.
4. The hole location was measured from existing site features and should be considered approximate.

North Mercer Island Interceptor and
Enatai Interceptor Upgrade Project
King County, Washington

LOG OF BORING NME-25

May 2018 21-1-22000-212

SHANNON & WILSON, INC.
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FIG. A-24
Sheet 3 of 3

REV 3 - Approved for Submittal

MASTER_LOG_BFW_21-22000.GPJ SHAN_WIL.GDT 5/17/18 Log: JAA Rev: EAS Typ: LK

Total Depth:	*21.5 ft.*	Northing:	*~ 218,679 ft.*	Drilling Method:	*Hollow Stem Auger*	Hole Diam.:	*8 in.*
Top Elevation:	*~ 145 ft.*	Easting:	*~ 1,294,262 ft.*	Drilling Company:	*Holt*	Rod Diam.:	*NWJ*
Vert. Datum:	*KC Metro*	Station:	~	Drill Rig Equipment:	*CME Track Rig*	Hammer Type:	*Automatic*
Horiz. Datum:	*NAD83*	Offset:	~	Other Comments:			

SOIL DESCRIPTION

Refer to the report text for a proper understanding of the subsurface materials and drilling methods. The stratification lines indicated below represent the approximate boundaries between material types, and the transition may be gradual.

Depth, ft. | Symbol | Samples | Ground Water Depth, ft.

PENETRATION RESISTANCE (blows/foot)

▲ Hammer Wt. & Drop: *140 lbs / 30 inches*

Medium stiff to stiff, brown, *Lean Clay with Sand (CL)* to *Fat Clay with Sand (CH)*; moist; trace fine, subrounded gravel; fine to coarse sand; medium to high plasticity fines; diamict; trace to few pockets with iron-oxide staining. (Qvri/Hf/Qpgl)

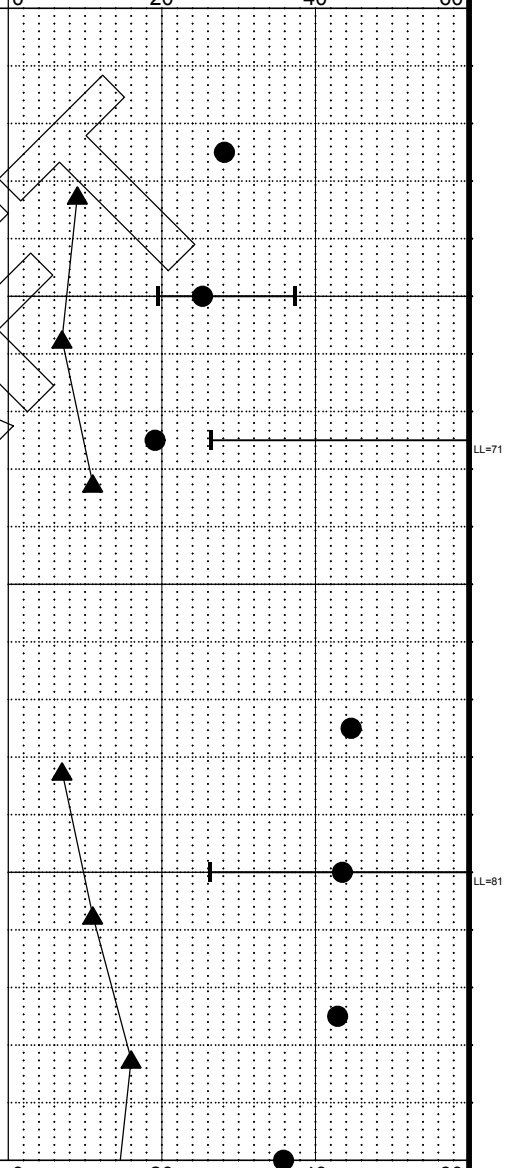
12.0

Stiff to very stiff, gray, *Fat Clay (CH)*; moist; medium to high plasticity fines. (Qvgl)

S-1 S-2 S-3 S-4 S-5 S-6 S-7

None Observed During Drilling

DRAFT



CONTINUED NEXT SHEET

LEGEND

- Sample Recovery
- * Sample Not Recovered
- Sonic Core Sample
- 2.0" O.D. Split Spoon Sample

◇ % Fines (<0.075mm)

● % Water Content

Plastic Limit ⊢●⊣ Liquid Limit

Natural Water Content

NOTES

1. Refer to KEY for explanation of symbols, codes, abbreviations and definitions.
2. Groundwater level, if indicated above, is for the date specified and may vary.
3. USCS designation is based on visual-manual classification and selected lab testing.
4. The hole location was measured from existing site features and should be considered approximate.

North Mercer Island Interceptor and Enatai Interceptor Upgrade Project
King County, Washington

LOG OF BORING NME-26

May 2018 | 21-1-22000-212

SHANNON & WILSON, INC.
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FIG. A-25
Sheet 1 of 2

REV 3 - Approved for Submittal

MASTER_LOG_BFW_21-22000.GPJ_SHAN_WIL.GDT 5/17/18 Log: JAA Rev: EAS Typ: LKN

Total Depth:	*21.5 ft.*	Northing:	*~ 218,679 ft.*	Drilling Method:	*Hollow Stem Auger*	Hole Diam.:	*8 in.*
Top Elevation:	*~ 145 ft.*	Easting:	*~ 1,294,262 ft.*	Drilling Company:	*Holt*	Rod Diam.:	*NWJ*
Vert. Datum:	*KC Metro*	Station:	~	Drill Rig Equipment:	*CME Track Rig*	Hammer Type:	*Automatic*
Horiz. Datum:	*NAD83*	Offset:	~	Other Comments:			

SOIL DESCRIPTION

Refer to the report text for a proper understanding of the subsurface materials and drilling methods. The stratification lines indicated below represent the approximate boundaries between material types, and the transition may be gradual.

Depth, ft. | Symbol | Samples | Ground Water Depth, ft.

PENETRATION RESISTANCE (blows/foot)

▲ Hammer Wt. & Drop: *140 lbs / 30 inches*

0 20 40 60

21.5 — S-8

BOTTOM OF BORING
COMPLETED 2/2/2018

25

30

35

DRAFT

0 20 40 60

LEGEND

- Sample Recovery
- * Sample Not Recovered
- Sonic Core Sample
- 2.0" O.D. Split Spoon Sample

◇ % Fines (<0.075mm)

● % Water Content

Plastic Limit ⊢●⊣ Liquid Limit

Natural Water Content

NOTES

1. Refer to KEY for explanation of symbols, codes, abbreviations and definitions.
2. Groundwater level, if indicated above, is for the date specified and may vary.
3. USCS designation is based on visual-manual classification and selected lab testing.
4. The hole location was measured from existing site features and should be considered approximate.

North Mercer Island Interceptor and
Enatai Interceptor Upgrade Project
King County, Washington

LOG OF BORING NME-26

May 2018 21-1-22000-212

SHANNON & WILSON, INC.
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FIG. A-25
Sheet 2 of 2

REV 3 - Approved for Submittal

MASTER_LOG_BFW_21-22000.GPJ SHAN_WIL.GDT 5/17/18 *Log: JAA Rev: EAS Typ: LKN*

Total Depth:	*26.5 ft.*	Northing:	*~ 218,674 ft.*	Drilling Method:	*Hollow Stem Auger*	Hole Diam.:	*8 in.*
Top Elevation:	*~ 145 ft.*	Easting:	*~ 1,294,263 ft.*	Drilling Company:	*Holt*	Rod Diam.:	*NWJ*
Vert. Datum:	*KC Metro*	Station:	~	Drill Rig Equipment:	*CME Track Rig*	Hammer Type:	*Automatic*
Horiz. Datum:	*NAD83*	Offset:	~	Other Comments:			

SOIL DESCRIPTION

Refer to the report text for a proper understanding of the subsurface materials and drilling methods. The stratification lines indicated below represent the approximate boundaries between material types, and the transition may be gradual.

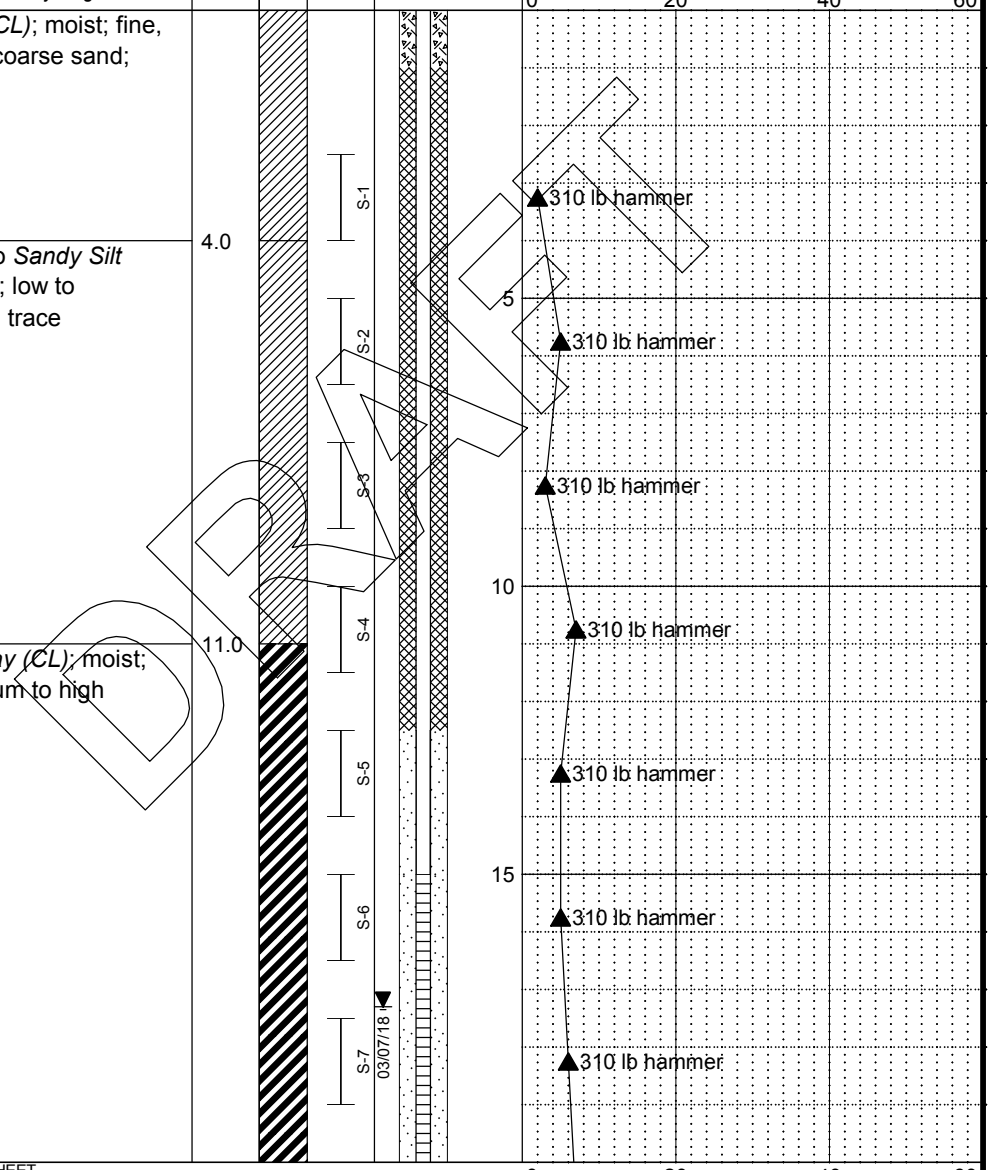
Brown, *Lean Clay with Gravel (CL)*; moist; fine, subrounded gravel; few fine to coarse sand; medium plasticity fines.
(Hf/Qvri)

4.0

Brown, *Sandy Lean Clay (CL)* to *Sandy Silt (ML)*; moist; fine to coarse sand; low to medium plasticity fines; diamict; trace iron-oxide staining.
(Qvgl)

11.0

Gray, *Fat Clay (CH)* to *Lean Clay (CL)*; moist; trace fine to coarse sand; medium to high plasticity fines.
(Qvgl)



CONTINUED NEXT SHEET

LEGEND

- I Sample Recovery
- * Sample Not Recovered
- Sonic Core Sample
- 2.0" O.D. Split Spoon Sample
- ▼ Ground Water Level in Well
- ◇ % Fines (<0.075mm)
- ● % Water Content

NOTES

1. Refer to KEY for explanation of symbols, codes, abbreviations and definitions.
2. Groundwater level, if indicated above, is for the date specified and may vary.
3. USCS designation is based on visual-manual classification and selected lab testing.
4. The hole location was measured from existing site features and should be considered approximate.

North Mercer Island Interceptor and Enatai Interceptor Upgrade Project
King County, Washington

LOG OF BORING NME-26A

May 2018 | 21-1-22000-212

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FIG. A-26
Sheet 1 of 2

REV 3 - Approved for Submittal

MASTER_LOG_BFW_21-22000.GPJ_SHAN_WIL.GDT 5/17/18 Log: JAA Rev: EAS Typ: LKN

Total Depth:	*26.5 ft.*	Northing:	*~ 218,674 ft.*	Drilling Method:	*Hollow Stem Auger*	Hole Diam.:	*8 in.*
Top Elevation:	*~ 145 ft.*	Easting:	*~ 1,294,263 ft.*	Drilling Company:	*Holt*	Rod Diam.:	*NWJ*
Vert. Datum:	*KC Metro*	Station:	~	Drill Rig Equipment:	*CME Track Rig*	Hammer Type:	*Automatic*
Horiz. Datum:	*NAD83*	Offset:	~	Other Comments:			

SOIL DESCRIPTION

Refer to the report text for a proper understanding of the subsurface materials and drilling methods. The stratification lines indicated below represent the approximate boundaries between material types, and the transition may be gradual.

Depth, ft. | Symbol | Samples | Ground Water | Depth, ft.

PENETRATION RESISTANCE (blows/foot)

▲ Hammer Wt. & Drop: *310 lbs / 30 inches*

0 20 40 60

S-8

310 lb hammer

25

S-9

310 lb hammer

26.5

BOTTOM OF BORING
COMPLETED 1/30/2018

-Boring was sampled using a non-standard 310-pound hammer with a 2-inch O.D. sampler. Penetration resistance is not in accordance with a Standard Penetration Test (SPT).

30

35

0 20 40 60

◇ % Fines (<0.075mm)

● % Water Content

DRAFT

LEGEND

- I Sample Recovery
- * Sample Not Recovered
- Sonic Core Sample
- 2.0" O.D. Split Spoon Sample
- ▼ Ground Water Level in Well

NOTES

1. Refer to KEY for explanation of symbols, codes, abbreviations and definitions.
2. Groundwater level, if indicated above, is for the date specified and may vary.
3. USCS designation is based on visual-manual classification and selected lab testing.
4. The hole location was measured from existing site features and should be considered approximate.

North Mercer Island Interceptor and
Enatai Interceptor Upgrade Project
King County, Washington

LOG OF BORING NME-26A

May 2018 21-1-22000-212

SHANNON & WILSON, INC.
Geotechnical and Environmental Consultants

FIG. A-26
Sheet 2 of 2

REV 3 - Approved for Submittal

MASTER_LOG_BFW_21-22000.GPJ_SHAN_WIL.GDT 5/17/18 *Log: JAA Rev: EAS Typ: LKN*

Total Depth:	*31.5 ft.*	Northing:	*~ 218,681 ft.*	Drilling Method:	*Hollow Stem Auger*	Hole Diam.:	*8 in.*
Top Elevation:	*~ 137 ft.*	Easting:	*~ 1,294,291 ft.*	Drilling Company:	*Holt*	Rod Diam.:	*NWJ*
Vert. Datum:	*KC Metro*	Station:	~	Drill Rig Equipment:	*CME Track Drill Rig*	Hammer Type:	*Automatic*
Horiz. Datum:	*NAD83*	Offset:	~	Other Comments:			

SOIL DESCRIPTION

Refer to the report text for a proper understanding of the subsurface materials and drilling methods. The stratification lines indicated below represent the approximate boundaries between material types, and the transition may be gradual.

Medium stiff, gray and dark brown *Organic Silt (OL)* and *Lean Clay (CL)*; moist; few fine to coarse sand; numerous organics; organic odor.
(Hf)

4.0

Very soft, brown, *Fat Clay (CH)*; trace fine sand; medium to high plasticity fines; few organics; blocky texture.
(Hf/Hl)

7.0

Stiff, brown to gray, *Lean Clay (CL)*; moist; medium to high plasticity fines.
(Qvgl)

9.0

Very stiff, gray, *Fat Clay (CH)* to *Lean Clay (CL)*; moist; trace fine sand; medium to high plasticity fines.
(Qvgl)

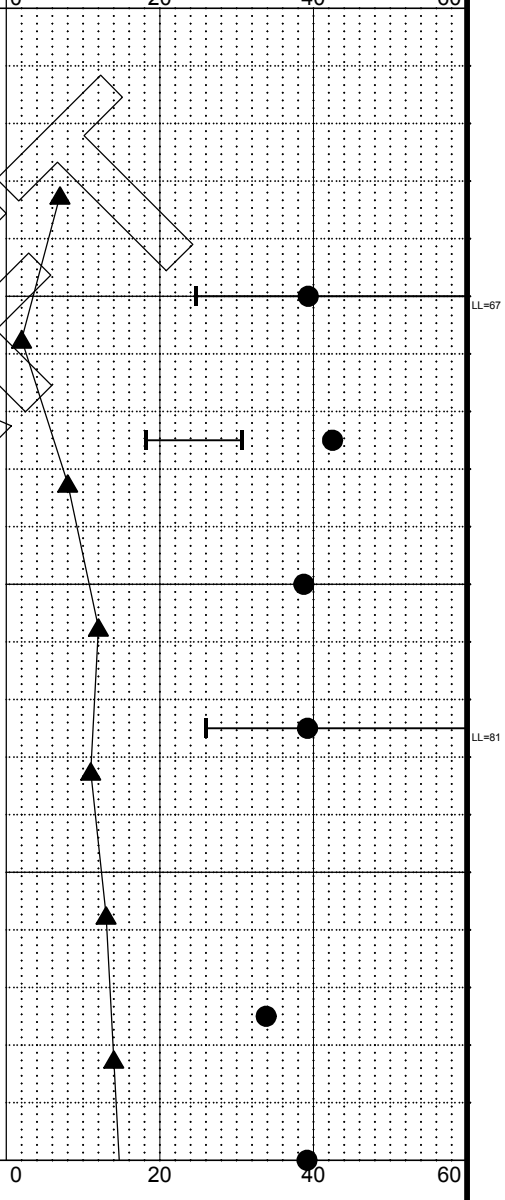
Depth, ft. | Symbol | Samples | Ground Water Depth, ft.

S-1 S-2 S-3 S-4 S-5 S-6 S-7

None Observed During Drilling

PENETRATION RESISTANCE (blows/foot)

▲ Hammer Wt. & Drop: *140 lbs / 30 inches*



◇ % Fines (<0.075mm)
● % Water Content
Plastic Limit ⊢●⊣ Liquid Limit
Natural Water Content

CONTINUED NEXT SHEET

LEGEND

- Sample Recovery
- * Sample Not Recovered
- Sonic Core Sample
- 2.0" O.D. Split Spoon Sample

NOTES

1. Refer to KEY for explanation of symbols, codes, abbreviations and definitions.
2. Groundwater level, if indicated above, is for the date specified and may vary.
3. USCS designation is based on visual-manual classification and selected lab testing.
4. The hole location was measured from existing site features and should be considered approximate.

North Mercer Island Interceptor and Enatai Interceptor Upgrade Project
King County, Washington

LOG OF BORING NME-27

May 2018 21-1-22000-212

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FIG. A-27
Sheet 1 of 2

DRAFT

Log: JAA Rev: EAS Typ: LKN

MASTER_LOG_BFW_21-22000.GPJ_SHAN_WIL.GDT 5/17/18

REV 3 - Approved for Submittal

Total Depth:	*31.5 ft.*	Northing:	*~ 218,681 ft.*	Drilling Method:	*Hollow Stem Auger*	Hole Diam.:	*8 in.*
Top Elevation:	*~ 137 ft.*	Easting:	*~ 1,294,291 ft.*	Drilling Company:	*Holt*	Rod Diam.:	*NWJ*
Vert. Datum:	*KC Metro*	Station:	~	Drill Rig Equipment:	*CME Track Drill Rig*	Hammer Type:	*Automatic*
Horiz. Datum:	*NAD83*	Offset:	~	Other Comments:			

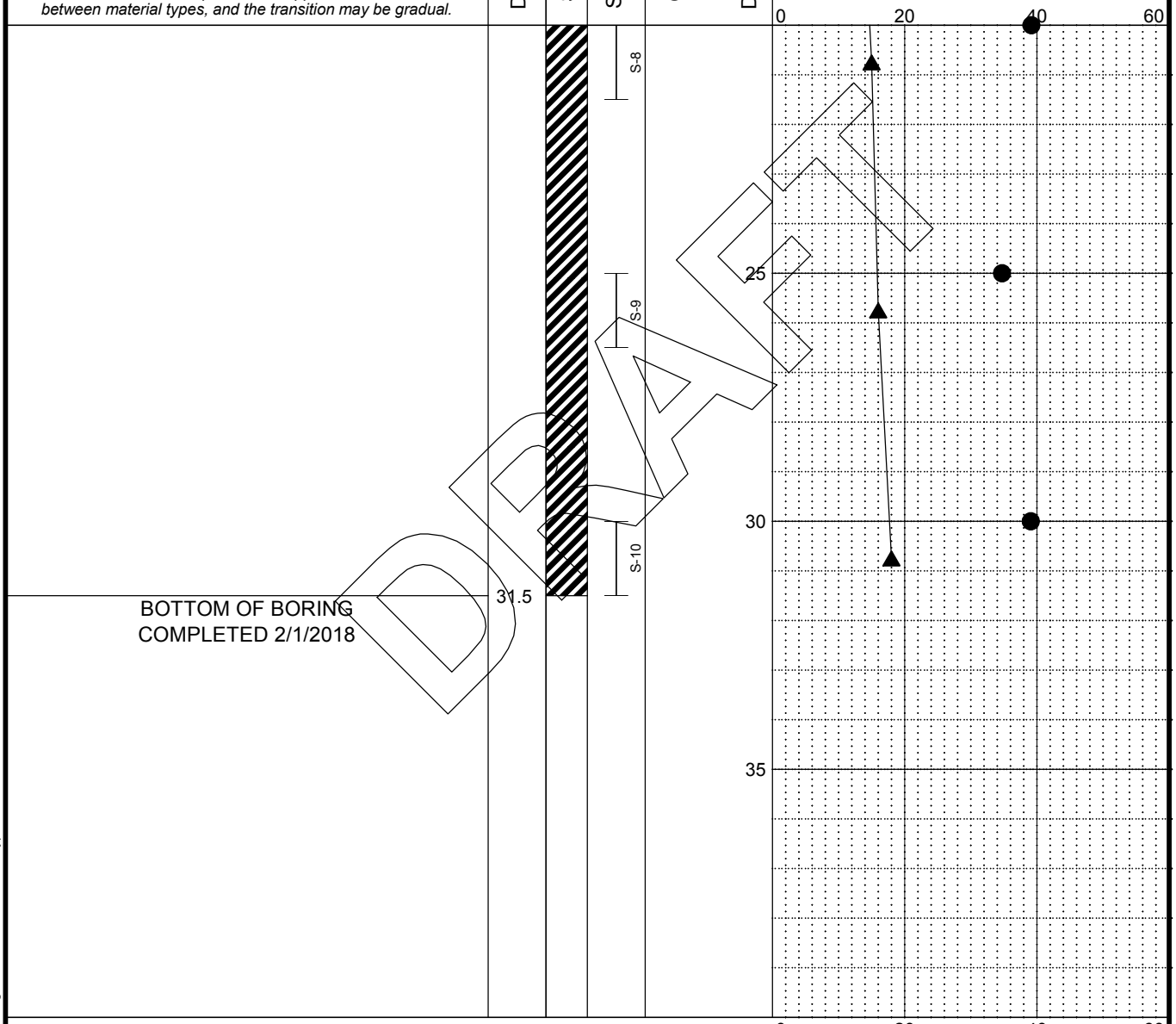
SOIL DESCRIPTION

Refer to the report text for a proper understanding of the subsurface materials and drilling methods. The stratification lines indicated below represent the approximate boundaries between material types, and the transition may be gradual.

Depth, ft. | Symbol | Samples | Ground Water Depth, ft.

PENETRATION RESISTANCE (blows/foot)

▲ Hammer Wt. & Drop: *140 lbs / 30 inches*



LEGEND

- Sample Recovery
- * Sample Not Recovered
- Sonic Core Sample
- 2.0" O.D. Split Spoon Sample

◇ % Fines (<0.075mm)

● % Water Content

Plastic Limit ⊢●⊣ Liquid Limit

Natural Water Content

NOTES

1. Refer to KEY for explanation of symbols, codes, abbreviations and definitions.
2. Groundwater level, if indicated above, is for the date specified and may vary.
3. USCS designation is based on visual-manual classification and selected lab testing.
4. The hole location was measured from existing site features and should be considered approximate.

North Mercer Island Interceptor and Enatai Interceptor Upgrade Project
King County, Washington

LOG OF BORING NME-27

May 2018 | 21-1-22000-212

SHANNON & WILSON, INC.
Geotechnical and Environmental Consultants

FIG. A-27
Sheet 2 of 2

REV 3 - Approved for Submittal

MASTER_LOG_BFW_21-22000.GPJ SHAN_WIL.GDT 5/17/18 Log: JAA Rev: EAS Typ: LKN

Total Depth:	*36.5 ft.*	Northing:	*~ 218,676 ft.*	Drilling Method:	*Hollow Stem Auger*	Hole Diam.:	*8 in.*
Top Elevation:	*~ 137 ft.*	Easting:	*~ 1,294,292 ft.*	Drilling Company:	*Holt*	Rod Diam.:	*NWJ*
Vert. Datum:	*KC Metro*	Station:	*~*	Drill Rig Equipment:	*CME Track Rig*	Hammer Type:	*Automatic*
Horiz. Datum:	*NAD83*	Offset:	*~*	Other Comments:			

SOIL DESCRIPTION

Refer to the report text for a proper understanding of the subsurface materials and drilling methods. The stratification lines indicated below represent the approximate boundaries between material types, and the transition may be gradual.

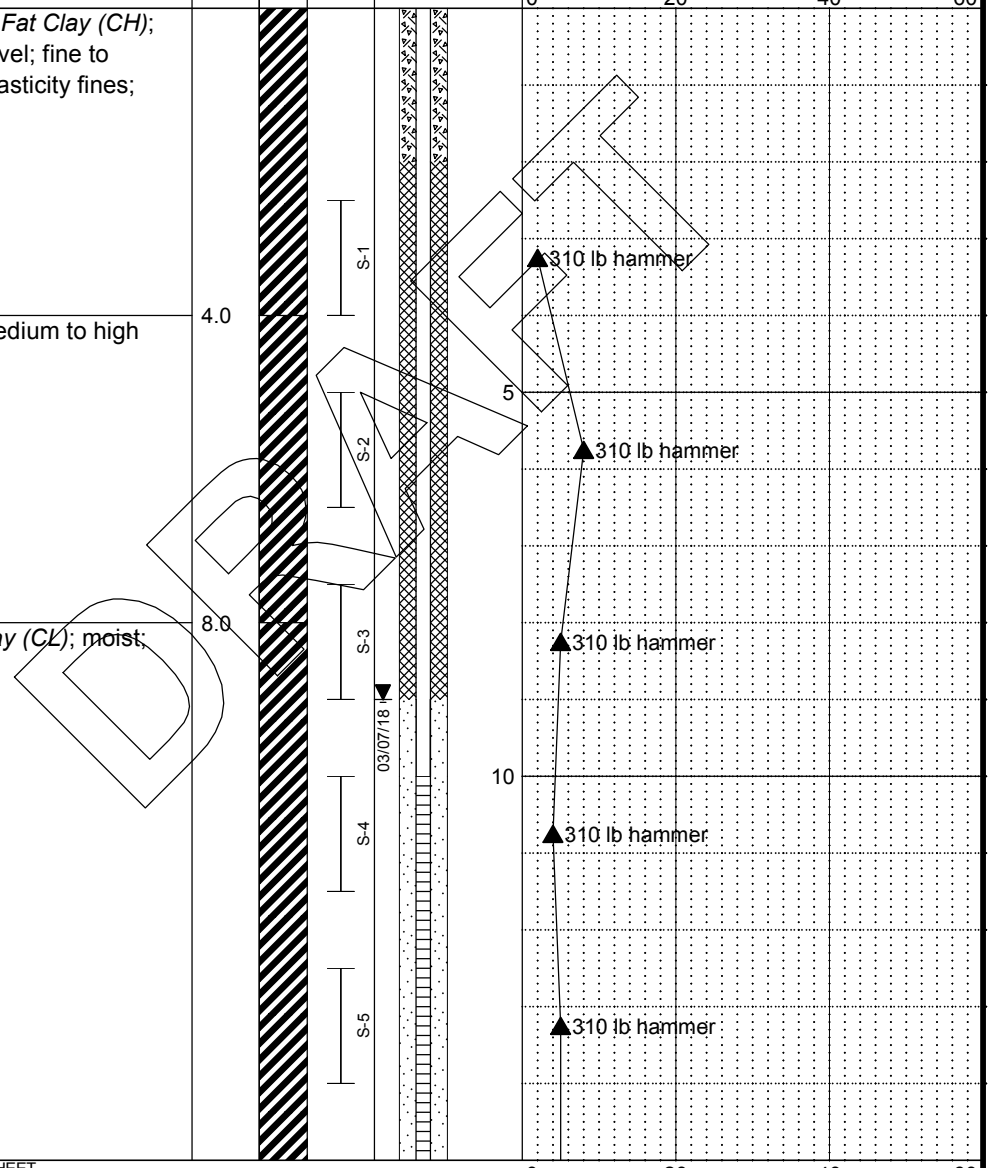
Mottled brown and gray, *Sandy Fat Clay (CH)*; moist; few, fine subrounded gravel; fine to coarse sand; medium to high plasticity fines; few wood fragments.
(Hf)

4.0

Brown, *Fat Clay (CH)*; moist; medium to high plasticity fines.
(Qvgl)

8.0

Gray, *Fat Clay (CH)* to *Lean Clay (CL)*; moist; medium to high plasticity fines.
(Qvgl)



CONTINUED NEXT SHEET

LEGEND

- I Sample Recovery
- * Sample Not Recovered
- Sonic Core Sample
- 2.0" O.D. Split Spoon Sample
- Ground Water Level in Well
- ◇ % Fines (<0.075mm)
- ● % Water Content

NOTES

1. Refer to KEY for explanation of symbols, codes, abbreviations and definitions.
2. Groundwater level, if indicated above, is for the date specified and may vary.
3. USCS designation is based on visual-manual classification and selected lab testing.
4. The hole location was measured from existing site features and should be considered approximate.

North Mercer Island Interceptor and
Enatai Interceptor Upgrade Project
King County, Washington

LOG OF BORING NME-27A

May 2018 21-1-22000-212

SHANNON & WILSON, INC.
Geotechnical and Environmental Consultants

FIG. A-28
Sheet 1 of 3

REV 3 - Approved for Submittal

MASTER_LOG_BFW_21-22000.GPJ SHAN_WIL.GDT 5/17/18 Log: JAA Rev: EAS Typ: LKN

Total Depth:	*36.5 ft.*	Northing:	*~ 218,676 ft.*	Drilling Method:	*Hollow Stem Auger*	Hole Diam.:	*8 in.*
Top Elevation:	*~ 137 ft.*	Easting:	*~ 1,294,292 ft.*	Drilling Company:	*Holt*	Rod Diam.:	*NWJ*
Vert. Datum:	*KC Metro*	Station:	~	Drill Rig Equipment:	*CME Track Rig*	Hammer Type:	*Automatic*
Horiz. Datum:	*NAD83*	Offset:	~	Other Comments:			

SOIL DESCRIPTION

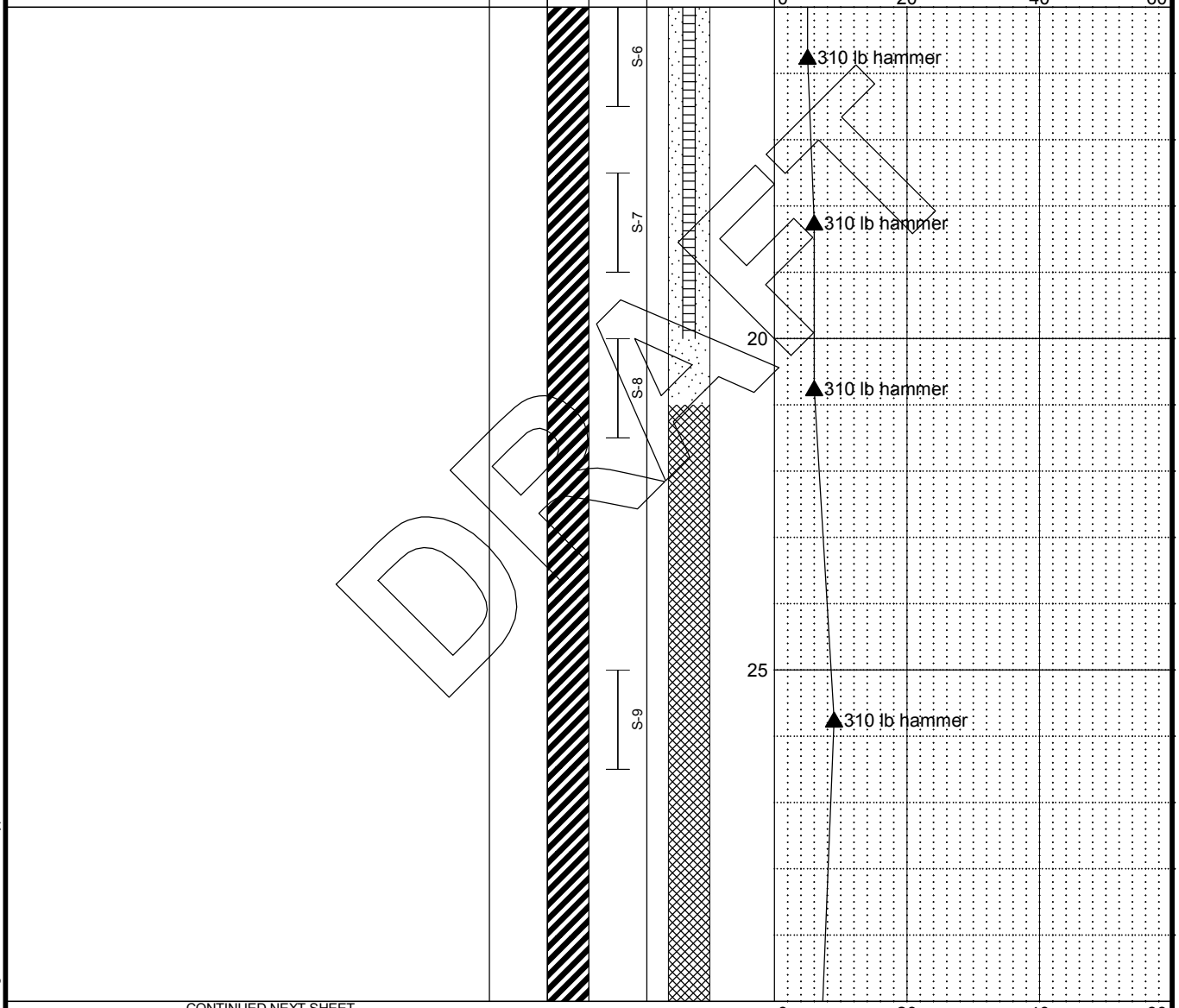
Refer to the report text for a proper understanding of the subsurface materials and drilling methods. The stratification lines indicated below represent the approximate boundaries between material types, and the transition may be gradual.

Depth, ft. | Symbol | Samples | Ground Water | Depth, ft.

PENETRATION RESISTANCE (blows/foot)

▲ Hammer Wt. & Drop: *310 lbs / 30 inches*

0 20 40 60



CONTINUED NEXT SHEET

0 20 40 60

◇ % Fines (<0.075mm)

● % Water Content

LEGEND

- I Sample Recovery
- * Sample Not Recovered
- Sonic Core Sample
- 2.0" O.D. Split Spoon Sample
- ▼ Ground Water Level in Well

NOTES

1. Refer to KEY for explanation of symbols, codes, abbreviations and definitions.
2. Groundwater level, if indicated above, is for the date specified and may vary.
3. USCS designation is based on visual-manual classification and selected lab testing.
4. The hole location was measured from existing site features and should be considered approximate.

North Mercer Island Interceptor and
Enatai Interceptor Upgrade Project
King County, Washington

LOG OF BORING NME-27A

May 2018 21-1-22000-212

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FIG. A-28
Sheet 2 of 3

REV 3 - Approved for Submittal

MASTER_LOG_BFW_21-22000.GPJ SHAN_WIL.GDT 5/17/18 Log: JAA Rev: EAS Typ: LKN

Total Depth:	*36.5 ft.*	Northing:	*~ 218,676 ft.*	Drilling Method:	*Hollow Stem Auger*	Hole Diam.:	*8 in.*
Top Elevation:	*~ 137 ft.*	Easting:	*~ 1,294,292 ft.*	Drilling Company:	*Holt*	Rod Diam.:	*NWJ*
Vert. Datum:	*KC Metro*	Station:	~	Drill Rig Equipment:	*CME Track Rig*	Hammer Type:	*Automatic*
Horiz. Datum:	*NAD83*	Offset:	~	Other Comments:			

SOIL DESCRIPTION

Refer to the report text for a proper understanding of the subsurface materials and drilling methods. The stratification lines indicated below represent the approximate boundaries between material types, and the transition may be gradual.

Depth, ft. | Symbol | Samples | Ground Water | Depth, ft.

PENETRATION RESISTANCE (blows/foot)

▲ Hammer Wt. & Drop: *310 lbs / 30 inches*

0 20 40 60

S-10

310 lb hammer

35

S-11

310 lb hammer

36.5

BOTTOM OF BORING
COMPLETED 1/31/2018

-Boring was sampled using a non-standard 310-pound hammer with a 2-inch O.D. sampler. Penetration resistance is not in accordance with a Standard Penetration Test (SPT).

40

DRAFT

0 20 40 60

◇ % Fines (<0.075mm)
● % Water Content

LEGEND

- I Sample Recovery
- * Sample Not Recovered
- ⊠ Sonic Core Sample
- ⊥ 2.0" O.D. Split Spoon Sample
- ▼ Ground Water Level in Well

NOTES

1. Refer to KEY for explanation of symbols, codes, abbreviations and definitions.
2. Groundwater level, if indicated above, is for the date specified and may vary.
3. USCS designation is based on visual-manual classification and selected lab testing.
4. The hole location was measured from existing site features and should be considered approximate.

North Mercer Island Interceptor and
Enatai Interceptor Upgrade Project
King County, Washington

LOG OF BORING NME-27A

May 2018 21-1-22000-212

SHANNON & WILSON, INC.
Geotechnical and Environmental Consultants

FIG. A-28
Sheet 3 of 3

REV 3 - Approved for Submittal

MASTER_LOG_BFW_21-22000.GPJ_SHAN_WIL.GDT 5/17/18 *Log: JAA Rev: EAS Typ: LKN*

Total Depth:	*31.5 ft.*	Northing:	*~ 218,710 ft.*	Drilling Method:	*Hollow Stem Auger*	Hole Diam.:	*8 in.*
Top Elevation:	*~ 137 ft.*	Easting:	*~ 1,294,287 ft.*	Drilling Company:	*Holt*	Rod Diam.:	*NWJ*
Vert. Datum:	*KC Metro*	Station:	~	Drill Rig Equipment:	*CME Track Rig*	Hammer Type:	*Automatic*
Horiz. Datum:	*NAD83*	Offset:	~	Other Comments:			

SOIL DESCRIPTION

Refer to the report text for a proper understanding of the subsurface materials and drilling methods. The stratification lines indicated below represent the approximate boundaries between material types, and the transition may be gradual.

Stiff, brown *Silt with Sand (ML)*; moist; trace fine, subrounded gravel; fine to coarse sand; low plasticity fines; few organics.
(Hf)

3.0

Medium stiff to stiff, brown, *Fat Clay (CH)*; moist; few fine to coarse sand; medium to high plasticity fines; trace organics.
(Qvgl)

9.0

Stiff to very stiff, gray, *Fat Clay (CH)*; moist; medium to high plasticity fines; trace slickensides.
(Qvgl)

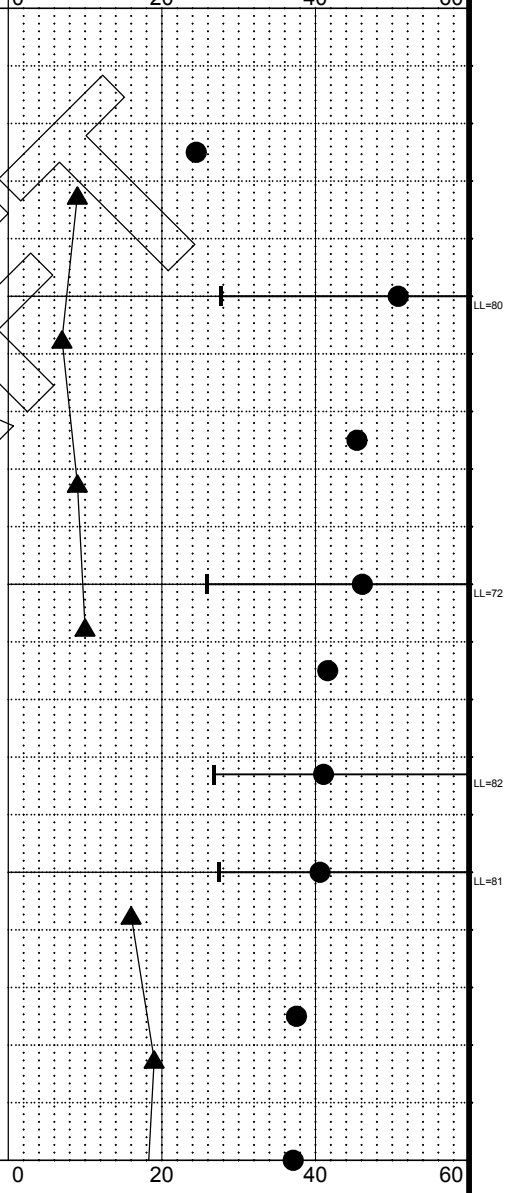
Depth, ft. | Symbol | Samples | Ground Water Depth, ft.

S-1 S-2 S-3 S-4 S-5 S-6 S-7

None Observed During Drilling

PENETRATION RESISTANCE (blows/foot)

▲ Hammer Wt. & Drop: *140 lbs / 30 inches*



◇ % Fines (<0.075mm)
● % Water Content
Plastic Limit ⊢●⊣ Liquid Limit
Natural Water Content

CONTINUED NEXT SHEET

LEGEND

- Sample Recovery
- * Sample Not Recovered
- Sonic Core Sample
- 2.0" O.D. Split Spoon Sample

NOTES

1. Refer to KEY for explanation of symbols, codes, abbreviations and definitions.
2. Groundwater level, if indicated above, is for the date specified and may vary.
3. USCS designation is based on visual-manual classification and selected lab testing.
4. The hole location was measured from existing site features and should be considered approximate.

North Mercer Island Interceptor and Enatai Interceptor Upgrade Project
King County, Washington

LOG OF BORING NME-28

May 2018 21-1-22000-212

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FIG. A-29
Sheet 1 of 2

REV 3 - Approved for Submittal

DRAFT

MASTER_LOG_BFW_21-22000.GPJ_SHAN_WIL.GDT 5/17/18 Log: JAA Rev: EAS Typ: LKN

Total Depth:	*31.5 ft.*	Northing:	*~ 218,710 ft.*	Drilling Method:	*Hollow Stem Auger*	Hole Diam.:	*8 in.*
Top Elevation:	*~ 137 ft.*	Easting:	*~ 1,294,287 ft.*	Drilling Company:	*Holt*	Rod Diam.:	*NWJ*
Vert. Datum:	*KC Metro*	Station:	~	Drill Rig Equipment:	*CME Track Rig*	Hammer Type:	*Automatic*
Horiz. Datum:	*NAD83*	Offset:	~	Other Comments:			

SOIL DESCRIPTION

Refer to the report text for a proper understanding of the subsurface materials and drilling methods. The stratification lines indicated below represent the approximate boundaries between material types, and the transition may be gradual.

Depth, ft. | Symbol | Samples | Ground Water | Depth, ft.

PENETRATION RESISTANCE (blows/foot)

▲ Hammer Wt. & Drop: *140 lbs / 30 inches*

S-8

S-9

S-10

31.5

BOTTOM OF BORING
COMPLETED 2/1/2018

DRAFT

0 20 40 60

25

30

35

0 20 40 60

LEGEND

- Sample Recovery
- * Sample Not Recovered
- Sonic Core Sample
- 2.0" O.D. Split Spoon Sample

◇ % Fines (<0.075mm)

● % Water Content

Plastic Limit ⊢●⊣ Liquid Limit

Natural Water Content

NOTES

1. Refer to KEY for explanation of symbols, codes, abbreviations and definitions.
2. Groundwater level, if indicated above, is for the date specified and may vary.
3. USCS designation is based on visual-manual classification and selected lab testing.
4. The hole location was measured from existing site features and should be considered approximate.

North Mercer Island Interceptor and
Enatai Interceptor Upgrade Project
King County, Washington

LOG OF BORING NME-28

May 2018 21-1-22000-212

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FIG. A-29
Sheet 2 of 2

REV 3 - Approved for Submittal

MASTER_LOG_BFW_21-22000.GPJ SHAN_WIL.GDT 5/17/18 *Log: JAA Rev: EAS Typ: LKN*

Total Depth:	*21.5 ft.*	Northing:	*~ 218,751 ft.*	Drilling Method:	*Hollow Stem Auger*	Hole Diam.:	*8 in.*
Top Elevation:	*~ 140.15 ft.*	Easting:	*~ 1,294,250 ft.*	Drilling Company:	*Holt*	Rod Diam.:	*NWJ*
Vert. Datum:	*KC Metro*	Station:	~	Drill Rig Equipment:	*CME Track Rig*	Hammer Type:	*Automatic*
Horiz. Datum:	*NAD83*	Offset:	~	Other Comments:			

SOIL DESCRIPTION

Refer to the report text for a proper understanding of the subsurface materials and drilling methods. The stratification lines indicated below represent the approximate boundaries between material types, and the transition may be gradual.

Very stiff, mottled brown and gray, *Lean Clay with Sand (CL)*; moist; fine to coarse sand; medium plasticity fines; few clayey sand pockets; trace organics; trace iron-oxide staining.
(Qvrl)

4.5

Very stiff, mottled brown and gray, *Fat Clay (CH)*; moist; trace fine to coarse sand; medium to high plasticity fines; trace iron-oxide staining.
(Qvgl)

7.0

Medium stiff, mottled brown and gray, *Fat Clay (CH)*; moist; medium to high plasticity fines; slightly blocky; trace iron-oxide staining.
(Qvgl)

9.5

Stiff to very stiff, *Fat Clay (CH)*; moist; trace subrounded gravel; trace fine to coarse sand; medium to high plasticity fines.
(Qvgl)

CONTINUED NEXT SHEET

Depth, ft. | Symbol | Samples | Ground Water | Depth, ft.

3/7/2018

PENETRATION RESISTANCE (blows/foot)

▲ Hammer Wt. & Drop: *140 lbs / 30 inches*

0 20 40 60

5 10 15

LL=63

WC=60 LL=73

LL=90

0 20 40 60

◇ % Fines (<0.075mm)

● % Water Content

Plastic Limit ⊢●⊣ Liquid Limit

Natural Water Content

LEGEND

* Sample Not Recovered

2.0" O.D. Split Spoon Sample

Well Screen and Sand Filter

Bentonite-Cement Grout

Bentonite Chips/Pellets

Bentonite Grout

Ground Water Level in Well

NOTES

1. Refer to KEY for explanation of symbols, codes, abbreviations and definitions.
2. Groundwater level, if indicated above, is for the date specified and may vary.
3. USCS designation is based on visual-manual classification and selected lab testing.
4. The hole location was measured from existing site features and should be considered approximate.

North Mercer Island Interceptor and Enatai Interceptor Upgrade Project
King County, Washington

LOG OF BORING NME-29

May 2018 21-1-22000-212

SHANNON & WILSON, INC.
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FIG. A-30
Sheet 1 of 2

REV 3 - Approved for Submittal

MASTER_LOG_E_21-22000.GPJ SHAN_WIL.GDT 5/17/18 Log: JAA Rev: EAS Typ: LKN

Total Depth:	*21.5 ft.*	Northing:	*~ 218,751 ft.*	Drilling Method:	*Hollow Stem Auger*	Hole Diam.:	*8 in.*
Top Elevation:	*~ 140 ft.*	Easting:	*~ 1,294,250 ft.*	Drilling Company:	*Holt*	Rod Diam.:	*NWJ*
Vert. Datum:	*KC Metro*	Station:	~	Drill Rig Equipment:	*CME Track Rig*	Hammer Type:	*Automatic*
Horiz. Datum:	*NAD83*	Offset:	~	Other Comments:			

SOIL DESCRIPTION

Refer to the report text for a proper understanding of the subsurface materials and drilling methods. The stratification lines indicated below represent the approximate boundaries between material types, and the transition may be gradual.

Depth, ft. | Symbol | Samples | Ground Water Depth, ft.

PENETRATION RESISTANCE (blows/foot)

▲ Hammer Wt. & Drop: *140 lbs / 30 inches*

0 20 40 60

21.5 — S-8

BOTTOM OF BORING
COMPLETED 2/2/2018

25

30

35

DRAFT

0 20 40 60

LEGEND

- Sample Recovery
- * Sample Not Recovered
- Sonic Core Sample
- 2.0" O.D. Split Spoon Sample
- Ground Water Level in Well

◇ % Fines (<0.075mm)
● % Water Content
Plastic Limit ⊢●⊣ Liquid Limit
Natural Water Content

NOTES

1. Refer to KEY for explanation of symbols, codes, abbreviations and definitions.
2. Groundwater level, if indicated above, is for the date specified and may vary.
3. USCS designation is based on visual-manual classification and selected lab testing.
4. The hole location was measured from existing site features and should be considered approximate.

North Mercer Island Interceptor and
Enatai Interceptor Upgrade Project
King County, Washington

LOG OF BORING NME-29

May 2018 | 21-1-22000-212

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FIG. A-30
Sheet 2 of 2

REV 3 - Approved for Submittal

MASTER_LOG_BFW_21-22000.GPJ_SHAN_WIL.GDT 5/17/18 Log: JAA Rev: EAS Typ: LKN

Total Depth:	*51.5 ft.*	Northing:	*~ 218,796 ft.*	Drilling Method:	*Hollow Stem Auger*	Hole Diam.:	*8 in.*
Top Elevation:	*~ 136 ft.*	Easting:	*~ 1,294,264 ft.*	Drilling Company:	*Holt*	Rod Diam.:	*NWJ*
Vert. Datum:	*KC Metro*	Station:	~	Drill Rig Equipment:	*CME Track Rig*	Hammer Type:	*Automatic*
Horiz. Datum:	*NAD83*	Offset:	~	Other Comments:			

SOIL DESCRIPTION

Refer to the report text for a proper understanding of the subsurface materials and drilling methods. The stratification lines indicated below represent the approximate boundaries between material types, and the transition may be gradual.

Stiff to medium dense, mottled gray, brown, and orange *Silt (ML)*; moist; low plasticity fines; few pockets with few fine to coarse sand; trace to few organics.
(Hf/Hl)

4.5

Stiff to hard, brown, *Fat Clay (CH)*; moist; medium to high plasticity fines; trace slickensides; trace organics; trace iron-oxide staining.
(Qvgl)

11.5

Stiff to hard, gray, *Fat Clay (CH)*; moist; medium to high plasticity fines; trace slickensides; trace silt partings; trace brown clay seams.
(Qvgl)

CONTINUED NEXT SHEET

Depth, ft. | Symbol | Samples | Ground Water | Depth, ft.

S-1 S-2 S-3 S-4 S-5 S-6 S-7

PENETRATION RESISTANCE (blows/foot)

▲ Hammer Wt. & Drop: *140 lbs / 30 inches*

0 20 40 60

5 10 15

LL=76

50/6"

LL=72

0 20 40 60

LEGEND

- I Sample Recovery
- * Sample Not Recovered
- Sonic Core Sample
- 2.0" O.D. Split Spoon Sample
- Ground Water Level in Well

◇ % Fines (<0.075mm)

● % Water Content

Plastic Limit ⊢●⊣ Liquid Limit

Natural Water Content

NOTES

1. Refer to KEY for explanation of symbols, codes, abbreviations and definitions.
2. Groundwater level, if indicated above, is for the date specified and may vary.
3. USCS designation is based on visual-manual classification and selected lab testing.
4. The hole location was measured from existing site features and should be considered approximate.

North Mercer Island Interceptor and Enatai Interceptor Upgrade Project
King County, Washington

LOG OF BORING NME-30

May 2018 21-1-22000-212

SHANNON & WILSON, INC.
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FIG. A-31
Sheet 1 of 3

REV 3 - Approved for Submittal

MASTER_LOG_BFW_21-22000.GPJ SHAN_WIL.GDT 5/17/18 Log: JAA Rev: EAS Typ: LKN

Total Depth:	*51.5 ft.*	Northing:	*~ 218,796 ft.*	Drilling Method:	*Hollow Stem Auger*	Hole Diam.:	*8 in.*
Top Elevation:	*~ 136 ft.*	Easting:	*~ 1,294,264 ft.*	Drilling Company:	*Holt*	Rod Diam.:	*NWJ*
Vert. Datum:	*KC Metro*	Station:	~	Drill Rig Equipment:	*CME Track Rig*	Hammer Type:	*Automatic*
Horiz. Datum:	*NAD83*	Offset:	~	Other Comments:			

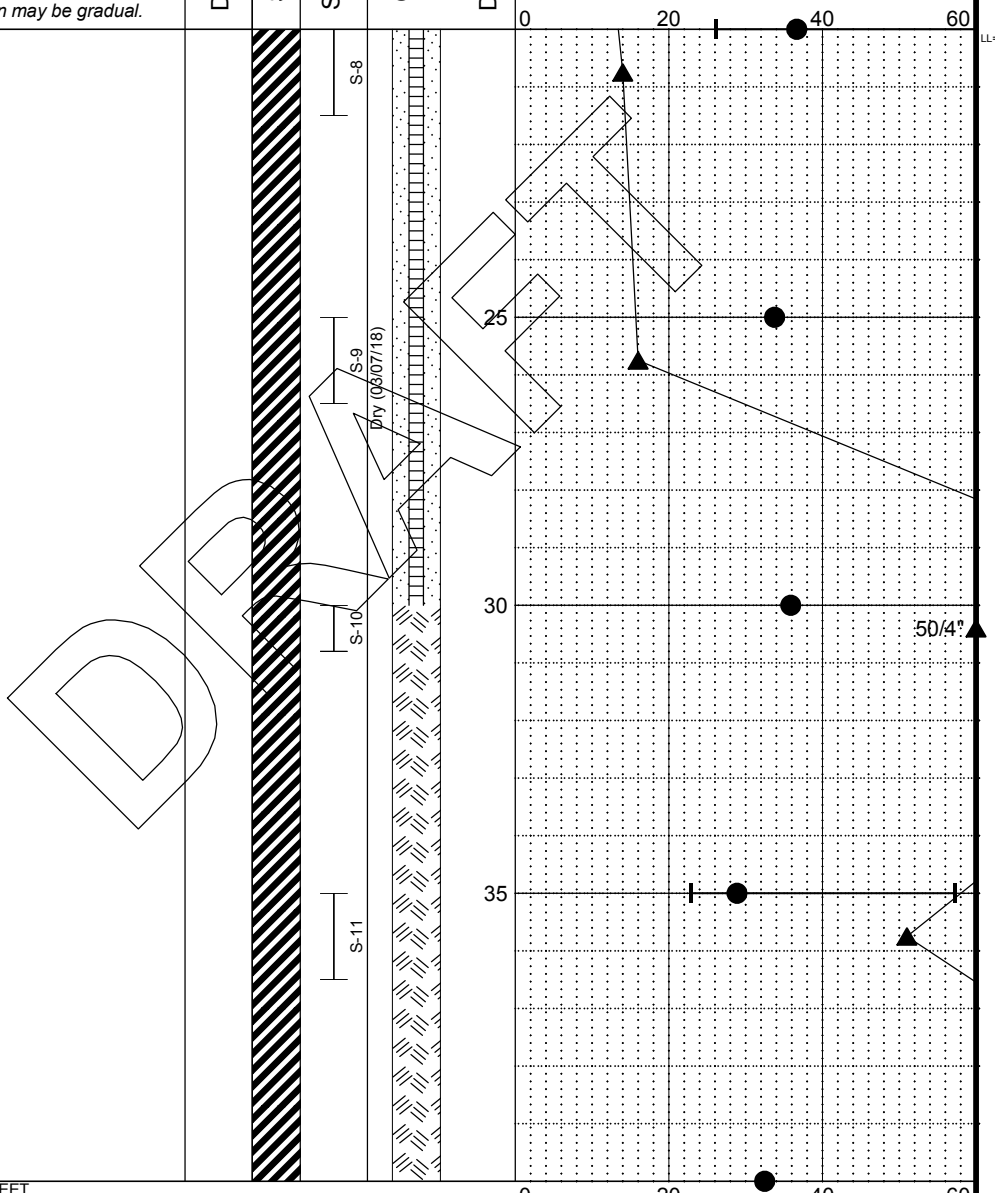
SOIL DESCRIPTION

Refer to the report text for a proper understanding of the subsurface materials and drilling methods. The stratification lines indicated below represent the approximate boundaries between material types, and the transition may be gradual.

Depth, ft. | Symbol | Samples | Ground Water | Depth, ft.

PENETRATION RESISTANCE (blows/foot)

▲ Hammer Wt. & Drop: *140 lbs / 30 inches*



CONTINUED NEXT SHEET

LEGEND

- I Sample Recovery
- * Sample Not Recovered
- Sonic Core Sample
- 2.0" O.D. Split Spoon Sample
- ▼ Ground Water Level in Well

- ◇ % Fines (<0.075mm)
- ● % Water Content
- Plastic Limit ⊢●⊣ Liquid Limit
- Natural Water Content

NOTES

1. Refer to KEY for explanation of symbols, codes, abbreviations and definitions.
2. Groundwater level, if indicated above, is for the date specified and may vary.
3. USCS designation is based on visual-manual classification and selected lab testing.
4. The hole location was measured from existing site features and should be considered approximate.

North Mercer Island Interceptor and Enatai Interceptor Upgrade Project
King County, Washington

LOG OF BORING NME-30

May 2018 | 21-1-22000-212

SHANNON & WILSON, INC.
Geotechnical and Environmental Consultants

FIG. A-31
Sheet 2 of 3

REV 3 - Approved for Submittal

MASTER_LOG_BFW_21-22000.GPJ_SHAN_WIL.GDT 5/17/18 Log: JAA Rev: EAS Typ: LKN

Total Depth:	*51.5 ft.*	Northing:	*~ 218,796 ft.*	Drilling Method:	*Hollow Stem Auger*	Hole Diam.:	*8 in.*
Top Elevation:	*~ 136 ft.*	Easting:	*~ 1,294,264 ft.*	Drilling Company:	*Holt*	Rod Diam.:	*NWJ*
Vert. Datum:	*KC Metro*	Station:	~	Drill Rig Equipment:	*CME Track Rig*	Hammer Type:	*Automatic*
Horiz. Datum:	*NAD83*	Offset:	~	Other Comments:			

SOIL DESCRIPTION

Refer to the report text for a proper understanding of the subsurface materials and drilling methods. The stratification lines indicated below represent the approximate boundaries between material types, and the transition may be gradual.

Depth, ft. | Symbol | Samples | Ground Water | Depth, ft.

PENETRATION RESISTANCE (blows/foot)

▲ Hammer Wt. & Drop: *140 lbs / 30 inches*

S-12

S-13

S-14

51.5

BOTTOM OF BORING
COMPLETED 2/5/2018

50/4"

0 20 40 60

45

50

55

0 20 40 60

DRAFT

LEGEND

- Sample Recovery
- * Sample Not Recovered
- Sonic Core Sample
- 2.0" O.D. Split Spoon Sample
- ▼ Ground Water Level in Well

◇ % Fines (<0.075mm)

● % Water Content

Plastic Limit ⊢●⊣ Liquid Limit

Natural Water Content

NOTES

1. Refer to KEY for explanation of symbols, codes, abbreviations and definitions.
2. Groundwater level, if indicated above, is for the date specified and may vary.
3. USCS designation is based on visual-manual classification and selected lab testing.
4. The hole location was measured from existing site features and should be considered approximate.

North Mercer Island Interceptor and
Enatai Interceptor Upgrade Project
King County, Washington

LOG OF BORING NME-30

May 2018 21-1-22000-212

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FIG. A-31
Sheet 3 of 3

REV 3 - Approved for Submittal

MASTER_LOG_BFW_21-22000.GPJ SHAN_WIL.GDT 5/17/18 Log: JAA Rev: EAS Typ: LKN

Total Depth:	*21.5 ft.*	Northing:	*~ 218,761 ft.*	Drilling Method:	*Hollow Stem Auger*	Hole Diam.:	*5 in.*
Top Elevation:	*~ 129 ft.*	Easting:	*~ 1,294,357 ft.*	Drilling Company:	*CN Drilling*	Rod Diam.:	*AW*
Vert. Datum:	*KC Metro*	Station:	~	Drill Rig Equipment:	*Acker Soil Mechanic*	Hammer Type:	*Cathead*
Horiz. Datum:	*NAD83*	Offset:	~	Other Comments:			

SOIL DESCRIPTION

Refer to the report text for a proper understanding of the subsurface materials and drilling methods. The stratification lines indicated below represent the approximate boundaries between material types, and the transition may be gradual.

Depth, ft. | Symbol | Samples | Ground Water | Depth, ft.

PENETRATION RESISTANCE (blows/foot)

▲ Hammer Wt. & Drop: *140 lbs / 30 inches*

0 — 20 — 40 — 60

Soft, mottled dark brown to gray, *Lean Clay (CL)* and *Silty Sand (SM)*; moist; few fine, subrounded gravel; fine to coarse sand; nonplastic to medium plasticity fines; trace organics; trace iron-oxide staining.
(Hf)

7.0

Medium stiff, mottled gray and brown, *Fat Clay (CH)*; moist; trace fine gravel; few fine to coarse sand; medium to high plasticity fines; trace organics.
(Qvrl)

9.5

Medium stiff, gray, *Fat Clay (CH)*; moist; trace fine to coarse sand; medium to high plasticity fines; few slickensides; blocky texture.
(Qvgl)

15.0

Stiff to very stiff, gray, *Fat Clay (CH)*; moist; trace fine to medium sand; medium to high plasticity fines; trace slickensides; trace blocky seams.
(Qvgl)

S-1, S-2, S-3, S-4, S-5, S-6, S-7

04/20/18 ▼

During Drilling ▽

5, 10, 15

LL=76

LL=76

0 — 20 — 40 — 60

CONTINUED NEXT SHEET

LEGEND

- I Sample Recovery
- * Sample Not Recovered
- Sonic Core Sample
- 2.0" O.D. Split Spoon Sample
- ▽ Ground Water Level ATD
- ▼ Ground Water Level in Well
- ◇ % Fines (<0.075mm)
- ● % Water Content
- Plastic Limit ⊢●⊣ Liquid Limit
- Natural Water Content

NOTES

1. Refer to KEY for explanation of symbols, codes, abbreviations and definitions.
2. Groundwater level, if indicated above, is for the date specified and may vary.
3. USCS designation is based on visual-manual classification and selected lab testing.
4. The hole location was measured from existing site features and should be considered approximate.

North Mercer Island Interceptor and Enatai Interceptor Upgrade Project
King County, Washington

LOG OF BORING NME-31

May 2018 | 21-1-22000-212

SHANNON & WILSON, INC.
Geotechnical and Environmental Consultants

FIG. A-32
Sheet 1 of 2

REV 3 - Approved for Submittal

MASTER_LOG_BFW_21-22000.GPJ_SHAN_WIL.GDT 5/17/18 Log: JAA Rev: EAS Typ: LKN

Total Depth:	*21.5 ft.*	Northing:	*~ 218,761 ft.*	Drilling Method:	*Hollow Stem Auger*	Hole Diam.:	*5 in.*
Top Elevation:	*~ 129 ft.*	Easting:	*~ 1,294,357 ft.*	Drilling Company:	*CN Drilling*	Rod Diam.:	*AW*
Vert. Datum:	*KC Metro*	Station:	~	Drill Rig Equipment:	*Acker Soil Mechanic*	Hammer Type:	*Cathead*
Horiz. Datum:	*NAD83*	Offset:	~	Other Comments:			

SOIL DESCRIPTION

Refer to the report text for a proper understanding of the subsurface materials and drilling methods. The stratification lines indicated below represent the approximate boundaries between material types, and the transition may be gradual.

Depth, ft. | Symbol | Samples | Ground Water Depth, ft.

PENETRATION RESISTANCE (blows/foot)

▲ Hammer Wt. & Drop: *140 lbs / 30 inches*

0 20 40 60

21.5 — S-8

BOTTOM OF BORING
COMPLETED 3/28/2018

25

30

35

DRAFT

0 20 40 60

LEGEND

- I Sample Recovery
- * Sample Not Recovered
- Sonic Core Sample
- 2.0" O.D. Split Spoon Sample
- ▽ Ground Water Level ATD
- ▼ Ground Water Level in Well
- ◇ % Fines (<0.075mm)
- ● % Water Content
- Plastic Limit ⊢●⊣ Liquid Limit
- Natural Water Content

NOTES

1. Refer to KEY for explanation of symbols, codes, abbreviations and definitions.
2. Groundwater level, if indicated above, is for the date specified and may vary.
3. USCS designation is based on visual-manual classification and selected lab testing.
4. The hole location was measured from existing site features and should be considered approximate.

North Mercer Island Interceptor and
Enatai Interceptor Upgrade Project
King County, Washington

LOG OF BORING NME-31

May 2018 | 21-1-22000-212

SHANNON & WILSON, INC.
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FIG. A-32
Sheet 2 of 2

REV 3 - Approved for Submittal

MASTER_LOG_BFW_21-22000.GPJ_SHAN_WIL.GDT 5/17/18 Log: JAA Rev: EAS Typ: LKN

Total Depth:	*21.5 ft.*	Northing:	*~ 219,025 ft.*	Drilling Method:	*Hollow Stem Auger*	Hole Diam.:	*8 in.*
Top Elevation:	*~ 159 ft.*	Easting:	*~ 1,294,770 ft.*	Drilling Company:	*Holt*	Rod Diam.:	*NWJ*
Vert. Datum:	*KC Metro*	Station:	~	Drill Rig Equipment:	*CME Track Rig*	Hammer Type:	*Automatic*
Horiz. Datum:	*NAD83*	Offset:	~	Other Comments:			

SOIL DESCRIPTION

Refer to the report text for a proper understanding of the subsurface materials and drilling methods. The stratification lines indicated below represent the approximate boundaries between material types, and the transition may be gradual.

Medium dense, gray and brown, *Silty Sand with Gravel (SM)* to *Sandy Silt with Gravel (ML)*; moist; fine to coarse, subrounded gravel; fine to medium sand; nonplastic to low plasticity fines; trace iron-oxide staining; trace roots.
(Hf)

7.0

Stiff to very stiff, brown, *Fat Clay (CH)* to *Lean Clay (CL)*; moist; trace fine sand; medium to high plasticity fines.
(Qvgl)

12.0

Stiff to very stiff, gray, *Fat Clay (CH)*; moist; medium to high plasticity fines; trace slickensides; few pockets with slightly blocky texture.
(Qvgl)

CONTINUED NEXT SHEET

Depth, ft. | Symbol | Samples | Ground Water | Depth, ft.

S-1, S-2, S-3, S-4, S-5, S-6, S-7

03/07/18

PENETRATION RESISTANCE (blows/foot)

▲ Hammer Wt. & Drop: *140 lbs / 30 inches*

0 20 40 60

5 10 15

LL=60

0 20 40 60

LEGEND

- I Sample Recovery
- * Sample Not Recovered
- Sonic Core Sample
- 2.0" O.D. Split Spoon Sample
- ▼ Ground Water Level in Well
- ◇ % Fines (<0.075mm)
- ● % Water Content
- Plastic Limit ⊢●⊣ Liquid Limit
- Natural Water Content

NOTES

1. Refer to KEY for explanation of symbols, codes, abbreviations and definitions.
2. Groundwater level, if indicated above, is for the date specified and may vary.
3. USCS designation is based on visual-manual classification and selected lab testing.
4. The hole location was measured from existing site features and should be considered approximate.

North Mercer Island Interceptor and Enatai Interceptor Upgrade Project
King County, Washington

LOG OF BORING NME-32

May 2018 21-1-22000-212

SHANNON & WILSON, INC.
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FIG. A-33
Sheet 1 of 2

REV 3 - Approved for Submittal

MASTER_LOG_BFW_21-22000.GPJ_SHAN_WIL.GDT 5/17/18 Log: JAA Rev: EAS Typ: LKN

Total Depth:	*21.5 ft.*	Northing:	*~ 219,025 ft.*	Drilling Method:	*Hollow Stem Auger*	Hole Diam.:	*8 in.*
Top Elevation:	*~ 159 ft.*	Easting:	*~ 1,294,770 ft.*	Drilling Company:	*Holt*	Rod Diam.:	*NWJ*
Vert. Datum:	*KC Metro*	Station:	~	Drill Rig Equipment:	*CME Track Rig*	Hammer Type:	*Automatic*
Horiz. Datum:	*NAD83*	Offset:	~	Other Comments:			

SOIL DESCRIPTION

Refer to the report text for a proper understanding of the subsurface materials and drilling methods. The stratification lines indicated below represent the approximate boundaries between material types, and the transition may be gradual.

Depth, ft. | Symbol | Samples | Ground Water Depth, ft.

PENETRATION RESISTANCE (blows/foot)

▲ Hammer Wt. & Drop: *140 lbs / 30 inches*

0 20 40 60

21.5 — S-8

BOTTOM OF BORING
COMPLETED 2/6/2018

25

30

35

DRAFT

0 20 40 60

LEGEND

- I Sample Recovery
- * Sample Not Recovered
- Sonic Core Sample
- 2.0" O.D. Split Spoon Sample
- ▼ Ground Water Level in Well

◇ % Fines (<0.075mm)
● % Water Content
Plastic Limit ⊢●⊣ Liquid Limit
Natural Water Content

NOTES

1. Refer to KEY for explanation of symbols, codes, abbreviations and definitions.
2. Groundwater level, if indicated above, is for the date specified and may vary.
3. USCS designation is based on visual-manual classification and selected lab testing.
4. The hole location was measured from existing site features and should be considered approximate.

North Mercer Island Interceptor and
Enatai Interceptor Upgrade Project
King County, Washington

LOG OF BORING NME-32

May 2018 | 21-1-22000-212

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FIG. A-33
Sheet 2 of 2

REV 3 - Approved for Submittal

MASTER_LOG_BFW_21-22000.GPJ_SHAN_WIL.GDT 5/17/18 Log: JAA Rev: EAS Typ: LKN

Total Depth:	*21.5 ft.*	Northing:	*~ 216,551 ft.*	Drilling Method:	*Hollow Stem Auger*	Hole Diam.:	*8 in.*
Top Elevation:	*~ 170 ft.*	Easting:	*~ 1,296,946 ft.*	Drilling Company:	*Holt Services*	Rod Diam.:	*NWJ*
Vert. Datum:	*KC Metro*	Station:	~	Drill Rig Equipment:	*B-57 Track Rig*	Hammer Type:	*Automatic*
Horiz. Datum:	*NAD83*	Offset:	~	Other Comments:			

SOIL DESCRIPTION

Refer to the report text for a proper understanding of the subsurface materials and drilling methods. The stratification lines indicated below represent the approximate boundaries between material types, and the transition may be gradual.

Depth, ft. | Symbol | Samples | Ground Water | Depth, ft.

PENETRATION RESISTANCE (blows/foot)

▲ Hammer Wt. & Drop: *140 lbs / 30 inches*

0 — 20 — 40 — 60

Medium dense, gray, *Sandy Silt (ML)* to *Silty Sand (SM)*; moist; fine sand; nonplastic to low plasticity fines; few silt seams.
(Qvgl)

4.5

Very stiff, gray, *Lean Clay (CL)* to *Silt (ML)*; moist; few fine sand; low to medium plasticity fines.
(Qvgl)

7.0

Dense to hard, gray, *Silt with Sand (ML)* to *Silty Sand (SM)* and *Silt (ML)*; trace fine, subangular gravel; fine sand; low plasticity fines; interbedded.
(Qvgl)

12.0

Dense, gray, *Silty Sand with Gravel (SM)*; wet; fine, subrounded to subangular gravel; fine to coarse sand; low plasticity fines.
(Qva)

14.5

Hard to dense, gray *Silt (ML)* to *Lean Clay (CL)*; moist; few fine, subangular gravel; few fine to coarse sand; low plasticity fines; few wet, silty sand seams.
(Qvgl)

17.0

Dense to very dense, gray, *Silty Sand with Gravel (SM)*; wet; fine, subrounded to subangular gravel; fine to coarse sand; nonplastic to low plasticity fines; few lean clay seams.

19.0

S-1 S-2 S-3 S-4 S-5 S-6 S-7

During Drilling ▽

5 — 10 — 15

◇ 82

CONTINUED NEXT SHEET

0 — 20 — 40 — 60

◇ % Fines (<0.075mm)
● % Water Content

LEGEND

- I Sample Recovery
- * Sample Not Recovered
- Sonic Core Sample
- 2.0" O.D. Split Spoon Sample
- ▽ Ground Water Level ATD

NOTES

1. Refer to KEY for explanation of symbols, codes, abbreviations and definitions.
2. Groundwater level, if indicated above, is for the date specified and may vary.
3. USCS designation is based on visual-manual classification and selected lab testing.
4. The hole location was measured from existing site features and should be considered approximate.

North Mercer Island Interceptor and
Enatai Interceptor Upgrade Project
King County, Washington

LOG OF BORING NME-34

May 2018 | 21-1-22000-212

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FIG. A-34
Sheet 1 of 2

DRAFT

MASTER_LOG_BFW_21-22000.GPJ SHAN_WIL.GDT 5/17/18 Log: JAA Rev: EAS Typ: LKN

REV 3 - Approved for Submittal

Total Depth:	*21.5 ft.*	Northing:	*~ 216,551 ft.*	Drilling Method:	*Hollow Stem Auger*	Hole Diam.:	*8 in.*
Top Elevation:	*~ 170 ft.*	Easting:	*~ 1,296,946 ft.*	Drilling Company:	*Holt Services*	Rod Diam.:	*NWJ*
Vert. Datum:	*KC Metro*	Station:	~	Drill Rig Equipment:	*B-57 Track Rig*	Hammer Type:	*Automatic*
Horiz. Datum:	*NAD83*	Offset:	~	Other Comments:			

SOIL DESCRIPTION

Refer to the report text for a proper understanding of the subsurface materials and drilling methods. The stratification lines indicated below represent the approximate boundaries between material types, and the transition may be gradual.

Depth, ft. | Symbol | Samples | Ground Water Depth, ft.

PENETRATION RESISTANCE (blows/foot)

▲ Hammer Wt. & Drop: *140 lbs / 30 inches*

(Qva)

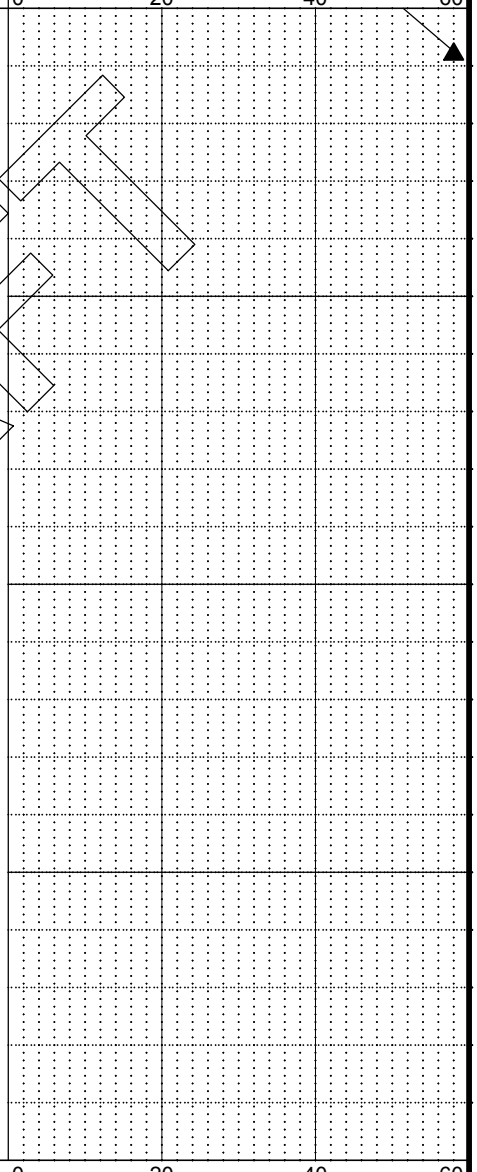
Very dense, gray, *Poorly Graded Sand (SP)*; wet; few fine, subrounded to subangular gravel; fine to coarse sand; nonplastic to low plasticity fines; few lean clay seams. (Qva)

21.5

S-8

BOTTOM OF BORING
COMPLETED 4/5/2018

DRAFT



◇ % Fines (<0.075mm)
● % Water Content

LEGEND

I Sample Recovery
* Sample Not Recovered
Sonic Core Sample
2.0" O.D. Split Spoon Sample
▽ Ground Water Level ATD

NOTES

1. Refer to KEY for explanation of symbols, codes, abbreviations and definitions.
2. Groundwater level, if indicated above, is for the date specified and may vary.
3. USCS designation is based on visual-manual classification and selected lab testing.
4. The hole location was measured from existing site features and should be considered approximate.

North Mercer Island Interceptor and
Enatai Interceptor Upgrade Project
King County, Washington

LOG OF BORING NME-34

May 2018 | 21-1-22000-212

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FIG. A-34
Sheet 2 of 2

REV 3 - Approved for Submittal

MASTER_LOG_BFW_21-22000.GPJ_SHAN_WIL.GDT 5/17/18 Log: JAA Rev: EAS Typ: LKN

Total Depth:	*31.5 ft.*	Northing:	*~ 215,802 ft.*	Drilling Method:	*Hollow Stem Auger*	Hole Diam.:	*8 in.*
Top Elevation:	*~ 208 ft.*	Easting:	*~ 1,298,063 ft.*	Drilling Company:	*Holt Services*	Rod Diam.:	*NWJ*
Vert. Datum:	*KC Metro*	Station:	~	Drill Rig Equipment:	*B-57 Track Rig*	Hammer Type:	*Automatic*
Horiz. Datum:	*NAD83*	Offset:	~	Other Comments:			

SOIL DESCRIPTION

Refer to the report text for a proper understanding of the subsurface materials and drilling methods. The stratification lines indicated below represent the approximate boundaries between material types, and the transition may be gradual.

Dense to very dense, brown, *Silty Sand with Gravel (SM)* to *Poorly Graded Sand with Silt and Gravel (SP-SM)*; moist; fine to coarse, subrounded to angular gravel; fine to coarse sand; nonplastic fines.
(Hf)

12.5

Medium dense, brown, *Silty Sand with Gravel (SM)*; moist; fine, subrounded to subnagular gravel; fine to coarse sand; nonplastic fines.
(Hf)

14.5

Dense, brown, *Silty Sand (SM)*; moist; fine to coarse, subrounded to subangular gravel; fine to coarse sand; nonplastic fines.
(Hf)

17.0

Medium dense to dense, *Well Graded Sand with Silt and Gravel (SW-SM)* to *Silty Sand with Gravel (SM)*; moist; fine to coarse, subrounded to subangular gravel; fine to coarse sand; nonplastic fines.

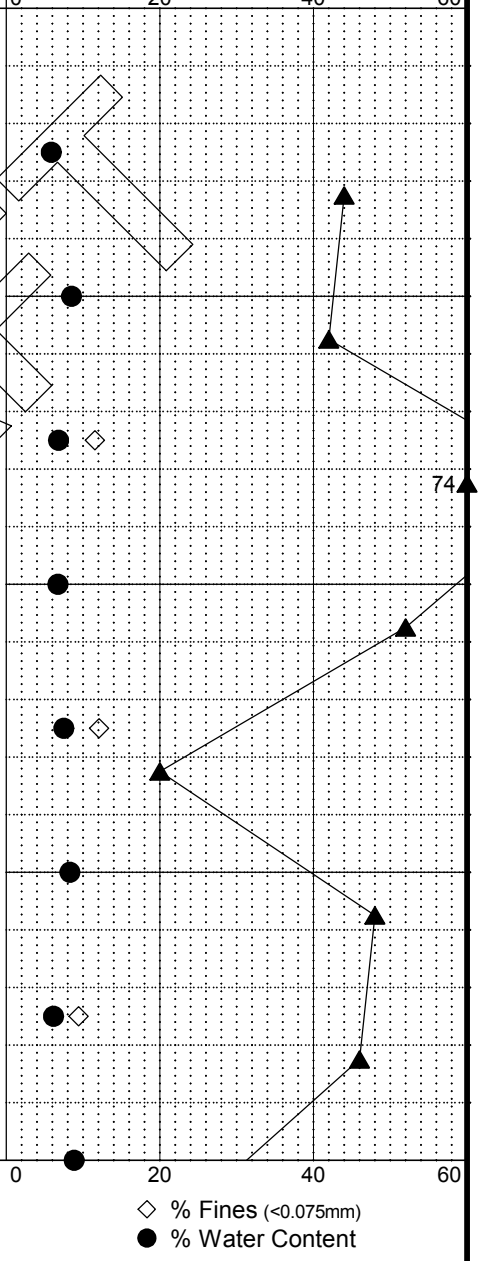
CONTINUED NEXT SHEET

Depth, ft. | Symbol | Samples | Ground Water | Depth, ft.

S-1 S-2 S-3 S-4 S-5 S-6 S-7

PENETRATION RESISTANCE (blows/foot)

▲ Hammer Wt. & Drop: *140 lbs / 30 inches*



DRAFT

LEGEND

- I Sample Recovery
- * Sample Not Recovered
- Sonic Core Sample
- 2.0" O.D. Split Spoon Sample
- ▽ Ground Water Level ATD

NOTES

1. Refer to KEY for explanation of symbols, codes, abbreviations and definitions.
2. Groundwater level, if indicated above, is for the date specified and may vary.
3. USCS designation is based on visual-manual classification and selected lab testing.
4. The hole location was measured from existing site features and should be considered approximate.

North Mercer Island Interceptor and
Enatai Interceptor Upgrade Project
King County, Washington

LOG OF BORING NME-35

May 2018 21-1-22000-212

SHANNON & WILSON, INC.
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FIG. A-35
Sheet 1 of 2

REV 3 - Approved for Submittal

MASTER_LOG_BFW_21-22000.GPJ SHAN_WIL.GDT 5/17/18 Log: JAA Rev: EAS Typ: LKN

Total Depth:	*31.5 ft.*	Northing:	*~ 215,802 ft.*	Drilling Method:	*Hollow Stem Auger*	Hole Diam.:	*8 in.*
Top Elevation:	*~ 208 ft.*	Easting:	*~ 1,298,063 ft.*	Drilling Company:	*Holt Services*	Rod Diam.:	*NWJ*
Vert. Datum:	*KC Metro*	Station:	~	Drill Rig Equipment:	*B-57 Track Rig*	Hammer Type:	*Automatic*
Horiz. Datum:	*NAD83*	Offset:	~	Other Comments:			

SOIL DESCRIPTION

Refer to the report text for a proper understanding of the subsurface materials and drilling methods. The stratification lines indicated below represent the approximate boundaries between material types, and the transition may be gradual.

(Hf)

22.0

Very loose to loose, gray-brown, *Poorly Graded Sand with Silt (SP-SM)*; wet; trace fine, subrounded gravel; fine to coarse sand; nonplastic fines.
(Qvro/Hf)

- 2 feet of heave at 25 feet.

30.0

Very stiff, gray *Silt (ML)* to *Lean Clay (CL)*; moist; trace fine sand; low to medium plasticity fines.
(Qvgl)

31.5

BOTTOM OF BORING
COMPLETED 4/5/2018

Depth, ft. | Symbol | Samples | Ground Water | Depth, ft.

S-8 | S-9 | S-10 | S-11

During Drilling ▽

PENETRATION RESISTANCE (blows/foot)

▲ Hammer Wt. & Drop: *140 lbs / 30 inches*

0 20 40 60

25 30 35

0 20 40 60

◇ % Fines (<0.075mm)
● % Water Content

DRAFT

LEGEND

I Sample Recovery
* Sample Not Recovered
Sonic Core Sample
2.0" O.D. Split Spoon Sample
▽ Ground Water Level ATD

NOTES

1. Refer to KEY for explanation of symbols, codes, abbreviations and definitions.
2. Groundwater level, if indicated above, is for the date specified and may vary.
3. USCS designation is based on visual-manual classification and selected lab testing.
4. The hole location was measured from existing site features and should be considered approximate.

North Mercer Island Interceptor and
Enatai Interceptor Upgrade Project
King County, Washington

LOG OF BORING NME-35

May 2018 21-1-22000-212

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FIG. A-35
Sheet 2 of 2

REV 3 - Approved for Submittal

MASTER_LOG_BFW_21-22000.GPJ_SHAN_WIL.GDT 5/17/18 Log: JAA Rev: EAS Typ: LKN

Total Depth:	*16.3 ft.*	Northing:	*~ 215,778 ft.*	Drilling Method:	*Hollow Stem Auger*	Hole Diam.:	*8 in.*
Top Elevation:	*~ 233 ft.*	Easting:	*~ 1,298,607 ft.*	Drilling Company:	*Holt*	Rod Diam.:	*NWJ*
Vert. Datum:	*KC Metro*	Station:	~	Drill Rig Equipment:	*CME Track Rig*	Hammer Type:	*Automatic*
Horiz. Datum:	*NAD83*	Offset:	~	Other Comments:			

SOIL DESCRIPTION

Refer to the report text for a proper understanding of the subsurface materials and drilling methods. The stratification lines indicated below represent the approximate boundaries between material types, and the transition may be gradual.

Medium dense, brown, *Sandy, Lean Clay (CL)*; moist; fine to coarse sand; low to medium plasticity fines; trace iron-oxide staining. (Hf)

5.0

Hard, brown *Lean Clay with Sand (CL)*; moist; trace fine, subrounded gravel; fine to coarse sand; low to medium plasticity fines. (Qvgl)

7.8

Dense, gray, *Silty Sand with Gravel (SM)* to *Sandy Silt with Gravel (ML)*; moist; fine to coarse, subangular to subrounded gravel; fine to coarse sand; nonplastic to low plasticity fines; diamict. (Qvt)

16.3

BOTTOM OF BORING
COMPLETED 2/8/2018

Depth, ft. | Symbol | Samples | Ground Water | Depth, ft.

S-1 | S-2 | S-3 | S-4 | S-5 | S-6

03/12/18

PENETRATION RESISTANCE (blows/foot)

▲ Hammer Wt. & Drop: *140 lbs / 30 inches*

0 20 40 60

5 — 84

10 — 67

15 — 86/10"

0 20 40 60

◇ % Fines (<0.075mm)

● % Water Content

Plastic Limit ⊢●⊣ Liquid Limit

Natural Water Content

LEGEND

- I Sample Recovery
- * Sample Not Recovered
- ▨ Sonic Core Sample
- ⌶ 2.0" O.D. Split Spoon Sample
- ▼ Ground Water Level in Well

NOTES

1. Refer to KEY for explanation of symbols, codes, abbreviations and definitions.
2. Groundwater level, if indicated above, is for the date specified and may vary.
3. USCS designation is based on visual-manual classification and selected lab testing.
4. The hole location was measured from existing site features and should be considered approximate.

North Mercer Island Interceptor and
Enatai Interceptor Upgrade Project
King County, Washington

LOG OF BORING NME-36

May 2018 | 21-1-22000-212

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FIG. A-36

REV 3 - Approved for Submittal

MASTER_LOG_BFW_21-22000.GPJ SHAN_WIL.GDT 5/17/18 Log: JCS Rev: EAS Typ: LKN

Total Depth:	*25.2 ft.*	Northing:	*~ 214,381 ft.*	Drilling Method:	*Hollow Stem Auger*	Hole Diam.:	*8 in.*
Top Elevation:	*~ 196 ft.*	Easting:	*~ 1,299,948 ft.*	Drilling Company:	*Holt*	Rod Diam.:	*NWJ*
Vert. Datum:	*KC Metro*	Station:	~	Drill Rig Equipment:	*CME Track Rig*	Hammer Type:	*Automatic*
Horiz. Datum:	*NAD83*	Offset:	~	Other Comments:			

SOIL DESCRIPTION

Refer to the report text for a proper understanding of the subsurface materials and drilling methods. The stratification lines indicated below represent the approximate boundaries between material types, and the transition may be gradual.

Dense, brown, *Poorly Graded Sand with Gravel (SP)*; moist; fine to coarse, subrounded to subangular gravel; fine to coarse sand; nonplastic fines.
(Hf)

7.0

Very dense, gray-brown, *Silty Sand with Gravel (SM)*; moist; fine to coarse, subrounded to subangular gravel; fine to coarse sand; nonplastic fines; trace asphalt clasts.
(Hf)

9.0

Very dense, gray-brown, *Poorly Graded Gravel with Sand (GP)*; moist; fine to coarse, subrounded to subangular gravel; fine to coarse sand; few asphalt clasts; trace nonplastic fines.
(Hf)

12.0

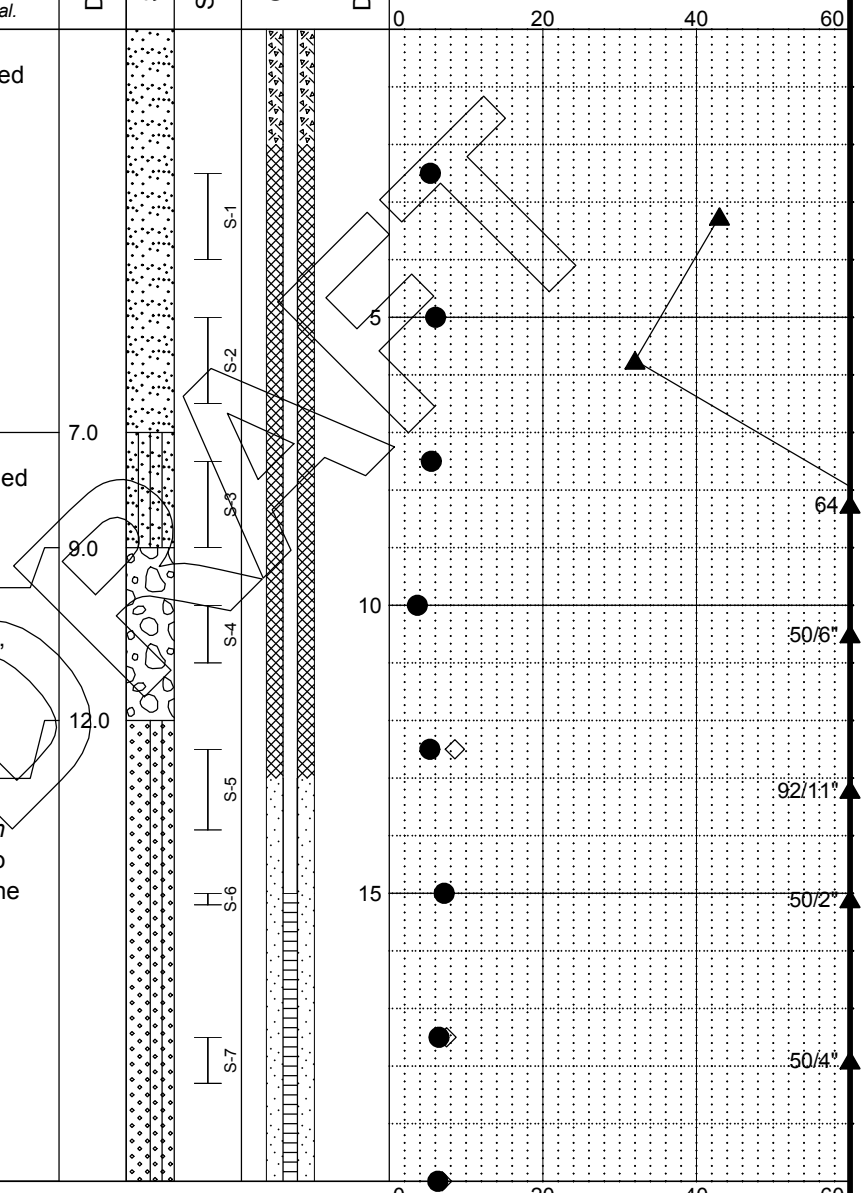
Very dense, *Well Graded Sand with Silt and Gravel (SW-SM)* to *Poorly Graded Sand with Silt and Gravel (SP-SM)*; moist to wet; fine to coarse, subrounded to subangular gravel; fine to coarse sand; nonplastic fines.
(Hf/Qva)

CONTINUED NEXT SHEET

Depth, ft. | Symbol | Samples | Ground Water | Depth, ft.

PENETRATION RESISTANCE (blows/foot)

▲ Hammer Wt. & Drop: *140 lbs / 30 inches*



◇ % Fines (<0.075mm)
● % Water Content

LEGEND

- I Sample Recovery
- * Sample Not Recovered
- Sonic Core Sample
- 2.0" O.D. Split Spoon Sample
- ▼ Ground Water Level in Well

NOTES

1. Refer to KEY for explanation of symbols, codes, abbreviations and definitions.
2. Groundwater level, if indicated above, is for the date specified and may vary.
3. USCS designation is based on visual-manual classification and selected lab testing.
4. The hole location was measured from existing site features and should be considered approximate.

North Mercer Island Interceptor and
Enatai Interceptor Upgrade Project
King County, Washington

LOG OF BORING NME-37

May 2018 | 21-1-22000-212

SHANNON & WILSON, INC.
Geotechnical and Environmental Consultants

FIG. A-37
Sheet 1 of 2

MASTER_LOG_BFW_21-22000.GPJ SHAN_WIL.GDT 5/17/18 Log: JAA Rev: EAS Typ: LKN

REV 3 - Approved for Submittal

Total Depth:	*25.2 ft.*	Northing:	*~ 214,381 ft.*	Drilling Method:	*Hollow Stem Auger*	Hole Diam.:	*8 in.*
Top Elevation:	*~ 196 ft.*	Easting:	*~ 1,299,948 ft.*	Drilling Company:	*Holt*	Rod Diam.:	*NWJ*
Vert. Datum:	*KC Metro*	Station:	~	Drill Rig Equipment:	*CME Track Rig*	Hammer Type:	*Automatic*
Horiz. Datum:	*NAD83*	Offset:	~	Other Comments:			

SOIL DESCRIPTION

Refer to the report text for a proper understanding of the subsurface materials and drilling methods. The stratification lines indicated below represent the approximate boundaries between material types, and the transition may be gradual.

Depth, ft. | Symbol | Samples | Ground Water | Depth, ft.

PENETRATION RESISTANCE (blows/foot)

▲ Hammer Wt. & Drop: *140 lbs / 30 inches*

0 20 40 60

20.0 Very dense, brown, *Well Graded Sand with Silt and Gravel (SW-SM)*; moist to wet; fine to coarse, subrounded to angular gravel; fine to coarse sand; nonplastic fines. (Hf/Qva)

S-8 50/6"

03/12/18

S-9 50/2"

25.2 BOTTOM OF BORING COMPLETED 2/7/2018

25 30 35

0 20 40 60

◇ % Fines (<0.075mm)

● % Water Content

DRAFT

LEGEND

- I Sample Recovery
- * Sample Not Recovered
- Sonic Core Sample
- 2.0" O.D. Split Spoon Sample
- ▼ Ground Water Level in Well

NOTES

1. Refer to KEY for explanation of symbols, codes, abbreviations and definitions.
2. Groundwater level, if indicated above, is for the date specified and may vary.
3. USCS designation is based on visual-manual classification and selected lab testing.
4. The hole location was measured from existing site features and should be considered approximate.

North Mercer Island Interceptor and Enatai Interceptor Upgrade Project
King County, Washington

LOG OF BORING NME-37

May 2018 21-1-22000-212

SHANNON & WILSON, INC.
Geotechnical and Environmental Consultants

FIG. A-37
Sheet 2 of 2

REV 3 - Approved for Submittal

MASTER_LOG_BFW_21-22000.GPJ SHAN_WIL.GDT 5/17/18 Log: JAA Rev: EAS Typ: LKN

Total Depth:	*21.5 ft.*	Northing:	*~ 214,535 ft.*	Drilling Method:	*Hollow Stem Auger*	Hole Diam.:	*8 in.*
Top Elevation:	*~ 152 ft.*	Easting:	*~ 1,300,837 ft.*	Drilling Company:	*Holt*	Rod Diam.:	*NWJ*
Vert. Datum:	*KC Metro*	Station:	*~*	Drill Rig Equipment:	*CME Track Rig*	Hammer Type:	*Automatic*
Horiz. Datum:	*NAD83*	Offset:	*~*	Other Comments:			

SOIL DESCRIPTION

Refer to the report text for a proper understanding of the subsurface materials and drilling methods. The stratification lines indicated below represent the approximate boundaries between material types, and the transition may be gradual.

Very soft, brown *Silt with Sand (ML)*; moist; fine sand; low plasticity fines.
(Qvrl)

5.0

Very stiff to hard, brown *Lean Clay (CL)*; moist; trace fine sand; low to medium plasticity fines; trace iron-oxide staining.
(Qvgl)

9.0

Medium dense to dense, brown *Silt (ML)*; moist; trace fine sand; nonplastic to low plasticity fines; trace pockets with iron-oxide staining.
(Qvgl)

15.0

Medium dense to very stiff, gray *Silt (ML)*; moist; trace fine sand; nonplastic to low plasticity fines; trace lean clay seams.
(Qvgl)

17.0

Dense to very dense, gray *Silt (ML)*; moist; trace fine to coarse sand; nonplastic fines; few diamict pockets; few silty sand seams.
(Qvgl)

CONTINUED NEXT SHEET

Depth, ft. | Symbol | Samples | Ground Water | Depth, ft.

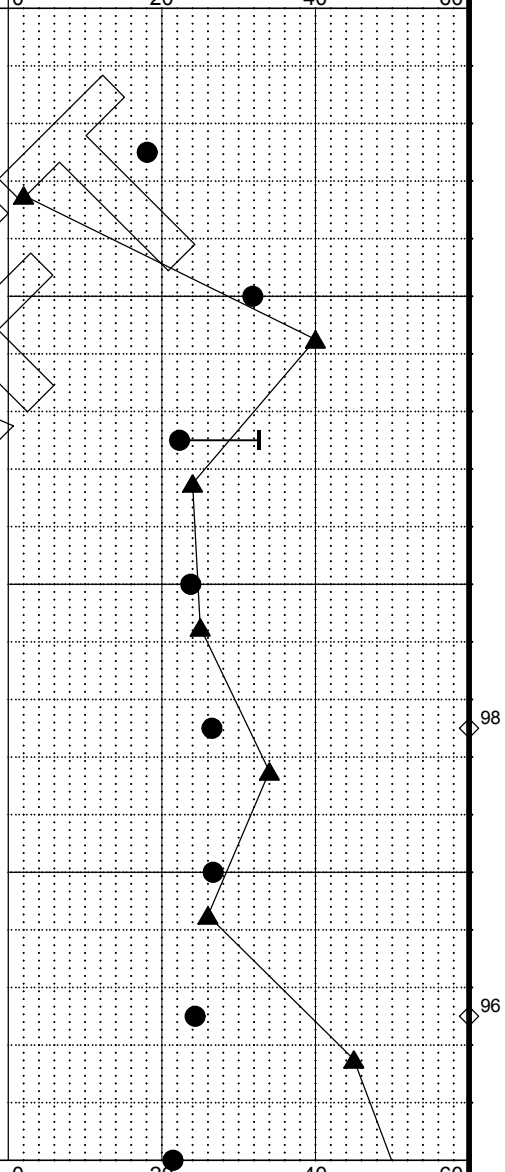
S-1 | S-2 | S-3 | S-4 | S-5 | S-6 | S-7

03/12/18 ▼

During Drilling ▽

PENETRATION RESISTANCE (blows/foot)

▲ Hammer Wt. & Drop: *140 lbs / 30 inches*



◇ % Fines (<0.075mm)
● % Water Content
Plastic Limit ⊢●⊣ Liquid Limit
Natural Water Content

LEGEND

- I Sample Recovery
- * Sample Not Recovered
- Sonic Core Sample
- 2.0" O.D. Split Spoon Sample
- ▽ Ground Water Level ATD
- ▼ Ground Water Level in Well

NOTES

1. Refer to KEY for explanation of symbols, codes, abbreviations and definitions.
2. Groundwater level, if indicated above, is for the date specified and may vary.
3. USCS designation is based on visual-manual classification and selected lab testing.
4. The hole location was measured from existing site features and should be considered approximate.

North Mercer Island Interceptor and
Enatai Interceptor Upgrade Project
King County, Washington

LOG OF BORING NME-39

May 2018 | 21-1-22000-212

SHANNON & WILSON, INC.
Geotechnical and Environmental Consultants

FIG. A-38
Sheet 1 of 2

REV 3 - Approved for Submittal

MASTER_LOG_BFW_21-22000.GPJ_SHAN_WIL.GDT 5/17/18 Log: JCS Rev: EAS Typ: LKN

Total Depth:	*21.5 ft.*	Northing:	*~ 214,535 ft.*	Drilling Method:	*Hollow Stem Auger*	Hole Diam.:	*8 in.*
Top Elevation:	*~ 152 ft.*	Easting:	*~ 1,300,837 ft.*	Drilling Company:	*Holt*	Rod Diam.:	*NWJ*
Vert. Datum:	*KC Metro*	Station:	~	Drill Rig Equipment:	*CME Track Rig*	Hammer Type:	*Automatic*
Horiz. Datum:	*NAD83*	Offset:	~	Other Comments:			

SOIL DESCRIPTION

Refer to the report text for a proper understanding of the subsurface materials and drilling methods. The stratification lines indicated below represent the approximate boundaries between material types, and the transition may be gradual.

Depth, ft. | Symbol | Samples | Ground Water Depth, ft.

PENETRATION RESISTANCE (blows/foot)

▲ Hammer Wt. & Drop: *140 lbs / 30 inches*

0 20 40 60

21.5 — S-8

BOTTOM OF BORING
COMPLETED 2/8/2018

25

30

35

DRAFT

0 20 40 60

LEGEND

- I Sample Recovery
- * Sample Not Recovered
- Sonic Core Sample
- 2.0" O.D. Split Spoon Sample
- ▽ Ground Water Level ATD
- ▼ Ground Water Level in Well
- ◇ % Fines (<0.075mm)
- ● % Water Content
- Plastic Limit ⊢●⊣ Liquid Limit
- Natural Water Content

NOTES

1. Refer to KEY for explanation of symbols, codes, abbreviations and definitions.
2. Groundwater level, if indicated above, is for the date specified and may vary.
3. USCS designation is based on visual-manual classification and selected lab testing.
4. The hole location was measured from existing site features and should be considered approximate.

North Mercer Island Interceptor and
Enatai Interceptor Upgrade Project
King County, Washington

LOG OF BORING NME-39

May 2018 | 21-1-22000-212

SHANNON & WILSON, INC.
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FIG. A-38
Sheet 2 of 2

REV 3 - Approved for Submittal

MASTER_LOG_BFW_21-22000.GPJ_SHAN_WIL.GDT 5/17/18 Log: JCS Rev: EAS Typ: LKN

Total Depth:	*36.5 ft.*	Northing:	*~ 214,145 ft.*	Drilling Method:	*Hollow Stem Auger*	Hole Diam.:	*8 in.*
Top Elevation:	*~ 174 ft.*	Easting:	*~ 1,301,199 ft.*	Drilling Company:	*Holt Services*	Rod Diam.:	*NWJ*
Vert. Datum:	*KC Metro*	Station:	~	Drill Rig Equipment:	*B-57 Track Rig*	Hammer Type:	*Automatic*
Horiz. Datum:	*NAD83*	Offset:	~	Other Comments:			

SOIL DESCRIPTION

Refer to the report text for a proper understanding of the subsurface materials and drilling methods. The stratification lines indicated below represent the approximate boundaries between material types, and the transition may be gradual.

Dense, gray, *Poorly Graded Gravel with Silt and Sand (GP-GM)*; moist; fine, subrounded to subangular gravel; fine to coarse sand; nonplastic fines; few organic seams.
(Hf)

4.5

Medium stiff, gray to gray-brown, *Lean Clay (CL)*; moist; trace fine, subrounded gravel; trace fine to coarse sand; medium plasticity fines; few to little organics and wood fragments.
(Hf)

7.0

Medium dense, mottled orange and brown and gray, *Sandy Silt (ML)* to *Silty Sand (SM)*; moist; fine sand; nonplastic fines; iron-oxide staining.
(Qvro/Hf)

9.5

Loose, blue-gray to green-gray *Lean Clay (CL)* and *Lean Clay with Sand (CL)*; moist to wet; trace fine, subrounded gravel; fine sand; low to medium plasticity fines; trace silty sand seams; trace organics.
(Qvrl)

12.0

Soft, brown, *Lean Clay (CL)*; moist; few fine sand; low to medium plasticity fines.
(Qvrl)

15.0

Loose, brown, *Silty Sand (SM)*; wet; fine to medium sand; nonplastic to low plasticity fines; few silt pockets; trace organics.
(Qvro)

CONTINUED NEXT SHEET

Depth, ft. | Symbol | Samples | Ground Water | Depth, ft.

S-1 S-2 S-3 S-4 S-5 S-6 S-7

PENETRATION RESISTANCE (blows/foot)

▲ Hammer Wt. & Drop: *140 lbs / 30 inches*

0 20 40 60

5 10 15

0 20 40 60

◇ % Fines (<0.075mm)
● % Water Content
Plastic Limit ⊢●⊣ Liquid Limit
Natural Water Content

LEGEND

I Sample Recovery	▽ Ground Water Level ATD
* Sample Not Recovered	
⊠ Sonic Core Sample	
⊥ 2.0" O.D. Split Spoon Sample	

NOTES

1. Refer to KEY for explanation of symbols, codes, abbreviations and definitions.
2. Groundwater level, if indicated above, is for the date specified and may vary.
3. USCS designation is based on visual-manual classification and selected lab testing.
4. The hole location was measured from existing site features and should be considered approximate.

North Mercer Island Interceptor and
Enatai Interceptor Upgrade Project
King County, Washington

LOG OF BORING NME-40

May 2018 21-1-22000-212

SHANNON & WILSON, INC.
Geotechnical and Environmental Consultants

FIG. A-39
Sheet 1 of 2

REV 3 - Approved for Submittal

MASTER_LOG_BFW_21-22000.GPJ_SHAN_WIL.GDT 5/17/18 Log: JAA Rev: EAS Typ: LKN

Total Depth:	*36.5 ft.*	Northing:	*~ 214,145 ft.*	Drilling Method:	*Hollow Stem Auger*	Hole Diam.:	*8 in.*
Top Elevation:	*~ 174 ft.*	Easting:	*~ 1,301,199 ft.*	Drilling Company:	*Holt Services*	Rod Diam.:	*NWJ*
Vert. Datum:	*KC Metro*	Station:	~	Drill Rig Equipment:	*B-57 Track Rig*	Hammer Type:	*Automatic*
Horiz. Datum:	*NAD83*	Offset:	~	Other Comments:			

SOIL DESCRIPTION

Refer to the report text for a proper understanding of the subsurface materials and drilling methods. The stratification lines indicated below represent the approximate boundaries between material types, and the transition may be gradual.

Depth, ft. | Symbol | Samples | Ground Water | Depth, ft.

PENETRATION RESISTANCE (blows/foot)

▲ Hammer Wt. & Drop: *140 lbs / 30 inches*

0 20 40 60 70

21.0 Very dense, brown, Silty Gravel with Sand (GM); wet; fine to coarse, subrounded to subangular gravel; fine to coarse sand; low plasticity fines. (Qvro/Qva)

24.0 Dense to very dense, gray *Silt (ML)* to *Silt with Sand (ML)*; moist to wet; trace fine, subangular gravel; trace medium to coarse sand; fine sand; nonplastic to low plasticity fines. (Qvgl)

36.5 BOTTOM OF BORING COMPLETED 4/4/2018

S-8 S-9 S-10 S-11

During Drilling ▽

25 30 35

0 20 40 60

◇ % Fines (<0.075mm)

● % Water Content

Plastic Limit ⊢●⊣ Liquid Limit

Natural Water Content

DRAFT

LEGEND

- I Sample Recovery
- * Sample Not Recovered
- ⊠ Sonic Core Sample
- ⊥ 2.0" O.D. Split Spoon Sample
- ▽ Ground Water Level ATD

NOTES

1. Refer to KEY for explanation of symbols, codes, abbreviations and definitions.
2. Groundwater level, if indicated above, is for the date specified and may vary.
3. USCS designation is based on visual-manual classification and selected lab testing.
4. The hole location was measured from existing site features and should be considered approximate.

North Mercer Island Interceptor and Enatai Interceptor Upgrade Project
King County, Washington

LOG OF BORING NME-40

May 2018 21-1-22000-212

SHANNON & WILSON, INC.
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FIG. A-39
Sheet 2 of 2

REV 3 - Approved for Submittal

MASTER_LOG_BFW_21-22000.GPJ_SHAN_WIL.GDT 5/17/18 Log: JAA Rev: EAS Typ: LKN

Total Depth:	*31.5 ft.*	Northing:	*~ 214,029 ft.*	Drilling Method:	*Hollow Stem Auger*	Hole Diam.:	*8 in.*
Top Elevation:	*~ 144 ft.*	Easting:	*~ 1,302,008 ft.*	Drilling Company:	*Holt Services*	Rod Diam.:	*NWJ*
Vert. Datum:	*KC Metro*	Station:	~	Drill Rig Equipment:	*B-57 Mobile Drill*	Hammer Type:	*Automatic*
Horiz. Datum:	*NAD83*	Offset:	~	Other Comments:			

SOIL DESCRIPTION

Refer to the report text for a proper understanding of the subsurface materials and drilling methods. The stratification lines indicated below represent the approximate boundaries between material types, and the transition may be gradual.

Depth, ft. | Symbol | Samples | Ground Water | Depth, ft.

PENETRATION RESISTANCE (blows/foot)

▲ Hammer Wt. & Drop: *140 lbs / 30 inches*

0 — 20 — 40 — 60

Loose, gray-brown, *Sandy Silt (ML)*; moist; trace fine, subrounded gravel; fine to medium sand; nonplastic fines; trace iron-oxide staining; trace organics.
(Hf)

4.5

Medium dense, gray-brown, *Silty Sand with Gravel (SM)*; moist; fine to coarse, subrounded gravel; fine to coarse sand; nonplastic to low plasticity fines; diamict; trace organics and wood fragments.
(Hf)

7.0

Medium dense, dark brown and brown, *Silty Sand (SM)*; moist; trace fine, subrounded gravel; fine to coarse sand; nonplastic fines; few organics; few peat seams.
(Hl/Hf)

9.5

Medium dense, gray and brown, *Sandy Silt (ML)*; moist; few fine to coarse, subrounded to subangular gravel; fine to coarse sand; nonplastic to low plasticity fines; diamict.
(Qvri/Hf)

12.0

Very dense, gray *Silt with Sand (ML)* to *Silt (ML)*; moist; trace fine, subrounded gravel; fine sand; nonplastic fines.
(Qvgl)

S-1 S-2 S-3 S-4 S-5 S-6 S-7

5 10 15

62 81 66 76 89

CONTINUED NEXT SHEET

0 — 20 — 40 — 60

◇ % Fines (<0.075mm)
● % Water Content

LEGEND

- I Sample Recovery
- * Sample Not Recovered
- Sonic Core Sample
- 2.0" O.D. Split Spoon Sample
- ▽ Ground Water Level ATD

NOTES

1. Refer to KEY for explanation of symbols, codes, abbreviations and definitions.
2. Groundwater level, if indicated above, is for the date specified and may vary.
3. USCS designation is based on visual-manual classification and selected lab testing.
4. The hole location was measured from existing site features and should be considered approximate.

North Mercer Island Interceptor and Enatai Interceptor Upgrade Project
King County, Washington

LOG OF BORING NME-42

May 2018 | 21-1-22000-212

SHANNON & WILSON, INC.
Geotechnical and Environmental Consultants

FIG. A-40
Sheet 1 of 2

REV 3 - Approved for Submittal

MASTER_LOG_BFW_21-22000.GPJ_SHAN_WIL.GDT 5/17/18 Log: JAA Rev: EAS Typ: LKN

Total Depth:	*31.5 ft.*	Northing:	*~ 214,029 ft.*	Drilling Method:	*Hollow Stem Auger*	Hole Diam.:	*8 in.*
Top Elevation:	*~ 144 ft.*	Easting:	*~ 1,302,008 ft.*	Drilling Company:	*Holt Services*	Rod Diam.:	*NWJ*
Vert. Datum:	*KC Metro*	Station:	~	Drill Rig Equipment:	*B-57 Mobile Drill*	Hammer Type:	*Automatic*
Horiz. Datum:	*NAD83*	Offset:	~	Other Comments:			

SOIL DESCRIPTION

Refer to the report text for a proper understanding of the subsurface materials and drilling methods. The stratification lines indicated below represent the approximate boundaries between material types, and the transition may be gradual.

Depth, ft. | Symbol | Samples | Ground Water | Depth, ft.

PENETRATION RESISTANCE (blows/foot)

▲ Hammer Wt. & Drop: *140 lbs / 30 inches*

0 20 40 60

23.0 — Very dense, gray *Silt (ML)*; wet; few fine sand; nonplastic fines; dilatent. (Qvgl)

27.0 — Very dense, *Silty Sand (SM)*; wet; fine to medium sand; nonplastic fines. (Qva)

31.5 — BOTTOM OF BORING COMPLETED 4/23/2018

S-8, S-9, S-10

During Drilling ▽

72

25 — 50/6"

30 — 80

35

0 20 40 60

◇ % Fines (<0.075mm)

● % Water Content

DRAFT

LEGEND

- I Sample Recovery
- * Sample Not Recovered
- Sonic Core Sample
- 2.0" O.D. Split Spoon Sample
- ▽ Ground Water Level ATD

NOTES

1. Refer to KEY for explanation of symbols, codes, abbreviations and definitions.
2. Groundwater level, if indicated above, is for the date specified and may vary.
3. USCS designation is based on visual-manual classification and selected lab testing.
4. The hole location was measured from existing site features and should be considered approximate.

North Mercer Island Interceptor and Enatai Interceptor Upgrade Project
King County, Washington

LOG OF BORING NME-42

May 2018 | 21-1-22000-212

SHANNON & WILSON, INC.
Geotechnical and Environmental Consultants

FIG. A-40
Sheet 2 of 2

MASTER_LOG_BFW_21-22000.GPJ_SHAN_WIL.GDT 5/17/18 Log: JAA Rev: EAS Typ: LKN

REV 3 - Approved for Submittal

Total Depth:	56.3 ft.	Northing:	~ 214,454 ft.	Drilling Method:	Hollow Stem Auger	Hole Diam.:	8 in.
Top Elevation:	~ 126 ft.	Easting:	~ 1,303,637 ft.	Drilling Company:	Holt Services	Rod Diam.:	AWJ
Vert. Datum:	KC Metro	Station:	~	Drill Rig Equipment:	B-57 Mobile Drill	Hammer Type:	Automatic
Horiz. Datum:	NAD83	Offset:	~	Other Comments:			

SOIL DESCRIPTION

Refer to the report text for a proper understanding of the subsurface materials and drilling methods. The stratification lines indicated below represent the approximate boundaries between material types, and the transition may be gradual.

Dense, brown, *Silty Sand (SM)*; moist; few fine, subangular gravel; fine to coarse sand; nonplastic fines; trace brick fragments. (Hf)

4.0

Medium dense, brown, *Silty Sand (SM)* to *Poorly Graded Sand with Silt (SP-SM)*; moist; few fine, subangular gravel; fine to coarse sand; nonplastic fines. (Qvro/Hf)

9.5

Medium dense, brown, *Silty Sand (SM)*; wet; trace fine, subangular gravel; fine to coarse sand; nonplastic fines; diamict pockets. (Qvro/Qvat)

12.0

Very dense, gray-brown, *Silty Sand (SM)* to *Poorly Graded Sand with Silt (SP-SM)*; wet; trace fine, subangular gravel; fine to coarse sand; nonplastic fines. (Qva)

16.0

Very dense, gray-brown, *Silty Sand (SM)*; wet; fine to medium smand; nonplastic fines. (Qva)

17.0

Very dense, gray-brown, *Silty Sand with Gravel (SM)*; moist to wet; fine, subrounded to subangular gravel; fine to coarse sand; nonplastic to low plasticity fines; diamict.

CONTINUED NEXT SHEET

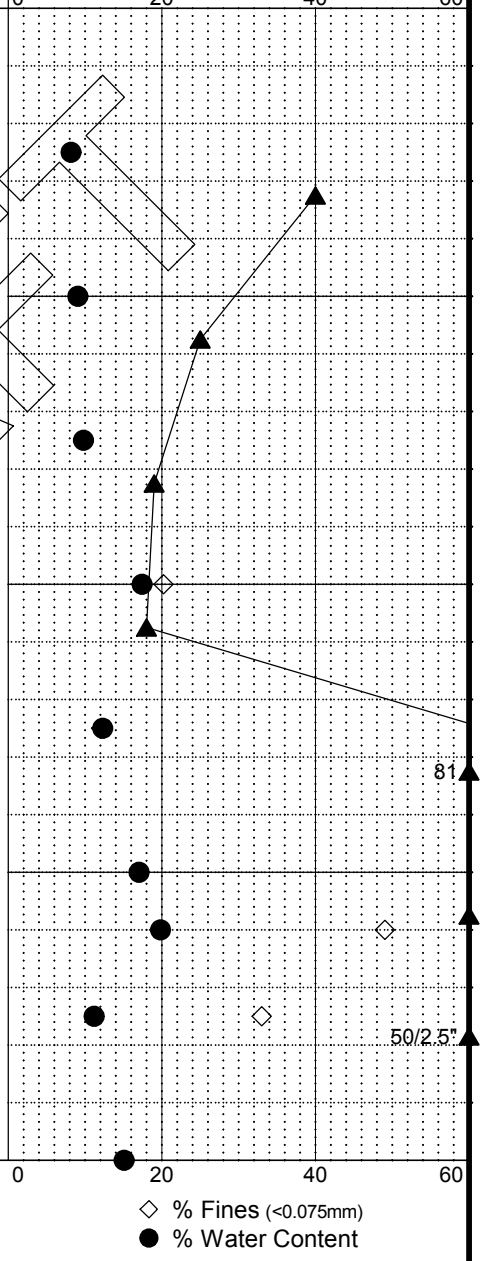
Depth, ft. | Symbol | Samples | Ground Water Depth, ft.

S-1 | S-2 | S-3 | S-4 | S-5 | S-6 | S-7

None Observed During Drilling

PENETRATION RESISTANCE (blows/foot)

▲ Hammer Wt. & Drop: *140 lbs / 30 inches*



DRAFT

LEGEND

- I Sample Recovery
- * Sample Not Recovered
- Sonic Core Sample
- 2.0" O.D. Split Spoon Sample

NOTES

1. Refer to KEY for explanation of symbols, codes, abbreviations and definitions.
2. Groundwater level, if indicated above, is for the date specified and may vary.
3. USCS designation is based on visual-manual classification and selected lab testing.
4. The hole location was measured from existing site features and should be considered approximate.

North Mercer Island Interceptor and Enatai Interceptor Upgrade Project
King County, Washington

LOG OF BORING NME-43

May 2018 | 21-1-22000-212

SHANNON & WILSON, INC.
Geotechnical and Environmental Consultants

FIG. A-41
Sheet 1 of 3

MASTER_LOG_BFW_21-22000.GPJ SHAN_WIL.GDT 5/17/18 Log: JAA Rev: EAS Typ: LKN

REV 3 - Approved for Submittal

Total Depth:	*56.3 ft.*	Northing:	*~ 214,454 ft.*	Drilling Method:	*Hollow Stem Auger*	Hole Diam.:	*8 in.*
Top Elevation:	*~ 126 ft.*	Easting:	*~ 1,303,637 ft.*	Drilling Company:	*Holt Services*	Rod Diam.:	*AWJ*
Vert. Datum:	*KC Metro*	Station:	~	Drill Rig Equipment:	*B-57 Mobile Drill*	Hammer Type:	*Automatic*
Horiz. Datum:	*NAD83*	Offset:	~	Other Comments:			

SOIL DESCRIPTION

Refer to the report text for a proper understanding of the subsurface materials and drilling methods. The stratification lines indicated below represent the approximate boundaries between material types, and the transition may be gradual.

(Qvd)

23.0

Very dense, gray-brown, *Poorly Graded Gravel with Silt and Sand (GP-GM)*; wet; fine to coarse, subrounded to subangular gravel; fine to coarse sand; nonplastic fines; few silty sand diamict pockets.
(Qva)

28.0

Very dense, gray-brown, *Poorly Graded Sand (SP)*; wet; few fine to coarse, subrounded gravel; fine to coarse sand; trace nonplastic fines.
(Qva)

33.0

Very dense, gray-brown, *Sandy Silt (ML)* to *Silty Sand (SM)*; moist; few fine, subrounded gravel; fine to coarse sand; nonplastic fines; diamict.
(Qvt/Qpgt)

38.0

Very dense, gray-brown, *Silty Sand with Gravel (SM)*; wet; fine, subrounded to subangular gravel; fine to coarse sand;

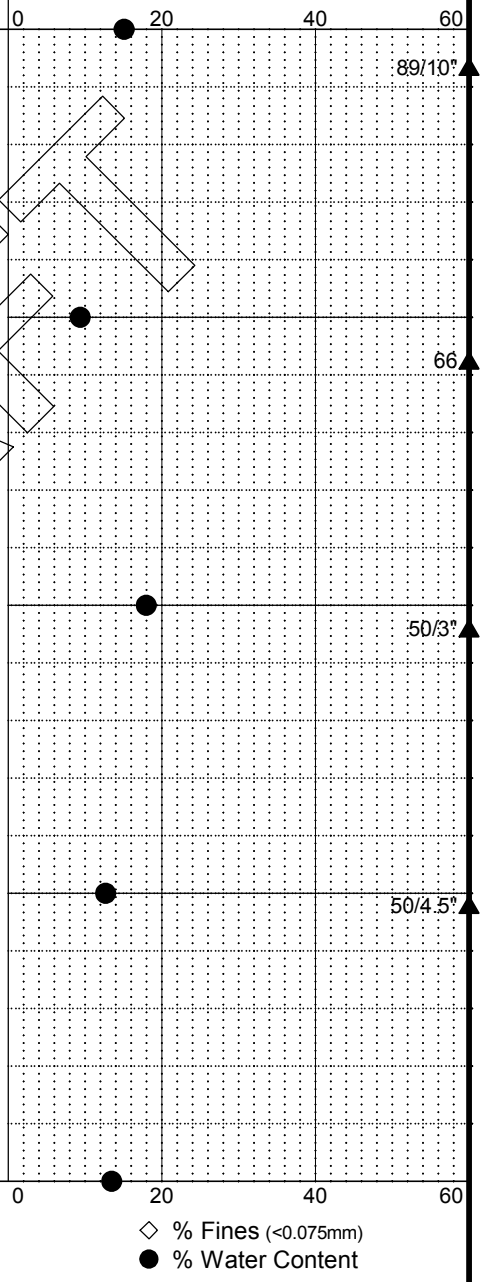
CONTINUED NEXT SHEET

Depth, ft. | Symbol | Samples | Ground Water | Depth, ft.

S-8 | S-9 | S-10 | S-11

PENETRATION RESISTANCE (blows/foot)

▲ Hammer Wt. & Drop: *140 lbs / 30 inches*



DRAFT

LEGEND

- Sample Recovery
- * Sample Not Recovered
- Sonic Core Sample
- 2.0" O.D. Split Spoon Sample

NOTES

1. Refer to KEY for explanation of symbols, codes, abbreviations and definitions.
2. Groundwater level, if indicated above, is for the date specified and may vary.
3. USCS designation is based on visual-manual classification and selected lab testing.
4. The hole location was measured from existing site features and should be considered approximate.

North Mercer Island Interceptor and Enatai Interceptor Upgrade Project
King County, Washington

LOG OF BORING NME-43

May 2018 | 21-1-22000-212

SHANNON & WILSON, INC.
Geotechnical and Environmental Consultants

FIG. A-41
Sheet 2 of 3

MASTER_LOG_BFW_21-22000.GPJ SHAN_WIL.GDT 5/17/18 Log: JAA Rev: EAS Typ: LKN

REV 3 - Approved for Submittal

Total Depth:	*56.3 ft.*	Northing:	*~ 214,454 ft.*	Drilling Method:	*Hollow Stem Auger*	Hole Diam.:	*8 in.*
Top Elevation:	*~ 126 ft.*	Easting:	*~ 1,303,637 ft.*	Drilling Company:	*Holt Services*	Rod Diam.:	*AWJ*
Vert. Datum:	*KC Metro*	Station:	~	Drill Rig Equipment:	*B-57 Mobile Drill*	Hammer Type:	*Automatic*
Horiz. Datum:	*NAD83*	Offset:	~	Other Comments:			

SOIL DESCRIPTION

Refer to the report text for a proper understanding of the subsurface materials and drilling methods. The stratification lines indicated below represent the approximate boundaries between material types, and the transition may be gradual.

nonplastic fines.
(Qva/Qpgo)

43.0

Very dense, gray-brown, *Poorly Graded Sand with Gravel (SP)*; wet; fine, subrounded to subangular gravel; fine to coarse sand; trace nonplastic fines.
(Qva)

48.0

Very dense, gray-brown, *Silty Sand (SM)* and *Silt with Sand (ML)*; moist; trace fine, subrounded gravel; fine to medium sand; nonplastic fines; diamict; trace iron-oxide staining.
(Qvt/Qpgt)

53.0

Very dense, gray, *Poorly Graded Sand (SP)*; wet; fine to medium sand; nonplastic fines.
(Qva/Qpgo)

56.3

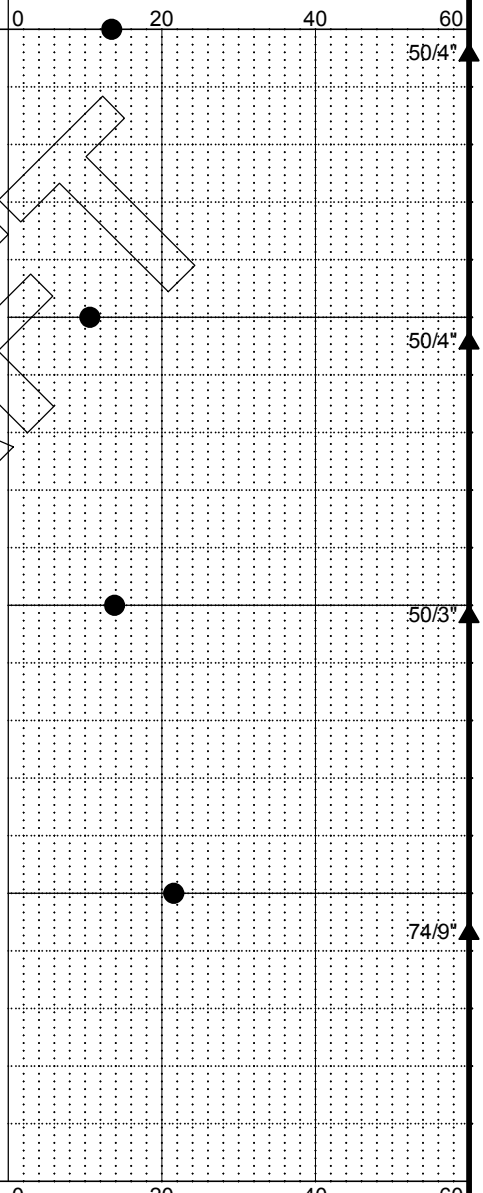
BOTTOM OF BORING
COMPLETED 4/18/2018

Depth, ft. | Symbol | Samples | Ground Water | Depth, ft.

S-12 | S-13 | S-14 | S-15

PENETRATION RESISTANCE (blows/foot)

▲ Hammer Wt. & Drop: *140 lbs / 30 inches*



DRAFT

LEGEND

- Sample Recovery
- * Sample Not Recovered
- Sonic Core Sample
- 2.0" O.D. Split Spoon Sample

NOTES

1. Refer to KEY for explanation of symbols, codes, abbreviations and definitions.
2. Groundwater level, if indicated above, is for the date specified and may vary.
3. USCS designation is based on visual-manual classification and selected lab testing.
4. The hole location was measured from existing site features and should be considered approximate.

North Mercer Island Interceptor and
Enatai Interceptor Upgrade Project
King County, Washington

LOG OF BORING NME-43

May 2018 | 21-1-22000-212

SHANNON & WILSON, INC.
Geotechnical and Environmental Consultants

FIG. A-41
Sheet 3 of 3

REV 3 - Approved for Submittal

MASTER_LOG_BFW_21-22000.GPJ_SHAN_WIL.GDT 5/17/18 Log: JAA Rev: EAS Typ: LKN

Total Depth:	*26.4 ft.*	Northing:	*~ 214,315 ft.*	Drilling Method:	*Hollow Stem Auger*	Hole Diam.:	*8 in.*
Top Elevation:	*~ 130 ft.*	Easting:	*~ 1,303,730 ft.*	Drilling Company:	*Holt Services*	Rod Diam.:	*NWJ*
Vert. Datum:	*KC Metro*	Station:	~	Drill Rig Equipment:	*B-57 Mobile Drill*	Hammer Type:	*Automatic*
Horiz. Datum:	*NAD83*	Offset:	~	Other Comments:			

SOIL DESCRIPTION

Refer to the report text for a proper understanding of the subsurface materials and drilling methods. The stratification lines indicated below represent the approximate boundaries between material types, and the transition may be gradual.

Dense to very dense, gray and gray-brown, *Silty Sand with Gravel (SM)*; moist; fine to coarse, subrounded to subangular gravel; fine to coarse sand; nonplastic to low plasticity fines; diamict.
(Hf)

9.5

Medium dense, gray, *Poorly Graded Sand with Silt and Gravel (SP-SM)* to *Silty Sand with Gravel (SM)*; moist; fine to coarse, subrounded to subangular gravel; fine to coarse sand; nonplastic fines.
(Qvro)

12.0

Dense, gray-brown, *Silty Gravel with Sand (GM)*; moist to wet; fine to coarse, subrounded to subangular gravel; fine to coarse sand; nonplastic fines; diamict pockets.
(Qvro/Qva)

17.0

Very dense, brown, *Silty Sand with Gravel (SM)*; moist; fine to coarse, subrounded to subangular gravel; fine to coarse sand; nonplastic fines; diamict pockets; trace iron-oxide staining; few silt seams.

CONTINUED NEXT SHEET

Depth, ft. | Symbol | Samples | Ground Water | Depth, ft.

S-1 S-2 S-3 S-4 S-5 S-6 S-7

During Drilling ▽

PENETRATION RESISTANCE (blows/foot)

▲ Hammer Wt. & Drop: *140 lbs / 30 inches*

0 20 40 60

5 10 15

78/10"

0 20 40 60

◇ % Fines (<0.075mm)

● % Water Content

LEGEND

- I Sample Recovery
- * Sample Not Recovered
- ⊠ Sonic Core Sample
- ⊥ 2.0" O.D. Split Spoon Sample
- ▽ Ground Water Level ATD

NOTES

1. Refer to KEY for explanation of symbols, codes, abbreviations and definitions.
2. Groundwater level, if indicated above, is for the date specified and may vary.
3. USCS designation is based on visual-manual classification and selected lab testing.
4. The hole location was measured from existing site features and should be considered approximate.

North Mercer Island Interceptor and
Enatai Interceptor Upgrade Project
King County, Washington

LOG OF BORING NME-44

May 2018 21-1-22000-212

SHANNON & WILSON, INC.
Geotechnical and Environmental Consultants

FIG. A-42
Sheet 1 of 2

REV 3 - Approved for Submittal

MASTER_LOG_BFW_21-22000.GPJ_SHAN_WIL.GDT 5/17/18 Log: JAA Rev: EAS Typ: LKN

Total Depth:	*26.4 ft.*	Northing:	*~ 214,315 ft.*	Drilling Method:	*Hollow Stem Auger*	Hole Diam.:	*8 in.*
Top Elevation:	*~ 130 ft.*	Easting:	*~ 1,303,730 ft.*	Drilling Company:	*Holt Services*	Rod Diam.:	*NWJ*
Vert. Datum:	*KC Metro*	Station:	~	Drill Rig Equipment:	*B-57 Mobile Drill*	Hammer Type:	*Automatic*
Horiz. Datum:	*NAD83*	Offset:	~	Other Comments:			

SOIL DESCRIPTION

Refer to the report text for a proper understanding of the subsurface materials and drilling methods. The stratification lines indicated below represent the approximate boundaries between material types, and the transition may be gradual.

(Qvd)

Very dense, brown, *Silty Sand (SM)*; wet; fine, subrounded to subangular; fine to coarse sand; nonplastic fines.
(Qva)

23.0

BOTTOM OF BORING
COMPLETED 4/23/2018

26.4

Depth, ft. | Symbol | Samples | Ground Water | Depth, ft.

S-8

S-9

PENETRATION RESISTANCE (blows/foot)

▲ Hammer Wt. & Drop: *140 lbs / 30 inches*

0 20 40 60

50/5" ▲

25

72/11" ▲

30

35

DRAFT

0 20 40 60

◇ % Fines (<0.075mm)

● % Water Content

LEGEND

I Sample Recovery

* Sample Not Recovered

Sonic Core Sample

2.0" O.D. Split Spoon Sample

▽ Ground Water Level ATD

NOTES

1. Refer to KEY for explanation of symbols, codes, abbreviations and definitions.
2. Groundwater level, if indicated above, is for the date specified and may vary.
3. USCS designation is based on visual-manual classification and selected lab testing.
4. The hole location was measured from existing site features and should be considered approximate.

North Mercer Island Interceptor and
Enatai Interceptor Upgrade Project
King County, Washington

LOG OF BORING NME-44

May 2018 21-1-22000-212

SHANNON & WILSON, INC.
Geotechnical and Environmental Consultants

FIG. A-42
Sheet 2 of 2

REV 3 - Approved for Submittal

MASTER_LOG_BFW_21-22000.GPJ_SHAN_WIL.GDT 5/17/18 Log: JAA Rev: EAS Typ: LKN

Total Depth:	*155 ft.*	Northing:	*~ 214,925 ft.*	Drilling Method:	*Sonic Core*	Hole Diam.:	
Top Elevation:	*~ 199 ft.*	Easting:	*~ 1,304,635 ft.*	Drilling Company:	*Holt*	Rod Diam.:	*NWJ*
Vert. Datum:	*KC Metro*	Station:	~	Drill Rig Equipment:	*Terra Sonic*	Hammer Type:	*Automatic*
Horiz. Datum:	*NAD83*	Offset:	~	Other Comments:			

SOIL DESCRIPTION

Refer to the report text for a proper understanding of the subsurface materials and drilling methods. The stratification lines indicated below represent the approximate boundaries between material types, and the transition may be gradual.

Dark brown, *Silty Sand with Gravel (SM)*; fine, subrounded to subangular gravel; fine to coarse sand; nonplastic fines; few organics. (Hf)

1.0

Brown, *Silty Sand with Gravel (SM)*; moist; fine to coarse, subrounded gravel; fine to coarse sand; low plasticity fines; trace organics. (Hf/Qvri)

2.5

Brown, *Poorly Graded Sand with Gravel (SP)*; fine to coarse, subangular gravel; fine to coarse sand; trace nonplastic fines. (Hf/Qvro)

7.0

Brown, *Silty Sand (SM)*; moist; trace fine, subrounded gravel; fine to medium sand; nonplastic fines; few diamict pockets. (Qva)

10.0

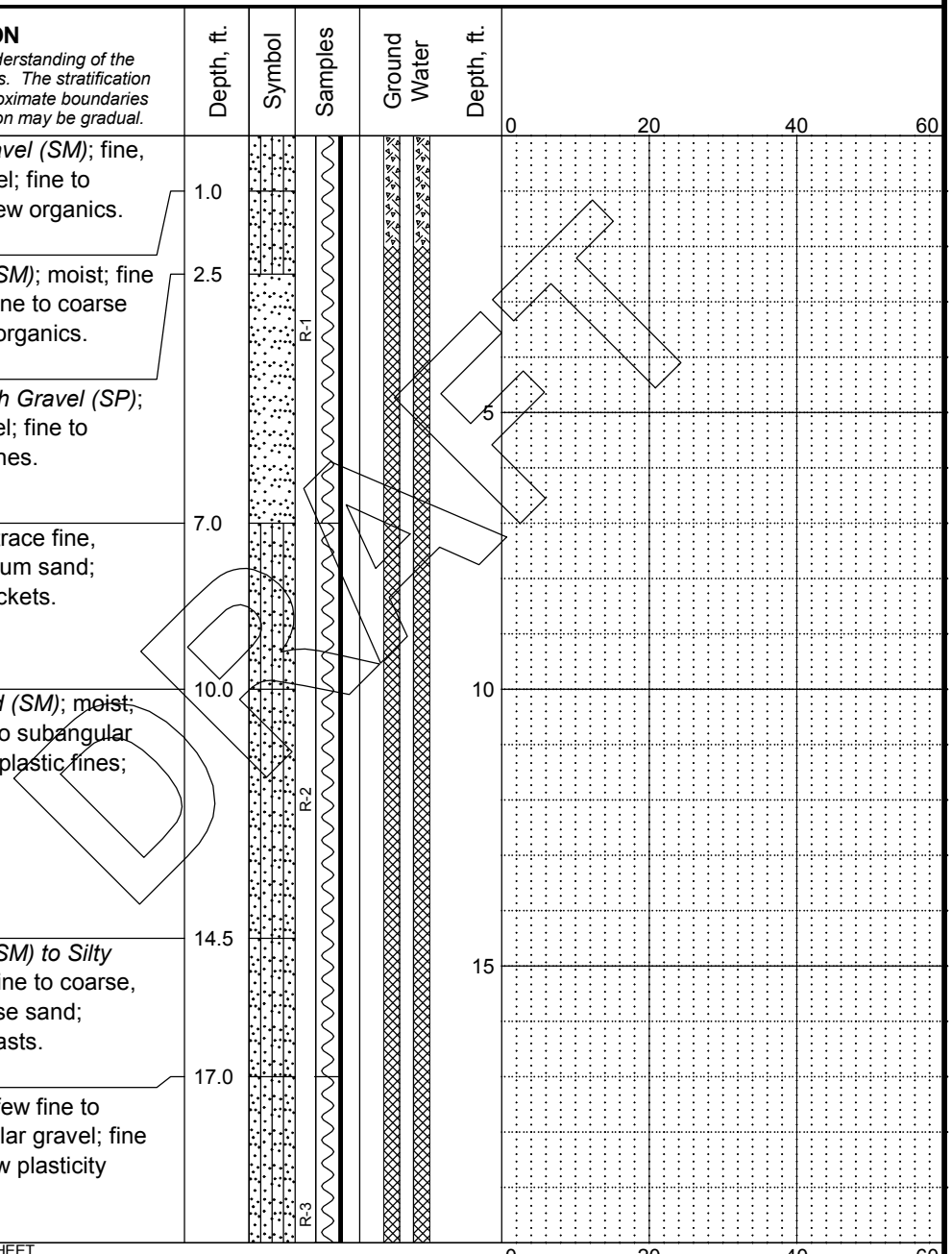
Brown to gray-brown, *Silty Sand (SM)*; moist; few fine to coarse subrounded to subangular gravel; fine to coarse sand; nonplastic fines; diamict. (Qvd)

14.5

Brown, *Silty Sand with Gravel (SM) to Silty Gravel with Sand (GM)*; moist; fine to coarse, subrounded gravel; fine to coarse sand; nonplastic fines; few diamect clasts. (Qva)

17.0

Brown, *Silty Sand (SM)*; moist; few fine to coarse, subrounded to subangular gravel; fine to coarse sand; nonplastic to low plasticity fines; diamict. (Qvd)



CONTINUED NEXT SHEET

LEGEND

- I Sample Recovery
- * Sample Not Recovered
- Sonic Core Sample
- Ground Water Level in Well
- ◇ % Fines (<0.075mm)
- ● % Water Content

NOTES

1. Refer to KEY for explanation of symbols, codes, abbreviations and definitions.
2. Groundwater level, if indicated above, is for the date specified and may vary.
3. USCS designation is based on visual-manual classification and selected lab testing.
4. The hole location was measured from existing site features and should be considered approximate.

North Mercer Island Interceptor and Enatai Interceptor Upgrade Project
King County, Washington

LOG OF BORING NME-45

May 2018 | 21-1-22000-212

SHANNON & WILSON, INC.
Geotechnical and Environmental Consultants

FIG. A-43
Sheet 1 of 8

REV 3 - Approved for Submittal

MASTER_LOG_BFW_21-22000.GPJ_SHAN_WIL.GDT 5/17/18 Log: JAA Rev: EAS Typ: LKN

Total Depth:	*155 ft.*	Northing:	*~ 214,925 ft.*	Drilling Method:	*Sonic Core*	Hole Diam.:	
Top Elevation:	*~ 199 ft.*	Easting:	*~ 1,304,635 ft.*	Drilling Company:	*Holt*	Rod Diam.:	*NWJ*
Vert. Datum:	*KC Metro*	Station:	~	Drill Rig Equipment:	*Terra Sonic*	Hammer Type:	*Automatic*
Horiz. Datum:	*NAD83*	Offset:	~	Other Comments:			

SOIL DESCRIPTION

Refer to the report text for a proper understanding of the subsurface materials and drilling methods. The stratification lines indicated below represent the approximate boundaries between material types, and the transition may be gradual.

Depth, ft. | Symbol | Samples | Ground Water | Depth, ft.

22.0 Brown, *Poorly Graded Gravel with Silt and Sand and Cobbles (GP/GM)*; moist; trace subrounded cobbles; fine to coarse subrounded gravel; fine to coarse sand; nonplastic fines.
(Qva)

26.5 Brown, *Poorly Graded Sand (SM)*; moist; fine to medium sand; trace nonplastic fines.
(Qva/Qvro)

30.0 Brown, *Silty Sand with Gravel (SM)*; moist; fine to coarse, subrounded gravel; fine to coarse sand; nonplastic fines; diamict.
(Qvd/Qvat)

32.0 Gray-brown, *Poorly Graded Gravel with Sand (GP-GM)*; moist; fine to coarse, subrounded to subangular gravel; fine to coarse sand; nonplastic fines.
(Qva)
- Layer of poorly graded sand at 34 feet.
- Layer of poorly graded gravel with sand at 36 feet.

37.0 Brown, *Poorly Graded Sand (SP)*; moist; fine to medium sand; trace nonplasic fines.
(Qva)

38.0 Brown, *Poorly Graded Sand with Gravel (SP)*; moist; fine, subrounded to subangular gravel;

CONTINUED NEXT SHEET

R-4 R-5

0 20 40 60

25 30 35

0 20 40 60

◇ % Fines (<0.075mm)
● % Water Content

LEGEND

I Sample Recovery
* Sample Not Recovered
Sonic Core Sample
Ground Water Level in Well

NOTES

1. Refer to KEY for explanation of symbols, codes, abbreviations and definitions.
2. Groundwater level, if indicated above, is for the date specified and may vary.
3. USCS designation is based on visual-manual classification and selected lab testing.
4. The hole location was measured from existing site features and should be considered approximate.

North Mercer Island Interceptor and
Enatai Interceptor Upgrade Project
King County, Washington

LOG OF BORING NME-45

May 2018 21-1-22000-212

SHANNON & WILSON, INC.
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FIG. A-43
Sheet 2 of 8

REV 3 - Approved for Submittal

MASTER_LOG_BFW_21-22000.GPJ SHAN_WIL.GDT 5/17/18 Log: JAA Rev: EAS Typ: LKN

Total Depth:	*155 ft.*	Northing:	*~ 214,925 ft.*	Drilling Method:	*Sonic Core*	Hole Diam.:	
Top Elevation:	*~ 199 ft.*	Easting:	*~ 1,304,635 ft.*	Drilling Company:	*Holt*	Rod Diam.:	*NWJ*
Vert. Datum:	*KC Metro*	Station:	~	Drill Rig Equipment:	*Terra Sonic*	Hammer Type:	*Automatic*
Horiz. Datum:	*NAD83*	Offset:	~	Other Comments:			

SOIL DESCRIPTION

Refer to the report text for a proper understanding of the subsurface materials and drilling methods. The stratification lines indicated below represent the approximate boundaries between material types, and the transition may be gradual.

Depth, ft. | Symbol | Samples | Ground Water | Depth, ft.

fine to coarse sand; trace nonplastic fines. (Qva)
- Layer of silty sand with gravel at 40 feet.

40.5

Brown, *Poorly Graded Sand (SP)*; moist; trace subrounded gravel; fine to medium sand; trace nonplastic fines. (Qva)

43.0

Gray-brown, *Silty Sand (SM) to Silty Sand with Gravel (SM)*; dry to moist; fine to coarse, subrounded to subangular gravel; fine to coarse sand; nonplastic fines; few diamict clasts. (Qva/Qvd)
- Layer of sandy silt at 47 feet.
- Layer of sandy silt at 48 feet.

R-6
R-7
R-8

0 20 40 60
45
50
55

DRAFT

CONTINUED NEXT SHEET

0 20 40 60

LEGEND

- I Sample Recovery
- * Sample Not Recovered
- Sonic Core Sample
- Ground Water Level in Well
- ◇ % Fines (<0.075mm)
- ● % Water Content

NOTES

1. Refer to KEY for explanation of symbols, codes, abbreviations and definitions.
2. Groundwater level, if indicated above, is for the date specified and may vary.
3. USCS designation is based on visual-manual classification and selected lab testing.
4. The hole location was measured from existing site features and should be considered approximate.

North Mercer Island Interceptor and Enatai Interceptor Upgrade Project
King County, Washington

LOG OF BORING NME-45

May 2018 | 21-1-22000-212

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Geotechnical and Environmental Consultants

FIG. A-43
Sheet 3 of 8

REV 3 - Approved for Submittal

MASTER_LOG_BFW_21-22000.GPJ_SHAN_WIL.GDT 5/17/18 Log: JAA Rev: EAS Typ: LKN

Total Depth:	*155 ft.*	Northing:	*~ 214,925 ft.*	Drilling Method:	*Sonic Core*	Hole Diam.:	
Top Elevation:	*~ 199 ft.*	Easting:	*~ 1,304,635 ft.*	Drilling Company:	*Holt*	Rod Diam.:	*NWJ*
Vert. Datum:	*KC Metro*	Station:	~	Drill Rig Equipment:	*Terra Sonic*	Hammer Type:	*Automatic*
Horiz. Datum:	*NAD83*	Offset:	~	Other Comments:			

SOIL DESCRIPTION

Refer to the report text for a proper understanding of the subsurface materials and drilling methods. The stratification lines indicated below represent the approximate boundaries between material types, and the transition may be gradual.

Depth, ft. | Symbol | Samples | Ground Water | Depth, ft.

- Layer of poorly graded sand at 65 feet.

70.0

Gray-brown, *Silty Sand with Gravel (SM)*; moist; fine to coarse, subrounded to subangular gravel; fine to coarse sand; nonplastic fines; diamict.
(Qvd)

74.5

Brown, *Poorly Graded Sand with Silt (SP-SM)*; to *Poorly Graded Sand (SP)*; moist; fine to medium sand; nonplastic fines; few silty sand seams.
(Qva)

R-9
R-10
03/12/18

0 20 40 60
65
70
75
0 20 40 60

CONTINUED NEXT SHEET

LEGEND

- I Sample Recovery
- * Sample Not Recovered
- Sonic Core Sample
- Ground Water Level in Well
- ◇ % Fines (<0.075mm)
- ● % Water Content

NOTES

1. Refer to KEY for explanation of symbols, codes, abbreviations and definitions.
2. Groundwater level, if indicated above, is for the date specified and may vary.
3. USCS designation is based on visual-manual classification and selected lab testing.
4. The hole location was measured from existing site features and should be considered approximate.

North Mercer Island Interceptor and
Enatai Interceptor Upgrade Project
King County, Washington

LOG OF BORING NME-45

May 2018 21-1-22000-212

SHANNON & WILSON, INC.
Geotechnical and Environmental Consultants

FIG. A-43
Sheet 4 of 8

MASTER_LOG_BFW_21-22000.GPJ SHAN_WIL.GDT 5/17/18 Log: JAA Rev: EAS Typ: LKN

REV 3 - Approved for Submittal

Total Depth:	*155 ft.*	Northing:	*~ 214,925 ft.*	Drilling Method:	*Sonic Core*	Hole Diam.:	
Top Elevation:	*~ 199 ft.*	Easting:	*~ 1,304,635 ft.*	Drilling Company:	*Holt*	Rod Diam.:	*NWJ*
Vert. Datum:	*KC Metro*	Station:	~	Drill Rig Equipment:	*Terra Sonic*	Hammer Type:	*Automatic*
Horiz. Datum:	*NAD83*	Offset:	~	Other Comments:			

SOIL DESCRIPTION

Refer to the report text for a proper understanding of the subsurface materials and drilling methods. The stratification lines indicated below represent the approximate boundaries between material types, and the transition may be gradual.

Depth, ft. | Symbol | Samples | Ground Water | Depth, ft.

Brown, *Poorly Graded Sand (SM)* to *Poorly Graded Sand with Silt (SP-SM)*; wet; fine to medium sand; nonplastic fines.
(Qva)

80.0

R-11

Brown, *Silty Sand (SM)*; moist to wet; fine to medium sand; noplastic fines.
(Qva)

90.2

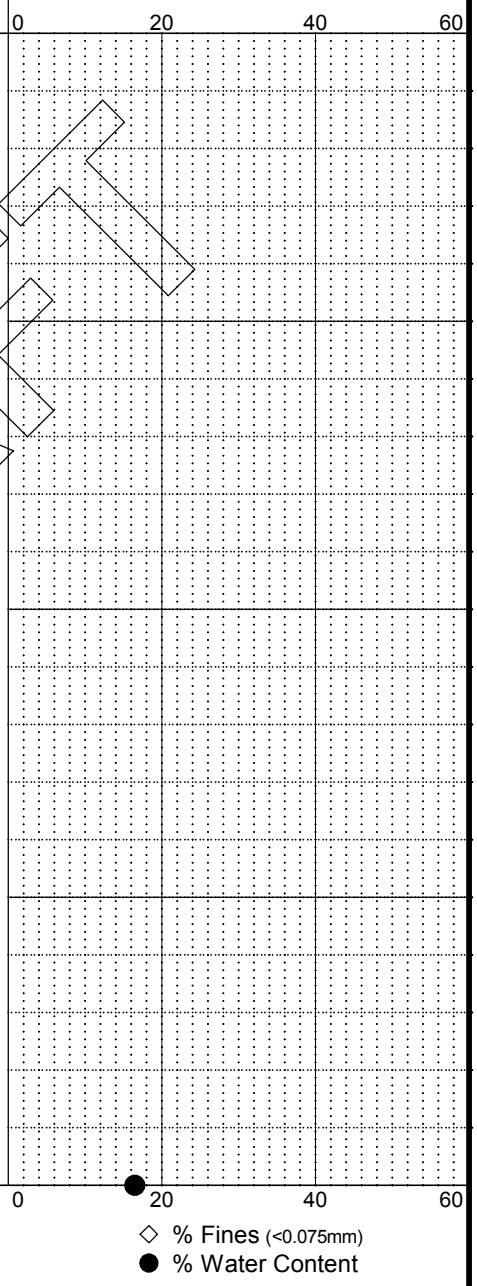
Gray-brown, *Poorly Graded Sand with Silt (SP-SM)* to *Silty Sand (SM)*; wet; fine to medium sand; nonplastic fines; trace organics.
(Qva)

92.5

Gray-brown, *Poorly Graded Sand with Silt (SP-SM)* to *Poorly Graded Sand (SP)*; wet; fine to medium sand; nonplastic fines; trace fine, subangular gravel; trace coarse sand.
(Qva)

95.0

CONTINUED NEXT SHEET



◇ % Fines (<0.075mm)
● % Water Content

LEGEND

Sample Recovery	▼ Ground Water Level in Well
* Sample Not Recovered	
Sonic Core Sample	

NOTES

1. Refer to KEY for explanation of symbols, codes, abbreviations and definitions.
2. Groundwater level, if indicated above, is for the date specified and may vary.
3. USCS designation is based on visual-manual classification and selected lab testing.
4. The hole location was measured from existing site features and should be considered approximate.

North Mercer Island Interceptor and
Enatai Interceptor Upgrade Project
King County, Washington

LOG OF BORING NME-45

May 2018 | 21-1-22000-212

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FIG. A-43
Sheet 5 of 8

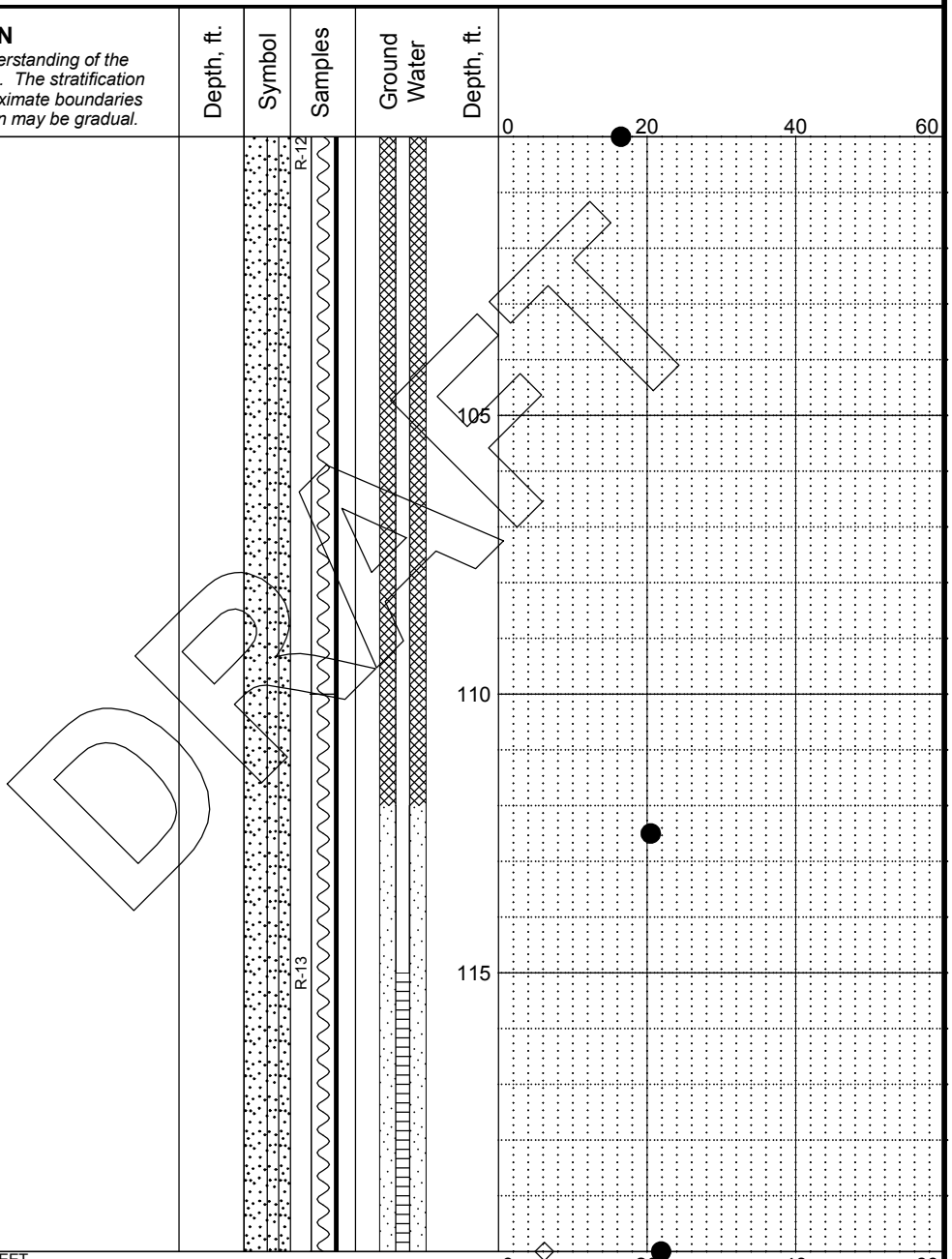
REV 3 - Approved for Submittal

MASTER_LOG_BFW_21-22000.GPJ_SHAN_WIL.GDT 5/17/18 Log: JAA Rev: EAS Typ: LKN

Total Depth:	*155 ft.*	Northing:	*~ 214,925 ft.*	Drilling Method:	*Sonic Core*	Hole Diam.:	
Top Elevation:	*~ 199 ft.*	Easting:	*~ 1,304,635 ft.*	Drilling Company:	*Holt*	Rod Diam.:	*NWJ*
Vert. Datum:	*KC Metro*	Station:	~	Drill Rig Equipment:	*Terra Sonic*	Hammer Type:	*Automatic*
Horiz. Datum:	*NAD83*	Offset:	~	Other Comments:			

SOIL DESCRIPTION

Refer to the report text for a proper understanding of the subsurface materials and drilling methods. The stratification lines indicated below represent the approximate boundaries between material types, and the transition may be gradual.



CONTINUED NEXT SHEET

LEGEND

- I Sample Recovery
- * Sample Not Recovered
- Sonic Core Sample
- Ground Water Level in Well
- ◇ % Fines (<0.075mm)
- ● % Water Content

NOTES

1. Refer to KEY for explanation of symbols, codes, abbreviations and definitions.
2. Groundwater level, if indicated above, is for the date specified and may vary.
3. USCS designation is based on visual-manual classification and selected lab testing.
4. The hole location was measured from existing site features and should be considered approximate.

North Mercer Island Interceptor and
Enatai Interceptor Upgrade Project
King County, Washington

LOG OF BORING NME-45

May 2018 21-1-22000-212

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FIG. A-43
Sheet 6 of 8

REV 3 - Approved for Submittal

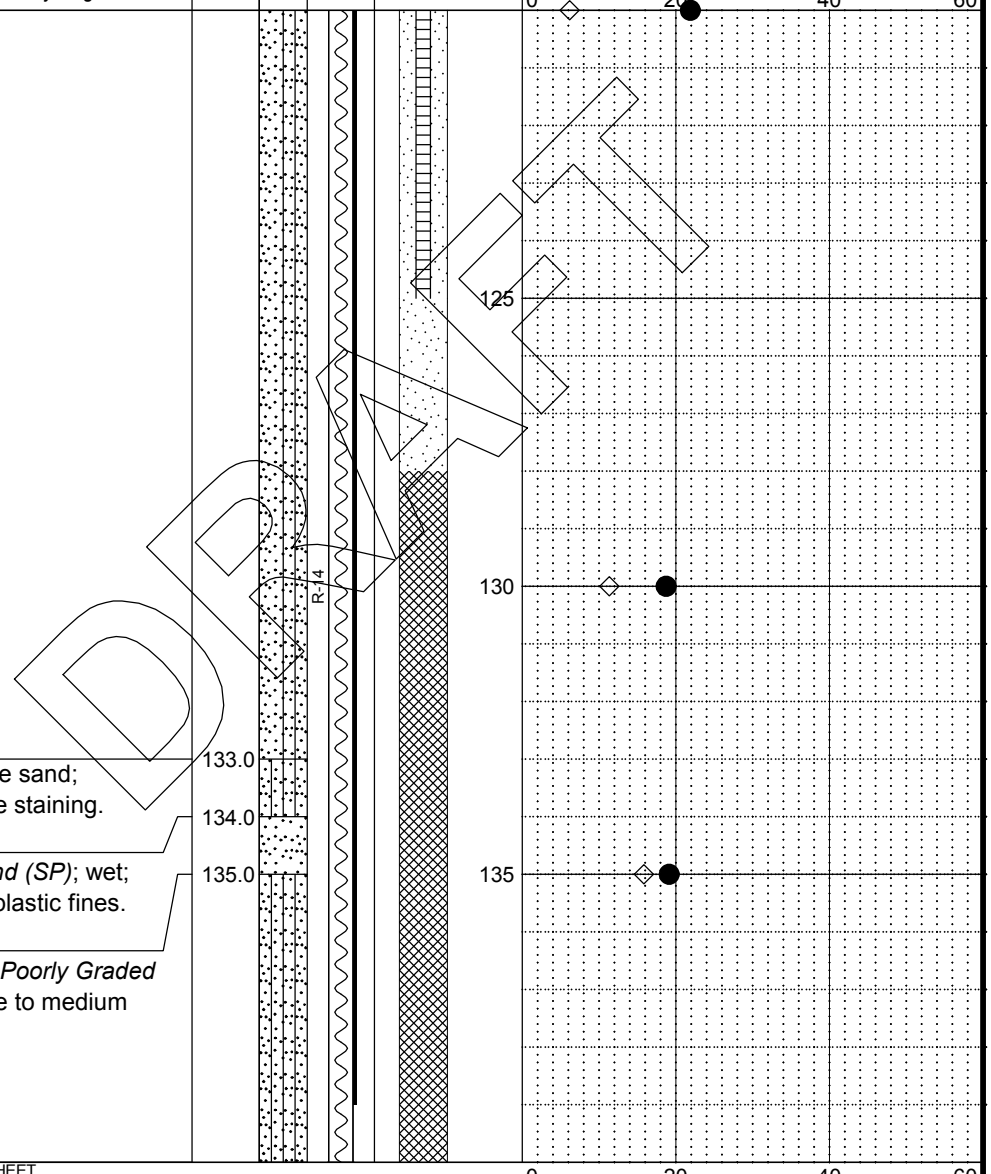
MASTER_LOG_BFW_21-22000.GPJ SHAN_WIL.GDT 5/17/18 Log: JAA Rev: EAS Typ: LKN

Total Depth:	*155 ft.*	Northing:	*~ 214,925 ft.*	Drilling Method:	*Sonic Core*	Hole Diam.:	
Top Elevation:	*~ 199 ft.*	Easting:	*~ 1,304,635 ft.*	Drilling Company:	*Holt*	Rod Diam.:	*NWJ*
Vert. Datum:	*KC Metro*	Station:	~	Drill Rig Equipment:	*Terra Sonic*	Hammer Type:	*Automatic*
Horiz. Datum:	*NAD83*	Offset:	~	Other Comments:			

SOIL DESCRIPTION

Refer to the report text for a proper understanding of the subsurface materials and drilling methods. The stratification lines indicated below represent the approximate boundaries between material types, and the transition may be gradual.

Depth, ft. | Symbol | Samples | Ground Water | Depth, ft.



133.0 Brown, *Silty Sand (SM)*; wet; fine sand; nonplastic fines; trace iron-oxide staining. (Qva)

134.0 Gray-brown, *Poorly Graded Sand (SP)*; wet; fine to medium sand; trace nonplastic fines. (Qva)

135.0 Gray-brown, *Silty Sand (SM)* to *Poorly Graded Sand with Silt (SP-SM)*; wet; fine to medium sand; nonplastic fines. (Qva)

CONTINUED NEXT SHEET

0 20 40 60

◇ % Fines (<0.075mm)
● % Water Content

LEGEND

I Sample Recovery
* Sample Not Recovered
Sonic Core Sample
Ground Water Level in Well

NOTES

1. Refer to KEY for explanation of symbols, codes, abbreviations and definitions.
2. Groundwater level, if indicated above, is for the date specified and may vary.
3. USCS designation is based on visual-manual classification and selected lab testing.
4. The hole location was measured from existing site features and should be considered approximate.

North Mercer Island Interceptor and Enatai Interceptor Upgrade Project
King County, Washington

LOG OF BORING NME-45

May 2018 | 21-1-22000-212

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FIG. A-43
Sheet 7 of 8

REV 3 - Approved for Submittal

MASTER_LOG_BFW_21-22000.GPJ SHAN_WIL.GDT 5/17/18 Log: JAA Rev: EAS Typ: LKN

Total Depth:	*155 ft.*	Northing:	*~ 214,925 ft.*	Drilling Method:	*Sonic Core*	Hole Diam.:	
Top Elevation:	*~ 199 ft.*	Easting:	*~ 1,304,635 ft.*	Drilling Company:	*Holt*	Rod Diam.:	*NWJ*
Vert. Datum:	*KC Metro*	Station:	~	Drill Rig Equipment:	*Terra Sonic*	Hammer Type:	*Automatic*
Horiz. Datum:	*NAD83*	Offset:	~	Other Comments:			

SOIL DESCRIPTION

Refer to the report text for a proper understanding of the subsurface materials and drilling methods. The stratification lines indicated below represent the approximate boundaries between material types, and the transition may be gradual.

Depth, ft. | Symbol | Samples | Ground Water | Depth, ft.

Gray-brown, *Silty Sand (SM)*; wet; fine to medium sand; nonplastic fines.
(Qva)

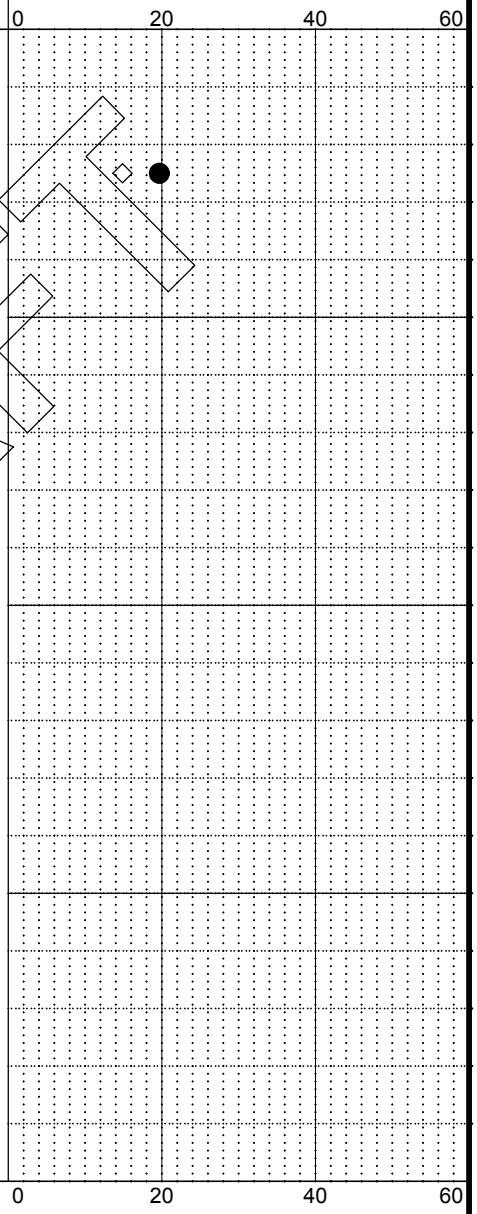
140.0

R-15

155.0

BOTTOM OF BORING
COMPLETED 3/7/2018

DRAFT



LEGEND

- Sample Recovery
- * Sample Not Recovered
- Sonic Core Sample
- Ground Water Level in Well
- ◇ % Fines (<0.075mm)
- ● % Water Content

NOTES

1. Refer to KEY for explanation of symbols, codes, abbreviations and definitions.
2. Groundwater level, if indicated above, is for the date specified and may vary.
3. USCS designation is based on visual-manual classification and selected lab testing.
4. The hole location was measured from existing site features and should be considered approximate.

North Mercer Island Interceptor and
Enatai Interceptor Upgrade Project
King County, Washington

LOG OF BORING NME-45

May 2018 | 21-1-22000-212

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FIG. A-43
Sheet 8 of 8

REV 3 - Approved for Submittal

MASTER_LOG_BFW_21-22000.GPJ_SHAN_WIL.GDT 5/17/18 Log: JAA Rev: EAS Typ: LKN

Total Depth:	*190 ft.*	Northing:	*~ 215,199 ft.*	Drilling Method:	*Sonic Core*	Hole Diam.:	
Top Elevation:	*~ 225 ft.*	Easting:	*~ 1,305,298 ft.*	Drilling Company:	*Holt*	Rod Diam.:	*NWJ*
Vert. Datum:	*KC Metro*	Station:	~	Drill Rig Equipment:	*Terra Sonic*	Hammer Type:	*Automatic*
Horiz. Datum:	*NAD83*	Offset:	~	Other Comments:			

SOIL DESCRIPTION

Refer to the report text for a proper understanding of the subsurface materials and drilling methods. The stratification lines indicated below represent the approximate boundaries between material types, and the transition may be gradual.

Depth, ft. | Symbol | Samples | Ground Water | Depth, ft.

Asphalt. — 0.3

Brown, *Silty Sand with Gravel (SM)*; moist; fine, subrounded to subangular gravel; fine to coarse sand; nonplastic fines. (Hf) — 1.0

Gray-brown, *Silty Sand (SM)* to *Silty Sand with Gravel (SM)*; moist; fine to coarse, subrounded to subangular gravel; fine to coarse sand; nonplastic fines; diamict; few silty sand seams. (Qvd)

R-1

R-2

17.5

Gray-brown, *Poorly Graded Sand with Silt (SP-SM)*; moist to wet; few fine to coarse, subrounded to subangular gravel; fine to coarse sand; nonplastic fines. — 18.5

CONTINUED NEXT SHEET

DRAFT

0 20 40 60

5

10

15

0 20 40 60

◇ % Fines (<0.075mm)

● % Water Content

LEGEND

I Sample Recovery

* Sample Not Recovered

Sonic Core Sample

Ground Water Level in Well

NOTES

1. Refer to KEY for explanation of symbols, codes, abbreviations and definitions.
2. Groundwater level, if indicated above, is for the date specified and may vary.
3. USCS designation is based on visual-manual classification and selected lab testing.
4. The hole location was measured from existing site features and should be considered approximate.

North Mercer Island Interceptor and Enatai Interceptor Upgrade Project
King County, Washington

LOG OF BORING NME-46

May 2018 — 21-1-22000-212

SHANNON & WILSON, INC.
Geotechnical and Environmental Consultants

FIG. A-44
Sheet 1 of 10

REV 3 - Approved for Submittal

MASTER_LOG_BFW_21-22000.GPJ_SHAN_WIL.GDT 5/17/18 — *Log: JAA* *Rev: EAS* *Typ: LKN*

Total Depth:	*190 ft.*	Northing:	*~ 215,199 ft.*	Drilling Method:	*Sonic Core*	Hole Diam.:	
Top Elevation:	*~ 225 ft.*	Easting:	*~ 1,305,298 ft.*	Drilling Company:	*Holt*	Rod Diam.:	*NWJ*
Vert. Datum:	*KC Metro*	Station:	~	Drill Rig Equipment:	*Terra Sonic*	Hammer Type:	*Automatic*
Horiz. Datum:	*NAD83*	Offset:	~	Other Comments:			

SOIL DESCRIPTION

Refer to the report text for a proper understanding of the subsurface materials and drilling methods. The stratification lines indicated below represent the approximate boundaries between material types, and the transition may be gradual.

(Qva)

Brown, *Silty Sand (SM)*; moist; trace fine to coarse, subrounded gravel; fine to medium sand; nonplastic fines.
(Qva)

28.5

Brown, *Silty Sand (SM)*; moist; fine sand; nonplastic fines.
(Qva)

31.0

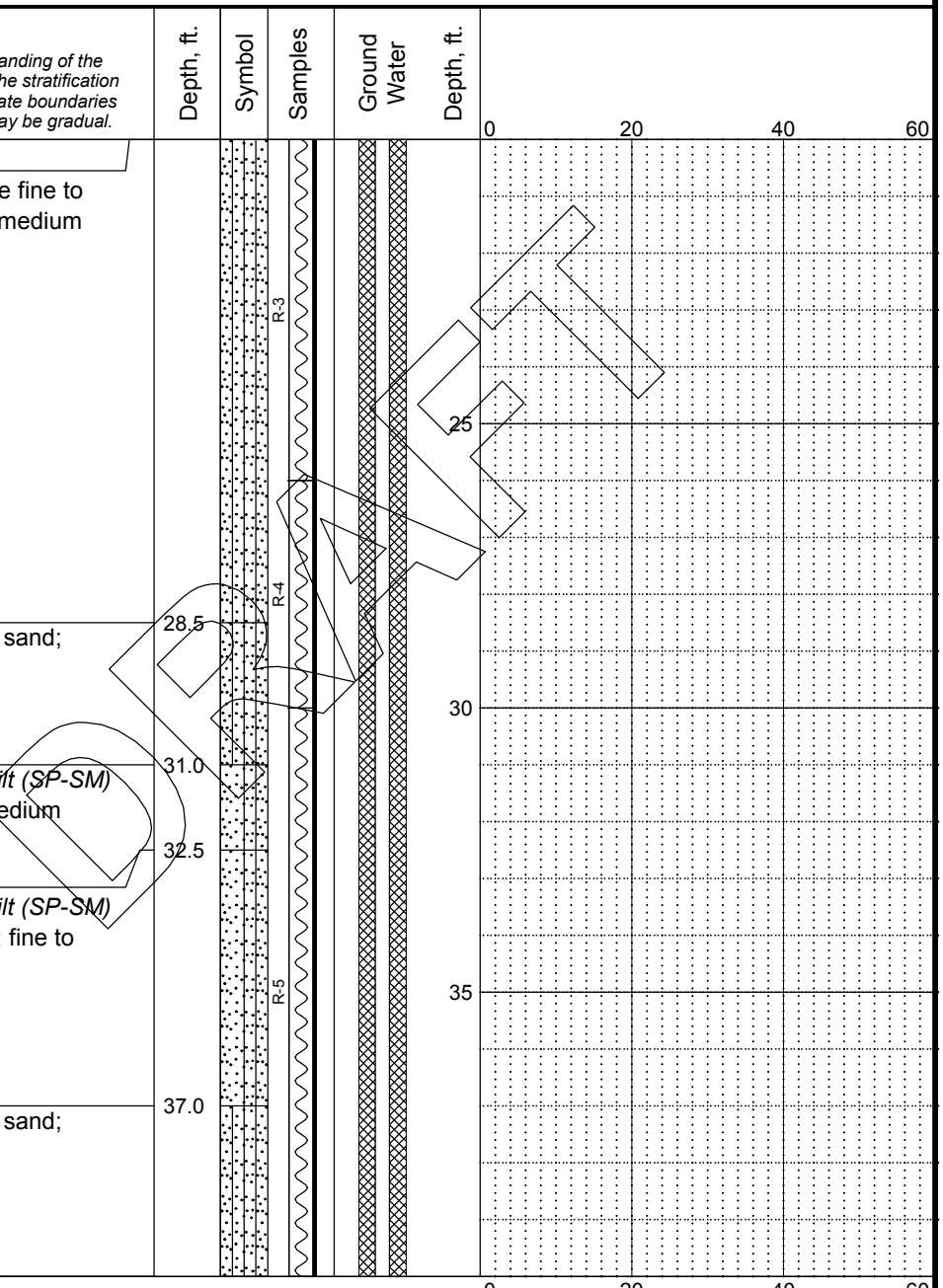
Brown, *Poorly Graded Sand with Silt (SP-SM)* to *Silty Sand (SM)*; moist; fine to medium sand; nonplastic fines.
(Qva)

32.5

Brown, *Poorly Graded Sand with Silt (SP-SM)* to *Poorly Graded Sand (SP)*; moist; fine to medium sand; nonplastic fines.
(Qva)

37.0

Brown, *Silty Sand (SM)*; moist; fine sand; nonplastic fines.
(Qva)



CONTINUED NEXT SHEET

LEGEND

- I Sample Recovery
- * Sample Not Recovered
- Sonic Core Sample
- Ground Water Level in Well
- ◇ % Fines (<0.075mm)
- ● % Water Content

NOTES

1. Refer to KEY for explanation of symbols, codes, abbreviations and definitions.
2. Groundwater level, if indicated above, is for the date specified and may vary.
3. USCS designation is based on visual-manual classification and selected lab testing.
4. The hole location was measured from existing site features and should be considered approximate.

North Mercer Island Interceptor and Enatai Interceptor Upgrade Project
King County, Washington

LOG OF BORING NME-46

May 2018 | 21-1-22000-212

SHANNON & WILSON, INC.
Geotechnical and Environmental Consultants

FIG. A-44
Sheet 2 of 10

REV 3 - Approved for Submittal

MASTER_LOG_BFW_21-22000.GPJ_SHAN_WIL.GDT 5/17/18 Log: JAA Rev: EAS Typ: LKN

Total Depth:	*190 ft.*	Northing:	*~ 215,199 ft.*	Drilling Method:	*Sonic Core*	Hole Diam.:	
Top Elevation:	*~ 225 ft.*	Easting:	*~ 1,305,298 ft.*	Drilling Company:	*Holt*	Rod Diam.:	*NWJ*
Vert. Datum:	*KC Metro*	Station:	~	Drill Rig Equipment:	*Terra Sonic*	Hammer Type:	*Automatic*
Horiz. Datum:	*NAD83*	Offset:	~	Other Comments:			

SOIL DESCRIPTION

Refer to the report text for a proper understanding of the subsurface materials and drilling methods. The stratification lines indicated below represent the approximate boundaries between material types, and the transition may be gradual.

Depth, ft. | Symbol | Samples | Ground Water | Depth, ft.

Brown *Silt with Sand (ML)* to *Silt (ML)*; moist; trace fine, subrounded gravel; fine to coarse sand; nonplastic to low plasticity fines; trace iron-oxide staining.
(Qpnl)

40.0

Gray *Silt (ML)*; moist; few fine sand; nonplastic fines; trace iron-oxide-stained layers.
(Qpnl)

42.0

R-6

Brown *Silt (ML)*; moist; trace fine sand; nonplastic to low plasticity fines; few lean clay seams.
(Qpnl)

45.0

R-7

R-8

58.5

Gray *Silt (ML)*; moist; trace fine to coarse, subrounded gravel; trace fine to coarse sand; nonplastic to low plasticity fines.

CONTINUED NEXT SHEET

DRAFT

0 20 40 60

45

50

55

0 20 40 60

◇ % Fines (<0.075mm)
● % Water Content

LEGEND

- I Sample Recovery
- * Sample Not Recovered
- ⊠ Sonic Core Sample
- ▼ Ground Water Level in Well

NOTES

1. Refer to KEY for explanation of symbols, codes, abbreviations and definitions.
2. Groundwater level, if indicated above, is for the date specified and may vary.
3. USCS designation is based on visual-manual classification and selected lab testing.
4. The hole location was measured from existing site features and should be considered approximate.

North Mercer Island Interceptor and
Enatai Interceptor Upgrade Project
King County, Washington

LOG OF BORING NME-46

May 2018 | 21-1-22000-212

SHANNON & WILSON, INC.
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FIG. A-44
Sheet 3 of 10

REV 3 - Approved for Submittal

MASTER_LOG_BFW_21-22000.GPJ_SHAN_WIL.GDT 5/17/18 Log: JAA Rev: EAS Typ: LKN

Total Depth:	*190 ft.*	Northing:	*~ 215,199 ft.*	Drilling Method:	*Sonic Core*	Hole Diam.:	
Top Elevation:	*~ 225 ft.*	Easting:	*~ 1,305,298 ft.*	Drilling Company:	*Holt*	Rod Diam.:	*NWJ*
Vert. Datum:	*KC Metro*	Station:	~	Drill Rig Equipment:	*Terra Sonic*	Hammer Type:	*Automatic*
Horiz. Datum:	*NAD83*	Offset:	~	Other Comments:			

SOIL DESCRIPTION

Refer to the report text for a proper understanding of the subsurface materials and drilling methods. The stratification lines indicated below represent the approximate boundaries between material types, and the transition may be gradual.

Depth, ft. | Symbol | Samples | Ground Water | Depth, ft.

(Qpnl)

70.0

Gray *Silt with Boulders (ML)* to *Silt with Gravel and Boulders (ML)*; moist; trace boulders; fine to coarse, subrounded to subangular gravel; few fine to coarse sand; nonplastic fines; diamict.
(Qpnl)
- Boulder from 70 to 72 feet.

77.0

Gray *Silt (ML)*; moist; trace fine sand; nonplastic to low plasticity fines.
(Qpnl)

R-9

R-10

0 20 40 60

65

70

75

0 20 40 60

◇ % Fines (<0.075mm)
● % Water Content

CONTINUED NEXT SHEET

LEGEND

- I Sample Recovery
- * Sample Not Recovered
- ⍁ Sonic Core Sample
- ▼ Ground Water Level in Well

NOTES

1. Refer to KEY for explanation of symbols, codes, abbreviations and definitions.
2. Groundwater level, if indicated above, is for the date specified and may vary.
3. USCS designation is based on visual-manual classification and selected lab testing.
4. The hole location was measured from existing site features and should be considered approximate.

North Mercer Island Interceptor and
Enatai Interceptor Upgrade Project
King County, Washington

LOG OF BORING NME-46

May 2018 21-1-22000-212

SHANNON & WILSON, INC.
Geotechnical and Environmental Consultants

FIG. A-44
Sheet 4 of 10

REV 3 - Approved for Submittal

MASTER_LOG_BFW_21-22000.GPJ SHAN_WIL.GDT 5/17/18 Log: JAA Rev: EAS Typ: LKN

Total Depth:	*190 ft.*	Northing:	*~ 215,199 ft.*	Drilling Method:	*Sonic Core*	Hole Diam.:	
Top Elevation:	*~ 225 ft.*	Easting:	*~ 1,305,298 ft.*	Drilling Company:	*Holt*	Rod Diam.:	*NWJ*
Vert. Datum:	*KC Metro*	Station:	~	Drill Rig Equipment:	*Terra Sonic*	Hammer Type:	*Automatic*
Horiz. Datum:	*NAD83*	Offset:	~	Other Comments:			

SOIL DESCRIPTION

Refer to the report text for a proper understanding of the subsurface materials and drilling methods. The stratification lines indicated below represent the approximate boundaries between material types, and the transition may be gradual.

Depth, ft. | Symbol | Samples | Ground Water | Depth, ft.

80.0

Gray *Silt with Sand (ML)* to *Sandy Silt (ML)*; moist; fine sand; nonplastic fines. (Qpnf)

- Layer of gray, silty sand with gravel from 88 to 89 feet.

91.5

Gray, *Poorly Graded Sand with Silt and Gravel (SP-SM)*; moist; few subrounded gravel; fine to coarse sand; nonplastic fines. (Qpnf)

92.5

Gray *Silt (ML)* to *Silt with Sand (ML)*; moist; fine sand; nonplastic fines; dilatant. (Qpnl)

96.0

Gray, *Sandy Silt (ML)* to *Silty Sand (SM)*; wet; fine sand; nonplastic fines. (Qpnl)

97.5

Gray *Silt with Sand (ML)* to *Sandy Silt (ML)*; wet; fine sand; nonplastic fines. (Qpnl)

R-11

R-12

03/15/18

0 20 40 60

85

90

95

0 20 40 60

CONTINUED NEXT SHEET

LEGEND

- I Sample Recovery
- * Sample Not Recovered
- Sonic Core Sample
- Ground Water Level in Well
- ◇ % Fines (<0.075mm)
- ● % Water Content

NOTES

1. Refer to KEY for explanation of symbols, codes, abbreviations and definitions.
2. Groundwater level, if indicated above, is for the date specified and may vary.
3. USCS designation is based on visual-manual classification and selected lab testing.
4. The hole location was measured from existing site features and should be considered approximate.

North Mercer Island Interceptor and Enatai Interceptor Upgrade Project
King County, Washington

LOG OF BORING NME-46

May 2018 21-1-22000-212

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FIG. A-44
Sheet 5 of 10

DRAFT

Log: JAA Rev: EAS Typ: LKN

MASTER_LOG_BFW_21-22000.GPJ SHAN_WIL.GDT 5/17/18

REV 3 - Approved for Submittal

Total Depth:	*190 ft.*	Northing:	*~ 215,199 ft.*	Drilling Method:	*Sonic Core*	Hole Diam.:	
Top Elevation:	*~ 225 ft.*	Easting:	*~ 1,305,298 ft.*	Drilling Company:	*Holt*	Rod Diam.:	*NWJ*
Vert. Datum:	*KC Metro*	Station:	~	Drill Rig Equipment:	*Terra Sonic*	Hammer Type:	*Automatic*
Horiz. Datum:	*NAD83*	Offset:	~	Other Comments:			

SOIL DESCRIPTION

Refer to the report text for a proper understanding of the subsurface materials and drilling methods. The stratification lines indicated below represent the approximate boundaries between material types, and the transition may be gradual.

Depth, ft. | Symbol | Samples | Ground Water | Depth, ft.

Gray, *Sandy Silt (ML)*; moist to wet; trace fine, subrounded gravel; fine, trace medium to coarse sand; fine sand; nonplastic fines; few silty sand pockets.
(Qpnl)

100.0

Gray *Silt with Sand (ML)*; moist; trace fine, subangular gravel; fine to medium sand; low plasticity fines.
(Qpnl)

102.5

Gray *Silt (ML)* to *Silt with Sand (ML)*; moist; trace coarse sand; fine to medium sand; nonplastic to low plasticity.
(Qpnl)

105.0

Gray *Silt (ML)* and *Sandy Silt (ML)*; moist to wet; fine to medium sand; nonplastic fines; few silty sand pockets; interbedded.
(Qpnl)

107.5

R-13

DRAFT

0 20 40 60

105 110 115

0 20 40 60

◇ % Fines (<0.075mm)
● % Water Content

CONTINUED NEXT SHEET

LEGEND

Sample Recovery	▼ Ground Water Level in Well
* Sample Not Recovered	
Sonic Core Sample	

NOTES

1. Refer to KEY for explanation of symbols, codes, abbreviations and definitions.
2. Groundwater level, if indicated above, is for the date specified and may vary.
3. USCS designation is based on visual-manual classification and selected lab testing.
4. The hole location was measured from existing site features and should be considered approximate.

North Mercer Island Interceptor and
Enatai Interceptor Upgrade Project
King County, Washington

LOG OF BORING NME-46

May 2018 21-1-22000-212

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FIG. A-44
Sheet 6 of 10

REV 3 - Approved for Submittal

MASTER_LOG_BFW_21-22000.GPJ SHAN_WIL.GDT 5/17/18 Log: JAA Rev: EAS Typ: LKN

Total Depth:	*190 ft.*	Northing:	*~ 215,199 ft.*	Drilling Method:	*Sonic Core*	Hole Diam.:	
Top Elevation:	*~ 225 ft.*	Easting:	*~ 1,305,298 ft.*	Drilling Company:	*Holt*	Rod Diam.:	*NWJ*
Vert. Datum:	*KC Metro*	Station:	~	Drill Rig Equipment:	*Terra Sonic*	Hammer Type:	*Automatic*
Horiz. Datum:	*NAD83*	Offset:	~	Other Comments:			

SOIL DESCRIPTION

Refer to the report text for a proper understanding of the subsurface materials and drilling methods. The stratification lines indicated below represent the approximate boundaries between material types, and the transition may be gradual.

Depth, ft. | Symbol | Samples | Ground Water | Depth, ft.

120.0

Gray, *Silty Sand (SM)*; moist; fine to medium sand; nonplastic fines.
(Qpnf)

- Layer of silt with sand from 122.2 to 123 feet.

R-14

130.0

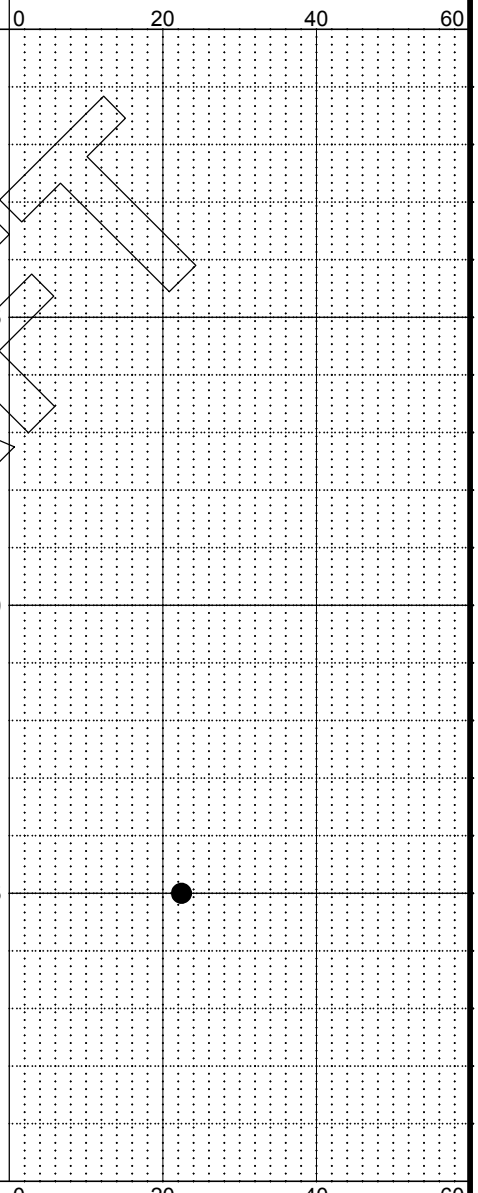
Gray *Silt (ML)* to *Silt with Sand (ML)* to *Sandy Silt (ML)*; wet; fine sand; nonplastic fines.
(Qpnl)

132.5

Gray, *Silty Sand (SM)* to *Poorly Graded Sand with Silt (SP-SM)*; wet; fine to medium sand; nonplastic fines; trace wood fragments; trace organics; few silt with sand seams.
(Qpnf)

CONTINUED NEXT SHEET

DRAFT



LEGEND

- I Sample Recovery
- * Sample Not Recovered
- Sonic Core Sample
- Ground Water Level in Well
- ◇ % Fines (<0.075mm)
- ● % Water Content

NOTES

1. Refer to KEY for explanation of symbols, codes, abbreviations and definitions.
2. Groundwater level, if indicated above, is for the date specified and may vary.
3. USCS designation is based on visual-manual classification and selected lab testing.
4. The hole location was measured from existing site features and should be considered approximate.

North Mercer Island Interceptor and
Enatai Interceptor Upgrade Project
King County, Washington

LOG OF BORING NME-46

May 2018 | 21-1-22000-212

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FIG. A-44
Sheet 7 of 10

REV 3 - Approved for Submittal

MASTER_LOG_BFW_21-22000.GPJ_SHAN_WIL.GDT 5/17/18 Log: JAA Rev: EAS Typ: LKN

Total Depth:	*190 ft.*	Northing:	*~ 215,199 ft.*	Drilling Method:	*Sonic Core*	Hole Diam.:	
Top Elevation:	*~ 225 ft.*	Easting:	*~ 1,305,298 ft.*	Drilling Company:	*Holt*	Rod Diam.:	*NWJ*
Vert. Datum:	*KC Metro*	Station:	~	Drill Rig Equipment:	*Terra Sonic*	Hammer Type:	*Automatic*
Horiz. Datum:	*NAD83*	Offset:	~	Other Comments:			

SOIL DESCRIPTION

Refer to the report text for a proper understanding of the subsurface materials and drilling methods. The stratification lines indicated below represent the approximate boundaries between material types, and the transition may be gradual.

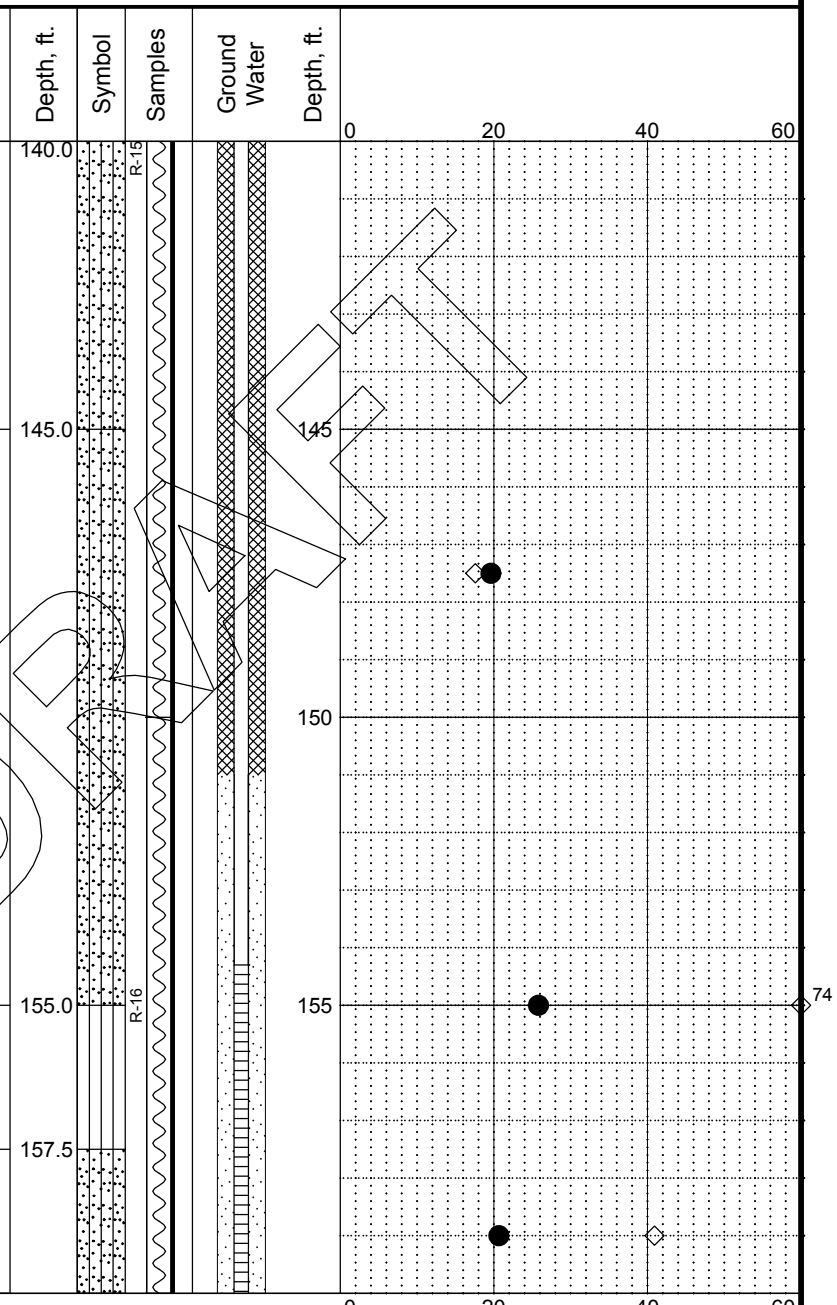
Gray, *Silty Sand (SM)*; moist to wet; fine sand; nonplastic fines.
(Qpnf)

Gray, *Silty Sand (SM)* to *Poorly Graded Sand with Silt (SP-SM)*; moist to wet; fine to medium sand; nonplastic fines.
(Qpnf)

Gray *Silt with Sand (ML)* and *Sandy Silt (ML)*; moist to wet; fine sand; nonplastic fines; few silty, fine sand seams; dilatant.
(Qpnl)

Gray, *Silty Sand (SM)*; moist to wet; fine to medium sand; nonplastic fines; few silt with sand seams.
(Qpnf)

CONTINUED NEXT SHEET



DRAFT

LEGEND

- I Sample Recovery
- * Sample Not Recovered
- Sonic Core Sample
- Ground Water Level in Well

NOTES

1. Refer to KEY for explanation of symbols, codes, abbreviations and definitions.
2. Groundwater level, if indicated above, is for the date specified and may vary.
3. USCS designation is based on visual-manual classification and selected lab testing.
4. The hole location was measured from existing site features and should be considered approximate.

North Mercer Island Interceptor and
Enatai Interceptor Upgrade Project
King County, Washington

LOG OF BORING NME-46

May 2018 21-1-22000-212

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FIG. A-44
Sheet 8 of 10

REV 3 - Approved for Submittal

MASTER_LOG_BFW_21-22000.GPJ SHAN_WIL.GDT 5/17/18 Log: JAA Rev: EAS Typ: LKN

Total Depth:	*190 ft.*	Northing:	*~ 215,199 ft.*	Drilling Method:	*Sonic Core*	Hole Diam.:	
Top Elevation:	*~ 225 ft.*	Easting:	*~ 1,305,298 ft.*	Drilling Company:	*Holt*	Rod Diam.:	*NWJ*
Vert. Datum:	*KC Metro*	Station:	~	Drill Rig Equipment:	*Terra Sonic*	Hammer Type:	*Automatic*
Horiz. Datum:	*NAD83*	Offset:	~	Other Comments:			

SOIL DESCRIPTION

Refer to the report text for a proper understanding of the subsurface materials and drilling methods. The stratification lines indicated below represent the approximate boundaries between material types, and the transition may be gradual.

- Layer of silt with sand at 158.5 feet.

Gray, *Silty Sand (SM)* and *Silt with Sand (ML)*; wet; fine sand; nonplastic fines; interbedded; dilatant.
(Qpnl)

160.0

Gray, *Silty Sand (SM)* to *Sandy Silt (ML)*; wet; fine sand; nonplastic fines.
(Qpnf)

165.0

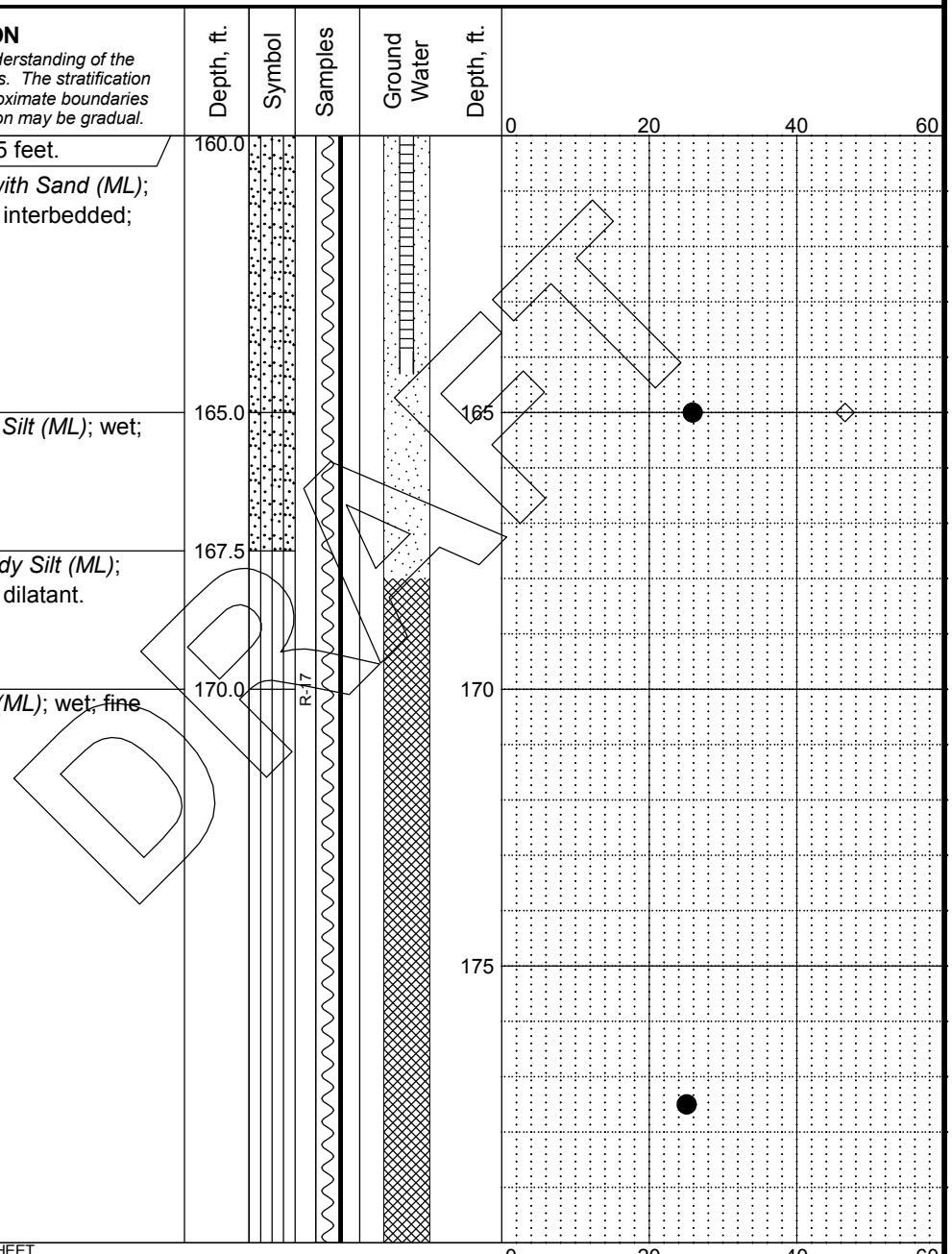
Gray *Silt with Sand (ML)* to *Sandy Silt (ML)*; wet; fine sand; nonplastic fines; dilatant.
(Qpnl)

167.5

Gray *Silt (ML)* to *Silt with Sand (ML)*; wet; fine sand; nonplastic fines; dilatant.
(Qpnl)

170.0

R-17



CONTINUED NEXT SHEET

LEGEND

- I Sample Recovery
- * Sample Not Recovered
- Sonic Core Sample
- Ground Water Level in Well
- ◇ % Fines (<0.075mm)
- ● % Water Content

NOTES

1. Refer to KEY for explanation of symbols, codes, abbreviations and definitions.
2. Groundwater level, if indicated above, is for the date specified and may vary.
3. USCS designation is based on visual-manual classification and selected lab testing.
4. The hole location was measured from existing site features and should be considered approximate.

North Mercer Island Interceptor and
Enatai Interceptor Upgrade Project
King County, Washington

LOG OF BORING NME-46

May 2018 21-1-22000-212

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FIG. A-44
Sheet 9 of 10

REV 3 - Approved for Submittal

MASTER_LOG_BFW_21-22000.GPJ SHAN_WIL.GDT 5/17/18 Log: JAA Rev: EAS Typ: LKN

Total Depth:	*190 ft.*	Northing:	*~ 215,199 ft.*	Drilling Method:	*Sonic Core*	Hole Diam.:	
Top Elevation:	*~ 225 ft.*	Easting:	*~ 1,305,298 ft.*	Drilling Company:	*Holt*	Rod Diam.:	*NWJ*
Vert. Datum:	*KC Metro*	Station:	~	Drill Rig Equipment:	*Terra Sonic*	Hammer Type:	*Automatic*
Horiz. Datum:	*NAD83*	Offset:	~	Other Comments:			

SOIL DESCRIPTION

Refer to the report text for a proper understanding of the subsurface materials and drilling methods. The stratification lines indicated below represent the approximate boundaries between material types, and the transition may be gradual.

Depth, ft. | Symbol | Samples | Ground Water | Depth, ft.

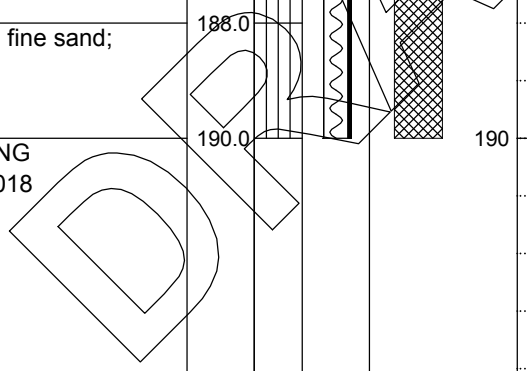
R-18

Gray, *Silt with Sand (ML)*; moist; fine sand; nonplastic fines.
(Qpnl)

188.0

BOTTOM OF BORING
COMPLETED 3/9/2018

190.0



0 20 40 60

185 190 195

0 20 40 60

LEGEND

- Sample Recovery
- * Sample Not Recovered
- Sonic Core Sample
- Ground Water Level in Well
- ◇ % Fines (<0.075mm)
- ● % Water Content

NOTES

1. Refer to KEY for explanation of symbols, codes, abbreviations and definitions.
2. Groundwater level, if indicated above, is for the date specified and may vary.
3. USCS designation is based on visual-manual classification and selected lab testing.
4. The hole location was measured from existing site features and should be considered approximate.

North Mercer Island Interceptor and
Enatai Interceptor Upgrade Project
King County, Washington

LOG OF BORING NME-46

May 2018 21-1-22000-212

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FIG. A-44
Sheet 10 of 10

REV 3 - Approved for Submittal

MASTER_LOG_BFW_21-22000.GPJ_SHAN_WIL.GDT 5/17/18 Log: JAA Rev: EAS Typ: LKN

Total Depth:	16.5 ft.	Northing:	~ 214,301 ft.	Drilling Method:	Hollow Stem Auger	Hole Diam.:	5 in.
Top Elevation:	~ 120 ft.	Easting:	~ 1,306,030 ft.	Drilling Company:	CN Drilling	Rod Diam.:	AW
Vert. Datum:	KC Metro	Station:	~	Drill Rig Equipment:	Acker Soil Mechanic	Hammer Type:	Cathead
Horiz. Datum:	NAD83	Offset:	~	Other Comments:			

SOIL DESCRIPTION

Refer to the report text for a proper understanding of the subsurface materials and drilling methods. The stratification lines indicated below represent the approximate boundaries between material types, and the transition may be gradual.

Depth, ft. | Symbol | Samples | Ground Water | Depth, ft.

PENETRATION RESISTANCE (blows/foot)

▲ Hammer Wt. & Drop: 140 lbs / 30 inches

0 — 20 — 40 — 60

Loose, mottled brown and gray, *Silty Sand with Gravel (SM)*; moist; fine, subrounded to subangular gravel; fine to coarse sand; nonplastic to low plasticity fines; diamict. (Hf)

4.5

Medium dense, gray, *Poorly Graded Sand with Silt and Gravel (SP-SM)*; moist to wet; fine to coarse, subrounded to subangular gravel; fine to coarse sand; nonplastic fines. (Hf/Qvro)

9.5

Very loose, gray, *Poorly Graded Sand with Gravel (SP)*; wet; fine, subrounded to subangular gravel; fine to coarse sand; nonplastic fines. (Hf/Qvro)

12.0

Very soft, dark brown, *Organic Soil (OL)*; moist; trace fine to coarse sand; nonplastic to low plasticity fines; mostly organics. (Hp)

16.5

BOTTOM OF BORING
COMPLETED 3/27/2018

S-1 S-2 S-3 S-4 S-5 S-6

5 10 15

0 — 20 — 40 — 60

◇ % Fines (<0.075mm)
● % Water Content

DRAFT

LEGEND

- I Sample Recovery
- * Sample Not Recovered
- Sonic Core Sample
- 2.0" O.D. Split Spoon Sample

NOTES

1. Refer to KEY for explanation of symbols, codes, abbreviations and definitions.
2. Groundwater level, if indicated above, is for the date specified and may vary.
3. USCS designation is based on visual-manual classification and selected lab testing.
4. The hole location was measured from existing site features and should be considered approximate.

North Mercer Island Interceptor and
Enatai Interceptor Upgrade Project
King County, Washington

LOG OF BORING PA-1

May 2018 | 21-1-22000-212

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FIG. A-45

Log: JAA Rev: EAS Typ: LKN

MASTER_LOG_BFW_21-22000.GPJ SHAN_WIL.GDT 5/17/18

REV 3 - Approved for Submittal

Total Depth:	16.5 ft.	Northing:	~ 214,328 ft.	Drilling Method:	Hollow Stem Auger	Hole Diam.:	5 in.
Top Elevation:	~ 120 ft.	Easting:	~ 1,306,030 ft.	Drilling Company:	CN Drilling	Rod Diam.:	AW
Vert. Datum:	KC Metro	Station:	~	Drill Rig Equipment:	Acker Soil Mechanic	Hammer Type:	Cathead
Horiz. Datum:	NAD83	Offset:	~	Other Comments:			

SOIL DESCRIPTION

Refer to the report text for a proper understanding of the subsurface materials and drilling methods. The stratification lines indicated below represent the approximate boundaries between material types, and the transition may be gradual.

Loose to medium dense, black and brown, *Poorly Graded Gravel (GP)*; moist.
(Hf)

4.5

Very soft, dark brown, *Organic Soil (OL)*; moist; nonplastic to low plasticity fines; mostly organics.
(Hp)

14.5

Very loose, black, *Silty Gravel with Sand (GM)*; wet; fine, subrounded to subangular gravel; fine to coarse sand; nonplastic fines; slight odor.
(Ha)

16.5

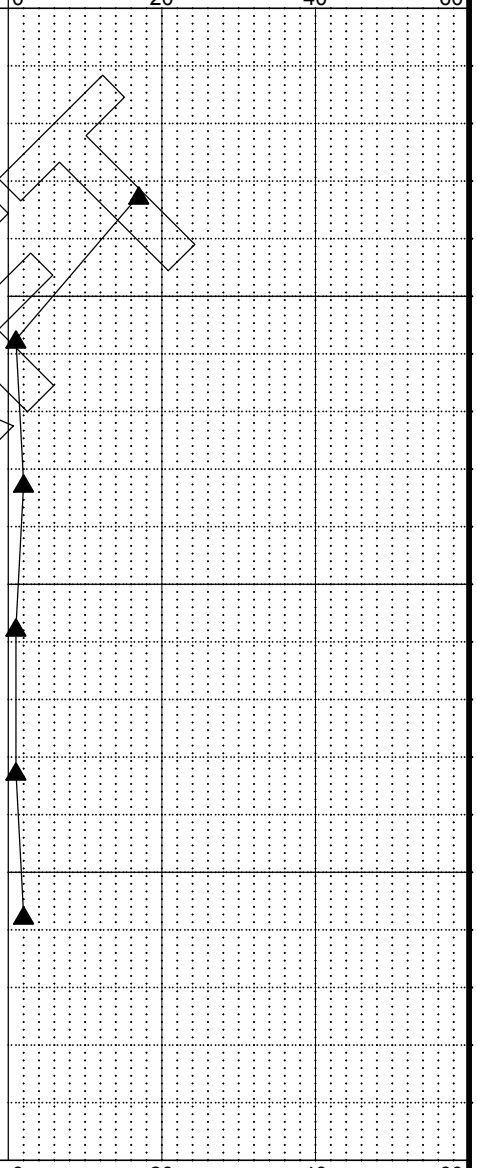
BOTTOM OF BORING
COMPLETED 3/27/2018

Depth, ft. | Symbol | Samples | Ground Water | Depth, ft.

S-1 S-2 S-3 S-4 S-5 S-6

PENETRATION RESISTANCE (blows/foot)

▲ Hammer Wt. & Drop: 140 lbs / 30 inches



◇ % Fines (<0.075mm)
● % Water Content

LEGEND

- Sample Recovery
- * Sample Not Recovered
- Sonic Core Sample
- 2.0" O.D. Split Spoon Sample

NOTES

1. Refer to KEY for explanation of symbols, codes, abbreviations and definitions.
2. Groundwater level, if indicated above, is for the date specified and may vary.
3. USCS designation is based on visual-manual classification and selected lab testing.
4. The hole location was measured from existing site features and should be considered approximate.

North Mercer Island Interceptor and
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LOG OF BORING PA-2

May 2018 21-1-22000-212

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FIG. A-46

REV 3 - Approved for Submittal

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MASTER_LOG_BFW_21-22000.GPJ SHAN_WIL.GDT 5/17/18 Log: JAA Rev: EAS Typ: LKN

APPENDIX B

HYDROGEOLOGIC DATA

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APPENDIX B

HYDROGEOLOGIC DATA

TABLES

B-1 Summary of Well Installation Data
B-2 Summary of Vibrating Wire Piezometer Installation Data

FIGURES

B-1 Water Level Readings, Boring NME-1
B-2 Water Level Readings, Boring NME-4
B-3 Water Level Readings, Boring NME-5
B-4 Water Level Readings, Boring NME-6
B-5 Water Level Readings, Boring NME-7
B-6 Water Level Readings, Boring NME-8
B-7 Water Level Readings, Boring NME-11
B-8 Water Level Readings, Boring NME-13
B-9 Water Level Readings, Boring NME-14
B-10 Water Level Readings, Boring NME-15
B-11 Water Level Readings, Boring NME-16
B-12 Water Level Readings, Boring NME-21
B-13 Water Level Readings, Boring NME-22
B-14 Water Level Readings, Boring NME-23
B-15 Water Level Readings, Boring NME-24
B-16 Water Level Readings, Boring NME-25
B-17 Water Level Readings, Boring NME-26
B-18 Water Level Readings, Boring NME-27
B-19 Water Level Readings, Boring NME-29
B-20 Water Level Readings, Boring NME-30
B-21 Water Level Readings, Boring NME-31
B-22 Water Level Readings, Boring NME-32
B-23 Water Level Readings, Boring NME-36
B-24 Water Level Readings, Boring NME-37
B-25 Water Level Readings, Boring NME-39
B-26 Water Level Readings, Boring NME-45
B-27 Water Level Readings, Boring NME-46

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TABLE B-1
SUMMARY OF WELL INSTALLATION DATA

Well No.[a]	Ecology Tag	Well Installation Date	Ground Surface & Monument Elevation[b] (feet)	Casing Stickdown Below Monument[c] (feet)	Approx. Casing Elevation[c] (feet)	Approx. Filter Pack Elevation Range[c] (feet)	Approx. Screen Elevation Range[c] (feet)	Screen Length[c] (feet)	Casing Depth Below Casing Rim (feet)	Approx. Well Bottom Elevation[c] (feet)	Sump Length[c] (feet)	Inside Casing Diameter (inches)
NME-4	BIK 214	12/18/14	195	0.26	194.2	-15.5 - -35.5	-20.5 - -35.2	14.7	229.4	-35.2	0.3	2.0
NME-7	BJX 243	10/28/16	134	0.30	133.6	110.9 - 98.0	109.2 - 99.6	9.7	34.7	99.0	0.3	2.0
NME-8	BJX 244	10/28/16	191	0.30	190.2	177.5 - 164.0	175.9 - 166.3	9.6	24.6	165.6	0.4	2.0
NME-11	BJX 245	10/31/16	256	0.60	255.0	242.1 - 228.6	240.1 - 230.4	9.7	25.5	229.5	0.3	2.0
NME-13	BJX 246	10/31/16	190	0.80	188.7	176.5 - 163.7	173.7 - 164.0	9.7	25.8	162.9	0.3	2.0
NME-14	BJX 408	12/01/16	179	0.30	179.1	171.4 - 159.4	169.4 - 159.8	9.6	19.9	159.2	0.3	2.0
NME-15	BJX 407	11/30/16	125	0.40	124.2	102.1 - 84.6	99.6 - 85.0	14.6	39.9	84.3	0.3	2.0
NME-16	BJX 247	11/01/16	179	0.50	178.2	174.7 - 162.7	173.7 - 164.0	9.7	15.0	163.2	0.3	2.0
NME-21	BJX 200	07/26/16	157	0.40	156.4	90.8 - 77.0	87.0 - 77.2	9.8	79.8	76.6	0.2	2.0
NME-22	BJX 062	07/15/16	187	0.25	186.5	60.0 - 46.8	56.9 - 47.2	9.7	139.9	46.6	0.4	2.0
NME-23	BJX 064	07/20/16	211	0.21	210.8	63.0 - 50.4	60.0 - 50.4	9.6	161.1	49.7	0.4	2.0
NME-24	BJX 063	07/22/16	159	0.30	158.5	61.8 - 40.2	59.8 - 40.2	19.6	119.0	39.5	0.4	2.0
NME-25	BJX 001	07/14/16	121	0.30	120.9	113.2 - 99.2	111.2 - 101.6	9.6	20.0	100.9	0.4	2.0
NME-26A	BJX 069	02/02/18	145	0.60	144.4	132.5 - 120.0	130.0 - 120.0	10.0	24.8	119.6	0.4	2.0
NME-27A	BJX 070	02/01/18	137	0.70	136.7	128.4 - 116.4	127.4 - 117.4	10.0	19.7	117.0	0.4	2.0
NME-29	BJX 071	02/05/18	140	0.70	139.1	131.8 - 119.8	129.8 - 119.8	10.0	19.7	119.4	0.4	2.0
NME-30	BJX 072	02/05/18	137	0.32	136.6	118.9 - 106.9	116.9 - 106.9	10.0	30.1	106.5	0.4	2.0
NME-31	BJI 901	03/28/18	129	0.20	128.4	121.1 - 108.6	118.6 - 108.6	10.0	20.2	108.2	0.4	1.3
NME-32	BJX 072	02/06/18	159	0.40	158.9	156.3 - 142.3	154.3 - 144.7	9.6	14.6	144.3	0.4	2.0
NME-36	BJX 075	02/08/18	233	0.25	232.9	229.1 - 218.1	228.1 - 218.4	9.7	14.9	218.0	0.4	2.0
NME-37	BJX 074	02/07/18	196	0.60	195.0	188.1 - 175.6	185.6 - 175.6	10.0	19.8	175.2	0.4	2.0
NME-39	BJX 076	02/08/18	153	0.40	152.1	144.5 - 132.5	142.5 - 132.8	9.7	19.7	132.4	0.4	2.0
NME-45	BKX 118	03/07/18	199	0.45	198.3	86.7 - 70.7	83.7 - 74.1	9.6	124.6	73.7	0.4	2.0
NME-46	BKX 119	03/12/18	225	0.30	198.3	73.6 - 56.6	70.3 - 60.7	9.6	164.0	34.3	0.4	2.0

Notes:

[a] Well No. corresponds to Exploration No. (see Table A-1).

[b] Ground surface elevation is from "2018-04-06_Overall.dwg" from Jacobs, "E00306E13dtm_EAST.dwg" from Tetra Tech, and "333-E00306E13-PS-D-2017 -Floor Plan - Export - SITE PLAN.dwg" from Tetra Tech dated 2018-05-03.

[c] Value shown was based on hand measurements during well construction.

TABLE B-2
SUMMARY OF VIBRATING WIRE PIEZOMETER INSTALLATION DATA

VWP No.[a]	Ecology Tag	VWP Installation Date	Ground Surface & Monument Elevation[b] (feet)	VWP Depth Below Ground Surface[c] (feet)	Approx. VWP Elevation[c] (feet)	Approx. Filter Pack Elevation Range[c] (feet)	Instrument Information[d]					
							Serial No.	Pressure Range[e] (psi)	Linear Gauge Factor (psi/digit)	Thermal Factor (psi/°Celsius)	Field Saturated Zero Reading (digits)	Field Initial Temperature (°Celsius)
NME-1	BIK 215	1/7/2015	165.00	65.0	100.0	N/A - N/A	1323729	100	-0.02763	0.001025	8833.6	8.0
NME-1	BIK 215	1/7/2015	165.00	110.0	55.0	N/A - N/A	1439717	145	-0.0389	0.0002609	8950	8.0
NME-4	BIK 214	12/18/2015	195.00	130.0	65.0	N/A - N/A	1424362	50	-0.01508	-0.01507	8724.9	7.6
NME-4	BIK 214	12/18/2015	195.00	148.0	47.0	N/A - N/A	1424358	50	-0.0168	-0.02255	8792.1	8.0
NME-5	BIO 370	4/15/2015	200.00	48.0	152.0	155.0 - 150.5	1332378	50	-0.01717	-0.005803	8815	9.4
NME-5	BIO 370	4/15/2015	200.00	142.0	58.0	61.5 - 55.0	07-13827	100	0.02317	-0.01543	8948.6	8.8
NME-6	BIQ 371	4/22/2015	148.00	23.0	125.0	N/A - N/A	1431550	50	-0.01696	0.009821	8876.1	10.3
NME-6	BIQ 371	4/22/2015	148.00	91.0	57.0	N/A - N/A	1501328	50	-0.01555	-0.01144	9153	10.3
NME-21	BJX 200	7/26/2016	157.00	49.5	107.5	109.0 - 106.2	1612519	50	-0.01706	-0.007269	8482.6	10.3
NME-22	BJX 062	7/15/2016	187.00	88.0	99.0	102.0 - 98.0	1537358	101	-0.02205	0.005563	8747	21.4
NME-24	BJX 063	7/22/2016	159.00	65.0	94.0	98.0 - 92.0	1514114	101	-0.03938	0.02167	8819.6	17.9

Notes:

[a] VWP = vibrating wire piezometer. VWP No. corresponds to Exploration No. (see Table A-1).

[b] Ground surface elevation is from "2018-04-06_Overall.dwg" from Jacobs, "E00306E13dtm_EAST.dwg" from Tetra Tech, and "333-E00306E13-PS-D-2017 -Floor Plan - Export - SITE PLAN.dwg" from Tetra Tech dated 2018-05-03.

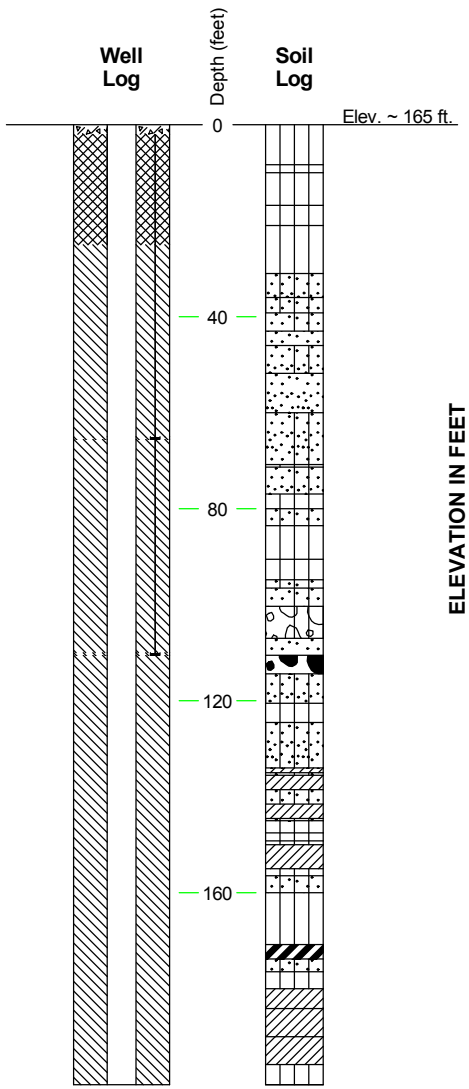
[c] Value shown was based on hand measurements during VWP construction.

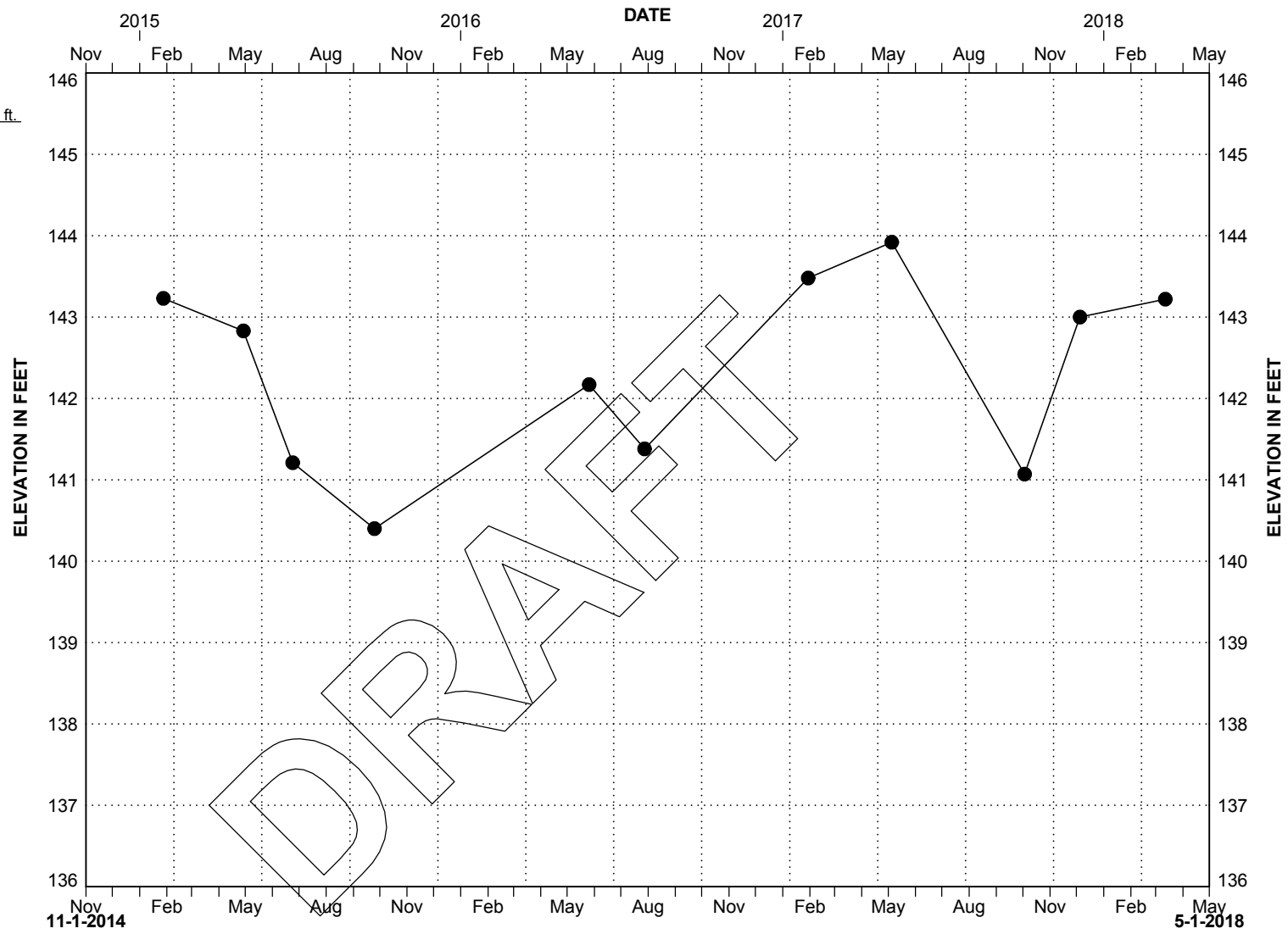
[d] Instrument is Geokon Model 4500S.

[e] psi = Pounds/square inch

N/A = Not applicable

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NOTES:

1. Refer to the Soil Classification and Log Key for explanations of graphic symbols in logs shown above. Additional information is shown on the log for boring NME-1 (see Figure A-02).
2. Read Point Depth or Elevation *(as listed in legend table at right)* is equal to the depth or elevation of the tip of the vibrating wire pressure (VWP) transducer or the bottom of the screen of the observation well (OW). Measured groundwater elevations less than these values are considered as "Dry".

Well Identification	Read Point Depth (feet)	Read Point Elev. (feet)	Water Level Elevation (feet) Low	High
NME-1 VWP1	65	100.0	140.4	143.9

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WATER LEVEL READINGS BORING NME-1

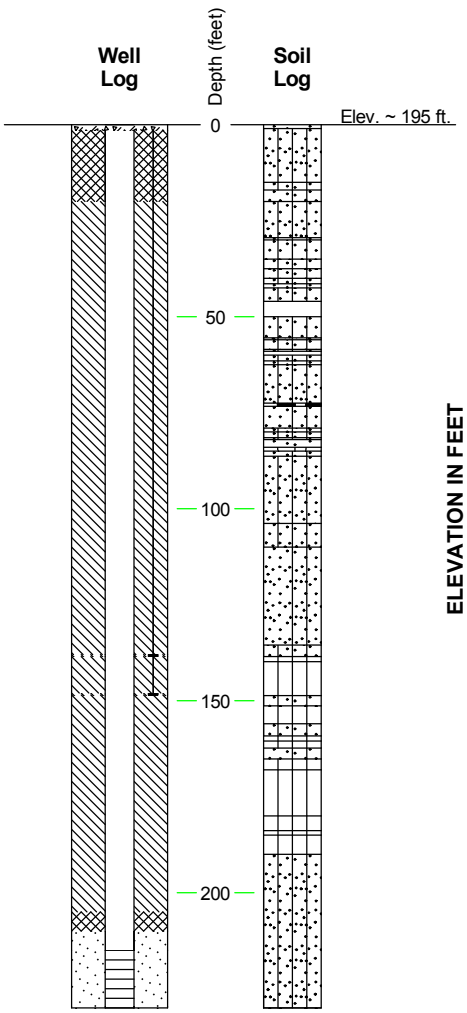
May 2018 21-1-22000-212

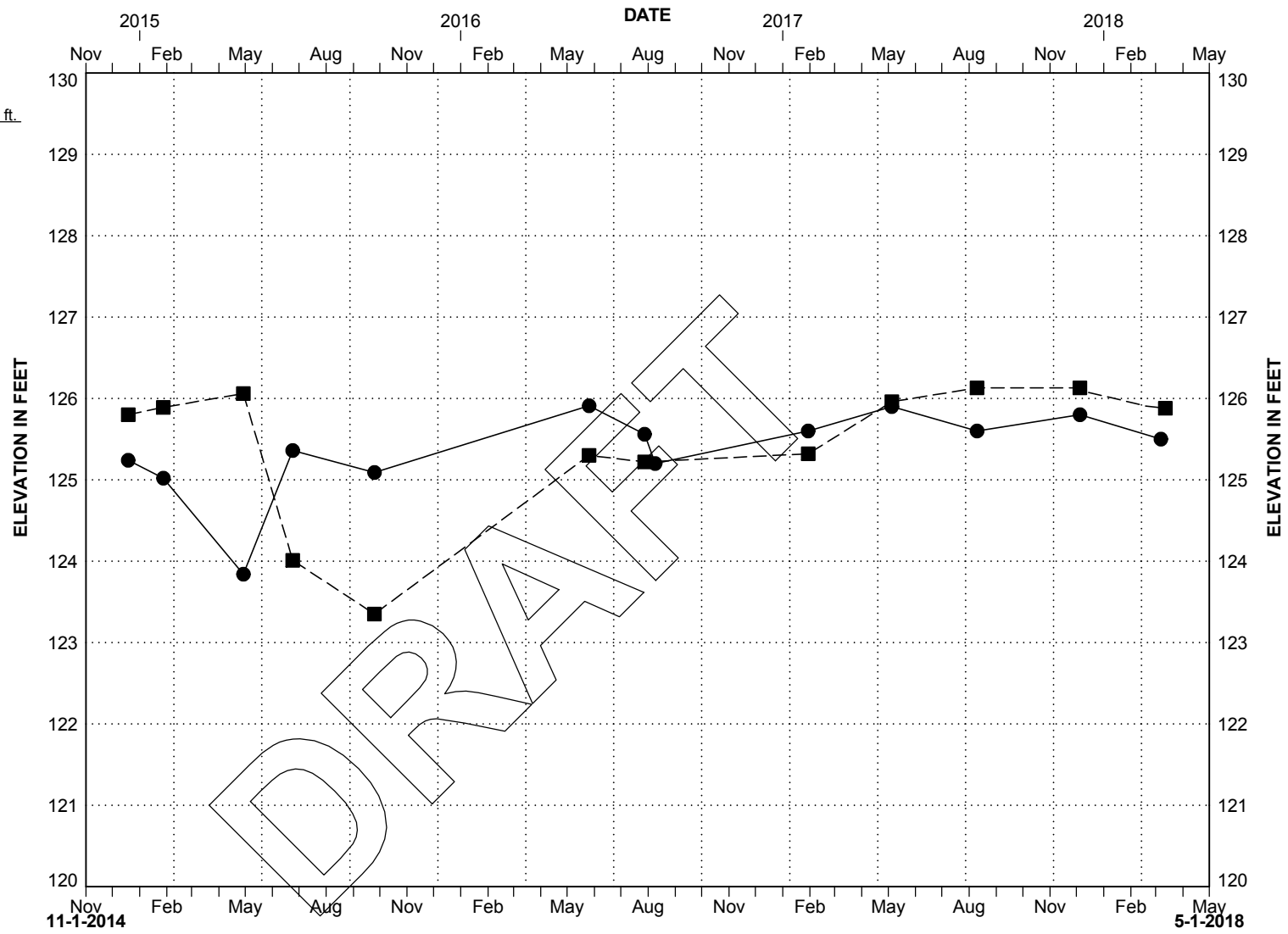
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FIG. B-1

FIG. B-1

GW PLOT ELEV. 21-22000.GPJ 21-21979.GPJ 5/17/18





NOTES:

1. Refer to the Soil Classification and Log Key for explanations of graphic symbols in logs shown above. Additional information is shown on the log for boring NME-4 (see Figure A-03).
2. Read Point Depth or Elevation *(as listed in legend table at right)* is equal to the depth or elevation of the tip of the vibrating wire pressure (VWP) transducer or the bottom of the screen of the observation well (OW). Measured groundwater elevations less than these values are considered as "Dry".

Well Identification	Read Point Depth (feet)	Read Point Elev. (feet)	Water Level Elevation (feet) Low	High
NME-4 OW1	230	-35.0	123.8	125.9
NME-4 VWP3	148	47.0	123.4	126.1

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WATER LEVEL READINGS BORING NME-4

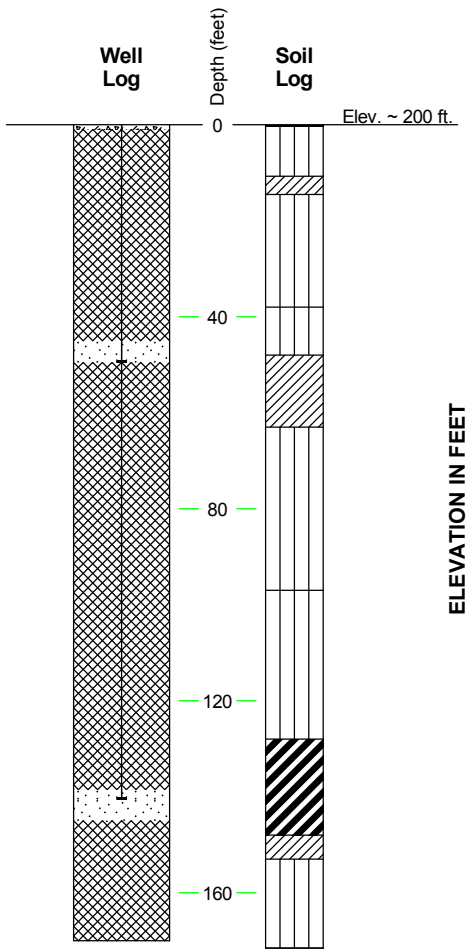
May 2018 21-1-22000-212

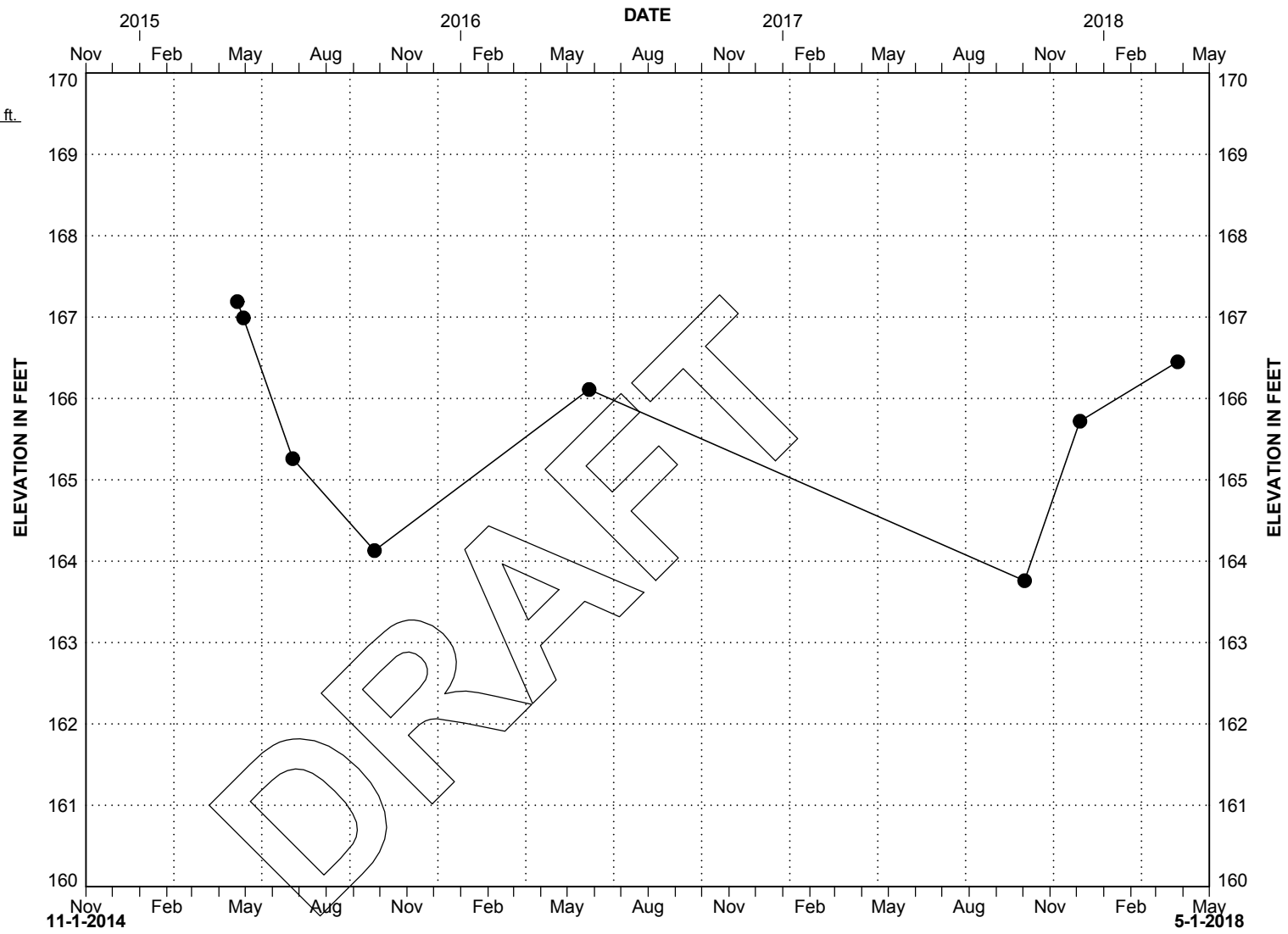
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FIG. B-2

FIG. B-2

GW PLOT ELEV. 21-22000.GPJ 21-21979.GPJ 5/17/18





NOTES:

1. Refer to the Soil Classification and Log Key for explanations of graphic symbols in logs shown above. Additional information is shown on the log for boring NME-5 (see Figure A-04).
2. Read Point Depth or Elevation *(as listed in legend table at right)* is equal to the depth or elevation of the tip of the vibrating wire pressure (VWP) transducer or the bottom of the screen of the observation well (OW). Measured groundwater elevations less than these values are considered as "Dry".

Well Identification	Read Point Depth (feet)	Read Point Elev. (feet)	Water Level Elevation (feet) Low	High
NME-5 VWP1	49	151.0	163.8	167.2

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WATER LEVEL READINGS BORING NME-5

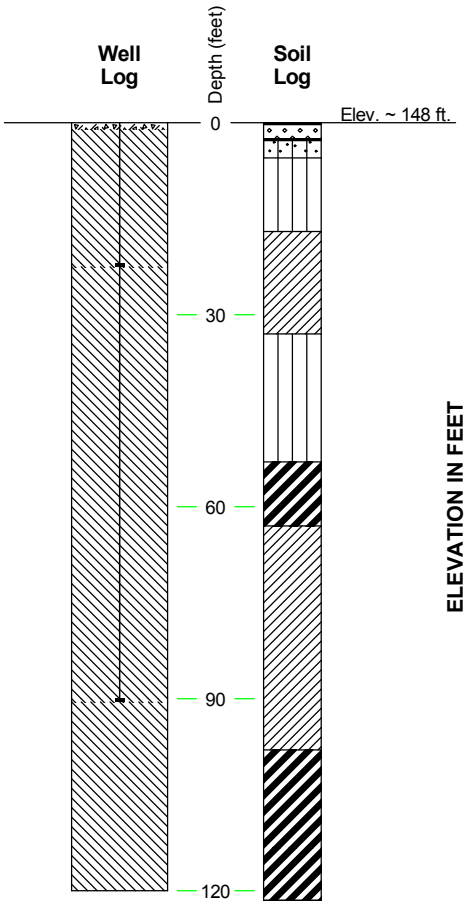
May 2018 21-1-22000-212

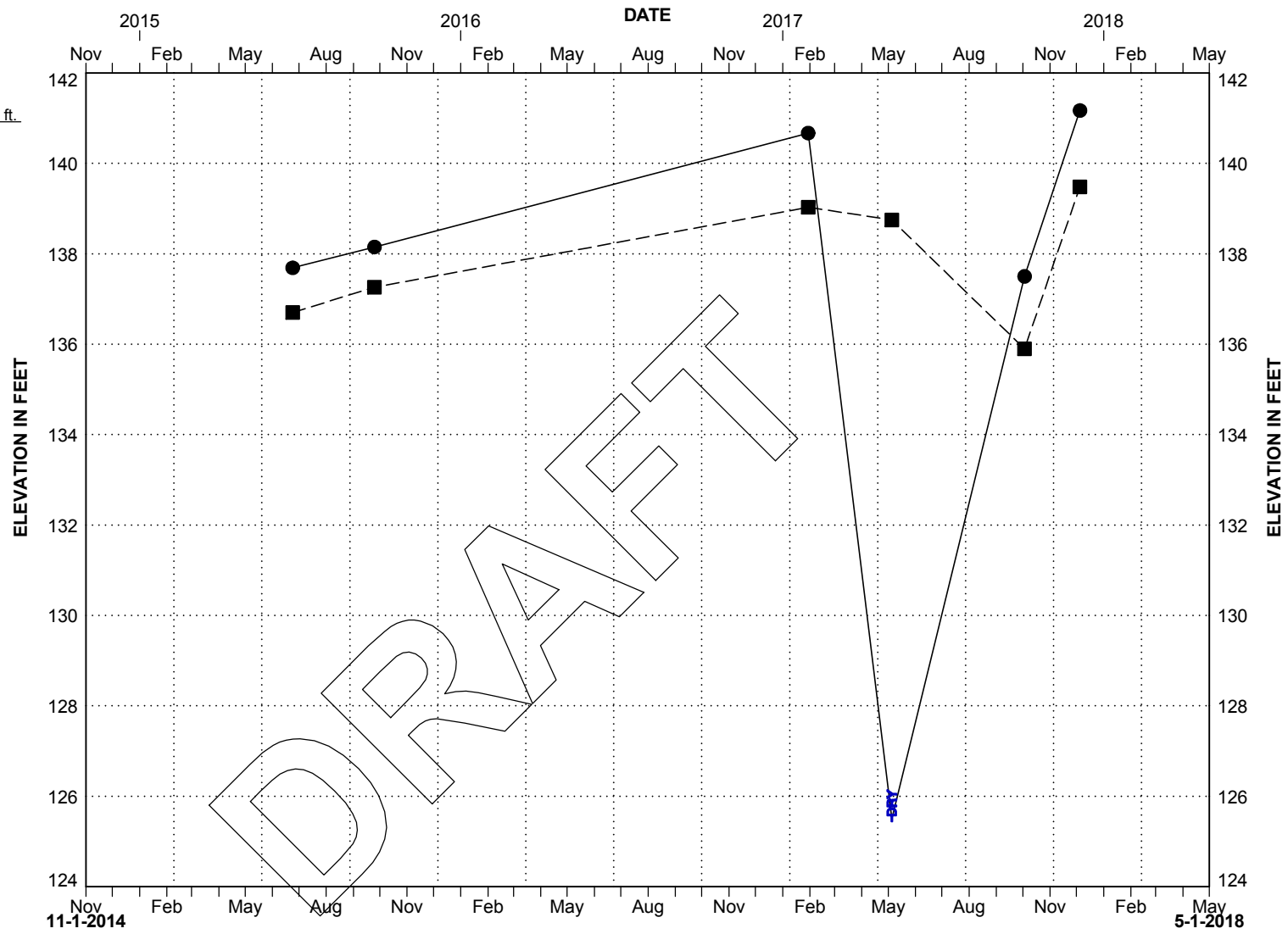
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FIG. B-3

FIG. B-3

GW PLOT ELEV. 21-22000.GPJ, 21-21979.GPJ, 5/17/18





NOTES:

1. Refer to the Soil Classification and Log Key for explanations of graphic symbols in logs shown above. Additional information is shown on the log for boring NME-6 (see Figure A-05).
2. Read Point Depth or Elevation *(as listed in legend table at right)* is equal to the depth or elevation of the tip of the vibrating wire pressure (VWP) transducer or the bottom of the screen of the observation well (OW). Measured groundwater elevations less than these values are considered as "Dry".

Well Identification	Read Point Depth (feet)	Read Point Elev. (feet)	Water Level Elevation (feet) Low	High
NME-6 VWP1	22.5	125.5	Dry	141.2
NME-6 VWP2	90.5	57.5	135.9	139.5

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WATER LEVEL READINGS BORING NME-6

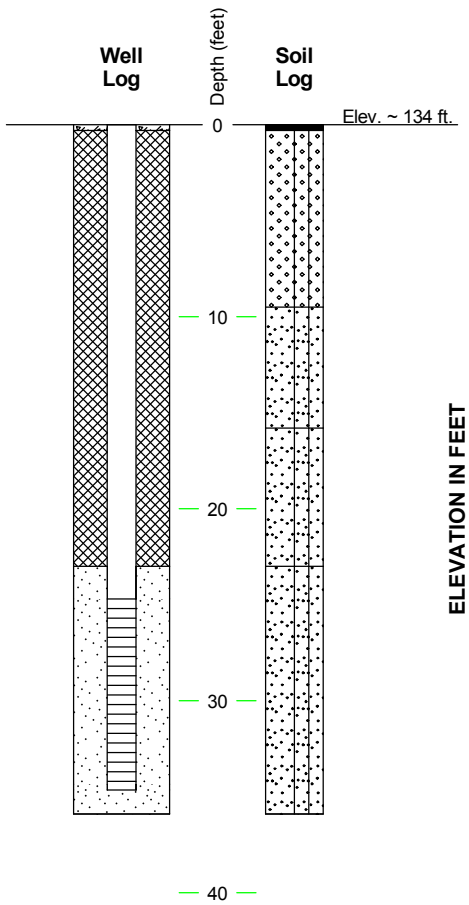
May 2018 21-1-22000-212

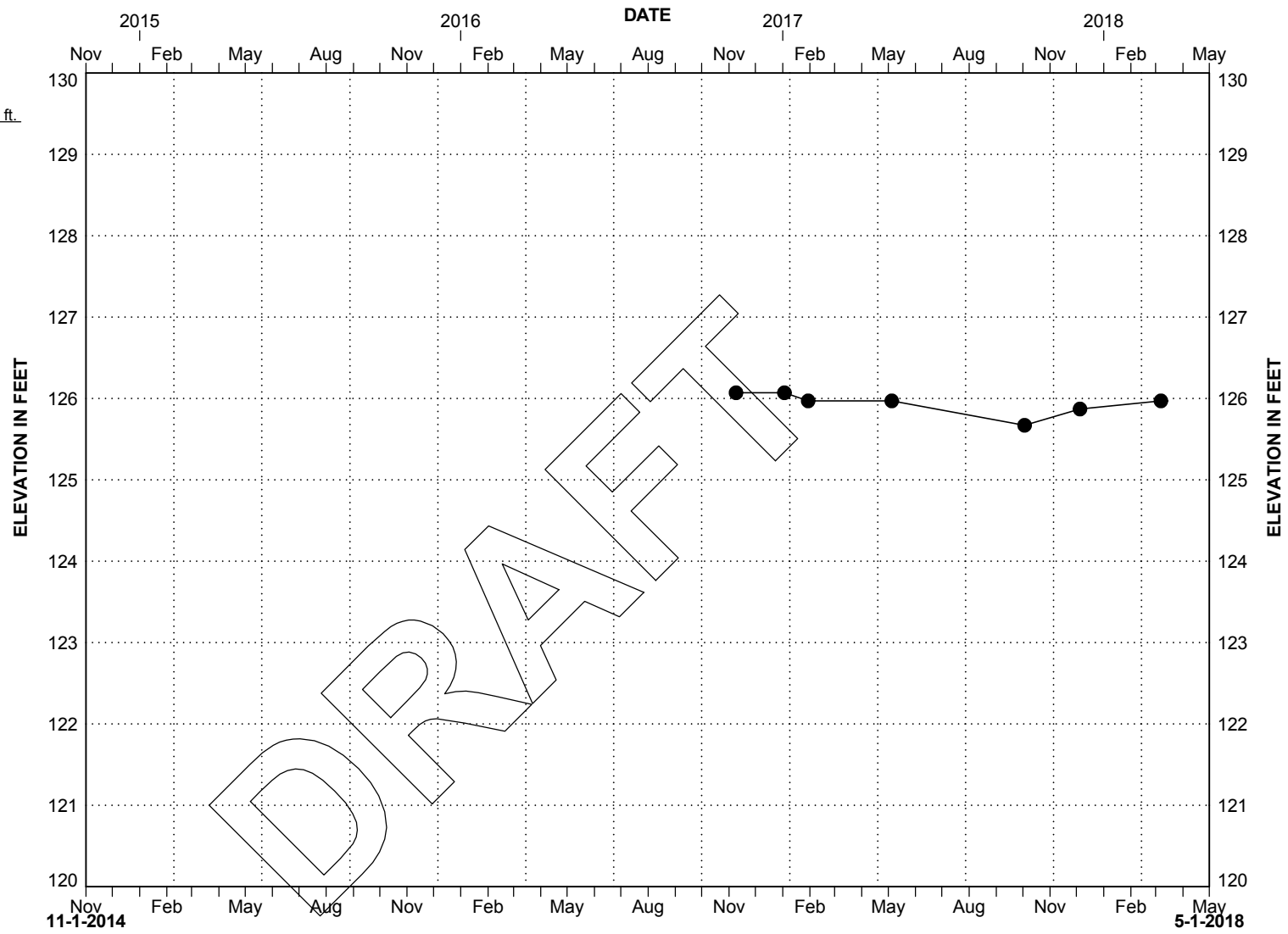
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FIG. B-4

FIG. B-4

GW PLOT ELEV. 21-22000.GPJ 21-21979.GPJ 5/17/18





GW PLOT ELEV 21-22000.GPJ 21-21979.GPJ 5/17/18

NOTES:

1. Refer to the Soil Classification and Log Key for explanations of graphic symbols in logs shown above. Additional information is shown on the log for boring NME-7 (see Figure A-06).
2. Read Point Depth or Elevation *(as listed in legend table at right)* is equal to the depth or elevation of the tip of the vibrating wire pressure (VWP) transducer or the bottom of the screen of the observation well (OW). Measured groundwater elevations less than these values are considered as "Dry".

Well Identification	Read Point Depth (feet)	Read Point Elev. (feet)	Water Level Elevation (feet) Low	High
NME-7 OW1	32	102.0	125.7	126.1

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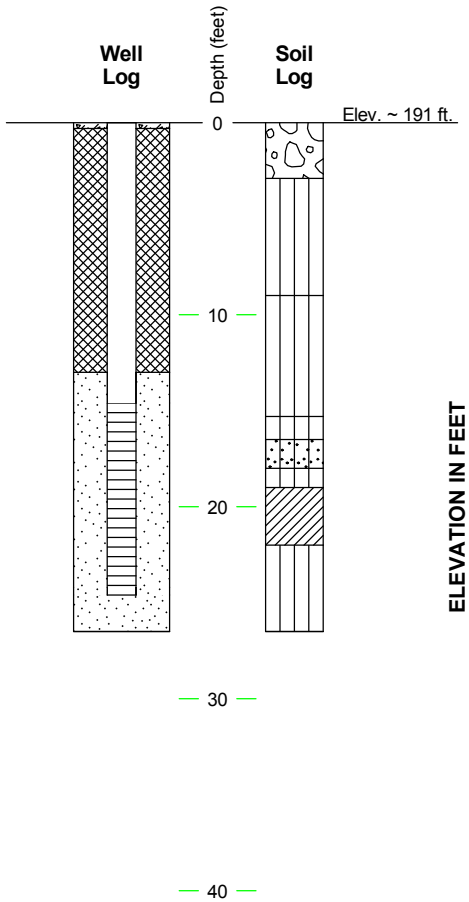
WATER LEVEL READINGS BORING NME-7

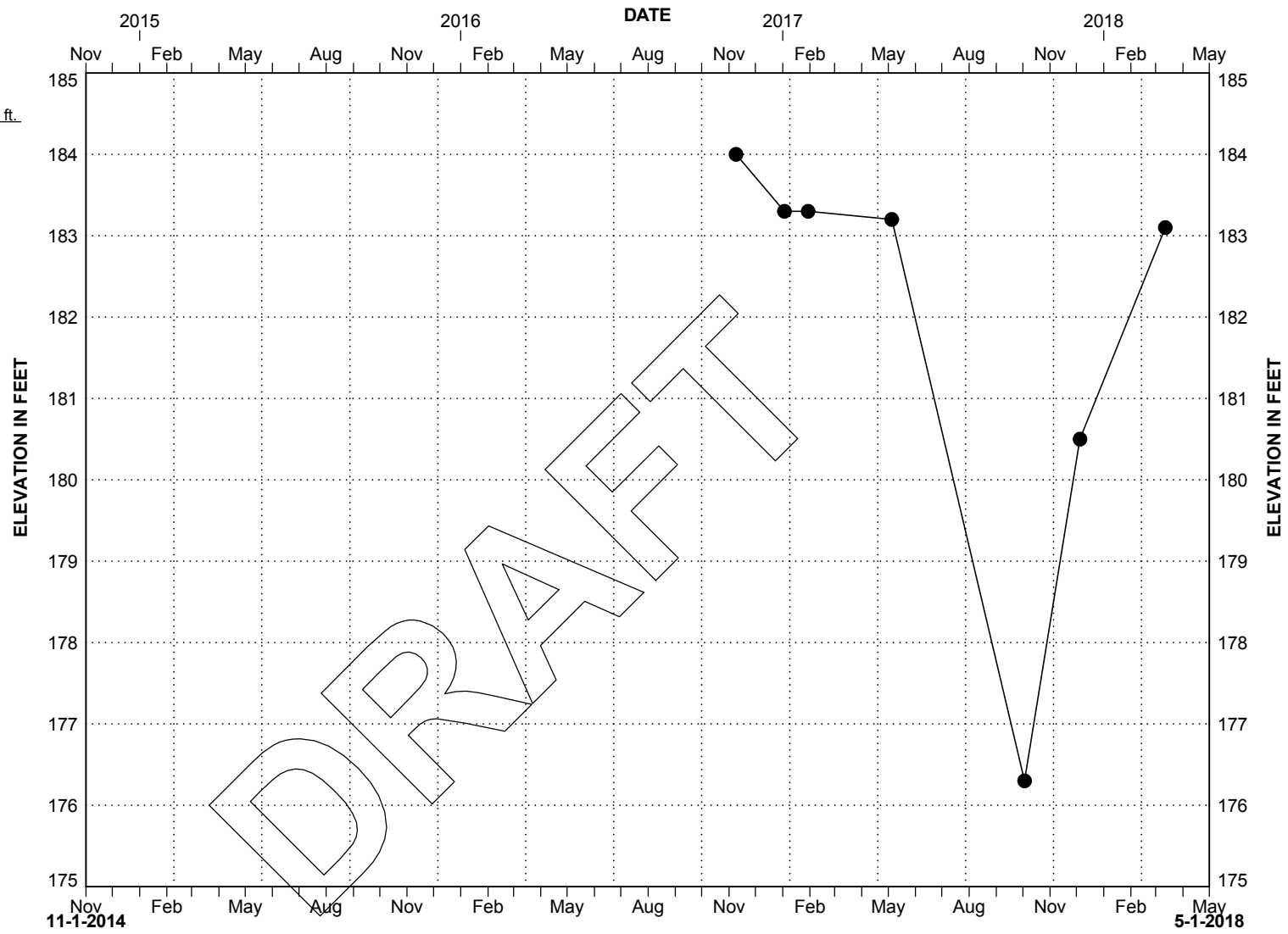
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FIG. B-5

FIG. B-5





NOTES:

1. Refer to the Soil Classification and Log Key for explanations of graphic symbols in logs shown above. Additional information is shown on the log for boring NME-8 (see Figure A-07).
2. Read Point Depth or Elevation *(as listed in legend table at right)* is equal to the depth or elevation of the tip of the vibrating wire pressure (VWP) transducer or the bottom of the screen of the observation well (OW). Measured groundwater elevations less than these values are considered as "Dry".

Well Identification	Read Point Depth (feet)	Read Point Elev. (feet)	Water Level Elevation (feet) Low	High
NME-8 OW1	23.9	167.1	176.3	184.0

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WATER LEVEL READINGS BORING NME-8

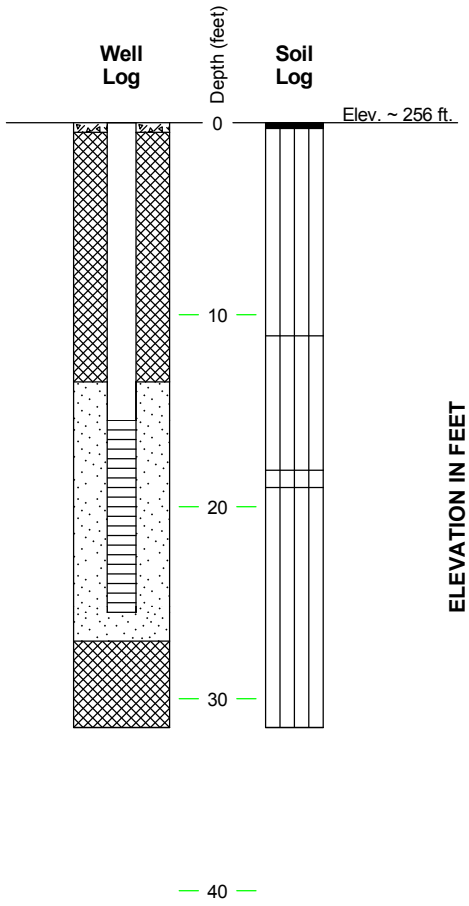
May 2018 21-1-22000-212

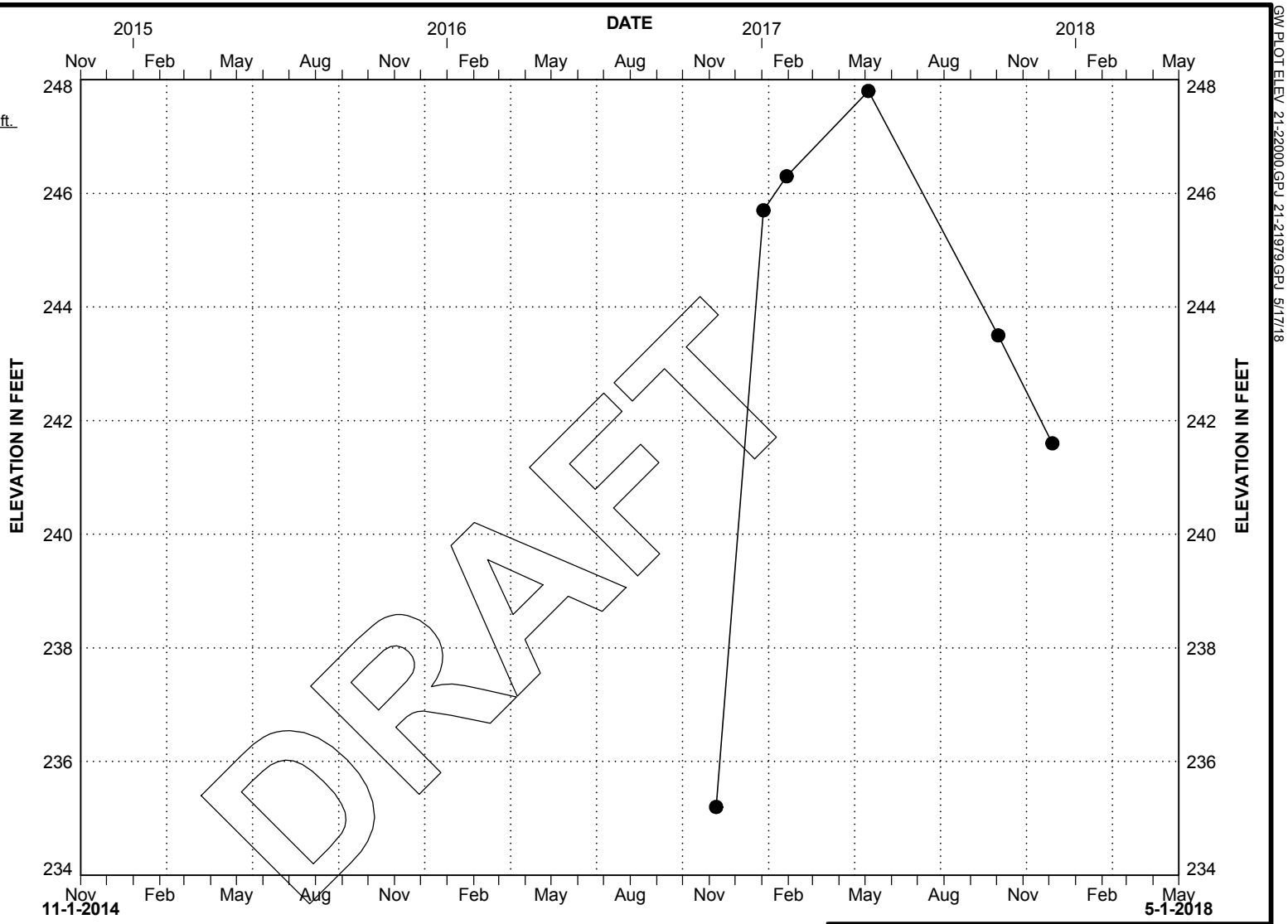
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FIG. B-6

FIG. B-6

GW PLOT ELEV 21-22000.GPJ 21-21979.GPJ 5/17/18





NOTES:

1. Refer to the Soil Classification and Log Key for explanations of graphic symbols in logs shown above. Additional information is shown on the log for boring NME-11 (see Figure A-10).
2. Read Point Depth or Elevation *(as listed in legend table at right)* is equal to the depth or elevation of the tip of the vibrating wire pressure (VWP) transducer or the bottom of the screen of the observation well (OW). Measured groundwater elevations less than these values are considered as "Dry".

Well Identification	Read Point Depth (feet)	Read Point Elev. (feet)	Water Level Elevation (feet) Low	High
NME-11 OW1	26	230.0	235.2	248.8

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WATER LEVEL READINGS BORING NME-11

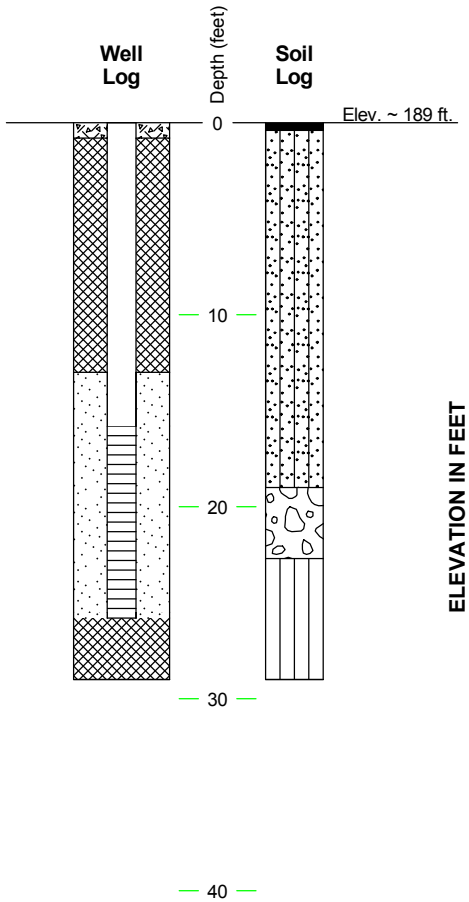
May 2018 21-1-22000-212

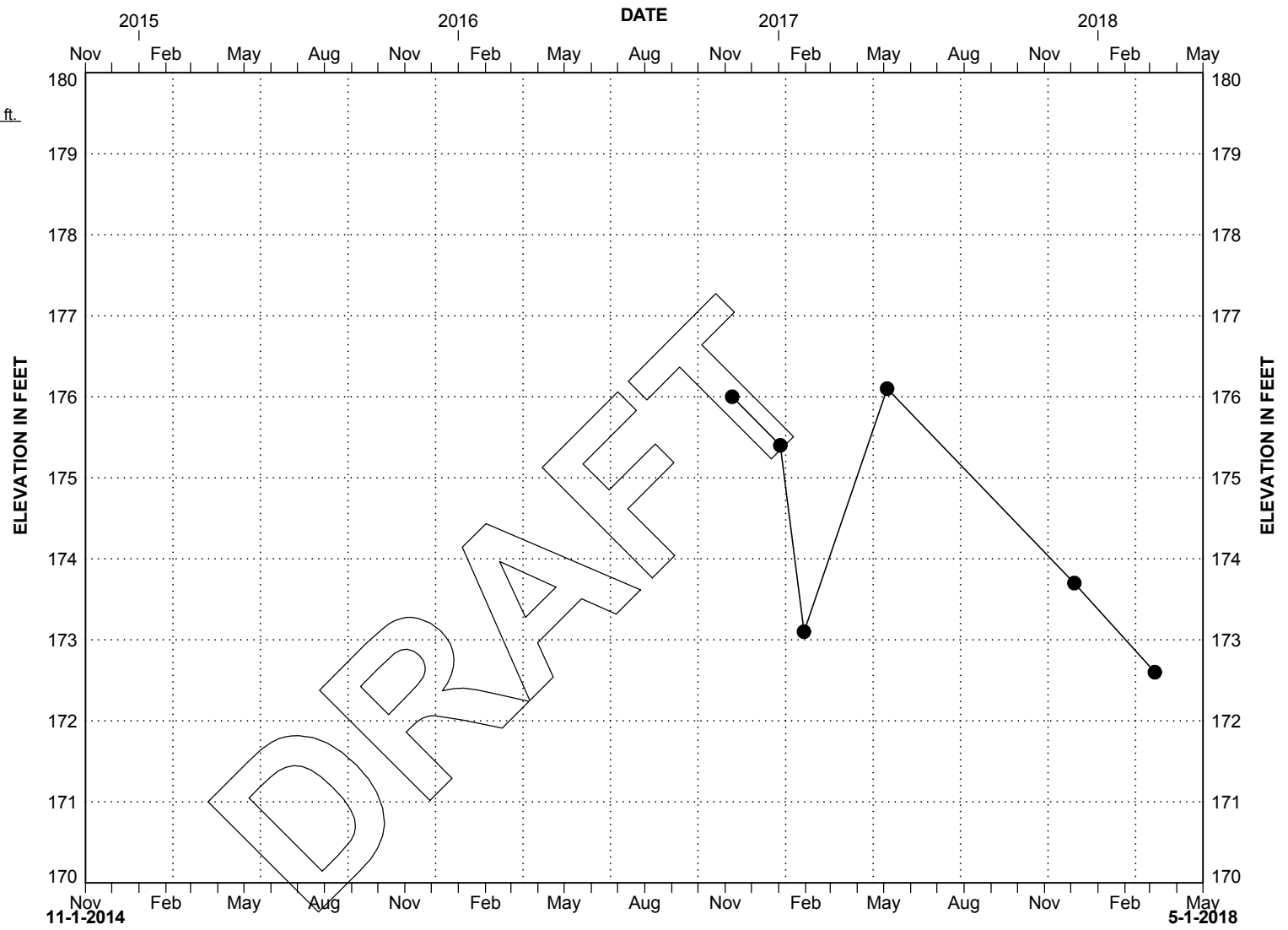
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FIG. B-7

FIG. B-7

GW PLOT ELEV. 21-22000.GPJ 21-21979.GPJ 5/17/18





NOTES:

1. Refer to the Soil Classification and Log Key for explanations of graphic symbols in logs shown above. Additional information is shown on the log for boring NME-13 (see Figure A-12).
2. Read Point Depth or Elevation *(as listed in legend table at right)* is equal to the depth or elevation of the tip of the vibrating wire pressure (VWP) transducer or the bottom of the screen of the observation well (OW). Measured groundwater elevations less than these values are considered as "Dry".

Well Identification	Read Point Depth (feet)	Read Point Elev. (feet)	Water Level Elevation (feet) Low	High
NME-13 OW1	23	166.0	172.6	176.1

North Mercer Island Interceptor and Enatai Interceptor Upgrade Project
King County, Washington

WATER LEVEL READINGS BORING NME-13

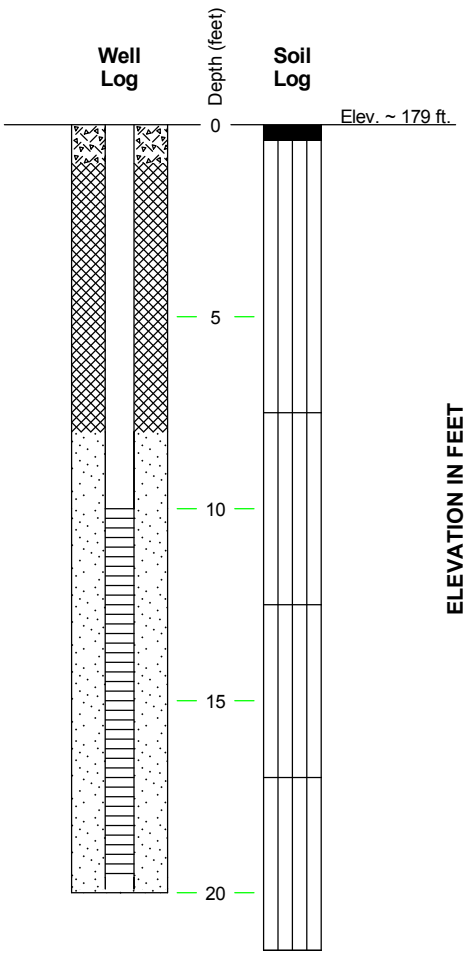
May 2018 21-1-22000-212

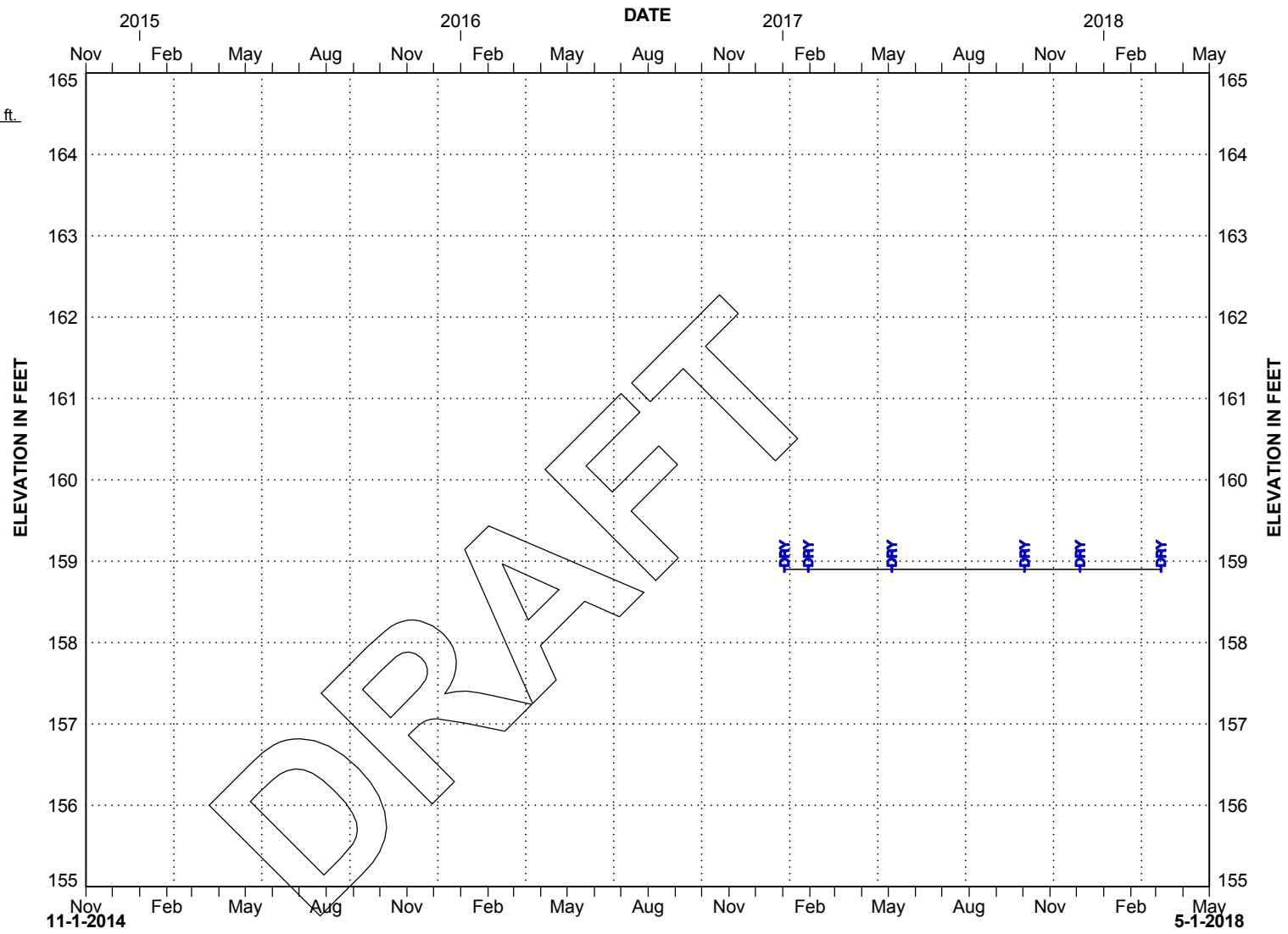
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FIG. B-8

FIG. B-8

GW PLOT ELEV. 21-22000.GPJ. 21-21979.GPJ. 5/17/18





NOTES:

1. Refer to the Soil Classification and Log Key for explanations of graphic symbols in logs shown above. Additional information is shown on the log for boring NME-14 (see Figure A-13).
2. Read Point Depth or Elevation *(as listed in legend table at right)* is equal to the depth or elevation of the tip of the vibrating wire pressure (VWP) transducer or the bottom of the screen of the observation well (OW). Measured groundwater elevations less than these values are considered as "Dry".

Well Identification	Read Point Depth (feet)	Read Point Elev. (feet)	Water Level Elevation (feet) Low	High
NME-14 OW1	20.1	158.9	Dry	Dry

North Mercer Island Interceptor and Enatai Interceptor Upgrade Project
King County, Washington

WATER LEVEL READINGS BORING NME-14

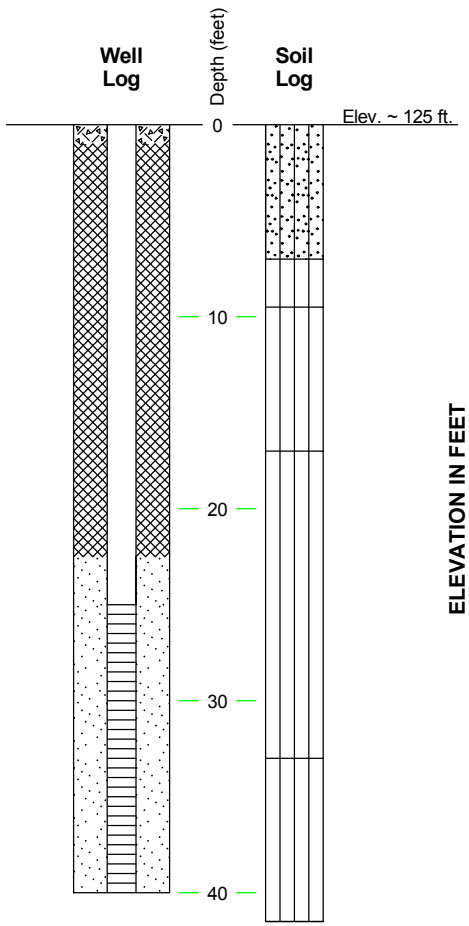
May 2018 21-1-22000-212

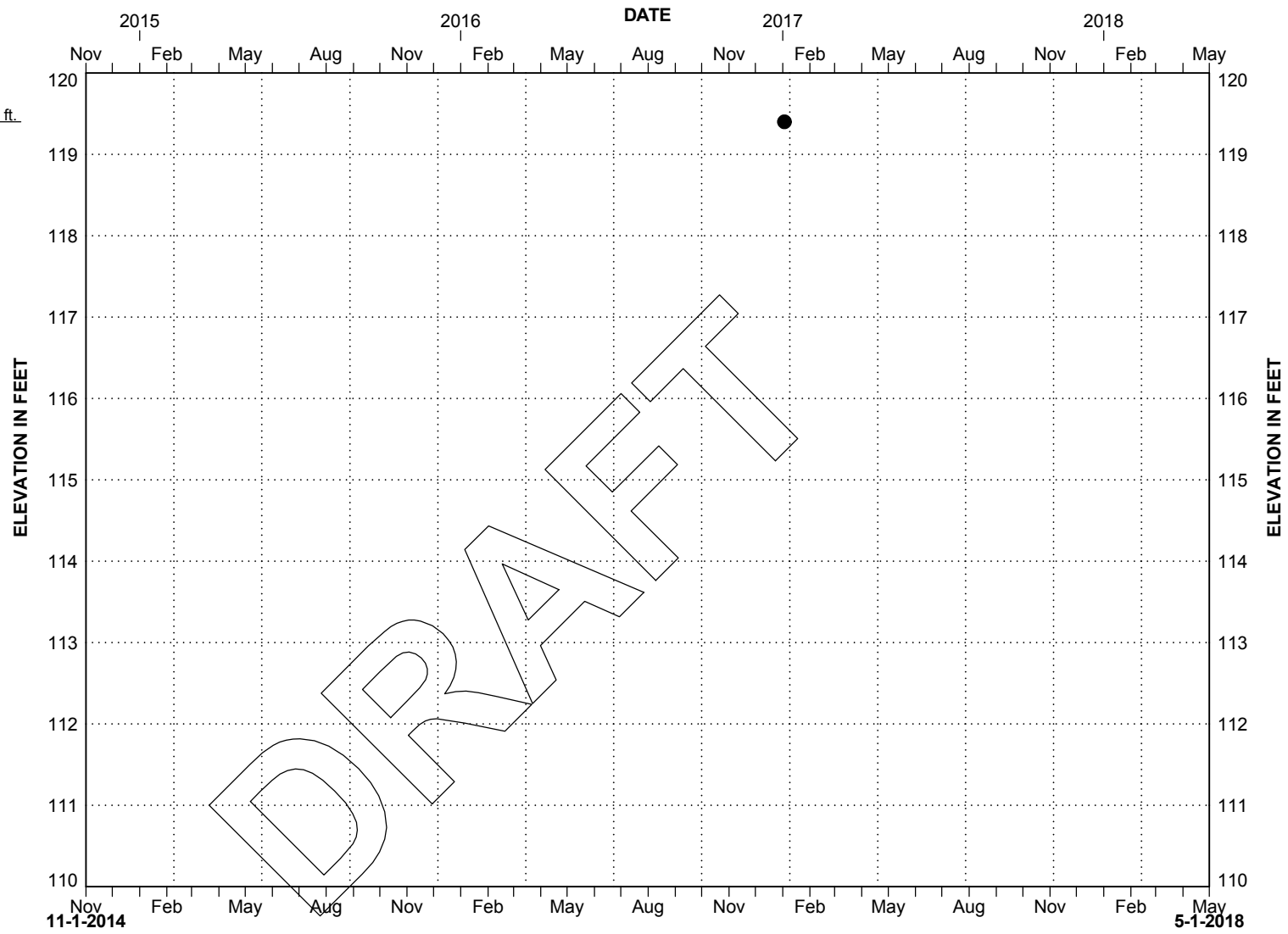
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FIG. B-9

FIG. B-9

GW PLOT ELEV 21-22000.GPJ 21-21979.GPJ 5/17/18





GW PLOT ELEV 21-22000.GPJ 21-21979.GPJ 5/17/18

NOTES:

1. Refer to the Soil Classification and Log Key for explanations of graphic symbols in logs shown above. Additional information is shown on the log for boring NME-15 (see Figure A-14).
2. Read Point Depth or Elevation *(as listed in legend table at right)* is equal to the depth or elevation of the tip of the vibrating wire pressure (VWP) transducer or the bottom of the screen of the observation well (OW). Measured groundwater elevations less than these values are considered as "Dry".

Well Identification	Read Point Depth (feet)	Read Point Elev. (feet)	Water Level Elevation (feet) Low	High
NME-15 OW1	25.2	99.8	119.4	123.7

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King County, Washington

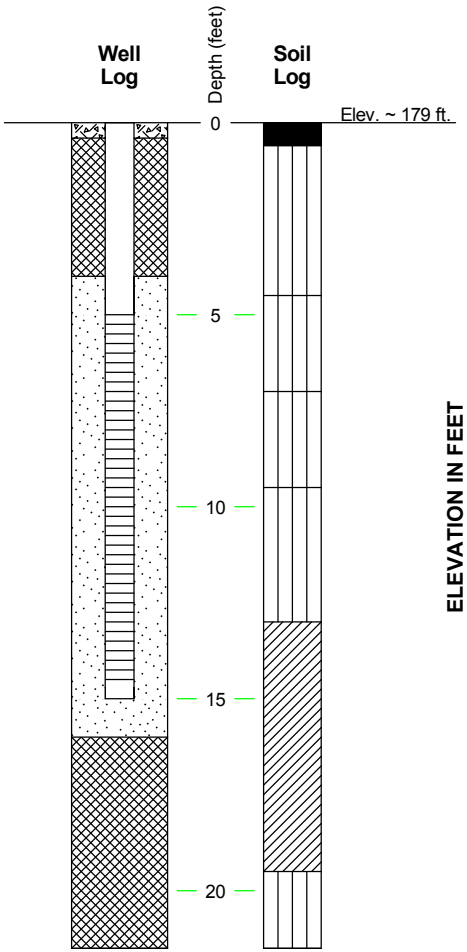
WATER LEVEL READINGS BORING NME-15

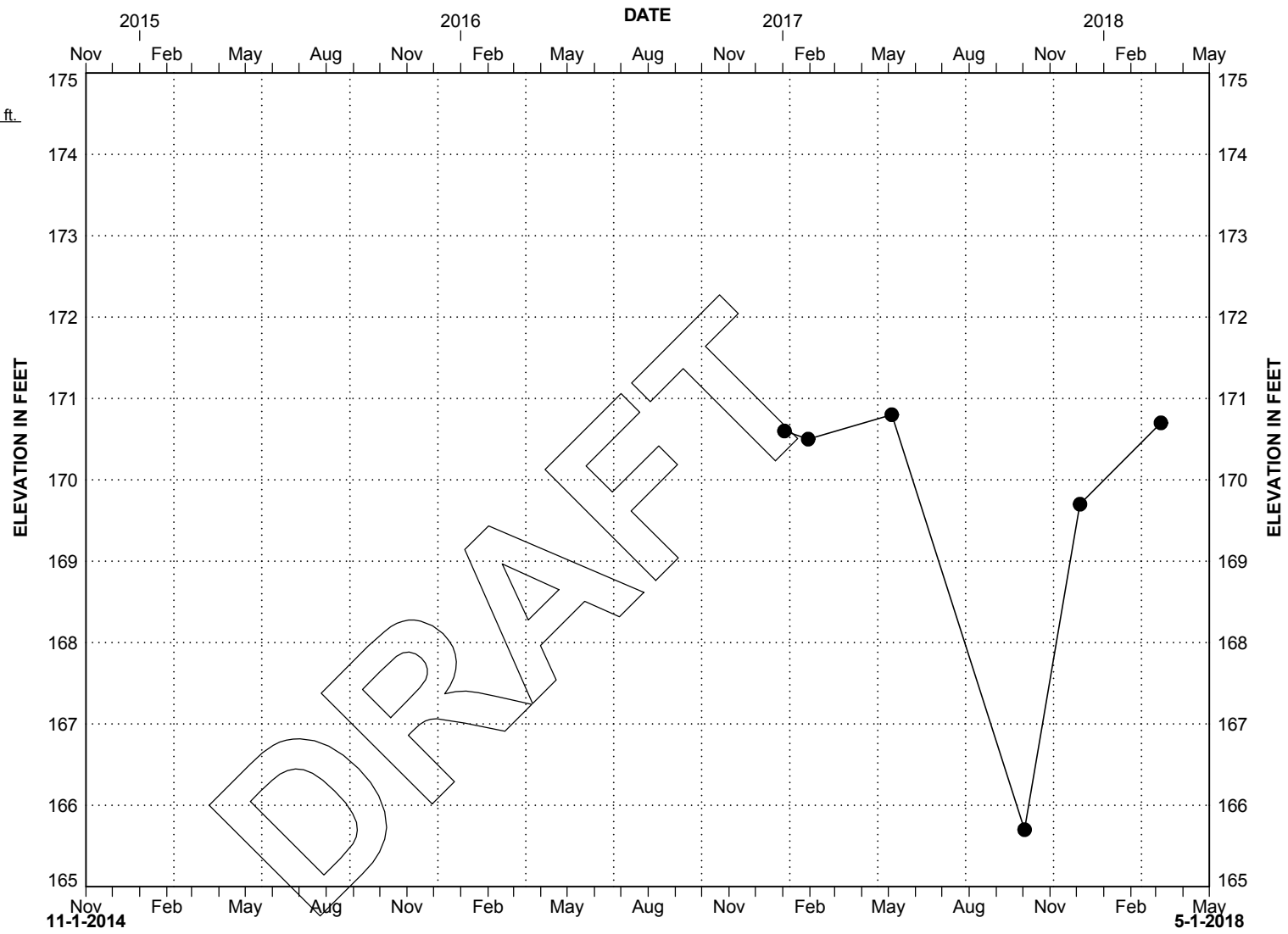
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FIG. B-10

FIG. B-10





NOTES:

1. Refer to the Soil Classification and Log Key for explanations of graphic symbols in logs shown above. Additional information is shown on the log for boring NME-16 (see Figure A-15).
2. Read Point Depth or Elevation *(as listed in legend table at right)* is equal to the depth or elevation of the tip of the vibrating wire pressure (VWP) transducer or the bottom of the screen of the observation well (OW). Measured groundwater elevations less than these values are considered as "Dry".

Well Identification	Read Point Depth (feet)	Read Point Elev. (feet)	Water Level Elevation (feet) Low	High
NME-16 OW1	14.9	164.1	164.9	170.8

North Mercer Island Interceptor and
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King County, Washington

WATER LEVEL READINGS
BORING NME-16

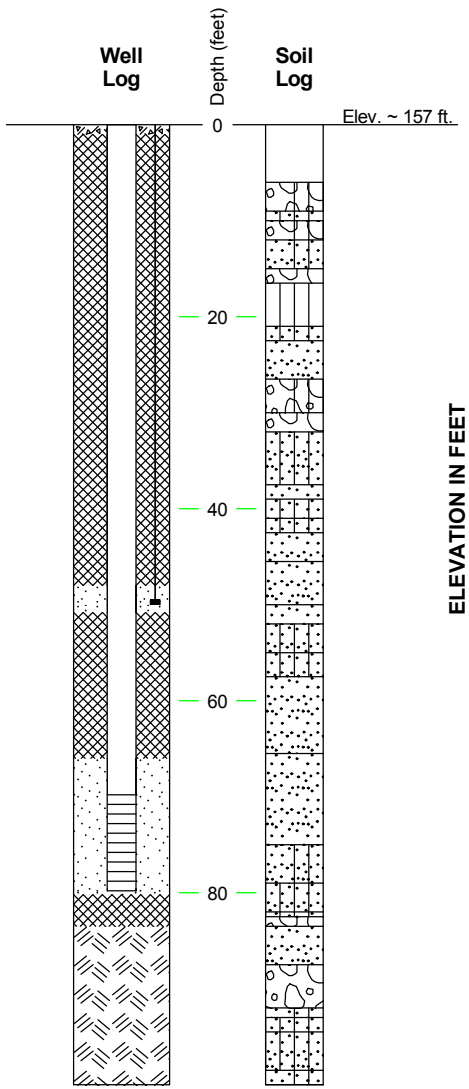
May 2018 21-1-22000-212

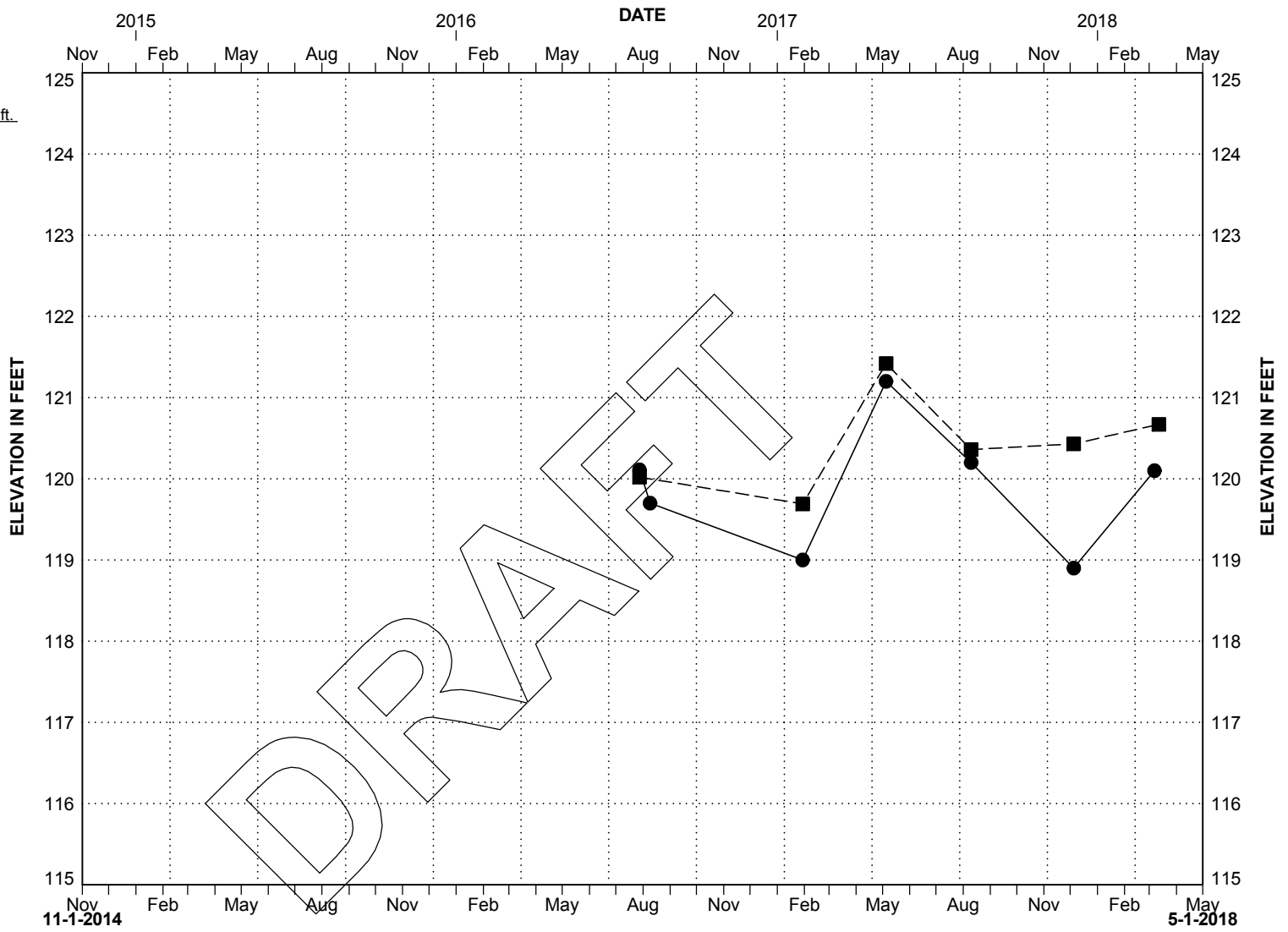
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FIG. B-11

FIG. B-11

GW PLOT ELEV. 21-22000.GPJ. 21-21979.GPJ. 5/17/18





NOTES:

1. Refer to the Soil Classification and Log Key for explanations of graphic symbols in logs shown above. Additional information is shown on the log for boring NME-21 (see Figure A-20).
2. Read Point Depth or Elevation *(as listed in legend table at right)* is equal to the depth or elevation of the tip of the vibrating wire pressure (VWP) transducer or the bottom of the screen of the observation well (OW). Measured groundwater elevations less than these values are considered as "Dry".

Well Identification	Read Point Depth (feet)	Read Point Elev. (feet)	Water Level Elevation (feet) Low	High
NME-21 OW1	80.1	76.9	118.9	121.2
NME-21 VWP2	49.5	107.5	119.7	121.4

North Mercer Island Interceptor and Enatai Interceptor Upgrade Project
King County, Washington

WATER LEVEL READINGS SONIC CORE NME-21

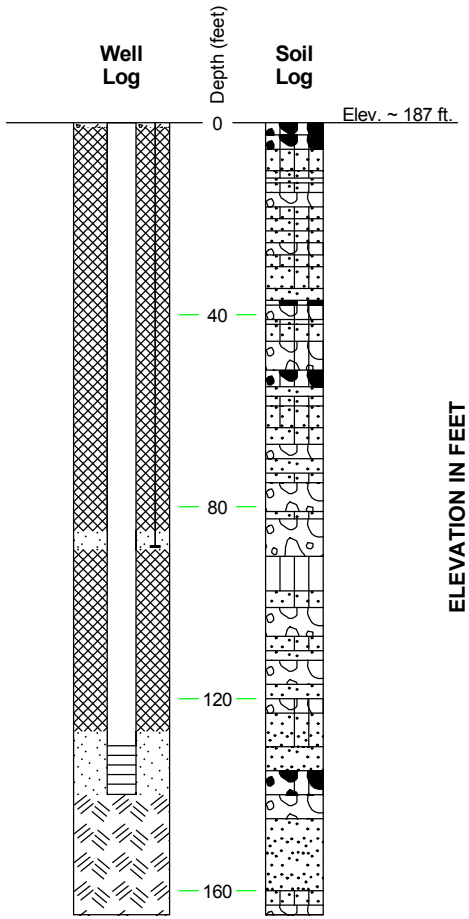
May 2018 21-1-22000-212

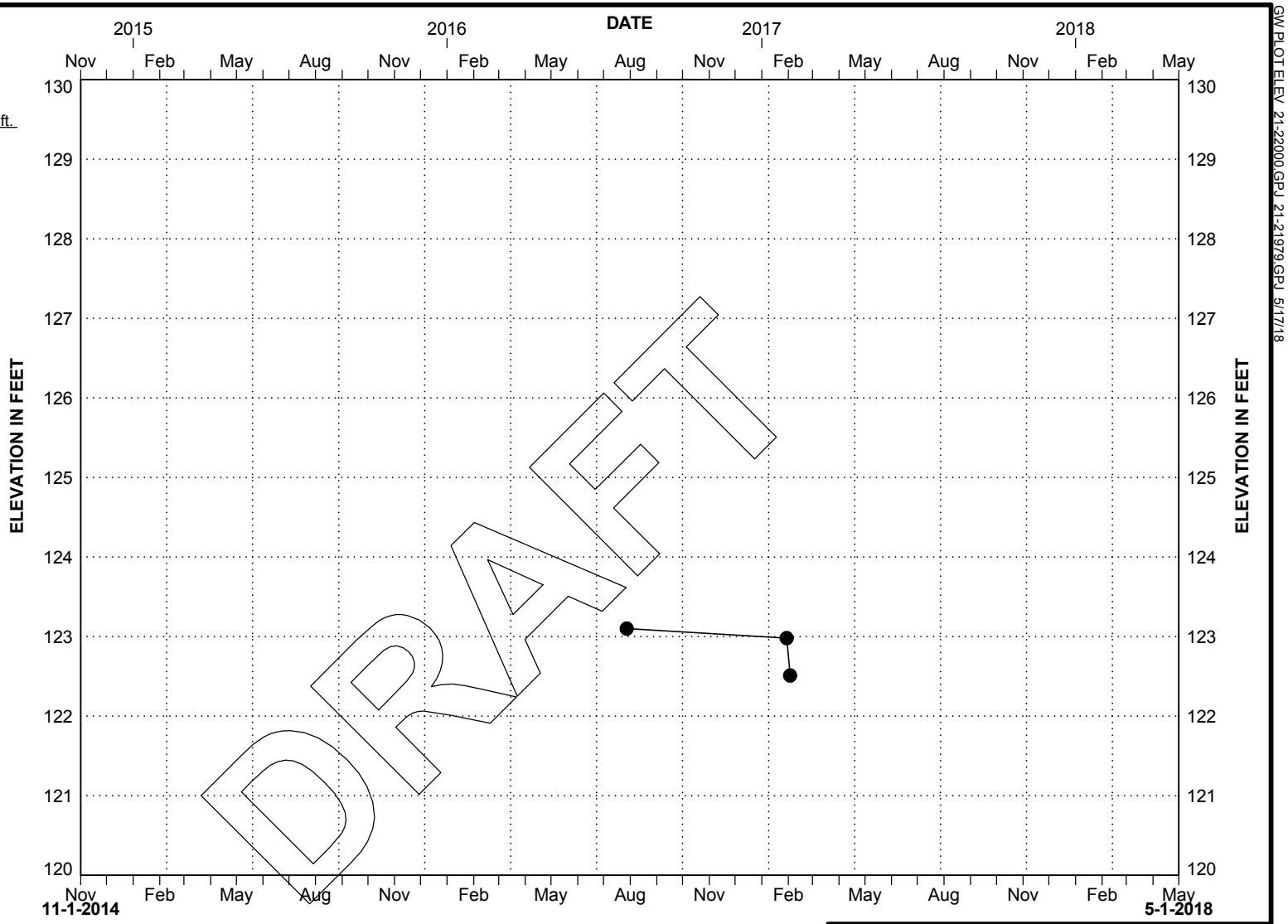
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FIG. B-12

FIG. B-12

GW PLOT ELEV. 21-22000.GPJ, 21-21979.GPJ, 5/17/18





GW PLOT ELEV 21-22000.GPJ 21-21979.GPJ 5/17/18

NOTES:

1. Refer to the Soil Classification and Log Key for explanations of graphic symbols in logs shown above. Additional information is shown on the log for boring NME-22 (see Figure A-21).
2. Read Point Depth or Elevation *(as listed in legend table at right)* is equal to the depth or elevation of the tip of the vibrating wire pressure (VWP) transducer or the bottom of the screen of the observation well (OW). Measured groundwater elevations less than these values are considered as "Dry".

Well Identification	Read Point Depth (feet)	Read Point Elev. (feet)	Water Level Elevation (feet) Low	High
NME-22 VWP2	88	99.0	Dry	123.1

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King County, Washington

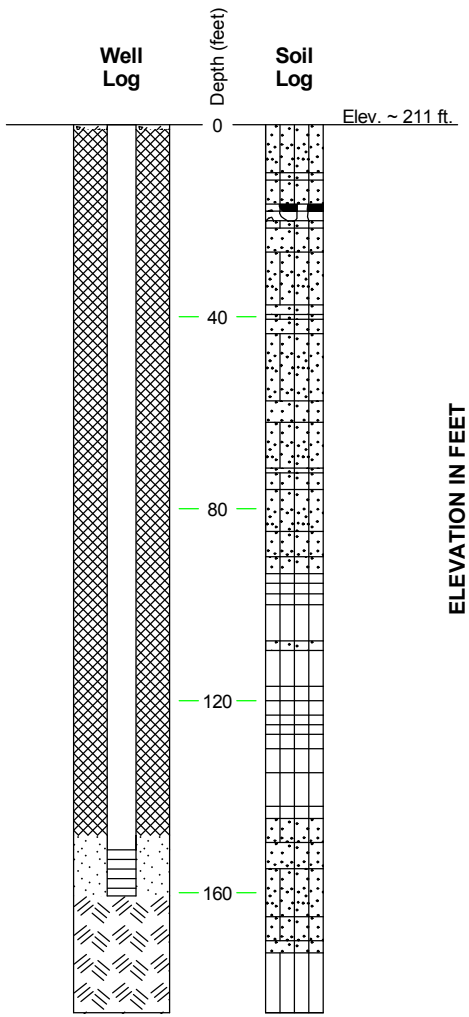
WATER LEVEL READINGS SONIC CORE NME-22

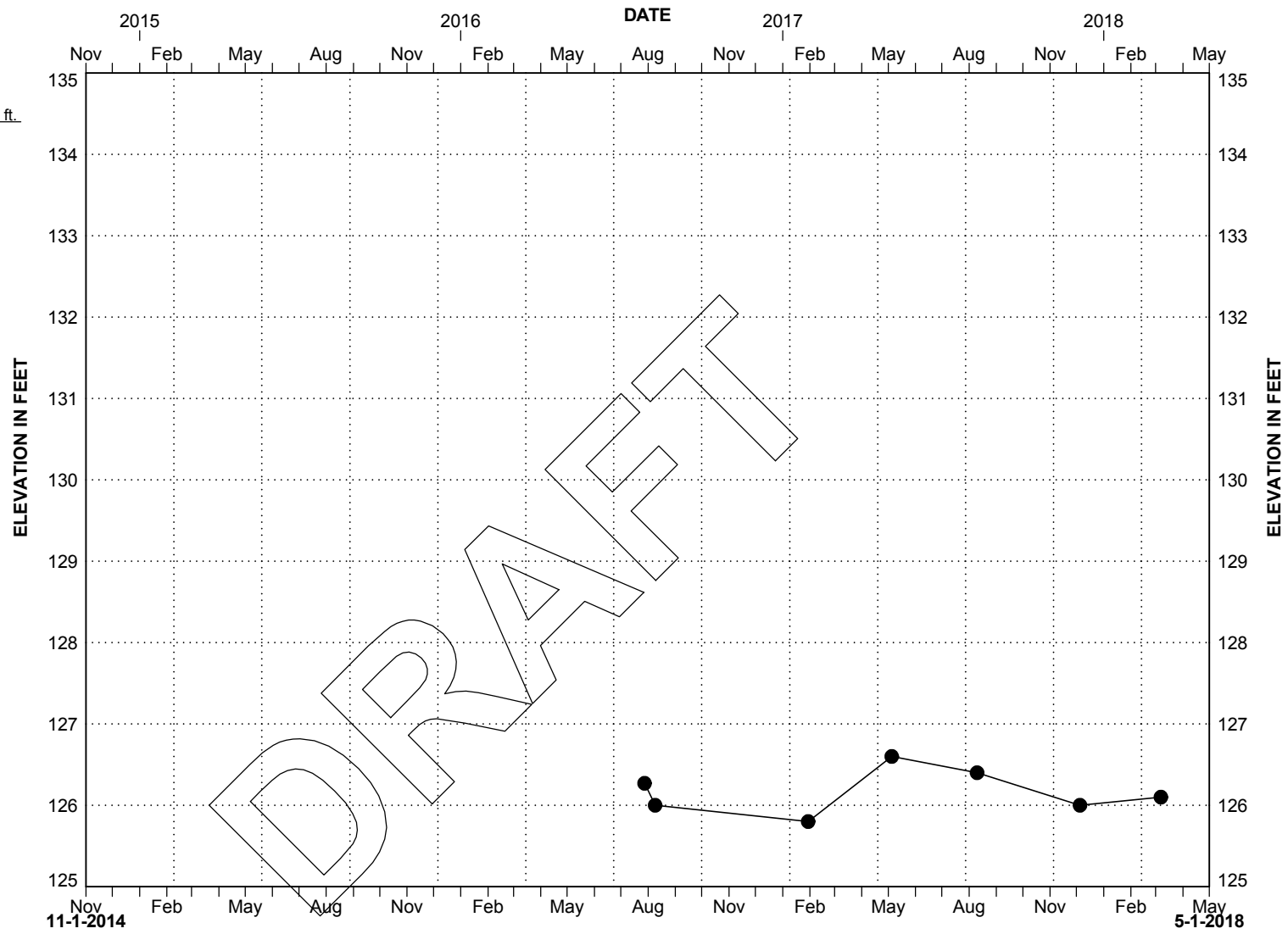
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FIG. B-13

FIG. B-13





GW PLOT ELEV. 21-22000.GPJ. 21-21979.GPJ. 5/17/18

NOTES:

1. Refer to the Soil Classification and Log Key for explanations of graphic symbols in logs shown above. Additional information is shown on the log for boring NME-23 (see Figure A-22).
2. Read Point Depth or Elevation *(as listed in legend table at right)* is equal to the depth or elevation of the tip of the vibrating wire pressure (VWP) transducer or the bottom of the screen of the observation well (OW). Measured groundwater elevations less than these values are considered as "Dry".

Well Identification	Read Point Depth (feet)	Read Point Elev. (feet)	Water Level Elevation (feet) Low	High
NME-23 OW1	159.9	51.1	125.8	126.6

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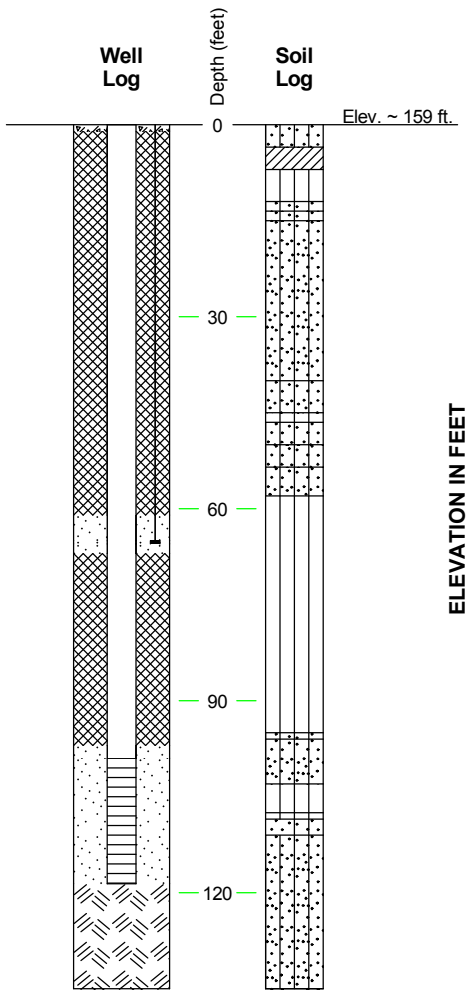
WATER LEVEL READINGS
SONIC CORE NME-23

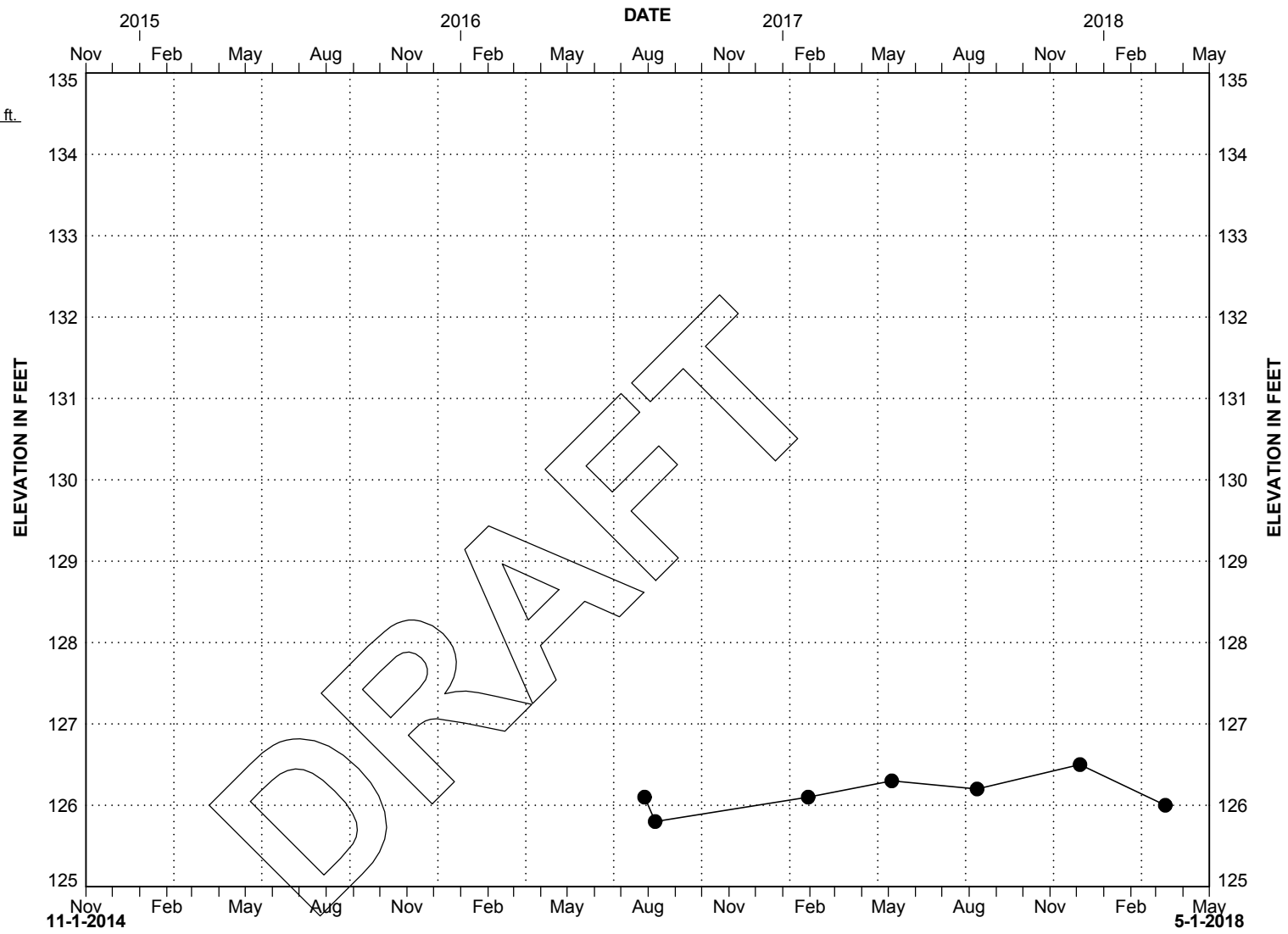
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FIG. B-14

FIG. B-14





NOTES:

1. Refer to the Soil Classification and Log Key for explanations of graphic symbols in logs shown above. Additional information is shown on the log for boring NME-24 (see Figure A-23).
2. Read Point Depth or Elevation *(as listed in legend table at right)* is equal to the depth or elevation of the tip of the vibrating wire pressure (VWP) transducer or the bottom of the screen of the observation well (OW). Measured groundwater elevations less than these values are considered as "Dry".

Well Identification	Read Point Depth (feet)	Read Point Elev. (feet)	Water Level Elevation (feet) Low	High
NME-24 OW1	119	40.0	125.8	126.5

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WATER LEVEL READINGS SONIC CORE NME-24

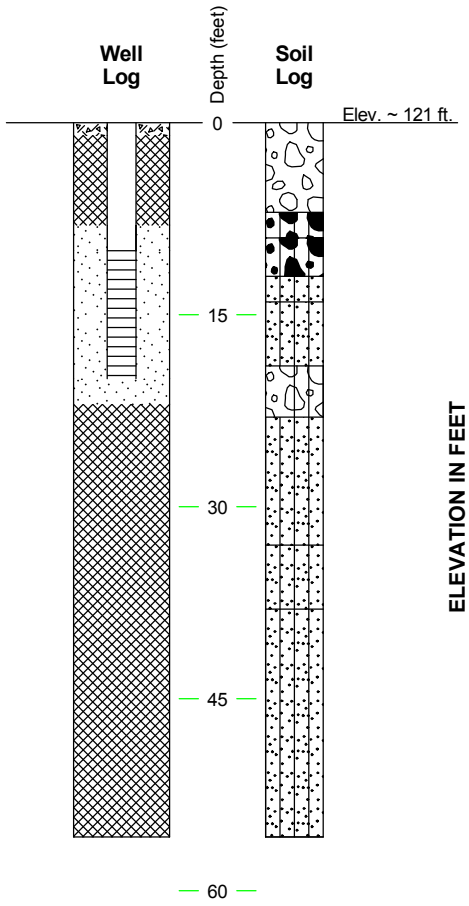
May 2018 21-1-22000-212

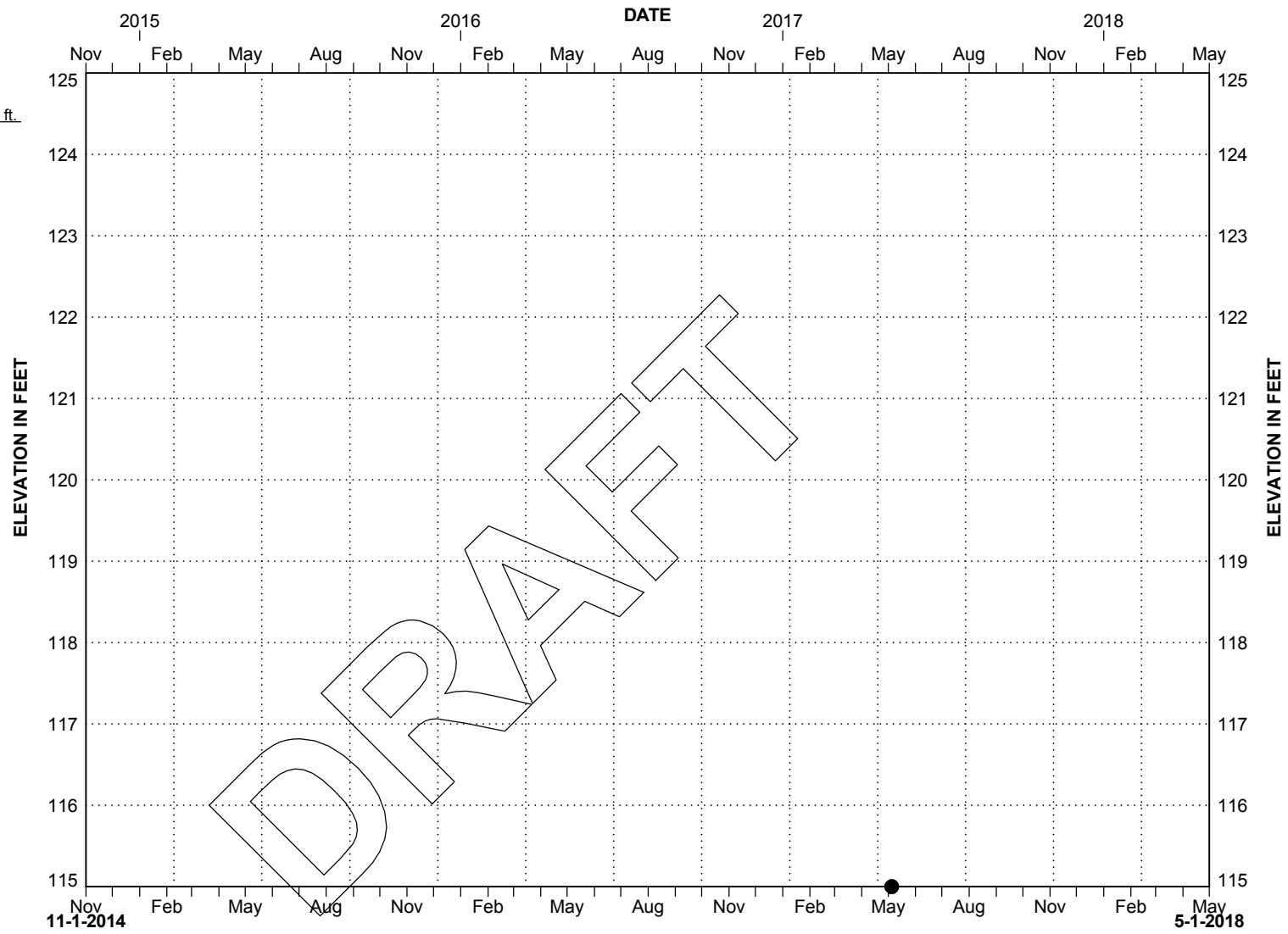
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FIG. B-15

FIG. B-15

GW PLOT ELEV 21-22000.GPJ 21-21979.GPJ 5/17/18





NOTES:

1. Refer to the Soil Classification and Log Key for explanations of graphic symbols in logs shown above. Additional information is shown on the log for boring NME-25 (see Figure A-24).
2. Read Point Depth or Elevation *(as listed in legend table at right)* is equal to the depth or elevation of the tip of the vibrating wire pressure (VWP) transducer or the bottom of the screen of the observation well (OW). Measured groundwater elevations less than these values are considered as "Dry".

Well Identification	Read Point Depth (feet)	Read Point Elev. (feet)	Water Level Elevation (feet) Low	High
NME-25 OW1	20	101.0	113.0	115.0

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WATER LEVEL READINGS BORING NME-25

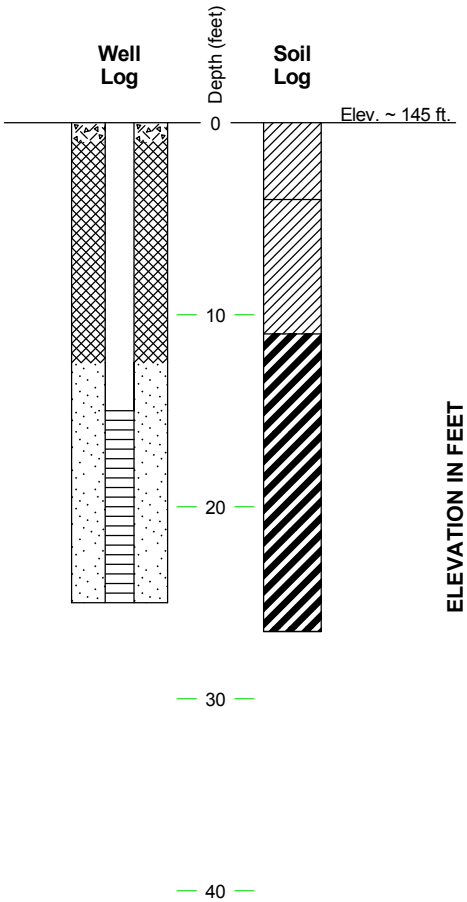
May 2018 21-1-22000-212

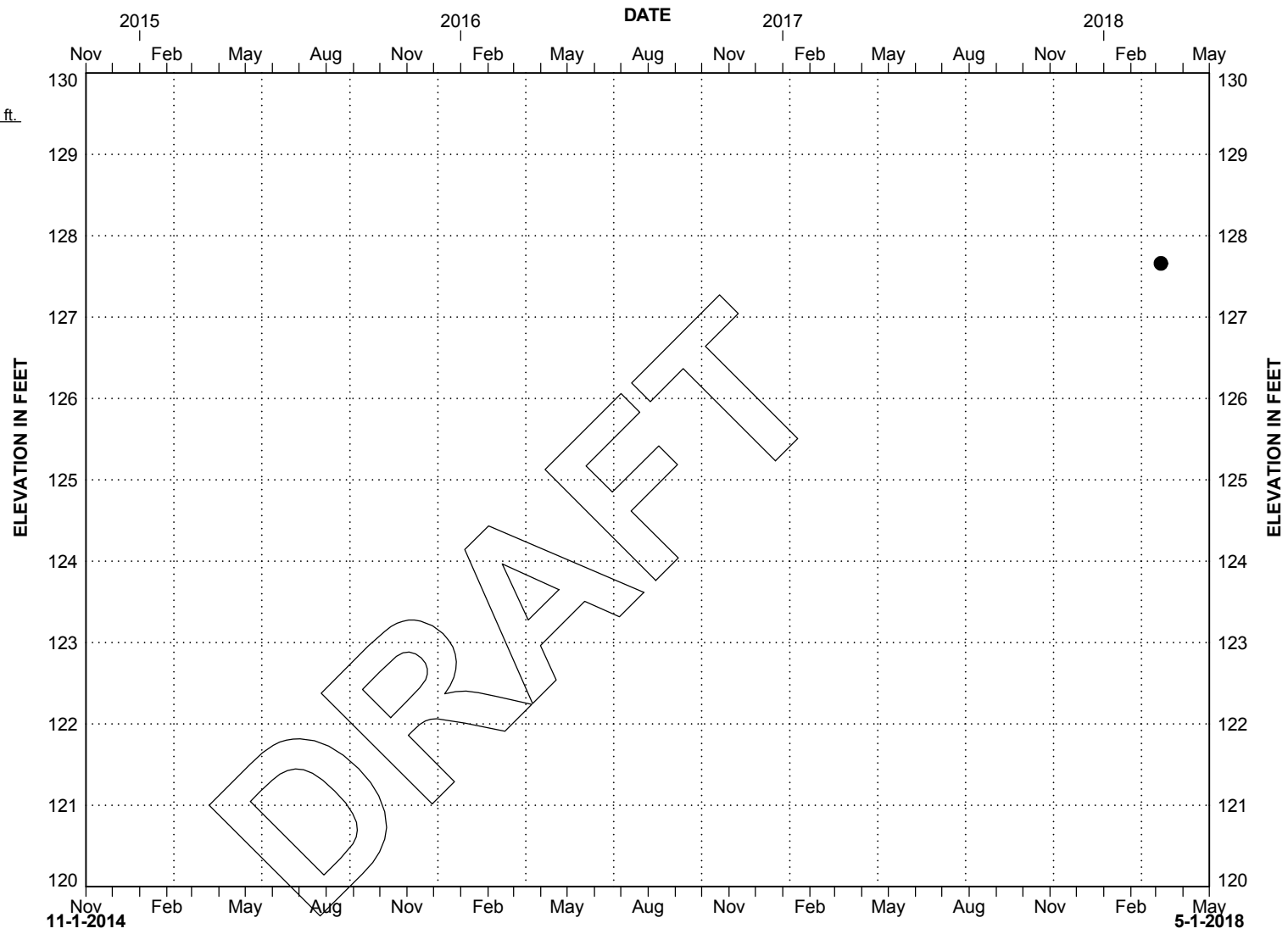
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FIG. B-16

FIG. B-16

GW PLOT ELEV. 21-22000.GPJ, 21-21979.GPJ, 5/17/18





NOTES:

1. Refer to the Soil Classification and Log Key for explanations of graphic symbols in logs shown above. Additional information is shown on the log for boring NME-26A (see Figure A-26).
2. Read Point Depth or Elevation *(as listed in legend table at right)* is equal to the depth or elevation of the tip of the vibrating wire pressure (VWP) transducer or the bottom of the screen of the observation well (OW). Measured groundwater elevations less than these values are considered as "Dry".

Well Identification	Read Point Depth (feet)	Read Point Elev. (feet)	Water Level Elevation (feet) Low	High
NME-26A OW1			127.7	127.7

North Mercer Island Interceptor and
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King County, Washington

WATER LEVEL READINGS
BORING NME-26A

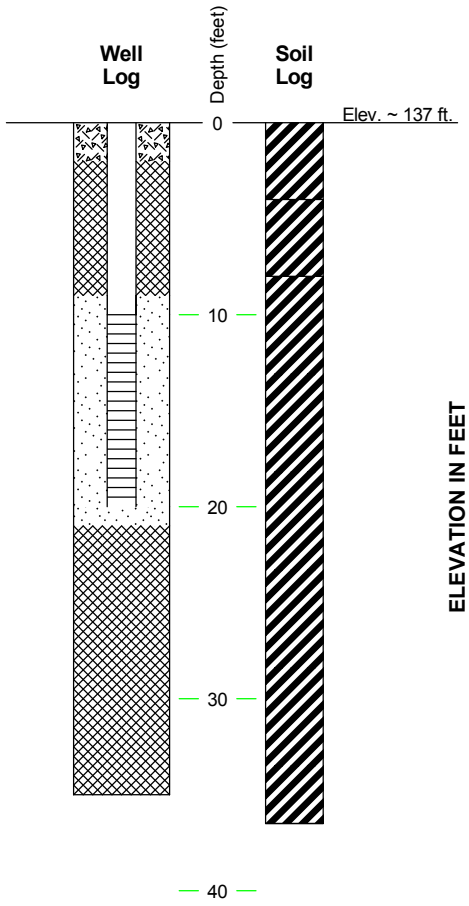
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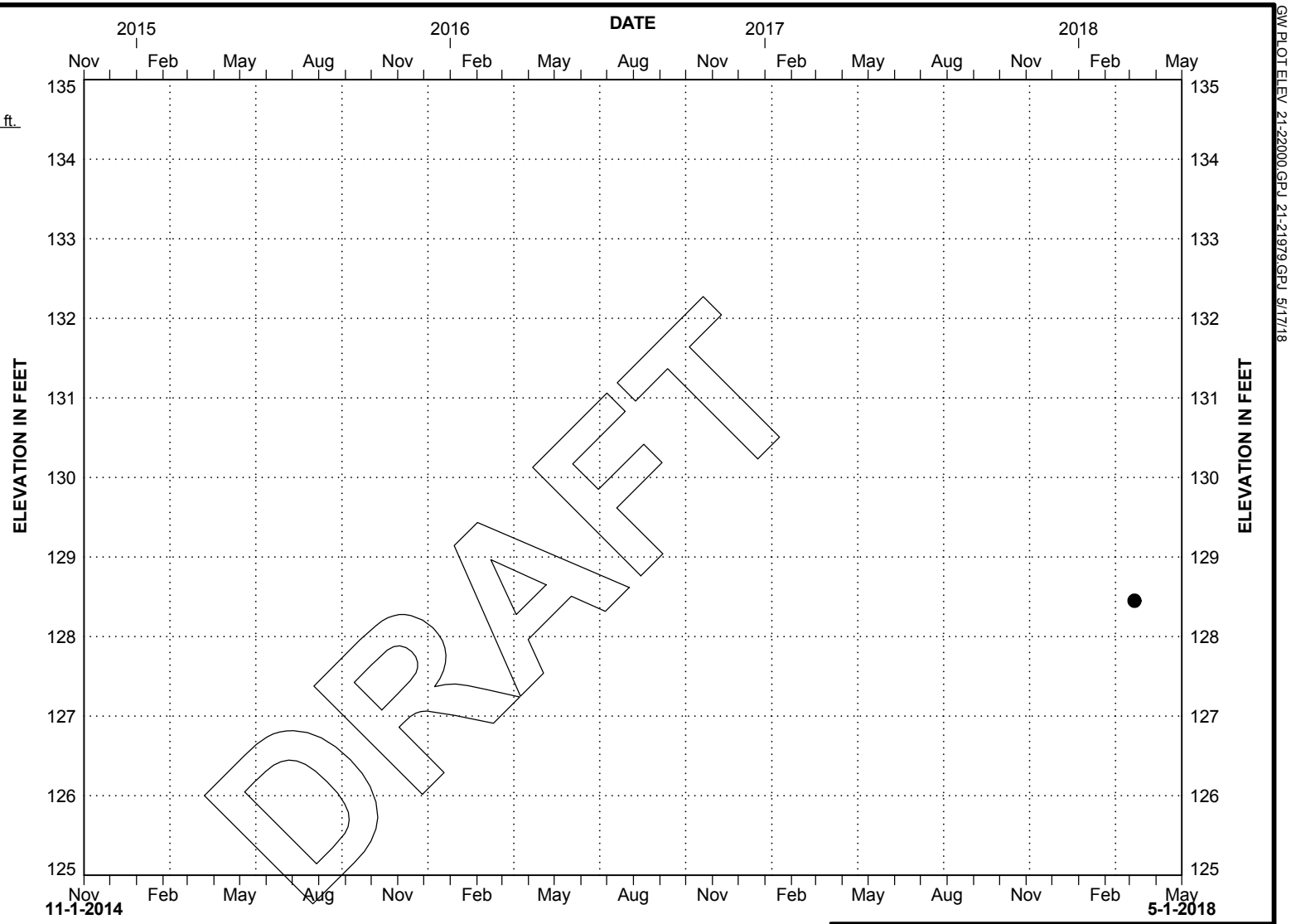
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FIG. B-17

FIG. B-17

GW PLOT ELEV. 21-22000.GPJ. 21-21979.GPJ. 5/17/18





NOTES:

1. Refer to the Soil Classification and Log Key for explanations of graphic symbols in logs shown above. Additional information is shown on the log for boring NME-27A (see Figure A-28).
2. Read Point Depth or Elevation *(as listed in legend table at right)* is equal to the depth or elevation of the tip of the vibrating wire pressure (VWP) transducer or the bottom of the screen of the observation well (OW). Measured groundwater elevations less than these values are considered as "Dry".

Well Identification	Read Point Depth (feet)	Read Point Elev. (feet)	Water Level Elevation (feet) Low	High
NME-27A OW1	20.4	117.1	128.5	128.5

North Mercer Island Interceptor and Enatai Interceptor Upgrade Project
King County, Washington

WATER LEVEL READINGS BORING NME-27A

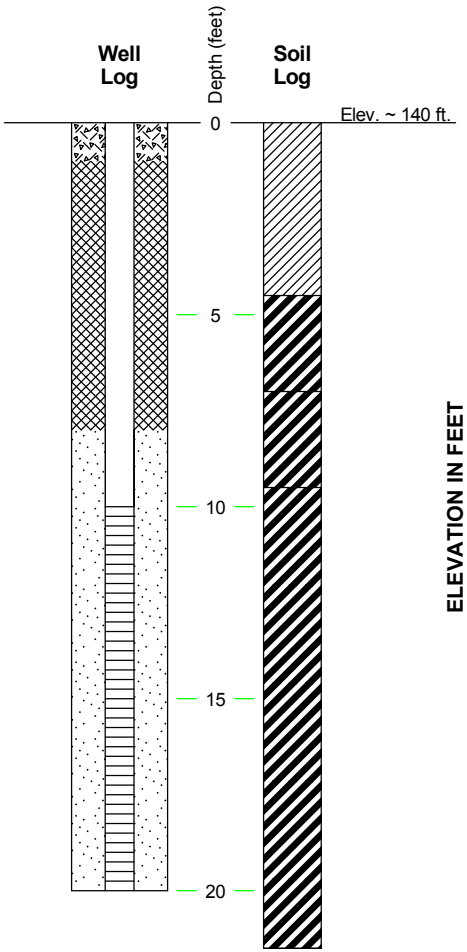
May 2018 21-1-22000-212

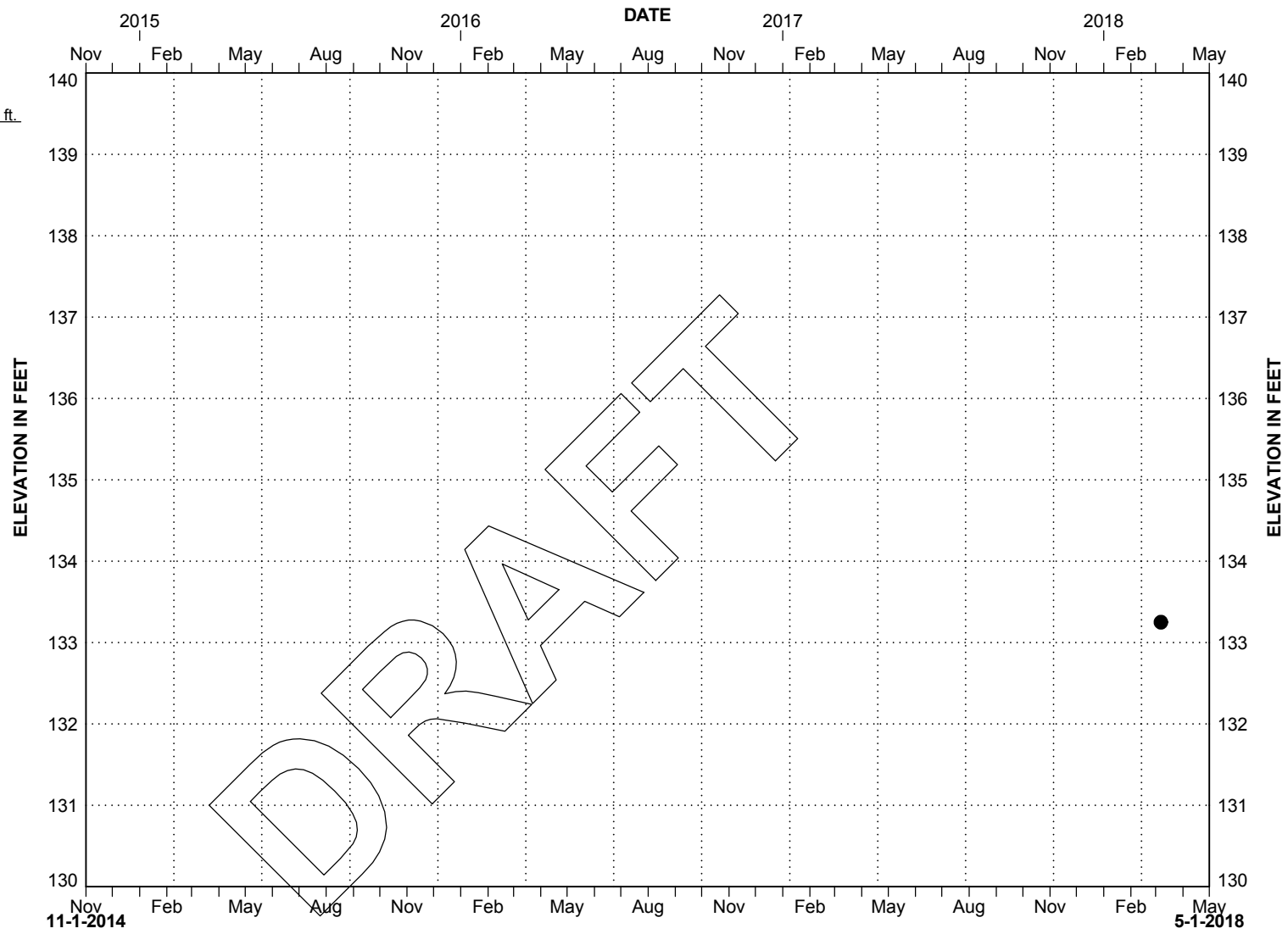
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FIG. B-18

FIG. B-18

GW PLOT ELEV. 21-22000.GPJ 21-21979.GPJ 5/17/18





NOTES:

1. Refer to the Soil Classification and Log Key for explanations of graphic symbols in logs shown above. Additional information is shown on the log for boring NME-29 (see Figure A-30).
2. Read Point Depth or Elevation *(as listed in legend table at right)* is equal to the depth or elevation of the tip of the vibrating wire pressure (VWP) transducer or the bottom of the screen of the observation well (OW). Measured groundwater elevations less than these values are considered as "Dry".

Well Identification	Read Point Depth (feet)	Read Point Elev. (feet)	Water Level Elevation (feet) Low	High
NME-29 OW1	20.4	119.8	133.3	133.3

North Mercer Island Interceptor and Enatai Interceptor Upgrade Project
King County, Washington

WATER LEVEL READINGS BORING NME-29

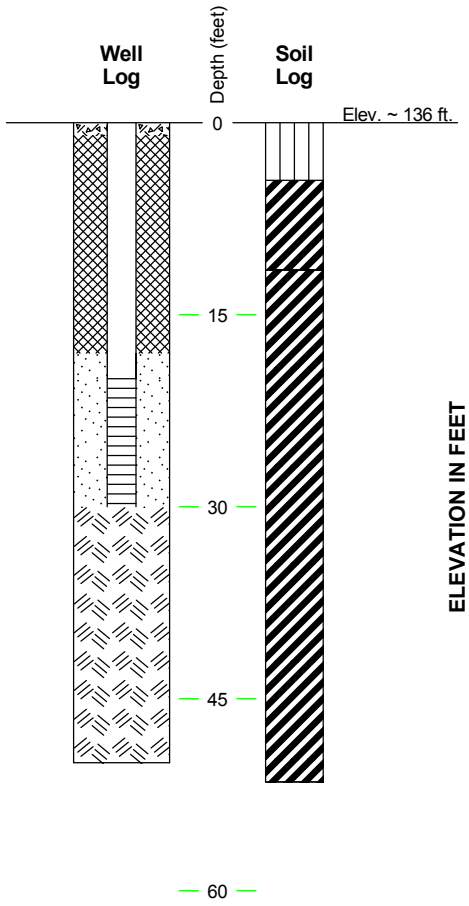
May 2018 21-1-22000-212

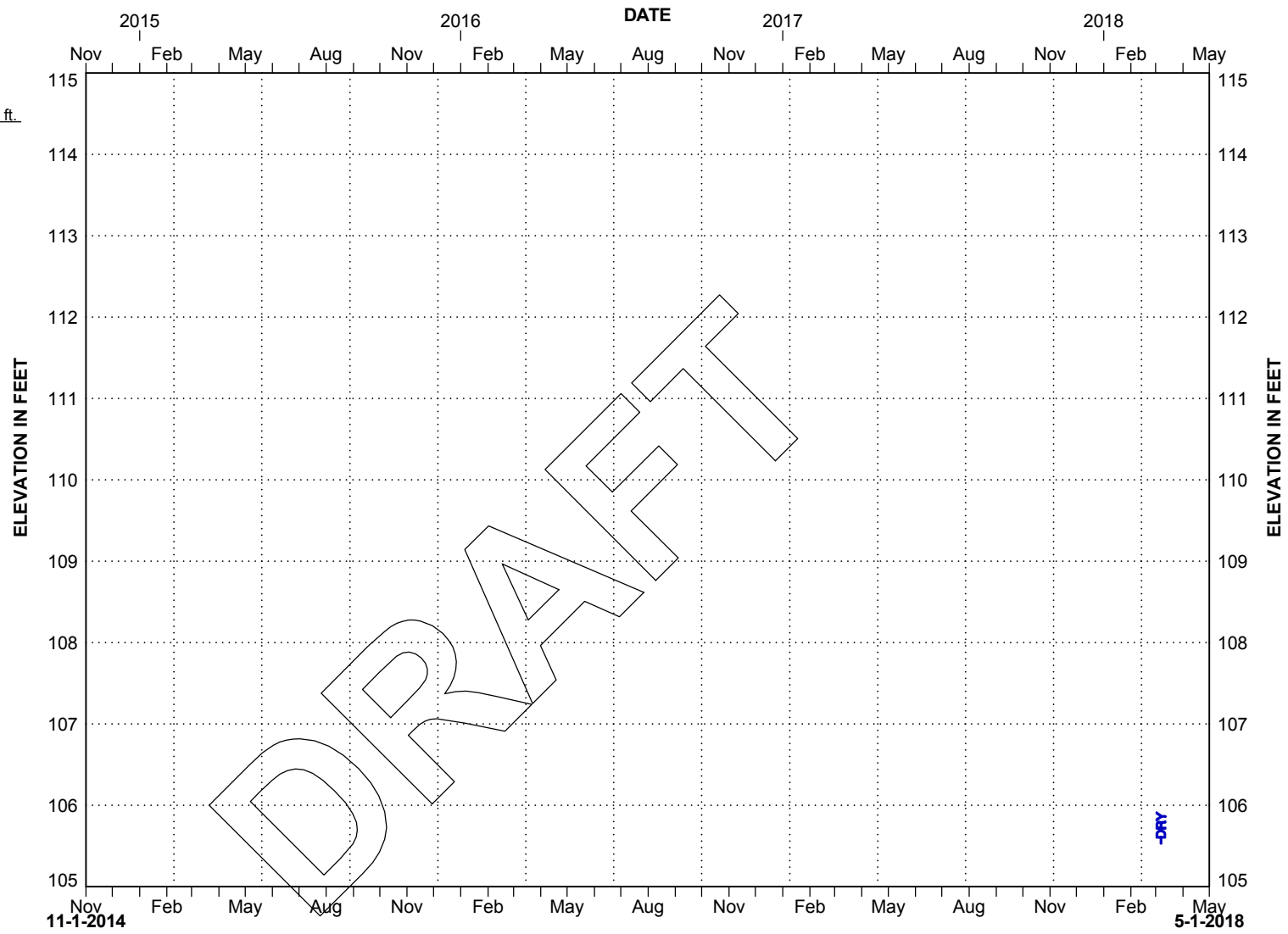
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FIG. B-19

FIG. B-19

GW PLOT ELEV. 21-22000.GPJ, 21-21979.GPJ, 5/17/18





NOTES:

1. Refer to the Soil Classification and Log Key for explanations of graphic symbols in logs shown above. Additional information is shown on the log for boring NME-30 (see Figure A-31).
2. Read Point Depth or Elevation *(as listed in legend table at right)* is equal to the depth or elevation of the tip of the vibrating wire pressure (VWP) transducer or the bottom of the screen of the observation well (OW). Measured groundwater elevations less than these values are considered as "Dry".

Well Identification	Read Point Depth (feet)	Read Point Elev. (feet)	Water Level Elevation (feet) Low	High
NME-30 OW1	30	105.6	Dry	Dry

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WATER LEVEL READINGS BORING NME-30

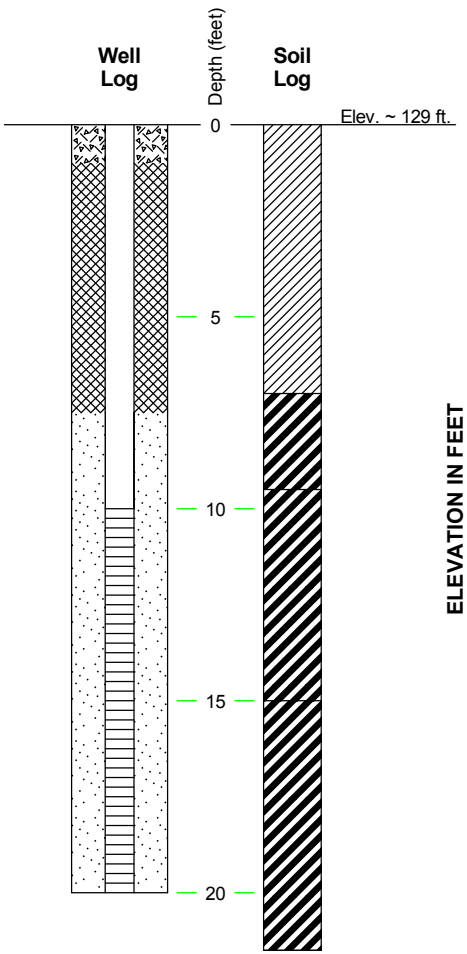
May 2018 21-1-22000-212

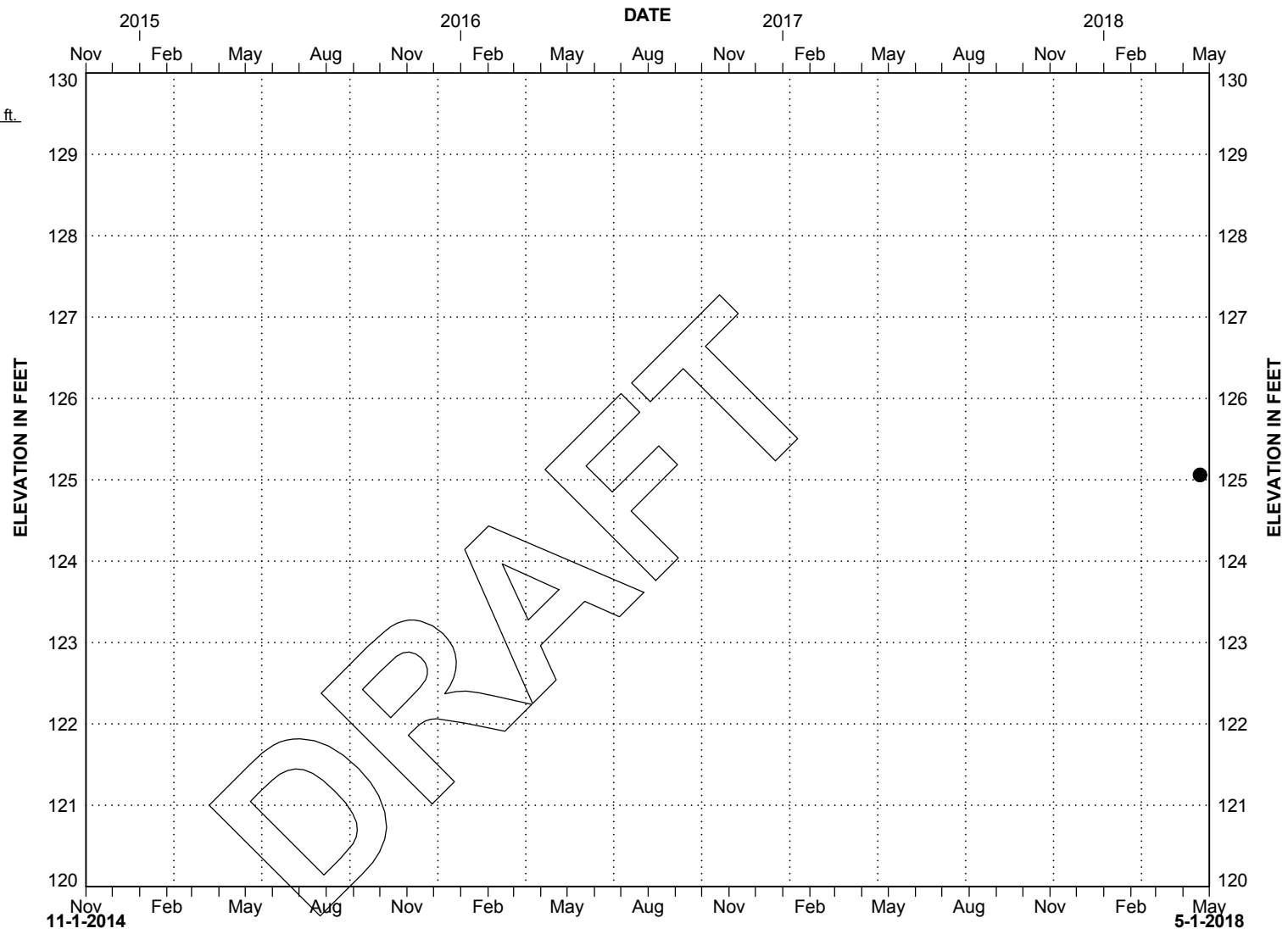
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FIG. B-20

FIG. B-20

GW PLOT ELEV. 21-22000.GPJ 21-21979.GPJ 5/17/18





GW PLOT ELEV. 21-22000.GPJ. 21-21979.GPJ. 5/17/18

NOTES:

1. Refer to the Soil Classification and Log Key for explanations of graphic symbols in logs shown above. Additional information is shown on the log for boring NME-31 (see Figure A-32).
2. Read Point Depth or Elevation *(as listed in legend table at right)* is equal to the depth or elevation of the tip of the vibrating wire pressure (VWP) transducer or the bottom of the screen of the observation well (OW). Measured groundwater elevations less than these values are considered as "Dry".

Well Identification	Read Point Depth (feet)	Read Point Elev. (feet)	Water Level Elevation (feet) Low	High
NME-31 OW1	19.3	110.1	125.1	125.1

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King County, Washington

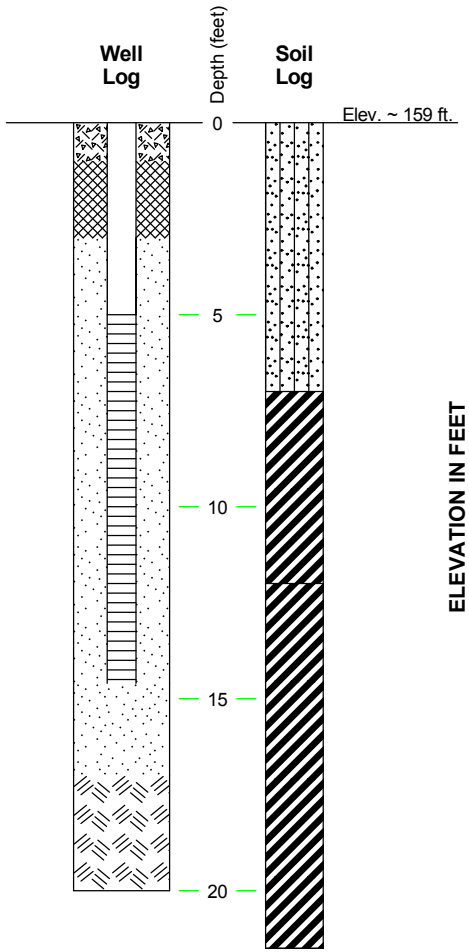
WATER LEVEL READINGS BORING NME-31

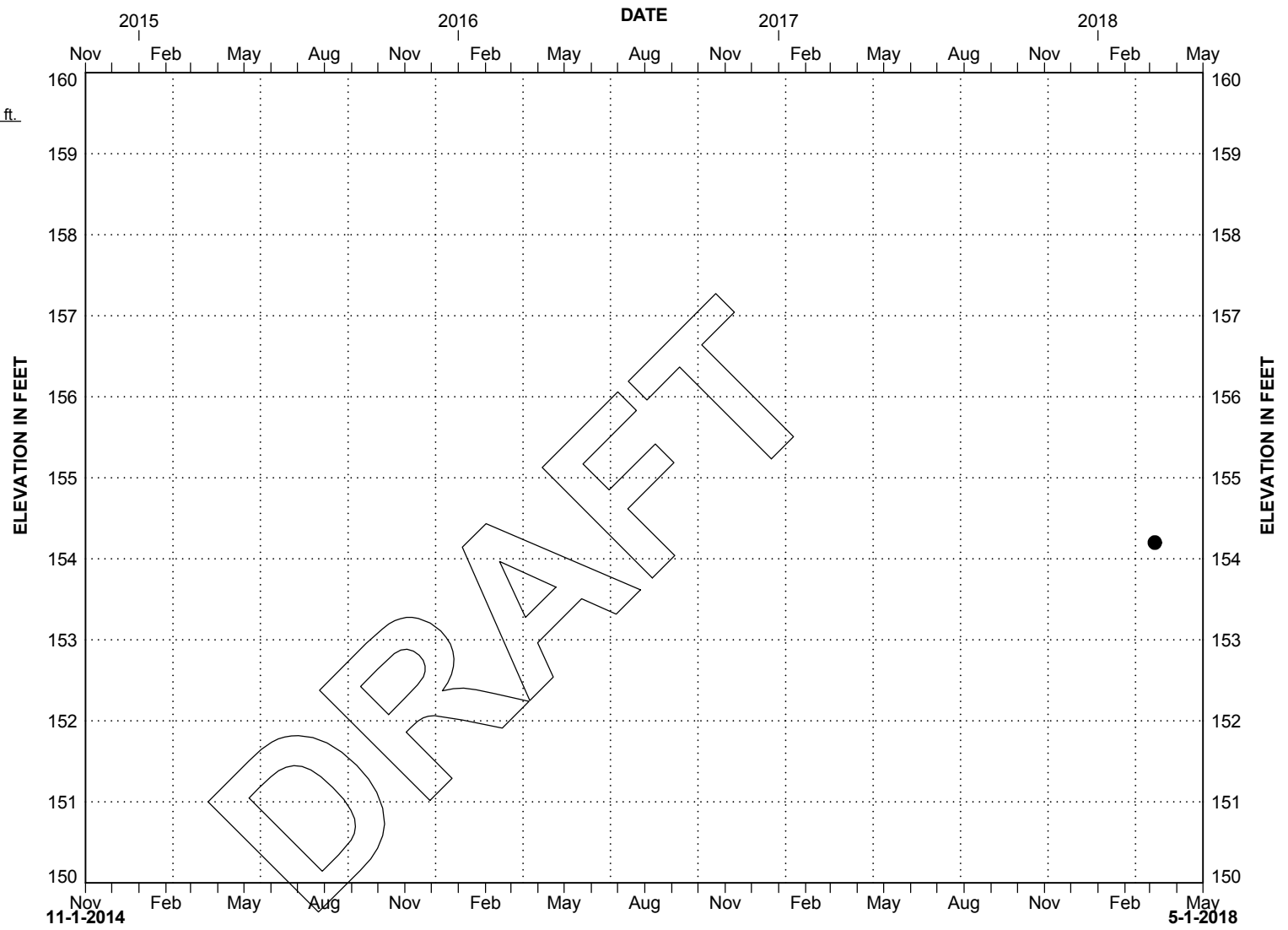
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FIG. B-21

FIG. B-21





NOTES:

1. Refer to the Soil Classification and Log Key for explanations of graphic symbols in logs shown above. Additional information is shown on the log for boring NME-32 (see Figure A-33).
2. Read Point Depth or Elevation *(as listed in legend table at right)* is equal to the depth or elevation of the tip of the vibrating wire pressure (VWP) transducer or the bottom of the screen of the observation well (OW). Measured groundwater elevations less than these values are considered as "Dry".

Well Identification	Read Point Depth (feet)	Read Point Elev. (feet)	Water Level Elevation (feet) Low	High
NME-32 OW1	15.1	143.9	154.2	154.2

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WATER LEVEL READINGS BORING NME-32

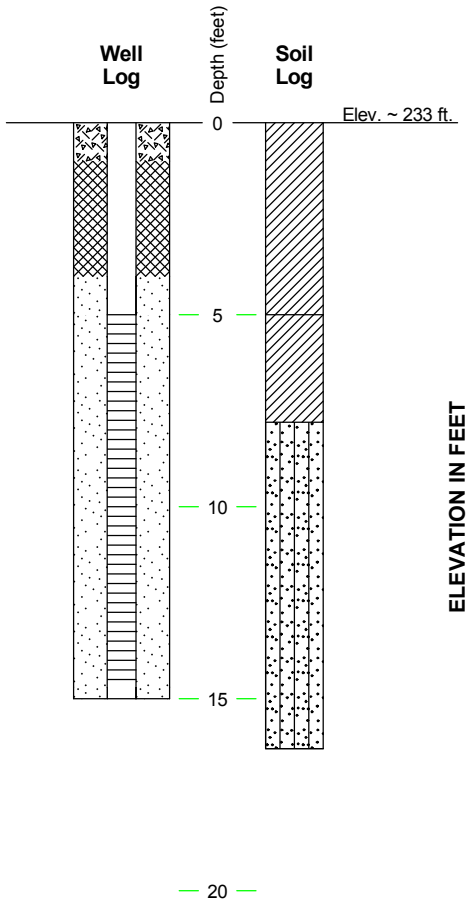
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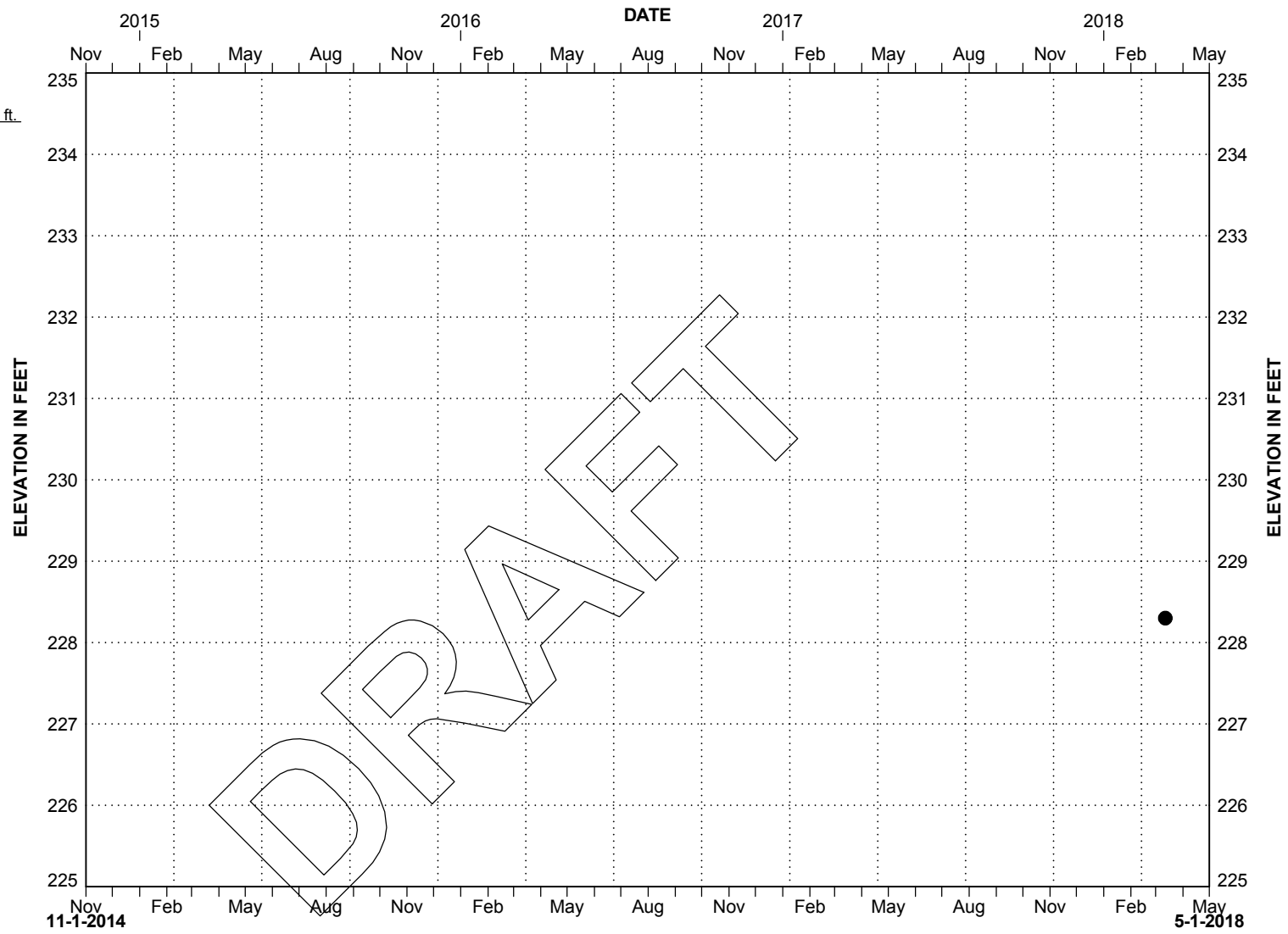
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FIG. B-22

FIG. B-22

GW PLOT ELEV. 21-22000.GPJ 21-21979.GPJ 5/17/18





NOTES:

1. Refer to the Soil Classification and Log Key for explanations of graphic symbols in logs shown above. Additional information is shown on the log for boring NME-36 (see Figure A-36).
2. Read Point Depth or Elevation *(as listed in legend table at right)* is equal to the depth or elevation of the tip of the vibrating wire pressure (VWP) transducer or the bottom of the screen of the observation well (OW). Measured groundwater elevations less than these values are considered as "Dry".

Well Identification	Read Point Depth (feet)	Read Point Elev. (feet)	Water Level Elevation (feet) Low	High
NME-36 OW1	15	218.1	228.3	228.3

North Mercer Island Interceptor and
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WATER LEVEL READINGS
BORING NME-36

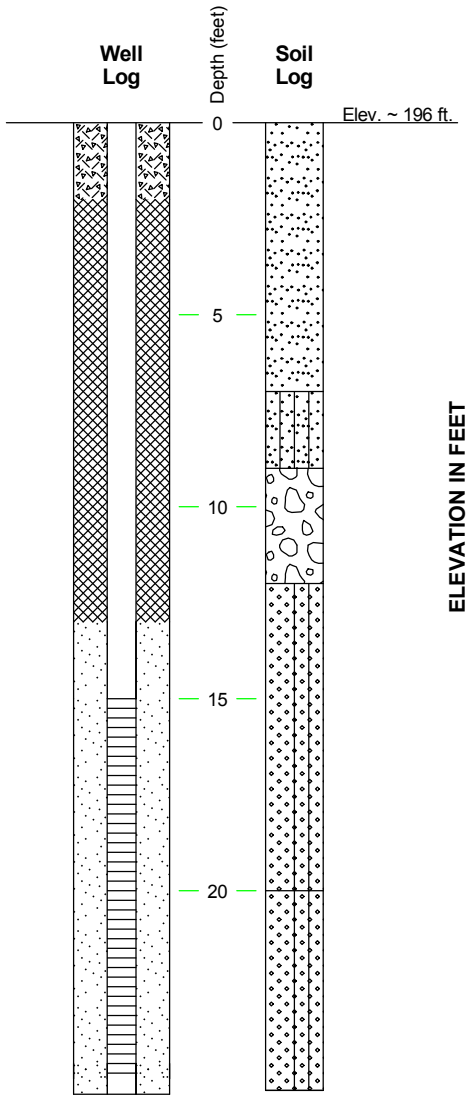
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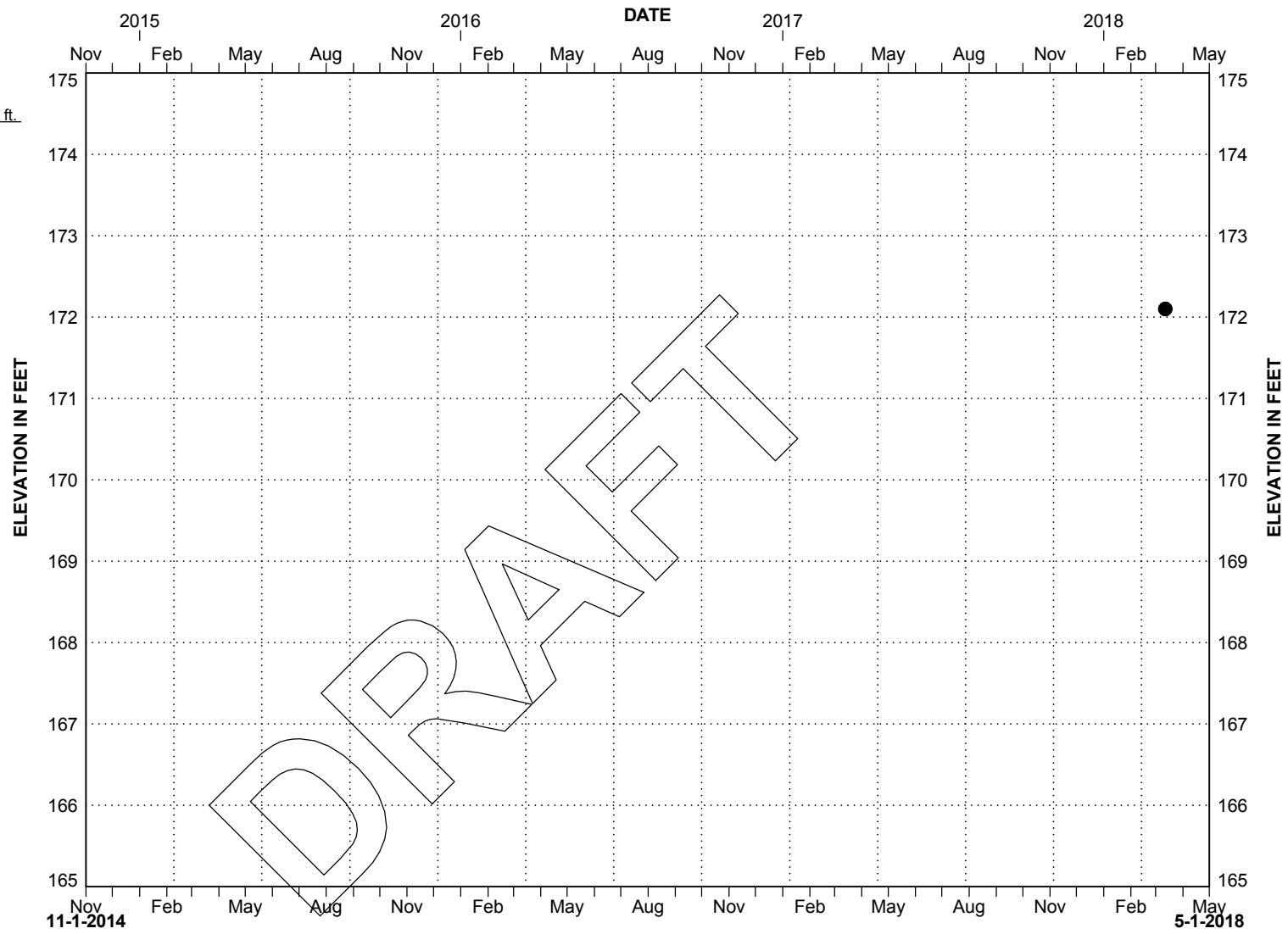
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FIG. B-23

FIG. B-23

GW PLOT ELEV. 21-22000.GPJ, 21-21979.GPJ, 5/17/18





NOTES:

1. Refer to the Soil Classification and Log Key for explanations of graphic symbols in logs shown above. Additional information is shown on the log for boring NME-37 (see Figure A-37).
2. Read Point Depth or Elevation *(as listed in legend table at right)* is equal to the depth or elevation of the tip of the vibrating wire pressure (VWP) transducer or the bottom of the screen of the observation well (OW). Measured groundwater elevations less than these values are considered as "Dry".

Well Identification	Read Point Depth (feet)	Read Point Elev. (feet)	Water Level Elevation (feet) Low	High
NME-37 OW1	25.3	170.7	172.1	172.1

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WATER LEVEL READINGS BORING NME-37

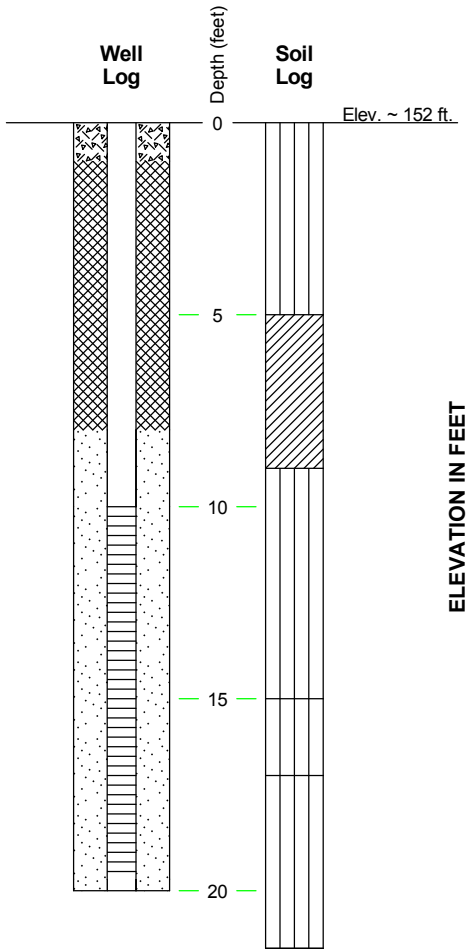
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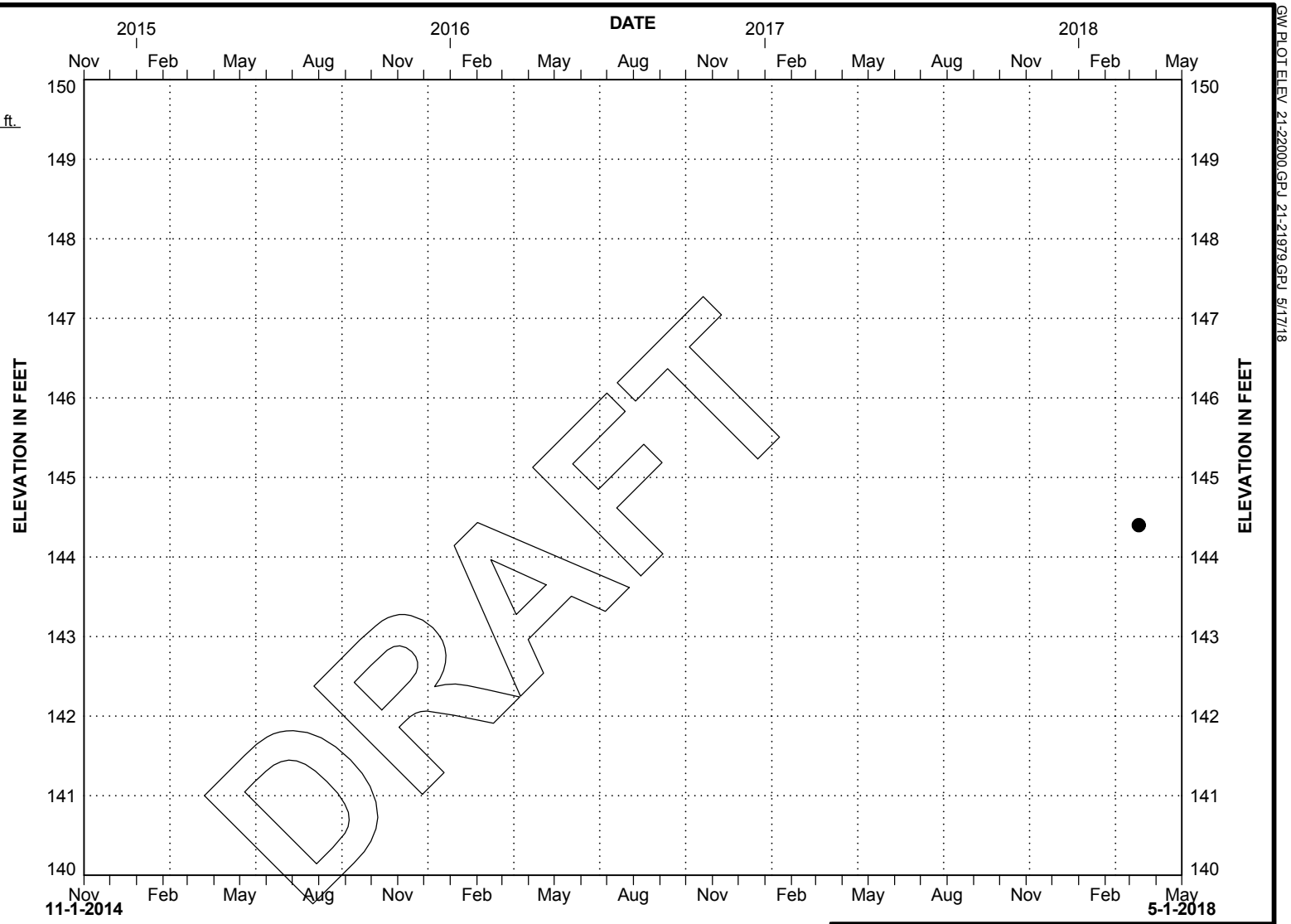
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FIG. B-24

FIG. B-24

GW PLOT ELEV 21-22000.GPJ 21-21979.GPJ 5/17/18





GW PLOT ELEV 21-22000.GPJ 21-21979.GPJ 5/17/18

NOTES:

1. Refer to the Soil Classification and Log Key for explanations of graphic symbols in logs shown above. Additional information is shown on the log for boring NME-39 (see Figure A-38).
2. Read Point Depth or Elevation *(as listed in legend table at right)* is equal to the depth or elevation of the tip of the vibrating wire pressure (VWP) transducer or the bottom of the screen of the observation well (OW). Measured groundwater elevations less than these values are considered as "Dry".

Well Identification	Read Point Depth (feet)	Read Point Elev. (feet)	Water Level Elevation (feet) Low	High
NME-39 OW1	20.1	131.9	144.4	144.4

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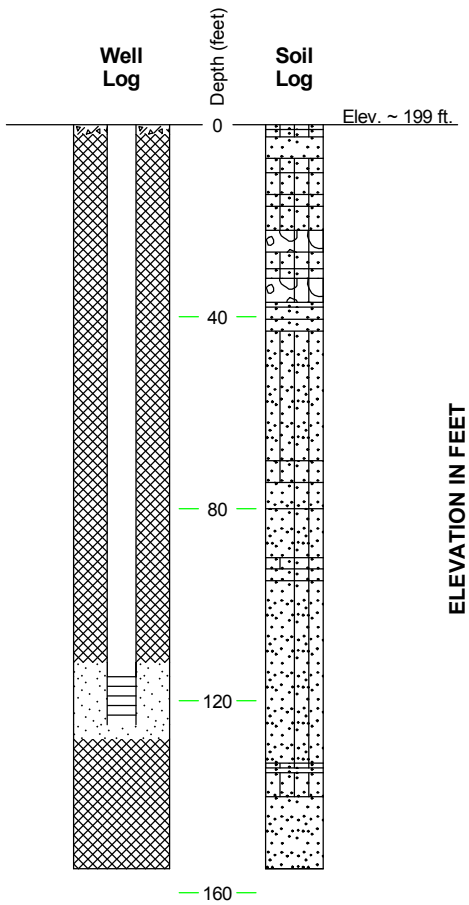
WATER LEVEL READINGS BORING NME-39

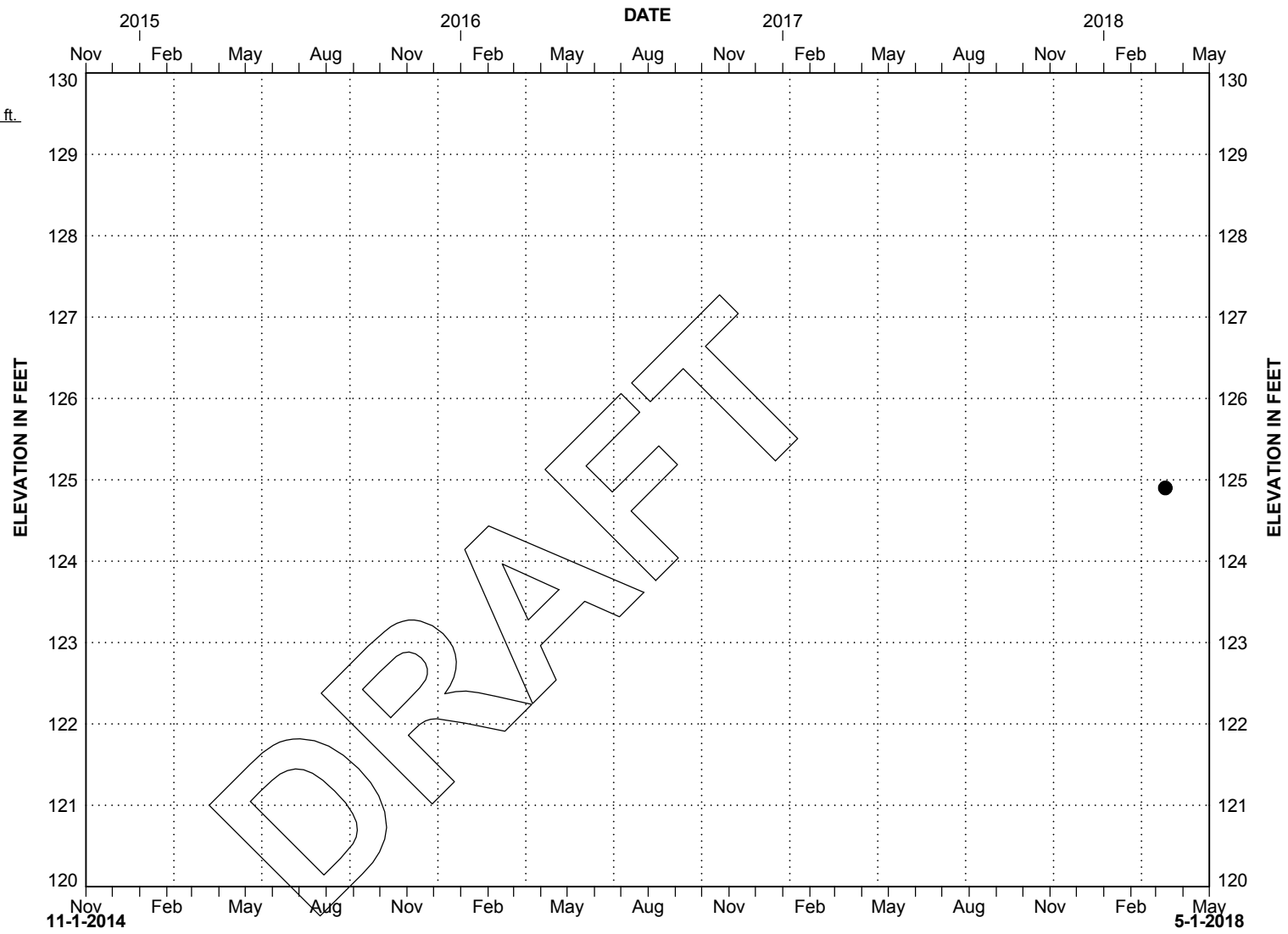
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FIG. B-25

FIG. B-25





NOTES:

1. Refer to the Soil Classification and Log Key for explanations of graphic symbols in logs shown above. Additional information is shown on the log for boring NME-45 (see Figure A-43).
2. Read Point Depth or Elevation *(as listed in legend table at right)* is equal to the depth or elevation of the tip of the vibrating wire pressure (VWP) transducer or the bottom of the screen of the observation well (OW). Measured groundwater elevations less than these values are considered as "Dry".

Well Identification	Read Point Depth (feet)	Read Point Elev. (feet)	Water Level Elevation (feet) Low	High
NME-45 OW1			124.9	124.9

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WATER LEVEL READINGS BORING NME-45

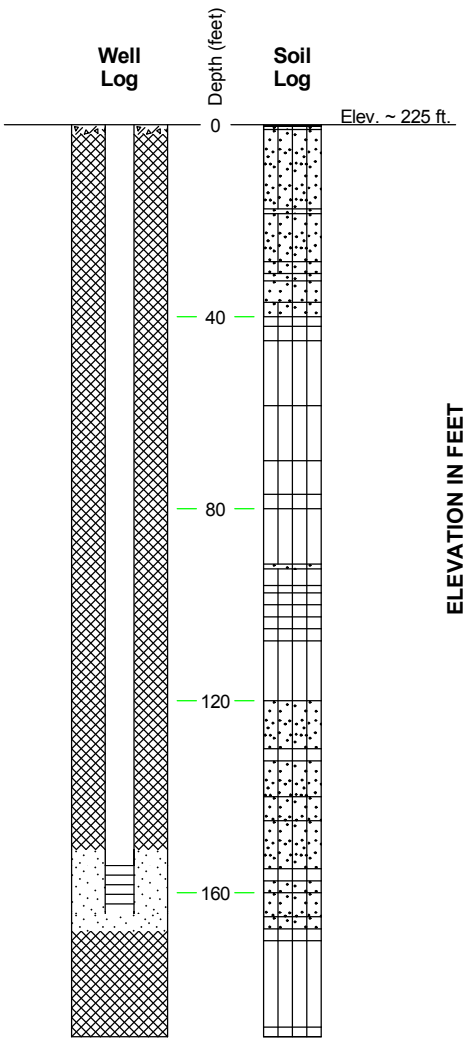
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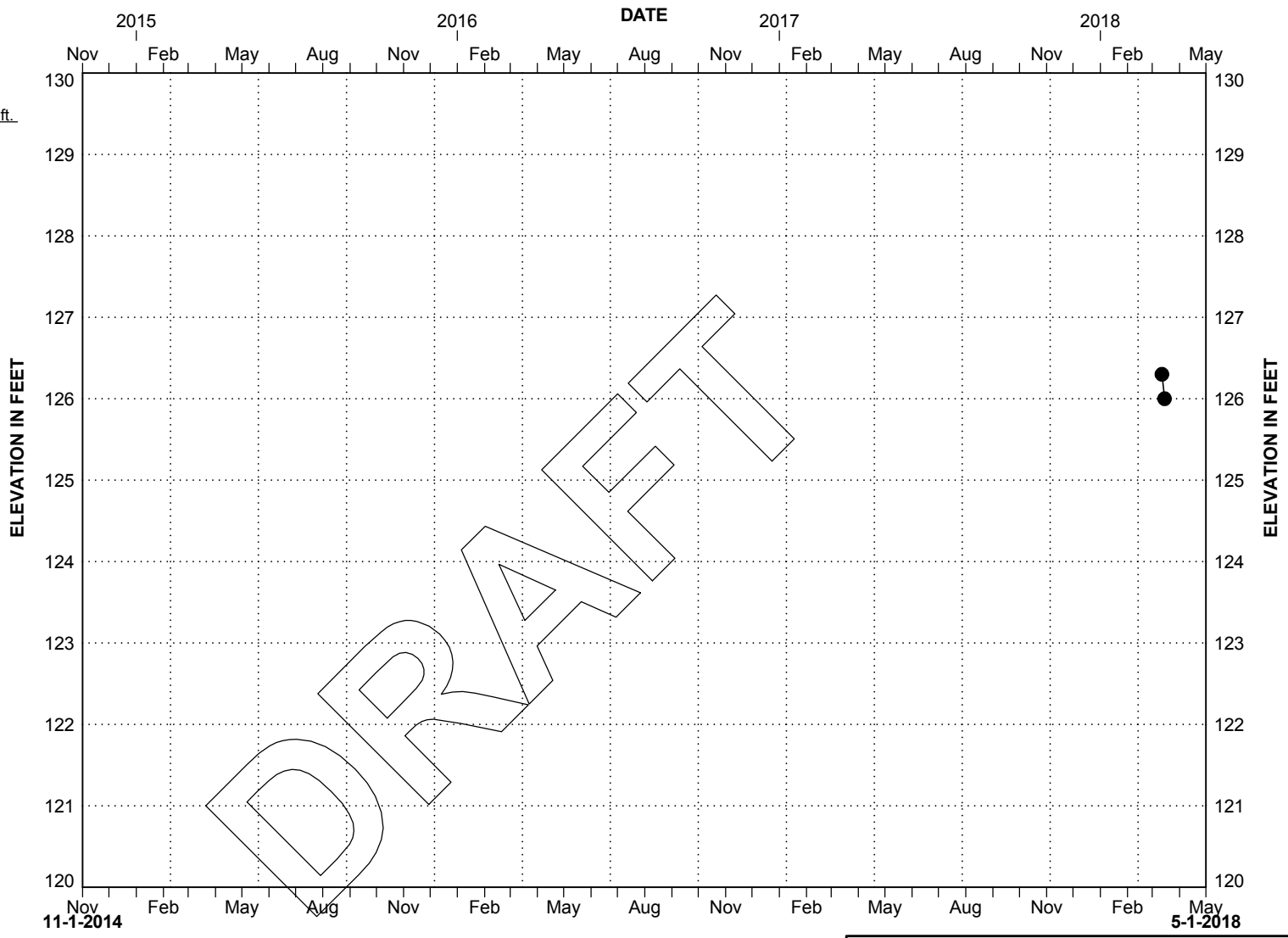
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FIG. B-26

FIG. B-26

GW PLOT ELEV. 21-22000.GPJ 21-21979.GPJ 5/17/18





NOTES:

1. Refer to the Soil Classification and Log Key for explanations of graphic symbols in logs shown above. Additional information is shown on the log for boring NME-46 (see Figure A-44).
2. Read Point Depth or Elevation *(as listed in legend table at right)* is equal to the depth or elevation of the tip of the vibrating wire pressure (VWP) transducer or the bottom of the screen of the observation well (OW). Measured groundwater elevations less than these values are considered as "Dry".

Well Identification	Read Point Depth (feet)	Read Point Elev. (feet)	Water Level Elevation (feet) Low	High
NME-46 OW1	163.8	61.2	126.0	126.3

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WATER LEVEL READINGS BORING NME-46

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FIG. B-27

FIG. B-27

GW PLOT ELEV 21-22000.GPJ 21-21979.GPJ 5/17/18

APPENDIX C

GEOTECHNICAL LABORATORY TESTING

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APPENDIX C

GEOTECHNICAL LABORATORY TESTING

TABLE OF CONTENTS

Page

TABLES

Laboratory Terms....1
Sample Types....2
Laboratory Test Summary....3

TESTS

Grain Size Distribution Plot, Boring NME-1....21
Grain Size Distribution Plot, Boring NME-4....22
Grain Size Distribution Plot, Boring NME-6....23
Grain Size Distribution Plot, Boring NME-7....24
Grain Size Distribution Plot, Boring NME-8....25
Grain Size Distribution Plot, Boring NME-9....26
Grain Size Distribution Plot, Boring NME-10....27
Grain Size Distribution Plot, Boring NME-11....28
Grain Size Distribution Plot, Boring NME-12....29
Grain Size Distribution Plot, Boring NME-13....30
Grain Size Distribution Plot, Boring NME-16....31
Grain Size Distribution Plot, Boring NME-17....32
Grain Size Distribution Plot, Boring NME-18....33
Grain Size Distribution Plot, Boring NME-19....34
Grain Size Distribution Plot, Boring NME-20....35
Grain Size Distribution Plot, Boring NME-21....36
Grain Size Distribution Plot, Boring NME-22....37
Grain Size Distribution Plot, Boring NME-23....38
Grain Size Distribution Plot, Boring NME-24....39
Grain Size Distribution Plot, Boring NME-25....40
Grain Size Distribution Plot, Boring NME-32....41
Grain Size Distribution Plot, Boring NME-34....42
Grain Size Distribution Plot, Boring NME-35....43
Grain Size Distribution Plot, Boring NME-36....44
Grain Size Distribution Plot, Boring NME-37....45
Grain Size Distribution Plot, Boring NME-39....46

Draft

TESTS (Cont.)

Page

Grain Size Distribution Plot, Boring NME-40 47
Grain Size Distribution Plot, Boring NME-42 48
Grain Size Distribution Plot, Boring NME-43 49
Grain Size Distribution Plot, Boring NME-44 50
Grain Size Distribution Plot, Boring NME-45 51
Grain Size Distribution Plot, Boring NME-46 52
Plasticity Chart, Boring NME-1 53
Plasticity Chart, Boring NME-5 54
Plasticity Chart, Boring NME-6 55
Plasticity Chart, Boring NME-8 56
Plasticity Chart, Boring NME-10 57
Plasticity Chart, Boring NME-11 58
Plasticity Chart, Boring NME-12 59
Plasticity Chart, Boring NME-14 60
Plasticity Chart, Boring NME-15 61
Plasticity Chart, Boring NME-16 62
Plasticity Chart, Boring NME-26 63
Plasticity Chart, Boring NME-27 64
Plasticity Chart, Boring NME-28 65
Plasticity Chart, Boring NME-29 66
Plasticity Chart, Boring NME-30 67
Plasticity Chart, Boring NME-31 68
Plasticity Chart, Boring NME-32 69
Plasticity Chart, Boring NME-36 70
Plasticity Chart, Boring NME-39 71
Plasticity Chart, Boring NME-40 72
One-Dimensional Consolidation, Boring NME-28, Sample S-5, 13.3 ft. 73

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LABORATORY TERMS

Abbreviations, Symbols, and Terms	Descriptions
%	Percent
*	Sample specimen weight did not meet required minimum mass for the test method
"	Inch
#	Test not performed by Shannon & Wilson, Inc. laboratory
ASTM Std.	ASTM International Standard
C_c	Coefficient of curvature
Clay-size	Soil particles finer than 0.002 mm
cm	Centimeter
cm^2	Square centimeter
Coarse-grained	Soil particles coarser than 0.075 mm (cobble-, gravel- and sand-sized particles)
Cobbles	Soil particles finer than 305 mm and coarser than 76.2 mm
C_u	Coefficient of uniformity
CU	Consolidated-Undrained
ε	Axial strain
Fine-grained	Soil particles finer than 0.075 mm (silt- and clay-sized particles)
ft	Feet
γm	Wet unit weight
Gravel	Soil particles finer than 76.2 mm and coarser than 4.75 mm
G_s	Specific gravity of soil solids
H_o	Initial height
ΔH	Change in height
ΔH_{load}	End of load increment deformation
in	Inch
in^3	Cubic inch
LL	Liquid Limit
min	Minute
mm	Millimeter
μ_m	Micrometer
MC	Moisture content
MPa	Mega-Pascal
NP	Non-plastic
OC	Organic content
p	Total stress
p'	Effective stress
Pa	Pascal
pcf	Pounds per cubic foot
PI	Plasticity Index
PL	Plastic Limit
psf	Pounds per square foot
psi	Pounds per square inch
q	Deviatoric stress
Sand	Soil particles finer than 4.75 mm and coarser than 0.075 mm
sec	Second
Silt	Soil particles finer than 0.075 mm and coarser than 0.002 mm
t_n	Time to n% primary consolidation
t_{load}	Duration of load increment
tsf	Short tons per square foot
USCS	Unified Soil Classification System
UU	Unconsolidated-Undrained
WC	Water content

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SAMPLE TYPES

Abbreviations, Symbols, and Terms	Descriptions
2SS	2.5-inch Outside Diameter Split-Spoon Sample
2ST	2-inch Outside Diameter Thin-Walled Tube
3HSA	3-inch CME Hollow-stem Auger Sampler
3SS	3-inch Outside Diameter Split-Spoon Sample
4SS	4-inch Inside Diameter Split-Spoon Sample
6SS	6-inch Inside Diameter Split-Spoon Sample
CA_MC	Modified California Sampler
CA_SPT	Standard Penetration Test (SPT)
CORE	Rock Core
DM	+3.25 inch Outside Diameter Split-Spoon Sample
DMR	3.25-inch Sampler with Internal Rings
GRAB	Grab Sample
GUS	3-inch Outside Diameter Gregory Undisturbed Sampler (GUS) Sample
OSTER	3-inch Outside Diameter Osterberg Sample
PITCHER	3-inch Outside Diameter Pitcher Sample
PMT	Pressuremeter Test (f=failed)
PO	Porter Penetration Test Sample
PT	2.5-inch Outside Diameter Thin-Walled Tube
ROCK	Rock Core Sample
SCORE	Soil Core (as in Sonic Core Borings)
SH1	1-inch Plastic Sheath
SH2	2-inch Plastic Sheath with Soil Recovery
SH3	2-inch Plastic Sheath with no Soil Recovery
SPT	2-inch Outside Diameter Split-Spoon Sample
SS	Split-Spoon
ST	3-inch Outside Diameter Thin-Walled Tube
STW	3-inch Outside Diameter Thin-Walled Tube
TEST	Sample Test Interval
TW	Thin Wall Sample
UNDIST	Undisturbed Sample
VANE	Vane Shear
WATER	Water Sample for Probe Logs
XCORE	Core Sample

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LABORATORY TEST SUMMARY

Boring	Top Depth (ft)	Sample Number	Sample Type	Blow Count	USCS	γ_m (pcf)	WC (%)	% Gravel	% Sand	% Fines	% Clay-size	C_u	C_c	LL	PL	NP	Soil Description
NME-1	6	R-1	SCORE				16.5										
NME-1	11	R-2	SCORE				26.1										
NME-1	16	R-2	SCORE				23.8										
NME-1	20.5	R-3	SCORE				29.1										
NME-1	26	R-3	SCORE				25.1										
NME-1	32	R-4	SCORE				22.9										
NME-1	37.5	R-4	SCORE				22.2										
NME-1	41.5	R-5	SCORE				14.7										
NME-1	46	R-5	SCORE				7.5										
NME-1	51.5	R-6	SCORE				17.3										
NME-1	55.5	R-6	SCORE				15.2										
NME-1	61.5	R-7	SCORE				18.2										
NME-1	65.5	R-7	SCORE		SP		18.2		97	3.4		2.2	1.1				Poorly Graded Sand
NME-1	72	R-8	SCORE				10.7										
NME-1	77.5	R-8	SCORE				19.4										
NME-1	82	R-9	SCORE				13.5										
NME-1	87	R-9	SCORE				22.6										
NME-1	91.5	R-10	SCORE				17.7										
NME-1	98.5	R-10	SCORE				5.5										
NME-1	103	R-11	SCORE				5.3										
NME-1	112	R-12	SCORE		GW		4.6	66	31	2.5		22.6	2.0				Well-Graded Gravel with Sand
NME-1	117	R-12	SCORE				18.2										
NME-1	123	R-13	SCORE				19.9										
NME-1	128	R-13	SCORE				19.8										
NME-1	133	R-14	SCORE				18.1										
NME-1	138	R-14	SCORE				23.9										
NME-1	141	R-15	SCORE				14.7										
NME-1	144	R-15	SCORE				19.0										
NME-1	147	R-15	SCORE				20.4										
NME-1	152	R-16	SCORE		CL		15.0	15	34	51							Sandy Lean Clay with Gravel
NME-1	158	R-16	SCORE				22.4										
NME-1	163	R-17	SCORE				20.1										

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LABORATORY TEST SUMMARY

Boring	Top Depth (ft)	Sample Number	Sample Type	Blow Count	USCS	γ_m (pcf)	WC (%)	% Gravel	% Sand	% Fines	% Clay-size	C_u	C_c	LL	PL	NP	Soil Description
NME-1	168	R-17	SCORE				21.2										
NME-1	172	R-18	SCORE		CH		24.2							64.6	23.3		Fat Clay
NME-1	179	R-18	SCORE				16.1										
NME-1	183	R-19	SCORE				22.8										
NME-1	188	R-19	SCORE		CL		24.6							47.8	23.9		Lean Clay
NME-1	193	R-20	SCORE				24.7										
NME-1	199	R-20	SCORE				26.0										
NME-4	122	R-14	SCORE				6.2										
NME-4	128	R-14	SCORE				6.4										
NME-4	130	R-15	SCORE		SP-SM		6.2	39*	54*	7.1*		21.9	0.9				Poorly Graded Sand with Silt and Gravel
NME-4	137	R-15	SCORE				13.1										
NME-4	139	R-15	SCORE				21.6										
NME-4	142	R-15	SCORE				19.7										
NME-4	147	R-15	SCORE		ML		20.1		15	85							Silt
NME-4	151	R-16	SCORE				16.5										
NME-4	155	R-16	SCORE				20.6										
NME-4	158	R-16	SCORE		SP-SM		9.7	30*	61*	8.6*		27.8	0.2				Poorly Graded Sand with Silt and Gravel
NME-4	161	R-16	SCORE		ML		18.4	0*	17*	83*							Silt with Sand
NME-4	165	R-16	SCORE				13.7										
NME-4	167	R-16	SCORE				19.4										
NME-4	172	R-17	SCORE				23.0										
NME-4	176	R-17	SCORE				19.9										
NME-4	182	R-17	SCORE				18.8										
NME-4	186	R-17	SCORE				9.8										
NME-4	193	R-18	SCORE				17.1										
NME-4	198	R-18	SCORE				18.4										
NME-4	203	R-19	SCORE				20.6										
NME-4	208	R-19	SCORE				17.0										
NME-4	213	R-20	SCORE				19.3										
NME-4	218	R-20	SCORE				15.3										

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LABORATORY TEST SUMMARY

Boring	Top Depth (ft)	Sample Number	Sample Type	Blow Count	USCS	γ_m (pcf)	WC (%)	% Gravel	% Sand	% Fines	% Clay-size	C_u	C_c	LL	PL	NP	Soil Description
NME-4	223	R-21	SCORE		SM		21.9		86	14							Silty Sand
NME-4	228	R-21	SCORE				22.5										
NME-5	2.5	S-1	SPT	62			17.8										
NME-5	5	S-2	SPT	56			18.1										
NME-5	7.5	S-3	SPT	69			19.1										
NME-5	10	S-4	SPT	40			18.2										
NME-5	10.7	S-4	SPT	40			13.8										
NME-5	12.5	S-5	SPT	44			15.6										
NME-5	15	S-6	SPT	47			16.8										
NME-5	20	S-7	SPT	46			19.0										
NME-5	25	S-8	SPT	43			16.9										
NME-5	35	S-10	SPT	73			15.7										
NME-5	40	S-11	SPT	91			21.4										
NME-5	45	S-12	SPT	98/11"			17.0										
NME-5	50	S-13	SPT	54			17.4										
NME-5	55	S-14	SPT	54	CL		18.2							35.7	24.2		Lean Clay
NME-5	60	S-15	SPT	42			25.6										
NME-5	65	S-16	SPT	84			18.7										
NME-5	70	S-17	SPT	69			17.3										
NME-5	75	S-18	SPT	47			18.5										
NME-5	80	S-19	SPT	50/6"			22.4										
NME-5	85	S-20	SPT	50/5"			20.2										
NME-5	90	S-21	SPT	50/4"			16.8										
NME-5	95	S-22	SPT	50/5"			15.6										
NME-5	100	S-23	SPT	50/5"			14.1										
NME-5	105	S-24	SPT	50/4"			12.5										
NME-5	110	S-25	SPT	50/5"			16.0										
NME-5	115	S-26	SPT	50/6"			13.5										
NME-5	120	S-27	SPT	50/6"			14.4										
NME-5	125	S-28	SPT	50/3"			13.1										
NME-5	130	S-29	SPT	31			34.9										
NME-5	135	S-30	SPT	49			31.4										

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LABORATORY TEST SUMMARY

Boring	Top Depth (ft)	Sample Number	Sample Type	Blow Count	USCS	γ_m (pcf)	WC (%)	% Gravel	% Sand	% Fines	% Clay-size	C_u	C_c	LL	PL	NP	Soil Description
NME-5	140	S-31	SPT	45	CH		34.7							74.4	27.5		Fat Clay
NME-5	145	S-32	SPT	43			37.5										
NME-5	150	S-33	SPT	47			24.7										
NME-5	155	S-34	SPT	74			26.6										
NME-5	160	S-35	SPT	76/10"			27.1										
NME-5	165	S-36	SPT	83/10"			24.6										
NME-5	170	S-37	SPT	74			24.9										
NME-6	5	S-1	GRAB				12.7										
NME-6	10	S-2	SPT	14			25.9										
NME-6	15	S-3	SPT	15			22.8										
NME-6	20	S-4	SPT	27	CL		16.6	2*	22*	77*	20*						Lean Clay with Sand
NME-6	25	S-5	SPT	35	CL		15.9							22.5	15.5		Lean Clay with Sand
NME-6	30	S-6	SPT	41			15.4										
NME-6	35	S-7	SPT	45			18.7										
NME-6	40	S-8	SPT	47			13.9										
NME-6	45	S-9	SPT	76			13.7										
NME-6	50	S-10	SPT	55			18.2										
NME-6	55	S-11	SPT	44			40.3										
NME-6	60	S-12	SPT	19			34.9										
NME-6	70	S-14	SPT	38			16.6										
NME-6	75	S-15	SPT	53			17.4										
NME-6	80	S-16	SPT	51			16.1										
NME-6	85	S-17	SPT	56	CL		16.1							28.1	19.3		Lean Clay with Sand
NME-6	90	S-18	SPT	61			19.4										
NME-6	95	S-19	SPT	71	CL		13.2	10*	22*	68*	16*						Sandy Lean Clay
NME-6	100	S-20	SPT	64			22.1										
NME-6	105	S-21	SPT	45			18.9										
NME-6	110	S-22	SPT	20			35.9										
NME-6	115	S-23	SPT	32			33.5										
NME-6	120	S-24	SPT	26			32.1										
NME-7	2.5	S-1	SPT	20			7.6										
NME-7	5	S-2	SPT	11			9.7										

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LABORATORY TEST SUMMARY

Boring	Top Depth (ft)	Sample Number	Sample Type	Blow Count	USCS	γ_m (pcf)	WC (%)	% Gravel	% Sand	% Fines	% Clay-size	C_u	C_c	LL	PL	NP	Soil Description
NME-7	7.5	S-3	SPT	8	SW-SM		11.9	9*	83*	8.7*		8.7	1.2				Well-Graded Sand with Silt
NME-7	10	S-4	SPT	8			13.3										
NME-7	12.5	S-5	SPT	10			14.9										
NME-7	14	S-6	SS	7			14.1										
NME-7	16	S-7	SPT	6			13.4										
NME-7	17.5	S-8	SPT	2			14.8										
NME-7	20	S-9	SPT	2			19.2										
NME-7	25	S-10	SPT	13	SP-SM		13.9	18*	76*	6.7*		13.6	0.9				Poorly Graded Sand with Silt and Gravel
NME-7	30	S-11	SPT	3			21.3										
NME-7	35	S-12	SPT	50/5"			13.6										
NME-8	2.5	S-1	SPT	38			4.4										
NME-8	2.9	S-1	SPT	38			11.2										
NME-8	5	S-2	SPT	35	ML		13.6	4*	33*	63*							Sandy Silt
NME-8	7.5	S-3	SPT	40			9.0										
NME-8	8.6	S-3	SPT	40			3.8										
NME-8	10	S-4	SPT	69	ML		10.0	14*	33*	54*							Sandy Silt
NME-8	12.5	S-5	SPT	52			14.0										
NME-8	15	S-6	SPT	54			18.8										
NME-8	15.3	S-6	SPT	54			20.4										
NME-8	16.5	S-7	SS	38			22.6										
NME-8	18	S-8	SPT	50/5"			13.5										
NME-8	20	S-9	SPT	50/2"	CL		9.3							27.2	18.2		Lean Clay with Sand
NME-8	25	S-10	SPT	75	ML		17.0	0*	34*	65*							Sandy Silt
NME-9	2.5	S-1	SPT	38			9.2										
NME-9	5	S-2	SPT	48			6.0										
NME-9	7.5	S-3	SPT	31			7.0										
NME-9	10	S-4	SPT	58			6.4										
NME-9	12.5	S-5	SPT	33	SW-SM		6.5	29*	60*	11*		24.8	1.2				Well-Graded Sand with Silt and Gravel
NME-9	15	S-6	SPT	79			8.7										
NME-9	17.5	S-7	SPT	70			6.2										

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LABORATORY TEST SUMMARY

Boring	Top Depth (ft)	Sample Number	Sample Type	Blow Count	USCS	γ_m (pcf)	WC (%)	% Gravel	% Sand	% Fines	% Clay-size	C_u	C_c	LL	PL	NP	Soil Description
NME-9	20	S-8	SPT	87/11.5"			6.9										
NME-9	25	S-10	SPT	74	SM		8.8	25*	62*	13*							Silty Sand with Gravel
NME-9	30	S-11	SPT	38			8.8										
NME-10	2.5	S-1	SPT	41			9.8										
NME-10	5	S-2	SPT	25			10.8										
NME-10	7.5	S-3	SPT	19	SW-SM		14.5	19*	71*	9.9*		14.7	1.8				Well-Graded Sand with Silt and Gravel
NME-10	10	S-4	SPT	8			19.5										
NME-10	12.5	S-5	SPT	32			17.9										
NME-10	13	S-5	SPT	32			16.9										
NME-10	15	S-6	SPT	7	CL		14.5							38.3	18.9		Lean Clay
NME-10	18	S-8	SPT	22			36.7										
NME-10	20	S-9	SPT	17			34.8										
NME-10	25	S-10	SPT	22	CH		33.7							75.4	27.7		Fat Clay
NME-11	2.5	S-1	SPT	40			9.4										
NME-11	5	S-2	SPT	65			10.8										
NME-11	7.5	S-3	SPT	66	ML		11.3	13*	35*	52*							Sandy Silt
NME-11	10	S-4	SPT	54			12.5										
NME-11	11.1	S-4	SPT	54			13.2										
NME-11	13	S-5	SPT	38			12.8										
NME-11	15	S-6	SPT	49	ML		12.6	1*	32*	67*							Sandy Silt
NME-11	17.5	S-7	SPT	30			12.4										
NME-11	18.3	S-7	SPT	30			28.3										
NME-11	19	S-8	SPT	17			12.3										
NME-11	21	S-9	SPT	49	CL		10.9							25.5	16.3		Lean Clay with Sand
NME-11	25	S-10	SPT	54	ML		13.2	21*	29*	50*							Sandy Silt with Gravel
NME-11	30	S-11	SPT	37			13.4										
NME-12	2.5	S-1	SPT	51			5.6										
NME-12	5	S-2	SPT	9	SM		8.5	40*	42*	18*							Silty Sand with Gravel
NME-12	7.5	S-3	SPT	5	CH		30.4							56.7	23.7		Fat Clay
NME-12	10	S-4	SPT	9			30.1										
NME-12	12.5	S-5	SPT	7			32.0										

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LABORATORY TEST SUMMARY

Boring	Top Depth (ft)	Sample Number	Sample Type	Blow Count	USCS	γ_m (pcf)	WC (%)	% Gravel	% Sand	% Fines	% Clay-size	C_u	C_c	LL	PL	NP	Soil Description
NME-12	15	S-6	SPT	4			31.6										
NME-12	17.5	S-7	SPT	1	CH		30.1							54.5	25		Fat Clay
NME-13	2.5	S-1	SPT	5			15.4										
NME-13	5	S-2	SPT	10			12.8										
NME-13	7.5	S-3	SPT	2	SM		16.3	8*	67*	24*							Silty Sand
NME-13	10	S-4	SPT	3			19.3										
NME-13	12.5	S-5	SPT	2			23.3										
NME-13	15	S-6	SPT	0	SM		20.4	8*	68*	24*							Silty Sand
NME-13	17.5	S-7	SPT	7			25.7										
NME-13	20	S-8	SPT	49			5.5										
NME-13	22.5	S-9	SPT	27			6.5										
NME-13	22.7	S-9B	SPT	27	ML		23.9		12	88							Silt
NME-13	27.5	S-10	SPT	26			24.4										
NME-14	2.5	S-1	GRAB				10.8										
NME-14	5	S-2	SPT	21	ML		20.0							31.3	23.5		Silt with Sand
NME-14	7.5	S-3	SPT	31			18.4										
NME-14	10	S-4	SPT	41			19.5										
NME-14	12.5	S-5	SPT	28			33.3										
NME-14	15	S-6	SPT	31			26.6										
NME-14	17.5	S-7	SPT	15	ML		26.4							27.7	24		Silt with Sand
NME-14	20	S-8	SPT	24			23.9										
NME-15	2.5	S-1	GRAB				29.4										
NME-15	5	S-2	GRAB				25.9										
NME-15	7.5	S-3	SPT	26			26.4										
NME-15	10	S-4	SPT	21	ML		27.0							31.1	25.2		Silt
NME-15	12.5	S-5	SPT	20			24.4										
NME-15	15	S-6	SPT	27			25.6										
NME-15	17.5	S-7	SPT	25			24.4										
NME-15	20	S-8	SPT	29	ML		24.8							26.1	23.3		Silt
NME-15	25	S-9	SPT	26			26.5										
NME-15	30	S-10	SPT	26			25.5										
NME-15	35	S-11	SPT	27	ML		28.1							22.6	23.7	NP	Sandy Silt

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LABORATORY TEST SUMMARY

Boring	Top Depth (ft)	Sample Number	Sample Type	Blow Count	USCS	γ_m (pcf)	WC (%)	% Gravel	% Sand	% Fines	% Clay-size	C_u	C_c	LL	PL	NP	Soil Description
NME-15	40	S-12	SPT	33			25.0										
NME-16	2.5	S-1	SPT	7			24.8										
NME-16	5	S-2	SPT	10	ML		15.8	15*	31*	53*							Sandy Silt with Gravel
NME-16	7.5	S-3	SPT	34			15.9										
NME-16	10	S-4	SPT	26			19.3										
NME-16	11.5	S-5	SS	22	CH		34.6							59.8	26.4		Sandy Fat Clay
NME-16	13	S-6	SPT	14			43.5										
NME-16	15	S-7	SPT	19	CL		28.2							48.4	24.6		Sandy Lean Clay
NME-16	17.5	S-8	SPT	22			28.4										
NME-16	20	S-9	SPT	27			24.9										
NME-17	5	R-2	SPT	4	SM		10.3	23*	49*	27*							Silty Sand with Gravel
NME-17	5	R-2	SCORE		SM		10.3										Silty Sand with Gravel
NME-17	10	S-2	SPT	76/11"			9.2										
NME-17	10	R-3	SCORE				9.2										
NME-17	15	S-3	SPT	98			8.5										
NME-18	5	R-2	SPT	37	SM		6.0	24*	49*	26*							Silty Sand with Gravel
NME-18	5	R-2	SCORE		SM		6.0										Silty Sand with Gravel
NME-18	10	S-2	SPT	47			10.7										
NME-18	10	R-3	SCORE				10.7										
NME-18	15	S-3	SPT	50/11"			9.1										
NME-19	5	R-2	SCORE		SM		7.0	7*	74*	18*							Silty Sand
NME-19	5	R-2	SPT	45	SM		7.0										Silty Sand
NME-19	10	S-R3	SCORE				9.8										
NME-19	10	S-S2	SPT	26			9.8										
NME-19	15	S-S3	SPT	65/11"			12.6										
NME-20	0	S-R1	SCORE				37.1										
NME-20	5	R-2	SCORE		GM		9.5	56*	28*	15*							Silty Gravel with Sand
NME-20	5	R-2	SPT	23	GM		9.5										Silty Gravel with Sand
NME-20	5.01	S-R2	SCORE				7.6										
NME-20	5.01	S-S1	SPT	23			7.6										
NME-20	9.5	S-R2	SCORE				11.0										
NME-20	10	S-R3	SCORE				9.6										

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LABORATORY TEST SUMMARY

Boring	Top Depth (ft)	Sample Number	Sample Type	Blow Count	USCS	γ_m (pcf)	WC (%)	% Gravel	% Sand	% Fines	% Clay-size	C_u	C_c	LL	PL	NP	Soil Description
NME-20	10	S-S2	SPT	24			9.6										
NME-20	15	S-S3	SPT	50/4"			9.0										
NME-21	8	R-1	SCORE				8.0										
NME-21	12.5	R-2	SCORE				5.4										
NME-21	17.5	R-2	SCORE				19.0										
NME-21	22.5	R-3	SCORE				5.3										
NME-21	27.5	R-3	SCORE				4.9										
NME-21	32.5	R-4	SCORE				16.6										
NME-21	37.5	R-4	SCORE				15.5										
NME-21	42.5	R-5	SCORE				11.1										
NME-21	47.5	R-5	SCORE				15.8										
NME-21	50	R-6	SCORE				12.6										
NME-21	55	R-6	SCORE				12.6										
NME-21	63	R-7	SCORE				12.6										
NME-21	67.5	R-7	SCORE				10.0										
NME-21	70	R-8	SCORE				15.6										
NME-21	75	R-8	SCORE		SP-SM		7.5	44*	49*	7.2*		60.0	0.2				Poorly Graded Sand with Silt and Gravel
NME-21	83.5	R-9	SCORE		SM		20.0	0*	76*	24*							Silty Sand
NME-21	87.5	R-9	SCORE				5.3										
NME-21	93	R-10	SCORE				20.2										
NME-21	97	R-10	SCORE				10.5										
NME-22	8	R-2	SCORE				8.2										
NME-22	14	R-3	SCORE				11.9										
NME-22	18	R-3	SCORE				8.1										
NME-22	23	R-4	SCORE				6.3										
NME-22	28	R-4	SCORE				3.5										
NME-22	32.5	R-5	SCORE				7.6										
NME-22	36	R-5	SCORE				3.9										
NME-22	43	R-7	SCORE				10.5										
NME-22	48	R-7	SCORE				3.4										
NME-22	52	R-8	SCORE				1.8										

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LABORATORY TEST SUMMARY

Boring	Top Depth (ft)	Sample Number	Sample Type	Blow Count	USCS	γ_m (pcf)	WC (%)	% Gravel	% Sand	% Fines	% Clay-size	C_u	C_c	LL	PL	NP	Soil Description
NME-22	57.5	R-9	SCORE				6.9										
NME-22	62	R-10	SCORE				8.5										
NME-22	68	R-10	SCORE				6.0										
NME-22	72	R-11	SCORE				8.4										
NME-22	77.5	R-11	SCORE				8.2										
NME-22	82	R-12	SCORE				12.5										
NME-22	87.5	R-12	SCORE		SP-SM		7.8	35*	54*	11*		44.3	0.5				Poorly Graded Sand with Silt and Gravel
NME-22	95	R-13	SCORE		ML		17.8	2	37	61							Sandy Silt
NME-22	104	R-14	SCORE				4.9										
NME-22	108	R-14	SCORE				16.2										
NME-22	113	R-15	SCORE				9.3										
NME-22	118	R-15	SCORE				16.4										
NME-22	123	R-16	SCORE				12.1										
NME-22	128	R-16	SCORE		SP-SM		16.6	7*	83*	9.8*		3.7	1.3				Poorly Graded Sand with Silt
NME-22	138	R-17	SCORE		GW-GM		4.8	61*	30*	8.6*		114.9	2.6				Well-Graded Gravel with Silt and Sand
NME-22	143	R-18	SCORE				6.3										
NME-22	148	R-19	SCORE				13.7										
NME-22	153	R-19	SCORE				16.5										
NME-22	157	R-19	SCORE				15.2										
NME-22	162	R-19	SCORE				16.6										
NME-23	2.5	R-1	SCORE				9.6										
NME-23	7.5	R-1	SCORE				8.4										
NME-23	12.5	R-2	SCORE				7.5										
NME-23	17.5	R-2	SCORE				2.4										
NME-23	22.5	R-4	SCORE				5.4										
NME-23	28	R-4	SCORE				3.2										
NME-23	32.5	R-5	SCORE				3.1										
NME-23	37.5	R-5	SCORE				4.5										
NME-23	42.5	R-6	SCORE				4.5										
NME-23	47.5	R-6	SCORE				5.8										

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LABORATORY TEST SUMMARY

Boring	Top Depth (ft)	Sample Number	Sample Type	Blow Count	USCS	γ_m (pcf)	WC (%)	% Gravel	% Sand	% Fines	% Clay-size	C_u	C_c	LL	PL	NP	Soil Description
NME-23	53	R-7	SCORE				6.2										
NME-23	57.5	R-7	SCORE				6.0										
NME-23	62.5	R-8	SCORE				6.5										
NME-23	67.5	R-8	SCORE				7.0										
NME-23	72.5	R-9	SCORE				7.5										
NME-23	77.5	R-9	SCORE				4.7										
NME-23	82.5	R-10	SCORE				5.5										
NME-23	87.5	R-10	SCORE				18.1										
NME-23	92.5	R-11	SCORE				23.9										
NME-23	97	R-11	SCORE				19.6										
NME-23	103	R-12	SCORE				18.9										
NME-23	108	R-12	SCORE				21.3										
NME-23	110	R-13	SCORE				18.0										
NME-23	115	R-13	SCORE				18.0										
NME-23	122	R-14	SCORE		ML		17.0	5*	28*	67*							Sandy Silt
NME-23	128	R-14	SCORE				23.0										
NME-23	133	R-15	SCORE		ML		22.6		3*	97*							Silt
NME-23	138	R-15	SCORE				22.6										
NME-23	143	R-16	SCORE				23.9										
NME-23	148	R-16	SCORE				20.5										
NME-23	150	R-17	SCORE				22.2										
NME-23	155	R-17	SCORE				26.4										
NME-23	163	R-18	SCORE				22.1										
NME-23	168	R-18	SCORE				22.3										
NME-23	173	R-19	SCORE				19.1										
NME-23	178	R-19	SCORE				20.9										
NME-24	3	R-1	SCORE				8.4										
NME-24	7.5	R-1	SCORE				35.8										
NME-24	12.5	R-2	SCORE				15.9										
NME-24	17.5	R-2	SCORE				13.6										
NME-24	22.5	R-3	SCORE				12.9										
NME-24	27.5	R-3	SCORE				13.5										

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LABORATORY TEST SUMMARY

Boring	Top Depth (ft)	Sample Number	Sample Type	Blow Count	USCS	γ_m (pcf)	WC (%)	% Gravel	% Sand	% Fines	% Clay-size	C_u	C_c	LL	PL	NP	Soil Description
NME-24	32.5	R-4	SCORE				10.5										
NME-24	37.5	R-4	SCORE				14.3										
NME-24	42.5	R-5	SCORE				15.1										
NME-24	47.5	R-5	SCORE				16.4										
NME-24	52.5	R-6	SCORE				24.0										
NME-24	60	R-7	SCORE		ML		23.8		25	75							Silt with Sand
NME-24	67.5	R-7	SCORE				24.4										
NME-24	70	R-8	SCORE		ML		24.8		13	87							Silt
NME-24	77.5	R-8	SCORE		ML		26.1		3*	97*							Silt
NME-24	82.5	R-9	SCORE				26.7										
NME-24	87.5	R-9	SCORE		ML		27.9	2*	3*	95*							Silt
NME-24	92.5	R-10	SCORE				28.3										
NME-24	97.5	R-10	SCORE				25.1										
NME-24	103	R-11	SCORE				20.1										
NME-24	109	R-11	SCORE		SM		18.4	0	83	17							Silty Sand
NME-24	113	R-12.5	SCORE		SM		22.5	0*	62*	38*							Silty Sand
NME-24	118	R-12	SCORE				21.2										
NME-24	123	R-13	SCORE				22.9										
NME-24	128	R-13	SCORE				24.8										
NME-24	133	R-14	SCORE				20.7										
NME-25	2.5	S-1	SPT	9			14.7										
NME-25	5	S-2	SPT	9			21.6										
NME-25	7.5	S-3	SPT	7	GM		12.8	52*	36*	12*							Silty Gravel with Sand
NME-25	10	S-4	SPT	23			9.5										
NME-25	12.5	S-5	SPT	35			9.1										
NME-25	15	S-6	SPT	50/4"			10.0										
NME-25	17.5	S-7	SPT	50/5.5"	SM		11.5	10*	64*	26*							Silty Sand
NME-25	20	S-8	SPT	50/3"			11.3										
NME-25	25	S-9	SPT	50/4"			10.5										
NME-25	30	S-10	SPT	50/3"			11.6										
NME-25	35	S-11	SPT	50/5"			12.0										
NME-25	40	S-12	SPT	50/3"			13.2										

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LABORATORY TEST SUMMARY

Boring	Top Depth (ft)	Sample Number	Sample Type	Blow Count	USCS	γ_m (pcf)	WC (%)	% Gravel	% Sand	% Fines	% Clay-size	C_u	C_c	LL	PL	NP	Soil Description
NME-25	45	S-13	SPT	50/5"			12.1										
NME-25	50	S-14	SPT	50/4.5"			8.2										
NME-25	55	S-15	SPT	50/3"			10.6										
NME-26	2.5	S-1	SPT	9			28.1										
NME-26	5	S-2	SPT	7	CL		25.3							37.3	19.5		Lean Clay with Sand
NME-26	7.5	S-3	SPT	11	CH		19.1							71.1	26.4		Fat Clay with Sand
NME-26	12.5	S-5	SPT	7			44.6										
NME-26	15	S-6	SPT	11	CH		43.5							80.8	26.3		Fat Clay
NME-26	17.5	S-7	SPT	16			42.9										
NME-26	20	S-8	SPT	14			35.8										
NME-27	5	S-2	SPT	2	CH		39.3							67.4	24.7		Fat Clay
NME-27	7.5	S-3	SPT	8	CL		42.5							30.7	18.2		Lean Clay
NME-27	10	S-4	SPT	12			38.7										
NME-27	12.5	S-5	SPT	11	CH		39.2							80.9	26		Fat Clay
NME-27	17.5	S-7	SPT	14			33.8										
NME-27	20	S-8	SPT	15			39.2										
NME-27	25	S-9	SPT	16			34.7										
NME-27	30	S-10	SPT	18			39.1										
NME-28	2.5	S-1	SPT	9			24.5										
NME-28	5	S-2	SPT	7	CH		50.8							80.4	27.7		Fat Clay
NME-28	7.5	S-3	SPT	9			45.4										
NME-28	10	S-4	SPT	10	CH		46.1							71.8	25.9		Fat Clay
NME-28	11.5	S-5	TW				41.6										
NME-28	13.3	S-5	TW		CH	114	41.1							81.8	26.8		Fat Clay
NME-28	15	S-6	SPT	16	CH		40.6							81.4	27.4		Fat Clay
NME-28	17.5	S-7	SPT	19			37.5										
NME-28	20	S-8	SPT	18			37.1										
NME-28	25	S-9	SPT	21			36.2										
NME-28	30	S-10	SPT	24			38.6										
NME-29	2.5	S-1	SPT	15			20.4										
NME-29	5	S-2	SPT	8	CH		32.6							54.1	22.1		Fat Clay
NME-29	7.5	S-3	SPT	6	CH		40.1							63.3	23.6		Fat Clay

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LABORATORY TEST SUMMARY

Boring	Top Depth (ft)	Sample Number	Sample Type	Blow Count	USCS	γ_m (pcf)	WC (%)	% Gravel	% Sand	% Fines	% Clay-size	C_u	C_c	LL	PL	NP	Soil Description
NME-29	10	S-4	SPT	10			38.4										
NME-29	12.5	S-5	SPT	13	CH		60.2							73.3	26.5		Fat Clay
NME-29	15	S-6	SPT	15			39.6										
NME-29	17.5	S-7	SPT	9	CH		23.1							90.5	28.1		Fat Clay
NME-29	20	S-8	SPT	17			38.0										
NME-30	2.5	S-1	SPT	12			27.0										
NME-30	5	S-2	SPT	43			44.0										
NME-30	7.5	S-3	SPT	11	CH		45.0							75.5	26.9		Fat Clay
NME-30	10	S-4	SPT	50/6"			44.1										
NME-30	12.5	S-5	SPT	11			40.6										
NME-30	15	S-6	SPT	13			41.2										
NME-30	17.5	S-7	SPT	12			38.9										
NME-30	20	S-8	SPT	14	CH		36.6							71.7	26.1		Fat Clay
NME-30	25	S-9	SPT	16			33.8										
NME-30	30	S-10	SPT	50/4"			35.9										
NME-30	35	S-11	SPT	51	CH		28.9							57.2	22.8		Fat Clay
NME-30	40	S-12	SPT	50/4"			32.5										
NME-30	45	S-13	SPT	39			28.7										
NME-30	50	S-14	SPT	30			31.3										
NME-31	2.5	S-1	SPT	2			22.0										
NME-31	5	S-2	SPT	3			28.6										
NME-31	7.5	S-3	SPT	6	CH		30.1							58.8	24		Fat Clay
NME-31	10	S-4	SPT	6	CH		45.0							76.3	24.9		Fat Clay
NME-31	12.5	S-5	SPT	4			42.5										
NME-31	15	S-6	SPT	11			43.2										
NME-31	17.5	S-7	SPT	16	CH		38.4							76	24.4		Fat Clay
NME-31	20	S-8	SPT	18			35.8										
NME-32	2.5	S-1	SPT	11			22.0										
NME-32	5	S-2	SPT	19	SM		15.4	21*	34*	45*							Silty Sand with Gravel
NME-32	7.5	S-3	SPT	12	CH		37.5							60.4	25.4		Fat Clay
NME-32	12.5	S-5	SPT	14			33.9										
NME-32	15	S-6	SPT	18	CH		31.8							58.6	23.9		Fat Clay

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LABORATORY TEST SUMMARY

Boring	Top Depth (ft)	Sample Number	Sample Type	Blow Count	USCS	γ_m (pcf)	WC (%)	% Gravel	% Sand	% Fines	% Clay-size	C_u	C_c	LL	PL	NP	Soil Description
NME-32	17.5	S-7	SPT	12			41.6										
NME-32	20	S-8	SPT	16			27.7										
NME-34	2.5	S-1	SPT	27			23.7										
NME-34	5	S-2	SPT	26			26.8										
NME-34	7.5	S-3	SPT	33	ML		24.5	0*	18*	82*							Silt with Sand
NME-34	10	S-4	SPT	34			23.2										
NME-34	12.5	S-5	SPT	39	SM		10.9	40*	44*	16*							Silty Sand with Gravel
NME-34	15	S-6	SPT	44			20.1										
NME-34	17.5	S-7	SPT	36			14.0										
NME-34	20	S-8	SPT	58			15.9										
NME-35	2.5	S-1	SPT	44			5.9										
NME-35	5	S-2	SPT	42			8.5										
NME-35	7.5	S-3	SPT	74	SM		6.8	35*	54*	12*							Silty Sand with Gravel
NME-35	10	S-4	SPT	52			6.7										
NME-35	12.5	S-5	SPT	20	SM		7.5	24*	64*	12*							Silty Sand with Gravel
NME-35	15	S-6	SPT	48			8.3										
NME-35	17.5	S-7	SPT	46	SW-SM		6.1	19*	71*	9.4*		14.1	1.8				Well-Graded Sand with Silt and Gravel
NME-35	20	S-8	SPT	25			8.8										
NME-35	22.5	S-9	SPT	3	SP-SM		17.0	7*	86*	7.4*		5.9	1.3				Poorly Graded Sand with Silt
NME-35	25	S-10	SPT	4			19.6										
NME-35	30	S-11	SPT	17			26.5										
NME-36	2.5	S-1	SPT	20			16.2										
NME-36	5	S-2	SPT	84			12.1										
NME-36	7.5	S-3A	SPT	48	CL		15.3							28.9	17.1		Lean Clay with Sand
NME-36	10	S-4	SPT	67	SM		9.7	18*	34*	48*							Silty Sand with Gravel
NME-36	12.5	S-5	SPT	43			14.1										
NME-36	15	S-6	SPT	86/10"			10.0										
NME-37	2.5	S-1	SPT	43			5.4										
NME-37	5	S-2	SPT	32			6.0										
NME-37	7.5	S-3	SPT	64			5.5										
NME-37	10	S-4	SPT	50/6"			3.7										

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LABORATORY TEST SUMMARY

Boring	Top Depth (ft)	Sample Number	Sample Type	Blow Count	USCS	γ_m (pcf)	WC (%)	% Gravel	% Sand	% Fines	% Clay-size	C_u	C_c	LL	PL	NP	Soil Description
NME-37	12.5	S-5	SPT	92/11"	SW-SM		5.3	26*	65*	8.5*		22.1	1.6				Well-Graded Sand with Silt and Gravel
NME-37	15	S-6	SPT	50/2"			7.2										
NME-37	17.5	S-7	SPT	50/4"	SP-SM		6.5	38*	54*	7.5*		27.7	0.9				Poorly Graded Sand with Silt and Gravel
NME-37	20	S-8	SPT	50/6"	SW-SM		6.3	43*	50*	6.9*		28.1	1.1				Well-Graded Sand with Silt and Gravel
NME-39	2.5	S-1	SPT	2			18.1										
NME-39	5	S-2	SPT	40			31.8										
NME-39	7.5	S-3	SPT	24	CL		22.3							32.6	22.5		Lean Clay
NME-39	10	S-4	SPT	25			23.8										
NME-39	12.5	S-5	SPT	34	ML		26.5		2	98							Silt
NME-39	15	S-6	SPT	26			26.7										
NME-39	17.5	S-7	SPT	45	ML		24.3		4	96							Silt
NME-39	20	S-8	SPT	52			21.4										
NME-39	21.2	S-8	SPT	52			9.8										
NME-40	2.5	S-1	SPT	37			6.9										
NME-40	5	S-2	SPT	6			36.9										
NME-40	7.5	S-3	SPT	19			23.8										
NME-40	10	S-4	SPT	9	CL		24.1							29.6	20.2		Lean Clay
NME-40	12.5	S-5	SPT	3	CL		34.5							34.9	18.8		Lean Clay
NME-40	15	S-6	SPT	5			25.2										
NME-40	17.5	S-7	SPT	7			23.7										
NME-40	20	S-8A	SPT	70	ML		26.8	0*	44*	56*							Sandy Silt
NME-40	21	S-8B	SPT	70	GM		9.8	52*	33*	15*							Silty Gravel with Sand
NME-40	25	S-9	SPT	36	ML		26.1							26.4	23.6		Silt
NME-40	30	S-10	SPT	60			25.6										
NME-40	35	S-11	SPT	50			22.9										
NME-42	2.5	S-1	SPT	7			13.8										
NME-42	5	S-2	SPT	24			9.6										
NME-42	7.5	S-3	SPT	12			22.5										
NME-42	10	S-4	SPT	18	SM		19.6	14*	41*	45*							Silty Sand

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LABORATORY TEST SUMMARY

Boring	Top Depth (ft)	Sample Number	Sample Type	Blow Count	USCS	γ_m (pcf)	WC (%)	% Gravel	% Sand	% Fines	% Clay-size	C_u	C_c	LL	PL	NP	Soil Description
NME-42	12.5	S-5	SPT	62			19.9										
NME-42	15	S-6	SPT	66	ML		14.2	1*	19*	81*							Silt with Sand
NME-42	17.5	S-7	SPT	76			17.6										
NME-42	20	S-8	SPT	72	ML		19.0		11*	89*							Silt
NME-42	25	S-9	SPT	50/6"			21.5										
NME-42	30	S-10	SPT	80			16.1										
NME-43	2.5	S-1	SPT	40			8.2										
NME-43	5	S-2	SPT	25			9.1										
NME-43	7.5	S-3	SPT	19			9.8										
NME-43	10	S-4	SPT	18	SM		17.4	2*	78*	20*							Silty Sand
NME-43	12.5	S-5	SPT	81	SM		12.3	13*	75*	12*							Silty Sand
NME-43	15	S-6	SPT	60			17.0										
NME-43	16	S-6B	SPT	60	SM		19.8	1*	50*	49*							Silty Sand
NME-43	17.5	S-7	SPT	50/2.5"	SM		11.2	18*	49*	33*							Silty Sand with Gravel
NME-43	20	S-8	SPT	89/10"			15.1										
NME-43	25	S-9	SPT	66			9.4										
NME-43	30	S-10	SPT	50/3"			18.0										
NME-43	35	S-11	SPT	50/4.5"			12.7										
NME-43	40	S-12	SPT	50/4"			13.5										
NME-43	45	S-13	SPT	50/4"			10.6										
NME-43	50	S-14	SPT	50/3"			13.8										
NME-43	55	S-15	SPT	74/9"			21.5										
NME-44	2.5	S-1	SPT	41			8.6										
NME-44	5	S-2	SPT	58			8.2										
NME-44	10	S-4	SPT	23	SP-SM		5.3	44*	45*	11*		133.4	0.2				Poorly Graded Sand with Silt and Gravel
NME-44	12.5	S-5	SPT	32	GM		6.6	44*	43*	12*							Silty Gravel with Sand
NME-44	15	S-6	SPT	32	GM		8.1	45*	42*	13*							Silty Gravel with Sand
NME-44	17.5	S-7	SPT	78/10"	SM		11.8	20*	55*	24*							Silty Sand with Gravel
NME-44	20	S-8	SPT	50/5"			13.4										
NME-44	25	S-9	SPT	72/11"			22.4										
NME-45	100	R-12	SCORE				16.5										

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LABORATORY TEST SUMMARY

Boring	Top Depth (ft)	Sample Number	Sample Type	Blow Count	USCS	γ_m (pcf)	WC (%)	% Gravel	% Sand	% Fines	% Clay-size	C_u	C_c	LL	PL	NP	Soil Description
NME-45	113	R-13	SCORE				20.5										
NME-45	120	R-14	SCORE		SP-SM		21.9		94	6.2		3.1	1.3				Poorly Graded Sand with Silt
NME-45	130	R-14	SCORE		SP-SM		18.7		89	11		3.6	1.4				Poorly Graded Sand with Silt
NME-45	135	R-14	SCORE		SM		19.1		84	16							Silty Sand
NME-45	143	R-15	SCORE		SM		19.7		85	15							Silty Sand
NME-46	135	R-15	SCORE				22.4										
NME-46	148	R-15	SCORE		SM		19.6		82	18							Silty Sand
NME-46	155	R-16	SCORE		ML		25.8	0	26	74							Silt with Sand
NME-46	159	R-16	SCORE		SM		20.6	0	59	41							Silty Sand
NME-46	165	R-17	SCORE		SM		25.9		53	47							Silty Sand
NME-46	178	R-17	SCORE				25.1										

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GRAIN SIZE DISTRIBUTION PLOT

North Mercer Island Interceptor and
Enatai Interceptor Upgrade Project
King County, Washington

BORING NME-1



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Sample Identification	Depth (ft)	USCS Group Symbol	USCS Group Name	Gravel %	Sand %	Fines %	< 20µm %	< 2µm %	WC %	Tested By	Review By	ASTM Std.
● NME-1	65.5	SP	Poorly Graded Sand		97	3.4			18.2	SXL	JFL	D422
■ NME-1	111.5	GW	Well-Graded Gravel with Sand	66	31	2.5			4.6	AKV	JFL	D422
▲ NME-1	152.0	CL	Sandy Lean Clay with Gravel	15	34	51			15.0	JFL	JFL	D422

GRAIN SIZE DISTRIBUTION PLOT

North Mercer Island Interceptor and Enatai Interceptor Upgrade Project
King County, Washington

BORING NME-4

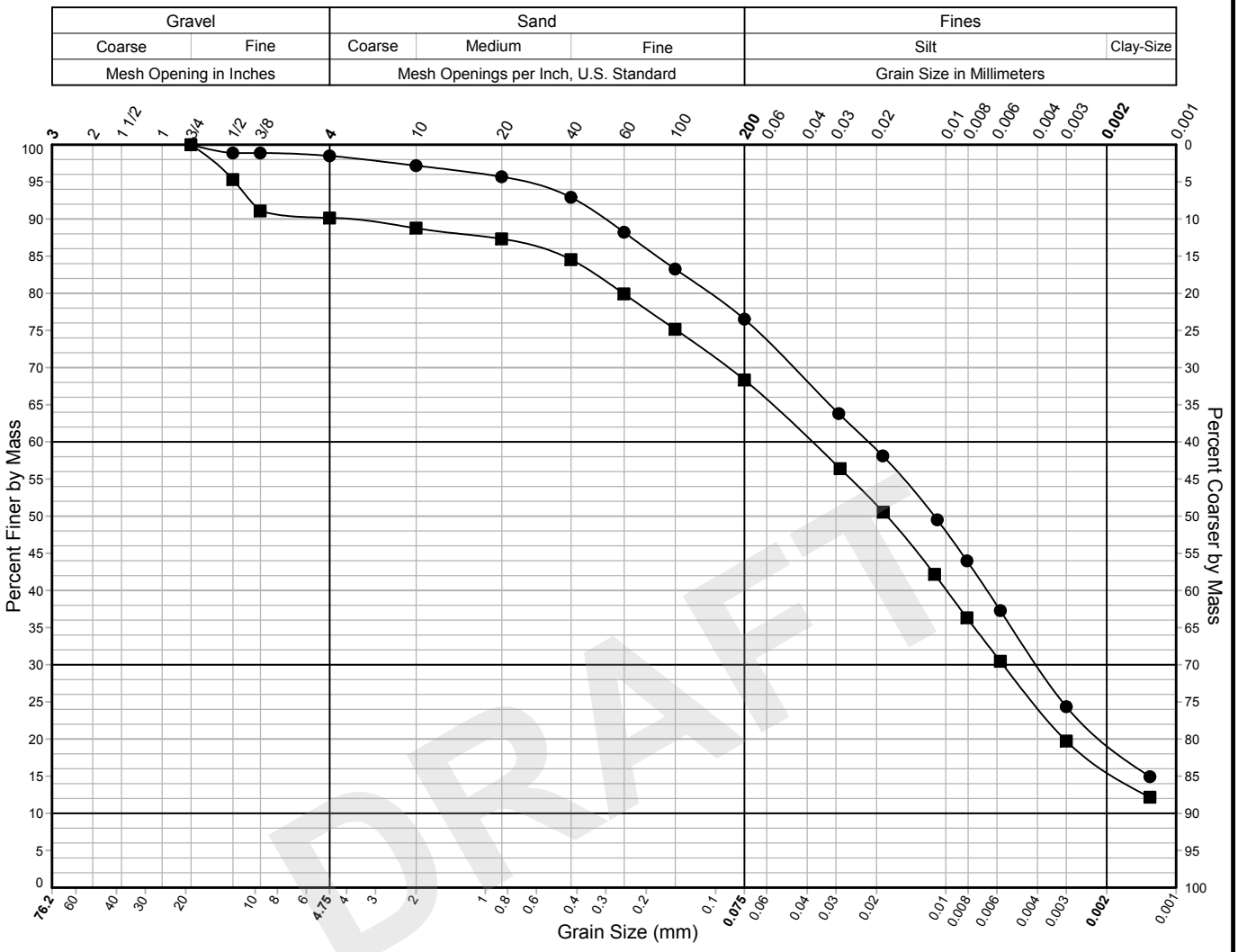


Sample Identification	Depth (ft)	USCS Group Symbol	USCS Group Name	Gravel %	Sand %	Fines %	< 20µm %	< 2µm %	WC %	Tested By	Review By	ASTM Std.
● NME-4, R-15*	130.0	SP-SM	Poorly Graded Sand with Silt and Gravel	39	54	7.1			6.2	AKV	JFL	D422
■ NME-4	147.0	ML	Silt		15	85			20.1	AKV	JFL	D422
▲ NME-4*	157.5	SP-SM	Poorly Graded Sand with Silt and Gravel	30	61	8.6			9.7	KDK	JFL	D422
◆ NME-4*	161.0	ML	Silt with Sand	0	17	83			18.4	AKV	JFL	D422
○ NME-4	222.5	SM	Silty Sand		86	14			21.9	AKV	JFL	D422

* *Test specimen did not meet minimum mass recommendations.*

North Mercer Island Interceptor and Enatai Interceptor Upgrade Project
King County, Washington

BORING NME-6



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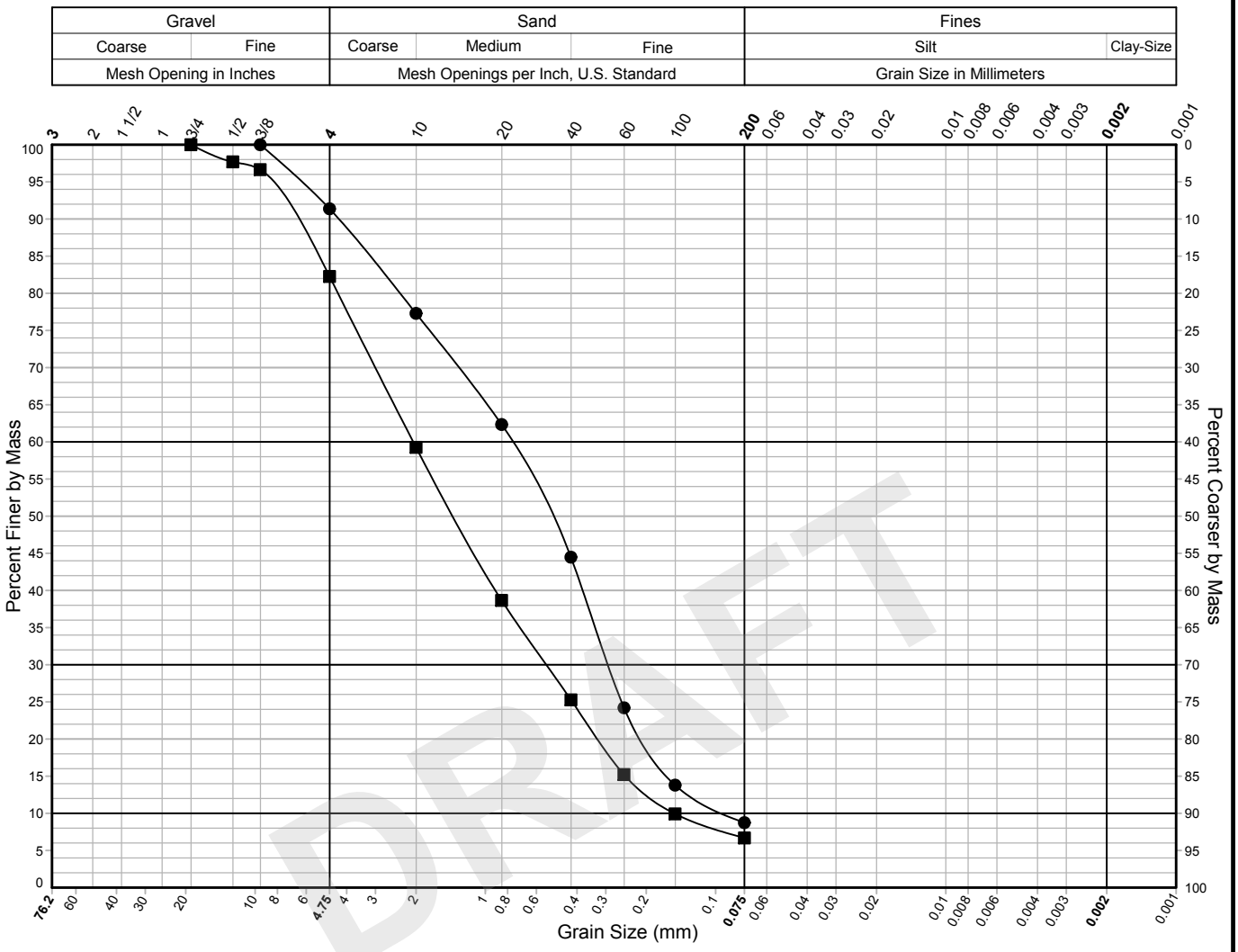
Sample Identification	Depth (ft)	USCS Group Symbol	USCS Group Name	Gravel %	Sand %	Fines %	< 20µm %	< 2µm %	WC %	Tested By	Review By	ASTM Std.
● NME-6, S-4*	20.0	CL	Lean Clay with Sand	2	22	77	59	20	16.6	BBK	JFL	D422
■ NME-6, S-19*	95.0	CL	Sandy Lean Clay	10	22	68	51	16	13.2	BBK	JFL	D422

* *Test specimen did not meet minimum mass recommendations.*

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BORING NME-7



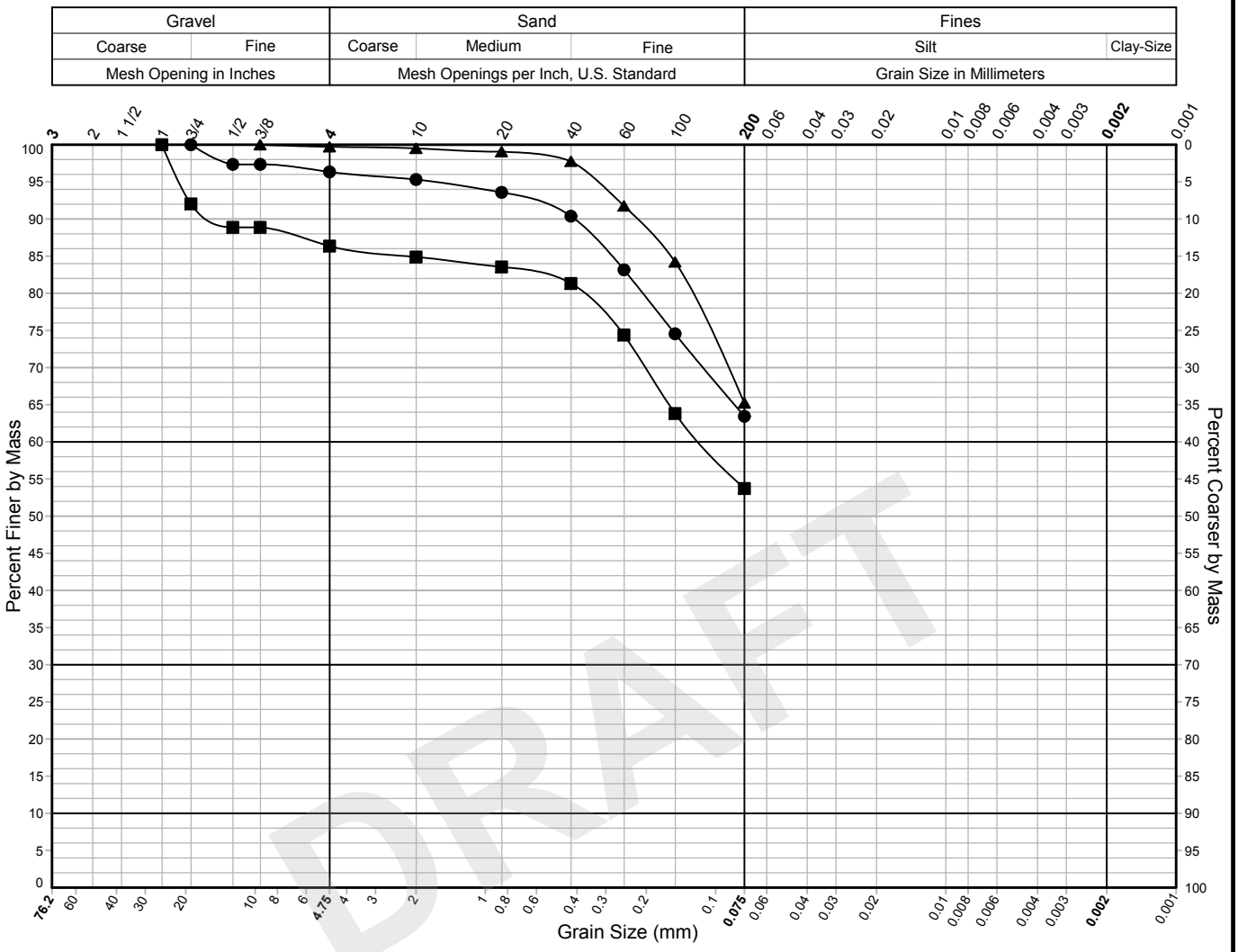
Sample Identification	Depth (ft)	USCS Group Symbol	USCS Group Name	Gravel %	Sand %	Fines %	< 20µm %	< 2µm %	WC %	Tested By	Review By	ASTM Std.
● NME-7, S-3*	7.5	SW-SM	Well-Graded Sand with Silt	9	83	8.7			11.9	JJM	JFL	C136
■ NME-7, S-10*	25.0	SP-SM	Poorly Graded Sand with Silt and Gravel	18	76	6.7			13.9	JJM	JFL	C136

* *Test specimen did not meet minimum mass recommendations.*

21-1-22000-212 A_GSA_MAIN 21-22000.GPJ SHAN_WIL.GDT 5/9/18

North Mercer Island Interceptor and Enatai Interceptor Upgrade Project
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BORING NME-8



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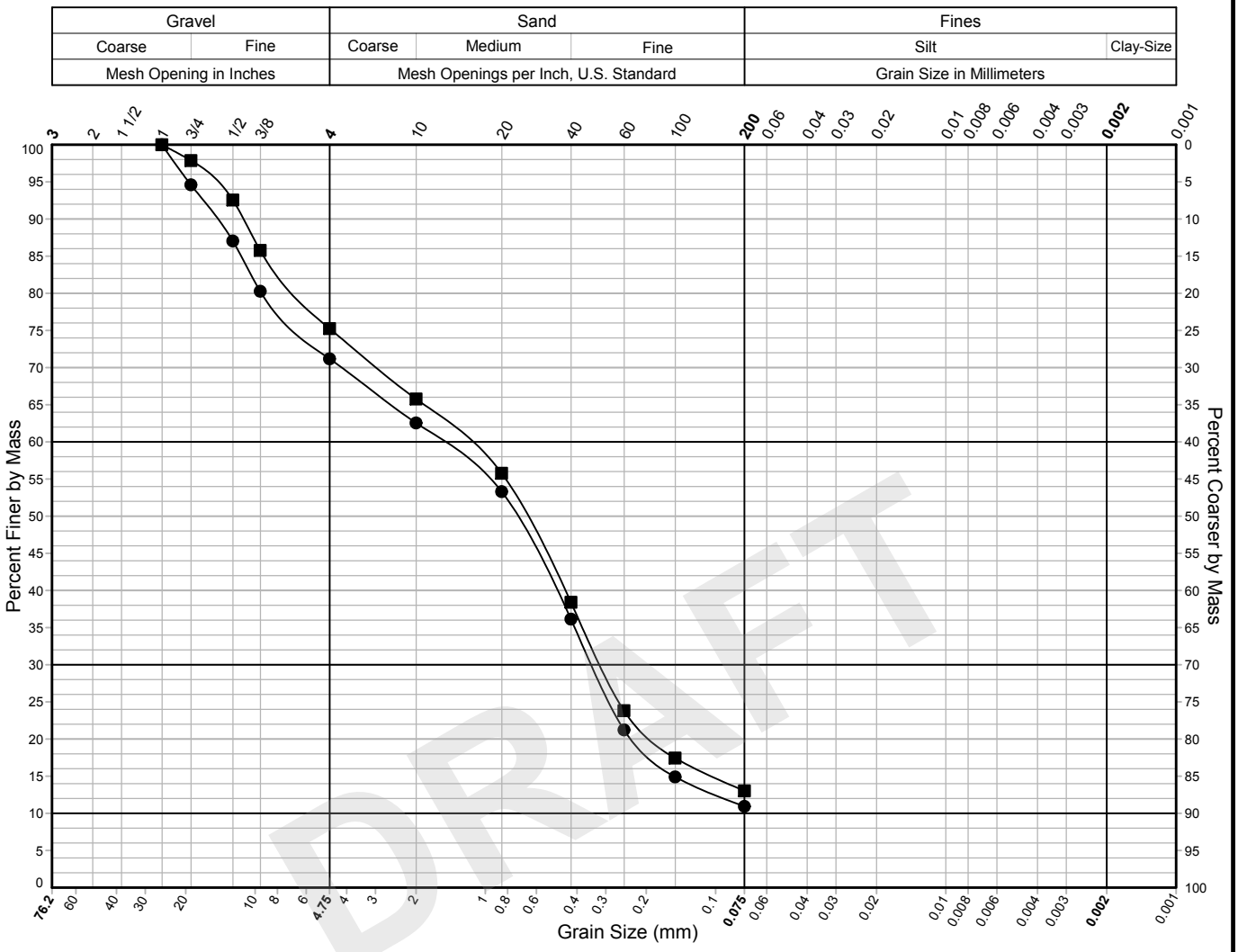
Sample Identification	Depth (ft)	USCS Group Symbol	USCS Group Name	Gravel %	Sand %	Fines %	< 20µm %	< 2µm %	WC %	Tested By	Review By	ASTM Std.
● NME-8, S-2*	5.0	ML	Sandy Silt	4	33	63			13.6	JJM	JFL	C136
■ NME-8, S-4*	10.0	ML	Sandy Silt	14	33	54			10.0	JJM	JFL	C136
▲ NME-8, S-10*	25.0	ML	Sandy Silt	0	34	65			17.0	JJM	JFL	C136

* *Test specimen did not meet minimum mass recommendations.*

GRAIN SIZE DISTRIBUTION PLOT

North Mercer Island Interceptor and
Enatai Interceptor Upgrade Project
King County, Washington

BORING NME-9



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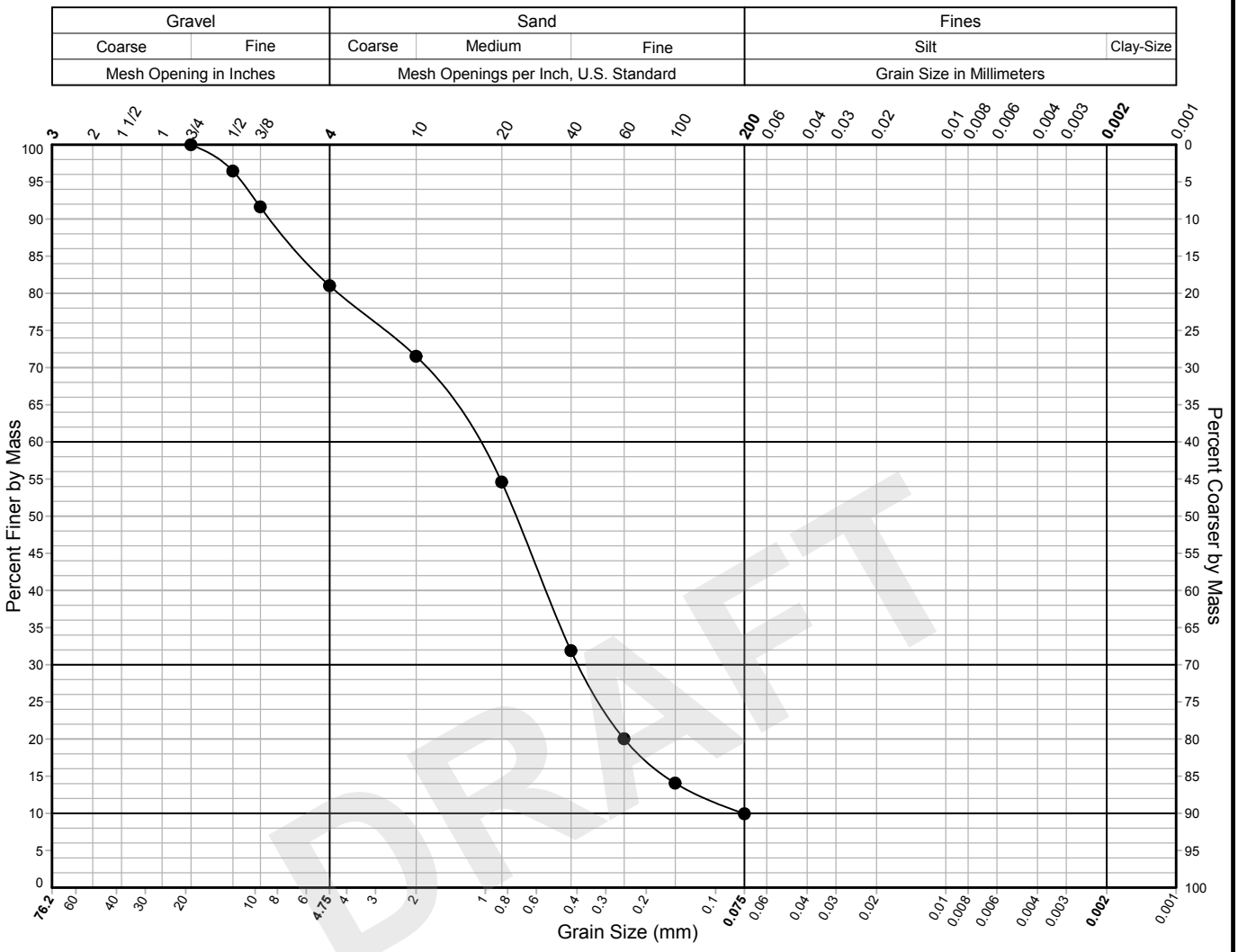
Sample Identification	Depth (ft)	USCS Group Symbol	USCS Group Name	Gravel %	Sand %	Fines %	< 20µm %	< 2µm %	WC %	Tested By	Review By	ASTM Std.
● NME-9, S-5*	12.5	SW-SM	Well-Graded Sand with Silt and Gravel	29	60	11			6.5	JJM	JFL	C136
■ NME-9, S-10*	25.0	SM	Silty Sand with Gravel	25	62	13			8.8	JJM	JFL	C136

* *Test specimen did not meet minimum mass recommendations.*

GRAIN SIZE DISTRIBUTION PLOT

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King County, Washington

BORING NME-10



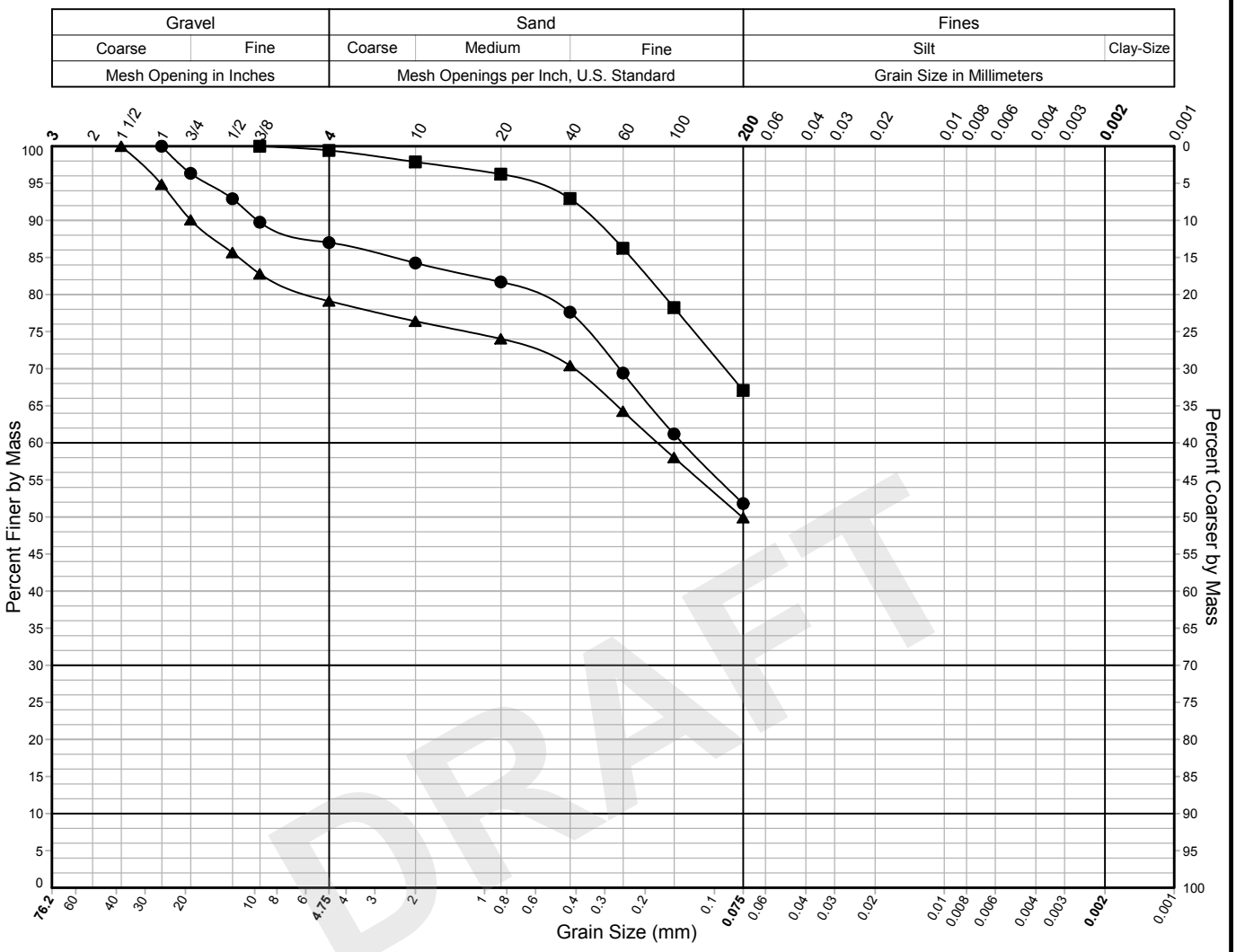
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Sample Identification	Depth (ft)	USCS Group Symbol	USCS Group Name	Gravel %	Sand %	Fines %	< 20µm %	< 2µm %	WC %	Tested By	Review By	ASTM Std.
● NME-10, S-3*	7.5	SW-SM	Well-Graded Sand with Silt and Gravel	19	71	9.9			14.5	JJM	JFL	C136

* *Test specimen did not meet minimum mass recommendations.*

North Mercer Island Interceptor and Enatai Interceptor Upgrade Project
King County, Washington

BORING NME-11



DRAFT

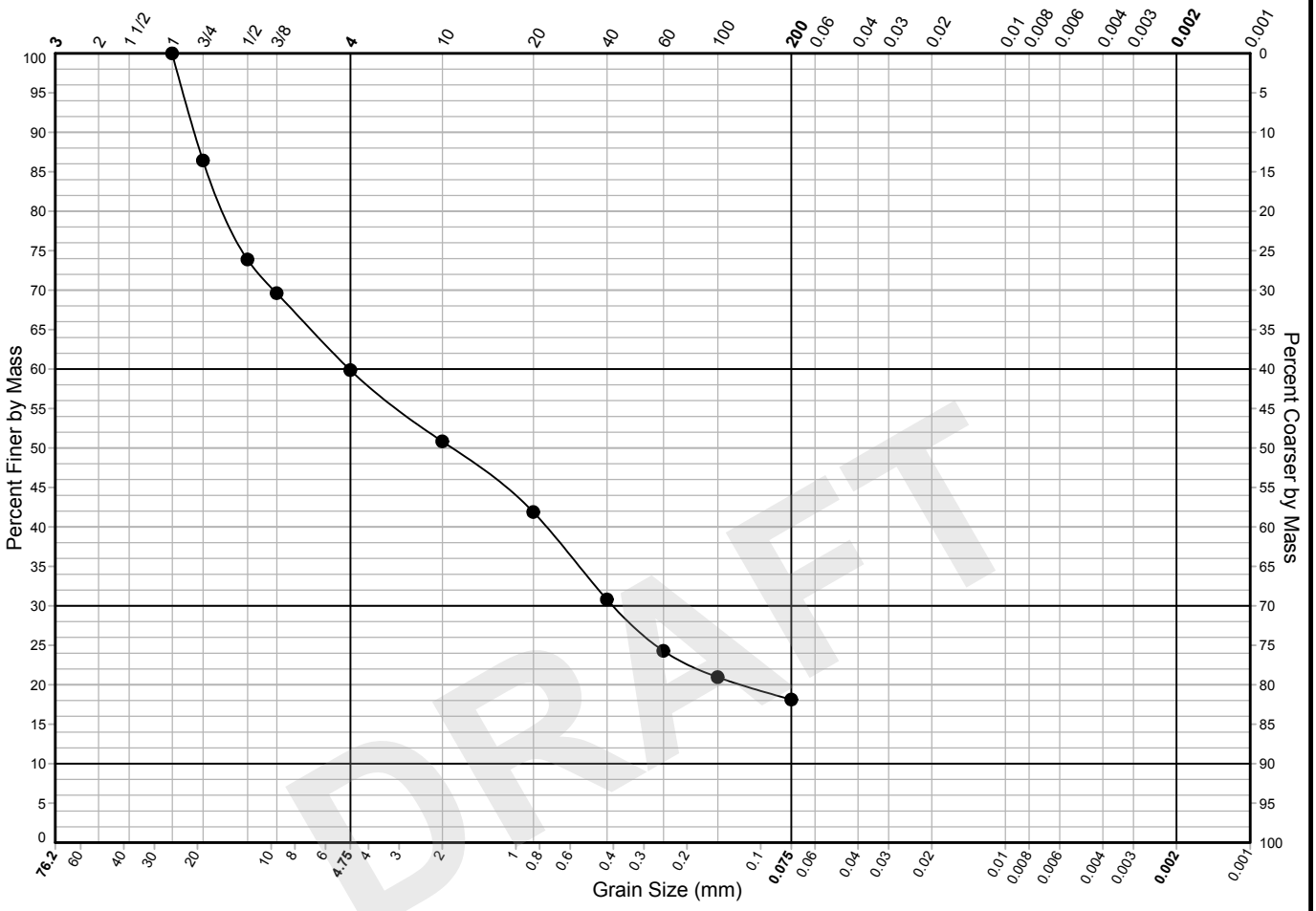
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● NME-11, S-3*	7.5	ML	Sandy Silt	13	35	52			11.3	AKV	JFL	C136
■ NME-11, S-6*	15.0	ML	Sandy Silt	1	32	67			12.6	AKV	JFL	C136
▲ NME-11, S-10*	25.0	ML	Sandy Silt with Gravel	21	29	50			13.2	AKV	JFL	C136

* *Test specimen did not meet minimum mass recommendations.*

North Mercer Island Interceptor and Enatai Interceptor Upgrade Project
King County, Washington

BORING NME-12

Gravel		Sand			Fines	
Coarse	Fine	Coarse	Medium	Fine	Silt	Clay-Size
Mesh Opening in Inches		Mesh Openings per Inch, U.S. Standard			Grain Size in Millimeters	



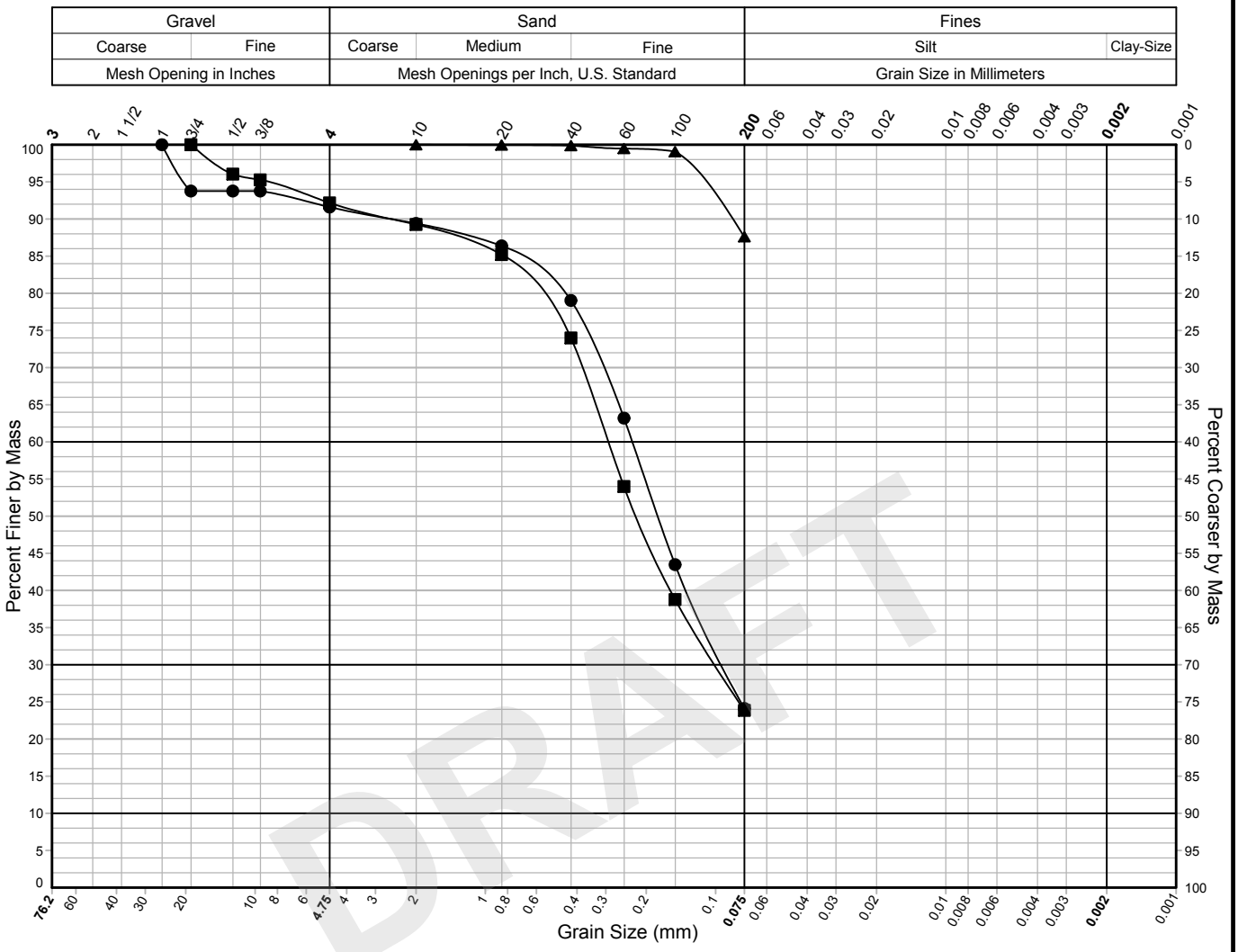
DRAFT

Sample Identification	Depth (ft)	USCS Group Symbol	USCS Group Name	Gravel %	Sand %	Fines %	< 20µm %	< 2µm %	WC %	Tested By	Review By	ASTM Std.
● NME-12, S-2*	5.0	SM	Silty Sand with Gravel	40	42	18			8.5	JJM	JFL	C136

* *Test specimen did not meet minimum mass recommendations.*

North Mercer Island Interceptor and Enatai Interceptor Upgrade Project
King County, Washington

BORING NME-13



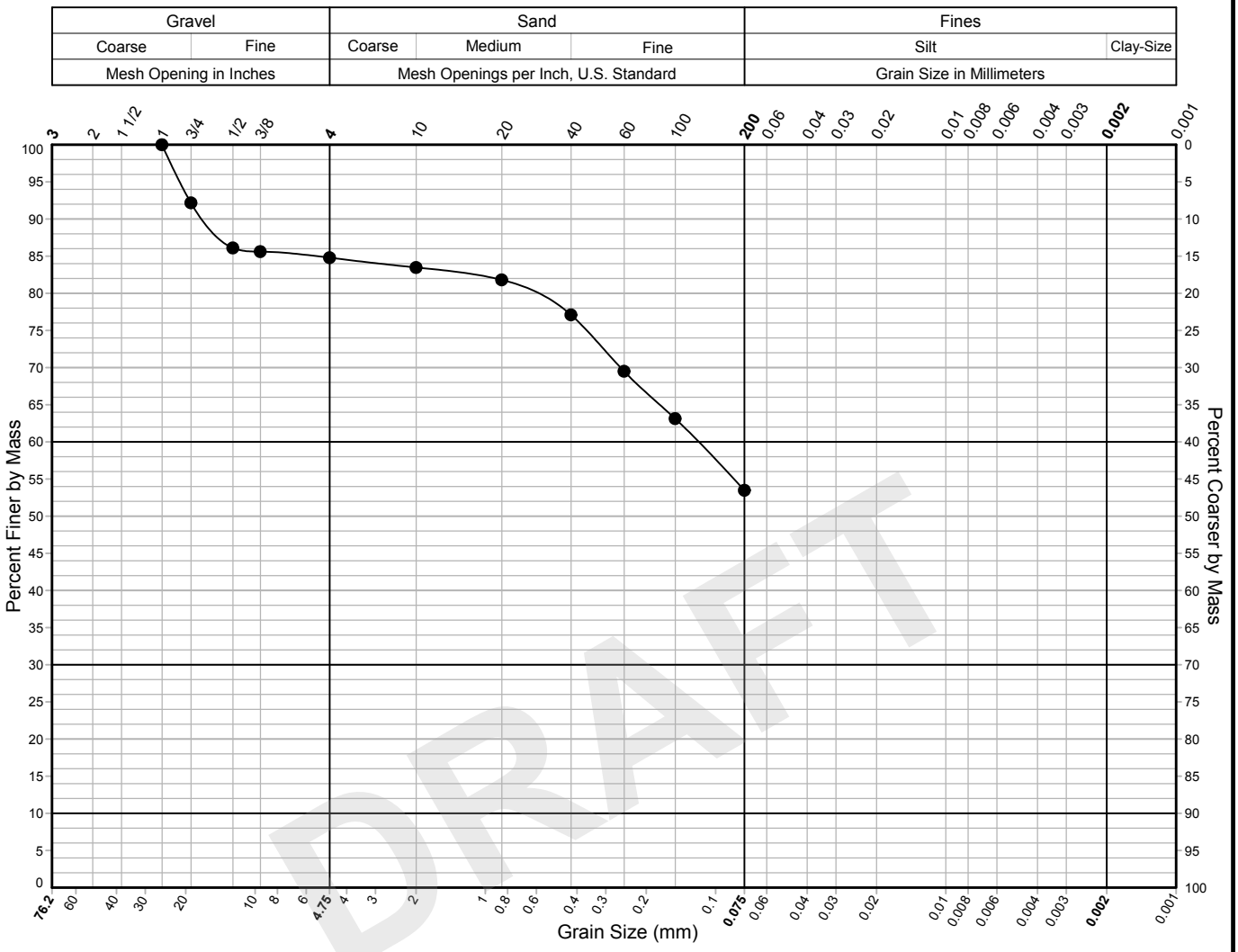
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Sample Identification	Depth (ft)	USCS Group Symbol	USCS Group Name	Gravel %	Sand %	Fines %	< 20µm %	< 2µm %	WC %	Tested By	Review By	ASTM Std.
● NME-13, S-3*	7.5	SM	Silty Sand	8	67	24			16.3	CRM	JFL	C136
■ NME-13, S-6*	15.0	SM	Silty Sand	8	68	24			20.4	CRM	JFL	C136
▲ NME-13, S-9B	22.7	ML	Silt		12	88			23.9	CRM	JFL	C136

* *Test specimen did not meet minimum mass recommendations.*

North Mercer Island Interceptor and Enatai Interceptor Upgrade Project
King County, Washington

BORING NME-16



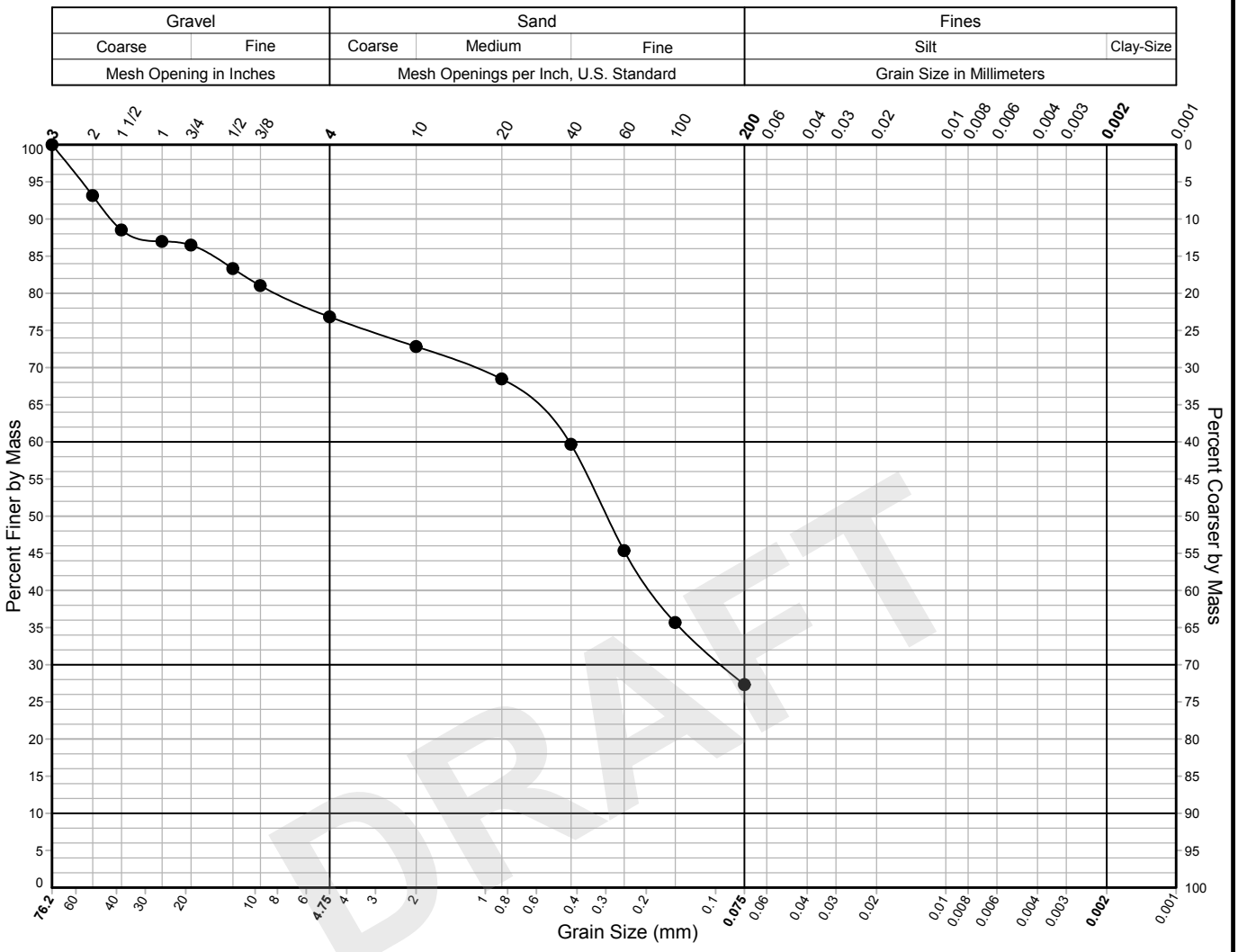
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Sample Identification	Depth (ft)	USCS Group Symbol	USCS Group Name	Gravel %	Sand %	Fines %	< 20µm %	< 2µm %	WC %	Tested By	Review By	ASTM Std.
● NME-16, S-2*	5.0	ML	Sandy Silt with Gravel	15	31	53			15.8	CRM	JFL	C136

* *Test specimen did not meet minimum mass recommendations.*

North Mercer Island Interceptor and Enatai Interceptor Upgrade Project
King County, Washington

BORING NME-17



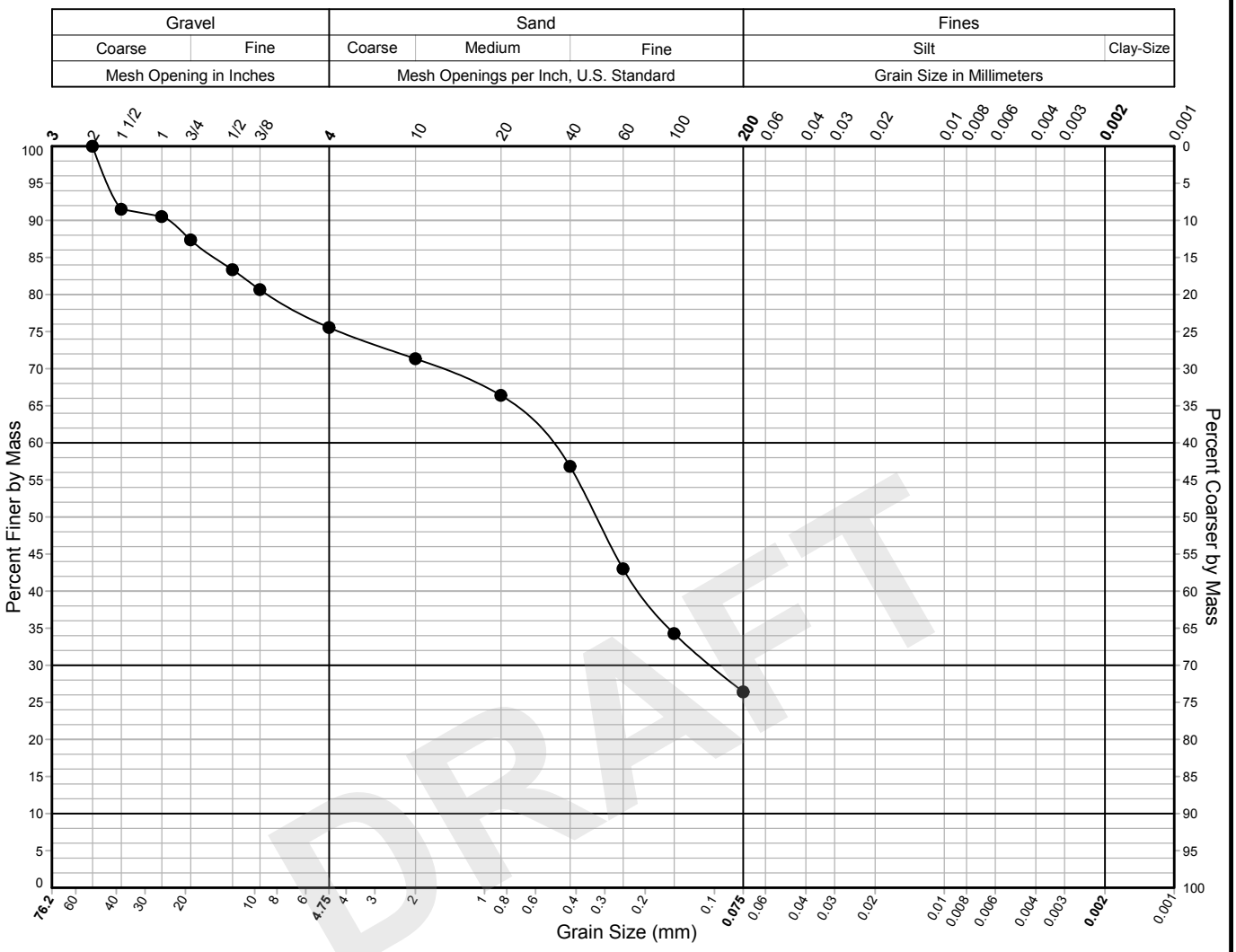
DRAFT

Sample Identification	Depth (ft)	USCS Group Symbol	USCS Group Name	Gravel %	Sand %	Fines %	< 20µm %	< 2µm %	WC %	Tested By	Review By	ASTM Std.
● NME-17, R-2*	5.0	SM	Silty Sand with Gravel	23	49	27			10.3	AKV	JFL	C136

* *Test specimen did not meet minimum mass recommendations.*

North Mercer Island Interceptor and Enatai Interceptor Upgrade Project
King County, Washington

BORING NME-18



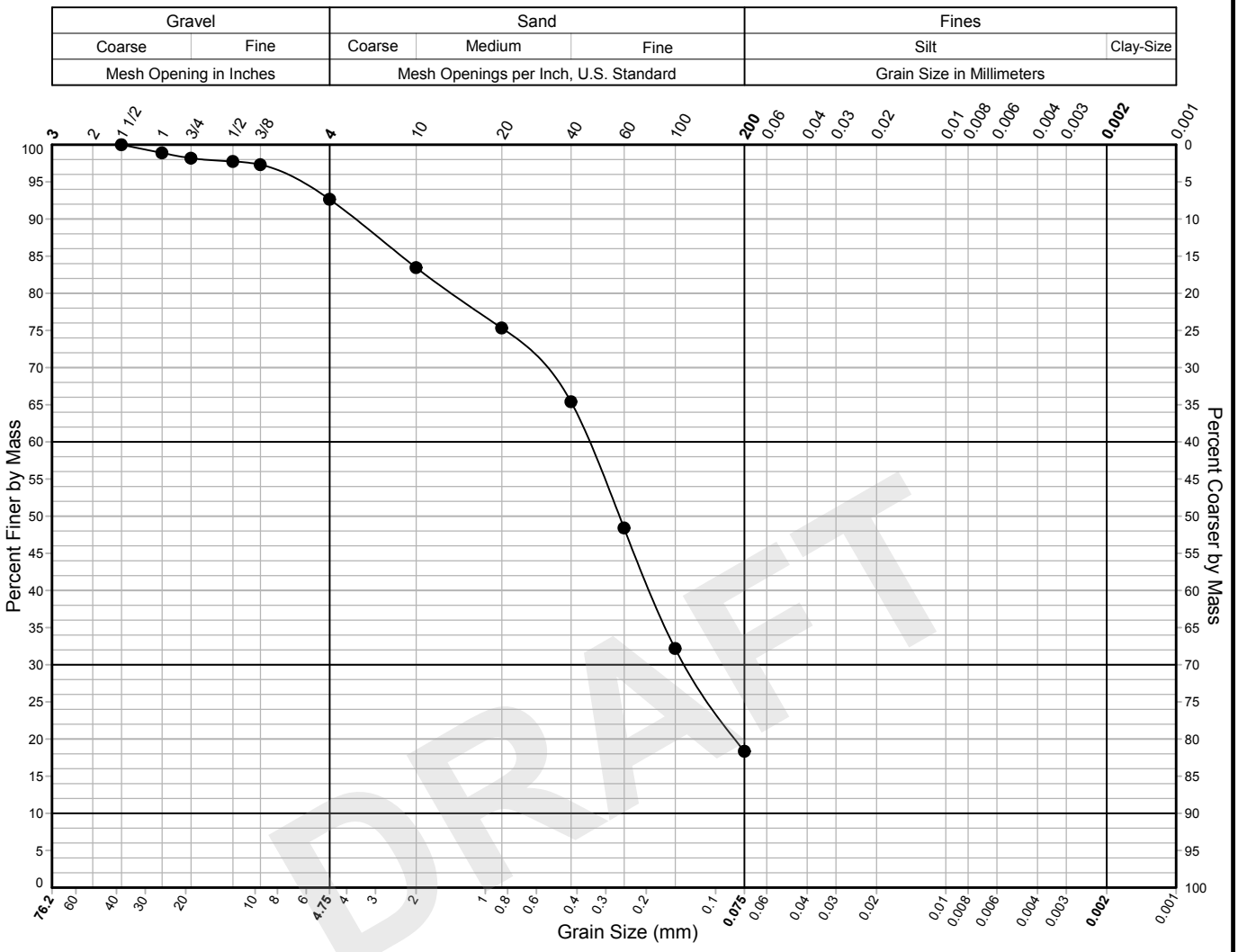
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Sample Identification	Depth (ft)	USCS Group Symbol	USCS Group Name	Gravel %	Sand %	Fines %	< 20µm %	< 2µm %	WC %	Tested By	Review By	ASTM Std.
● NME-18, R-2*	5.0	SM	Silty Sand with Gravel	24	49	26			6.0	AKV	JFL	C136

* *Test specimen did not meet minimum mass recommendations.*

North Mercer Island Interceptor and Enatai Interceptor Upgrade Project
King County, Washington

BORING NME-19



DRAFT

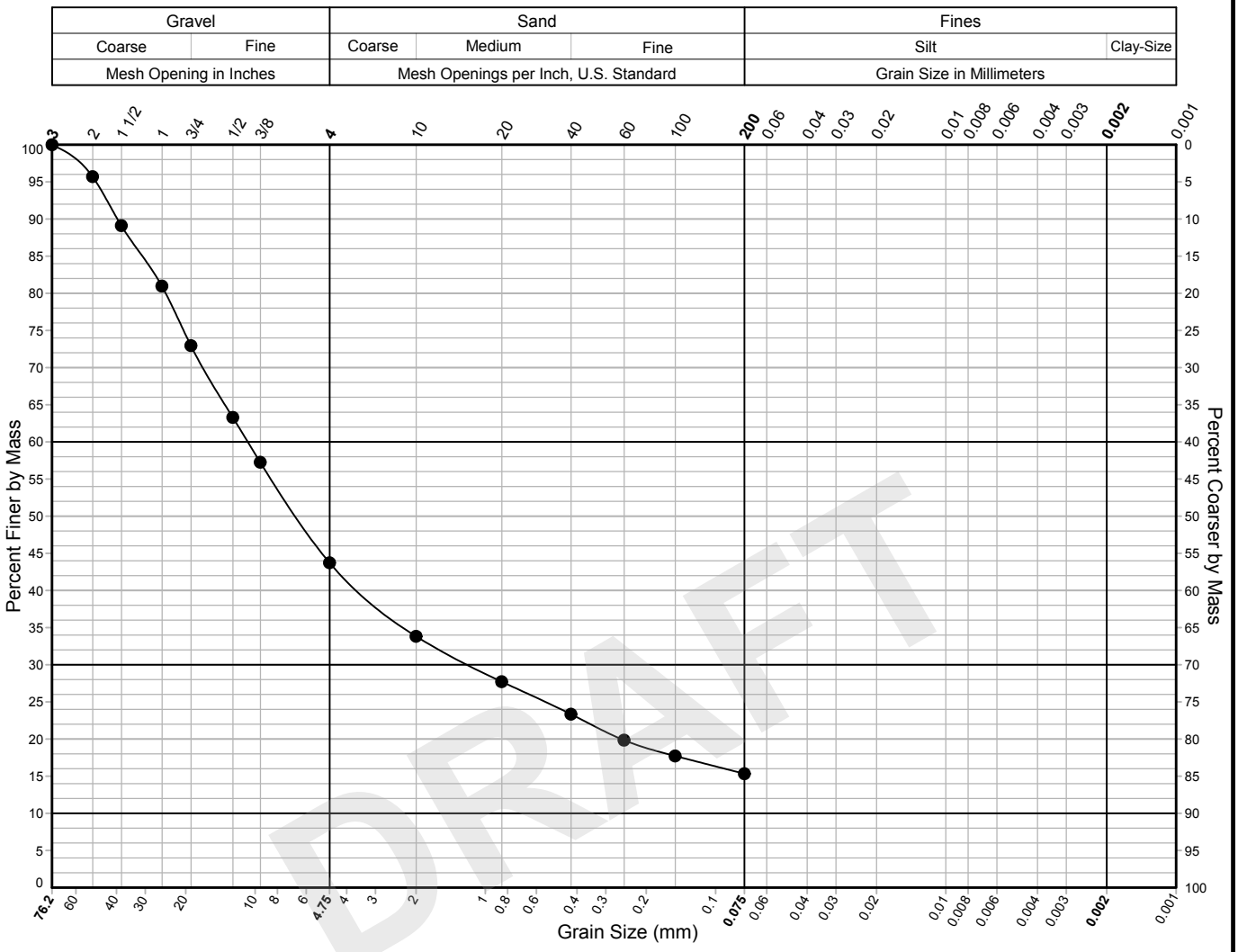
Sample Identification	Depth (ft)	USCS Group Symbol	USCS Group Name	Gravel %	Sand %	Fines %	< 20µm %	< 2µm %	WC %	Tested By	Review By	ASTM Std.
● NME-19, R-2*	5.0	SM	Silty Sand	7	74	18			7.0	AKV	JFL	C136

* *Test specimen did not meet minimum mass recommendations.*

SHANNON & WILSON, INC. • 400 NORTH 34TH STREET • SUITE 100 • SEATTLE, WASHINGTON • 98103 • MAIN (206) 632-8020 • FAX (206) 695-6777

North Mercer Island Interceptor and Enatai Interceptor Upgrade Project
King County, Washington

BORING NME-20



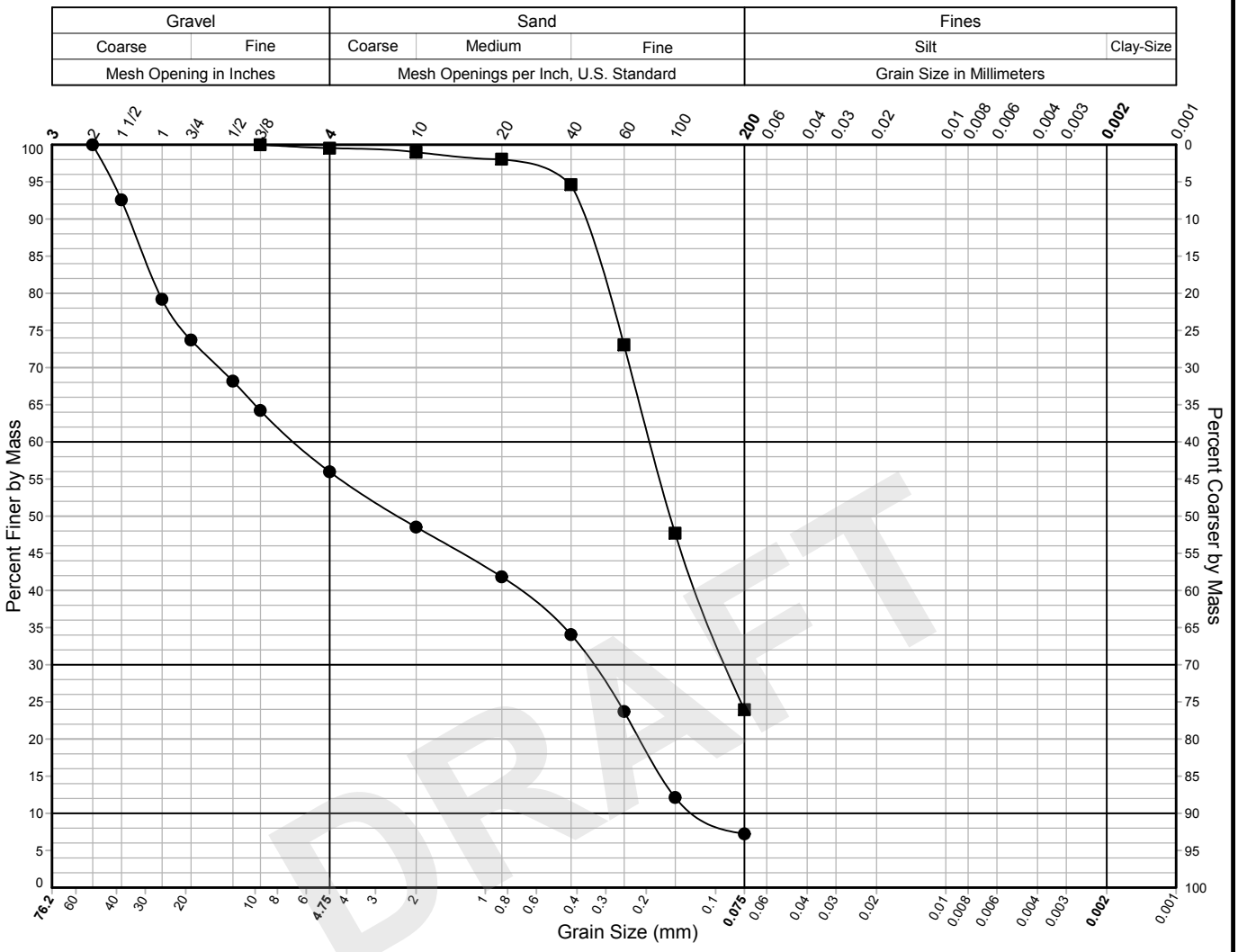
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Sample Identification	Depth (ft)	USCS Group Symbol	USCS Group Name	Gravel %	Sand %	Fines %	< 20µm %	< 2µm %	WC %	Tested By	Review By	ASTM Std.
● NME-20, R-2*	5.0	GM	Silty Gravel with Sand	56	28	15			9.5	AKV	JFL	C136

* *Test specimen did not meet minimum mass recommendations.*

North Mercer Island Interceptor and Enatai Interceptor Upgrade Project
King County, Washington

BORING NME-21



Sample Identification	Depth (ft)	USCS Group Symbol	USCS Group Name	Gravel %	Sand %	Fines %	< 20µm %	< 2µm %	WC %	Tested By	Review By	ASTM Std.
● NME-21, R-8*	75.0	SP-SM	Poorly Graded Sand with Silt and Gravel	44	49	7.2			7.5	AKV	JFL	C136
■ NME-21, R-9*	83.5	SM	Silty Sand	0	76	24			20.0	AKV	JFL	C136

* *Test specimen did not meet minimum mass recommendations.*

21-1-22000-212 A_GSA_MAIN 21-22000.GPJ SHAN_WIL.GDT 5/9/18

North Mercer Island Interceptor and Enatai Interceptor Upgrade Project
King County, Washington

BORING NME-22

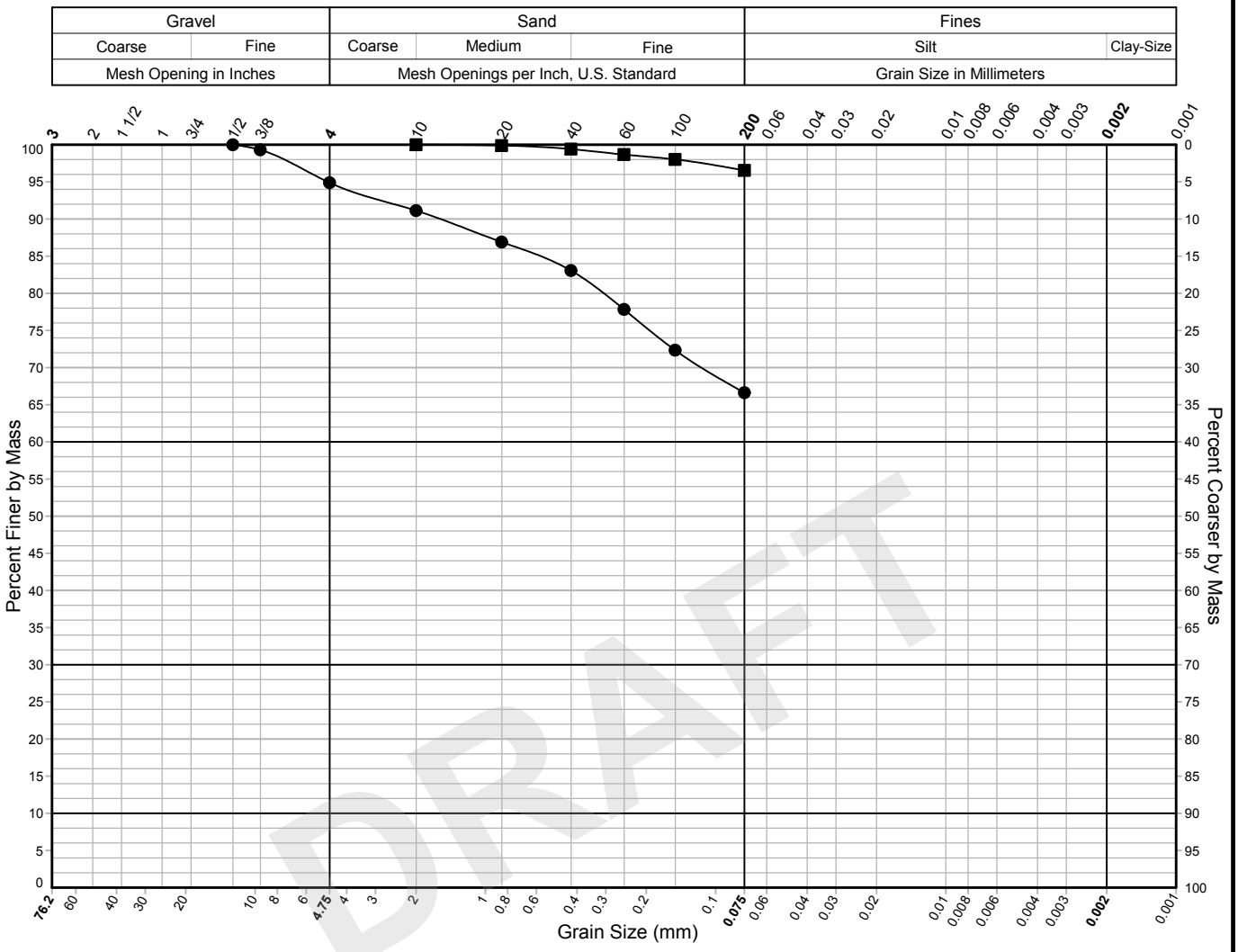


Sample Identification	Depth (ft)	USCS Group Symbol	USCS Group Name	Gravel %	Sand %	Fines %	< 20µm %	< 2µm %	WC %	Tested By	Review By	ASTM Std.
● NME-22, R-12*	87.5	SP-SM	Poorly Graded Sand with Silt and Gravel	35	54	11			7.8	AKV	JFL	C136
■ NME-22, R-13	95.0	ML	Sandy Silt	2	37	61			17.8	AKV	JFL	C136
▲ NME-22, R-16*	127.5	SP-SM	Poorly Graded Sand with Silt	7	83	9.8			16.6	AKV	JFL	C136
◆ NME-22, R-17*	137.5	GW-GM	Well-Graded Gravel with Silt and Sand	61	30	8.6			4.8	AKV	JFL	C136

* *Test specimen did not meet minimum mass recommendations.*

North Mercer Island Interceptor and Enatai Interceptor Upgrade Project
King County, Washington

BORING NME-23



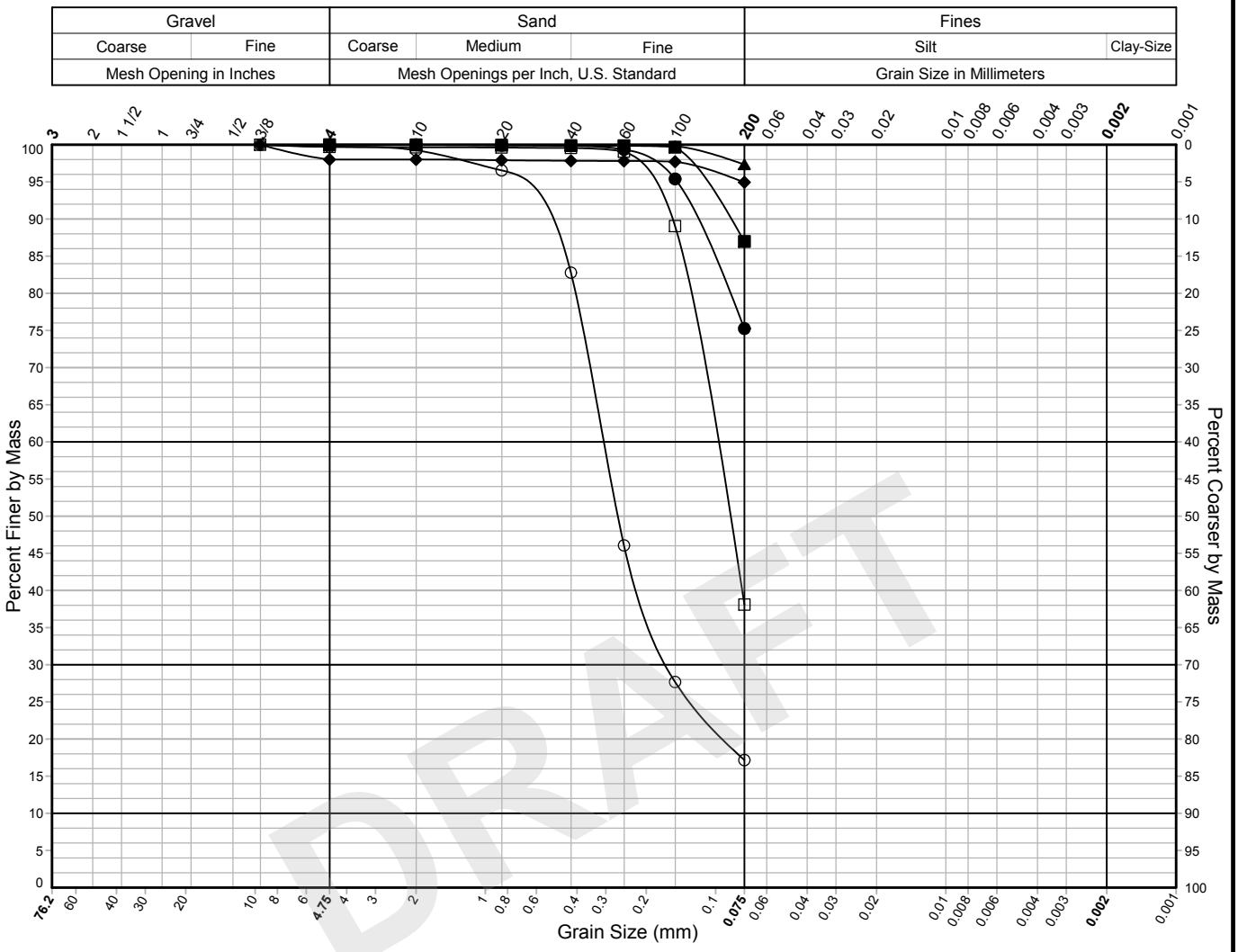
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Sample Identification	Depth (ft)	USCS Group Symbol	USCS Group Name	Gravel %	Sand %	Fines %	< 20µm %	< 2µm %	WC %	Tested By	Review By	ASTM Std.
● NME-23, R-14*	122.0	ML	Sandy Silt	5	28	67			17.0	AKV	JFL	C136
■ NME-23, R-15*	132.5	ML	Silt		3	97			22.6	AKV	JFL	C136

* *Test specimen did not meet minimum mass recommendations.*

North Mercer Island Interceptor and Enatai Interceptor Upgrade Project
King County, Washington

BORING NME-24

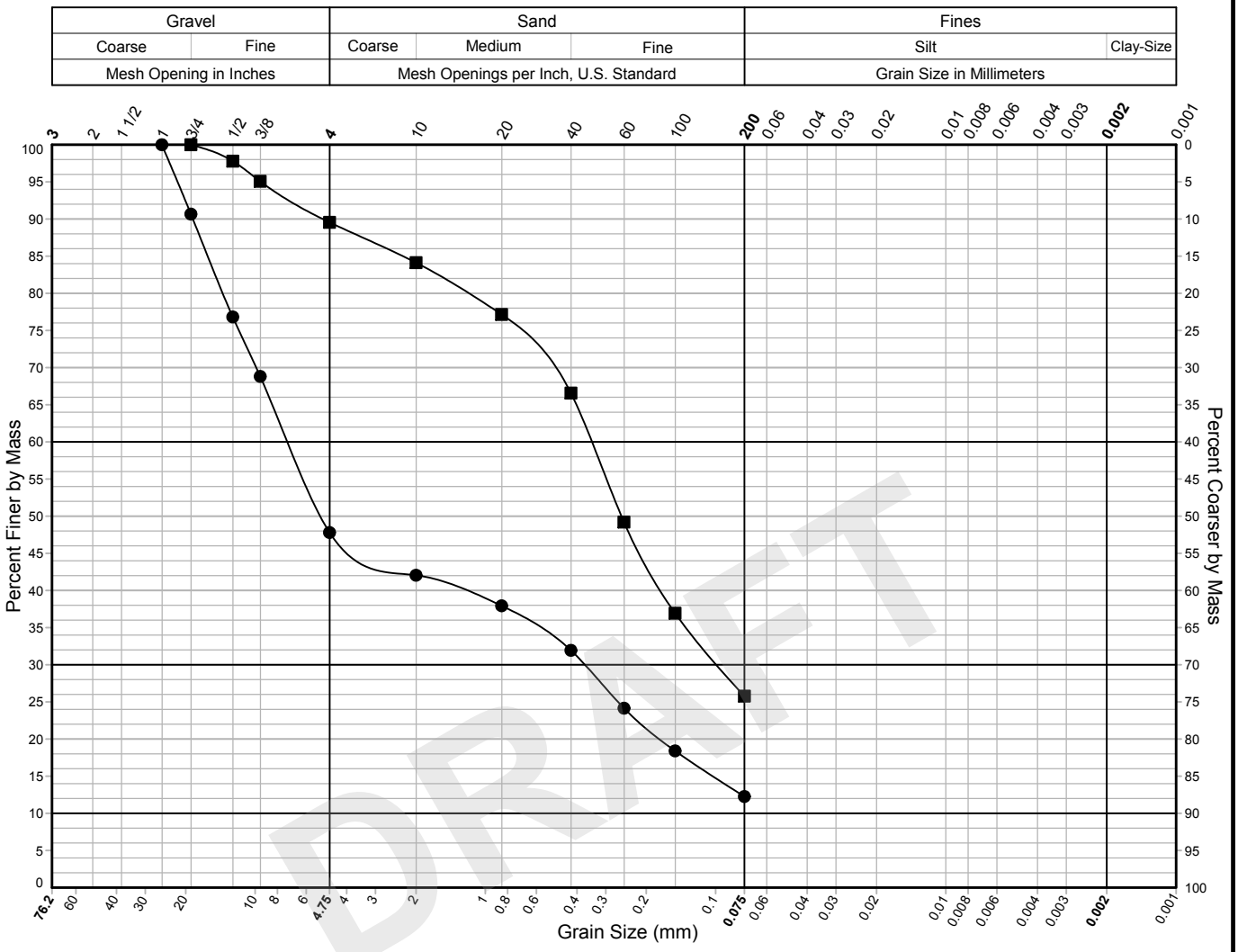


Sample Identification	Depth (ft)	USCS Group Symbol	USCS Group Name	Gravel %	Sand %	Fines %	< 20µm %	< 2µm %	WC %	Tested By	Review By	ASTM Std.
● NME-24, R-7	60.0	ML	Silt with Sand		25	75			23.8	AKV	JFL	C136
■ NME-24, R-8	70.0	ML	Silt		13	87			24.8	AKV	JFL	C136
▲ NME-24, R-8*	77.5	ML	Silt		3	97			26.1	AKV	JFL	C136
◆ NME-24, R-9*	87.5	ML	Silt	2	3	95			27.9	AKV	JFL	C136
○ NME-24, R-11	108.5	SM	Silty Sand	0	83	17			18.4	AKV	JFL	C136
□ NME-24, R-12.5*	112.5	SM	Silty Sand	0	62	38			22.5	AKV	JFL	C136

* *Test specimen did not meet minimum mass recommendations.*

North Mercer Island Interceptor and Enatai Interceptor Upgrade Project
King County, Washington

BORING NME-25

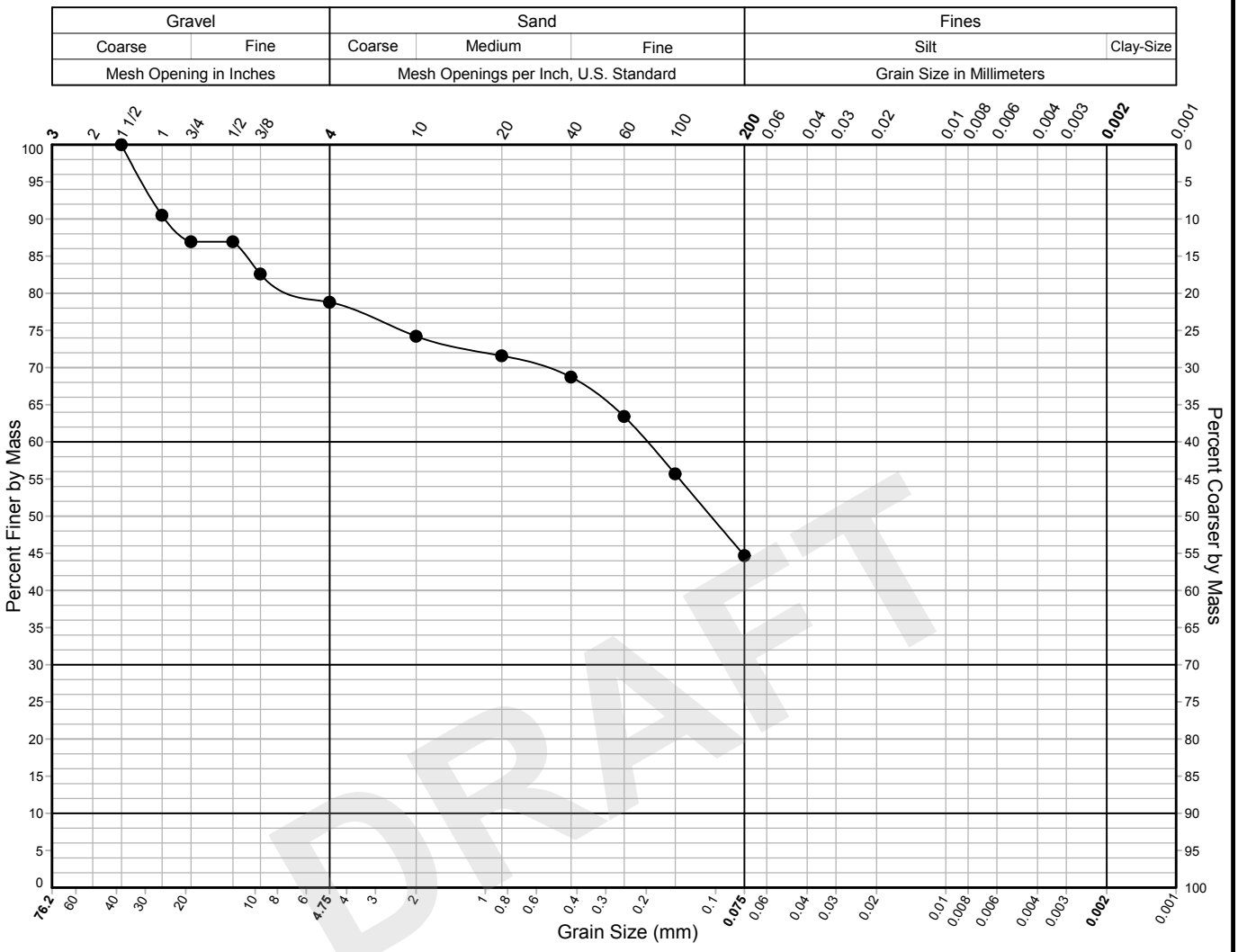


Sample Identification	Depth (ft)	USCS Group Symbol	USCS Group Name	Gravel %	Sand %	Fines %	< 20µm %	< 2µm %	WC %	Tested By	Review By	ASTM Std.
● NME-25, S-3*	7.5	GM	Silty Gravel with Sand	52	36	12			12.8	AKV	JFL	C136
■ NME-25, S-7*	17.5	SM	Silty Sand	10	64	26			11.5	AKV	JFL	C136

* *Test specimen did not meet minimum mass recommendations.*

North Mercer Island Interceptor and Enatai Interceptor Upgrade Project
King County, Washington

BORING NME-32



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Sample Identification	Depth (ft)	USCS Group Symbol	USCS Group Name	Gravel %	Sand %	Fines %	< 20µm %	< 2µm %	WC %	Tested By	Review By	ASTM Std.
● NME-32, S-2*	5.0	SM	Silty Sand with Gravel	21	34	45			15.4	JJM	AKV	C136

* *Test specimen did not meet minimum mass recommendations.*

North Mercer Island Interceptor and Enatai Interceptor Upgrade Project
King County, Washington

BORING NME-34



Sample Identification	Depth (ft)	USCS Group Symbol	USCS Group Name	Gravel %	Sand %	Fines %	< 20µm %	< 2µm %	WC %	Tested By	Review By	ASTM Std.
● NME-34, S-3*	7.5	ML	Silt with Sand	0	18	82			24.5	RJS	AKV	C136
■ NME-34, S-5*	12.5	SM	Silty Sand with Gravel	40	44	16			10.9	RJS	AKV	C136

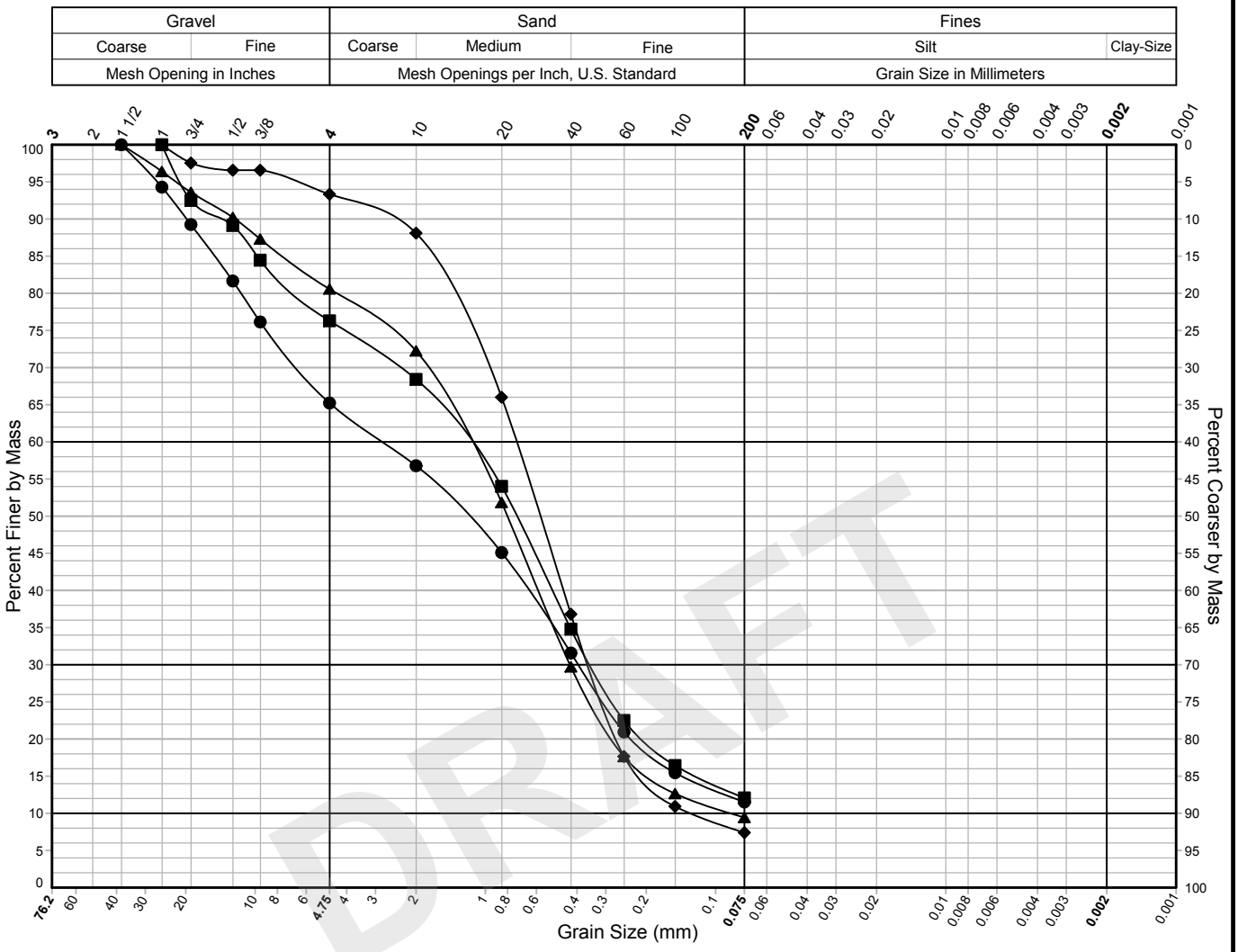
* *Test specimen did not meet minimum mass recommendations.*

DRAFT

GRAIN SIZE DISTRIBUTION PLOT

North Mercer Island Interceptor and Enatai Interceptor Upgrade Project
King County, Washington

BORING NME-35



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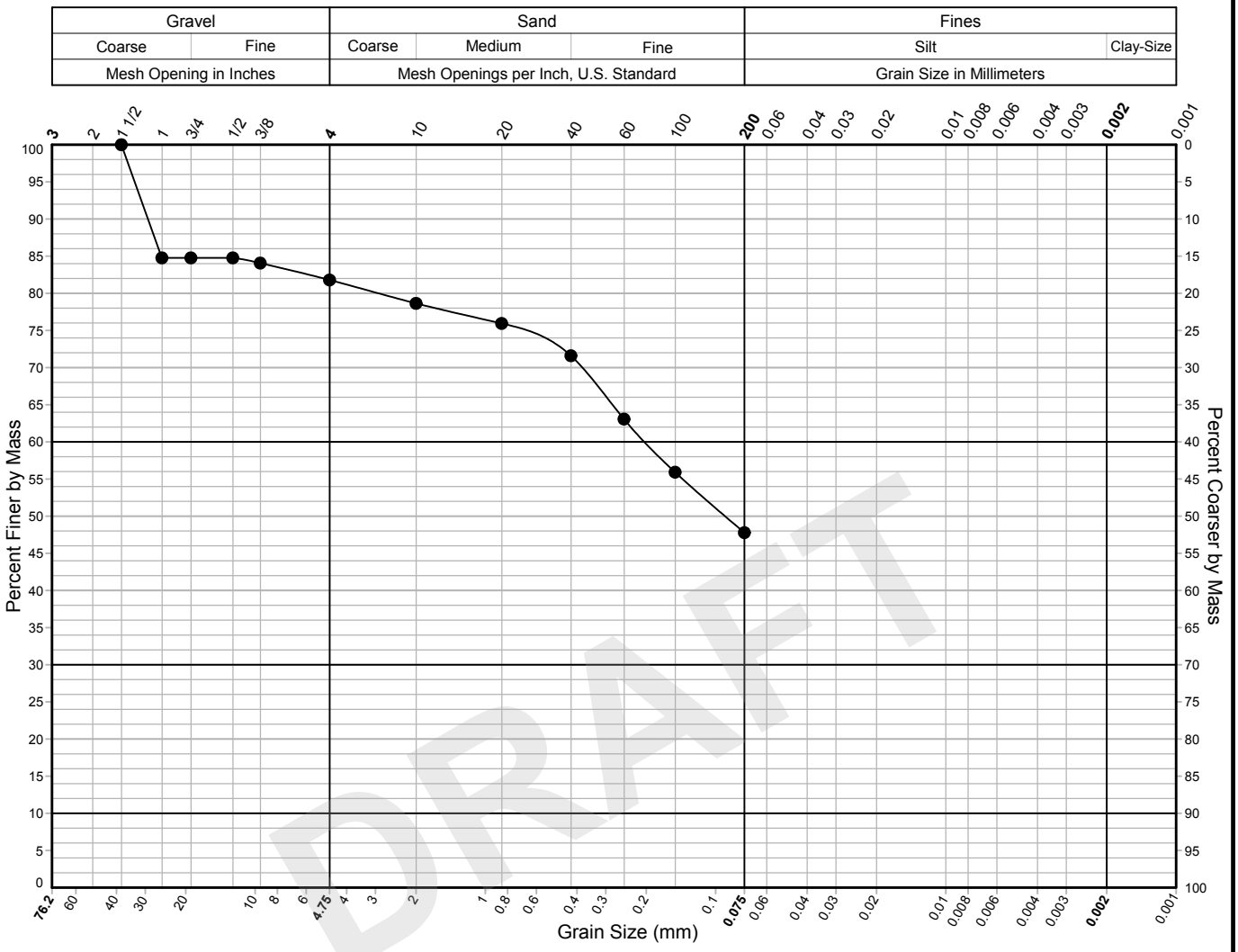
Sample Identification	Depth (ft)	USCS Group Symbol	USCS Group Name	Gravel %	Sand %	Fines %	< 20µm %	< 2µm %	WC %	Tested By	Review By	ASTM Std.
● NME-35, S-3*	7.5	SM	Silty Sand with Gravel	35	54	12			6.8	JFW	AKV	C136
■ NME-35, S-5*	12.5	SM	Silty Sand with Gravel	24	64	12			7.5	JFW	AKV	C136
▲ NME-35, S-7*	17.5	SW-SM	Well-Graded Sand with Silt and Gravel	19	71	9.4			6.1	JFW	AKV	C136
◆ NME-35, S-9*	22.5	SP-SM	Poorly Graded Sand with Silt	7	86	7.4			17.0	JFW	AKV	C136

* *Test specimen did not meet minimum mass recommendations.*

GRAIN SIZE DISTRIBUTION PLOT

North Mercer Island Interceptor and
Enatai Interceptor Upgrade Project
King County, Washington

BORING NME-36



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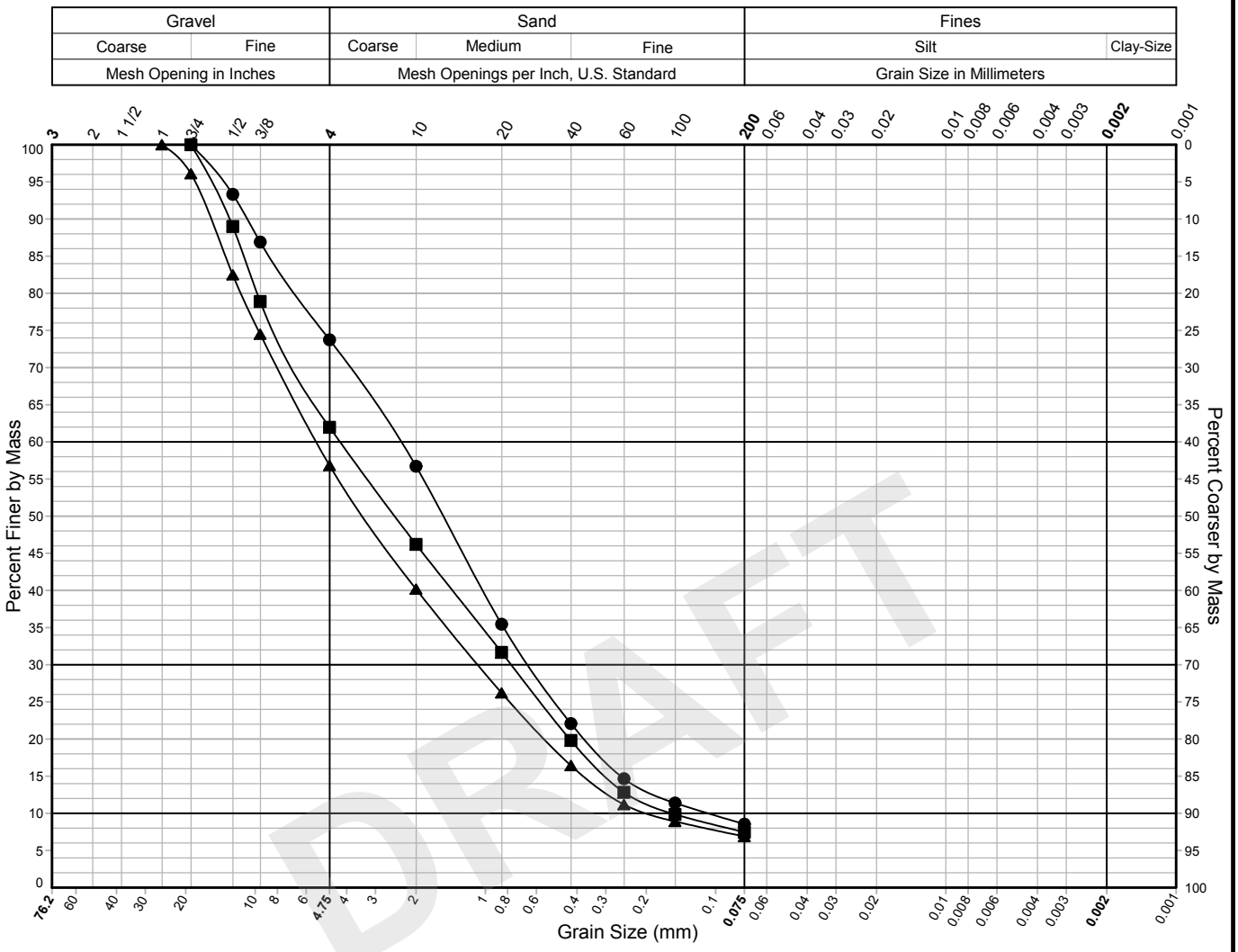
Sample Identification	Depth (ft)	USCS Group Symbol	USCS Group Name	Gravel %	Sand %	Fines %	< 20µm %	< 2µm %	WC %	Tested By	Review By	ASTM Std.
● NME-36, S-4*	10.0	SM	Silty Sand with Gravel	18	34	48			9.7	JJM	AKV	C136

* *Test specimen did not meet minimum mass recommendations.*

GRAIN SIZE DISTRIBUTION PLOT

North Mercer Island Interceptor and
Enatai Interceptor Upgrade Project
King County, Washington

BORING NME-37



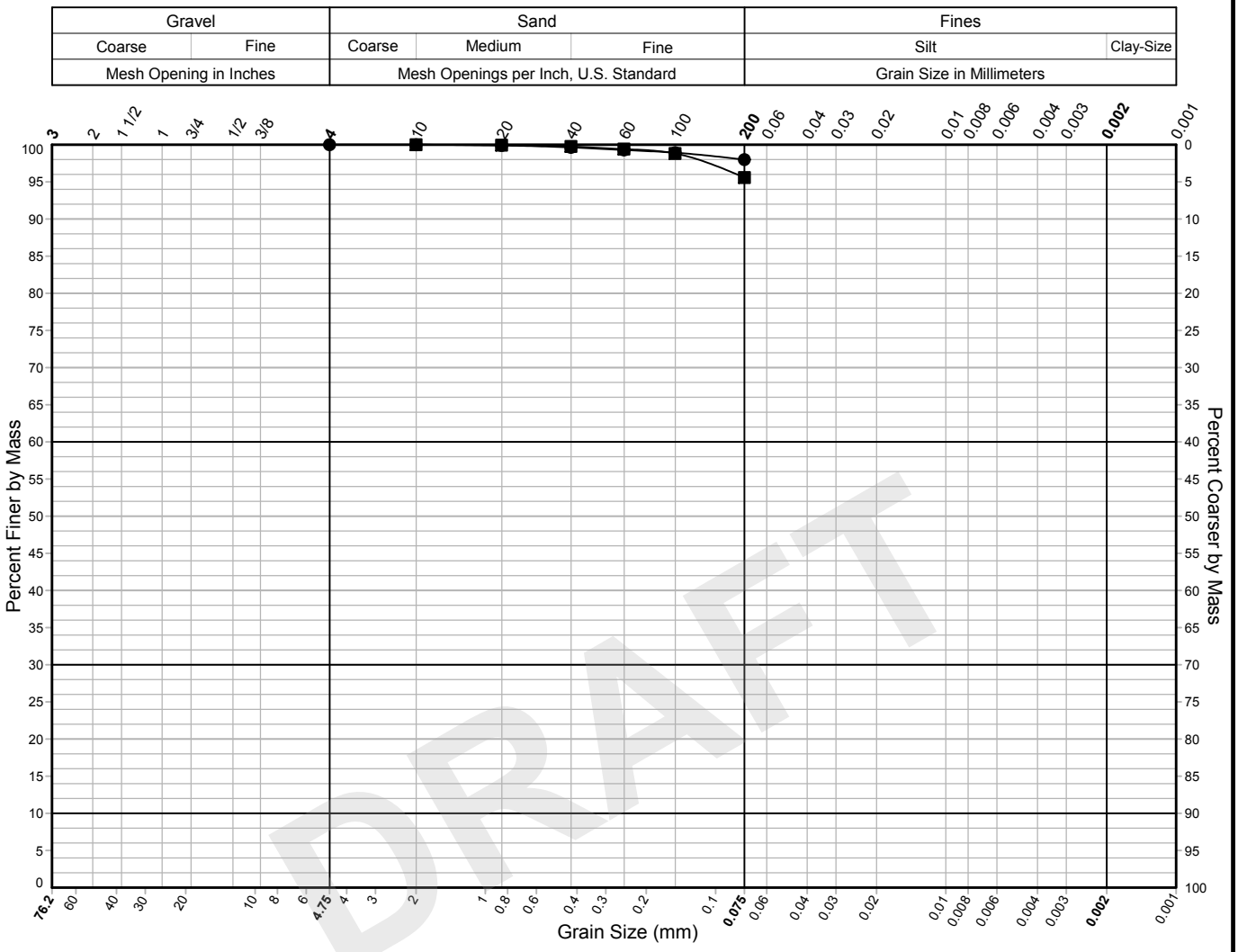
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Sample Identification	Depth (ft)	USCS Group Symbol	USCS Group Name	Gravel %	Sand %	Fines %	< 20µm %	< 2µm %	WC %	Tested By	Review By	ASTM Std.
● NME-37, S-5*	12.5	SW-SM	Well-Graded Sand with Silt and Gravel	26	65	8.5			5.3	JJM	AKV	C136
■ NME-37, S-7*	17.5	SP-SM	Poorly Graded Sand with Silt and Gravel	38	54	7.5			6.5	ECS	AKV	C136
▲ NME-37, S-8*	20.0	SW-SM	Well-Graded Sand with Silt and Gravel	43	50	6.9			6.3	AKV	AKV	C136

* *Test specimen did not meet minimum mass recommendations.*

North Mercer Island Interceptor and Enatai Interceptor Upgrade Project
King County, Washington

BORING NME-39



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Sample Identification	Depth (ft)	USCS Group Symbol	USCS Group Name	Gravel %	Sand %	Fines %	< 20µm %	< 2µm %	WC %	Tested By	Review By	ASTM Std.
● NME-39, S-5	12.5	ML	Silt		2	98			26.5	JJM	AKV	C136
■ NME-39, S-7	17.5	ML	Silt		4	96			24.3	AKV	AKV	C136

North Mercer Island Interceptor and Enatai Interceptor Upgrade Project
King County, Washington

BORING NME-40



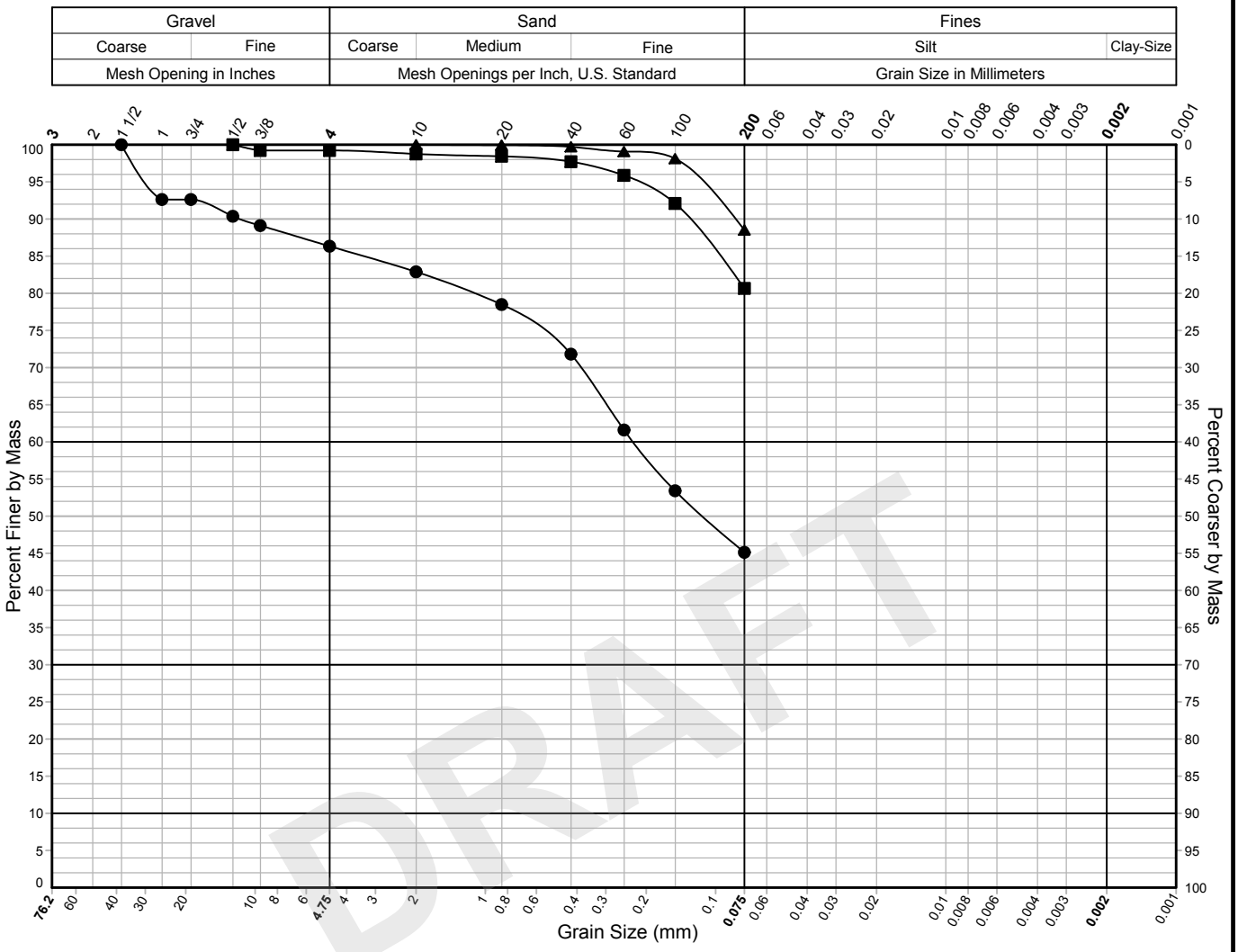
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Sample Identification	Depth (ft)	USCS Group Symbol	USCS Group Name	Gravel %	Sand %	Fines %	< 20µm %	< 2µm %	WC %	Tested By	Review By	ASTM Std.
● NME-40, S-8A*	20.0	ML	Sandy Silt	0	44	56			26.8	AKV	AKV	C136
■ NME-40, S-8B*	21.0	GM	Silty Gravel with Sand	52	33	15			9.8	RJS	AKV	C136

* *Test specimen did not meet minimum mass recommendations.*

North Mercer Island Interceptor and Enatai Interceptor Upgrade Project
King County, Washington

BORING NME-42



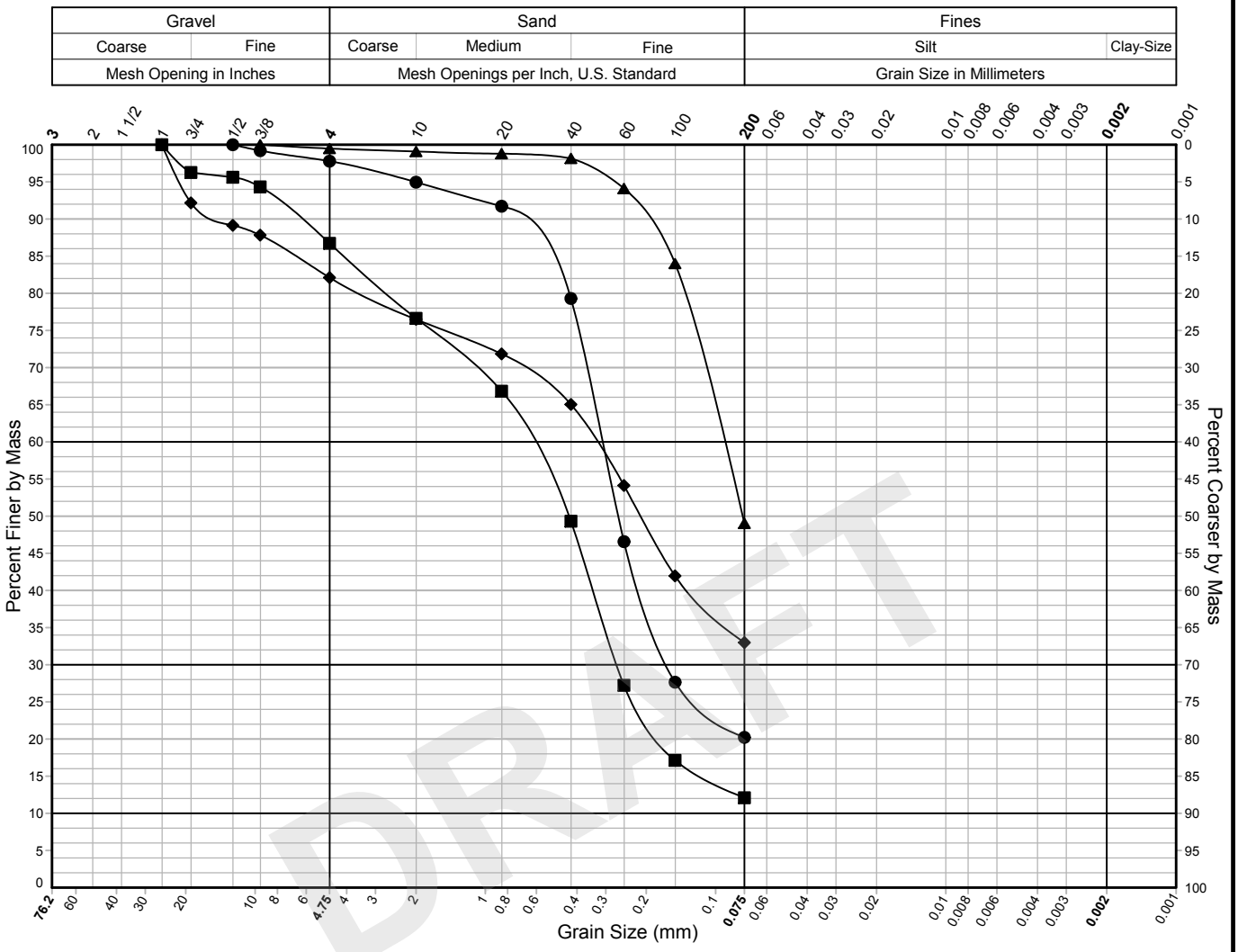
Sample Identification	Depth (ft)	USCS Group Symbol	USCS Group Name	Gravel %	Sand %	Fines %	< 20µm %	< 2µm %	WC %	Tested By	Review By	ASTM Std.
● NME-42, S-4*	10.0	SM	Silty Sand	14	41	45			19.6	ECS	AKV	C136
■ NME-42, S-6*	15.0	ML	Silt with Sand	1	19	81			14.2	ECS	AKV	C136
▲ NME-42, S-8*	20.0	ML	Silt		11	89			19.0	ECS	AKV	C136

* *Test specimen did not meet minimum mass recommendations.*

21-1-22000-212 A_GSA_MAIN 21-22000.GPJ SHAN_WIL.GDT 5/9/18

North Mercer Island Interceptor and Enatai Interceptor Upgrade Project
King County, Washington

BORING NME-43



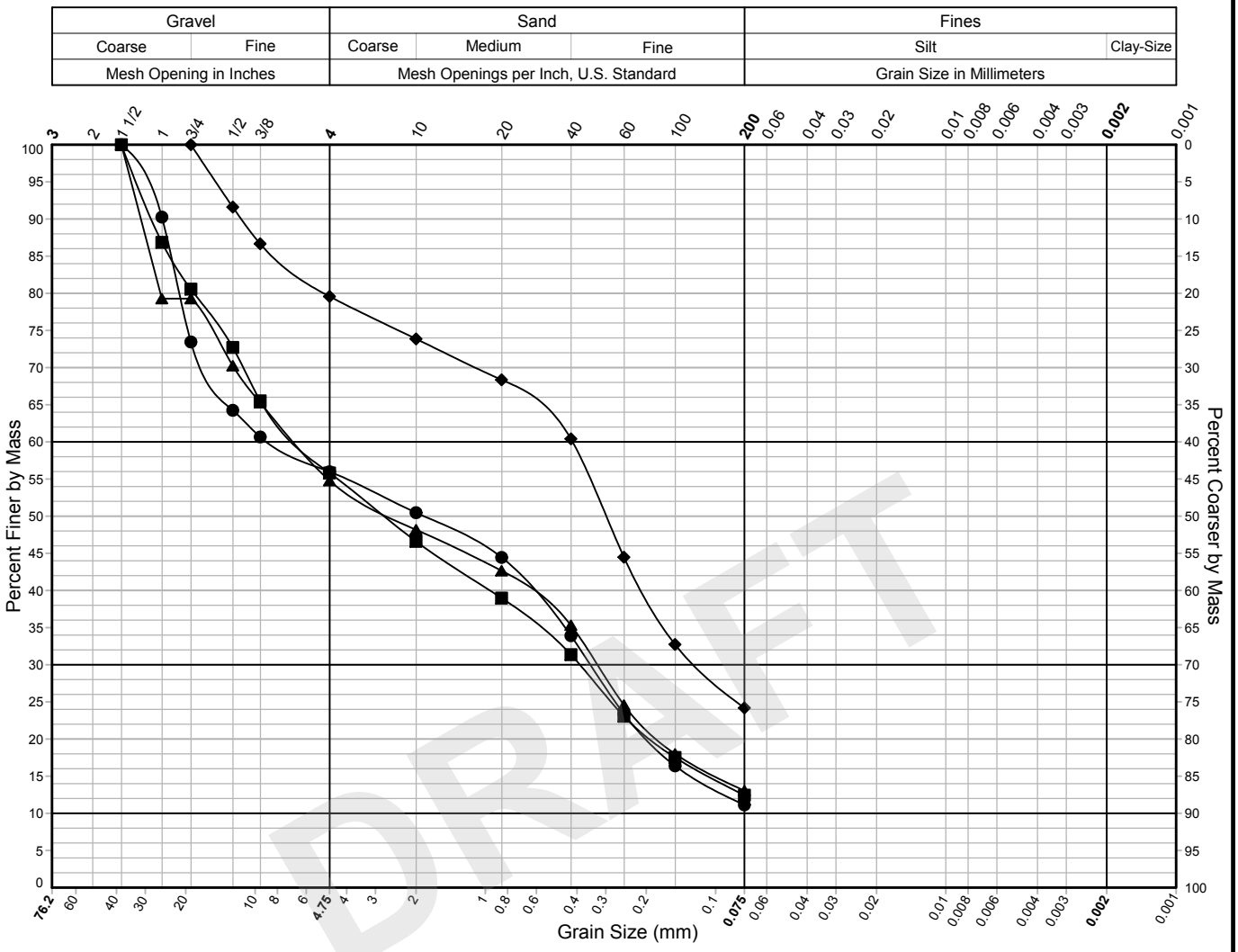
Sample Identification	Depth (ft)	USCS Group Symbol	USCS Group Name	Gravel %	Sand %	Fines %	< 20µm %	< 2µm %	WC %	Tested By	Review By	ASTM Std.
● NME-43, S-4*	10.0	SM	Silty Sand	2	78	20			17.4	ECS	AKV	C136
■ NME-43, S-5*	12.5	SM	Silty Sand	13	75	12			12.3	ECS	AKV	C136
▲ NME-43, S-6B*	16.0	SM	Silty Sand	1	50	49			19.8	ECS	AKV	C136
◆ NME-43, S-7*	17.5	SM	Silty Sand with Gravel	18	49	33			11.2	ECS	AKV	C136

* *Test specimen did not meet minimum mass recommendations.*

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North Mercer Island Interceptor and Enatai Interceptor Upgrade Project
King County, Washington

BORING NME-44



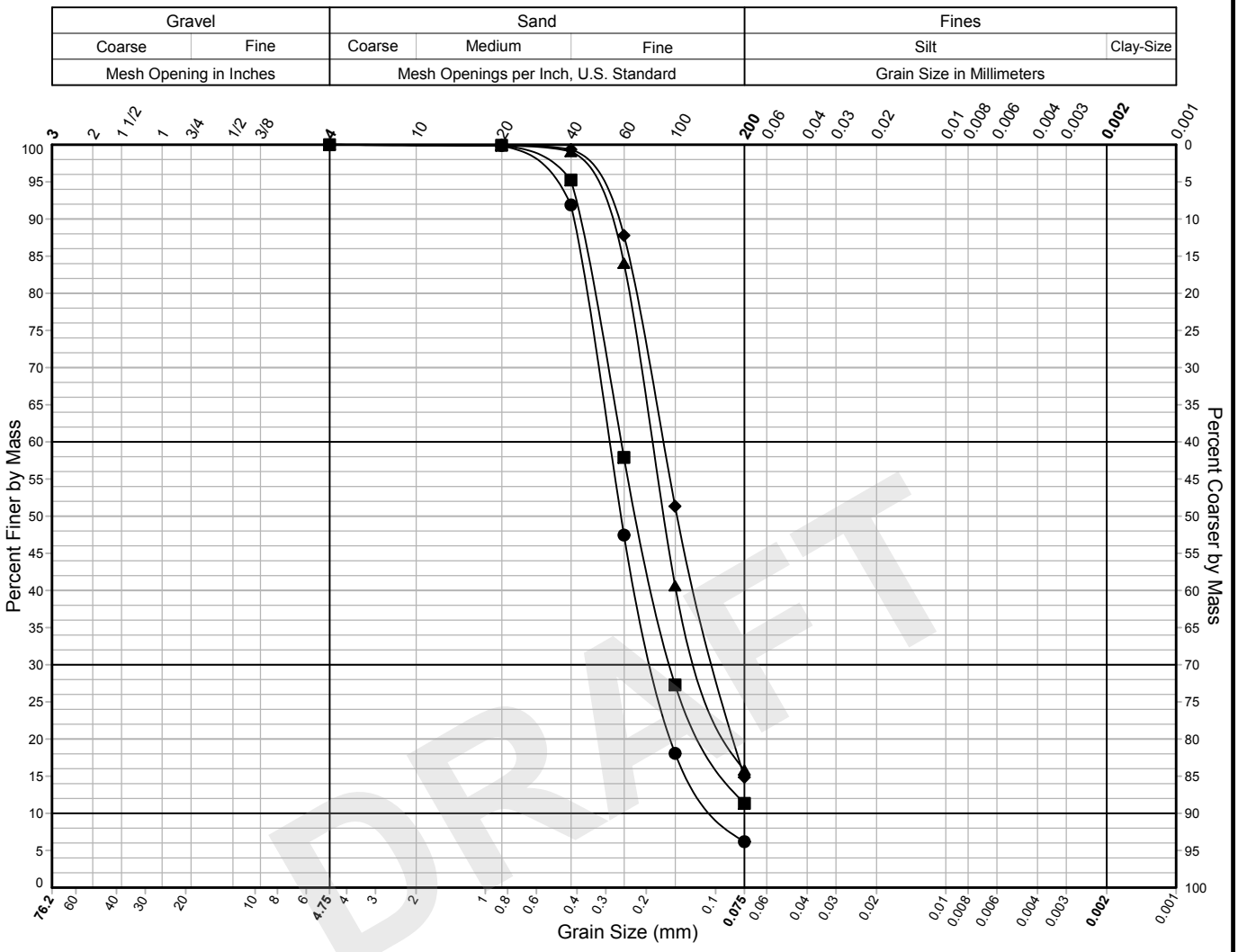
DRAFT

Sample Identification	Depth (ft)	USCS Group Symbol	USCS Group Name	Gravel %	Sand %	Fines %	< 20µm %	< 2µm %	WC %	Tested By	Review By	ASTM Std.
● NME-44, S-4*	10.0	SP-SM	Poorly Graded Sand with Silt and Gravel	44	45	11			5.3	ECS	AKV	C136
■ NME-44, S-5*	12.5	GM	Silty Gravel with Sand	44	43	12			6.6	ECS	AKV	C136
▲ NME-44, S-6*	15.0	GM	Silty Gravel with Sand	45	42	13			8.1	ECS	AKV	C136
◆ NME-44, S-7*	17.5	SM	Silty Sand with Gravel	20	55	24			11.8	ECS	AKV	C136

* *Test specimen did not meet minimum mass recommendations.*

North Mercer Island Interceptor and Enatai Interceptor Upgrade Project
King County, Washington

BORING NME-45



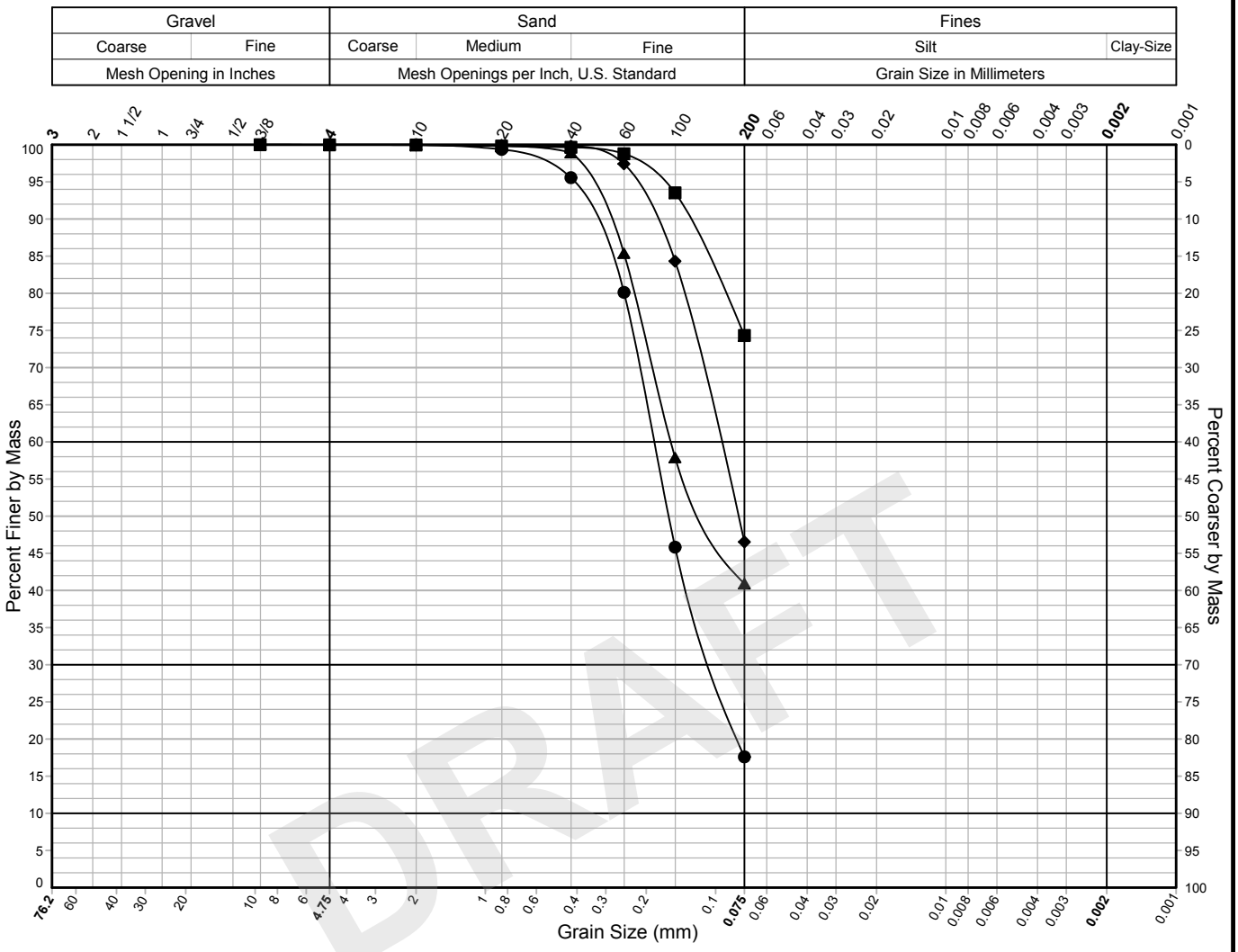
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Sample Identification	Depth (ft)	USCS Group Symbol	USCS Group Name	Gravel %	Sand %	Fines %	< 20µm %	< 2µm %	WC %	Tested By	Review By	ASTM Std.
● NME-45, R-14	120.0	SP-SM	Poorly Graded Sand with Silt		94	6.2			21.9	AKV	AKV	C136
■ NME-45, R-14	130.0	SP-SM	Poorly Graded Sand with Silt		89	11			18.7	JJM	AKV	C136
▲ NME-45, R-14	135.0	SM	Silty Sand		84	16			19.1	JJM	AKV	C136
◆ NME-45, R-15	142.5	SM	Silty Sand		85	15			19.7	JJM	AKV	C136

GRAIN SIZE DISTRIBUTION PLOT

North Mercer Island Interceptor and
Enatai Interceptor Upgrade Project
King County, Washington

BORING NME-46

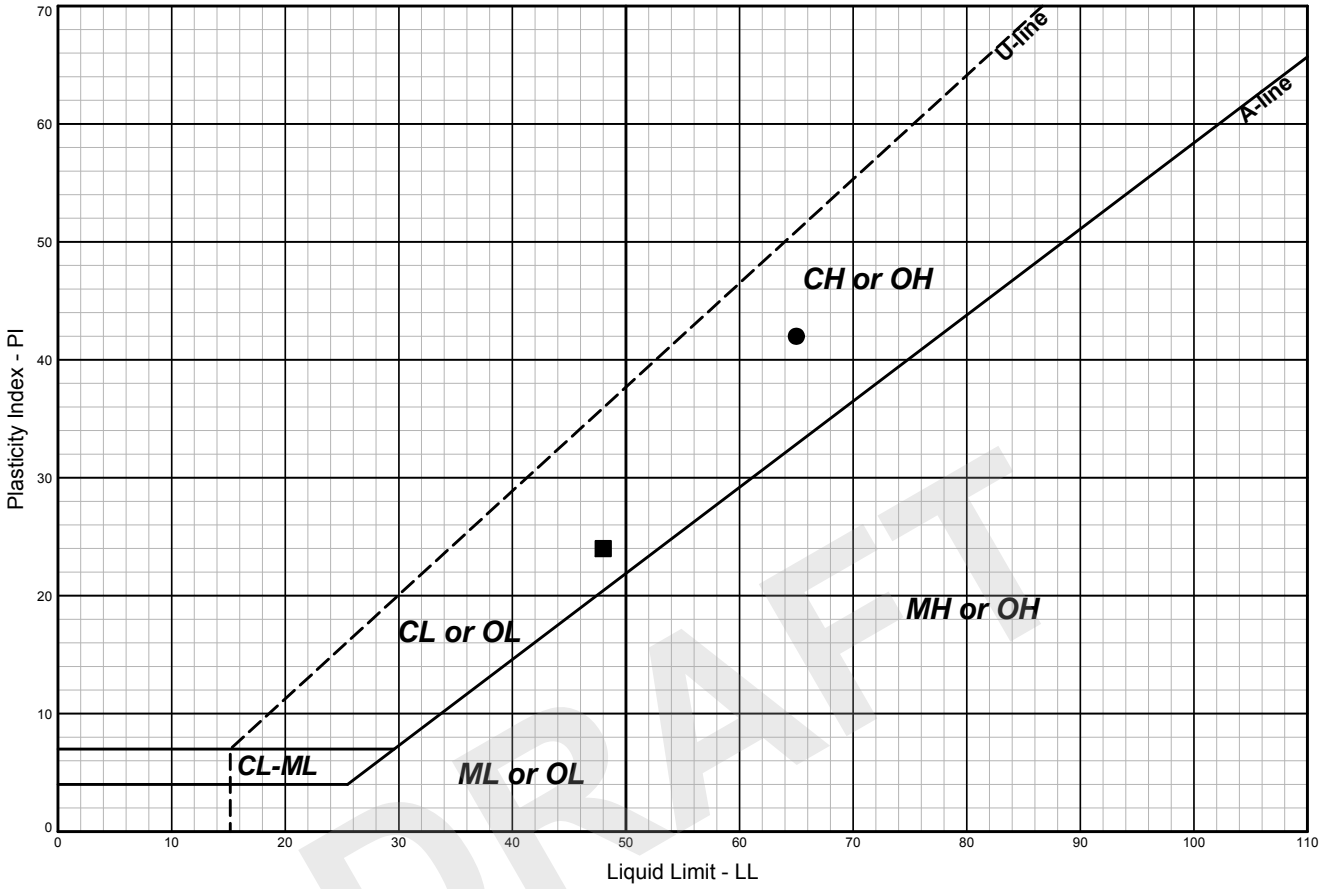


DRAFT

Sample Identification	Depth (ft)	USCS Group Symbol	USCS Group Name	Gravel %	Sand %	Fines %	< 20µm %	< 2µm %	WC %	Tested By	Review By	ASTM Std.
● NME-46, R-15	147.5	SM	Silty Sand		82	18			19.6	JJM	AKV	C136
■ NME-46, R-16	155.0	ML	Silt with Sand	0	26	74			25.8	JJM	AKV	C136
▲ NME-46, R-16	159.0	SM	Silty Sand	0	59	41			20.6	JJM	AKV	C136
◆ NME-46, R-17	165.0	SM	Silty Sand		53	47			25.9	JJM	AKV	C136

North Mercer Island Interceptor and
Enatai Interceptor Upgrade Project
King County, Washington

BORING NME-1

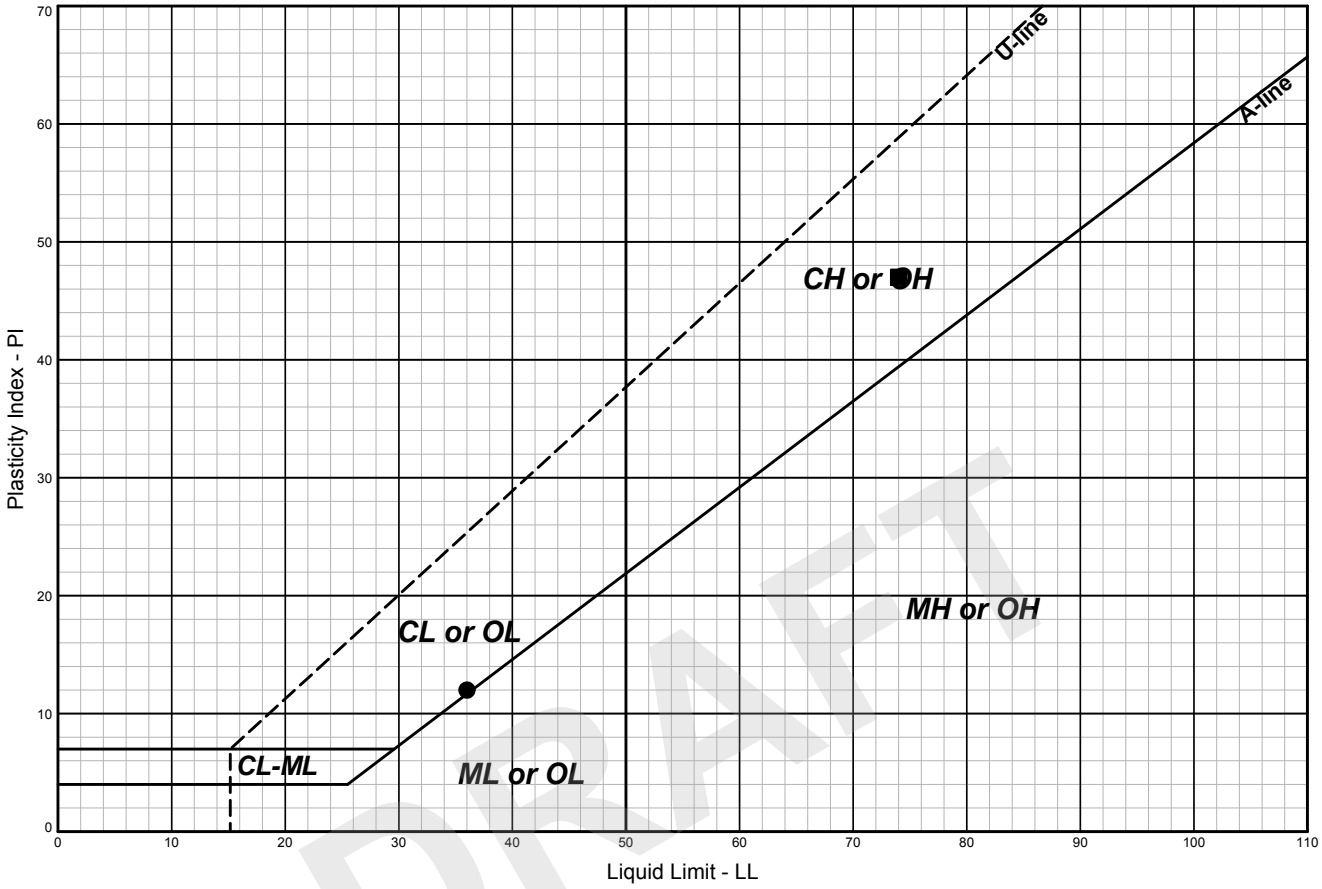


DRAFT

Sample Identification	Depth (ft)	USCS Group Symbol	USCS Group Name	LL	PL	PI	WC %	Gravel %	Sand %	Fines %	< 2µm %	Tested By	Review By	ASTM Std.
● NME-1	172.0	CH	Fat Clay	65	23	42	24.2					SXL	JFL	D4318
■ NME-1	187.5	CL	Lean Clay	48	24	24	24.6					SXL	JFL	D4318

North Mercer Island Interceptor and
Enatai Interceptor Upgrade Project
King County, Washington

BORING NME-5

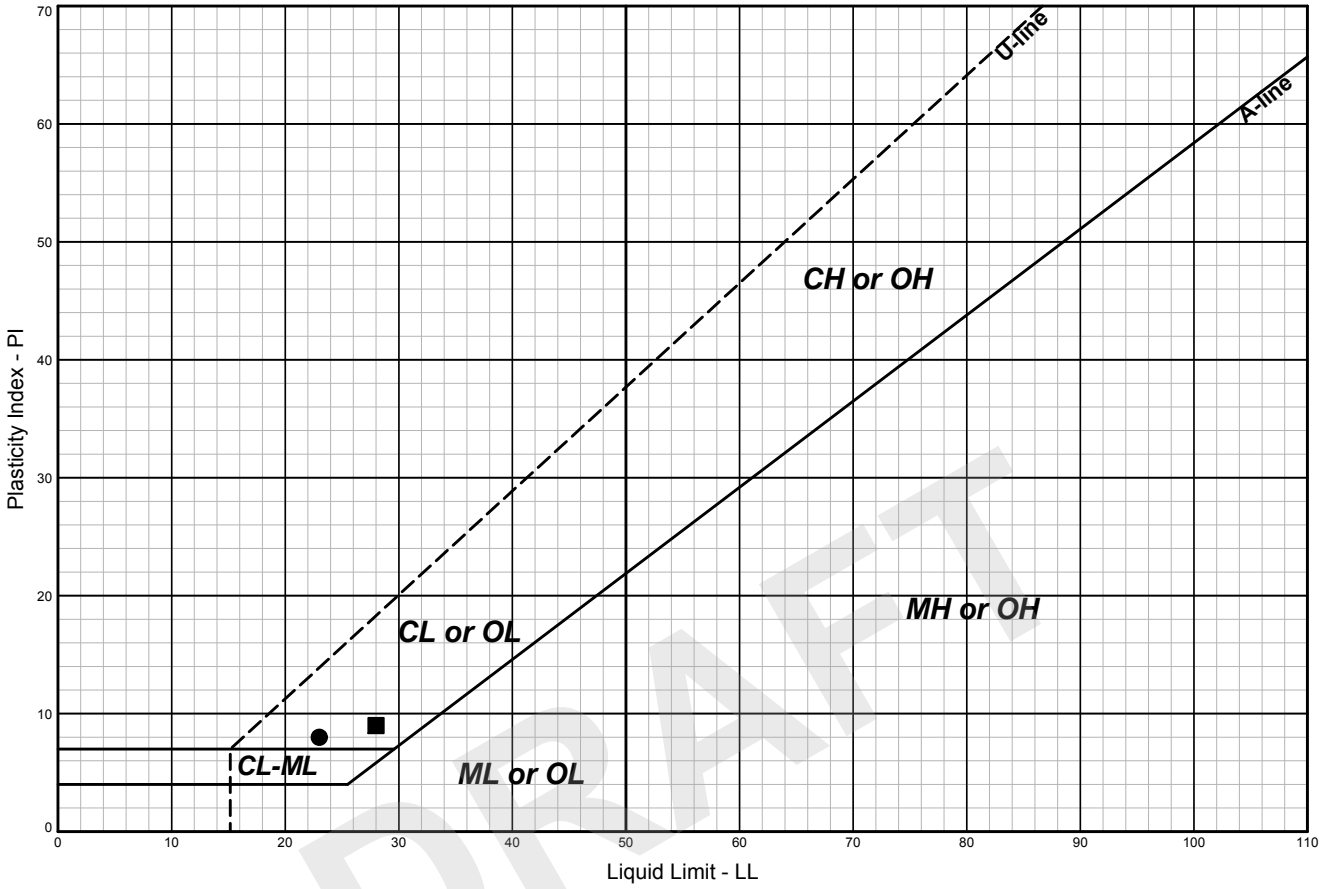


DRAFT

Sample Identification	Depth (ft)	USCS Group Symbol	USCS Group Name	LL	PL	PI	WC %	Gravel %	Sand %	Fines %	< 2µm %	Tested By	Review By	ASTM Std.
● NME-5, S-14	55.0	CL	Lean Clay	36	24	12	18.2					AKV	JFL	D4318
■ NME-5, S-31	140.0	CH	Fat Clay	74	27	47	34.7					AKV	JFL	D4318

North Mercer Island Interceptor and
Enatai Interceptor Upgrade Project
King County, Washington

BORING NME-6

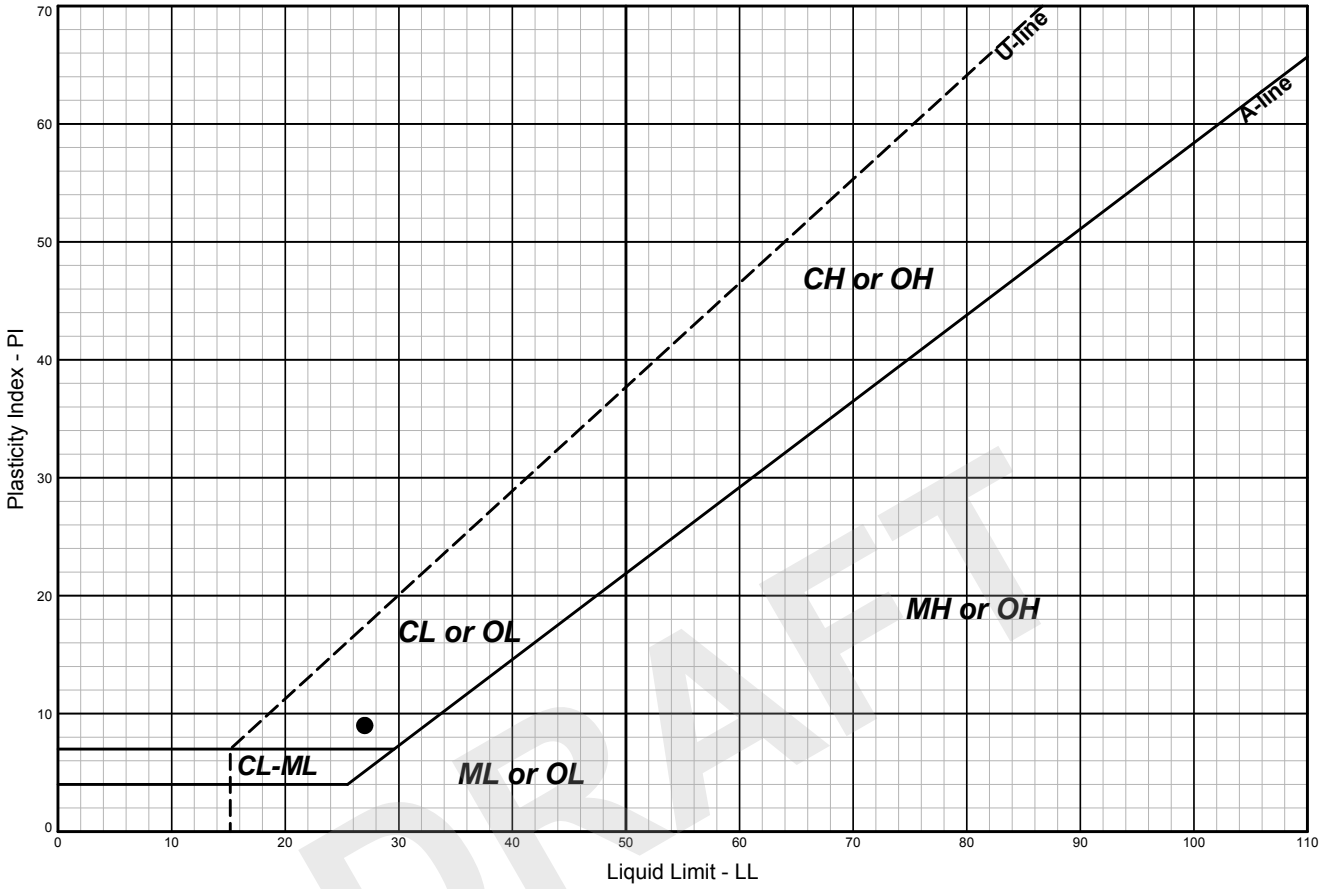


DRAFT

Sample Identification	Depth (ft)	USCS Group Symbol	USCS Group Name	LL	PL	PI	WC %	Gravel %	Sand %	Fines %	< 2µm %	Tested By	Review By	ASTM Std.
● NME-6, S-5	25.0	CL	Lean Clay with Sand	23	15	8	15.9					CTC	JFL	D4318
■ NME-6, S-17	85.0	CL	Lean Clay with Sand	28	19	9	16.1					AKV	JFL	D4318

North Mercer Island Interceptor and
Enatai Interceptor Upgrade Project
King County, Washington

BORING NME-8

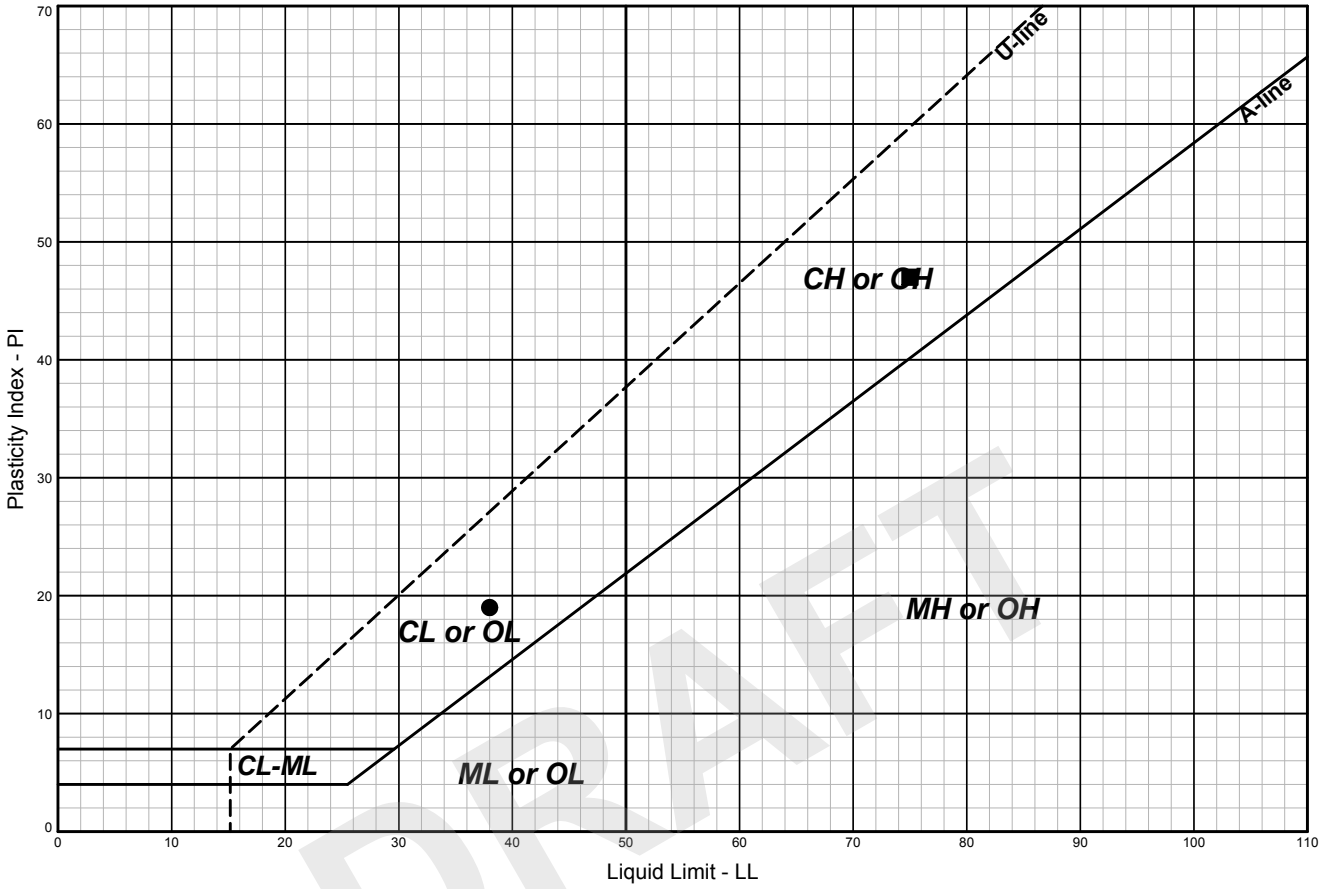


DRAFT

Sample Identification	Depth (ft)	USCS Group Symbol	USCS Group Name	LL	PL	PI	WC %	Gravel %	Sand %	Fines %	< 2µm %	Tested By	Review By	ASTM Std.
● NME-8, S-9	20.0	CL	Lean Clay with Sand	27	18	9	9.3					AKV	JFL	D4318

North Mercer Island Interceptor and
Enatai Interceptor Upgrade Project
King County, Washington

BORING NME-10



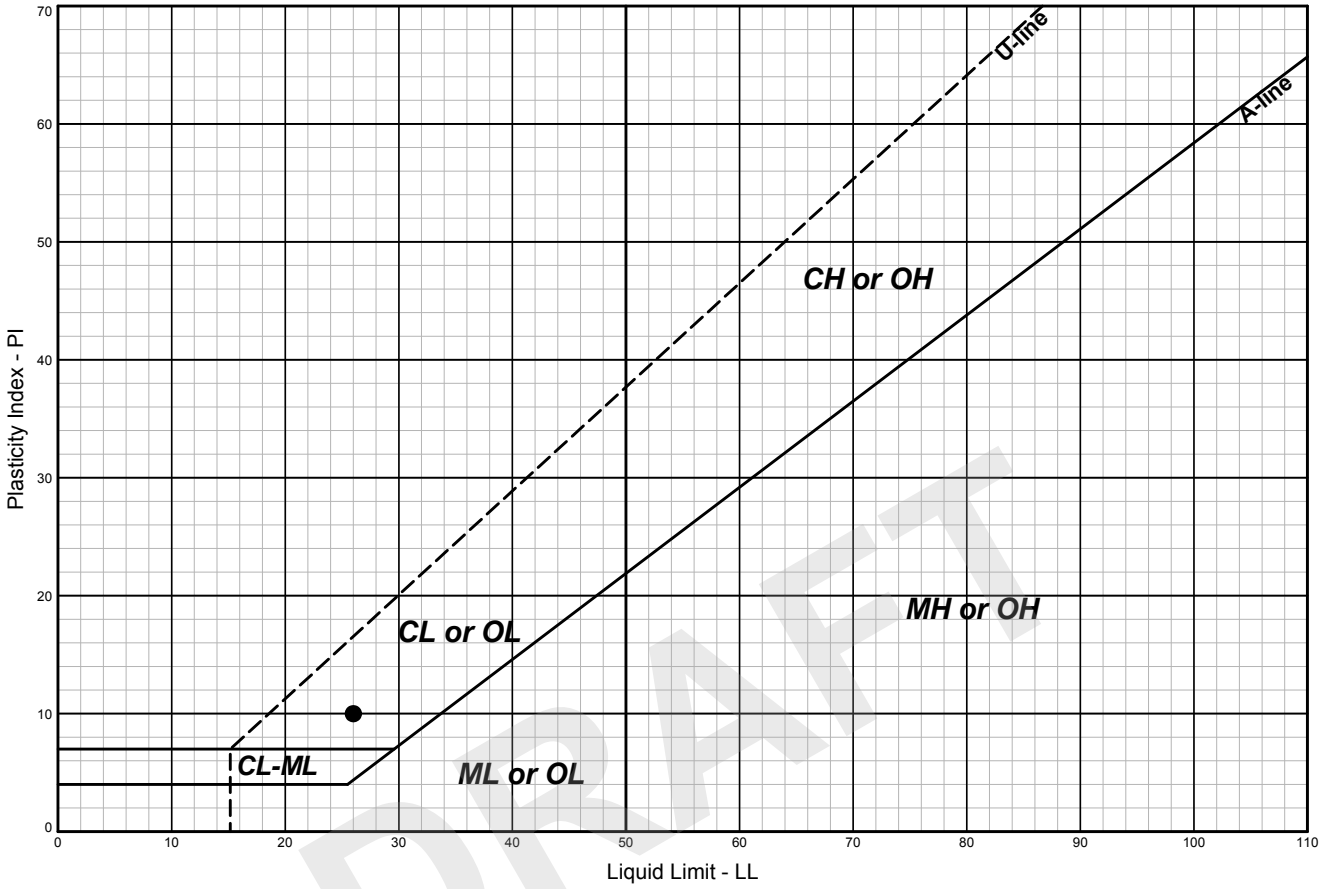
DRAFT

Sample Identification	Depth (ft)	USCS Group Symbol	USCS Group Name	LL	PL	PI	WC %	Gravel %	Sand %	Fines %	< 2µm %	Tested By	Review By	ASTM Std.
● NME-10, S-6	15.0	CL	Lean Clay	38	19	19	14.5					AKV	JFL	D4318
■ NME-10, S-10	25.0	CH	Fat Clay	75	28	47	33.7					AKV	JFL	D4318

PLASTICITY CHART

North Mercer Island Interceptor and
Enatai Interceptor Upgrade Project
King County, Washington

BORING NME-11

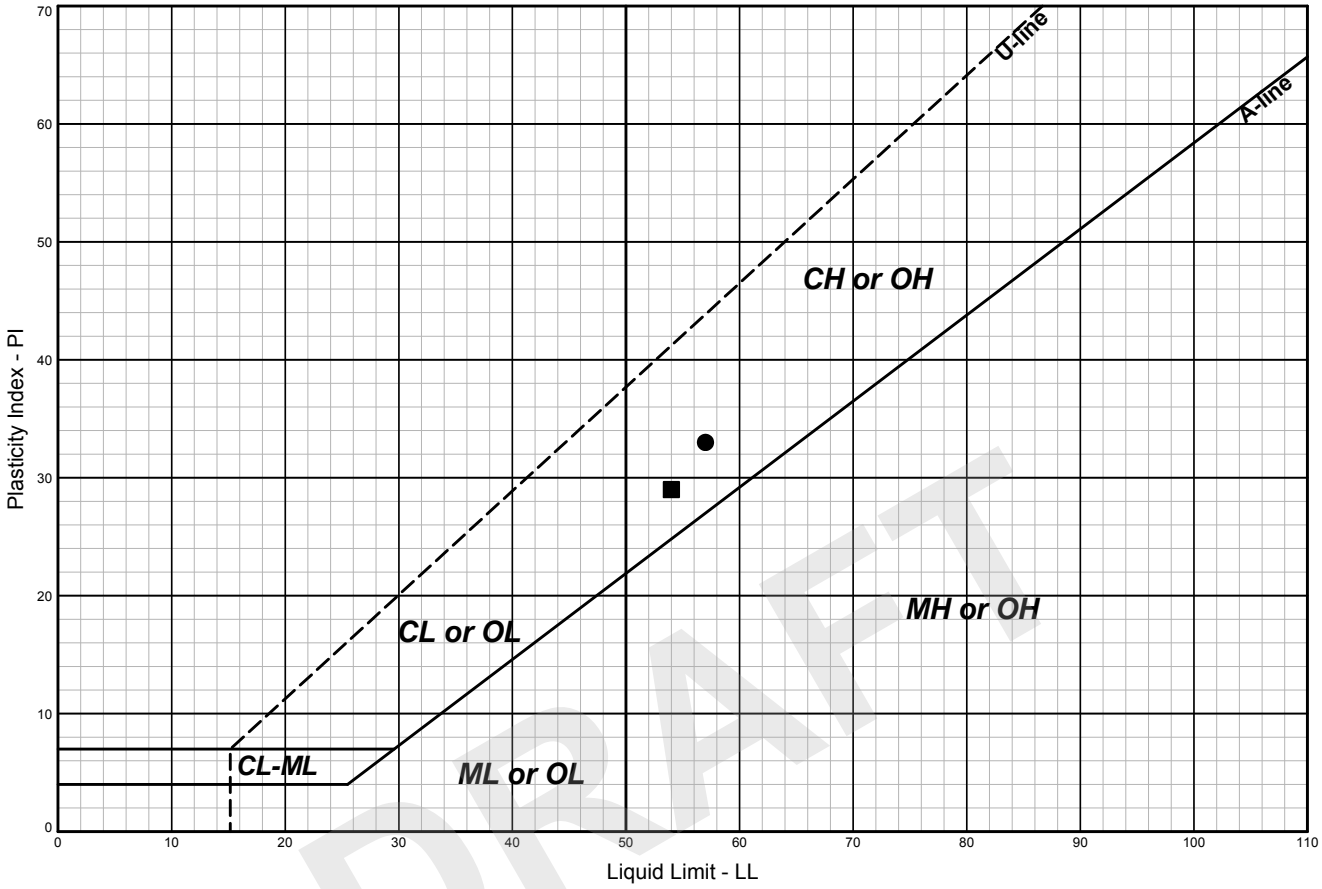


DRAFT

Sample Identification	Depth (ft)	USCS Group Symbol	USCS Group Name	LL	PL	PI	WC %	Gravel %	Sand %	Fines %	< 2µm %	Tested By	Review By	ASTM Std.
● NME-11, S-9	21.0	CL	Lean Clay with Sand	26	16	10	10.9					AKV	JFL	D4318

North Mercer Island Interceptor and
Enatai Interceptor Upgrade Project
King County, Washington

BORING NME-12

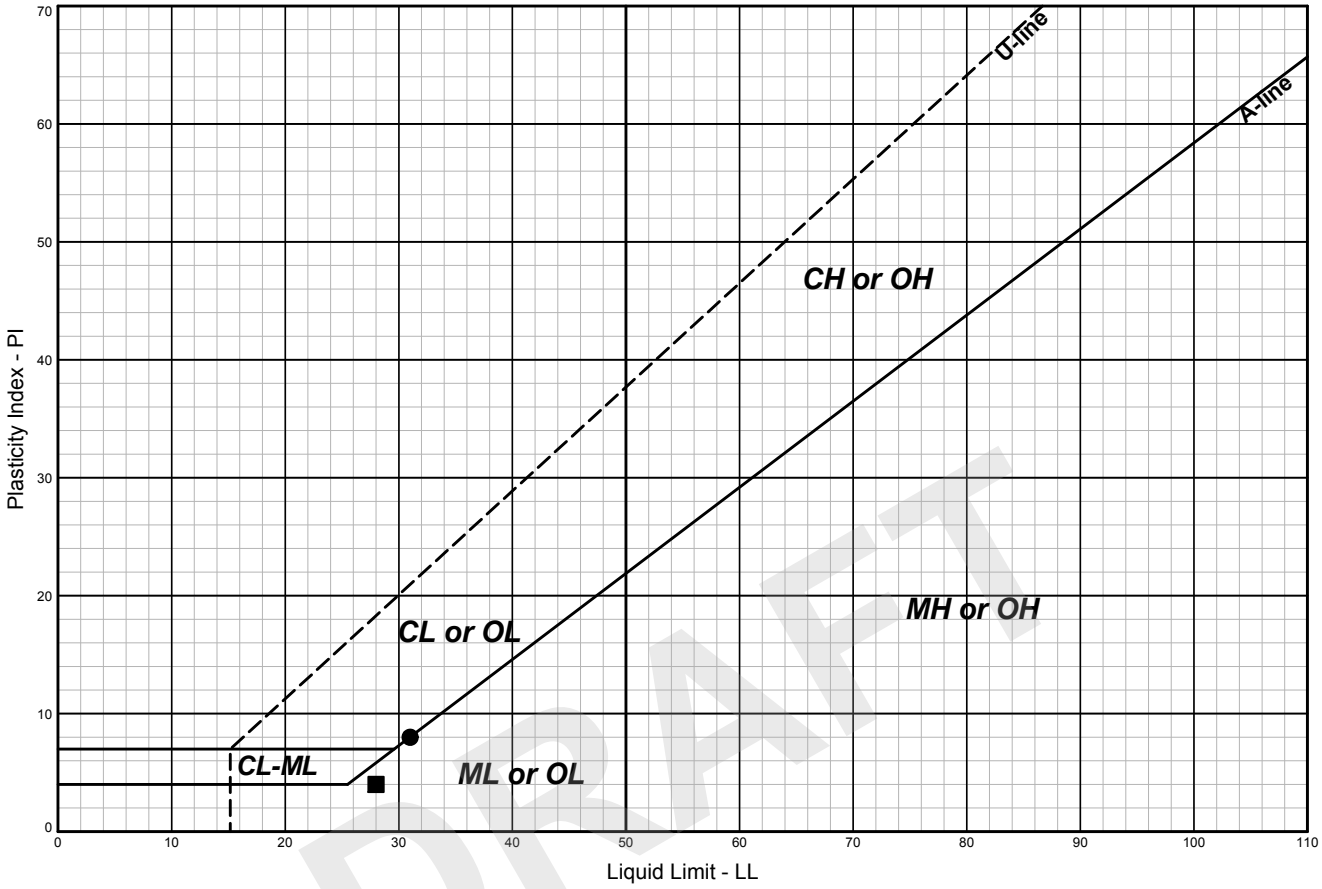


DRAFT

Sample Identification	Depth (ft)	USCS Group Symbol	USCS Group Name	LL	PL	PI	WC %	Gravel %	Sand %	Fines %	< 2µm %	Tested By	Review By	ASTM Std.
● NME-12, S-3	7.5	CH	Fat Clay	57	24	33	30.4					AKV	JFL	D4318
■ NME-12, S-7	17.5	CH	Fat Clay	54	25	29	30.1					AKV	JFL	D4318

North Mercer Island Interceptor and
Enatai Interceptor Upgrade Project
King County, Washington

BORING NME-14

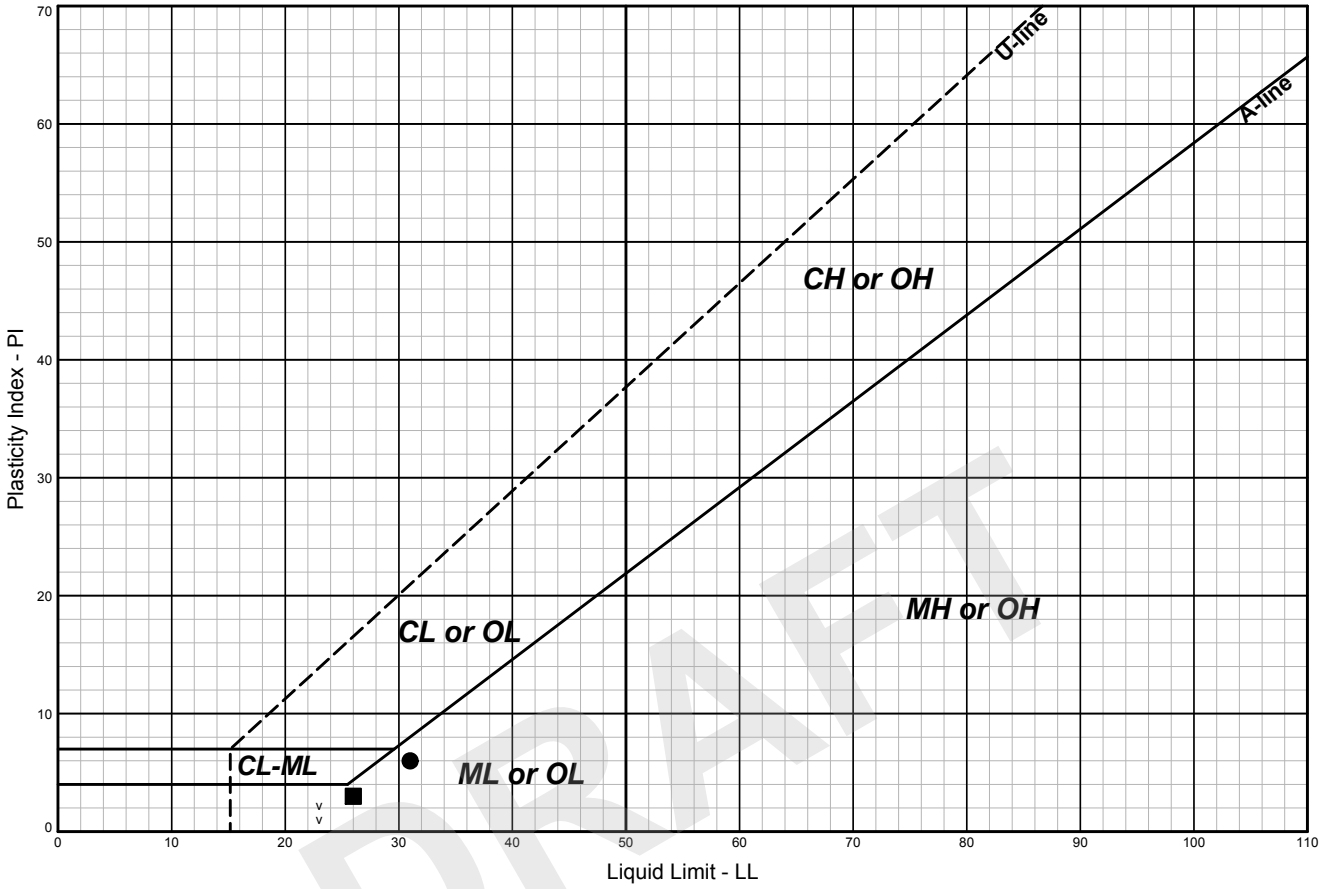


DRAFT

Sample Identification	Depth (ft)	USCS Group Symbol	USCS Group Name	LL	PL	PI	WC %	Gravel %	Sand %	Fines %	< 2µm %	Tested By	Review By	ASTM Std.
● NME-14, S-2	5.0	ML	Silt with Sand	31	23	8	20.0					AKV	JFL	D4318
■ NME-14, S-7	17.5	ML	Silt with Sand	28	24	4	26.4					AKV	JFL	D4318

North Mercer Island Interceptor and
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King County, Washington

BORING NME-15

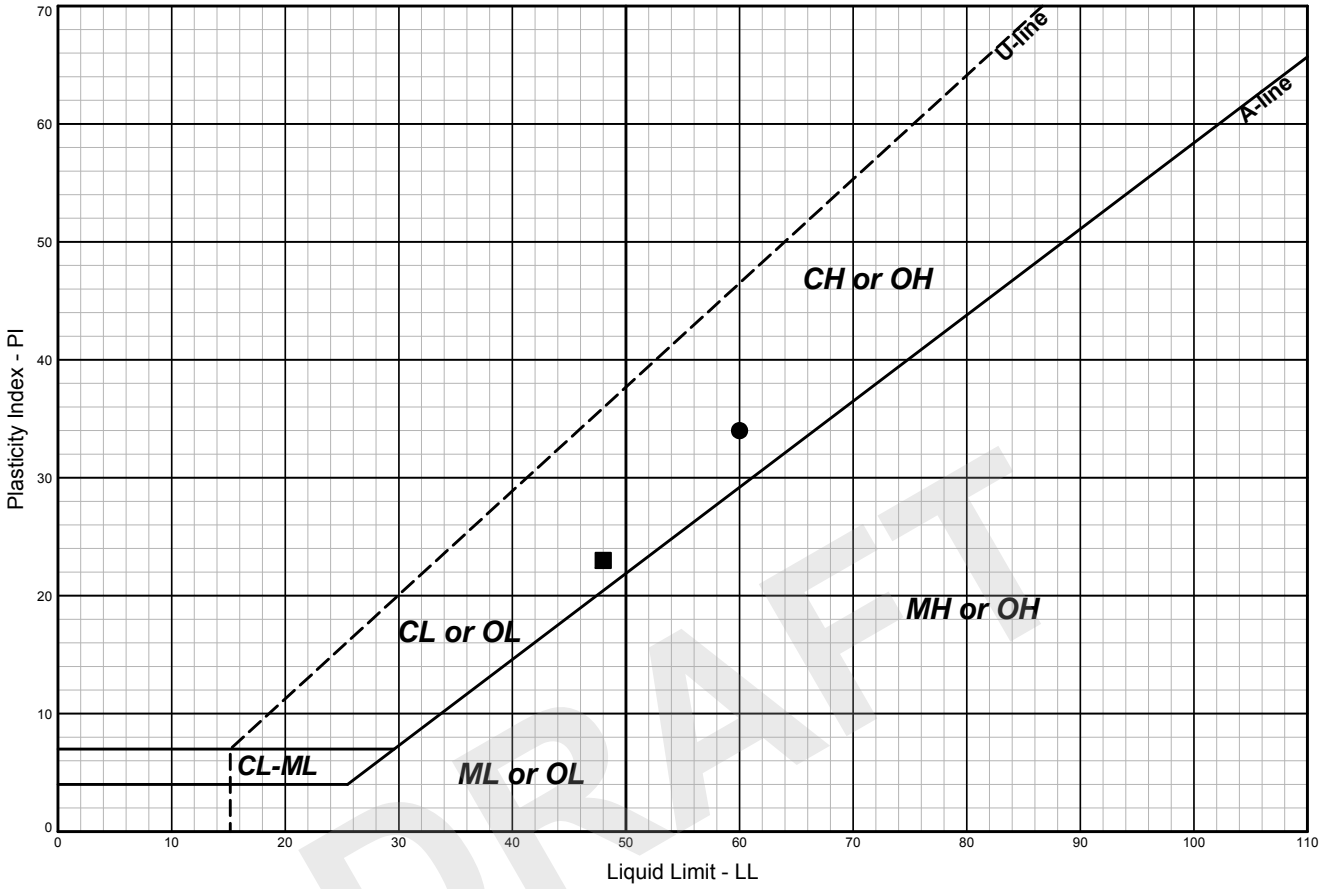


DRAFT

Sample Identification	Depth (ft)	USCS Group Symbol	USCS Group Name	LL	PL	PI	WC %	Gravel %	Sand %	Fines %	< 2µm %	Tested By	Review By	ASTM Std.
● NME-15, S-4	10.0	ML	Silt	31	25	6	27.0					AKV	JFL	D4318
■ NME-15, S-8	20.0	ML	Silt	26	23	3	24.8					AKV	JFL	D4318
NME-15, S-11	35.0	ML	Sandy Silt	23	24	**NP**	28.1					AKV	JFL	D4318

North Mercer Island Interceptor and
Enatai Interceptor Upgrade Project
King County, Washington

BORING NME-16

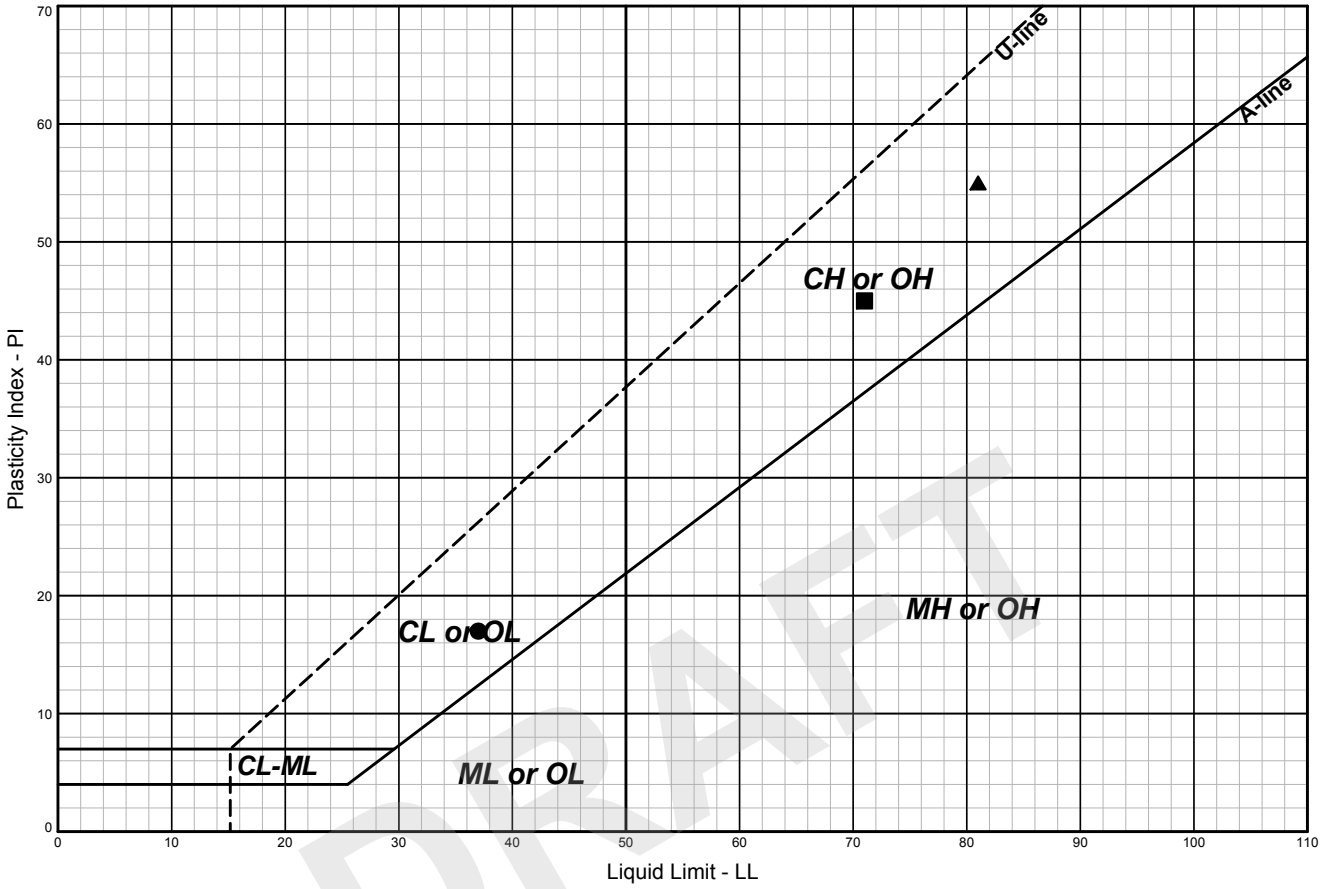


DRAFT

Sample Identification	Depth (ft)	USCS Group Symbol	USCS Group Name	LL	PL	PI	WC %	Gravel %	Sand %	Fines %	< 2µm %	Tested By	Review By	ASTM Std.
● NME-16, S-5	11.5	CH	Sandy Fat Clay	60	26	34	34.6					AKV	JFL	D4318
■ NME-16, S-7	15.0	CL	Sandy Lean Clay	48	25	23	28.2					AKV	JFL	D4318

North Mercer Island Interceptor and
Enatai Interceptor Upgrade Project
King County, Washington

BORING NME-26

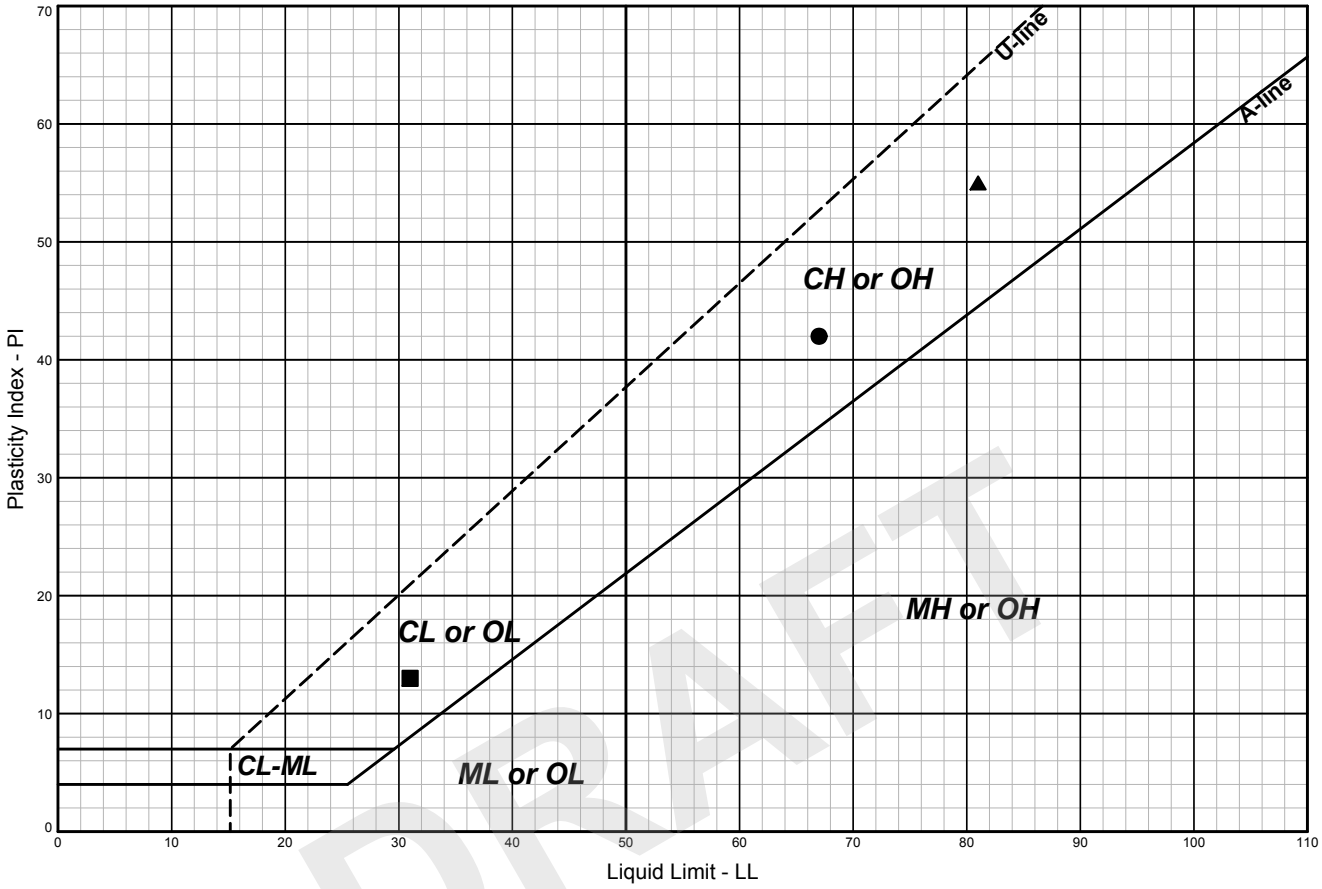


DRAFT

Sample Identification	Depth (ft)	USCS Group Symbol	USCS Group Name	LL	PL	PI	WC %	Gravel %	Sand %	Fines %	< 2µm %	Tested By	Review By	ASTM Std.
● NME-26, S-2	5.0	CL	Lean Clay with Sand	37	20	17	25.3					AKV	AKV	D4318
■ NME-26, S-3	7.5	CH	Fat Clay with Sand	71	26	45	19.1					AKV	AKV	D4318
▲ NME-26, S-6	15.0	CH	Fat Clay	81	26	55	43.5					AKV	AKV	D4318

North Mercer Island Interceptor and
Enatai Interceptor Upgrade Project
King County, Washington

BORING NME-27

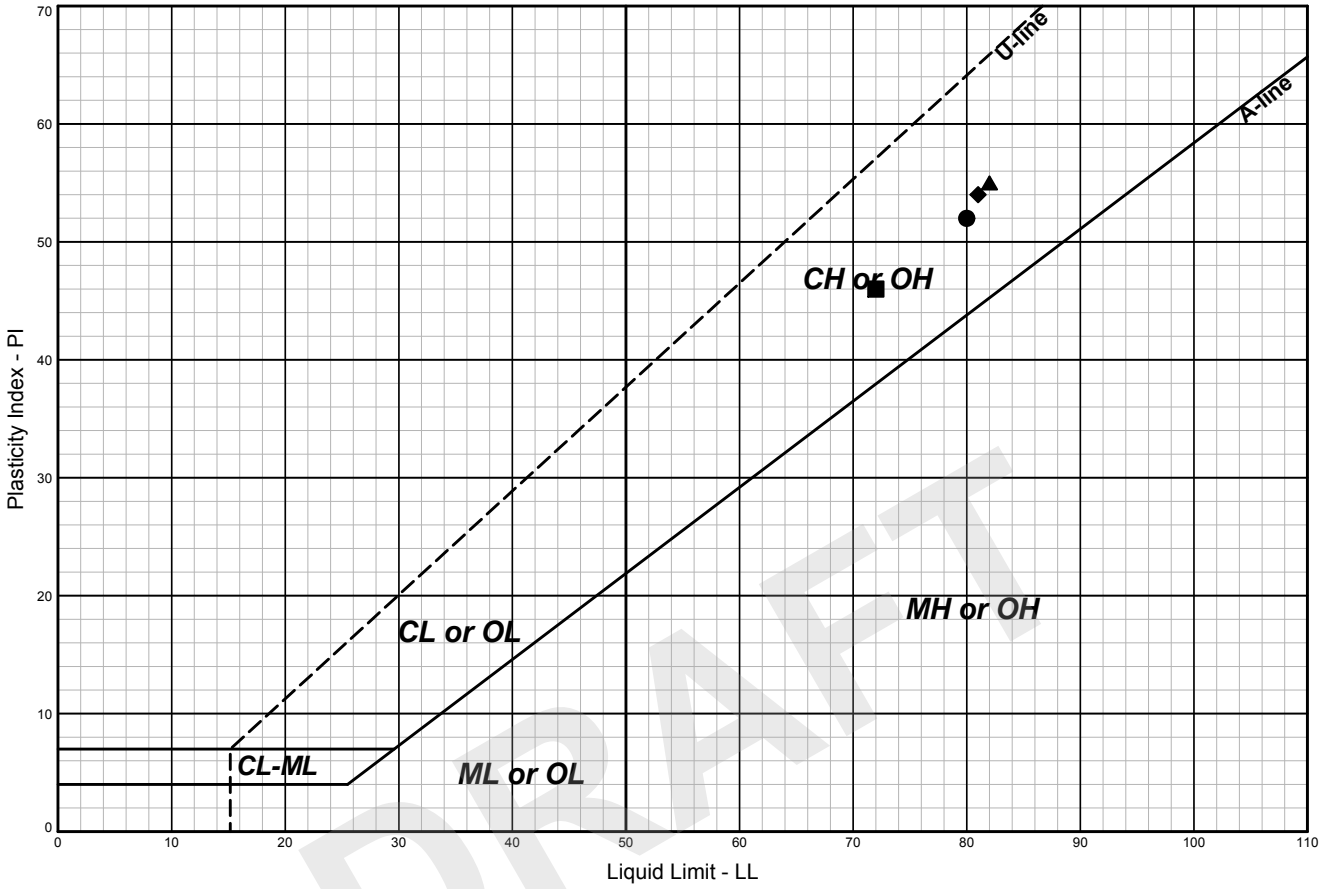


DRAFT

Sample Identification	Depth (ft)	USCS Group Symbol	USCS Group Name	LL	PL	PI	WC %	Gravel %	Sand %	Fines %	< 2µm %	Tested By	Review By	ASTM Std.
● NME-27, S-2	5.0	CH	Fat Clay	67	25	42	39.3					AKV	AKV	D4318
■ NME-27, S-3	7.5	CL	Lean Clay	31	18	13	42.5					AKV	AKV	D4318
▲ NME-27, S-5	12.5	CH	Fat Clay	81	26	55	39.2					AKV	AKV	D4318

North Mercer Island Interceptor and
Enatai Interceptor Upgrade Project
King County, Washington

BORING NME-28

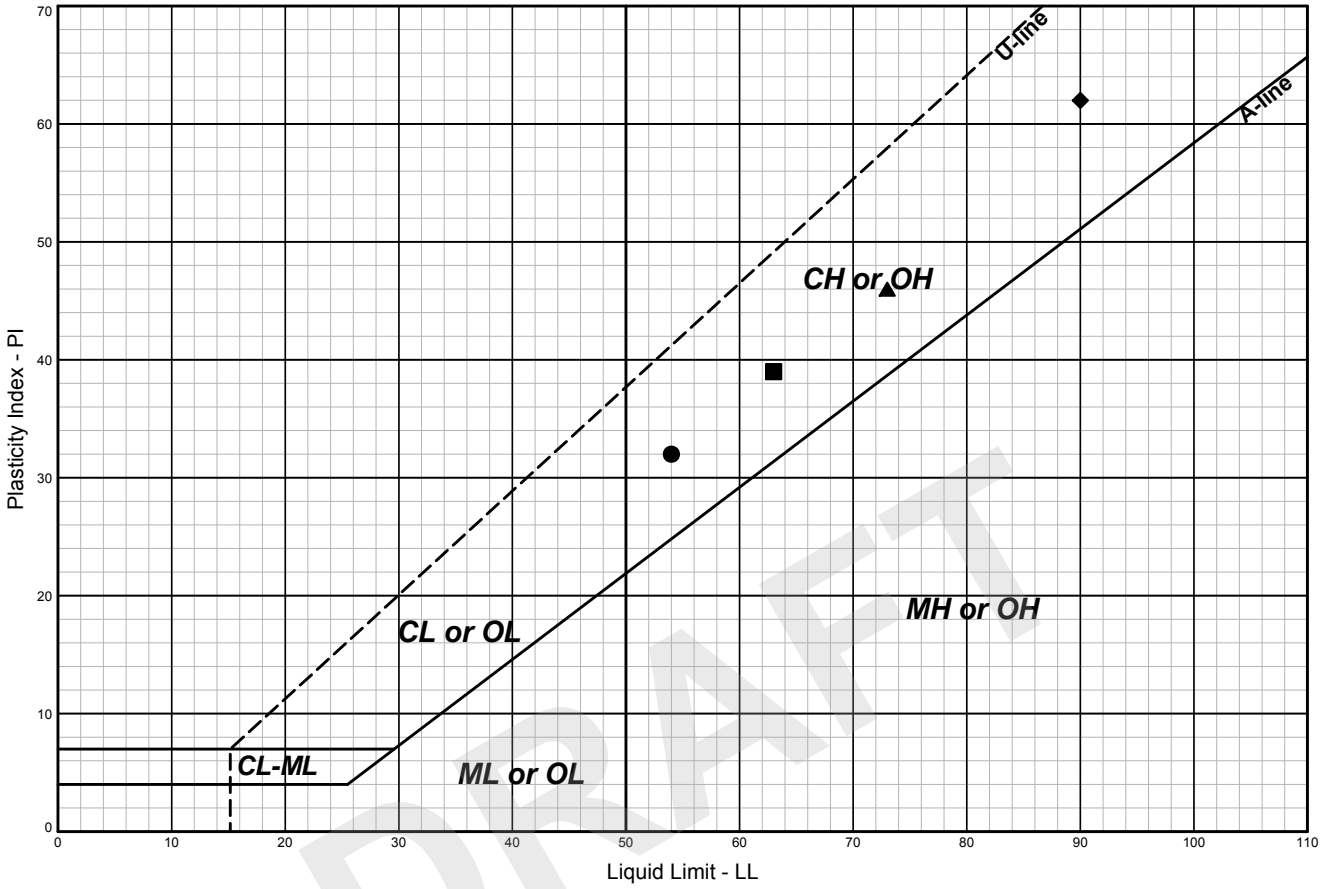


DRAFT

Sample Identification	Depth (ft)	USCS Group Symbol	USCS Group Name	LL	PL	PI	WC %	Gravel %	Sand %	Fines %	< 2µm %	Tested By	Review By	ASTM Std.
● NME-28, S-2	5.0	CH	Fat Clay	80	28	52	50.8					AKV	AKV	D4318
■ NME-28, S-4	10.0	CH	Fat Clay	72	26	46	46.1					AKV	AKV	D4318
▲ NME-28, S-5	13.3	CH	Fat Clay	82	27	55	41.1					AKV	AKV	D4318
◆ NME-28, S-6	15.0	CH	Fat Clay	81	27	54	40.6					AKV	AKV	D4318

North Mercer Island Interceptor and
Enatai Interceptor Upgrade Project
King County, Washington

BORING NME-29

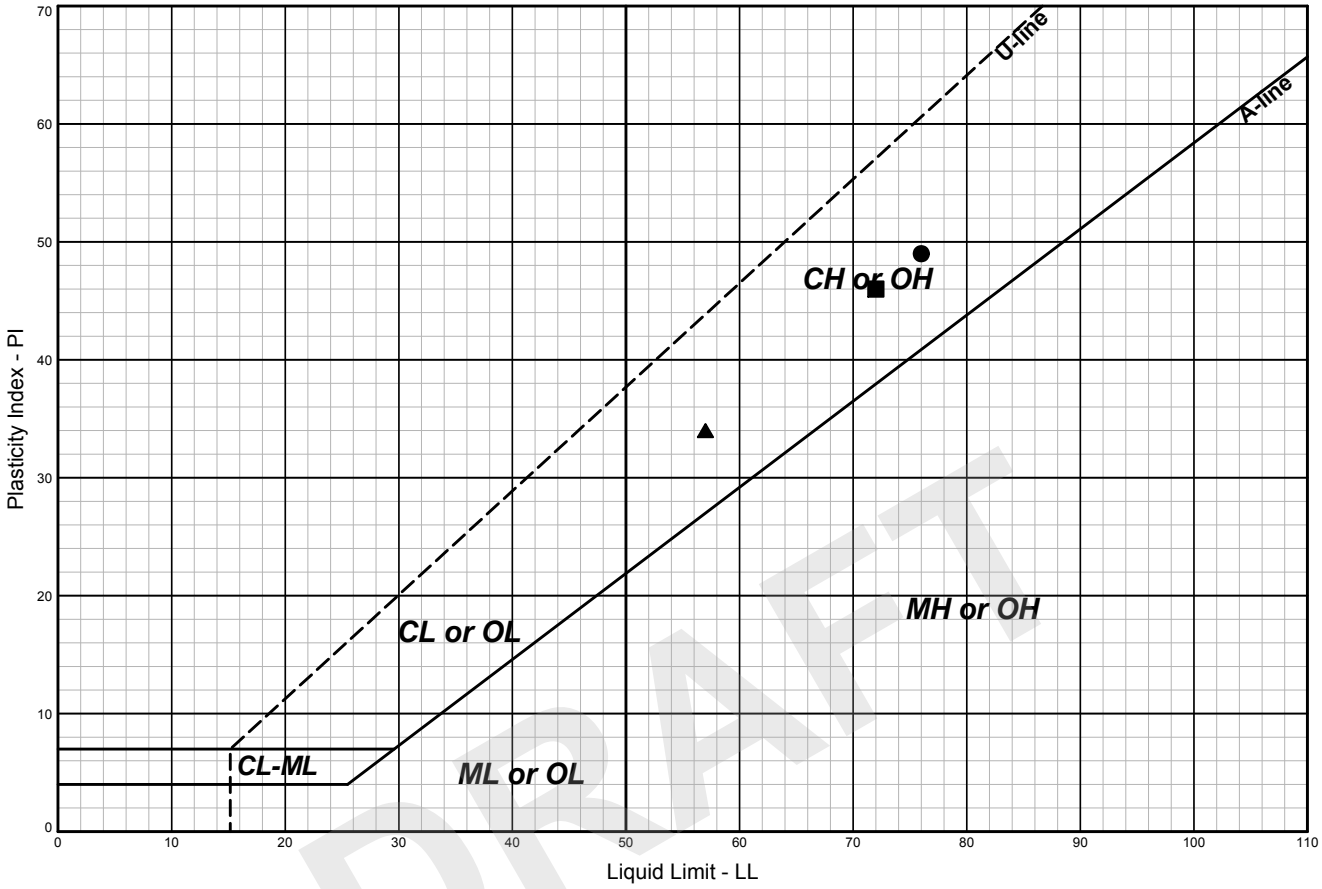


DRAFT

Sample Identification	Depth (ft)	USCS Group Symbol	USCS Group Name	LL	PL	PI	WC %	Gravel %	Sand %	Fines %	< 2µm %	Tested By	Review By	ASTM Std.
● NME-29, S-2	5.0	CH	Fat Clay	54	22	32	32.6					AKV	AKV	D4318
■ NME-29, S-3	7.5	CH	Fat Clay	63	24	39	40.1					AKV	AKV	D4318
▲ NME-29, S-5	12.5	CH	Fat Clay	73	27	46	60.2					AKV	AKV	D4318
◆ NME-29, S-7	17.5	CH	Fat Clay	90	28	62	23.1					AKV	AKV	D4318

North Mercer Island Interceptor and
Enatai Interceptor Upgrade Project
King County, Washington

BORING NME-30

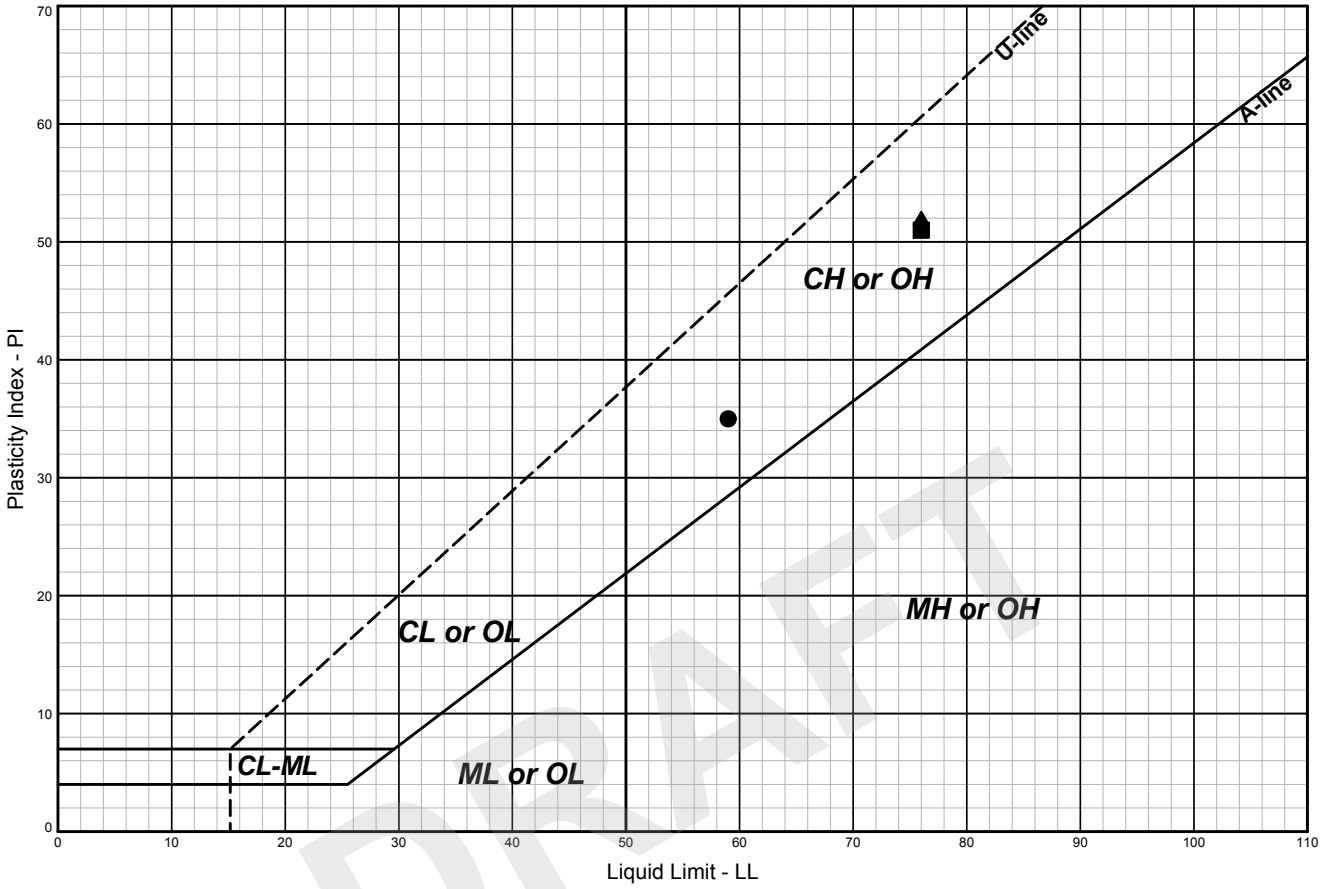


DRAFT

Sample Identification	Depth (ft)	USCS Group Symbol	USCS Group Name	LL	PL	PI	WC %	Gravel %	Sand %	Fines %	< 2µm %	Tested By	Review By	ASTM Std.
● NME-30, S-3	7.5	CH	Fat Clay	76	27	49	45.0					AKV	AKV	D4318
■ NME-30, S-8	20.0	CH	Fat Clay	72	26	46	36.6					AKV	AKV	D4318
▲ NME-30, S-11	35.0	CH	Fat Clay	57	23	34	28.9					AKV	AKV	D4318

North Mercer Island Interceptor and
Enatai Interceptor Upgrade Project
King County, Washington

BORING NME-31

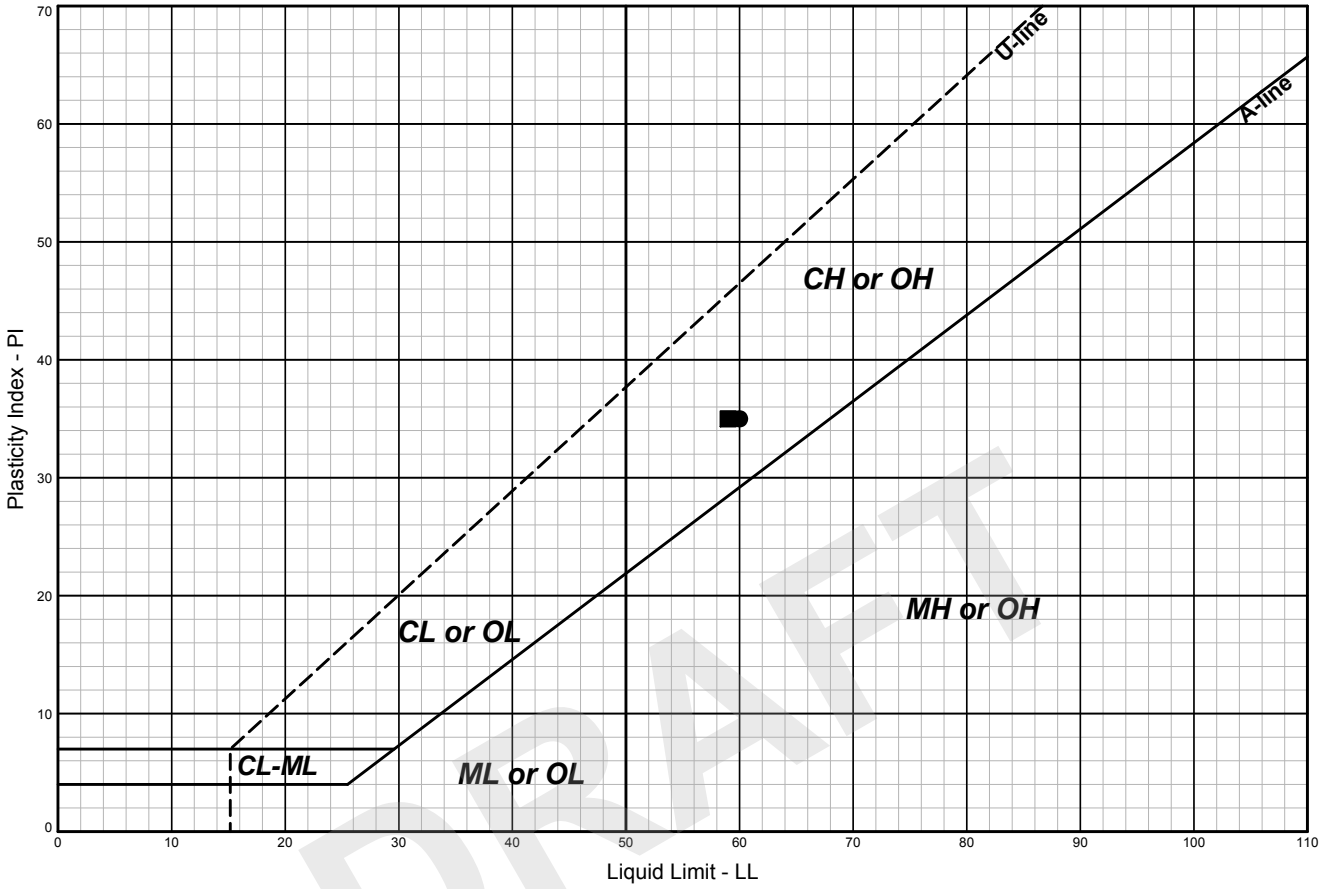


DRAFT

Sample Identification	Depth (ft)	USCS Group Symbol	USCS Group Name	LL	PL	PI	WC %	Gravel %	Sand %	Fines %	< 2µm %	Tested By	Review By	ASTM Std.
● NME-31, S-3	7.5	CH	Fat Clay	59	24	35	30.1					AKV	AKV	D4318
■ NME-31, S-4	10.0	CH	Fat Clay	76	25	51	45.0					RJS	AKV	D4318
▲ NME-31, S-7	17.5	CH	Fat Clay	76	24	52	38.4					AKV	AKV	D4318

North Mercer Island Interceptor and
Enatai Interceptor Upgrade Project
King County, Washington

BORING NME-32

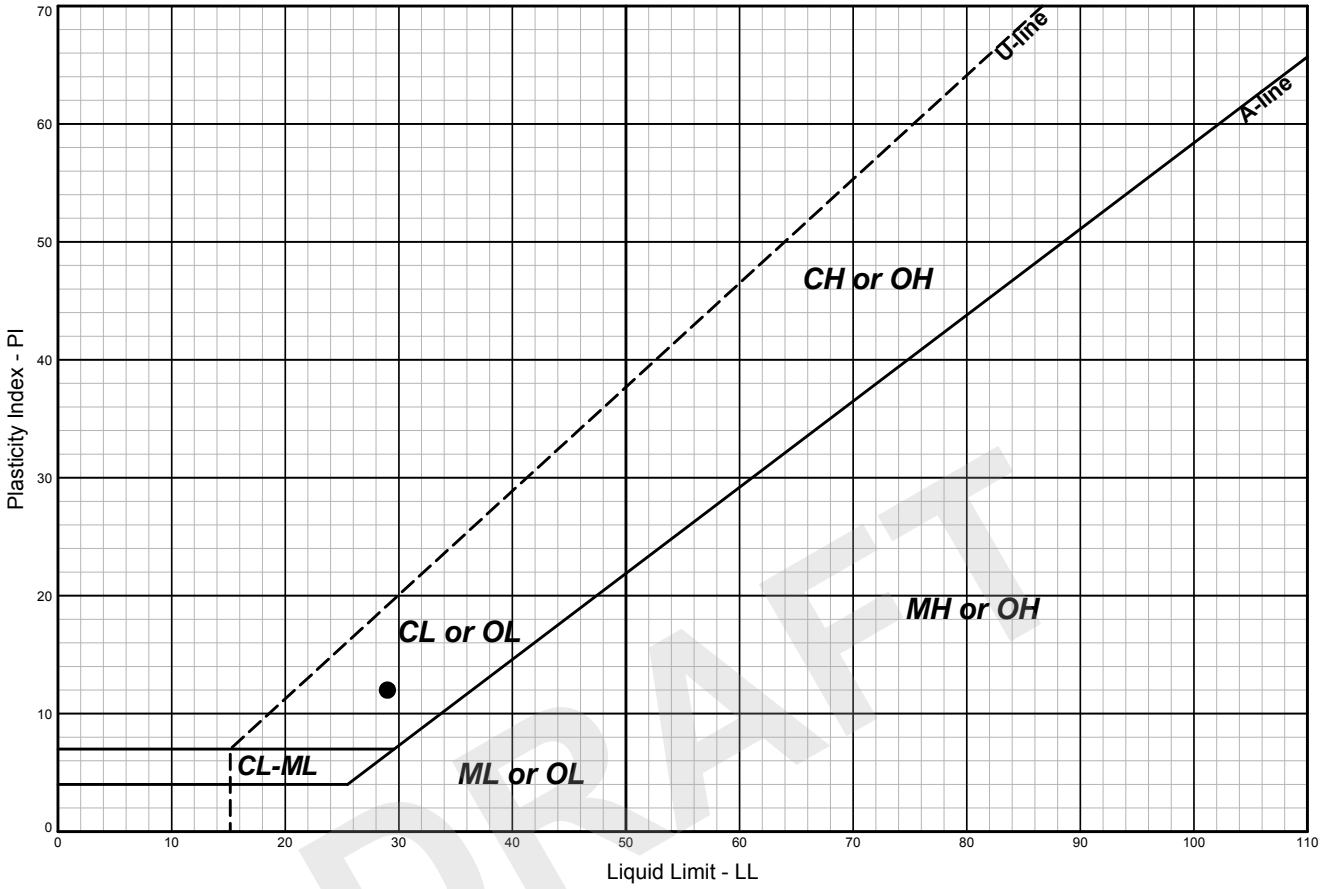


DRAFT

Sample Identification	Depth (ft)	USCS Group Symbol	USCS Group Name	LL	PL	PI	WC %	Gravel %	Sand %	Fines %	< 2µm %	Tested By	Review By	ASTM Std.
● NME-32, S-3	7.5	CH	Fat Clay	60	25	35	37.5					AKV	AKV	D4318
■ NME-32, S-6	15.0	CH	Fat Clay	59	24	35	31.8					AKV	AKV	D4318

North Mercer Island Interceptor and
Enatai Interceptor Upgrade Project
King County, Washington

BORING NME-36

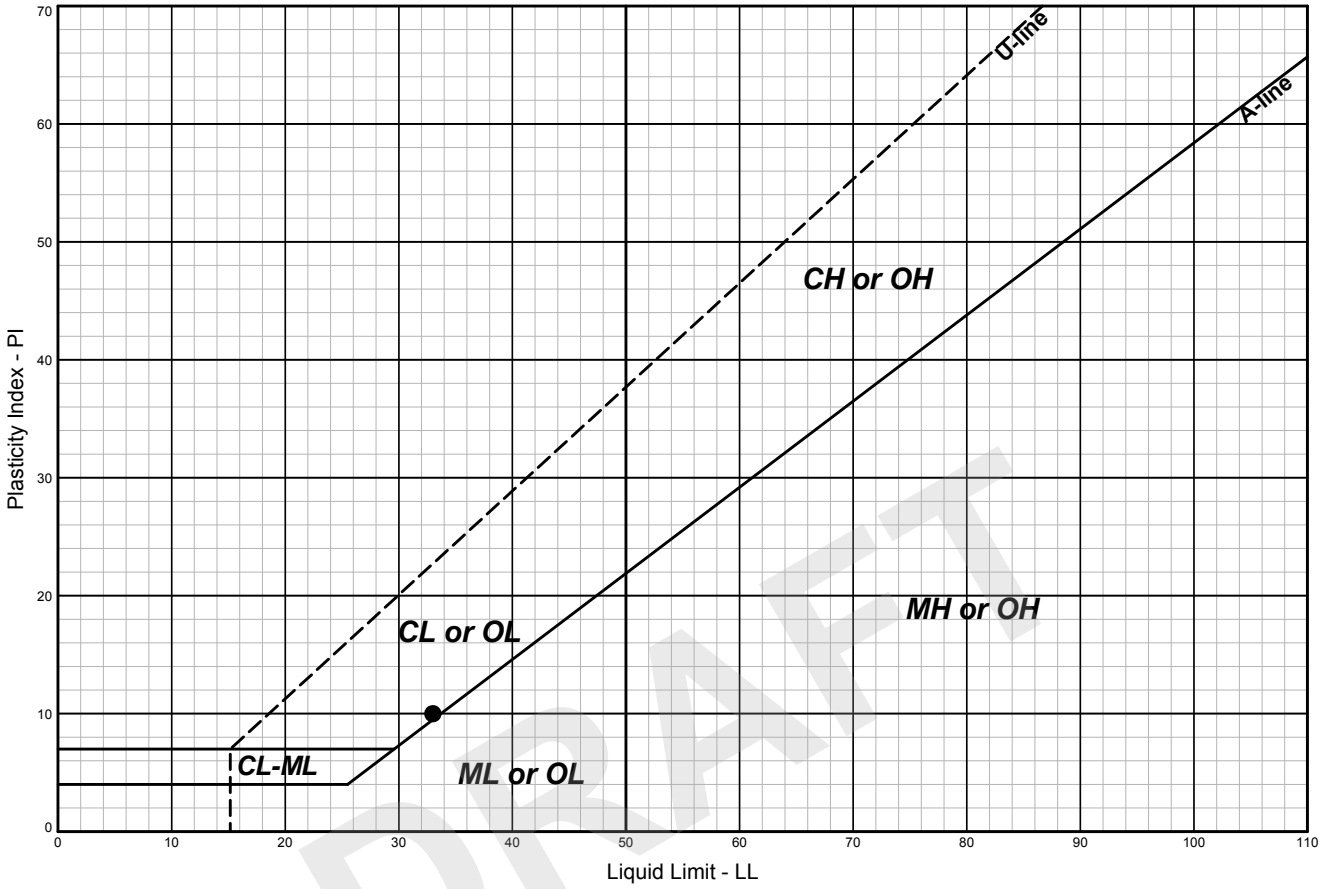


DRAFT

Sample Identification	Depth (ft)	USCS Group Symbol	USCS Group Name	LL	PL	PI	WC %	Gravel %	Sand %	Fines %	< 2µm %	Tested By	Review By	ASTM Std.
● NME-36, S-3A	7.5	CL	Lean Clay with Sand	29	17	12	15.3					AKV	AKV	D4318

North Mercer Island Interceptor and
Enatai Interceptor Upgrade Project
King County, Washington

BORING NME-39

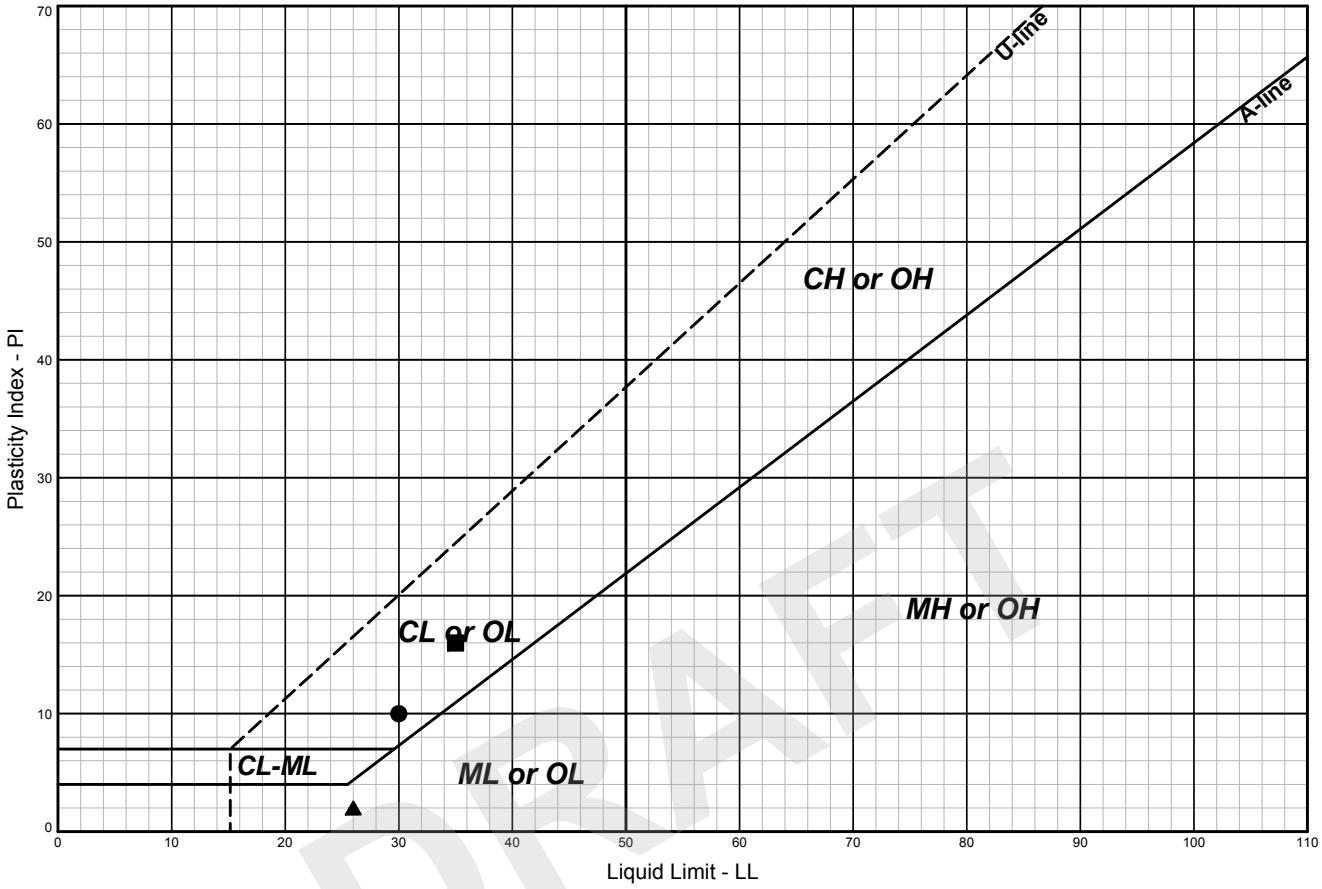


DRAFT

Sample Identification	Depth (ft)	USCS Group Symbol	USCS Group Name	LL	PL	PI	WC %	Gravel %	Sand %	Fines %	< 2µm %	Tested By	Review By	ASTM Std.
● NME-39, S-3	7.5	CL	Lean Clay	33	23	10	22.3					AKV	AKV	D4318

North Mercer Island Interceptor and
Enatai Interceptor Upgrade Project
King County, Washington

BORING NME-40



DRAFT

Sample Identification	Depth (ft)	USCS Group Symbol	USCS Group Name	LL	PL	PI	WC %	Gravel %	Sand %	Fines %	< 2µm %	Tested By	Review By	ASTM Std.
● NME-40, S-4	10.0	CL	Lean Clay	30	20	10	24.1					AKV	AKV	D4318
■ NME-40, S-5	12.5	CL	Lean Clay	35	19	16	34.5					JFW	AKV	D4318
▲ NME-40, S-9	25.0	ML	Silt	26	24	2	26.1					AKV	AKV	D4318

North Mercer Island Interceptor and Enatai Interceptor Upgrade Project
King County, Washington

TEST SUMMARY
Boring NME-28, Sample S-5, 13.3 ft

SPECIMEN DATA AND TEST RESULTS

Sample Classification:
Fat Clay (CH)

Specific Gravity, G_s (Assumed)	1.9
Liquid Limit, LL	82
Plastic Limit, PL	27
Plasticity Index, PI (LL - PL)	55
Fines Content	---
Organic Content	66%
Initial Seating Load, g	50
Final Seating Load, g	50
ASTM Test Method	Method B
Coefficient of Consolidation Interpretation	Procedure 1

	Pre-Inundation	Final Load
Height, in	0.776	0.730
Diameter, in	2.509	2.509
Specimen Volume, in^3	3.835	3.609
Wet Unit Weight, pcf	113.6	118.6
Dry Unit Weight, pcf	80.6	85.7
Water Content	41%	38%
Void Ratio	0.47	0.38
Degree of Saturation	100%	100%

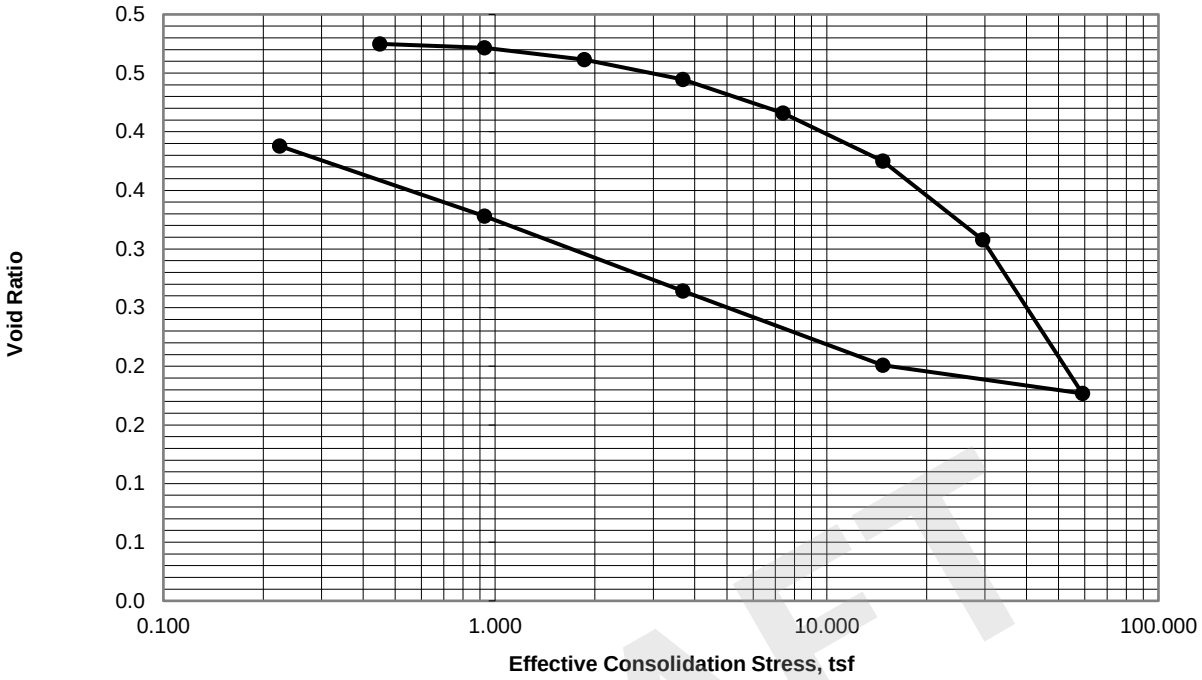
Load Increment Number	Applied Stress, tsf	t_{load}, min	t_{50}, min	ΔH_{load}, in	ΔH at t_{100}, in	$\Delta H/H_o$	Void Ratio	a_v, Mpa^{-1}	c_v, cm^2/s	k, cm/s
Seating										
1	0.45	5431	0.7	0.001	-0.002	-0.2%	0.475	-7.99E-02	4.51E-03	2.40E-08
2	0.93	435	0.6	0.004	0.000	0%	0.471	7.46E-02	5.03E-03	2.49E-08
3	1.86	915	0.9	0.011	0.005	0.7%	0.462	1.12E-01	3.55E-03	2.64E-08
4	3.69	240	1.5	0.022	0.014	1.8%	0.445	9.64E-02	2.10E-03	1.36E-08
5	7.37	285	2.1	0.041	0.029	3.8%	0.416	8.19E-02	1.44E-03	8.03E-09
6	14.74	885	2.7	0.066	0.051	6.6%	0.375	5.77E-02	1.04E-03	4.18E-09
7	29.49	1875	4.9	0.110	0.086	11.1%	0.308	4.75E-02	5.38E-04	1.82E-09
8	58.97	1440	9.3	0.181	0.155	20%	0.177	4.64E-02	2.41E-04	8.40E-10
9	14.74	285	4.3	0.155	0.143	18.4%	0.201	5.69E-03	4.77E-04	2.26E-10
10	3.69	1110	18.2	0.118	0.109	14.1%	0.264	5.98E-02	1.23E-04	6.03E-10
11	0.93	1470	51.2	0.080	0.076	9.8%	0.328	2.41E-01	4.84E-05	9.06E-10
12	0.22	7186	138.2	0.046	0.044	5.7%	0.388	8.85E-01	1.97E-05	1.29E-09
13										

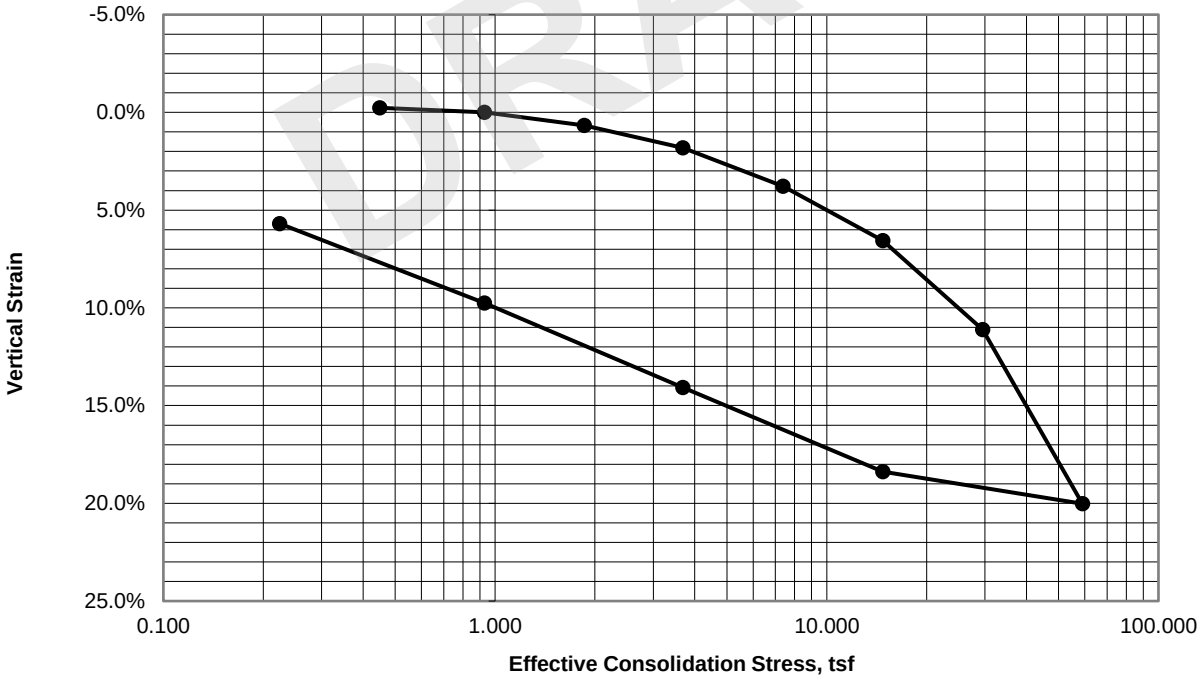
DRAFT

Specimen trimmed using a trimming turntable and indundated with distilled water.
Tested by AKV in accordance with ASTM D2435-11. Test initiated on 2/15/018. Finalized by AKV.

North Mercer Island Interceptor and Enatai Interceptor Upgrade Project
King County, Washington

CONSOLIDATION CURVES
Boring NME-28, Sample S-5, 13.3 ft





Maximum Applied Effective Consolidation Stress, tsf = 58.97

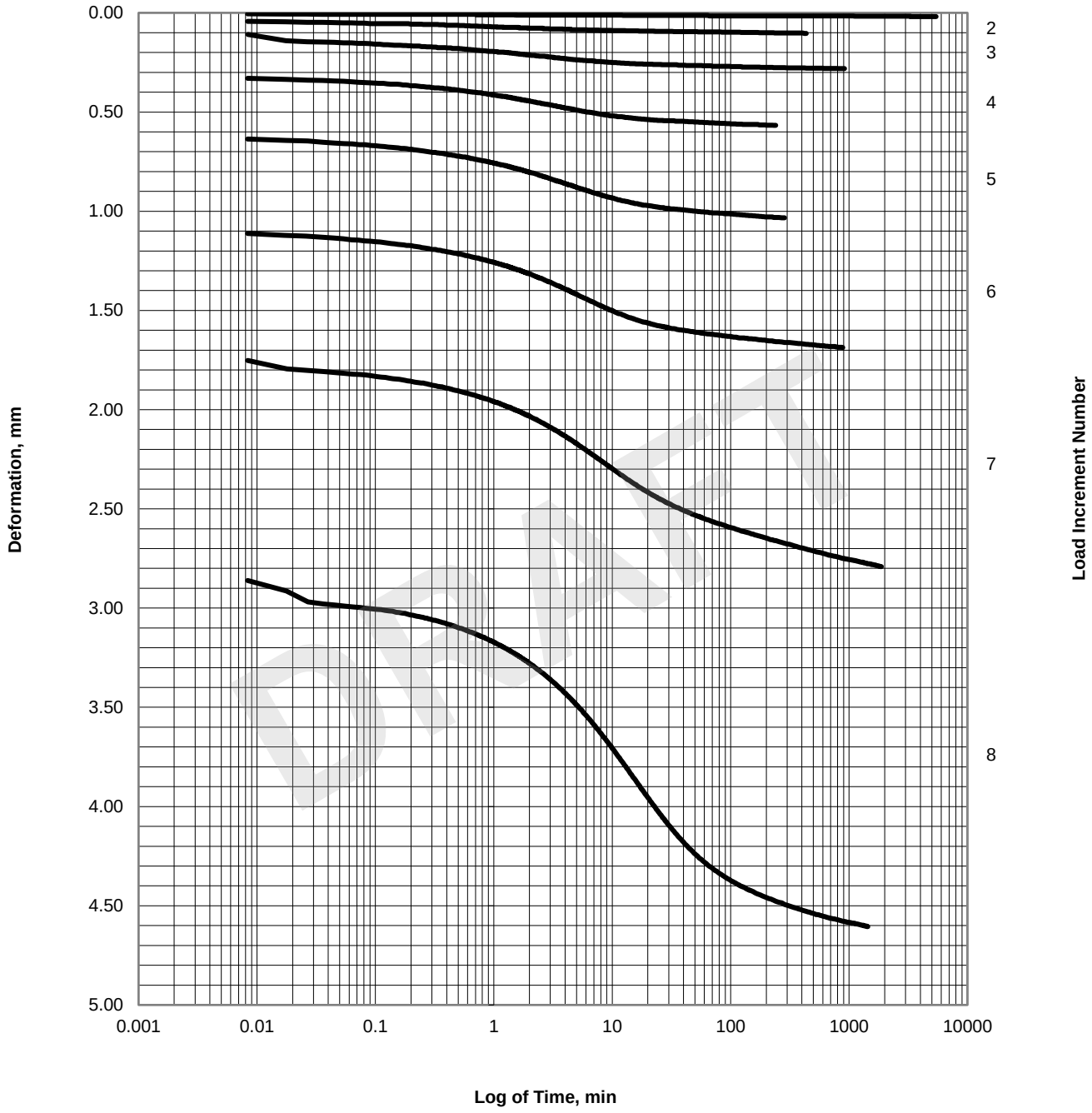
DRAFT

Specimen trimmed using a trimming turntable and indundated with distilled water.
Tested by AKV in accordance with ASTM D2435-11. Test initiated on 2/15/018. Finalized by AKV.

ONE-DIMENSIONAL CONSOLIDATION

North Mercer Island Interceptor and
Enatai Interceptor Upgrade Project
King County, Washington

LOAD INCREMENT TIME-DEFORMATION CURVES
Boring NME-28, Sample S-5, 13.3 ft



DRAFT

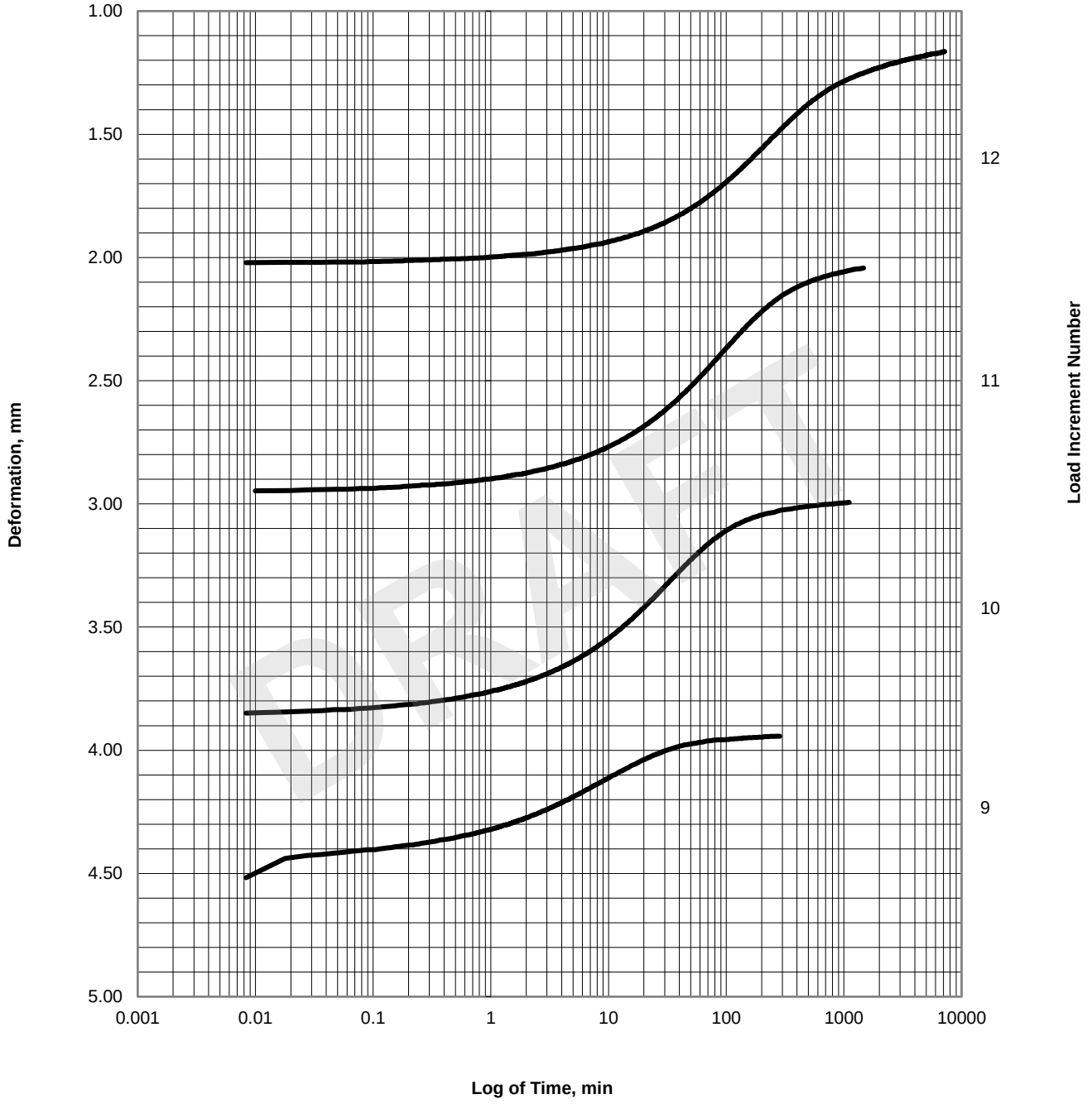
Load Sequence, tsf = 0.93, 1.86, 3.69, 7.37, 14.74, 29.49, 58.97

Specimen trimmed using a trimming turntable and indundated with distilled water.
Tested by AKV in accordance with ASTM D2435-11. Test initiated on 2/15/018. Finalized by AKV.

ONE-DIMENSIONAL CONSOLIDATION

North Mercer Island Interceptor and Enatai Interceptor Upgrade Project
King County, Washington

UNLOAD INCREMENT TIME-DEFORMATION CURVES
Boring NME-28, Sample S-5, 13.3 ft



DRAFT

Load Sequence, tsf = 14.74, 3.69, 0.93, 0.22

Specimen trimmed using a trimming turntable and indundated with distilled water.
Tested by AKV in accordance with ASTM D2435-11. Test initiated on 2/15/018. Finalized by AKV.

APPENDIX D

CORROSION, MICROBIOLOGICAL, AND ANALYTICAL LABORATORY TESTING

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APPENDIX D

CORROSION, MICROBIOLOGICAL, AND ANALYTICAL LABORATORY TESTING

TABLES

D-1 Summary of Corrosion Testing
D-2 Summary of Microbiological Testing
D-3 Summary of Analytical Analyses
D-4 Summary of Analytical Results, Total Metals, SVOCS, PCBS, Organochlorine Pesticides, and Dioxins/Furans

REPORT

Report to Shannon & Wilson, Inc., from Fremont Analytical, 9/20/2016 (485 pages) Samples included: NME:0-4c, NME:4-7c

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TABLE D-1
SUMMARY OF CORROSION TESTING

Exploration No.	Depth (feet)	Material	Moisture (percent)	pH	Redox (V)	Sulfide (ug/g)	Chloride (ug/g)	Resistivity (ohms-cm)	Resistivity (sat.) (ohms-cm)
NME-08	16.5	Soil	18.25	7.5	0.305	<10	<10	8900	7900
NME-09	21.5	Soil	8.6	6	0.314	<10	<10	43000	23000
NME-10	17	Soil	11.25	6.6	0.262	<10	<10	6400	4000
NME-11	17.5	Soil	21.75	8	0.204	<10	390	3200	2100
NME-16	10	Soil	21.67	6.7	0.252	<10	<10	5700	4200
NME-17	5	Soil	8.92	6.7	0.233	<10	14	17000	14000
NME-18	5	Soil	8.97	6.4	0.215	<10	19	18000	15000
NME-19	5	Soil	10.62	6.4	0.227	11	29	22000	15000
NME-20	5	Soil	25.77	6.6	0.211	<10	11	51000	4700
NME-31	10	Soil	30.24	6.5	0.263	ND	ND	2300	2200
NME-32	54	Soil	27.40	7.3	0.185	ND	ND	4300	3400
NME-34	10	Soil	20.32	6.4	0.215	ND	ND	3400	2600
NEM-35	15	Soil	7.57	6.6	0.209	ND	ND	52000	28000
NME-36	53	Soil	8.84	6.9	0.169	ND	ND	14000	4500
NME-39	53	Soil	19.56	7.3	0.182	ND	ND	6200	4800
PA-1	14	Water	NA	5.8	0.22	<0.05	27.9	2400	NA
PA-1[a]	14	Soil	-	-	-	-	-	3800	-
PA-1	15	Soil	83.22	6.7	0.145	<10	<10	3300	3500
PA-1[a]	mix	Soil	-	-	-	-	-	4100	-
PA-2	13	Soil	73.37	73.37	0.168	<10	<10	1900	1800
PA-2	15	Soil	25.77	19.42	0.131	<10	<10	NA	18000

Notes:
V=volts
ug/g = microgram/gram
cm=centimeter
sat. = saturated
[a] Corrosion test conducted in the field during drilling

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TABLE D-2
SUMMARY OF MICROBIOLOGICAL TESTING

Exploration No.	Depth (feet)	Material	BTI-LNB (per ml)	BTI-IRB (per ml)	BTI-ANA (per ml)	BTI-APB (per ml)	BTI-SRB (per ml)
PA-1	15	Soil	1,000 - 10,000	>100,000	10 - 100	10 - 100	>100,000
PA-1	14	Water	>100,000	>100,000	1,000 - 10,000	>100,000	>100,000
PA-2	13	Soil	1,000 - 10,000	>100,000	1,000 - 10,000	10 - 100	>100,000
PA-2	15	Soil	>100,000	>100,000	10 - 100	10 - 100	1,000 - 10,000

Notes:
(per ml) = Minimum and maximum bacteria count range per milliliter of material
BTI = BTI Products, LLC
LNB = Low nutrient bacteria
IRB = Iron-related bacteria
ANA = Anaerobic bacteria
APB = Acid producing bacteria
SRB = Sulfate-reducing bacteria

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TABLE D-3
SUMMARY OF ANALYTICAL ANALYSES

Sample Number	Analytical Lab Report No.	Laboratory	Approximate Depth (feet bgs)	Date Sample Collected	Analyses Performed				
					Metals	SVOCs	PCBs	Organochlorine Pesticides	Dioxins/Furans
NME: 0-4c	1608094	Fremont Analytical	0-4	8/10/2016	X	X	X	X	
NME: 0-4c	1608094	Analytical Resources	0-4	8/10/2016					X
NME: 4-7c	1608094	Fremont Analytical	4-7	8/10/2016	X	X	X	X	
NME: 4-7c	1608094	Analytical Resources	4-7	8/10/2016					X

Notes:
bgs = below ground surface
No. = Number
PCBs = polychlorinated biphenyls by EPA Method 8082A
SVOCs = semi volatile organic compounds by EPA Method 8270
X = analysis was performed

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TABLE D-4
SUMMARY OF ANALYTICAL RESULTS
TOTAL METALS, SVOCS, PCBS, ORGANOCHLORINE PESTICIDES, AND DIOXINS/FURANS

Analyte	Analytical Method	CAS	Units	DMMP SL	SMS SL1	SMS SL2	*NME 0-4C* 8/10/2016 11:30 AM	*NME 4-7C* 8/10/2016 11:50 AM
Total Metals								
Antimony	SW6020A	7440-36-0	mg/kg	150	---	---	<0.191 J*	<0.176
Arsenic		7440-38-2	mg/kg	57	14	120	4.75	3.71
Cadmium		7440-43-9	mg/kg	5.1	2.1	5.4	<0.191	<0.176
Chromium		7440-47-3	mg/kg	260	72	88	45.9 J*	39.4
Copper		7440-50-8	mg/kg	390	400	1,200	25.2	15.0
Lead		7439-92-1	mg/kg	450	360	>1,300	3.23	2.40
Selenium		7782-49-2	mg/kg	---	11	>20	1.65	1.06
Silver		7440-22-4	mg/kg	6.1	0.57	1.7	<0.0956	<0.0882
Zinc		7440-66-6	mg/kg	410	3,200	>4,200	42.0 J+*	32.2
Mercury	SW7471B	7439-97-6	mg/kg	0.41	0.66	0.8	<0.264	<0.270
Organometallic Compounds								
Tributyltin Ion	SW8270D-	36643-28-4	µg/kg	---	47	320	<3.72	<3.86
Chlorinated Hydrocarbons								
1,2,4-Trichlorobenzene	SW8270D	120-82-1	µg/kg	31	---	---	<2.52	<2.33
1,2-Dichlorobenzene		95-50-1	µg/kg	35	---	---	<4.63 J*	<4.28
1,4-Dichlorobenzene		106-46-7	µg/kg	110	---	---	<4.17	<3.86
Hexachlorobenzene		118-74-1	µg/kg	22	--	--	<2.48 J*	<2.29
Phthalates								
Bis (2-ethylhexyl) phthalate	SW8270D	117-81-7	µg/kg	1,300	500	22,000	<31.6	<29.2
Butyl benzyl phthalate		85-68-7	µg/kg	63	---	---	<18.2	<16.8
Diethyl phthalate		84-66-2	µg/kg	200	---	---	<3.76 J*	<3.48 J*
Dimethyl phthalate		131-11-3	µg/kg	71	---	---	<11.5 B*	<2.37 J*
Di-n-butyl phthalate		84-74-2	µg/kg	1,400	380	1,000	<10	<9.26
Di-n-octyl phthalate		117-84-0	µg/kg	6,200	39	>1,100	<16.4	<15.1
Phenols								
2,4-Dimethylphenol	SW8270D	105-67-9	µg/kg	29	---	---	<3.37	<3.12 J*
2-Methylphenol		95-48-7	µg/kg	63	---	---	<2.55 J*	<2.36
4-Methylphenol		106-44-5	µg/kg	670	260	2,000	<1.52 J*	<1.40 J*
Pentachlorophenol		87-86-5	µg/kg	400	1,200	>1,200	R*	R*
Phenol		108-95-2	µg/kg	420	120	210	<5.80	<5.37

TABLE D-4
SUMMARY OF ANALYTICAL RESULTS
TOTAL METALS, SVOCS, PCBS, ORGANOCHLORINE PESTICIDES, AND DIOXINS/FURANS

Analyte	Analytical Method	CAS	Units	DMMP SL	SMS SL1	SMS SL2	*NME 0-4C* 8/10/2016 11:30 AM	*NME 4-7C* 8/10/2016 11:50 AM
Miscellaneous Extractables								
Benzoic acid	SW8270D	65-85-0	µg/kg	650	2,900	3,800	<612	<566 J*
Benzyl alcohol		100-51-6	µg/kg	57	---	---	<1.98	<1.83
Dibenzofuran		132-64-9	µg/kg	540	200	680	<2.46 J*	<2.28 J*
Diphenylamine		122-39-4	µg/kg	---	---	---	<3.18	<2.94
Hexachlorobutadiene		87-68-3	µg/kg	11	---	---	<3.14	<2.91 J*
N-Nitrosodiphenylamine		86-30-6	µg/kg	28	---	---	<3.18	<2.94
Polynuclear Aromatic Hydrocarbons (PAHs)								
2-Methylnaphthalene	SW8270D	91-57-6	µg/kg	670	---	---	<3.09 J*	<2.86 J*
Acenaphthene		83-32-9	µg/kg	500	---	---	<59.8 J*	<55.3 J*
Acenaphthylene		208-96-8	µg/kg	560	---	---	<2.71 J*	<2.51 J*
Anthracene		120-12-7	µg/kg	960	---	---	<2.70 J*	<2.50 J*
Fluorene		86-73-7	µg/kg	540	---	---	<2.64 J*	<2.44 J*
Naphthalene		91-20-3	µg/kg	2,100	---	---	<33.7 J*	<31.2 J*
Phenanthrene		85-01-8	µg/kg	1,500	---	---	<3.88 J*	<3.59 J*
Total LPAH		---	µg/kg	5,200	---	---	<59.8	<55.3
Benzo(a)anthracene		56-55-3	µg/kg	1,300	---	---	<5.17	<4.78
Benzo(a)pyrene		50-32-8	µg/kg	---	---	---	<3.34 J*	<3.09
Benzo(b)fluoranthene		205-99-2	µg/kg	---	---	---	<5.00 J*	<4.62
Benzo(g,h,i)perylene		191-24-2	µg/kg	670	---	---	<4.33 J*	<4.00 J*
Benzo(j)fluoranthene		205-82-3	µg/kg	---	---	---	<3.58	<3.31
Benzo(k)fluoranthene		207-08-9	µg/kg	---	---	---	<3.58 J*	<3.31
Chrysene		218-01-9	µg/kg	1,400	---	---	<5.12 J*	<4.73
Dibenzo(a,h)anthracene		53-70-3	µg/kg	230	---	---	<2.55 J*	<2.36 J*
Fluoranthene		206-44-0	µg/kg	1,700	---	---	<6.39	<5.91
Indeno(1,2,3-cd)pyrene		193-39-5	µg/kg	600	---	---	<4.02 J*	<3.72 J*
Pyrene		129-00-0	µg/kg	2,600	---	---	<26.0	<24.1
Total HPAH		---	µg/kg	12,000	17,000	30,000	<26.0	<24.1
Polychlorinated Biphenyls (PCBs)								
Aroclor-1016	SW8082	12674-11-2	µg/kg	---	---	---	<6.11 J*	<5.72
Aroclor-1221		11104-28-2	µg/kg	---	---	---	<6.11	<5.72
Aroclor-1232		11141-16-5	µg/kg	---	---	---	<6.11	<5.72
Aroclor-1242		53469-21-9	µg/kg	---	---	---	<6.11	<5.72
Aroclor-1248		12672-29-6	µg/kg	---	---	---	<6.11	<5.72
Aroclor-1254		11097-69-1	µg/kg	---	---	---	<6.11	<5.72
Aroclor-1260		11096-82-5	µg/kg	---	---	---	<6.11 J*	<5.72
Arochlor-1262		37324-23-5	µg/kg	---	---	---	<6.11	<5.72
Arochlor-1268		11100-14-4	µg/kg	---	---	---	<6.11	<5.72
Total PCBs		---	µg/kg	130	110	2,500	<6.11	<5.72

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TABLE D-4
SUMMARY OF ANALYTICAL RESULTS
TOTAL METALS, SVOCS, PCBS, ORGANOCHLORINE PESTICIDES, AND DIOXINS/FURANS

Analyte	Analytical Method	CAS	Units	DMMP SL	SMS SL1	SMS SL2	*NME 0-4C* 8/10/2016 11:30 AM	*NME 4-7C* 8/10/2016 11:50 AM
Organochloride Pesticides								
4,4´-DDD	SW8081A	72-54-8	µg/kg	16	---	---	<1.22	<1.14
4,4´-DDE		72-55-9	µg/kg	9	---	---	<1.22	<1.14
4,4´-DDT		50-29-3	µg/kg	12	---	---	<1.22	<1.14
Sum of 4,4'-DDD, 4,4'-DDE, and 4,4'-DDT		---	µg/kg	---	---	---	<1.22	<1.14
Aldrin		309-00-2	µg/kg	9.5	---	---	<0.611	<0.571
cis-Chlordane		5103-71-9	µg/kg	---	---	---	<0.611	<0.571
cis-Nonachlor		5103-73-1	µg/kg	---	---	---	<0.171	<0.160
Dieldrin		60-57-1	µg/kg	1.9	4.9	9.3	<0.611	<0.571
gamma-Chlordane		5566-34-7	µg/kg	---	---	---	<0.611	<0.571
Heptachlor		76-44-8	µg/kg	1.5	---	---	<0.611	<0.571
Oxycchlordane		27304-13-8	µg/kg	---	---	---	<0.171	<0.160
trans-Nonachlor		39765-80-5	µg/kg	---	---	---	<0.171	<0.160
Total Chlordane		---	µg/kg	2.8	---	---	<0.611	<0.571
Dioxins								
2,3,7,8-TCDD	EPA 1613	1746-01-6	ng/kg	---	---	---	<0.993	<0.996
1,2,3,7,8-PeCDD		40321-76-4	ng/kg	---	---	---	0.114 J* EMPC	0.0350 J EMPC
1,2,3,7,8,9-HxCDD		19408-74-3	ng/kg	---	---	---	<0.993 B*	<0.160 B*
1,2,3,6,7,8-HxCDD		57653-85-7	ng/kg	---	---	---	0.163 J EMPC	<0.996
1,2,3,4,7,8-HxCDD		39227-28-6	ng/kg	---	---	---	0.0820 J EMPC	<0.996
1,2,3,4,6,7,8-HpCDD		35822-46-9	ng/kg	---	---	---	<3.81 B*	<1.73 B*
OCDD		3268-87-9	ng/kg	---	---	---	<32.9 B*	<17.5 B*
Furans								
2,3,7,8-TCDF	EPA 1613	51207-31-9	ng/kg	---	---	---	<0.993	<0.996
1,2,3,7,8-PeCDF		57117-41-6	ng/kg	---	---	---	<0.993 B*	<0.996
2,3,4,7,8-PeCDF		57117-31-4	ng/kg	---	---	---	<0.993	<0.996
1,2,3,4,7,8-HxCDF		70648-26-9	ng/kg	---	---	---	<0.993	<0.996
1,2,3,6,7,8-HxCDF		57117-44-9	ng/kg	---	---	---	<0.993	<0.996
1,2,3,7,8,9-HxCDF		72918-21-9	ng/kg	---	---	---	<0.993	<0.0430 B*
2,3,4,6,7,8-HxCDF		60851-34-5	ng/kg	---	---	---	<0.993	<0.996
1,2,3,4,6,7,8-HpCDF		67562-39-4	ng/kg	---	---	---	0.450 J+* EMPC	<0.996
1,2,3,4,7,8,9-HpCDF		58200-70-7	ng/kg	---	---	---	0.0550 J EMPC	<0.996
OCDF		39001-02-0	ng/kg	---	---	---	<3.36 B*	<1.99

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TABLE D-4
SUMMARY OF ANALYTICAL RESULTS
TOTAL METALS, SVOCS, PCBS, ORGANOCHLORINE PESTICIDES, AND DIOXINS/FURANS

Analyte	Analytical Method	CAS	Units	DMMP SL	SMS SL1	SMS SL2	*NME 0-4C* 8/10/2016 11:30 AM	*NME 4-7C* 8/10/2016 11:50 AM
Adjusted Dioxin/Furan TEQ								
Total 2,3,7,8-TCDD TEQ (ND = 0)	EPA 1613	---	ng/kg	4	---	---	0.224	0.078
Total 2,3,7,8-TCDD TEQ (ND = 1/2		---	ng/kg	4	---	---	0.289	0.149

Notes:
DMMP SL and SMS SL were obtained from the East Channel Sampling and Analysis Plan dated August 2017.
The Analytical Resources, Incorporated laboratory provided the Adjusted Dioxin/Furan TEQ results, per the DMMP Manual dated August 2016.
All non-detect dioxin/furan data were reported at the method detection limit; all other non-detect data were reported at the reporting limit
* Analyte not detected; listed as less than the reporting limit (RL), unless otherwise flagged due to quality-control failures.
B* = Result is considered not detected due to quality control failures; see checklist for details. Flag applied by Shannon & Wilson, Inc.
J = Estimated concentration, detected greater than the detection limit (DL) and less than the RL. Flag applied by the laboratory.
J* = Estimated concentration due to quality control failures. Flag applied by Shannon & Wilson, Inc.
J+* = Estimated concentration, biased high due to quality control failures. Flag applied by Shannon & Wilson, Inc.
R* = Rejected result due to severe quality control failures; see checklist for details. Flag applied by Shannon & Wilson, Inc.
CAS = Chemical Abstract Registry Number
DMMP = Dredge Material Management Plan
EDL = estimated detection limit
EMPC = Estimated maximum possible concentration. Flag applied by the laboratory.
EPA = U.S. Environmental Protection Agency
mg/kg = milligram per kilogram
µg/kg = microgram per kilogram
ND = non-detect results
ng/kg = nanogram per kilogram
SL = screening level
TEQ = Toxicity Equivalence

DRAFT

3600 Fremont Ave. N.
Seattle, WA 98103
T: (206) 352-3790
F: (206) 352-7178
info@fremontanalytical.com

Shannon & Wilson
Dave Randall
400 N. 34th Street, Suite 100
Seattle, WA 98103

RE: NME
Lab ID: 1608094

September 20, 2016

Attention Dave Randall:

Fremont Analytical, Inc. received 2 sample(s) on 8/10/2016 for the analyses presented in the following report.

Dioxins by EPA Method 1613
Mercury by EPA Method 7471
Organochlorine Pesticides by EPA Method 8081
Organotins
Polychlorinated Biphenyls (PCB) by EPA 8082
Sample Moisture (Percent Moisture)
Semi-Volatile Organic Compounds by EPA Method 8270
Total Metals by EPA Method 6020

This report consists of the following:

- Case Narrative
- Analytical Results
- Applicable Quality Control Summary Reports
- Chain of Custody

All analyses were performed consistent with the Quality Assurance program of Fremont Analytical, Inc. Please contact the laboratory if you should have any questions about the results.

Thank you for using Fremont Analytical.

Sincerely,

Mike Ridgeway
Laboratory Director

DoD/ELAP Certification #L2371, ISO/ICC 17025:2005
ORELAP Certification: WA 100009-007 (NELAP Recognized)

CLIENT: Shannon & Wilson
Project: NME
Lab Order: 1608094

Work Order Sample Summary

Lab Sample ID	Client Sample ID	Date/Time Collected	Date/Time Received
1608094-001	NME:0-4c	08/10/2016 11:30 AM	08/10/2016 12:40 PM
1608094-002	NME:4-7c	08/10/2016 11:50 AM	08/10/2016 12:40 PM

Case Narrative

WO#: **1608094**
Date: **9/20/2016**

CLIENT: Shannon & Wilson
Project: NME

I. SAMPLE RECEIPT:
Samples receipt information is recorded on the attached Sample Receipt Checklist.

II. GENERAL REPORTING COMMENTS:
Results are reported on a wet weight basis unless dry-weight correction is denoted in the units field on the analytical report ("mg/kg-dry" or "ug/kg-dry").

Matrix Spike (MS) and MS Duplicate (MSD) samples are tested from an analytical batch of "like" matrix to check for possible matrix effect. The MS and MSD will provide site specific matrix data only for those samples which are spiked by the laboratory. The sample chosen for spike purposes may or may not have been a sample submitted in this sample delivery group. The validity of the analytical procedures for which data is reported in this analytical report is determined by the Laboratory Control Sample (LCS) and the Method Blank (MB). The LCS and the MB are processed with the samples and the MS/MSD to ensure method criteria are achieved throughout the entire analytical process.

III. ANALYSES AND EXCEPTIONS:
Exceptions associated with this report will be footnoted in the analytical results page(s) or the quality control summary page(s) and/or noted below.
1608094-001B
C-TBT has been Sub Contracted.
1608094-001B
O-DIOXIN has been Sub Contracted.
1608094-002B
C-TBT has been Sub Contracted.
1608094-002B
O-DIOXIN has been Sub Contracted.

Qualifiers:

* - Flagged value is not within established control limits
B - Analyte detected in the associated Method Blank
D - Dilution was required
E - Value above quantitation range
H - Holding times for preparation or analysis exceeded
I - Analyte with an internal standard that does not meet established acceptance criteria
J - Analyte detected below Reporting Limit
N - Tentatively Identified Compound (TIC)
Q - Analyte with an initial or continuing calibration that does not meet established acceptance criteria (<20%RSD, <20% Drift or minimum RRF)
S - Spike recovery outside accepted recovery limits
ND - Not detected at the Reporting Limit
R - High relative percent difference observed

Acronyms:

%Rec - Percent Recovery
CCB - Continued Calibration Blank
CCV - Continued Calibration Verification
DF - Dilution Factor
HEM - Hexane Extractable Material
ICV - Initial Calibration Verification
LCS/LCSD - Laboratory Control Sample / Laboratory Control Sample Duplicate
MB or MBLANK - Method Blank
MDL - Method Detection Limit
MS/MSD - Matrix Spike / Matrix Spike Duplicate
PDS - Post Digestion Spike
Ref Val - Reference Value
RL - Reporting Limit
RPD - Relative Percent Difference
SD - Serial Dilution
SGT - Silica Gel Treatment
SPK - Spike
Surr - Surrogate

Client: Shannon & Wilson
Collection Date: 8/10/2016 11:30:00 AM
Project: NME
Lab ID: 1608094-001
Matrix: Soil
Client Sample ID: **NME:0-4c**

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
Polychlorinated Biphenyls (PCB) by EPA 8082				Batch ID: 14525		Analyst: CM
Aroclor 1016	ND	0.00611		mg/Kg-dry	1	8/17/2016 4:29:00 PM
Aroclor 1221	ND	0.00611		mg/Kg-dry	1	8/17/2016 4:29:00 PM
Aroclor 1232	ND	0.00611		mg/Kg-dry	1	8/17/2016 4:29:00 PM
Aroclor 1242	ND	0.00611		mg/Kg-dry	1	8/17/2016 4:29:00 PM
Aroclor 1248	ND	0.00611		mg/Kg-dry	1	8/17/2016 4:29:00 PM
Aroclor 1254	ND	0.00611		mg/Kg-dry	1	8/17/2016 4:29:00 PM
Aroclor 1260	ND	0.00611		mg/Kg-dry	1	8/17/2016 4:29:00 PM
Aroclor 1262	ND	0.00611		mg/Kg-dry	1	8/17/2016 4:29:00 PM
Aroclor 1268	ND	0.00611		mg/Kg-dry	1	8/17/2016 4:29:00 PM
Total PCBs	ND	0.00611		mg/Kg-dry	1	8/17/2016 4:29:00 PM
Surr: Decachlorobiphenyl	212	30.8-168	S	%Rec	1	8/17/2016 4:29:00 PM
Surr: Tetrachloro-m-xylene	97.9	30.1-143		%Rec	1	8/17/2016 4:29:00 PM

NOTES:
S - Outlying surrogate recovery(ies) observed. A duplicate analysis was performed and recovered within range.

Organochlorine Pesticides by EPA Method 8081				Batch ID: 14529		Analyst: CM
cis-Nonachlor	ND	0.000171		mg/Kg-dry	1	8/22/2016 12:07:00 PM
Oxychlordane	ND	0.000171		mg/Kg-dry	1	8/22/2016 12:07:00 PM
trans-Nonachlor	ND	0.000171		mg/Kg-dry	1	8/22/2016 12:07:00 PM
Heptachlor	ND	0.000611		mg/Kg-dry	1	8/18/2016 4:58:00 PM
Aldrin	ND	0.000611		mg/Kg-dry	1	8/18/2016 4:58:00 PM
gamma-Chlordane	ND	0.000611		mg/Kg-dry	1	8/18/2016 4:58:00 PM
alpha-Chlordane	ND	0.000611		mg/Kg-dry	1	8/18/2016 4:58:00 PM
Dieldrin	ND	0.000611		mg/Kg-dry	1	8/18/2016 4:58:00 PM
4,4´-DDE	ND	0.00122		mg/Kg-dry	1	8/18/2016 4:58:00 PM
4,4´-DDD	ND	0.00122		mg/Kg-dry	1	8/18/2016 4:58:00 PM
4,4´-DDT	ND	0.00122		mg/Kg-dry	1	8/18/2016 4:58:00 PM
Chlordane, Total	ND	0.000611		mg/Kg-dry	1	8/22/2016 12:07:00 PM
Surr: Decachlorobiphenyl	18.6	17.8-157		%Rec	1	8/18/2016 4:58:00 PM
Surr: Tetrachloro-m-xylene	13.1	11-150		%Rec	1	8/18/2016 4:58:00 PM
Semi-Volatile Organic Compounds by EPA Method 8270				Batch ID: 14521		Analyst: BT
Benzo (J) fluoranthene	ND	0		mg/Kg-dry	1	8/12/2016 8:55:48 PM
Benzoic acid	ND	609		µg/Kg-dry	1	8/12/2016 8:55:48 PM
Phenol	ND	5.78		µg/Kg-dry	1	8/12/2016 8:55:48 PM
N-Nitrosodiphenylamine	ND	0		µg/Kg-dry	1	8/12/2016 8:55:48 PM
1,4-Dichlorobenzene	ND	4.15		µg/Kg-dry	1	8/12/2016 8:55:48 PM

Client: Shannon & Wilson
Collection Date: 8/10/2016 11:30:00 AM
Project: NME
Lab ID: 1608094-001
Matrix: Soil
Client Sample ID: **NME:0-4c**

Semi-Volatile Organic Compounds by EPA Method 8270

Batch ID: 14521 Analyst: BT

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
1,2-Dichlorobenzene	ND	4.61		µg/Kg-dry	1	8/12/2016 8:55:48 PM
Benzyl alcohol	ND	1.97		µg/Kg-dry	1	8/12/2016 8:55:48 PM
2-Methylphenol (o-cresol)	ND	2.54		µg/Kg-dry	1	8/12/2016 8:55:48 PM
4-Methylphenol (p-cresol)	ND	1.51	*	µg/Kg-dry	1	8/12/2016 8:55:48 PM
2,4-Dimethylphenol	ND	3.36		µg/Kg-dry	1	8/12/2016 8:55:48 PM
1,2,4-Trichlorobenzene	ND	2.51		µg/Kg-dry	1	8/12/2016 8:55:48 PM
Naphthalene	ND	33.6		µg/Kg-dry	1	8/12/2016 8:55:48 PM
Hexachlorobutadiene	ND	3.13		µg/Kg-dry	1	8/12/2016 8:55:48 PM
2-Methylnaphthalene	ND	3.08		µg/Kg-dry	1	8/12/2016 8:55:48 PM
Acenaphthene	ND	59.5		µg/Kg-dry	1	8/12/2016 8:55:48 PM
Dimethylphthalate	11.5	2.55		µg/Kg-dry	1	8/12/2016 8:55:48 PM
Acenaphthylene	ND	2.70		µg/Kg-dry	1	8/12/2016 8:55:48 PM
Dibenzofuran	ND	2.45		µg/Kg-dry	1	8/12/2016 8:55:48 PM
Fluorene	ND	2.63		µg/Kg-dry	1	8/12/2016 8:55:48 PM
Diethylphthalate	ND	3.74		µg/Kg-dry	1	8/12/2016 8:55:48 PM
Hexachlorobenzene	ND	2.46		µg/Kg-dry	1	8/12/2016 8:55:48 PM
Pentachlorophenol	ND	21.9	*	µg/Kg-dry	1	8/12/2016 8:55:48 PM
Phenanthrene	ND	3.86		µg/Kg-dry	1	8/12/2016 8:55:48 PM
Anthracene	ND	2.69		µg/Kg-dry	1	8/12/2016 8:55:48 PM
Di-n-butylphthalate	ND	9.97		µg/Kg-dry	1	8/12/2016 8:55:48 PM
Fluoranthene	ND	6.36		µg/Kg-dry	1	8/12/2016 8:55:48 PM
Pyrene	ND	25.9		µg/Kg-dry	1	8/12/2016 8:55:48 PM
Butyl Benzylphthalate	ND	18.1		µg/Kg-dry	1	8/12/2016 8:55:48 PM
Benz (a) anthracene	ND	5.14		µg/Kg-dry	1	8/12/2016 8:55:48 PM
Chrysene	ND	5.09		µg/Kg-dry	1	8/12/2016 8:55:48 PM
bis (2-Ethylhexyl) phthalate	ND	31.4		µg/Kg-dry	1	8/12/2016 8:55:48 PM
Di-n-octyl phthalate	ND	16.3		µg/Kg-dry	1	8/12/2016 8:55:48 PM
Benzo (b) fluoranthene	ND	4.97		µg/Kg-dry	1	8/12/2016 8:55:48 PM
Benzo (k) fluoranthene	ND	3.56		µg/Kg-dry	1	8/12/2016 8:55:48 PM
Benzo (a) pyrene	ND	3.32		µg/Kg-dry	1	8/12/2016 8:55:48 PM
Indeno (1,2,3-cd) pyrene	ND	4.00	I	µg/Kg-dry	1	8/12/2016 8:55:48 PM
Dibenz (a,h) anthracene	ND	2.54	I	µg/Kg-dry	1	8/12/2016 8:55:48 PM
Benzo (g,h,I) perylene	ND	4.31	I	µg/Kg-dry	1	8/12/2016 8:55:48 PM
Surr: 2,4,6-Tribromophenol	72.5	11.1-127		%Rec	1	8/12/2016 8:55:48 PM
Surr: 2-Fluorobiphenyl	11.0	15-123	S	%Rec	1	8/12/2016 8:55:48 PM
Surr: Nitrobenzene-d5	13.1	10-133		%Rec	1	8/12/2016 8:55:48 PM
Surr: Phenol-d6	57.7	11.6-133		%Rec	1	8/12/2016 8:55:48 PM
Surr: p-Terphenyl	107	21.8-150		%Rec	1	8/12/2016 8:55:48 PM

Analytical Report

WO#: **1608094**
Date Reported: **9/20/2016**

Client: Shannon & Wilson
Collection Date: 8/10/2016 11:30:00 AM
Project: NME
Lab ID: 1608094-001
Matrix: Soil
Client Sample ID: **NME:0-4c**

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
Semi-Volatile Organic Compounds by EPA Method 8270				Batch ID: 14521		Analyst: BT

NOTES:
I - Internal standards were outside of established acceptance criteria. Re-analysis yielded the same result indicating a possible matrix effect.
* - Flagged value is not within established control limits.
S - Outlying surrogate recovery(ies) observed.

Mercury by EPA Method 7471				Batch ID: 14515		Analyst: TN
Mercury	ND	0.264		mg/Kg-dry	1	8/11/2016 12:10:06 PM
Total Metals by EPA Method 6020				Batch ID: 14523		Analyst: TN
Antimony	ND	0.191		mg/Kg-dry	1	8/12/2016 2:21:24 PM
Arsenic	4.75	0.0956		mg/Kg-dry	1	8/12/2016 2:21:24 PM
Cadmium	ND	0.191		mg/Kg-dry	1	8/12/2016 2:21:24 PM
Chromium	45.9	0.0956		mg/Kg-dry	1	8/12/2016 2:21:24 PM
Copper	25.2	0.191		mg/Kg-dry	1	8/12/2016 2:21:24 PM
Lead	3.23	0.191		mg/Kg-dry	1	8/12/2016 2:21:24 PM
Selenium	1.65	0.478		mg/Kg-dry	1	8/12/2016 2:21:24 PM
Silver	ND	0.0956		mg/Kg-dry	1	8/12/2016 2:21:24 PM
Zinc	42.0	0.478		mg/Kg-dry	1	8/12/2016 2:21:24 PM
Sample Moisture (Percent Moisture)				Batch ID: R31114		Analyst: ME
Percent Moisture	18.3	0.500		wt%	1	8/11/2016 8:32:49 AM

Client: Shannon & Wilson
Collection Date: 8/10/2016 11:50:00 AM
Project: NME
Lab ID: 1608094-002
Matrix: Soil
Client Sample ID: **NME:4-7c**

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
Polychlorinated Biphenyls (PCB) by EPA 8082				Batch ID: 14525		Analyst: CM
Aroclor 1016	ND	0.00572		mg/Kg-dry	1	8/17/2016 5:13:00 PM
Aroclor 1221	ND	0.00572		mg/Kg-dry	1	8/17/2016 5:13:00 PM
Aroclor 1232	ND	0.00572		mg/Kg-dry	1	8/17/2016 5:13:00 PM
Aroclor 1242	ND	0.00572		mg/Kg-dry	1	8/17/2016 5:13:00 PM
Aroclor 1248	ND	0.00572		mg/Kg-dry	1	8/17/2016 5:13:00 PM
Aroclor 1254	ND	0.00572		mg/Kg-dry	1	8/17/2016 5:13:00 PM
Aroclor 1260	ND	0.00572		mg/Kg-dry	1	8/17/2016 5:13:00 PM
Aroclor 1262	ND	0.00572		mg/Kg-dry	1	8/17/2016 5:13:00 PM
Aroclor 1268	ND	0.00572		mg/Kg-dry	1	8/17/2016 5:13:00 PM
Total PCBs	ND	0.00572		mg/Kg-dry	1	8/17/2016 5:13:00 PM
Surr: Decachlorobiphenyl	204	30.8-168	S	%Rec	1	8/17/2016 5:13:00 PM
Surr: Tetrachloro-m-xylene	139	30.1-143		%Rec	1	8/17/2016 5:13:00 PM

NOTES:
S - Outlying surrogate recovery(ies) observed (high bias). Sample is non-detect; no further action required.

Organochlorine Pesticides by EPA Method 8081				Batch ID: 14529		Analyst: CM
cis-Nonachlor	ND	0.000160		mg/Kg-dry	1	8/22/2016 11:46:00 AM
Oxychlordane	ND	0.000160		mg/Kg-dry	1	8/22/2016 11:46:00 AM
trans-Nonachlor	ND	0.000160		mg/Kg-dry	1	8/22/2016 11:46:00 AM
Heptachlor	ND	0.000571		mg/Kg-dry	1	8/18/2016 4:15:00 PM
Aldrin	ND	0.000571		mg/Kg-dry	1	8/18/2016 4:15:00 PM
gamma-Chlordane	ND	0.000571		mg/Kg-dry	1	8/18/2016 4:15:00 PM
alpha-Chlordane	ND	0.000571		mg/Kg-dry	1	8/18/2016 4:15:00 PM
Dieldrin	ND	0.000571		mg/Kg-dry	1	8/18/2016 4:15:00 PM
4,4´-DDE	ND	0.00114		mg/Kg-dry	1	8/18/2016 4:15:00 PM
4,4´-DDD	ND	0.00114		mg/Kg-dry	1	8/18/2016 4:15:00 PM
4,4´-DDT	ND	0.00114		mg/Kg-dry	1	8/18/2016 4:15:00 PM
Chlordane, Total	ND	0.000571		mg/Kg-dry	1	8/22/2016 11:46:00 AM
Surr: Decachlorobiphenyl	23.5	17.8-157		%Rec	1	8/18/2016 4:15:00 PM
Surr: Tetrachloro-m-xylene	12.9	11-150		%Rec	1	8/18/2016 4:15:00 PM
Semi-Volatile Organic Compounds by EPA Method 8270				Batch ID: 14521		Analyst: BT
Benzo (J) fluoranthene	ND	0		mg/Kg-dry	1	8/12/2016 10:24:14 PM
Benzoic acid	ND	572		µg/Kg-dry	1	8/12/2016 10:24:14 PM
Phenol	ND	5.42		µg/Kg-dry	1	8/12/2016 10:24:14 PM
N-Nitrosodiphenylamine	ND	0		µg/Kg-dry	1	8/12/2016 10:24:14 PM
1,4-Dichlorobenzene	ND	3.89		µg/Kg-dry	1	8/12/2016 10:24:14 PM

Client: Shannon & Wilson
Collection Date: 8/10/2016 11:50:00 AM
Project: NME
Lab ID: 1608094-002
Matrix: Soil
Client Sample ID: **NME:4-7c**

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
Semi-Volatile Organic Compounds by EPA Method 8270				Batch ID: 14521		Analyst: BT
1,2-Dichlorobenzene	ND	4.32		µg/Kg-dry	1	8/12/2016 10:24:14 PM
Benzyl alcohol	ND	1.85		µg/Kg-dry	1	8/12/2016 10:24:14 PM
2-Methylphenol (o-cresol)	ND	2.38		µg/Kg-dry	1	8/12/2016 10:24:14 PM
4-Methylphenol (p-cresol)	ND	1.42	*	µg/Kg-dry	1	8/12/2016 10:24:14 PM
2,4-Dimethylphenol	ND	3.15		µg/Kg-dry	1	8/12/2016 10:24:14 PM
1,2,4-Trichlorobenzene	ND	2.35		µg/Kg-dry	1	8/12/2016 10:24:14 PM
Naphthalene	ND	31.5		µg/Kg-dry	1	8/12/2016 10:24:14 PM
Hexachlorobutadiene	ND	2.93		µg/Kg-dry	1	8/12/2016 10:24:14 PM
2-Methylnaphthalene	ND	2.89		µg/Kg-dry	1	8/12/2016 10:24:14 PM
Acenaphthene	ND	55.8		µg/Kg-dry	1	8/12/2016 10:24:14 PM
Dimethylphthalate	ND	2.39		µg/Kg-dry	1	8/12/2016 10:24:14 PM
Acenaphthylene	ND	2.53		µg/Kg-dry	1	8/12/2016 10:24:14 PM
Dibenzofuran	ND	2.30		µg/Kg-dry	1	8/12/2016 10:24:14 PM
Fluorene	ND	2.47		µg/Kg-dry	1	8/12/2016 10:24:14 PM
Diethylphthalate	ND	3.51		µg/Kg-dry	1	8/12/2016 10:24:14 PM
Hexachlorobenzene	ND	2.31		µg/Kg-dry	1	8/12/2016 10:24:14 PM
Pentachlorophenol	ND	20.5	*	µg/Kg-dry	1	8/12/2016 10:24:14 PM
Phenanthrene	ND	3.63		µg/Kg-dry	1	8/12/2016 10:24:14 PM
Anthracene	ND	2.53		µg/Kg-dry	1	8/12/2016 10:24:14 PM
Di-n-butylphthalate	ND	9.35		µg/Kg-dry	1	8/12/2016 10:24:14 PM
Fluoranthene	ND	5.97		µg/Kg-dry	1	8/12/2016 10:24:14 PM
Pyrene	ND	24.3		µg/Kg-dry	1	8/12/2016 10:24:14 PM
Butyl Benzylphthalate	ND	17.0		µg/Kg-dry	1	8/12/2016 10:24:14 PM
Benz (a) anthracene	ND	4.83		µg/Kg-dry	1	8/12/2016 10:24:14 PM
Chrysene	ND	4.78		µg/Kg-dry	1	8/12/2016 10:24:14 PM
bis (2-Ethylhexyl) phthalate	ND	29.5		µg/Kg-dry	1	8/12/2016 10:24:14 PM
Di-n-octyl phthalate	ND	15.3		µg/Kg-dry	1	8/12/2016 10:24:14 PM
Benzo (b) fluoranthene	ND	4.67		µg/Kg-dry	1	8/12/2016 10:24:14 PM
Benzo (k) fluoranthene	ND	3.34		µg/Kg-dry	1	8/12/2016 10:24:14 PM
Benzo (a) pyrene	ND	3.12		µg/Kg-dry	1	8/12/2016 10:24:14 PM
Indeno (1,2,3-cd) pyrene	ND	3.76	I	µg/Kg-dry	1	8/12/2016 10:24:14 PM
Dibenz (a,h) anthracene	ND	2.38	I	µg/Kg-dry	1	8/12/2016 10:24:14 PM
Benzo (g,h,I) perylene	ND	4.04	I	µg/Kg-dry	1	8/12/2016 10:24:14 PM
Surr: 2,4,6-Tribromophenol	61.5	11.1-127		%Rec	1	8/12/2016 10:24:14 PM
Surr: 2-Fluorobiphenyl	9.33	15-123	S	%Rec	1	8/12/2016 10:24:14 PM
Surr: Nitrobenzene-d5	9.98	10-133	S	%Rec	1	8/12/2016 10:24:14 PM
Surr: Phenol-d6	39.0	11.6-133		%Rec	1	8/12/2016 10:24:14 PM
Surr: p-Terphenyl	96.7	21.8-150		%Rec	1	8/12/2016 10:24:14 PM

Client: Shannon & Wilson
Collection Date: 8/10/2016 11:50:00 AM
Project: NME
Lab ID: 1608094-002
Matrix: Soil
Client Sample ID: **NME:4-7c**

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
Semi-Volatile Organic Compounds by EPA Method 8270				Batch ID: 14521		Analyst: BT

NOTES:
I - Internal standards were outside of established acceptance criteria. Re-analysis yielded the same result indicating a possible matrix effect.
* - Flagged value is not within established control limits.
S - Outlying surrogate recovery(ies) observed.

Mercury by EPA Method 7471				Batch ID: 14515		Analyst: TN
Mercury	ND	0.270		mg/Kg-dry	1	8/11/2016 12:11:48 PM
Total Metals by EPA Method 6020				Batch ID: 14523		Analyst: TN
Antimony	ND	0.176		mg/Kg-dry	1	8/12/2016 2:42:37 PM
Arsenic	3.71	0.0882		mg/Kg-dry	1	8/12/2016 2:42:37 PM
Cadmium	ND	0.176		mg/Kg-dry	1	8/12/2016 2:42:37 PM
Chromium	39.4	0.0882		mg/Kg-dry	1	8/12/2016 2:42:37 PM
Copper	15.0	0.176		mg/Kg-dry	1	8/12/2016 2:42:37 PM
Lead	2.40	0.176		mg/Kg-dry	1	8/12/2016 2:42:37 PM
Selenium	1.06	0.441		mg/Kg-dry	1	8/12/2016 2:42:37 PM
Silver	ND	0.0882		mg/Kg-dry	1	8/12/2016 2:42:37 PM
Zinc	32.2	0.441		mg/Kg-dry	1	8/12/2016 2:42:37 PM
Sample Moisture (Percent Moisture)				Batch ID: R31114		Analyst: ME
Percent Moisture	12.7	0.500		wt%	1	8/11/2016 8:32:49 AM

Work Order: 1608094
CLIENT: Shannon & Wilson
Project: NME

QC SUMMARY REPORT

Total Metals by EPA Method 6020

Sample ID	**MB-14523**	SampType: **MBLK**		Units: **mg/Kg**	Prep Date: **8/12/2016**	RunNo: **31150**
Client ID:	**MBLKS**	Batch ID: **14523**			Analysis Date: **8/12/2016**	SeqNo: **587850**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Antimony	ND	0.156									
Arsenic	ND	0.0781									
Cadmium	ND	0.156									
Chromium	ND	0.0781									
Copper	ND	0.156									
Lead	ND	0.156									
Selenium	ND	0.391									
Silver	ND	0.0781									
Zinc	ND	0.391									

Sample ID	**LCS-14523**	SampType: **LCS**		Units: **mg/Kg**	Prep Date: **8/12/2016**	RunNo: **31150**
Client ID:	**LCSS**	Batch ID: **14523**			Analysis Date: **8/12/2016**	SeqNo: **587851**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Antimony	1.87	0.157	1.969	0	94.9	80	120				
Arsenic	38.9	0.0787	39.37	0	98.9	80	120				
Cadmium	1.91	0.157	1.969	0	97.1	80	120				
Chromium	42.5	0.0787	39.37	0	108	80	120				
Copper	42.1	0.157	39.37	0	107	80	120				
Lead	18.7	0.157	19.69	0	94.8	80	120				
Selenium	3.46	0.394	3.937	0	88.0	80	120				
Silver	1.86	0.0787	1.969	0	94.7	80	120				
Zinc	40.5	0.394	39.37	0	103	80	120				

Sample ID	**1608094-001ADUP**	SampType: **DUP**		Units: **mg/Kg-dry**	Prep Date: **8/12/2016**	RunNo: **31150**
Client ID:	**NME:0-4c**	Batch ID: **14523**			Analysis Date: **8/12/2016**	SeqNo: **587853**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Antimony	ND	0.191						0		20	
Arsenic	4.67	0.0956						4.747	1.70	20	

Work Order: 1608094
CLIENT: Shannon & Wilson
Project: NME

QC SUMMARY REPORT

Total Metals by EPA Method 6020

Sample ID **1608094-001ADUP** SampType: **DUP** Units: **mg/Kg-dry** Prep Date: **8/12/2016** RunNo: **31150**
Client ID: **NME:0-4c** Batch ID: **14523** Analysis Date: **8/12/2016** SeqNo: **587853**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Cadmium	ND	0.191						0		20	
Chromium	52.0	0.0956						45.95	12.3	20	
Copper	28.5	0.191						25.22	12.1	20	
Lead	3.47	0.191						3.227	7.17	20	
Selenium	1.69	0.478						1.645	2.90	20	
Silver	ND	0.0956						0		20	
Zinc	45.3	0.478						42.04	7.37	20	

Sample ID **1608094-001AMS** SampType: **MS** Units: **mg/Kg-dry** Prep Date: **8/12/2016** RunNo: **31150**
Client ID: **NME:0-4c** Batch ID: **14523** Analysis Date: **8/12/2016** SeqNo: **587855**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Antimony	0.441	0.193	2.410	0.05691	15.9	75	125				S
Arsenic	52.7	0.0964	48.20	4.747	99.5	75	125				
Cadmium	2.22	0.193	2.410	0.04323	90.3	75	125				
Chromium	107	0.0964	48.20	45.95	127	75	125				S
Copper	72.2	0.193	48.20	25.22	97.5	75	125				
Lead	26.5	0.193	24.10	3.227	96.4	75	125				
Selenium	6.02	0.482	4.820	1.645	90.8	75	125				
Silver	2.06	0.0964	2.410	0.03816	84.0	75	125				
Zinc	92.0	0.482	48.20	42.04	104	75	125				

NOTES:
S - Outlying spike recovery(ies) observed (Sb, Cr). A duplicate analysis was performed with similar results indicating a possible matrix effect.

Sample ID **1608094-001AMSD** SampType: **MSD** Units: **mg/Kg-dry** Prep Date: **8/12/2016** RunNo: **31150**
Client ID: **NME:0-4c** Batch ID: **14523** Analysis Date: **8/12/2016** SeqNo: **587856**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Antimony	0.452	0.190	2.373	0.05691	16.7	75	125	0.4412	2.41	20	S
Arsenic	56.9	0.0949	47.45	4.747	110	75	125	52.69	7.69	20	
Cadmium	2.47	0.190	2.373	0.04323	102	75	125	2.219	10.7	20	

Work Order: 1608094
CLIENT: Shannon & Wilson
Project: NME

QC SUMMARY REPORT

Total Metals by EPA Method 6020

Sample ID **1608094-001AMSD** SampType: **MSD** Units: **mg/Kg-dry** Prep Date: **8/12/2016** RunNo: **31150**
Client ID: **NME:0-4c** Batch ID: **14523** Analysis Date: **8/12/2016** SeqNo: **587856**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Chromium	119	0.0949	47.45	45.95	153	75	125	107.2	10.1	20	S
Copper	82.7	0.190	47.45	25.22	121	75	125	72.23	13.5	20	
Lead	30.2	0.190	23.73	3.227	114	75	125	26.47	13.3	20	
Selenium	6.53	0.475	4.745	1.645	103	75	125	6.021	8.12	20	
Silver	2.33	0.0949	2.373	0.03816	96.5	75	125	2.062	12.1	20	
Zinc	107	0.475	47.45	42.04	136	75	125	91.96	14.9	20	S

NOTES:
S - Outlying spike recovery(ies) observed (Sb, Cr). A duplicate analysis was performed with similar results indicating a possible matrix effect.
S - Outlying spike recovery(ies) observed (Zn). A duplicate analysis was performed and recovered within range.

Sample ID **1608094-001APDS** SampType: **PDS** Units: **mg/Kg-dry** Prep Date: **8/12/2016** RunNo: **31150**
Client ID: **NME:0-4c** Batch ID: **14523** Analysis Date: **8/12/2016** SeqNo: **587857**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Antimony	4.23	0.191	2.50	0.119	82.2	80	120				
Chromium	202	0.0956	50.0	96.1	106	80	120				

Work Order: 1608094
CLIENT: Shannon & Wilson
Project: NME

QC SUMMARY REPORT

Mercury by EPA Method 7471

Sample ID	MB-14515	SampType:	MBLK			Units:	mg/Kg	Prep Date:	8/11/2016		RunNo:	31127	
Client ID:	MBLKS	Batch ID:	14515					Analysis Date:	8/11/2016		SeqNo:	587435	
Analyte		Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual	
Mercury		ND	0.219										

Sample ID	LCS-14515	SampType:	LCS			Units:	mg/Kg	Prep Date:	8/11/2016		RunNo:	31127	
Client ID:	LCSS	Batch ID:	14515					Analysis Date:	8/11/2016		SeqNo:	587436	
Analyte		Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual	
Mercury		0.502	0.236	0.4717	0	106	80	120					

Sample ID	1608085-001ADUP	SampType:	DUP			Units:	mg/Kg-dry	Prep Date:	8/11/2016		RunNo:	31127	
Client ID:	BATCH	Batch ID:	14515					Analysis Date:	8/11/2016		SeqNo:	587438	
Analyte		Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual	
Mercury		ND	0.260						0		20		

Sample ID	1608085-001AMS	SampType:	MS			Units:	mg/Kg-dry	Prep Date:	8/11/2016		RunNo:	31127	
Client ID:	BATCH	Batch ID:	14515					Analysis Date:	8/11/2016		SeqNo:	587439	
Analyte		Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual	
Mercury		0.603	0.280	0.5594	0.02802	103	70	130					

Sample ID	1608085-001AMSD	SampType:	MSD			Units:	mg/Kg-dry	Prep Date:	8/11/2016		RunNo:	31127	
Client ID:	BATCH	Batch ID:	14515					Analysis Date:	8/11/2016		SeqNo:	587440	
Analyte		Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual	
Mercury		0.602	0.285	0.5700	0.02802	101	70	130	0.6031	0.193	20		

Work Order: 1608094
CLIENT: Shannon & Wilson
Project: NME

QC SUMMARY REPORT

Polychlorinated Biphenyls (PCB) by EPA 8082

Sample ID **MB-14525** SampType: **MBLK** Units: **mg/Kg** Prep Date: **8/12/2016** RunNo: **31242**
Client ID: **MBLKS** Batch ID: **14525** Analysis Date: **8/17/2016** SeqNo: **589394**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Aroclor 1016	ND	0.0100									
Aroclor 1221	ND	0.0100									
Aroclor 1232	ND	0.0100									
Aroclor 1242	ND	0.0100									
Aroclor 1248	ND	0.0100									
Aroclor 1254	ND	0.0100									
Aroclor 1260	ND	0.0100									
Aroclor 1262	ND	0.0100									
Aroclor 1268	ND	0.0100									
Total PCBs	ND	0.0100									
Surr: Decachlorobiphenyl	12.4		5.000		247	30.8	168				S
Surr: Tetrachloro-m-xylene	10.6		5.000		212	30.1	143				S

NOTES:
S - Outlying surrogate recovery(ies) observed (high bias). Sample is non-detect; no further action required.

Sample ID **LCS1-14525** SampType: **LCS** Units: **mg/Kg** Prep Date: **8/12/2016** RunNo: **31242**
Client ID: **LCSS** Batch ID: **14525** Analysis Date: **8/17/2016** SeqNo: **589392**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Aroclor 1016	0.0601	0.0100	0.1000	0	60.1	21.7	138				
Aroclor 1260	0.0609	0.0100	0.1000	0	60.9	20.8	137				
Surr: Decachlorobiphenyl	13.9		5.000		277	30.8	168				S
Surr: Tetrachloro-m-xylene	11.6		5.000		233	30.1	143				S

NOTES:
S - Outlying surrogate recovery(ies) observed.

Sample ID **LCS2-14525** SampType: **LCS** Units: **mg/Kg** Prep Date: **8/12/2016** RunNo: **31242**
Client ID: **LCSS** Batch ID: **14525** Analysis Date: **8/17/2016** SeqNo: **589393**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Aroclor 1254	0.0531	0.0100	0.1000	0	53.1	32.8	151				
Surr: Decachlorobiphenyl	10.1		5.000		201	30.8	168				S

Work Order: 1608094
CLIENT: Shannon & Wilson
Project: NME

QC SUMMARY REPORT

Polychlorinated Biphenyls (PCB) by EPA 8082

Sample ID **LCS2-14525** SampType: **LCS** Units: **mg/Kg** Prep Date: **8/12/2016** RunNo: **31242**
Client ID: **LCSS** Batch ID: **14525** Analysis Date: **8/17/2016** SeqNo: **589393**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Surr: Tetrachloro-m-xylene	8.92		5.000		178	30.1	143				S

NOTES:
S - Outlying surrogate recovery(ies) observed.

Sample ID **1608094-001ADUP** SampType: **DUP** Units: **mg/Kg-dry** Prep Date: **8/12/2016** RunNo: **31242**
Client ID: **NME:0-4c** Batch ID: **14525** Analysis Date: **8/17/2016** SeqNo: **589405**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Aroclor 1016	ND	0.00610						0		30	
Aroclor 1221	ND	0.00610						0		30	
Aroclor 1232	ND	0.00610						0		30	
Aroclor 1242	ND	0.00610						0		30	
Aroclor 1248	ND	0.00610						0		30	
Aroclor 1254	ND	0.00610						0		30	
Aroclor 1260	ND	0.00610						0		30	
Aroclor 1262	ND	0.00610						0		30	
Aroclor 1268	ND	0.00610						0		30	
Total PCBs	ND	0.00610						0		30	
Surr: Decachlorobiphenyl	4.77		3.048		156	30.8	168		0		
Surr: Tetrachloro-m-xylene	3.54		3.048		116	30.1	143		0		

Sample ID **1608094-001AMS** SampType: **MS** Units: **mg/Kg-dry** Prep Date: **8/12/2016** RunNo: **31242**
Client ID: **NME:0-4c** Batch ID: **14525** Analysis Date: **8/17/2016** SeqNo: **589406**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Aroclor 1016	0.0280	0.00611	0.06106	0	45.8	61.7	139				S
Aroclor 1260	0.0320	0.00611	0.06106	0	52.3	63.1	138				S
Surr: Decachlorobiphenyl	7.33		3.053		240	30.8	168				S
Surr: Tetrachloro-m-xylene	4.07		3.053		133	30.1	143				

Work Order: 1608094
CLIENT: Shannon & Wilson
Project: NME

QC SUMMARY REPORT

Polychlorinated Biphenyls (PCB) by EPA 8082

Sample ID **1608094-001AMS** SampType: **MS** Units: **mg/Kg-dry** Prep Date: **8/12/2016** RunNo: **31242**
Client ID: **NME:0-4c** Batch ID: **14525** Analysis Date: **8/17/2016** SeqNo: **589406**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual

NOTES:
S - Outlying QC recoveries were associated with this sample. The method is in control as indicated by the LCS.
S - Outlying surrogate recovery(ies) observed.

Sample ID **1608094-001AMSD** SampType: **MSD** Units: **mg/Kg-dry** Prep Date: **8/12/2016** RunNo: **31242**
Client ID: **NME:0-4c** Batch ID: **14525** Analysis Date: **8/17/2016** SeqNo: **589407**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Aroclor 1016	0.0215	0.00612	0.06119	0	35.1	61.7	139	0.02795	26.3	30	S
Aroclor 1260	0.0228	0.00612	0.06119	0	37.2	63.1	138	0.03196	33.6	30	RS
Surr: Decachlorobiphenyl	5.02		3.059		164	30.8	168		0		
Surr: Tetrachloro-m-xylene	2.97		3.059		96.9	30.1	143		0		

NOTES:
S - Outlying QC recoveries were associated with this sample. The method is in control as indicated by the LCS.
R - High RPD observed. The method is in control as indicated by the LCS.
S - Outlying surrogate recovery(ies) observed.

Work Order: 1608094
CLIENT: Shannon & Wilson
Project: NME

QC SUMMARY REPORT

Organochlorine Pesticides by EPA Method 8081

Sample ID **MB-14529** SampType: **MBLK** Units: **mg/Kg** Prep Date: **8/12/2016** RunNo: **31263**
Client ID: **MBLKS** Batch ID: **14529** Analysis Date: **8/18/2016** SeqNo: **589791**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Heptachlor	ND	0.00100									
Aldrin	ND	0.00100									
gamma-Chlordane	ND	0.00100									
alpha-Chlordane	ND	0.00100									
Dieldrin	ND	0.00100									
4,4´-DDE	ND	0.00200									
4,4´-DDD	ND	0.00200									
4,4´-DDT	ND	0.00200									
Surr: Decachlorobiphenyl	0.0123		0.005000		246	17.8	157				S
Surr: Tetrachloro-m-xylene	0.00890		0.005000		178	11	150				S

NOTES:
S - Outlying surrogate recovery(ies) observed (high bias). Sample is non-detect; no further action required.

Sample ID **LCS-14529** SampType: **LCS** Units: **µg/Kg** Prep Date: **8/12/2016** RunNo: **31263**
Client ID: **LCSS** Batch ID: **14529** Analysis Date: **8/18/2016** SeqNo: **589790**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Heptachlor	0.0153	0.00100	0.02000	0	76.4	54	141				
Aldrin	0.0138	0.00100	0.02000	0	68.9	43.7	147				
gamma-Chlordane	0.0150	0.00100	0.02000	0	75.2	58.5	136				
alpha-Chlordane	0.0149	0.00100	0.02000	0	74.7	46.1	140				
Dieldrin	0.0145	0.00100	0.02000	0	72.7	61.2	133				
4,4´-DDE	0.0224	0.00200	0.02000	0	112	55.4	142				
4,4´-DDD	0.0141	0.00200	0.02000	0	70.6	53.3	145				
4,4´-DDT	0.0177	0.00200	0.02000	0	88.2	48.2	152				
Surr: Decachlorobiphenyl	0.0147		0.005000		294	17.8	157				S
Surr: Tetrachloro-m-xylene	0.0102		0.005000		205	11	150				S

NOTES:
S - Outlying surrogate recovery(ies) observed.

Work Order: 1608094
CLIENT: Shannon & Wilson
Project: NME

QC SUMMARY REPORT

Organochlorine Pesticides by EPA Method 8081

Sample ID **1608094-002ADUP** SampType: **DUP** Units: **mg/Kg-dry** Prep Date: **8/12/2016** RunNo: **31263**
Client ID: **NME:4-7c** Batch ID: **14529** Analysis Date: **8/18/2016** SeqNo: **589786**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Heptachlor	ND	0.000572						0		30	
Aldrin	ND	0.000572						0		30	
gamma-Chlordane	ND	0.000572						0		30	
alpha-Chlordane	ND	0.000572						0		30	
Dieldrin	ND	0.000572						0		30	
4,4´-DDE	ND	0.00114						0		30	
4,4´-DDD	ND	0.00114						0		30	
4,4´-DDT	ND	0.00114						0		30	
Surr: Decachlorobiphenyl	0.00617		0.002862		216	17.8	157		0		S
Surr: Tetrachloro-m-xylene	0.00352		0.002862		123	11	150		0		

NOTES:
S - Outlying surrogate recovery(ies) observed (high bias). Sample is non-detect; no further action required.

Sample ID **1608094-002AMS** SampType: **MS** Units: **µg/Kg-dry** Prep Date: **8/12/2016** RunNo: **31263**
Client ID: **NME:4-7c** Batch ID: **14529** Analysis Date: **8/18/2016** SeqNo: **589787**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Heptachlor	0.00629	0.000572	0.01143	0	55.0	53.6	167				
Aldrin	0.00535	0.000572	0.01143	0	46.8	46.4	145				
gamma-Chlordane	0.00654	0.000572	0.01143	0	57.2	49	162				
alpha-Chlordane	0.00627	0.000572	0.01143	0	54.8	46.3	153				
Dieldrin	0.00597	0.000572	0.01143	0	52.2	48	162				
4,4´-DDE	0.00630	0.00114	0.01143	0	55.1	39.9	162				
4,4´-DDD	0.00602	0.00114	0.01143	0	52.7	45.8	160				
4,4´-DDT	0.00793	0.00114	0.01143	0	69.4	45.7	168				
Surr: Decachlorobiphenyl	0.00565		0.002858		198	17.8	157				S
Surr: Tetrachloro-m-xylene	0.00343		0.002858		120	11	150				

NOTES:
S - Outlying surrogate recovery(ies) observed.

Work Order: 1608094
CLIENT: Shannon & Wilson
Project: NME

QC SUMMARY REPORT

Organochlorine Pesticides by EPA Method 8081

Sample ID **1608094-002AMSD** SampType: **MSD** Units: **µg/Kg-dry** Prep Date: **8/12/2016** RunNo: **31263**
Client ID: **NME:4-7c** Batch ID: **14529** Analysis Date: **8/18/2016** SeqNo: **589788**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Heptachlor	0.00685	0.000573	0.01146	0	59.8	53.6	167	0.006289	8.56	30	
Aldrin	0.00569	0.000573	0.01146	0	49.7	46.4	145	0.005347	6.28	30	
gamma-Chlordane	0.00674	0.000573	0.01146	0	58.8	49	162	0.006536	3.07	30	
alpha-Chlordane	0.00648	0.000573	0.01146	0	56.6	46.3	153	0.006267	3.40	30	
Dieldrin	0.00620	0.000573	0.01146	0	54.1	48	162	0.005969	3.73	30	
4,4´-DDE	0.00662	0.00115	0.01146	0	57.8	39.9	162	0.006296	5.07	30	
4,4´-DDD	0.00641	0.00115	0.01146	0	56.0	45.8	160	0.006021	6.27	30	
4,4´-DDT	0.00829	0.00115	0.01146	0	72.4	45.7	168	0.007929	4.49	30	
Surr: Decachlorobiphenyl	0.00603		0.002864		210	17.8	157		0		S
Surr: Tetrachloro-m-xylene	0.00398		0.002864		139	11	150		0		

NOTES:
S - Outlying surrogate recovery(ies) observed.

Sample ID **MB-14529** SampType: **MBLK** Units: **mg/Kg** Prep Date: **8/12/2016** RunNo: **31305**
Client ID: **MBLKS** Batch ID: **14529** Analysis Date: **8/22/2016** SeqNo: **590702**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
cis-Nonachlor	ND	0.000280									
Oxychlordane	ND	0.000280									
trans-Nonachlor	ND	0.000280									
Chlordane, Total	ND	0.00100									

Sample ID **1608094-002ADUP** SampType: **DUP** Units: **mg/Kg-dry** Prep Date: **8/12/2016** RunNo: **31305**
Client ID: **NME:4-7c** Batch ID: **14529** Analysis Date: **8/22/2016** SeqNo: **590698**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
cis-Nonachlor	ND	0.000160						0		0	
Oxychlordane	ND	0.000160						0		0	
trans-Nonachlor	ND	0.000160						0		0	
Chlordane, Total	ND	0.000572						0		0	

Work Order: 1608094
CLIENT: Shannon & Wilson
Project: NME

QC SUMMARY REPORT

Semi-Volatile Organic Compounds by EPA Method 8270

Sample ID **MB-14521** SampType: **MBLK** Units: **µg/Kg** Prep Date: **8/11/2016** RunNo: **31205**
Client ID: **MBLKS** Batch ID: **14521** Analysis Date: **8/12/2016** SeqNo: **588732**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Phenol	ND	4.74									
1,4-Dichlorobenzene	ND	3.41									
1,2-Dichlorobenzene	ND	3.78									
Benzyl alcohol	ND	1.62									
2-Methylphenol (o-cresol)	ND	2.08									
4-Methylphenol (p-cresol)	ND	1.24									*
2,4-Dimethylphenol	ND	2.76									
1,2,4-Trichlorobenzene	ND	2.06									
Naphthalene	ND	27.6									
Hexachlorobutadiene	ND	2.57									
2-Methylnaphthalene	ND	2.53									
Acenaphthene	ND	48.9									
Dimethylphthalate	2.38	2.09									
Acenaphthylene	ND	2.22									
Dibenzofuran	ND	2.01									
Fluorene	ND	2.16									
Diethylphthalate	ND	3.07									
Hexachlorobenzene	ND	2.02									
Pentachlorophenol	ND	18.0									*
Phenanthrene	ND	3.17									
Anthracene	ND	2.21									
Di-n-butylphthalate	ND	8.18									
Fluoranthene	ND	5.22									
Pyrene	ND	21.3									
Butyl Benzylphthalate	ND	14.9									
Benz (a) anthracene	ND	4.22									
Chrysene	ND	4.18									
bis (2-Ethylhexyl) phthalate	ND	25.8									
Di-n-octyl phthalate	ND	13.4									
Benzo (b) fluoranthene	ND	4.08									
Benzo (k) fluoranthene	ND	2.92									

Work Order: 1608094
CLIENT: Shannon & Wilson
Project: NME

QC SUMMARY REPORT

Semi-Volatile Organic Compounds by EPA Method 8270

Sample ID **MB-14521** SampType: **MBLK** Units: **µg/Kg** Prep Date: **8/11/2016** RunNo: **31205**
Client ID: **MBLKS** Batch ID: **14521** Analysis Date: **8/12/2016** SeqNo: **588732**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Benzo (a) pyrene	ND	2.73									
Indeno (1,2,3-cd) pyrene	ND	3.29									
Dibenz (a,h) anthracene	ND	2.08									
Benzo (g,h,I) perylene	ND	3.54									
Surr: 2,4,6-Tribromophenol	0		50.00		0	11.1	127				S
Surr: 2-Fluorobiphenyl	7.68		25.00		30.7	15	123				
Surr: Nitrobenzene-d5	4.91		25.00		19.7	10	133				
Surr: Phenol-d6	33.4		50.00		66.7	11.6	133				
Surr: p-Terphenyl	25.7		25.00		103	21.8	150				

NOTES:
* - Flagged value is not within established control limits.
S - Outlying surrogate recovery(ies) observed.

Sample ID **LCS-14521** SampType: **LCS** Units: **µg/Kg** Prep Date: **8/11/2016** RunNo: **31205**
Client ID: **LCSS** Batch ID: **14521** Analysis Date: **8/12/2016** SeqNo: **588733**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Phenol	30.0	4.74	50.00	0	60.1	41.8	138				
1,4-Dichlorobenzene	24.5	3.41	50.00	0	49.1	44.7	135				
1,2-Dichlorobenzene	24.6	3.78	50.00	0	49.2	45	138				
Benzyl alcohol	31.4	1.62	50.00	0	62.8	42.4	131				
2-Methylphenol (o-cresol)	30.3	2.08	50.00	0	60.6	47.2	134				
4-Methylphenol (p-cresol)	14.5	1.24	50.00	0	29.1	57.4	131				S
2,4-Dimethylphenol	31.5	2.76	50.00	0	63.1	57.8	121				
1,2,4-Trichlorobenzene	30.6	2.06	50.00	0	61.2	36.2	140				
Naphthalene	27.7	27.6	50.00	0	55.3	52.9	131				
Hexachlorobutadiene	29.7	2.57	50.00	0	59.4	55.9	131				
2-Methylnaphthalene	31.1	2.53	50.00	0	62.2	56.3	132				
Acenaphthene	31.6	48.9	50.00	0	63.2	49.2	127				
Dimethylphthalate	34.7	2.09	50.00	0	69.4	62.4	130				B
Acenaphthylene	31.7	2.22	50.00	0	63.4	53.7	137				

Work Order: 1608094
CLIENT: Shannon & Wilson
Project: NME

QC SUMMARY REPORT

Semi-Volatile Organic Compounds by EPA Method 8270

Sample ID **LCS-14521** SampType: **LCS** Units: **µg/Kg** Prep Date: **8/11/2016** RunNo: **31205**
Client ID: **LCSS** Batch ID: **14521** Analysis Date: **8/12/2016** SeqNo: **588733**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Dibenzofuran	33.4	2.01	50.00	0	66.9	56	133				
Fluorene	32.7	2.16	50.00	0	65.3	64.8	126				
Diethylphthalate	34.0	3.07	50.00	0	67.9	42.9	132				
Hexachlorobenzene	33.2	2.02	50.00	0	66.4	56.7	131				
Pentachlorophenol	ND	18.0	50.00	0	0	10	123				S
Phenanthrene	35.7	3.17	50.00	0	71.3	61.2	130				
Anthracene	35.0	2.21	50.00	0	70.1	59.2	135				
Di-n-butylphthalate	40.5	8.18	50.00	0	80.9	50.6	130				
Fluoranthene	35.3	5.22	50.00	0	70.5	66	129				
Pyrene	36.9	21.3	50.00	0	73.8	45.4	140				
Butyl Benzylphthalate	37.6	14.9	50.00	0	75.2	31.1	157				
Benz (a) anthracene	35.0	4.22	50.00	0	70.0	44	150				
Chrysene	35.9	4.18	50.00	0	71.9	65.8	128				
bis (2-Ethylhexyl) phthalate	41.3	25.8	50.00	0	82.6	36.3	149				
Di-n-octyl phthalate	46.2	13.4	50.00	0	92.3	31.5	152				
Benzo (b) fluoranthene	36.5	4.08	50.00	0	73.0	45.6	146				
Benzo (k) fluoranthene	37.0	2.92	50.00	0	74.0	45.5	138				
Benzo (a) pyrene	39.6	2.73	50.00	0	79.1	49.2	137				
Indeno (1,2,3-cd) pyrene	47.5	3.29	50.00	0	95.0	44.2	146				
Dibenz (a,h) anthracene	55.1	2.08	50.00	0	110	37.5	152				
Benzo (g,h,I) perylene	43.7	3.54	50.00	0	87.5	24.1	156				
Surr: 2,4,6-Tribromophenol	0		50.00		0	11.1	127				S
Surr: 2-Fluorobiphenyl	6.92		25.00		27.7	15	123				
Surr: Nitrobenzene-d5	4.18		25.00		16.7	10	133				
Surr: Phenol-d6	28.5		50.00		57.0	11.6	133				
Surr: p-Terphenyl	25.4		25.00		102	21.8	150				

NOTES:
S - Outlying surrogate recovery(ies) observed.

Work Order: 1608094
CLIENT: Shannon & Wilson
Project: NME

QC SUMMARY REPORT

Semi-Volatile Organic Compounds by EPA Method 8270

Sample ID **1608094-001ADUP** SampType: **DUP** Units: **µg/Kg-dry** Prep Date: **8/11/2016** RunNo: **31205**
Client ID: **NME:0-4c** Batch ID: **14521** Analysis Date: **8/12/2016** SeqNo: **588735**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Phenol	ND	5.80						0		50	
1,4-Dichlorobenzene	ND	4.17						0		50	
1,2-Dichlorobenzene	ND	4.63						0		50	
Benzyl alcohol	ND	1.98						0		50	
2-Methylphenol (o-cresol)	ND	2.55						0		50	
4-Methylphenol (p-cresol)	ND	1.52						0		50	*
2,4-Dimethylphenol	ND	3.37						0		50	
1,2,4-Trichlorobenzene	ND	2.52						0		50	
Naphthalene	ND	33.7						0		50	
Hexachlorobutadiene	ND	3.14						0		50	
2-Methylnaphthalene	ND	3.09						0		50	
Acenaphthene	ND	59.7						0		50	
Dimethylphthalate	11.6	2.56						11.53	0.899	50	
Acenaphthylene	ND	2.71						0		50	
Dibenzofuran	ND	2.46						0		50	
Fluorene	ND	2.64						0		50	
Diethylphthalate	ND	3.76						0		50	
Hexachlorobenzene	ND	2.47						0		50	
Pentachlorophenol	ND	22.0						0		50	*
Phenanthrene	ND	3.88						0		50	
Anthracene	ND	2.70						0		50	
Di-n-butylphthalate	ND	10.0						0		50	
Fluoranthene	ND	6.39						0		50	
Pyrene	ND	26.0						0		50	
Butyl Benzylphthalate	ND	18.2						0		50	
Benz (a) anthracene	ND	5.16						0		50	
Chrysene	ND	5.11						0		50	
bis (2-Ethylhexyl) phthalate	ND	31.6						0		50	
Di-n-octyl phthalate	ND	16.3						0		50	
Benzo (b) fluoranthene	ND	4.99						0		50	
Benzo (k) fluoranthene	ND	3.57						0		50	

Work Order: 1608094
CLIENT: Shannon & Wilson
Project: NME

QC SUMMARY REPORT

Semi-Volatile Organic Compounds by EPA Method 8270

Sample ID **1608094-001ADUP** SampType: **DUP** Units: **µg/Kg-dry** Prep Date: **8/11/2016** RunNo: **31205**
Client ID: **NME:0-4c** Batch ID: **14521** Analysis Date: **8/12/2016** SeqNo: **588735**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Benzo (a) pyrene	ND	3.33						0		50	
Indeno (1,2,3-cd) pyrene	ND	4.02						0		50	I
Dibenz (a,h) anthracene	ND	2.55						0		50	I
Benzo (g,h,I) perylene	ND	4.33						0		50	I
Surr: 2,4,6-Tribromophenol	38.5		61.15		63.0	11.1	127		0		
Surr: 2-Fluorobiphenyl	3.79		30.58		12.4	15	123		0		S
Surr: Nitrobenzene-d5	4.61		30.58		15.1	10	133		0		
Surr: Phenol-d6	37.3		61.15		61.1	11.6	133		0		
Surr: p-Terphenyl	32.5		30.58		106	21.8	150		0		

NOTES:
I - Internal standards were outside of established acceptance criteria. Re-analysis yielded the same result indicating a possible matrix effect.
* - Flagged value is not within established control limits.
S - Outlying surrogate recovery(ies) observed.

Sample ID **1608094-001AMS** SampType: **MS** Units: **µg/Kg-dry** Prep Date: **8/11/2016** RunNo: **31205**
Client ID: **NME:0-4c** Batch ID: **14521** Analysis Date: **8/12/2016** SeqNo: **588736**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Phenol	45.0	5.78	60.91	5.396	65.0	29.2	146				
1,4-Dichlorobenzene	15.9	4.15	60.91	0	26.2	20.9	131				
1,2-Dichlorobenzene	16.7	4.61	60.91	0	27.4	35	131				S
Benzyl alcohol	40.1	1.97	60.91	0	65.8	30.8	159				
2-Methylphenol (o-cresol)	39.9	2.54	60.91	0	65.5	57.7	125				
4-Methylphenol (p-cresol)	18.8	1.51	60.91	0	30.8	65.5	127				S
2,4-Dimethylphenol	38.5	3.36	60.91	0	63.2	46	158				
1,2,4-Trichlorobenzene	23.9	2.51	60.91	0	39.3	29.2	140				
Naphthalene	27.5	33.6	60.91	0	45.2	44.4	136				
Hexachlorobutadiene	24.8	3.13	60.91	0	40.7	38.2	138				
2-Methylnaphthalene	29.5	3.08	60.91	0	48.4	51.7	138				S
Acenaphthene	33.0	59.5	60.91	0	54.1	49.6	129				
Dimethylphthalate	52.2	2.55	60.91	11.53	66.8	61.5	131				

Work Order: 1608094
CLIENT: Shannon & Wilson
Project: NME

QC SUMMARY REPORT

Semi-Volatile Organic Compounds by EPA Method 8270

Sample ID **1608094-001AMS** SampType: **MS** Units: **µg/Kg-dry** Prep Date: **8/11/2016** RunNo: **31205**
Client ID: **NME:0-4c** Batch ID: **14521** Analysis Date: **8/12/2016** SeqNo: **588736**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Acenaphthylene	32.2	2.70	60.91	0	52.9	64	128				S
Dibenzofuran	36.0	2.45	60.91	0	59.1	64.7	131				S
Fluorene	38.1	2.63	60.91	0	62.6	64.2	127				S
Diethylphthalate	41.8	3.74	60.91	0	68.7	61.7	129				
Hexachlorobenzene	38.7	2.46	60.91	0	63.6	66.5	123				S
Pentachlorophenol	26.9	21.9	60.91	0	44.2	28.2	156				
Phenanthrene	41.4	3.86	60.91	0	68.1	57	134				
Anthracene	42.8	2.69	60.91	0	70.3	68.2	123				
Di-n-butylphthalate	49.7	9.97	60.91	0	81.5	52.4	130				
Fluoranthene	46.0	6.36	60.91	0	75.5	46.5	165				
Pyrene	47.2	25.9	60.91	0	77.5	31.4	151				
Butyl Benzylphthalate	48.8	18.1	60.91	0	80.1	30.4	138				
Benz (a) anthracene	41.1	5.14	60.91	0	67.4	43.9	151				
Chrysene	44.2	5.09	60.91	0	72.6	71.1	126				
bis (2-Ethylhexyl) phthalate	54.4	31.4	60.91	0	89.2	40.8	170				
Di-n-octyl phthalate	49.3	16.3	60.91	0	81.0	34.6	142				
Benzo (b) fluoranthene	30.7	4.97	60.91	0	50.4	52.1	136				S
Benzo (k) fluoranthene	24.8	3.56	60.91	0	40.7	45	140				S
Benzo (a) pyrene	21.7	3.32	60.91	0	35.7	50.5	137				S
Indeno (1,2,3-cd) pyrene	18.0	4.00	60.91	0	29.6	38.1	155				SI
Dibenz (a,h) anthracene	19.8	2.54	60.91	0	32.6	40.7	152				SI
Benzo (g,h,I) perylene	13.6	4.31	60.91	0	22.4	34	157				SI
Surr: 2,4,6-Tribromophenol	43.3		60.91		71.1	11.1	127				
Surr: 2-Fluorobiphenyl	1.87		30.45		6.14	15	123				S
Surr: Nitrobenzene-d5	2.78		30.45		9.14	10	133				S
Surr: Phenol-d6	17.9		60.91		29.5	11.6	133				
Surr: p-Terphenyl	33.3		30.45		109	21.8	150				

NOTES:
S - Outlying QC recoveries were associated with this sample. The method is in control as indicated by the LCS.
I - Internal standards were outside of established acceptance criteria. Re-analysis yielded the same result indicating a possible matrix effect.
S - Outlying surrogate recovery(ies) observed.

Work Order: 1608094
CLIENT: Shannon & Wilson
Project: NME

QC SUMMARY REPORT

Semi-Volatile Organic Compounds by EPA Method 8270

Sample ID **1608094-001AMSD** SampType: **MSD** Units: **µg/Kg-dry** Prep Date: **8/11/2016** RunNo: **31205**
Client ID: **NME:0-4c** Batch ID: **14521** Analysis Date: **8/12/2016** SeqNo: **588737**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Phenol	37.9	5.80	61.15	5.396	53.2	29.2	146	44.98	17.0	50	
1,4-Dichlorobenzene	14.5	4.17	61.15	0	23.7	20.9	131	15.94	9.41	50	
1,2-Dichlorobenzene	16.7	4.63	61.15	0	27.3	35	131	16.71	0.142	50	S
Benzyl alcohol	37.1	1.98	61.15	0	60.6	30.8	159	40.11	7.85	50	
2-Methylphenol (o-cresol)	34.2	2.55	61.15	0	55.9	57.7	125	39.90	15.5	50	S
4-Methylphenol (p-cresol)	17.5	1.52	61.15	0	28.7	65.5	127	18.76	6.72	50	S
2,4-Dimethylphenol	36.1	3.37	61.15	0	59.0	46	158	38.48	6.39	50	
1,2,4-Trichlorobenzene	26.6	2.52	61.15	0	43.5	29.2	140	23.93	10.6	50	
Naphthalene	26.1	33.7	61.15	0	42.6	44.4	136	0		50	S
Hexachlorobutadiene	24.9	3.14	61.15	0	40.6	38.2	138	24.81	0.155	50	
2-Methylnaphthalene	32.6	3.09	61.15	0	53.3	51.7	138	29.46	10.1	50	
Acenaphthene	34.2	59.7	61.15	0	56.0	49.6	129	0		50	
Dimethylphthalate	53.7	2.56	61.15	11.53	68.9	61.5	131	52.23	2.76	50	
Acenaphthylene	33.3	2.71	61.15	0	54.4	64	128	32.23	3.21	50	S
Dibenzofuran	36.1	2.46	61.15	0	59.1	64.7	131	36.00	0.394	50	S
Fluorene	38.6	2.64	61.15	0	63.2	64.2	127	38.12	1.38	50	S
Diethylphthalate	42.6	3.76	61.15	0	69.7	61.7	129	41.82	1.94	50	
Hexachlorobenzene	39.5	2.47	61.15	0	64.6	66.5	123	38.74	2.01	50	S
Pentachlorophenol	26.6	22.0	61.15	0	43.5	28.2	156	26.90	1.18	50	
Phenanthrene	40.7	3.88	61.15	0	66.6	57	134	41.45	1.74	50	
Anthracene	42.6	2.70	61.15	0	69.6	68.2	123	42.80	0.528	50	
Di-n-butylphthalate	48.1	10.0	61.15	0	78.7	52.4	130	49.66	3.11	50	
Fluoranthene	44.2	6.39	61.15	0	72.2	46.5	165	46.02	4.10	50	
Pyrene	46.1	26.0	61.15	0	75.4	31.4	151	47.22	2.40	50	
Butyl Benzylphthalate	47.5	18.2	61.15	0	77.6	30.4	138	48.80	2.77	50	
Benz (a) anthracene	44.1	5.16	61.15	0	72.1	43.9	151	41.07	7.11	50	
Chrysene	40.5	5.11	61.15	0	66.3	71.1	126	44.20	8.63	50	S
bis (2-Ethylhexyl) phthalate	52.4	31.6	61.15	0	85.7	40.8	170	54.35	3.69	50	
Di-n-octyl phthalate	48.7	16.3	61.15	0	79.7	34.6	142	49.35	1.29	50	
Benzo (b) fluoranthene	29.5	4.99	61.15	0	48.3	52.1	136	30.68	3.84	50	S
Benzo (k) fluoranthene	25.2	3.57	61.15	0	41.2	45	140	24.77	1.80	50	S

Work Order: 1608094
CLIENT: Shannon & Wilson
Project: NME

QC SUMMARY REPORT

Semi-Volatile Organic Compounds by EPA Method 8270

Sample ID **1608094-001AMSD** SampType: **MSD** Units: **µg/Kg-dry** Prep Date: **8/11/2016** RunNo: **31205**
Client ID: **NME:0-4c** Batch ID: **14521** Analysis Date: **8/12/2016** SeqNo: **588737**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Benzo (a) pyrene	23.6	3.33	61.15	0	38.6	50.5	137	21.75	8.28	50	S
Indeno (1,2,3-cd) pyrene	21.8	4.02	61.15	0	35.7	38.1	155	18.03	19.1	50	SI
Dibenz (a,h) anthracene	22.8	2.55	61.15	0	37.3	40.7	152	19.83	13.9	50	SI
Benzo (g,h,I) perylene	16.5	4.33	61.15	0	26.9	34	157	13.63	18.8	50	SI
Surr: 2,4,6-Tribromophenol	40.7		61.15		66.6	11.1	127		0		
Surr: 2-Fluorobiphenyl	1.40		30.58		4.56	15	123		0		S
Surr: Nitrobenzene-d5	2.55		30.58		8.34	10	133		0		S
Surr: Phenol-d6	22.5		61.15		36.7	11.6	133		0		
Surr: p-Terphenyl	32.8		30.58		107	21.8	150		0		

NOTES:
S - Outlying QC recoveries were associated with this sample. The method is in control as indicated by the LCS.
I - Internal standards were outside of established acceptance criteria. Re-analysis yielded the same result indicating a possible matrix effect.
S - Outlying surrogate recovery(ies) observed.

Work Order: 1608094
CLIENT: Shannon & Wilson
Project: NME

QC SUMMARY REPORT

Sample Moisture (Percent Moisture)

Sample ID **1608094-001ADUP**	SampType: **DUP**			Units: **wt%**		Prep Date: **8/11/2016**		RunNo: **31114**		
Client ID: **NME:0-4c**	Batch ID: **R31114**					Analysis Date: **8/11/2016**		SeqNo: **587297**		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Percent Moisture	15.5	0.500						18.32	16.6	20	

Sample ID **1608094-002ADUP**	SampType: **DUP**			Units: **wt%**		Prep Date: **8/11/2016**		RunNo: **31114**		
Client ID: **NME:4-7c**	Batch ID: **R31114**					Analysis Date: **8/11/2016**		SeqNo: **587299**		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Percent Moisture	11.8	0.500						12.74	7.32	20	

Analytical Resources, Incorporated
Analytical Chemists and Consultants

14 September 2016

Mike Ridgeway
Fremont Analytical
3600 Fremont Avenue N.
Seattle, WA 98103

RE: 1608094

Please find enclosed sample receipt documentation and analytical results for samples from the project referenced above.

Sample analyses were performed according to ARI's Quality Assurance Plan and any provided project specific Quality Assurance Plan. Each analytical section of this report has been approved and reviewed by an analytical peer, the appropriate Laboratory Supervisor or qualified substitute, and a technical reviewer.

Should you have any questions or problems, please feel free to contact us at your convenience.

Associated Work Order(s)	Associated SDG ID(s)
16H0071	N/A

I certify that this data package is in compliance with the terms and conditions of the contract, both technically and for completeness, for other than the conditions detailed in the enclose Narrative. ARI, an accredited laboratory, certifies that the report results for which ARI is accredited meets all the reqirements of the accrediting body. A list of certified analyses, accreditations, and expiration dates is included in this report.

Release of the data contained in this hardcopy data package has been authorized by the Laboratory Manager or his/her designee, as verified by the following signature.

Analytical Resources, Inc.



Cheronne Oreiro, Project Manager

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

ACCREDITED IN ACCORDANCE WITH nelac Cert# 100006
PJLA Testing Accreditation # 66169

Fremont Analytical	Project: 1608094	
3600 Fremont Avenue N.	Project Number: 1608094	**Reported:**
Seattle WA, 98103	Project Manager: Mike Ridgeway	14-Sep-2016 13:35

Case Narrative

Sample receipt

Two soil samples were received under under ARI work order 16H0071 on August 11, 2016. For details regarding sample receipt, please refer to the Cooler Receipt Form.

Dioxin/Furans - EPA Method 1613

The samples and associated laboratory QC were extracted and analyzed within recommended holding times.

Analysis was performed using an application specific column recently developed by Restek. The RTX-DIoxin2 column has unique isomer separation for the 2378-TCDF, eliminating the need for confirmation analysis.

Initial calibrations, initial calibration verifications, and continuing calibration verifications were within method requirements.

The cleanup surrogate percent recoveries were within control limits.

The method blank contained reportable responses for several compounds. “B” qualifiers were applied to results greater than the reporting limits. No further corrective action was taken.

The OPR (Ongoing Precision and Recovery) standard percent recoveries were within control limits.

A duplicate was analyzed for sample **NME:0-4C**. The Puget Sound Sediment Reference Material (PSSRM) was analyzed with samples. All clients are responsible for reporting PSSRM results to EPA.

Tributyltin - EPA Method SW8270D-SIM

The samples and associated laboratory QC were extracted and analyzed within recommended holding times.

Initial calibrations, initial calibration verifications, and continuing calibration verifications were within method requirements. Internal standard areas were within limits.

The surrogate percent recoveries were within control limits.

The method blank was clean at the reporting limit. The LCS percent recovery was within control limits.

The matrix spike and matrix spike duplicate percent recoveries were within control limits.

CHAIN OF CUSTODY RECORD

Omega COCID 258	PAGE: 1	OF: 1

1608071

ADDRESS
Fremont Analytical, Inc.
3600 Fremont Ave. N.
Seattle, WA 98103
TEL: 206-352-3790
FAX: 206-352-7178
Website: www.fremontanalytical.com

SUB CONTRATOR: **ARI** COMPANY: **Analytical Resources Inc.**

ADDRESS: **4611 South 134th Place, Suite 100**

CITY, STATE, ZIP: **Tukwila, WA 98168**

PHONE: **(206) 695-6200** FAX: EMAIL:

ACCOUNT #:

SPECIAL INSTRUCTIONS / COMMENTS:
Standard TAT. Please send results to cward@fremontanalytical.com and mridgeway@fremontanalytical.com.
*Tributyltin Only

ITEM #	SAMPLE ID	CLIENT SAMPLE ID	BOTTLE TYPE	MATRIX	DATE COLLECTED	NUMBER OF CONTAINERS	COMMENTS: Methanol Preserved Weights HOT Sample Notation, Additional Sample Description.
1	1608094-001B	NME:0-4c	AMBER JAR 8OZ	Soil	8/10/2016 11:30:00 AM	1	
	C-TBT (Organotins), O-DIOXIN (~~SW8290~~) 8/10/16						DMMP GUIDELINES
2	1608094-002B	NME:4-7c	AMBER JAR 8OZ	Soil	8/10/2016 11:50:00 AM	1	
	C-TBT (Organotins), O-DIOXIN (~~SW8290~~) 8/10/16						DMMP GUIDELINES

(*) DIOXN: SRM + DUP (*)

(*) TRIBUTYLTIN ONLY (*)

Relinquished By:	Date: 8/11/16	Time: 905	Received By:	Date: 8-11	Time: 9:34
Relinquished By:	Date:	Time:	Received By:	Date: 8-11-16	Time: 1040
Relinquished By:	Date:	Time:	Received By:	Date:	Time:

TAT: Standard X RUSH Next BD ☐ 2nd BD ☐ 3rd BD ☐

Note: RUSH requests will incur surcharges!

REPORT TRANSMITTAL DESIRED:
☐ HARDCOPY (extra cost) ☐ FAX ☐ EMAIL ☐ ONLINE

FOR LAB USE ONLY
Temp of samples _____ °C Attempt to Cool ? _____
Comments: _____

Analytical Resources, Incorporated
Analytical Chemists and Consultants

Cooler Receipt Form

ARI Client: Fremont Analytical

Project Name: 1608094

COC No(s): _____ NA

Delivered by: Fed-Ex UPS Courier Hand Delivered Other: _____

Assigned ARI Job No: 16H0071

Tracking No: _____ NA

Preliminary Examination Phase:

Were intact, properly signed and dated custody seals attached to the outside of to cooler? YES NO

Were custody papers included with the cooler? ..... YES NO

Were custody papers properly filled out (ink, signed, etc.) ..... YES NO

Temperature of Cooler(s) (°C) (recommended 2.0-6.0 °C for chemistry) 5.2

Time: _____

If cooler temperature is out of compliance fill out form 00070F

Temp Gun ID#: 70052276

Cooler Accepted by: TR Date: 8-11-16 Time: 1040

Complete custody forms and attach all shipping documents

Log-In Phase:

Was a temperature blank included in the cooler? ..... YES NO

What kind of packing material was used? ... Bubble Wrap Wet Ice Gel Packs Baggies Foam Block Paper Other: _____

Was sufficient ice used (if appropriate)? ..... NA YES NO

Were all bottles sealed in individual plastic bags? ..... YES NO

Did all bottles arrive in good condition (unbroken)? ..... YES NO

Were all bottle labels complete and legible? ..... YES NO

Did the number of containers listed on COC match with the number of containers received? ..... YES NO

Did all bottle labels and tags agree with custody papers? ..... YES NO

Were all bottles used correct for the requested analyses? ..... YES NO

Do any of the analyses (bottles) require preservation? (attach preservation sheet, excluding VOCs)... NA YES NO

Were all VOC vials free of air bubbles? ..... NA YES NO

Was sufficient amount of sample sent in each bottle? ..... YES NO

Date VOC Trip Blank was made at ARI ..... NA _____

Was Sample Split by ARI : NA YES Date/Time: _____ Equipment: _____ Split by: _____

Samples Logged by: JM Date: 8-11-16 Time: 12:19

*** Notify Project Manager of discrepancies or concerns ***

Sample ID on Bottle	Sample ID on COC	Sample ID on Bottle	Sample ID on COC

Additional Notes, Discrepancies, & Resolutions:

By: Date:

Small Air Bubbles ~ 2mm	Peabubbles 2-4 mm	LARGE Air Bubbles > 4 mm
• • •	• • •	● ● ●

Small → "sm" (< 2 mm)

Peabubbles → "pb" (2 to < 4 mm)

Large → "lg" (4 to < 6 mm)

Headspace → "hs" (> 6 mm)

Fremont Analytical	Project: 1608094	
3600 Fremont Avenue N.	Project Number: 1608094	**Reported:**
Seattle, WA 98103	Project Manager: Mike Ridgeway	09/14/2016 13:35

ANALYTICAL REPORT FOR SAMPLES

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
NME:0-4C	16H0071-01	Solid	08/10/16 11:30	08/11/16 10:40
NME:4-7C	16H0071-02	Solid	08/10/16 11:50	08/11/16 10:40

Analytical Resources, Incorporated

Internal Chain of Custody

Client:	Fremont Analytical	Received:	11-Aug-2016 10:40
Project:	1608094	Received By:	Justin Meyer
Number:	1608094	Temp (°C):	5.20

16H0071-01 (NME:0-4C) Sampled 08/10/2016 11:30

Current Status	*Out*	*Location*	*In*
16H0071-01 A [Glass WM, Clear, 8 oz]			*Hazard Info:*
Sample Receiving	08/11/2016 12:24 by JEM	***START***	08/11/2016 12:24 by JEM
	08/11/2016 12:24 by JEM	***START***	08/11/2016 12:24 by JEM
	08/11/2016 12:24 by JEM	***START***	08/11/2016 12:24 by JEM
Extractions	08/18/2016 07:02 by NPL	Dioxin Lab	08/18/2016 07:09 by NPL
	08/18/2016 07:02 by NPL	Dioxin Lab	08/18/2016 07:09 by NPL
	08/18/2016 07:02 by NPL	Dioxin Lab	08/18/2016 07:09 by NPL
	08/18/2016 13:21 by NPL	Dioxin Lab	08/18/2016 13:59 by NPL
	08/18/2016 13:21 by NPL	Dioxin Lab	08/18/2016 13:59 by NPL
	08/18/2016 13:21 by NPL	Dioxin Lab	08/18/2016 13:59 by NPL
	08/18/2016 13:59 by NPL	F-05 03	08/22/2016 10:16 by YQL
	08/18/2016 13:59 by NPL	F-05 03	08/22/2016 10:16 by YQL
	08/18/2016 13:59 by NPL	F-05 03	08/22/2016 10:16 by YQL
	08/22/2016 10:16 by YQL	F-51 M3-2	by
	08/22/2016 10:16 by YQL	F-51 M3-2	by
	08/22/2016 10:16 by YQL	F-51 M3-2	by

16H0071-02 (NME:4-7C) Sampled 08/10/2016 11:50

Current Status	*Out*	*Location*	*In*
16H0071-02 A [Glass WM, Clear, 8 oz]			*Hazard Info:*
Sample Receiving	08/11/2016 12:24 by JEM	***START***	08/11/2016 12:24 by JEM
	08/11/2016 12:24 by JEM	***START***	08/11/2016 12:24 by JEM
	08/11/2016 12:24 by JEM	***START***	08/11/2016 12:24 by JEM
Extractions	08/18/2016 07:02 by NPL	Dioxin Lab	08/18/2016 07:09 by NPL
	08/18/2016 07:02 by NPL	Dioxin Lab	08/18/2016 07:09 by NPL
	08/18/2016 07:02 by NPL	Dioxin Lab	08/18/2016 07:09 by NPL
	08/18/2016 13:21 by NPL	Dioxin Lab	08/18/2016 13:59 by NPL
	08/18/2016 13:21 by NPL	Dioxin Lab	08/18/2016 13:59 by NPL
	08/18/2016 13:21 by NPL	Dioxin Lab	08/18/2016 13:59 by NPL
	08/18/2016 13:59 by NPL	F-05 03	08/22/2016 10:16 by YQL
	08/18/2016 13:59 by NPL	F-05 03	08/22/2016 10:16 by YQL
	08/18/2016 13:59 by NPL	F-05 03	08/22/2016 10:16 by YQL
	08/22/2016 10:16 by YQL	F-51 M3-2	by
	08/22/2016 10:16 by YQL	F-51 M3-2	by
	08/22/2016 10:16 by YQL	F-51 M3-2	by

Analytical Standard Record

Standard ID: E003382 **Printed: 9/14/2016 1:43:55PM**

Description:	Puget Sound reference-SRM	Expires:	11-Aug-2017
Standard Type:	Reference Mate	Prepared:	11-Aug-2016
Solvent:	NA	Prepared By:	Justin Meyer
Final Volume (mls):	30	Department:	QC
Vials:	1	Last Edit:	11-Aug-2016 14:12 by JEM
Vendor:	QATS Lab	Lot #:	SR0431
Vendor Catalog #:			

Comments

PSRM0067 for Cheronne. Shannon Wilson.

Analyte	CAS Number	Concentration	Units	SRM Control Limits
1,2,3,7,8-PeCDF	57117-41-6	0.00000123	mg/Kg	50-150
1,2,3,4,6,7,8-HpCDF	67562-39-4	0.0000187	mg/Kg	50-150
1,2,3,4,7,8,9-HpCDF	58200-70-7	0.00000163	mg/Kg	50-150
1,2,3,4,7,8-HxCDD	39227-28-6	0.00000159	mg/Kg	50-150
1,2,3,4,7,8-HxCDF	70648-26-9	0.00000302	mg/Kg	50-150
1,2,3,6,7,8-HxCDD	57653-85-7	0.00000388	mg/Kg	50-150
1,2,3,6,7,8-HxCDF	57117-44-9	0.00000109	mg/Kg	50-150
1,2,3,7,8,9-HxCDD	19408-74-3	0.00000304	mg/Kg	50-150
1,2,3,4,6,7,8-HpCDD	35822-46-9	0.0000906	mg/Kg	50-150
1,2,3,7,8-PeCDD	40321-76-4	0.00000108	mg/Kg	50-150
OCDF	39001-02-0	0.0000584	mg/Kg	50-150
2,3,4,6,7,8-HxCDF	60851-34-5	0.00000183	mg/Kg	50-150
2,3,4,7,8-PeCDF	57117-31-4	0.00000107	mg/Kg	50-150
2,3,7,8-TCDD	1746-01-6	0.00000105	mg/Kg	50-150
2,3,7,8-TCDF	51207-31-9	0.00000111	mg/Kg	50-150
Aroclor 1260	11096-82-5	0.108	mg/Kg	38-167
Aroclor 1260 [2C]	11096-82-5	0.108	mg/Kg	38-167
OCDD	3268-87-9	0.000811	mg/Kg	50-150
1,2,3,7,8,9-HxCDF	72918-21-9	0.000000511	mg/Kg	50-150

Reviewed By Date

Recipient Copy

CHAIN-OF-CUSTODY RECORD

COC No. 13768

Order Number: CB013214

Date Shipped: 8/10/2016

AirBill No(s): 560847658928

From: QATS LABORATORY
2700 CHANDLER AVENUE, BLDG. B
LAS VEGAS, NV 89120
PHONE: 1-702-895-8712
FAX: 1-702-795-8210

To: CHERONNE OREIRO
ANALYTICAL RESOURCES
4611 S. 134TH PLACE, SUITE 100
TUKWILA WA 98168
206-695-6214

Sample ID	Qty	Description/Remarks	→ Catalogue Number
PSRM0067	1	PUGET SOUND SEDIMENT RM	PS-SRM

AC 8/10/16

Please use the enclosed Sample Preparation Instructions. If catalogue number(s) are listed at the top of the Sample Preparation Instructions use the Sample Preparation Instructions with catalogue number(s) matching the catalogue number(s) of each of the samples listed above.

Relinquished by: (Signature)	Date/Time	Received by: (Signature)	Date/Time
	8/10/16 3:00 pm		8/11/16 1105
Custody Seal(s): Present/Absent	Remarks:		
Relinquished by: (Signature)	Date/Time	Received by: (Signature)	Date/Time

QUALIFIERS AND NOTES

Qualifier	Definition
U	This analyte is not detected above the applicable reporting or detection limit.
J	Estimated concentration value detected below the reporting limit.
EMPC	Estimated Maximum Possible Concentration qualifier for HRGCMS Dioxin
B	This analyte was detected in the method blank.
*	Flagged value is not within established control limits.
DET	Analyte DETECTED
ND	Analyte NOT DETECTED at or above the reporting limit
NR	Not Reported
dry	Sample results reported on a dry weight basis
RPD	Relative Percent Difference

NME:0-4C

Form I
ORGANIC ANALYSIS DATA SHEET
EPA 1613B
Dioxin 1613B

Laboratory:	Analytical Resources, Inc.			SDG:	16H0071
Client:	Fremont Analytical			Project:	1608094
Matrix:	soil	Laboratory ID:	16H0071-01	File ID:	16082308
Sampled:	08/10/16 11:30	Prepared:	08/18/16 15:40	Analyzed:	08/23/16 16:02
Solids Wt%:	84.70	Preparation:	EPA 1613	Initial/Final:	11.89 g / 20 uL
Result Basis:	Dry	Sequence:	SEH0246	Calibration:	ZE00016
Batch:	BEH0316	Instrument:	AUTOSPEC01	Column:	RTX-Dioxin2

CAS NO.	COMPOUND	DF/Split	Ion Ratio	Ratio Limits	EDL	RL	Result	Units	Q
51207-31-9	2,3,7,8-TCDF	1	0.000	0.655-0.886	0.027	0.993	ND	ng/kg	U
1746-01-6	2,3,7,8-TCDD	1	0.000	0.655-0.886	0.041	0.993	ND	ng/kg	U
57117-41-6	1,2,3,7,8-PeCDF	1	1.371	1.318-1.783		0.993	0.044	ng/kg	J, B
57117-31-4	2,3,4,7,8-PeCDF	1	0.000	1.318-1.783	0.024	0.993	ND	ng/kg	U
40321-76-4	1,2,3,7,8-PeCDD	1	1.891	1.318-1.783		0.993	0.114	ng/kg	EMPC, J
70648-26-9	1,2,3,4,7,8-HxCDF	1	0.000	1.054-1.426	0.033	0.993	ND	ng/kg	U
57117-44-9	1,2,3,6,7,8-HxCDF	1	0.000	1.054-1.426	0.032	0.993	ND	ng/kg	U
60851-34-5	2,3,4,6,7,8-HxCDF	1	0.000	1.054-1.426	0.036	0.993	ND	ng/kg	U
72918-21-9	1,2,3,7,8,9-HxCDF	1	0.000	1.054-1.426	0.044	0.993	ND	ng/kg	U
39227-28-6	1,2,3,4,7,8-HxCDD	1	0.743	1.054-1.426		0.993	0.082	ng/kg	EMPC, J
57653-85-7	1,2,3,6,7,8-HxCDD	1	1.657	1.054-1.426		0.993	0.163	ng/kg	EMPC, J
19408-74-3	1,2,3,7,8,9-HxCDD	1	0.935	1.054-1.426		0.993	0.303	ng/kg	EMPC, J, B
67562-39-4	1,2,3,4,6,7,8-HpCDF	1	0.751	0.893-1.208		0.993	0.450	ng/kg	EMPC, J, B
58200-70-7	1,2,3,4,7,8,9-HpCDF	1	0.473	0.893-1.208		0.993	0.055	ng/kg	EMPC, J
35822-46-9	1,2,3,4,6,7,8-HpCDD	1	0.953	0.893-1.208		0.993	3.81	ng/kg	B
39001-02-0	OCDF	1	0.849	0.757-1.024		1.99	3.36	ng/kg	B
3268-87-9	OCDD	1	0.856	0.757-1.024		9.93	32.9	ng/kg	B

Homologue Groups

55722-27-5	Total TCDF	1	0.000			0.993	0.075	ng/kg
41903-57-5	Total TCDD	1	0.000			0.993	1.59	ng/kg
30402-15-4	Total PeCDF	1	0.000			0.993	0.044	ng/kg
36088-22-9	Total PeCDD	1	0.000			0.993	0.727	ng/kg
55684-94-1	Total HxCDF	1	0.000			0.993	0.251	ng/kg
34465-46-8	Total HxCDD	1	0.000			0.993	2.84	ng/kg
38998-75-3	Total HpCDF	1	0.000			0.993	2.57	ng/kg
37871-00-4	Total HpCDD	1	0.000			0.993	9.64	ng/kg

Total 2,3,7,8-TCDD Equivalence (WHO2005, ND=0, Including EMPC): 0.224
Total 2,3,7,8-TCDD Equivalence (WHO2005, ND=1/2 EDL, Including EMPC): 0.289

NME:0-4C

Form I

ORGANIC ANALYSIS DATA SHEET

EPA 1613B

Dioxin 1613B

Laboratory:	Analytical Resources, Inc.			SDG:	16H0071
Client:	Fremont Analytical			Project:	1608094
Matrix:	soil	Laboratory ID:	16H0071-01	File ID:	16082308
Sampled:	08/10/16 11:30	Prepared:	08/18/16 15:40	Analyzed:	08/23/16 16:02
Solids Wt%:	84.70	Preparation:	EPA 1613	Initial/Final:	11.89 g / 20 uL
Result Basis:	Dry	Sequence:	SEH0246	Calibration:	ZE00016
Batch:	BEH0316	Instrument:	AUTOSPEC01	Column:	RTX-Dioxin2

Labels	DF/Split	Ion Ratio	Ratio Limits	EDL	% REC	QC LIMITS	Q
13C12-2,3,7,8-TCDF		0.784	0.655-0.886		88.2	24 - 169 %	
13C12-2,3,7,8-TCDD		0.785	0.655-0.886		86.2	25 - 164 %	
13C12-1,2,3,7,8-PeCDF		1.577	1.318-1.783		88.9	24 - 185 %	
13C12-2,3,4,7,8-PeCDF		1.592	1.318-1.783		85.9	21 - 178 %	
13C12-1,2,3,7,8-PeCDD		1.569	1.318-1.783		85.1	25 - 181 %	
13C12-1,2,3,4,7,8-HxCDF		0.521	0.434-0.587		85.4	26 - 152 %	
13C12-1,2,3,6,7,8-HxCDF		0.511	0.434-0.587		83.9	26 - 123 %	
13C12-2,3,4,6,7,8-HxCDF		0.523	0.434-0.587		81.5	28 - 136 %	
13C12-1,2,3,7,8,9-HxCDF		0.528	0.434-0.587		80.4	29 - 147 %	
13C12-1,2,3,4,7,8-HxCDD		1.268	1.054-1.426		87.7	32 - 141 %	
13C12-1,2,3,6,7,8-HxCDD		1.262	1.054-1.426		83.5	28 - 130 %	
13C12-1,2,3,4,6,7,8-HpCDF		0.454	0.374-0.506		72.3	28 - 143 %	
13C12-1,2,3,4,7,8,9-HpCDF		0.450	0.374-0.506		71.1	26 - 138 %	
13C12-1,2,3,4,6,7,8-HpCDD		1.039	0.893-1.208		76.3	23 - 140 %	
13C12-OCDD		0.909	0.757-1.024		58.8	17 - 157 %	
37C14-2,3,7,8-TCDD		328.000			96.4	35 - 197 %	

* Values outside of QC limits

Dataset: C:\MassLynx\Dioxin.pro\160823DATA1.qld
Last Altered: Thursday, August 25, 2016 12:51:34 Pacific Daylight Time
Printed: Thursday, August 25, 2016 15:46:38 Pacific Daylight Time

Page 21 of 45

Method: C:\MassLynx\Dioxin.pro\MethDB\Dioxin1608163SN.mdb 17 Aug 2016 15:09:47
Calibration: C:\MassLynx\Dioxin.pro\CurveDB\160510ICAL.cdb 11 May 2016 09:28:40

ID: 16H0071-01, Name: 16082308, Date: 23-Aug-2016, Time: 16:02:59, Conditions: AUTOSPEC01, User: PK

Name	RT	RRT	Ion1Area	Ion2Area	RRF	Ratio	Pred R	Noise 1	Noise 2	Height 1	Height 2	S/N	EMPC?	EMPC	pg
2378-TCDF					0.935		0.770	729	1023						
12378-PeCDF	29.775	1.001	2.77e2	2.02e2	0.952	1.371	1.550	647	591	4.39e3	3.80e3	6.8	NO	0.022	0.022
23478-PeCDF					0.963		1.550	647	591						
123478-HxCDF					1.137		1.240	753	609						
234678-HxCDF					1.164		1.240	753	609						
123678-HxCDF					1.099		1.240	753	609						
123789-HxCDF					1.101		1.240	753	609						
1234678-HpCDF	39.114	1.001	1.31e3	1.75e3	1.303	0.751	1.050	447	501	1.97e4	2.32e4	44.0	YES	0.190	0.227
1234789-HpCDF	41.734	1.000	8.90e1	1.88e2	1.317	0.473	1.050	447	501	1.49e3	3.09e3	3.3	YES	0.017	0.028
OCDF	46.893	1.006	5.31e3	6.25e3	1.166	0.849	0.890	735	748	5.59e4	6.59e4	76.0	NO	1.690	1.690
2378-TCDD					1.134		0.770	1142	619						
12378-PeCDD	31.353	1.000	4.74e2	2.51e2	0.975	1.891	1.550	946	1223	5.41e3	6.47e3	5.7	YES	0.050	0.057
123478-HxCDD	36.045	1.001	2.04e2	2.74e2	1.031	0.743	1.240	1176	1521	4.72e3	6.28e3	4.0	YES	0.032	0.041
123678-HxCDD	36.166	1.001	5.89e2	3.56e2	0.971	1.657	1.240	1176	1521	1.29e4	9.26e3	11.0	YES	0.069	0.082
123789-HxCDD	36.571	1.012	8.07e2	8.63e2	0.947	0.935	1.240	1176	1521	1.30e4	1.87e4	11.1	YES	0.133	0.153
1234678-HpCDD	40.868	1.000	8.11e3	8.51e3	1.028	0.953	1.050	540	951	1.08e5	1.17e5	200.7	NO	1.916	1.916
OCDD	46.642	1.000	4.96e4	5.80e4	1.107	0.856	0.890	1462	968	5.06e5	5.63e5	345.9	NO	16.580	16.580
13C-2378-TCDF	25.615	1.007	1.23e6	1.56e6	1.567	0.784	0.770	5242	3563	1.85e7	2.35e7	3526.1	NO		88.199
13C-12378-PeCDF	29.753	1.170	1.40e6	8.87e5	1.274	1.577	1.550	4245	4721	2.14e7	1.35e7	5036.0	NO		88.890
13C-23478-PeCDF	31.101	1.223	1.32e6	8.26e5	1.235	1.592	1.550	4245	4721	1.97e7	1.24e7	4646.8	NO		85.938
13C-123478-HxCDF	34.784	0.951	4.91e5	9.43e5	1.381	0.521	0.510	4116	6216	7.32e6	1.38e7	1779.2	NO		85.381
13C-123678-HxCDF	34.927	0.955	5.42e5	1.06e6	1.569	0.511	0.510	4116	6216	7.82e6	1.50e7	1899.0	NO		83.919
13C-234678-HxCDF	35.869	0.981	4.58e5	8.76e5	1.345	0.523	0.510	4116	6216	6.64e6	1.27e7	1612.7	NO		81.545
13C-123789-HxCDF	37.021	1.012	4.00e5	7.57e5	1.183	0.528	0.510	4116	6216	5.75e6	1.08e7	1396.2	NO		80.365
13C-1234678-HpCDF	39.092	1.069	3.24e5	7.13e5	1.178	0.454	0.440	3842	2688	4.67e6	1.03e7	1216.6	NO		72.334
13C-1234789-HpCDF	41.712	1.141	2.36e5	5.23e5	0.878	0.450	0.440	3842	2688	2.95e6	6.52e6	768.8	NO		71.075
13C-1234-TCDD	25.436	0.000	8.92e5	1.13e6	1.000	0.792	0.770	2144	1684	1.36e7	1.72e7	6354.8	NO		100.000
13C-2378-TCDD	26.243	1.032	6.94e5	8.85e5	0.908	0.785	0.770	2144	1684	9.98e6	1.29e7	4652.7	NO		86.222
13C-12378-PeCDD	31.353	1.233	7.92e5	5.05e5	0.756	1.569	1.550	1642	1295	1.20e7	7.55e6	7299.0	NO		85.072
13C-123478-HxCDD	36.012	0.985	6.30e5	4.97e5	1.056	1.268	1.240	2496	2277	9.33e6	7.29e6	3738.2	NO		87.669
13C-123678-HxCDD	36.132	0.988	6.59e5	5.23e5	1.163	1.262	1.240	2496	2277	9.39e6	7.40e6	3764.1	NO		83.526
13C-1234678-HpCDD	40.857	1.117	4.30e5	4.14e5	0.909	1.039	1.050	1574	1972	5.71e6	5.40e6	3624.2	NO		76.329
13C-OCDD	46.624	1.275	5.58e5	6.14e5	0.820	0.909	0.890	2341	1979	5.71e6	6.23e6	2439.1	NO		117.580
13C-123789-HxCDD	36.571	0.000	6.77e5	5.39e5	1.000	1.257	1.240	2496	2277	9.58e6	7.62e6	3836.7	NO		100.000
Total-tetrafurans			3.44e2		0.935			729		5.29e3					0.038

D-2016-0418

Dataset: C:\MassLynx\Dioxin.pro\160823DATA1.qld
Last Altered: Thursday, August 25, 2016 12:51:34 Pacific Daylight Time
Printed: Thursday, August 25, 2016 15:46:38 Pacific Daylight Time

ID: 16L0071-01, Name: 16082308, Date: 23-Aug-2016, Time: 16:02:59, Conditions: AUTOSPEC01, User: PK

Name	RT	RRT	Ion1Area	Ion2Area	RRF	Ratio	Pred R	Noise 1	Noise 2	Height 1	Height 2	S/N	EMPC?	EMPC	pg
Total-penta1			0.00e0					728		0.00e0					
Total-pentafurans			2.77e2		0.957			647		4.39e3					0.022
Total-hexafurans			1.12e3		1.125			753		1.98e4					0.126
Total-heptafurans			7.65e3		1.310			447		1.10e5					1.294
Total-Furans			1.47e4		1.114			729		1.96e5					3.171
Total-tetradioxins			6.37e3		1.134			1142		9.76e4					0.802
Total-pentadioxins			2.77e3		0.975			946		4.95e4					0.366
Total-hexadioxins			8.51e3		0.983			1176		1.33e5					1.433
Total-heptadioxins			2.12e4		1.028			540		2.95e5					4.852
Total-Dioxins			8.84e4		1.028			1142		1.08e6					24.032
Total-TEQ			1.03e5					1142		1.28e6					27.203
37CL-2378-TCDD	26.272	1.033	8.30e5		1.067			1120		1.24e7		11077.4			38.552
FUNCTION1 PFK			6.65e7					335726		1.57e8					
FUNCTION2 PFK			1.61e5					93081		4.40e6					0.000
FUNCTION3 PFK			3.49e5					264867		8.89e6					0.000
FUNCTION4 PFK			6.43e5					236176		1.69e7					
FUNCTION5 PFK			0.00e0					186937		0.00e0					
FUNCTION1 HXCD...			7.21e1					260		1.26e3					0.000
FUNCTION1 HPCD...			0.00e0					432		0.00e0					
FUNCTION2 HPCD...			7.47e1					428		3.33e3					0.000
FUNCTION3 OCDPE			7.85e1					484		3.36e3					0.000
FUNCTION4 NCDPE			2.44e2					511		4.72e3					0.000
FUNCTION5 DCDPE			0.00e0					277		0.00e0					

Method: C:\MassLynx\Dioxin.pro\MethDB\Dioxin1608163SN.mdb 17 Aug 2016 15:09:47
Calibration: C:\MassLynx\Dioxin.pro\CurveDB\160510ICAL.cdb 11 May 2016 09:28:40

ID: 16H0071-01, Name: 16082308, Date: 23-Aug-2016, Time: 16:02:59, Conditions: AUTOSPEC01, User: PK

TF

	#	Name	Trace	RT	Abs.Resp	RRF	M...	pg	EMPC	1º Rati...	1º Rati...	1º R...	S/N
1	35	Total-tetrafurans	303.9016	23.00	985.631	0.935		0.038		0.54	0.77	YES	7.3

PP

	#	Name	Trace	RT	Abs.Resp	RRF	M...	pg	EMPC	1º Rati...	1º Rati...	1º R...	S/N
1													

PF

	#	Name	Trace	RT	Abs.Resp	RRF	M...	pg	EMPC	1º Rati...	1º Rati...	1º R...	S/N
1	2	12378-PeCDF	339.8597	29.77	479.586	0.952		0.022	0.022	1.37	1.55	NO	6.8

HF

	#	Name	Trace	RT	Abs.Resp	RRF	M...	pg	EMPC	1º Rati...	1º Rati...	1º R...	S/N
1	38	Total-hexafurans	373.8208	34.14	1612.413	1.125		0.104		1.36	1.24	NO	19.9
2	38	Total-hexafurans	373.8208	33.29	351.646	1.125		0.023		1.24	1.24	NO	6.4

HPF

	#	Name	Trace	RT	Abs.Resp	RRF	M...	pg	EMPC	1º Rati...	1º Rati...	1º R...	S/N
1	39	Total-heptafurans	407.7818	39.87	12237.004	1.310		1.040		1.04	1.05	NO	199.3
2	8	1234678-HpCDF	407.7818	39.11	3060.930	1.303		0.227	0.190	0.75	1.05	YES	44.0
3	9	1234789-HpCDF	407.7818	41.73	277.039	1.317		0.028	0.017	0.47	1.05	YES	3.3

Furans,TF,PP,PF,HF,HPF,OF

	#	Name	Trace	RT	Abs.Resp	RRF	M...	pg	EMPC	1º Rati...	1º Rati...	1º R...	S/N
1	35	Total-tetrafurans	303.9016	23.00	985.631	0.935		0.038		0.54	0.77	YES	7.3
2	38	Total-hexafurans	373.8208	34.14	1612.413	1.125		0.104		1.36	1.24	NO	19.9
3	38	Total-hexafurans	373.8208	33.29	351.646	1.125		0.023		1.24	1.24	NO	6.4
4	2	12378-PeCDF	339.8597	29.77	479.586	0.952		0.022	0.022	1.37	1.55	NO	6.8
5	39	Total-heptafurans	407.7818	39.87	12237.004	1.310		1.040		1.04	1.05	NO	199.3
6	8	1234678-HpCDF	407.7818	39.11	3060.930	1.303		0.227	0.190	0.75	1.05	YES	44.0
7	10	OCDF	441.7428	46.89	11551.430	1.166		1.690	1.690	0.85	0.89	NO	76.0
8	9	1234789-HpCDF	407.7818	41.73	277.039	1.317		0.028	0.017	0.47	1.05	YES	3.3

TD

	#	Name	Trace	RT	Abs.Resp	RRF	M...	pg	EMPC	1º Rati...	1º Rati...	1º R...	S/N
1	41	Total-tetradioxins	319.8965	23.43	1499.950	1.134		0.084		0.83	0.77	NO	7.7
2	41	Total-tetradioxins	319.8965	26.38	315.618	1.134		0.018		1.07	0.77	YES	4.0
3	41	Total-tetradioxins	319.8965	25.61	523.410	1.134		0.029		2.23	0.77	YES	5.5
4	41	Total-tetradioxins	319.8965	25.45	636.621	1.134		0.036		1.11	0.77	YES	4.8
5	41	Total-tetradioxins	319.8965	24.40	11384.831	1.134		0.636		0.74	0.77	NO	63.6

ID: 16H0071-01, Name: 16082308, Date: 23-Aug-2016, Time: 16:02:59, Conditions: AUTOSPEC01, User: PK

PD

	#	Name	Trace	RT	Abs.Resp	RRF M...	pg	EMPC	1º Rati...	1º Rati...	1º R...	S/N
1	42	Total-pentadioxins	355.8546	30.30	339.102	0.975	0.027		1.56	1.55	NO	7.1
2	42	Total-pentadioxins	355.8546	30.26	409.012	0.975	0.032		0.99	1.55	YES	4.1
3	42	Total-pentadioxins	355.8546	30.14	699.945	0.975	0.055		1.06	1.55	YES	7.7
4	42	Total-pentadioxins	355.8546	29.16	1643.615	0.975	0.130		1.54	1.55	NO	19.2
5	42	Total-pentadioxins	355.8546	28.69	814.910	0.975	0.064		1.85	1.55	YES	8.5
6	12	12378-PeCDD	355.8546	31.35	724.260	0.975	0.057	0.050	1.89	1.55	YES	5.7

HD

	#	Name	Trace	RT	Abs.Resp	RRF M...	pg	EMPC	1º Rati...	1º Rati...	1º R...	S/N
1	15	123789-HxCDD	389.8157	36.57	1669.559	0.947	0.153	0.133	0.93	1.24	YES	11.1
2	14	123678-HxCDD	389.8157	36.17	944.850	0.971	0.082	0.069	1.66	1.24	YES	11.0
3	13	123478-HxCDD	389.8157	36.04	477.738	1.031	0.041	0.032	0.74	1.24	YES	4.0
4	43	Total-hexadioxins	389.8157	35.18	329.926	0.983	0.029		0.66	1.24	YES	4.4
5	43	Total-hexadioxins	389.8157	35.04	3443.836	0.983	0.304		1.06	1.24	NO	17.8
6	43	Total-hexadioxins	389.8157	34.67	1015.027	0.983	0.089		1.61	1.24	YES	6.9
7	43	Total-hexadioxins	389.8157	33.87	8329.155	0.983	0.734		1.11	1.24	NO	58.4

HPD

	#	Name	Trace	RT	Abs.Resp	RRF M...	pg	EMPC	1º Rati...	1º Rati...	1º R...	S/N
1	16	1234678-HpCDD	423.7766	40.87	16628.490	1.028	1.916	1.916	0.95	1.05	NO	200.7
2	44	Total-heptadioxins	423.7766	39.64	25475.950	1.028	2.936		1.05	1.05	NO	345.5

Dioxins,TD,PD,HD,HPD,OD

	#	Name	Trace	RT	Abs.Resp	RRF M...	pg	EMPC	1º Rati...	1º Rati...	1º R...	S/N
1	41	Total-tetradioxins	319.8965	23.43	1499.950	1.134	0.084		0.83	0.77	NO	7.7
2	41	Total-tetradioxins	319.8965	26.38	315.618	1.134	0.018		1.07	0.77	YES	4.0
3	41	Total-tetradioxins	319.8965	25.61	523.410	1.134	0.029		2.23	0.77	YES	5.5
4	41	Total-tetradioxins	319.8965	25.45	636.621	1.134	0.036		1.11	0.77	YES	4.8
5	41	Total-tetradioxins	319.8965	24.40	11384.831	1.134	0.636		0.74	0.77	NO	63.6
6	42	Total-pentadioxins	355.8546	30.30	339.102	0.975	0.027		1.56	1.55	NO	7.1
7	42	Total-pentadioxins	355.8546	30.26	409.012	0.975	0.032		0.99	1.55	YES	4.1
8	42	Total-pentadioxins	355.8546	30.14	699.945	0.975	0.055		1.06	1.55	YES	7.7
9	42	Total-pentadioxins	355.8546	29.16	1643.615	0.975	0.130		1.54	1.55	NO	19.2
10	42	Total-pentadioxins	355.8546	28.69	814.910	0.975	0.064		1.85	1.55	YES	8.5
11	12	12378-PeCDD	355.8546	31.35	724.260	0.975	0.057	0.050	1.89	1.55	YES	5.7
12	15	123789-HxCDD	389.8157	36.57	1669.559	0.947	0.153	0.133	0.93	1.24	YES	11.1
13	14	123678-HxCDD	389.8157	36.17	944.850	0.971	0.082	0.069	1.66	1.24	YES	11.0
14	13	123478-HxCDD	389.8157	36.04	477.738	1.031	0.041	0.032	0.74	1.24	YES	4.0
15	43	Total-hexadioxins	389.8157	35.18	329.926	0.983	0.029		0.66	1.24	YES	4.4
16	43	Total-hexadioxins	389.8157	35.04	3443.836	0.983	0.304		1.06	1.24	NO	17.8
17	43	Total-hexadioxins	389.8157	34.67	1015.027	0.983	0.089		1.61	1.24	YES	6.9
18	43	Total-hexadioxins	389.8157	33.87	8329.155	0.983	0.734		1.11	1.24	NO	58.4
19	17	OCDD	457.7377	46.64	107590.320	1.107	16.580	16.580	0.86	0.89	NO	345.9
20	16	1234678-HpCDD	423.7766	40.87	16628.490	1.028	1.916	1.916	0.95	1.05	NO	200.7
21	44	Total-heptadioxins	423.7766	39.64	25475.950	1.028	2.936		1.05	1.05	NO	345.5

ID: 16H0071-01, Name: 16082308, Date: 23-Aug-2016, Time: 16:02:59, Conditions: AUTOSPEC01, User: PK

TotalTEQ,Furans,Dioxins

	#	Name	Trace	RT	Abs.Resp	RRF M...	pg	EMPC	1º Rati...	1º Rati...	1º R...	S/N
1	35	Total-tetrafurans	303.9016	23.00	985.631	0.935	0.038		0.54	0.77	YES	7.3
2	38	Total-hexafurans	373.8208	34.14	1612.413	1.125	0.104		1.36	1.24	NO	19.9
3	38	Total-hexafurans	373.8208	33.29	351.646	1.125	0.023		1.24	1.24	NO	6.4
4	2	12378-PeCDF	339.8597	29.77	479.586	0.952	0.022	0.022	1.37	1.55	NO	6.8
5	39	Total-heptafurans	407.7818	39.87	12237.004	1.310	1.040		1.04	1.05	NO	199.3
6	8	1234678-HpCDF	407.7818	39.11	3060.930	1.303	0.227	0.190	0.75	1.05	YES	44.0
7	10	OCDF	441.7428	46.89	11551.430	1.166	1.690	1.690	0.85	0.89	NO	76.0
8	9	1234789-HpCDF	407.7818	41.73	277.039	1.317	0.028	0.017	0.47	1.05	YES	3.3
9	41	Total-tetradioxins	319.8965	23.43	1499.950	1.134	0.084		0.83	0.77	NO	7.7
10	41	Total-tetradioxins	319.8965	26.38	315.618	1.134	0.018		1.07	0.77	YES	4.0
11	41	Total-tetradioxins	319.8965	25.61	523.410	1.134	0.029		2.23	0.77	YES	5.5
12	41	Total-tetradioxins	319.8965	25.45	636.621	1.134	0.036		1.11	0.77	YES	4.8
13	41	Total-tetradioxins	319.8965	24.40	11384.831	1.134	0.636		0.74	0.77	NO	63.6
14	42	Total-pentadioxins	355.8546	30.30	339.102	0.975	0.027		1.56	1.55	NO	7.1
15	42	Total-pentadioxins	355.8546	30.26	409.012	0.975	0.032		0.99	1.55	YES	4.1
16	42	Total-pentadioxins	355.8546	30.14	699.945	0.975	0.055		1.06	1.55	YES	7.7
17	42	Total-pentadioxins	355.8546	29.16	1643.615	0.975	0.130		1.54	1.55	NO	19.2
18	42	Total-pentadioxins	355.8546	28.69	814.910	0.975	0.064		1.85	1.55	YES	8.5
19	12	12378-PeCDD	355.8546	31.35	724.260	0.975	0.057	0.050	1.89	1.55	YES	5.7
20	15	123789-HxCDD	389.8157	36.57	1669.559	0.947	0.153	0.133	0.93	1.24	YES	11.1
21	14	123678-HxCDD	389.8157	36.17	944.850	0.971	0.082	0.069	1.66	1.24	YES	11.0
22	13	123478-HxCDD	389.8157	36.04	477.738	1.031	0.041	0.032	0.74	1.24	YES	4.0
23	43	Total-hexadioxins	389.8157	35.18	329.926	0.983	0.029		0.66	1.24	YES	4.4
24	43	Total-hexadioxins	389.8157	35.04	3443.836	0.983	0.304		1.06	1.24	NO	17.8
25	43	Total-hexadioxins	389.8157	34.67	1015.027	0.983	0.089		1.61	1.24	YES	6.9
26	43	Total-hexadioxins	389.8157	33.87	8329.155	0.983	0.734		1.11	1.24	NO	58.4
27	17	OCDD	457.7377	46.64	107590.320	1.107	16.580	16.580	0.86	0.89	NO	345.9
28	16	1234678-HpCDD	423.7766	40.87	16628.490	1.028	1.916	1.916	0.95	1.05	NO	200.7
29	44	Total-heptadioxins	423.7766	39.64	25475.950	1.028	2.936		1.05	1.05	NO	345.5

PFK1

	#	Name	Trace	RT	Abs.Resp	RRF M...	pg	EMPC	1º Rati...	1º Rati...	1º R...	S/N
1	48	FUNCTION1 PFK	330.9792	23.94	0.000							15.0
2	48	FUNCTION1 PFK	330.9792	23.82	0.000							28.1
3	48	FUNCTION1 PFK	330.9792	22.72	0.000							69.9
4	48	FUNCTION1 PFK	330.9792	22.51	0.000							76.7
5	48	FUNCTION1 PFK	330.9792	22.16	0.000							89.0
6	48	FUNCTION1 PFK	330.9792	21.42	0.000							114.8
7	48	FUNCTION1 PFK	330.9792	21.15	0.000							74.9

ID: 16H0071-01, Name: 16082308, Date: 23-Aug-2016, Time: 16:02:59, Conditions: AUTOSPEC01, User: PK

PFK2

	#	Name	Trace	RT	Abs.Resp	RRF M...	pg	EMPC	1º Rati...	1º Rati...	1º R...	S/N
1	49	FUNCTION2 PFK	366.9792	28.14	0.000		0.000					1.0
2	49	FUNCTION2 PFK	366.9792	27.94	0.000		0.000					1.3
3	49	FUNCTION2 PFK	366.9792	30.25	0.000		0.000					1.0
4	49	FUNCTION2 PFK	366.9792	30.20	0.000		0.000					1.0
5	49	FUNCTION2 PFK	366.9792	30.06	0.000		0.000					1.2
6	49	FUNCTION2 PFK	366.9792	29.86	0.000		0.000					1.9
7	49	FUNCTION2 PFK	366.9792	29.74	0.000		0.000					1.5
8	49	FUNCTION2 PFK	366.9792	29.63	0.000		0.000					1.6
9	49	FUNCTION2 PFK	366.9792	29.54	0.000		0.000					1.4
10	49	FUNCTION2 PFK	366.9792	29.42	0.000		0.000					2.0
11	49	FUNCTION2 PFK	366.9792	29.37	0.000		0.000					1.7
12	49	FUNCTION2 PFK	366.9792	29.30	0.000		0.000					1.8
13	49	FUNCTION2 PFK	366.9792	29.06	0.000		0.000					1.8
14	49	FUNCTION2 PFK	366.9792	28.89	0.000		0.000					2.4
15	49	FUNCTION2 PFK	366.9792	28.84	0.000		0.000					1.5
16	49	FUNCTION2 PFK	366.9792	28.50	0.000		0.000					1.0
17	49	FUNCTION2 PFK	366.9792	28.28	0.000		0.000					1.3
18	49	FUNCTION2 PFK	366.9792	28.19	0.000		0.000					0.5
19	49	FUNCTION2 PFK	366.9792	32.44	0.000		0.000					1.2
20	49	FUNCTION2 PFK	366.9792	32.38	0.000		0.000					1.5
21	49	FUNCTION2 PFK	366.9792	32.25	0.000		0.000					1.2
22	49	FUNCTION2 PFK	366.9792	32.11	0.000		0.000					0.8
23	49	FUNCTION2 PFK	366.9792	32.03	0.000		0.000					1.5
24	49	FUNCTION2 PFK	366.9792	31.93	0.000		0.000					1.1
25	49	FUNCTION2 PFK	366.9792	31.75	0.000		0.000					1.0
26	49	FUNCTION2 PFK	366.9792	31.49	0.000		0.000					1.2
27	49	FUNCTION2 PFK	366.9792	31.23	0.000		0.000					0.8
28	49	FUNCTION2 PFK	366.9792	31.18	0.000		0.000					2.5
29	49	FUNCTION2 PFK	366.9792	31.00	0.000		0.000					1.1
30	49	FUNCTION2 PFK	366.9792	30.93	0.000		0.000					1.1
31	49	FUNCTION2 PFK	366.9792	30.86	0.000		0.000					1.8
32	49	FUNCTION2 PFK	366.9792	30.79	0.000		0.000					1.8
33	49	FUNCTION2 PFK	366.9792	30.67	0.000		0.000					1.6
34	49	FUNCTION2 PFK	366.9792	30.61	0.000		0.000					0.4
35	49	FUNCTION2 PFK	366.9792	32.48	0.000		0.000					0.8

ID: 16H0071-01, Name: 16082308, Date: 23-Aug-2016, Time: 16:02:59, Conditions: AUTOSPEC01, User: PK

PFK3

	#	Name	Trace	RT	Abs.Resp	RRF M...	pg	EMPC	1º Rati...	1º Rati...	1º R...	S/N
1	50	FUNCTION3 PFK	380.9760	35.51	0.000		0.000					0.5
2	50	FUNCTION3 PFK	380.9760	35.17	0.000		0.000					1.1
3	50	FUNCTION3 PFK	380.9760	35.12	0.000		0.000					0.5
4	50	FUNCTION3 PFK	380.9760	34.77	0.000		0.000					1.4
5	50	FUNCTION3 PFK	380.9760	34.66	0.000		0.000					1.5
6	50	FUNCTION3 PFK	380.9760	34.29	0.000		0.000					0.6
7	50	FUNCTION3 PFK	380.9760	33.79	0.000		0.000					1.7
8	50	FUNCTION3 PFK	380.9760	33.71	0.000		0.000					1.5
9	50	FUNCTION3 PFK	380.9760	33.28	0.000		0.000					2.4
10	50	FUNCTION3 PFK	380.9760	33.09	0.000		0.000					1.4
11	50	FUNCTION3 PFK	380.9760	33.00	0.000		0.000					1.2
12	50	FUNCTION3 PFK	380.9760	32.89	0.000		0.000					1.9
13	50	FUNCTION3 PFK	380.9760	32.78	0.000		0.000					0.7
14	50	FUNCTION3 PFK	380.9760	32.72	0.000		0.000					1.5
15	50	FUNCTION3 PFK	380.9760	37.88	0.000		0.000					0.5
16	50	FUNCTION3 PFK	380.9760	37.69	0.000		0.000					1.5
17	50	FUNCTION3 PFK	380.9760	37.60	0.000		0.000					0.5
18	50	FUNCTION3 PFK	380.9760	37.40	0.000		0.000					0.8
19	50	FUNCTION3 PFK	380.9760	36.85	0.000		0.000					1.6
20	50	FUNCTION3 PFK	380.9760	36.71	0.000		0.000					0.7
21	50	FUNCTION3 PFK	380.9760	36.43	0.000		0.000					1.7
22	50	FUNCTION3 PFK	380.9760	36.38	0.000		0.000					1.7
23	50	FUNCTION3 PFK	380.9760	36.25	0.000		0.000					1.6
24	50	FUNCTION3 PFK	380.9760	36.20	0.000		0.000					0.8
25	50	FUNCTION3 PFK	380.9760	36.14	0.000		0.000					0.6
26	50	FUNCTION3 PFK	380.9760	36.10	0.000		0.000					0.9
27	50	FUNCTION3 PFK	380.9760	35.80	0.000		0.000					0.9
28	50	FUNCTION3 PFK	380.9760	35.58	0.000		0.000					1.3
29	50	FUNCTION3 PFK	380.9760	35.54	0.000		0.000					0.6

ID: 16H0071-01, Name: 16082308, Date: 23-Aug-2016, Time: 16:02:59, Conditions: AUTOSPEC01, User: PK

PFK4

	#	Name	Trace	RT	Abs.Resp	RRF M...	pg	EMPC	1º Rati...	1º Rati...	1º R...	S/N
1	51	FUNCTION4 PFK	430.9728	40.00	0.000							1.0
2	51	FUNCTION4 PFK	430.9728	39.96	0.000							1.7
3	51	FUNCTION4 PFK	430.9728	39.83	0.000							1.1
4	51	FUNCTION4 PFK	430.9728	39.49	0.000							0.9
5	51	FUNCTION4 PFK	430.9728	39.44	0.000							0.5
6	51	FUNCTION4 PFK	430.9728	39.38	0.000							1.4
7	51	FUNCTION4 PFK	430.9728	39.26	0.000							0.6
8	51	FUNCTION4 PFK	430.9728	39.21	0.000							1.7
9	51	FUNCTION4 PFK	430.9728	39.10	0.000							1.0
10	51	FUNCTION4 PFK	430.9728	39.03	0.000							0.9
11	51	FUNCTION4 PFK	430.9728	38.71	0.000							2.3
12	51	FUNCTION4 PFK	430.9728	38.53	0.000							2.1
13	51	FUNCTION4 PFK	430.9728	38.49	0.000							1.6
14	51	FUNCTION4 PFK	430.9728	38.45	0.000							2.0
15	51	FUNCTION4 PFK	430.9728	38.41	0.000							1.7
16	51	FUNCTION4 PFK	430.9728	38.27	0.000							1.9
17	51	FUNCTION4 PFK	430.9728	41.47	0.000							1.5
18	51	FUNCTION4 PFK	430.9728	41.36	0.000							1.2
19	51	FUNCTION4 PFK	430.9728	41.30	0.000							0.6
20	51	FUNCTION4 PFK	430.9728	41.03	0.000							0.7
21	51	FUNCTION4 PFK	430.9728	40.97	0.000							0.5
22	51	FUNCTION4 PFK	430.9728	40.92	0.000							1.0
23	51	FUNCTION4 PFK	430.9728	40.82	0.000							1.0
24	51	FUNCTION4 PFK	430.9728	40.76	0.000							1.4
25	51	FUNCTION4 PFK	430.9728	40.68	0.000							1.3
26	51	FUNCTION4 PFK	430.9728	40.59	0.000							1.7
27	51	FUNCTION4 PFK	430.9728	40.52	0.000							2.1
28	51	FUNCTION4 PFK	430.9728	40.39	0.000							0.9
29	51	FUNCTION4 PFK	430.9728	40.32	0.000							1.0
30	51	FUNCTION4 PFK	430.9728	40.24	0.000							1.6
31	51	FUNCTION4 PFK	430.9728	40.13	0.000							1.3
32	51	FUNCTION4 PFK	430.9728	40.05	0.000							1.1
33	51	FUNCTION4 PFK	430.9728	42.82	0.000							1.0
34	51	FUNCTION4 PFK	430.9728	42.76	0.000							1.4
35	51	FUNCTION4 PFK	430.9728	42.72	0.000							1.6
36	51	FUNCTION4 PFK	430.9728	42.57	0.000							1.4
37	51	FUNCTION4 PFK	430.9728	42.52	0.000							1.0
38	51	FUNCTION4 PFK	430.9728	42.47	0.000							1.7
39	51	FUNCTION4 PFK	430.9728	42.30	0.000							1.0
40	51	FUNCTION4 PFK	430.9728	42.25	0.000							1.8
41	51	FUNCTION4 PFK	430.9728	42.21	0.000							2.0
42	51	FUNCTION4 PFK	430.9728	42.06	0.000							0.9
43	51	FUNCTION4 PFK	430.9728	41.95	0.000							0.4
44	51	FUNCTION4 PFK	430.9728	41.90	0.000							0.5
45	51	FUNCTION4 PFK	430.9728	41.84	0.000							0.9
46	51	FUNCTION4 PFK	430.9728	41.71	0.000							1.0
47	51	FUNCTION4 PFK	430.9728	41.66	0.000							0.5
48	51	FUNCTION4 PFK	430.9728	41.55	0.000							1.5
49	51	FUNCTION4 PFK	430.9728	44.45	0.000							0.6
50	51	FUNCTION4 PFK	430.9728	44.41	0.000							1.7
51	51	FUNCTION4 PFK	430.9728	44.36	0.000							0.9

ID: 16H0071-01, Name: 16082308, Date: 23-Aug-2016, Time: 16:02:59, Conditions: AUTOSPEC01, User: PK

PFK4

	#	Name	Trace	RT	Abs.Resp	RRF M...	pg	EMPC	1º Rati...	1º Rati...	1º R...	S/N
52	51	FUNCTION4 PFK	430.9728	44.28	0.000							0.5
53	51	FUNCTION4 PFK	430.9728	44.11	0.000							0.3
54	51	FUNCTION4 PFK	430.9728	44.04	0.000							0.6
55	51	FUNCTION4 PFK	430.9728	43.98	0.000							0.8
56	51	FUNCTION4 PFK	430.9728	43.64	0.000							1.6
57	51	FUNCTION4 PFK	430.9728	43.56	0.000							0.8
58	51	FUNCTION4 PFK	430.9728	43.52	0.000							0.9
59	51	FUNCTION4 PFK	430.9728	43.33	0.000							0.4
60	51	FUNCTION4 PFK	430.9728	43.16	0.000							1.5
61	51	FUNCTION4 PFK	430.9728	43.07	0.000							1.2

PFK5

	#	Name	Trace	RT	Abs.Resp	RRF M...	pg	EMPC	1º Rati...	1º Rati...	1º R...	S/N
1												

ETHERS1

	#	Name	Trace	RT	Abs.Resp	RRF M...	pg	EMPC	1º Rati...	1º Rati...	1º R...	S/N
1	53	FUNCTION1 HXCD...	375.8364	25.39	0.000		0.000					4.8

ETHERS2

	#	Name	Trace	RT	Abs.Resp	RRF M...	pg	EMPC	1º Rati...	1º Rati...	1º R...	S/N
1												

ETHERS3

	#	Name	Trace	RT	Abs.Resp	RRF M...	pg	EMPC	1º Rati...	1º Rati...	1º R...	S/N
1	55	FUNCTION2 HPCD...	409.7974	30.93	0.000		0.000					7.8

ETHERS4

	#	Name	Trace	RT	Abs.Resp	RRF M...	pg	EMPC	1º Rati...	1º Rati...	1º R...	S/N
1	56	FUNCTION3 OCDPE	445.7555	33.64	0.000		0.000					6.9

ETHERS5

	#	Name	Trace	RT	Abs.Resp	RRF M...	pg	EMPC	1º Rati...	1º Rati...	1º R...	S/N
1	57	FUNCTION4 NCDPE	479.7165	41.17	0.000		0.000					4.4
2	57	FUNCTION4 NCDPE	479.7165	38.65	0.000		0.000					4.8

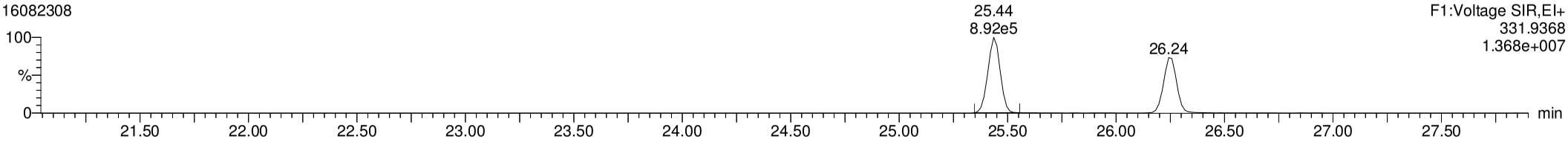
ETHERS6

	#	Name	Trace	RT	Abs.Resp	RRF M...	pg	EMPC	1º Rati...	1º Rati...	1º R...	S/N
1												

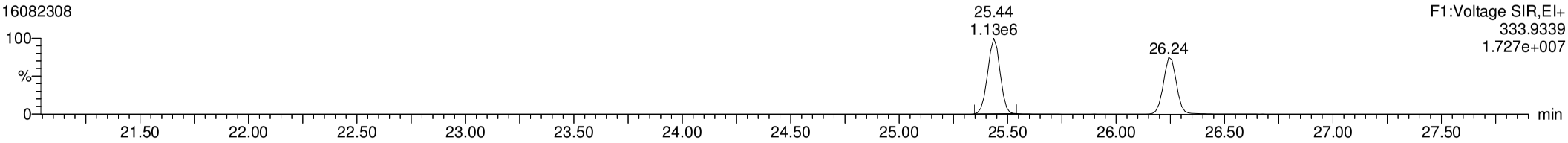
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ID: 16H0071-01, Name: 16082308, Date: 23-Aug-2016, Time: 16:02:59, Conditions: AUTOSPEC01, User: PK

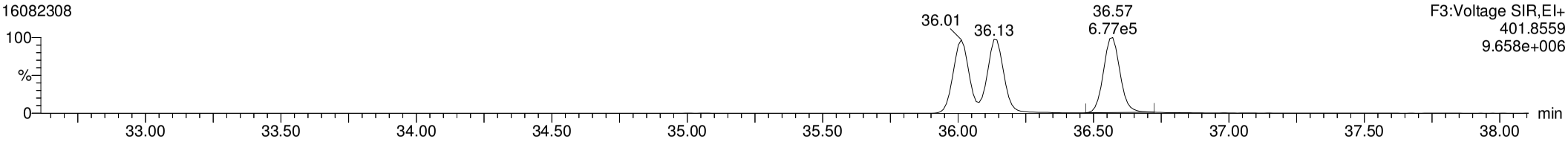
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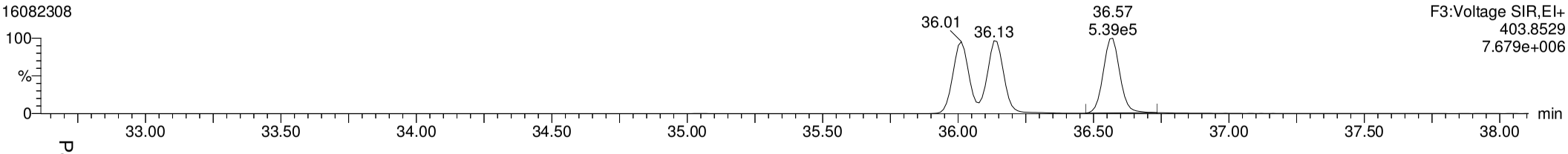
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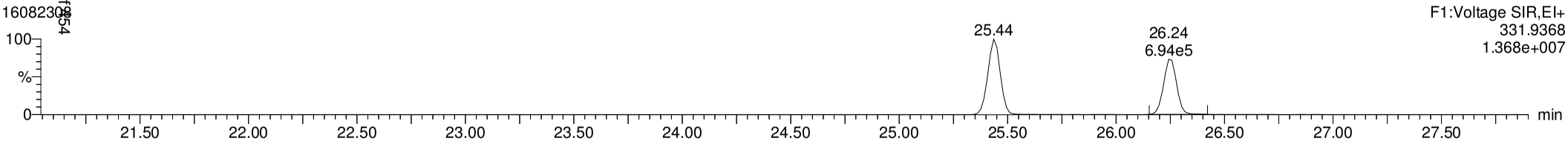


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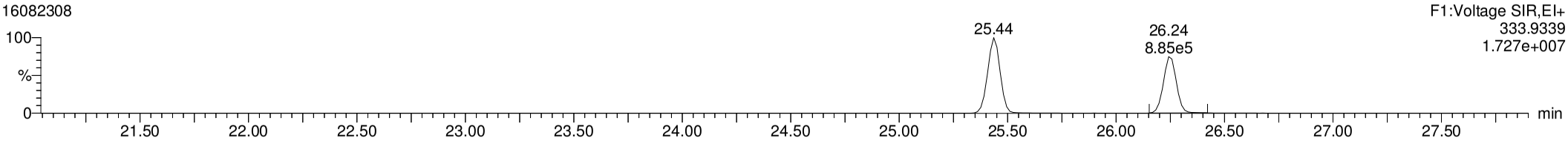


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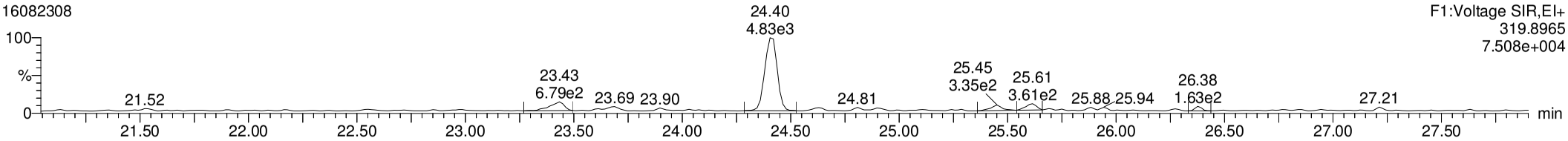
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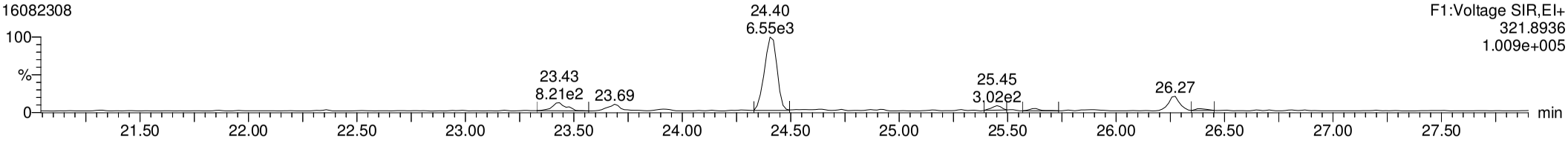
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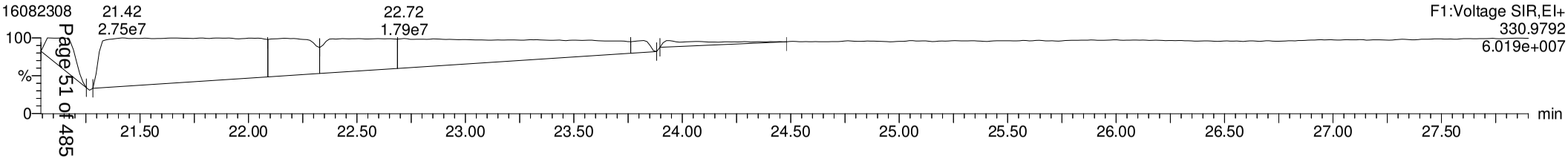
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Total-tetradioxins



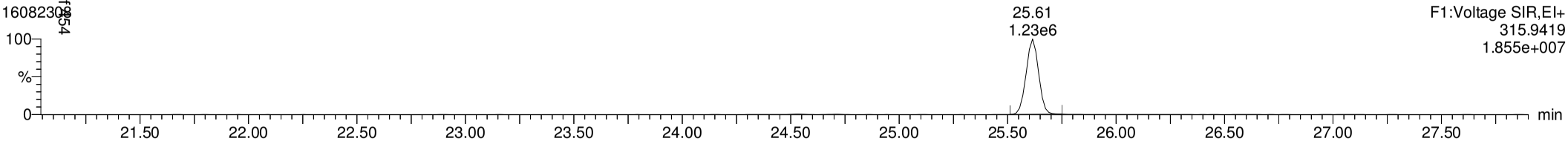
FUNCTION1 PFK



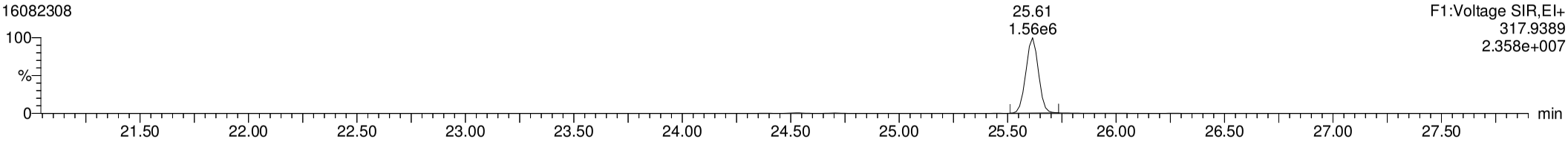
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Page 2378 of 3054

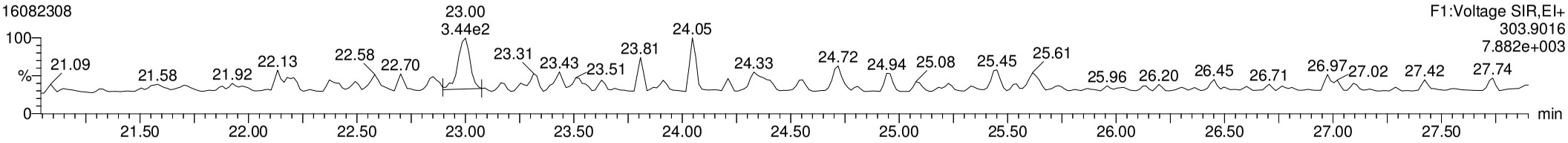
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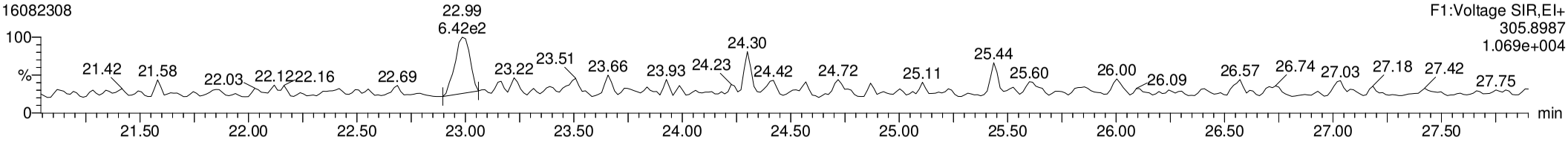
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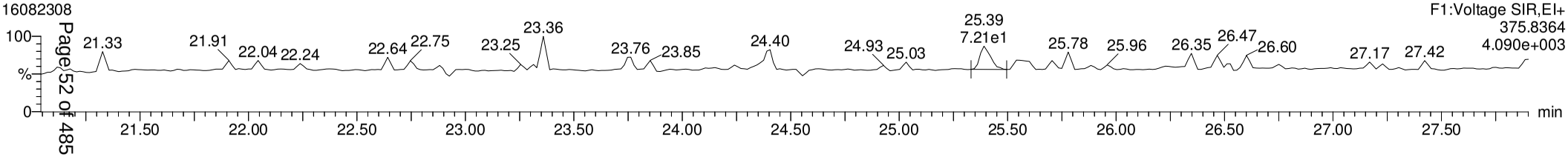
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Total-tetrafurans



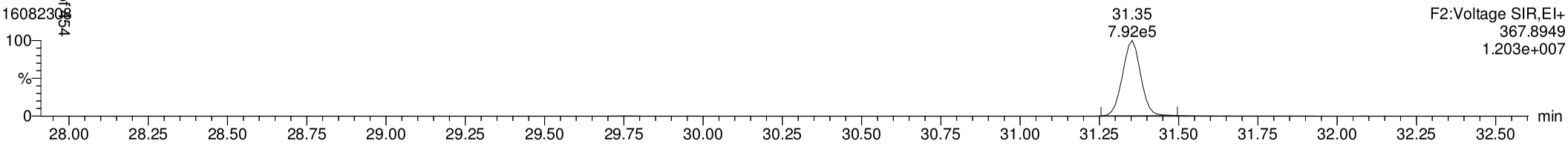
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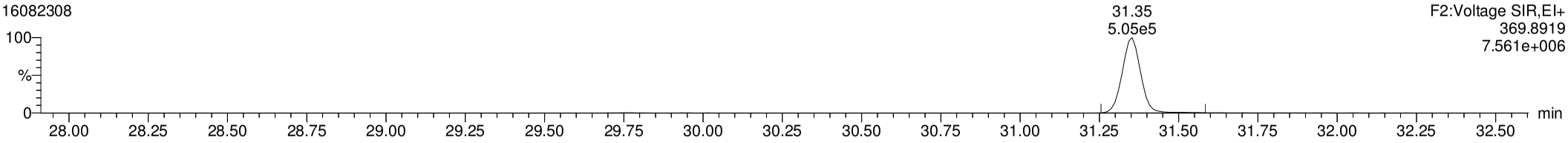
Page 52 of 485

ID: 16L0071-01, Name: 16082308, Date: 23-Aug-2016, Time: 16:02:59, Conditions: AUTOSPEC01, User: PK

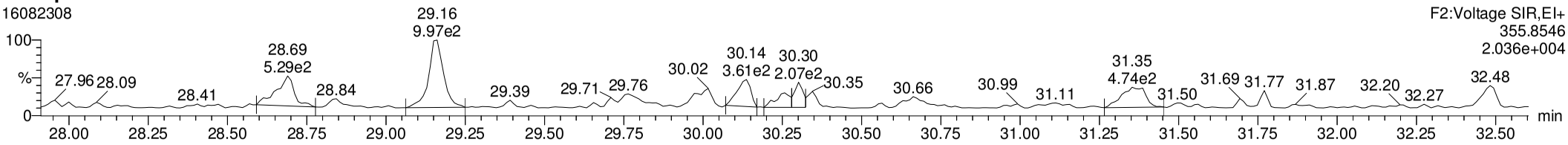
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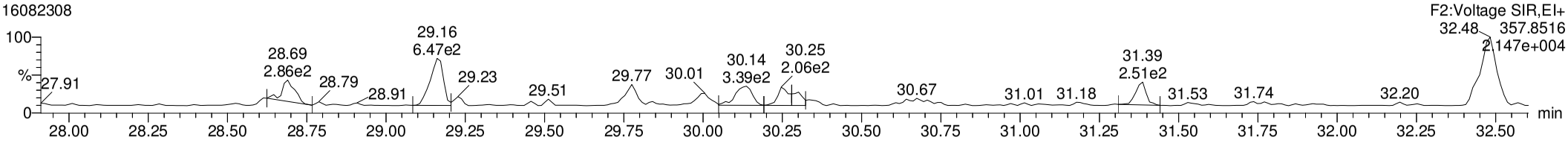
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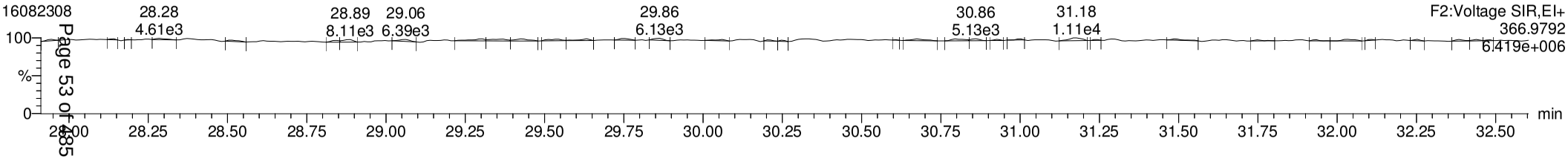
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Total-pentadioxins



FUNCTION2 PFK

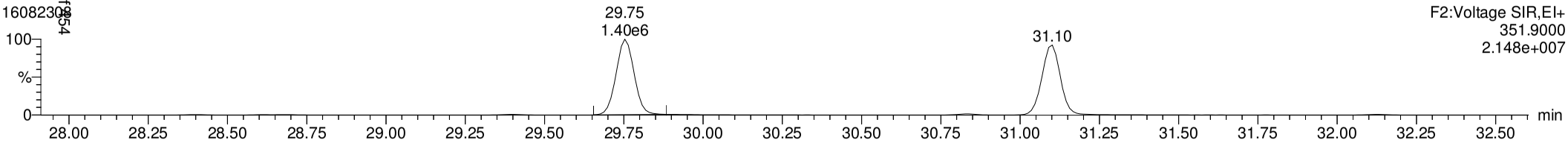


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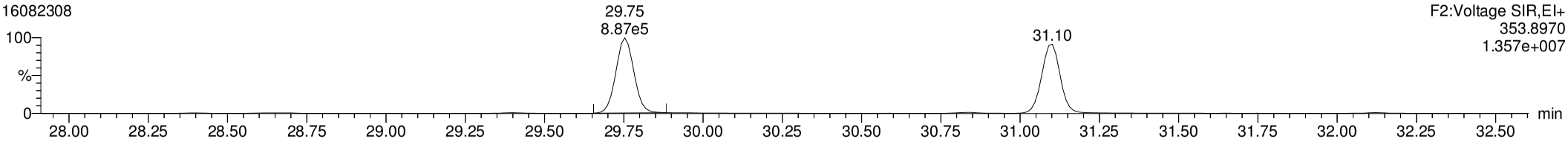
Page 2 of 54

ID: 16L0071-01, Name: 16082308, Date: 23-Aug-2016, Time: 16:02:59, Conditions: AUTOSPEC01, User: PK

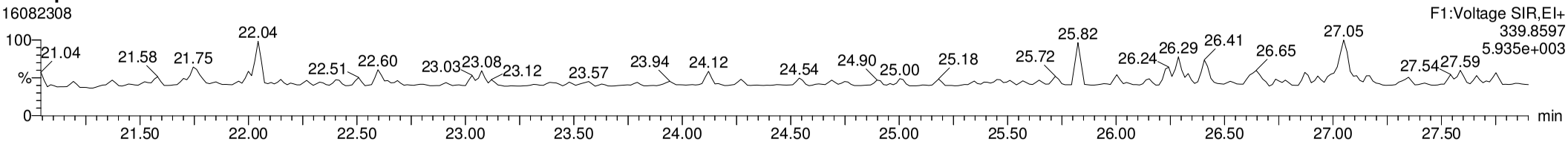
13C-12378-PeCDF



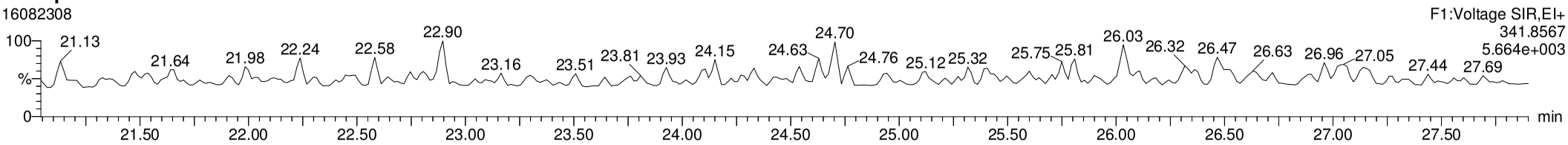
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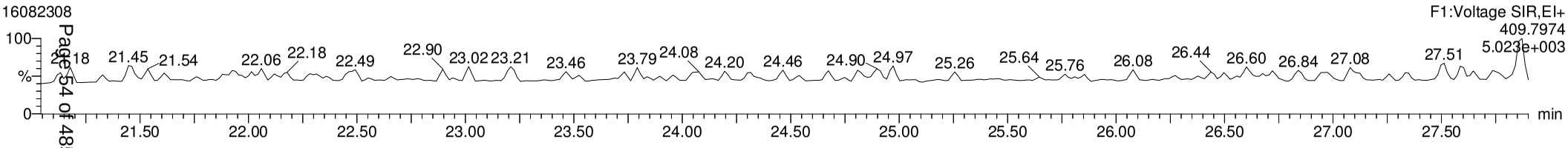
Total-penta1



Total-penta1



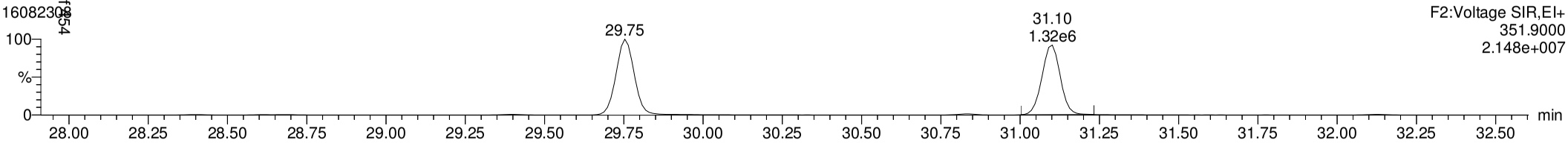
FUNCTION1 HPCDPE



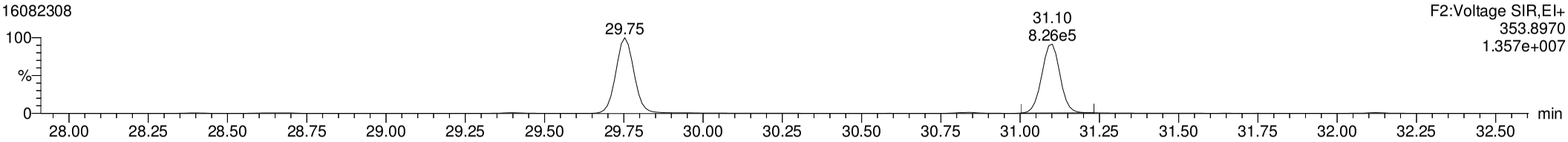
Page 54 of 485

ID: 16L0071-01, Name: 16082308, Date: 23-Aug-2016, Time: 16:02:59, Conditions: AUTOSPEC01, User: PK

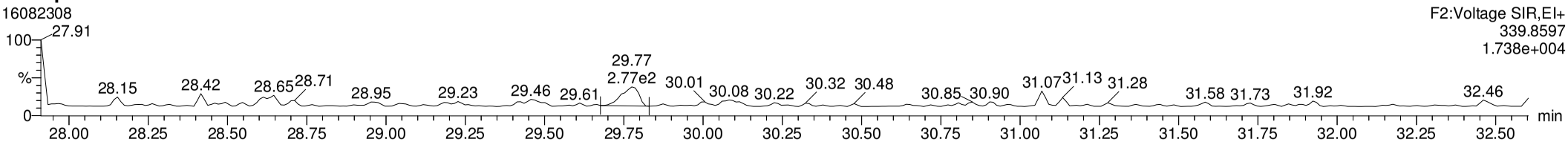
13C-23478-PeCDF



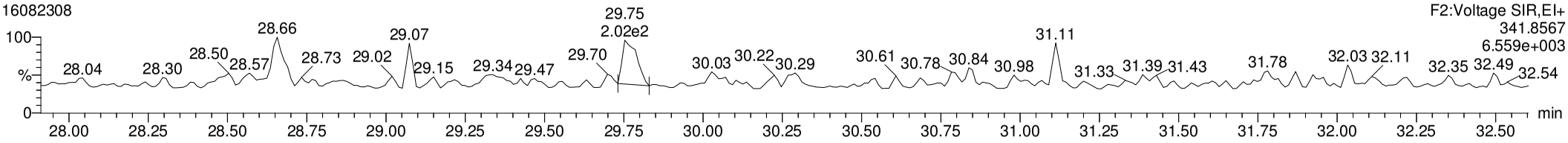
13C-23478-PeCDF



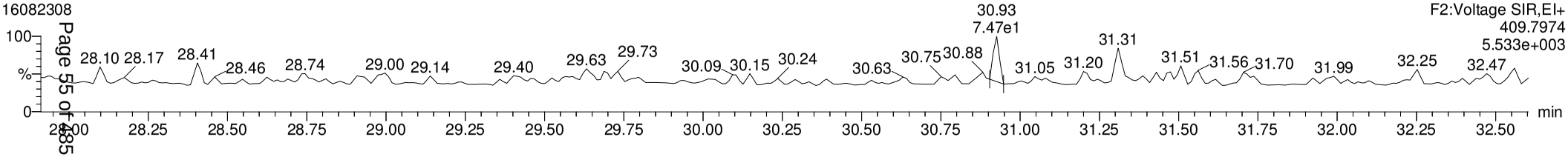
Total-pentafurans



Total-pentafurans

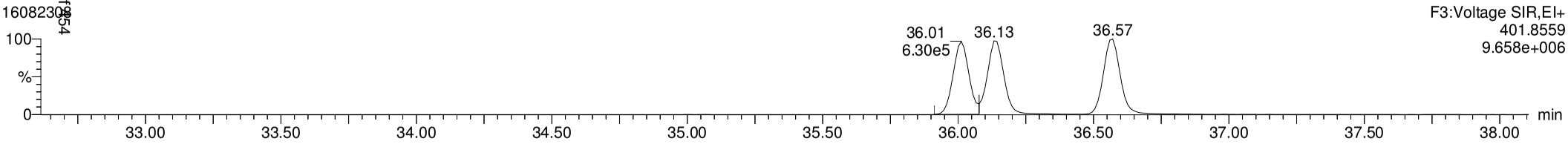


FUNCTION2 HPCDPE

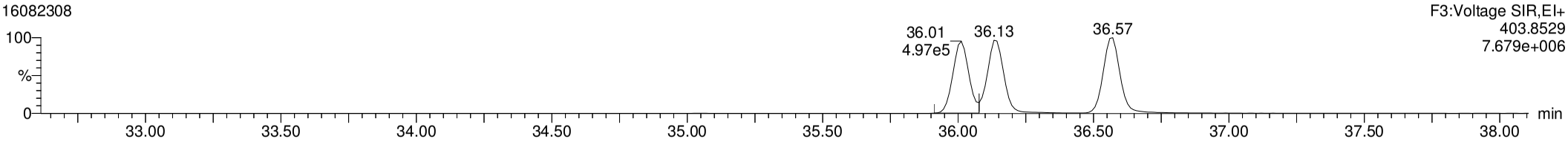


ID: 16L0071-01, Name: 16082308, Date: 23-Aug-2016, Time: 16:02:59, Conditions: AUTOSPEC01, User: PK

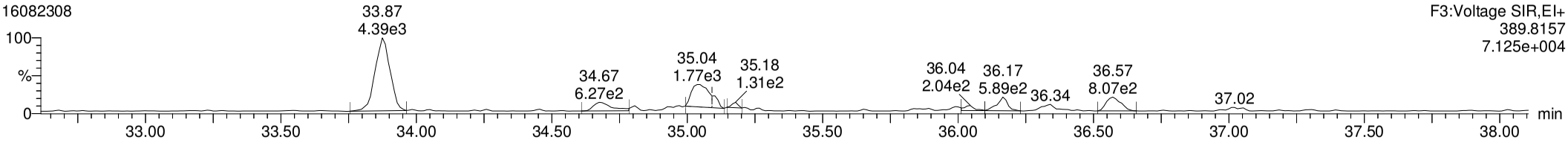
13C-123478-HxCDD



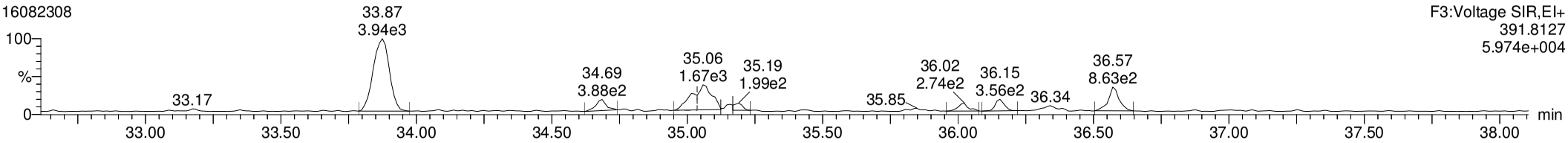
13C-123478-HxCDD



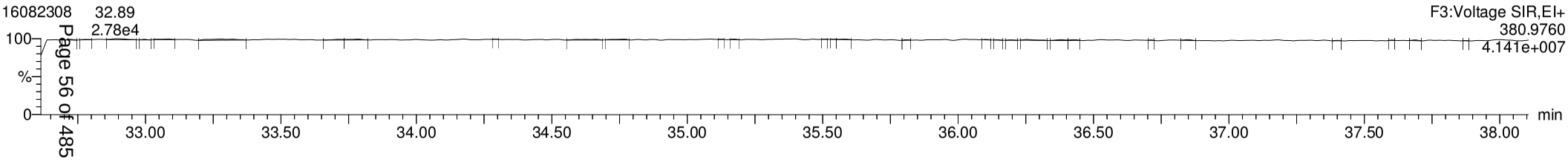
Total-hexadioxins



Total-hexadioxins

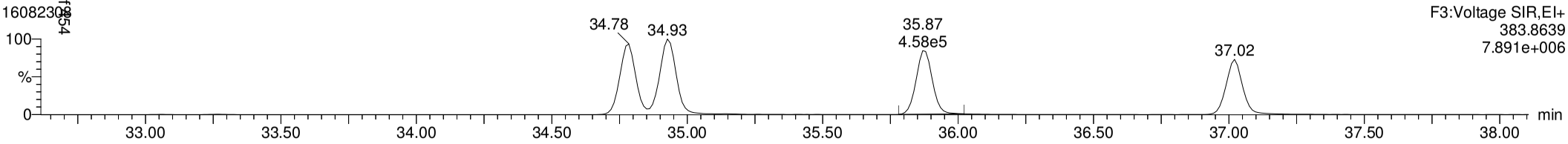


FUNCTION3 PFK

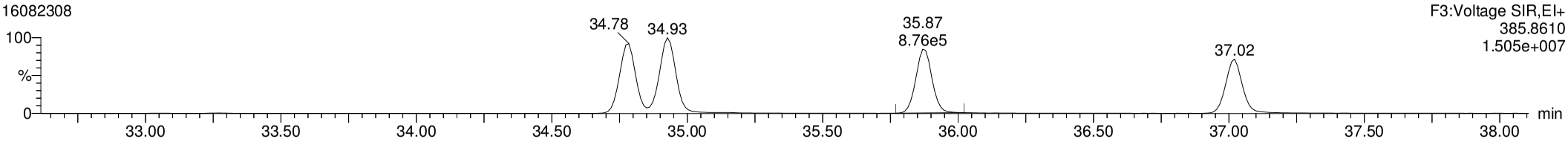


ID: 16L0071-01, Name: 16082308, Date: 23-Aug-2016, Time: 16:02:59, Conditions: AUTOSPEC01, User: PK

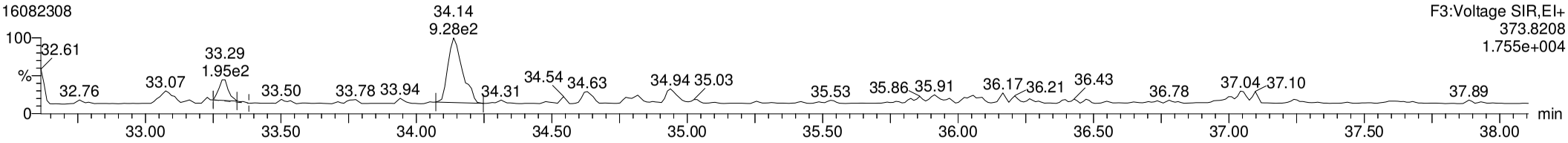
13C-234678-HxCDF



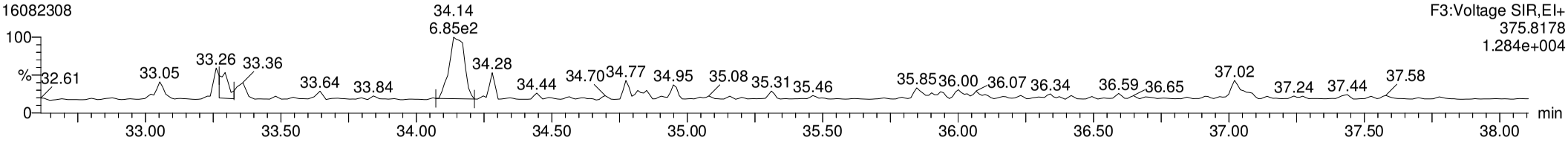
13C-234678-HxCDF



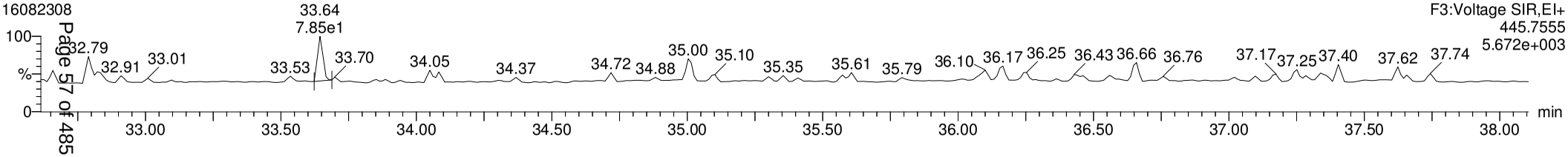
Total-hexafurans



Total-hexafurans



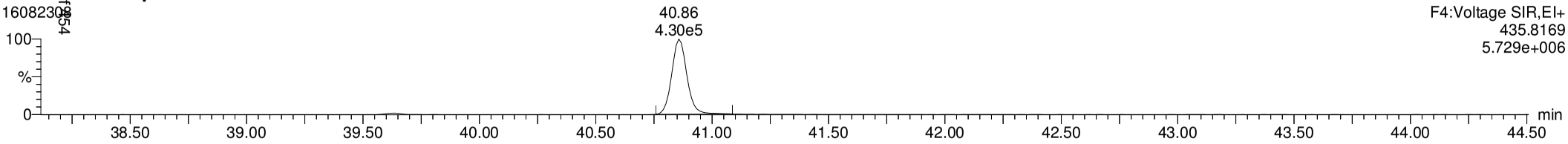
FUNCTION3 OCDPE



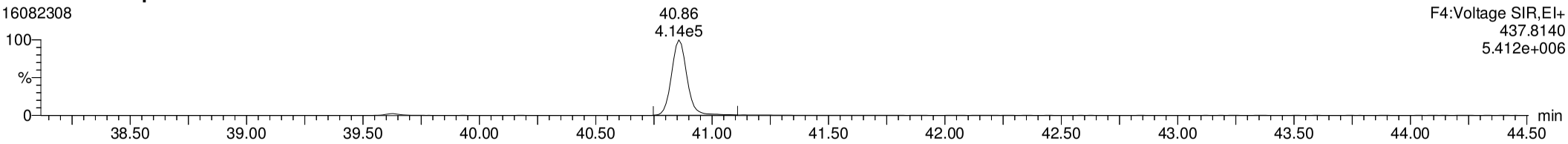
Dataset: C:\MassLynx\Dioxin.pro\160823DATA1.qld
Last Altered: Thursday, August 25, 2016 12:51:34 Pacific Daylight Time
Printed: Thursday, August 25, 2016 15:46:38 Pacific Daylight Time

ID: 16L0071-01, Name: 16082308, Date: 23-Aug-2016, Time: 16:02:59, Conditions: AUTOSPEC01, User: PK

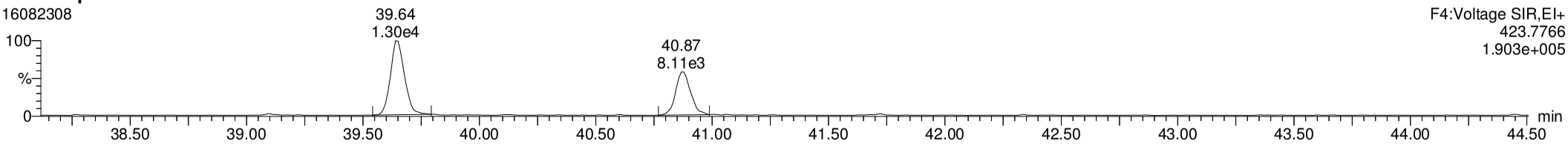
13C-1234678-HpCDD



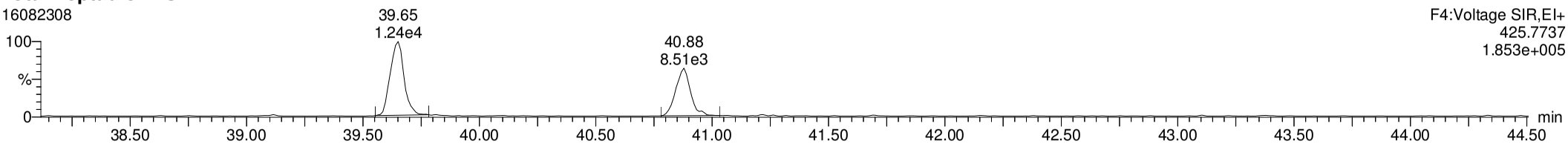
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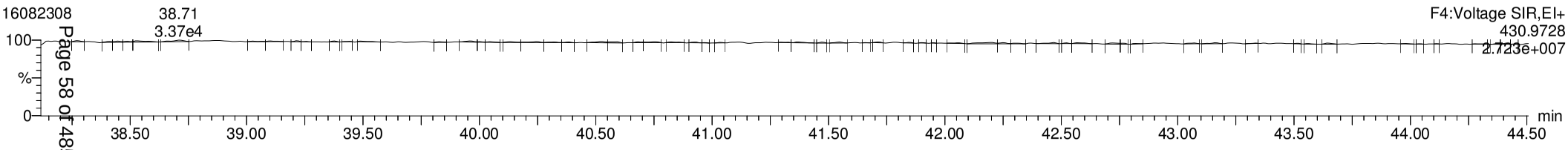
Total-heptadioxins



Total-heptadioxins



FUNCTION4 PFK

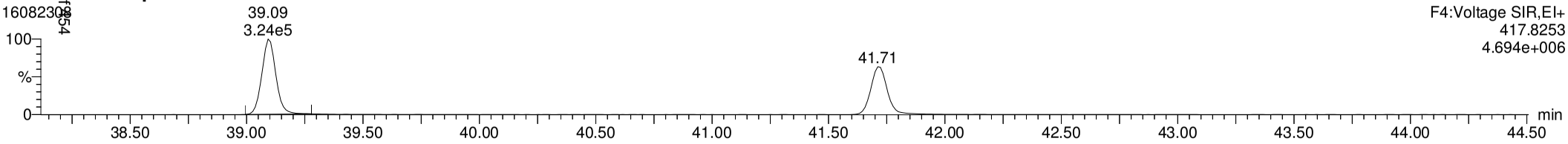


Dataset: C:\MassLynx\Dioxin.pro\160823DATA1.qld
Last Altered: Thursday, August 25, 2016 12:51:34 Pacific Daylight Time
Printed: Thursday, August 25, 2016 15:46:38 Pacific Daylight Time

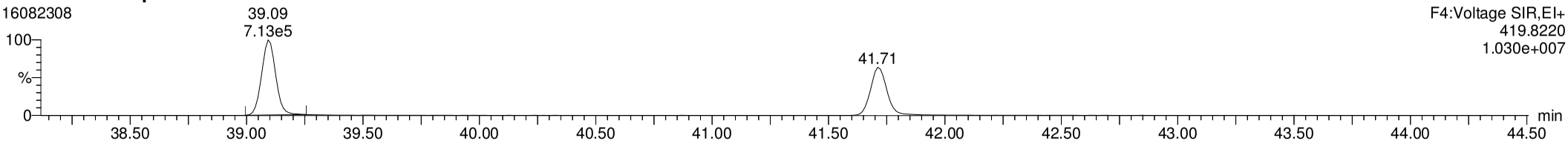
ID: 16L0071-01, Name: 16082308, Date: 23-Aug-2016, Time: 16:02:59, Conditions: AUTOSPEC01, User: PK

Page 30 of 54

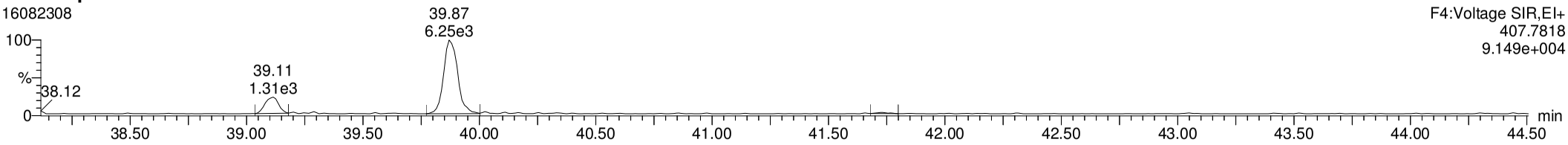
13C-1234678-HpCDF



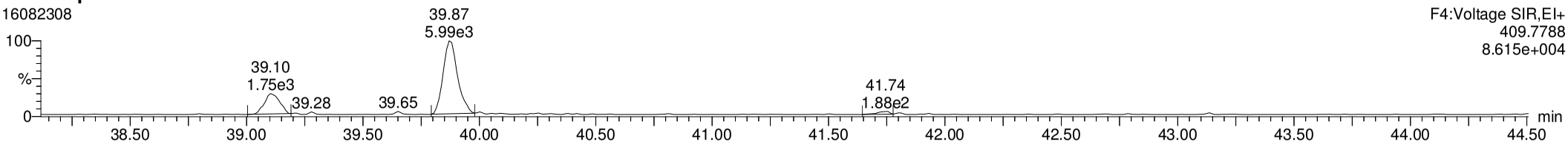
13C-1234678-HpCDF



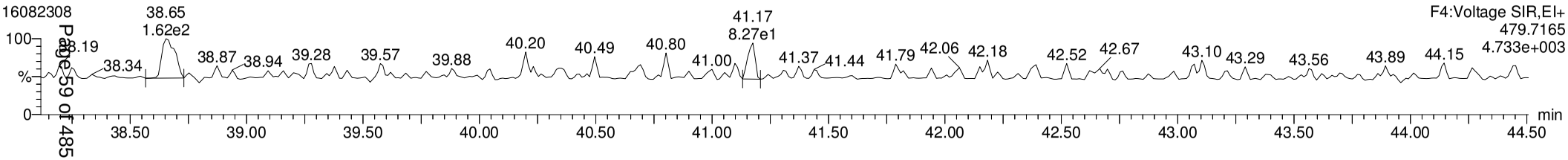
Total-heptafurans



Total-heptafurans



FUNCTION4 NCDPE



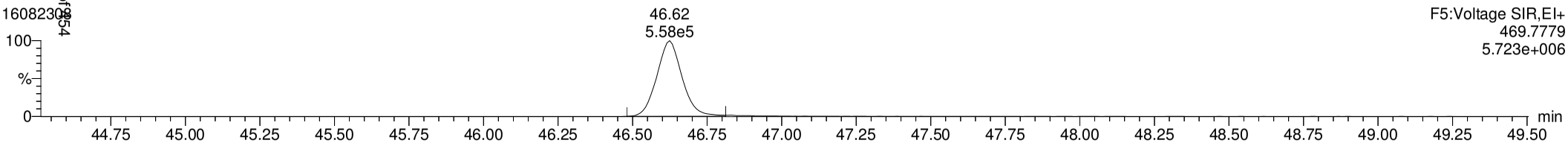
Page 59 of 485

Dataset: C:\MassLynx\Dioxin.pro\160823DATA1.qld
Last Altered: Thursday, August 25, 2016 12:51:34 Pacific Daylight Time
Printed: Thursday, August 25, 2016 15:46:38 Pacific Daylight Time

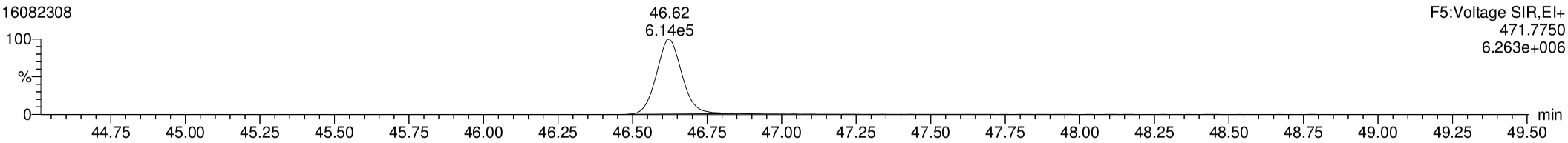
ID: 16L0071-01, Name: 16082308, Date: 23-Aug-2016, Time: 16:02:59, Conditions: AUTOSPEC01, User: PK

Page 31 of 54

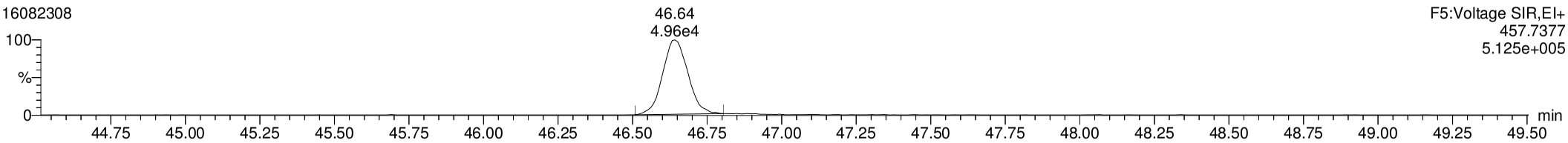
13C-OCDD



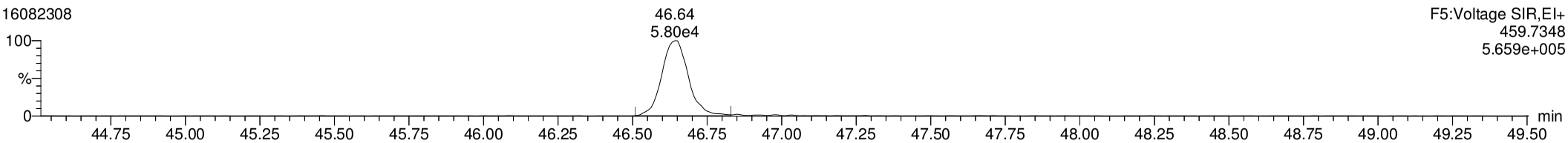
13C-OCDD



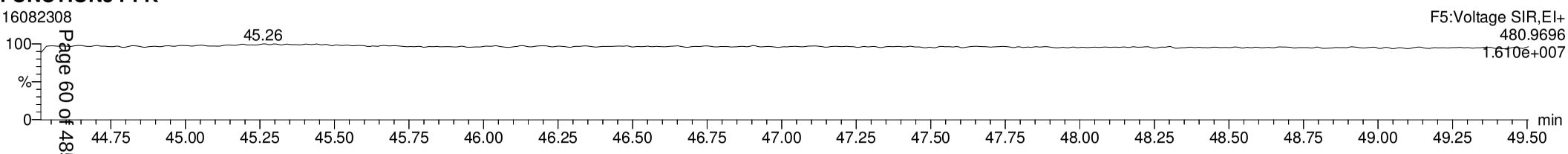
OCDD



OCDD



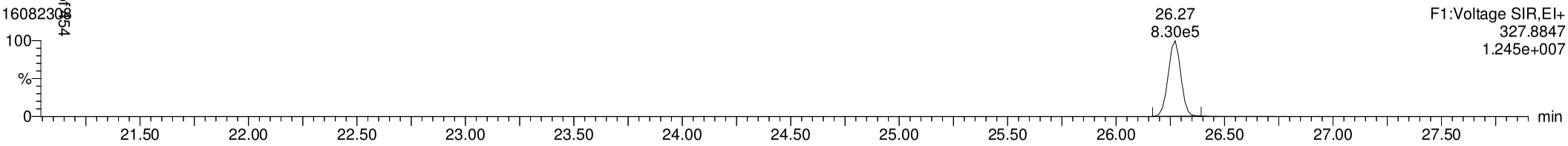
FUNCTION5 PFK



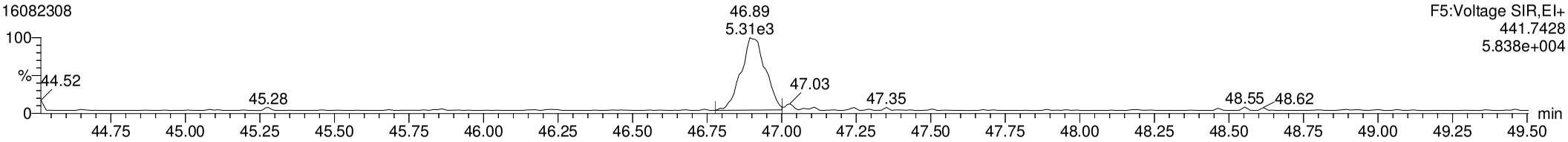
Page 60 of 485

ID: 16L0071-01, Name: 16082308, Date: 23-Aug-2016, Time: 16:02:59, Conditions: AUTOSPEC01, User: PK

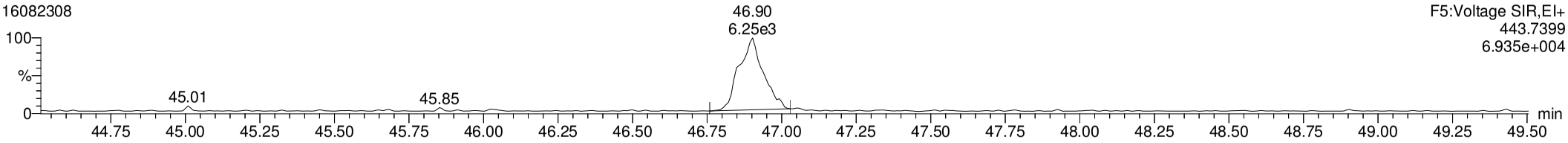
37CL-2378-TCDD



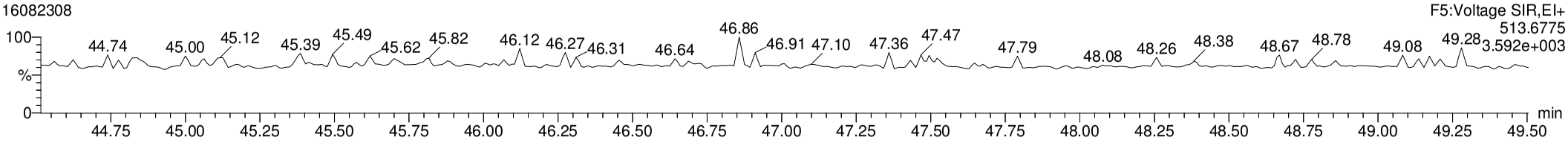
OCDF



OCDF



FUNCTION5 DCDPE



NME:4-7C

Form I
ORGANIC ANALYSIS DATA SHEET
EPA 1613B
Dioxin 1613B

Laboratory:	Analytical Resources, Inc.			SDG:	16H0071
Client:	Fremont Analytical			Project:	1608094
Matrix:	soil	Laboratory ID:	16H0071-02	File ID:	16082309
Sampled:	08/10/16 11:50	Prepared:	08/18/16 15:40	Analyzed:	08/23/16 16:56
Solids Wt%:	86.19	Preparation:	EPA 1613	Initial/Final:	11.65 g / 20 uL
Result Basis:	Dry	Sequence:	SEH0246	Calibration:	ZE00016
Batch:	BEH0316	Instrument:	AUTOSPEC01	Column:	RTX-Dioxin2

CAS NO.	COMPOUND	DF/Split	Ion Ratio	Ratio Limits	EDL	RL	Result	Units	Q
51207-31-9	2,3,7,8-TCDF	1	0.000	0.655-0.886	0.024	0.996	ND	ng/kg	U
1746-01-6	2,3,7,8-TCDD	1	0.000	0.655-0.886	0.033	0.996	ND	ng/kg	U
57117-41-6	1,2,3,7,8-PeCDF	1	0.000	1.318-1.783	0.035	0.996	ND	ng/kg	U
57117-31-4	2,3,4,7,8-PeCDF	1	0.000	1.318-1.783	0.036	0.996	ND	ng/kg	U
40321-76-4	1,2,3,7,8-PeCDD	1	1.906	1.318-1.783		0.996	0.035	ng/kg	EMPC, J
70648-26-9	1,2,3,4,7,8-HxCDF	1	0.000	1.054-1.426	0.03	0.996	ND	ng/kg	U
57117-44-9	1,2,3,6,7,8-HxCDF	1	0.000	1.054-1.426	0.03	0.996	ND	ng/kg	U
60851-34-5	2,3,4,6,7,8-HxCDF	1	0.000	1.054-1.426	0.031	0.996	ND	ng/kg	U
72918-21-9	1,2,3,7,8,9-HxCDF	1	1.281	1.054-1.426		0.996	0.043	ng/kg	J, B
39227-28-6	1,2,3,4,7,8-HxCDD	1	0.000	1.054-1.426	0.068	0.996	ND	ng/kg	U
57653-85-7	1,2,3,6,7,8-HxCDD	1	0.000	1.054-1.426	0.072	0.996	ND	ng/kg	U
19408-74-3	1,2,3,7,8,9-HxCDD	1	1.204	1.054-1.426		0.996	0.160	ng/kg	J, B
67562-39-4	1,2,3,4,6,7,8-HpCDF	1	0.000	0.893-1.208	0.034	0.996	ND	ng/kg	U
58200-70-7	1,2,3,4,7,8,9-HpCDF	1	0.000	0.893-1.208	0.057	0.996	ND	ng/kg	U
35822-46-9	1,2,3,4,6,7,8-HpCDD	1	1.077	0.893-1.208		0.996	1.73	ng/kg	B
39001-02-0	OCDF	1	0.000	0.757-1.024	0.101	1.99	ND	ng/kg	U
3268-87-9	OCDD	1	0.834	0.757-1.024		9.96	17.5	ng/kg	B

Homologue Groups

55722-27-5	Total TCDF	1	0.000			0.996	0.105	ng/kg
41903-57-5	Total TCDD	1	0.000			0.996	1.27	ng/kg
30402-15-4	Total PeCDF	1	0.000			0.996	ND	ng/kg
36088-22-9	Total PeCDD	1	0.000			0.996	0.484	ng/kg
55684-94-1	Total HxCDF	1	0.000			0.996	0.043	ng/kg
34465-46-8	Total HxCDD	1	0.000			0.996	1.66	ng/kg
38998-75-3	Total HpCDF	1	0.000			0.996	ND	ng/kg
37871-00-4	Total HpCDD	1	0.000			0.996	4.95	ng/kg

Total 2,3,7,8-TCDD Equivalence (WHO2005, ND=0, Including EMPC): 0.078
Total 2,3,7,8-TCDD Equivalence (WHO2005, ND=1/2 EDL, Including EMPC): 0.149

NME:4-7C

Form I

ORGANIC ANALYSIS DATA SHEET

EPA 1613B

Dioxin 1613B

Laboratory:	Analytical Resources, Inc.			SDG:	16H0071
Client:	Fremont Analytical			Project:	1608094
Matrix:	soil	Laboratory ID:	16H0071-02	File ID:	16082309
Sampled:	08/10/16 11:50	Prepared:	08/18/16 15:40	Analyzed:	08/23/16 16:56
Solids Wt%:	86.19	Preparation:	EPA 1613	Initial/Final:	11.65 g / 20 uL
Result Basis:	Dry	Sequence:	SEH0246	Calibration:	ZE00016
Batch:	BEH0316	Instrument:	AUTOSPEC01	Column:	RTX-Dioxin2

Labels	DF/Split	Ion Ratio	Ratio Limits	EDL	% REC	QC LIMITS	Q
13C12-2,3,7,8-TCDF		0.786	0.655-0.886		92.7	24 - 169 %	
13C12-2,3,7,8-TCDD		0.782	0.655-0.886		94.0	25 - 164 %	
13C12-1,2,3,7,8-PeCDF		1.593	1.318-1.783		83.1	24 - 185 %	
13C12-2,3,4,7,8-PeCDF		1.577	1.318-1.783		80.4	21 - 178 %	
13C12-1,2,3,7,8-PeCDD		1.590	1.318-1.783		79.5	25 - 181 %	
13C12-1,2,3,4,7,8-HxCDF		0.514	0.434-0.587		91.2	26 - 152 %	
13C12-1,2,3,6,7,8-HxCDF		0.528	0.434-0.587		86.2	26 - 123 %	
13C12-2,3,4,6,7,8-HxCDF		0.516	0.434-0.587		86.5	28 - 136 %	
13C12-1,2,3,7,8,9-HxCDF		0.507	0.434-0.587		87.0	29 - 147 %	
13C12-1,2,3,4,7,8-HxCDD		1.276	1.054-1.426		91.6	32 - 141 %	
13C12-1,2,3,6,7,8-HxCDD		1.262	1.054-1.426		86.7	28 - 130 %	
13C12-1,2,3,4,6,7,8-HpCDF		0.457	0.374-0.506		78.8	28 - 143 %	
13C12-1,2,3,4,7,8,9-HpCDF		0.456	0.374-0.506		72.2	26 - 138 %	
13C12-1,2,3,4,6,7,8-HpCDD		1.041	0.893-1.208		76.9	23 - 140 %	
13C12-OCDD		0.900	0.757-1.024		54.1	17 - 157 %	
37C14-2,3,7,8-TCDD		328.000			101	35 - 197 %	

* Values outside of QC limits

Dataset: C:\MassLynx\Dioxin.pro\160823DATA1.qld
Last Altered: Thursday, August 25, 2016 12:51:34 Pacific Daylight Time
Printed: Thursday, August 25, 2016 15:46:43 Pacific Daylight Time

Page 30 of 45

Method: C:\MassLynx\Dioxin.pro\MethDB\Dioxin1608163SN.mdb 17 Aug 2016 15:09:47
Calibration: C:\MassLynx\Dioxin.pro\CurveDB\160510ICAL.cdb 11 May 2016 09:28:40

ID: 16H0071-02, Name: 16082309, Date: 23-Aug-2016, Time: 16:56:22, Conditions: AUTOSPEC01, User: PK

Name	RT	RRT	Ion1Area	Ion2Area	RRF	Ratio	Pred R	Noise 1	Noise 2	Height 1	Height 2	S/N	EMPC?	EMPC	pg
2378-TCDF					0.935		0.770	889	838						
12378-PeCDF					0.952		1.550	691	1217						
23478-PeCDF					0.963		1.550	691	1217						
123478-HxCDF					1.137		1.240	611	587						
234678-HxCDF					1.164		1.240	611	587						
123678-HxCDF					1.099		1.240	611	587						
123789-HxCDF	37.020	1.000	1.54e2	1.20e2	1.101	1.281	1.240	611	587	5.35e3	3.19e3	8.8	NO	0.022	0.022
1234678-HpCDF					1.303		1.050	724	392						
1234789-HpCDF					1.317		1.050	724	392						
OCDF					1.166		0.890	386	582						
2378-TCDD					1.134		0.770	1076	706						
12378-PeCDD	31.365	1.001	1.44e2	7.56e1	0.975	1.906	1.550	1083	643	3.33e3	2.19e3	3.1	YES	0.015	0.017
123478-HxCDD					1.031		1.240	927	966						
123678-HxCDD					0.971		1.240	927	966						
123789-HxCDD	36.571	1.012	4.56e2	3.79e2	0.947	1.204	1.240	927	966	6.90e3	5.17e3	7.4	NO	0.080	0.080
1234678-HpCDD	40.868	1.000	3.59e3	3.33e3	1.028	1.077	1.050	587	875	5.08e4	4.33e4	86.6	NO	0.869	0.869
OCDD	46.633	1.000	2.18e4	2.61e4	1.107	0.834	0.890	601	533	2.16e5	2.67e5	359.2	NO	8.784	8.784
13C-2378-TCDF	25.600	1.007	1.38e6	1.76e6	1.567	0.786	0.770	4305	2883	2.03e7	2.57e7	4708.2	NO		92.665
13C-12378-PeCDF	29.753	1.170	1.41e6	8.83e5	1.274	1.593	1.550	3659	3524	2.11e7	1.32e7	5759.9	NO		83.068
13C-23478-PeCDF	31.090	1.222	1.31e6	8.33e5	1.235	1.577	1.550	3659	3524	2.00e7	1.26e7	5467.2	NO		80.395
13C-123478-HxCDF	34.773	0.951	4.74e5	9.23e5	1.381	0.514	0.510	2462	2866	7.06e6	1.36e7	2868.5	NO		91.218
13C-123678-HxCDF	34.916	0.955	5.19e5	9.82e5	1.569	0.528	0.510	2462	2866	7.57e6	1.43e7	3074.5	NO		86.215
13C-234678-HxCDF	35.869	0.981	4.39e5	8.51e5	1.345	0.516	0.510	2462	2866	6.67e6	1.26e7	2707.6	NO		86.474
13C-123789-HxCDF	37.009	1.012	3.84e5	7.57e5	1.183	0.507	0.510	2462	2866	5.54e6	1.07e7	2250.6	NO		87.021
13C-1234678-HpCDF	39.092	1.069	3.23e5	7.06e5	1.178	0.457	0.440	2038	3070	4.68e6	1.00e7	2298.2	NO		78.751
13C-1234789-HpCDF	41.711	1.141	2.20e5	4.83e5	0.878	0.456	0.440	2038	3070	2.76e6	5.98e6	1353.2	NO		72.158
13C-1234-TCDD	25.436	0.000	9.54e5	1.21e6	1.000	0.790	0.770	2615	1422	1.42e7	1.78e7	5417.7	NO		100.000
13C-2378-TCDD	26.243	1.032	8.09e5	1.04e6	0.908	0.782	0.770	2615	1422	1.23e7	1.55e7	4709.6	NO		93.965
13C-12378-PeCDD	31.343	1.232	7.97e5	5.01e5	0.756	1.590	1.550	984	1416	1.20e7	7.35e6	12169.2	NO		79.457
13C-123478-HxCDD	36.001	0.985	6.01e5	4.71e5	1.056	1.276	1.240	2532	1948	9.02e6	7.13e6	3561.5	NO		91.597
13C-123678-HxCDD	36.132	0.988	6.24e5	4.94e5	1.163	1.262	1.240	2532	1948	9.01e6	7.18e6	3558.8	NO		86.717
13C-1234678-HpCDD	40.846	1.117	3.95e5	3.80e5	0.909	1.041	1.050	2175	2002	5.21e6	4.93e6	2395.7	NO		76.885
13C-OCDD	46.615	1.275	4.66e5	5.18e5	0.820	0.900	0.890	2036	1963	4.63e6	5.12e6	2275.3	NO		108.212
13C-123789-HxCDD	36.560	0.000	6.16e5	4.94e5	1.000	1.247	1.240	2532	1948	8.91e6	7.15e6	3517.7	NO		100.000
Total-tetrafurans			9.06e2		0.935			889		1.31e4					0.053

Dataset: C:\MassLynx\Dioxin.pro\160823DATA1.qld
Last Altered: Thursday, August 25, 2016 12:51:34 Pacific Daylight Time
Printed: Thursday, August 25, 2016 15:46:43 Pacific Daylight Time

ID: 16L0071-02, Name: 16082309, Date: 23-Aug-2016, Time: 16:56:22, Conditions: AUTOSPEC01, User: PK

Name	RT	RRT	Ion1Area	Ion2Area	RRF	Ratio	Pred R	Noise 1	Noise 2	Height 1	Height 2	S/N	EMPC?	EMPC	pg
Total-penta1			0.00e0					561		0.00e0					
Total-pentafurans			0.00e0		0.957			691		0.00e0					
Total-hexafurans			1.54e2		1.125			611		5.35e3					0.022
Total-heptafurans			0.00e0		1.310			724		0.00e0					
Total-Furans			1.06e3		1.114			889		1.84e4					0.075
Total-tetradioxins			5.83e3		1.134			1076		9.79e4					0.640
Total-pentadioxins			2.00e3		0.975			1083		3.38e4					0.243
Total-hexadioxins			4.74e3		0.983			927		7.97e4					0.833
Total-heptadioxins			1.04e4		1.028			587		1.43e5					2.483
Total-Dioxins			4.48e4		1.028			1076		5.76e5					12.996
Total-TEQ			4.59e4					1076		5.94e5					13.071
37CL-2378-TCDD	26.257	1.032	9.35e5		1.067			831		1.39e7		16768.3			40.539
FUNCTION1 PFK			3.13e7					310493		2.81e8					
FUNCTION2 PFK			2.10e5					90634		5.94e6					0.000
FUNCTION3 PFK			3.40e5					296802		9.17e6					0.000
FUNCTION4 PFK			0.00e0					253803		0.00e0					
FUNCTION5 PFK			0.00e0					140711		0.00e0					
FUNCTION1 HXCD...			1.18e2					224		3.81e3					0.000
FUNCTION1 HPCD...			1.57e2					469		3.69e3					0.000
FUNCTION2 HPCD...			0.00e0					566		0.00e0					
FUNCTION3 OCDPE			0.00e0					214		0.00e0					
FUNCTION4 NCDPE			0.00e0					397		0.00e0					
FUNCTION5 DCDPE			0.00e0					168		0.00e0					

Method: C:\MassLynx\Dioxin.pro\MethDB\Dioxin1608163SN.mdb 17 Aug 2016 15:09:47
Calibration: C:\MassLynx\Dioxin.pro\CurveDB\160510ICAL.cdb 11 May 2016 09:28:40

ID: 16H0071-02, Name: 16082309, Date: 23-Aug-2016, Time: 16:56:22, Conditions: AUTOSPEC01, User: PK

TF

	#	Name	Trace	RT	Abs.Resp	RRF	M...	pg	EMPC	1º Rati...	1º Rati...	1º R...	S/N
1	35	Total-tetrafurans	303.9016	27.02	849.950	0.935		0.029		1.36	0.77	YES	8.4
2	35	Total-tetrafurans	303.9016	22.96	698.225	0.935		0.024		1.47	0.77	YES	6.3

PP

	#	Name	Trace	RT	Abs.Resp	RRF	M...	pg	EMPC	1º Rati...	1º Rati...	1º R...	S/N
1													

PF

	#	Name	Trace	RT	Abs.Resp	RRF	M...	pg	EMPC	1º Rati...	1º Rati...	1º R...	S/N
1													

HF

	#	Name	Trace	RT	Abs.Resp	RRF	M...	pg	EMPC	1º Rati...	1º Rati...	1º R...	S/N
1	7	123789-HxCDF	373.8208	37.02	274.176	1.101		0.022	0.022	1.28	1.24	NO	8.8

HPF

	#	Name	Trace	RT	Abs.Resp	RRF	M...	pg	EMPC	1º Rati...	1º Rati...	1º R...	S/N
1													

Furans,TF,PP,PF,HF,HPF,OF

	#	Name	Trace	RT	Abs.Resp	RRF	M...	pg	EMPC	1º Rati...	1º Rati...	1º R...	S/N
1	35	Total-tetrafurans	303.9016	27.02	849.950	0.935		0.029		1.36	0.77	YES	8.4
2	35	Total-tetrafurans	303.9016	22.96	698.225	0.935		0.024		1.47	0.77	YES	6.3
3	7	123789-HxCDF	373.8208	37.02	274.176	1.101		0.022	0.022	1.28	1.24	NO	8.8

TD

	#	Name	Trace	RT	Abs.Resp	RRF	M...	pg	EMPC	1º Rati...	1º Rati...	1º R...	S/N
1	41	Total-tetradioxins	319.8965	25.45	721.013	1.134		0.034		0.82	0.77	NO	6.0
2	41	Total-tetradioxins	319.8965	24.40	12082.388	1.134		0.578		0.78	0.77	NO	81.8
3	41	Total-tetradioxins	319.8965	23.93	576.848	1.134		0.028		0.61	0.77	YES	3.2

PD

	#	Name	Trace	RT	Abs.Resp	RRF	M...	pg	EMPC	1º Rati...	1º Rati...	1º R...	S/N
1	12	12378-PeCDD	355.8546	31.36	219.616	0.975		0.017	0.015	1.91	1.55	YES	3.1
2	42	Total-pentadioxins	355.8546	30.30	337.952	0.975		0.027		3.41	1.55	YES	5.5
3	42	Total-pentadioxins	355.8546	30.27	324.583	0.975		0.026		1.30	1.55	YES	4.4
4	42	Total-pentadioxins	355.8546	29.98	362.552	0.975		0.029		0.94	1.55	YES	3.2
5	42	Total-pentadioxins	355.8546	29.76	526.333	0.975		0.042		2.95	1.55	YES	3.9
6	42	Total-pentadioxins	355.8546	29.15	1304.018	0.975		0.103		1.80	1.55	YES	11.2

ID: 16H0071-02, Name: 16082309, Date: 23-Aug-2016, Time: 16:56:22, Conditions: AUTOSPEC01, User: PK

HD

	#	Name	Trace	RT	Abs.Resp	RRF M...	pg	EMPC	1º Rati...	1º Rati...	1º R...	S/N
1	15	123789-HxCDD	389.8157	36.57	834.802	0.947	0.080	0.080	1.20	1.24	NO	7.4
2	43	Total-hexadioxins	389.8157	36.33	332.117	0.983	0.031		0.57	1.24	YES	3.5
3	43	Total-hexadioxins	389.8157	35.06	934.431	0.983	0.087		0.46	1.24	YES	9.8
4	43	Total-hexadioxins	389.8157	35.04	936.226	0.983	0.087		0.77	1.24	YES	8.9
5	43	Total-hexadioxins	389.8157	34.66	472.739	0.983	0.044		2.07	1.24	YES	8.5
6	43	Total-hexadioxins	389.8157	33.85	5430.095	0.983	0.504		1.37	1.24	NO	47.7

HPD

	#	Name	Trace	RT	Abs.Resp	RRF M...	pg	EMPC	1º Rati...	1º Rati...	1º R...	S/N
1	16	1234678-HpCDD	423.7766	40.87	6923.647	1.028	0.869	0.869	1.08	1.05	NO	86.6
2	44	Total-heptadioxins	423.7766	39.65	12865.829	1.028	1.614		1.11	1.05	NO	157.4

Dioxins,TD,PD,HD,HPD,OD

	#	Name	Trace	RT	Abs.Resp	RRF M...	pg	EMPC	1º Rati...	1º Rati...	1º R...	S/N
1	45	Total-Dioxins	319.8965	21.10	247.678	1.028	0.013		2.07	0.77	YES	4.5
2	41	Total-tetradioxins	319.8965	25.45	721.013	1.134	0.034		0.82	0.77	NO	6.0
3	41	Total-tetradioxins	319.8965	24.40	12082.388	1.134	0.578		0.78	0.77	NO	81.8
4	41	Total-tetradioxins	319.8965	23.93	576.848	1.134	0.028		0.61	0.77	YES	3.2
5	12	12378-PeCDD	355.8546	31.36	219.616	0.975	0.017	0.015	1.91	1.55	YES	3.1
6	42	Total-pentadioxins	355.8546	30.30	337.952	0.975	0.027		3.41	1.55	YES	5.5
7	42	Total-pentadioxins	355.8546	30.27	324.583	0.975	0.026		1.30	1.55	YES	4.4
8	42	Total-pentadioxins	355.8546	29.98	362.552	0.975	0.029		0.94	1.55	YES	3.2
9	42	Total-pentadioxins	355.8546	29.76	526.333	0.975	0.042		2.95	1.55	YES	3.9
10	42	Total-pentadioxins	355.8546	29.15	1304.018	0.975	0.103		1.80	1.55	YES	11.2
11	15	123789-HxCDD	389.8157	36.57	834.802	0.947	0.080	0.080	1.20	1.24	NO	7.4
12	43	Total-hexadioxins	389.8157	36.33	332.117	0.983	0.031		0.57	1.24	YES	3.5
13	43	Total-hexadioxins	389.8157	35.06	934.431	0.983	0.087		0.46	1.24	YES	9.8
14	43	Total-hexadioxins	389.8157	35.04	936.226	0.983	0.087		0.77	1.24	YES	8.9
15	43	Total-hexadioxins	389.8157	34.66	472.739	0.983	0.044		2.07	1.24	YES	8.5
16	43	Total-hexadioxins	389.8157	33.85	5430.095	0.983	0.504		1.37	1.24	NO	47.7
17	16	1234678-HpCDD	423.7766	40.87	6923.647	1.028	0.869	0.869	1.08	1.05	NO	86.6
18	44	Total-heptadioxins	423.7766	39.65	12865.829	1.028	1.614		1.11	1.05	NO	157.4
19	17	OCDD	457.7377	46.63	47830.217	1.107	8.784	8.784	0.83	0.89	NO	359.2

ID: 16H0071-02, Name: 16082309, Date: 23-Aug-2016, Time: 16:56:22, Conditions: AUTOSPEC01, User: PK

TotalTEQ,Furans,Dioxins

	#	Name	Trace	RT	Abs.Resp	RRF M...	pg	EMPC	1º Rati...	1º Rati...	1º R...	S/N
1	35	Total-tetrafurans	303.9016	27.02	849.950	0.935	0.029		1.36	0.77	YES	8.4
2	35	Total-tetrafurans	303.9016	22.96	698.225	0.935	0.024		1.47	0.77	YES	6.3
3	7	123789-HxCDF	373.8208	37.02	274.176	1.101	0.022	0.022	1.28	1.24	NO	8.8
4	45	Total-Dioxins	319.8965	21.10	247.678	1.028	0.013		2.07	0.77	YES	4.5
5	41	Total-tetradioxins	319.8965	25.45	721.013	1.134	0.034		0.82	0.77	NO	6.0
6	41	Total-tetradioxins	319.8965	24.40	12082.388	1.134	0.578		0.78	0.77	NO	81.8
7	41	Total-tetradioxins	319.8965	23.93	576.848	1.134	0.028		0.61	0.77	YES	3.2
8	12	12378-PeCDD	355.8546	31.36	219.616	0.975	0.017	0.015	1.91	1.55	YES	3.1
9	42	Total-pentadioxins	355.8546	30.30	337.952	0.975	0.027		3.41	1.55	YES	5.5
10	42	Total-pentadioxins	355.8546	30.27	324.583	0.975	0.026		1.30	1.55	YES	4.4
11	42	Total-pentadioxins	355.8546	29.98	362.552	0.975	0.029		0.94	1.55	YES	3.2
12	42	Total-pentadioxins	355.8546	29.76	526.333	0.975	0.042		2.95	1.55	YES	3.9
13	42	Total-pentadioxins	355.8546	29.15	1304.018	0.975	0.103		1.80	1.55	YES	11.2
14	15	123789-HxCDD	389.8157	36.57	834.802	0.947	0.080	0.080	1.20	1.24	NO	7.4
15	43	Total-hexadioxins	389.8157	36.33	332.117	0.983	0.031		0.57	1.24	YES	3.5
16	43	Total-hexadioxins	389.8157	35.06	934.431	0.983	0.087		0.46	1.24	YES	9.8
17	43	Total-hexadioxins	389.8157	35.04	936.226	0.983	0.087		0.77	1.24	YES	8.9
18	43	Total-hexadioxins	389.8157	34.66	472.739	0.983	0.044		2.07	1.24	YES	8.5
19	43	Total-hexadioxins	389.8157	33.85	5430.095	0.983	0.504		1.37	1.24	NO	47.7
20	16	1234678-HpCDD	423.7766	40.87	6923.647	1.028	0.869	0.869	1.08	1.05	NO	86.6
21	44	Total-heptadioxins	423.7766	39.65	12865.829	1.028	1.614		1.11	1.05	NO	157.4
22	17	OCDD	457.7377	46.63	47830.217	1.107	8.784	8.784	0.83	0.89	NO	359.2

ID: 16H0071-02, Name: 16082309, Date: 23-Aug-2016, Time: 16:56:22, Conditions: AUTOSPEC01, User: PK

PFK1

	#	Name	Trace	RT	Abs.Resp	RRF M...	pg	EMPC	1º Rati...	1º Rati...	1º R...	S/N
1	48	FUNCTION1 PFK	330.9792	21.98	0.000							44.0
2	48	FUNCTION1 PFK	330.9792	21.92	0.000							45.8
3	48	FUNCTION1 PFK	330.9792	21.75	0.000							48.4
4	48	FUNCTION1 PFK	330.9792	21.66	0.000							49.6
5	48	FUNCTION1 PFK	330.9792	21.54	0.000							54.2
6	48	FUNCTION1 PFK	330.9792	21.42	0.000							57.0
7	48	FUNCTION1 PFK	330.9792	21.36	0.000							58.5
8	48	FUNCTION1 PFK	330.9792	21.30	0.000							60.0
9	48	FUNCTION1 PFK	330.9792	21.09	0.000							43.4
10	48	FUNCTION1 PFK	330.9792	24.32	0.000							0.7
11	48	FUNCTION1 PFK	330.9792	24.06	0.000							7.2
12	48	FUNCTION1 PFK	330.9792	23.91	0.000							7.9
13	48	FUNCTION1 PFK	330.9792	23.82	0.000							12.6
14	48	FUNCTION1 PFK	330.9792	23.57	0.000							17.5
15	48	FUNCTION1 PFK	330.9792	23.42	0.000							20.6
16	48	FUNCTION1 PFK	330.9792	23.33	0.000							23.2
17	48	FUNCTION1 PFK	330.9792	23.19	0.000							23.3
18	48	FUNCTION1 PFK	330.9792	23.09	0.000							24.9
19	48	FUNCTION1 PFK	330.9792	23.03	0.000							25.7
20	48	FUNCTION1 PFK	330.9792	22.94	0.000							29.6
21	48	FUNCTION1 PFK	330.9792	22.73	0.000							32.5
22	48	FUNCTION1 PFK	330.9792	22.58	0.000							34.6
23	48	FUNCTION1 PFK	330.9792	22.27	0.000							39.7
24	48	FUNCTION1 PFK	330.9792	22.21	0.000							41.1
25	48	FUNCTION1 PFK	330.9792	22.04	0.000							43.6
26	48	FUNCTION1 PFK	330.9792	26.29	0.000							3.0
27	48	FUNCTION1 PFK	330.9792	26.24	0.000							2.7
28	48	FUNCTION1 PFK	330.9792	26.14	0.000							1.8
29	48	FUNCTION1 PFK	330.9792	26.05	0.000							1.1
30	48	FUNCTION1 PFK	330.9792	25.97	0.000							0.6
31	48	FUNCTION1 PFK	330.9792	25.91	0.000							0.4
32	48	FUNCTION1 PFK	330.9792	25.59	0.000							1.4
33	48	FUNCTION1 PFK	330.9792	25.53	0.000							2.2
34	48	FUNCTION1 PFK	330.9792	25.39	0.000							2.2
35	48	FUNCTION1 PFK	330.9792	25.26	0.000							2.3
36	48	FUNCTION1 PFK	330.9792	25.08	0.000							1.3
37	48	FUNCTION1 PFK	330.9792	24.91	0.000							1.3
38	48	FUNCTION1 PFK	330.9792	24.85	0.000							1.9
39	48	FUNCTION1 PFK	330.9792	24.72	0.000							2.4
40	48	FUNCTION1 PFK	330.9792	24.61	0.000							1.0
41	48	FUNCTION1 PFK	330.9792	24.49	0.000							2.3
42	48	FUNCTION1 PFK	330.9792	27.81	0.000							0.6
43	48	FUNCTION1 PFK	330.9792	27.50	0.000							1.3
44	48	FUNCTION1 PFK	330.9792	27.33	0.000							1.4
45	48	FUNCTION1 PFK	330.9792	27.20	0.000							1.5
46	48	FUNCTION1 PFK	330.9792	27.12	0.000							1.6
47	48	FUNCTION1 PFK	330.9792	27.05	0.000							1.2
48	48	FUNCTION1 PFK	330.9792	26.88	0.000							1.5
49	48	FUNCTION1 PFK	330.9792	26.83	0.000							2.0
50	48	FUNCTION1 PFK	330.9792	26.74	0.000							3.3
51	48	FUNCTION1 PFK	330.9792	26.66	0.000							4.2

ID: 16H0071-02, Name: 16082309, Date: 23-Aug-2016, Time: 16:56:22, Conditions: AUTOSPEC01, User: PK

PFK1

	#	Name	Trace	RT	Abs.Resp	RRF M...	pg	EMPC	1º Rati...	1º Rati...	1º R...	S/N
52	48	FUNCTION1 PFK	330.9792	26.60	0.000							4.5
53	48	FUNCTION1 PFK	330.9792	26.51	0.000							4.3
54	48	FUNCTION1 PFK	330.9792	26.42	0.000							4.7

ID: 16H0071-02, Name: 16082309, Date: 23-Aug-2016, Time: 16:56:22, Conditions: AUTOSPEC01, User: PK

PFK2

	#	Name	Trace	RT	Abs.Resp	RRF M...	pg	EMPC	1º Rati...	1º Rati...	1º R...	S/N
1	49	FUNCTION2 PFK	366.9792	28.15	0.000		0.000					0.5
2	49	FUNCTION2 PFK	366.9792	28.00	0.000		0.000					1.2
3	49	FUNCTION2 PFK	366.9792	29.65	0.000		0.000					1.7
4	49	FUNCTION2 PFK	366.9792	29.59	0.000		0.000					2.9
5	49	FUNCTION2 PFK	366.9792	29.49	0.000		0.000					1.9
6	49	FUNCTION2 PFK	366.9792	29.45	0.000		0.000					1.6
7	49	FUNCTION2 PFK	366.9792	29.34	0.000		0.000					1.2
8	49	FUNCTION2 PFK	366.9792	29.23	0.000		0.000					0.7
9	49	FUNCTION2 PFK	366.9792	29.16	0.000		0.000					1.2
10	49	FUNCTION2 PFK	366.9792	29.02	0.000		0.000					0.7
11	49	FUNCTION2 PFK	366.9792	28.98	0.000		0.000					1.7
12	49	FUNCTION2 PFK	366.9792	28.56	0.000		0.000					0.6
13	49	FUNCTION2 PFK	366.9792	28.50	0.000		0.000					0.5
14	49	FUNCTION2 PFK	366.9792	28.46	0.000		0.000					0.8
15	49	FUNCTION2 PFK	366.9792	28.42	0.000		0.000					0.7
16	49	FUNCTION2 PFK	366.9792	28.34	0.000		0.000					0.9
17	49	FUNCTION2 PFK	366.9792	28.26	0.000		0.000					1.9
18	49	FUNCTION2 PFK	366.9792	28.20	0.000		0.000					1.5
19	49	FUNCTION2 PFK	366.9792	31.33	0.000		0.000					1.6
20	49	FUNCTION2 PFK	366.9792	31.24	0.000		0.000					2.2
21	49	FUNCTION2 PFK	366.9792	31.19	0.000		0.000					1.5
22	49	FUNCTION2 PFK	366.9792	31.10	0.000		0.000					2.5
23	49	FUNCTION2 PFK	366.9792	31.06	0.000		0.000					1.6
24	49	FUNCTION2 PFK	366.9792	30.81	0.000		0.000					2.6
25	49	FUNCTION2 PFK	366.9792	30.76	0.000		0.000					1.2
26	49	FUNCTION2 PFK	366.9792	30.56	0.000		0.000					0.5
27	49	FUNCTION2 PFK	366.9792	30.52	0.000		0.000					0.4
28	49	FUNCTION2 PFK	366.9792	30.44	0.000		0.000					2.0
29	49	FUNCTION2 PFK	366.9792	30.35	0.000		0.000					1.1
30	49	FUNCTION2 PFK	366.9792	30.11	0.000		0.000					0.8
31	49	FUNCTION2 PFK	366.9792	30.01	0.000		0.000					1.7
32	49	FUNCTION2 PFK	366.9792	29.93	0.000		0.000					2.6
33	49	FUNCTION2 PFK	366.9792	29.78	0.000		0.000					1.0
34	49	FUNCTION2 PFK	366.9792	29.69	0.000		0.000					2.7
35	49	FUNCTION2 PFK	366.9792	32.54	0.000		0.000					0.8
36	49	FUNCTION2 PFK	366.9792	32.39	0.000		0.000					1.4
37	49	FUNCTION2 PFK	366.9792	32.11	0.000		0.000					1.1
38	49	FUNCTION2 PFK	366.9792	32.08	0.000		0.000					1.2
39	49	FUNCTION2 PFK	366.9792	32.04	0.000		0.000					1.6
40	49	FUNCTION2 PFK	366.9792	31.98	0.000		0.000					1.8
41	49	FUNCTION2 PFK	366.9792	31.75	0.000		0.000					0.5
42	49	FUNCTION2 PFK	366.9792	31.70	0.000		0.000					1.3
43	49	FUNCTION2 PFK	366.9792	31.62	0.000		0.000					1.3
44	49	FUNCTION2 PFK	366.9792	31.56	0.000		0.000					2.9
45	49	FUNCTION2 PFK	366.9792	31.47	0.000		0.000					1.9
46	49	FUNCTION2 PFK	366.9792	31.38	0.000		0.000					1.5

ID: 16H0071-02, Name: 16082309, Date: 23-Aug-2016, Time: 16:56:22, Conditions: AUTOSPEC01, User: PK

PFK3

	#	Name	Trace	RT	Abs.Resp	RRF M...	pg	EMPC	1º Rati...	1º Rati...	1º R...	S/N
1	50	FUNCTION3 PFK	380.9760	33.86	0.000		0.000					0.4
2	50	FUNCTION3 PFK	380.9760	33.64	0.000		0.000					0.7
3	50	FUNCTION3 PFK	380.9760	33.17	0.000		0.000					1.9
4	50	FUNCTION3 PFK	380.9760	36.47	0.000		0.000					1.1
5	50	FUNCTION3 PFK	380.9760	36.34	0.000		0.000					1.1
6	50	FUNCTION3 PFK	380.9760	36.31	0.000		0.000					1.3
7	50	FUNCTION3 PFK	380.9760	35.89	0.000		0.000					0.5
8	50	FUNCTION3 PFK	380.9760	35.86	0.000		0.000					1.2
9	50	FUNCTION3 PFK	380.9760	35.71	0.000		0.000					1.4
10	50	FUNCTION3 PFK	380.9760	35.51	0.000		0.000					1.4
11	50	FUNCTION3 PFK	380.9760	35.42	0.000		0.000					0.9
12	50	FUNCTION3 PFK	380.9760	35.37	0.000		0.000					1.3
13	50	FUNCTION3 PFK	380.9760	35.31	0.000		0.000					0.5
14	50	FUNCTION3 PFK	380.9760	34.70	0.000		0.000					1.7
15	50	FUNCTION3 PFK	380.9760	34.52	0.000		0.000					1.8
16	50	FUNCTION3 PFK	380.9760	34.48	0.000		0.000					1.3
17	50	FUNCTION3 PFK	380.9760	34.41	0.000		0.000					1.6
18	50	FUNCTION3 PFK	380.9760	34.09	0.000		0.000					1.0
19	50	FUNCTION3 PFK	380.9760	33.91	0.000		0.000					1.1
20	50	FUNCTION3 PFK	380.9760	37.85	0.000		0.000					0.9
21	50	FUNCTION3 PFK	380.9760	37.79	0.000		0.000					1.2
22	50	FUNCTION3 PFK	380.9760	37.73	0.000		0.000					0.8
23	50	FUNCTION3 PFK	380.9760	37.67	0.000		0.000					1.2
24	50	FUNCTION3 PFK	380.9760	37.63	0.000		0.000					0.6
25	50	FUNCTION3 PFK	380.9760	37.16	0.000		0.000					0.7
26	50	FUNCTION3 PFK	380.9760	36.88	0.000		0.000					1.7
27	50	FUNCTION3 PFK	380.9760	36.83	0.000		0.000					0.5
28	50	FUNCTION3 PFK	380.9760	36.78	0.000		0.000					0.8

PFK4

	#	Name	Trace	RT	Abs.Resp	RRF M...	pg	EMPC	1º Rati...	1º Rati...	1º R...	S/N
1												

PFK5

	#	Name	Trace	RT	Abs.Resp	RRF M...	pg	EMPC	1º Rati...	1º Rati...	1º R...	S/N
1												

ETHERS1

	#	Name	Trace	RT	Abs.Resp	RRF M...	pg	EMPC	1º Rati...	1º Rati...	1º R...	S/N
1	53	FUNCTION1 HXCD...	375.8364	27.00	0.000		0.000					17.0

ETHERS2

	#	Name	Trace	RT	Abs.Resp	RRF M...	pg	EMPC	1º Rati...	1º Rati...	1º R...	S/N
1	54	FUNCTION1 HPCD...	409.7974	21.91	0.000		0.000					3.9
2	54	FUNCTION1 HPCD...	409.7974	21.28	0.000		0.000					3.9

ID: 16H0071-02, Name: 16082309, Date: 23-Aug-2016, Time: 16:56:22, Conditions: AUTOSPEC01, User: PK

ETHERS3

	#	Name	Trace	RT	Abs.Resp	RRF M...	pg	EMPC	1º Rati...	1º Rati...	1º R...	S/N
1												

ETHERS4

	#	Name	Trace	RT	Abs.Resp	RRF M...	pg	EMPC	1º Rati...	1º Rati...	1º R...	S/N
1												

ETHERS5

	#	Name	Trace	RT	Abs.Resp	RRF M...	pg	EMPC	1º Rati...	1º Rati...	1º R...	S/N
1												

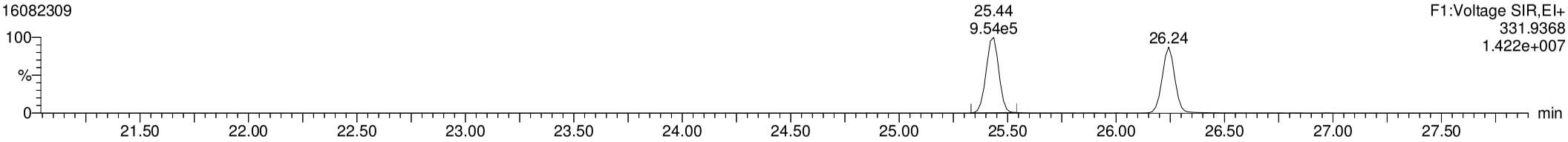
ETHERS6

	#	Name	Trace	RT	Abs.Resp	RRF M...	pg	EMPC	1º Rati...	1º Rati...	1º R...	S/N
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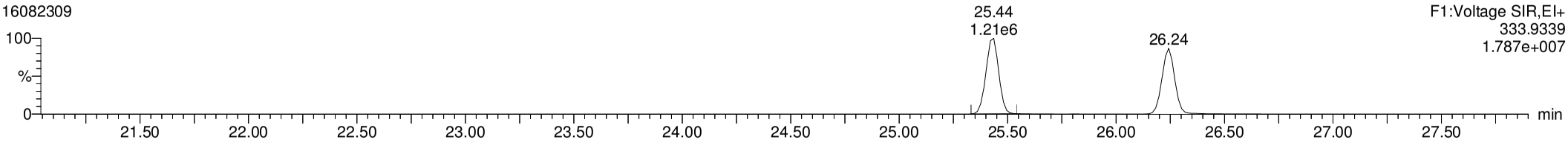
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ID: 16L0071-02, Name: 16082309, Date: 23-Aug-2016, Time: 16:56:22, Conditions: AUTOSPEC01, User: PK

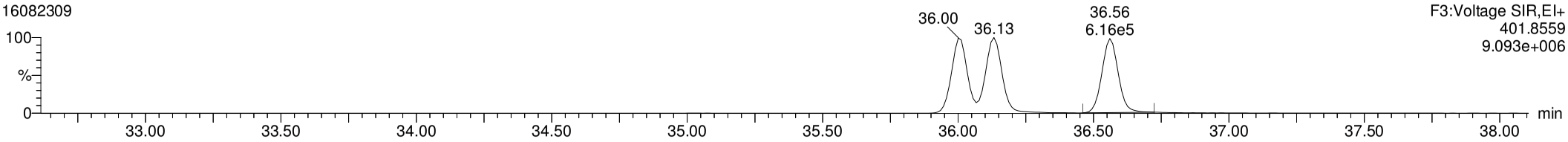
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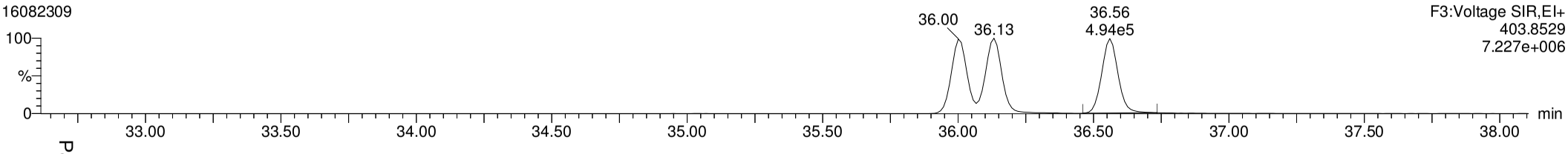
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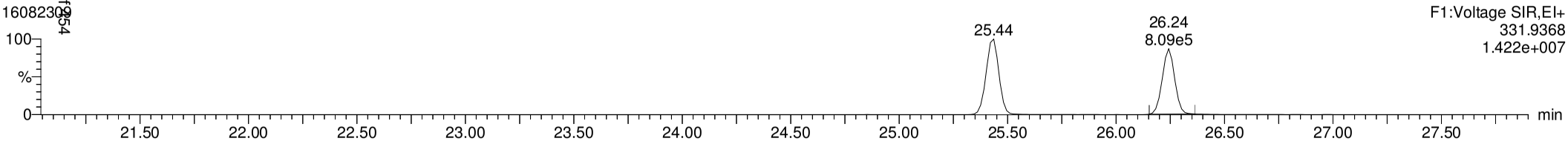


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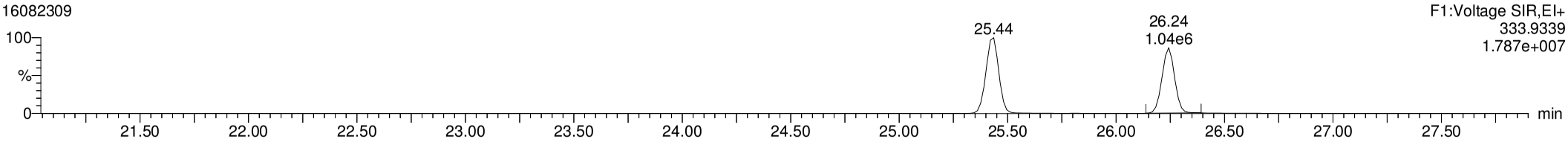
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Page 46 of 354

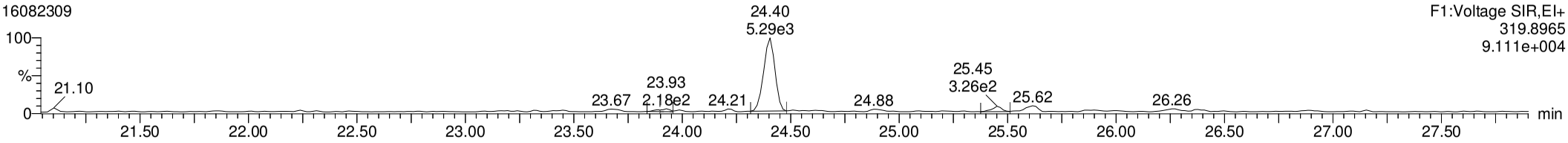
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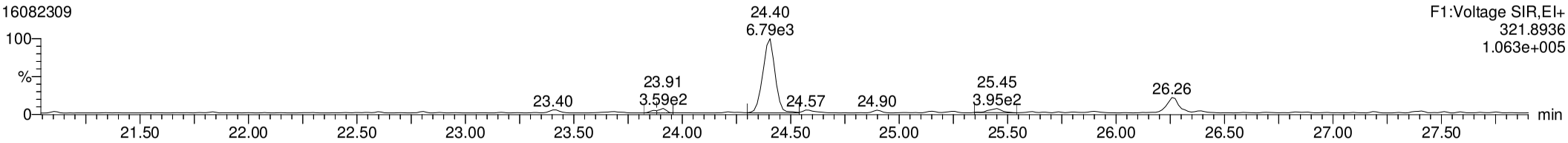
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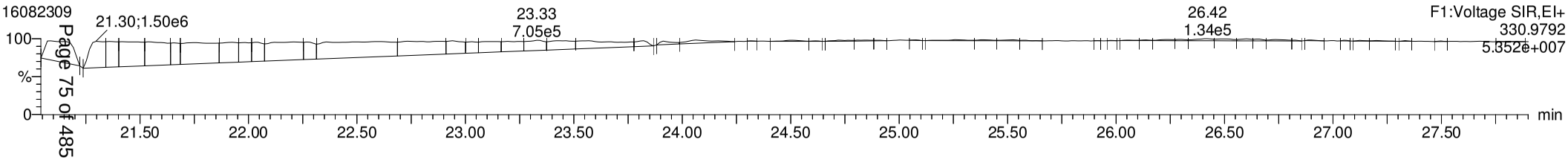
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Total-tetradioxins



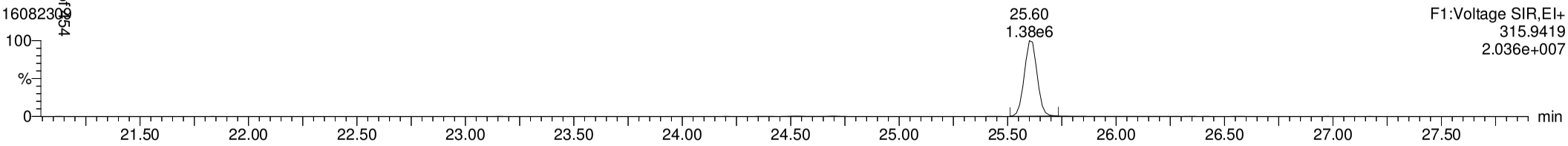
FUNCTION1 PFK



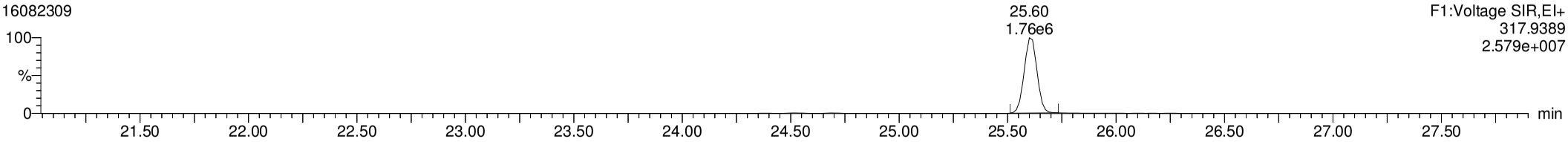
Page 75 of 485

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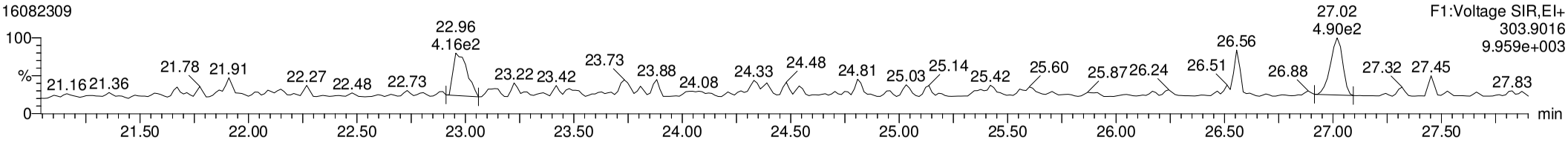
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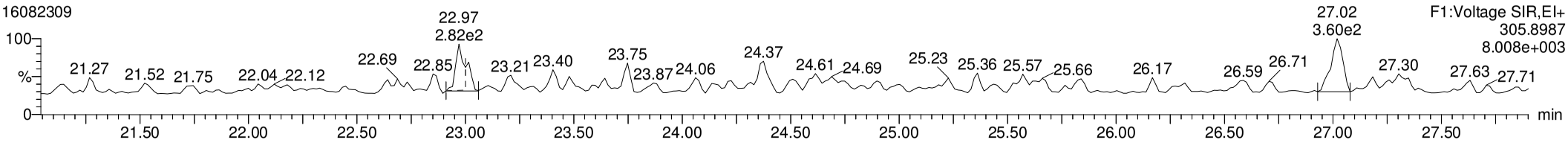
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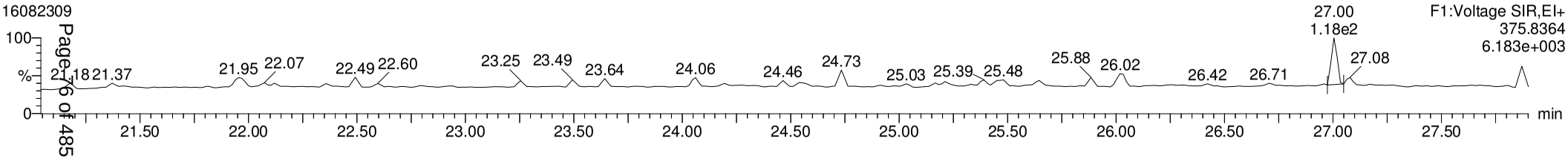
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Total-tetrafurans



FUNCTION1 HXCDPE

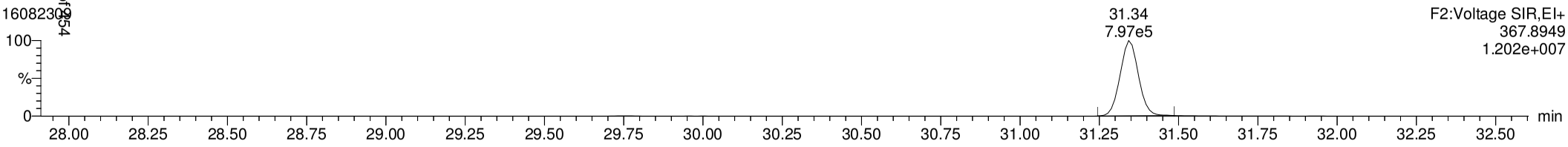


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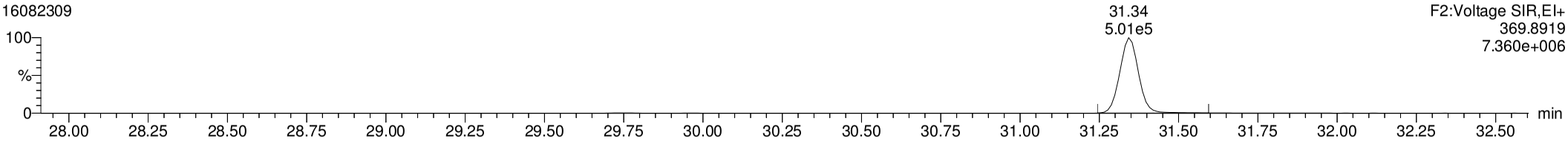
Page 4 of 1954

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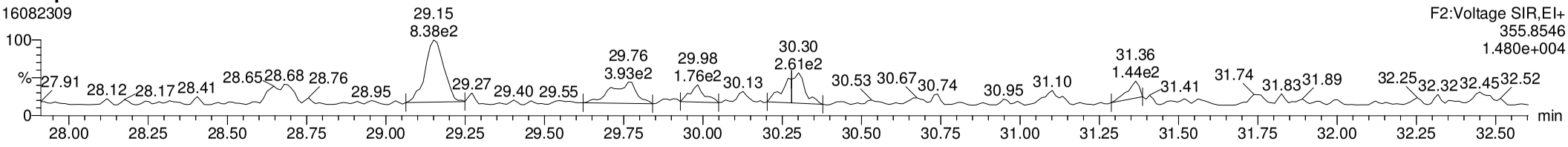
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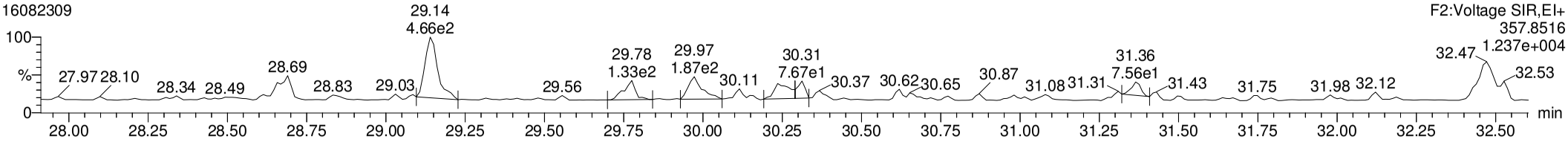
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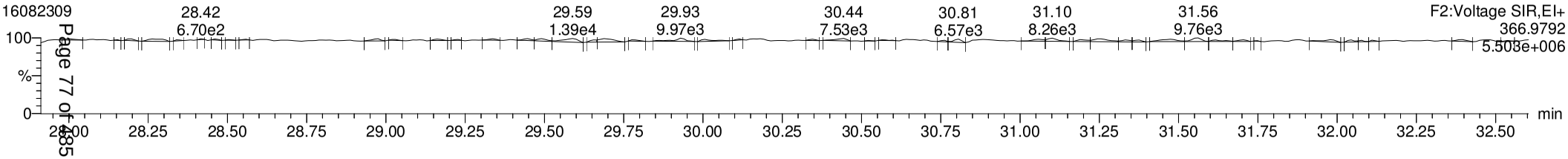
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Total-pentadioxins



FUNCTION2 PFK

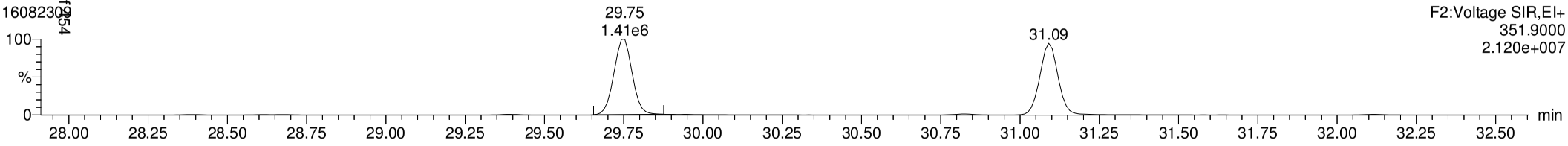


Page 77 of 485

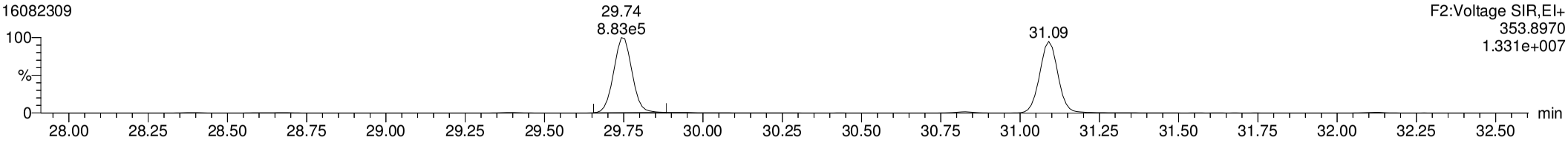
ID: 16L0071-02, Name: 16082309, Date: 23-Aug-2016, Time: 16:56:22, Conditions: AUTOSPEC01, User: PK

Page 493 of 954

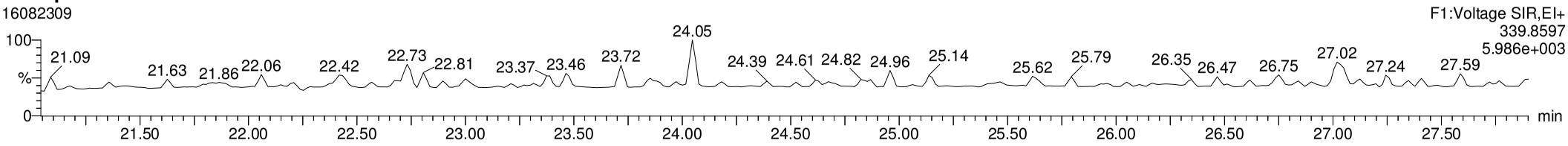
13C-12378-PeCDF



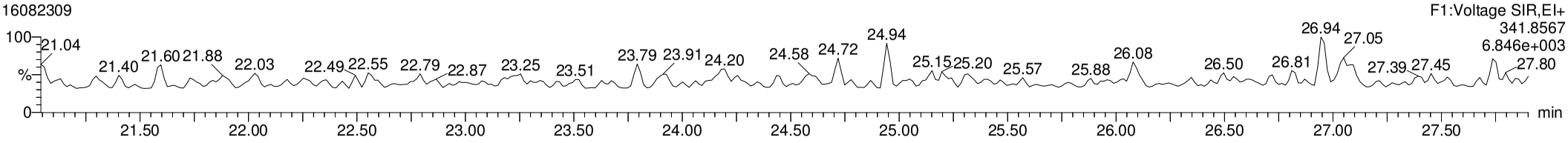
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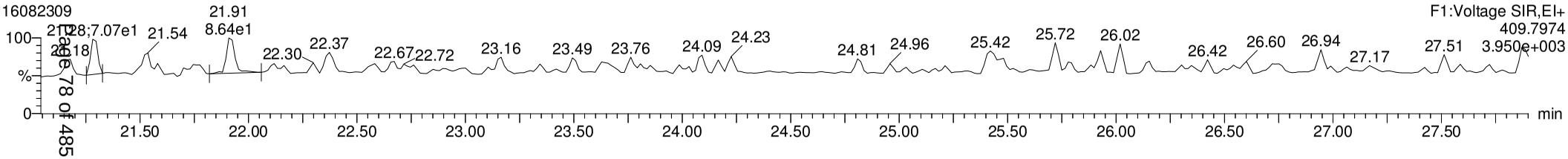
Total-penta1



Total-penta1



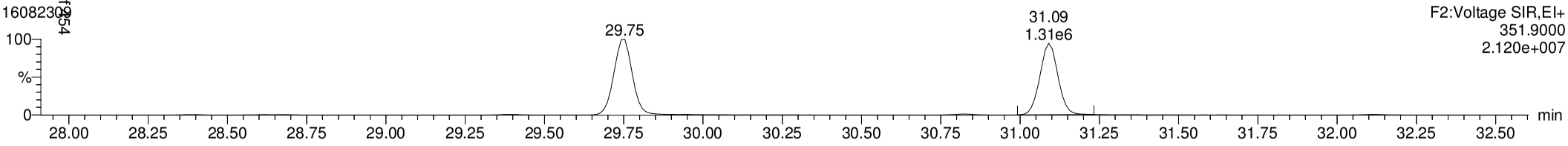
FUNCTION1 HPCDPE



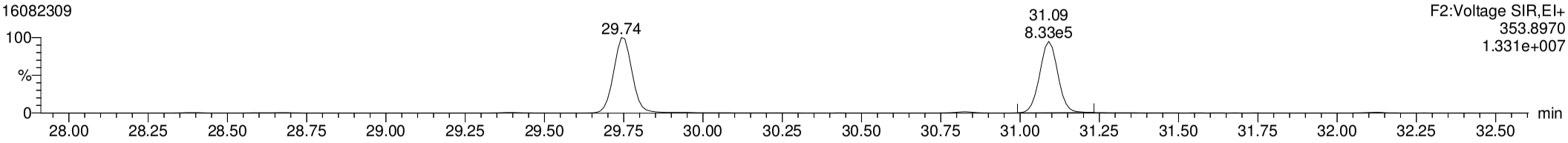
Page 78 of 485

ID: 16L0071-02, Name: 16082309, Date: 23-Aug-2016, Time: 16:56:22, Conditions: AUTOSPEC01, User: PK

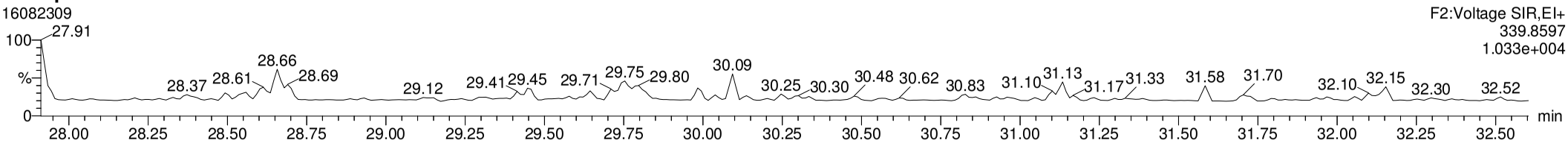
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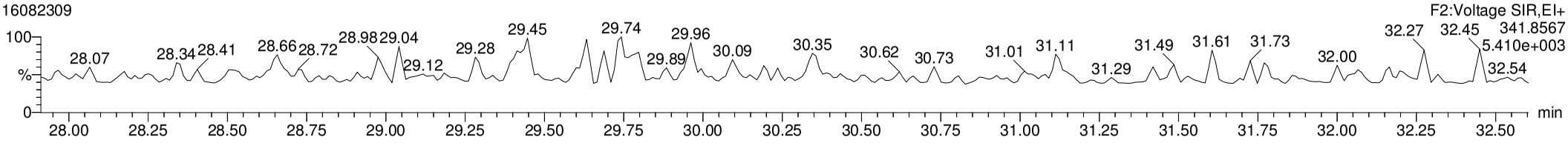
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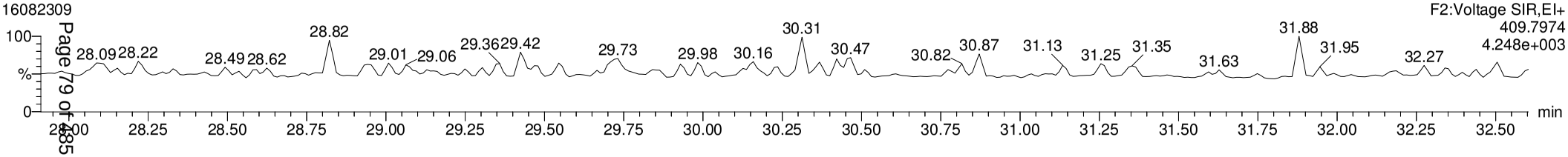
Total-pentafurans



Total-pentafurans



FUNCTION2 HPCDPE

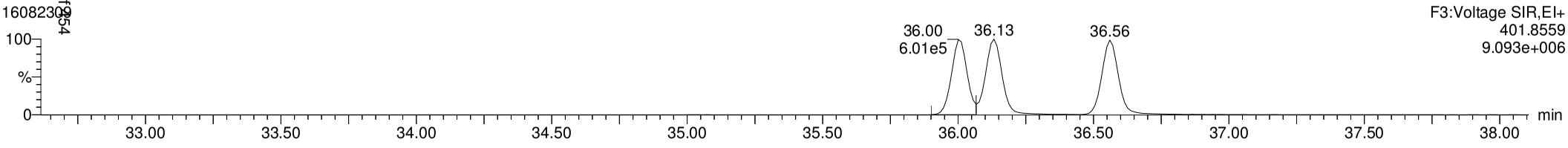


Dataset: C:\MassLynx\Dioxin.pro\160823DATA1.qld
Last Altered: Thursday, August 25, 2016 12:51:34 Pacific Daylight Time
Printed: Thursday, August 25, 2016 15:46:43 Pacific Daylight Time

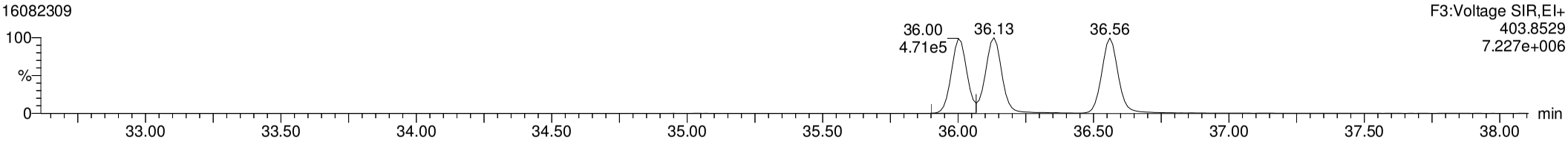
Page 5 of 2054

ID: 16L0071-02, Name: 16082309, Date: 23-Aug-2016, Time: 16:56:22, Conditions: AUTOSPEC01, User: PK

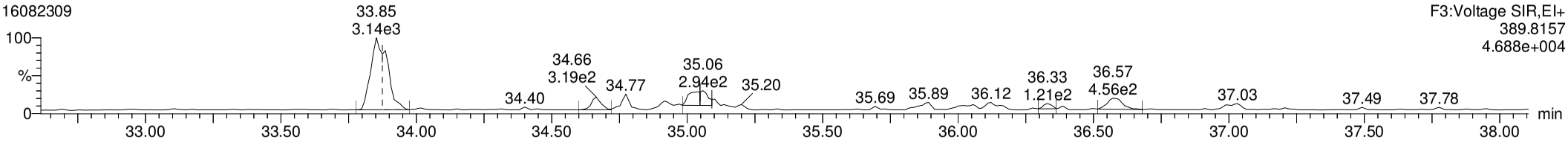
13C-123478-HxCDD



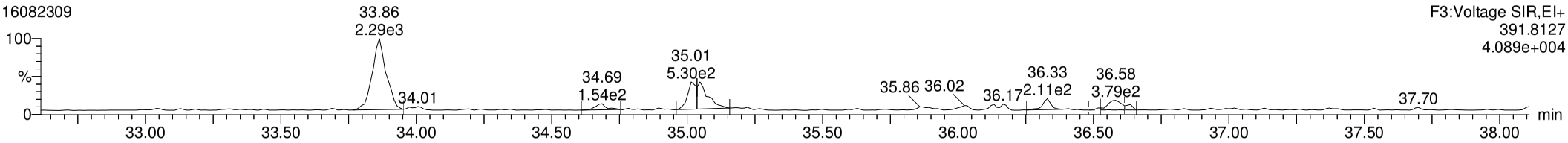
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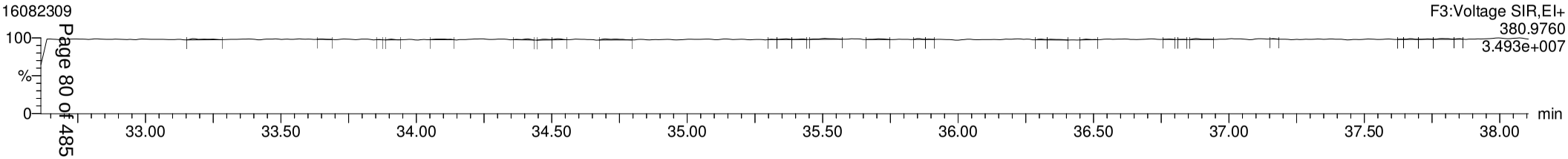
Total-hexadioxins



Total-hexadioxins



FUNCTION3 PFK



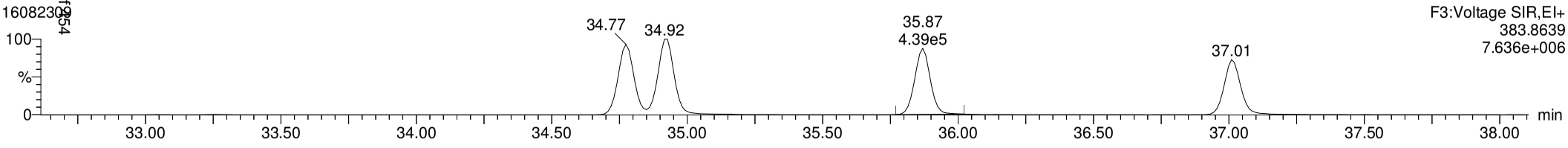
Page 80 of 485

Dataset: C:\MassLynx\Dioxin.pro\160823DATA1.qld
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Printed: Thursday, August 25, 2016 15:46:43 Pacific Daylight Time

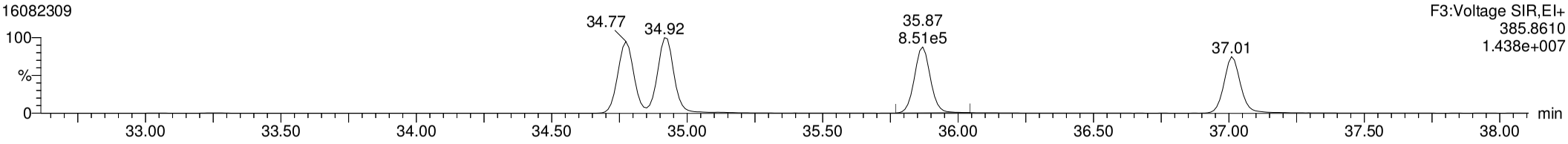
Page 524 of 1054

ID: 16L0071-02, Name: 16082309, Date: 23-Aug-2016, Time: 16:56:22, Conditions: AUTOSPEC01, User: PK

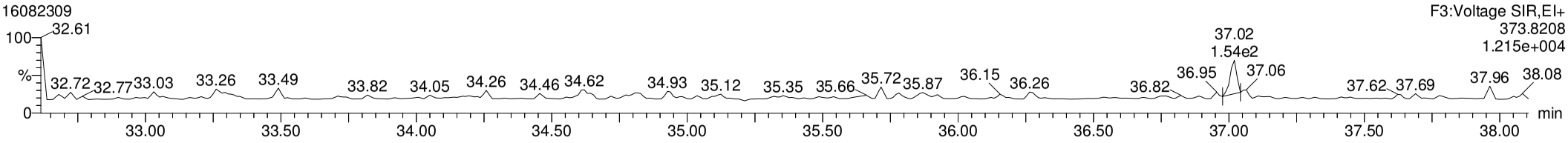
13C-234678-HxCDF



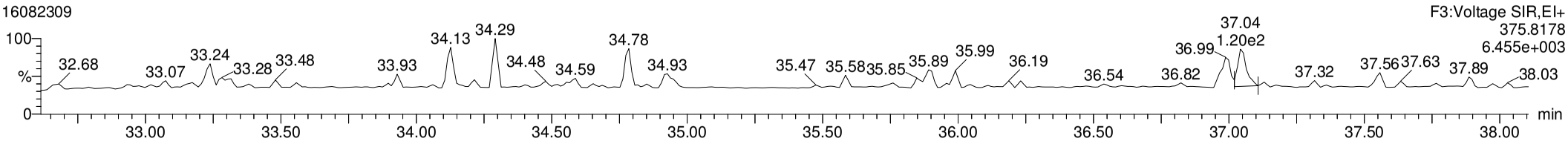
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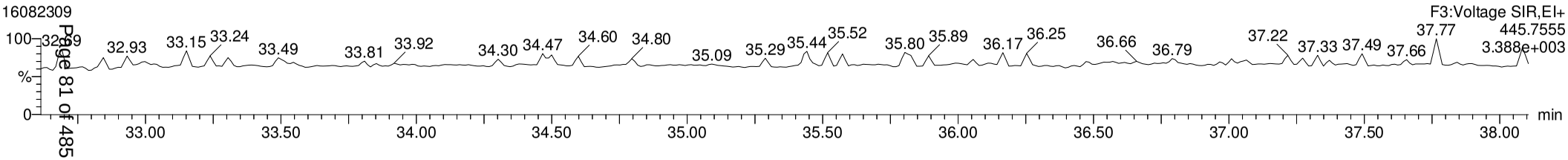
Total-hexafurans



Total-hexafurans



FUNCTION3 OCDPE



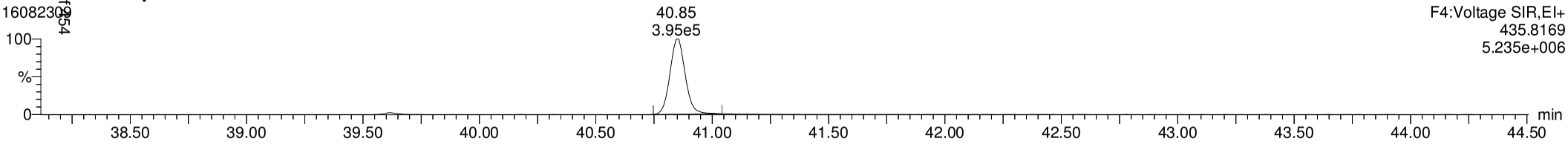
Page 81 of 485

Dataset: C:\MassLynx\Dioxin.pro\160823DATA1.qld
Last Altered: Thursday, August 25, 2016 12:51:34 Pacific Daylight Time
Printed: Thursday, August 25, 2016 15:46:43 Pacific Daylight Time

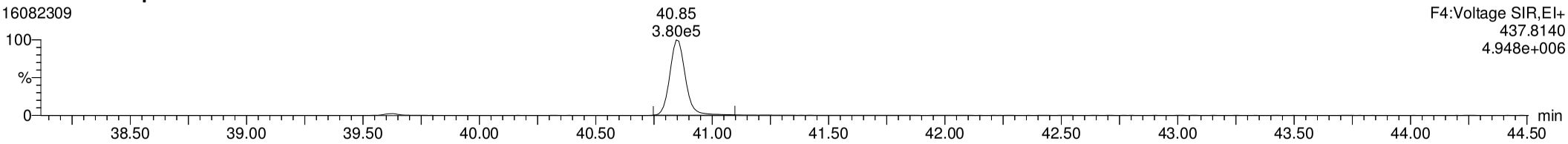
ID: 16L0071-02, Name: 16082309, Date: 23-Aug-2016, Time: 16:56:22, Conditions: AUTOSPEC01, User: PK

Page 53 of 354

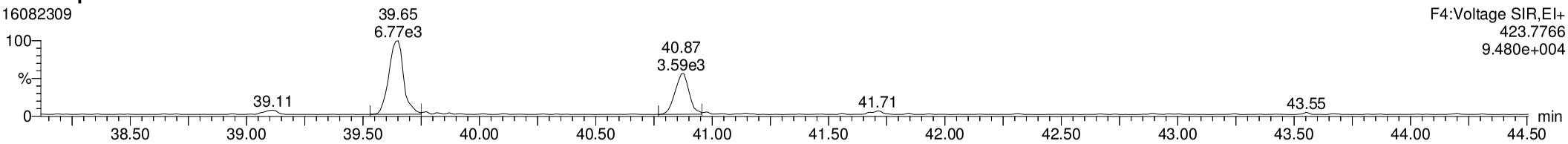
13C-1234678-HpCDD



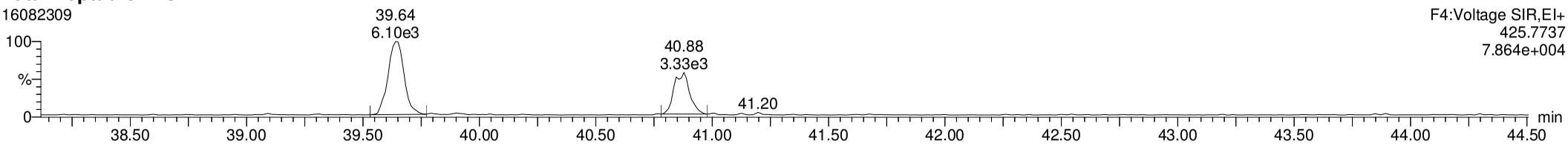
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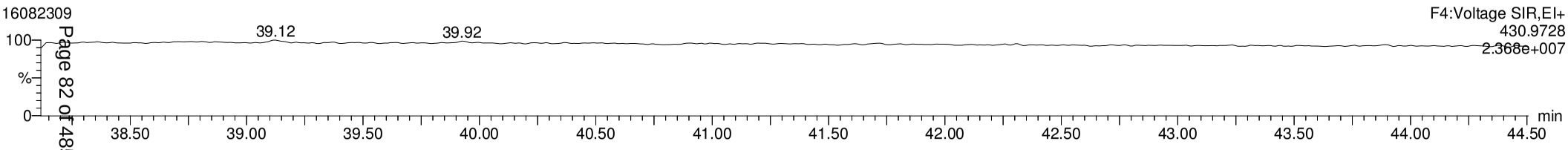
Total-heptadioxins



Total-heptadioxins



FUNCTION4 PFK

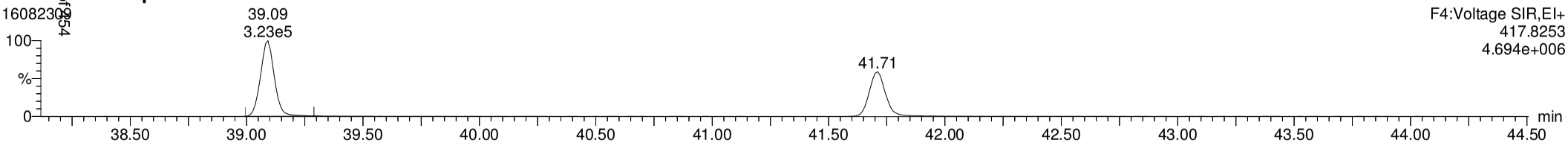


Page 82 of 485

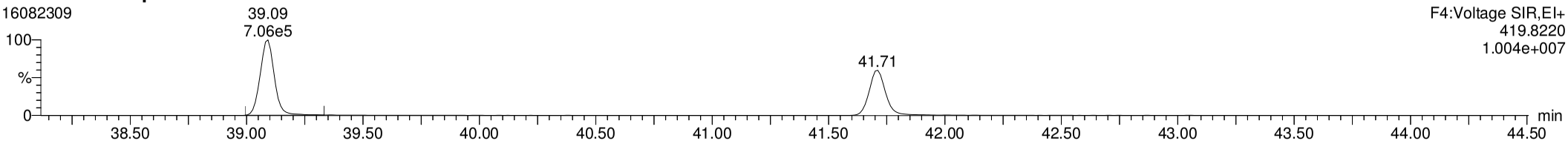
Dataset: C:\MassLynx\Dioxin.pro\160823DATA1.qld
Last Altered: Thursday, August 25, 2016 12:51:34 Pacific Daylight Time
Printed: Thursday, August 25, 2016 15:46:43 Pacific Daylight Time

ID: 16L0071-02, Name: 16082309, Date: 23-Aug-2016, Time: 16:56:22, Conditions: AUTOSPEC01, User: PK

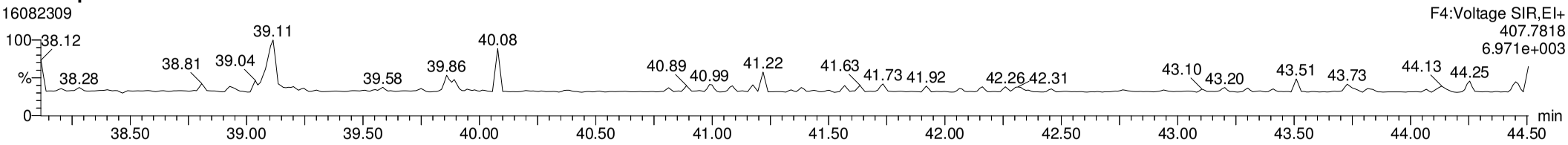
13C-1234678-HpCDF



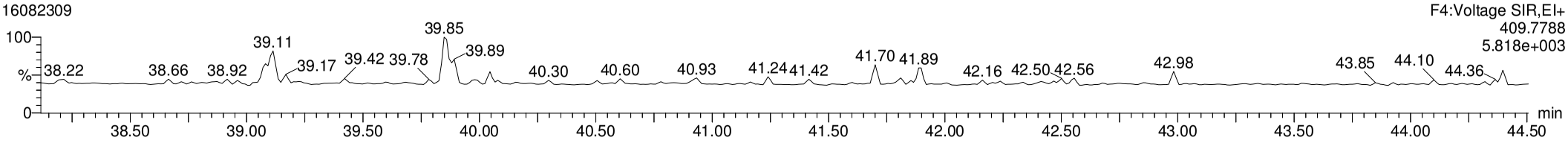
13C-1234678-HpCDF



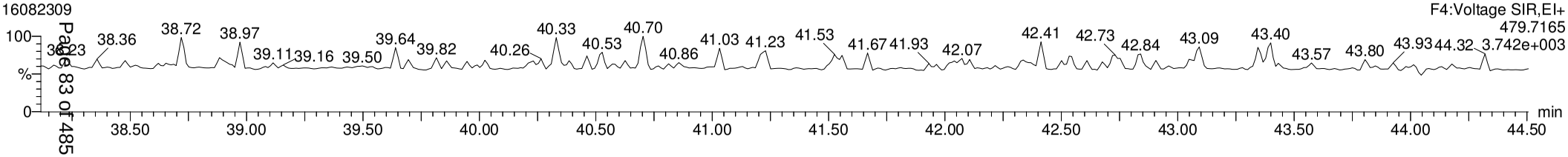
Total-heptafurans



Total-heptafurans



FUNCTION4 NCDPE

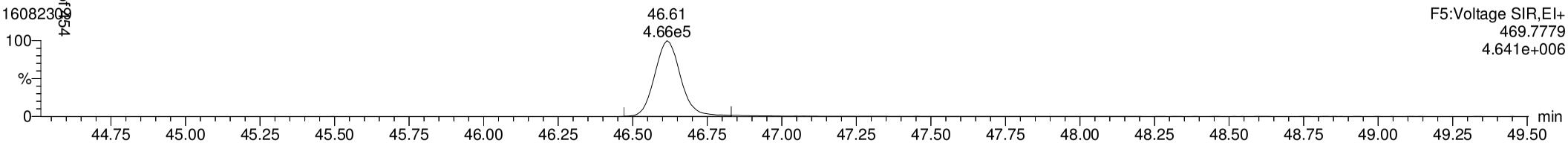


Dataset: C:\MassLynx\Dioxin.pro\160823DATA1.qld
Last Altered: Thursday, August 25, 2016 12:51:34 Pacific Daylight Time
Printed: Thursday, August 25, 2016 15:46:43 Pacific Daylight Time

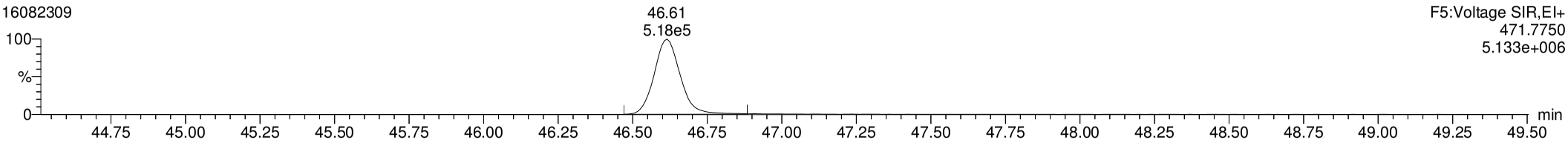
ID: 16L0071-02, Name: 16082309, Date: 23-Aug-2016, Time: 16:56:22, Conditions: AUTOSPEC01, User: PK

Page 55 of 354

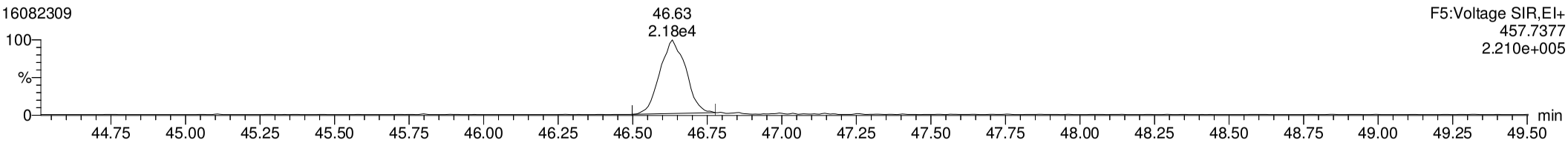
13C-OCDD



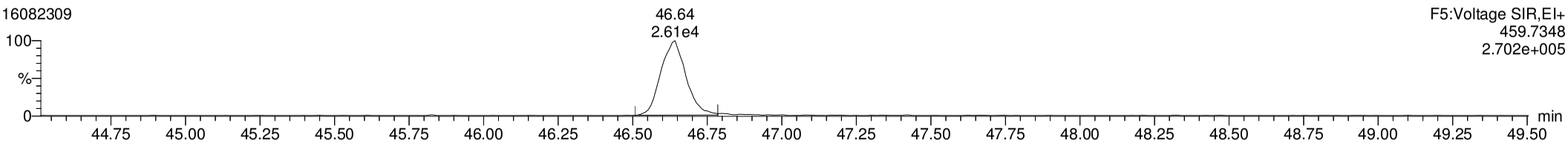
13C-OCDD



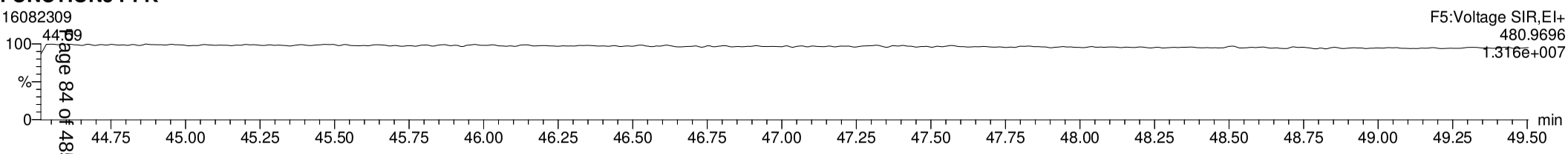
OCDD



OCDD



FUNCTION5 PFK

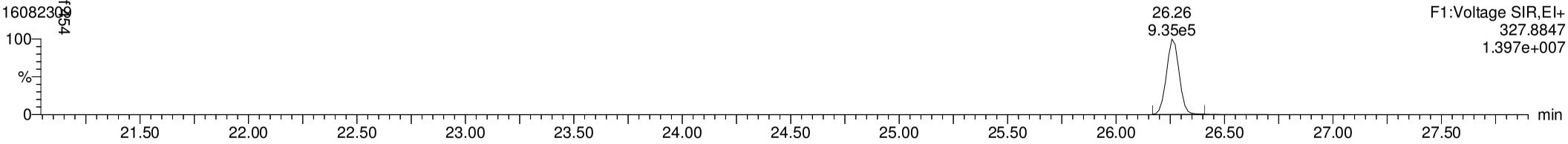


Page 84 of 485

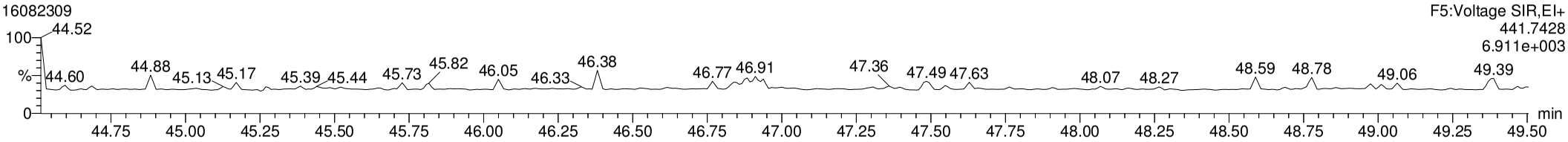
Dataset: C:\MassLynx\Dioxin.pro\160823DATA1.qld
Last Altered: Thursday, August 25, 2016 12:51:34 Pacific Daylight Time
Printed: Thursday, August 25, 2016 15:46:43 Pacific Daylight Time

ID: 16L0071-02, Name: 16082309, Date: 23-Aug-2016, Time: 16:56:22, Conditions: AUTOSPEC01, User: PK

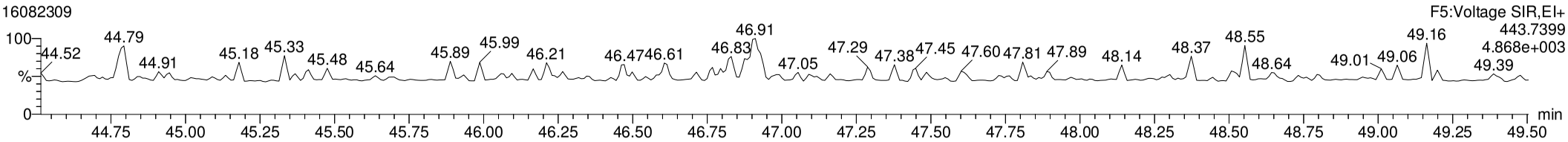
37CL-2378-TCDD



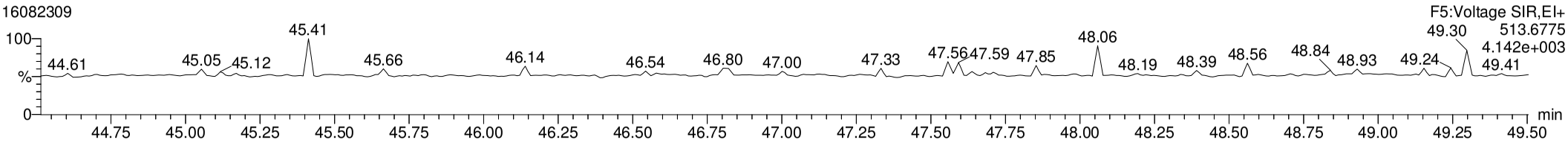
OCDF



OCDF



FUNCTION5 DCDPE



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Form I
METHOD BLANK DATA SHEET
EPA 1613B
Dioxin 1613B

Laboratory:	Analytical Resources, Inc.			SDG:	16H0071
Client:	Fremont Analytical			Project:	1608094
Matrix:	Solid	Laboratory ID:	BEH0316-BLK1	File ID:	16082304
Sampled:	N/A	Prepared:	08/18/16 15:40	Analyzed:	08/23/16 12:31
Solids Wt%:		Preparation:	EPA 1613	Initial/Final:	10 g / 20 uL
Result Basis:	Wet	Sequence:	SEH0246	Calibration:	ZE00016
Batch:	BEH0316	Instrument:	AUTOSPEC01	Column:	RTX-Dioxin2

CAS NO.	COMPOUND	DF/Split	Ion Ratio	Ratio Limits	EDL	RL	Result	Units	Q
51207-31-9	2,3,7,8-TCDF	1	0.000	0.655-0.886	0.032	1.00	ND	ng/kg	U
1746-01-6	2,3,7,8-TCDD	1	0.000	0.655-0.886	0.032	1.00	ND	ng/kg	U
57117-41-6	1,2,3,7,8-PeCDF	1	1.475	1.318-1.783		1.00	0.0630	ng/kg	J
57117-31-4	2,3,4,7,8-PeCDF	1	0.000	1.318-1.783	0.03	1.00	ND	ng/kg	U
40321-76-4	1,2,3,7,8-PeCDD	1	0.000	1.318-1.783	0.072	1.00	ND	ng/kg	U
70648-26-9	1,2,3,4,7,8-HxCDF	1	0.000	1.054-1.426	0.04	1.00	ND	ng/kg	U
57117-44-9	1,2,3,6,7,8-HxCDF	1	0.000	1.054-1.426	0.038	1.00	ND	ng/kg	U
60851-34-5	2,3,4,6,7,8-HxCDF	1	0.000	1.054-1.426	0.043	1.00	ND	ng/kg	U
72918-21-9	1,2,3,7,8,9-HxCDF	1	0.747	1.054-1.426		1.00	0.0479	ng/kg	EMPC, J
39227-28-6	1,2,3,4,7,8-HxCDD	1	0.000	1.054-1.426	0.077	1.00	ND	ng/kg	U
57653-85-7	1,2,3,6,7,8-HxCDD	1	0.000	1.054-1.426	0.084	1.00	ND	ng/kg	U
19408-74-3	1,2,3,7,8,9-HxCDD	1	3.045	1.054-1.426		1.00	0.105	ng/kg	EMPC, J
67562-39-4	1,2,3,4,6,7,8-HpCDF	1	1.341	0.893-1.208		1.00	0.0680	ng/kg	EMPC, J
58200-70-7	1,2,3,4,7,8,9-HpCDF	1	0.000	0.893-1.208	0.068	1.00	ND	ng/kg	U
35822-46-9	1,2,3,4,6,7,8-HpCDD	1	1.093	0.893-1.208		1.00	1.43	ng/kg	
39001-02-0	OCDF	1	1.001	0.757-1.024		2.00	0.232	ng/kg	J
3268-87-9	OCDD	1	0.980	0.757-1.024		10.0	9.96	ng/kg	J

Homologue Groups

55722-27-5	Total TCDF	1	0.000			1.00	0.0276	ng/kg
41903-57-5	Total TCDD	1	0.000			1.00	0.360	ng/kg
30402-15-4	Total PeCDF	1	0.000			1.00	0.0630	ng/kg
36088-22-9	Total PeCDD	1	0.000			1.00	0.138	ng/kg
55684-94-1	Total HxCDF	1	0.000			1.00	0.0479	ng/kg
34465-46-8	Total HxCDD	1	0.000			1.00	0.983	ng/kg
38998-75-3	Total HpCDF	1	0.000			1.00	0.0680	ng/kg
37871-00-4	Total HpCDD	1	0.000			1.00	3.86	ng/kg

Total 2,3,7,8-TCDD Equivalence (WHO2005, ND=0, Including EMPC): 0.035
Total 2,3,7,8-TCDD Equivalence (WHO2005, ND=1/2 EDL, Including EMPC): 0.181

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Form I

METHOD BLANK DATA SHEET

EPA 1613B

Dioxin 1613B

Laboratory:	Analytical Resources, Inc.			SDG:	16H0071
Client:	Fremont Analytical			Project:	1608094
Matrix:	Solid	Laboratory ID:	BEH0316-BLK1	File ID:	16082304
Sampled:	N/A	Prepared:	08/18/16 15:40	Analyzed:	08/23/16 12:31
Solids Wt%:	0.00	Preparation:	EPA 1613	Initial/Final:	10 g / 20 uL
Result Basis:	Wet	Sequence:	SEH0246	Calibration:	ZE00016
Batch:	BEH0316	Instrument:	AUTOSPEC01	Column:	RTX-Dioxin2

Labels	DF/Split	Ion Ratio	Ratio Limits	EDL	% REC	QC LIMITS	Q
13C12-2,3,7,8-TCDF	1	0.780	0.655-0.886		101	24 - 169 %	
13C12-2,3,7,8-TCDD	1	0.790	0.655-0.886		101	25 - 164 %	
13C12-1,2,3,7,8-PeCDF	1	1.510	1.318-1.783		88.3	24 - 185 %	
13C12-2,3,4,7,8-PeCDF	1	1.586	1.318-1.783		88.0	21 - 178 %	
13C12-1,2,3,7,8-PeCDD	1	1.610	1.318-1.783		85.4	25 - 181 %	
13C12-1,2,3,4,7,8-HxCDF	1	0.519	0.434-0.587		100	26 - 152 %	
13C12-1,2,3,6,7,8-HxCDF	1	0.519	0.434-0.587		100	26 - 123 %	
13C12-2,3,4,6,7,8-HxCDF	1	0.523	0.434-0.587		95.4	28 - 136 %	
13C12-1,2,3,7,8,9-HxCDF	1	0.526	0.434-0.587		94.6	29 - 147 %	
13C12-1,2,3,4,7,8-HxCDD	1	1.288	1.054-1.426		101	32 - 141 %	
13C12-1,2,3,6,7,8-HxCDD	1	1.263	1.054-1.426		96.6	28 - 130 %	
13C12-1,2,3,4,6,7,8-HpCDF	1	0.453	0.374-0.506		89.9	28 - 143 %	
13C12-1,2,3,4,7,8,9-HpCDF	1	0.465	0.374-0.506		86.5	26 - 138 %	
13C12-1,2,3,4,6,7,8-HpCDD	1	1.062	0.893-1.208		89.5	23 - 140 %	
13C12-OCDD	1	0.910	0.757-1.024		64.8	17 - 157 %	
37C14-2,3,7,8-TCDD	1	328.000			106	35 - 197 %	

* Values outside of QC limits

Dataset: C:\MassLynx\Dioxin.pro\160823DATA1.qld
Last Altered: Thursday, August 25, 2016 12:51:34 Pacific Daylight Time
Printed: Thursday, August 25, 2016 15:46:18 Pacific Daylight Time

Page 9 of 45

Method: C:\MassLynx\Dioxin.pro\MethDB\Dioxin1608163SN.mdb 17 Aug 2016 15:09:47
Calibration: C:\MassLynx\Dioxin.pro\CurveDB\160510ICAL.cdb 11 May 2016 09:28:40

ID: BEH0316-BLK1, Name: 16082304, Date: 23-Aug-2016, Time: 12:31:47, Conditions: AUTOSPEC01, User: PK

Name	RT	RRT	Ion1Area	Ion2Area	RRF	Ratio	Pred R	Noise 1	Noise 2	Height 1	Height 2	S/N	EMPC?	EMPC	pg
2378-TCDF					0.935		0.770	1039	1456						
12378-PeCDF	29.754	1.000	4.24e2	2.87e2	0.952	1.475	1.550	786	903	5.81e3	3.77e3	7.4	NO	0.031	0.031
23478-PeCDF					0.963		1.550	786	903						
123478-HxCDF					1.137		1.240	917	820						
234678-HxCDF					1.164		1.240	917	820						
123678-HxCDF					1.099		1.240	917	820						
123789-HxCDF	37.021	1.000	1.41e2	1.88e2	1.101	0.747	1.240	917	820	3.31e3	4.88e3	3.6	YES	0.018	0.024
1234678-HpCDF	39.104	1.001	3.00e2	2.23e2	1.303	1.341	1.050	708	846	6.42e3	5.42e3	9.1	YES	0.030	0.034
1234789-HpCDF					1.317		1.050	708	846						
OCDF	46.867	1.005	4.00e2	4.00e2	1.166	1.001	0.890	556	801	6.27e3	5.32e3	11.3	NO	0.116	0.116
2378-TCDD					1.134		0.770	940	799						
12378-PeCDD					0.975		1.550	1556	818						
123478-HxCDD					1.031		1.240	1515	872						
123678-HxCDD					0.971		1.240	1515	872						
123789-HxCDD	36.583	1.012	4.57e2	1.50e2	0.947	3.045	1.240	1515	872	7.46e3	3.62e3	4.9	YES	0.029	0.052
1234678-HpCDD	40.857	1.000	3.49e3	3.19e3	1.028	1.093	1.050	427	721	4.79e4	4.84e4	112.3	NO	0.716	0.716
OCDD	46.634	1.000	1.62e4	1.65e4	1.107	0.980	0.890	837	1067	1.63e5	1.71e5	194.3	NO	4.982	4.982
13C-2378-TCDF	25.600	1.007	1.47e6	1.88e6	1.567	0.780	0.770	6360	3434	2.17e7	2.81e7	3417.8	NO		101.434
13C-12378-PeCDF	29.743	1.169	1.43e6	9.45e5	1.274	1.510	1.550	3671	2401	2.15e7	1.40e7	5865.4	NO		88.305
13C-23478-PeCDF	31.091	1.222	1.40e6	8.85e5	1.235	1.586	1.550	3671	2401	2.12e7	1.32e7	5767.7	NO		87.958
13C-123478-HxCDF	34.774	0.951	5.26e5	1.01e6	1.381	0.519	0.510	3473	6679	7.80e6	1.49e7	2244.9	NO		99.980
13C-123678-HxCDF	34.916	0.955	6.01e5	1.16e6	1.569	0.519	0.510	3473	6679	8.62e6	1.66e7	2481.5	NO		100.402
13C-234678-HxCDF	35.870	0.981	4.92e5	9.40e5	1.345	0.523	0.510	3473	6679	7.18e6	1.36e7	2068.4	NO		95.419
13C-123789-HxCDF	37.010	1.012	4.30e5	8.18e5	1.183	0.526	0.510	3473	6679	6.05e6	1.14e7	1743.2	NO		94.565
13C-1234678-HpCDF	39.082	1.069	3.69e5	8.13e5	1.178	0.453	0.440	3188	3367	5.31e6	1.18e7	1665.4	NO		89.867
13C-1234789-HpCDF	41.701	1.141	2.69e5	5.78e5	0.878	0.465	0.440	3188	3367	3.31e6	7.32e6	1036.6	NO		86.527
13C-1234-TCDD	25.436	0.000	9.32e5	1.18e6	1.000	0.793	0.770	3027	1507	1.38e7	1.72e7	4570.8	NO		100.000
13C-2378-TCDD	26.243	1.032	8.51e5	1.08e6	0.908	0.790	0.770	3027	1507	1.26e7	1.58e7	4150.9	NO		100.816
13C-12378-PeCDD	31.343	1.232	8.39e5	5.21e5	0.756	1.610	1.550	1251	1752	1.25e7	7.83e6	10020.9	NO		85.403
13C-123478-HxCDD	36.001	0.985	6.73e5	5.22e5	1.056	1.288	1.240	3435	2041	1.02e7	7.88e6	2976.2	NO		101.418
13C-123678-HxCDD	36.133	0.988	6.99e5	5.54e5	1.163	1.263	1.240	3435	2041	9.76e6	7.71e6	2842.3	NO		96.598
13C-1234678-HpCDD	40.847	1.117	4.68e5	4.40e5	0.909	1.062	1.050	2948	1617	6.16e6	5.66e6	2091.4	NO		89.514
13C-OCDD	46.616	1.275	5.65e5	6.21e5	0.820	0.910	0.890	3776	2500	5.54e6	6.17e6	1466.4	NO		129.687
13C-123789-HxCDD	36.561	0.000	6.24e5	4.91e5	1.000	1.272	1.240	3435	2041	8.73e6	6.91e6	2542.5	NO		100.000
Total-tetrafurans			2.42e2		0.935			1039		5.02e3					0.014

Dataset: C:\MassLynx\Dioxin.pro\160823DATA1.qld
Last Altered: Thursday, August 25, 2016 12:51:34 Pacific Daylight Time
Printed: Thursday, August 25, 2016 15:46:18 Pacific Daylight Time

ID: BEH0316-BLK1, Name: 16082304, Date: 23-Aug-2016, Time: 12:31:47, Conditions: AUTOSPEC01, User: PK

Name	RT	RRT	Ion1Area	Ion2Area	RRF	Ratio	Pred R	Noise 1	Noise 2	Height 1	Height 2	S/N	EMPC?	EMPC	pg
Total-penta1			0.00e0					548		0.00e0					
Total-pentafurans			4.24e2		0.957			786		5.81e3					0.031
Total-hexafurans			1.41e2		1.125			917		3.31e3					0.024
Total-heptafurans			3.00e2		1.310			708		6.42e3					0.034
Total-Furans			1.64e3		1.114			1039		2.83e4					0.226
Total-tetradioxins			1.76e3		1.134			940		2.66e4					0.180
Total-pentadioxins			6.28e2		0.975			1556		1.37e4					0.069
Total-hexadioxins			3.53e3		0.983			1515		5.57e4					0.491
Total-heptadioxins			9.38e3		1.028			427		1.32e5					1.931
Total-Dioxins			3.15e4		1.028			940		3.91e5					7.654
Total-TEQ			3.31e4					940		4.19e5					7.880
37CL-2378-TCDD	26.258	1.032	9.52e5		1.067			1092		1.40e7		12778.1			42.356
FUNCTION1 PFK			1.67e8					588873		1.05e9					
FUNCTION2 PFK			3.10e5					124961		7.54e6					0.000
FUNCTION3 PFK			8.80e4					423441		4.07e6					0.000
FUNCTION4 PFK			1.04e5					319046		1.31e6					
FUNCTION5 PFK			1.12e4					212257		4.71e5					
FUNCTION1 HXCD...			8.02e1					462		2.64e3					0.000
FUNCTION1 HPCD...			6.44e2					612		1.48e4					0.000
FUNCTION2 HPCD...			3.01e2					879		9.51e3					0.000
FUNCTION3 OCDPE			7.59e1					469		2.33e3					0.000
FUNCTION4 NCDPE			7.09e1					740		3.21e3					0.000
FUNCTION5 DCDPE			0.00e0					287		0.00e0					

Method: C:\MassLynx\Dioxin.pro\MethDB\Dioxin1608163SN.mdb 17 Aug 2016 15:09:47
Calibration: C:\MassLynx\Dioxin.pro\CurveDB\160510ICAL.cdb 11 May 2016 09:28:40

ID: BEH0316-BLK1, Name: 16082304, Date: 23-Aug-2016, Time: 12:31:47, Conditions: AUTOSPEC01, User: PK

TF

	#	Name	Trace	RT	Abs.Resp	RRF	M...	pg	EMPC	1º Rati...	1º Rati...	1º R...	S/N
1	35	Total-tetrafurans	303.9016	23.02	431.944	0.935		0.014		1.28	0.77	YES	4.8

PP

	#	Name	Trace	RT	Abs.Resp	RRF	M...	pg	EMPC	1º Rati...	1º Rati...	1º R...	S/N
1													

PF

	#	Name	Trace	RT	Abs.Resp	RRF	M...	pg	EMPC	1º Rati...	1º Rati...	1º R...	S/N
1	2	12378-PeCDF	339.8597	29.75	710.896	0.952		0.031	0.031	1.47	1.55	NO	7.4

HF

	#	Name	Trace	RT	Abs.Resp	RRF	M...	pg	EMPC	1º Rati...	1º Rati...	1º R...	S/N
1	7	123789-HxCDF	373.8208	37.02	328.982	1.101		0.024	0.018	0.75	1.24	YES	3.6

HPF

	#	Name	Trace	RT	Abs.Resp	RRF	M...	pg	EMPC	1º Rati...	1º Rati...	1º R...	S/N
1	8	1234678-HpCDF	407.7818	39.10	523.081	1.303		0.034	0.030	1.34	1.05	YES	9.1

Furans,TF,PP,PF,HF,HPF,OF

	#	Name	Trace	RT	Abs.Resp	RRF	M...	pg	EMPC	1º Rati...	1º Rati...	1º R...	S/N
1	35	Total-tetrafurans	303.9016	23.02	431.944	0.935		0.014		1.28	0.77	YES	4.8
2	40	Total-Furans	303.9016	21.15	250.188	1.114		0.007		1.18	0.77	YES	1.4
3	2	12378-PeCDF	339.8597	29.75	710.896	0.952		0.031	0.031	1.47	1.55	NO	7.4
4	7	123789-HxCDF	373.8208	37.02	328.982	1.101		0.024	0.018	0.75	1.24	YES	3.6
5	10	OCDF	441.7428	46.87	799.930	1.166		0.116	0.116	1.00	0.89	NO	11.3
6	8	1234678-HpCDF	407.7818	39.10	523.081	1.303		0.034	0.030	1.34	1.05	YES	9.1

TD

	#	Name	Trace	RT	Abs.Resp	RRF	M...	pg	EMPC	1º Rati...	1º Rati...	1º R...	S/N
1	41	Total-tetradioxins	319.8965	24.41	3325.431	1.134		0.152		0.82	0.77	NO	22.7
2	41	Total-tetradioxins	319.8965	23.69	607.239	1.134		0.028		0.76	0.77	NO	5.5

PD

	#	Name	Trace	RT	Abs.Resp	RRF	M...	pg	EMPC	1º Rati...	1º Rati...	1º R...	S/N
1	42	Total-pentadioxins	355.8546	29.15	535.210	0.975		0.040		1.88	1.55	YES	4.8
2	42	Total-pentadioxins	355.8546	29.75	381.979	0.975		0.029		2.70	1.55	YES	4.1

ID: BEH0316-BLK1, Name: 16082304, Date: 23-Aug-2016, Time: 12:31:47, Conditions: AUTOSPEC01, User: PK

HD

	#	Name	Trace	RT	Abs.Resp	RRF	M...	pg	EMPC	1º Rati...	1º Rati...	1º R...	S/N
1	43	Total-hexadioxins	389.8157	35.06	1119.239	0.983		0.093		2.19	1.24	YES	8.6
2	43	Total-hexadioxins	389.8157	34.68	600.265	0.983		0.050		1.47	1.24	YES	4.4
3	43	Total-hexadioxins	389.8157	33.86	3561.284	0.983		0.296		1.21	1.24	NO	18.8
4	15	123789-HxCDD	389.8157	36.58	607.336	0.947		0.052	0.029	3.04	1.24	YES	4.9

HPD

	#	Name	Trace	RT	Abs.Resp	RRF	M...	pg	EMPC	1º Rati...	1º Rati...	1º R...	S/N
1	16	1234678-HpCDD	423.7766	40.86	6684.320	1.028		0.716	0.716	1.09	1.05	NO	112.3
2	44	Total-heptadioxins	423.7766	39.64	11337.340	1.028		1.215		1.08	1.05	NO	196.7

Dioxins,TD,PD,HD,HPD,OD

	#	Name	Trace	RT	Abs.Resp	RRF	M...	pg	EMPC	1º Rati...	1º Rati...	1º R...	S/N
1	41	Total-tetradioxins	319.8965	24.41	3325.431	1.134		0.152		0.82	0.77	NO	22.7
2	41	Total-tetradioxins	319.8965	23.69	607.239	1.134		0.028		0.76	0.77	NO	5.5
3	42	Total-pentadioxins	355.8546	29.15	535.210	0.975		0.040		1.88	1.55	YES	4.8
4	42	Total-pentadioxins	355.8546	29.75	381.979	0.975		0.029		2.70	1.55	YES	4.1
5	43	Total-hexadioxins	389.8157	35.06	1119.239	0.983		0.093		2.19	1.24	YES	8.6
6	43	Total-hexadioxins	389.8157	34.68	600.265	0.983		0.050		1.47	1.24	YES	4.4
7	43	Total-hexadioxins	389.8157	33.86	3561.284	0.983		0.296		1.21	1.24	NO	18.8
8	15	123789-HxCDD	389.8157	36.58	607.336	0.947		0.052	0.029	3.04	1.24	YES	4.9
9	16	1234678-HpCDD	423.7766	40.86	6684.320	1.028		0.716	0.716	1.09	1.05	NO	112.3
10	44	Total-heptadioxins	423.7766	39.64	11337.340	1.028		1.215		1.08	1.05	NO	196.7
11	17	OCDD	457.7377	46.63	32694.490	1.107		4.982	4.982	0.98	0.89	NO	194.3

TotalTEQ,Furans,Dioxins

	#	Name	Trace	RT	Abs.Resp	RRF	M...	pg	EMPC	1º Rati...	1º Rati...	1º R...	S/N
1	35	Total-tetrafurans	303.9016	23.02	431.944	0.935		0.014		1.28	0.77	YES	4.8
2	40	Total-Furans	303.9016	21.15	250.188	1.114		0.007		1.18	0.77	YES	1.4
3	2	12378-PeCDF	339.8597	29.75	710.896	0.952		0.031	0.031	1.47	1.55	NO	7.4
4	7	123789-HxCDF	373.8208	37.02	328.982	1.101		0.024	0.018	0.75	1.24	YES	3.6
5	10	OCDF	441.7428	46.87	799.930	1.166		0.116	0.116	1.00	0.89	NO	11.3
6	8	1234678-HpCDF	407.7818	39.10	523.081	1.303		0.034	0.030	1.34	1.05	YES	9.1
7	41	Total-tetradioxins	319.8965	24.41	3325.431	1.134		0.152		0.82	0.77	NO	22.7
8	41	Total-tetradioxins	319.8965	23.69	607.239	1.134		0.028		0.76	0.77	NO	5.5
9	42	Total-pentadioxins	355.8546	29.15	535.210	0.975		0.040		1.88	1.55	YES	4.8
10	42	Total-pentadioxins	355.8546	29.75	381.979	0.975		0.029		2.70	1.55	YES	4.1
11	43	Total-hexadioxins	389.8157	35.06	1119.239	0.983		0.093		2.19	1.24	YES	8.6
12	43	Total-hexadioxins	389.8157	34.68	600.265	0.983		0.050		1.47	1.24	YES	4.4
13	43	Total-hexadioxins	389.8157	33.86	3561.284	0.983		0.296		1.21	1.24	NO	18.8
14	15	123789-HxCDD	389.8157	36.58	607.336	0.947		0.052	0.029	3.04	1.24	YES	4.9
15	16	1234678-HpCDD	423.7766	40.86	6684.320	1.028		0.716	0.716	1.09	1.05	NO	112.3
16	44	Total-heptadioxins	423.7766	39.64	11337.340	1.028		1.215		1.08	1.05	NO	196.7
17	17	OCDD	457.7377	46.63	32694.490	1.107		4.982	4.982	0.98	0.89	NO	194.3

ID: BEH0316-BLK1, Name: 16082304, Date: 23-Aug-2016, Time: 12:31:47, Conditions: AUTOSPEC01, User: PK

PFK1

	#	Name	Trace	RT	Abs.Resp	RRF M...	pg	EMPC	1º Rati...	1º Rati...	1º R...	S/N
1	48	FUNCTION1 PFK	330.9792	22.84	0.000							85.7
2	48	FUNCTION1 PFK	330.9792	22.42	0.000							102.4
3	48	FUNCTION1 PFK	330.9792	22.16	0.000							111.1
4	48	FUNCTION1 PFK	330.9792	22.01	0.000							115.5
5	48	FUNCTION1 PFK	330.9792	21.84	0.000							122.7
6	48	FUNCTION1 PFK	330.9792	21.70	0.000							127.6
7	48	FUNCTION1 PFK	330.9792	21.49	0.000							134.0
8	48	FUNCTION1 PFK	330.9792	21.42	0.000							134.9
9	48	FUNCTION1 PFK	330.9792	21.04	0.000							0.0
10	48	FUNCTION1 PFK	330.9792	25.85	0.000							1.0
11	48	FUNCTION1 PFK	330.9792	25.33	0.000							1.5
12	48	FUNCTION1 PFK	330.9792	25.20	0.000							6.7
13	48	FUNCTION1 PFK	330.9792	24.52	0.000							34.4
14	48	FUNCTION1 PFK	330.9792	24.42	0.000							37.7
15	48	FUNCTION1 PFK	330.9792	24.29	0.000							42.3
16	48	FUNCTION1 PFK	330.9792	24.02	0.000							51.8
17	48	FUNCTION1 PFK	330.9792	23.96	0.000							50.3
18	48	FUNCTION1 PFK	330.9792	23.78	0.000							60.3
19	48	FUNCTION1 PFK	330.9792	23.51	0.000							68.5
20	48	FUNCTION1 PFK	330.9792	23.37	0.000							72.4
21	48	FUNCTION1 PFK	330.9792	23.25	0.000							76.5
22	48	FUNCTION1 PFK	330.9792	23.09	0.000							81.9
23	48	FUNCTION1 PFK	330.9792	23.08	0.000							81.7
24	48	FUNCTION1 PFK	330.9792	22.96	0.000							84.9
25	48	FUNCTION1 PFK	330.9792	22.85	0.000							86.1
26	48	FUNCTION1 PFK	330.9792	27.56	0.000							0.9
27	48	FUNCTION1 PFK	330.9792	27.35	0.000							0.9
28	48	FUNCTION1 PFK	330.9792	26.92	0.000							1.4
29	48	FUNCTION1 PFK	330.9792	25.91	0.000							0.6

ID: BEH0316-BLK1, Name: 16082304, Date: 23-Aug-2016, Time: 12:31:47, Conditions: AUTOSPEC01, User: PK

PFK2

	#	Name	Trace	RT	Abs.Resp	RRF M...	pg	EMPC	1º Rati...	1º Rati...	1º R...	S/N
1	49	FUNCTION2 PFK	366.9792	29.46	0.000		0.000					1.1
2	49	FUNCTION2 PFK	366.9792	29.39	0.000		0.000					0.7
3	49	FUNCTION2 PFK	366.9792	29.14	0.000		0.000					2.2
4	49	FUNCTION2 PFK	366.9792	29.04	0.000		0.000					1.8
5	49	FUNCTION2 PFK	366.9792	28.94	0.000		0.000					3.0
6	49	FUNCTION2 PFK	366.9792	28.88	0.000		0.000					1.9
7	49	FUNCTION2 PFK	366.9792	28.83	0.000		0.000					1.7
8	49	FUNCTION2 PFK	366.9792	28.77	0.000		0.000					1.4
9	49	FUNCTION2 PFK	366.9792	28.51	0.000		0.000					2.6
10	49	FUNCTION2 PFK	366.9792	28.18	0.000		0.000					2.0
11	49	FUNCTION2 PFK	366.9792	28.01	0.000		0.000					0.7
12	49	FUNCTION2 PFK	366.9792	30.75	0.000		0.000					2.4
13	49	FUNCTION2 PFK	366.9792	30.65	0.000		0.000					0.6
14	49	FUNCTION2 PFK	366.9792	30.62	0.000		0.000					0.5
15	49	FUNCTION2 PFK	366.9792	30.58	0.000		0.000					1.0
16	49	FUNCTION2 PFK	366.9792	30.35	0.000		0.000					0.7
17	49	FUNCTION2 PFK	366.9792	30.30	0.000		0.000					2.1
18	49	FUNCTION2 PFK	366.9792	30.20	0.000		0.000					2.5
19	49	FUNCTION2 PFK	366.9792	30.17	0.000		0.000					2.4
20	49	FUNCTION2 PFK	366.9792	30.12	0.000		0.000					1.5
21	49	FUNCTION2 PFK	366.9792	30.09	0.000		0.000					1.3
22	49	FUNCTION2 PFK	366.9792	29.99	0.000		0.000					0.6
23	49	FUNCTION2 PFK	366.9792	29.93	0.000		0.000					2.4
24	49	FUNCTION2 PFK	366.9792	29.89	0.000		0.000					2.2
25	49	FUNCTION2 PFK	366.9792	29.71	0.000		0.000					1.2
26	49	FUNCTION2 PFK	366.9792	29.63	0.000		0.000					2.0
27	49	FUNCTION2 PFK	366.9792	29.51	0.000		0.000					1.4
28	49	FUNCTION2 PFK	366.9792	32.32	0.000		0.000					0.8
29	49	FUNCTION2 PFK	366.9792	32.02	0.000		0.000					1.6
30	49	FUNCTION2 PFK	366.9792	31.92	0.000		0.000					0.7
31	49	FUNCTION2 PFK	366.9792	31.89	0.000		0.000					0.5
32	49	FUNCTION2 PFK	366.9792	31.72	0.000		0.000					1.1
33	49	FUNCTION2 PFK	366.9792	31.64	0.000		0.000					0.9
34	49	FUNCTION2 PFK	366.9792	31.38	0.000		0.000					1.0
35	49	FUNCTION2 PFK	366.9792	31.33	0.000		0.000					1.4
36	49	FUNCTION2 PFK	366.9792	31.23	0.000		0.000					0.7
37	49	FUNCTION2 PFK	366.9792	31.13	0.000		0.000					0.7
38	49	FUNCTION2 PFK	366.9792	31.05	0.000		0.000					1.7
39	49	FUNCTION2 PFK	366.9792	30.97	0.000		0.000					2.0
40	49	FUNCTION2 PFK	366.9792	30.93	0.000		0.000					1.5
41	49	FUNCTION2 PFK	366.9792	30.84	0.000		0.000					1.9

ID: BEH0316-BLK1, Name: 16082304, Date: 23-Aug-2016, Time: 12:31:47, Conditions: AUTOSPEC01, User: PK

PFK3

	#	Name	Trace	RT	Abs.Resp	RRF M...	pg	EMPC	1º Rati...	1º Rati...	1º R...	S/N
1	50	FUNCTION3 PFK	380.9760	33.45	0.000		0.000					1.1
2	50	FUNCTION3 PFK	380.9760	37.73	0.000		0.000					0.5
3	50	FUNCTION3 PFK	380.9760	37.58	0.000		0.000					1.5
4	50	FUNCTION3 PFK	380.9760	36.59	0.000		0.000					0.6
5	50	FUNCTION3 PFK	380.9760	35.80	0.000		0.000					0.8
6	50	FUNCTION3 PFK	380.9760	34.92	0.000		0.000					0.5
7	50	FUNCTION3 PFK	380.9760	34.38	0.000		0.000					1.0
8	50	FUNCTION3 PFK	380.9760	34.20	0.000		0.000					1.1
9	50	FUNCTION3 PFK	380.9760	34.15	0.000		0.000					1.5
10	50	FUNCTION3 PFK	380.9760	33.56	0.000		0.000					1.1

PFK4

	#	Name	Trace	RT	Abs.Resp	RRF M...	pg	EMPC	1º Rati...	1º Rati...	1º R...	S/N
1	51	FUNCTION4 PFK	430.9728	39.94	0.000							4.1

PFK5

	#	Name	Trace	RT	Abs.Resp	RRF M...	pg	EMPC	1º Rati...	1º Rati...	1º R...	S/N
1	52	FUNCTION5 PFK	480.9696	44.60	0.000							2.2

ETHERS1

	#	Name	Trace	RT	Abs.Resp	RRF M...	pg	EMPC	1º Rati...	1º Rati...	1º R...	S/N
1	53	FUNCTION1 HXCD...	375.8364	26.15	0.000		0.000					5.7

ETHERS2

	#	Name	Trace	RT	Abs.Resp	RRF M...	pg	EMPC	1º Rati...	1º Rati...	1º R...	S/N
1	54	FUNCTION1 HPCD...	409.7974	26.41	0.000		0.000					4.1
2	54	FUNCTION1 HPCD...	409.7974	25.30	0.000		0.000					4.5
3	54	FUNCTION1 HPCD...	409.7974	24.91	0.000		0.000					3.2
4	54	FUNCTION1 HPCD...	409.7974	24.48	0.000		0.000					3.6
5	54	FUNCTION1 HPCD...	409.7974	23.96	0.000		0.000					2.6
6	54	FUNCTION1 HPCD...	409.7974	22.15	0.000		0.000					6.2

ETHERS3

	#	Name	Trace	RT	Abs.Resp	RRF M...	pg	EMPC	1º Rati...	1º Rati...	1º R...	S/N
1	55	FUNCTION2 HPCD...	409.7974	31.16	0.000		0.000					2.5
2	55	FUNCTION2 HPCD...	409.7974	30.97	0.000		0.000					3.4
3	55	FUNCTION2 HPCD...	409.7974	30.18	0.000		0.000					4.9

ETHERS4

	#	Name	Trace	RT	Abs.Resp	RRF M...	pg	EMPC	1º Rati...	1º Rati...	1º R...	S/N
1	56	FUNCTION3 OCDPE	445.7555	34.65	0.000		0.000					5.0

ETHERS5

	#	Name	Trace	RT	Abs.Resp	RRF M...	pg	EMPC	1º Rati...	1º Rati...	1º R...	S/N
1	57	FUNCTION4 OCDPE	479.7165	38.60	0.000		0.000					4.9

ID: BEH0316-BLK1, Name: 16082304, Date: 23-Aug-2016, Time: 12:31:47, Conditions: AUTOSPEC01, User: PK

ETHERS6

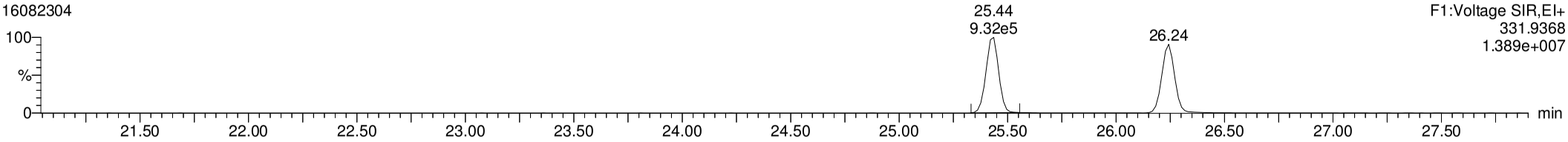
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1													

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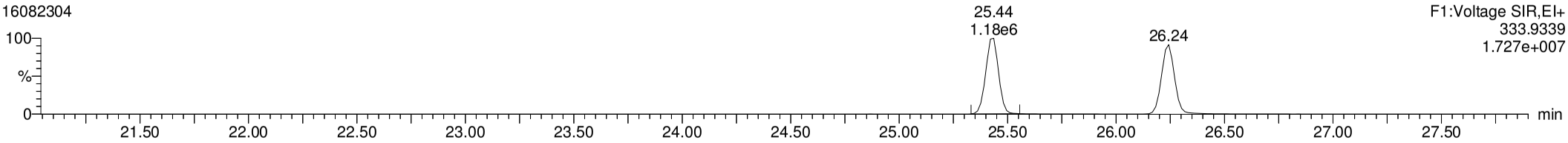
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ID: BEH0316-BLK1, Name: 16082304, Date: 23-Aug-2016, Time: 12:31:47, Conditions: AUTOSPEC01, User: PK

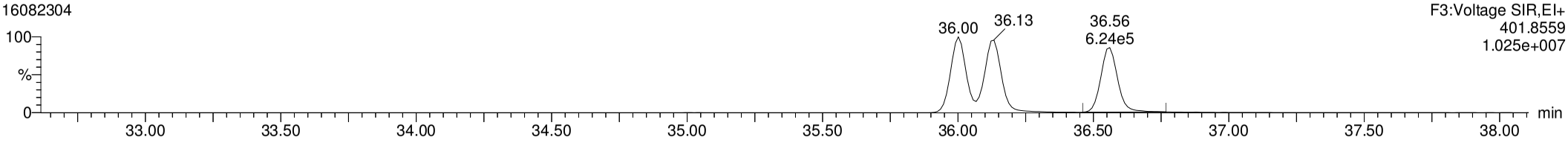
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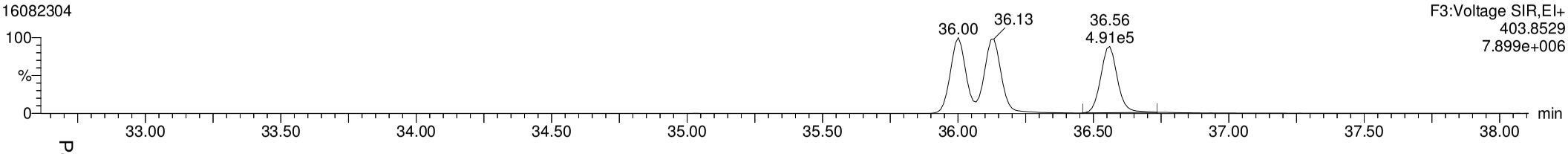
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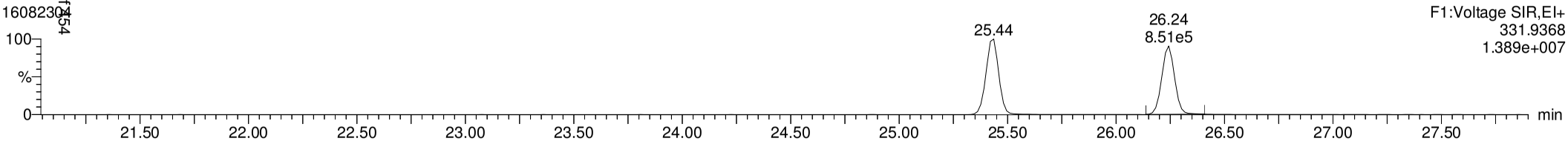
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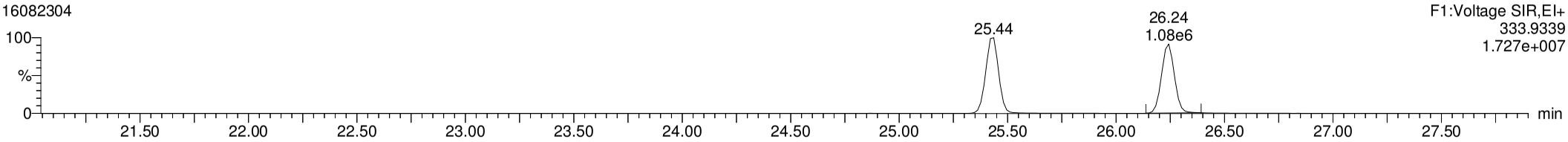
Page 68 of 454

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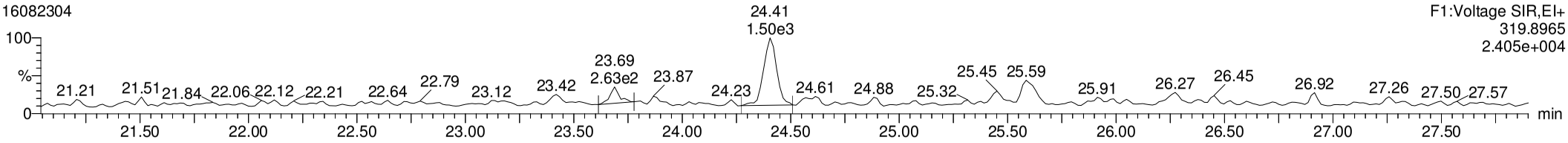
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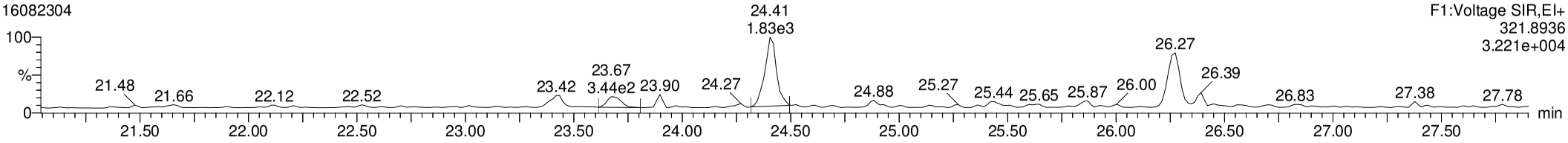
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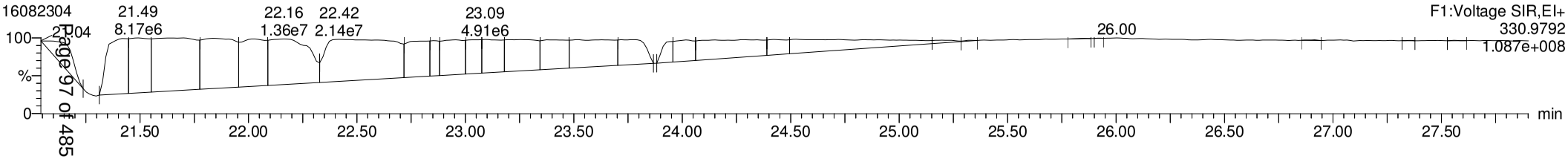
Total-tetradioxins



Total-tetradioxins



FUNCTION1 PFK

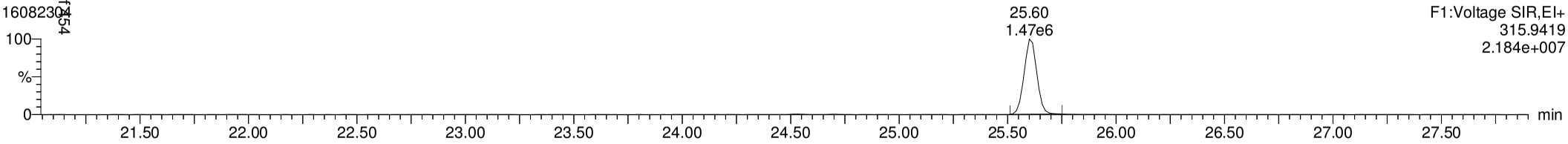


Page 97 of 485

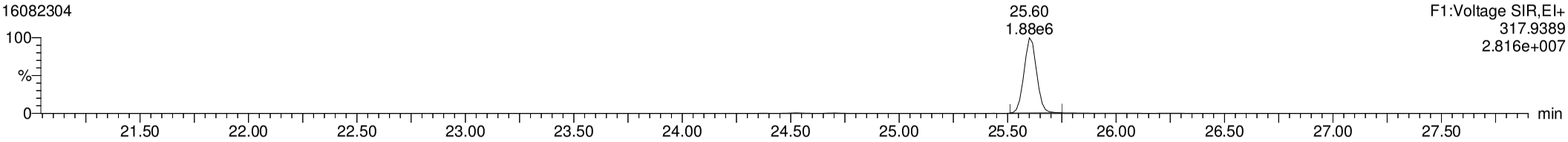
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Page 69 of 454

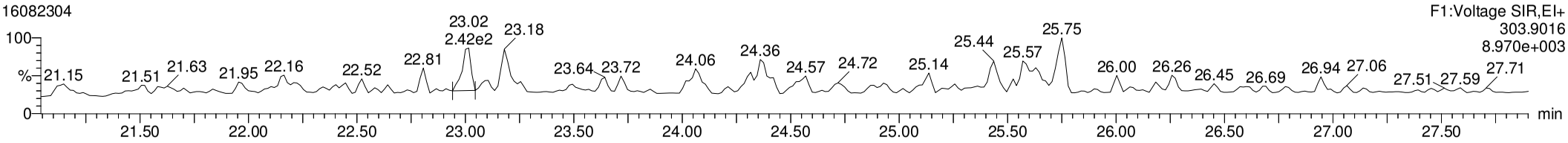
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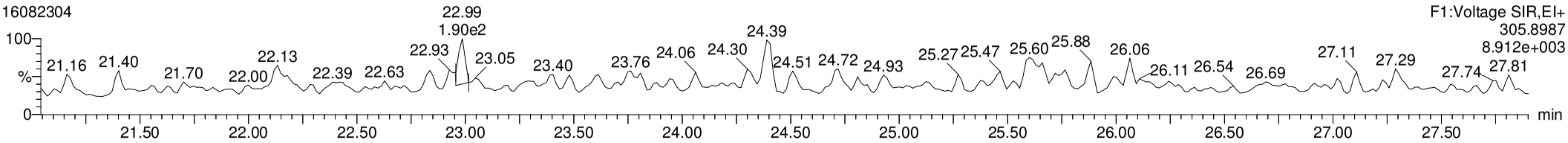
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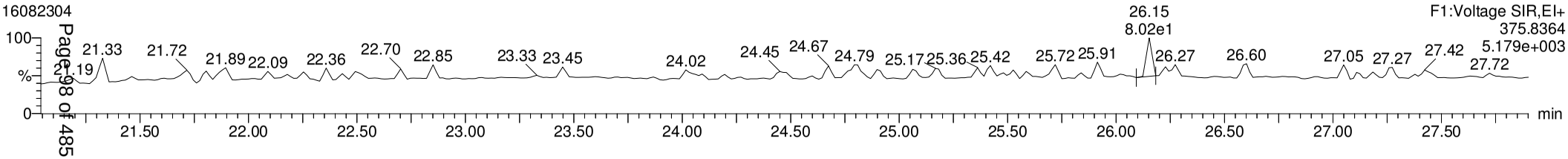
Total-tetrafurans



Total-tetrafurans



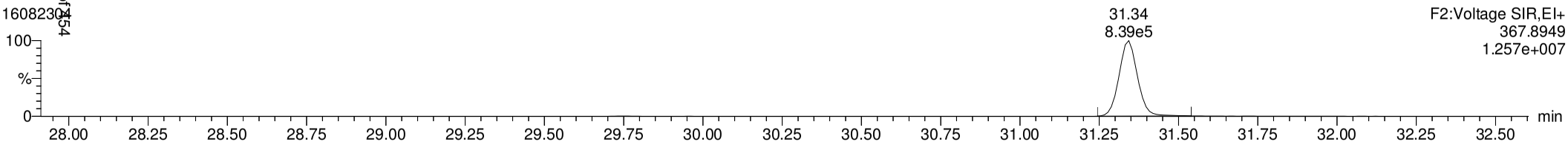
FUNCTION1 HXCDPE



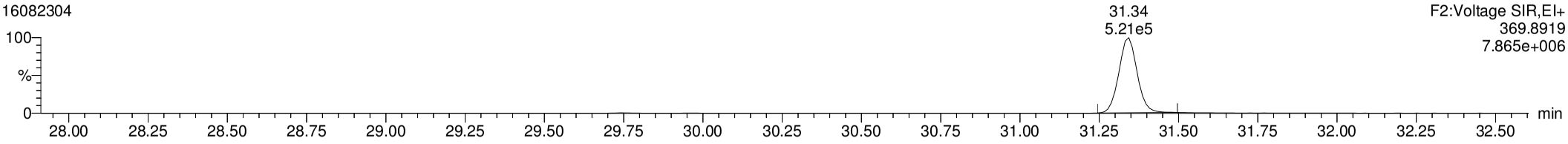
Page 98 of 485

ID: BEH0316-BLK1, Name: 16082304, Date: 23-Aug-2016, Time: 12:31:47, Conditions: AUTOSPEC01, User: PK

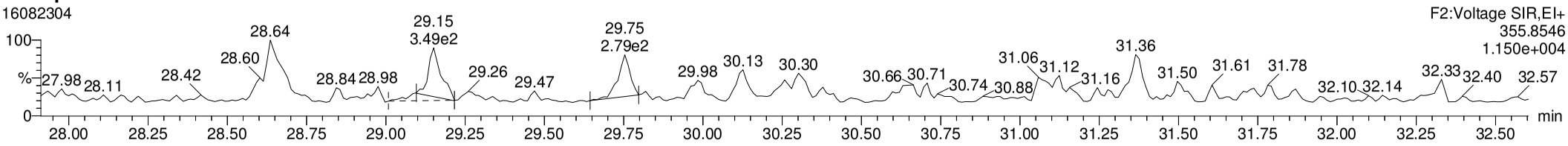
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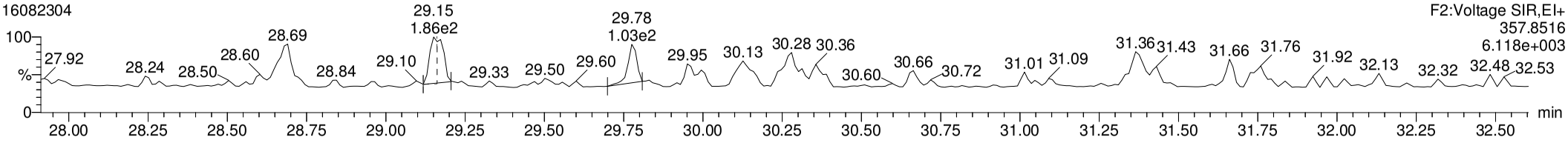
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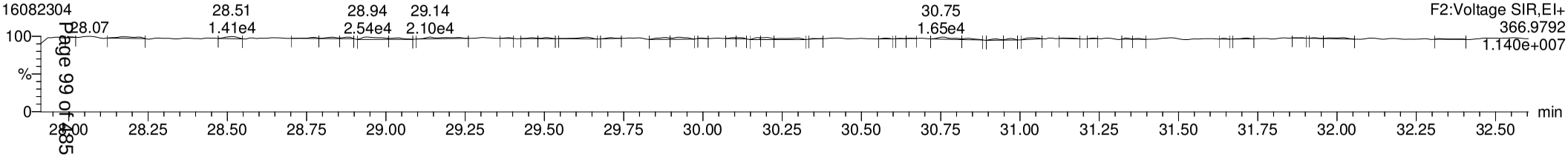
Total-pentadioxins



Total-pentadioxins

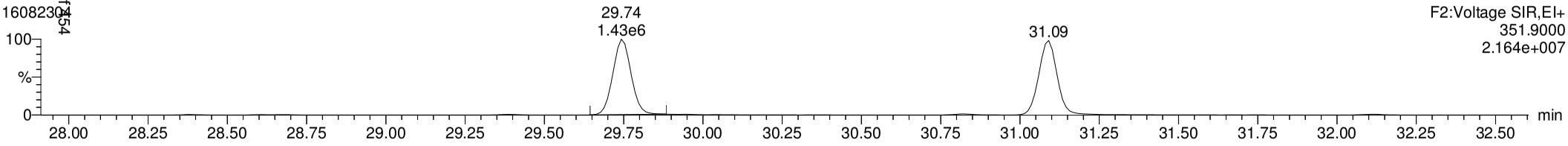


FUNCTION2 PFK

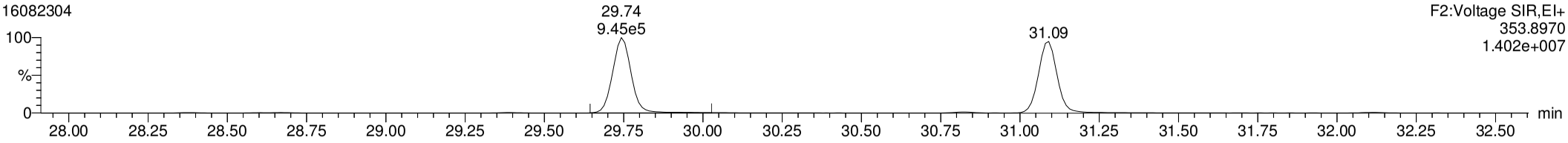


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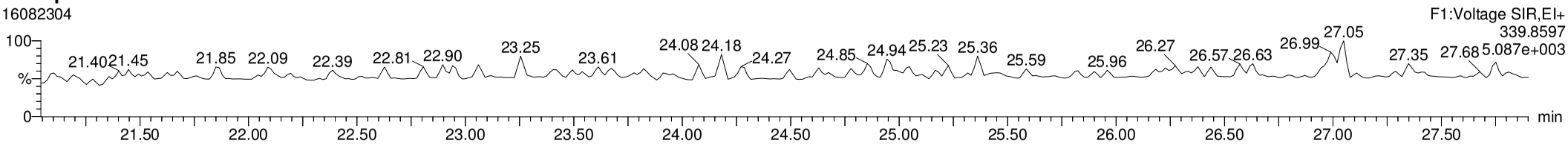
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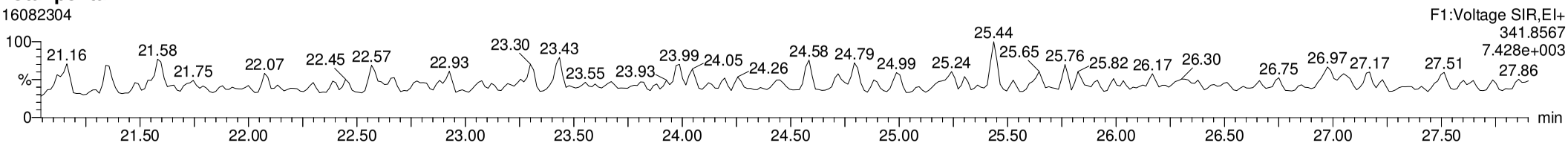
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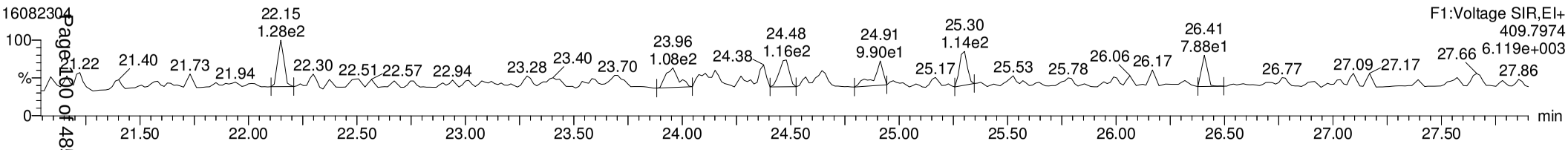
Total-penta1



Total-penta1

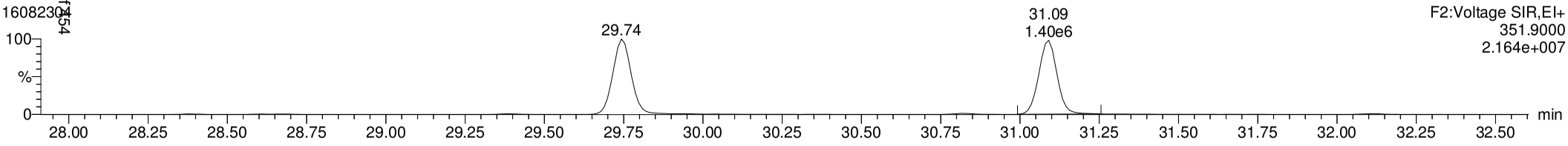


FUNCTION1 HPCDPE

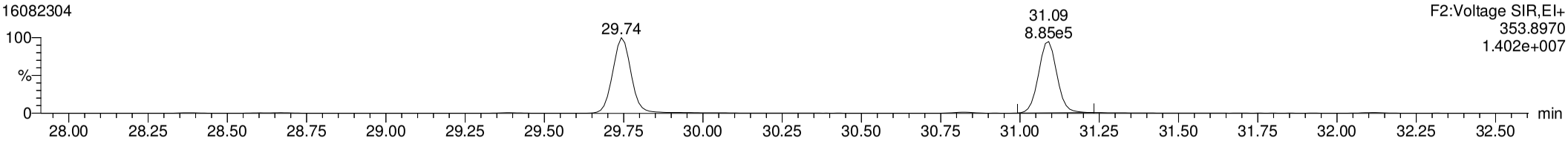


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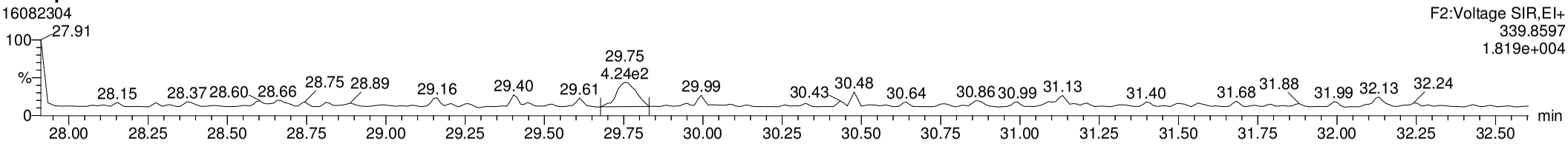
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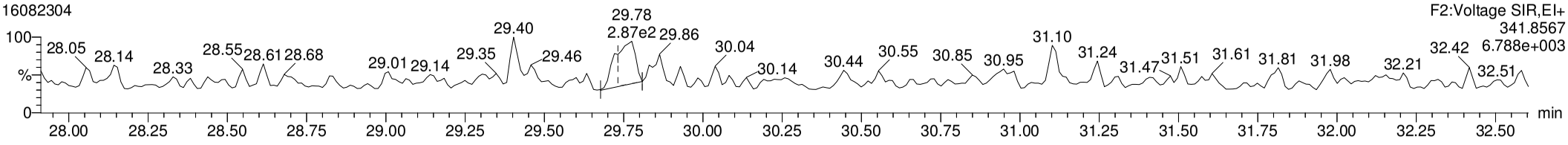
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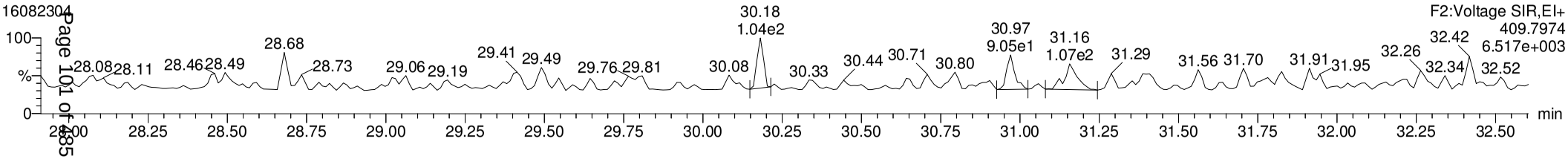
Total-pentafurans



Total-pentafurans

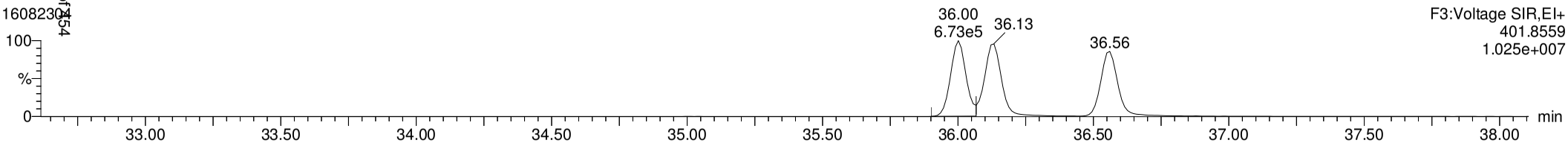


FUNCTION2 HPCDPE

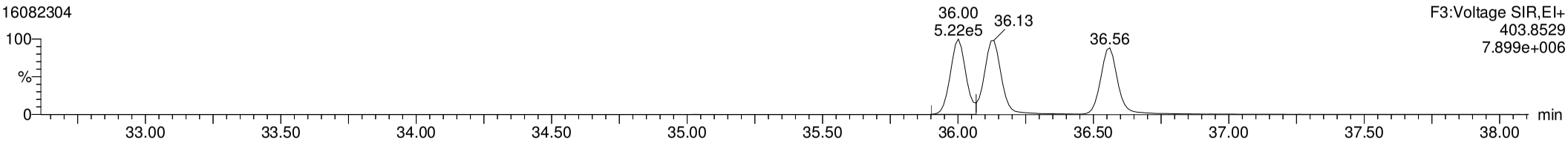


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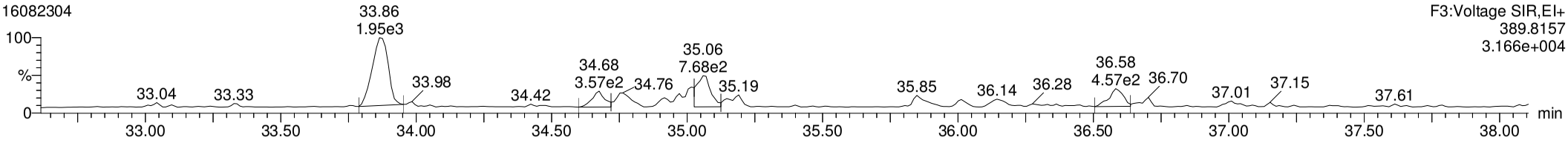
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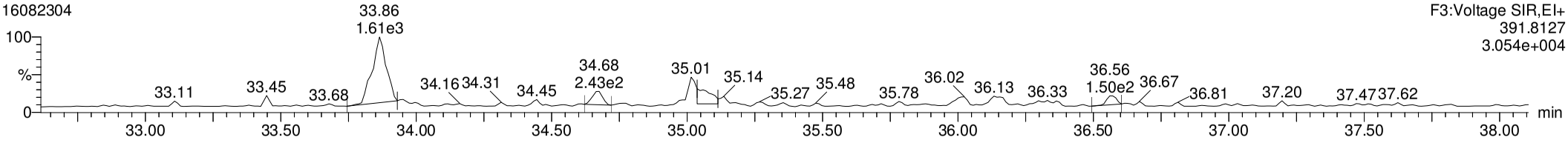
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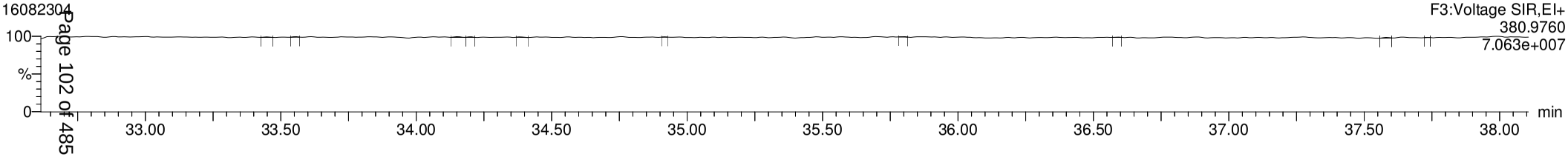
Total-hexadioxins



Total-hexadioxins

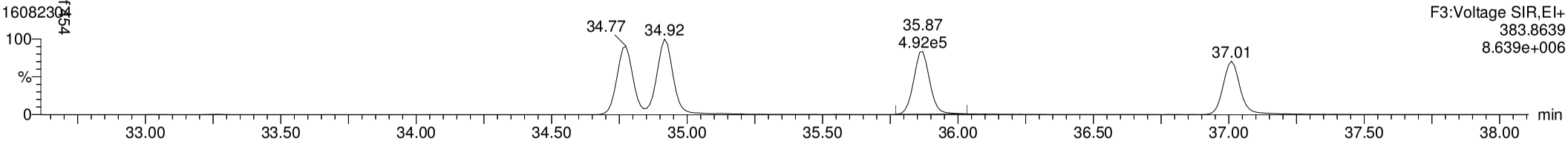


FUNCTION3 PFK

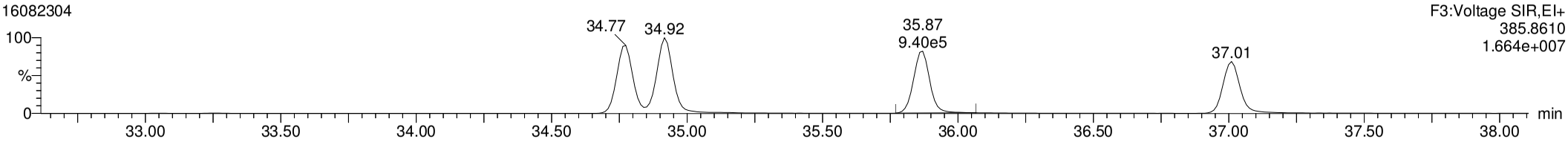


ID: BEH0316-BLK1, Name: 16082304, Date: 23-Aug-2016, Time: 12:31:47, Conditions: AUTOSPEC01, User: PK

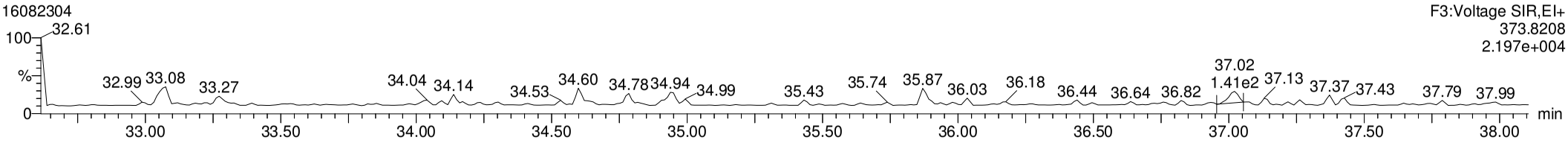
13C-234678-HxCDF



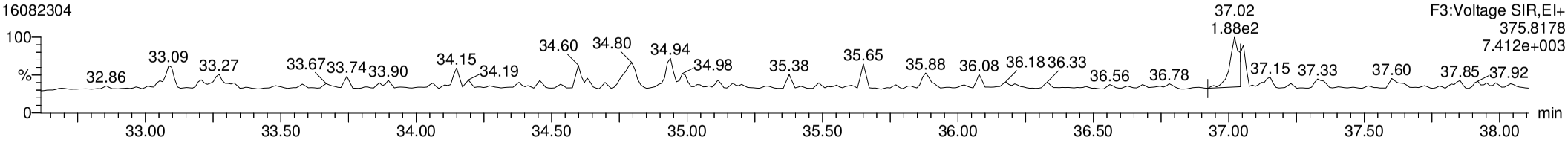
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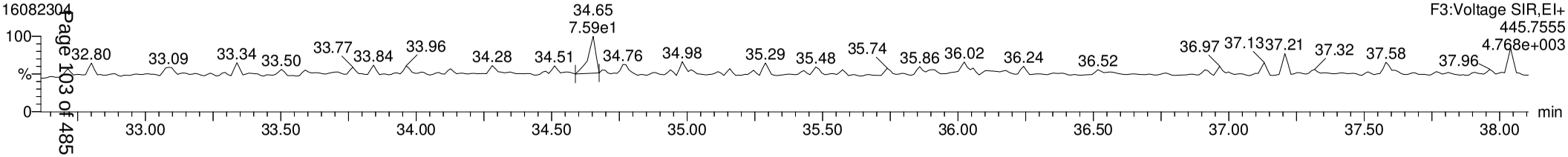
Total-hexafurans



Total-hexafurans



FUNCTION3 OCDPE

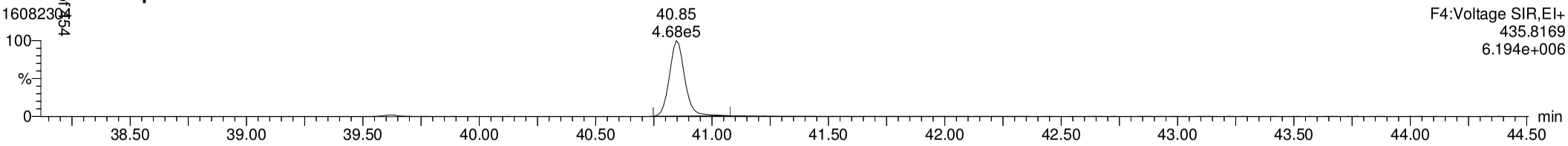


Dataset: C:\MassLynx\Dioxin.pro\160823DATA1.qld
Last Altered: Thursday, August 25, 2016 12:51:34 Pacific Daylight Time
Printed: Thursday, August 25, 2016 15:46:18 Pacific Daylight Time

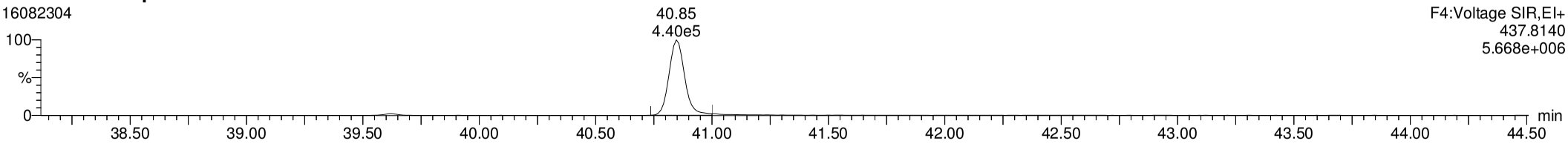
ID: BEH0316-BLK1, Name: 16082304, Date: 23-Aug-2016, Time: 12:31:47, Conditions: AUTOSPEC01, User: PK

Page 75 of 354

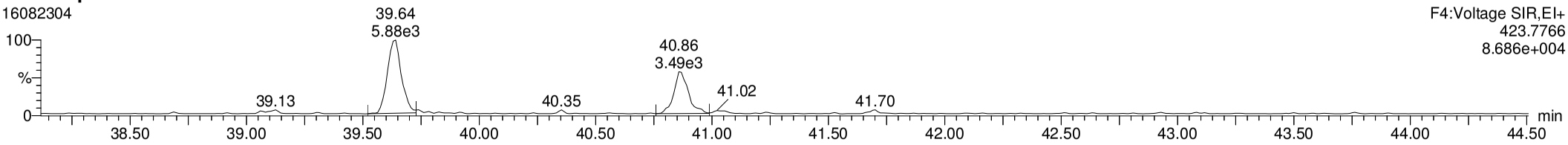
13C-1234678-HpCDD



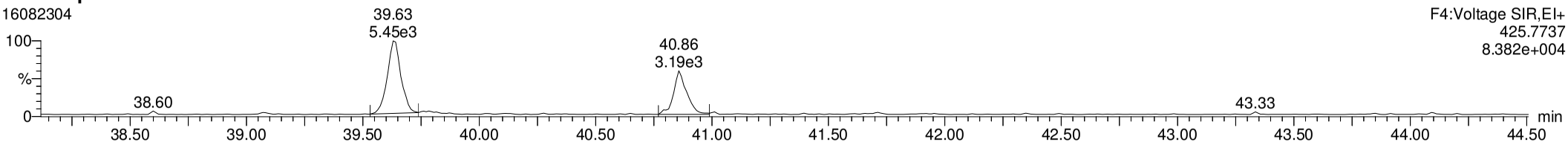
13C-1234678-HpCDD



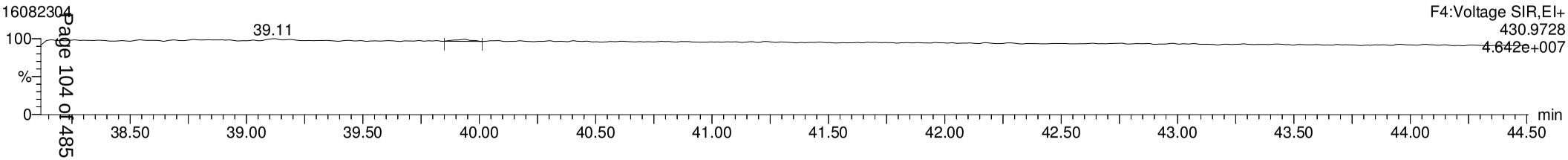
Total-heptadioxins



Total-heptadioxins



FUNCTION4 PFK



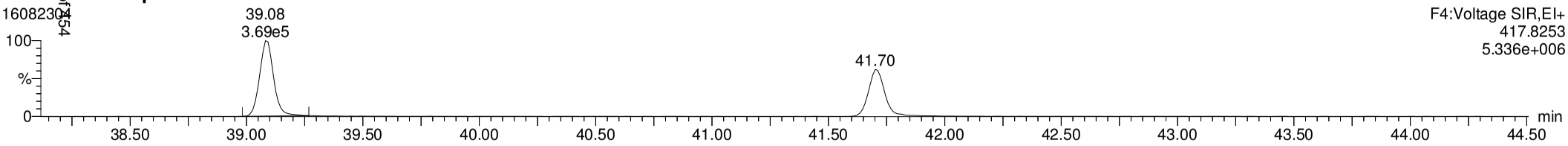
Page 104 of 485

Dataset: C:\MassLynx\Dioxin.pro\160823DATA1.qld
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Printed: Thursday, August 25, 2016 15:46:18 Pacific Daylight Time

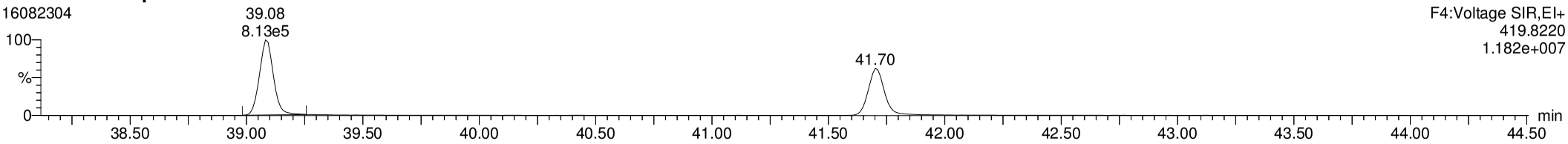
ID: BEH0316-BLK1, Name: 16082304, Date: 23-Aug-2016, Time: 12:31:47, Conditions: AUTOSPEC01, User: PK

Page 76 of 354

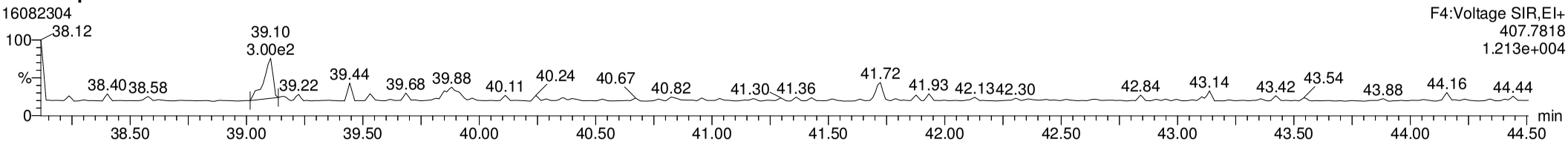
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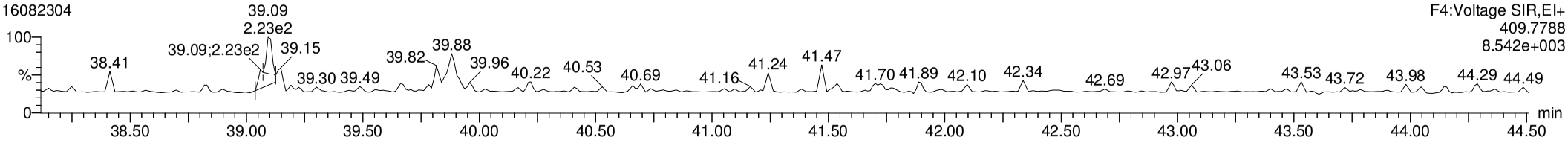
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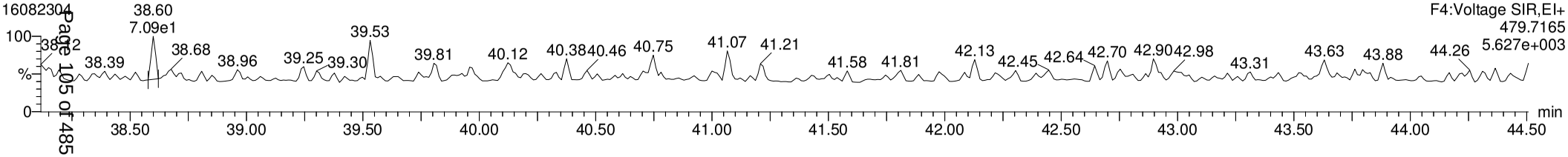
Total-heptafurans



Total-heptafurans



FUNCTION4 NCDPE



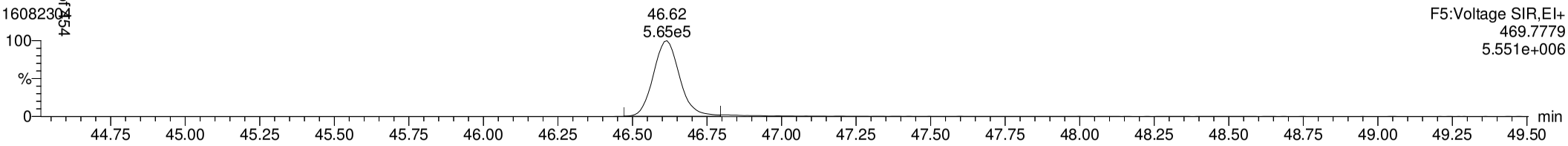
Page 105 of 485

Dataset: C:\MassLynx\Dioxin.pro\160823DATA1.qld
Last Altered: Thursday, August 25, 2016 12:51:34 Pacific Daylight Time
Printed: Thursday, August 25, 2016 15:46:18 Pacific Daylight Time

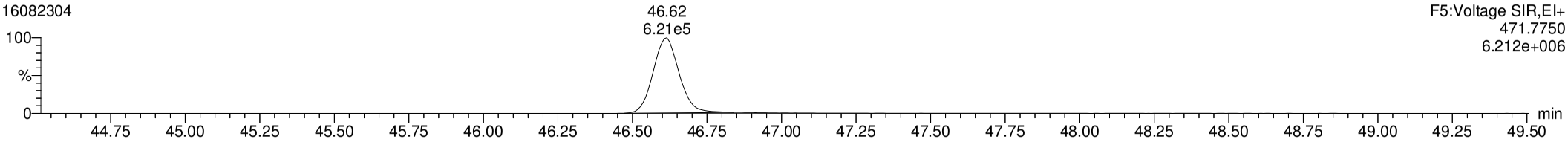
ID: BEH0316-BLK1, Name: 16082304, Date: 23-Aug-2016, Time: 12:31:47, Conditions: AUTOSPEC01, User: PK

Page 77 of 354

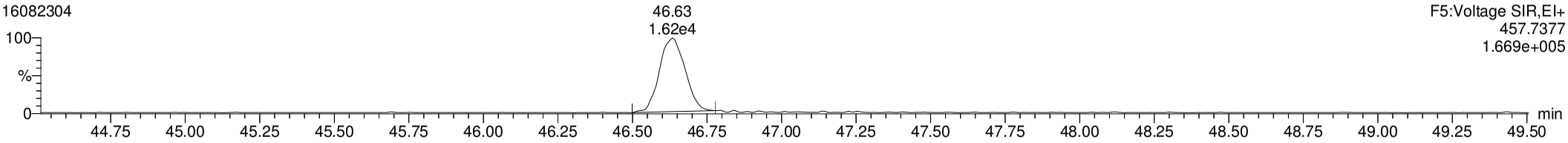
13C-OCDD



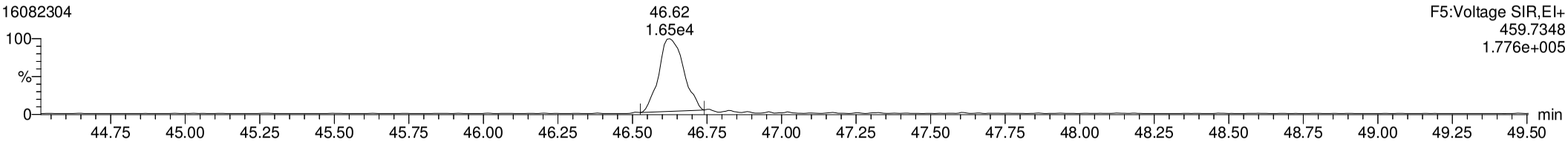
13C-OCDD



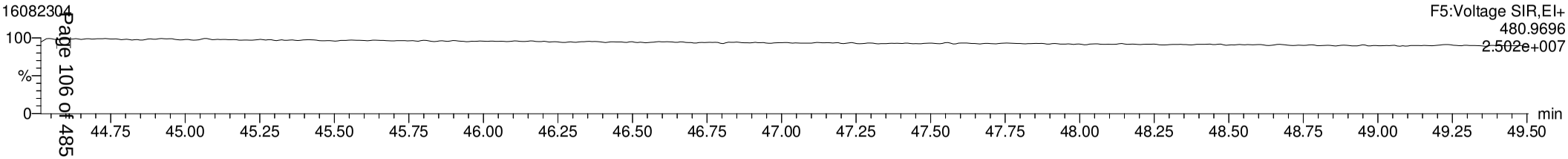
OCDD



OCDD



FUNCTION5 PFK

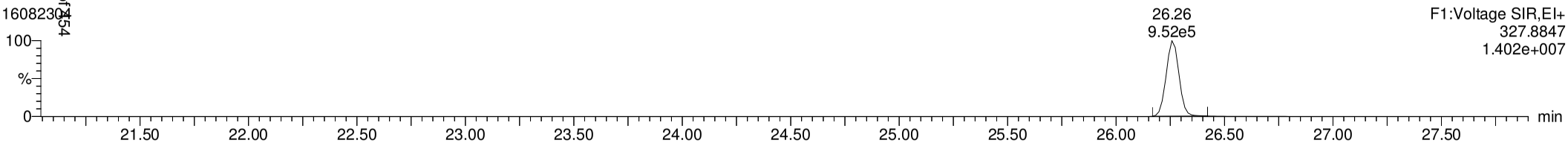


Page 106 of 485

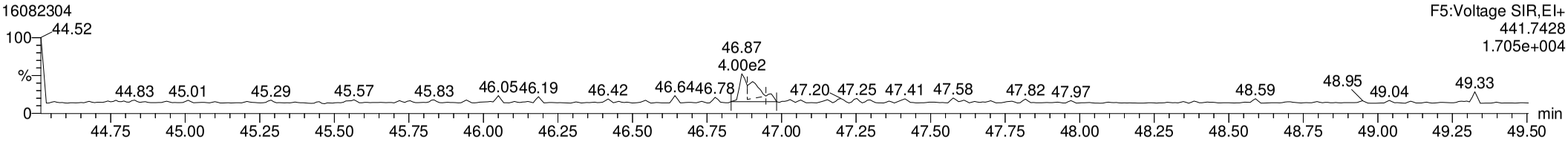
Dataset: C:\MassLynx\Dioxin.pro\160823DATA1.qld
Last Altered: Thursday, August 25, 2016 12:51:34 Pacific Daylight Time
Printed: Thursday, August 25, 2016 15:46:18 Pacific Daylight Time

ID: BEH0316-BLK1, Name: 16082304, Date: 23-Aug-2016, Time: 12:31:47, Conditions: AUTOSPEC01, User: PK

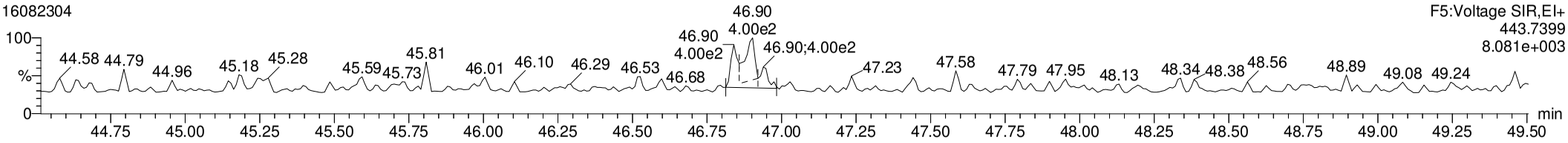
37CL-2378-TCDD



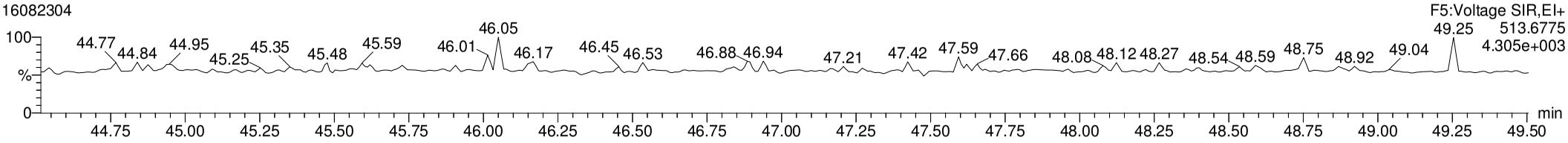
OCDF



OCDF



FUNCTION5 DCDPE



LCS / LCS DUPLICATE RECOVERY
EPA 1613B

Laboratory:	Analytical Resources, Inc.	SDG:	16H0071
Client:	Fremont Analytical	Project:	1608094
Matrix:	Solid	Analyzed:	08/23/16 13:23
Batch:	BEH0316	Laboratory ID:	BEH0316-BS1
Preparation:	EPA 1613	Initial/Final:	10 g / 20 uL

COMPOUND	SPIKE ADDED (ng/kg wet)	LCS CONCENTRATION (ng/kg wet)	LCS % REC.	QC LIMITS REC.	Q
2,3,7,8-TCDF	20.0	21.1	105	75 - 158	
2,3,7,8-TCDD	20.0	20.9	105	67 - 158	
1,2,3,7,8-PeCDF	100	106	106	80 - 134	
2,3,4,7,8-PeCDF	100	102	102	68 - 160	
1,2,3,7,8-PeCDD	100	106	106	70 - 142	
1,2,3,4,7,8-HxCDF	100	104	104	72 - 134	
1,2,3,6,7,8-HxCDF	100	102	102	84 - 130	
2,3,4,6,7,8-HxCDF	100	108	108	70 - 156	
1,2,3,7,8,9-HxCDF	100	105	105	78 - 130	
1,2,3,4,7,8-HxCDD	100	102	102	70 - 164	
1,2,3,6,7,8-HxCDD	100	107	107	76 - 134	
1,2,3,7,8,9-HxCDD	100	107	107	64 - 162	
1,2,3,4,6,7,8-HpCDF	100	112	112	82 - 122	
1,2,3,4,7,8,9-HpCDF	100	105	105	78 - 138	
1,2,3,4,6,7,8-HpCDD	100	109	109	70 - 140	
OCDF	200	224	112	63 - 170	
OCDD	200	207	103	78 - 144	
13C12-2,3,7,8-TCDF	200	189	94.7	24 - 169	
Labels					
13C12-2,3,7,8-TCDD	200	186	93.0	25 - 164	
13C12-1,2,3,7,8-PeCDF	200	169	84.4	24 - 185	
13C12-2,3,4,7,8-PeCDF	200	165	82.6	21 - 178	
13C12-1,2,3,7,8-PeCDD	200	161	80.6	25 - 181	
13C12-1,2,3,4,7,8-HxCDF	200	190	95.0	26 - 152	
13C12-1,2,3,6,7,8-HxCDF	200	188	94.2	26 - 123	
13C12-2,3,4,6,7,8-HxCDF	200	179	89.5	28 - 136	
13C12-1,2,3,7,8,9-HxCDF	200	180	89.8	29 - 147	
13C12-1,2,3,4,7,8-HxCDD	200	191	95.6	32 - 141	
13C12-1,2,3,6,7,8-HxCDD	200	178	89.2	28 - 130	
13C12-1,2,3,4,6,7,8-HpCDF	200	161	80.3	28 - 143	
13C12-1,2,3,4,7,8,9-HpCDF	200	154	76.8	26 - 138	
13C12-1,2,3,4,6,7,8-HpCDD	200	160	79.9	23 - 140	
13C12-OCDD	400	232	58.0	17 - 157	
37C14-2,3,7,8-TCDD	80.0	78.8	98.5	35 - 197	

* Values outside of QC limits

Dataset: C:\MassLynx\Dioxin.pro\160823DATA1.qld
Last Altered: Thursday, August 25, 2016 12:51:34 Pacific Daylight Time
Printed: Thursday, August 25, 2016 15:46:23 Pacific Daylight Time

Page 90 of 454

Method: C:\MassLynx\Dioxin.pro\MethDB\Dioxin1608163SN.mdb 17 Aug 2016 15:09:47
Calibration: C:\MassLynx\Dioxin.pro\CurveDB\160510ICAL.cdb 11 May 2016 09:28:40

ID: BEH0316-BS1, Name: 16082305, Date: 23-Aug-2016, Time: 13:23:14, Conditions: AUTOSPEC01, User: PK

Name	RT	RRT	Ion1Area	Ion2Area	RRF	Ratio	Pred R	Noise 1	Noise 2	Height 1	Height 2	S/N	EMPC?	EMPC	pg
2378-TCDF	25.615	1.001	1.37e5	1.78e5	0.935	0.773	0.770	731	1621	2.07e6	2.66e6	2830.9	NO	10.540	10.540
12378-PeCDF	29.764	1.001	7.11e5	4.54e5	0.952	1.565	1.550	3138	2765	1.05e7	6.64e6	3331.1	NO	52.802	52.802
23478-PeCDF	31.101	1.000	6.57e5	4.24e5	0.963	1.548	1.550	3138	2765	1.00e7	6.45e6	3187.8	NO	51.093	51.093
123478-HxCDF	34.784	1.001	4.78e5	3.82e5	1.137	1.250	1.240	3783	4350	7.04e6	5.62e6	1859.9	NO	52.181	52.181
234678-HxCDF	35.881	1.001	4.58e5	3.76e5	1.164	1.217	1.240	3783	4350	6.74e6	5.52e6	1782.5	NO	53.936	53.936
123678-HxCDF	34.938	1.001	5.07e5	4.04e5	1.099	1.255	1.240	3783	4350	7.22e6	5.68e6	1908.8	NO	50.769	50.769
123789-HxCDF	37.021	1.000	3.81e5	3.00e5	1.101	1.269	1.240	3783	4350	5.24e6	4.22e6	1385.3	NO	52.703	52.703
1234678-HpCDF	39.092	1.000	3.85e5	3.75e5	1.303	1.028	1.050	2669	2229	5.42e6	5.38e6	2032.6	NO	55.805	55.805
1234789-HpCDF	41.723	1.000	2.63e5	2.54e5	1.317	1.038	1.050	2669	2229	3.30e6	3.14e6	1238.0	NO	52.713	52.713
OCDF	46.885	1.006	3.23e5	3.63e5	1.166	0.892	0.890	1757	2239	3.14e6	3.45e6	1786.8	NO	112.049	112.049
2378-TCDD	26.257	1.001	9.56e4	1.20e5	1.134	0.794	0.770	1172	798	1.44e6	1.78e6	1229.1	NO	10.469	10.469
12378-PeCDD	31.354	1.000	4.14e5	2.63e5	0.975	1.572	1.550	1673	1819	6.13e6	3.95e6	3664.5	NO	52.883	52.883
123478-HxCDD	36.012	1.000	3.26e5	2.59e5	1.031	1.258	1.240	3003	2450	4.88e6	3.89e6	1625.0	NO	50.940	50.940
123678-HxCDD	36.144	1.001	3.28e5	2.68e5	0.971	1.222	1.240	3003	2450	4.68e6	3.78e6	1557.8	NO	53.507	53.507
123789-HxCDD	36.571	1.012	3.20e5	2.52e5	0.947	1.271	1.240	3003	2450	4.63e6	3.67e6	1543.6	NO	53.510	53.510
1234678-HpCDD	40.868	1.000	2.31e5	2.20e5	1.028	1.049	1.050	1856	1495	2.99e6	2.84e6	1612.0	NO	54.713	54.713
OCDD	46.633	1.001	2.89e5	3.12e5	1.107	0.924	0.890	1542	3010	2.86e6	3.15e6	1852.6	NO	103.409	103.409
13C-2378-TCDF	25.600	1.007	1.41e6	1.79e6	1.567	0.788	0.770	5293	3062	2.12e7	2.69e7	4005.8	NO		94.682
13C-12378-PeCDF	29.742	1.170	1.42e6	8.95e5	1.274	1.591	1.550	4306	2273	2.11e7	1.33e7	4910.9	NO		84.428
13C-23478-PeCDF	31.090	1.223	1.34e6	8.57e5	1.235	1.564	1.550	4306	2273	1.98e7	1.28e7	4602.8	NO		82.584
13C-123478-HxCDF	34.763	0.951	4.92e5	9.57e5	1.381	0.514	0.510	4924	4330	7.21e6	1.40e7	1464.8	NO		95.037
13C-123678-HxCDF	34.916	0.955	5.60e5	1.07e6	1.569	0.521	0.510	4924	4330	7.88e6	1.51e7	1599.6	NO		94.241
13C-234678-HxCDF	35.859	0.981	4.51e5	8.78e5	1.345	0.513	0.510	4924	4330	6.54e6	1.28e7	1327.2	NO		89.454
13C-123789-HxCDF	37.009	1.012	4.12e5	7.61e5	1.183	0.542	0.510	4924	4330	5.68e6	1.06e7	1153.2	NO		89.769
13C-1234678-HpCDF	39.081	1.069	3.28e5	7.17e5	1.178	0.457	0.440	1769	2877	4.85e6	1.06e7	2742.9	NO		80.273
13C-1234789-HpCDF	41.701	1.141	2.37e5	5.08e5	0.878	0.466	0.440	1769	2877	3.00e6	6.54e6	1696.7	NO		76.844
13C-1234-TCDD	25.421	0.000	9.52e5	1.20e6	1.000	0.790	0.770	2775	1255	1.44e7	1.84e7	5185.7	NO		100.000
13C-2378-TCDD	26.242	1.032	8.09e5	1.01e6	0.908	0.801	0.770	2775	1255	1.15e7	1.44e7	4154.1	NO		92.969
13C-12378-PeCDD	31.343	1.233	8.05e5	5.08e5	0.756	1.585	1.550	2306	1284	1.19e7	7.43e6	5163.5	NO		80.598
13C-123478-HxCDD	36.001	0.985	6.28e5	4.87e5	1.056	1.290	1.240	2583	2282	9.39e6	7.17e6	3636.0	NO		95.563
13C-123678-HxCDD	36.122	0.988	6.38e5	5.08e5	1.163	1.256	1.240	2583	2282	9.24e6	7.33e6	3576.5	NO		89.199
13C-1234678-HpCDD	40.846	1.117	4.16e5	3.86e5	0.909	1.078	1.050	2820	1671	5.45e6	5.10e6	1931.7	NO		79.907
13C-OCDD	46.606	1.275	4.98e5	5.52e5	0.820	0.901	0.890	2593	2036	5.03e6	5.49e6	1938.4	NO		116.006
13C-123789-HxCDD	36.560	0.000	6.18e5	4.86e5	1.000	1.272	1.240	2583	2282	8.88e6	6.96e6	3436.8	NO		100.000
Total-tetrafurans			1.44e5		0.935			731		2.16e6					11.014

Dataset: C:\MassLynx\Dioxin.pro\160823DATA1.qld
Last Altered: Thursday, August 25, 2016 12:51:34 Pacific Daylight Time
Printed: Thursday, August 25, 2016 15:46:23 Pacific Daylight Time

ID: BEH0316-BS1, Name: 16082305, Date: 23-Aug-2016, Time: 13:23:14, Conditions: AUTOSPEC01, User: PK

Name	RT	RRT	Ion1Area	Ion2Area	RRF	Ratio	Pred R	Noise 1	Noise 2	Height 1	Height 2	S/N	EMPC?	EMPC	pg
Total-penta1			0.00e0					430		0.00e0					
Total-pentafurans			1.41e6		0.957			3138		2.10e7					106.827
Total-hexafurans			1.83e6		1.125			3783		2.63e7					209.851
Total-heptafurans			6.49e5		1.310			2669		8.74e6					108.668
Total-Furans			4.35e6		1.114			731		6.13e7					548.408
Total-tetradioxins			1.01e5		1.134			1172		1.51e6					11.026
Total-pentadioxins			4.15e5		0.975			1673		6.16e6					53.102
Total-hexadioxins			9.78e5		0.983			3003		1.42e7					158.588
Total-heptadioxins			2.40e5		1.028			1856		3.12e6					56.624
Total-Dioxins			2.02e6		1.028			1172		2.79e7					382.764
Total-TEQ			6.37e6					1172		8.92e7					931.172
37CL-2378-TCDD	26.257	1.033	9.06e5		1.067			1259		1.35e7		10700.4			39.411
FUNCTION1 PFK			2.99e7					441498		5.67e7					
FUNCTION2 PFK			1.88e5					142083		4.51e6					0.000
FUNCTION3 PFK			1.80e5					356763		7.06e6					0.000
FUNCTION4 PFK			5.50e5					287871		1.42e7					
FUNCTION5 PFK			1.01e5					205086		4.01e6					
FUNCTION1 HXCD...			1.00e2					514		2.24e3					0.000
FUNCTION1 HPCD...			1.68e2					858		5.18e3					0.000
FUNCTION2 HPCD...			0.00e0					834		0.00e0					
FUNCTION3 OCDPE			0.00e0					283		0.00e0					
FUNCTION4 NCDPE			7.39e1					638		2.33e3					0.000
FUNCTION5 DCDPE			0.00e0					258		0.00e0					

Method: C:\MassLynx\Dioxin.pro\MethDB\Dioxin1608163SN.mdb 17 Aug 2016 15:09:47
Calibration: C:\MassLynx\Dioxin.pro\CurveDB\160510ICAL.cdb 11 May 2016 09:28:40

ID: BEH0316-BS1, Name: 16082305, Date: 23-Aug-2016, Time: 13:23:14, Conditions: AUTOSPEC01, User: PK

TF

	#	Name	Trace	RT	Abs.Resp	RRF	M...	pg	EMPC	1º Rati...	1º Rati...	1º R...	S/N
1	1	2378-TCDF	303.9016	25.61	315210.437	0.935		10.540	10.540	0.77	0.77	NO	2830.9
2	35	Total-tetrafurans	303.9016	24.70	3386.031	0.935		0.113		0.66	0.77	NO	27.3
3	35	Total-tetrafurans	303.9016	24.54	6294.937	0.935		0.210		0.68	0.77	NO	50.4
4	35	Total-tetrafurans	303.9016	24.37	4496.266	0.935		0.150		0.97	0.77	YES	44.0

PP

	#	Name	Trace	RT	Abs.Resp	RRF	M...	pg	EMPC	1º Rati...	1º Rati...	1º R...	S/N
1													

PF

	#	Name	Trace	RT	Abs.Resp	RRF	M...	pg	EMPC	1º Rati...	1º Rati...	1º R...	S/N
1	37	Total-pentafurans	339.8597	29.41	5795.344	0.957		0.268		2.00	1.55	YES	14.9
2	37	Total-pentafurans	339.8597	28.69	9463.952	0.957		0.438		1.62	1.55	NO	25.3
3	37	Total-pentafurans	339.8597	28.62	2797.849	0.957		0.129		1.78	1.55	NO	12.6
4	37	Total-pentafurans	339.8597	32.13	7953.485	0.957		0.368		1.57	1.55	NO	23.5
5	3	23478-PeCDF	339.8597	31.10	1081399.719	0.963		51.093	51.093	1.55	1.55	NO	3187.8
6	37	Total-pentafurans	339.8597	30.07	3024.037	0.957		0.140		1.90	1.55	YES	12.2
7	37	Total-pentafurans	339.8597	29.96	34357.164	0.957		1.589		1.69	1.55	NO	84.7
8	2	12378-PeCDF	339.8597	29.76	1165586.344	0.952		52.802	52.802	1.57	1.55	NO	3331.1

HF

	#	Name	Trace	RT	Abs.Resp	RRF	M...	pg	EMPC	1º Rati...	1º Rati...	1º R...	S/N
1	6	123678-HxCDF	373.8208	34.94	911294.625	1.099		50.769	50.769	1.26	1.24	NO	1908.8
2	4	123478-HxCDF	373.8208	34.78	859669.501	1.137		52.181	52.181	1.25	1.24	NO	1859.9
3	38	Total-hexafurans	373.8208	33.26	4112.016	1.125		0.262		1.27	1.24	NO	6.9
4	7	123789-HxCDF	373.8208	37.02	680456.750	1.101		52.703	52.703	1.27	1.24	NO	1385.3
5	5	234678-HxCDF	373.8208	35.88	834155.437	1.164		53.936	53.936	1.22	1.24	NO	1782.5

HPF

	#	Name	Trace	RT	Abs.Resp	RRF	M...	pg	EMPC	1º Rati...	1º Rati...	1º R...	S/N
1	39	Total-heptafurans	407.7818	39.85	1752.007	1.310		0.149		0.58	1.05	YES	3.8
2	8	1234678-HpCDF	407.7818	39.09	759568.688	1.303		55.805	55.805	1.03	1.05	NO	2032.6
3	9	1234789-HpCDF	407.7818	41.72	517376.422	1.317		52.713	52.713	1.04	1.05	NO	1238.0

ID: BEH0316-BS1, Name: 16082305, Date: 23-Aug-2016, Time: 13:23:14, Conditions: AUTOSPEC01, User: PK

Furans,TF,PP,PF,HF,HPF,OF

	#	Name	Trace	RT	Abs.Resp	RRF	M...	pg	EMPC	1º Rati...	1º Rati...	1º R...	S/N
1	1	2378-TCDF	303.9016	25.61	315210.437	0.935		10.540	10.540	0.77	0.77	NO	2830.9
2	35	Total-tetrafurans	303.9016	24.70	3386.031	0.935		0.113		0.66	0.77	NO	27.3
3	35	Total-tetrafurans	303.9016	24.54	6294.937	0.935		0.210		0.68	0.77	NO	50.4
4	35	Total-tetrafurans	303.9016	24.37	4496.266	0.935		0.150		0.97	0.77	YES	44.0
5	37	Total-pentafurans	339.8597	29.41	5795.344	0.957		0.268		2.00	1.55	YES	14.9
6	37	Total-pentafurans	339.8597	28.69	9463.952	0.957		0.438		1.62	1.55	NO	25.3
7	37	Total-pentafurans	339.8597	28.62	2797.849	0.957		0.129		1.78	1.55	NO	12.6
8	37	Total-pentafurans	339.8597	32.13	7953.485	0.957		0.368		1.57	1.55	NO	23.5
9	3	23478-PeCDF	339.8597	31.10	1081399.719	0.963		51.093	51.093	1.55	1.55	NO	3187.8
10	37	Total-pentafurans	339.8597	30.07	3024.037	0.957		0.140		1.90	1.55	YES	12.2
11	37	Total-pentafurans	339.8597	29.96	34357.164	0.957		1.589		1.69	1.55	NO	84.7
12	2	12378-PeCDF	339.8597	29.76	1165586.344	0.952		52.802	52.802	1.57	1.55	NO	3331.1
13	6	123678-HxCDF	373.8208	34.94	911294.625	1.099		50.769	50.769	1.26	1.24	NO	1908.8
14	4	123478-HxCDF	373.8208	34.78	859669.501	1.137		52.181	52.181	1.25	1.24	NO	1859.9
15	38	Total-hexafurans	373.8208	33.26	4112.016	1.125		0.262		1.27	1.24	NO	6.9
16	7	123789-HxCDF	373.8208	37.02	680456.750	1.101		52.703	52.703	1.27	1.24	NO	1385.3
17	5	234678-HxCDF	373.8208	35.88	834155.437	1.164		53.936	53.936	1.22	1.24	NO	1782.5
18	39	Total-heptafurans	407.7818	39.85	1752.007	1.310		0.149		0.58	1.05	YES	3.8
19	8	1234678-HpCDF	407.7818	39.09	759568.688	1.303		55.805	55.805	1.03	1.05	NO	2032.6
20	9	1234789-HpCDF	407.7818	41.72	517376.422	1.317		52.713	52.713	1.04	1.05	NO	1238.0
21	10	OCDF	441.7428	46.88	685876.594	1.166		112.049	112....	0.89	0.89	NO	1786.8

TD

	#	Name	Trace	RT	Abs.Resp	RRF	M...	pg	EMPC	1º Rati...	1º Rati...	1º R...	S/N
1	11	2378-TCDD	319.8965	26.26	215980.414	1.134		10.469	10.469	0.79	0.77	NO	1229.1
2	41	Total-tetradioxins	319.8965	25.87	6428.086	1.134		0.312		0.83	0.77	NO	28.4
3	41	Total-tetradioxins	319.8965	24.88	514.857	1.134		0.025		0.98	0.77	YES	4.6
4	41	Total-tetradioxins	319.8965	24.39	4223.428	1.134		0.205		0.96	0.77	YES	26.4
5	41	Total-tetradioxins	319.8965	23.90	321.166	1.134		0.016		0.78	0.77	NO	3.0

PD

	#	Name	Trace	RT	Abs.Resp	RRF	M...	pg	EMPC	1º Rati...	1º Rati...	1º R...	S/N
1	42	Total-pentadioxins	355.8546	29.99	793.991	0.975		0.062		0.87	1.55	YES	3.4
2	42	Total-pentadioxins	355.8546	29.78	992.705	0.975		0.078		1.44	1.55	NO	6.2
3	12	12378-PeCDD	355.8546	31.35	677347.250	0.975		52.883	52.883	1.57	1.55	NO	3664.5
4	42	Total-pentadioxins	355.8546	30.68	1012.700	0.975		0.079		0.99	1.55	YES	5.8

HD

	#	Name	Trace	RT	Abs.Resp	RRF	M...	pg	EMPC	1º Rati...	1º Rati...	1º R...	S/N
1	43	Total-hexadioxins	389.8157	35.03	2450.364	0.983		0.221		1.09	1.24	NO	4.1
2	43	Total-hexadioxins	389.8157	33.86	4562.333	0.983		0.411		1.10	1.24	NO	10.5
3	15	123789-HxCDD	389.8157	36.57	572550.501	0.947		53.510	53.510	1.27	1.24	NO	1543.6
4	14	123678-HxCDD	389.8157	36.14	595600.187	0.971		53.507	53.507	1.22	1.24	NO	1557.8
5	13	123478-HxCDD	389.8157	36.01	585426.063	1.031		50.940	50.940	1.26	1.24	NO	1625.0

ID: BEH0316-BS1, Name: 16082305, Date: 23-Aug-2016, Time: 13:23:14, Conditions: AUTOSPEC01, User: PK

HPD

	#	Name	Trace	RT	Abs.Resp	RRF M...	pg	EMPC	1º Rati...	1º Rati...	1º R...	S/N
1	44	Total-heptadioxins	423.7766	41.17	745.510	1.028	0.090					7.6
2	16	1234678-HpCDD	423.7766	40.87	451298.016	1.028	54.713	54.713	1.05	1.05	NO	1612.0
3	44	Total-heptadioxins	423.7766	39.64	15014.766	1.028	1.820		1.11	1.05	NO	60.8

Dioxins,TD,PD,HD,HPD,OD

	#	Name	Trace	RT	Abs.Resp	RRF M...	pg	EMPC	1º Rati...	1º Rati...	1º R...	S/N
1	45	Total-Dioxins	319.8965	27.53	269.570	1.028	0.014		2.81	0.77	YES	4.2
2	11	2378-TCDD	319.8965	26.26	215980.414	1.134	10.469	10.469	0.79	0.77	NO	1229.1
3	41	Total-tetradioxins	319.8965	25.87	6428.086	1.134	0.312		0.83	0.77	NO	28.4
4	41	Total-tetradioxins	319.8965	24.88	514.857	1.134	0.025		0.98	0.77	YES	4.6
5	41	Total-tetradioxins	319.8965	24.39	4223.428	1.134	0.205		0.96	0.77	YES	26.4
6	41	Total-tetradioxins	319.8965	23.90	321.166	1.134	0.016		0.78	0.77	NO	3.0
7	42	Total-pentadioxins	355.8546	29.99	793.991	0.975	0.062		0.87	1.55	YES	3.4
8	42	Total-pentadioxins	355.8546	29.78	992.705	0.975	0.078		1.44	1.55	NO	6.2
9	12	12378-PeCDD	355.8546	31.35	677347.250	0.975	52.883	52.883	1.57	1.55	NO	3664.5
10	42	Total-pentadioxins	355.8546	30.68	1012.700	0.975	0.079		0.99	1.55	YES	5.8
11	43	Total-hexadioxins	389.8157	35.03	2450.364	0.983	0.221		1.09	1.24	NO	4.1
12	43	Total-hexadioxins	389.8157	33.86	4562.333	0.983	0.411		1.10	1.24	NO	10.5
13	15	123789-HxCDD	389.8157	36.57	572550.501	0.947	53.510	53.510	1.27	1.24	NO	1543.6
14	14	123678-HxCDD	389.8157	36.14	595600.187	0.971	53.507	53.507	1.22	1.24	NO	1557.8
15	13	123478-HxCDD	389.8157	36.01	585426.063	1.031	50.940	50.940	1.26	1.24	NO	1625.0
16	44	Total-heptadioxins	423.7766	41.17	745.510	1.028	0.090					7.6
17	16	1234678-HpCDD	423.7766	40.87	451298.016	1.028	54.713	54.713	1.05	1.05	NO	1612.0
18	44	Total-heptadioxins	423.7766	39.64	15014.766	1.028	1.820		1.11	1.05	NO	60.8
19	17	OCDD	457.7377	46.63	601074.781	1.107	103.409	103....	0.92	0.89	NO	1852.6

ID: BEH0316-BS1, Name: 16082305, Date: 23-Aug-2016, Time: 13:23:14, Conditions: AUTOSPEC01, User: PK

TotalTEQ,Furans,Dioxins

	#	Name	Trace	RT	Abs.Resp	RRF M...	pg	EMPC	1º Rati...	1º Rati...	1º R...	S/N
1	1	2378-TCDF	303.9016	25.61	315210.437	0.935	10.540	10.540	0.77	0.77	NO	2830.9
2	35	Total-tetrafurans	303.9016	24.70	3386.031	0.935	0.113		0.66	0.77	NO	27.3
3	35	Total-tetrafurans	303.9016	24.54	6294.937	0.935	0.210		0.68	0.77	NO	50.4
4	35	Total-tetrafurans	303.9016	24.37	4496.266	0.935	0.150		0.97	0.77	YES	44.0
5	37	Total-pentafurans	339.8597	29.41	5795.344	0.957	0.268		2.00	1.55	YES	14.9
6	37	Total-pentafurans	339.8597	28.69	9463.952	0.957	0.438		1.62	1.55	NO	25.3
7	37	Total-pentafurans	339.8597	28.62	2797.849	0.957	0.129		1.78	1.55	NO	12.6
8	37	Total-pentafurans	339.8597	32.13	7953.485	0.957	0.368		1.57	1.55	NO	23.5
9	3	23478-PeCDF	339.8597	31.10	1081399.719	0.963	51.093	51.093	1.55	1.55	NO	3187.8
10	37	Total-pentafurans	339.8597	30.07	3024.037	0.957	0.140		1.90	1.55	YES	12.2
11	37	Total-pentafurans	339.8597	29.96	34357.164	0.957	1.589		1.69	1.55	NO	84.7
12	2	12378-PeCDF	339.8597	29.76	1165586.344	0.952	52.802	52.802	1.57	1.55	NO	3331.1
13	6	123678-HxCDF	373.8208	34.94	911294.625	1.099	50.769	50.769	1.26	1.24	NO	1908.8
14	4	123478-HxCDF	373.8208	34.78	859669.501	1.137	52.181	52.181	1.25	1.24	NO	1859.9
15	38	Total-hexafurans	373.8208	33.26	4112.016	1.125	0.262		1.27	1.24	NO	6.9
16	7	123789-HxCDF	373.8208	37.02	680456.750	1.101	52.703	52.703	1.27	1.24	NO	1385.3
17	5	234678-HxCDF	373.8208	35.88	834155.437	1.164	53.936	53.936	1.22	1.24	NO	1782.5
18	39	Total-heptafurans	407.7818	39.85	1752.007	1.310	0.149		0.58	1.05	YES	3.8
19	8	1234678-HpCDF	407.7818	39.09	759568.688	1.303	55.805	55.805	1.03	1.05	NO	2032.6
20	9	1234789-HpCDF	407.7818	41.72	517376.422	1.317	52.713	52.713	1.04	1.05	NO	1238.0
21	10	OCDF	441.7428	46.88	685876.594	1.166	112.049	112....	0.89	0.89	NO	1786.8
22	45	Total-Dioxins	319.8965	27.53	269.570	1.028	0.014		2.81	0.77	YES	4.2
23	11	2378-TCDD	319.8965	26.26	215980.414	1.134	10.469	10.469	0.79	0.77	NO	1229.1
24	41	Total-tetradioxins	319.8965	25.87	6428.086	1.134	0.312		0.83	0.77	NO	28.4
25	41	Total-tetradioxins	319.8965	24.88	514.857	1.134	0.025		0.98	0.77	YES	4.6
26	41	Total-tetradioxins	319.8965	24.39	4223.428	1.134	0.205		0.96	0.77	YES	26.4
27	41	Total-tetradioxins	319.8965	23.90	321.166	1.134	0.016		0.78	0.77	NO	3.0
28	42	Total-pentadioxins	355.8546	29.99	793.991	0.975	0.062		0.87	1.55	YES	3.4
29	42	Total-pentadioxins	355.8546	29.78	992.705	0.975	0.078		1.44	1.55	NO	6.2
30	12	12378-PeCDD	355.8546	31.35	677347.250	0.975	52.883	52.883	1.57	1.55	NO	3664.5
31	42	Total-pentadioxins	355.8546	30.68	1012.700	0.975	0.079		0.99	1.55	YES	5.8
32	43	Total-hexadioxins	389.8157	35.03	2450.364	0.983	0.221		1.09	1.24	NO	4.1
33	43	Total-hexadioxins	389.8157	33.86	4562.333	0.983	0.411		1.10	1.24	NO	10.5
34	15	123789-HxCDD	389.8157	36.57	572550.501	0.947	53.510	53.510	1.27	1.24	NO	1543.6
35	14	123678-HxCDD	389.8157	36.14	595600.187	0.971	53.507	53.507	1.22	1.24	NO	1557.8
36	13	123478-HxCDD	389.8157	36.01	585426.063	1.031	50.940	50.940	1.26	1.24	NO	1625.0
37	44	Total-heptadioxins	423.7766	41.17	745.510	1.028	0.090					7.6
38	16	1234678-HpCDD	423.7766	40.87	451298.016	1.028	54.713	54.713	1.05	1.05	NO	1612.0
39	44	Total-heptadioxins	423.7766	39.64	15014.766	1.028	1.820		1.11	1.05	NO	60.8
40	17	OCDD	457.7377	46.63	601074.781	1.107	103.409	103....	0.92	0.89	NO	1852.6

PFK1

	#	Name	Trace	RT	Abs.Resp	RRF M...	pg	EMPC	1º Rati...	1º Rati...	1º R...	S/N
1	48	FUNCTION1 PFK	330.9792	21.12	0.000							31.9
2	48	FUNCTION1 PFK	330.9792	24.24	0.000							14.1
3	48	FUNCTION1 PFK	330.9792	23.43	0.000							13.4
4	48	FUNCTION1 PFK	330.9792	22.57	0.000							3.4
5	48	FUNCTION1 PFK	330.9792	22.15	0.000							24.3
6	48	FUNCTION1 PFK	330.9792	21.81	0.000							41.5

ID: BEH0316-BS1, Name: 16082305, Date: 23-Aug-2016, Time: 13:23:14, Conditions: AUTOSPEC01, User: PK

PFK2

	#	Name	Trace	RT	Abs.Resp	RRF M...	pg	EMPC	1º Rati...	1º Rati...	1º R...	S/N
1	49	FUNCTION2 PFK	366.9792	29.94	0.000		0.000					1.0
2	49	FUNCTION2 PFK	366.9792	29.86	0.000		0.000					1.5
3	49	FUNCTION2 PFK	366.9792	29.74	0.000		0.000					1.3
4	49	FUNCTION2 PFK	366.9792	29.04	0.000		0.000					0.9
5	49	FUNCTION2 PFK	366.9792	28.89	0.000		0.000					1.5
6	49	FUNCTION2 PFK	366.9792	28.74	0.000		0.000					1.7
7	49	FUNCTION2 PFK	366.9792	28.68	0.000		0.000					0.8
8	49	FUNCTION2 PFK	366.9792	28.17	0.000		0.000					1.4
9	49	FUNCTION2 PFK	366.9792	28.07	0.000		0.000					2.1
10	49	FUNCTION2 PFK	366.9792	28.00	0.000		0.000					1.8
11	49	FUNCTION2 PFK	366.9792	32.52	0.000		0.000					1.1
12	49	FUNCTION2 PFK	366.9792	32.32	0.000		0.000					1.4
13	49	FUNCTION2 PFK	366.9792	32.24	0.000		0.000					1.7
14	49	FUNCTION2 PFK	366.9792	32.00	0.000		0.000					0.9
15	49	FUNCTION2 PFK	366.9792	31.93	0.000		0.000					0.9
16	49	FUNCTION2 PFK	366.9792	31.88	0.000		0.000					1.0
17	49	FUNCTION2 PFK	366.9792	31.84	0.000		0.000					1.6
18	49	FUNCTION2 PFK	366.9792	31.43	0.000		0.000					2.1
19	49	FUNCTION2 PFK	366.9792	30.99	0.000		0.000					1.4
20	49	FUNCTION2 PFK	366.9792	30.72	0.000		0.000					0.6
21	49	FUNCTION2 PFK	366.9792	30.48	0.000		0.000					1.1
22	49	FUNCTION2 PFK	366.9792	30.40	0.000		0.000					1.9
23	49	FUNCTION2 PFK	366.9792	30.35	0.000		0.000					1.0
24	49	FUNCTION2 PFK	366.9792	30.04	0.000		0.000					1.3

PFK3

	#	Name	Trace	RT	Abs.Resp	RRF M...	pg	EMPC	1º Rati...	1º Rati...	1º R...	S/N
1	50	FUNCTION3 PFK	380.9760	33.48	0.000		0.000					1.5
2	50	FUNCTION3 PFK	380.9760	37.73	0.000		0.000					1.5
3	50	FUNCTION3 PFK	380.9760	37.69	0.000		0.000					0.8
4	50	FUNCTION3 PFK	380.9760	37.39	0.000		0.000					1.0
5	50	FUNCTION3 PFK	380.9760	37.28	0.000		0.000					1.3
6	50	FUNCTION3 PFK	380.9760	37.00	0.000		0.000					2.0
7	50	FUNCTION3 PFK	380.9760	36.92	0.000		0.000					0.9
8	50	FUNCTION3 PFK	380.9760	36.24	0.000		0.000					1.2
9	50	FUNCTION3 PFK	380.9760	35.83	0.000		0.000					0.9
10	50	FUNCTION3 PFK	380.9760	35.73	0.000		0.000					1.3
11	50	FUNCTION3 PFK	380.9760	35.55	0.000		0.000					1.9
12	50	FUNCTION3 PFK	380.9760	35.23	0.000		0.000					1.0
13	50	FUNCTION3 PFK	380.9760	34.95	0.000		0.000					1.9
14	50	FUNCTION3 PFK	380.9760	34.84	0.000		0.000					1.0
15	50	FUNCTION3 PFK	380.9760	34.74	0.000		0.000					1.5

ID: BEH0316-BS1, Name: 16082305, Date: 23-Aug-2016, Time: 13:23:14, Conditions: AUTOSPEC01, User: PK

PFK4

	#	Name	Trace	RT	Abs.Resp	RRF M...	pg	EMPC	1º Rati...	1º Rati...	1º R...	S/N
1	51	FUNCTION4 PFK	430.9728	38.22	0.000							0.9
2	51	FUNCTION4 PFK	430.9728	40.85	0.000							1.1
3	51	FUNCTION4 PFK	430.9728	40.70	0.000							2.8
4	51	FUNCTION4 PFK	430.9728	40.56	0.000							1.7
5	51	FUNCTION4 PFK	430.9728	40.44	0.000							0.9
6	51	FUNCTION4 PFK	430.9728	40.30	0.000							1.1
7	51	FUNCTION4 PFK	430.9728	40.07	0.000							1.2
8	51	FUNCTION4 PFK	430.9728	39.91	0.000							3.6
9	51	FUNCTION4 PFK	430.9728	39.84	0.000							1.9
10	51	FUNCTION4 PFK	430.9728	39.65	0.000							0.3
11	51	FUNCTION4 PFK	430.9728	39.54	0.000							0.6
12	51	FUNCTION4 PFK	430.9728	39.17	0.000							0.7
13	51	FUNCTION4 PFK	430.9728	38.99	0.000							1.1
14	51	FUNCTION4 PFK	430.9728	38.79	0.000							1.1
15	51	FUNCTION4 PFK	430.9728	38.56	0.000							0.8
16	51	FUNCTION4 PFK	430.9728	38.47	0.000							1.5
17	51	FUNCTION4 PFK	430.9728	38.29	0.000							0.6
18	51	FUNCTION4 PFK	430.9728	43.17	0.000							0.7
19	51	FUNCTION4 PFK	430.9728	42.93	0.000							1.3
20	51	FUNCTION4 PFK	430.9728	42.74	0.000							0.8
21	51	FUNCTION4 PFK	430.9728	42.69	0.000							1.3
22	51	FUNCTION4 PFK	430.9728	42.35	0.000							1.3
23	51	FUNCTION4 PFK	430.9728	42.12	0.000							1.0
24	51	FUNCTION4 PFK	430.9728	42.08	0.000							1.0
25	51	FUNCTION4 PFK	430.9728	42.04	0.000							1.1
26	51	FUNCTION4 PFK	430.9728	41.96	0.000							1.4
27	51	FUNCTION4 PFK	430.9728	41.85	0.000							1.8
28	51	FUNCTION4 PFK	430.9728	41.82	0.000							1.6
29	51	FUNCTION4 PFK	430.9728	41.64	0.000							0.8
30	51	FUNCTION4 PFK	430.9728	41.45	0.000							1.3
31	51	FUNCTION4 PFK	430.9728	41.39	0.000							1.5
32	51	FUNCTION4 PFK	430.9728	41.17	0.000							1.5
33	51	FUNCTION4 PFK	430.9728	41.10	0.000							1.9
34	51	FUNCTION4 PFK	430.9728	44.34	0.000							1.3
35	51	FUNCTION4 PFK	430.9728	44.30	0.000							1.1
36	51	FUNCTION4 PFK	430.9728	44.22	0.000							0.7
37	51	FUNCTION4 PFK	430.9728	43.97	0.000							1.2
38	51	FUNCTION4 PFK	430.9728	43.93	0.000							0.9
39	51	FUNCTION4 PFK	430.9728	43.78	0.000							0.5
40	51	FUNCTION4 PFK	430.9728	43.74	0.000							0.6
41	51	FUNCTION4 PFK	430.9728	43.36	0.000							0.5

ID: BEH0316-BS1, Name: 16082305, Date: 23-Aug-2016, Time: 13:23:14, Conditions: AUTOSPEC01, User: PK

PFK5

	#	Name	Trace	RT	Abs.Resp	RRF M...	pg	EMPC	1º Rati...	1º Rati...	1º R...	S/N
1	52	FUNCTION5 PFK	480.9696	46.64	0.000							0.8
2	52	FUNCTION5 PFK	480.9696	46.55	0.000							0.4
3	52	FUNCTION5 PFK	480.9696	45.58	0.000							1.3
4	52	FUNCTION5 PFK	480.9696	45.15	0.000							1.9
5	52	FUNCTION5 PFK	480.9696	45.06	0.000							2.1
6	52	FUNCTION5 PFK	480.9696	44.82	0.000							1.3
7	52	FUNCTION5 PFK	480.9696	44.59	0.000							0.9
8	52	FUNCTION5 PFK	480.9696	49.42	0.000							1.6
9	52	FUNCTION5 PFK	480.9696	49.27	0.000							2.0
10	52	FUNCTION5 PFK	480.9696	48.42	0.000							0.4
11	52	FUNCTION5 PFK	480.9696	48.34	0.000							1.7
12	52	FUNCTION5 PFK	480.9696	47.75	0.000							0.9
13	52	FUNCTION5 PFK	480.9696	47.33	0.000							0.5
14	52	FUNCTION5 PFK	480.9696	47.07	0.000							0.9
15	52	FUNCTION5 PFK	480.9696	46.77	0.000							0.6
16	52	FUNCTION5 PFK	480.9696	46.71	0.000							1.4
17	52	FUNCTION5 PFK	480.9696	46.68	0.000							0.9

ETHERS1

	#	Name	Trace	RT	Abs.Resp	RRF M...	pg	EMPC	1º Rati...	1º Rati...	1º R...	S/N
1	53	FUNCTION1 HXCD...	375.8364	24.42	0.000		0.000					4.4

ETHERS2

	#	Name	Trace	RT	Abs.Resp	RRF M...	pg	EMPC	1º Rati...	1º Rati...	1º R...	S/N
1	54	FUNCTION1 HPCD...	409.7974	26.47	0.000		0.000					3.2
2	54	FUNCTION1 HPCD...	409.7974	25.24	0.000		0.000					2.8

ETHERS3

	#	Name	Trace	RT	Abs.Resp	RRF M...	pg	EMPC	1º Rati...	1º Rati...	1º R...	S/N
1												

ETHERS4

	#	Name	Trace	RT	Abs.Resp	RRF M...	pg	EMPC	1º Rati...	1º Rati...	1º R...	S/N
1												

ETHERS5

	#	Name	Trace	RT	Abs.Resp	RRF M...	pg	EMPC	1º Rati...	1º Rati...	1º R...	S/N
1	57	FUNCTION4 NCDPE	479.7165	43.89	0.000		0.000					3.7

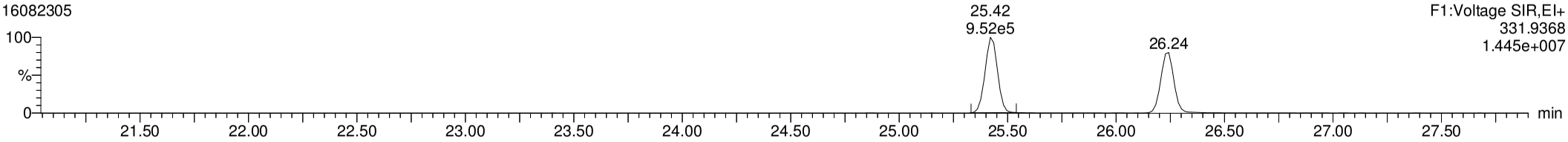
ETHERS6

	#	Name	Trace	RT	Abs.Resp	RRF M...	pg	EMPC	1º Rati...	1º Rati...	1º R...	S/N
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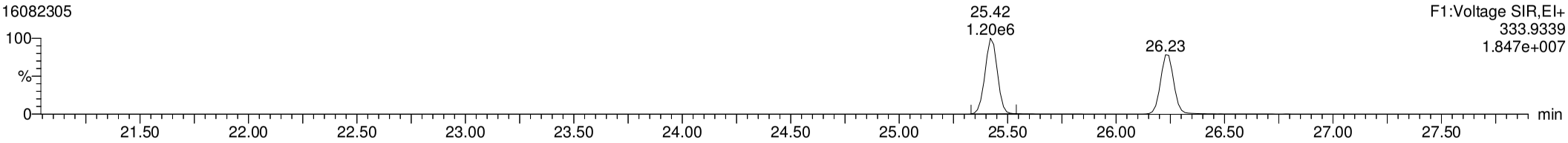
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ID: BEH0316-BS1, Name: 16082305, Date: 23-Aug-2016, Time: 13:23:14, Conditions: AUTOSPEC01, User: PK

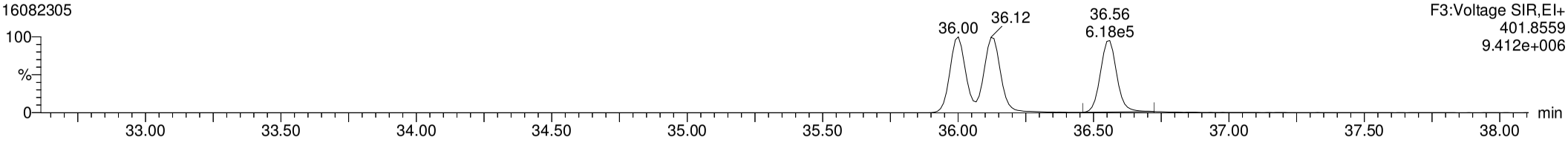
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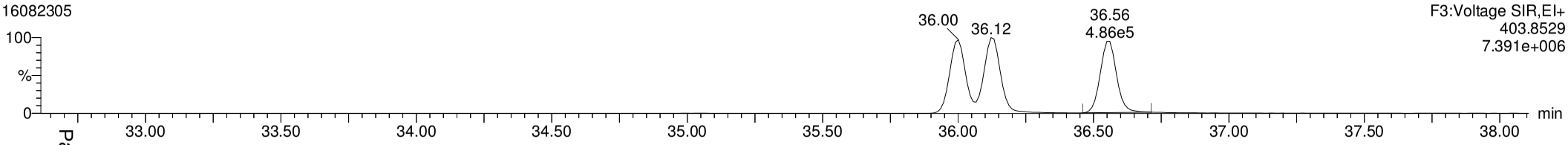
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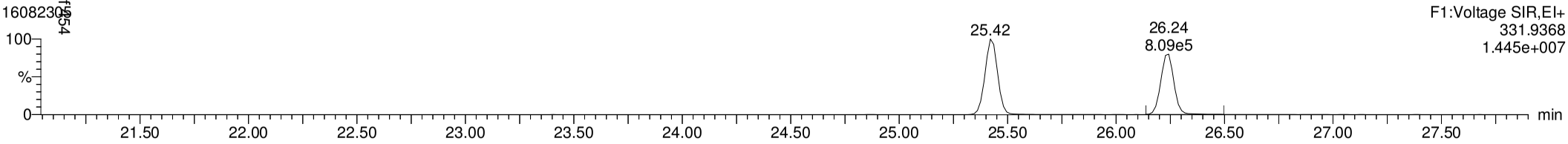
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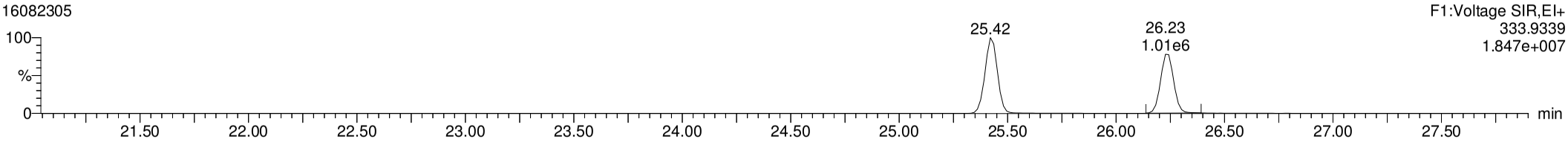
ID: BEH0316-BS1, Name: 16082305, Date: 23-Aug-2016, Time: 13:23:14, Conditions: AUTOSPEC01, User: PK

Page 90 of 954

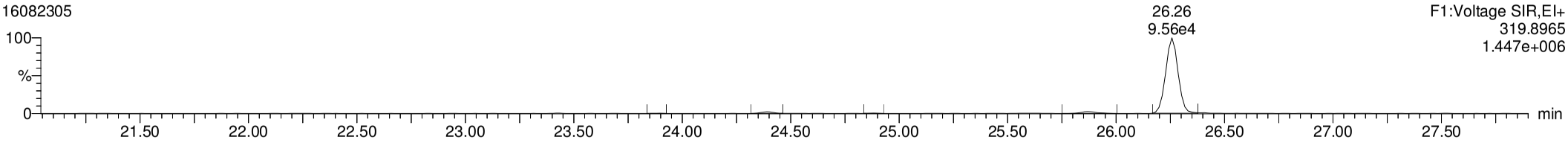
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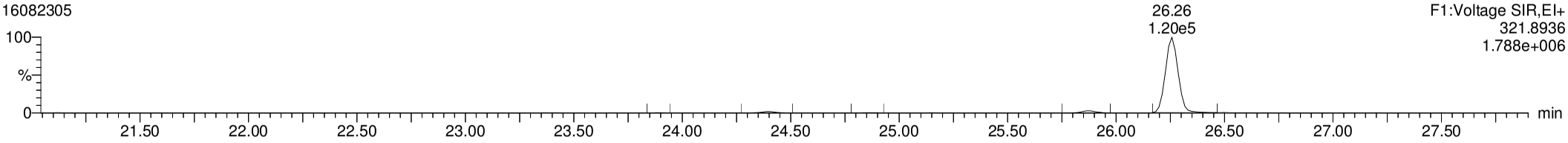
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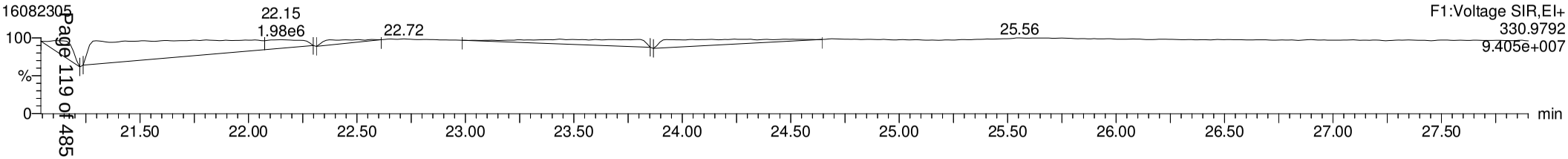
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Total-tetradioxins



FUNCTION1 PFK



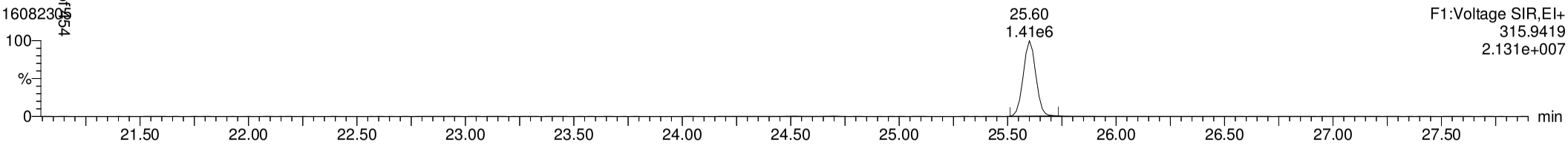
Page 119 of 485

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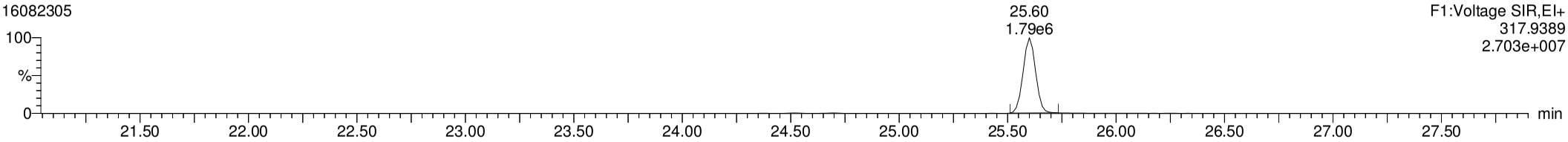
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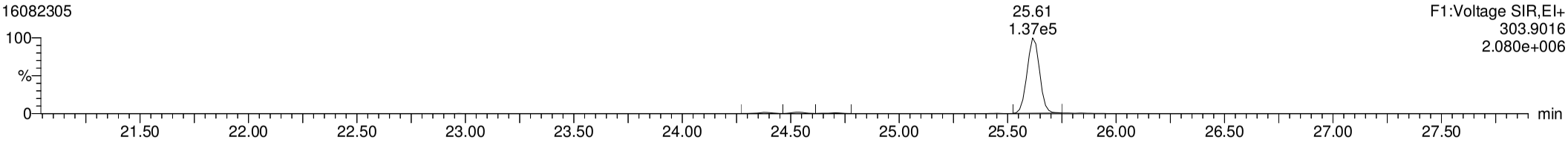
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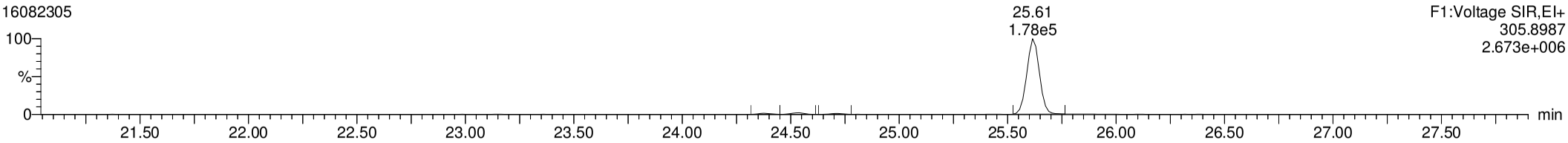
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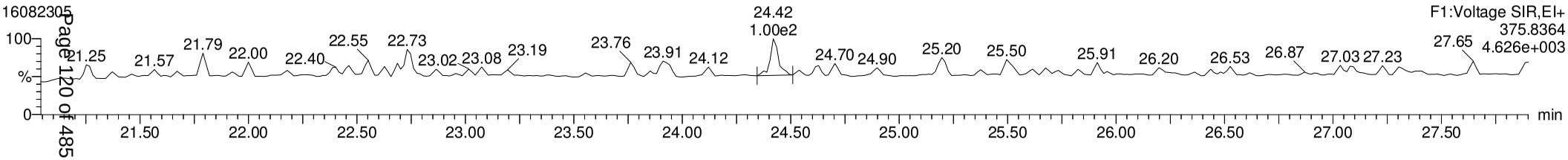
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Total-tetrafurans



FUNCTION1 HXCDPE



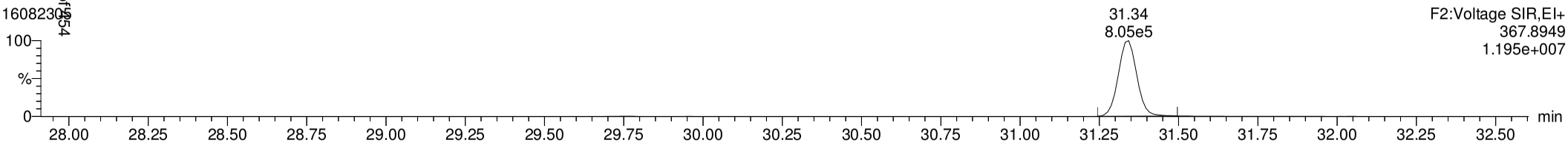
Page 120 of 485

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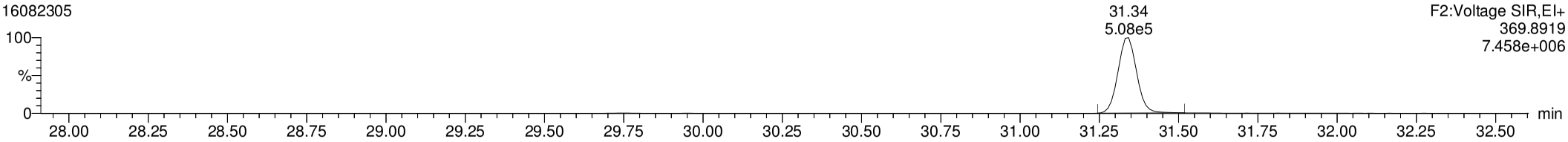
Page 92 of 954

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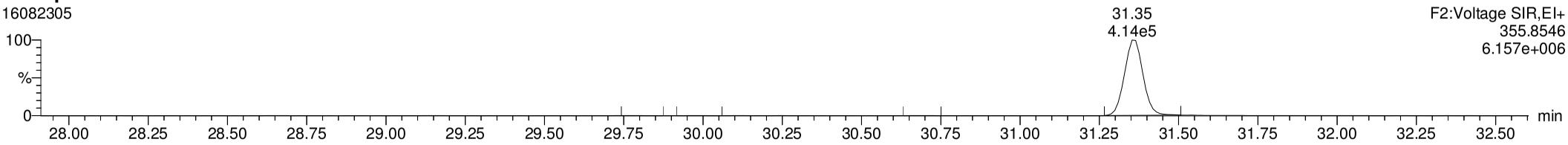
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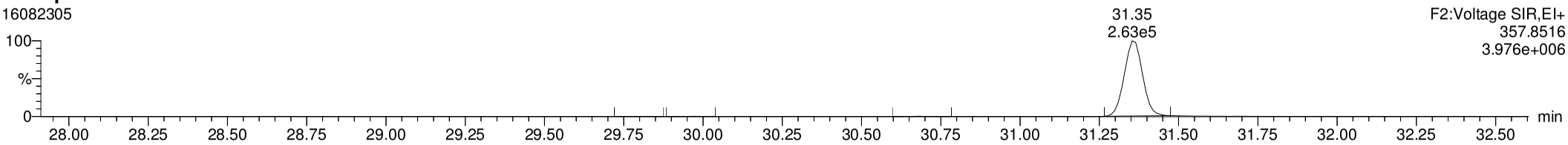
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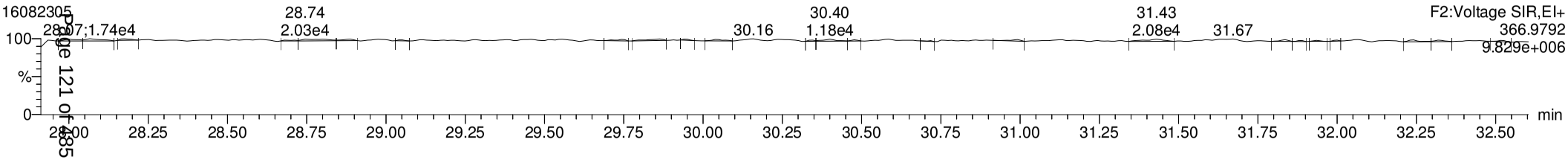
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Total-pentadioxins



FUNCTION2 PFK

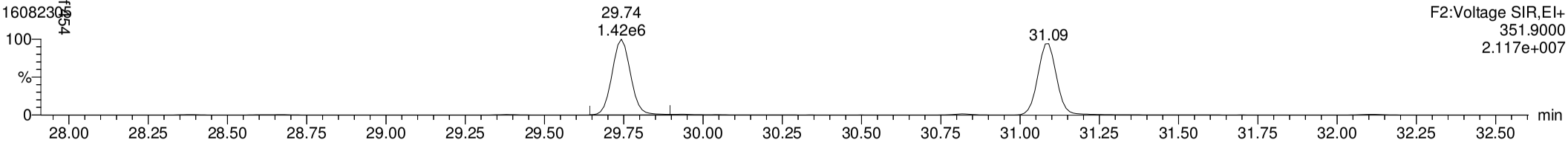


Page 121 of 485

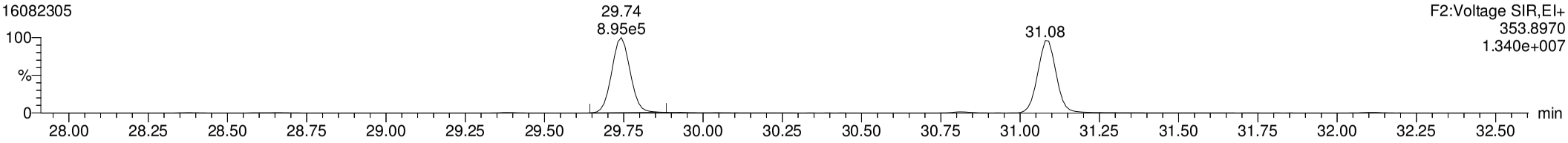
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Page 93 of 954

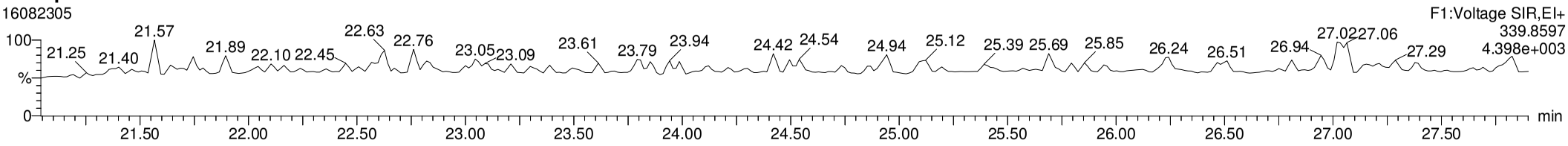
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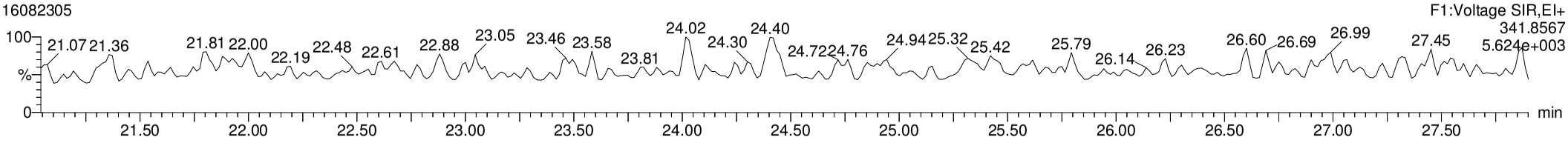
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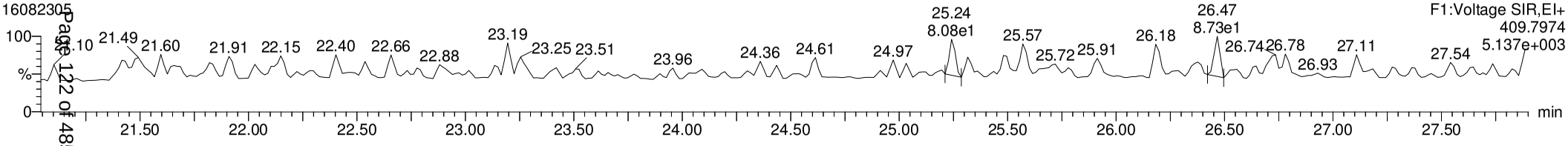
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Total-penta1



FUNCTION1 HPCDPE



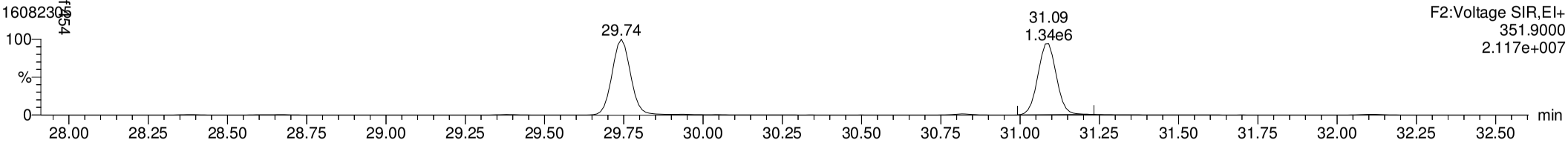
Page 122 of 485

Dataset: C:\MassLynx\Dioxin.pro\160823DATA1.qld
Last Altered: Thursday, August 25, 2016 12:51:34 Pacific Daylight Time
Printed: Thursday, August 25, 2016 15:46:23 Pacific Daylight Time

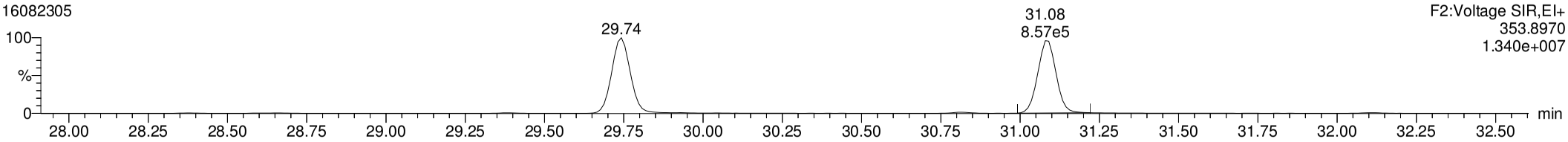
ID: BEH0316-BS1, Name: 16082305, Date: 23-Aug-2016, Time: 13:23:14, Conditions: AUTOSPEC01, User: PK

Page 94 of 954

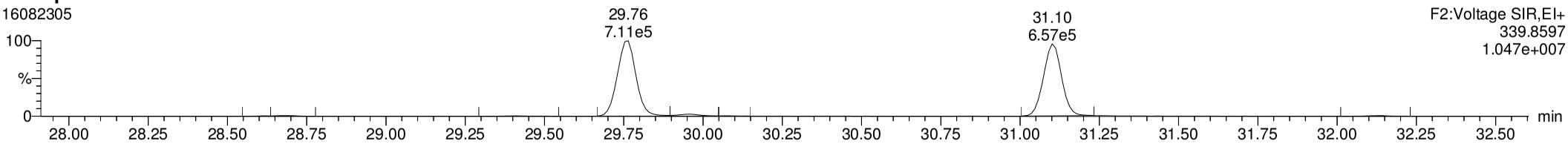
13C-23478-PeCDF



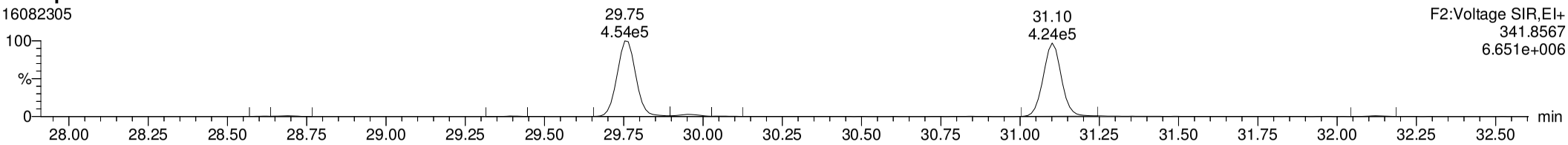
13C-23478-PeCDF



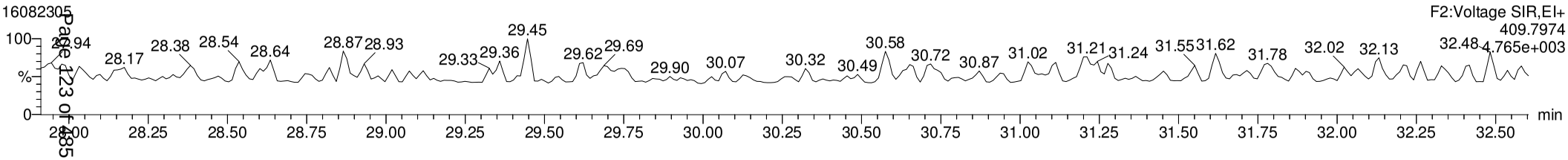
Total-pentafurans



Total-pentafurans



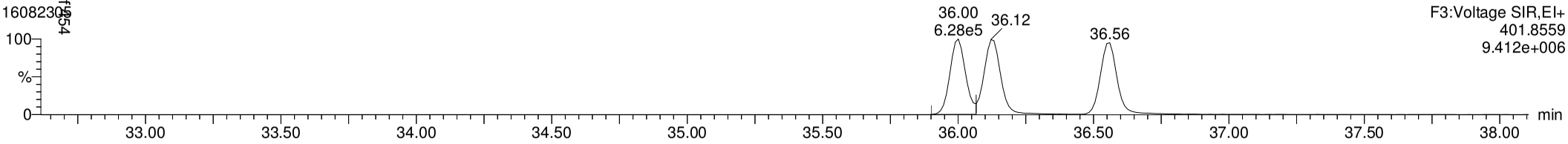
FUNCTION2 HPCDPE



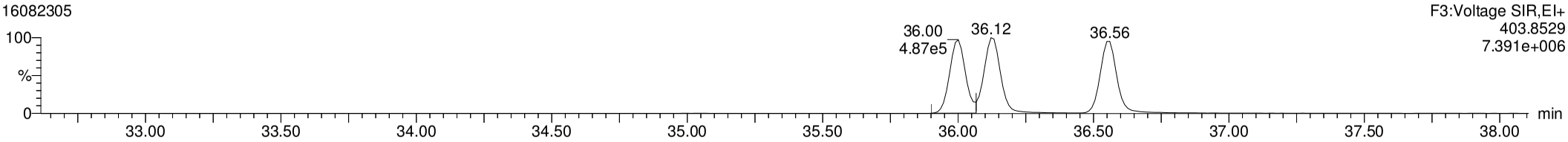
Page 123 of 485

ID: BEH0316-BS1, Name: 16082305, Date: 23-Aug-2016, Time: 13:23:14, Conditions: AUTOSPEC01, User: PK

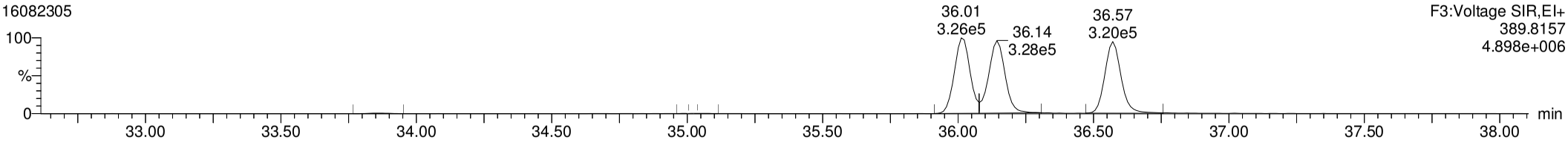
13C-123478-HxCDD



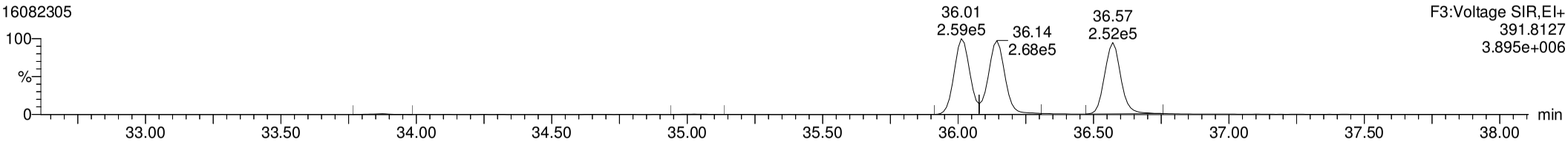
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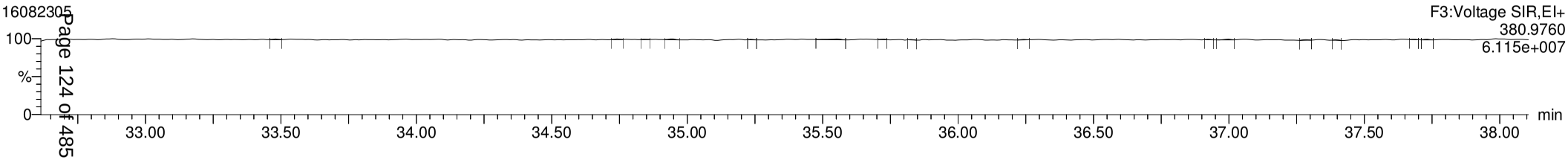
Total-hexadioxins



Total-hexadioxins



FUNCTION3 PFK

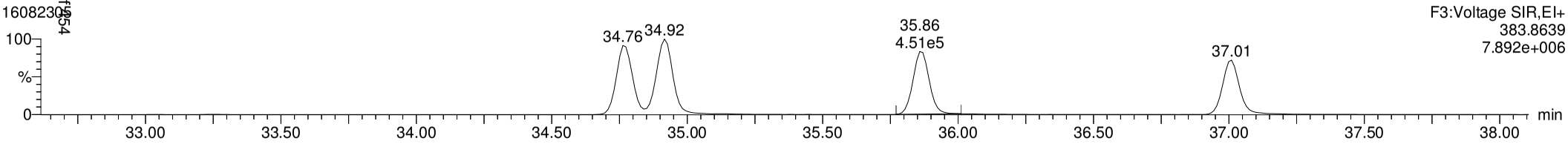


Dataset: C:\MassLynx\Dioxin.pro\160823DATA1.qld
Last Altered: Thursday, August 25, 2016 12:51:34 Pacific Daylight Time
Printed: Thursday, August 25, 2016 15:46:23 Pacific Daylight Time

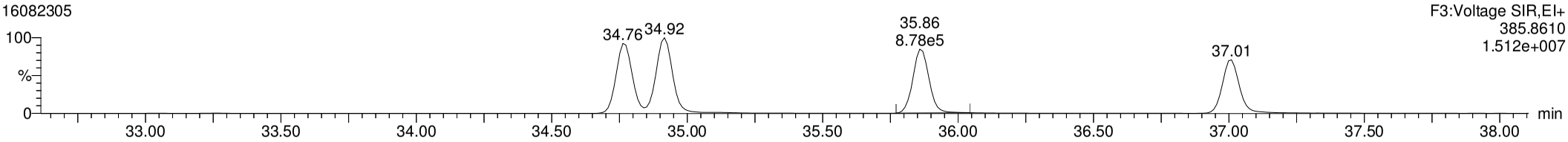
ID: BEH0316-BS1, Name: 16082305, Date: 23-Aug-2016, Time: 13:23:14, Conditions: AUTOSPEC01, User: PK

Page 96 of 954

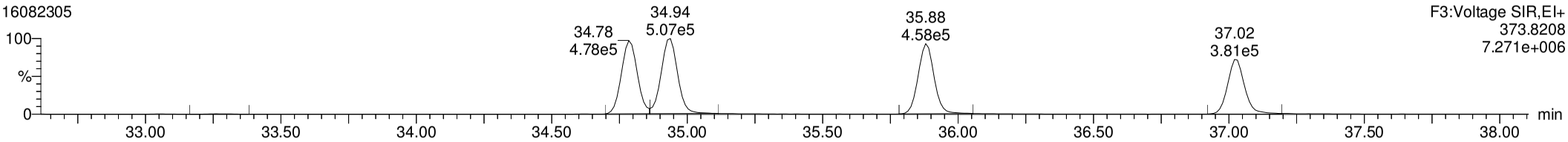
13C-234678-HxCDF



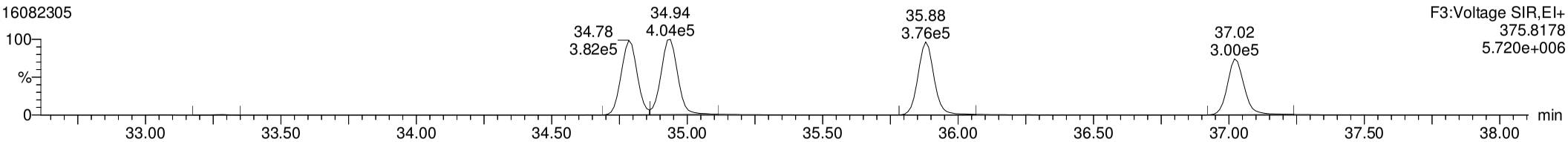
13C-234678-HxCDF



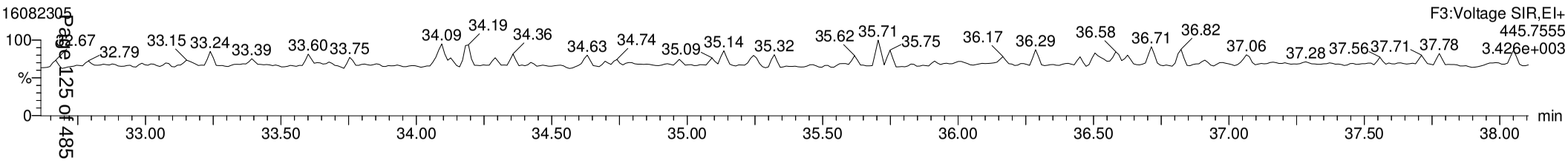
Total-hexafurans



Total-hexafurans



FUNCTION3 OCDPE

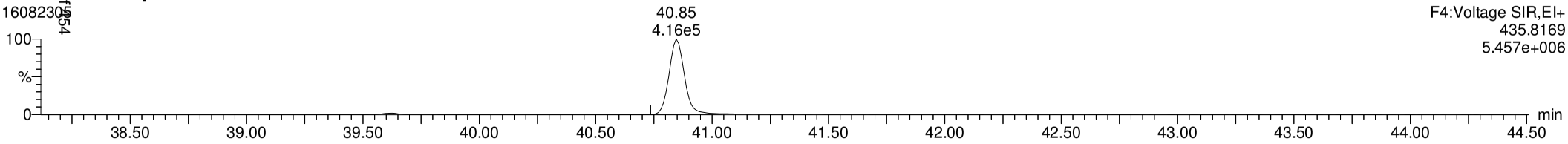


Page 125 of 485

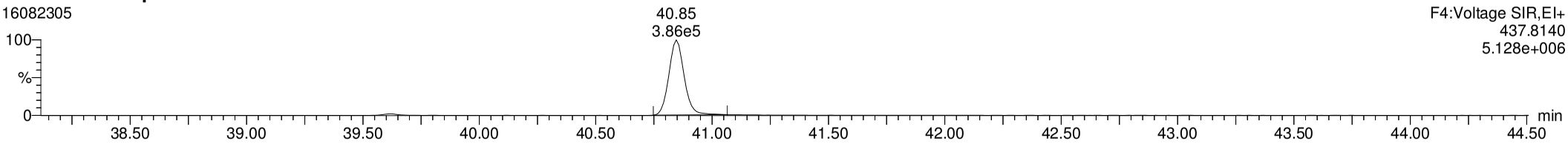
ID: BEH0316-BS1, Name: 16082305, Date: 23-Aug-2016, Time: 13:23:14, Conditions: AUTOSPEC01, User: PK

Page 97 of 954

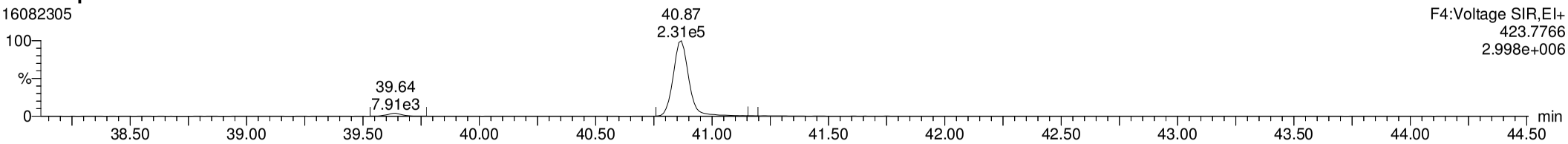
13C-1234678-HpCDD



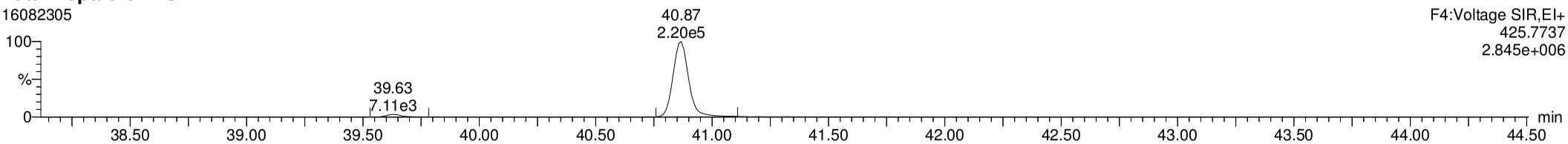
13C-1234678-HpCDD



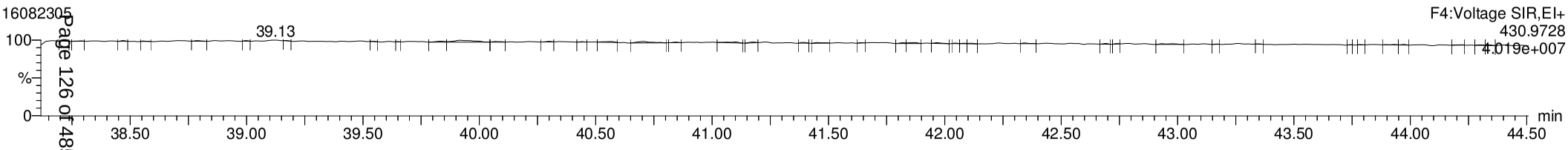
Total-heptadioxins



Total-heptadioxins



FUNCTION4 PFK

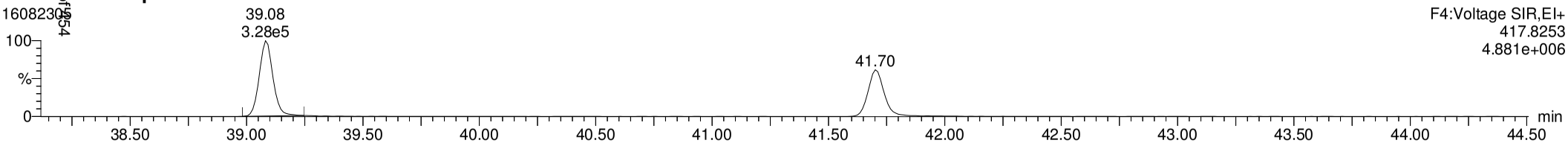


Page 126 of 485

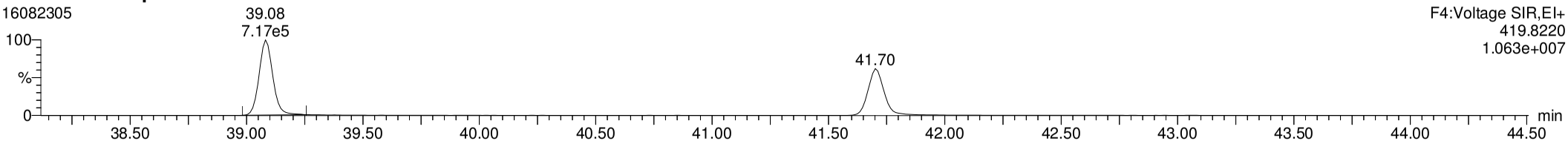
ID: BEH0316-BS1, Name: 16082305, Date: 23-Aug-2016, Time: 13:23:14, Conditions: AUTOSPEC01, User: PK

Page 90 of 954

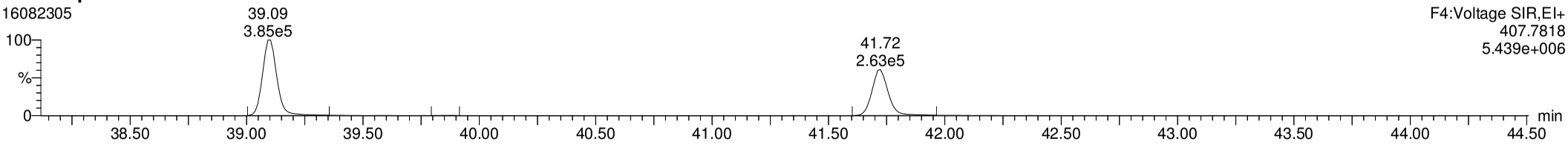
13C-1234678-HpCDF



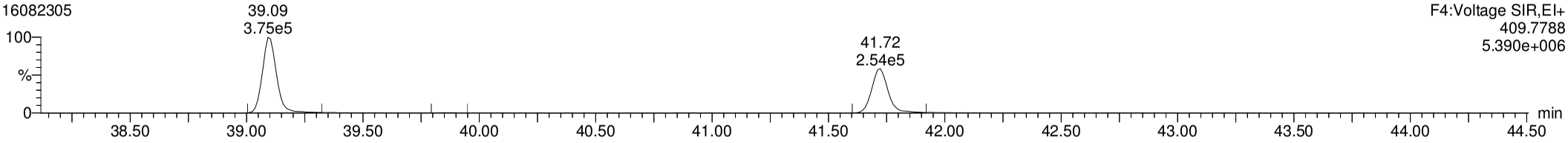
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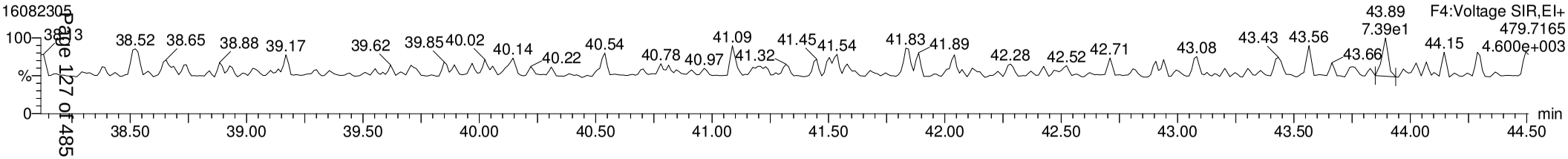
Total-heptafurans



Total-heptafurans



FUNCTION4 NCDPE



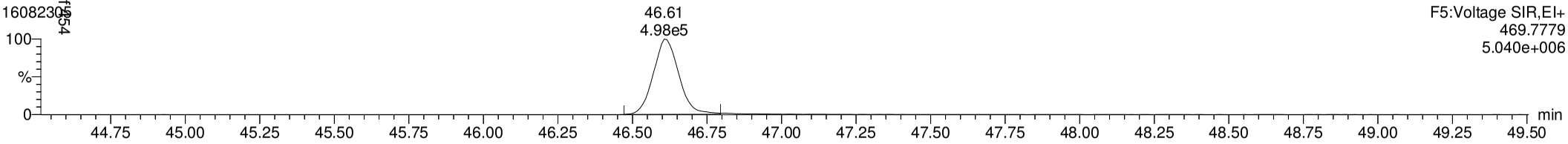
Page 127 of 485

Dataset: C:\MassLynx\Dioxin.pro\160823DATA1.qld
Last Altered: Thursday, August 25, 2016 12:51:34 Pacific Daylight Time
Printed: Thursday, August 25, 2016 15:46:23 Pacific Daylight Time

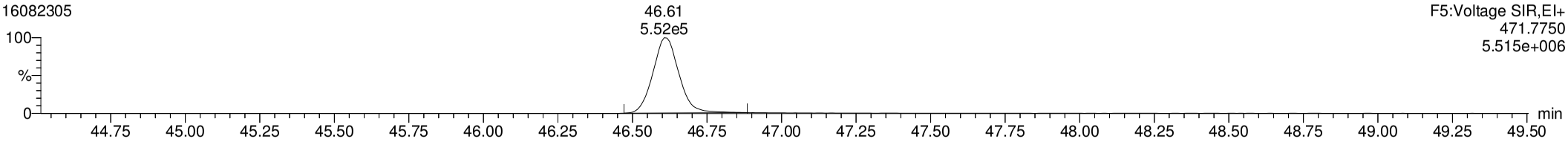
ID: BEH0316-BS1, Name: 16082305, Date: 23-Aug-2016, Time: 13:23:14, Conditions: AUTOSPEC01, User: PK

Page 99 of 954

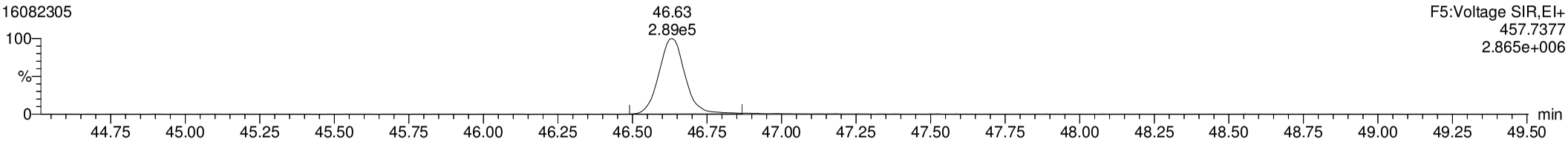
13C-OCDD



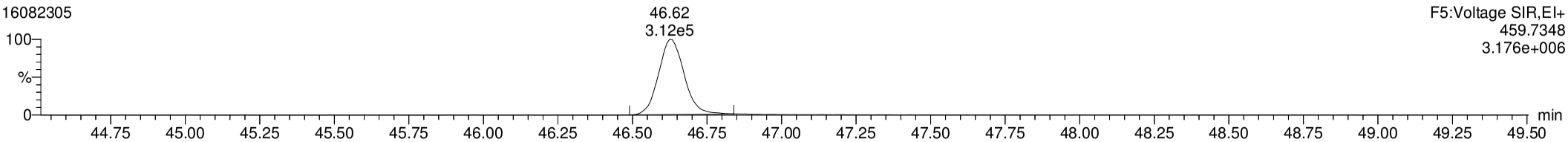
13C-OCDD



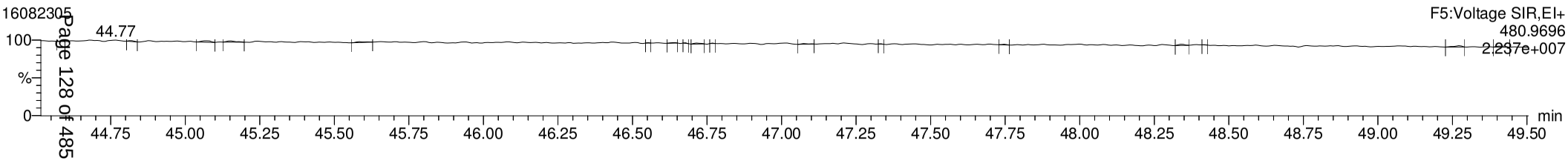
OCDD



OCDD



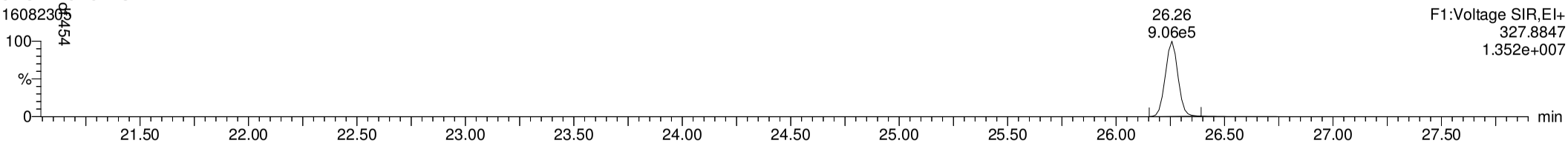
FUNCTION5 PFK



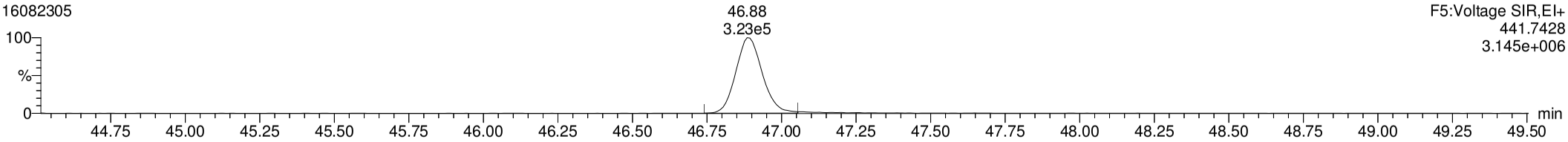
Page 128 of 485

ID: BEH0316-BS1, Name: 16082305, Date: 23-Aug-2016, Time: 13:23:14, Conditions: AUTOSPEC01, User: PK

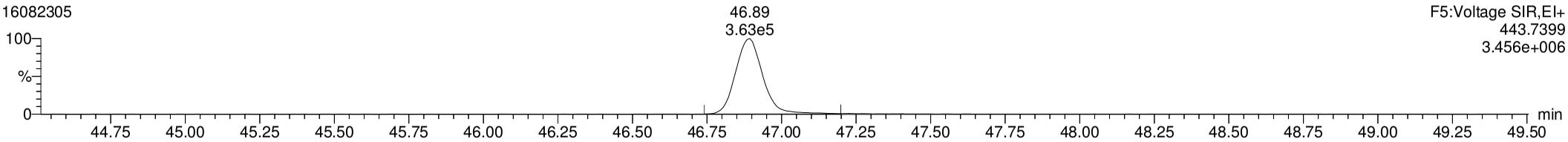
37CL-2378-TCDD



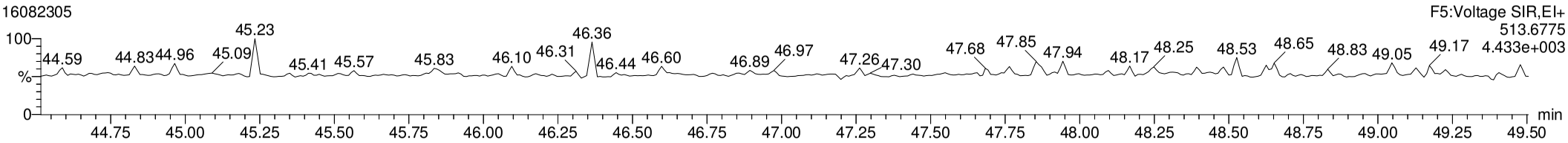
OCDF



OCDF



FUNCTION5 DCDPE



Analytical Resources, Incorporated

DUPLICATES
EPA 1613B

NME:0-4C

Laboratory: Analytical Resources, Inc.
SDG: 16H0071
Client: Fremont Analytical
Project: 1608094
Matrix: Solid
Laboratory ID: BEH0316-DUP1
Batch: BEH0316
Lab Source ID: 16H0071-01
Preparation: EPA 1613
Initial/Final: 11.88 g / 20 uL
Source Sample Name: NME:0-4C
% Solids: 84.70

ANALYTE	CONTROL LIMIT	SAMPLE CONCENTRATION	DUPLICATE CONCENTRATION	RPD %	Q
2,3,7,8-TCDF		ND	ND		
2,3,7,8-TCDD		ND	ND		
1,2,3,7,8-PeCDF	25	0.044	0.0396	9.92	
2,3,4,7,8-PeCDF		ND	ND		
1,2,3,7,8-PeCDD	25	0.114	0.0481	81.0	*
1,2,3,4,7,8-HxCDF		ND	ND		
1,2,3,6,7,8-HxCDF		ND	0.0169		
2,3,4,6,7,8-HxCDF		ND	ND		
1,2,3,7,8,9-HxCDF		ND	0.0516		
1,2,3,4,7,8-HxCDD	25	0.082	ND		
1,2,3,6,7,8-HxCDD	25	0.163	ND		
1,2,3,7,8,9-HxCDD	25	0.303	0.188	47.1	*
1,2,3,4,6,7,8-HpCDF	25	0.450	0.439	2.40	
1,2,3,4,7,8,9-HpCDF	25	0.055	ND		
1,2,3,4,6,7,8-HpCDD	25	3.81	2.57	38.8	*
OCDF	25	3.36	3.03	10.2	
OCDD	25	32.9	24.9	27.8	*
Total TCDF	200	0.075	0.0627	18.0	
Total TCDD	200	1.59	1.34	17.3	
Total PeCDF	200	0.044	0.0396	9.92	
Total PeCDD	200	0.727	0.358	68.1	
Total HxCDF	200	0.251	0.436	53.8	
Total HxCDD	200	2.84	1.97	36.6	
Total HpCDF	200	2.57	2.42	6.12	
Total HpCDD	200	9.64	6.47	39.2	
13C12-2,3,7,8-TCDF		175	174		
13C12-2,3,7,8-TCDD		171	177		
13C12-1,2,3,7,8-PeCDF		177	160		

* Values outside of QC limits
L Analyte concentration is <=5 times the reporting limit and the replicate control limit defaults to +/- RL instead of 20% RPD

Dataset: C:\MassLynx\Dioxin.pro\160823DATA1.qld
Last Altered: Thursday, August 25, 2016 12:51:34 Pacific Daylight Time
Printed: Thursday, August 25, 2016 15:46:34 Pacific Daylight Time

Method: C:\MassLynx\Dioxin.pro\MethDB\Dioxin1608163SN.mdb 17 Aug 2016 15:09:47
Calibration: C:\MassLynx\Dioxin.pro\CurveDB\160510ICAL.cdb 11 May 2016 09:28:40

ID: BEH0316-DUP1, Name: 16082307, Date: 23-Aug-2016, Time: 15:09:48, Conditions: AUTOSPEC01, User: PK

Name	RT	RRT	Ion1Area	Ion2Area	RRF	Ratio	Pred R	Noise 1	Noise 2	Height 1	Height 2	S/N	EMPC?	EMPC	pg
2378-TCDF					0.935		0.770	945	1035						
12378-PeCDF	29.764	1.000	2.76e2	1.87e2	0.952	1.475	1.550	578	1273	6.94e3	4.08e3	12.0	NO	0.020	0.020
23478-PeCDF					0.963		1.550	578	1273						
123478-HxCDF					1.137		1.240	721	566						
234678-HxCDF					1.164		1.240	721	566						
123678-HxCDF	34.960	1.001	8.36e1	7.27e1	1.099	1.149	1.240	721	566	2.57e3	1.77e3	3.6	NO	0.008	0.008
123789-HxCDF	36.999	0.999	7.83e1	2.92e2	1.101	0.268	1.240	721	566	3.10e3	6.09e3	4.3	YES	0.010	0.026
1234678-HpCDF	39.103	1.000	1.72e3	1.57e3	1.303	1.096	1.050	739	339	2.63e4	2.35e4	35.5	NO	0.221	0.221
1234789-HpCDF					1.317		1.050	739	339						
OCDF	46.894	1.006	5.37e3	6.56e3	1.166	0.819	0.890	1880	747	5.10e4	6.84e4	27.1	NO	1.525	1.525
2378-TCDD					1.134		0.770	939	1098						
12378-PeCDD	31.354	1.000	1.13e2	2.26e2	0.975	0.501	1.550	1198	432	4.07e3	3.50e3	3.4	YES	0.013	0.024
123478-HxCDD					1.031		1.240	821	2106						
123678-HxCDD					0.971		1.240	821	2106						
123789-HxCDD	36.582	1.012	6.31e2	4.80e2	0.947	1.315	1.240	821	2106	1.39e4	7.68e3	17.0	NO	0.094	0.094
1234678-HpCDD	40.868	1.000	6.55e3	5.78e3	1.028	1.134	1.050	665	928	9.69e4	8.34e4	145.8	NO	1.292	1.292
OCDD	46.643	1.001	4.50e4	4.80e4	1.107	0.937	0.890	914	896	4.47e5	4.98e5	488.8	NO	12.521	12.521
13C-2378-TCDF	25.615	1.007	1.43e6	1.82e6	1.567	0.787	0.770	4341	2713	2.14e7	2.68e7	4918.9	NO		87.609
13C-12378-PeCDF	29.753	1.170	1.48e6	9.54e5	1.274	1.554	1.550	3231	2450	2.26e7	1.43e7	7005.7	NO		80.695
13C-23478-PeCDF	31.091	1.222	1.46e6	9.19e5	1.235	1.591	1.550	3231	2450	2.23e7	1.40e7	6904.2	NO		81.411
13C-123478-HxCDF	34.773	0.951	5.38e5	1.03e6	1.381	0.524	0.510	3480	5396	8.03e6	1.54e7	2308.2	NO		84.980
13C-123678-HxCDF	34.927	0.955	5.69e5	1.11e6	1.569	0.513	0.510	3480	5396	8.39e6	1.61e7	2411.1	NO		80.092
13C-234678-HxCDF	35.869	0.981	5.02e5	9.60e5	1.345	0.523	0.510	3480	5396	7.37e6	1.41e7	2118.5	NO		81.477
13C-123789-HxCDF	37.021	1.013	4.34e5	8.63e5	1.183	0.503	0.510	3480	5396	6.18e6	1.20e7	1776.5	NO		82.207
13C-1234678-HpCDF	39.092	1.069	3.55e5	7.90e5	1.178	0.449	0.440	2114	2886	5.26e6	1.15e7	2487.2	NO		72.837
13C-1234789-HpCDF	41.712	1.141	2.69e5	5.92e5	0.878	0.454	0.440	2114	2886	3.40e6	7.57e6	1606.1	NO		73.510
13C-1234-TCDD	25.436	0.000	1.05e6	1.32e6	1.000	0.800	0.770	2472	1770	1.61e7	2.02e7	6528.7	NO		100.000
13C-2378-TCDD	26.243	1.032	8.44e5	1.07e6	0.908	0.785	0.770	2472	1770	1.26e7	1.61e7	5086.1	NO		89.169
13C-12378-PeCDD	31.343	1.232	8.83e5	5.51e5	0.756	1.603	1.550	1108	1699	1.30e7	8.29e6	11749.8	NO		80.087
13C-123478-HxCDD	36.012	0.985	6.79e5	5.32e5	1.056	1.276	1.240	2428	1567	1.04e7	8.08e6	4281.7	NO		86.034
13C-123678-HxCDD	36.133	0.988	7.14e5	5.60e5	1.163	1.276	1.240	2428	1567	1.06e7	8.25e6	4349.0	NO		82.088
13C-1234678-HpCDD	40.857	1.117	4.80e5	4.49e5	0.909	1.068	1.050	2455	1840	6.26e6	5.93e6	2550.7	NO		76.582
13C-OCDD	46.616	1.275	6.41e5	7.02e5	0.820	0.913	0.890	2875	2978	6.33e6	6.93e6	2202.9	NO		122.788
13C-123789-HxCDD	36.560	0.000	7.47e5	5.87e5	1.000	1.272	1.240	2428	1567	1.06e7	8.43e6	4378.1	NO		100.000
Total-tetrafurans			4.26e2		0.935			945		6.23e3					0.032

Dataset: C:\MassLynx\Dioxin.pro\160823DATA1.qld
Last Altered: Thursday, August 25, 2016 12:51:34 Pacific Daylight Time
Printed: Thursday, August 25, 2016 15:46:34 Pacific Daylight Time

ID: BEH0316-DUP1, Name: 16082307, Date: 23-Aug-2016, Time: 15:09:48, Conditions: AUTOSPEC01, User: PK

Name	RT	RRT	Ion1Area	Ion2Area	RRF	Ratio	Pred R	Noise 1	Noise 2	Height 1	Height 2	S/N	EMPC?	EMPC	pg
Total-penta1			0.00e0					540		0.00e0					
Total-pentafurans			2.76e2		0.957			578		6.94e3					0.020
Total-hexafurans			1.92e3		1.125			721		3.70e4					0.219
Total-heptafurans			8.29e3		1.310			739		1.20e5					1.217
Total-Furans			1.63e4		1.114			945		2.21e5					3.012
Total-tetradioxins			6.56e3		1.134			939		1.10e5					0.673
Total-pentadioxins			1.50e3		0.975			1198		2.33e4					0.180
Total-hexadioxins			6.54e3		0.983			821		1.13e5					0.989
Total-heptadioxins			1.60e4		1.028			665		2.26e5					3.257
Total-Dioxins			7.56e4		1.028			939		9.19e5					17.620
Total-TEQ			9.19e4					939		1.14e6					20.632
37CL-2378-TCDD	26.272	1.033	9.78e5		1.067			1122		1.43e7		12700.1			38.701
FUNCTION1 PFK			9.56e7					509511		3.10e8					
FUNCTION2 PFK			9.08e4					127146		3.21e6					0.000
FUNCTION3 PFK			2.82e5					317808		7.74e6					0.000
FUNCTION4 PFK			5.66e5					258604		1.52e7					
FUNCTION5 PFK			2.84e5					206504		1.10e7					
FUNCTION1 HXCD...			0.00e0					471		0.00e0					
FUNCTION1 HPCD...			0.00e0					462		0.00e0					
FUNCTION2 HPCD...			9.83e1					506		3.12e3					0.000
FUNCTION3 OCDPE			0.00e0					440		0.00e0					
FUNCTION4 NCDPE			1.67e2					555		3.65e3					0.000
FUNCTION5 DCDPE			0.00e0					263		0.00e0					

Method: C:\MassLynx\Dioxin.pro\MethDB\Dioxin1608163SN.mdb 17 Aug 2016 15:09:47
Calibration: C:\MassLynx\Dioxin.pro\CurveDB\160510ICAL.cdb 11 May 2016 09:28:40

ID: BEH0316-DUP1, Name: 16082307, Date: 23-Aug-2016, Time: 15:09:48, Conditions: AUTOSPEC01, User: PK

TF

	#	Name	Trace	RT	Abs.Resp	RRF M...	pg	EMPC	1º Rati...	1º Rati...	1º R...	S/N
1	35	Total-tetrafurans	303.9016	22.97	959.542	0.935	0.032		0.80	0.77	NO	6.6

PP

	#	Name	Trace	RT	Abs.Resp	RRF M...	pg	EMPC	1º Rati...	1º Rati...	1º R...	S/N
1												

PF

	#	Name	Trace	RT	Abs.Resp	RRF M...	pg	EMPC	1º Rati...	1º Rati...	1º R...	S/N
1	2	12378-PeCDF	339.8597	29.76	462.696	0.952	0.020	0.020	1.48	1.55	NO	12.0

HF

	#	Name	Trace	RT	Abs.Resp	RRF M...	pg	EMPC	1º Rati...	1º Rati...	1º R...	S/N
1	38	Total-hexafurans	373.8208	34.14	2032.460	1.125	0.120		1.26	1.24	NO	24.5
2	38	Total-hexafurans	373.8208	33.28	783.096	1.125	0.046		1.27	1.24	NO	12.9
3	38	Total-hexafurans	373.8208	33.09	300.329	1.125	0.018		1.60	1.24	YES	6.0
4	6	123678-HxCDF	373.8208	34.96	156.297	1.099	0.008	0.008	1.15	1.24	NO	3.6
5	7	123789-HxCDF	373.8208	37.00	370.725	1.101	0.026	0.010	0.27	1.24	YES	4.3

HPF

	#	Name	Trace	RT	Abs.Resp	RRF M...	pg	EMPC	1º Rati...	1º Rati...	1º R...	S/N
1	39	Total-heptafurans	407.7818	39.87	13076.354	1.310	0.996		1.01	1.05	NO	127.3
2	8	1234678-HpCDF	407.7818	39.10	3295.840	1.303	0.221	0.221	1.10	1.05	NO	35.5

Furans,TF,PP,PF,HF,HPF,OF

	#	Name	Trace	RT	Abs.Resp	RRF M...	pg	EMPC	1º Rati...	1º Rati...	1º R...	S/N
1	35	Total-tetrafurans	303.9016	22.97	959.542	0.935	0.032		0.80	0.77	NO	6.6
2	38	Total-hexafurans	373.8208	34.14	2032.460	1.125	0.120		1.26	1.24	NO	24.5
3	38	Total-hexafurans	373.8208	33.28	783.096	1.125	0.046		1.27	1.24	NO	12.9
4	38	Total-hexafurans	373.8208	33.09	300.329	1.125	0.018		1.60	1.24	YES	6.0
5	2	12378-PeCDF	339.8597	29.76	462.696	0.952	0.020	0.020	1.48	1.55	NO	12.0
6	6	123678-HxCDF	373.8208	34.96	156.297	1.099	0.008	0.008	1.15	1.24	NO	3.6
7	10	OCDF	441.7428	46.89	11928.590	1.166	1.525	1.525	0.82	0.89	NO	27.1
8	39	Total-heptafurans	407.7818	39.87	13076.354	1.310	0.996		1.01	1.05	NO	127.3
9	8	1234678-HpCDF	407.7818	39.10	3295.840	1.303	0.221	0.221	1.10	1.05	NO	35.5
10	7	123789-HxCDF	373.8208	37.00	370.725	1.101	0.026	0.010	0.27	1.24	YES	4.3

TD

	#	Name	Trace	RT	Abs.Resp	RRF M...	pg	EMPC	1º Rati...	1º Rati...	1º R...	S/N
1	41	Total-tetradioxins	319.8965	25.47	673.953	1.134	0.031		0.92	0.77	YES	5.7
2	41	Total-tetradioxins	319.8965	24.60	414.845	1.134	0.019		0.86	0.77	NO	4.1
3	41	Total-tetradioxins	319.8965	24.40	12438.557	1.134	0.572		0.77	0.77	NO	94.9
4	41	Total-tetradioxins	319.8965	23.43	566.619	1.134	0.026		1.66	0.77	YES	4.4
5	41	Total-tetradioxins	319.8965	26.39	553.811	1.134	0.025		1.09	0.77	YES	4.7

ID: BEH0316-DUP1, Name: 16082307, Date: 23-Aug-2016, Time: 15:09:48, Conditions: AUTOSPEC01, User: PK

PD

	#	Name	Trace	RT	Abs.Resp	RRF	M...	pg	EMPC	1º Rati...	1º Rati...	1º R...	S/N
1	12	12378-PeCDD	355.8546	31.35	338.942	0.975		0.024	0.013	0.50	1.55	YES	3.4
2	42	Total-pentadioxins	355.8546	30.29	742.436	0.975		0.053		1.50	1.55	NO	5.5
3	42	Total-pentadioxins	355.8546	29.14	1437.220	0.975		0.103		1.89	1.55	YES	10.6

HD

	#	Name	Trace	RT	Abs.Resp	RRF	M...	pg	EMPC	1º Rati...	1º Rati...	1º R...	S/N
1	43	Total-hexadioxins	389.8157	33.86	7276.661	0.983		0.596		1.20	1.24	NO	73.8
2	15	123789-HxCDD	389.8157	36.58	1110.830	0.947		0.094	0.094	1.32	1.24	NO	17.0
3	43	Total-hexadioxins	389.8157	35.08	2254.883	0.983		0.185		0.74	1.24	YES	24.2
4	43	Total-hexadioxins	389.8157	35.04	1391.138	0.983		0.114		2.43	1.24	YES	22.8

HPD

	#	Name	Trace	RT	Abs.Resp	RRF	M...	pg	EMPC	1º Rati...	1º Rati...	1º R...	S/N
1	16	1234678-HpCDD	423.7766	40.87	12336.270	1.028		1.292	1.292	1.13	1.05	NO	145.8
2	44	Total-heptadioxins	423.7766	39.64	18753.934	1.028		1.965		1.02	1.05	NO	193.5

Dioxins,TD,PD,HD,HPD,OD

	#	Name	Trace	RT	Abs.Resp	RRF	M...	pg	EMPC	1º Rati...	1º Rati...	1º R...	S/N
1	41	Total-tetradioxins	319.8965	25.47	673.953	1.134		0.031		0.92	0.77	YES	5.7
2	41	Total-tetradioxins	319.8965	24.60	414.845	1.134		0.019		0.86	0.77	NO	4.1
3	41	Total-tetradioxins	319.8965	24.40	12438.557	1.134		0.572		0.77	0.77	NO	94.9
4	41	Total-tetradioxins	319.8965	23.43	566.619	1.134		0.026		1.66	0.77	YES	4.4
5	41	Total-tetradioxins	319.8965	26.39	553.811	1.134		0.025		1.09	0.77	YES	7.7
6	12	12378-PeCDD	355.8546	31.35	338.942	0.975		0.024	0.013	0.50	1.55	YES	3.4
7	42	Total-pentadioxins	355.8546	30.29	742.436	0.975		0.053		1.50	1.55	NO	5.5
8	42	Total-pentadioxins	355.8546	29.14	1437.220	0.975		0.103		1.89	1.55	YES	10.6
9	43	Total-hexadioxins	389.8157	33.86	7276.661	0.983		0.596		1.20	1.24	NO	73.8
10	15	123789-HxCDD	389.8157	36.58	1110.830	0.947		0.094	0.094	1.32	1.24	NO	17.0
11	43	Total-hexadioxins	389.8157	35.08	2254.883	0.983		0.185		0.74	1.24	YES	24.2
12	43	Total-hexadioxins	389.8157	35.04	1391.138	0.983		0.114		2.43	1.24	YES	22.8
13	16	1234678-HpCDD	423.7766	40.87	12336.270	1.028		1.292	1.292	1.13	1.05	NO	145.8
14	44	Total-heptadioxins	423.7766	39.64	18753.934	1.028		1.965		1.02	1.05	NO	193.5
15	17	OCDD	457.7377	46.64	93017.406	1.107		12.521	12.521	0.94	0.89	NO	488.8

ID: BEH0316-DUP1, Name: 16082307, Date: 23-Aug-2016, Time: 15:09:48, Conditions: AUTOSPEC01, User: PK

TotalTEQ,Furans,Dioxins

	#	Name	Trace	RT	Abs.Resp	RRF M...	pg	EMPC	1º Rati...	1º Rati...	1º R...	S/N
1	35	Total-tetrafurans	303.9016	22.97	959.542	0.935	0.032		0.80	0.77	NO	6.6
2	38	Total-hexafurans	373.8208	34.14	2032.460	1.125	0.120		1.26	1.24	NO	24.5
3	38	Total-hexafurans	373.8208	33.28	783.096	1.125	0.046		1.27	1.24	NO	12.9
4	38	Total-hexafurans	373.8208	33.09	300.329	1.125	0.018		1.60	1.24	YES	6.0
5	2	12378-PeCDF	339.8597	29.76	462.696	0.952	0.020	0.020	1.48	1.55	NO	12.0
6	6	123678-HxCDF	373.8208	34.96	156.297	1.099	0.008	0.008	1.15	1.24	NO	3.6
7	10	OCDF	441.7428	46.89	11928.590	1.166	1.525	1.525	0.82	0.89	NO	27.1
8	39	Total-heptafurans	407.7818	39.87	13076.354	1.310	0.996		1.01	1.05	NO	127.3
9	8	1234678-HpCDF	407.7818	39.10	3295.840	1.303	0.221	0.221	1.10	1.05	NO	35.5
10	7	123789-HxCDF	373.8208	37.00	370.725	1.101	0.026	0.010	0.27	1.24	YES	4.3
11	41	Total-tetradioxins	319.8965	25.47	673.953	1.134	0.031		0.92	0.77	YES	5.7
12	41	Total-tetradioxins	319.8965	24.60	414.845	1.134	0.019		0.86	0.77	NO	4.1
13	41	Total-tetradioxins	319.8965	24.40	12438.557	1.134	0.572		0.77	0.77	NO	94.9
14	41	Total-tetradioxins	319.8965	23.43	566.619	1.134	0.026		1.66	0.77	YES	4.4
15	41	Total-tetradioxins	319.8965	26.39	553.811	1.134	0.025		1.09	0.77	YES	7.7
16	12	12378-PeCDD	355.8546	31.35	338.942	0.975	0.024	0.013	0.50	1.55	YES	3.4
17	42	Total-pentadioxins	355.8546	30.29	742.436	0.975	0.053		1.50	1.55	NO	5.5
18	42	Total-pentadioxins	355.8546	29.14	1437.220	0.975	0.103		1.89	1.55	YES	10.6
19	43	Total-hexadioxins	389.8157	33.86	7276.661	0.983	0.596		1.20	1.24	NO	73.8
20	15	123789-HxCDD	389.8157	36.58	1110.830	0.947	0.094	0.094	1.32	1.24	NO	17.0
21	43	Total-hexadioxins	389.8157	35.08	2254.883	0.983	0.185		0.74	1.24	YES	24.2
22	43	Total-hexadioxins	389.8157	35.04	1391.138	0.983	0.114		2.43	1.24	YES	22.8
23	16	1234678-HpCDD	423.7766	40.87	12336.270	1.028	1.292	1.292	1.13	1.05	NO	145.8
24	44	Total-heptadioxins	423.7766	39.64	18753.934	1.028	1.965		1.02	1.05	NO	193.5
25	17	OCDD	457.7377	46.64	93017.406	1.107	12.521	12.521	0.94	0.89	NO	488.8

PFK1

	#	Name	Trace	RT	Abs.Resp	RRF M...	pg	EMPC	1º Rati...	1º Rati...	1º R...	S/N
1	48	FUNCTION1 PFK	330.9792	22.12	0.000							78.0
2	48	FUNCTION1 PFK	330.9792	21.72	0.000							89.0
3	48	FUNCTION1 PFK	330.9792	21.66	0.000							90.7
4	48	FUNCTION1 PFK	330.9792	21.07	0.000							21.0
5	48	FUNCTION1 PFK	330.9792	27.68	0.000							0.6
6	48	FUNCTION1 PFK	330.9792	26.72	0.000							0.7
7	48	FUNCTION1 PFK	330.9792	25.88	0.000							1.1
8	48	FUNCTION1 PFK	330.9792	25.09	0.000							2.8
9	48	FUNCTION1 PFK	330.9792	25.03	0.000							4.0
10	48	FUNCTION1 PFK	330.9792	24.96	0.000							5.9
11	48	FUNCTION1 PFK	330.9792	24.73	0.000							11.5
12	48	FUNCTION1 PFK	330.9792	23.94	0.000							30.8
13	48	FUNCTION1 PFK	330.9792	23.81	0.000							34.8
14	48	FUNCTION1 PFK	330.9792	23.61	0.000							39.8
15	48	FUNCTION1 PFK	330.9792	22.69	0.000							60.1
16	48	FUNCTION1 PFK	330.9792	22.45	0.000							68.8
17	48	FUNCTION1 PFK	330.9792	22.39	0.000							69.2

ID: BEH0316-DUP1, Name: 16082307, Date: 23-Aug-2016, Time: 15:09:48, Conditions: AUTOSPEC01, User: PK

PFK2

	#	Name	Trace	RT	Abs.Resp	RRF M...	pg	EMPC	1º Rati...	1º Rati...	1º R...	S/N
1	49	FUNCTION2 PFK	366.9792	28.02	0.000		0.000					0.7
2	49	FUNCTION2 PFK	366.9792	27.96	0.000		0.000					2.0
3	49	FUNCTION2 PFK	366.9792	31.93	0.000		0.000					1.4
4	49	FUNCTION2 PFK	366.9792	31.85	0.000		0.000					0.7
5	49	FUNCTION2 PFK	366.9792	31.67	0.000		0.000					0.5
6	49	FUNCTION2 PFK	366.9792	31.51	0.000		0.000					0.9
7	49	FUNCTION2 PFK	366.9792	31.09	0.000		0.000					0.5
8	49	FUNCTION2 PFK	366.9792	30.95	0.000		0.000					1.5
9	49	FUNCTION2 PFK	366.9792	30.69	0.000		0.000					1.1
10	49	FUNCTION2 PFK	366.9792	30.19	0.000		0.000					1.3
11	49	FUNCTION2 PFK	366.9792	29.78	0.000		0.000					0.4
12	49	FUNCTION2 PFK	366.9792	29.68	0.000		0.000					1.3
13	49	FUNCTION2 PFK	366.9792	29.58	0.000		0.000					1.4
14	49	FUNCTION2 PFK	366.9792	29.22	0.000		0.000					1.1
15	49	FUNCTION2 PFK	366.9792	28.89	0.000		0.000					1.7
16	49	FUNCTION2 PFK	366.9792	28.70	0.000		0.000					1.3
17	49	FUNCTION2 PFK	366.9792	28.34	0.000		0.000					1.3
18	49	FUNCTION2 PFK	366.9792	28.30	0.000		0.000					0.9
19	49	FUNCTION2 PFK	366.9792	32.46	0.000		0.000					1.5
20	49	FUNCTION2 PFK	366.9792	32.27	0.000		0.000					0.9
21	49	FUNCTION2 PFK	366.9792	32.22	0.000		0.000					1.0
22	49	FUNCTION2 PFK	366.9792	32.02	0.000		0.000					1.0
23	49	FUNCTION2 PFK	366.9792	31.95	0.000		0.000					1.1

PFK3

	#	Name	Trace	RT	Abs.Resp	RRF M...	pg	EMPC	1º Rati...	1º Rati...	1º R...	S/N
1	50	FUNCTION3 PFK	380.9760	35.58	0.000		0.000					1.4
2	50	FUNCTION3 PFK	380.9760	35.06	0.000		0.000					1.6
3	50	FUNCTION3 PFK	380.9760	35.01	0.000		0.000					0.6
4	50	FUNCTION3 PFK	380.9760	34.92	0.000		0.000					1.5
5	50	FUNCTION3 PFK	380.9760	34.20	0.000		0.000					1.7
6	50	FUNCTION3 PFK	380.9760	33.60	0.000		0.000					0.7
7	50	FUNCTION3 PFK	380.9760	33.56	0.000		0.000					1.2
8	50	FUNCTION3 PFK	380.9760	33.17	0.000		0.000					0.5
9	50	FUNCTION3 PFK	380.9760	33.13	0.000		0.000					0.6
10	50	FUNCTION3 PFK	380.9760	32.73	0.000		0.000					0.6
11	50	FUNCTION3 PFK	380.9760	37.97	0.000		0.000					1.5
12	50	FUNCTION3 PFK	380.9760	37.90	0.000		0.000					1.2
13	50	FUNCTION3 PFK	380.9760	37.32	0.000		0.000					1.3
14	50	FUNCTION3 PFK	380.9760	37.21	0.000		0.000					1.0
15	50	FUNCTION3 PFK	380.9760	37.00	0.000		0.000					1.7
16	50	FUNCTION3 PFK	380.9760	36.92	0.000		0.000					2.2
17	50	FUNCTION3 PFK	380.9760	36.83	0.000		0.000					1.1
18	50	FUNCTION3 PFK	380.9760	36.54	0.000		0.000					1.5
19	50	FUNCTION3 PFK	380.9760	36.29	0.000		0.000					0.8
20	50	FUNCTION3 PFK	380.9760	36.14	0.000		0.000					0.8
21	50	FUNCTION3 PFK	380.9760	35.99	0.000		0.000					0.9

ID: BEH0316-DUP1, Name: 16082307, Date: 23-Aug-2016, Time: 15:09:48, Conditions: AUTOSPEC01, User: PK

PFK4

	#	Name	Trace	RT	Abs.Resp	RRF M...	pg	EMPC	1º Rati...	1º Rati...	1º R...	S/N
1	51	FUNCTION4 PFK	430.9728	38.76	0.000							1.5
2	51	FUNCTION4 PFK	430.9728	38.71	0.000							0.9
3	51	FUNCTION4 PFK	430.9728	38.49	0.000							0.5
4	51	FUNCTION4 PFK	430.9728	38.15	0.000							1.1
5	51	FUNCTION4 PFK	430.9728	40.68	0.000							0.9
6	51	FUNCTION4 PFK	430.9728	40.59	0.000							0.4
7	51	FUNCTION4 PFK	430.9728	40.54	0.000							1.8
8	51	FUNCTION4 PFK	430.9728	40.44	0.000							1.5
9	51	FUNCTION4 PFK	430.9728	40.34	0.000							2.2
10	51	FUNCTION4 PFK	430.9728	40.01	0.000							1.6
11	51	FUNCTION4 PFK	430.9728	39.95	0.000							2.1
12	51	FUNCTION4 PFK	430.9728	39.72	0.000							1.3
13	51	FUNCTION4 PFK	430.9728	39.66	0.000							1.6
14	51	FUNCTION4 PFK	430.9728	39.51	0.000							0.6
15	51	FUNCTION4 PFK	430.9728	39.44	0.000							0.8
16	51	FUNCTION4 PFK	430.9728	39.23	0.000							0.8
17	51	FUNCTION4 PFK	430.9728	39.10	0.000							1.8
18	51	FUNCTION4 PFK	430.9728	39.06	0.000							1.7
19	51	FUNCTION4 PFK	430.9728	39.03	0.000							1.7
20	51	FUNCTION4 PFK	430.9728	38.81	0.000							2.2
21	51	FUNCTION4 PFK	430.9728	43.08	0.000							1.2
22	51	FUNCTION4 PFK	430.9728	43.02	0.000							0.9
23	51	FUNCTION4 PFK	430.9728	42.86	0.000							0.5
24	51	FUNCTION4 PFK	430.9728	42.82	0.000							0.6
25	51	FUNCTION4 PFK	430.9728	42.69	0.000							0.6
26	51	FUNCTION4 PFK	430.9728	42.64	0.000							1.2
27	51	FUNCTION4 PFK	430.9728	42.61	0.000							0.5
28	51	FUNCTION4 PFK	430.9728	42.29	0.000							1.6
29	51	FUNCTION4 PFK	430.9728	42.21	0.000							0.8
30	51	FUNCTION4 PFK	430.9728	41.80	0.000							1.6
31	51	FUNCTION4 PFK	430.9728	41.73	0.000							1.3
32	51	FUNCTION4 PFK	430.9728	41.67	0.000							0.7
33	51	FUNCTION4 PFK	430.9728	41.35	0.000							1.7
34	51	FUNCTION4 PFK	430.9728	41.16	0.000							0.5
35	51	FUNCTION4 PFK	430.9728	41.08	0.000							2.1
36	51	FUNCTION4 PFK	430.9728	40.99	0.000							1.4
37	51	FUNCTION4 PFK	430.9728	44.31	0.000							0.9
38	51	FUNCTION4 PFK	430.9728	44.08	0.000							0.9
39	51	FUNCTION4 PFK	430.9728	43.99	0.000							1.1
40	51	FUNCTION4 PFK	430.9728	43.92	0.000							1.2
41	51	FUNCTION4 PFK	430.9728	43.84	0.000							1.4
42	51	FUNCTION4 PFK	430.9728	43.78	0.000							0.7
43	51	FUNCTION4 PFK	430.9728	43.73	0.000							2.2
44	51	FUNCTION4 PFK	430.9728	43.51	0.000							1.3
45	51	FUNCTION4 PFK	430.9728	43.31	0.000							1.1
46	51	FUNCTION4 PFK	430.9728	43.26	0.000							0.4
47	51	FUNCTION4 PFK	430.9728	43.21	0.000							1.7
48	51	FUNCTION4 PFK	430.9728	43.15	0.000							1.7

ID: BEH0316-DUP1, Name: 16082307, Date: 23-Aug-2016, Time: 15:09:48, Conditions: AUTOSPEC01, User: PK

PFK5

	#	Name	Trace	RT	Abs.Resp	RRF M...	pg	EMPC	1º Rati...	1º Rati...	1º R...	S/N
1	52	FUNCTION5 PFK	480.9696	44.92	0.000							0.4
2	52	FUNCTION5 PFK	480.9696	44.83	0.000							0.7
3	52	FUNCTION5 PFK	480.9696	44.61	0.000							1.0
4	52	FUNCTION5 PFK	480.9696	46.61	0.000							0.9
5	52	FUNCTION5 PFK	480.9696	46.54	0.000							1.0
6	52	FUNCTION5 PFK	480.9696	46.39	0.000							1.2
7	52	FUNCTION5 PFK	480.9696	46.20	0.000							0.7
8	52	FUNCTION5 PFK	480.9696	46.14	0.000							1.1
9	52	FUNCTION5 PFK	480.9696	46.10	0.000							1.6
10	52	FUNCTION5 PFK	480.9696	45.95	0.000							0.6
11	52	FUNCTION5 PFK	480.9696	45.74	0.000							0.8
12	52	FUNCTION5 PFK	480.9696	45.58	0.000							1.2
13	52	FUNCTION5 PFK	480.9696	45.53	0.000							1.6
14	52	FUNCTION5 PFK	480.9696	45.49	0.000							1.8
15	52	FUNCTION5 PFK	480.9696	45.44	0.000							0.6
16	52	FUNCTION5 PFK	480.9696	45.41	0.000							0.5
17	52	FUNCTION5 PFK	480.9696	45.30	0.000							0.4
18	52	FUNCTION5 PFK	480.9696	45.21	0.000							1.1
19	52	FUNCTION5 PFK	480.9696	45.02	0.000							0.9
20	52	FUNCTION5 PFK	480.9696	48.24	0.000							0.6
21	52	FUNCTION5 PFK	480.9696	48.20	0.000							0.8
22	52	FUNCTION5 PFK	480.9696	48.17	0.000							0.6
23	52	FUNCTION5 PFK	480.9696	47.88	0.000							1.6
24	52	FUNCTION5 PFK	480.9696	47.83	0.000							1.4
25	52	FUNCTION5 PFK	480.9696	47.75	0.000							0.9
26	52	FUNCTION5 PFK	480.9696	47.58	0.000							1.3
27	52	FUNCTION5 PFK	480.9696	47.53	0.000							2.0
28	52	FUNCTION5 PFK	480.9696	47.30	0.000							1.0
29	52	FUNCTION5 PFK	480.9696	47.11	0.000							1.2
30	52	FUNCTION5 PFK	480.9696	47.06	0.000							1.1
31	52	FUNCTION5 PFK	480.9696	47.00	0.000							1.2
32	52	FUNCTION5 PFK	480.9696	46.84	0.000							1.0
33	52	FUNCTION5 PFK	480.9696	46.80	0.000							1.5
34	52	FUNCTION5 PFK	480.9696	46.72	0.000							1.5
35	52	FUNCTION5 PFK	480.9696	46.64	0.000							1.8
36	52	FUNCTION5 PFK	480.9696	49.40	0.000							1.1
37	52	FUNCTION5 PFK	480.9696	49.37	0.000							0.9
38	52	FUNCTION5 PFK	480.9696	49.32	0.000							1.4
39	52	FUNCTION5 PFK	480.9696	49.27	0.000							1.7
40	52	FUNCTION5 PFK	480.9696	49.16	0.000							1.2
41	52	FUNCTION5 PFK	480.9696	49.11	0.000							0.9
42	52	FUNCTION5 PFK	480.9696	49.07	0.000							0.6
43	52	FUNCTION5 PFK	480.9696	48.99	0.000							1.1
44	52	FUNCTION5 PFK	480.9696	48.98	0.000							1.2
45	52	FUNCTION5 PFK	480.9696	48.88	0.000							0.7
46	52	FUNCTION5 PFK	480.9696	48.84	0.000							1.0
47	52	FUNCTION5 PFK	480.9696	48.76	0.000							1.0
48	52	FUNCTION5 PFK	480.9696	48.38	0.000							1.2
49	52	FUNCTION5 PFK	480.9696	48.35	0.000							0.5
50	52	FUNCTION5 PFK	480.9696	48.28	0.000							1.1

ID: BEH0316-DUP1, Name: 16082307, Date: 23-Aug-2016, Time: 15:09:48, Conditions: AUTOSPEC01, User: PK

ETHERS1

	#	Name	Trace	RT	Abs.Resp	RRF M...	pg	EMPC	1º Rati...	1º Rati...	1º R...	S/N
1												

ETHERS2

	#	Name	Trace	RT	Abs.Resp	RRF M...	pg	EMPC	1º Rati...	1º Rati...	1º R...	S/N
1												

ETHERS3

	#	Name	Trace	RT	Abs.Resp	RRF M...	pg	EMPC	1º Rati...	1º Rati...	1º R...	S/N
1	55	FUNCTION2 HPCD...	409.7974	32.41	0.000		0.000					6.2

ETHERS4

	#	Name	Trace	RT	Abs.Resp	RRF M...	pg	EMPC	1º Rati...	1º Rati...	1º R...	S/N
1												

ETHERS5

	#	Name	Trace	RT	Abs.Resp	RRF M...	pg	EMPC	1º Rati...	1º Rati...	1º R...	S/N
1	57	FUNCTION4 NCDPE	479.7165	38.68	0.000		0.000					6.6

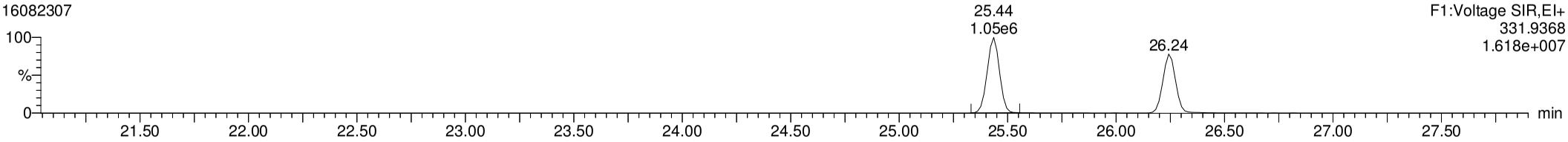
ETHERS6

	#	Name	Trace	RT	Abs.Resp	RRF M...	pg	EMPC	1º Rati...	1º Rati...	1º R...	S/N
1												

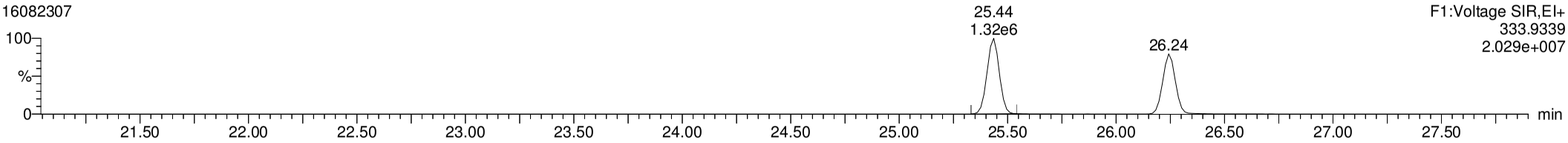
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ID: BEH0316-DUP1, Name: 16082307, Date: 23-Aug-2016, Time: 15:09:48, Conditions: AUTOSPEC01, User: PK

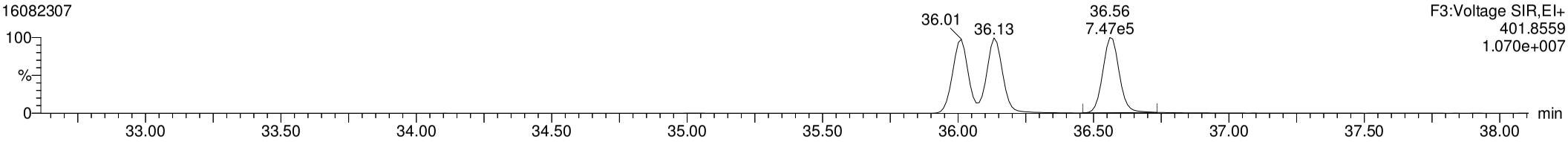
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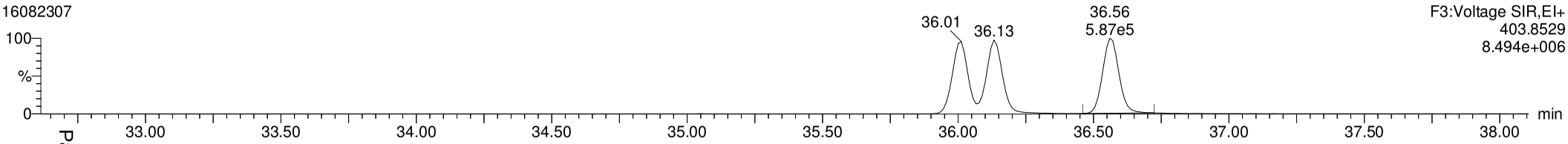
13C-1234-TCDD



13C-123789-HxCDD

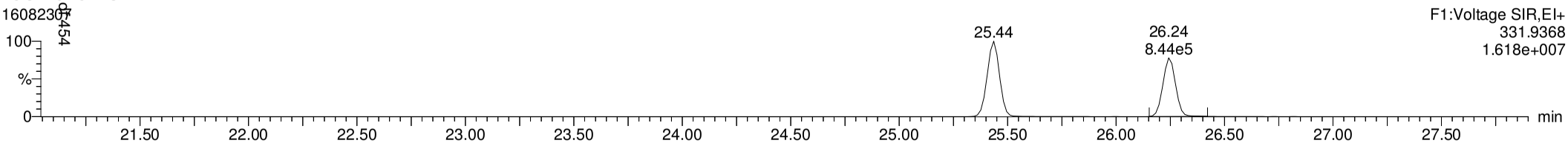


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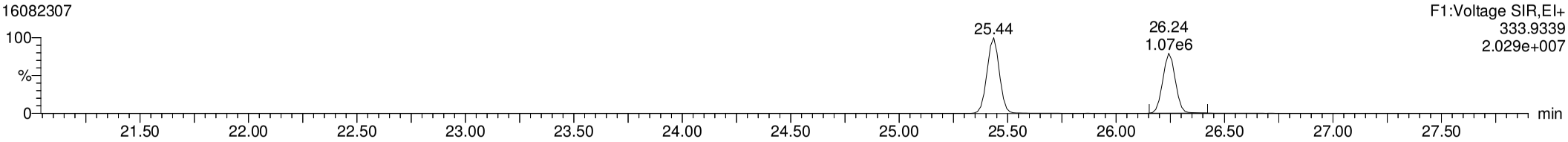


ID: BEH0316-DUP1, Name: 16082307, Date: 23-Aug-2016, Time: 15:09:48, Conditions: AUTOSPEC01, User: PK

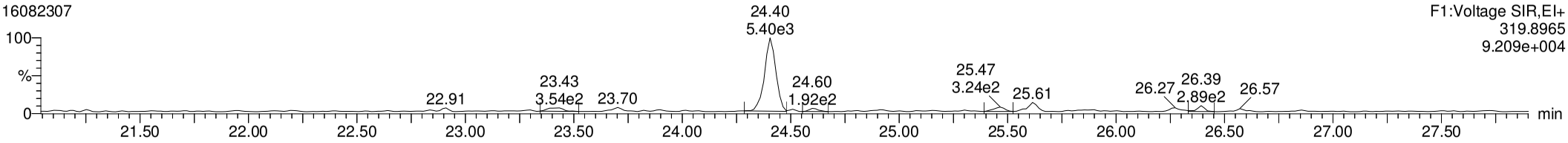
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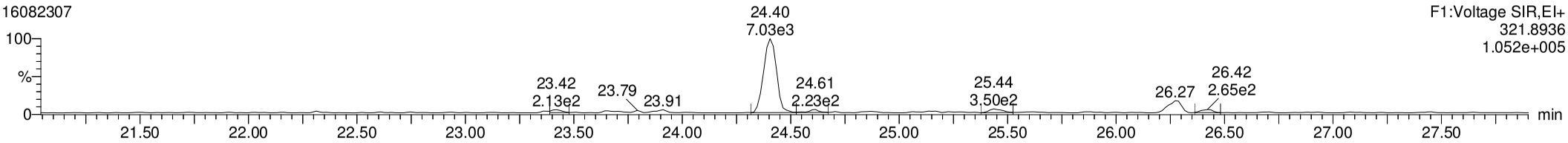
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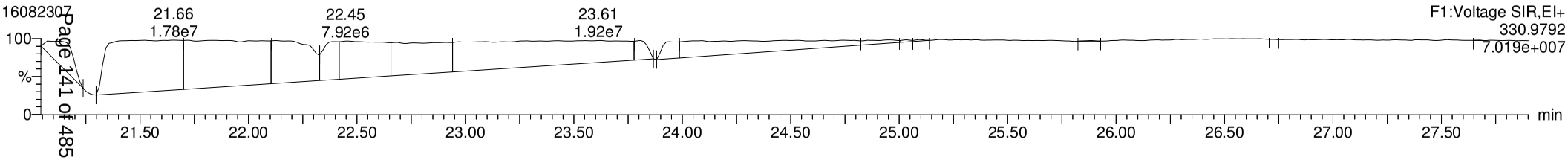
Total-tetradioxins



Total-tetradioxins

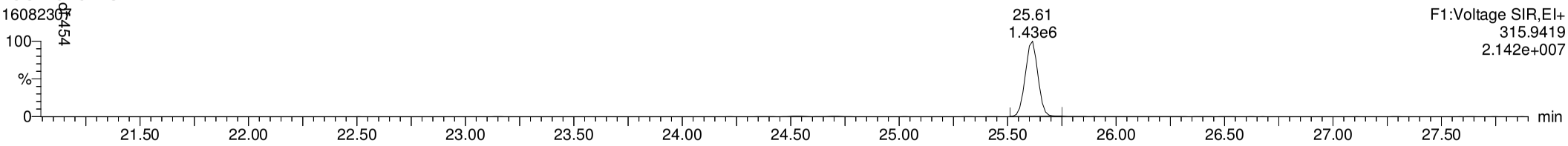


FUNCTION1 PFK

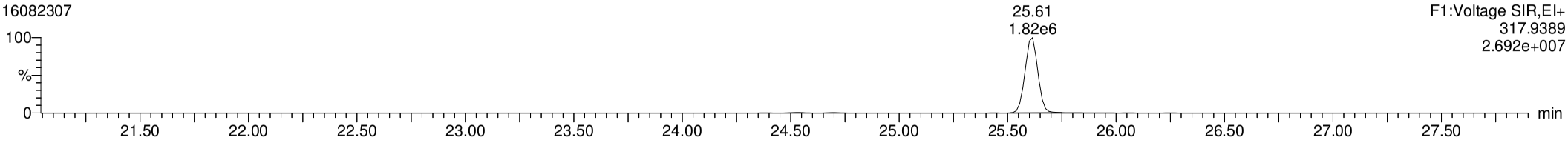


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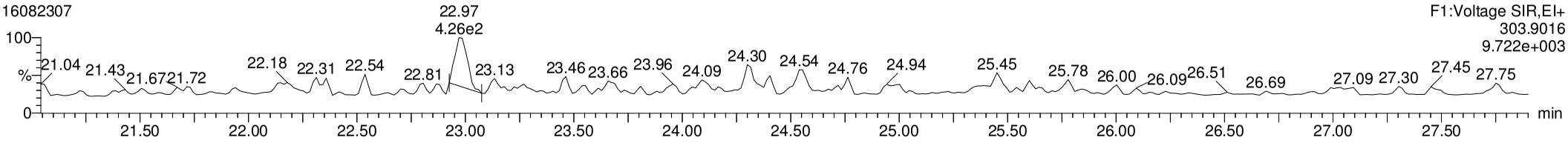
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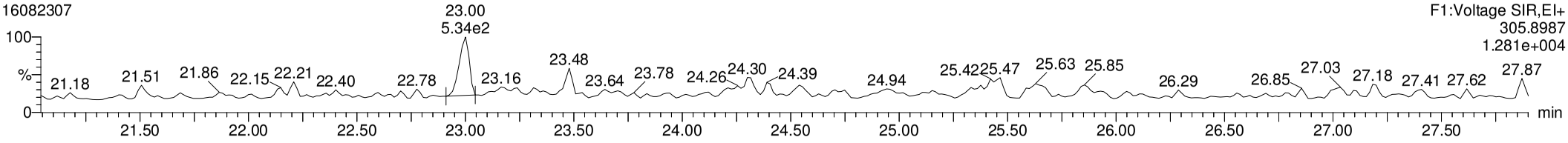
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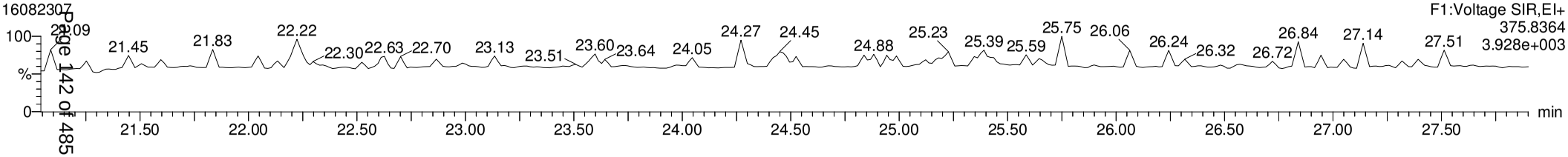
Total-tetrafurans



Total-tetrafurans



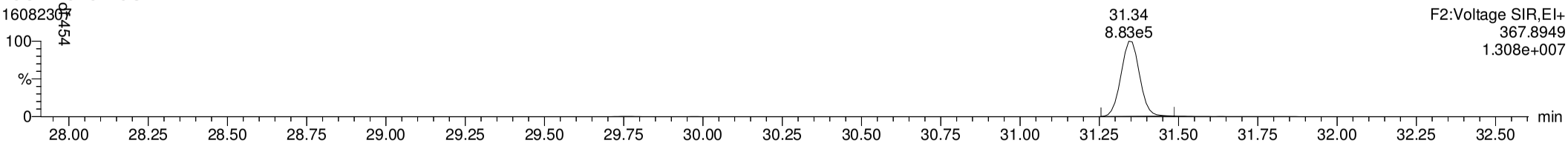
FUNCTION1 HXCDPE



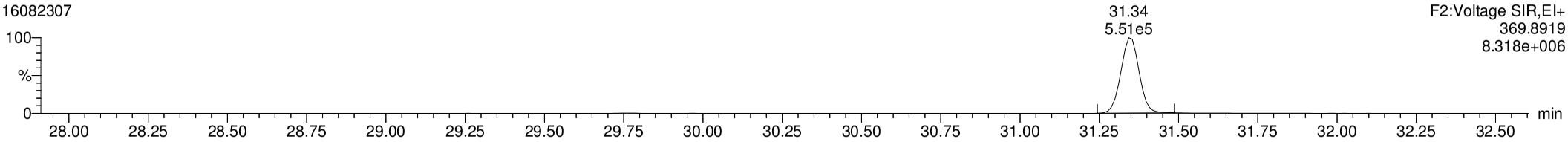
ID: BEH0316-DUP1, Name: 16082307, Date: 23-Aug-2016, Time: 15:09:48, Conditions: AUTOSPEC01, User: PK

Page 142 of 485

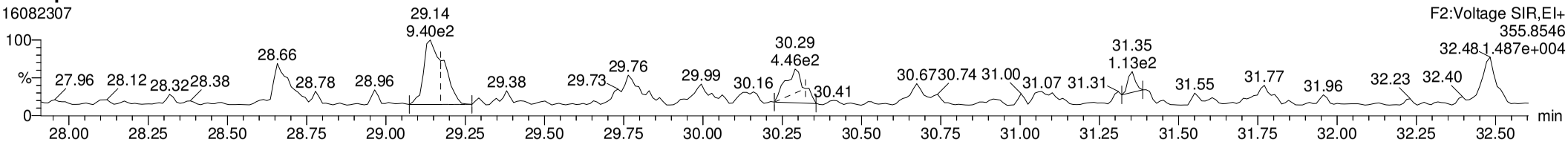
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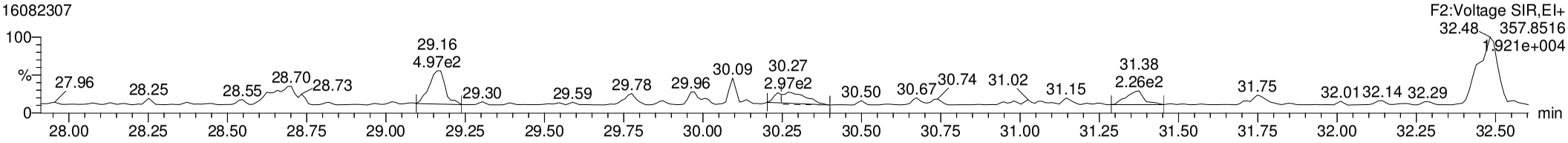
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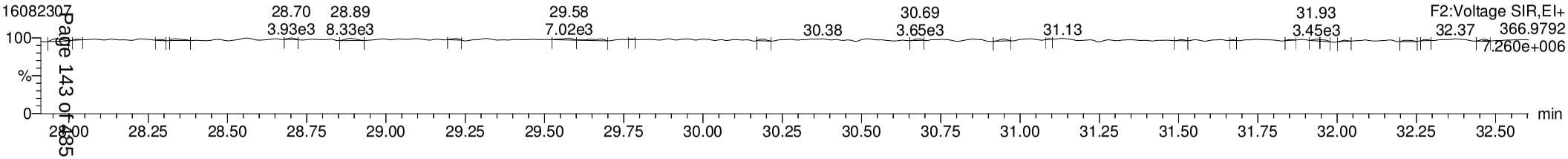
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Total-pentadioxins



FUNCTION2 PFK

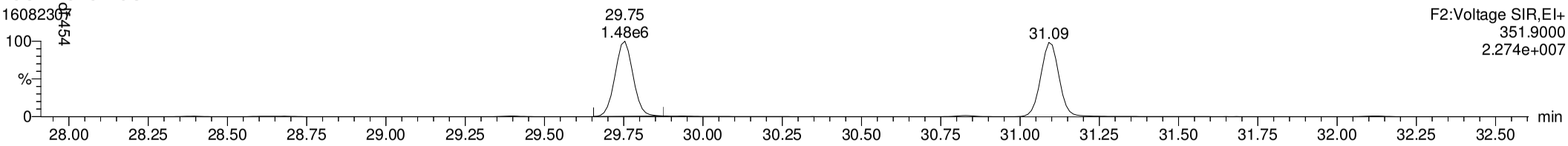


Page 143 of 485

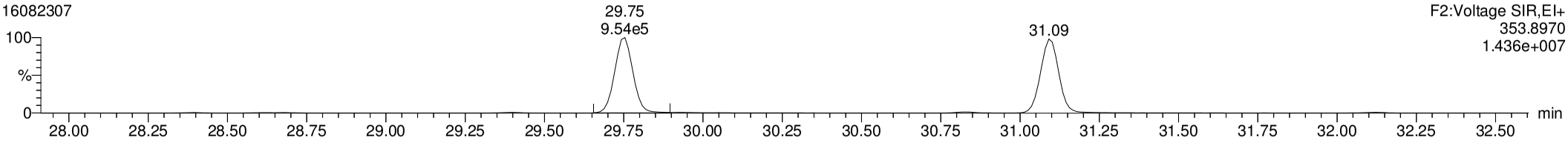
ID: BEH0316-DUP1, Name: 16082307, Date: 23-Aug-2016, Time: 15:09:48, Conditions: AUTOSPEC01, User: PK

Page 143 of 454

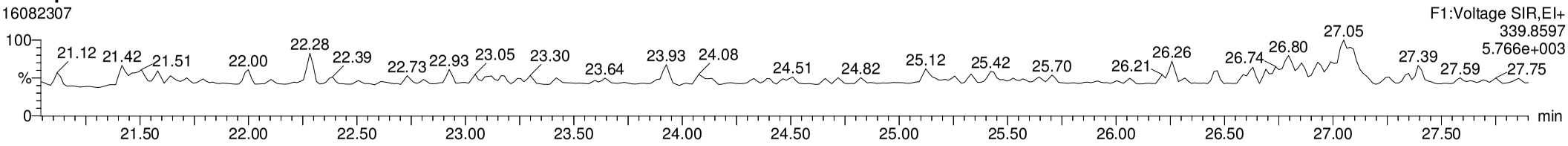
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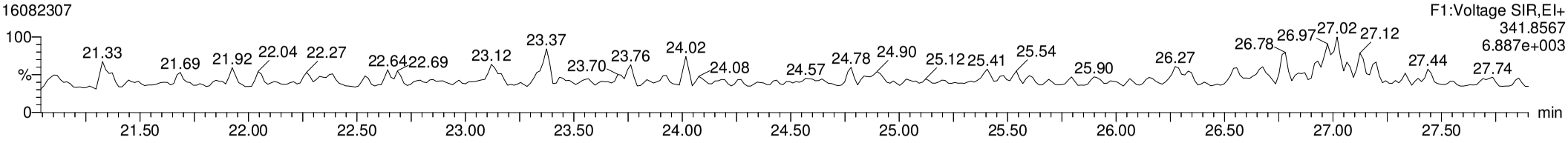
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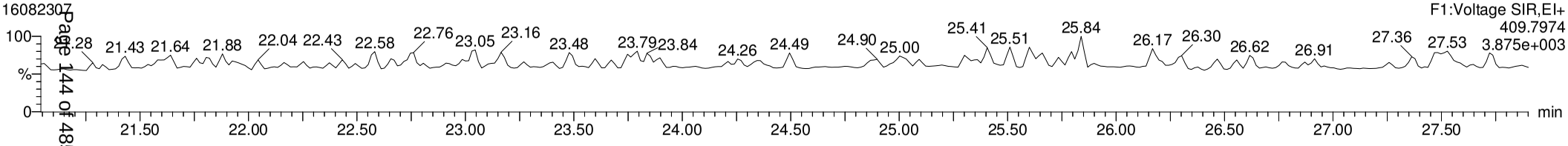
Total-penta1



Total-penta1



FUNCTION1 HPCDPE

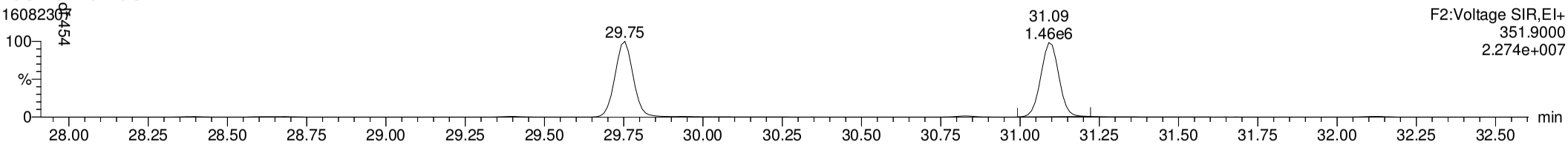


Page 144 of 485

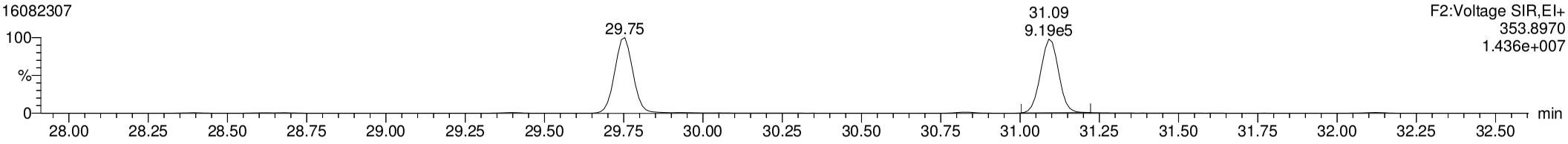
ID: BEH0316-DUP1, Name: 16082307, Date: 23-Aug-2016, Time: 15:09:48, Conditions: AUTOSPEC01, User: PK

Page 144 of 454

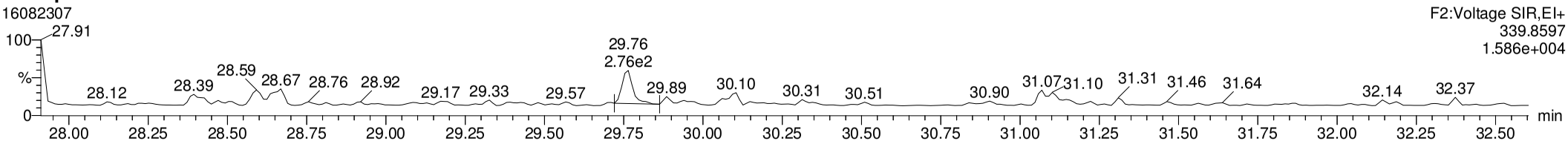
13C-23478-PeCDF



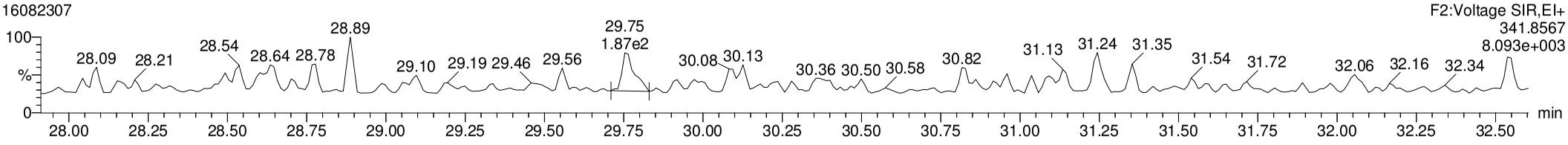
13C-23478-PeCDF



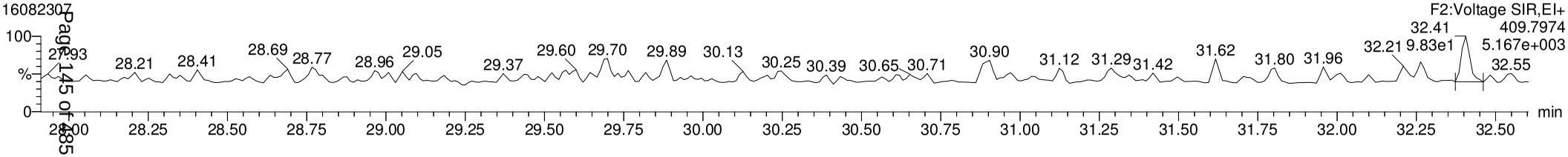
Total-pentafurans



Total-pentafurans



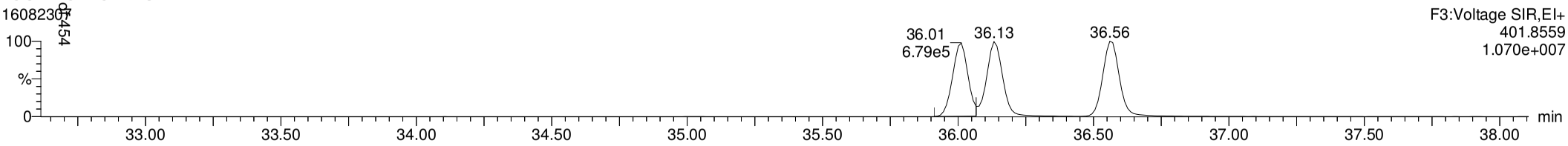
FUNCTION2 HPCDPE



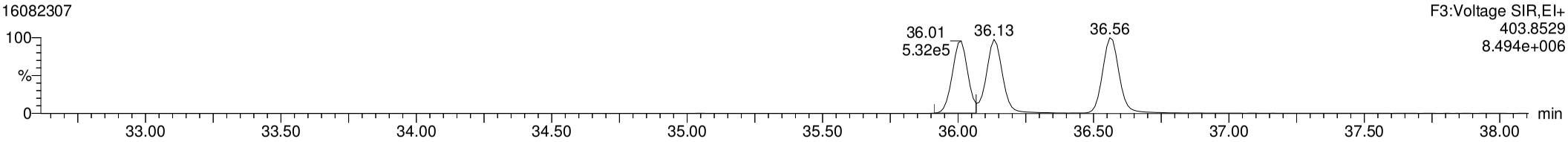
Page 145 of 485

ID: BEH0316-DUP1, Name: 16082307, Date: 23-Aug-2016, Time: 15:09:48, Conditions: AUTOSPEC01, User: PK

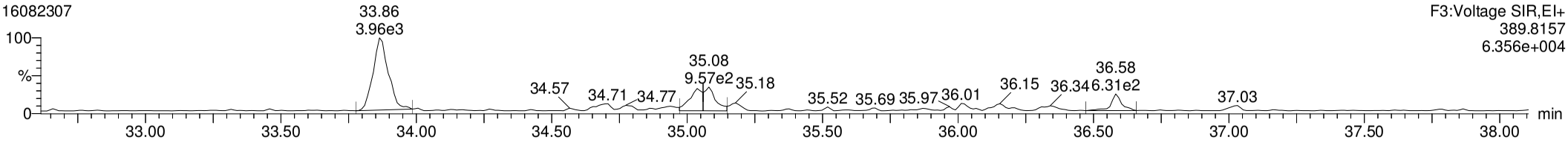
13C-123478-HxCDD



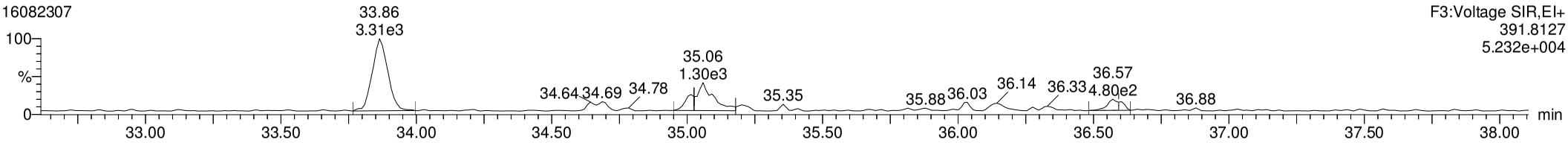
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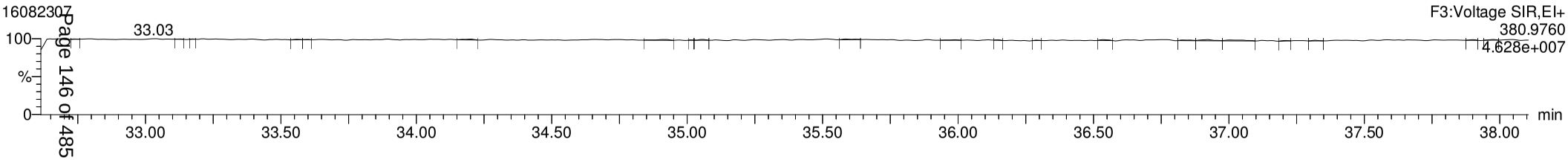
Total-hexadioxins



Total-hexadioxins



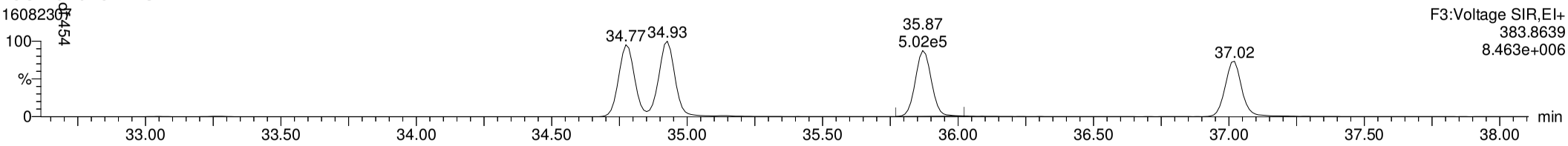
FUNCTION3 PFK



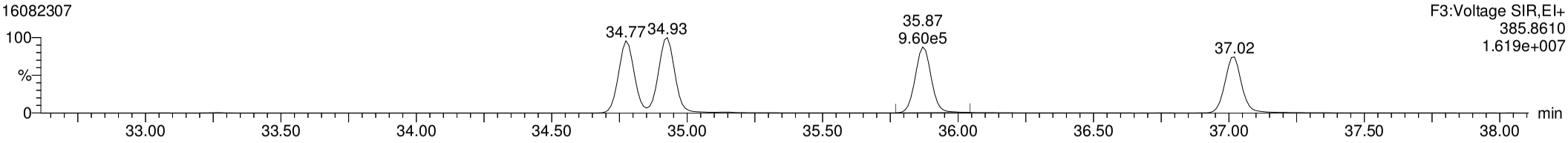
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Last Altered: Thursday, August 25, 2016 12:51:34 Pacific Daylight Time
Printed: Thursday, August 25, 2016 15:46:34 Pacific Daylight Time

ID: BEH0316-DUP1, Name: 16082307, Date: 23-Aug-2016, Time: 15:09:48, Conditions: AUTOSPEC01, User: PK

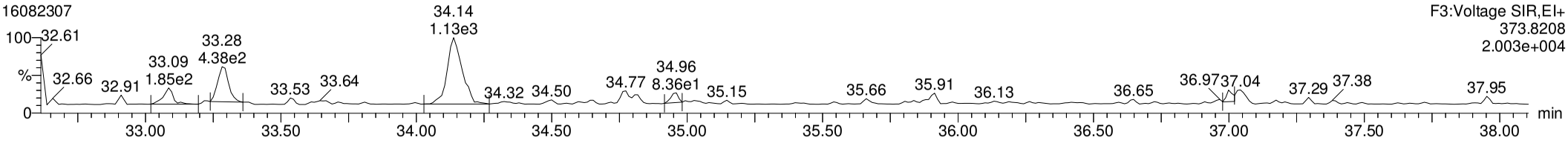
13C-234678-HxCDF



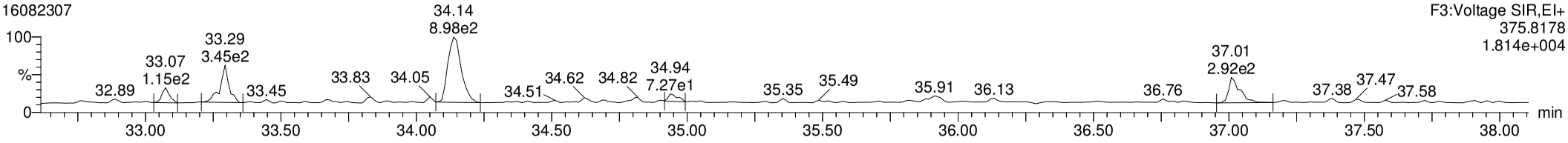
13C-234678-HxCDF



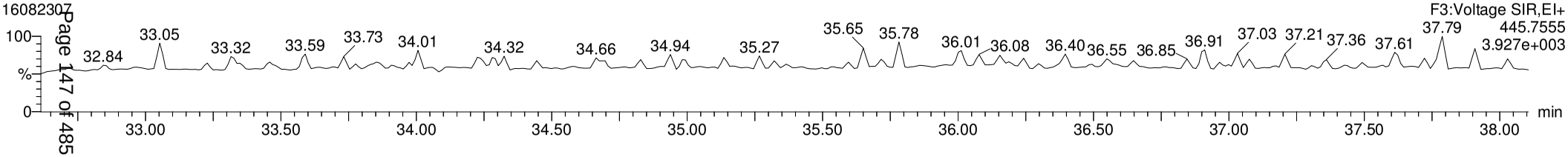
Total-hexafurans



Total-hexafurans

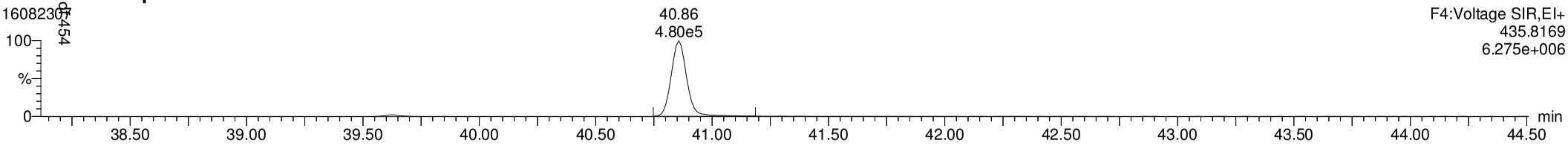


FUNCTION3 OCDPE

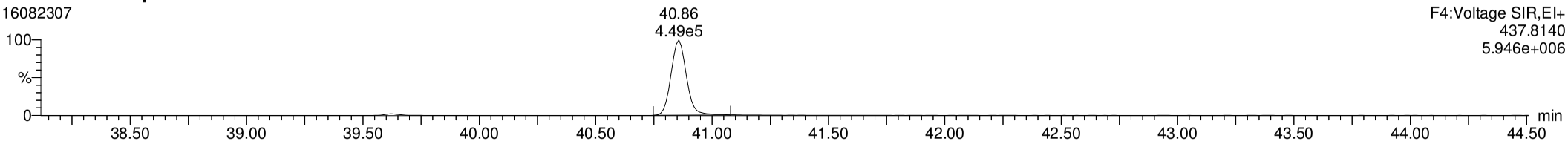


ID: BEH0316-DUP1, Name: 16082307, Date: 23-Aug-2016, Time: 15:09:48, Conditions: AUTOSPEC01, User: PK

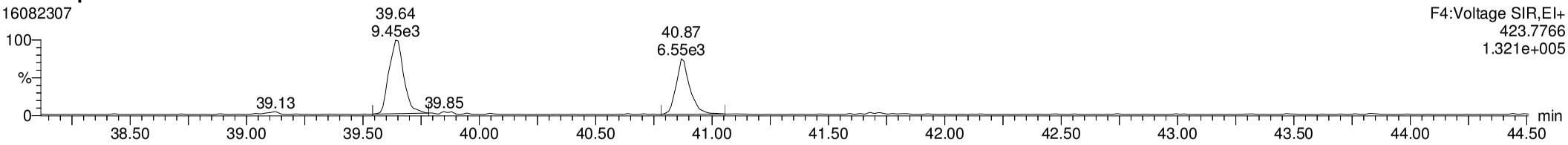
13C-1234678-HpCDD



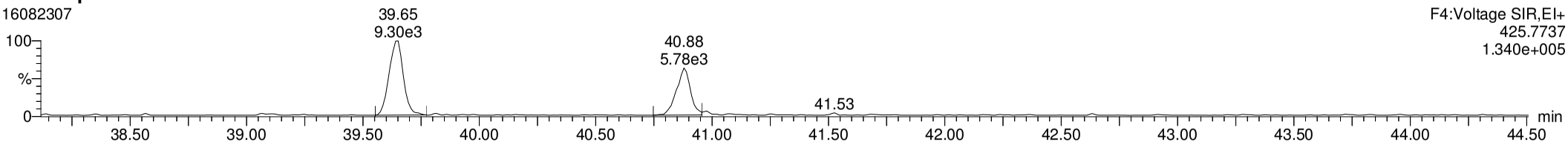
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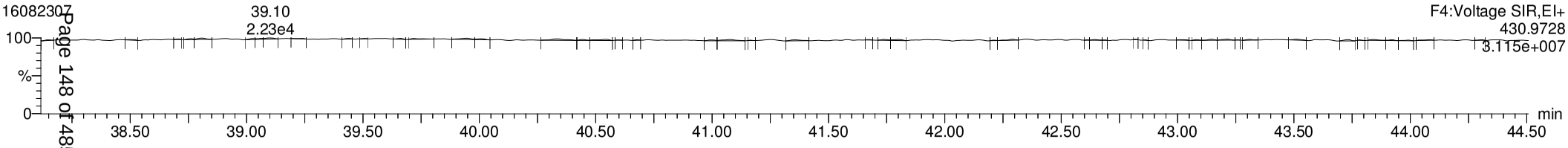
Total-heptadioxins



Total-heptadioxins

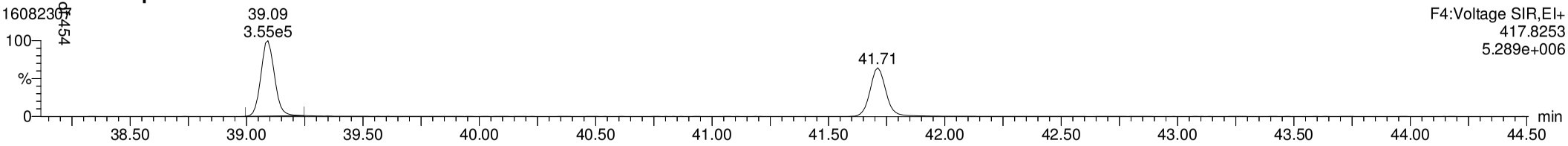


FUNCTION4 PFK

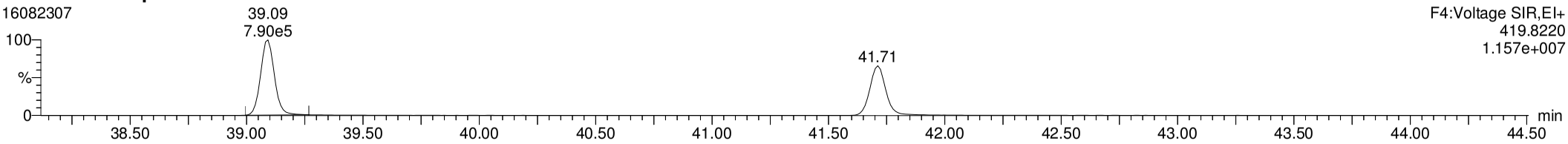


ID: BEH0316-DUP1, Name: 16082307, Date: 23-Aug-2016, Time: 15:09:48, Conditions: AUTOSPEC01, User: PK

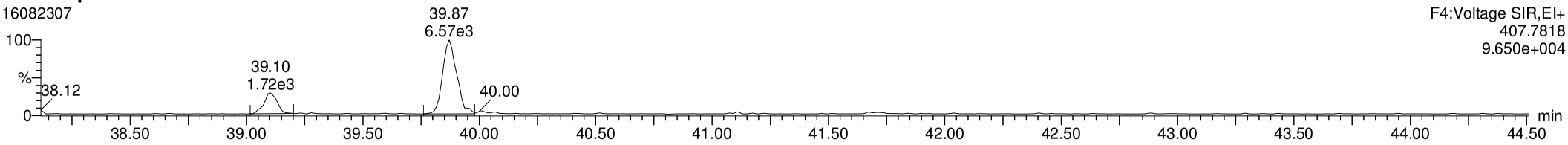
13C-1234678-HpCDF



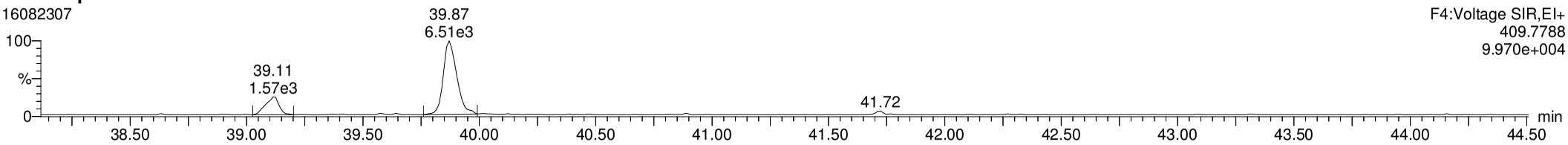
13C-1234678-HpCDF



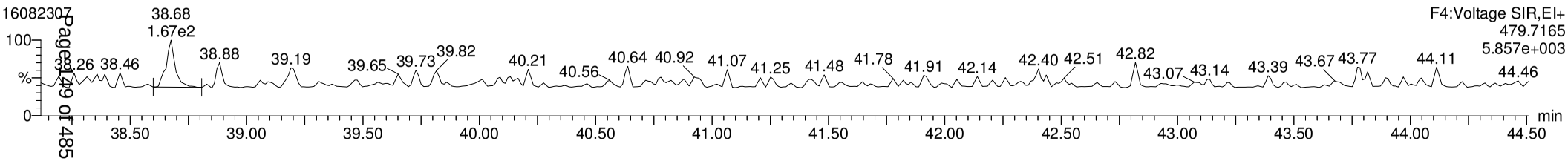
Total-heptafurans



Total-heptafurans



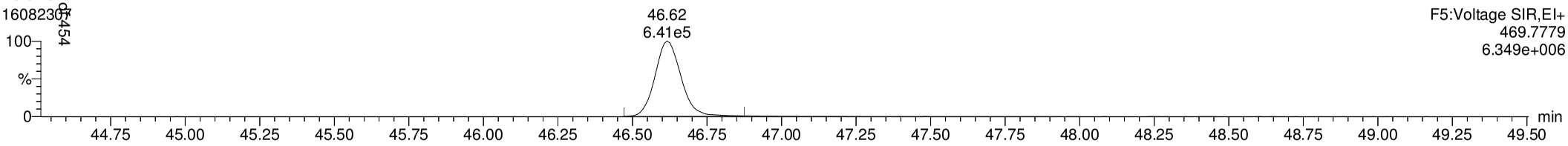
FUNCTION4 NCDPE



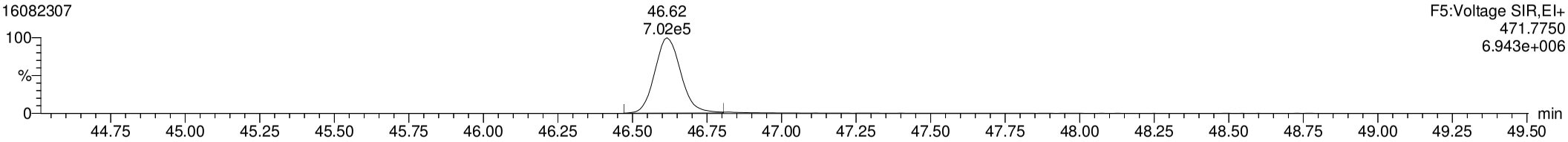
ID: BEH0316-DUP1, Name: 16082307, Date: 23-Aug-2016, Time: 15:09:48, Conditions: AUTOSPEC01, User: PK

Page 120 of 454

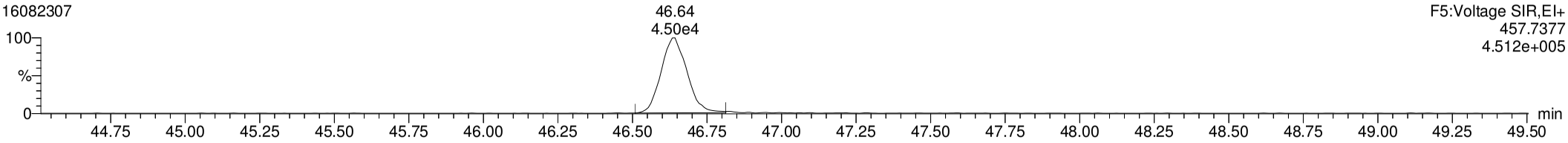
13C-OCDD



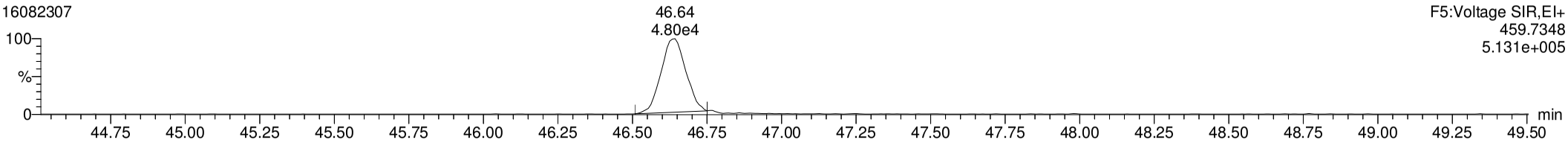
13C-OCDD



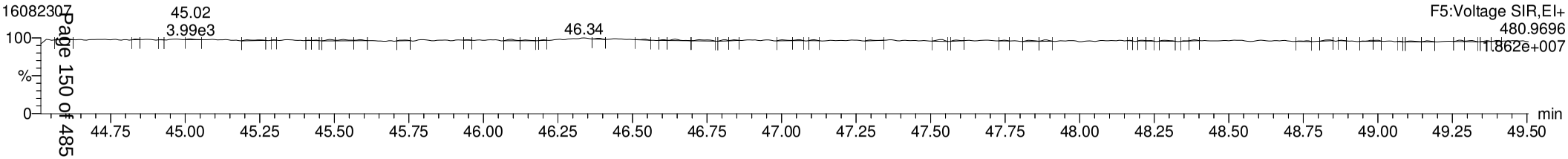
OCDD



OCDD



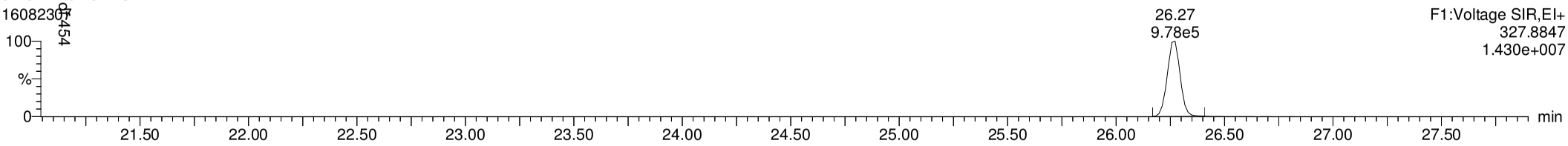
FUNCTION5 PFK



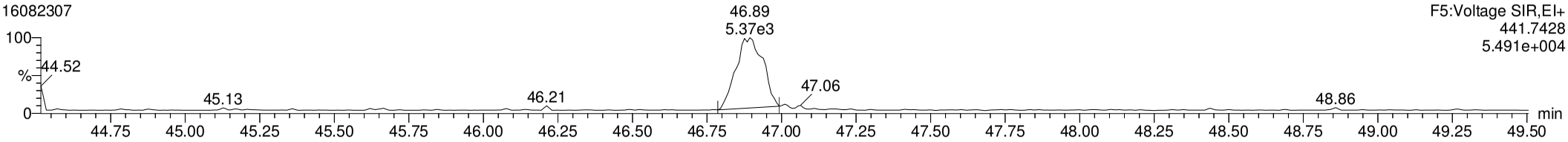
Page 150 of 485

ID: BEH0316-DUP1, Name: 16082307, Date: 23-Aug-2016, Time: 15:09:48, Conditions: AUTOSPEC01, User: PK

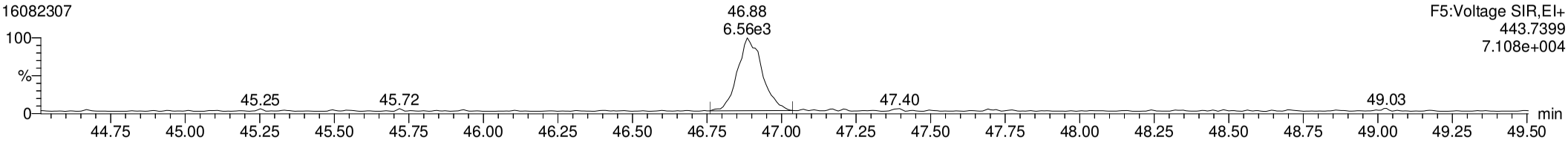
37CL-2378-TCDD



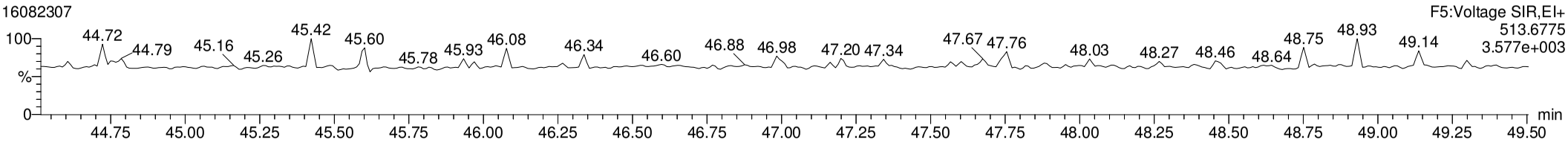
OCDF



OCDF



FUNCTION5 DCDPE



Analytical Resources, Incorporated

STANDARD REFERENCE MATERIAL RECOVERY

EPA 1613B

Laboratory: Analytical Resources, Inc. **SDG:** 16H0071

Client: Fremont Analytical **Project:** 1608094

Matrix: Solid **Laboratory ID:** BEH0316-SRM1

Batch: BEH0316 **Initial/Final:** 10 g / 20 uL

Preparation: EPA 1613 **Analyzed:** 08/23/2016 14:16

Standard ID: E003382 **Description:** Puget Sound reference-SRM **Expires:** 08/11/2017

ANALYTE	TRUE (ng/kg wet)	FOUND (ng/kg wet)	SRM % REC.	QC LIMITS REC.
2,3,7,8-TCDF	1.1100	0.965	86.9	50 - 150
2,3,7,8-TCDD	1.0500	1.18	113	50 - 150
1,2,3,7,8-PeCDF	1.2300	1.19	96.6	50 - 150
2,3,4,7,8-PeCDF	1.0700	1.05	98.6	50 - 150
1,2,3,7,8-PeCDD	1.0800	1.25	116	50 - 150
1,2,3,4,7,8-HxCDF	3.0200	3.21	106	50 - 150
1,2,3,6,7,8-HxCDF	1.0900	1.07	97.7	50 - 150
2,3,4,6,7,8-HxCDF	1.8300	2.27	124	50 - 150
1,2,3,7,8,9-HxCDF	0.51100	0.778	152 *	50 - 150
1,2,3,4,7,8-HxCDD	1.5900	1.68	106	50 - 150
1,2,3,6,7,8-HxCDD	3.8800	4.21	108	50 - 150
1,2,3,7,8,9-HxCDD	3.0400	2.97	97.6	50 - 150
1,2,3,4,6,7,8-HpCDF	18.700	20.4	109	50 - 150
1,2,3,4,7,8,9-HpCDF	1.6300	1.81	111	50 - 150
1,2,3,4,6,7,8-HpCDD	90.600	107	118	50 - 150
OCDF	58.400	65.4	112	50 - 150
OCDD	811.00	840	104	50 - 150

* Values outside of QC limits

Dataset: C:\MassLynx\Dioxin.pro\160823DATA1.qld
Last Altered: Thursday, August 25, 2016 12:51:34 Pacific Daylight Time
Printed: Thursday, August 25, 2016 15:46:27 Pacific Daylight Time

Method: C:\MassLynx\Dioxin.pro\MethDB\Dioxin1608163SN.mdb 17 Aug 2016 15:09:47
Calibration: C:\MassLynx\Dioxin.pro\CurveDB\160510ICAL.cdb 11 May 2016 09:28:40

ID: BEH0316-SRM1, Name: 16082306, Date: 23-Aug-2016, Time: 14:16:25, Conditions: AUTOSPEC01, User: PK

Name	RT	RRT	Ion1Area	Ion2Area	RRF	Ratio	Pred R	Noise 1	Noise 2	Height 1	Height 2	S/N	EMPC?	EMPC	pg
2378-TCDF	25.630	1.001	6.67e3	9.53e3	0.935	0.700	0.770	1901	2726	9.70e4	1.47e5	51.0	NO	0.482	0.482
12378-PeCDF	29.775	1.001	9.13e3	6.50e3	0.952	1.406	1.550	3380	2055	1.32e5	9.16e4	39.0	NO	0.594	0.594
23478-PeCDF	31.113	1.001	8.63e3	6.13e3	0.963	1.409	1.550	3380	2055	1.31e5	9.21e4	38.8	NO	0.527	0.527
123478-HxCDF	34.796	1.000	1.90e4	1.53e4	1.137	1.241	1.240	2411	1832	2.79e5	2.32e5	115.7	NO	1.607	1.607
234678-HxCDF	35.903	1.001	1.35e4	1.06e4	1.164	1.271	1.240	2411	1832	1.26e5	1.16e5	52.1	NO	1.136	1.136
123678-HxCDF	34.949	1.001	6.24e3	6.02e3	1.099	1.036	1.240	2411	1832	8.86e4	9.04e4	36.8	YES	0.490	0.533
123789-HxCDF	37.010	1.000	4.14e3	3.22e3	1.101	1.283	1.240	2411	1832	4.87e4	3.78e4	20.2	NO	0.389	0.389
1234678-HpCDF	39.103	1.000	9.11e4	8.80e4	1.303	1.036	1.050	1962	1669	1.29e6	1.30e6	658.4	NO	10.217	10.217
1234789-HpCDF	41.734	1.000	5.88e3	7.02e3	1.317	0.837	1.050	1962	1669	8.16e4	9.44e4	41.6	YES	0.803	0.903
OCDF	46.912	1.006	1.61e5	1.79e5	1.166	0.900	0.890	1673	1718	1.58e6	1.73e6	942.5	NO	32.697	32.697
2378-TCDD	26.257	1.001	6.00e3	7.81e3	1.134	0.767	0.770	1943	742	8.22e4	1.18e5	42.3	NO	0.591	0.591
12378-PeCDD	31.365	1.000	6.14e3	4.15e3	0.975	1.479	1.550	2266	3150	8.09e4	5.74e4	35.7	NO	0.624	0.624
123478-HxCDD	36.034	1.000	7.12e3	5.74e3	1.031	1.240	1.240	3070	2025	9.91e4	7.78e4	32.3	NO	0.839	0.839
123678-HxCDD	36.166	1.001	1.76e4	1.45e4	0.971	1.217	1.240	3070	2025	2.53e5	2.00e5	82.4	NO	2.103	2.103
123789-HxCDD	36.593	1.012	1.11e4	1.04e4	0.947	1.063	1.240	3070	2025	1.71e5	1.52e5	55.8	NO	1.483	1.483
1234678-HpCDD	40.879	1.000	3.18e5	3.02e5	1.028	1.054	1.050	4040	4650	4.19e6	3.98e6	1037.8	NO	53.419	53.419
OCDD	46.652	1.000	1.97e6	2.18e6	1.107	0.907	0.890	3425	4593	1.99e7	2.21e7	5798.8	NO	420.223	420.223
13C-2378-TCDF	25.615	1.007	1.57e6	2.02e6	1.567	0.779	0.770	5346	4053	2.35e7	3.01e7	4393.2	NO		92.670
13C-12378-PeCDF	29.753	1.170	1.69e6	1.07e6	1.274	1.578	1.550	4978	4990	2.54e7	1.61e7	5097.4	NO		87.690
13C-23478-PeCDF	31.091	1.222	1.77e6	1.13e6	1.235	1.563	1.550	4978	4990	2.70e7	1.73e7	5415.5	NO		95.188
13C-123478-HxCDF	34.785	0.951	6.39e5	1.24e6	1.381	0.518	0.510	3917	5119	9.45e6	1.82e7	2412.0	NO		84.283
13C-123678-HxCDF	34.927	0.955	7.19e5	1.38e6	1.569	0.522	0.510	3917	5119	1.02e7	1.92e7	2593.3	NO		82.872
13C-234678-HxCDF	35.881	0.981	6.22e5	1.21e6	1.345	0.516	0.510	3917	5119	8.71e6	1.69e7	2222.6	NO		84.332
13C-123789-HxCDF	37.021	1.012	5.90e5	1.13e6	1.183	0.523	0.510	3917	5119	8.35e6	1.58e7	2133.2	NO		90.193
13C-1234678-HpCDF	39.092	1.069	4.16e5	9.30e5	1.178	0.447	0.440	3536	3477	6.14e6	1.39e7	1737.6	NO		70.914
13C-1234789-HpCDF	41.712	1.141	3.37e5	7.47e5	0.878	0.451	0.440	3536	3477	4.24e6	9.42e6	1199.7	NO		76.684
13C-1237-TCDD	25.436	0.000	1.10e6	1.38e6	1.000	0.795	0.770	3825	2583	1.71e7	2.14e7	4473.9	NO		100.000
13C-2378-TCDD	26.243	1.032	9.07e5	1.15e6	0.908	0.786	0.770	3825	2583	1.36e7	1.75e7	3561.4	NO		91.807
13C-12378-PeCDD	31.354	1.233	1.03e6	6.64e5	0.756	1.549	1.550	2539	1638	1.54e7	9.85e6	6050.3	NO		90.516
13C-123478-HxCDD	36.023	0.985	8.34e5	6.52e5	1.056	1.280	1.240	2646	2600	1.22e7	9.43e6	4596.3	NO		87.381
13C-123678-HxCDD	36.144	0.988	8.79e5	6.93e5	1.163	1.268	1.240	2646	2600	1.24e7	9.80e6	4679.4	NO		83.907
13C-1234678-HpCDD	40.857	1.117	5.85e5	5.44e5	0.909	1.074	1.050	2410	2615	7.76e6	7.28e6	3219.6	NO		77.125
13C-OCDD	46.633	1.275	8.44e5	9.40e5	0.820	0.898	0.890	2455	2357	8.45e6	9.31e6	3442.0	NO		135.165
13C-123789-HxCDD	36.571	0.000	8.97e5	7.13e5	1.000	1.258	1.240	2646	2600	1.29e7	1.03e7	4892.3	NO		100.000
Total-tetrafurans			1.38e5		0.935			1901		1.69e6					9.019

Dataset: C:\MassLynx\Dioxin.pro\160823DATA1.qld
Last Altered: Thursday, August 25, 2016 12:51:34 Pacific Daylight Time
Printed: Thursday, August 25, 2016 15:46:27 Pacific Daylight Time

ID: BEH0316-SRM1, Name: 16082306, Date: 23-Aug-2016, Time: 14:16:25, Conditions: AUTOSPEC01, User: PK

Name	RT	RRT	Ion1Area	Ion2Area	RRF	Ratio	Pred R	Noise 1	Noise 2	Height 1	Height 2	S/N	EMPC?	EMPC	pg
Total-penta1			6.01e4					1522		8.38e5					3.881
Total-pentafurans			1.11e5		0.957			3380		1.39e6					6.612
Total-hexafurans			1.99e5		1.125			2411		2.87e6					17.020
Total-heptafurans			2.89e5		1.310			1962		4.02e6					34.522
Total-Furans			9.62e5		1.114			1901		1.24e7					103.968
Total-tetradioxins			3.22e4		1.134			1943		4.88e5					3.242
Total-pentadioxins			4.02e4		0.975			2266		5.20e5					4.032
Total-hexadioxins			1.55e5		0.983			3070		2.01e6					18.693
Total-heptadioxins			7.98e5		1.028			4040		1.09e7					135.025
Total-Dioxins			3.00e6		1.028			1943		3.38e7					581.215
Total-TEQ			3.96e6					1943		4.62e7					685.183
37CL-2378-TCDD	26.257	1.032	1.03e6		1.067			2321		1.50e7		6470.8			39.149
FUNCTION1 PFK			2.14e7					378666		2.45e7					
FUNCTION2 PFK			1.66e4					131520		3.61e5					0.000
FUNCTION3 PFK			3.18e6					300093		4.40e7					0.000
FUNCTION4 PFK			6.21e5					241104		1.77e7					
FUNCTION5 PFK			0.00e0					198783		0.00e0					
FUNCTION1 HXCD...			2.96e3					1044		5.00e4					0.000
FUNCTION1 HPCD...			3.34e4					574		5.12e5					0.000
FUNCTION2 HPCD...			6.91e2					952		1.89e4					0.000
FUNCTION3 OCDPE			0.00e0					470		0.00e0					
FUNCTION4 NCDPE			4.60e4					664		7.20e5					0.000
FUNCTION5 DCDPE			0.00e0					262		0.00e0					

Method: C:\MassLynx\Dioxin.pro\MethDB\Dioxin1608163SN.mdb 17 Aug 2016 15:09:47
Calibration: C:\MassLynx\Dioxin.pro\CurveDB\160510ICAL.cdb 11 May 2016 09:28:40

ID: BEH0316-SRM1, Name: 16082306, Date: 23-Aug-2016, Time: 14:16:25, Conditions: AUTOSPEC01, User: PK

TF

	#	Name	Trace	RT	Abs.Resp	RRF M...	pg	EMPC	1º Rati...	1º Rati...	1º R...	S/N
1	35	Total-tetrafurans	303.9016	23.76	13943.961	0.935	0.415		0.80	0.77	NO	41.6
2	35	Total-tetrafurans	303.9016	23.63	12428.579	0.935	0.370		0.89	0.77	YES	45.4
3	35	Total-tetrafurans	303.9016	23.46	6788.611	0.935	0.202		0.56	0.77	YES	25.4
4	35	Total-tetrafurans	303.9016	23.39	17033.120	0.935	0.507		0.89	0.77	YES	54.0
5	35	Total-tetrafurans	303.9016	23.28	14377.662	0.935	0.428		0.73	0.77	NO	53.4
6	35	Total-tetrafurans	303.9016	22.99	34428.809	0.935	1.025		0.75	0.77	NO	66.0
7	35	Total-tetrafurans	303.9016	22.40	6243.557	0.935	0.186		0.71	0.77	NO	21.1
8	35	Total-tetrafurans	303.9016	22.34	3402.294	0.935	0.101		0.44	0.77	YES	8.4
9	35	Total-tetrafurans	303.9016	22.15	4509.539	0.935	0.134		0.90	0.77	YES	17.4
10	35	Total-tetrafurans	303.9016	26.80	2977.813	0.935	0.089		1.10	0.77	YES	13.5
11	35	Total-tetrafurans	303.9016	25.85	15482.627	0.935	0.461		0.79	0.77	NO	51.4
12	35	Total-tetrafurans	303.9016	25.75	4384.719	0.935	0.131		0.88	0.77	NO	15.9
13	1	2378-TCDF	303.9016	25.63	16198.114	0.935	0.482	0.482	0.70	0.77	NO	51.0
14	35	Total-tetrafurans	303.9016	25.38	20579.335	0.935	0.613		0.89	0.77	YES	43.2
15	35	Total-tetrafurans	303.9016	25.14	3508.407	0.935	0.104		1.19	0.77	YES	14.2
16	35	Total-tetrafurans	303.9016	24.93	6960.173	0.935	0.207		0.94	0.77	YES	18.2
17	35	Total-tetrafurans	303.9016	24.72	22023.904	0.935	0.656		0.90	0.77	YES	81.8
18	35	Total-tetrafurans	303.9016	24.54	15217.781	0.935	0.453		0.91	0.77	YES	53.4
19	35	Total-tetrafurans	303.9016	24.38	55784.649	0.935	1.661		0.86	0.77	NO	130.9
20	35	Total-tetrafurans	303.9016	24.06	16136.984	0.935	0.481		1.07	0.77	YES	44.0
21	35	Total-tetrafurans	303.9016	23.88	10467.031	0.935	0.312		0.87	0.77	NO	36.6

PP

	#	Name	Trace	RT	Abs.Resp	RRF M...	pg	EMPC	1º Rati...	1º Rati...	1º R...	S/N
1	36	Total-penta1	339.8597	27.60	481.000		0.019		1.15	1.55	YES	3.8
2	36	Total-penta1	339.8597	27.45	3466.938		0.133		1.51	1.55	NO	20.8
3	36	Total-penta1	339.8597	27.36	492.273		0.019		1.59	1.55	NO	4.2
4	36	Total-penta1	339.8597	27.05	86795.645		3.339		1.49	1.55	NO	467.4
5	36	Total-penta1	339.8597	26.94	9649.871		0.371		1.30	1.55	YES	54.2

PF

	#	Name	Trace	RT	Abs.Resp	RRF M...	pg	EMPC	1º Rati...	1º Rati...	1º R...	S/N
1	37	Total-pentafurans	339.8597	29.99	22395.339	0.957	0.825		1.63	1.55	NO	36.9
2	2	12378-PeCDF	339.8597	29.78	15627.704	0.952	0.594	0.594	1.41	1.55	NO	39.0
3	37	Total-pentafurans	339.8597	29.70	2825.554	0.957	0.104		1.82	1.55	YES	11.1
4	37	Total-pentafurans	339.8597	29.42	16241.931	0.957	0.598		1.74	1.55	NO	39.1
5	37	Total-pentafurans	339.8597	29.29	4580.209	0.957	0.169		4.92	1.55	YES	9.6
6	37	Total-pentafurans	339.8597	28.70	45125.791	0.957	1.663		1.50	1.55	NO	80.4
7	37	Total-pentafurans	339.8597	28.51	10793.676	0.957	0.398		1.66	1.55	NO	25.2
8	37	Total-pentafurans	339.8597	28.36	23803.385	0.957	0.877		1.80	1.55	YES	63.9
9	37	Total-pentafurans	339.8597	28.28	2561.353	0.957	0.094		0.79	1.55	YES	10.3
10	37	Total-pentafurans	339.8597	28.05	5479.296	0.957	0.202		1.81	1.55	YES	18.1
11	37	Total-pentafurans	339.8597	31.56	940.493	0.957	0.035		1.45	1.55	NO	3.4
12	3	23478-PeCDF	339.8597	31.11	14763.052	0.963	0.527	0.527	1.41	1.55	NO	38.8
13	37	Total-pentafurans	339.8597	30.96	7522.509	0.957	0.277		1.68	1.55	NO	20.2
14	37	Total-pentafurans	339.8597	30.85	6759.866	0.957	0.249		1.37	1.55	NO	15.9

ID: BEH0316-SRM1, Name: 16082306, Date: 23-Aug-2016, Time: 14:16:25, Conditions: AUTOSPEC01, User: PK

HF

	#	Name	Trace	RT	Abs.Resp	RRF M...	pg	EMPC	1º Rati...	1º Rati...	1º R...	S/N
1	38	Total-hexafurans	373.8208	34.15	132626.594	1.125	6.276		1.29	1.24	NO	478.9
2	38	Total-hexafurans	373.8208	33.82	3376.497	1.125	0.160		1.43	1.24	YES	12.9
3	38	Total-hexafurans	373.8208	33.28	108943.242	1.125	5.155		1.21	1.24	NO	347.7
4	38	Total-hexafurans	373.8208	33.07	30016.730	1.125	1.420		1.15	1.24	NO	97.6
5	7	123789-HxCDF	373.8208	37.01	7361.909	1.101	0.389	0.389	1.28	1.24	NO	20.2
6	5	234678-HxCDF	373.8208	35.90	24150.527	1.164	1.136	1.136	1.27	1.24	NO	52.1
7	38	Total-hexafurans	373.8208	35.29	1319.452	1.125	0.062		0.82	1.24	YES	3.7
8	6	123678-HxCDF	373.8208	34.95	12261.035	1.099	0.533	0.490	1.04	1.24	YES	36.8
9	4	123478-HxCDF	373.8208	34.80	34240.183	1.137	1.607	1.607	1.24	1.24	NO	115.7
10	38	Total-hexafurans	373.8208	34.62	5966.630	1.125	0.282		1.33	1.24	NO	25.4

HPF

	#	Name	Trace	RT	Abs.Resp	RRF M...	pg	EMPC	1º Rati...	1º Rati...	1º R...	S/N
1	8	1234678-HpCDF	407.7818	39.10	179147.133	1.303	10.217	10.217	1.04	1.05	NO	658.4
2	9	1234789-HpCDF	407.7818	41.73	12894.718	1.317	0.903	0.803	0.84	1.05	YES	41.6
3	39	Total-heptafurans	407.7818	39.87	369105.656	1.310	23.189		1.06	1.05	NO	1332.6
4	39	Total-heptafurans	407.7818	39.59	3392.806	1.310	0.213		1.37	1.05	YES	16.1

ID: BEH0316-SRM1, Name: 16082306, Date: 23-Aug-2016, Time: 14:16:25, Conditions: AUTOSPEC01, User: PK

Furans,TF,PP,PF,HF,HPF,OF

	#	Name	Trace	RT	Abs.Resp	RRF	M...	pg	EMPC	1º Rati...	1º Rati...	1º R...	S/N
1	35	Total-tetrafurans	303.9016	23.76	13943.961	0.935		0.415		0.80	0.77	NO	41.6
2	35	Total-tetrafurans	303.9016	23.63	12428.579	0.935		0.370		0.89	0.77	YES	45.4
3	35	Total-tetrafurans	303.9016	23.46	6788.611	0.935		0.202		0.56	0.77	YES	25.4
4	35	Total-tetrafurans	303.9016	23.39	17033.120	0.935		0.507		0.89	0.77	YES	54.0
5	35	Total-tetrafurans	303.9016	23.28	14377.662	0.935		0.428		0.73	0.77	NO	53.4
6	35	Total-tetrafurans	303.9016	22.99	34428.809	0.935		1.025		0.75	0.77	NO	66.0
7	35	Total-tetrafurans	303.9016	22.40	6243.557	0.935		0.186		0.71	0.77	NO	21.1
8	35	Total-tetrafurans	303.9016	22.34	3402.294	0.935		0.101		0.44	0.77	YES	8.4
9	35	Total-tetrafurans	303.9016	22.15	4509.539	0.935		0.134		0.90	0.77	YES	17.4
10	40	Total-Furans	303.9016	21.25	3575.925	1.114		0.089		0.98	0.77	YES	14.3
11	35	Total-tetrafurans	303.9016	26.80	2977.813	0.935		0.089		1.10	0.77	YES	13.5
12	35	Total-tetrafurans	303.9016	25.85	15482.627	0.935		0.461		0.79	0.77	NO	51.4
13	35	Total-tetrafurans	303.9016	25.75	4384.719	0.935		0.131		0.88	0.77	NO	15.9
14	1	2378-TCDF	303.9016	25.63	16198.114	0.935		0.482	0.482	0.70	0.77	NO	51.0
15	35	Total-tetrafurans	303.9016	25.38	20579.335	0.935		0.613		0.89	0.77	YES	43.2
16	35	Total-tetrafurans	303.9016	25.14	3508.407	0.935		0.104		1.19	0.77	YES	14.2
17	35	Total-tetrafurans	303.9016	24.93	6960.173	0.935		0.207		0.94	0.77	YES	18.2
18	35	Total-tetrafurans	303.9016	24.72	22023.904	0.935		0.656		0.90	0.77	YES	81.8
19	35	Total-tetrafurans	303.9016	24.54	15217.781	0.935		0.453		0.91	0.77	YES	53.4
20	35	Total-tetrafurans	303.9016	24.38	55784.649	0.935		1.661		0.86	0.77	NO	130.9
21	35	Total-tetrafurans	303.9016	24.06	16136.984	0.935		0.481		1.07	0.77	YES	44.0
22	35	Total-tetrafurans	303.9016	23.88	10467.031	0.935		0.312		0.87	0.77	NO	36.6
23	40	Total-Furans	303.9016	27.72	5133.498	1.114		0.128		0.70	0.77	NO	17.4
24	37	Total-pentafurans	339.8597	29.99	22395.339	0.957		0.825		1.63	1.55	NO	36.9
25	2	12378-PeCDF	339.8597	29.78	15627.704	0.952		0.594	0.594	1.41	1.55	NO	39.0
26	37	Total-pentafurans	339.8597	29.70	2825.554	0.957		0.104		1.82	1.55	YES	11.1
27	37	Total-pentafurans	339.8597	29.42	16241.931	0.957		0.598		1.74	1.55	NO	39.1
28	37	Total-pentafurans	339.8597	29.29	4580.209	0.957		0.169		4.92	1.55	YES	9.6
29	37	Total-pentafurans	339.8597	28.70	45125.791	0.957		1.663		1.50	1.55	NO	80.4
30	37	Total-pentafurans	339.8597	28.51	10793.676	0.957		0.398		1.66	1.55	NO	25.2
31	37	Total-pentafurans	339.8597	28.36	23803.385	0.957		0.877		1.80	1.55	YES	63.9
32	37	Total-pentafurans	339.8597	28.28	2561.353	0.957		0.094		0.79	1.55	YES	10.3
33	37	Total-pentafurans	339.8597	28.05	5479.296	0.957		0.202		1.81	1.55	YES	18.1
34	37	Total-pentafurans	339.8597	31.56	940.493	0.957		0.035		1.45	1.55	NO	3.4
35	3	23478-PeCDF	339.8597	31.11	14763.052	0.963		0.527	0.527	1.41	1.55	NO	38.8
36	37	Total-pentafurans	339.8597	30.96	7522.509	0.957		0.277		1.68	1.55	NO	20.2
37	37	Total-pentafurans	339.8597	30.85	6759.866	0.957		0.249		1.37	1.55	NO	15.9
38	38	Total-hexafurans	373.8208	34.15	132626.594	1.125		6.276		1.29	1.24	NO	478.9
39	38	Total-hexafurans	373.8208	33.82	3376.497	1.125		0.160		1.43	1.24	YES	12.9
40	38	Total-hexafurans	373.8208	33.28	108943.242	1.125		5.155		1.21	1.24	NO	347.7
41	38	Total-hexafurans	373.8208	33.07	30016.730	1.125		1.420		1.15	1.24	NO	97.6
42	7	123789-HxCDF	373.8208	37.01	7361.909	1.101		0.389	0.389	1.28	1.24	NO	20.2
43	5	234678-HxCDF	373.8208	35.90	24150.527	1.164		1.136	1.136	1.27	1.24	NO	52.1
44	38	Total-hexafurans	373.8208	35.29	1319.452	1.125		0.062		0.82	1.24	YES	3.7
45	6	123678-HxCDF	373.8208	34.95	12261.035	1.099		0.533	0.490	1.04	1.24	YES	36.8
46	4	123478-HxCDF	373.8208	34.80	34240.183	1.137		1.607	1.607	1.24	1.24	NO	115.7
47	38	Total-hexafurans	373.8208	34.62	5966.630	1.125		0.282		1.33	1.24	NO	25.4
48	8	1234678-HpCDF	407.7818	39.10	179147.133	1.303		10.217	10.217	1.04	1.05	NO	658.4
49	9	1234789-HpCDF	407.7818	41.73	12894.718	1.317		0.903	0.803	0.84	1.05	YES	41.6
50	39	Total-heptafurans	407.7818	39.87	369105.656	1.310		23.189		1.06	1.05	NO	1332.6
51	39	Total-heptafurans	407.7818	39.59	3392.806	1.310		0.213		1.37	1.05	YES	16.1

ID: BEH0316-SRM1, Name: 16082306, Date: 23-Aug-2016, Time: 14:16:25, Conditions: AUTOSPEC01, User: PK

Furans,TF,PP,PF,HF,HPF,OF

	#	Name	Trace	RT	Abs.Resp	RRF	M...	pg	EMPC	1º Rati...	1º Rati...	1º R...	S/N
52	10	OCDF	441.7428	46.91	340047.641	1.166		32.697	32.697	0.90	0.89	NO	942.5
53	36	Total-penta1	339.8597	27.60	481.000			0.019		1.15	1.55	YES	3.8
54	36	Total-penta1	339.8597	27.45	3466.938			0.133		1.51	1.55	NO	20.8
55	36	Total-penta1	339.8597	27.36	492.273			0.019		1.59	1.55	NO	4.2
56	36	Total-penta1	339.8597	27.05	86795.645			3.339		1.49	1.55	NO	467.4
57	36	Total-penta1	339.8597	26.94	9649.871			0.371		1.30	1.55	YES	54.2

TD

	#	Name	Trace	RT	Abs.Resp	RRF	M...	pg	EMPC	1º Rati...	1º Rati...	1º R...	S/N
1	41	Total-tetradioxins	319.8965	24.60	3151.583	1.134		0.135		0.57	0.77	YES	9.6
2	41	Total-tetradioxins	319.8965	24.40	10037.350	1.134		0.429		0.75	0.77	NO	35.2
3	41	Total-tetradioxins	319.8965	23.88	2009.052	1.134		0.086		0.59	0.77	YES	6.8
4	41	Total-tetradioxins	319.8965	23.67	6963.500	1.134		0.298		0.59	0.77	YES	22.1
5	41	Total-tetradioxins	319.8965	23.42	11717.858	1.134		0.501		0.78	0.77	NO	40.5
6	41	Total-tetradioxins	319.8965	26.39	1830.171	1.134		0.078		0.89	0.77	YES	6.0
7	11	2378-TCDD	319.8965	26.26	13812.982	1.134		0.591	0.591	0.77	0.77	NO	42.3
8	41	Total-tetradioxins	319.8965	25.90	4386.426	1.134		0.188		1.00	0.77	YES	13.9
9	41	Total-tetradioxins	319.8965	25.60	999.428	1.134		0.043		2.48	0.77	YES	5.8
10	41	Total-tetradioxins	319.8965	25.45	10744.214	1.134		0.460		0.70	0.77	NO	36.0
11	41	Total-tetradioxins	319.8965	25.24	1485.385	1.134		0.064		0.63	0.77	YES	5.1
12	41	Total-tetradioxins	319.8965	24.88	8644.547	1.134		0.370		0.68	0.77	NO	27.8

PD

	#	Name	Trace	RT	Abs.Resp	RRF	M...	pg	EMPC	1º Rati...	1º Rati...	1º R...	S/N
1	42	Total-pentadioxins	355.8546	28.68	17519.787	0.975		1.062		1.59	1.55	NO	48.3
2	12	12378-PeCDD	355.8546	31.36	10298.219	0.975		0.624	0.624	1.48	1.55	NO	35.7
3	42	Total-pentadioxins	355.8546	30.70	3018.438	0.975		0.183		1.42	1.55	NO	10.2
4	42	Total-pentadioxins	355.8546	30.30	6182.815	0.975		0.375		1.75	1.55	NO	18.1
5	42	Total-pentadioxins	355.8546	30.14	6277.749	0.975		0.380		1.40	1.55	NO	21.4
6	42	Total-pentadioxins	355.8546	29.99	8310.894	0.975		0.504		1.55	1.55	NO	31.8
7	42	Total-pentadioxins	355.8546	29.78	6952.695	0.975		0.421		1.70	1.55	NO	31.4
8	42	Total-pentadioxins	355.8546	29.16	5937.868	0.975		0.360		1.42	1.55	NO	22.8
9	42	Total-pentadioxins	355.8546	31.76	2038.058	0.975		0.123		1.09	1.55	YES	9.8

HD

	#	Name	Trace	RT	Abs.Resp	RRF	M...	pg	EMPC	1º Rati...	1º Rati...	1º R...	S/N
1	15	123789-HxCDD	389.8157	36.59	21472.039	0.947		1.483	1.483	1.06	1.24	NO	55.8
2	43	Total-hexadioxins	389.8157	36.34	5806.452	0.983		0.386		1.28	1.24	NO	14.9
3	14	123678-HxCDD	389.8157	36.17	32116.460	0.971		2.103	2.103	1.22	1.24	NO	82.4
4	13	123478-HxCDD	389.8157	36.03	12860.956	1.031		0.839	0.839	1.24	1.24	NO	32.3
5	43	Total-hexadioxins	389.8157	35.18	10478.917	0.983		0.697		1.30	1.24	NO	26.5
6	43	Total-hexadioxins	389.8157	35.07	99606.723	0.983		6.627		1.24	1.24	NO	170.4
7	43	Total-hexadioxins	389.8157	34.68	18523.457	0.983		1.232		1.10	1.24	NO	49.5
8	43	Total-hexadioxins	389.8157	33.87	80022.476	0.983		5.324		1.29	1.24	NO	222.1

ID: BEH0316-SRM1, Name: 16082306, Date: 23-Aug-2016, Time: 14:16:25, Conditions: AUTOSPEC01, User: PK

HPD

	#	Name	Trace	RT	Abs.Resp	RRF M...	pg	EMPC	1º Rati...	1º Rati...	1º R...	S/N
1	16	1234678-HpCDD	423.7766	40.88	620137.313	1.028	53.419	53.419	1.05	1.05	NO	1037.8
2	44	Total-heptadioxins	423.7766	39.65	947368.626	1.028	81.607		1.03	1.05	NO	1659.6

Dioxins,TD,PD,HD,HPD,OD

	#	Name	Trace	RT	Abs.Resp	RRF M...	pg	EMPC	1º Rati...	1º Rati...	1º R...	S/N
1	41	Total-tetradioxins	319.8965	24.60	3151.583	1.134	0.135		0.57	0.77	YES	9.6
2	41	Total-tetradioxins	319.8965	24.40	10037.350	1.134	0.429		0.75	0.77	NO	35.2
3	41	Total-tetradioxins	319.8965	23.88	2009.052	1.134	0.086		0.59	0.77	YES	6.8
4	41	Total-tetradioxins	319.8965	23.67	6963.500	1.134	0.298		0.59	0.77	YES	22.1
5	41	Total-tetradioxins	319.8965	23.42	11717.858	1.134	0.501		0.78	0.77	NO	40.5
6	41	Total-tetradioxins	319.8965	26.39	1830.171	1.134	0.078		0.89	0.77	YES	6.0
7	11	2378-TCDD	319.8965	26.26	13812.982	1.134	0.591	0.591	0.77	0.77	NO	42.3
8	41	Total-tetradioxins	319.8965	25.90	4386.426	1.134	0.188		1.00	0.77	YES	13.9
9	41	Total-tetradioxins	319.8965	25.60	999.428	1.134	0.043		2.48	0.77	YES	5.8
10	41	Total-tetradioxins	319.8965	25.45	10744.214	1.134	0.460		0.70	0.77	NO	36.0
11	41	Total-tetradioxins	319.8965	25.24	1485.385	1.134	0.064		0.63	0.77	YES	5.1
12	41	Total-tetradioxins	319.8965	24.88	8644.547	1.134	0.370		0.68	0.77	NO	27.8
13	42	Total-pentadioxins	355.8546	28.68	17519.787	0.975	1.062		1.59	1.55	NO	48.3
14	12	12378-PeCDD	355.8546	31.36	10298.219	0.975	0.624	0.624	1.48	1.55	NO	35.7
15	42	Total-pentadioxins	355.8546	30.70	3018.438	0.975	0.183		1.42	1.55	NO	10.2
16	42	Total-pentadioxins	355.8546	30.30	6182.815	0.975	0.375		1.75	1.55	NO	18.1
17	42	Total-pentadioxins	355.8546	30.14	6277.749	0.975	0.380		1.40	1.55	NO	21.4
18	42	Total-pentadioxins	355.8546	29.99	8310.894	0.975	0.504		1.55	1.55	NO	31.8
19	42	Total-pentadioxins	355.8546	29.78	6952.695	0.975	0.421		1.70	1.55	NO	31.4
20	42	Total-pentadioxins	355.8546	29.16	5937.868	0.975	0.360		1.42	1.55	NO	22.8
21	42	Total-pentadioxins	355.8546	31.76	2038.058	0.975	0.123		1.09	1.55	YES	9.8
22	15	123789-HxCDD	389.8157	36.59	21472.039	0.947	1.483	1.483	1.06	1.24	NO	55.8
23	43	Total-hexadioxins	389.8157	36.34	5806.452	0.983	0.386		1.28	1.24	NO	14.9
24	14	123678-HxCDD	389.8157	36.17	32116.460	0.971	2.103	2.103	1.22	1.24	NO	82.4
25	13	123478-HxCDD	389.8157	36.03	12860.956	1.031	0.839	0.839	1.24	1.24	NO	32.3
26	43	Total-hexadioxins	389.8157	35.18	10478.917	0.983	0.697		1.30	1.24	NO	26.5
27	43	Total-hexadioxins	389.8157	35.07	99606.723	0.983	6.627		1.24	1.24	NO	170.4
28	43	Total-hexadioxins	389.8157	34.68	18523.457	0.983	1.232		1.10	1.24	NO	49.5
29	43	Total-hexadioxins	389.8157	33.87	80022.476	0.983	5.324		1.29	1.24	NO	222.1
30	16	1234678-HpCDD	423.7766	40.88	620137.313	1.028	53.419	53.419	1.05	1.05	NO	1037.8
31	44	Total-heptadioxins	423.7766	39.65	947368.626	1.028	81.607		1.03	1.05	NO	1659.6
32	17	OCDD	457.7377	46.65	4149974.250	1.107	420.223	420....	0.91	0.89	NO	5798.8

ID: BEH0316-SRM1, Name: 16082306, Date: 23-Aug-2016, Time: 14:16:25, Conditions: AUTOSPEC01, User: PK

TotalTEQ,Furans,Dioxins

	#	Name	Trace	RT	Abs.Resp	RRF	M...	pg	EMPC	1º Rati...	1º Rati...	1º R...	S/N
1	35	Total-tetrafurans	303.9016	23.76	13943.961	0.935		0.415		0.80	0.77	NO	41.6
2	35	Total-tetrafurans	303.9016	23.63	12428.579	0.935		0.370		0.89	0.77	YES	45.4
3	35	Total-tetrafurans	303.9016	23.46	6788.611	0.935		0.202		0.56	0.77	YES	25.4
4	35	Total-tetrafurans	303.9016	23.39	17033.120	0.935		0.507		0.89	0.77	YES	54.0
5	35	Total-tetrafurans	303.9016	23.28	14377.662	0.935		0.428		0.73	0.77	NO	53.4
6	35	Total-tetrafurans	303.9016	22.99	34428.809	0.935		1.025		0.75	0.77	NO	66.0
7	35	Total-tetrafurans	303.9016	22.40	6243.557	0.935		0.186		0.71	0.77	NO	21.1
8	35	Total-tetrafurans	303.9016	22.34	3402.294	0.935		0.101		0.44	0.77	YES	8.4
9	35	Total-tetrafurans	303.9016	22.15	4509.539	0.935		0.134		0.90	0.77	YES	17.4
10	40	Total-Furans	303.9016	21.25	3575.925	1.114		0.089		0.98	0.77	YES	14.3
11	35	Total-tetrafurans	303.9016	26.80	2977.813	0.935		0.089		1.10	0.77	YES	13.5
12	35	Total-tetrafurans	303.9016	25.85	15482.627	0.935		0.461		0.79	0.77	NO	51.4
13	35	Total-tetrafurans	303.9016	25.75	4384.719	0.935		0.131		0.88	0.77	NO	15.9
14	1	2378-TCDF	303.9016	25.63	16198.114	0.935		0.482	0.482	0.70	0.77	NO	51.0
15	35	Total-tetrafurans	303.9016	25.38	20579.335	0.935		0.613		0.89	0.77	YES	43.2
16	35	Total-tetrafurans	303.9016	25.14	3508.407	0.935		0.104		1.19	0.77	YES	14.2
17	35	Total-tetrafurans	303.9016	24.93	6960.173	0.935		0.207		0.94	0.77	YES	18.2
18	35	Total-tetrafurans	303.9016	24.72	22023.904	0.935		0.656		0.90	0.77	YES	81.8
19	35	Total-tetrafurans	303.9016	24.54	15217.781	0.935		0.453		0.91	0.77	YES	53.4
20	35	Total-tetrafurans	303.9016	24.38	55784.649	0.935		1.661		0.86	0.77	NO	130.9
21	35	Total-tetrafurans	303.9016	24.06	16136.984	0.935		0.481		1.07	0.77	YES	44.0
22	35	Total-tetrafurans	303.9016	23.88	10467.031	0.935		0.312		0.87	0.77	NO	36.6
23	40	Total-Furans	303.9016	27.72	5133.498	1.114		0.128		0.70	0.77	NO	17.4
24	37	Total-pentafurans	339.8597	29.99	22395.339	0.957		0.825		1.63	1.55	NO	36.9
25	2	12378-PeCDF	339.8597	29.78	15627.704	0.952		0.594	0.594	1.41	1.55	NO	39.0
26	37	Total-pentafurans	339.8597	29.70	2825.554	0.957		0.104		1.82	1.55	YES	11.1
27	37	Total-pentafurans	339.8597	29.42	16241.931	0.957		0.598		1.74	1.55	NO	39.1
28	37	Total-pentafurans	339.8597	29.29	4580.209	0.957		0.169		4.92	1.55	YES	9.6
29	37	Total-pentafurans	339.8597	28.70	45125.791	0.957		1.663		1.50	1.55	NO	80.4
30	37	Total-pentafurans	339.8597	28.51	10793.676	0.957		0.398		1.66	1.55	NO	25.2
31	37	Total-pentafurans	339.8597	28.36	23803.385	0.957		0.877		1.80	1.55	YES	63.9
32	37	Total-pentafurans	339.8597	28.28	2561.353	0.957		0.094		0.79	1.55	YES	10.3
33	37	Total-pentafurans	339.8597	28.05	5479.296	0.957		0.202		1.81	1.55	YES	18.1
34	37	Total-pentafurans	339.8597	31.56	940.493	0.957		0.035		1.45	1.55	NO	3.4
35	3	23478-PeCDF	339.8597	31.11	14763.052	0.963		0.527	0.527	1.41	1.55	NO	38.8
36	37	Total-pentafurans	339.8597	30.96	7522.509	0.957		0.277		1.68	1.55	NO	20.2
37	37	Total-pentafurans	339.8597	30.85	6759.866	0.957		0.249		1.37	1.55	NO	15.9
38	38	Total-hexafurans	373.8208	34.15	132626.594	1.125		6.276		1.29	1.24	NO	478.9
39	38	Total-hexafurans	373.8208	33.82	3376.497	1.125		0.160		1.43	1.24	YES	12.9
40	38	Total-hexafurans	373.8208	33.28	108943.242	1.125		5.155		1.21	1.24	NO	347.7
41	38	Total-hexafurans	373.8208	33.07	30016.730	1.125		1.420		1.15	1.24	NO	97.6
42	7	123789-HxCDF	373.8208	37.01	7361.909	1.101		0.389	0.389	1.28	1.24	NO	20.2
43	5	234678-HxCDF	373.8208	35.90	24150.527	1.164		1.136	1.136	1.27	1.24	NO	52.1
44	38	Total-hexafurans	373.8208	35.29	1319.452	1.125		0.062		0.82	1.24	YES	3.7
45	6	123678-HxCDF	373.8208	34.95	12261.035	1.099		0.533	0.490	1.04	1.24	YES	36.8
46	4	123478-HxCDF	373.8208	34.80	34240.183	1.137		1.607	1.607	1.24	1.24	NO	115.7
47	38	Total-hexafurans	373.8208	34.62	5966.630	1.125		0.282		1.33	1.24	NO	25.4
48	8	1234678-HpCDF	407.7818	39.10	179147.133	1.303		10.217	10.217	1.04	1.05	NO	658.4
49	9	1234789-HpCDF	407.7818	41.73	12894.718	1.317		0.903	0.803	0.84	1.05	YES	41.6
50	39	Total-heptafurans	407.7818	39.87	369105.656	1.310		23.189		1.06	1.05	NO	1332.6
51	39	Total-heptafurans	407.7818	39.59	3392.806	1.310		0.213		1.37	1.05	YES	16.1

ID: BEH0316-SRM1, Name: 16082306, Date: 23-Aug-2016, Time: 14:16:25, Conditions: AUTOSPEC01, User: PK

TotalTEQ,Furans,Dioxins

	#	Name	Trace	RT	Abs.Resp	RRF M...	pg	EMPC	1º Rati...	1º Rati...	1º R...	S/N
52	10	OCDF	441.7428	46.91	340047.641	1.166	32.697	32.697	0.90	0.89	NO	942.5
53	36	Total-penta1	339.8597	27.60	481.000		0.019		1.15	1.55	YES	3.8
54	36	Total-penta1	339.8597	27.45	3466.938		0.133		1.51	1.55	NO	20.8
55	36	Total-penta1	339.8597	27.36	492.273		0.019		1.59	1.55	NO	4.2
56	36	Total-penta1	339.8597	27.05	86795.645		3.339		1.49	1.55	NO	467.4
57	36	Total-penta1	339.8597	26.94	9649.871		0.371		1.30	1.55	YES	54.2
58	41	Total-tetradioxins	319.8965	24.60	3151.583	1.134	0.135		0.57	0.77	YES	9.6
59	41	Total-tetradioxins	319.8965	24.40	10037.350	1.134	0.429		0.75	0.77	NO	35.2
60	41	Total-tetradioxins	319.8965	23.88	2009.052	1.134	0.086		0.59	0.77	YES	6.8
61	41	Total-tetradioxins	319.8965	23.67	6963.500	1.134	0.298		0.59	0.77	YES	22.1
62	41	Total-tetradioxins	319.8965	23.42	11717.858	1.134	0.501		0.78	0.77	NO	40.5
63	41	Total-tetradioxins	319.8965	26.39	1830.171	1.134	0.078		0.89	0.77	YES	6.0
64	11	2378-TCDD	319.8965	26.26	13812.982	1.134	0.591	0.591	0.77	0.77	NO	42.3
65	41	Total-tetradioxins	319.8965	25.90	4386.426	1.134	0.188		1.00	0.77	YES	13.9
66	41	Total-tetradioxins	319.8965	25.60	999.428	1.134	0.043		2.48	0.77	YES	5.8
67	41	Total-tetradioxins	319.8965	25.45	10744.214	1.134	0.460		0.70	0.77	NO	36.0
68	41	Total-tetradioxins	319.8965	25.24	1485.385	1.134	0.064		0.63	0.77	YES	5.1
69	41	Total-tetradioxins	319.8965	24.88	8644.547	1.134	0.370		0.68	0.77	NO	27.8
70	42	Total-pentadioxins	355.8546	28.68	17519.787	0.975	1.062		1.59	1.55	NO	48.3
71	12	12378-PeCDD	355.8546	31.36	10298.219	0.975	0.624	0.624	1.48	1.55	NO	35.7
72	42	Total-pentadioxins	355.8546	30.70	3018.438	0.975	0.183		1.42	1.55	NO	10.2
73	42	Total-pentadioxins	355.8546	30.30	6182.815	0.975	0.375		1.75	1.55	NO	18.1
74	42	Total-pentadioxins	355.8546	30.14	6277.749	0.975	0.380		1.40	1.55	NO	21.4
75	42	Total-pentadioxins	355.8546	29.99	8310.894	0.975	0.504		1.55	1.55	NO	31.8
76	42	Total-pentadioxins	355.8546	29.78	6952.695	0.975	0.421		1.70	1.55	NO	31.4
77	42	Total-pentadioxins	355.8546	29.16	5937.868	0.975	0.360		1.42	1.55	NO	22.8
78	42	Total-pentadioxins	355.8546	31.76	2038.058	0.975	0.123		1.09	1.55	YES	9.8
79	15	123789-HxCDD	389.8157	36.59	21472.039	0.947	1.483	1.483	1.06	1.24	NO	55.8
80	43	Total-hexadioxins	389.8157	36.34	5806.452	0.983	0.386		1.28	1.24	NO	14.9
81	14	123678-HxCDD	389.8157	36.17	32116.460	0.971	2.103	2.103	1.22	1.24	NO	82.4
82	13	123478-HxCDD	389.8157	36.03	12860.956	1.031	0.839	0.839	1.24	1.24	NO	32.3
83	43	Total-hexadioxins	389.8157	35.18	10478.917	0.983	0.697		1.30	1.24	NO	26.5
84	43	Total-hexadioxins	389.8157	35.07	99606.723	0.983	6.627		1.24	1.24	NO	170.4
85	43	Total-hexadioxins	389.8157	34.68	18523.457	0.983	1.232		1.10	1.24	NO	49.5
86	43	Total-hexadioxins	389.8157	33.87	80022.476	0.983	5.324		1.29	1.24	NO	222.1
87	16	1234678-HpCDD	423.7766	40.88	620137.313	1.028	53.419	53.419	1.05	1.05	NO	1037.8
88	44	Total-heptadioxins	423.7766	39.65	947368.626	1.028	81.607		1.03	1.05	NO	1659.6
89	17	OCDD	457.7377	46.65	4149974.250	1.107	420.223	420....	0.91	0.89	NO	5798.8

PFK1

	#	Name	Trace	RT	Abs.Resp	RRF M...	pg	EMPC	1º Rati...	1º Rati...	1º R...	S/N
1	48	FUNCTION1 PFK	330.9792	23.31	0.000							1.8
2	48	FUNCTION1 PFK	330.9792	22.00	0.000							48.2
3	48	FUNCTION1 PFK	330.9792	21.21	0.000							14.7

PFK2

	#	Name	Trace	RT	Abs.Resp	RRF M...	pg	EMPC	1º Rati...	1º Rati...	1º R...	S/N
1	49	FUNCTION2 PFK	366.9792	29.18	0.000		0.000					2.7

ID: BEH0316-SRM1, Name: 16082306, Date: 23-Aug-2016, Time: 14:16:25, Conditions: AUTOSPEC01, User: PK

PFK3

	#	Name	Trace	RT	Abs.Resp	RRF M...	pg	EMPC	1º Rati...	1º Rati...	1º R...	S/N
1	50	FUNCTION3 PFK	380.9760	34.62	0.000		0.000					0.8
2	50	FUNCTION3 PFK	380.9760	34.39	0.000		0.000					1.5
3	50	FUNCTION3 PFK	380.9760	34.34	0.000		0.000					0.5
4	50	FUNCTION3 PFK	380.9760	34.30	0.000		0.000					0.8
5	50	FUNCTION3 PFK	380.9760	34.17	0.000		0.000					0.7
6	50	FUNCTION3 PFK	380.9760	34.12	0.000		0.000					1.4
7	50	FUNCTION3 PFK	380.9760	33.78	0.000		0.000					1.1
8	50	FUNCTION3 PFK	380.9760	33.72	0.000		0.000					1.1
9	50	FUNCTION3 PFK	380.9760	33.59	0.000		0.000					2.0
10	50	FUNCTION3 PFK	380.9760	33.52	0.000		0.000					2.0
11	50	FUNCTION3 PFK	380.9760	33.43	0.000		0.000					1.0
12	50	FUNCTION3 PFK	380.9760	33.38	0.000		0.000					0.8
13	50	FUNCTION3 PFK	380.9760	33.33	0.000		0.000					1.0
14	50	FUNCTION3 PFK	380.9760	32.88	0.000		0.000					0.9
15	50	FUNCTION3 PFK	380.9760	32.78	0.000		0.000					2.0
16	50	FUNCTION3 PFK	380.9760	32.72	0.000		0.000					1.4
17	50	FUNCTION3 PFK	380.9760	36.47	0.000		0.000					2.9
18	50	FUNCTION3 PFK	380.9760	36.21	0.000		0.000					1.9
19	50	FUNCTION3 PFK	380.9760	36.15	0.000		0.000					3.1
20	50	FUNCTION3 PFK	380.9760	36.02	0.000		0.000					5.4
21	50	FUNCTION3 PFK	380.9760	35.89	0.000		0.000					5.3
22	50	FUNCTION3 PFK	380.9760	35.79	0.000		0.000					4.5
23	50	FUNCTION3 PFK	380.9760	35.71	0.000		0.000					3.3
24	50	FUNCTION3 PFK	380.9760	35.66	0.000		0.000					2.8
25	50	FUNCTION3 PFK	380.9760	35.54	0.000		0.000					1.4
26	50	FUNCTION3 PFK	380.9760	35.41	0.000		0.000					1.5
27	50	FUNCTION3 PFK	380.9760	35.17	0.000		0.000					1.3
28	50	FUNCTION3 PFK	380.9760	35.12	0.000		0.000					0.7
29	50	FUNCTION3 PFK	380.9760	34.95	0.000		0.000					3.5
30	50	FUNCTION3 PFK	380.9760	34.82	0.000		0.000					1.4
31	50	FUNCTION3 PFK	380.9760	34.73	0.000		0.000					0.4
32	50	FUNCTION3 PFK	380.9760	34.65	0.000		0.000					0.6
33	50	FUNCTION3 PFK	380.9760	38.04	0.000		0.000					0.5
34	50	FUNCTION3 PFK	380.9760	38.00	0.000		0.000					1.4
35	50	FUNCTION3 PFK	380.9760	37.94	0.000		0.000					1.9
36	50	FUNCTION3 PFK	380.9760	37.91	0.000		0.000					1.9
37	50	FUNCTION3 PFK	380.9760	37.85	0.000		0.000					1.2
38	50	FUNCTION3 PFK	380.9760	37.69	0.000		0.000					2.4
39	50	FUNCTION3 PFK	380.9760	37.54	0.000		0.000					5.1
40	50	FUNCTION3 PFK	380.9760	37.47	0.000		0.000					5.1
41	50	FUNCTION3 PFK	380.9760	37.32	0.000		0.000					7.5
42	50	FUNCTION3 PFK	380.9760	37.27	0.000		0.000					7.7
43	50	FUNCTION3 PFK	380.9760	37.21	0.000		0.000					8.8
44	50	FUNCTION3 PFK	380.9760	37.17	0.000		0.000					9.4
45	50	FUNCTION3 PFK	380.9760	37.09	0.000		0.000					9.2
46	50	FUNCTION3 PFK	380.9760	37.04	0.000		0.000					9.3
47	50	FUNCTION3 PFK	380.9760	37.01	0.000		0.000					8.6
48	50	FUNCTION3 PFK	380.9760	36.70	0.000		0.000					7.6

ID: BEH0316-SRM1, Name: 16082306, Date: 23-Aug-2016, Time: 14:16:25, Conditions: AUTOSPEC01, User: PK

PFK4

	#	Name	Trace	RT	Abs.Resp	RRF M...	pg	EMPC	1º Rati...	1º Rati...	1º R...	S/N
1	51	FUNCTION4 PFK	430.9728	39.75	0.000							1.3
2	51	FUNCTION4 PFK	430.9728	39.71	0.000							1.8
3	51	FUNCTION4 PFK	430.9728	39.66	0.000							1.1
4	51	FUNCTION4 PFK	430.9728	39.60	0.000							2.0
5	51	FUNCTION4 PFK	430.9728	39.37	0.000							0.8
6	51	FUNCTION4 PFK	430.9728	39.16	0.000							0.5
7	51	FUNCTION4 PFK	430.9728	39.09	0.000							2.0
8	51	FUNCTION4 PFK	430.9728	39.03	0.000							1.8
9	51	FUNCTION4 PFK	430.9728	38.96	0.000							1.8
10	51	FUNCTION4 PFK	430.9728	38.86	0.000							1.1
11	51	FUNCTION4 PFK	430.9728	38.83	0.000							1.7
12	51	FUNCTION4 PFK	430.9728	38.70	0.000							0.9
13	51	FUNCTION4 PFK	430.9728	38.65	0.000							0.9
14	51	FUNCTION4 PFK	430.9728	38.26	0.000							1.6
15	51	FUNCTION4 PFK	430.9728	38.20	0.000							1.9
16	51	FUNCTION4 PFK	430.9728	41.47	0.000							0.4
17	51	FUNCTION4 PFK	430.9728	41.37	0.000							2.0
18	51	FUNCTION4 PFK	430.9728	41.31	0.000							0.9
19	51	FUNCTION4 PFK	430.9728	41.20	0.000							0.6
20	51	FUNCTION4 PFK	430.9728	41.10	0.000							1.9
21	51	FUNCTION4 PFK	430.9728	40.96	0.000							1.2
22	51	FUNCTION4 PFK	430.9728	40.85	0.000							1.5
23	51	FUNCTION4 PFK	430.9728	40.77	0.000							1.4
24	51	FUNCTION4 PFK	430.9728	40.66	0.000							0.5
25	51	FUNCTION4 PFK	430.9728	40.56	0.000							2.2
26	51	FUNCTION4 PFK	430.9728	40.46	0.000							2.0
27	51	FUNCTION4 PFK	430.9728	40.12	0.000							2.2
28	51	FUNCTION4 PFK	430.9728	40.01	0.000							1.2
29	51	FUNCTION4 PFK	430.9728	39.94	0.000							1.5
30	51	FUNCTION4 PFK	430.9728	39.90	0.000							0.6
31	51	FUNCTION4 PFK	430.9728	39.78	0.000							0.9
32	51	FUNCTION4 PFK	430.9728	43.21	0.000							1.1
33	51	FUNCTION4 PFK	430.9728	43.18	0.000							0.9
34	51	FUNCTION4 PFK	430.9728	43.12	0.000							1.2
35	51	FUNCTION4 PFK	430.9728	42.94	0.000							1.9
36	51	FUNCTION4 PFK	430.9728	42.88	0.000							1.6
37	51	FUNCTION4 PFK	430.9728	42.75	0.000							1.4
38	51	FUNCTION4 PFK	430.9728	42.70	0.000							2.1
39	51	FUNCTION4 PFK	430.9728	42.57	0.000							1.4
40	51	FUNCTION4 PFK	430.9728	42.38	0.000							1.0
41	51	FUNCTION4 PFK	430.9728	42.33	0.000							1.5
42	51	FUNCTION4 PFK	430.9728	42.24	0.000							2.6
43	51	FUNCTION4 PFK	430.9728	42.16	0.000							1.1
44	51	FUNCTION4 PFK	430.9728	42.15	0.000							1.3
45	51	FUNCTION4 PFK	430.9728	42.11	0.000							1.3
46	51	FUNCTION4 PFK	430.9728	41.99	0.000							0.9
47	51	FUNCTION4 PFK	430.9728	41.70	0.000							0.4
48	51	FUNCTION4 PFK	430.9728	44.47	0.000							1.2
49	51	FUNCTION4 PFK	430.9728	44.31	0.000							0.7
50	51	FUNCTION4 PFK	430.9728	44.28	0.000							1.3
51	51	FUNCTION4 PFK	430.9728	44.18	0.000							1.3

ID: BEH0316-SRM1, Name: 16082306, Date: 23-Aug-2016, Time: 14:16:25, Conditions: AUTOSPEC01, User: PK

PFK4

	#	Name	Trace	RT	Abs.Resp	RRF M...	pg	EMPC	1º Rati...	1º Rati...	1º R...	S/N
52	51	FUNCTION4 PFK	430.9728	43.89	0.000							1.7
53	51	FUNCTION4 PFK	430.9728	43.75	0.000							0.5
54	51	FUNCTION4 PFK	430.9728	43.58	0.000							0.8
55	51	FUNCTION4 PFK	430.9728	43.48	0.000							1.3
56	51	FUNCTION4 PFK	430.9728	43.42	0.000							0.5
57	51	FUNCTION4 PFK	430.9728	43.27	0.000							0.7

PFK5

	#	Name	Trace	RT	Abs.Resp	RRF M...	pg	EMPC	1º Rati...	1º Rati...	1º R...	S/N
1												

ETHERS1

	#	Name	Trace	RT	Abs.Resp	RRF M...	pg	EMPC	1º Rati...	1º Rati...	1º R...	S/N
1	53	FUNCTION1 HXCD...	375.8364	25.42	0.000		0.000					2.6
2	53	FUNCTION1 HXCD...	375.8364	25.21	0.000		0.000					2.0
3	53	FUNCTION1 HXCD...	375.8364	22.64	0.000		0.000					1.2
4	53	FUNCTION1 HXCD...	375.8364	22.04	0.000		0.000					2.0
5	53	FUNCTION1 HXCD...	375.8364	27.36	0.000		0.000					1.5
6	53	FUNCTION1 HXCD...	375.8364	26.63	0.000		0.000					9.1
7	53	FUNCTION1 HXCD...	375.8364	26.29	0.000		0.000					8.1
8	53	FUNCTION1 HXCD...	375.8364	26.20	0.000		0.000					6.6
9	53	FUNCTION1 HXCD...	375.8364	25.99	0.000		0.000					2.8
10	53	FUNCTION1 HXCD...	375.8364	25.87	0.000		0.000					2.3
11	53	FUNCTION1 HXCD...	375.8364	25.69	0.000		0.000					6.4
12	53	FUNCTION1 HXCD...	375.8364	25.47	0.000		0.000					3.4

ETHERS2

	#	Name	Trace	RT	Abs.Resp	RRF M...	pg	EMPC	1º Rati...	1º Rati...	1º R...	S/N
1	54	FUNCTION1 HPCD...	409.7974	27.78	0.000		0.000					6.9
2	54	FUNCTION1 HPCD...	409.7974	24.24	0.000		0.000					5.2
3	54	FUNCTION1 HPCD...	409.7974	22.91	0.000		0.000					11.9
4	54	FUNCTION1 HPCD...	409.7974	21.94	0.000		0.000					869.6

ETHERS3

	#	Name	Trace	RT	Abs.Resp	RRF M...	pg	EMPC	1º Rati...	1º Rati...	1º R...	S/N
1	55	FUNCTION2 HPCD...	409.7974	28.49	0.000		0.000					3.1
2	55	FUNCTION2 HPCD...	409.7974	28.42	0.000		0.000					1.5
3	55	FUNCTION2 HPCD...	409.7974	32.17	0.000		0.000					4.0
4	55	FUNCTION2 HPCD...	409.7974	32.04	0.000		0.000					2.1
5	55	FUNCTION2 HPCD...	409.7974	30.44	0.000		0.000					4.3
6	55	FUNCTION2 HPCD...	409.7974	28.96	0.000		0.000					2.2
7	55	FUNCTION2 HPCD...	409.7974	28.84	0.000		0.000					2.6

ETHERS4

	#	Name	Trace	RT	Abs.Resp	RRF M...	pg	EMPC	1º Rati...	1º Rati...	1º R...	S/N
1												

ID: BEH0316-SRM1, Name: 16082306, Date: 23-Aug-2016, Time: 14:16:25, Conditions: AUTOSPEC01, User: PK

ETHERS5

	#	Name	Trace	RT	Abs.Resp	RRF M...	pg	EMPC	1º Rati...	1º Rati...	1º R...	S/N
1	57	FUNCTION4 NCDPE	479.7165	41.01	0.000		0.000					4.4
2	57	FUNCTION4 NCDPE	479.7165	38.84	0.000		0.000					4.3
3	57	FUNCTION4 NCDPE	479.7165	38.68	0.000		0.000					1072.5
4	57	FUNCTION4 NCDPE	479.7165	38.34	0.000		0.000					3.1

ETHERS6

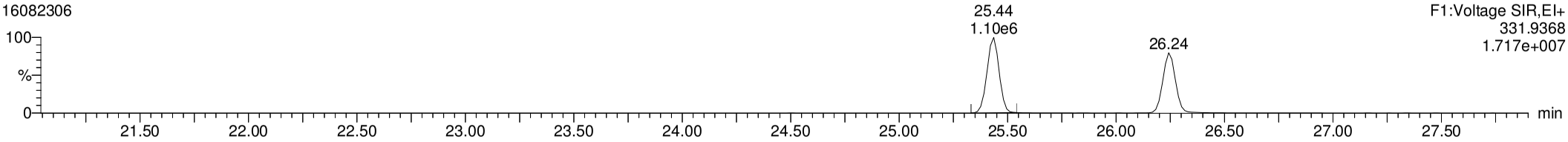
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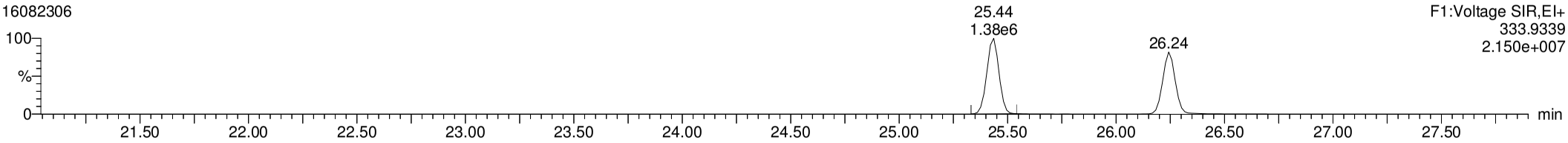
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ID: BEH0316-SRM1, Name: 16082306, Date: 23-Aug-2016, Time: 14:16:25, Conditions: AUTOSPEC01, User: PK

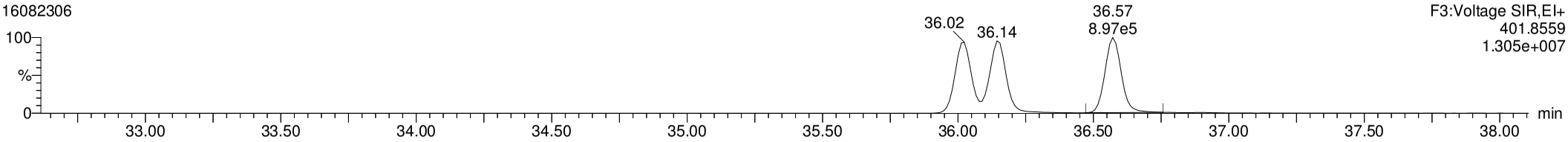
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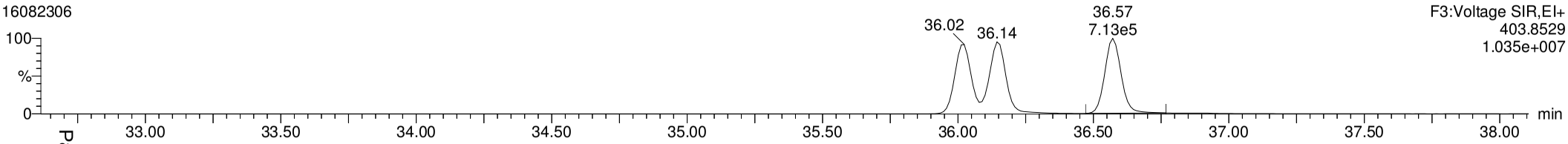
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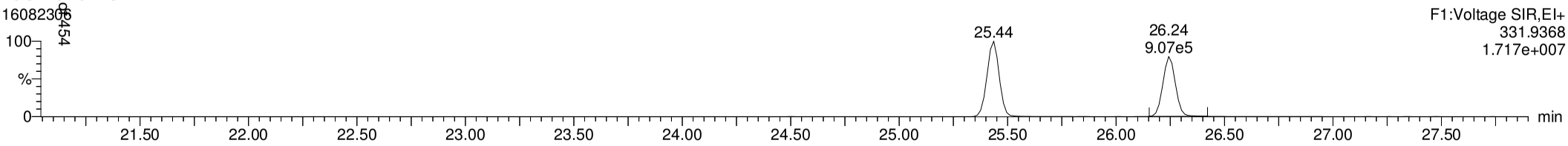


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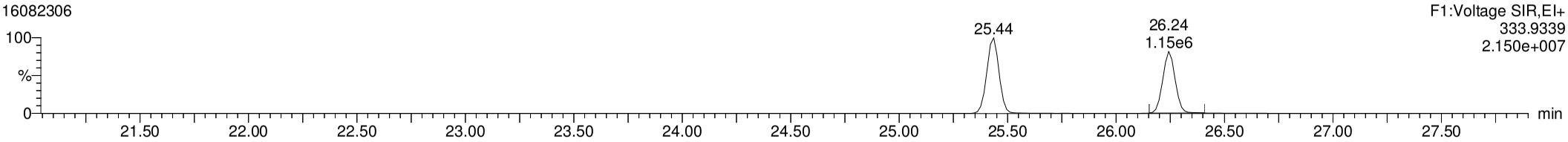


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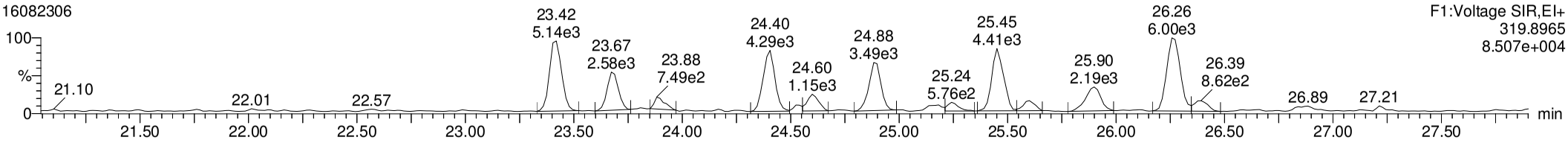
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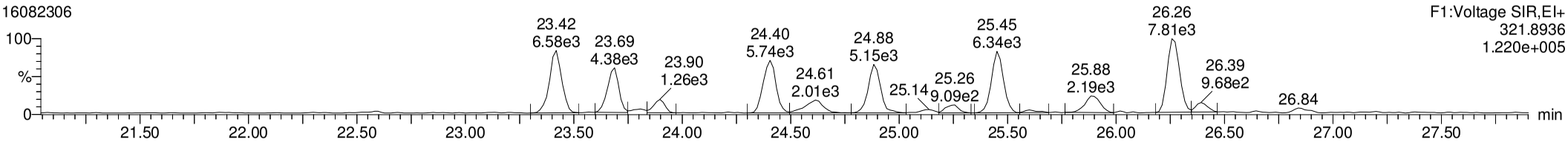
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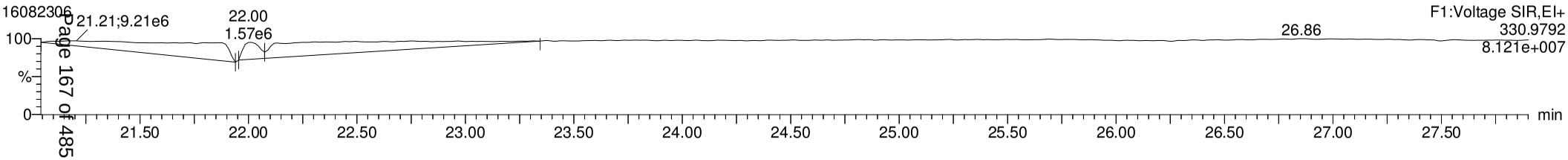
Total-tetradioxins



Total-tetradioxins

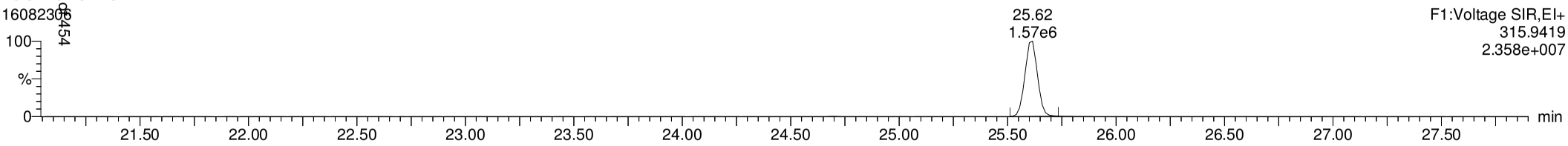


FUNCTION1 PFK

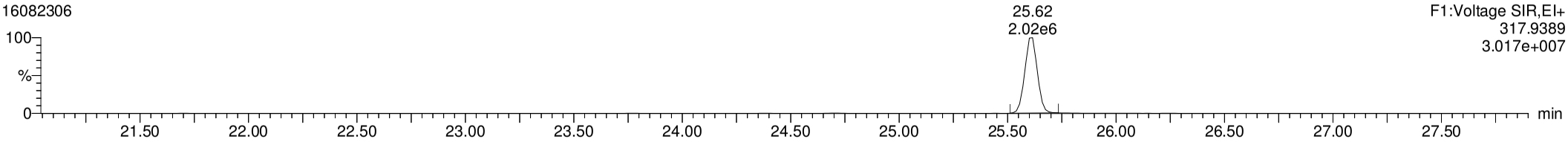


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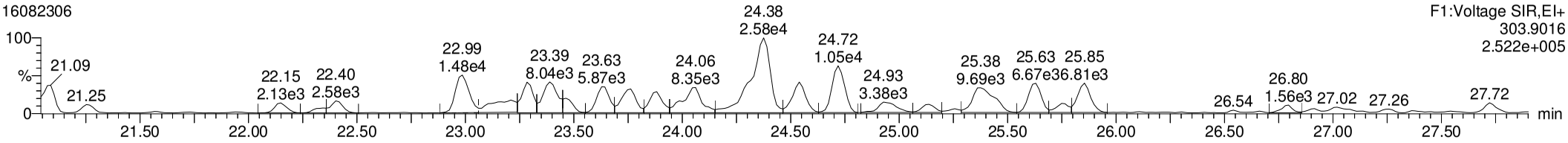
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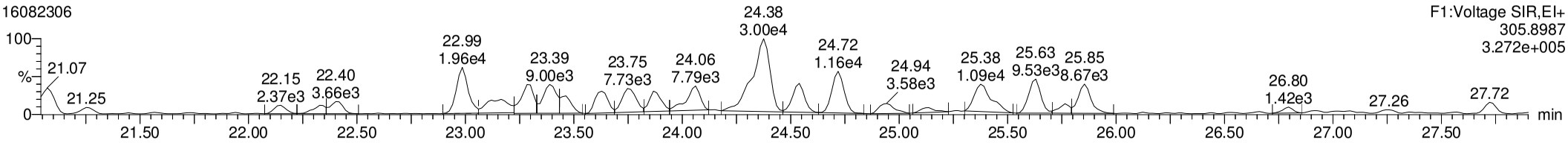
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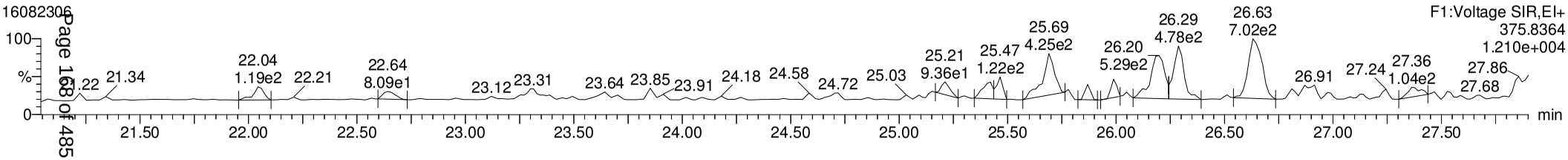
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Total-tetrafurans



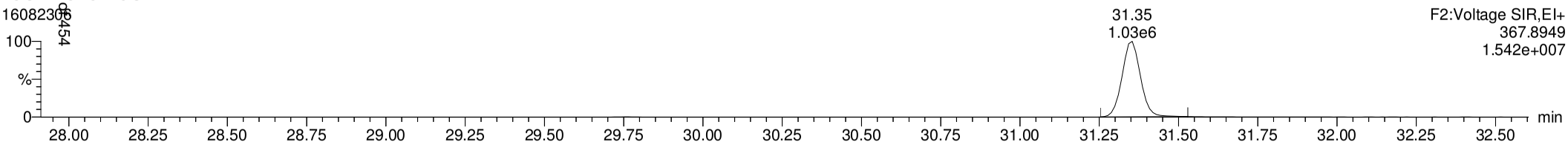
FUNCTION1 HXCDPE



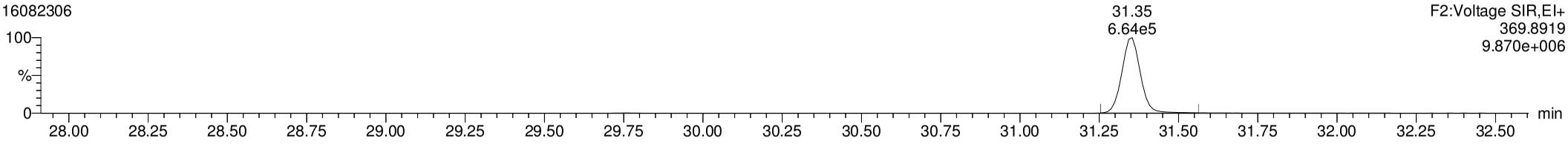
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Page 1486454

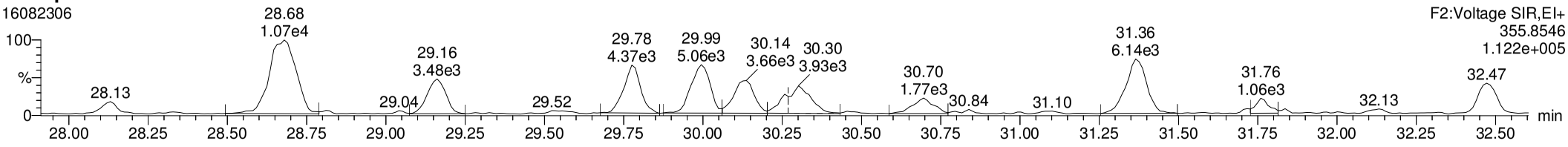
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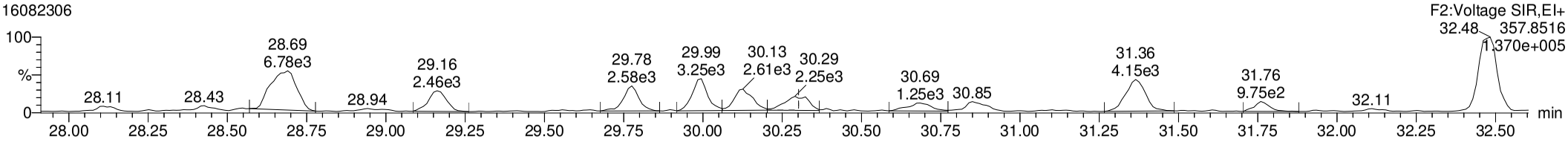
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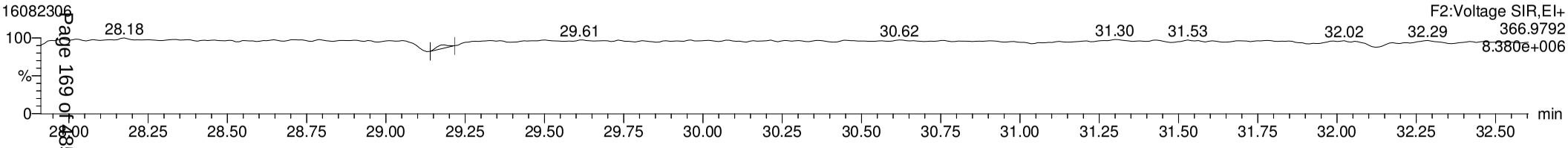
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Total-pentadioxins



FUNCTION2 PFK

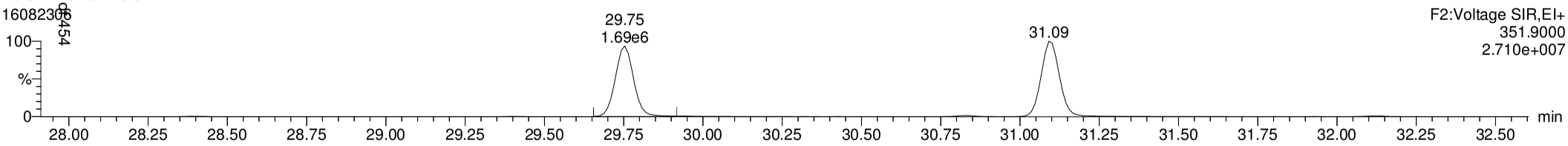


Page 169 of 485

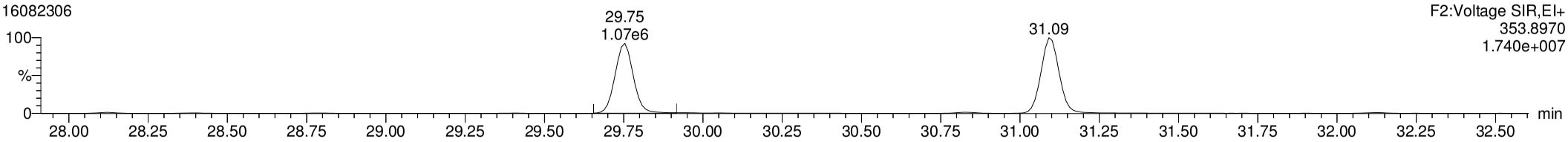
ID: BEH0316-SRM1, Name: 16082306, Date: 23-Aug-2016, Time: 14:16:25, Conditions: AUTOSPEC01, User: PK

Page 169 of 485

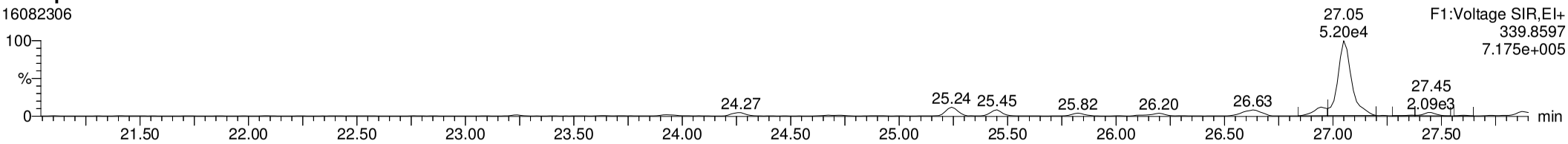
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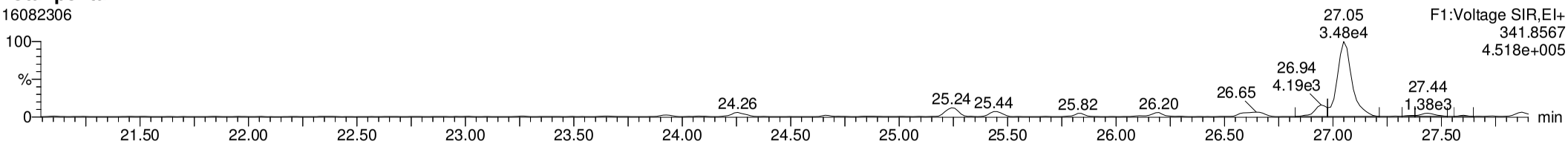
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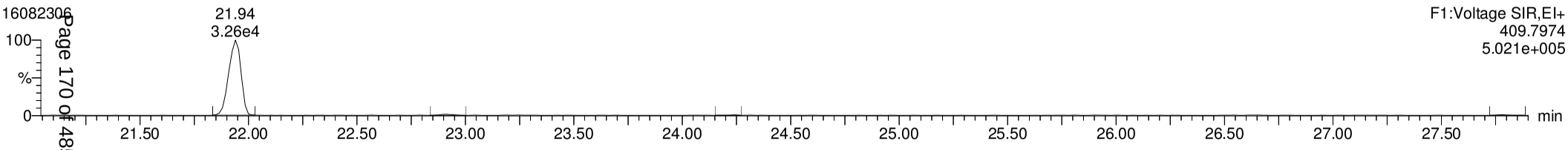
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Total-penta1



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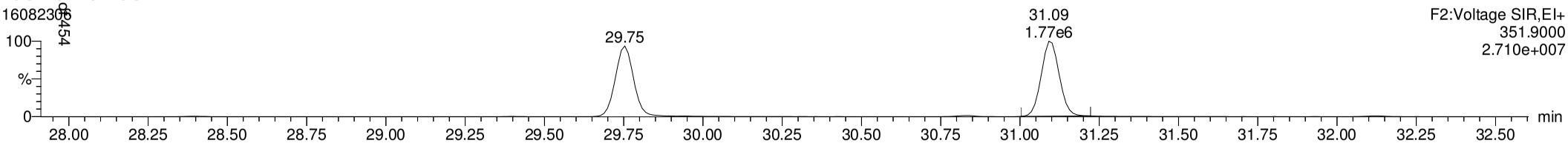


Page 170 of 485

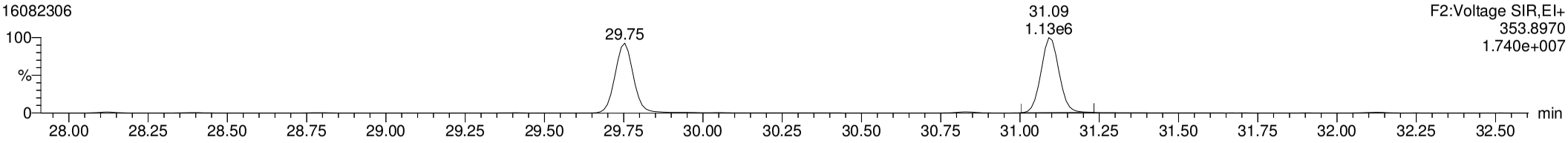
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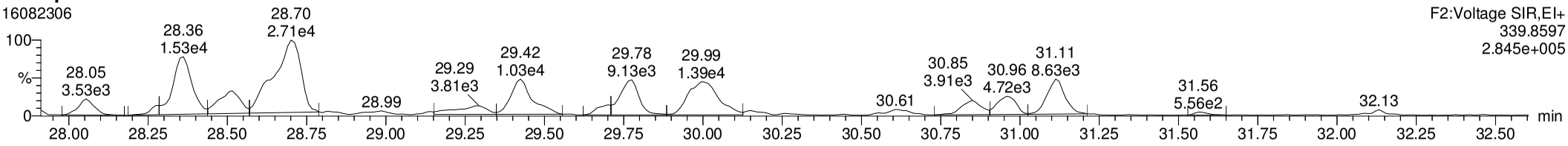
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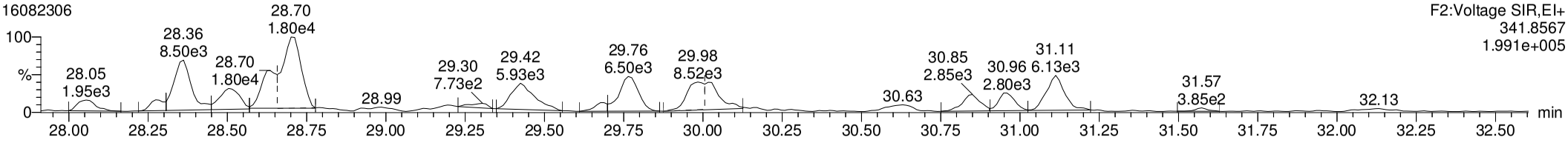
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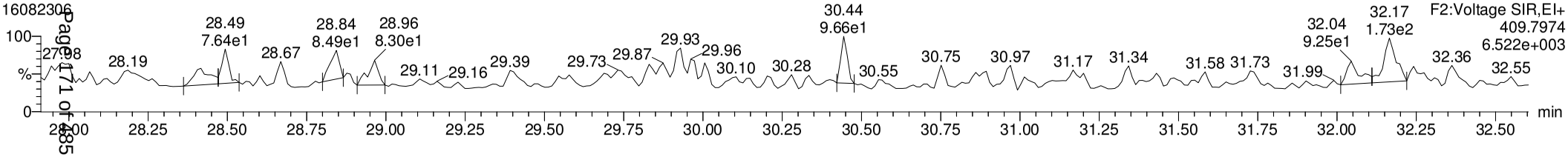
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Total-pentafurans



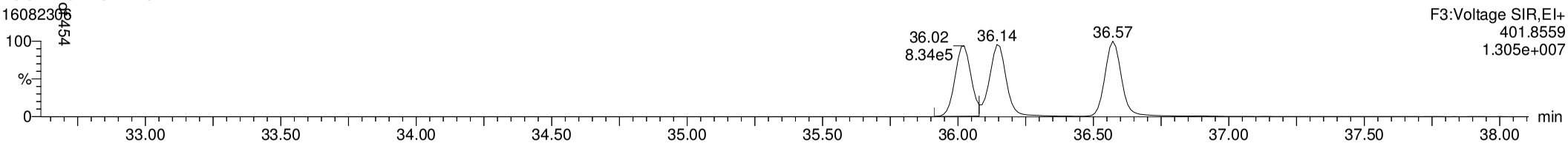
FUNCTION2 HPCDPE



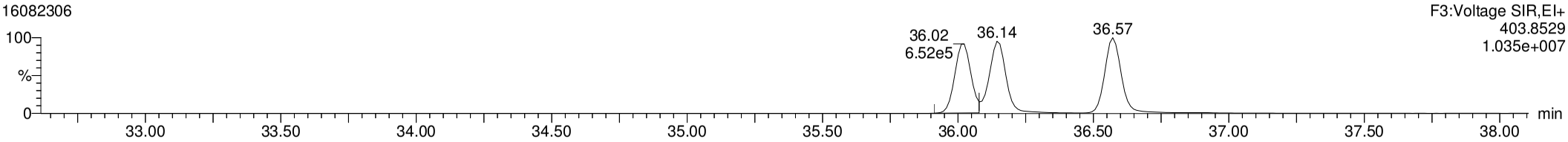
Page 1471 of 6485

ID: BEH0316-SRM1, Name: 16082306, Date: 23-Aug-2016, Time: 14:16:25, Conditions: AUTOSPEC01, User: PK

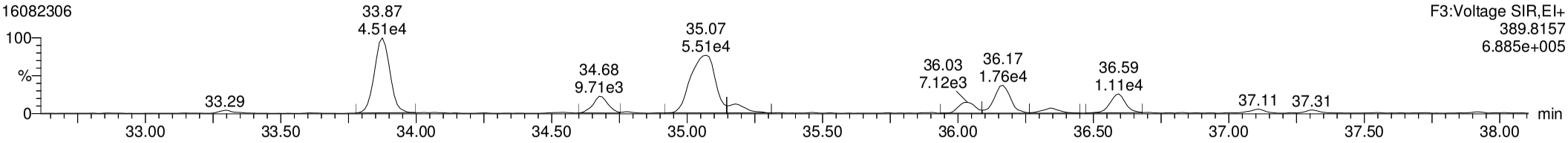
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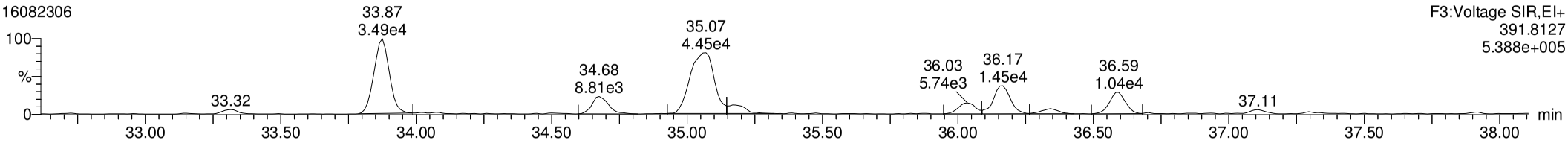
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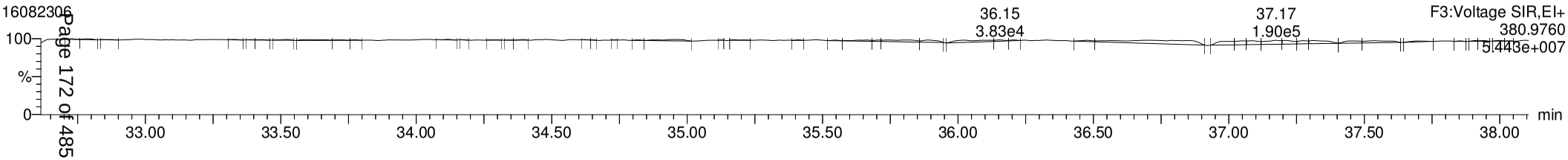
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Total-hexadioxins

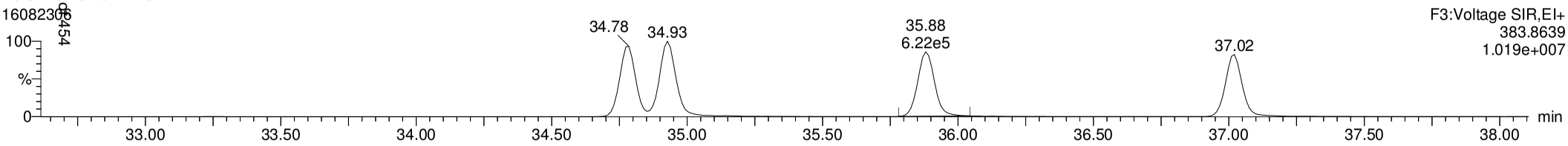


FUNCTION3 PFK

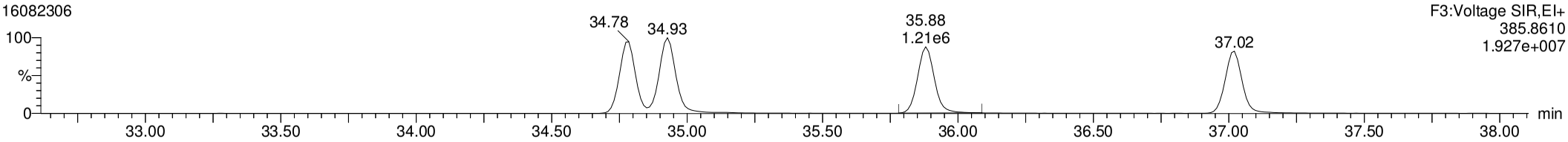


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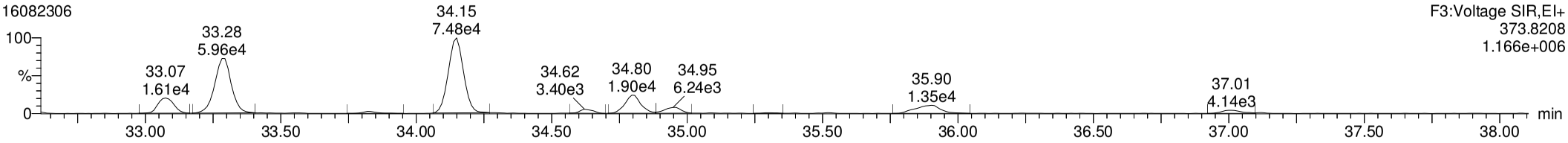
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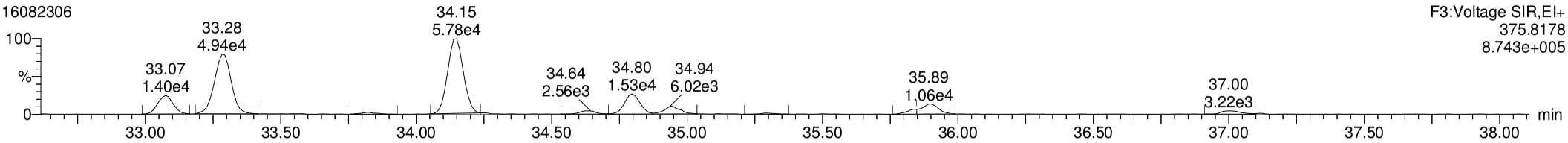
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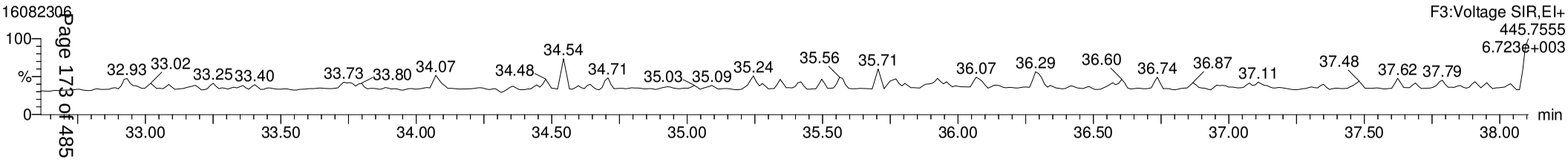
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Total-hexafurans

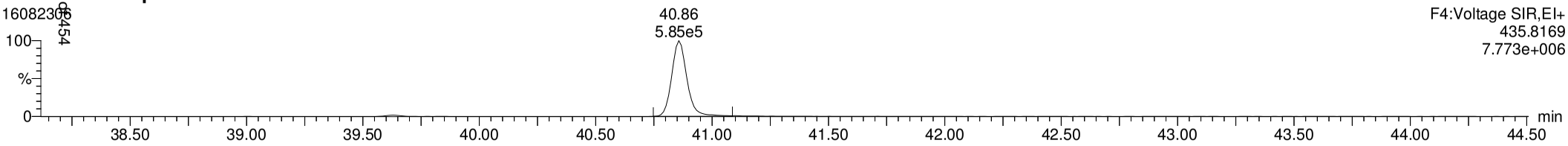


FUNCTION3 OCDPE

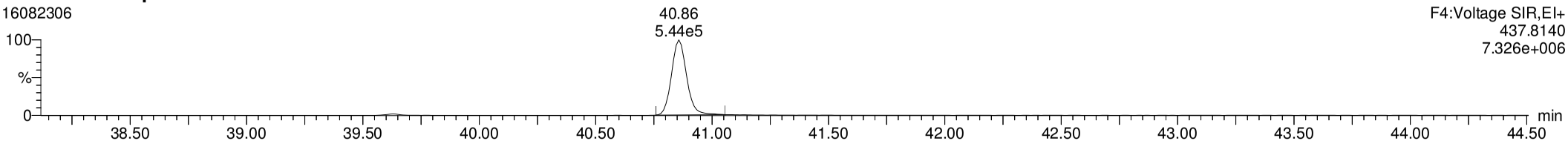


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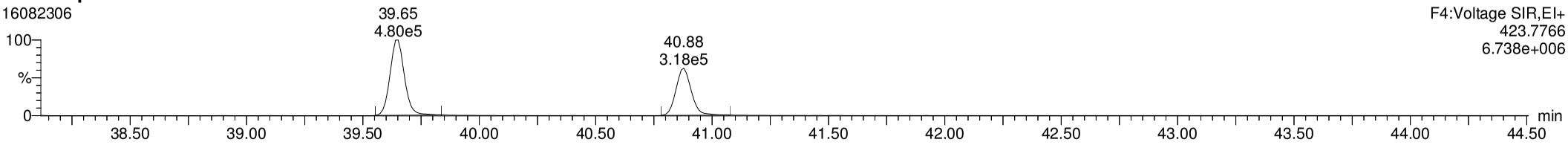
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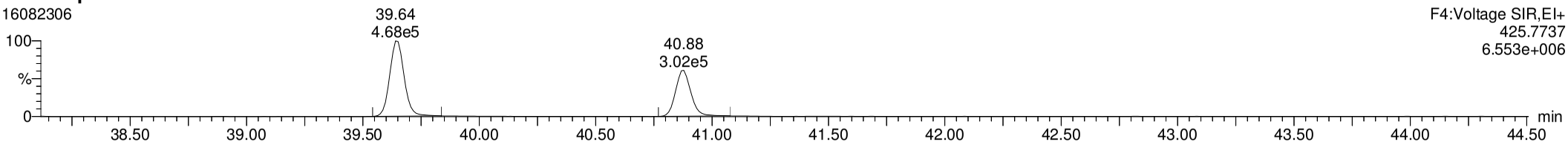
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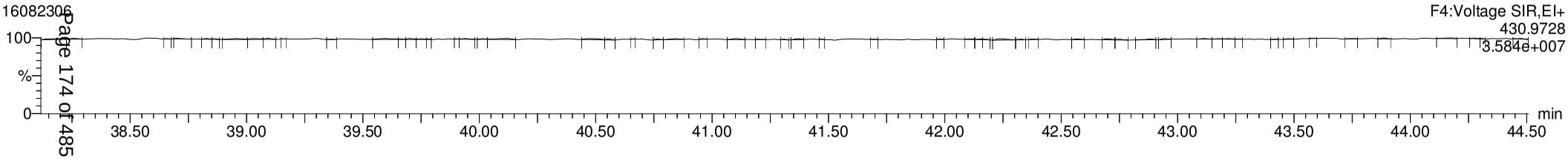
Total-heptadioxins



Total-heptadioxins



FUNCTION4 PFK

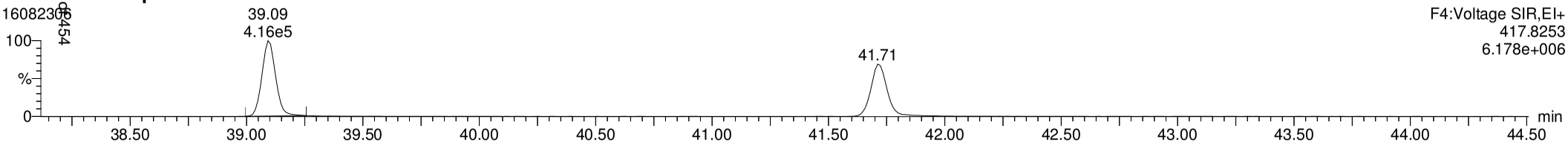


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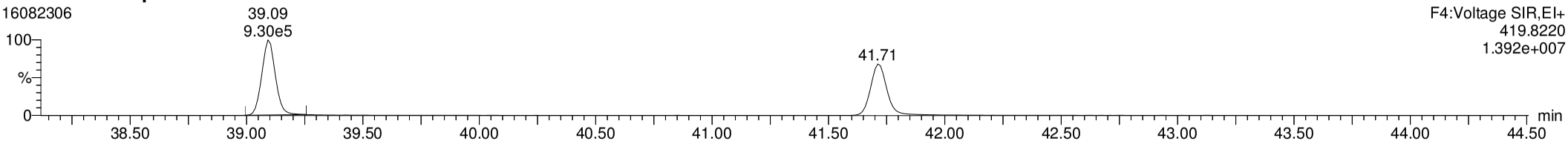
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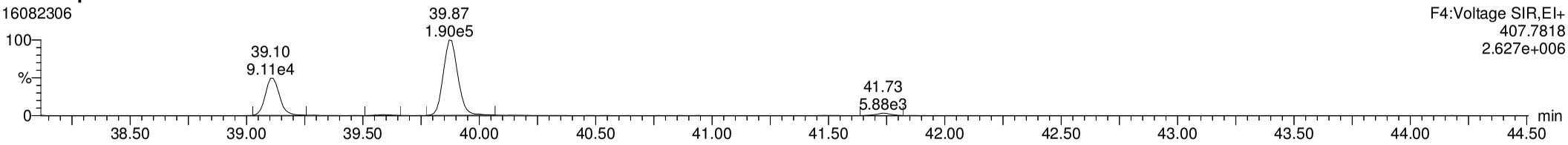
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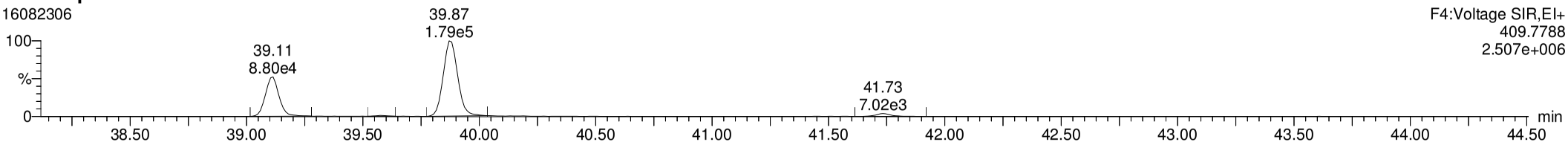
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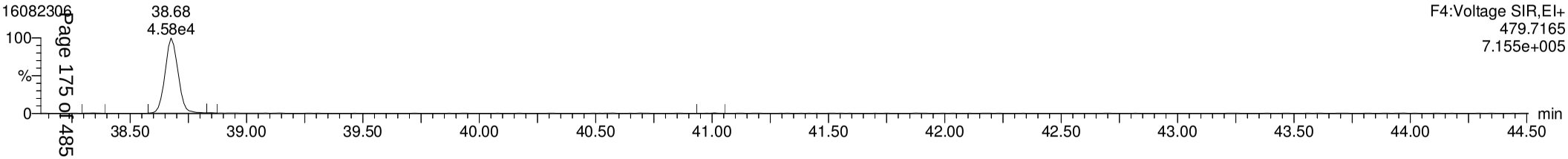
Total-heptafurans



Total-heptafurans



FUNCTION4 NCDPE



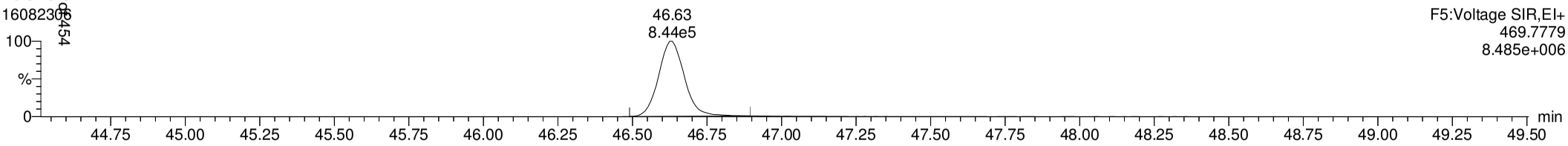
Page 175 of 485

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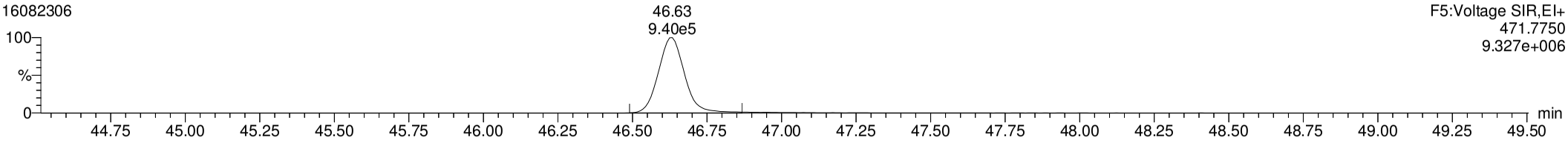
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Page 1476 of 9454

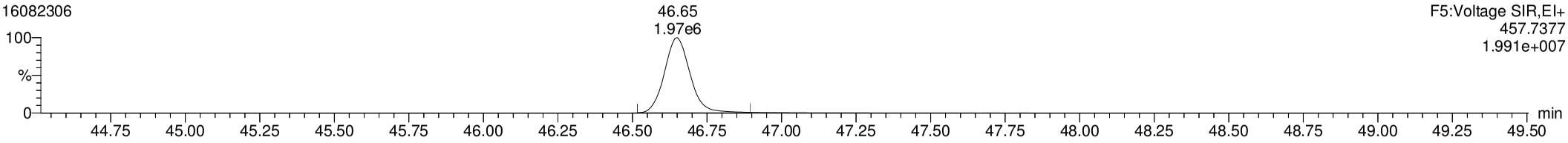
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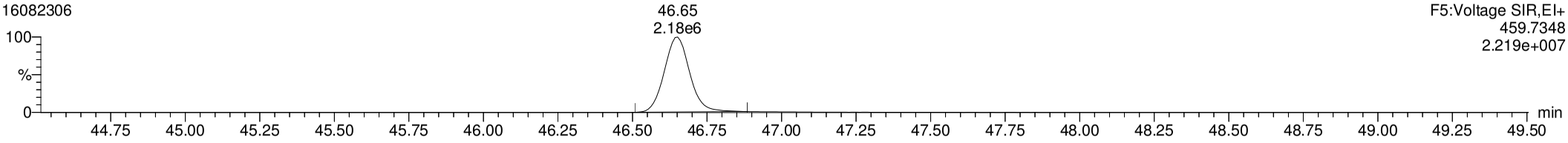
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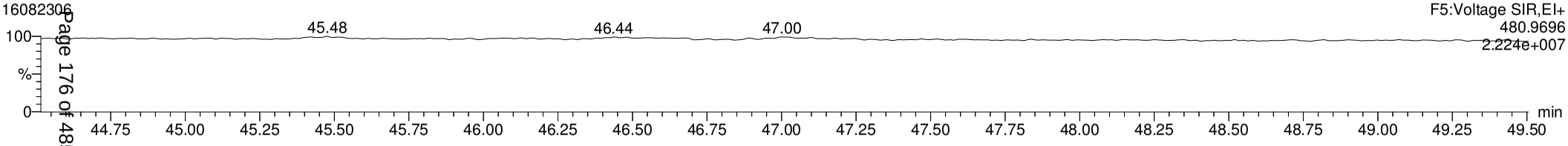
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OCDD



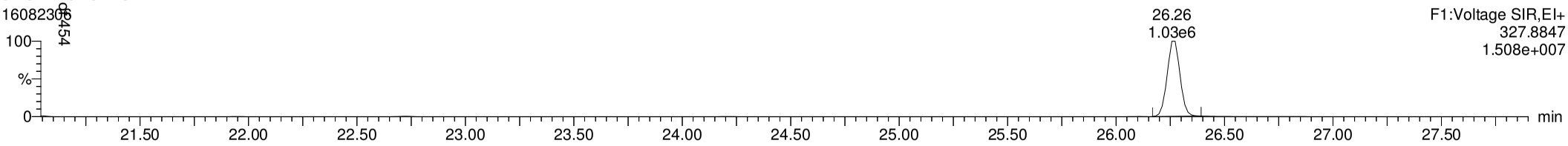
FUNCTION5 PFK



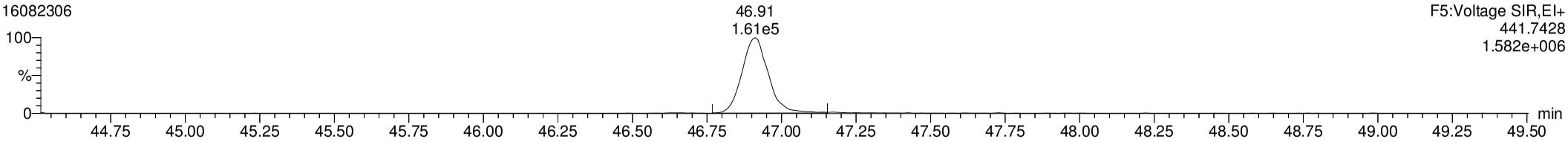
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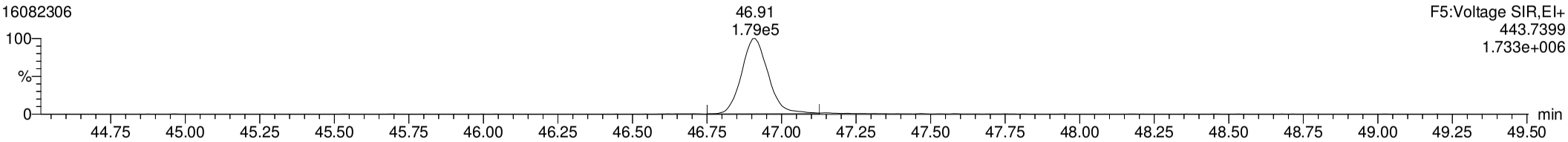
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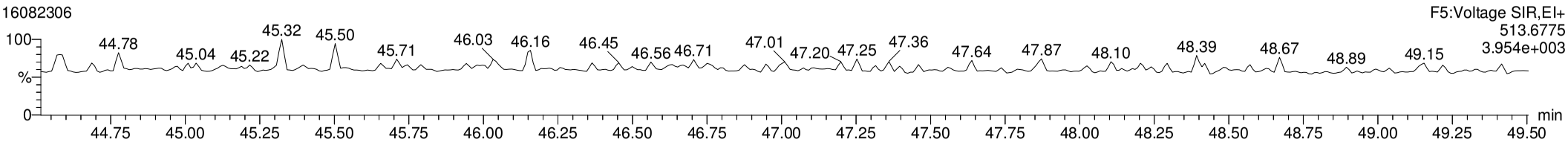
OCDF



OCDF



FUNCTION5 DCDPE



PREPARATION BATCH SUMMARY

EPA 1613B

Laboratory: Analytical Resources, Inc. SDG: 16H0071

Client: Fremont Analytical Project: 1608094

Batch: BEH0316 Batch Matrix: Solid Preparation: EPA 1613

SAMPLE NAME	LAB SAMPLE ID	LAB FILE ID	DATE PREPARED	OBSERVATIONS
NME:0-4C	16H0071-01	16082308	08/18/16 15:40	
NME:4-7C	16H0071-02	16082309	08/18/16 15:40	
Blank	BEH0316-BLK1	16082304	08/18/16 15:40	
LCS	BEH0316-BS1	16082305	08/18/16 15:40	
NME:0-4C	BEH0316-DUP1	16082307	08/18/16 15:40	
Reference	BEH0316-SRM1	16082306	08/18/16 15:40	

Analytical Resources, Incorporated
Analytical Chemists and Consultants

HRGCMS Dioxin/Furan Preparation Bench Sheet EPA Methods 8290A & 1613B

Batch: BEH0316

Solid Samples

ARI Work Orders:	M 8/18/16 16H0070 16H0071, 16H0080, 16H0103		
Matrix (circle one)	(Soil) Sediment Oil Tissue		
Extraction Method	Start Date/Time:	End Date/Time:	
Soxhlet	8/18/16 1540	8/19/16 0805	

Reagents/Equipment Used	NA	ID / Lot Number	Initials	Date
Balance		246503 44	NL	8/18/16
Purified Sand		D002772	NL	8/18/16
Toluene		E001098	NL	8/18/16
Hexane		E002813	M	8/19/16 8/22/16
CH2Cl2		E000848	M	8/22/16
H2SO4		E000847	NL	8/19/16
Na2SO4		E003056	M	8/22/16
Glasswool		D E000334 M 8/22/16	M	8/22/16
(98:2) Hex/DCM		E003436	M	8/22/16
Basic Silica		E002985	M	8/22/16
Acid Silica		E002986	M	8/22/16
0% Silica		E000542	NL	8/18/16 8/22/16
Activated Florisil		E001666	M	8/22/16
Nonane		E000869	M	8/22/16
Other ( )	✓			

Lab Number & Container	Sample Name	% Solids	Sample Weight Equal to dry (g) (Target Dry)	Actual	RotoVap 45 °C	Water Trap Vol (mL)	Final Vol. (uL)
16H0071-01 A	NME:0-4C	84.7	(11.81)	11.89	(1) 2	1.8	20
16H0071-02 A	NME:4-7C	86.19	(11.60)	11.65	1 (2)	1.9	20
16H0080-05 H	EST03_21-22	42.42	(23.57)	23.65	(1) 2	13.0	20
16H0103-01 H	EST01_13-14	78.49	(12.74)	12.86	1 (2)	3.5	20
16H0103-02 H	EST01_14-15	54.03	(18.51)	19.24	(1) 2	8.0	20
BEH0316-BLK1	Blank	100	(10.00)		(1) 2	0.8	20
BEH0316-BS1	LCS	100	(10.00)		1 (2)	0.8	20
BEH0316-DUP1	16H0071-01A		()	11.88	(1) 2	2.0	20
BEH0316-SRM1	Reference	100	(10.00)		1 (2)	0.2	20
Prep Analyst / Date:	NL 8/18/16				M 8/19/16	M 8/19/16	M 8/22/16

Standards Used	Vol	ID / Lot Number	Concentration	Expiration Date	Analyst	Witness	Date
Recovery Standard	1.0 mL	E003007	2/4 ng/mL	1/22/17	NL	M x2	8/18/16
OPR	20 uL	E003630	10/50/100 ng/mL	2/27/17	M	M x2	8/18/16
QLS Standard	10 uL		0.5/2.5/5 ng/mL				
Cleanu-up Standard	1.0 mL	E003507	0.8 ng/mL	2/12/17	M	M x2	8/22/16

	Verify Client ID
Analyst / Date:	M 8/18/16
	Acid Clean
	(Y) / N
Analyst / Date:	M 8/19/16
	Silica-Florisil Clean
	(Y) / N
Analyst / Date:	M 8/22/16

Supervisor Review By 8/23/16 Date

Printed: 8/19/2016 8:33:41AM

Analytical Resources, Incorporated
Analytical Chemists and Consultants

Dioxin Extraction Laboratory – Glassware

ARI Sample ID: _____ Client Sample ID: _____ Client Project ID: _____ ARI Analyst NL

ARI Sample ID	300 mL Flat Bottom	Small Soxhlet	Large Soxhlet	250 mL Beaker	Funnel	Column	Florisil Column	Turbo Tube	Sep Funnel	Erlenmeyer Flask	Centrifuge Bottle	Turbo-Vap	Vortex Mixer	Heating Mantle
BEH0316 - BLK1	8	L1		12	62	146	L8	L10				4	4	A1
BS1	2	2		221	99	179	128	9				4	4	A2
Dup1	80	46		210	92	102	L4	10				4	4	A3
SRM1	16	12		224	100	206	L1	152				4	4	A4
16H0071 - 01A	58	L8		249	4	220	L10	154				4	4	A5
02A	44		52	236	L1	92	136	L4				4	4	A6
16H0080 - 05H	13		60	184	81	128	26	L5				4	4	B1
16H0103 - 01H	3	77		195	L6	217	L5	159				4	4	B2
02H	48	59		186	78	162	L3	L7				4	4	B3
												4	4	
												4	4	
												4	4	
												4	4	
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												4	4	

Analytical Resources, Incorporated
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Organic Extractions Laboratory Analyst Notes

ARI Job No.: 16HP871 Client ID: Fremont Analytical

Batch ID:

Parameter: Client Project: 1608094

Screens: Soil/Sediment/Solid/Other:	Analyst/Date
☐ No Anomalies (standard soil/wet sediment/sand/gravel)=	
☐ Standing Water Decanted (Not shared)=	
☐ Standing Water Homogenized (Shared samples)=	
☐ Clay/Clumps (Difficult to homogenize)=	
☒ Rocks (%+size)? 20.0% -Φ1 10.0% Φ2	lfe 08/13/16
☐ Organics (Leaves/sticks/grass)=	
☐ Oily, obvious fuel/sulfur odors=	
☐ Received in 32oz jar(s)=Homogenized in Pyrex dish=	
☐ Other (Details)=	
Aqueous:	
☐ No Anomalies	
☐ Turbid/Color=	
☐ Particulates(%)=(Note: >5%=Notify Supervisor/Lead)	
☐ Emulsions (%)=	
☐ Oily, obvious fuel/sulfur odors=	
☐ Other (Details)=	
☐ Received in 1.0L Bottle(s)=No Bottle Rinse=	
☐ Other Notes/Comments= (Note problems, concerns, corrective actions).	
☒ Share Samples Y / N	lfe 08/13/16
☒ Multiple Jars Y / N	lfe 08/13/16
☐ Sample Pre-Screens indicate analyte activity=	
☐ Sample weights/volumes reduced based on Pre-Screen=	

Analytical Resources, Incorporated

CLEANUP BATCH SUMMARY

Laboratory:	Analytical Resources, Inc.	SDG:	16H0071
Client:	Fremont Analytical	Project:	1608094
Cleanup Batch:	CEH0158	Cleanup Type:	Sulfuric Acid

SAMPLE NAME	LAB SAMPLE ID	LAB FILE ID	DATE PREPARED	OBSERVATIONS
NME:0-4C	16H0071-01		08/22/2016	
NME:4-7C	16H0071-02	16082908.D	08/22/2016	
NME:4-7C	16H0071-02	16082309	08/22/2016	
NME:4-7C	16H0071-02		08/22/2016	
NME:0-4C	16H0071-01	16082905.D	08/22/2016	
NME:0-4C	16H0071-01	16082308	08/22/2016	

Analytical Resources, Incorporated
Analytical Chemists and Consultants

CLEANUP BENCH SHEET

CEH0158

Matrix: Solid **Cleanup using: HRGCMS - EPA 3665A Sulfuric Acid Cleanup** **Printed: 8/23/2016 8:28:58AM**

Lab Number	Sample Container	Sample Name	Extract Container	Initial (mL)	Final (mL)	Analysis	Clean Up Date	Cleaned By	Cleanup Comments
16H0071-01	A	NME:0-4C	A 01	20	20	1613B Dioxin	8/22/2016	NPL	
16H0071-02	A	NME:4-7C	A 01	20	20	1613B Dioxin	8/22/2016	NPL	
16H0080-05	H	EST03_21-22	H 02	20	20	1613B Dioxin	8/22/2016	NPL	
16H0103-01	H	EST01_13-14	H 02	20	20	1613B Dioxin	8/22/2016	NPL	
16H0103-02	H	EST01_14-15	H 02	20	20	1613B Dioxin	8/22/2016	NPL	
BEH0316-BLK1	-	Blank	-	20	20	-	8/22/2016	NPL	
BEH0316-BS1	-	LCS	-	20	20	-	8/22/2016	NPL	
BEH0316-DUP1	-	16H0071-01A	-	20	20	-	8/22/2016	NPL	
BEH0316-SRM1	-	Reference	-	20	20	-	8/22/2016	NPL	

Cleanup Reviewed By Date

Analytical Resources, Incorporated

CLEANUP BATCH SUMMARY

Laboratory:	Analytical Resources, Inc.	SDG:	16H0071
Client:	Fremont Analytical	Project:	1608094
Cleanup Batch:	CEH0159	Cleanup Type:	Silica Gel

SAMPLE NAME	LAB SAMPLE ID	LAB FILE ID	DATE PREPARED	OBSERVATIONS
NME:4-7C	16H0071-02	16082908.D	08/22/2016	
NME:0-4C	16H0071-01		08/22/2016	
NME:0-4C	16H0071-01	16082308	08/22/2016	
NME:0-4C	16H0071-01	16082905.D	08/22/2016	
NME:4-7C	16H0071-02	16082309	08/22/2016	
NME:4-7C	16H0071-02		08/22/2016	

Analytical Resources, Incorporated
Analytical Chemists and Consultants

CLEANUP BENCH SHEET

CEH0159

Matrix: Solid **Cleanup using: HRGCMS - EPA 3630C Silica Gel Cleanup** **Printed: 8/23/2016 8:28:46AM**

Lab Number	Sample Container	Sample Name	Extract Container	Initial (mL)	Final (mL)	Analysis	Clean Up Date	Cleaned By	Cleanup Comments
16H0071-01	A	NME:0-4C	A 01	20	20	1613B Dioxin	8/22/2016	NPL	
16H0071-02	A	NME:4-7C	A 01	20	20	1613B Dioxin	8/22/2016	NPL	
16H0080-05	H	EST03_21-22	H 02	20	20	1613B Dioxin	8/22/2016	NPL	
16H0103-01	H	EST01_13-14	H 02	20	20	1613B Dioxin	8/22/2016	NPL	
16H0103-02	H	EST01_14-15	H 02	20	20	1613B Dioxin	8/22/2016	NPL	
BEH0316-BLK1	-	Blank	-	20	20	-	8/22/2016	NPL	
BEH0316-BS1	-	LCS	-	20	20	-	8/22/2016	NPL	
BEH0316-DUP1	-	16H0071-01A	-	20	20	-	8/22/2016	NPL	
BEH0316-SRM1	-	Reference	-	20	20	-	8/22/2016	NPL	

Cleanup Reviewed By Date

Analytical Resources, Incorporated

CLEANUP BATCH SUMMARY

Laboratory:	Analytical Resources, Inc.	SDG:	16H0071
Client:	Fremont Analytical	Project:	1608094
Cleanup Batch:	CEH0160	Cleanup Type:	Florisil

SAMPLE NAME	LAB SAMPLE ID	LAB FILE ID	DATE PREPARED	OBSERVATIONS
NME:4-7C	16H0071-02	16082908.D	08/22/2016	
NME:4-7C	16H0071-02	16082309	08/22/2016	
NME:4-7C	16H0071-02		08/22/2016	
NME:0-4C	16H0071-01	16082905.D	08/22/2016	
NME:0-4C	16H0071-01	16082308	08/22/2016	
NME:0-4C	16H0071-01		08/22/2016	

Analytical Resources, Incorporated
Analytical Chemists and Consultants

CLEANUP BENCH SHEET

CEH0160

Matrix: Solid **Cleanup using: HRGCMS - EPA 3620B Florisil Cleanup** **Printed: 8/23/2016 8:30:50AM**

Lab Number	Sample Container	Sample Name	Extract Container	Initial (mL)	Final (mL)	Analysis	Clean Up Date	Cleaned By	Cleanup Comments
16H0071-01	A	NME:0-4C	A 01	20	20	1613B Dioxin	8/22/2016	NPL	
16H0071-02	A	NME:4-7C	A 01	20	20	1613B Dioxin	8/22/2016	NPL	
16H0080-05	H	EST03_21-22	H 02	20	20	1613B Dioxin	8/22/2016	NPL	
16H0103-01	H	EST01_13-14	H 02	20	20	1613B Dioxin	8/22/2016	NPL	
16H0103-02	H	EST01_14-15	H 02	20	20	1613B Dioxin	8/22/2016	NPL	
BEH0316-BLK1	-	Blank	-	20	20	-	8/22/2016	NPL	
BEH0316-BS1	-	LCS	-	20	20	-	8/22/2016	NPL	
BEH0316-DUP1	-	16H0071-01A	-	20	20	-	8/22/2016	NPL	
BEH0316-SRM1	-	Reference	-	20	20	-	8/22/2016	NPL	

Cleanup Reviewed By Date

INITIAL CALIBRATION DATA

EPA 1613B

Laboratory:	Analytical Resources, Inc.	SDG:	16H0071
Client:	Fremont Analytical	Project:	1608094
Calibration:	ZE00016	Instrument:	AUTOSPEC01
Calibration Date:	05/10/2016 15:20	Column (1):	RTX-Dioxin2

Compound	Level 01		Level 02		Level 03		Level 04		Level 05		Level 06	
		RF		RF		RF		RF		RF		RF
2,3,7,8-TCDF			0.5	0.8797361	2	0.9295275	10	0.9408094	40	0.9588917	200	0.9649929
2,3,7,8-TCDD			0.5	1.115377	2	1.100376	10	1.144028	40	1.150807	200	1.159235
1,2,3,7,8-PeCDF	0.5	0.9485384	2.5	0.9209936	10	0.9056015	50	0.9633152	200	0.9840803	1000	0.9889675
2,3,4,7,8-PeCDF	0.5	0.9035144	2.5	0.9573729	10	0.9682878	50	0.9666401	200	0.9842584	1000	0.9973965
1,2,3,7,8-PeCDD	0.5	0.9219366	2.5	0.9579214	10	0.9628834	50	1.001705	200	0.9893907	1000	1.018547
1,2,3,4,7,8-HxCDF	0.5	1.117198	2.5	1.125003	10	1.135882	50	1.142157	200	1.152665	1000	1.14638
1,2,3,6,7,8-HxCDF	0.5	1.063648	2.5	1.068909	10	1.111893	50	1.110729	200	1.121041	1000	1.116234
2,3,4,6,7,8-HxCDF	0.5	1.141715	2.5	1.111651	10	1.170072	50	1.160348	200	1.184913	1000	1.212323
1,2,3,7,8,9-HxCDF	0.5	1.124362	2.5	1.074397	10	1.083361	50	1.064959	200	1.119352	1000	1.138494
1,2,3,4,7,8-HxCDD	0.5	1.042764	2.5	0.9810013	10	1.023544	50	1.046335	200	1.040786	1000	1.052574
1,2,3,6,7,8-HxCDD	0.5	0.9324052	2.5	0.9744786	10	0.9634003	50	0.994897	200	0.9876577	1000	0.9757835
1,2,3,7,8,9-HxCDD	0.5	0.9678897	2.5	0.9321987	10	1.003559	50	1.024956	200	1.023361	1000	1.018307
1,2,3,4,6,7,8-HpCDF	0.5	1.261865	2.5	1.296787	10	1.278741	50	1.309499	200	1.322647	1000	1.347196
1,2,3,4,7,8,9-HpCDF	0.5	1.289233	2.5	1.281743	10	1.260792	50	1.327622	200	1.390769	1000	1.354006
1,2,3,4,6,7,8-HpCDD	0.5	0.9974608	2.5	1.037504	10	1.0097	50	1.027278	200	1.046087	1000	1.050065
OCDF	1	1.095681	5	1.108285	20	1.164797	100	1.193316	400	1.212513	2000	1.220252
OCDD	1	1.036043	5	1.527806	20	1.00888	100	1.025001	400	1.021189	2000	1.023204
37C14-2,3,7,8-TCDD	0.1	1.085129	0.5	0.9696672	2	1.037502	10	1.033134	40	1.080686	200	1.193229

INITIAL CALIBRATION DATA

EPA 1613B

Laboratory:	Analytical Resources, Inc.	SDG:	16H0071
Client:	Fremont Analytical	Project:	1608094
Calibration:	ZE00016	Instrument:	AUTOSPEC01
Calibration Date:	05/10/2016 15:20	Column (1):	RTX-Dioxin2

COMPOUND	Mean RF	RF RSD	Linear COD	Quad COD	Limit Type & Limit	Q
2,3,7,8-TCDF	0.9347915	3.6			RSD ()	
2,3,7,8-TCDD	1.133965	2.2			RSD ()	
1,2,3,7,8-PeCDF	0.9519161	3.5			RSD ()	
2,3,4,7,8-PeCDF	0.9629117	3.4			RSD ()	
1,2,3,7,8-PeCDD	0.9753974	3.6			RSD ()	
1,2,3,4,7,8-HxCDF	1.136547	1.2			RSD ()	
1,2,3,6,7,8-HxCDF	1.098742	2.3			RSD ()	
2,3,4,6,7,8-HxCDF	1.163504	3.0			RSD ()	
1,2,3,7,8,9-HxCDF	1.100821	2.8			RSD ()	
1,2,3,4,7,8-HxCDD	1.031167	2.6			RSD ()	
1,2,3,6,7,8-HxCDD	0.9714371	2.3			RSD ()	
1,2,3,7,8,9-HxCDD	0.9950452	3.8			RSD ()	
1,2,3,4,6,7,8-HpCDF	1.302789	2.4			RSD ()	
1,2,3,4,7,8,9-HpCDF	1.317361	3.7			RSD ()	
1,2,3,4,6,7,8-HpCDD	1.028016	2.0			RSD ()	
OCDF	1.165807	4.6			RSD ()	
OCDD	1.107021	18.6			RSD ()	
37C14-2,3,7,8-TCDD	1.066558	7.0			RSD ()	

Analytical Resources, Incorporated
Analytical Chemists and
Consultants

Dioxin Curve 5/10/16

HR-GC/MS Analyst Notes / Data Review Checklist

ELEMENT/NWA: _____ Client ID: _____

Element Calibration Code: ZE00016 METHOD: **1613B** (Dioxins) **8290A** (Dioxins)

Instrument: **AutoSpec01** Analysis Start Date: HRSM01.2 5/10/16

	REVIEW 1/REVIEW 2		REVIEW 1/REVIEW 2
Resolution Check > 10,000ppm	(Y) / N / _____	Signal / Noise ≥ 3.0?	Y / N / _____
TCDD /TCDF Resolution ≤ 25%	(Y) / N / _____	Extraction STD Limits Met?	Y / N / _____
PCDF Windows Verified	(Y) / N / _____	Cleanup STD Limits Met?	Y / N / _____
ICV/CCV %D limits met?	(Y) / N / _____	Method Blank in Control?	Y / N / _____
ICV/CCV Ratios limits met?	Y / N / _____	OPR Recovery Limits Met?	Y / N / _____
ICV/CCV RRT limits met?	Y / N / _____	Values Exceeding Curve Range?	Y / N / _____
Manual Integrations?	Y / (N) _____	Samples Diluted?	Y / N / _____
VDP Completed?	NA / Y / N / _____	Duplicate Sample RPD ≤ 25%?	NA / _____
EPA Case #	NA/_____	Technical Review?	_____/_____

Detail problems, corrective actions and/or other pertinent information below:

- TCDD/TCDF are 5 point curves: CS1-CS5
  All others are 6 points - CSL-CS5
- All cpds < 20% RSD. All avg.
- Seq. SEQ0076

(Review 1)Analyst: PKeplin **Date:** 5/12/16

(Review 2)Peer: _____ **Date:** _____

(Final Review)Reviewer: _____ **Date:** _____

Analytical Resources Inc.: Organics Instrument Log

AutoSpec01 Serial No.:GC=CN10921030, MS=P764

Date: 5/10/16 Analysis: Dioxins Analyst: MK

GC Program: 8290 D Column No: B764 Column Type: VF-Dioxin2

Inj Vol: 1ul Instrument Tune (IPR): May0416 1-5 Detector Voltage: 340

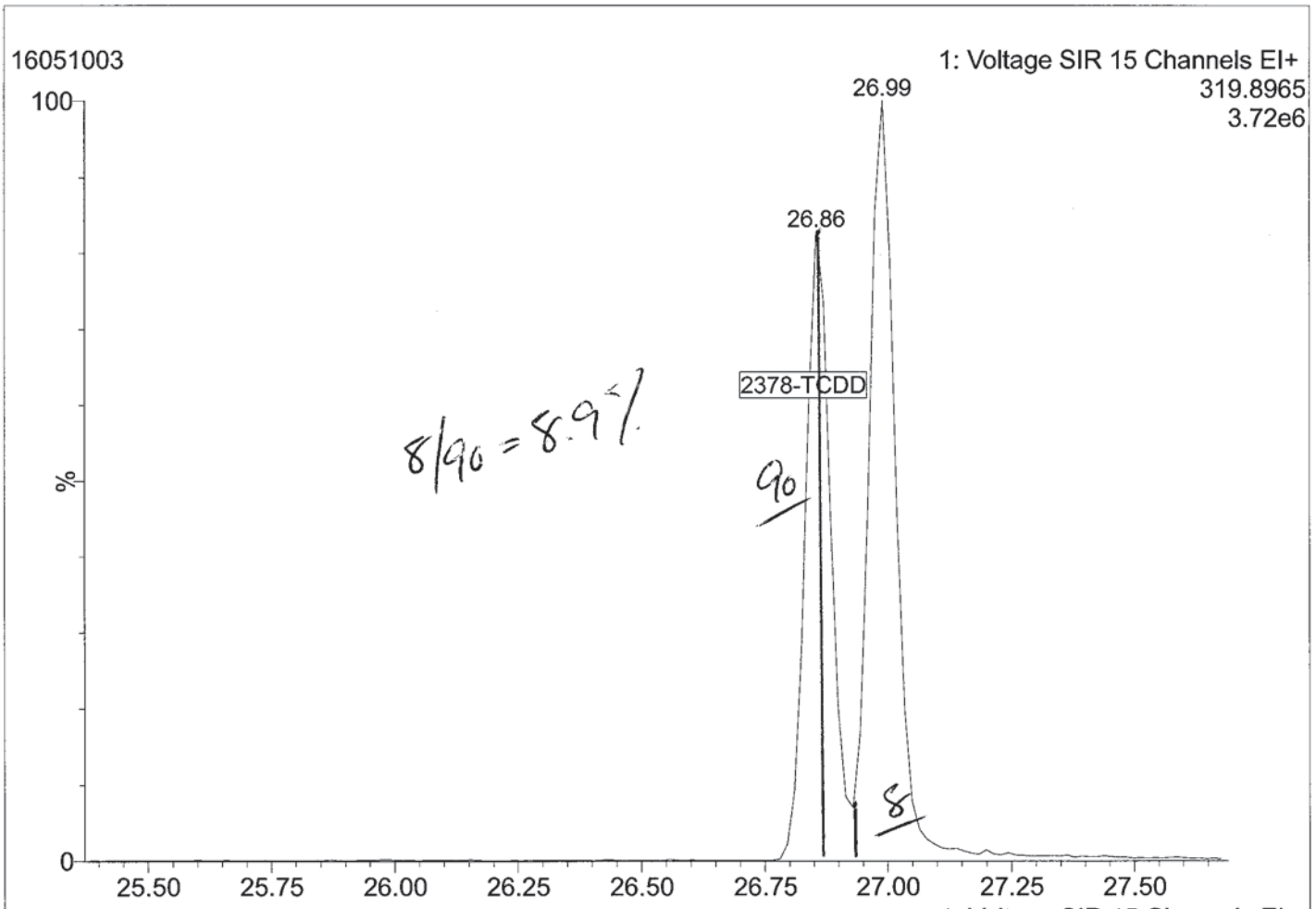
Resolution Check Files: 10:38, 20:54 Curve Date: 5/10/16

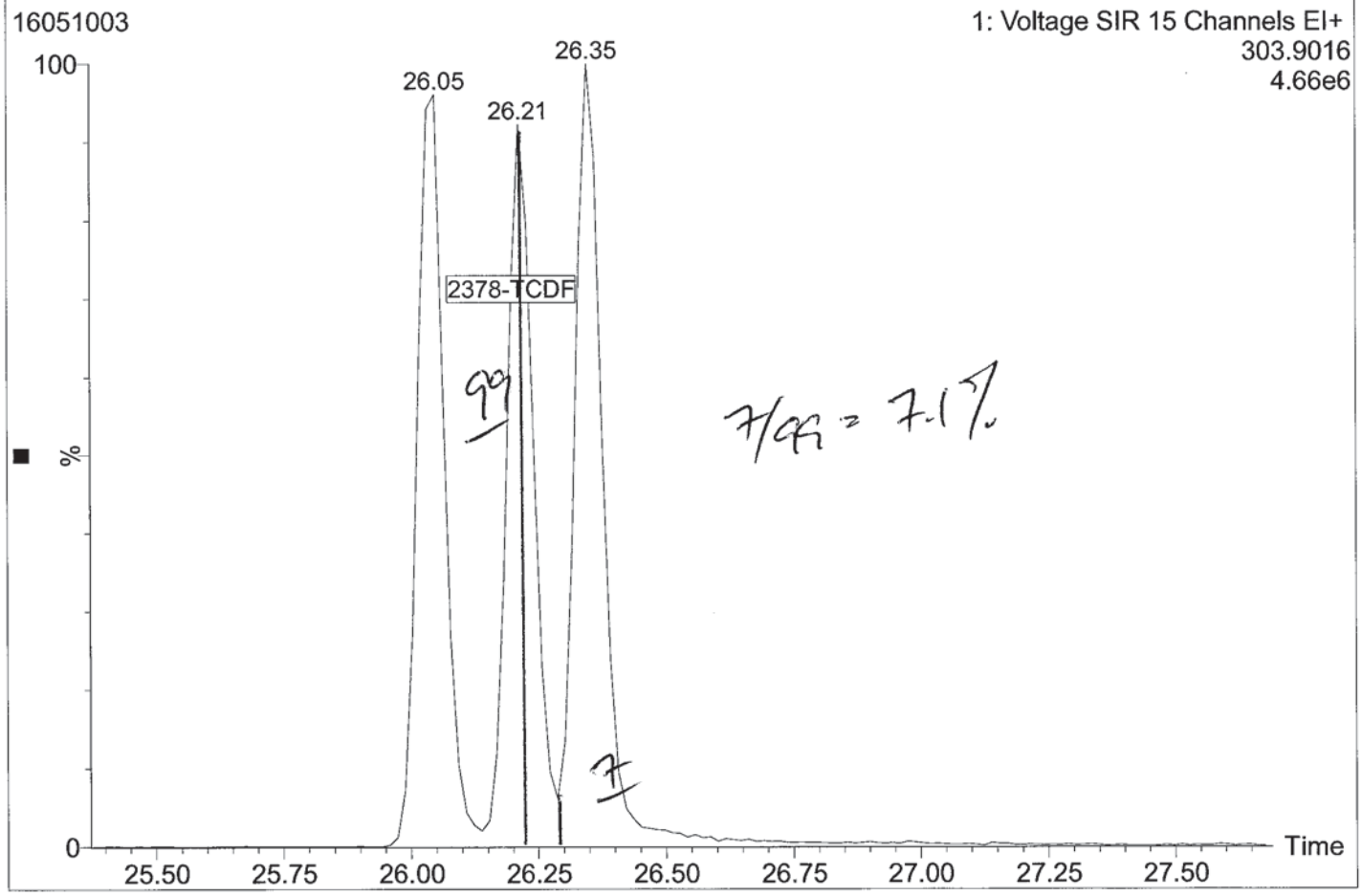
IS/SS	Ical/Ccal		LCS/ICV
	D623	B001	
	D621	B002	C2712
	D620	~~C4214~~	MK 5/12/16
	D622	E1146	

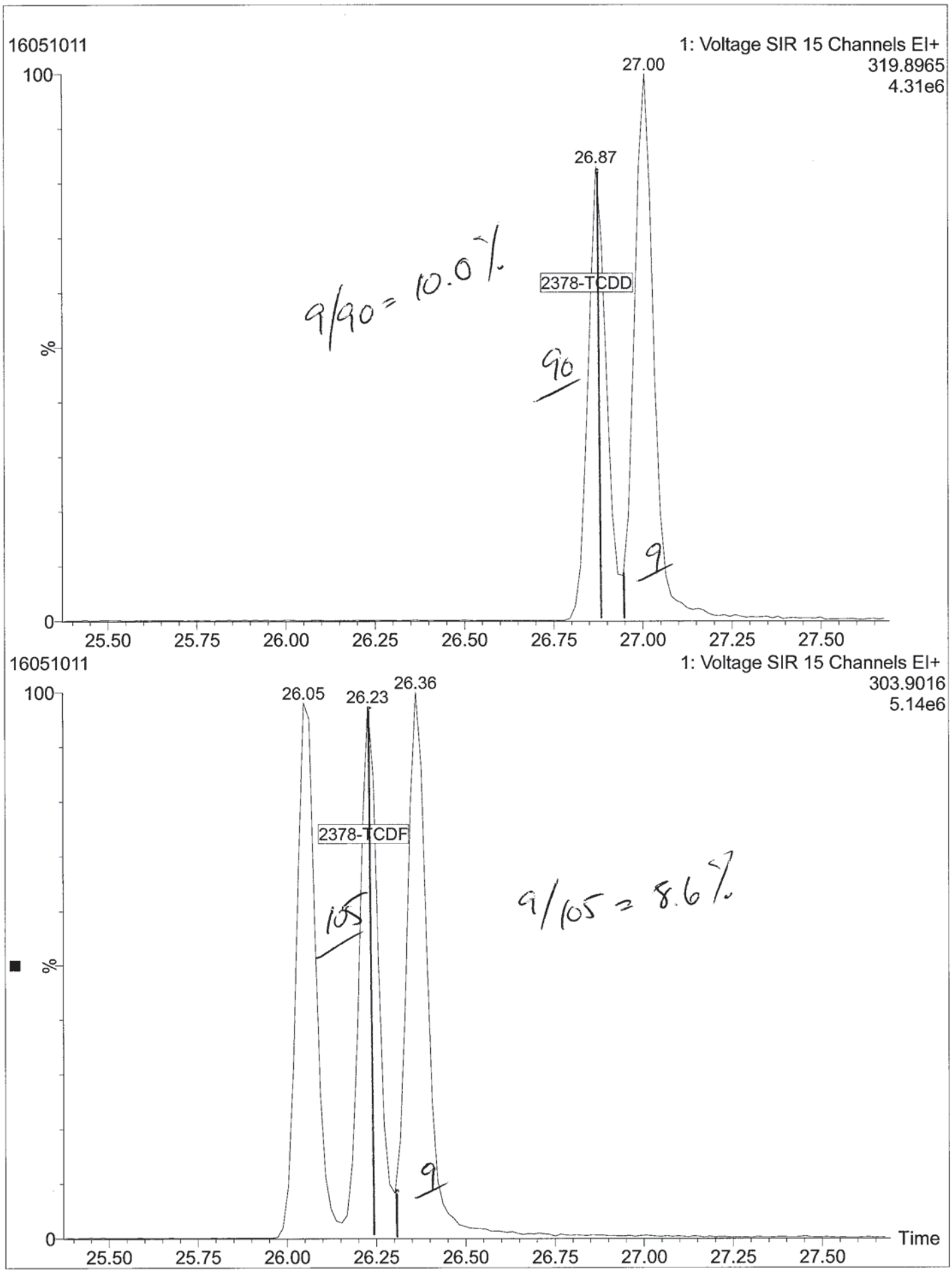
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2	10-May-16	11:43:55	16051003	ISC01A	
3	10-May-16	13:36:21	16051004	~~CSL~~ CS1AA	
4	10-May-16	14:27:42	16051005	~~CS1~~ CS2AA	
5	10-May-16	15:30:50	16051006	CS2 CS3AA	
6	10-May-16	16:22:15	16051007	~~CS3~~ CS4AA	
7	10-May-16	17:15:41	16051008	CS4 CS5AA	
8	10-May-16	18:09:09	16051009	CS5 CS6AA	
9	10-May-16	19:02:32	16051010	ICV	
10	10-May-16	19:56:06	16051011	ISC02	06/30/16 DD

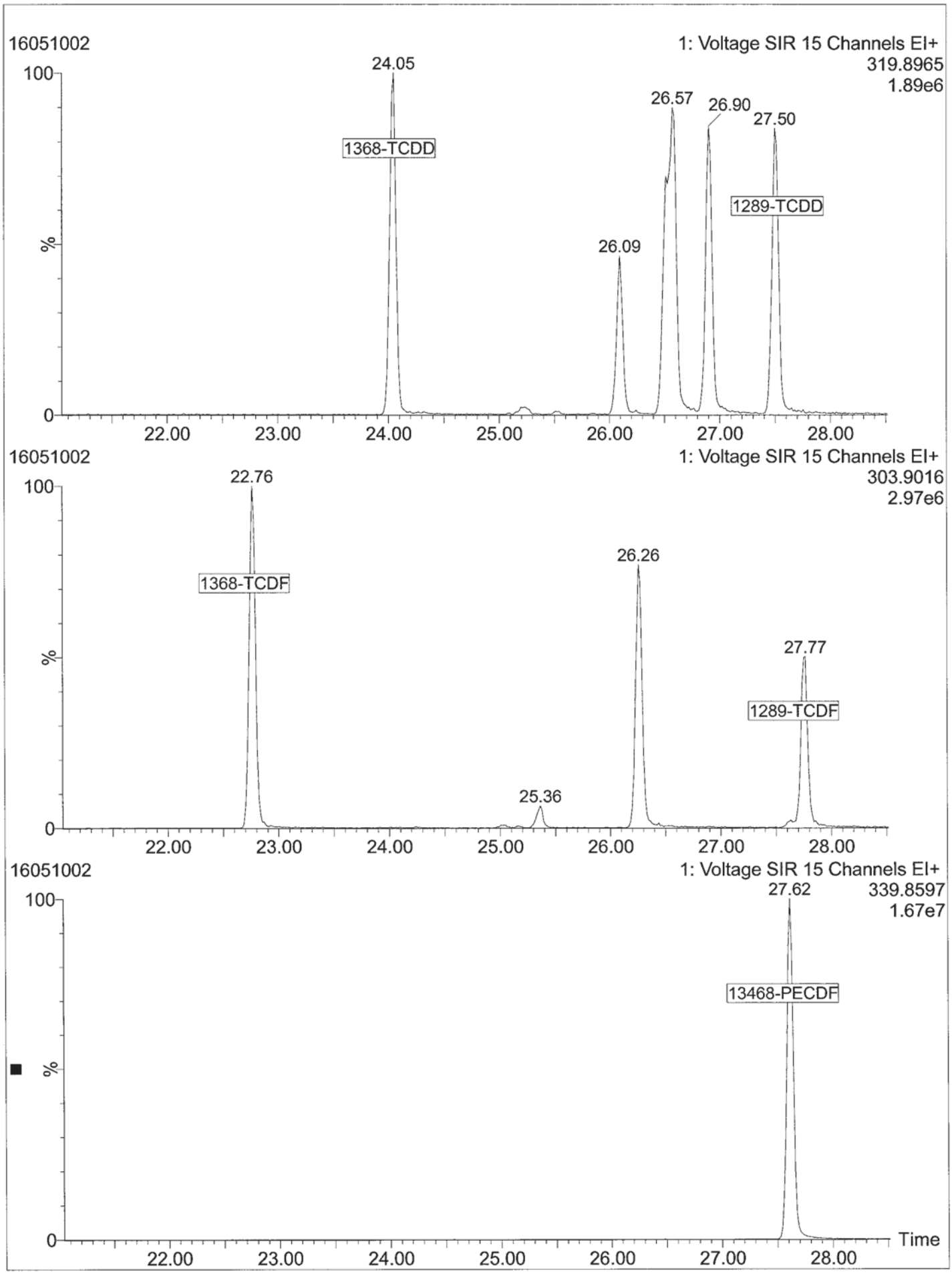
MK 5/12/16

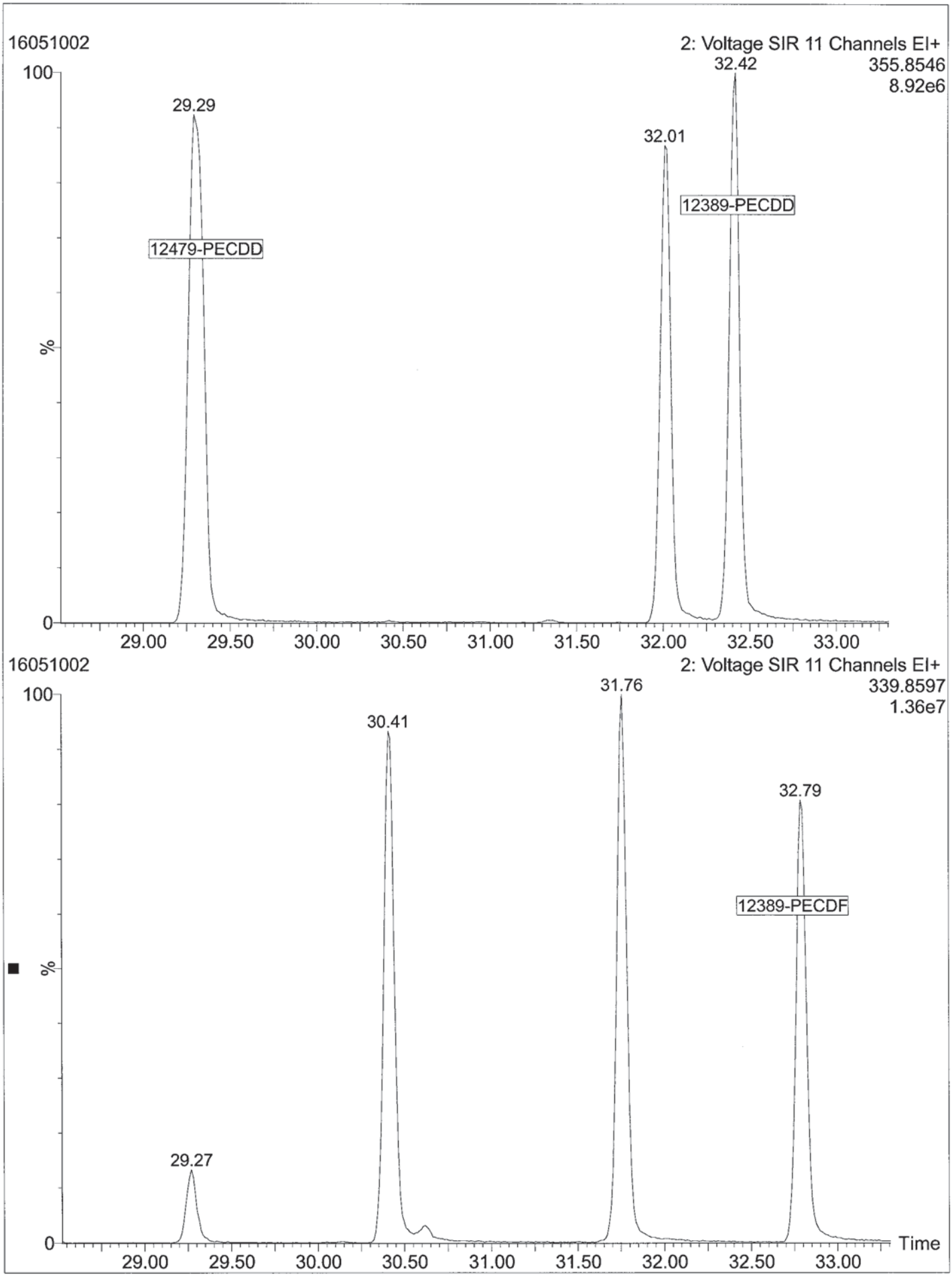
Every line must contain information or be lined out. Make all entries legible.
Start a new page for each QC period. Document All Maintenance Tasks In Element LIMS

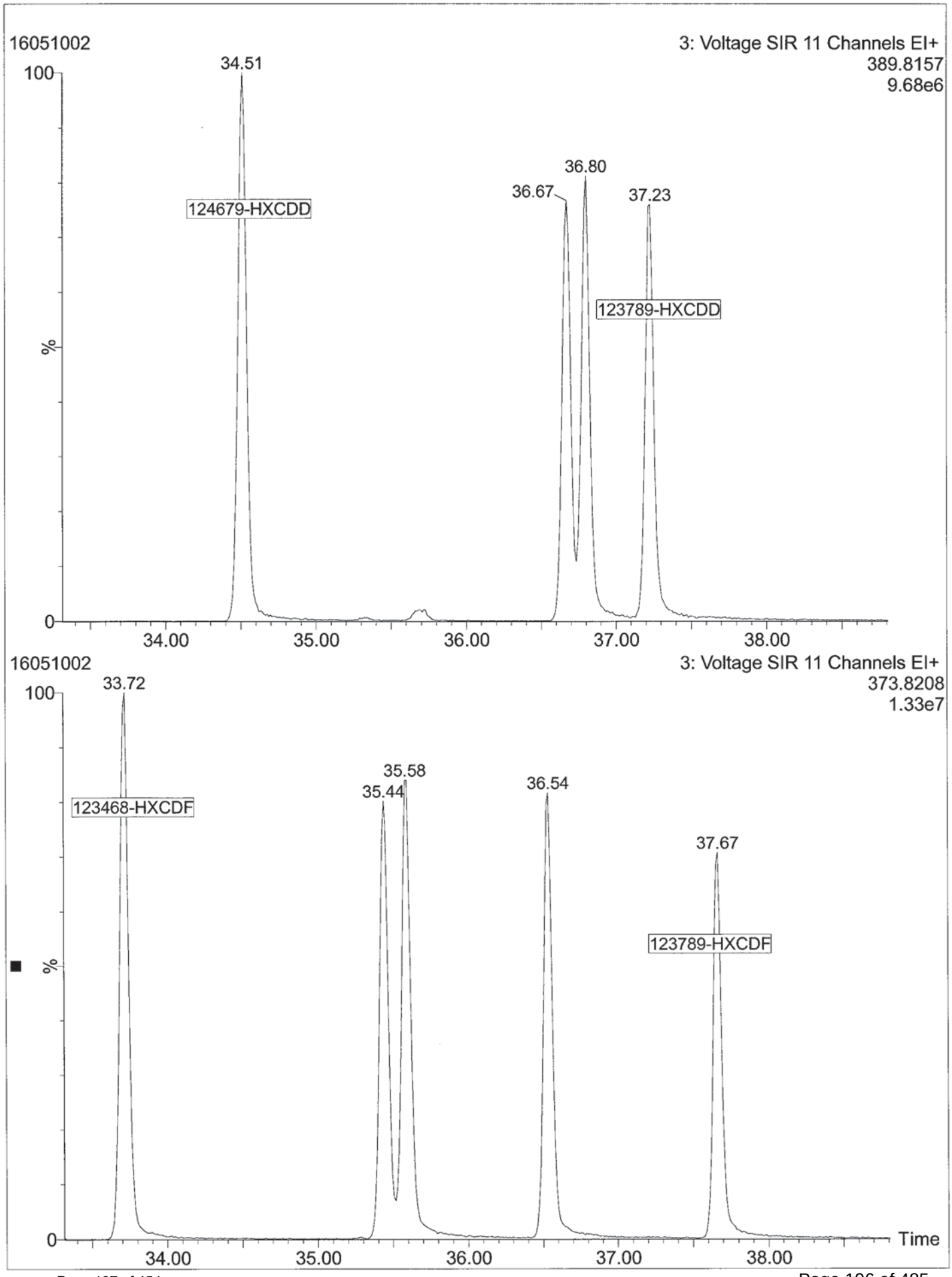

16051003
1: Voltage SIR 15 Channels EI+
319.8965
3.72e6
100
%
0
26.99
26.86
2378-TCDD
90
8
8/90 = 8.9%
25.50
25.75
26.00
26.25
26.50
26.75
27.00
27.25
27.50

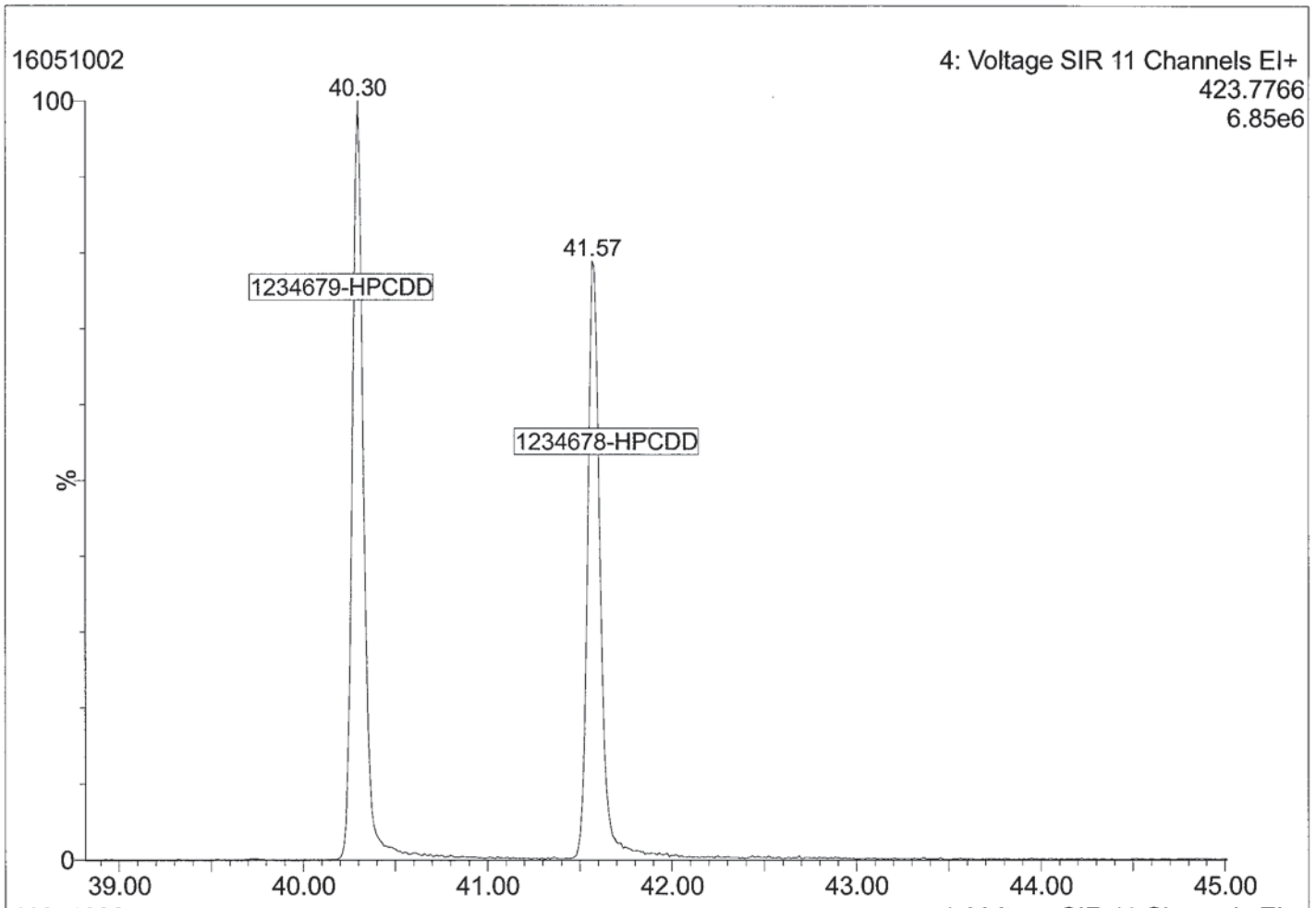

16051003
1: Voltage SIR 15 Channels EI+
303.9016
4.66e6
100
%
0
26.35
26.05
26.21
2378-TCDF
90
7
7/99 = 7.1%
Time
25.50
25.75
26.00
26.25
26.50
26.75
27.00
27.25
27.50

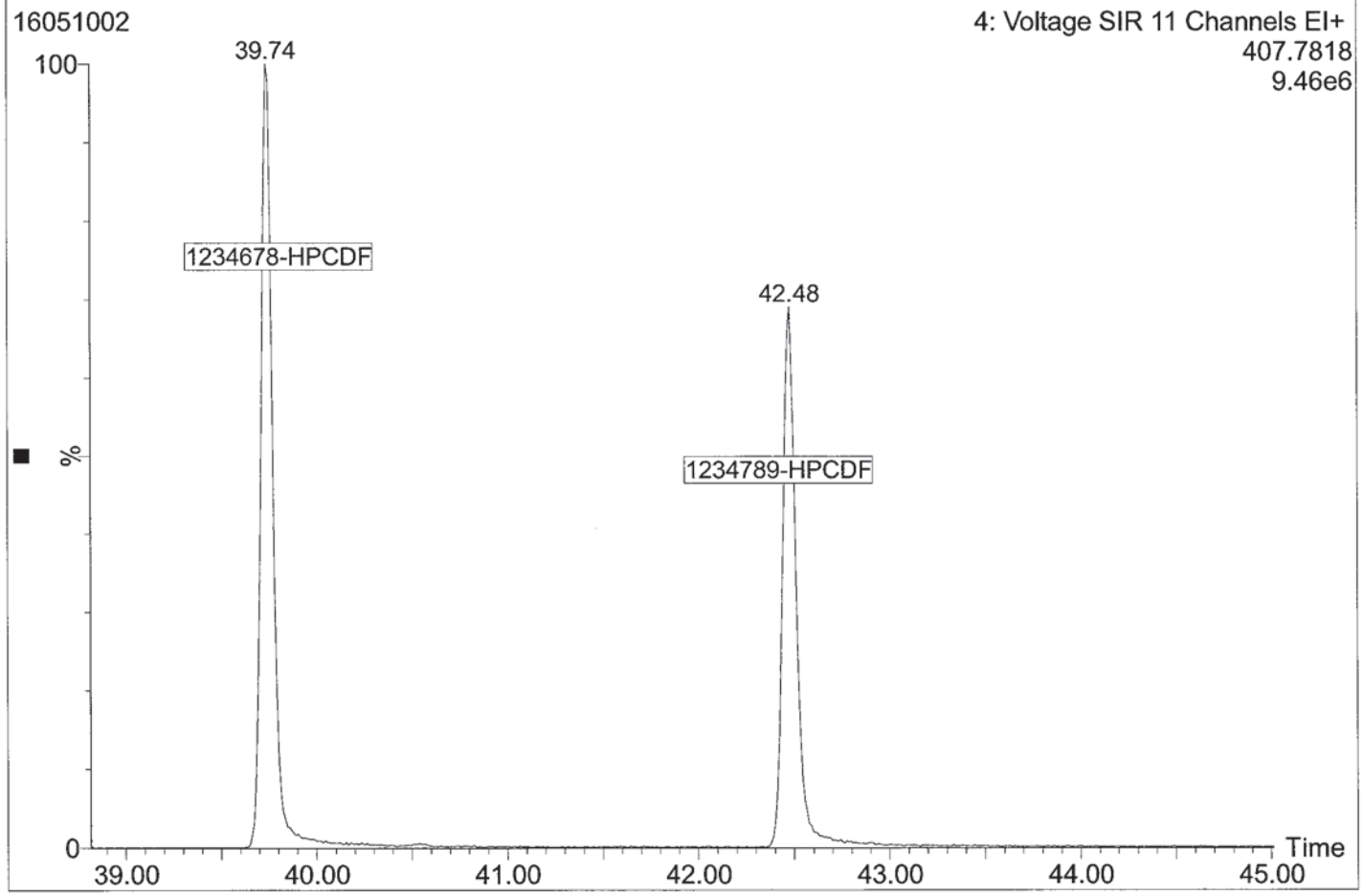

16051011
1: Voltage SIR 15 Channels EI+
319.8965
4.31e6
27.00
26.87
100
%
0
2378-TCDD
9/90 = 10.0%
90
9
25.50
25.75
26.00
26.25
26.50
26.75
27.00
27.25
27.50
16051011
1: Voltage SIR 15 Channels EI+
303.9016
5.14e6
26.05
26.23
26.36
100
%
0
2378-TCDF
105
9/105 = 8.6%
9
Time
25.50
25.75
26.00
26.25
26.50
26.75
27.00
27.25
27.50


16051002
1: Voltage SIR 15 Channels EI+
319.8965
1.89e6
24.05
1368-TCDD
26.09
26.57
26.90
27.50
1289-TCDD
%
100
0
22.00
23.00
24.00
25.00
26.00
27.00
28.00
16051002
1: Voltage SIR 15 Channels EI+
303.9016
2.97e6
22.76
1368-TCDF
25.36
26.26
27.77
1289-TCDF
%
100
0
22.00
23.00
24.00
25.00
26.00
27.00
28.00
16051002
1: Voltage SIR 15 Channels EI+
339.8597
1.67e7
27.62
13468-PECDF
%
100
0
Time
22.00
23.00
24.00
25.00
26.00
27.00
28.00


16051002
2: Voltage SIR 11 Channels EI+
355.8546
8.92e6
100
%
0
29.29
12479-PECDD
32.01
32.42
12389-PECDD
29.00
29.50
30.00
30.50
31.00
31.50
32.00
32.50
33.00
16051002
2: Voltage SIR 11 Channels EI+
339.8597
1.36e7
100
%
0
29.27
30.41
31.76
32.79
12389-PECDF
Time
29.00
29.50
30.00
30.50
31.00
31.50
32.00
32.50
33.00

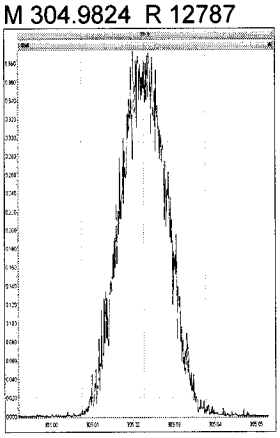

16051002
3: Voltage SIR 11 Channels EI+
389.8157
9.68e6
100
%
0
34.51
124679-HXCDD
36.80
36.67
37.23
123789-HXCDD
34.00
35.00
36.00
37.00
38.00
16051002
3: Voltage SIR 11 Channels EI+
373.8208
1.33e7
100
%
0
33.72
123468-HXCDF
35.58
35.44
36.54
37.67
123789-HXCDF
Time
34.00
35.00
36.00
37.00
38.00


16051002
4: Voltage SIR 11 Channels EI+
423.7766
6.85e6
100
40.30
41.57
1234679-HPCDD
1234678-HPCDD
%
0
39.00
40.00
41.00
42.00
43.00
44.00
45.00

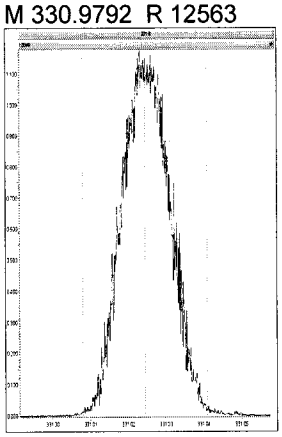

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4: Voltage SIR 11 Channels EI+
407.7818
9.46e6
100
39.74
1234678-HPCDF
42.48
1234789-HPCDF
%
0
Time
39.00
40.00
41.00
42.00
43.00
44.00
45.00

Printed: Tuesday, May 10, 2016 10:38:35 Pacific Daylight Time

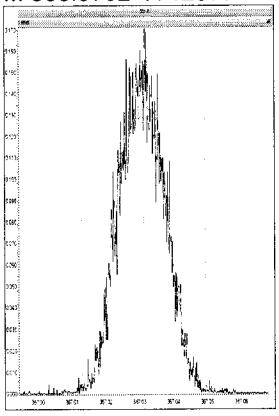
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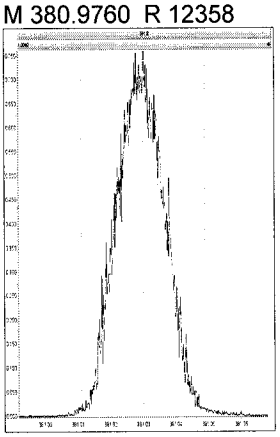
M 330.9792 R 12563



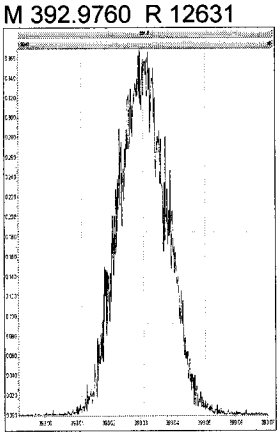
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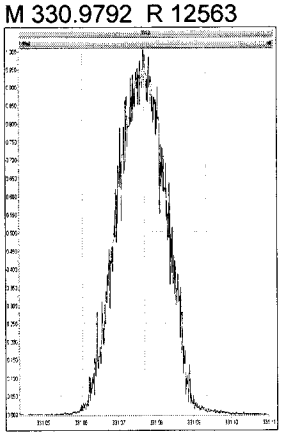
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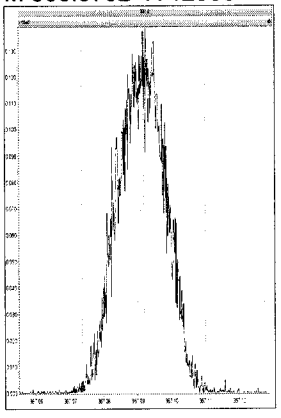
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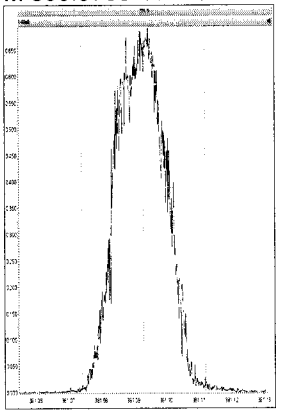
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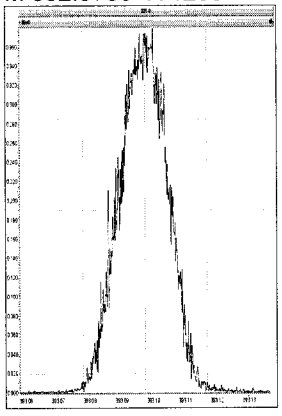
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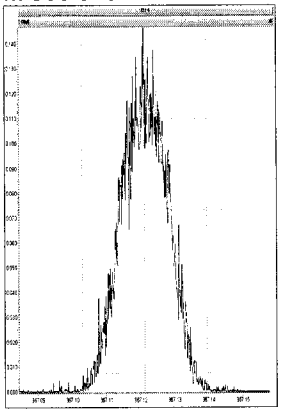
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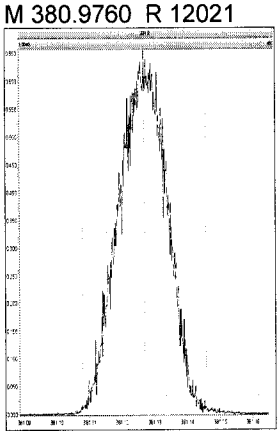
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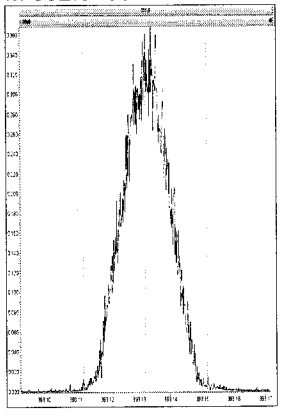
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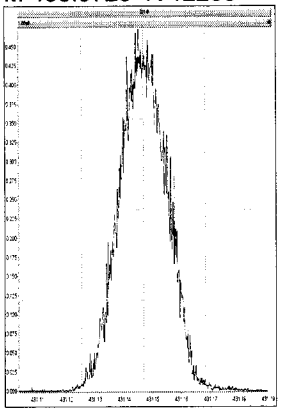
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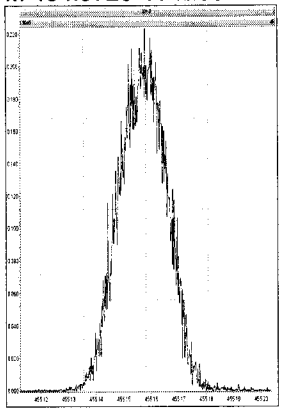
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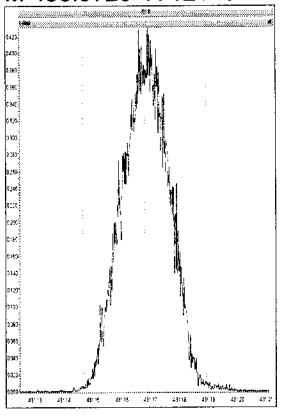
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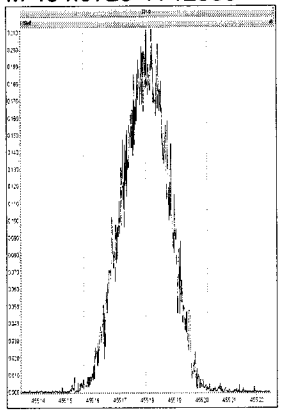
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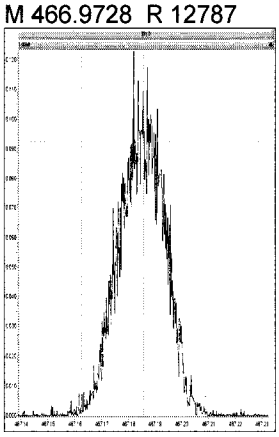
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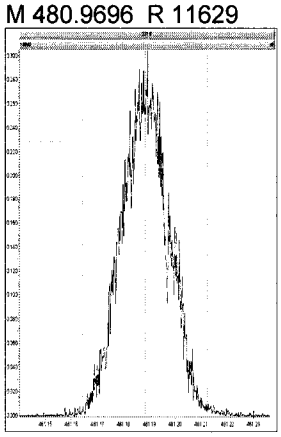
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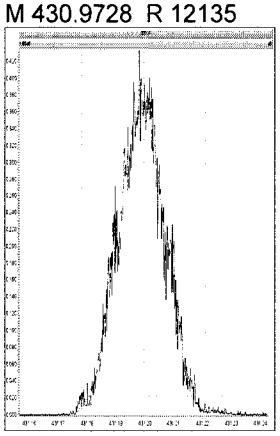
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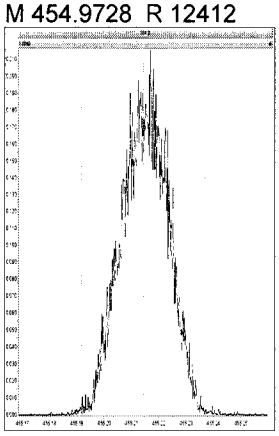
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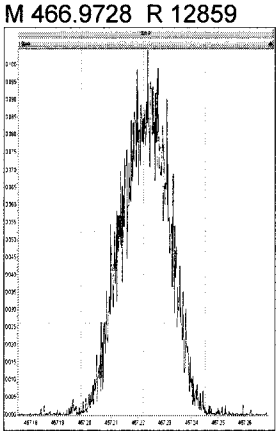
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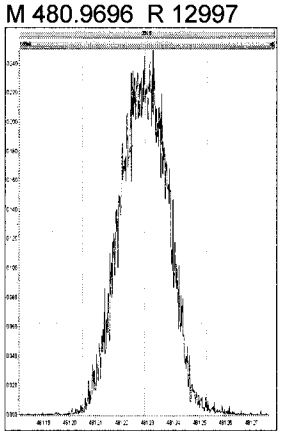
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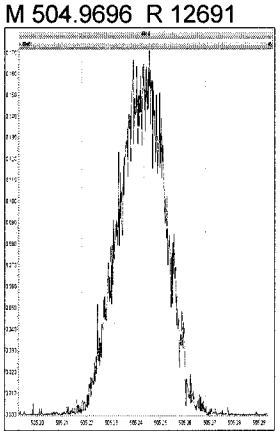
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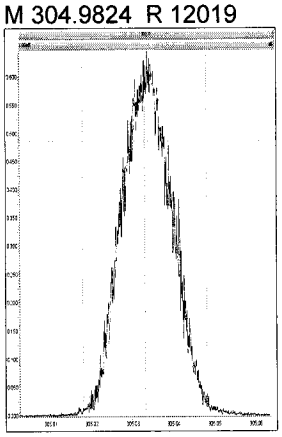
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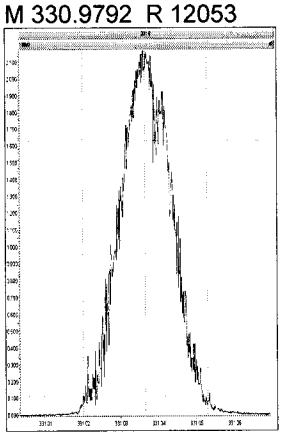
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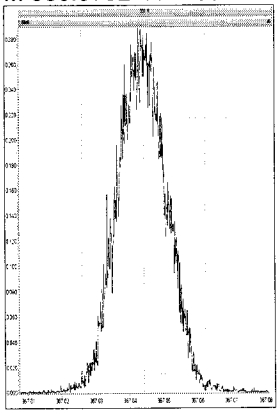
M 304.9824 R 12019



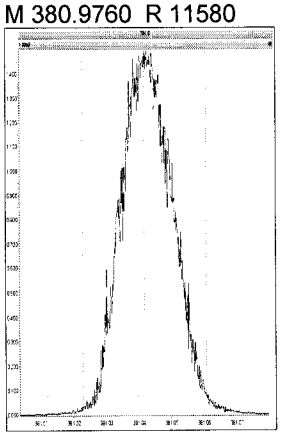
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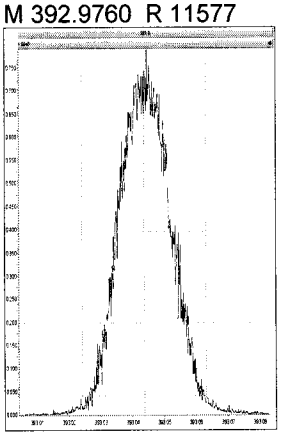
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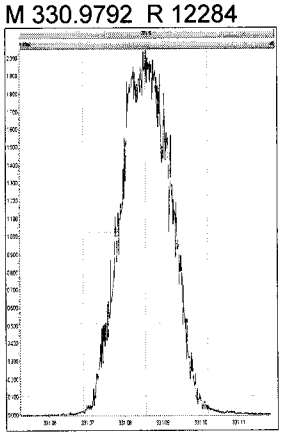
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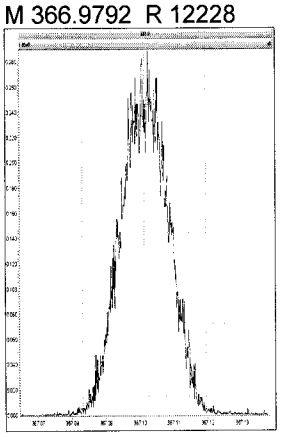
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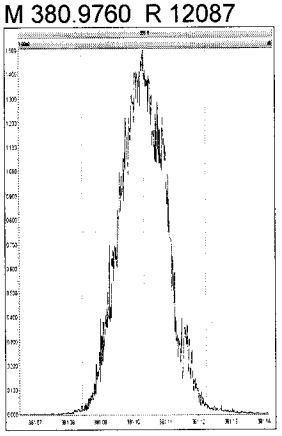
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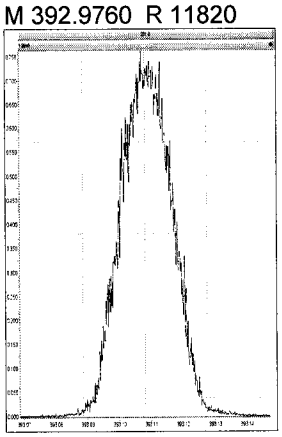
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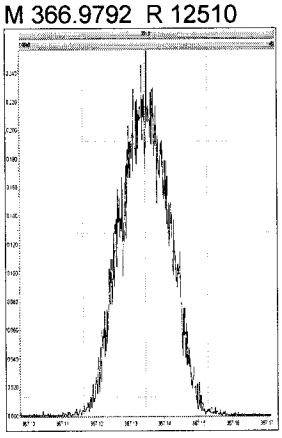
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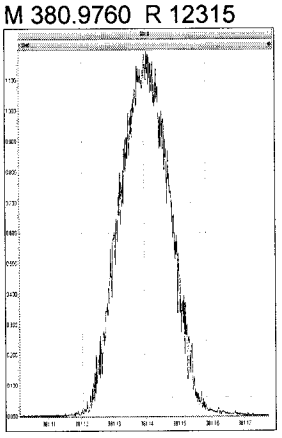
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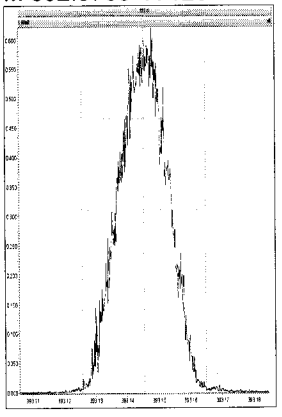
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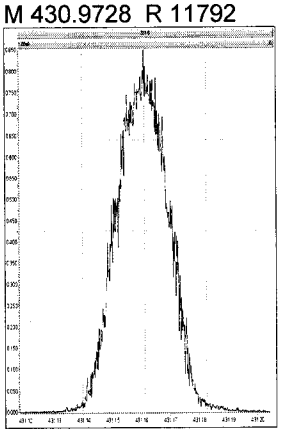
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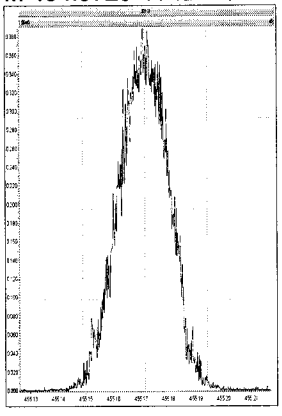
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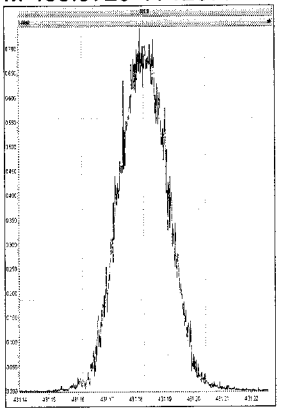
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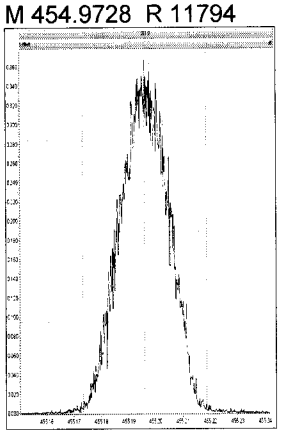
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M 430.9728 R 12077

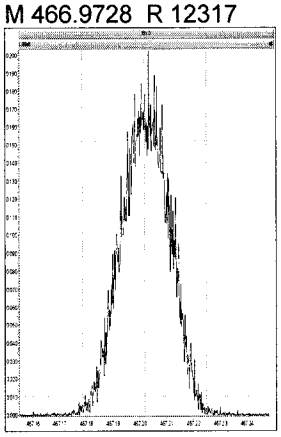


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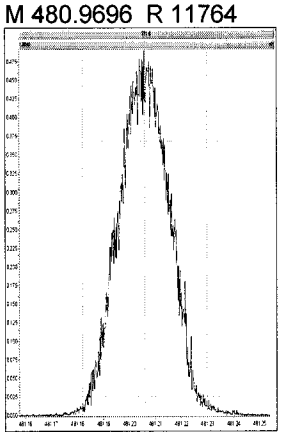


Printed: Tuesday, May 10, 2016 20:54:22 Pacific Daylight Time

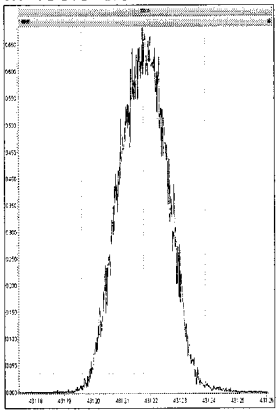
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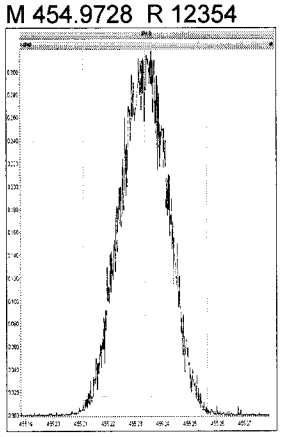
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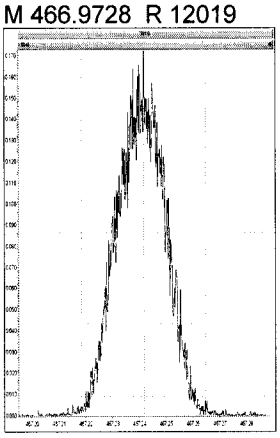
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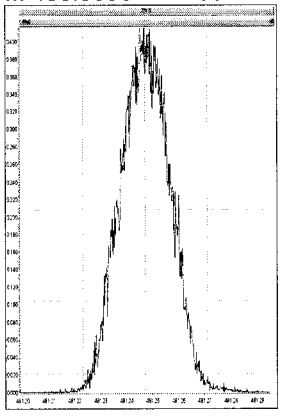
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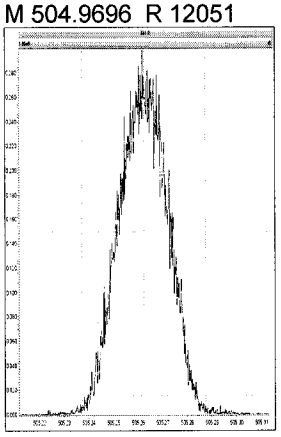
M 466.9728 R 12019



M 480.9696 R 11857



M 504.9696 R 12051



Quantify Sample Summary Report **MassLynx MassLynx V4.1 SCN909**
Dataset: P:\DIOXIN8290.PRO\160510IC.qld
Last Altered: Wednesday, May 11, 2016 09:28:40 Pacific Daylight Time
Printed: Thursday, May 12, 2016 14:36:55 Pacific Daylight Time

Page 173 of 454

Method: P:\DIOXIN8290.pro\MethDB\Dioxin1604143SN.mdb 14 Apr 2016 14:40:15
Calibration: P:\DIOXIN8290.PRO\CurveDB\160510ICAL.cdb 11 May 2016 09:28:40
CSIAA 6/3/16
ID: ~~CSL~~, Name: 16051004, Date: 10-May-2016, Time: 13:36:21, Conditions: AUTOSPEC01, User: pk

Name	RT	RRT	Ion1Area	Ion2Area	RRF	Ratio	Pred R	Noise 1	Noise 2	Height 1	Height 2	S/N	EMPC?	EMPC	pg
2378-TCDF					0.935		0.770	1158	1257						
12378-PeCDF	30.377	1.000	9.40e3	6.05e3	0.952	1.554	1.550	1150	1400	1.36e5	8.43e4	118.5	NO	0.498	0.498
23478-PeCDF	31.725	1.001	8.50e3	5.93e3	0.963	1.433	1.550	1150	1400	1.29e5	8.06e4	111.8	NO	0.469	0.469
123478-HxCDF	35.408	1.000	7.47e3	6.36e3	1.137	1.175	1.240	1179	964	1.17e5	9.25e4	99.2	NO	0.491	0.491
234678-HxCDF	36.504	1.001	7.88e3	6.35e3	1.164	1.241	1.240	1179	964	1.16e5	8.25e4	98.0	NO	0.491	0.491
123678-HxCDF	35.550	1.000	8.80e3	6.46e3	1.099	1.363	1.240	1179	964	1.22e5	8.29e4	103.4	NO	0.484	0.484
123789-HxCDF	37.633	1.000	6.90e3	5.32e3	1.101	1.297	1.240	1179	964	1.01e5	8.85e4	85.9	NO	0.511	0.511
1234678-HpCDF	39.715	1.000	6.67e3	7.22e3	1.303	0.924	1.050	665	709	9.07e4	9.69e4	136.3	NO	0.484	0.484
1234789-HpCDF	42.445	1.000	5.57e3	5.41e3	1.317	1.031	1.050	665	709	6.54e4	6.71e4	98.2	NO	0.489	0.489
OCDF	47.818	1.006	7.95e3	9.45e3	1.166	0.842	0.890	827	869	8.30e4	9.35e4	100.3	NO	0.940	0.940
2378-TCDD					1.134		0.770	801	851						
12378-PeCDD	31.966	1.000	5.27e3	3.65e3	0.975	1.445	1.550	992	530	6.70e4	4.68e4	67.5	NO	0.473	0.473
123478-HxCDD	36.636	1.000	5.65e3	4.29e3	1.031	1.318	1.240	1131	992	8.35e4	6.23e4	73.8	NO	0.506	0.506
123678-HxCDD	36.767	1.001	5.54e3	4.15e3	0.971	1.334	1.240	1131	992	7.63e4	6.16e4	67.5	NO	0.480	0.480
123789-HxCDD	37.194	1.012	5.41e3	3.81e3	0.947	1.421	1.240	1131	992	8.16e4	5.76e4	72.2	NO	0.489	0.489
1234678-HpCDD	41.557	1.000	4.34e3	4.24e3	1.028	1.023	1.050	668	1442	5.65e4	5.13e4	84.6	NO	0.485	0.485
OCDD	47.549	1.000	7.89e3	8.56e3	1.107	0.922	0.890	708	454	8.02e4	7.96e4	113.3	NO	0.936	0.936
13C-2378-TCDF	26.198	1.006	1.80e6	2.29e6	1.567	0.783	0.770	7362	4176	2.43e7	3.10e7	3307.1	NO		102.580
13C-12378-PeCDF	30.366	1.166	2.00e6	1.26e6	1.274	1.584	1.550	6743	4292	2.70e7	1.71e7	3999.1	NO		100.515
13C-23478-PeCDF	31.703	1.218	1.96e6	1.24e6	1.235	1.582	1.550	6743	4292	2.69e7	1.72e7	3987.2	NO		101.689
13C-123478-HxCDF	35.397	0.952	8.48e5	1.63e6	1.381	0.521	0.510	6454	7352	1.18e7	2.28e7	1831.1	NO		98.726
13C-123678-HxCDF	35.540	0.956	9.42e5	1.93e6	1.569	0.489	0.510	6454	7352	1.29e7	2.49e7	1996.1	NO		100.638
13C-234678-HxCDF	36.482	0.981	8.63e5	1.63e6	1.345	0.530	0.510	6454	7352	1.17e7	2.25e7	1813.3	NO		102.060
13C-123789-HxCDF	37.622	1.012	7.45e5	1.43e6	1.183	0.522	0.510	6454	7352	1.08e7	2.08e7	1678.3	NO		101.203
13C-1234678-HpCDF	39.704	1.068	6.81e5	1.52e6	1.178	0.448	0.440	4413	6414	9.34e6	2.07e7	2115.7	NO		102.846
13C-1234789-HpCDF	42.434	1.141	5.19e5	1.18e6	0.878	0.438	0.440	4413	6414	6.27e6	1.40e7	1420.1	NO		106.839
13C-1234-TCDD	26.033	0.000	1.12e6	1.42e6	1.000	0.791	0.770	3612	2200	1.53e7	1.93e7	4234.7	NO		100.000
13C-2378-TCDD	26.840	1.031	1.02e6	1.30e6	0.908	0.783	0.770	3612	2200	1.36e7	1.74e7	3754.2	NO		100.396
13C-12378-PeCDD	31.955	1.227	1.19e6	7.50e5	0.756	1.579	1.550	3912	2865	1.64e7	1.04e7	4180.8	NO		100.697
13C-123478-HxCDD	36.625	0.985	1.08e6	8.24e5	1.056	1.313	1.240	2885	3824	1.54e7	1.20e7	5329.2	NO		99.411
13C-123678-HxCDD	36.745	0.988	1.15e6	9.28e5	1.163	1.241	1.240	2885	3824	1.56e7	1.23e7	5405.2	NO		98.477
13C-1234678-HpCDD	41.535	1.117	9.01e5	8.19e5	0.909	1.100	1.050	3510	2889	1.08e7	1.02e7	3069.6	NO		104.227
13C-OCDD	47.531	1.278	1.51e6	1.67e6	0.820	0.906	0.890	3005	4316	1.44e7	1.60e7	4783.3	NO		213.449

Page 202 of 485

Quantify Sample Summary Report **MassLynx MassLynx V4.1 SCN909**
Dataset: P:\DIOXIN8290.PRO\160510IC.qld
Last Altered: Wednesday, May 11, 2016 09:28:40 Pacific Daylight Time
Printed: Thursday, May 12, 2016 14:36:55 Pacific Daylight Time

SHA 5/3/16

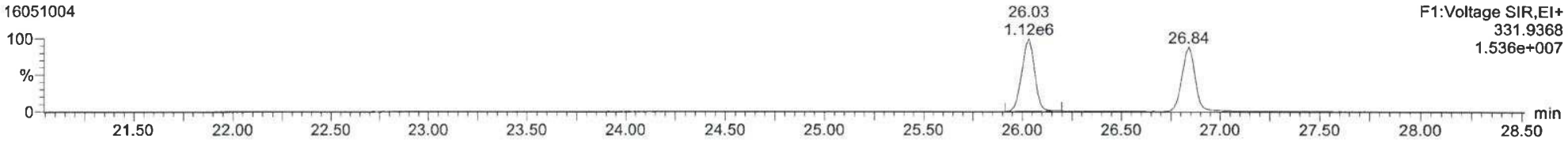
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13C-123789-HxCDD	37.183	0.000	1.01e6	8.04e5	1.000	1.259	1.240	2885	3824	1.41e7	1.12e7	4884.2	NO		100.000
Total-tetrafurans			0.00e0		0.935			1158		0.00e0					
Total-penta1			0.00e0					703		0.00e0					
Total-pentafurans			1.79e4		0.957			1150		2.65e5					0.967
Total-hexafurans			3.12e4		1.125			1179		4.62e5					1.987
Total-heptafurans			1.22e4		1.310			665		1.56e5					0.974
Total-Furans			6.93e4		1.114			1158		9.66e5					4.868
Total-tetradioxins			1.33e2		1.134			801		2.99e3					0.010
Total-pentadioxins			5.27e3		0.975			992		6.70e4					0.473
Total-hexadioxins			1.66e4		0.983			1131		2.41e5					1.474
Total-heptadioxins			4.34e3		1.028			668		5.65e4					0.485
Total-Dioxins			3.42e4		1.028			801		4.48e5					3.378
Total-TEQ			1.04e5					801		1.41e6					8.246
37CL-2378-TCDD	26.855	1.032	2.76e3		1.067			1034		3.88e4		37.5			0.102
FUNCTION1 PFK			1.17e7					906583		1.33e8					
FUNCTION2 PFK			2.60e5					203778		7.31e6					0.000
FUNCTION3 PFK			0.00e0					647647		0.00e0					
FUNCTION4 PFK			3.60e5					383565		1.10e7					
FUNCTION5 PFK			2.56e5					330213		1.04e7					
FUNCTION1 HXCDPE			3.54e2					448		6.74e3					0.000
FUNCTION1 HPCDPE			6.67e2					768		1.35e4					0.000
FUNCTION2 HPCDPE			7.30e1					786		2.39e3					0.000
FUNCTION3 OCDPE			0.00e0					482		0.00e0					
FUNCTION4 NCDPE			1.83e2					519		5.82e3					0.000
FUNCTION5 DCDPE			0.00e0					433		0.00e0					

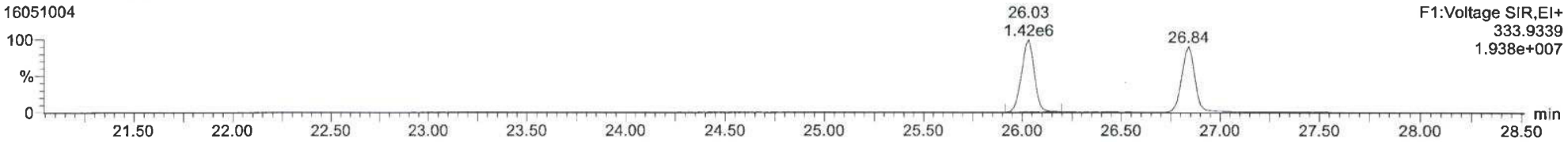
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Calibration: P:\DIOXIN8290.PRO\CurveDB\160510ICAL.cdb 11 May 2016 09:28:40
CSIAA 06/30/16
ID: ~~CSL~~, Name: 16051004, Date: 10-May-2016, Time: 13:36:21, Conditions: AUTOSPEC01, User: pk

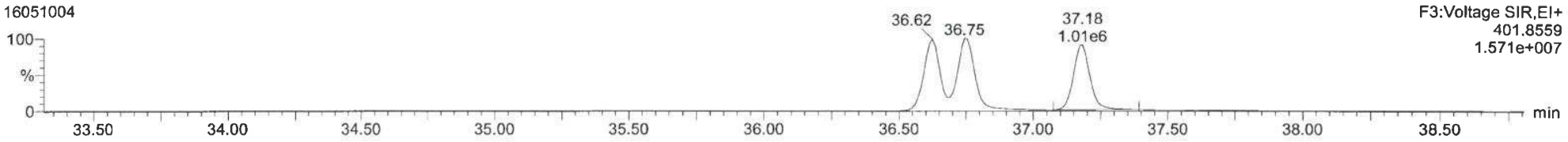
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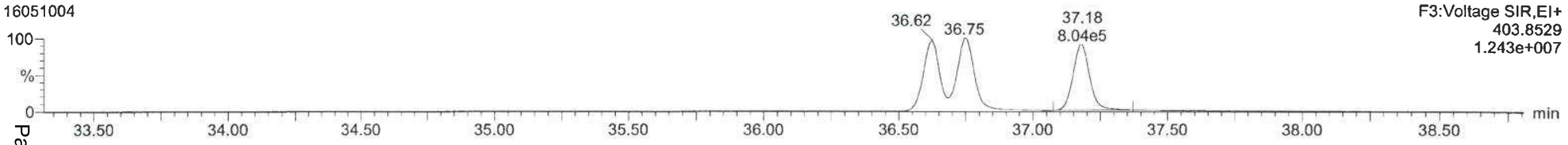
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13C-123789-HxCDD



13C-123789-HxCDD



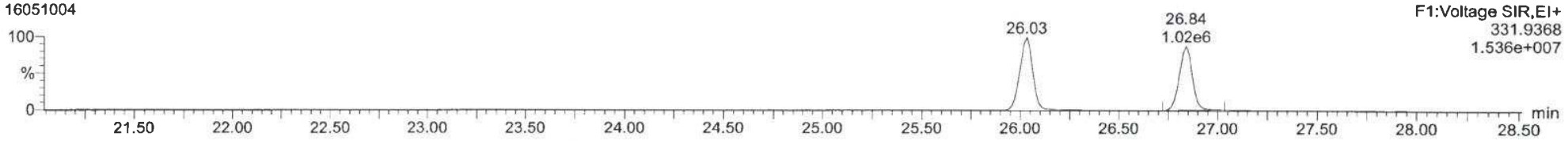
Quantify Sample Report **MassLynx MassLynx V4.1 SCN909**
Dataset: P:\DIOXIN8290.PRO\160510IC.qld
Last Altered: Wednesday, May 11, 2016 09:28:40 Pacific Daylight Time
Printed: Thursday, May 12, 2016 14:36:55 Pacific Daylight Time

Page 176 of 454

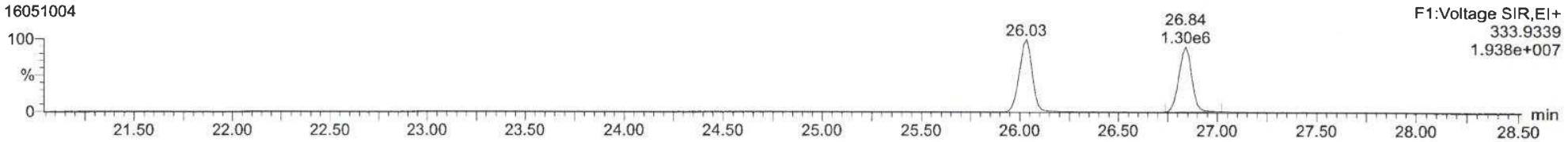
CSIAA 06/30/16

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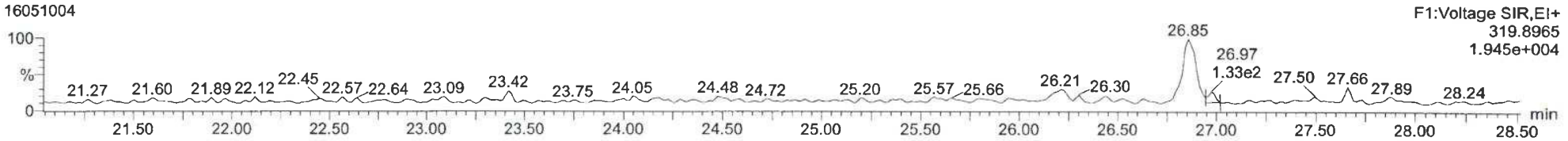
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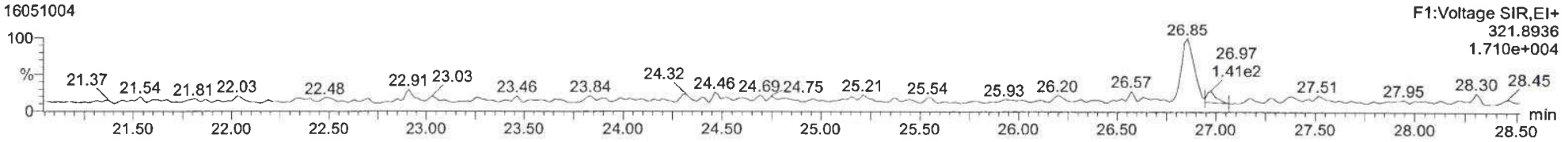
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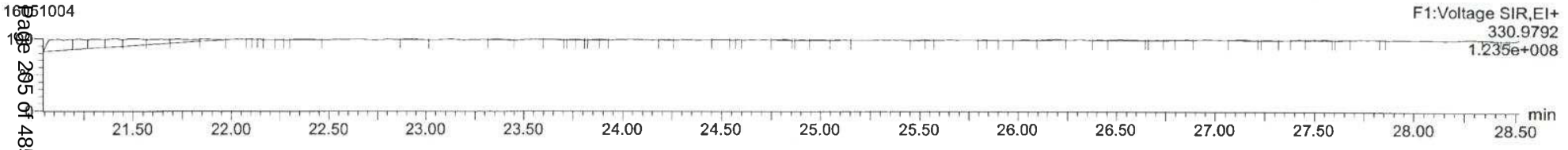
Total-tetradioxins



Total-tetradioxins



FUNCTION1 PFK



Page 295 of 485

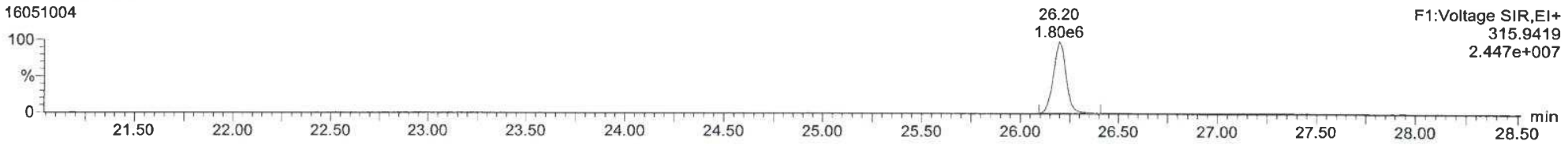
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Page 177 of 459

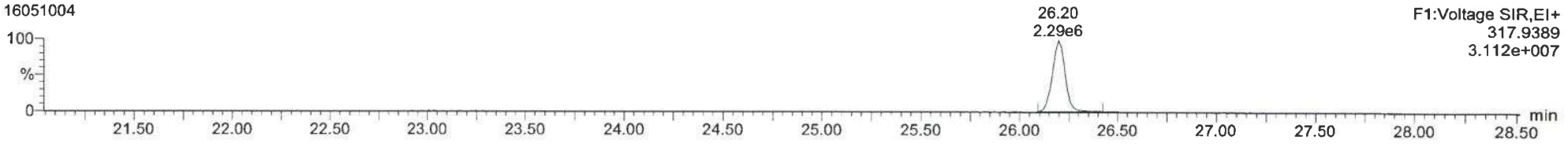
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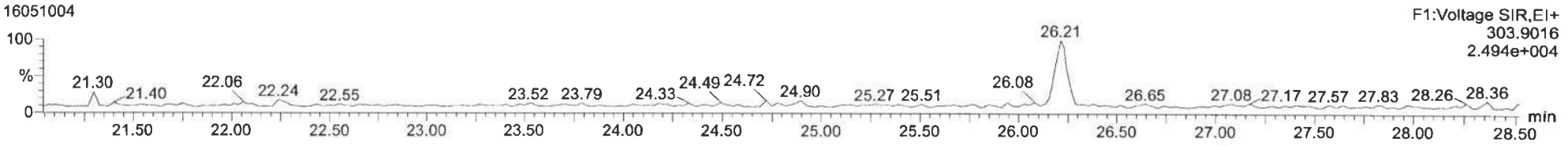
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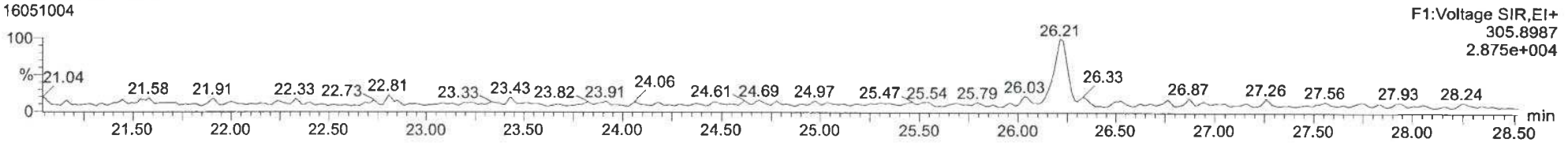
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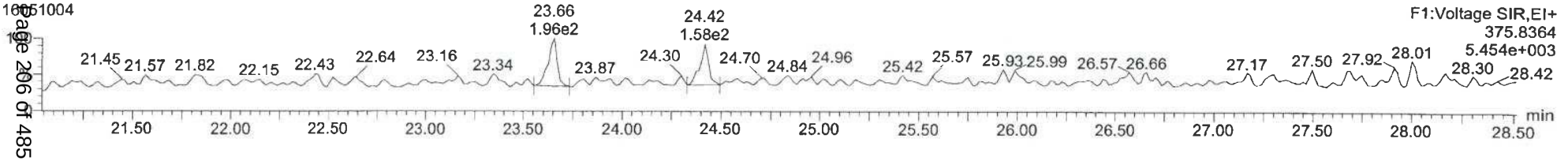
Total-tetrafurans



Total-tetrafurans



FUNCTION1 HXCDPE

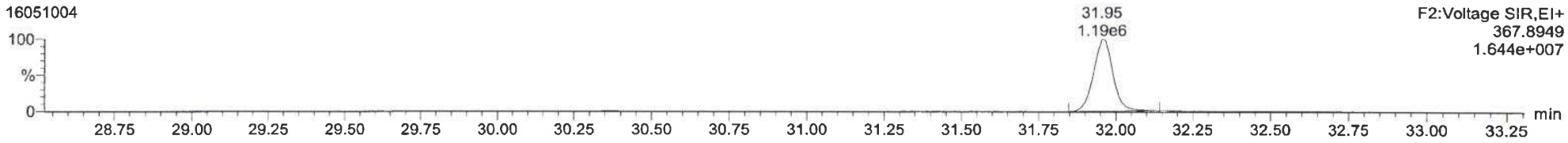


Page 206 of 485

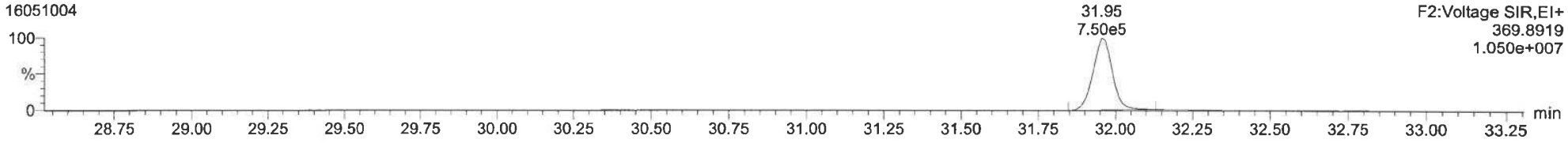
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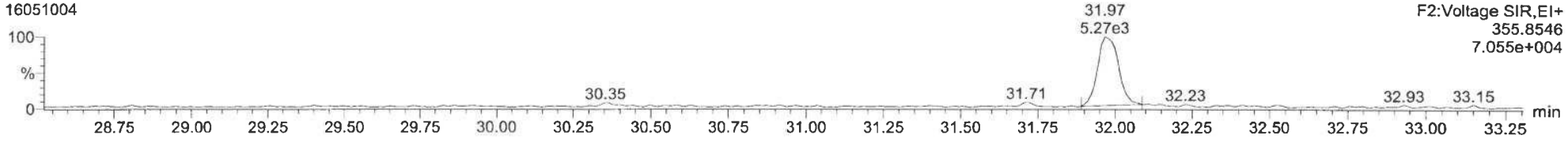
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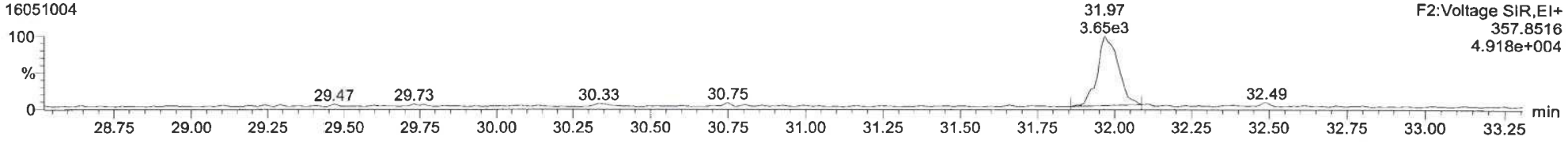
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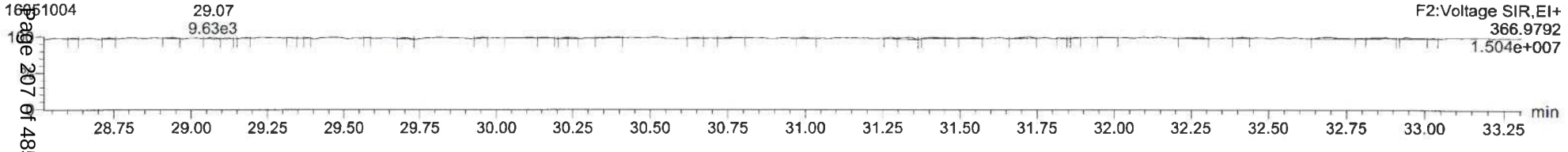
Total-pentadioxins



Total-pentadioxins



FUNCTION2 PFK



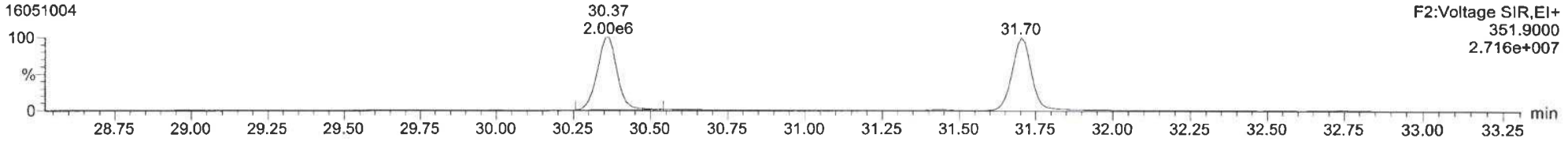
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Printed: Thursday, May 12, 2016 14:36:55 Pacific Daylight Time

Page 179 of 454

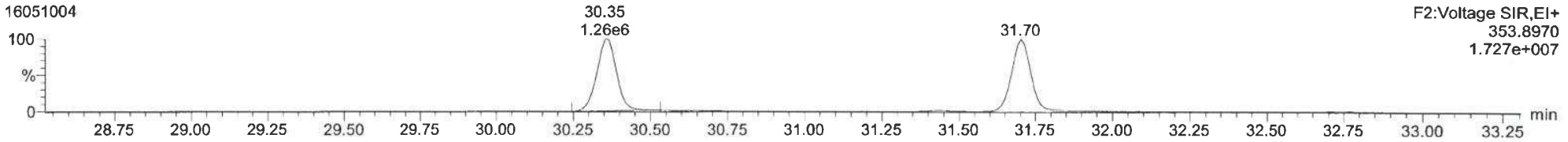
CSIAA 06/30/16

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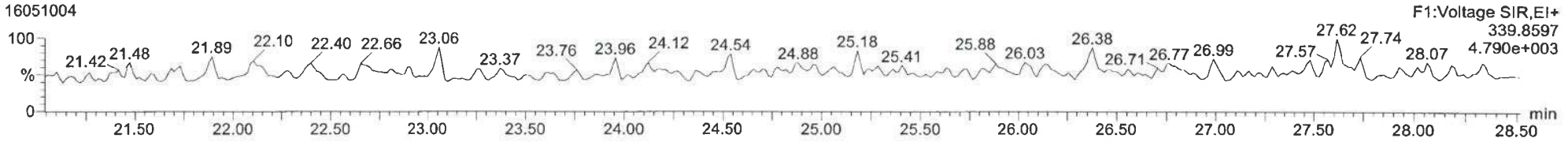
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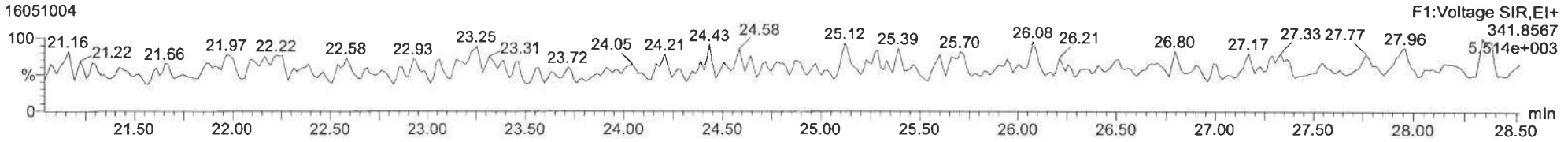
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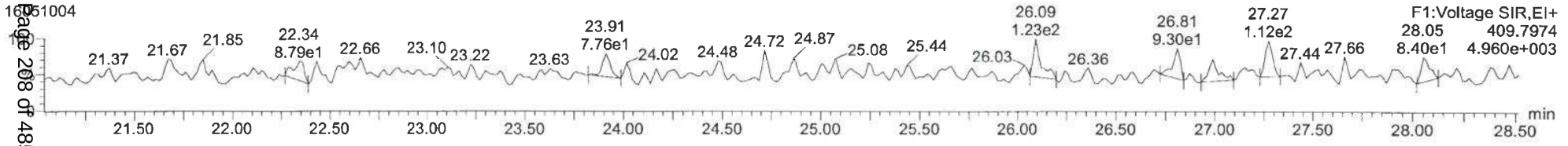
Total-penta1



Total-penta1



FUNCTION1 HPCDPE



Page 208 of 485

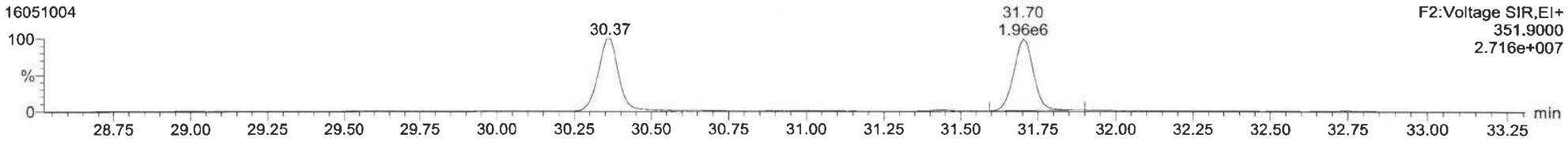
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Page 180 of 454

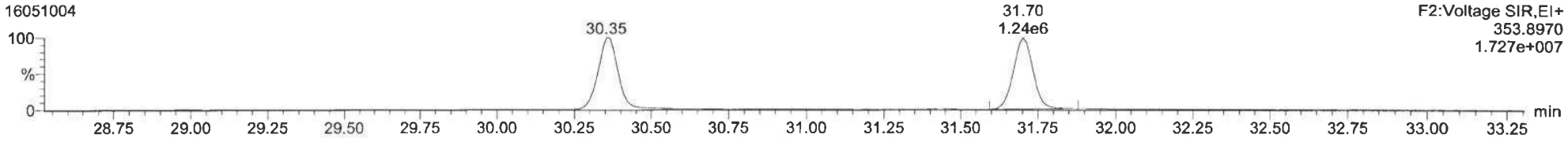
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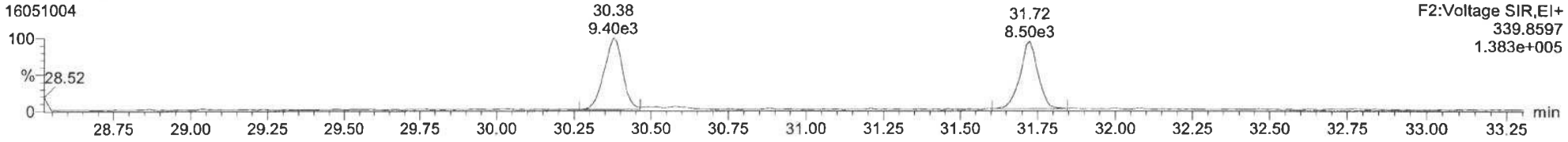
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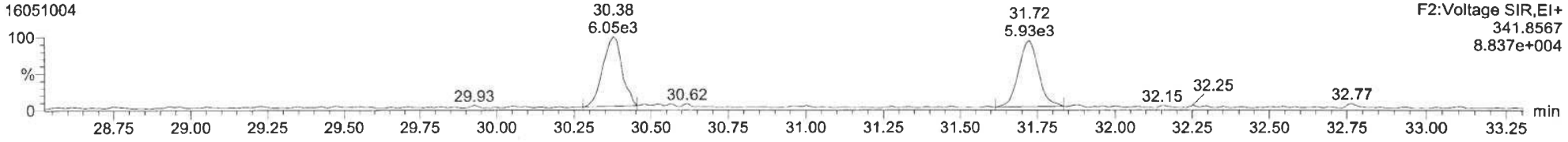
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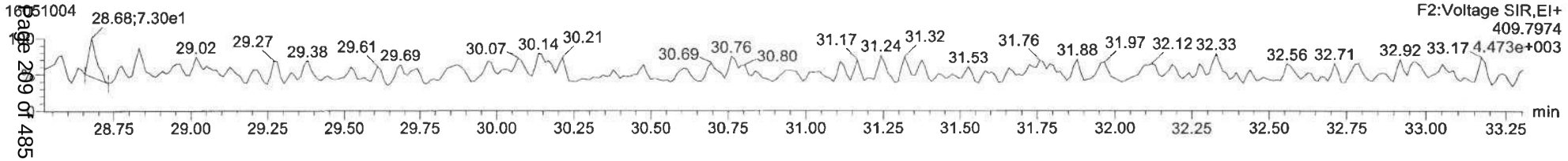
Total-pentafurans



Total-pentafurans



FUNCTION2 HPCDPE



Page 209 of 485

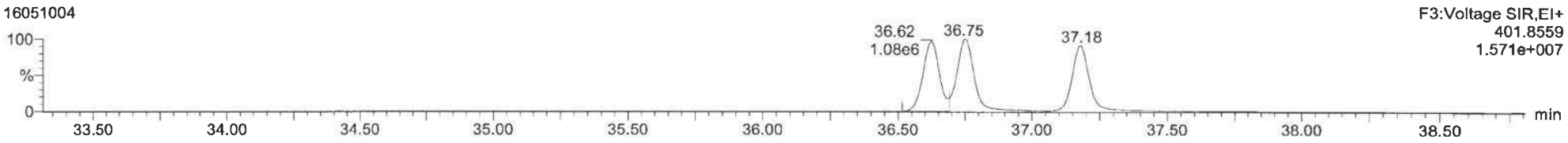
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Page 181 of 458

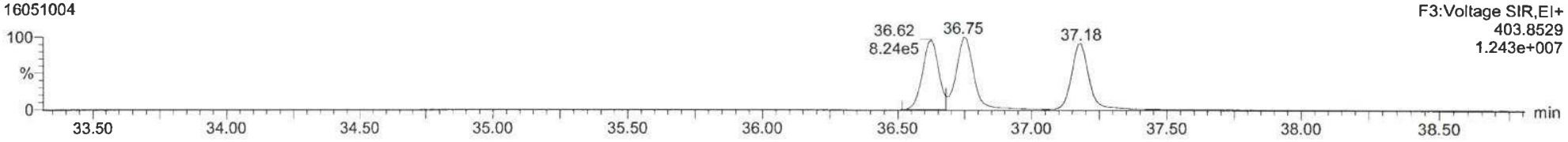
CSIAA 06/30/16

ID: ~~CCL~~, Name: 16051004, Date: 10-May-2016, Time: 13:36:21, Conditions: AUTOSPEC01, User: pk

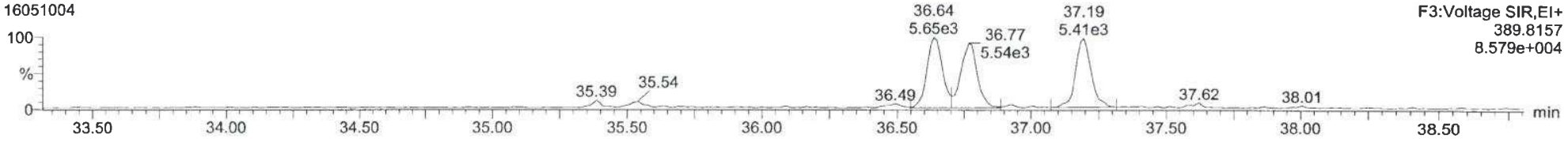
13C-123478-HxCDD



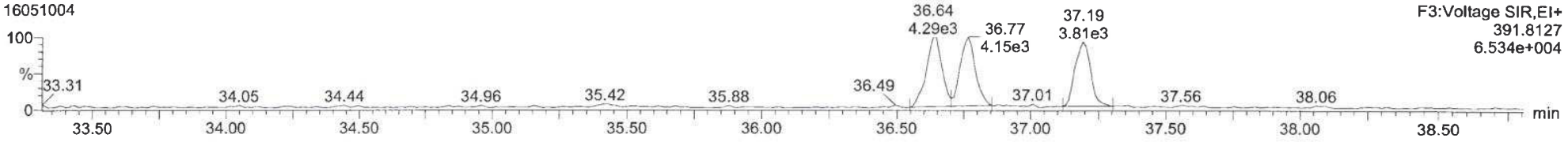
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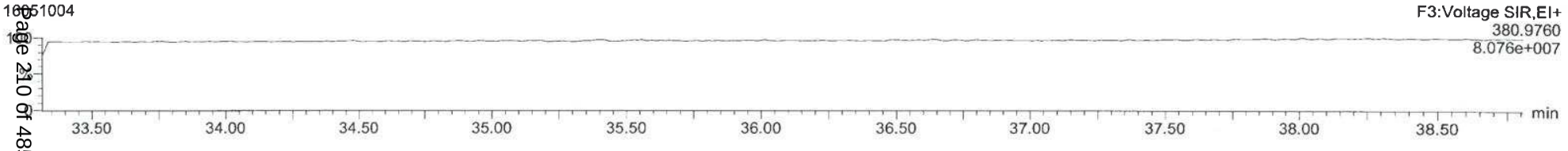
Total-hexadioxins



Total-hexadioxins



FUNCTION3 PFK



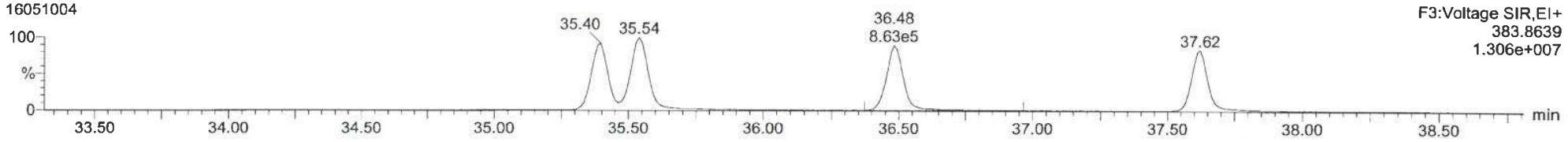
Page 210 of 485

Quantify Sample Report **MassLynx MassLynx V4.1 SCN909**
Dataset: P:\DIOXIN8290.PRO\160510IC.qld
Last Altered: Wednesday, May 11, 2016 09:28:40 Pacific Daylight Time
Printed: Thursday, May 12, 2016 14:36:55 Pacific Daylight Time

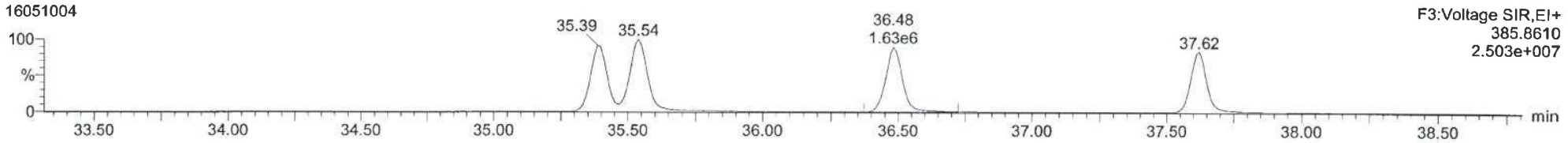
CSIAA 06/30/16

ID: ~~CSL~~, Name: 16051004, Date: 10-May-2016, Time: 13:36:21, Conditions: AUTOSPEC01, User: pk

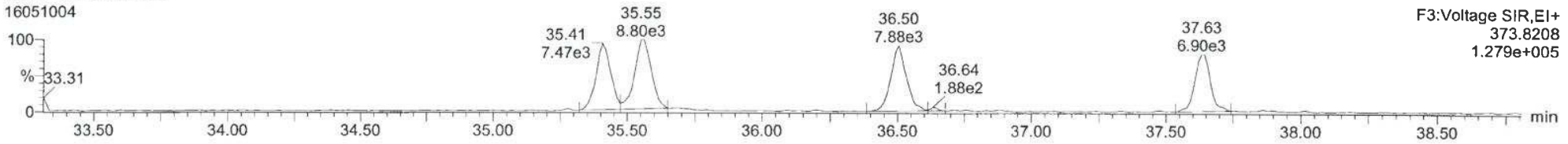
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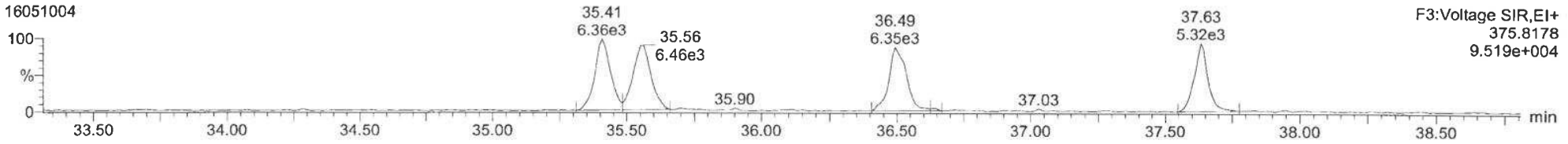
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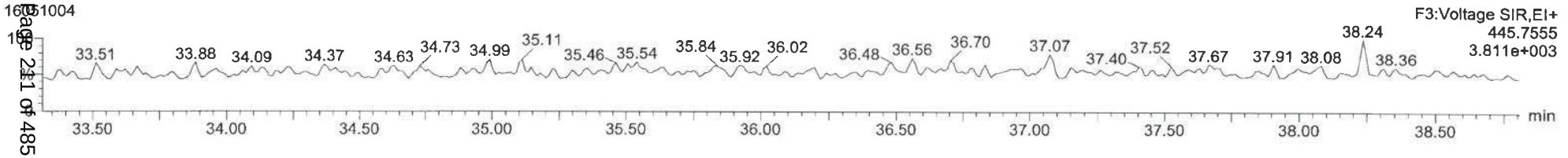
Total-hexafurans



Total-hexafurans



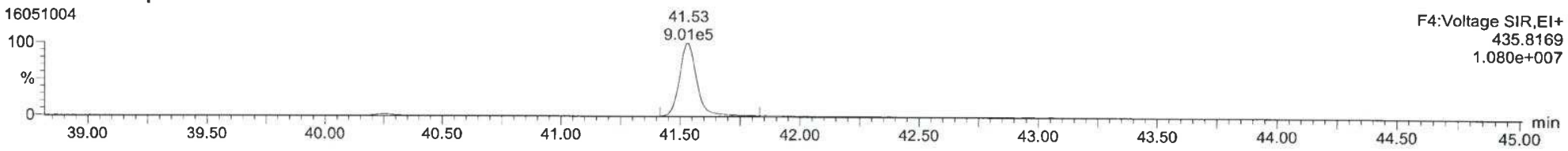
FUNCTION3 OCDPE



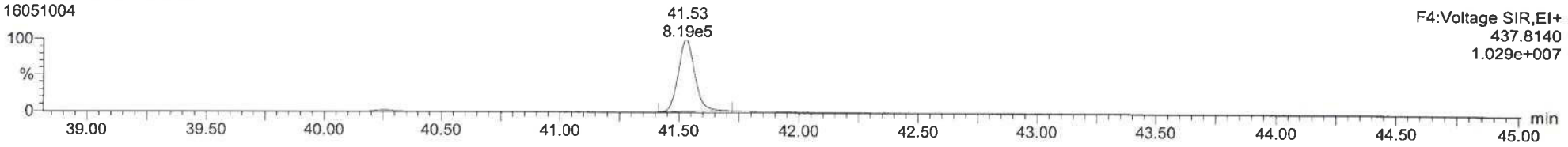
CS1AA 6/30/16

ID: CSL, Name: 16051004, Date: 10-May-2016, Time: 13:36:21, Conditions: AUTOSPEC01, User: pk

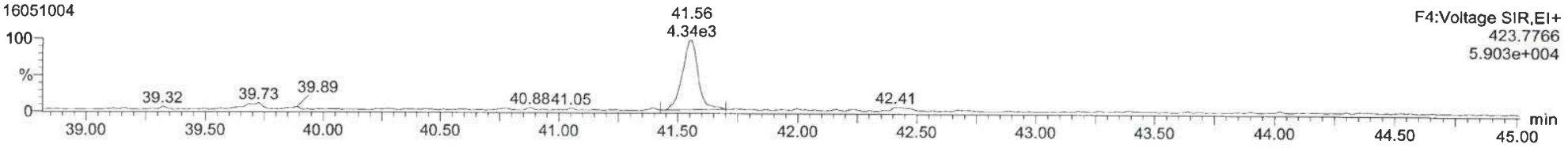
13C-1234678-HpCDD



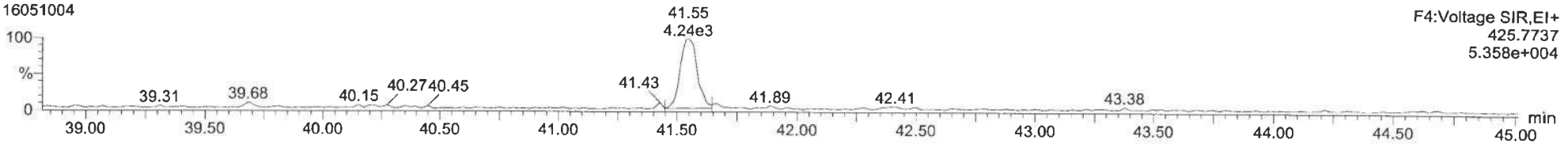
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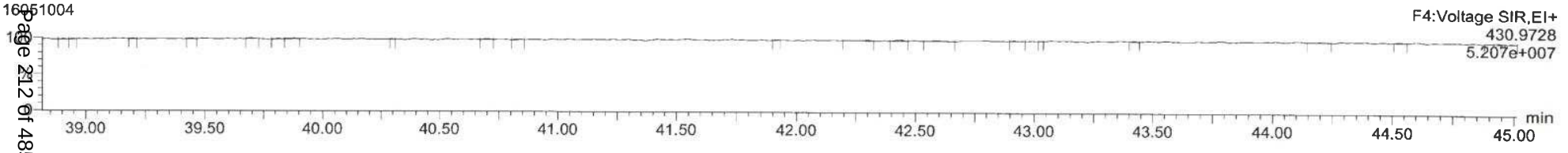
Total-heptadioxins



Total-heptadioxins



FUNCTION4 PFK



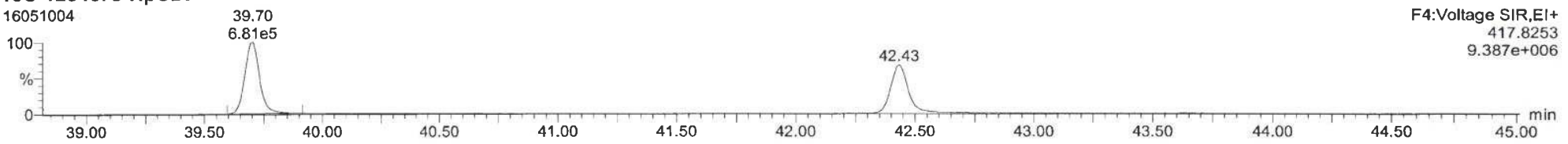
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Last Altered: Wednesday, May 11, 2016 09:28:40 Pacific Daylight Time
Printed: Thursday, May 12, 2016 14:36:55 Pacific Daylight Time

Page 184 of 454

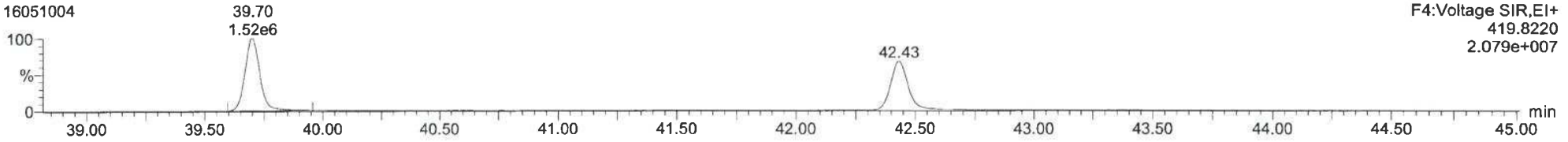
CS1AA 06/30/16

ID: ~~CS1~~, Name: 16051004, Date: 10-May-2016, Time: 13:36:21, Conditions: AUTOSPEC01, User: pk

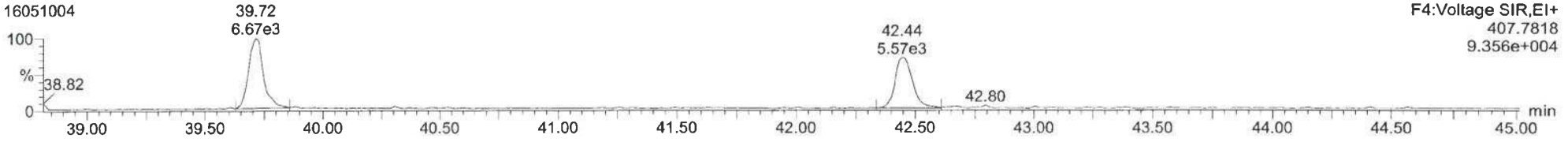
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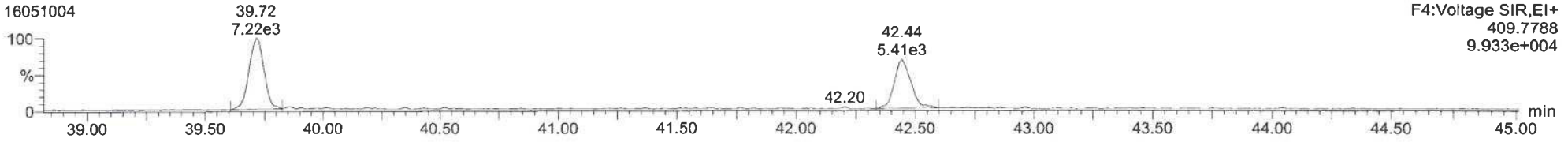
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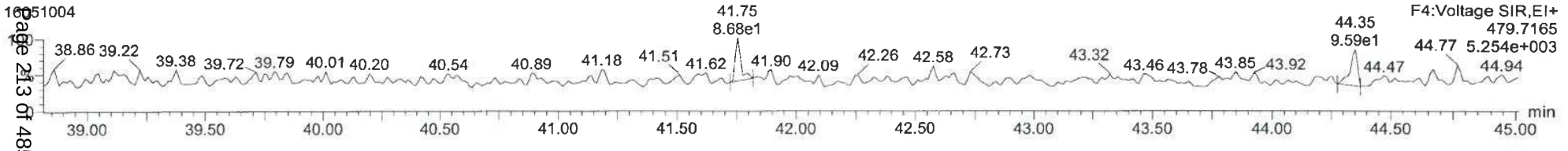
Total-heptafurans



Total-heptafurans



FUNCTION4 NCDPE



Page 213 of 485

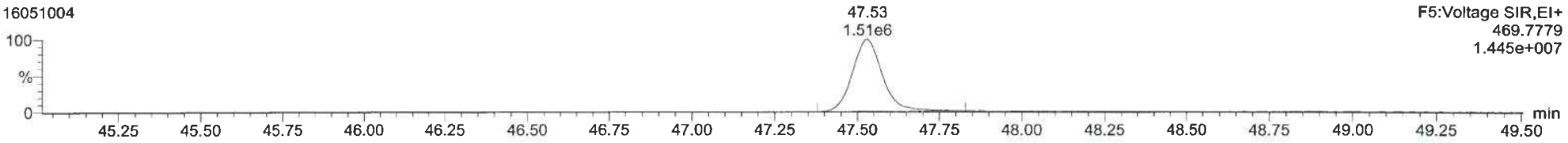
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Last Altered: Wednesday, May 11, 2016 09:28:40 Pacific Daylight Time
Printed: Thursday, May 12, 2016 14:36:55 Pacific Daylight Time

Page 185 of 454

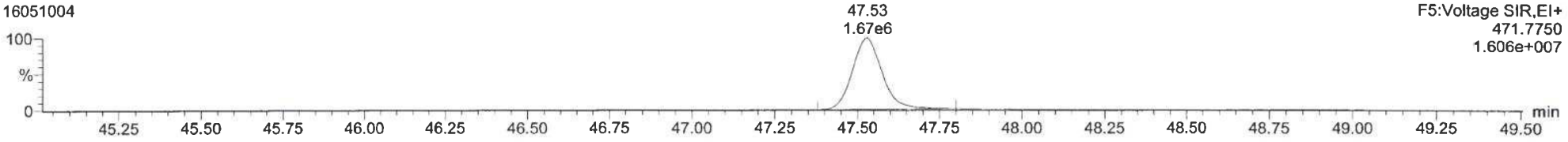
CS1AA 06/30/16

ID: CS1, Name: 16051004, Date: 10-May-2016, Time: 13:36:21, Conditions: AUTOSPEC01, User: pk

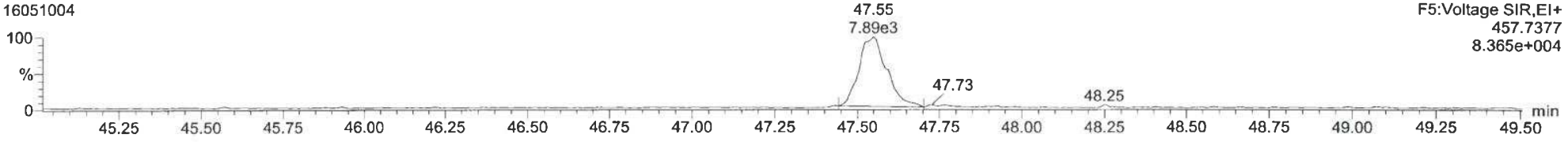
13C-OCDD



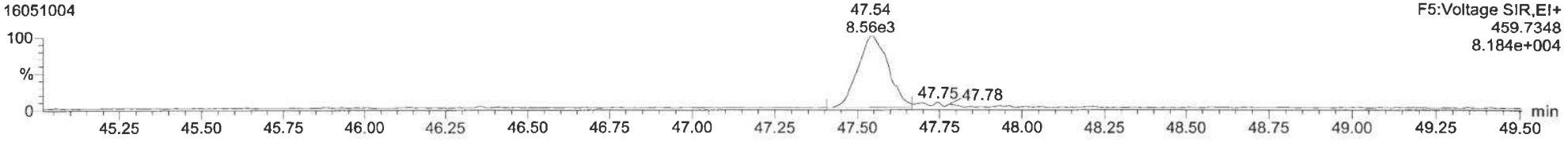
13C-OCDD



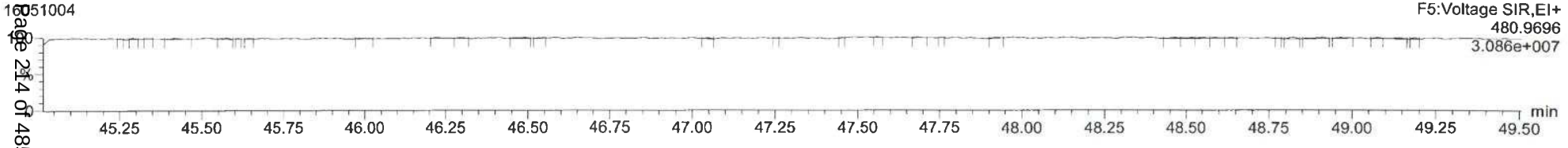
OCDD



OCDD



FUNCTION5 PFK



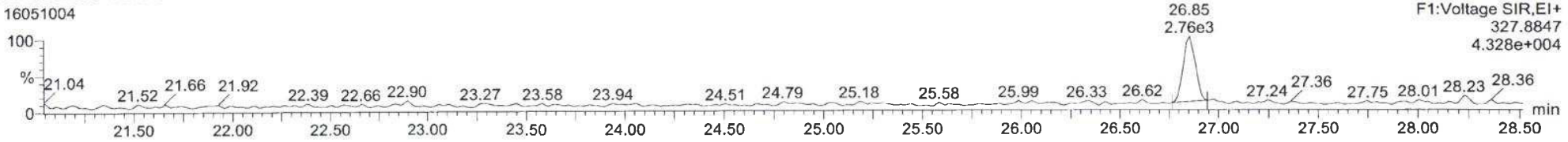
Page 214 of 485

Quantify Sample Report **MassLynx MassLynx V4.1 SCN909**
Dataset: P:\DIOXIN8290.PRO\160510IC.qld
Last Altered: Wednesday, May 11, 2016 09:28:40 Pacific Daylight Time
Printed: Thursday, May 12, 2016 14:36:55 Pacific Daylight Time

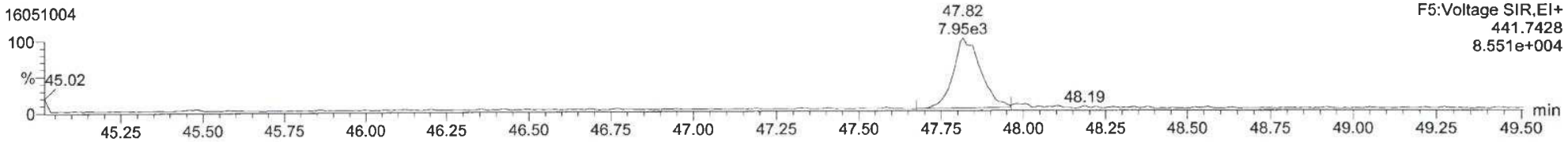
CSIAA 06/30/16

ID: ~~CSL~~, Name: 16051004, Date: 10-May-2016, Time: 13:36:21, Conditions: AUTOSPEC01, User: pk

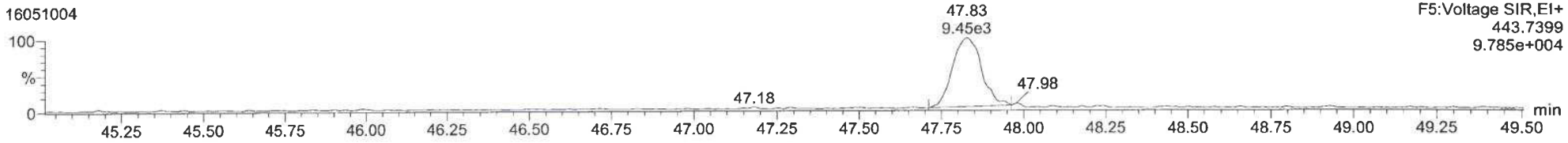
37CL-2378-TCDD



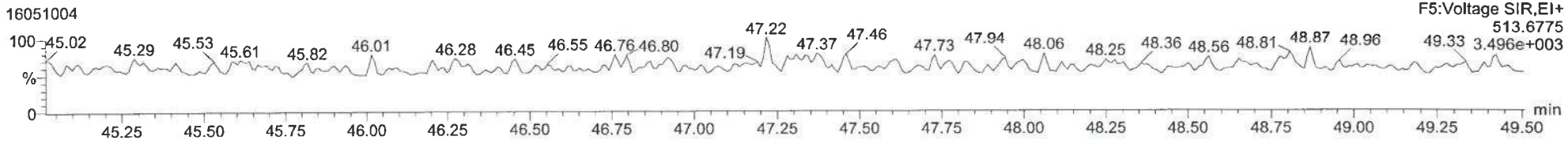
OCDF



OCDF



FUNCTION5 DCDPE



Quantify Sample Summary Report **MassLynx MassLynx V4.1 SCN909**

Dataset: P:\DIOXIN8290.PRO\160510IC.qld
Last Altered: Wednesday, May 11, 2016 09:28:40 Pacific Daylight Time
Printed: Thursday, May 12, 2016 14:36:56 Pacific Daylight Time

Method: P:\DIOXIN8290.pro\MethDB\Dioxin1604143SN.mdb 14 Apr 2016 14:40:15
Calibration: P:\DIOXIN8290.PRO\CurveDB\160510ICAL.cdb 11 May 2016 09:28:40

CS2AA 5/30/16

ID: ~~CS1~~, Name: 16051005, Date: 10-May-2016, Time: 14:27:42, Conditions: AUTOSPEC01, User: pk

Name	RT	RRT	Ion1Area	Ion2Area	RRF	Ratio	Pred R	Noise 1	Noise 2	Height 1	Height 2	S/N	EMPC?	EMPC	pg
2378-TCDF	26.213	1.001	6.68e3	8.57e3	0.935	0.780	0.770	624	1162	9.01e4	1.18e5	144.4	NO	0.471	0.471
12378-PeCDF	30.377	1.001	4.02e4	2.30e4	0.952	1.747	1.550	1915	1646	5.44e5	3.26e5	283.8	NO	2.419	2.419
23478-PeCDF	31.725	1.001	3.89e4	2.42e4	0.963	1.603	1.550	1915	1646	5.39e5	3.25e5	281.3	NO	2.486	2.486
123478-HxCDF	35.408	1.001	3.12e4	2.48e4	1.137	1.258	1.240	2315	1569	4.64e5	3.57e5	200.5	NO	2.475	2.475
234678-HxCDF	36.504	1.001	2.91e4	2.36e4	1.164	1.235	1.240	2315	1569	4.12e5	3.29e5	178.1	NO	2.389	2.389
123678-HxCDF	35.561	1.001	3.46e4	2.62e4	1.099	1.320	1.240	2315	1569	4.48e5	3.57e5	193.6	NO	2.432	2.432
123789-HxCDF	37.633	1.000	2.37e4	2.03e4	1.101	1.168	1.240	2315	1569	3.32e5	2.86e5	143.3	NO	2.440	2.440
1234678-HpCDF	39.715	1.000	2.74e4	2.65e4	1.303	1.033	1.050	937	1508	3.63e5	3.66e5	387.6	NO	2.488	2.488
1234789-HpCDF	42.456	1.000	1.92e4	1.86e4	1.317	1.036	1.050	937	1508	2.15e5	2.22e5	229.9	NO	2.432	2.432
OCDF	47.836	1.006	2.72e4	3.13e4	1.166	0.869	0.890	1813	1195	2.65e5	3.03e5	146.3	NO	4.753	4.753
2378-TCDD	26.855	1.001	5.15e3	5.98e3	1.134	0.861	0.770	873	738	6.94e4	7.89e4	79.5	NO	0.492	0.492
12378-PeCDD	31.977	1.001	2.31e4	1.49e4	0.975	1.545	1.550	1483	751	3.38e5	2.05e5	228.0	NO	2.455	2.455
123478-HxCDD	36.646	1.001	2.03e4	1.68e4	1.031	1.209	1.240	1210	1058	2.99e5	2.35e5	247.4	NO	2.378	2.378
123678-HxCDD	36.767	1.001	2.13e4	1.81e4	0.971	1.180	1.240	1210	1058	3.00e5	2.49e5	248.4	NO	2.508	2.508
123789-HxCDD	37.194	1.012	1.95e4	1.58e4	0.947	1.233	1.240	1210	1058	2.85e5	2.15e5	235.5	NO	2.381	2.381
1234678-HpCDD	41.557	1.000	1.61e4	1.64e4	1.028	0.984	1.050	880	817	2.07e5	2.05e5	234.6	NO	2.523	2.523
OCDD	47.549	1.000	3.81e4	4.26e4	1.107	0.895	0.890	912	966	3.66e5	4.09e5	401.3	NO	6.901	6.901
13C-2378-TCDF	26.198	1.006	1.52e6	1.95e6	1.567	0.781	0.770	7213	3636	2.06e7	2.61e7	2854.5	NO		97.056
13C-12378-PeCDF	30.355	1.166	1.65e6	1.09e6	1.274	1.519	1.550	4968	6965	2.31e7	1.47e7	4658.0	NO		94.412
13C-23478-PeCDF	31.703	1.218	1.61e6	1.02e6	1.235	1.575	1.550	4968	6965	2.26e7	1.44e7	4558.9	NO		93.672
13C-123478-HxCDF	35.386	0.952	6.75e5	1.31e6	1.381	0.515	0.510	5229	9078	9.42e6	1.84e7	1800.8	NO		103.223
13C-123678-HxCDF	35.539	0.956	7.84e5	1.49e6	1.569	0.526	0.510	5229	9078	1.04e7	1.98e7	1981.5	NO		103.869
13C-234678-HxCDF	36.482	0.981	6.51e5	1.24e6	1.345	0.524	0.510	5229	9078	9.09e6	1.73e7	1738.2	NO		100.995
13C-123789-HxCDF	37.622	1.012	5.63e5	1.08e6	1.183	0.523	0.510	5229	9078	7.97e6	1.53e7	1523.3	NO		99.391
13C-1234678-HpCDF	39.704	1.068	5.18e5	1.15e6	1.178	0.452	0.440	3357	3824	7.02e6	1.57e7	2089.7	NO		101.292
13C-1234789-HpCDF	42.434	1.141	3.63e5	8.15e5	0.878	0.445	0.440	3357	3824	4.24e6	9.62e6	1263.8	NO		96.293
13C-1234-TCDD	26.034	0.000	9.87e5	1.29e6	1.000	0.764	0.770	3203	3485	1.32e7	1.69e7	4111.4	NO		100.000
13C-2378-TCDD	26.840	1.031	8.78e5	1.12e6	0.908	0.786	0.770	3203	3485	1.17e7	1.47e7	3638.7	NO		96.425
13C-12378-PeCDD	31.955	1.227	9.73e5	6.16e5	0.756	1.580	1.550	2714	2965	1.32e7	8.37e6	4859.3	NO		92.208
13C-123478-HxCDD	36.625	0.985	8.50e5	6.65e5	1.056	1.279	1.240	4926	3042	1.20e7	9.45e6	2437.9	NO		102.903
13C-123678-HxCDD	36.745	0.988	8.97e5	7.21e5	1.163	1.244	1.240	4926	3042	1.23e7	9.91e6	2506.2	NO		99.774
13C-1234678-HpCDD	41.535	1.117	6.58e5	5.97e5	0.909	1.103	1.050	2482	3099	7.94e6	7.53e6	3199.3	NO		98.957
13C-OCDD	47.531	1.278	9.94e5	1.12e6	0.820	0.888	0.890	5478	3657	9.18e6	1.01e7	1676.4	NO		184.791

Quantify Sample Summary Report **MassLynx MassLynx V4.1 SCN909**
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CS2AA 06/30/16

ID: ~~CS1~~, Name: 16051005, Date: 10-May-2016, Time: 14:27:42, Conditions: AUTOSPEC01, User: pk

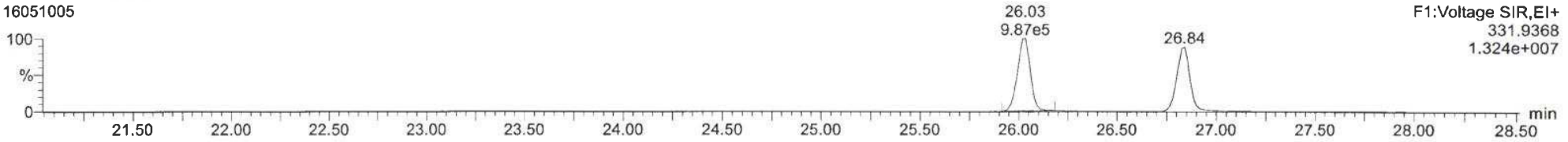
Name	RT	RRT	Ion1Area	Ion2Area	RRF	Ratio	Pred R	Noise 1	Noise 2	Height 1	Height 2	S/N	EMPC?	EMPC	pg
13C-123789-HxCDD	37.183	0.000	7.78e5	6.17e5	1.000	1.261	1.240	4926	3042	1.07e7	8.38e6	2166.0	NO		100.000
Total-tetrafurans			6.89e3		0.935			624		9.48e4					0.480
Total-penta1			0.00e0					685		0.00e0					
Total-pentafurans			8.07e4		0.957			1915		1.11e6					4.986
Total-hexafurans			1.19e5		1.125			2315		1.68e6					9.815
Total-heptafurans			4.78e4		1.310			937		5.96e5					5.033
Total-Furans			2.82e5		1.114			624		3.74e6					25.066
Total-tetradioxins			5.15e3		1.134			873		6.94e4					0.492
Total-pentadioxins			2.33e4		0.975			1483		3.46e5					2.481
Total-hexadioxins			6.12e4		0.983			1210		8.85e5					7.267
Total-heptadioxins			1.74e4		1.028			880		2.29e5					2.716
Total-Dioxins			1.45e5		1.028			873		1.90e6					19.856
Total-TEQ			4.27e5					873		5.64e6					44.922
37CL-2378-TCDD	26.855	1.032	1.11e4		1.067			1295		1.59e5		122.7			0.455
FUNCTION1 PFK			1.86e6					839683		3.45e7					
FUNCTION2 PFK			1.48e5					170069		4.43e6					0.000
FUNCTION3 PFK			0.00e0					617332		0.00e0					
FUNCTION4 PFK			3.08e5					401956		9.69e6					
FUNCTION5 PFK			2.68e5					309329		1.04e7					
FUNCTION1 HXCDPE			3.06e2					522		6.37e3					0.000
FUNCTION1 HPCDPE			8.95e2					980		1.98e4					0.000
FUNCTION2 HPCDPE			1.50e2					689		5.22e3					0.000
FUNCTION3 OCDPE			0.00e0					469		0.00e0					
FUNCTION4 NCDPE			0.00e0					652		0.00e0					
FUNCTION5 DCDPE			0.00e0					485		0.00e0					

Quantify Sample Report **MassLynx MassLynx V4.1 SCN909**
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Printed: Thursday, May 12, 2016 14:36:56 Pacific Daylight Time

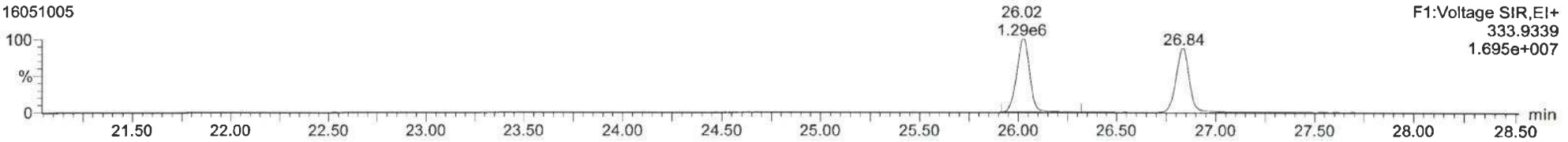
Page 189 of 454

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Calibration: P:\DIOXIN8290.PRO\CurveDB\160510ICAL.cdb 11 May 2016 09:28:40
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ID: ~~CS1~~, Name: 16051005, Date: 10-May-2016, Time: 14:27:42, Conditions: AUTOSPEC01, User: pk

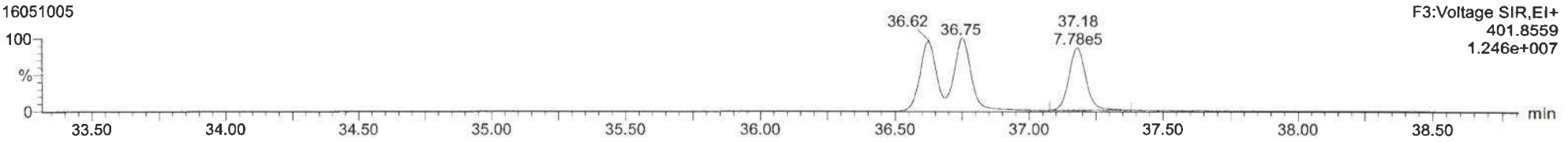
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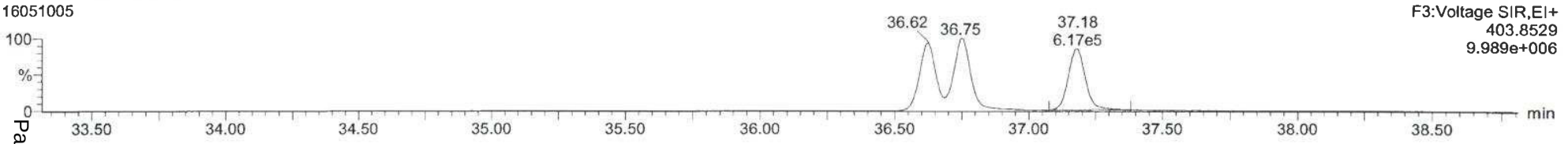
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13C-123789-HxCDD



13C-123789-HxCDD



Page 218 of 485

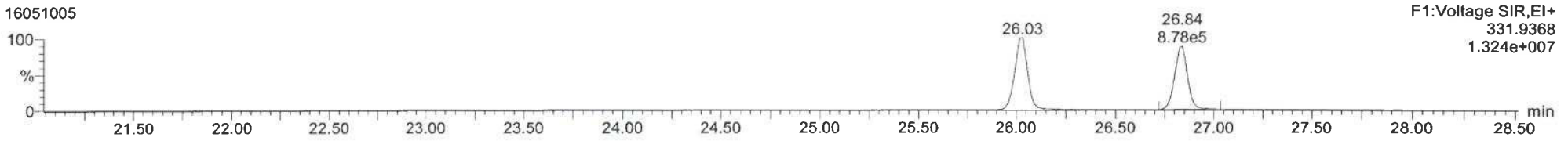
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Page 190 of 454

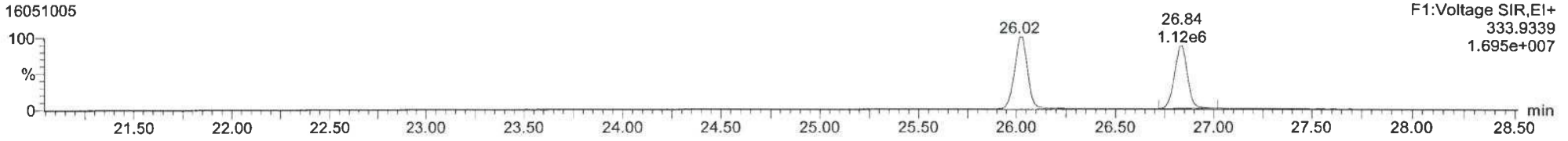
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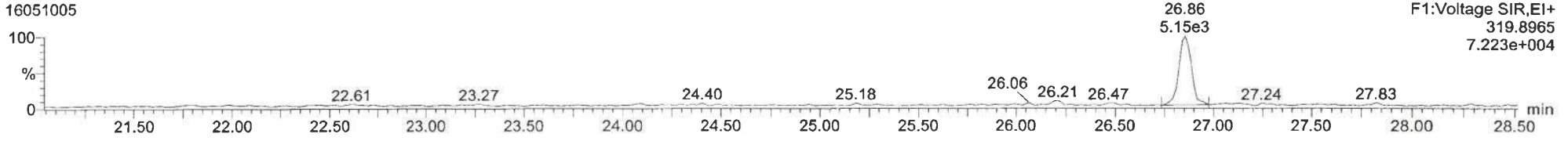
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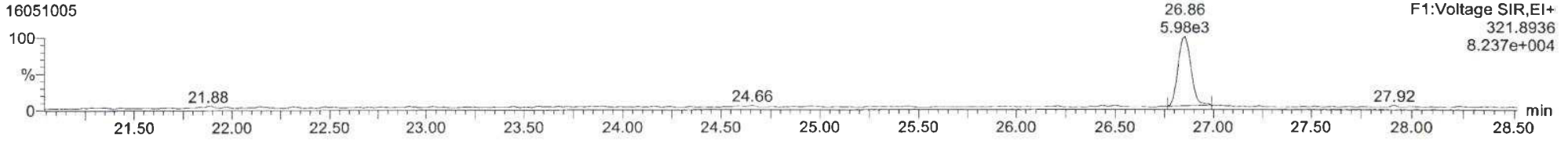
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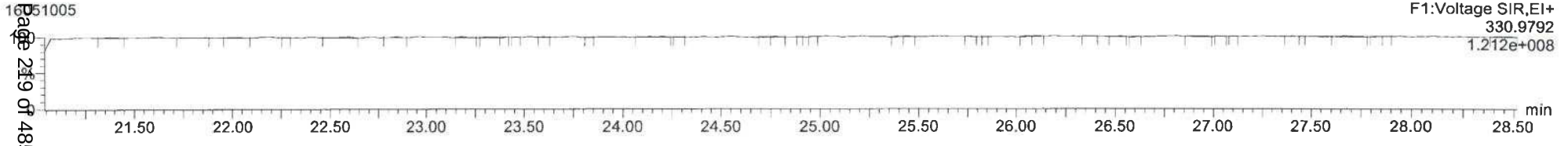
Total-tetradioxins



Total-tetradioxins



FUNCTION1 PFK



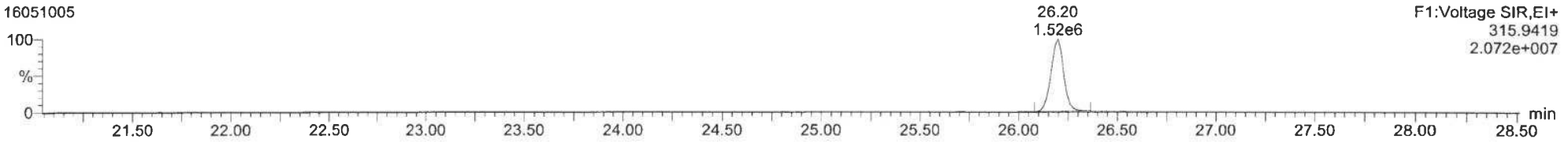
Page 219 of 485

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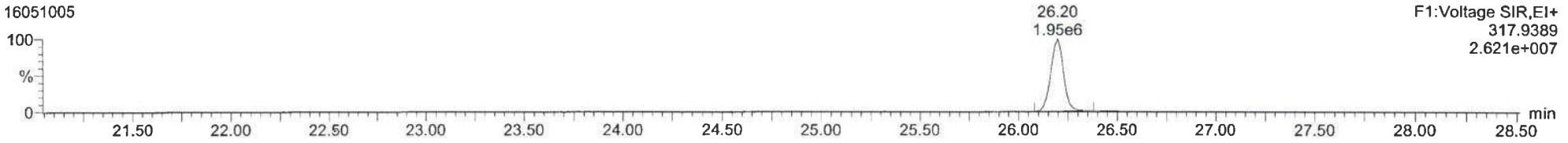
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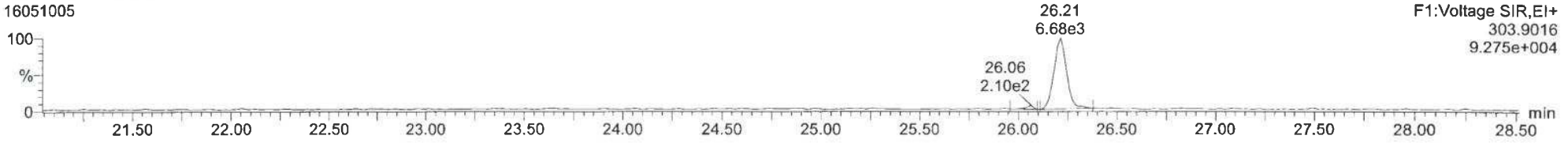
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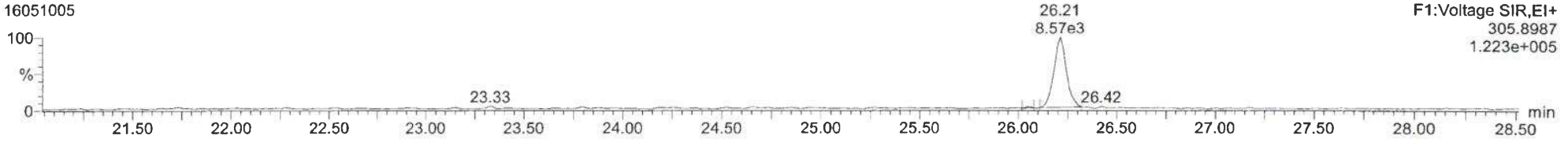
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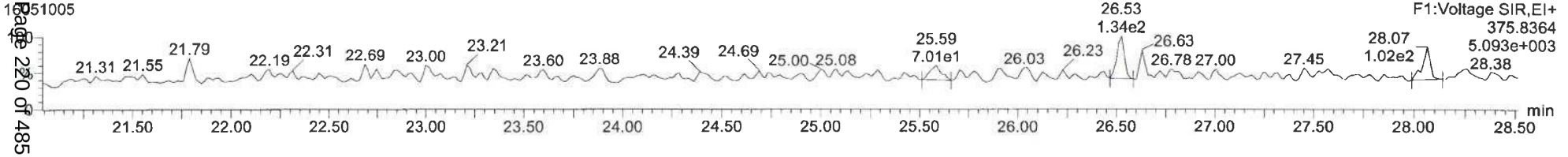
Total-tetrafurans



Total-tetrafurans



FUNCTION1 HXCDPE

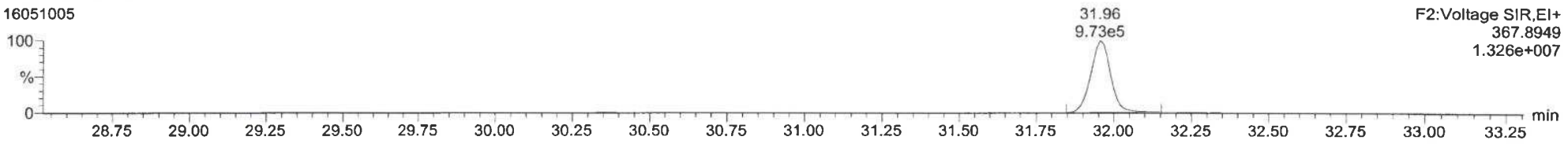


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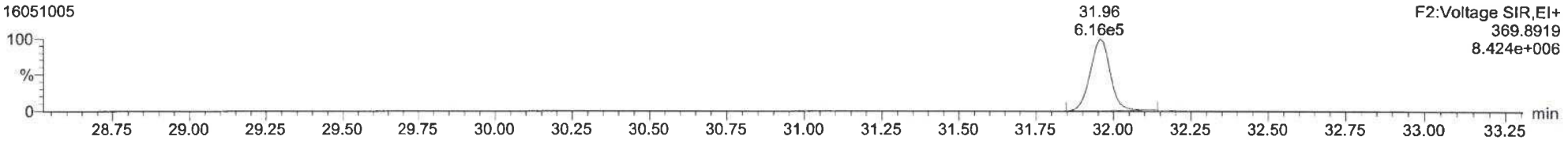
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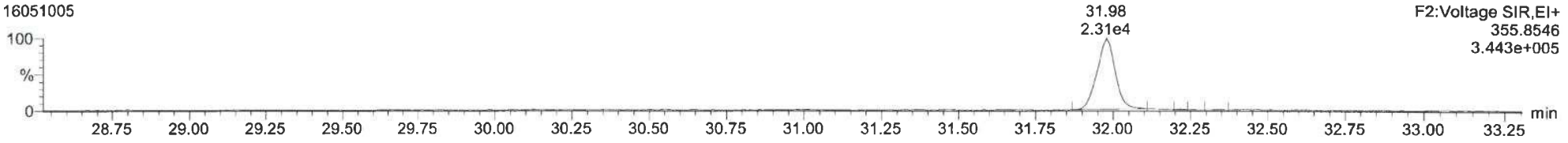
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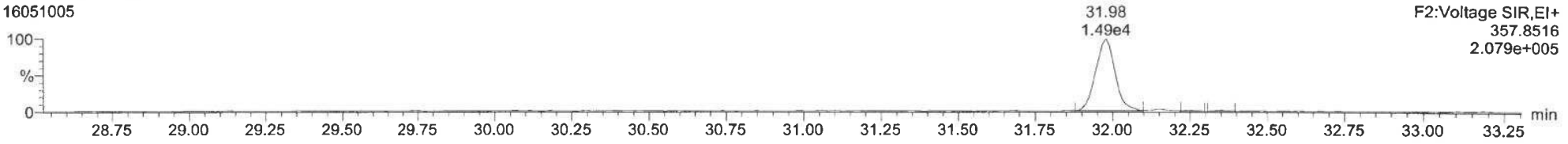
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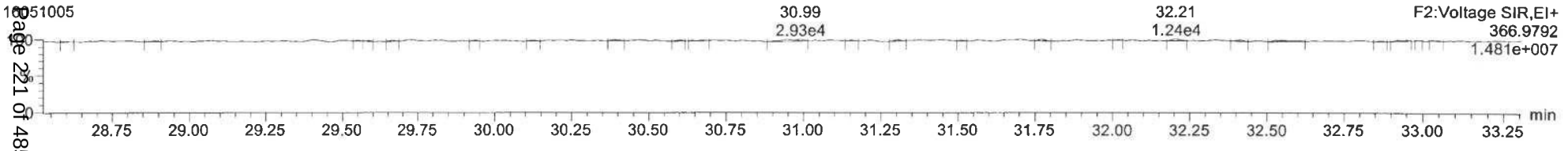
Total-pentadioxins



Total-pentadioxins



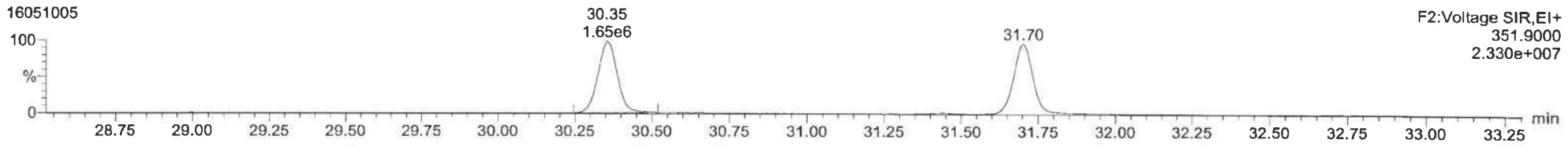
FUNCTION2 PFK



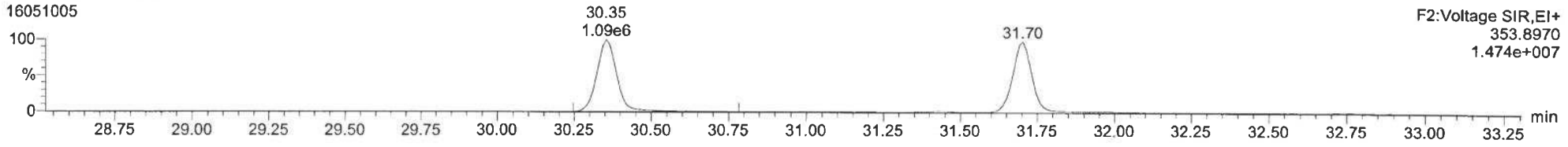
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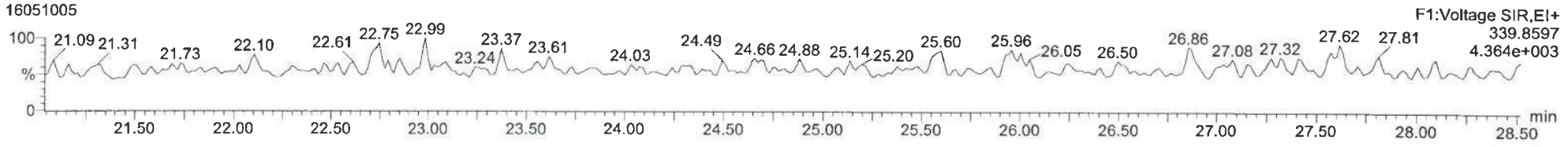
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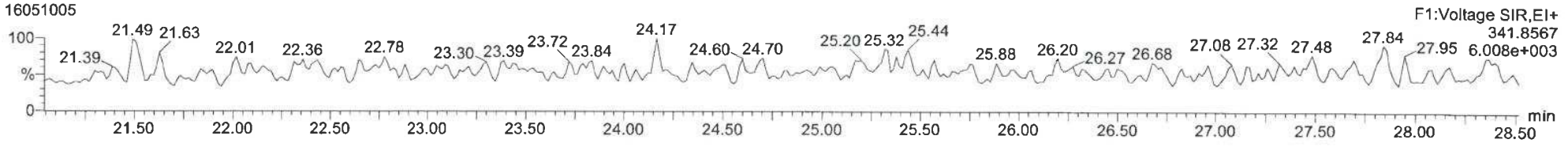
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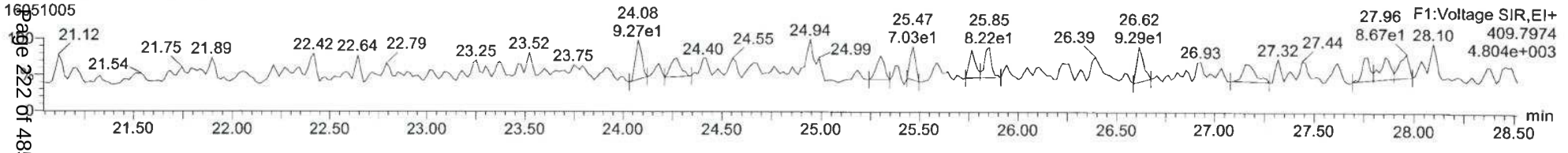
Total-penta1



Total-penta1



FUNCTION1 HPCDPE

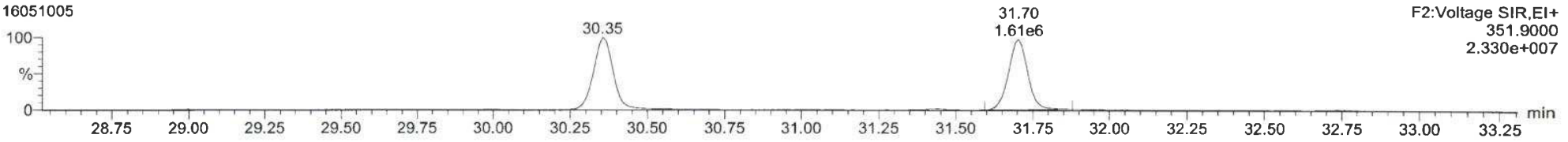


Page 194 of 454

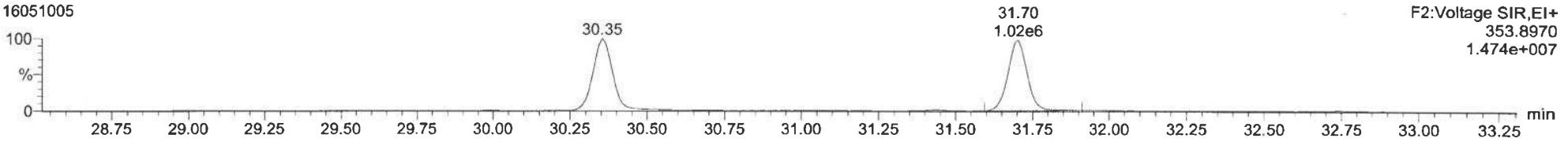
CS2AA 06/30/16

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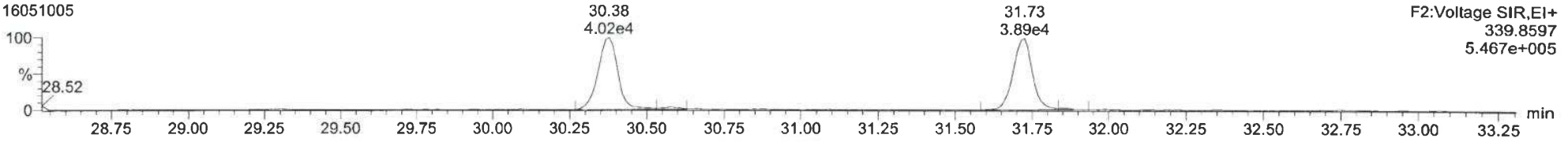
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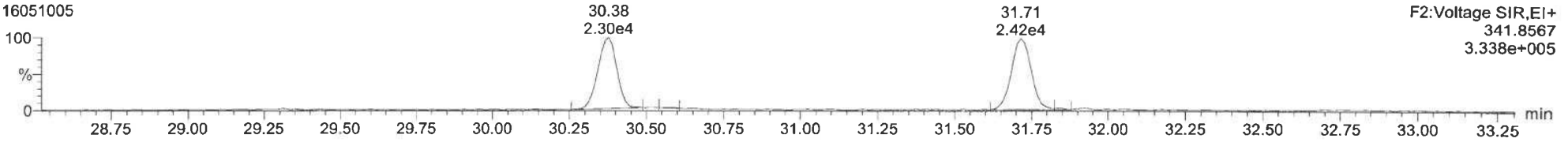
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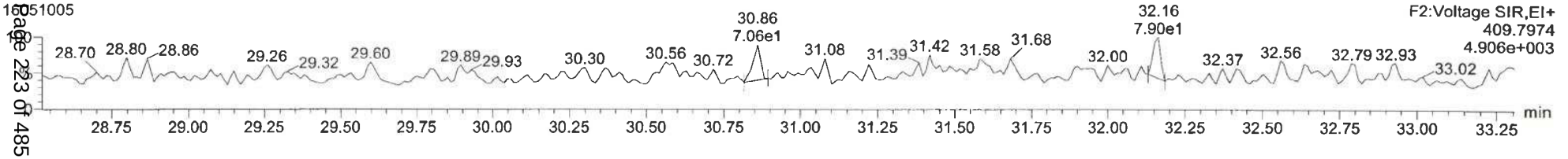
Total-pentafurans



Total-pentafurans



FUNCTION2 HPCDPE



Page 223 of 485

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Printed: Thursday, May 12, 2016 14:36:56 Pacific Daylight Time

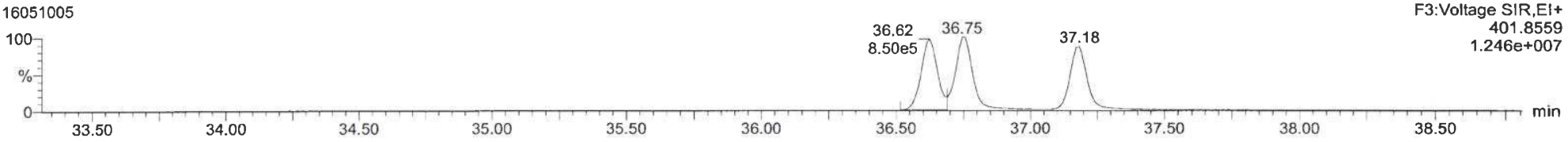
Page 195 of 454

CS2AA 06/30/16

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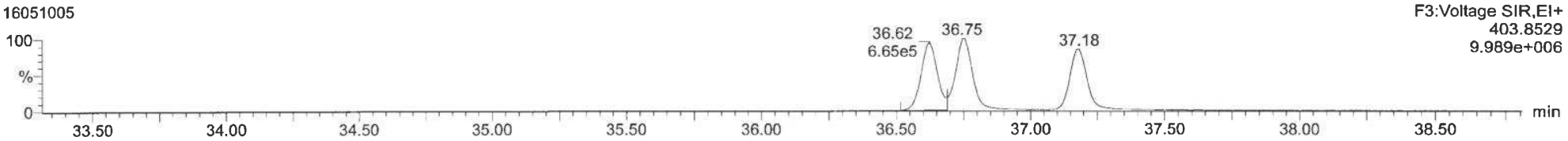
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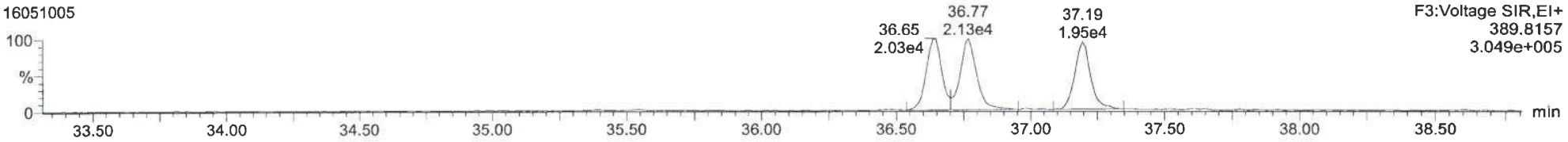
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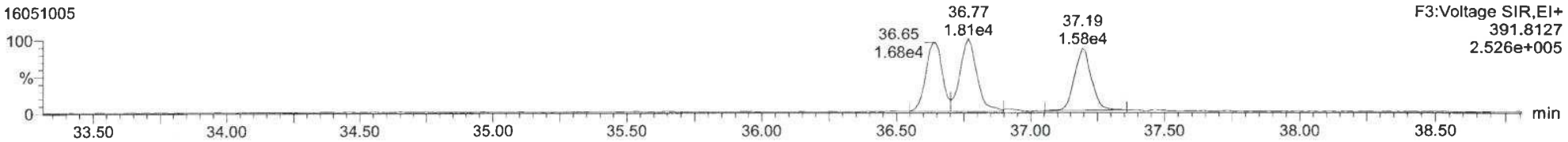
Total-hexadioxins

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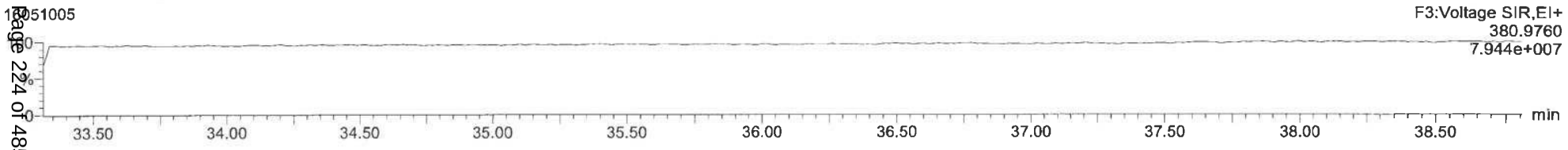
Total-hexadioxins

16051005



FUNCTION3 PFK

16051005



Page 224 of 485

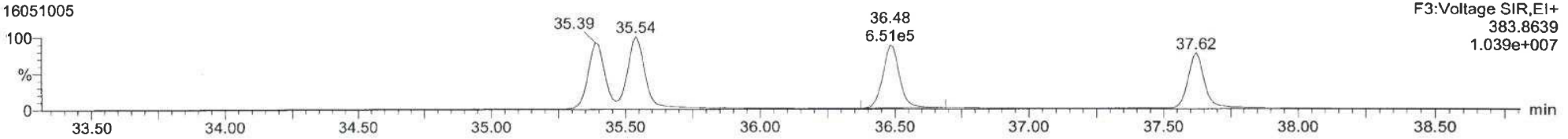
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Page 196 of 454

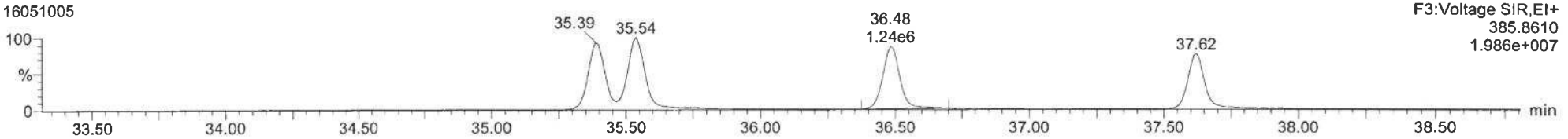
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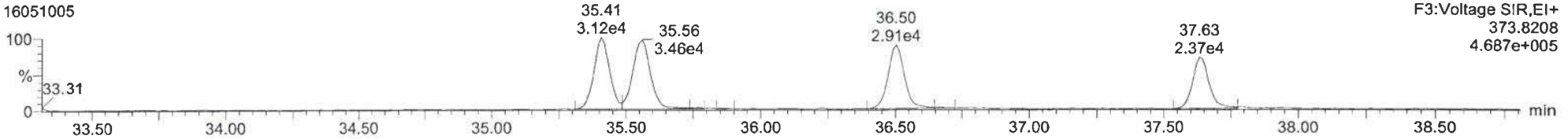
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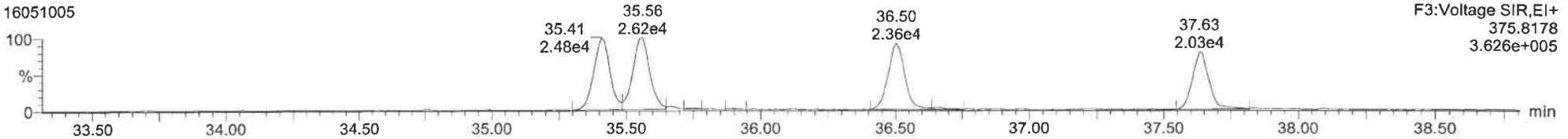
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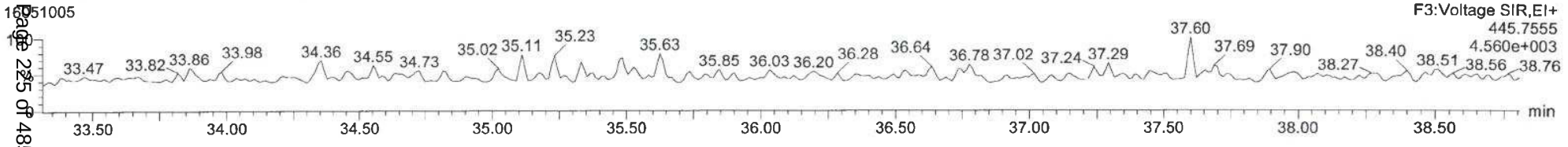
Total-hexafurans



Total-hexafurans



FUNCTION3 OCDPE



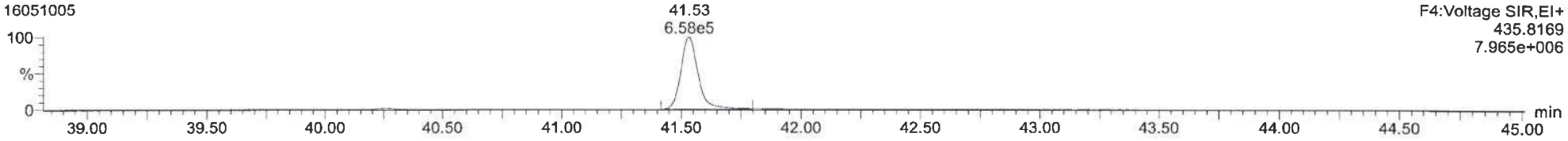
Page 225 of 485

Page 197 of 454

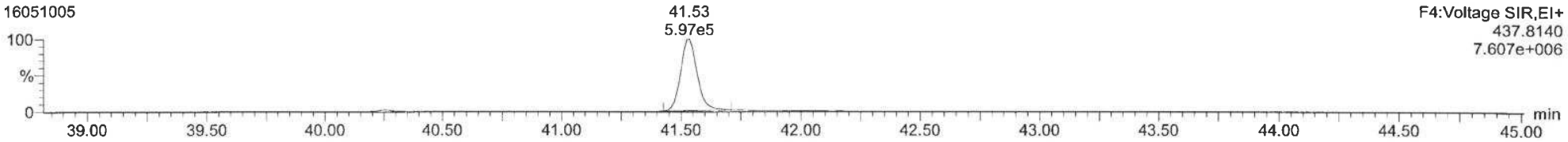
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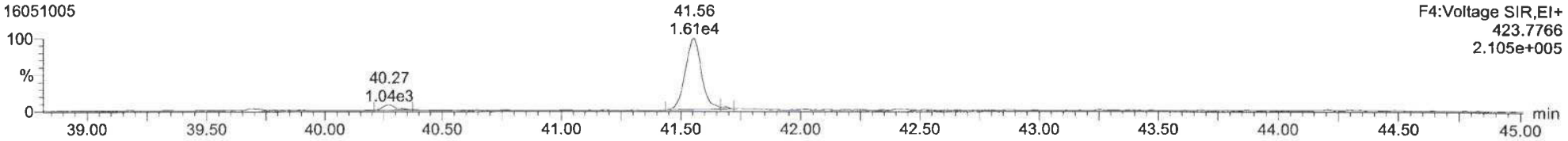
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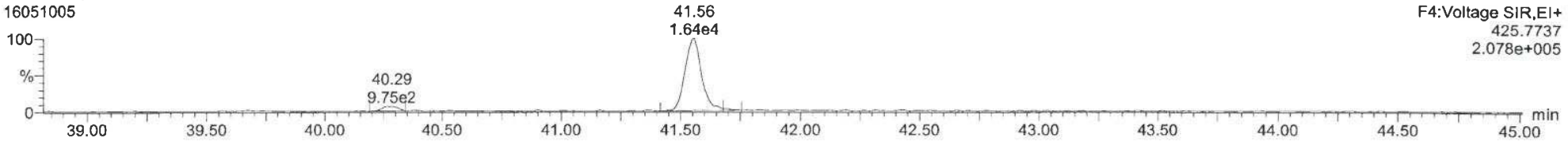
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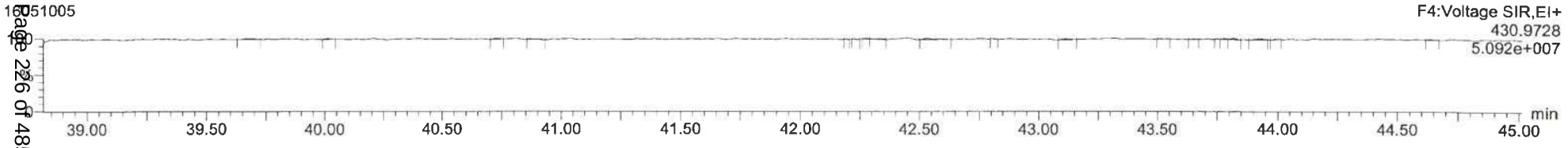
Total-heptadioxins



Total-heptadioxins



FUNCTION4 PFK



Page 226 of 485

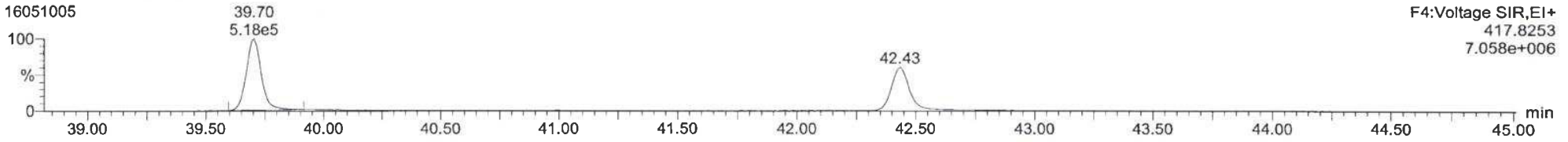
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Printed: Thursday, May 12, 2016 14:36:56 Pacific Daylight Time

Page 198 of 453

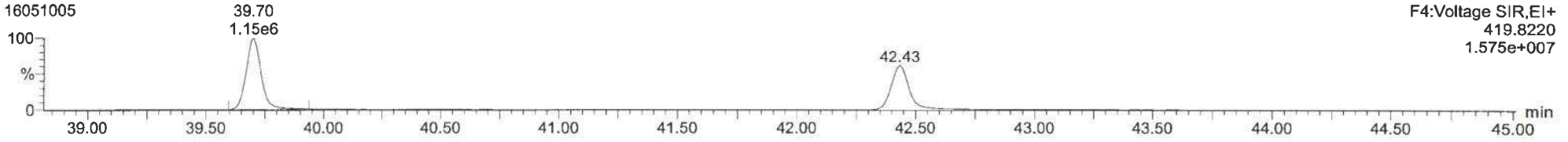
CS2AA 06/30/16

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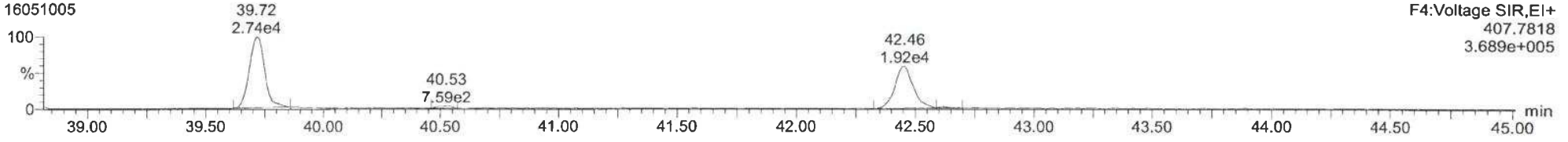
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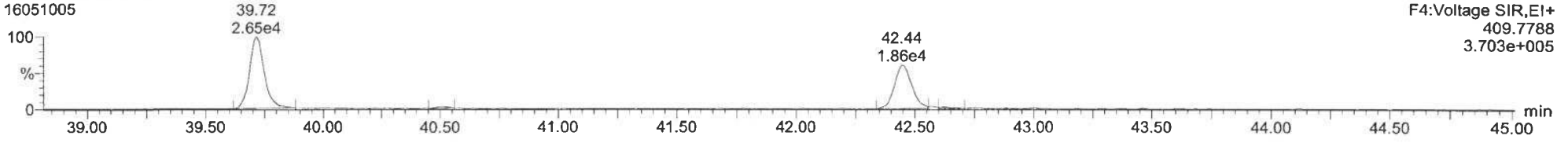
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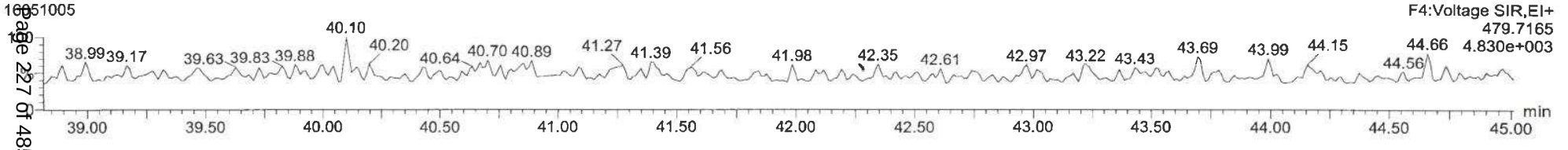
Total-heptafurans



Total-heptafurans



FUNCTION4 NCDPE



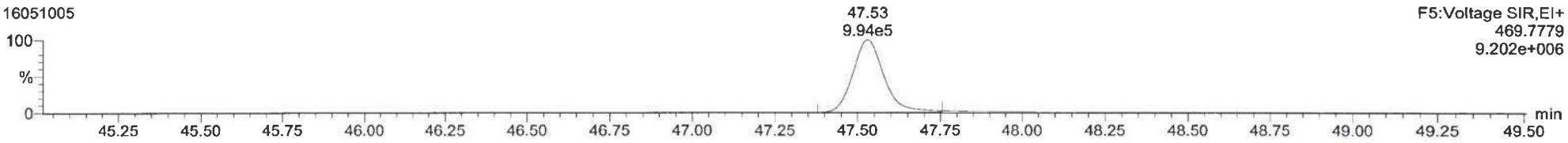
Page 227 of 485

Page 199 of 454

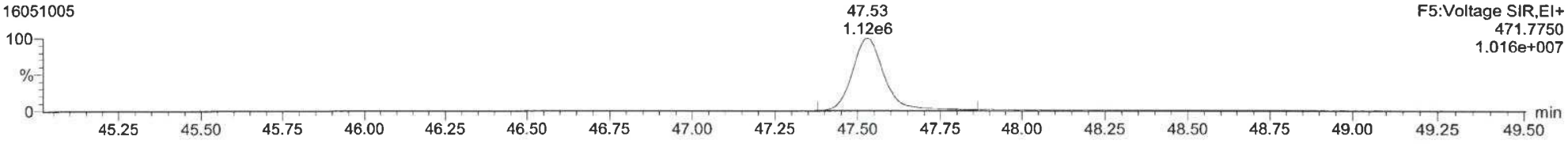
CS2AA 04/30/16

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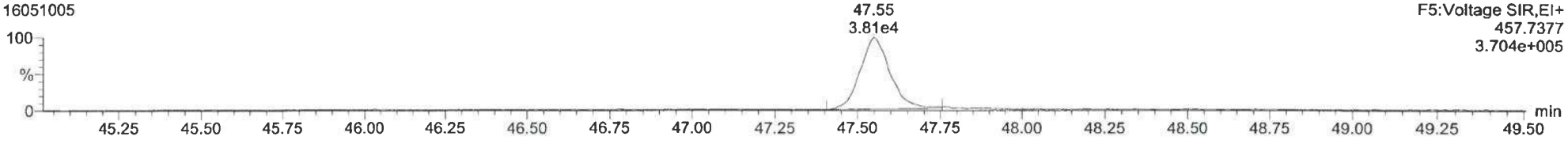
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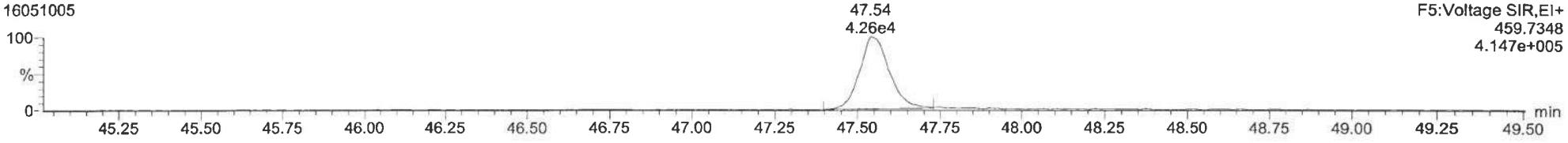
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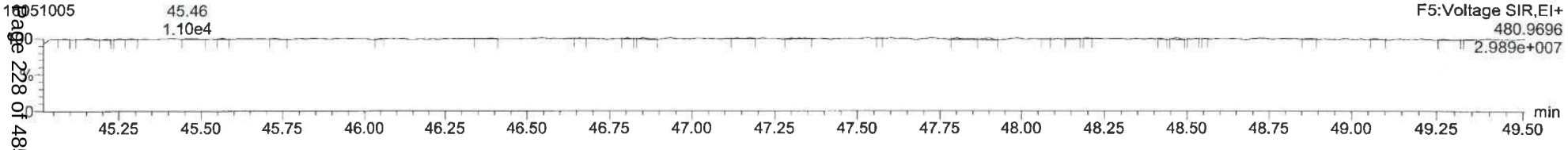
OCDD



OCDD



FUNCTION5 PFK



Page 228 of 485

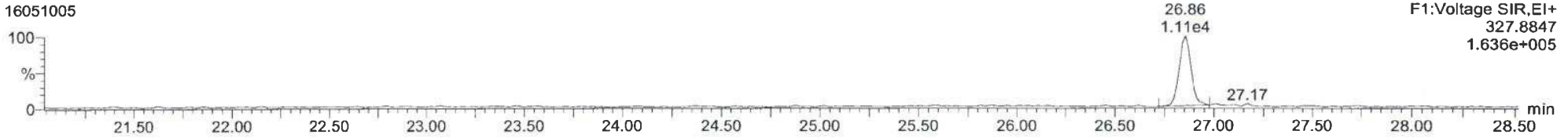
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Dataset: P:\DIOXIN8290.PRO\160510IC.qld
Last Altered: Wednesday, May 11, 2016 09:28:40 Pacific Daylight Time
Printed: Thursday, May 12, 2016 14:36:56 Pacific Daylight Time

Page 200 of 454

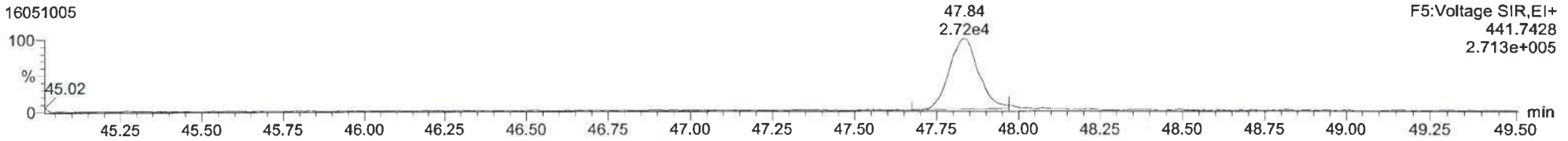
CS2AA 06/30/16

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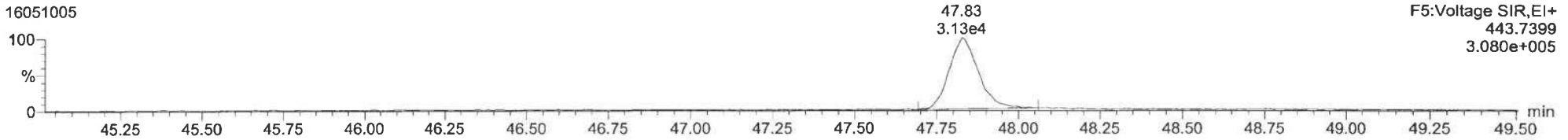
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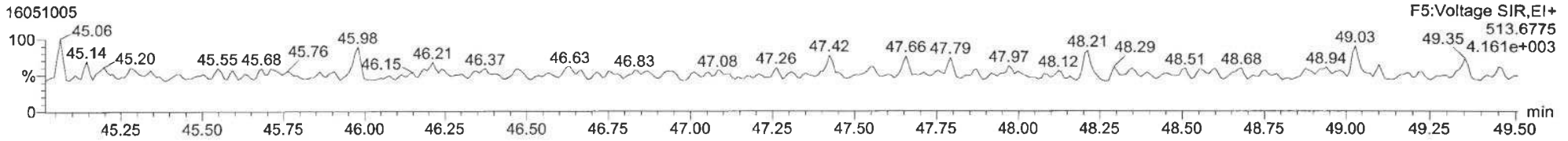
OCDF



OCDF



FUNCTION5 DCDPE



Page 229 of 485

Quantify Sample Summary Report **MassLynx MassLynx V4.1 SCN909**
Dataset: P:\DIOXIN8290.PRO\160510IC.qld
Last Altered: Wednesday, May 11, 2016 09:28:40 Pacific Daylight Time
Printed: Thursday, May 12, 2016 14:36:58 Pacific Daylight Time

Page 201 of 445

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Calibration: P:\DIOXIN8290.PRO\CurveDB\160510ICAL.cdb 11 May 2016 09:28:40

CS3AA 06/30/16 SD

ID: ~~CS2~~, Name: 16051006, Date: 10-May-2016, Time: 15:30:50, Conditions: AUTOSPEC01, User: pk

Name	RT	RRT	Ion1Area	Ion2Area	RRF	Ratio	Pred R	Noise 1	Noise 2	Height 1	Height 2	S/N	EMPC?	EMPC	pg
2378-TCDF	26.228	1.001	3.07e4	3.77e4	0.935	0.815	0.770	712	1111	4.18e5	5.13e5	587.6	NO	1.989	1.989
12378-PeCDF	30.388	1.001	1.70e5	1.07e5	0.952	1.587	1.550	2318	2111	2.30e6	1.48e6	994.0	NO	9.513	9.513
23478-PeCDF	31.736	1.001	1.71e5	1.10e5	0.963	1.561	1.550	2318	2111	2.39e6	1.51e6	1030.0	NO	10.056	10.056
123478-HxCDF	35.419	1.000	1.40e5	1.13e5	1.137	1.242	1.240	3320	2835	2.00e6	1.63e6	602.7	NO	9.994	9.994
234678-HxCDF	36.515	1.001	1.43e5	1.11e5	1.164	1.289	1.240	3320	2835	1.95e6	1.53e6	586.9	NO	10.056	10.056
123678-HxCDF	35.572	1.001	1.52e5	1.24e5	1.099	1.222	1.240	3320	2835	2.04e6	1.64e6	614.5	NO	10.120	10.120
123789-HxCDF	37.644	1.001	1.24e5	9.11e4	1.101	1.357	1.240	3320	2835	1.71e6	1.29e6	513.7	NO	9.841	9.841
1234678-HpCDF	39.727	1.001	1.29e5	1.23e5	1.303	1.051	1.050	1943	2140	1.79e6	1.68e6	918.8	NO	9.815	9.815
1234789-HpCDF	42.456	1.000	9.87e4	9.17e4	1.317	1.077	1.050	1943	2140	1.11e6	1.08e6	573.3	NO	9.571	9.571
OCDF	47.845	1.006	1.54e5	1.71e5	1.166	0.898	0.890	1587	2180	1.40e6	1.54e6	883.0	NO	19.983	19.983
2378-TCDD	26.870	1.001	2.01e4	2.62e4	1.134	0.765	0.770	1285	889	2.72e5	3.48e5	211.6	NO	1.941	1.941
12378-PeCDD	31.988	1.000	1.02e5	6.55e4	0.975	1.562	1.550	1115	773	1.41e6	9.00e5	1267.9	NO	9.872	9.872
123478-HxCDD	36.647	1.000	9.61e4	7.58e4	1.031	1.268	1.240	1493	1507	1.37e6	1.09e6	919.3	NO	9.926	9.926
123678-HxCDD	36.778	1.001	1.01e5	8.20e4	0.971	1.234	1.240	1493	1507	1.34e6	1.10e6	900.3	NO	9.917	9.917
123789-HxCDD	37.206	1.012	9.26e4	7.59e4	0.947	1.221	1.240	1493	1507	1.27e6	1.08e6	848.8	NO	9.943	9.943
1234678-HpCDD	41.557	1.000	8.01e4	7.55e4	1.028	1.061	1.050	1296	1324	9.67e5	9.17e5	746.0	NO	9.822	9.822
OCDD	47.567	1.001	1.32e5	1.50e5	1.107	0.881	0.890	2421	2005	1.24e6	1.38e6	513.8	NO	18.227	18.227
13C-2378-TCDF	26.212	1.006	1.61e6	2.06e6	1.567	0.782	0.770	8042	3396	2.20e7	2.83e7	2733.6	NO		100.369
13C-12378-PeCDF	30.366	1.166	1.87e6	1.18e6	1.274	1.579	1.550	5347	3950	2.45e7	1.57e7	4586.8	NO		102.455
13C-23478-PeCDF	31.714	1.217	1.76e6	1.14e6	1.235	1.549	1.550	5347	3950	2.48e7	1.58e7	4639.2	NO		100.381
13C-123478-HxCDF	35.408	0.952	7.55e5	1.47e6	1.381	0.514	0.510	5314	6448	1.08e7	2.08e7	2027.5	NO		98.776
13C-123678-HxCDF	35.550	0.956	8.54e5	1.63e6	1.569	0.525	0.510	5314	6448	1.17e7	2.23e7	2200.7	NO		96.940
13C-234678-HxCDF	36.493	0.981	7.51e5	1.42e6	1.345	0.530	0.510	5314	6448	1.05e7	1.96e7	1971.4	NO		98.800
13C-123789-HxCDF	37.622	1.012	6.94e5	1.29e6	1.183	0.539	0.510	5314	6448	9.58e6	1.84e7	1802.2	NO		102.675
13C-1234678-HpCDF	39.705	1.068	6.19e5	1.35e6	1.178	0.457	0.440	3354	5015	8.20e6	1.81e7	2445.2	NO		102.663
13C-1234789-HpCDF	42.445	1.141	4.81e5	1.03e6	0.878	0.467	0.440	3354	5015	5.36e6	1.17e7	1598.2	NO		105.491
13C-1234-TCDD	26.048	0.000	1.03e6	1.30e6	1.000	0.792	0.770	3541	1647	1.43e7	1.79e7	4036.4	NO		100.000
13C-2378-TCDD	26.855	1.031	9.17e5	1.19e6	0.908	0.773	0.770	3541	1647	1.23e7	1.59e7	3471.7	NO		99.138
13C-12378-PeCDD	31.977	1.228	1.06e6	6.79e5	0.756	1.566	1.550	2253	2411	1.42e7	9.08e6	6306.3	NO		98.648
13C-123478-HxCDD	36.636	0.985	9.40e5	7.39e5	1.056	1.273	1.240	3866	2476	1.37e7	1.06e7	3541.5	NO		97.494
13C-123678-HxCDD	36.756	0.988	1.06e6	8.40e5	1.163	1.265	1.240	3866	2476	1.40e7	1.12e7	3610.8	NO		100.224
13C-1234678-HpCDD	41.535	1.117	8.03e5	7.38e5	0.909	1.088	1.050	3038	3332	9.57e6	9.18e6	3150.6	NO		103.956
13C-OCDD	47.540	1.278	1.31e6	1.48e6	0.820	0.882	0.890	4449	5697	1.20e7	1.35e7	2705.1	NO		208.660

Page 2300485

Quantify Sample Summary Report **MassLynx MassLynx V4.1 SCN909**
Dataset: P:\DIOXIN8290.PRO\160510IC.qld
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Printed: Thursday, May 12, 2016 14:36:58 Pacific Daylight Time

CS3AA 06/30/16

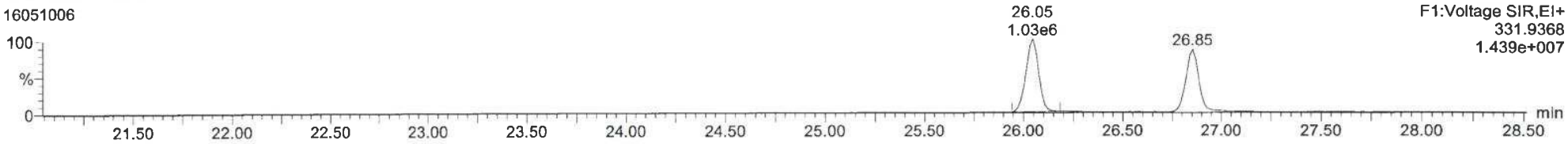
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13C-123789-HxCDD	37.184	0.000	9.13e5	7.18e5	1.000	1.271	1.240	3866	2476	1.24e7	9.87e6	3203.6	NO		100.000
Total-tetrafurans			3.09e4		0.935			712		4.21e5					2.010
Total-penta1			0.00e0					586		0.00e0					
Total-pentafurans			3.48e5		0.957			2318		4.79e6					20.060
Total-hexafurans			5.62e5		1.125			3320		7.77e6					40.233
Total-heptafurans			2.30e5		1.310			1943		2.93e6					19.531
Total-Furans			1.32e6		1.114			712		1.73e7					101.817
Total-tetradioxins			2.04e4		1.134			1285		2.78e5					1.968
Total-pentadioxins			1.04e5		0.975			1115		1.44e6					9.994
Total-hexadioxins			2.92e5		0.983			1493		4.02e6					29.978
Total-heptadioxins			8.19e4		1.028			1296		9.88e5					9.986
Total-Dioxins			6.30e5		1.028			1285		7.97e6					70.152
Total-TEQ			1.95e6					1285		2.53e7					171.969
37CL-2378-TCDD	26.870	1.031	4.85e4		1.067			1406		6.58e5		468.0			1.946
FUNCTION1 PFK			9.43e5					932576		1.84e7					
FUNCTION2 PFK			3.05e5					159650		8.30e6					0.000
FUNCTION3 PFK			1.01e6					591214		2.87e7					0.000
FUNCTION4 PFK			3.50e5					397418		9.33e6					
FUNCTION5 PFK			4.56e5					308988		1.79e7					
FUNCTION1 HXCDPE			2.31e2					387		4.69e3					0.000
FUNCTION1 HPCDPE			4.73e2					695		9.42e3					0.000
FUNCTION2 HPCDPE			2.94e2					593		7.36e3					0.000
FUNCTION3 OCDPE			0.00e0					362		0.00e0					
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FUNCTION5 DCDPE			0.00e0					383		0.00e0					

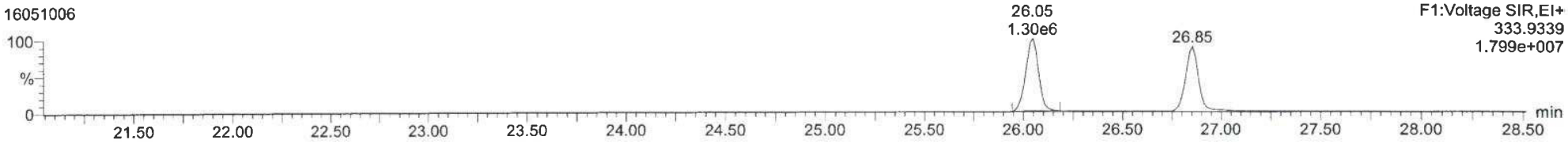
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Last Altered: Wednesday, May 11, 2016 09:28:40 Pacific Daylight Time
Printed: Thursday, May 12, 2016 14:36:58 Pacific Daylight Time

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CS3AA 06/30/16 SD
ID: ~~CS2~~, Name: 16051006, Date: 10-May-2016, Time: 15:30:50, Conditions: AUTOSPEC01, User: pk

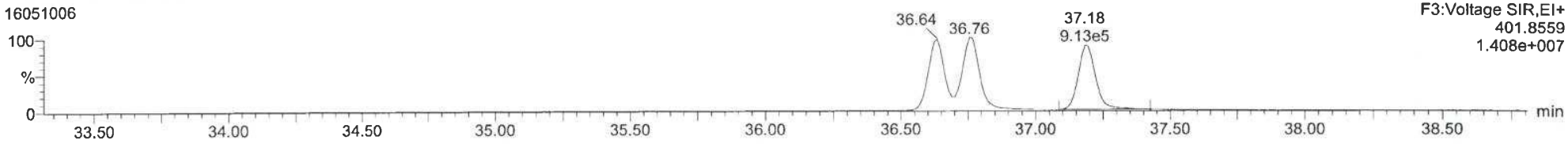
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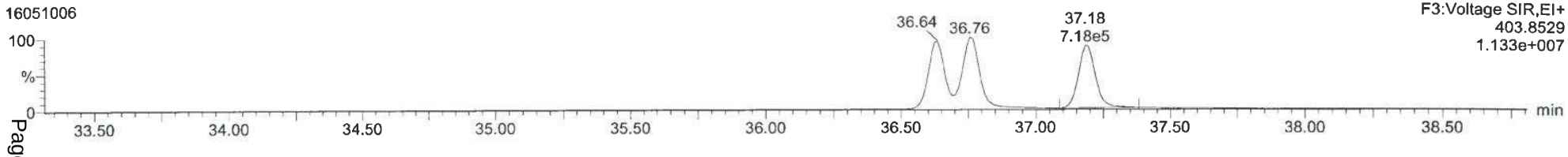
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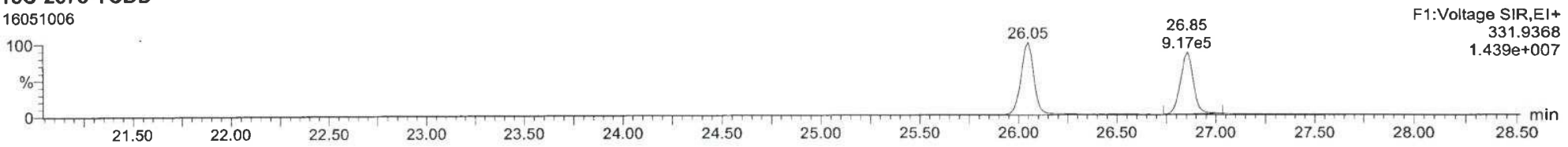
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Printed: Thursday, May 12, 2016 14:36:58 Pacific Daylight Time

Page 204 of 454

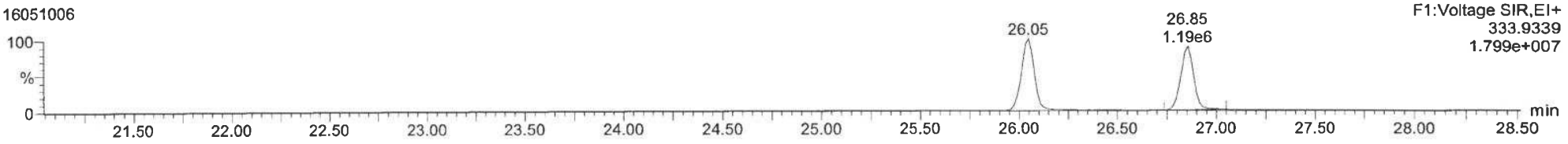
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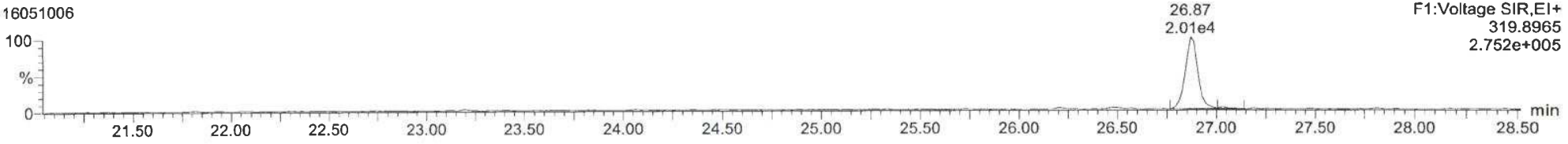
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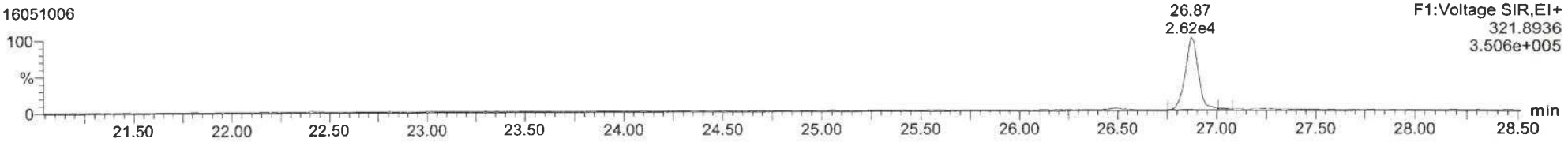
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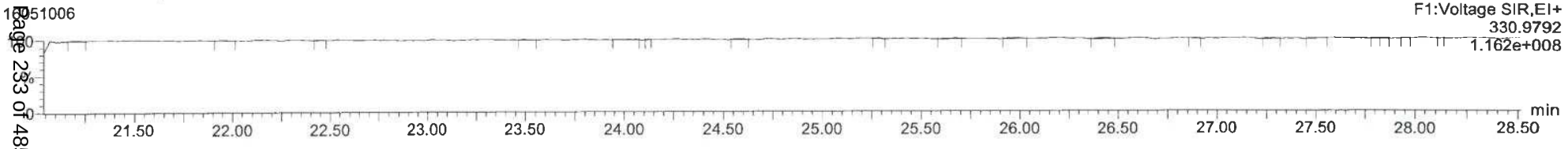
Total-tetradioxins



Total-tetradioxins



FUNCTION1 PFK



Page 233 of 485

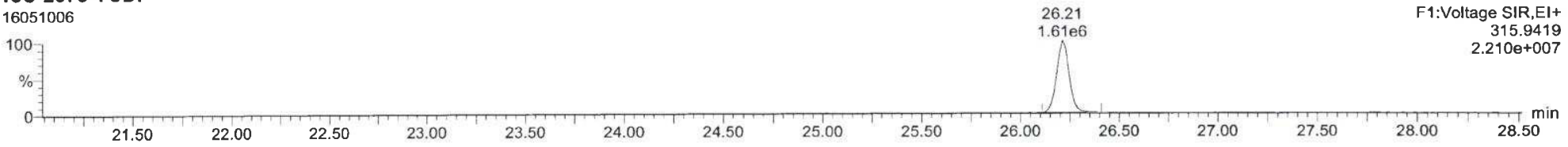
Quantify Sample Report **MassLynx MassLynx V4.1 SCN909**
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Page 205 of 454

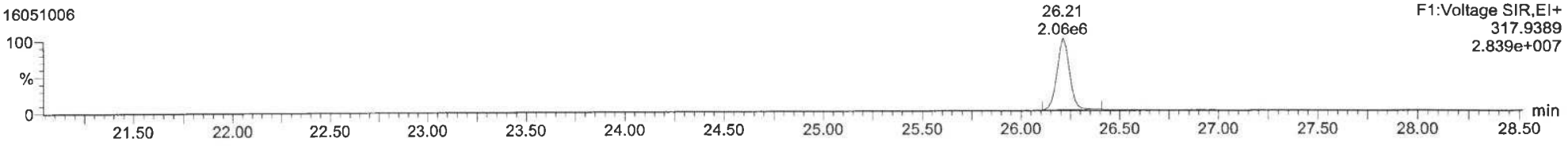
CS3AA 06/30/16

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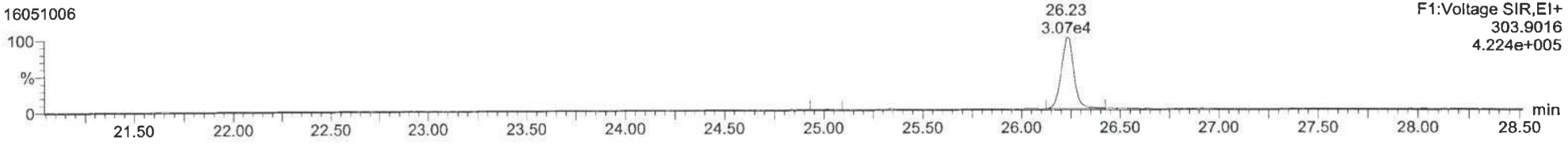
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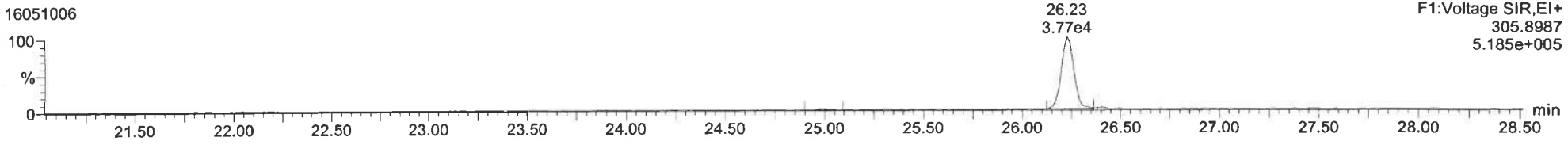
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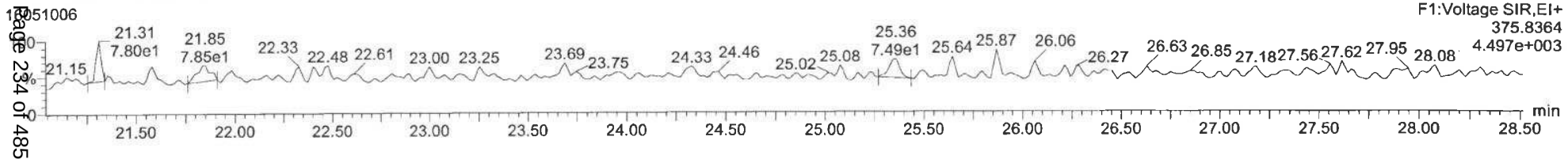
Total-tetrafurans



Total-tetrafurans



FUNCTION1 HXCDPE



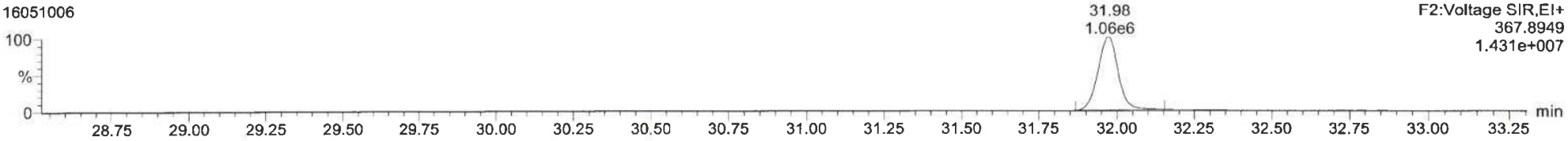
Page 234 of 485

Dataset: P:\DIOXIN8290.PRO\160510IC.qld
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Printed: Thursday, May 12, 2016 14:36:58 Pacific Daylight Time

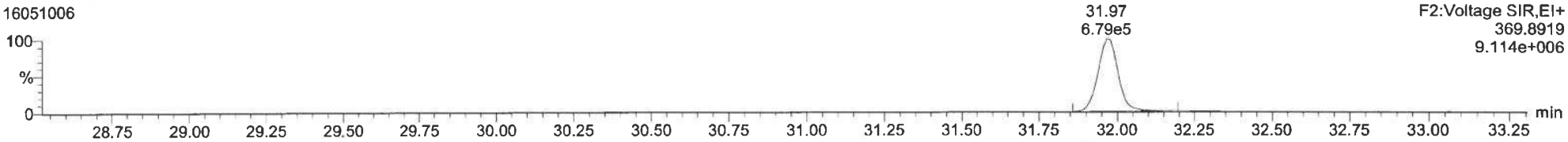
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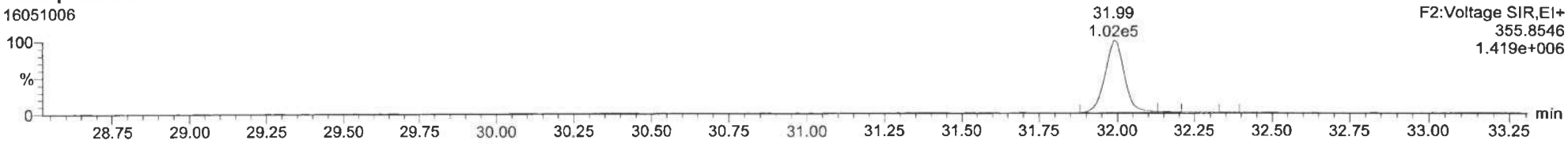
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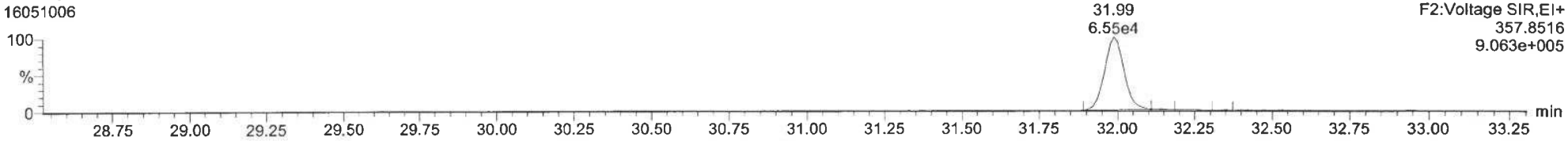
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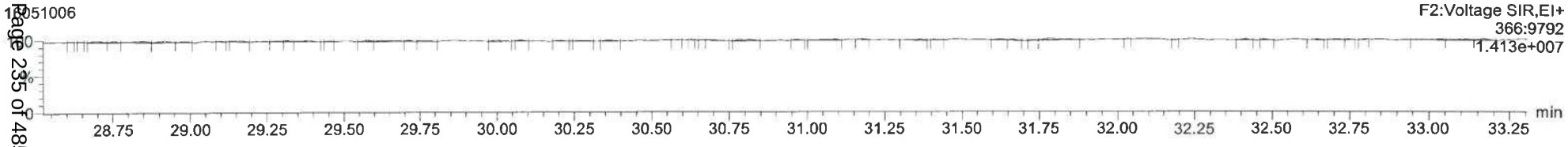
Total-pentadioxins



Total-pentadioxins



FUNCTION2 PFK



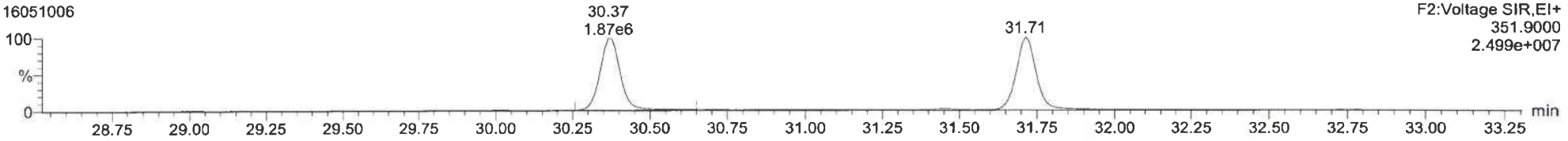
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Page 207 of 454

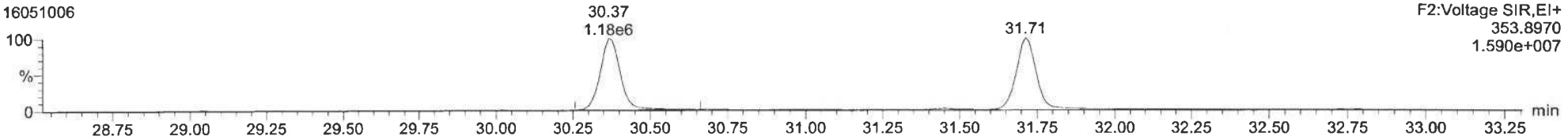
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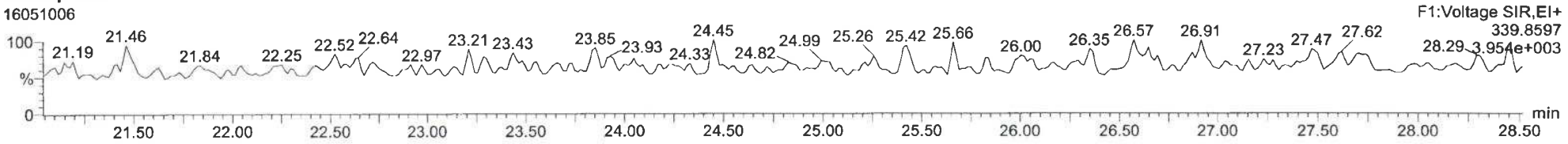
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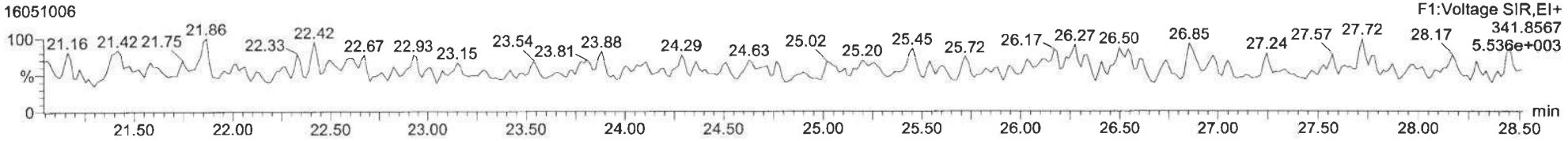
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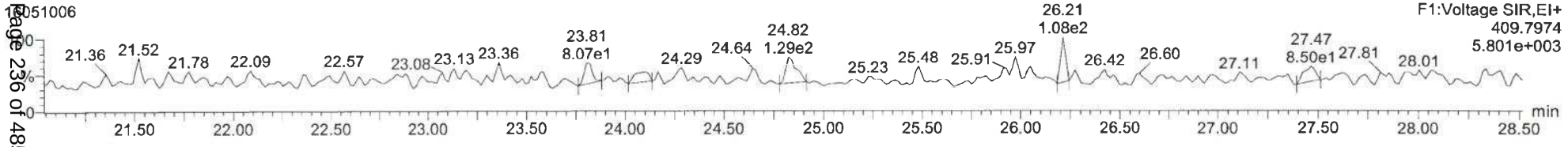
Total-penta1



Total-penta1



FUNCTION1 HPCDPE

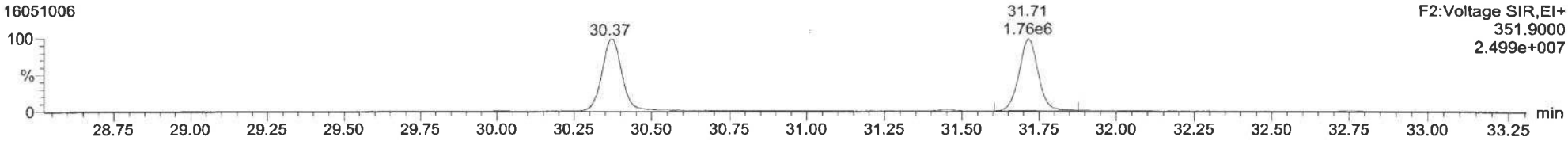


Page 236 of 485

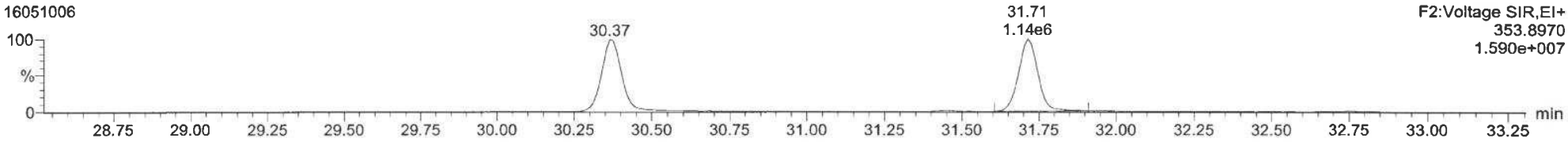
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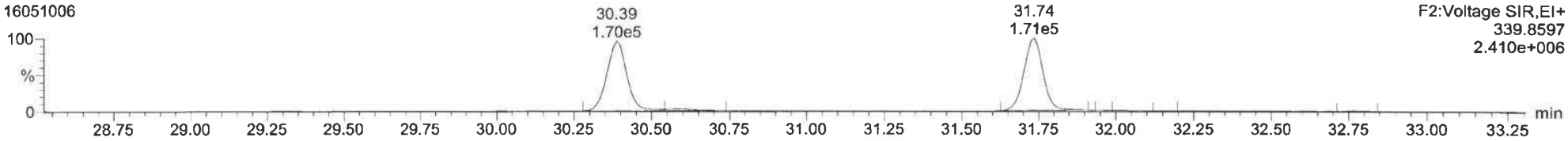
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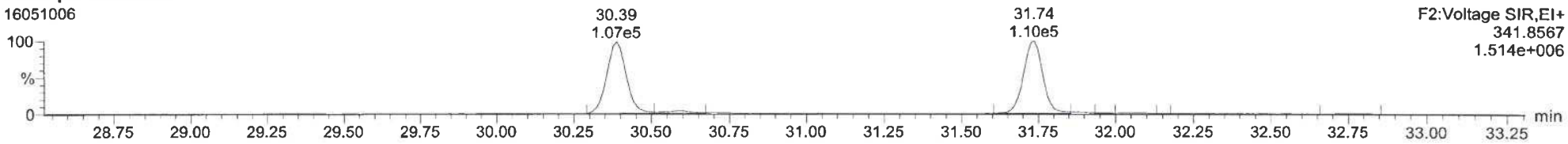
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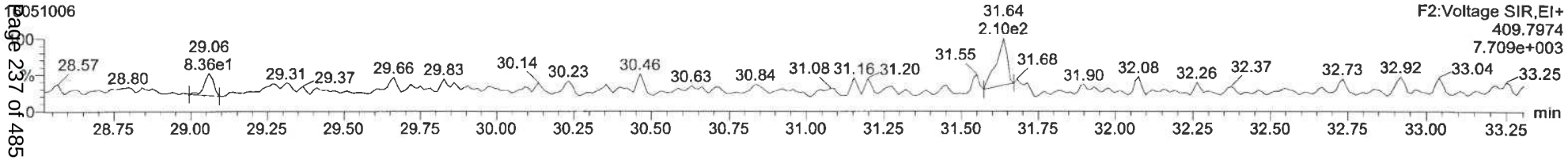
Total-pentafurans



Total-pentafurans



FUNCTION2 HPCDPE



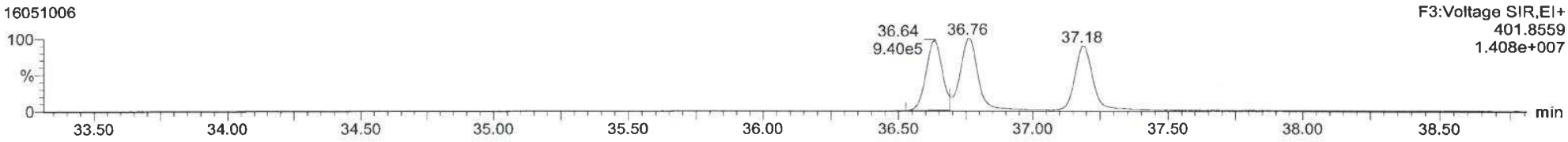
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Page 209 of 454

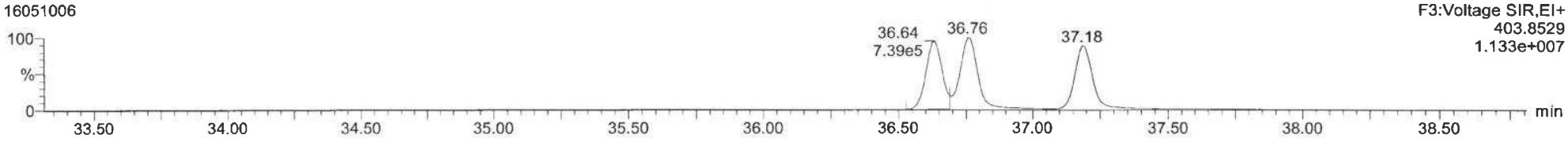
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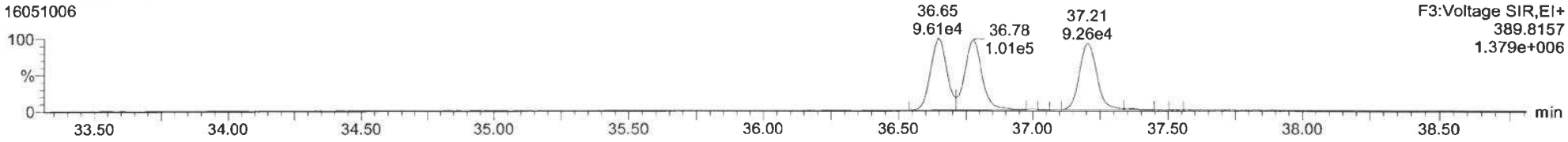
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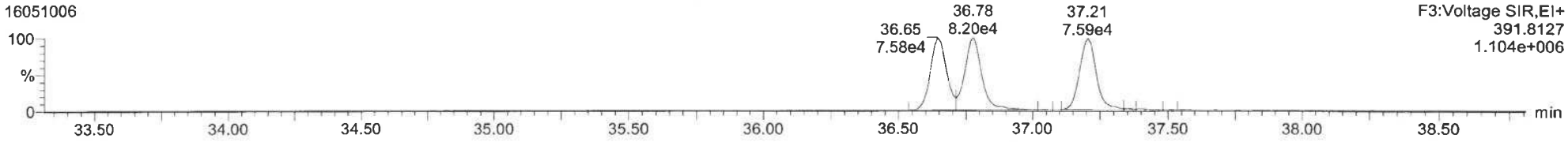
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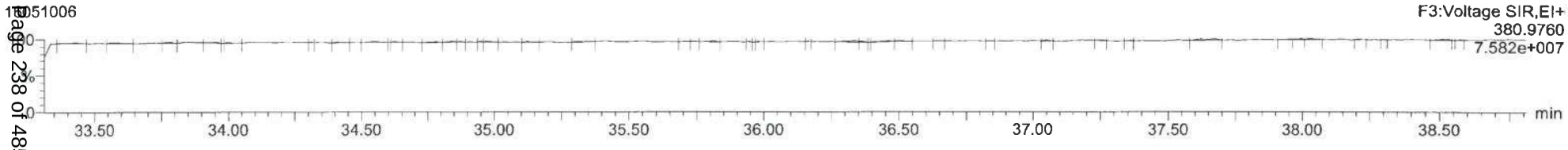
Total-hexadioxins



Total-hexadioxins



FUNCTION3 PFK



Page 238 of 485

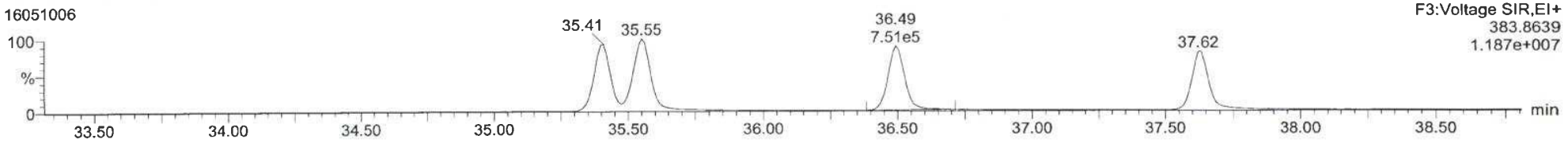
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Page 210 of 454

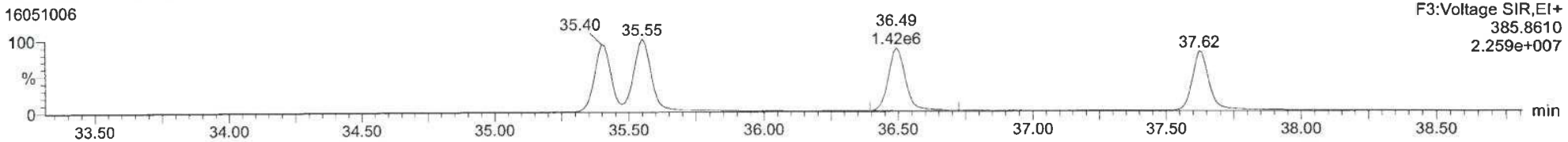
CS3AA 06/30/16

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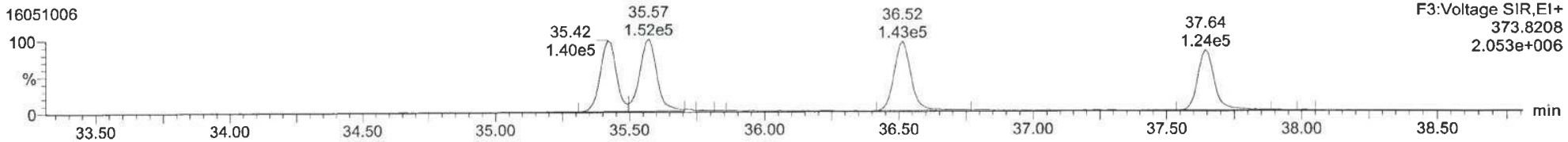
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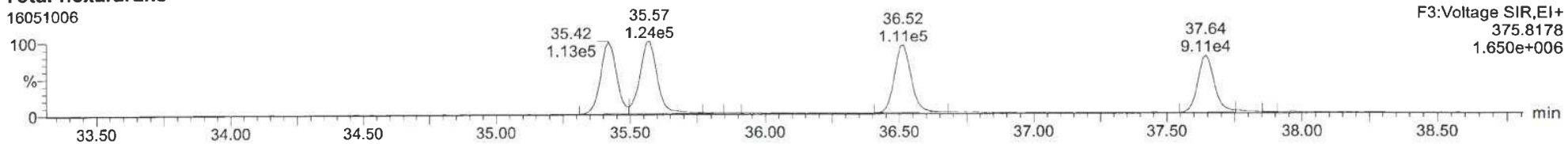
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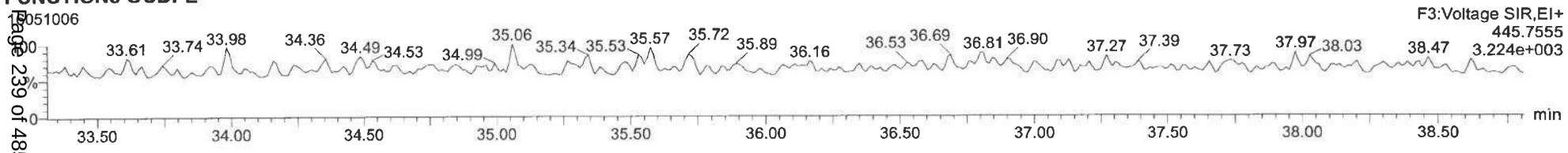
Total-hexafurans



Total-hexafurans



FUNCTION3 OCDPE



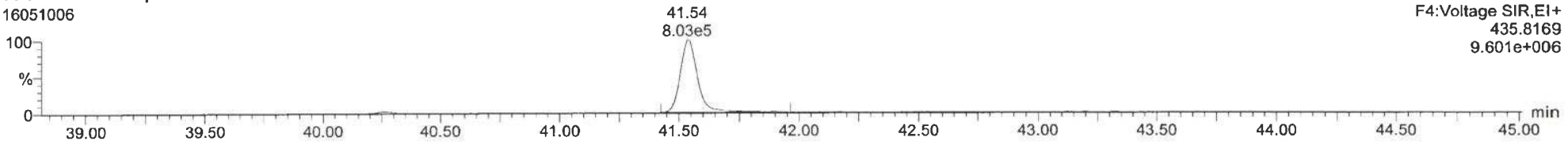
Page 239 of 485

Quantify Sample Report **MassLynx MassLynx V4.1 SCN909**
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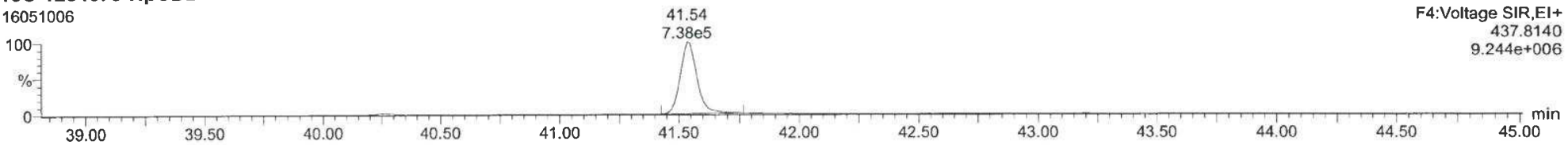
CS3AA 5/31/16

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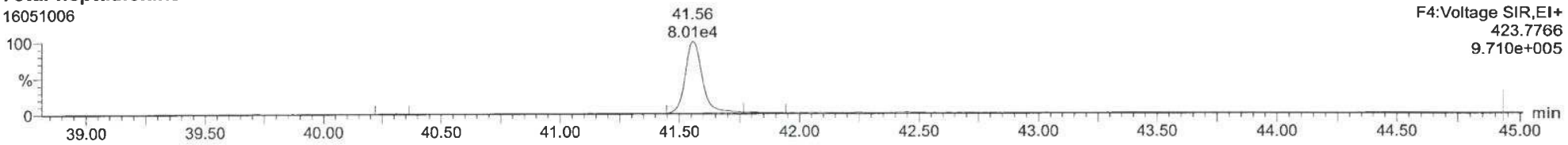
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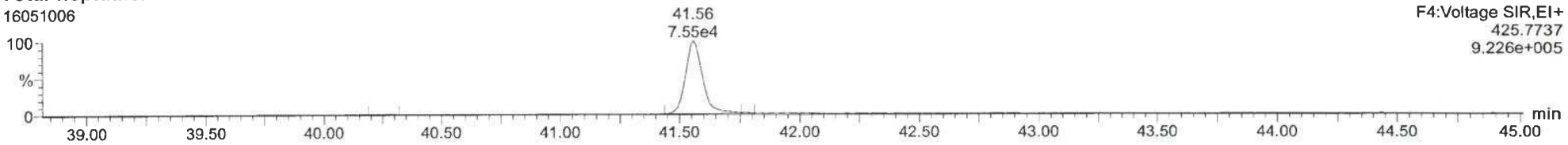
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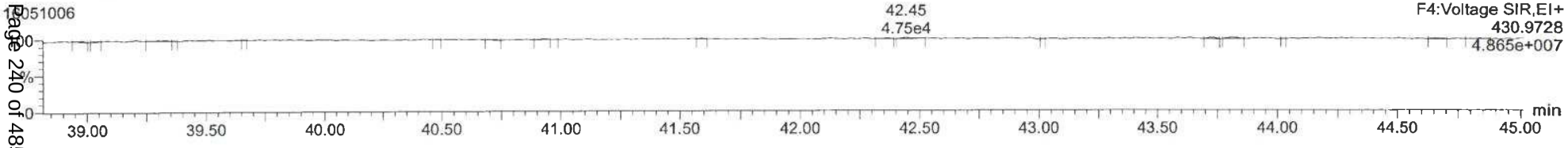
Total-heptadioxins



Total-heptadioxins



FUNCTION4 PFK

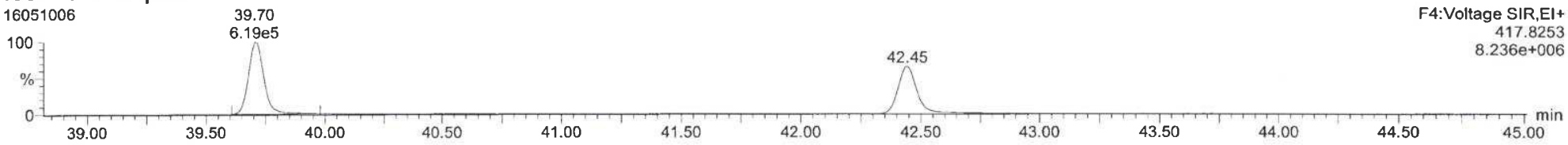


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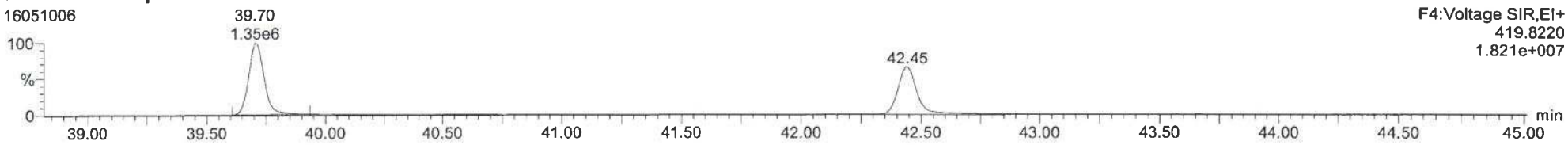
CS3AA 04/30/16

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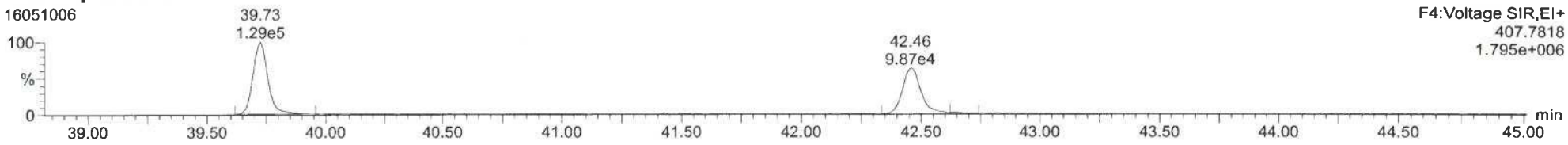
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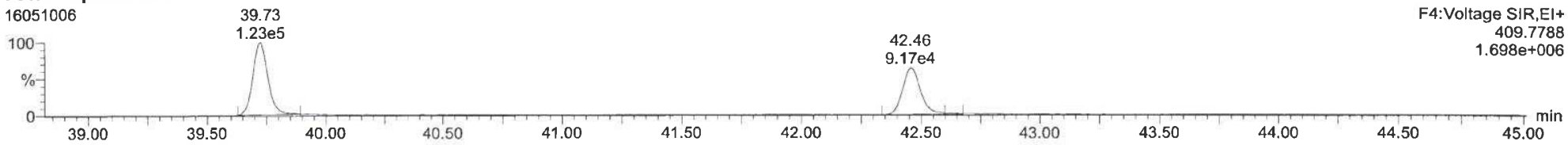
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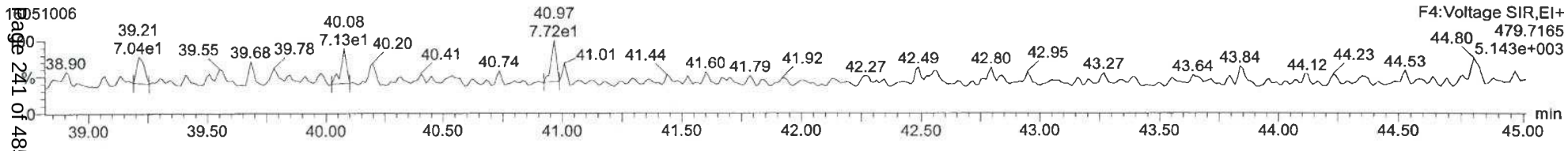
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Total-heptafurans



FUNCTION4 NCDPE

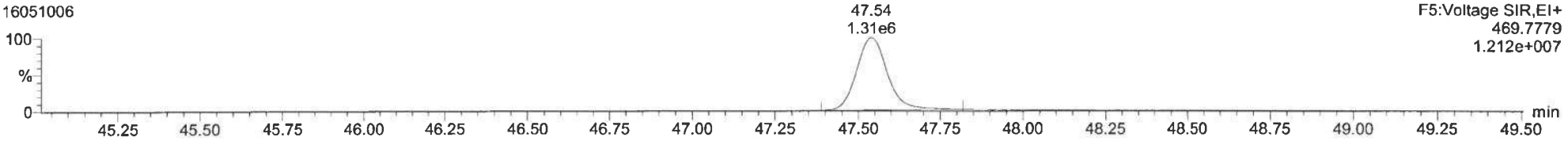


Page 213 of 454

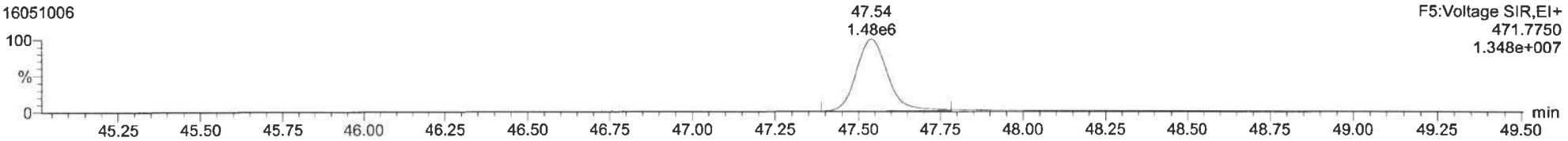
CS3A1 06/30/16

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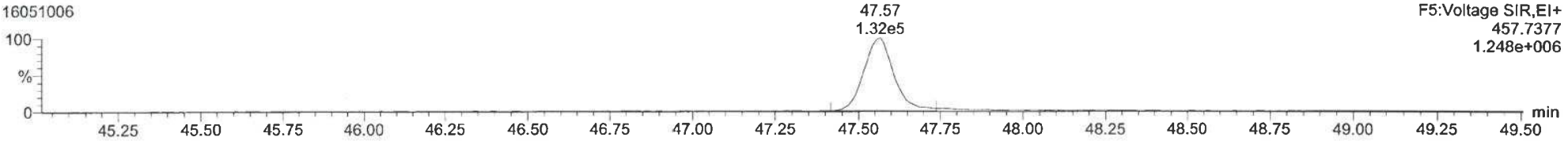
13C-OCDD



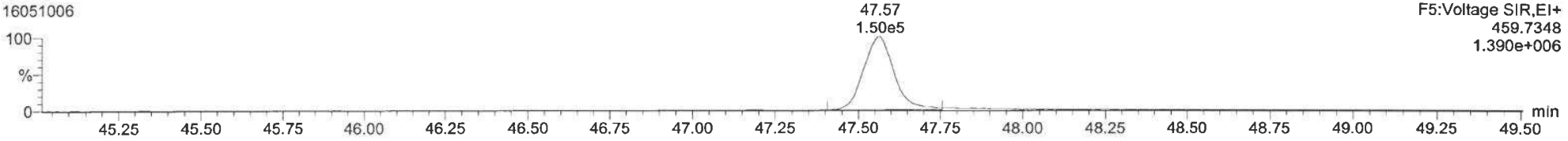
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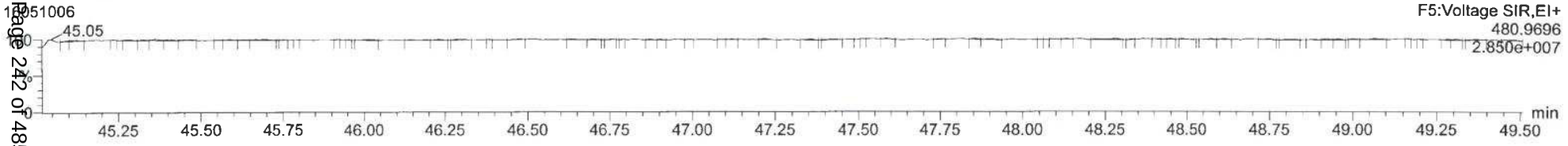
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OCDD



FUNCTION5 PFK



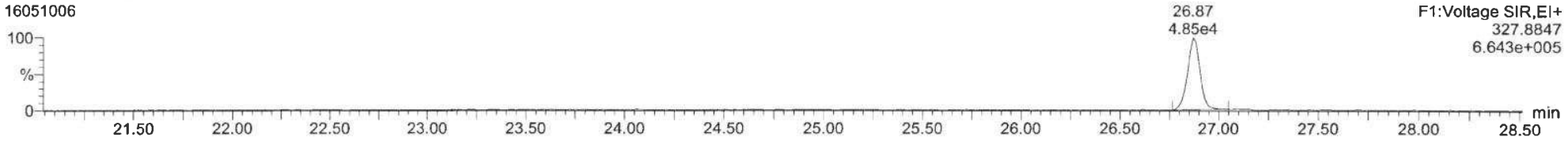
Page 242 of 485

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Printed: Thursday, May 12, 2016 14:36:58 Pacific Daylight Time

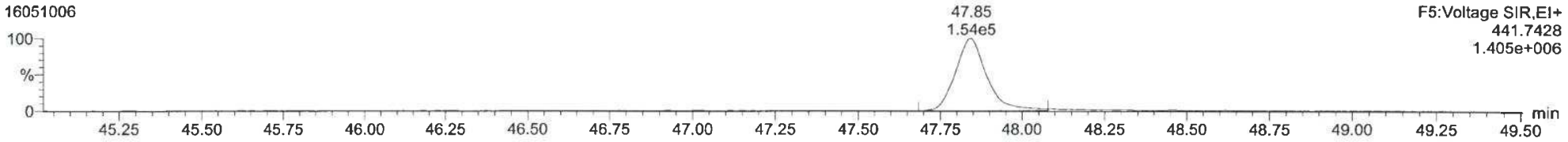
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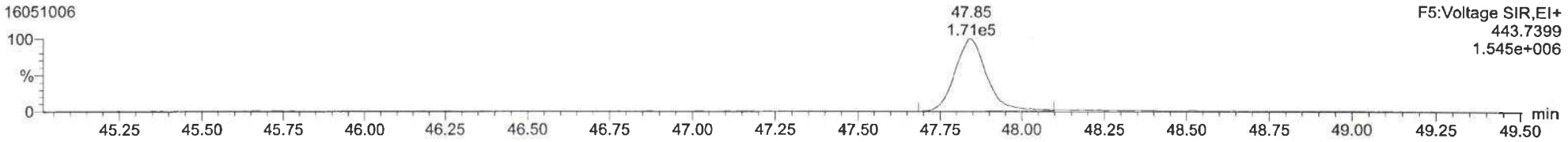
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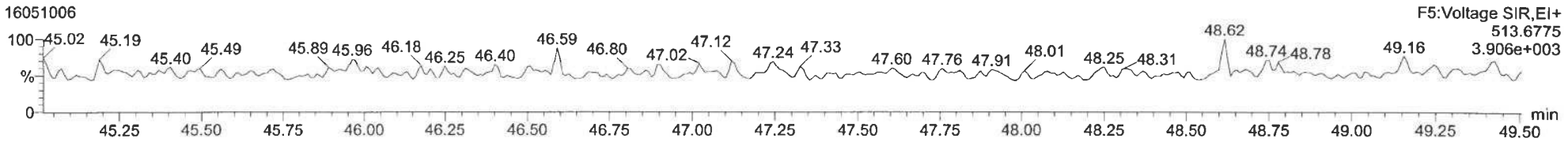
OCDF



OCDF



FUNCTION5 DCDPE



Quantify Sample Summary Report **MassLynx MassLynx V4.1 SCN909**
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Last Altered: Wednesday, May 11, 2016 09:28:40 Pacific Daylight Time
Printed: Thursday, May 12, 2016 14:37:00 Pacific Daylight Time

Page 215 of 354

Method: P:\DIOXIN8290.pro\MethDB\Dioxin1604143SN.mdb 14 Apr 2016 14:40:15
Calibration: P:\DIOXIN8290.PRO\CurveDB\160510ICAL.cdb 11 May 2016 09:28:40
CS4AA 06/30/16
ID: CS3, Name: 16051007, Date: 10-May-2016, Time: 16:22:15, Conditions: AUTOSPEC01, User: pk

Name	RT	RRT	Ion1Area	Ion2Area	RRF	Ratio	Pred R	Noise 1	Noise 2	Height 1	Height 2	S/N	EMPC?	EMPC	pg
2378-TCDF	26.213	1.001	1.78e5	2.30e5	0.935	0.770	0.770	2421	2881	2.34e6	3.03e6	965.7	NO	10.064	10.064
12378-PeCDF	30.377	1.000	1.00e6	6.32e5	0.952	1.584	1.550	5774	5259	1.37e7	8.68e6	2375.1	NO	50.599	50.599
23478-PeCDF	31.725	1.000	9.64e5	6.14e5	0.963	1.571	1.550	5774	5259	1.38e7	8.80e6	2389.5	NO	50.194	50.194
123478-HxCDF	35.419	1.001	7.74e5	6.24e5	1.137	1.241	1.240	8198	6551	1.11e7	9.02e6	1356.2	NO	50.247	50.247
234678-HxCDF	36.515	1.001	7.55e5	6.06e5	1.164	1.245	1.240	8198	6551	1.05e7	8.36e6	1283.4	NO	49.864	49.864
123678-HxCDF	35.573	1.001	8.37e5	6.76e5	1.099	1.238	1.240	8198	6551	1.14e7	9.02e6	1389.4	NO	50.545	50.545
123789-HxCDF	37.645	1.001	6.09e5	4.84e5	1.101	1.257	1.240	8198	6551	8.62e6	6.97e6	1051.3	NO	48.371	48.371
1234678-HpCDF	39.727	1.001	6.40e5	6.58e5	1.303	0.973	1.050	6203	5140	8.59e6	8.58e6	1385.6	NO	50.258	50.258
1234789-HpCDF	42.457	1.000	4.88e5	4.65e5	1.317	1.051	1.050	6203	5140	5.80e6	5.56e6	935.4	NO	50.389	50.389
OCDF	47.837	1.006	7.50e5	8.40e5	1.166	0.892	0.890	3246	3947	6.70e6	7.62e6	2063.8	NO	102.360	102.360
2378-TCDD	26.870	1.001	1.29e5	1.57e5	1.134	0.821	0.770	1985	1394	1.68e6	2.12e6	846.6	NO	10.089	10.089
12378-PeCDD	31.989	1.001	6.19e5	3.92e5	0.975	1.580	1.550	4664	3561	8.64e6	5.44e6	1852.9	NO	51.349	51.349
123478-HxCDD	36.647	1.000	5.32e5	4.27e5	1.031	1.245	1.240	4738	4830	7.84e6	6.25e6	1655.4	NO	50.735	50.735
123678-HxCDD	36.779	1.001	5.79e5	4.47e5	0.971	1.296	1.240	4738	4830	7.71e6	6.00e6	1626.3	NO	51.207	51.207
123789-HxCDD	37.206	1.012	5.31e5	4.08e5	0.947	1.300	1.240	4738	4830	7.22e6	5.69e6	1523.3	NO	50.943	50.943
1234678-HpCDD	41.558	1.000	4.00e5	3.84e5	1.028	1.042	1.050	3688	4172	4.95e6	4.66e6	1343.4	NO	49.964	49.964
OCDD	47.559	1.000	6.35e5	7.31e5	1.107	0.868	0.890	2846	3297	5.96e6	6.89e6	2094.7	NO	92.591	92.591
13C-2378-TCDF	26.198	1.006	1.90e6	2.44e6	1.567	0.777	0.770	10273	5323	2.55e7	3.28e7	2478.2	NO		98.091
13C-12378-PeCDF	30.366	1.166	2.07e6	1.32e6	1.274	1.563	1.550	5465	4417	2.88e7	1.82e7	5276.6	NO		94.299
13C-23478-PeCDF	31.715	1.218	2.00e6	1.27e6	1.235	1.581	1.550	5465	4417	2.81e7	1.76e7	5137.2	NO		93.789
13C-123478-HxCDF	35.397	0.952	8.33e5	1.61e6	1.381	0.516	0.510	5046	6079	1.19e7	2.30e7	2354.1	NO		101.606
13C-123678-HxCDF	35.551	0.956	9.61e5	1.76e6	1.569	0.546	0.510	5046	6079	1.27e7	2.37e7	2512.4	NO		99.485
13C-234678-HxCDF	36.493	0.981	8.24e5	1.52e6	1.345	0.541	0.510	5046	6079	1.10e7	2.08e7	2182.4	NO		99.999
13C-123789-HxCDF	37.623	1.012	6.94e5	1.36e6	1.183	0.511	0.510	5046	6079	9.59e6	1.84e7	1899.8	NO		99.465
13C-1234678-HpCDF	39.705	1.068	6.30e5	1.35e6	1.178	0.465	0.440	3924	5699	8.22e6	1.82e7	2094.3	NO		96.456
13C-1234789-HpCDF	42.446	1.141	4.50e5	9.86e5	0.878	0.456	0.440	3924	5699	5.36e6	1.15e7	1366.3	NO		93.769
13C-1234-TCDD	26.034	0.000	1.25e6	1.58e6	1.000	0.790	0.770	3668	2181	1.76e7	2.25e7	4800.2	NO		100.000
13C-2378-TCDD	26.840	1.031	1.10e6	1.40e6	0.908	0.789	0.770	3668	2181	1.50e7	1.91e7	4077.1	NO		97.659
13C-12378-PeCDD	31.966	1.228	1.23e6	7.84e5	0.756	1.575	1.550	2656	2320	1.73e7	1.10e7	6509.6	NO		94.655
13C-123478-HxCDD	36.636	0.985	1.03e6	8.08e5	1.056	1.270	1.240	4105	3134	1.50e7	1.17e7	3651.1	NO		99.538
13C-123678-HxCDD	36.757	0.988	1.15e6	9.11e5	1.163	1.263	1.240	4105	3134	1.54e7	1.24e7	3748.4	NO		101.680
13C-1234678-HpCDD	41.547	1.117	7.79e5	7.47e5	0.909	1.043	1.050	3359	3150	9.60e6	9.17e6	2856.6	NO		96.286
13C-OCDD	47.541	1.278	1.27e6	1.39e6	0.820	0.913	0.890	2890	5148	1.14e7	1.27e7	3958.4	NO		186.477

Page 244 of 485

Quantify Sample Summary Report **MassLynx MassLynx V4.1 SCN909**
Dataset: P:\DIOXIN8290.PRO\160510IC.qld
Last Altered: Wednesday, May 11, 2016 09:28:40 Pacific Daylight Time
Printed: Thursday, May 12, 2016 14:37:00 Pacific Daylight Time

CS4AA 04/30/16

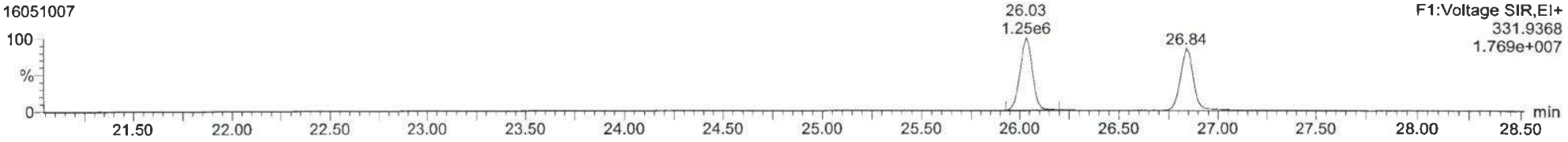
ID: ~~CS3~~, Name: 16051007, Date: 10-May-2016, Time: 16:22:15, Conditions: AUTOSPEC01, User: pk

Name	RT	RRT	Ion1Area	Ion2Area	RRF	Ratio	Pred R	Noise 1	Noise 2	Height 1	Height 2	S/N	EMPC?	EMPC	pg
13C-123789-HxCDD	37.184	0.000	9.76e5	7.68e5	1.000	1.270	1.240	4105	3134	1.33e7	1.04e7	3233.4	NO		100.000
Total-tetrafurans			5.55e5		0.935			2421		7.52e6					31.166
Total-penta1			1.28e6					1529		1.75e7					69.412
Total-pentafurans			2.96e6		0.957			5774		4.13e7					152.122
Total-hexafurans			3.93e6		1.125			8198		5.52e7					263.103
Total-heptafurans			1.13e6		1.310			6203		1.45e7					100.979
Total-Furans			1.06e7		1.114			2421		1.43e8					719.141
Total-tetradioxins			7.09e5		1.134			1985		8.29e6					56.500
Total-pentadioxins			2.29e6		0.975			4664		2.70e7					189.364
Total-hexadioxins			2.40e6		0.983			4738		3.32e7					224.417
Total-heptadioxins			8.83e5		1.028			3688		1.14e7					111.222
Total-Dioxins			6.91e6		1.028			1985		8.58e7					674.113
Total-TEQ			1.75e7					1985		2.29e8					1393.254
37CL-2378-TCDD	26.855	1.032	2.91e5		1.067			1895		3.93e6		2073.8			9.687
FUNCTION1 PFK			1.13e6					1200435		2.46e7					
FUNCTION2 PFK			3.93e5					220776		1.09e7					0.000
FUNCTION3 PFK			2.71e6					770478		7.24e7					0.000
FUNCTION4 PFK			3.24e5					618458		8.97e6					
FUNCTION5 PFK			3.38e5					406410		1.22e7					
FUNCTION1 HXCDPE			7.89e2					744		1.64e4					0.000
FUNCTION1 HPCDPE			6.19e2					929		1.61e4					0.000
FUNCTION2 HPCDPE			1.48e3					1245		2.67e4					0.000
FUNCTION3 OCDPE			0.00e0					468		0.00e0					
FUNCTION4 NCDPE			3.15e2					785		6.77e3					0.000
FUNCTION5 DCDPE			0.00e0					470		0.00e0					

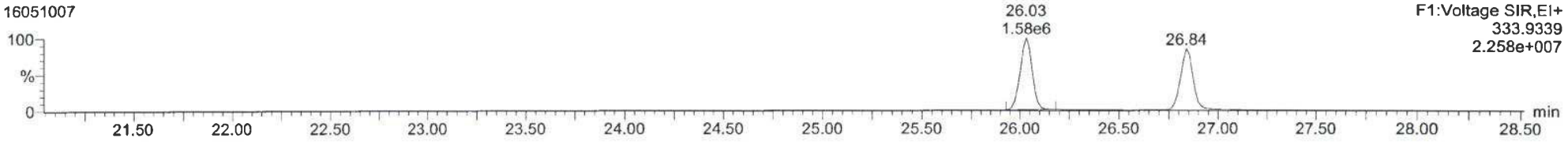
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Calibration: P:\DIOXIN8290.PRO\CurveDB\160510ICAL.cdb 11 May 2016 09:28:40
CS4AA 05/30/16
ID: ~~CS3~~, Name: 16051007, Date: 10-May-2016, Time: 16:22:15, Conditions: AUTOSPEC01, User: pk

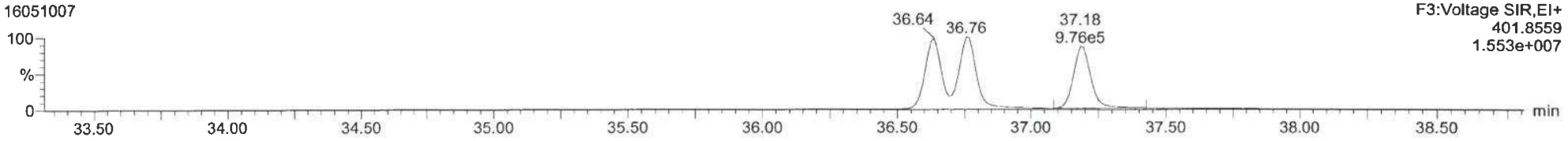
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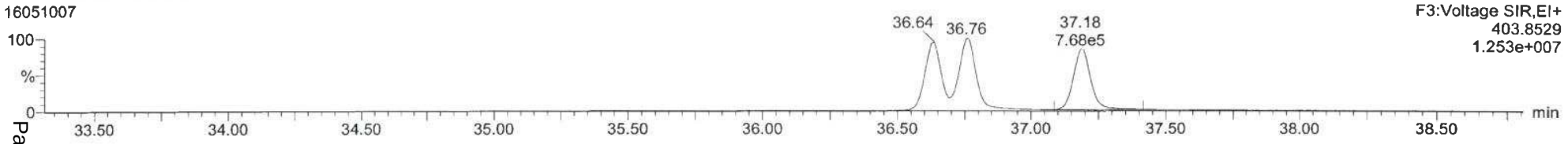
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13C-123789-HxCDD



13C-123789-HxCDD



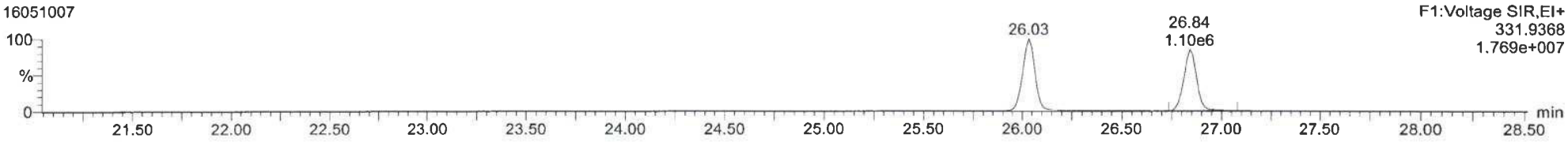
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Page 218 of 454

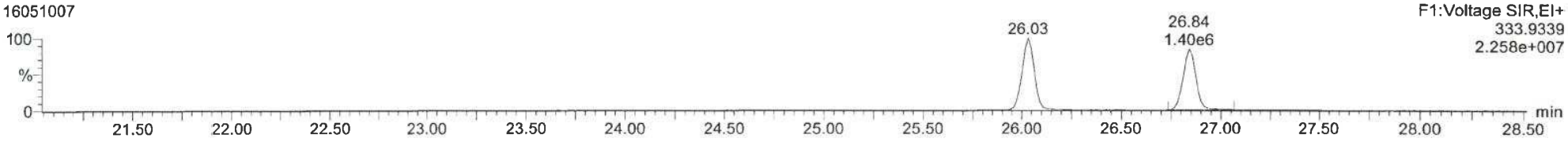
CS4AA 04/30/16

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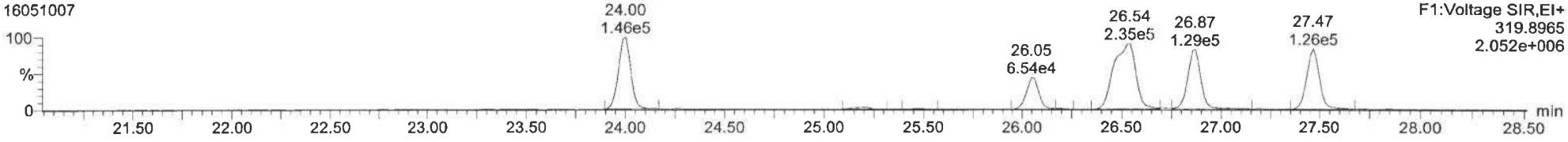
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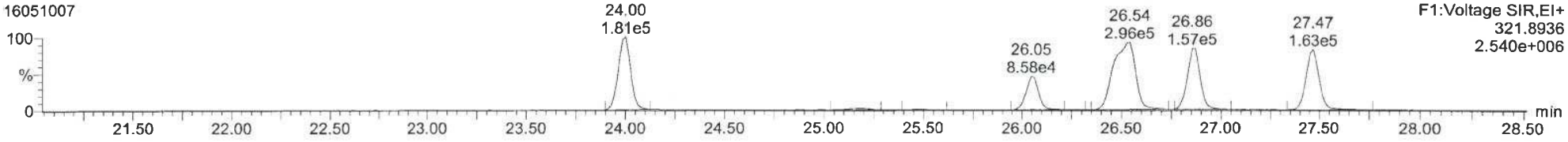
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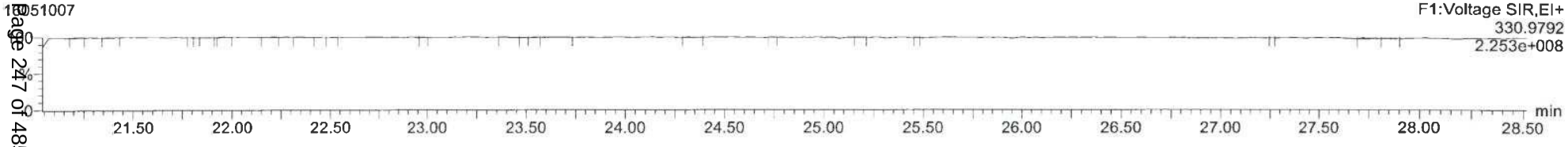
Total-tetradioxins



Total-tetradioxins



FUNCTION1 PFK



Page 247 of 485

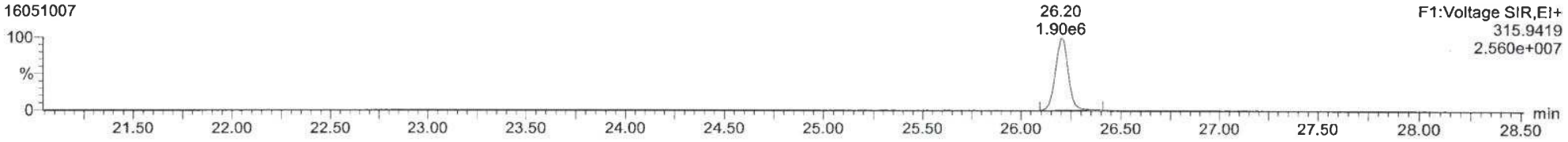
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Last Altered: Wednesday, May 11, 2016 09:28:40 Pacific Daylight Time
Printed: Thursday, May 12, 2016 14:37:00 Pacific Daylight Time

Page 219 of 454

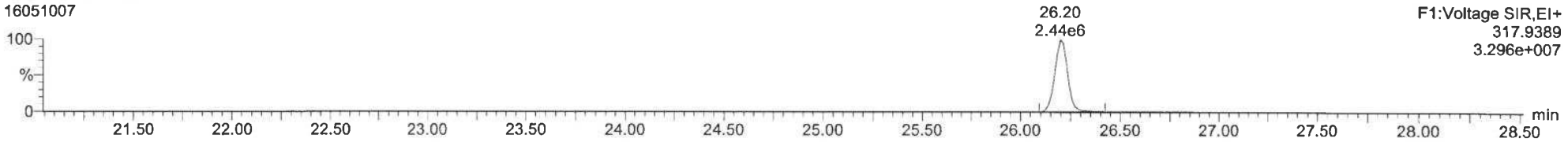
S4AA 06/30/16

ID: ~~C33~~, Name: 16051007, Date: 10-May-2016, Time: 16:22:15, Conditions: AUTOSPEC01, User: pk

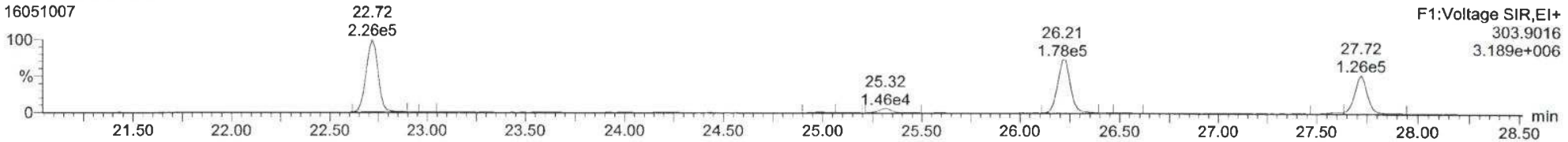
13C-2378-TCDF



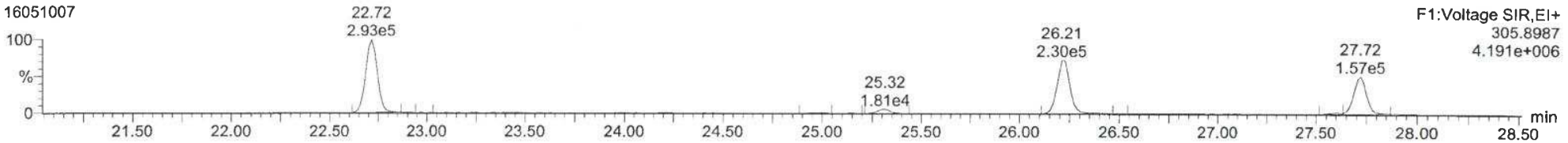
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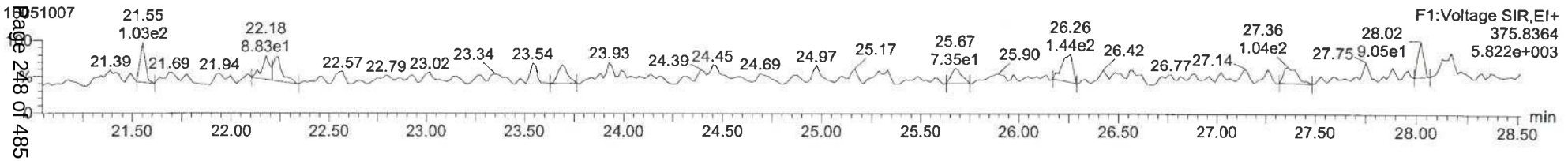
Total-tetrafurans



Total-tetrafurans



FUNCTION1 HXCDPE



Page 248 of 485

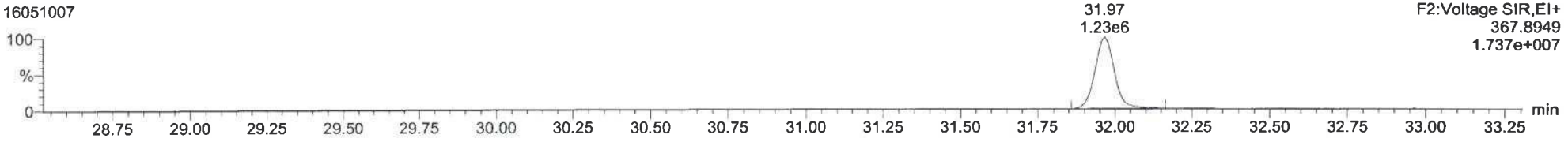
Quantify Sample Report **MassLynx MassLynx V4.1 SCN909**
Dataset: P:\DIOXIN8290.PRO\160510IC.qld
Last Altered: Wednesday, May 11, 2016 09:28:40 Pacific Daylight Time
Printed: Thursday, May 12, 2016 14:37:00 Pacific Daylight Time

Page 220 of 454

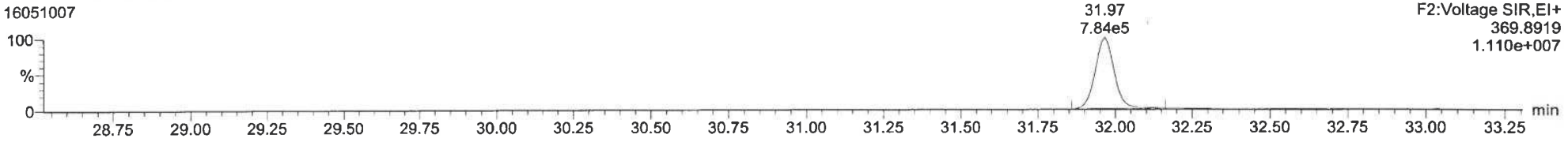
CS4AA 04/30/16

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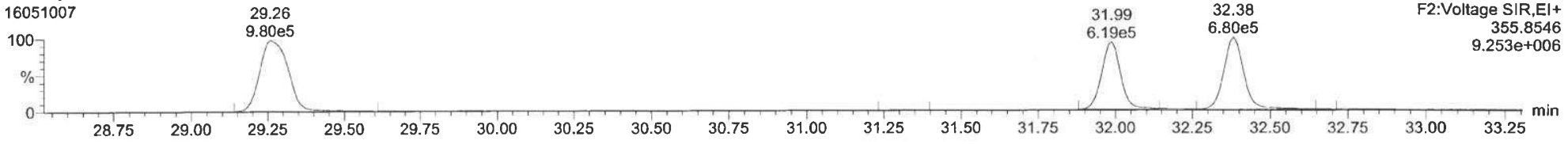
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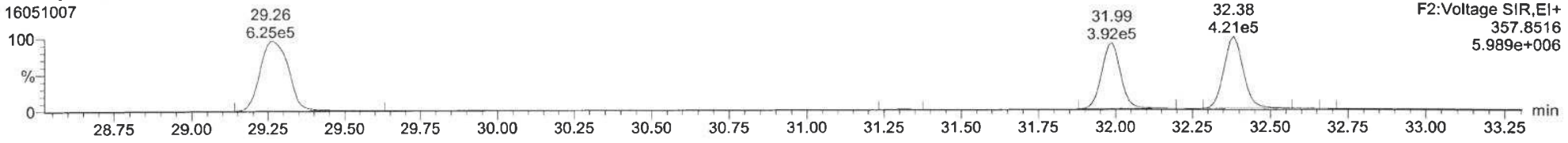
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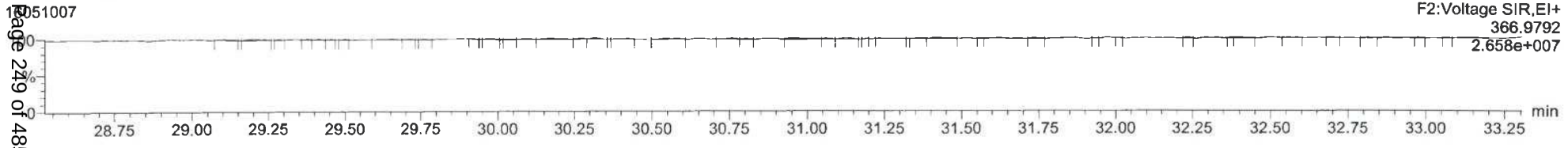
Total-pentadioxins



Total-pentadioxins



FUNCTION2 PFK



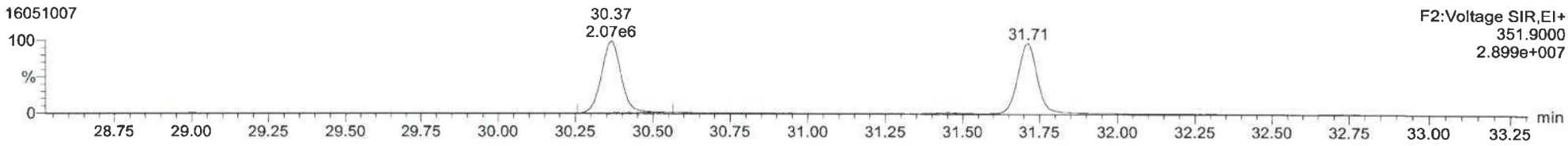
Page 249 of 485

Dataset: P:\DIOXIN8290.PRO\160510IC.qld
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Printed: Thursday, May 12, 2016 14:37:00 Pacific Daylight Time

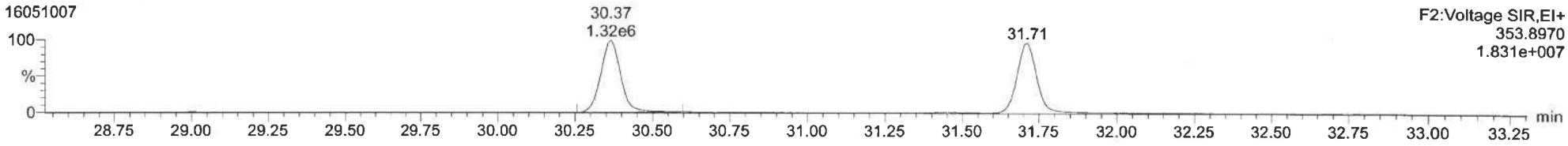
CS4AA 04/30/16

ID: CS3, Name: 16051007, Date: 10-May-2016, Time: 16:22:15, Conditions: AUTOSPEC01, User: pk

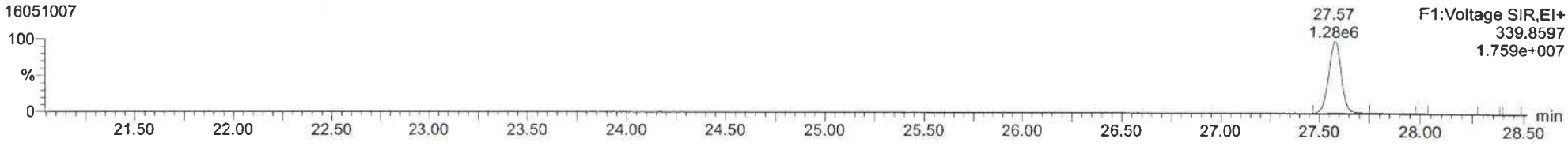
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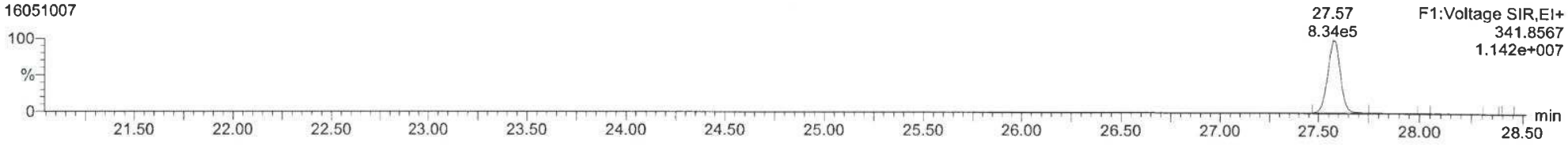
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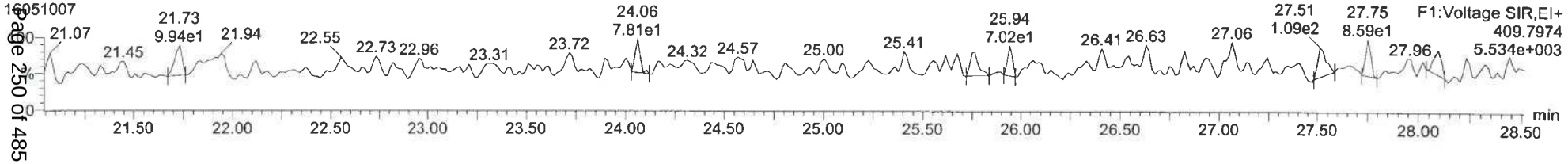
Total-penta1



Total-penta1



FUNCTION1 HPCDPE



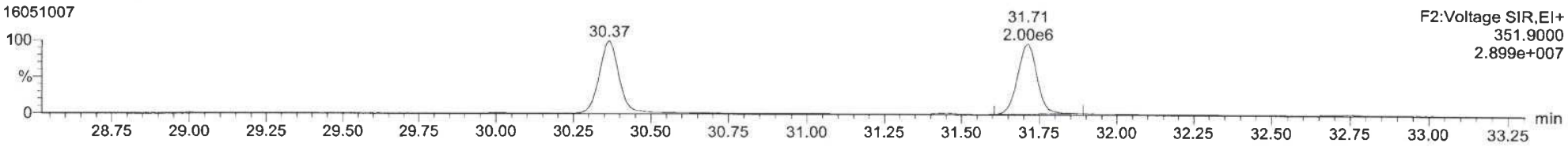
Quantify Sample Report **MassLynx MassLynx V4.1 SCN909**
Dataset: P:\DIOXIN8290.PRO\160510IC.qld
Last Altered: Wednesday, May 11, 2016 09:28:40 Pacific Daylight Time
Printed: Thursday, May 12, 2016 14:37:00 Pacific Daylight Time

Page 222 of 458

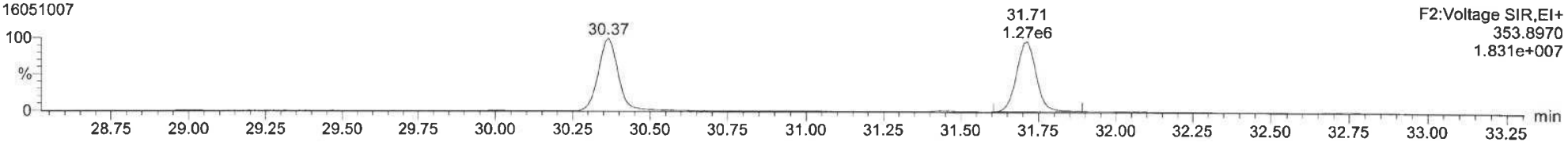
CS4AA 06/30/16

ID: CS3, Name: 16051007, Date: 10-May-2016, Time: 16:22:15, Conditions: AUTOSPEC01, User: pk

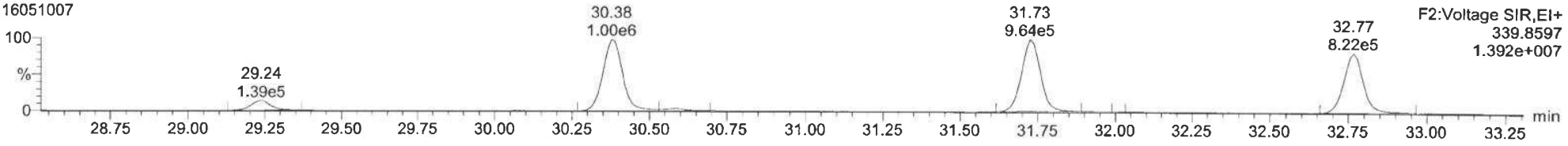
13C-23478-PeCDF



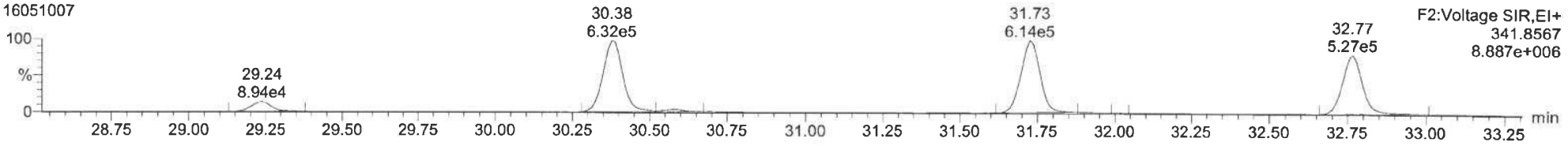
13C-23478-PeCDF



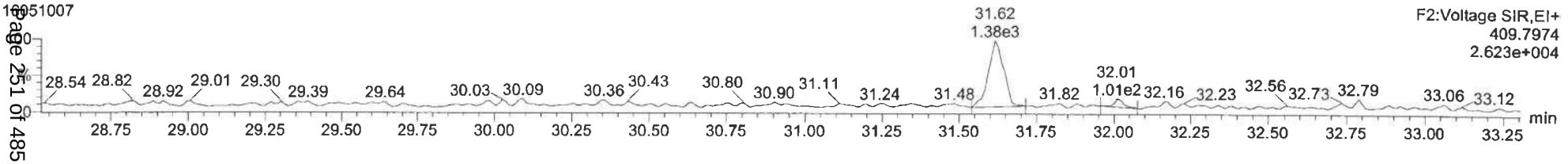
Total-pentafurans



Total-pentafurans



FUNCTION2 HPCDPE



Page 251 of 485

Dataset: P:\DIOXIN8290.PRO\160510IC.qld
Last Altered: Wednesday, May 11, 2016 09:28:40 Pacific Daylight Time
Printed: Thursday, May 12, 2016 14:37:00 Pacific Daylight Time

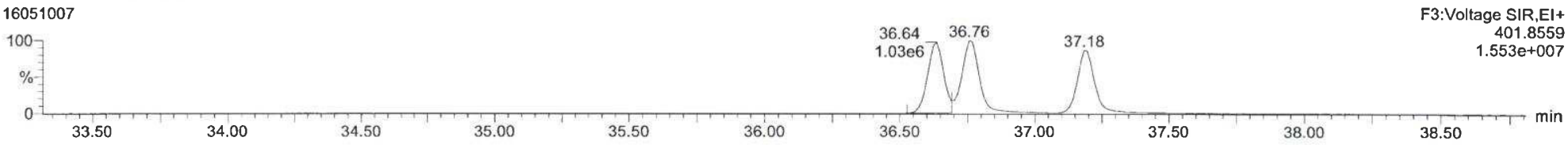
Page 223 of 453

CS4AS 06/30/16

ID: ~~CS3~~, Name: 16051007, Date: 10-May-2016, Time: 16:22:15, Conditions: AUTOSPEC01, User: pk

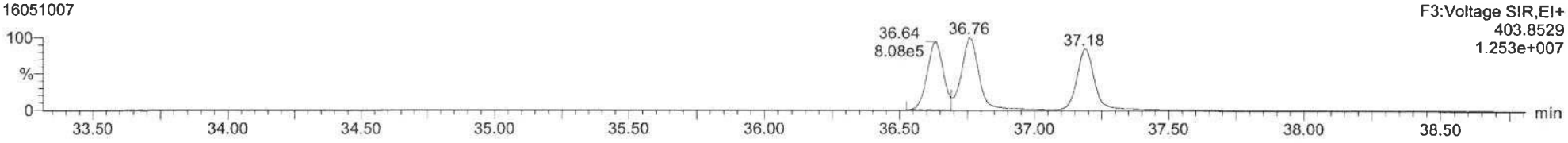
13C-123478-HxCDD

16051007



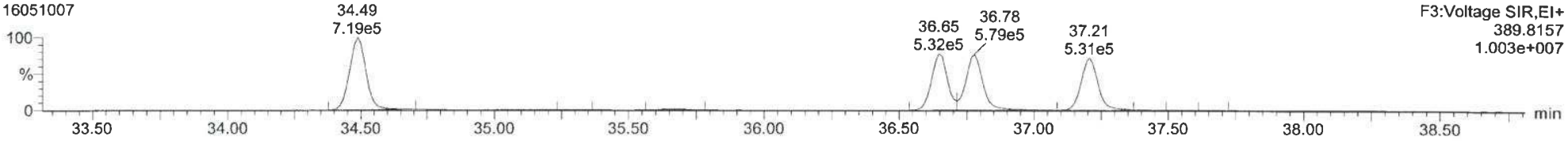
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16051007



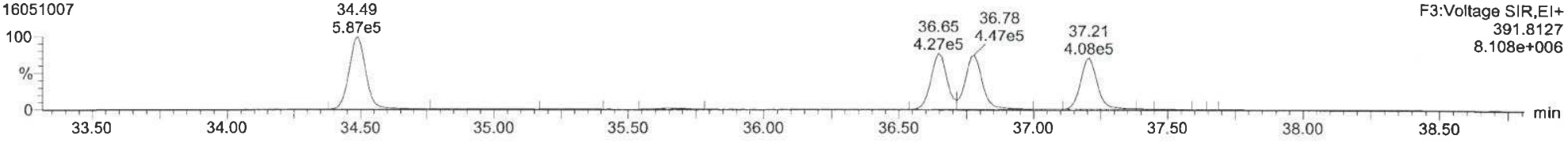
Total-hexadioxins

16051007



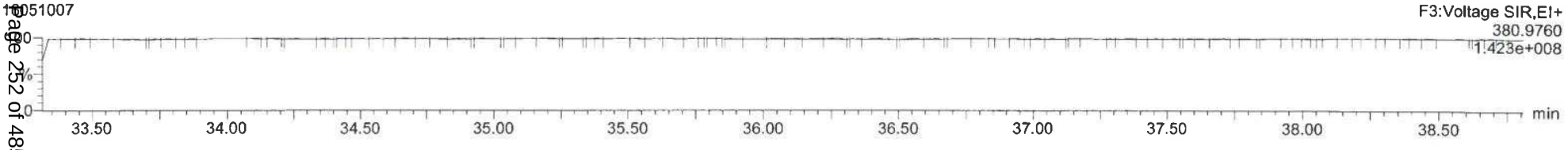
Total-hexadioxins

16051007



FUNCTION3 PFK

16051007



Page 252 of 485

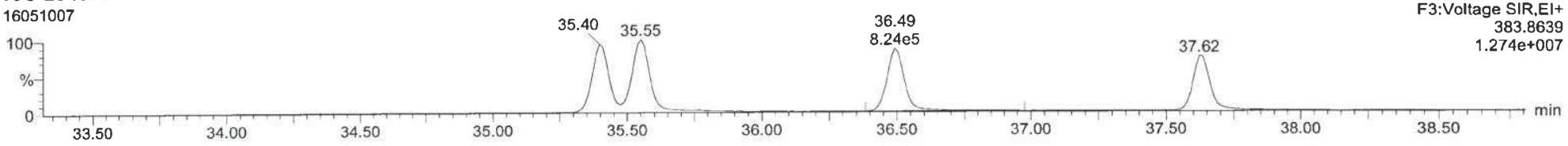
Quantify Sample Report **MassLynx MassLynx V4.1 SCN909**
Dataset: P:\DIOXIN8290.PRO\160510IC.qld
Last Altered: Wednesday, May 11, 2016 09:28:40 Pacific Daylight Time
Printed: Thursday, May 12, 2016 14:37:00 Pacific Daylight Time

Page 224 of 454

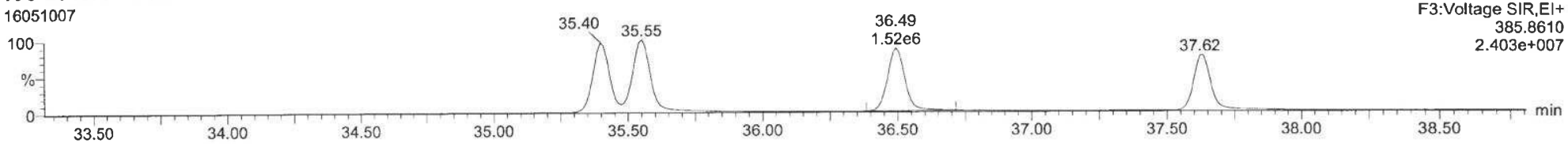
CS4AA 6/30/16

ID: ~~CS3,~~ Name: 16051007, Date: 10-May-2016, Time: 16:22:15, Conditions: AUTOSPEC01, User: pk

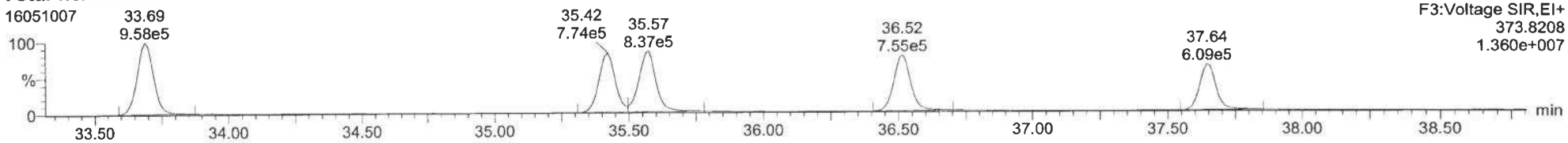
13C-234678-HxCDF



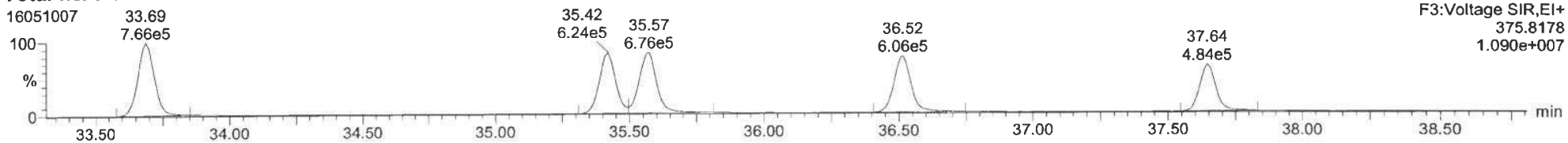
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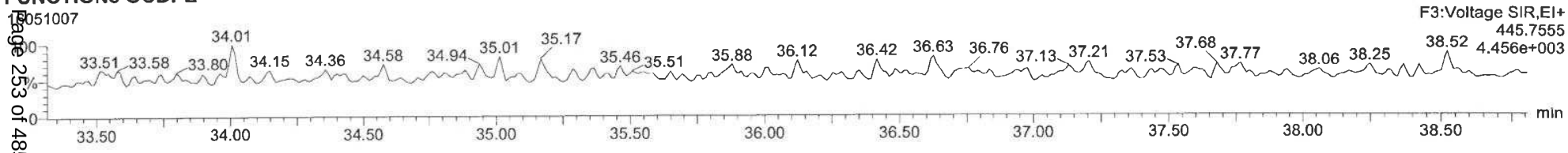
Total-hexafurans



Total-hexafurans



FUNCTION3 OCDPE



Page 253 of 485

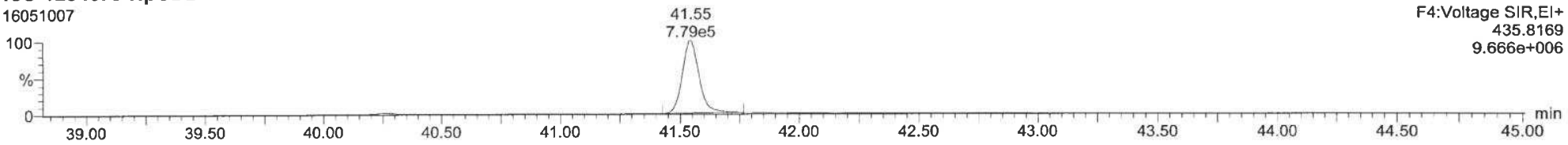
Quantify Sample Report **MassLynx MassLynx V4.1 SCN909**
Dataset: P:\DIOXIN8290.PRO\160510IC.qld
Last Altered: Wednesday, May 11, 2016 09:28:40 Pacific Daylight Time
Printed: Thursday, May 12, 2016 14:37:00 Pacific Daylight Time

Page 225 of 454

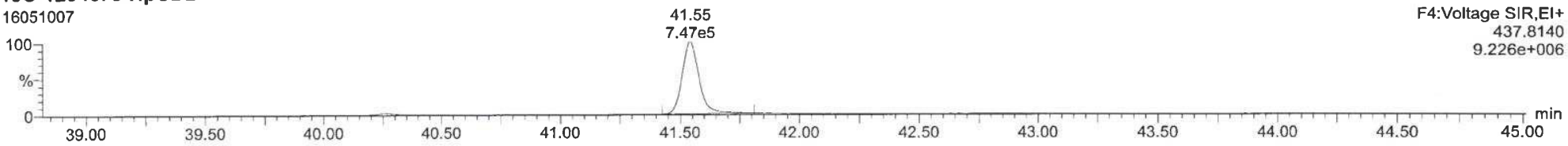
CS4AA 06/30/16 SD

ID: ~~CS3~~, Name: 16051007, Date: 10-May-2016, Time: 16:22:15, Conditions: AUTOSPEC01, User: pk

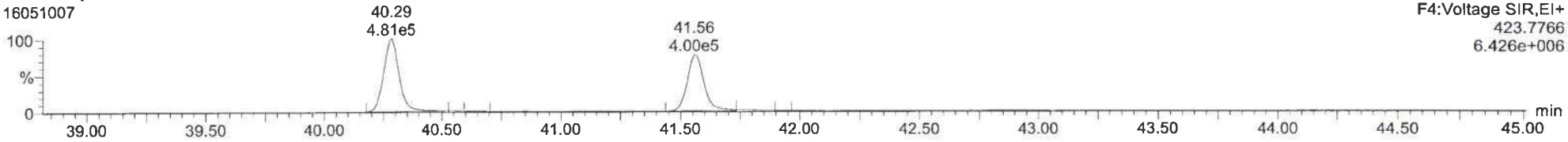
13C-1234678-HpCDD



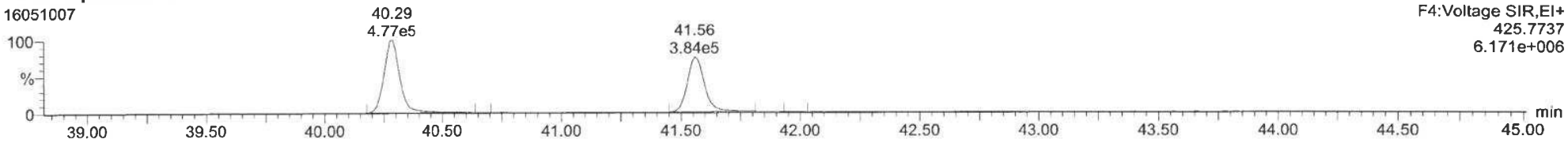
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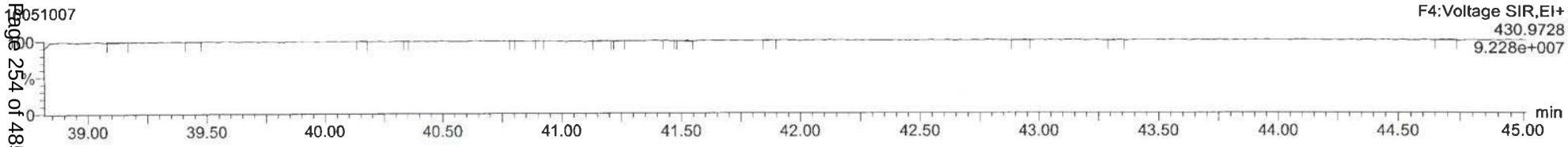
Total-heptadioxins



Total-heptadioxins



FUNCTION4 PFK



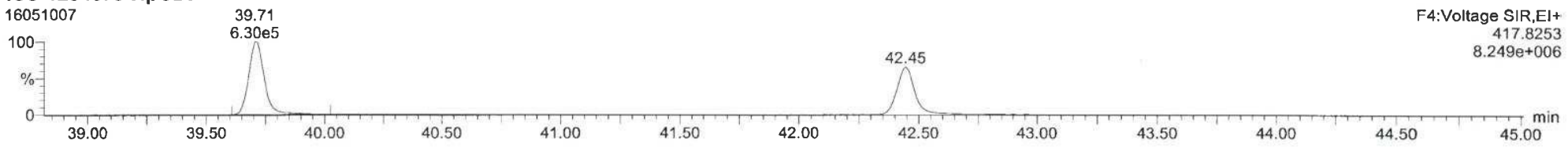
Page 254 of 485

Dataset: P:\DIOXIN8290.PRO\160510IC.qld
Last Altered: Wednesday, May 11, 2016 09:28:40 Pacific Daylight Time
Printed: Thursday, May 12, 2016 14:37:00 Pacific Daylight Time

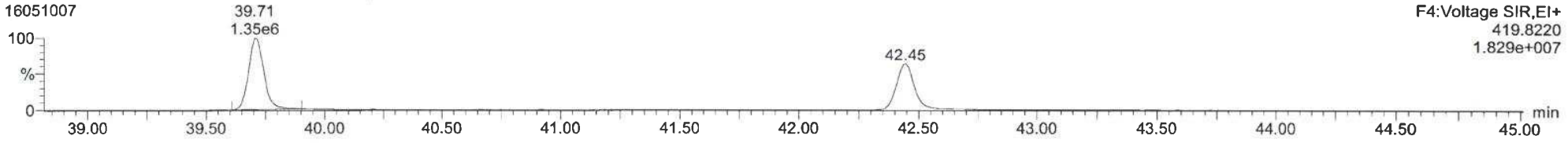
CS4AA 4/30/16

ID: ~~CS3~~, Name: 16051007, Date: 10-May-2016, Time: 16:22:15, Conditions: AUTOSPEC01, User: pk

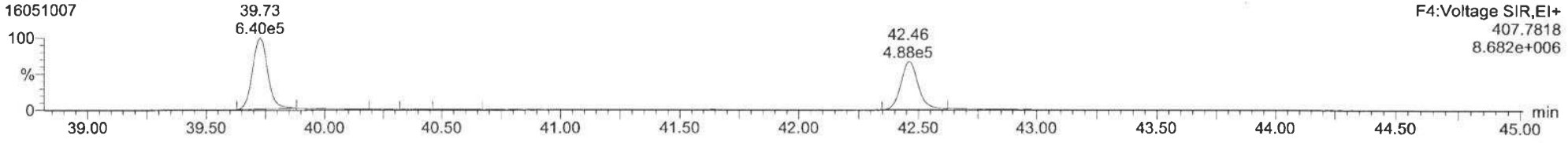
13C-1234678-HpCDF



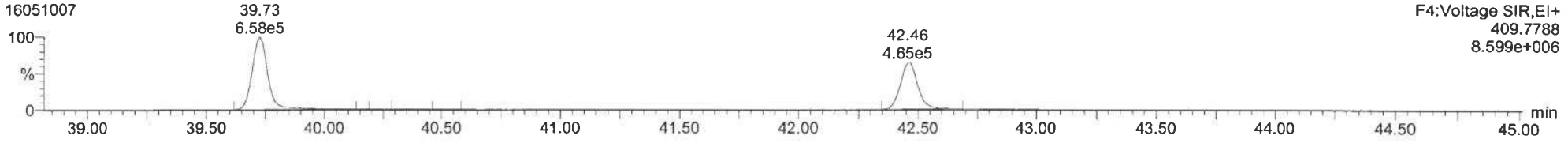
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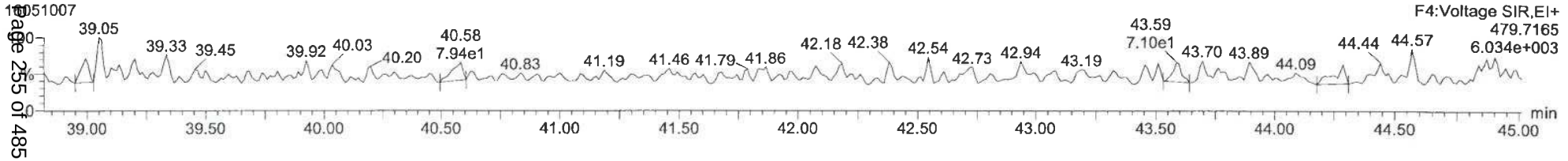
Total-heptafurans



Total-heptafurans



FUNCTION4 NCDPE

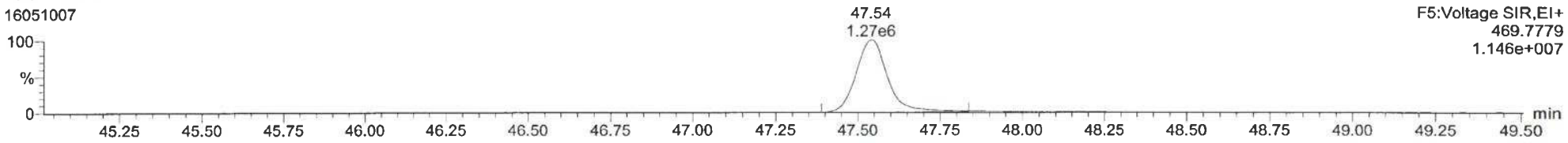


Dataset: P:\DIOXIN8290.PRO\160510IC.qld
Last Altered: Wednesday, May 11, 2016 09:28:40 Pacific Daylight Time
Printed: Thursday, May 12, 2016 14:37:00 Pacific Daylight Time

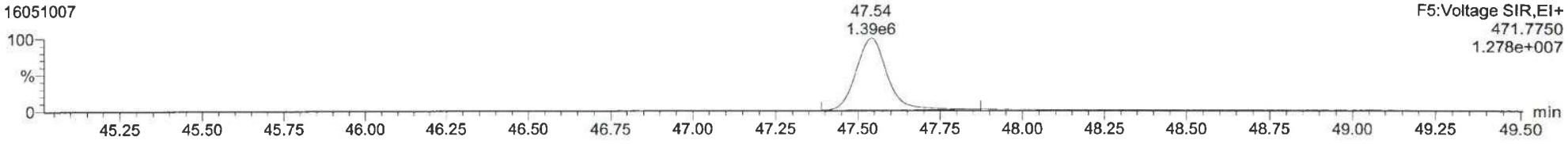
CS4AA 06/30/16

ID: ~~CS3~~, Name: 16051007, Date: 10-May-2016, Time: 16:22:15, Conditions: AUTOSPEC01, User: pk

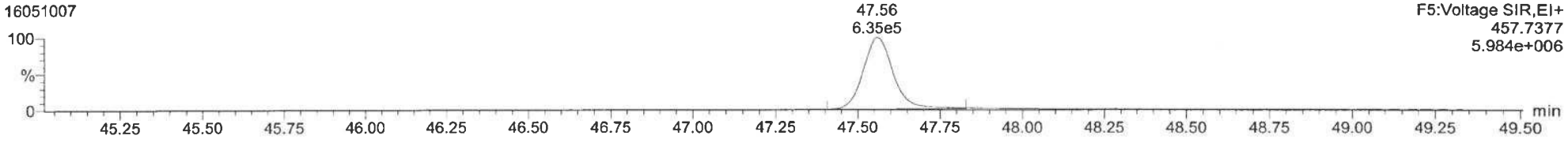
13C-OCDD



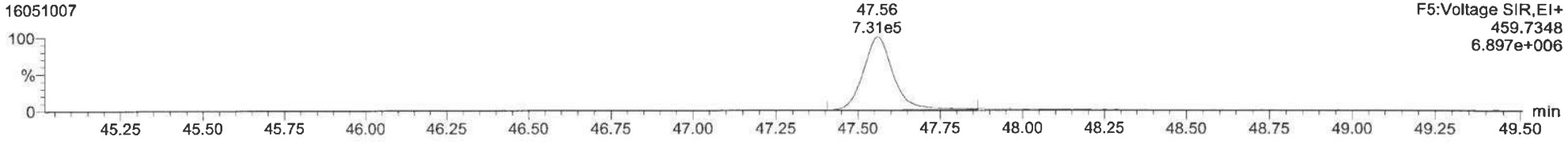
13C-OCDD



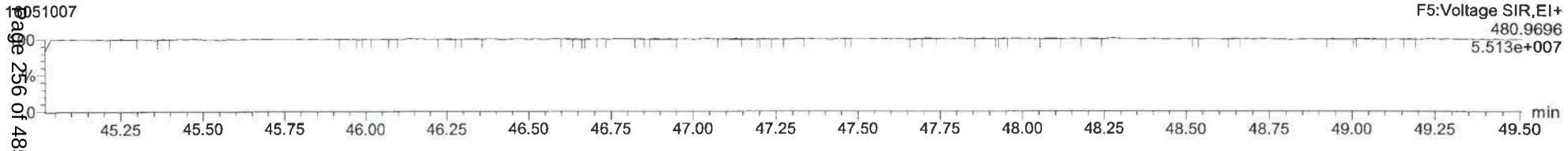
OCDD



OCDD



FUNCTION5 PFK

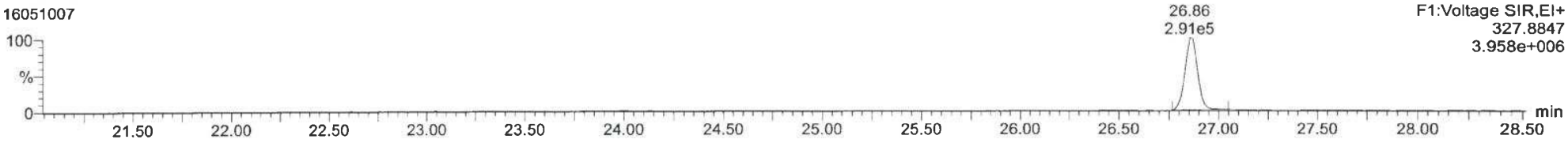


Quantify Sample Report **MassLynx MassLynx V4.1 SCN909**
Dataset: P:\DIOXIN8290.PRO\160510IC.qld
Last Altered: Wednesday, May 11, 2016 09:28:40 Pacific Daylight Time
Printed: Thursday, May 12, 2016 14:37:00 Pacific Daylight Time

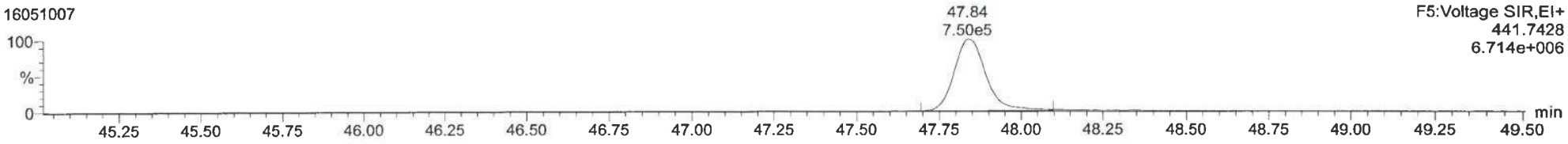
CS4AA 06/30/16

ID: CS3, Name: 16051007, Date: 10-May-2016, Time: 16:22:15, Conditions: AUTOSPEC01, User: pk

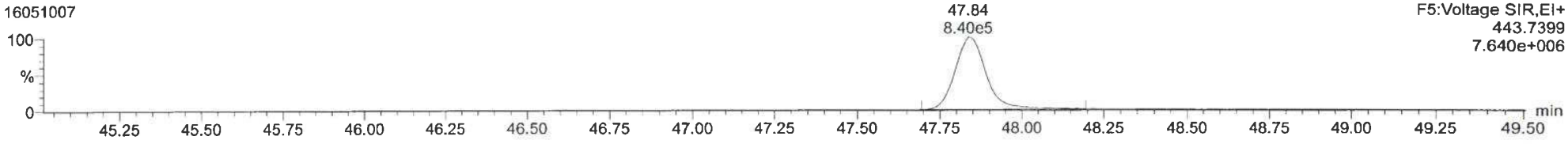
37CL-2378-TCDD



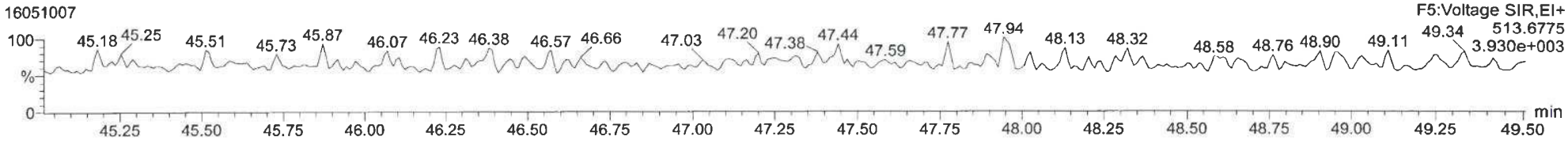
OCDF



OCDF



FUNCTION5 DCDPE



Quantify Sample Summary Report **MassLynx MassLynx V4.1 SCN909**
Dataset: P:\DIOXIN8290.PRO\160510IC.qld
Last Altered: Wednesday, May 11, 2016 09:28:40 Pacific Daylight Time
Printed: Thursday, May 12, 2016 14:37:02 Pacific Daylight Time

Page 229 of 354

Method: P:\DIOXIN8290.pro\MethDB\Dioxin1604143SN.mdb 14 Apr 2016 14:40:15
Calibration: P:\DIOXIN8290.PRO\CurveDB\160510ICAL.cdb 11 May 2016 09:28:40

CS5AA 06/30/16 RD

ID: ~~CS4~~, Name: 16051008, Date: 10-May-2016, Time: 17:15:41, Conditions: AUTOSPEC01, User: pk

Name	RT	RRT	Ion1Area	Ion2Area	RRF	Ratio	Pred R	Noise 1	Noise 2	Height 1	Height 2	S/N	EMPC?	EMPC	pg
2378-TCDF	26.212	1.001	7.17e5	9.00e5	0.935	0.796	0.770	2295	7656	9.79e6	1.27e7	4263.6	NO	41.031	41.031
12378-PeCDF	30.377	1.000	4.07e6	2.59e6	0.952	1.573	1.550	6883	4240	5.75e7	3.65e7	8348.8	NO	206.758	206.758
23478-PeCDF	31.725	1.001	3.95e6	2.52e6	0.963	1.569	1.550	6883	4240	5.62e7	3.56e7	8161.8	NO	204.434	204.434
123478-HxCDF	35.419	1.001	3.15e6	2.50e6	1.137	1.261	1.240	13601	10755	4.46e7	3.58e7	3276.6	NO	202.836	202.836
234678-HxCDF	36.504	1.000	3.11e6	2.49e6	1.164	1.249	1.240	13601	10755	4.37e7	3.55e7	3210.0	NO	203.680	203.680
123678-HxCDF	35.561	1.001	3.61e6	2.77e6	1.099	1.303	1.240	13601	10755	4.77e7	3.84e7	3506.5	NO	204.059	204.059
123789-HxCDF	37.644	1.001	2.55e6	2.03e6	1.101	1.255	1.240	13601	10755	3.71e7	2.93e7	2726.3	NO	203.367	203.367
1234678-HpCDF	39.715	1.000	2.74e6	2.75e6	1.303	0.994	1.050	6885	7691	3.78e7	3.70e7	5494.3	NO	203.048	203.048
1234789-HpCDF	42.456	1.000	2.10e6	2.02e6	1.317	1.041	1.050	6885	7691	2.44e7	2.36e7	3539.4	NO	211.145	211.145
OCDF	47.836	1.006	3.14e6	3.47e6	1.166	0.905	0.890	4831	4858	3.01e7	3.32e7	6225.8	NO	416.025	416.025
2378-TCDD	26.855	1.001	5.00e5	6.38e5	1.134	0.784	0.770	1676	1626	6.80e6	8.68e6	4059.3	NO	40.594	40.594
12378-PeCDD	31.977	1.001	2.48e6	1.60e6	0.975	1.550	1.550	3667	1576	3.55e7	2.29e7	9674.9	NO	202.869	202.869
123478-HxCDD	36.646	1.001	2.20e6	1.73e6	1.031	1.270	1.240	4236	6491	3.19e7	2.56e7	7523.4	NO	201.866	201.866
123678-HxCDD	36.767	1.000	2.24e6	1.87e6	0.971	1.200	1.240	4236	6491	3.06e7	2.47e7	7220.4	NO	203.339	203.339
123789-HxCDD	37.194	1.012	2.13e6	1.73e6	0.947	1.229	1.240	4236	6491	2.93e7	2.38e7	6928.2	NO	205.678	205.678
1234678-HpCDD	41.557	1.000	1.65e6	1.59e6	1.028	1.039	1.050	4062	5246	2.08e7	1.98e7	5129.3	NO	203.516	203.516
OCDD	47.557	1.000	2.56e6	3.01e6	1.107	0.851	0.890	4823	4025	2.45e7	2.79e7	5087.1	NO	368.986	368.986
13C-2378-TCDF	26.198	1.006	1.86e6	2.36e6	1.567	0.787	0.770	9068	5281	2.59e7	3.31e7	2860.1	NO		97.809
13C-12378-PeCDF	30.366	1.166	2.08e6	1.31e6	1.274	1.590	1.550	3910	3905	2.93e7	1.85e7	7488.0	NO		96.584
13C-23478-PeCDF	31.703	1.218	2.01e6	1.28e6	1.235	1.575	1.550	3910	3905	2.90e7	1.83e7	7419.1	NO		96.913
13C-123478-HxCDF	35.397	0.952	8.47e5	1.61e6	1.381	0.527	0.510	3719	7297	1.21e7	2.31e7	3247.7	NO		100.488
13C-123678-HxCDF	35.539	0.956	9.67e5	1.88e6	1.569	0.514	0.510	3719	7297	1.28e7	2.49e7	3445.1	NO		102.721
13C-234678-HxCDF	36.493	0.981	8.07e5	1.56e6	1.345	0.518	0.510	3719	7297	1.12e7	2.15e7	3012.3	NO		99.485
13C-123789-HxCDF	37.622	1.012	6.97e5	1.35e6	1.183	0.515	0.510	3719	7297	1.04e7	1.97e7	2786.8	NO		98.078
13C-1234678-HpCDF	39.704	1.068	6.29e5	1.45e6	1.178	0.435	0.440	3678	4603	8.83e6	1.95e7	2402.0	NO		99.678
13C-1234789-HpCDF	42.434	1.141	4.60e5	1.02e6	0.878	0.450	0.440	3678	4603	5.41e6	1.19e7	1470.4	NO		95.545
13C-1234-TCDD	26.033	0.000	1.21e6	1.54e6	1.000	0.788	0.770	4360	2513	1.71e7	2.16e7	3929.7	NO		100.000
13C-2378-TCDD	26.840	1.031	1.09e6	1.38e6	0.908	0.787	0.770	4360	2513	1.50e7	1.90e7	3451.4	NO		99.039
13C-12378-PeCDD	31.955	1.227	1.28e6	7.82e5	0.756	1.634	1.550	2594	1749	1.74e7	1.10e7	6717.7	NO		99.127
13C-123478-HxCDD	36.624	0.985	1.06e6	8.27e5	1.056	1.280	1.240	3316	7010	1.55e7	1.22e7	4679.9	NO		101.114
13C-123678-HxCDD	36.756	0.988	1.16e6	9.21e5	1.163	1.258	1.240	3316	7010	1.57e7	1.27e7	4733.5	NO		101.181
13C-1234678-HpCDD	41.535	1.117	7.90e5	7.57e5	0.909	1.044	1.050	3750	2889	1.00e7	9.48e6	2676.9	NO		96.299
13C-OCDD	47.540	1.278	1.31e6	1.41e6	0.820	0.929	0.890	4418	5175	1.19e7	1.33e7	2699.0	NO		188.350

Page 250 of 435

Quantify Sample Summary Report **MassLynx MassLynx V4.1 SCN909**
Dataset: P:\DIOXIN8290.PRO\160510IC.qld
Last Altered: Wednesday, May 11, 2016 09:28:40 Pacific Daylight Time
Printed: Thursday, May 12, 2016 14:37:02 Pacific Daylight Time

C55AA 04/3.1/16

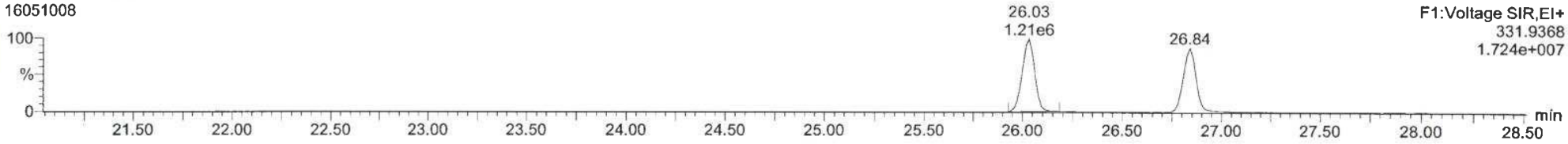
ID: ~~C94,~~ Name: 16051008, Date: 10-May-2016, Time: 17:15:41, Conditions: AUTOSPEC01, User: pk

Name	RT	RRT	Ion1Area	Ion2Area	RRF	Ratio	Pred R	Noise 1	Noise 2	Height 1	Height 2	S/N	EMPC?	EMPC	pg
13C-123789-HxCDD	37.183	0.000	9.81e5	7.86e5	1.000	1.248	1.240	3316	7010	1.40e7	1.10e7	4215.8	NO		100.000
Total-tetrafurans			7.32e5		0.935			2295		9.99e6					41.818
Total-penta1			3.02e2					1006		4.38e3					0.012
Total-pentafurans			8.28e6		0.957			6883		1.16e8					423.647
Total-hexafurans			1.24e7		1.125			13601		1.73e8					814.310
Total-heptafurans			4.84e6		1.310			6885		6.23e7					414.734
Total-Furans			2.94e7		1.114			2295		3.92e8					2110.546
Total-tetradioxins			5.13e5		1.134			1676		6.96e6					41.692
Total-pentadioxins			2.48e6		0.975			3667		3.56e7					203.361
Total-hexadioxins			6.57e6		0.983			4236		9.19e7					611.686
Total-heptadioxins			1.66e6		1.028			4062		2.09e7					204.605
Total-Dioxins			1.38e7		1.028			1676		1.80e8					1430.329
Total-TEQ			4.32e7					1676		5.72e8					3540.875
37CL-2378-TCDD	26.855	1.032	1.19e6		1.067			2351		1.63e7		6926.2			40.530
FUNCTION1 PFK			5.93e6					1292017		8.23e7					
FUNCTION2 PFK			1.97e5					231314		5.98e6					0.000
FUNCTION3 PFK			4.75e5					829123		1.56e7					0.000
FUNCTION4 PFK			5.13e5					609401		1.38e7					
FUNCTION5 PFK			1.90e5					404182		8.68e6					
FUNCTION1 HXCDPE			8.25e1					694		1.17e3					0.000
FUNCTION1 HPCDPE			1.77e3					1114		3.08e4					0.000
FUNCTION2 HPCDPE			5.48e3					1104		8.68e4					0.000
FUNCTION3 OCDPE			0.00e0					541		0.00e0					
FUNCTION4 NCDPE			3.38e2					700		8.15e3					0.000
FUNCTION5 DCDPE			1.08e2					501		3.99e3					0.000

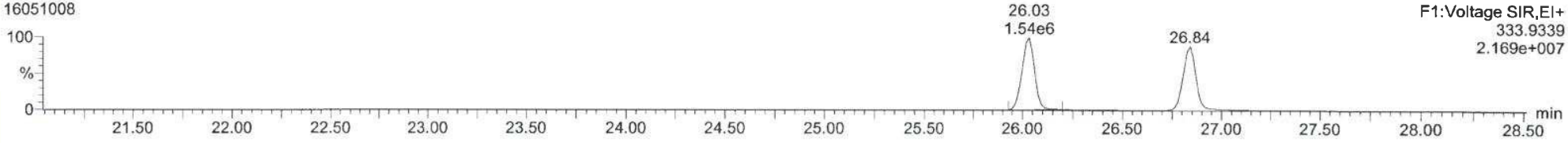
Quantify Sample Report **MassLynx MassLynx V4.1 SCN909**
Dataset: P:\DIOXIN8290.PRO\160510IC.qld
Last Altered: Wednesday, May 11, 2016 09:28:40 Pacific Daylight Time
Printed: Thursday, May 12, 2016 14:37:02 Pacific Daylight Time

Method: P:\DIOXIN8290.pro\MethDB\Dioxin1604143SN.mdb 14 Apr 2016 14:40:15
Calibration: P:\DIOXIN8290.PRO\CurveDB\160510ICAL.cdb 11 May 2016 09:28:40
CS5AA 06/30/16
ID: CS4, Name: 16051008, Date: 10-May-2016, Time: 17:15:41, Conditions: AUTOSPEC01, User: pk

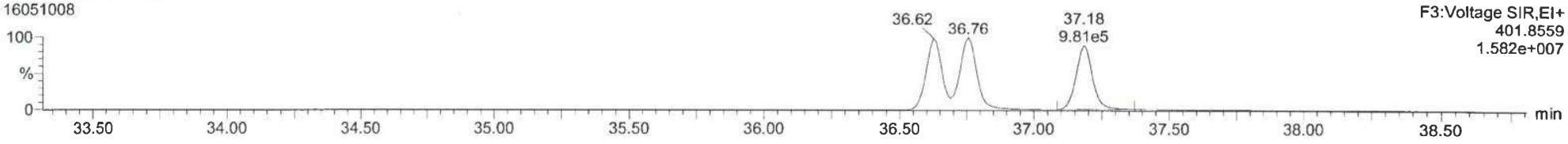
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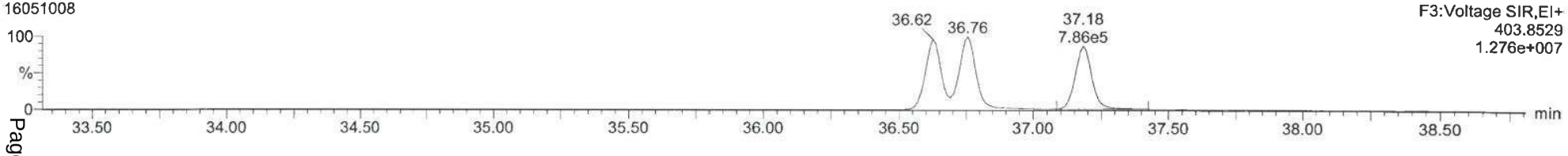
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13C-123789-HxCDD



13C-123789-HxCDD

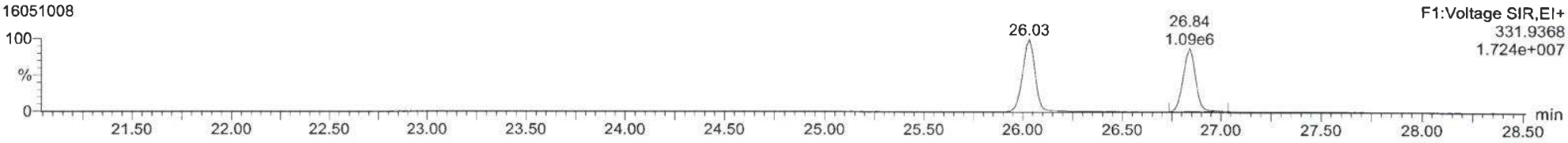


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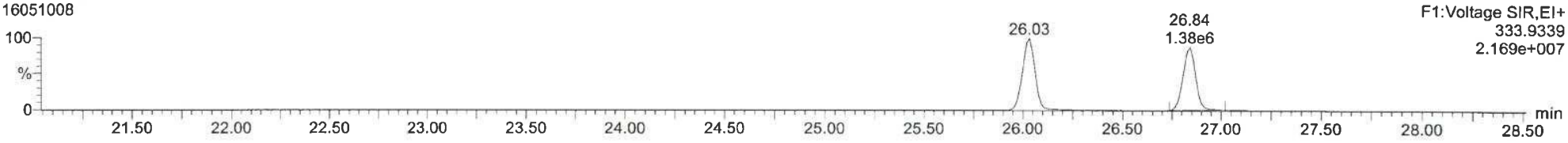
CS5 AA 04/30/16

ID: ~~CS4~~, Name: 16051008, Date: 10-May-2016, Time: 17:15:41, Conditions: AUTOSPEC01, User: pk

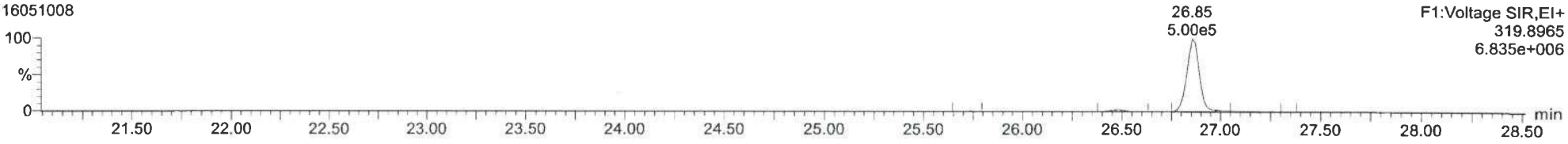
13C-2378-TCDD



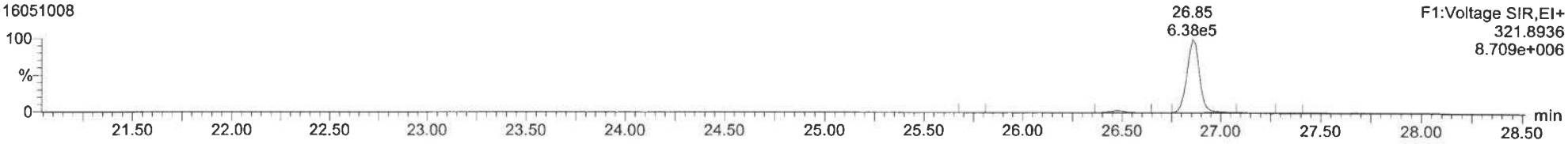
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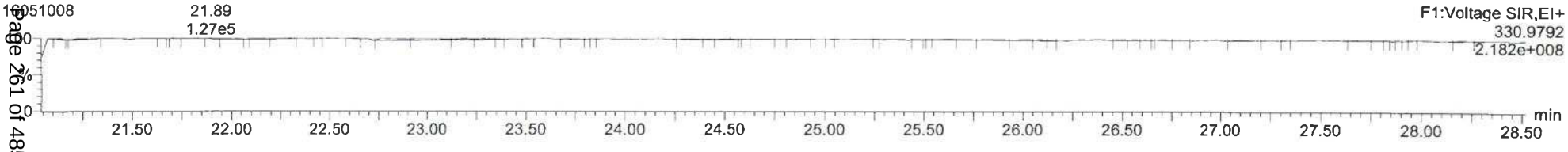
Total-tetradioxins



Total-tetradioxins



FUNCTION1 PFK

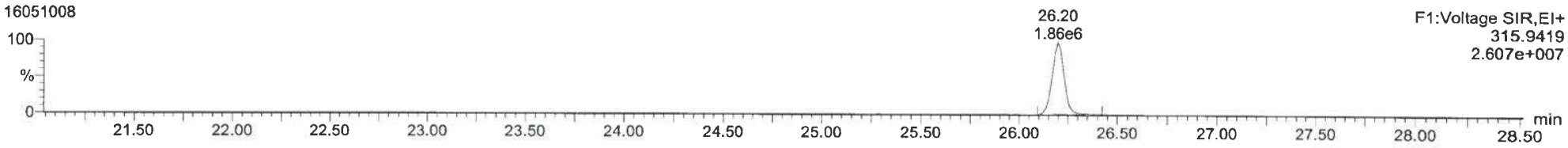


Quantify Sample Report **MassLynx MassLynx V4.1 SCN909**
Dataset: P:\DIOXIN8290.PRO\160510IC.qld
Last Altered: Wednesday, May 11, 2016 09:28:40 Pacific Daylight Time
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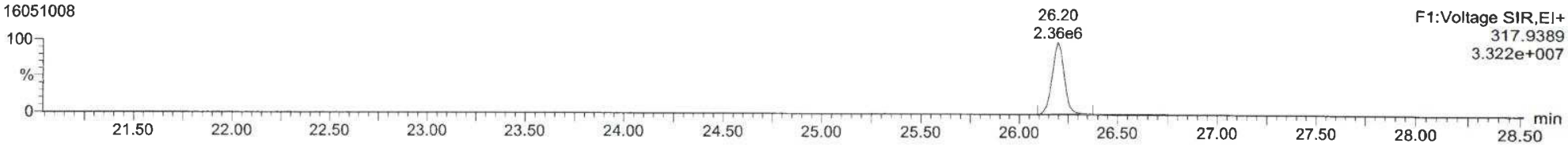
CS5AA 06/30/16

ID: ~~CS4~~, Name: 16051008, Date: 10-May-2016, Time: 17:15:41, Conditions: AUTOSPEC01, User: pk

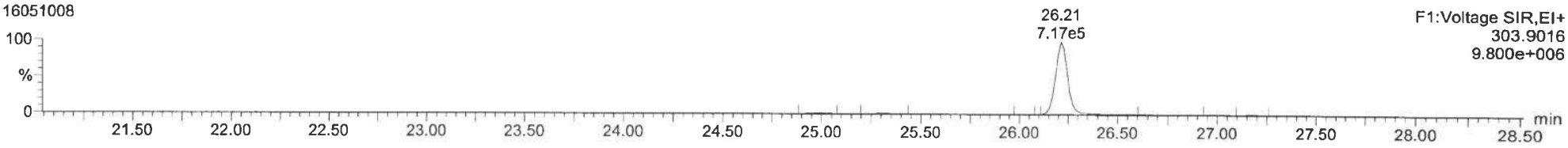
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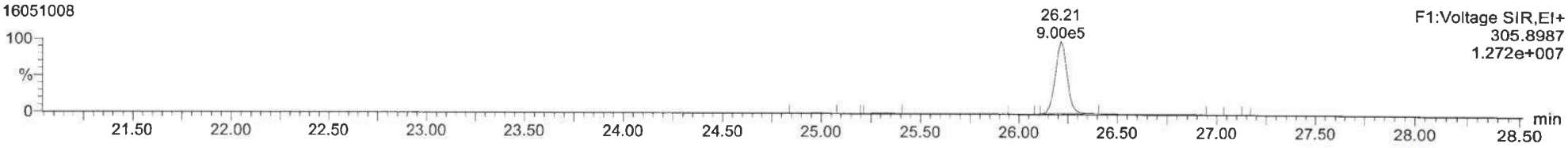
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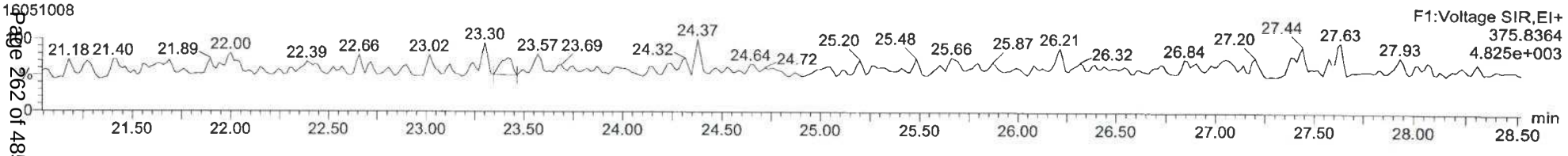
Total-tetrafurans



Total-tetrafurans



FUNCTION1 HXCDPE



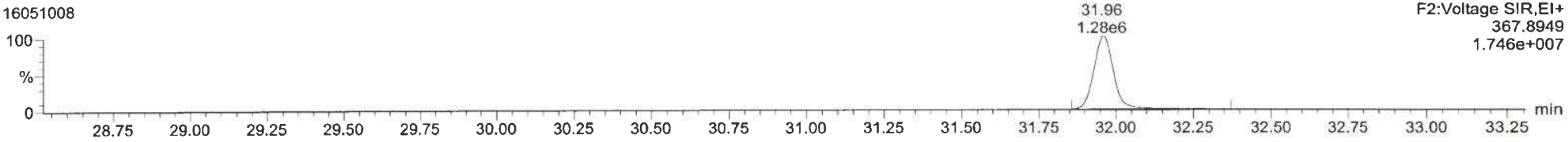
Quantify Sample Report **MassLynx MassLynx V4.1 SCN909**
Dataset: P:\DIOXIN8290.PRO\160510IC.qld
Last Altered: Wednesday, May 11, 2016 09:28:40 Pacific Daylight Time
Printed: Thursday, May 12, 2016 14:37:02 Pacific Daylight Time

Page 234 of 454

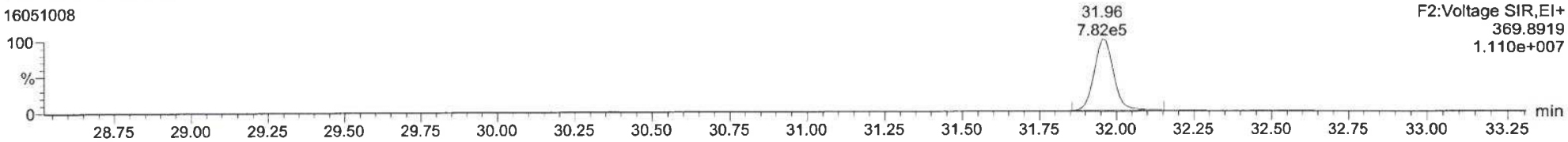
CS5AA 05/30/16

ID: CS4, Name: 16051008, Date: 10-May-2016, Time: 17:15:41, Conditions: AUTOSPEC01, User: pk

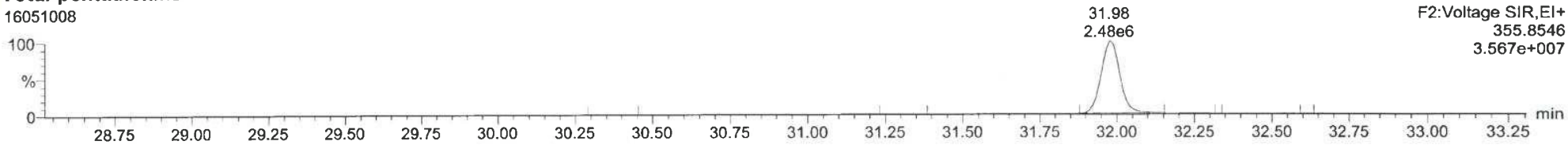
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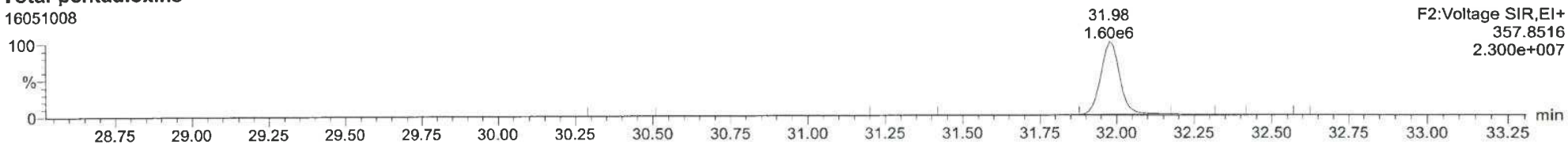
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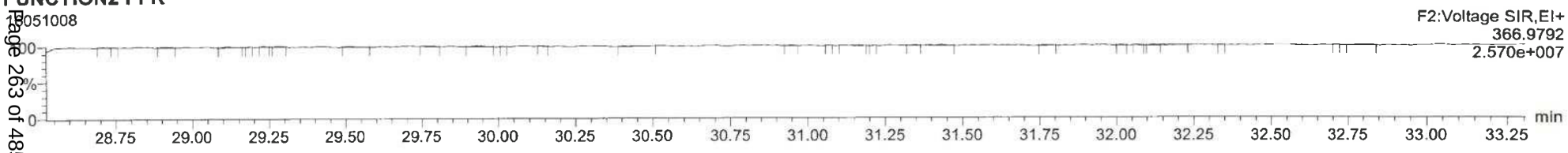
Total-pentadioxins



Total-pentadioxins



FUNCTION2 PFK



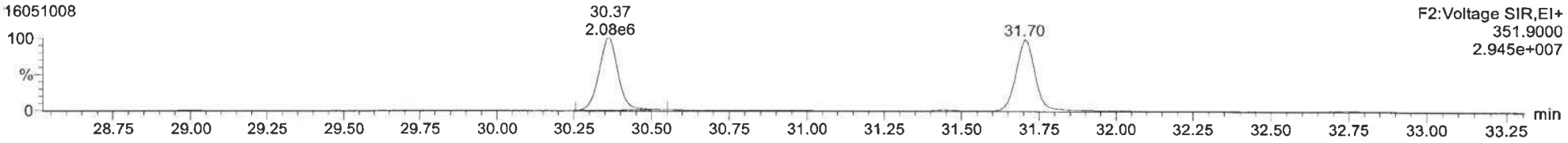
Page 263 of 485

Page 235 of 458

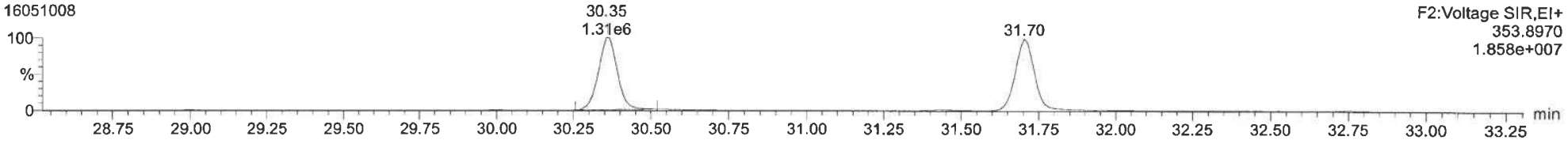
CS5AA 06/30/16

ID: CS4, Name: 16051008, Date: 10-May-2016, Time: 17:15:41, Conditions: AUTOSPEC01, User: pk

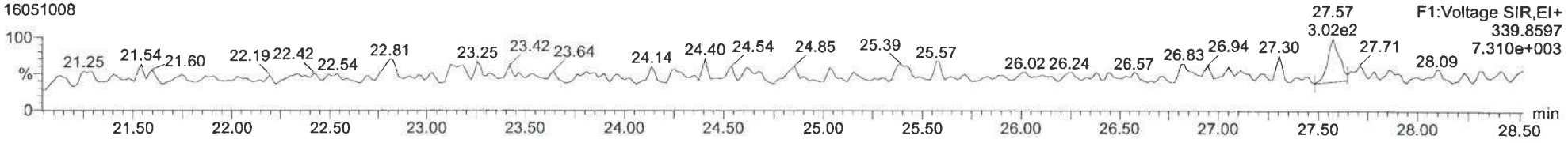
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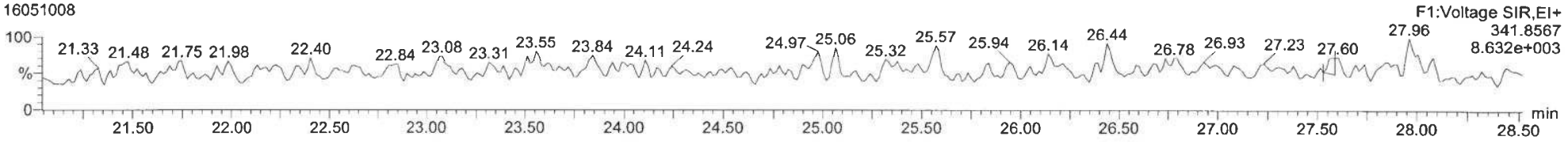
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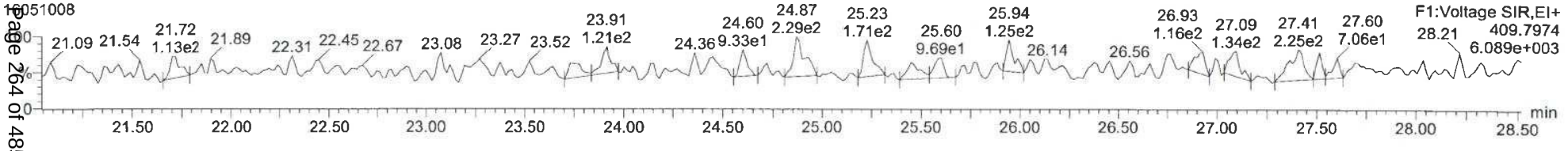
Total-penta1



Total-penta1



FUNCTION1 HPCDPE



Page 264 of 485

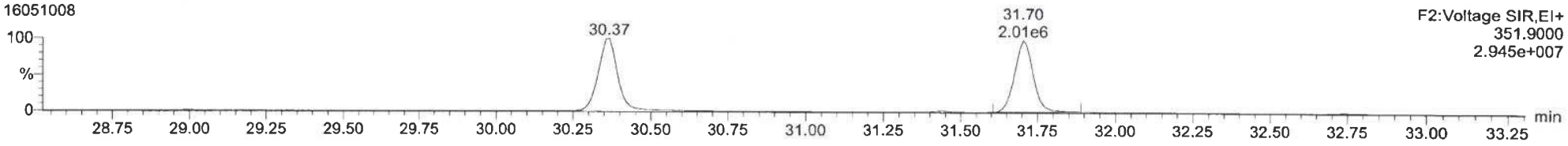
Quantify Sample Report **MassLynx MassLynx V4.1 SCN909**
Dataset: P:\DIOXIN8290.PRO\160510IC.qld
Last Altered: Wednesday, May 11, 2016 09:28:40 Pacific Daylight Time
Printed: Thursday, May 12, 2016 14:37:02 Pacific Daylight Time

Page 236 of 452

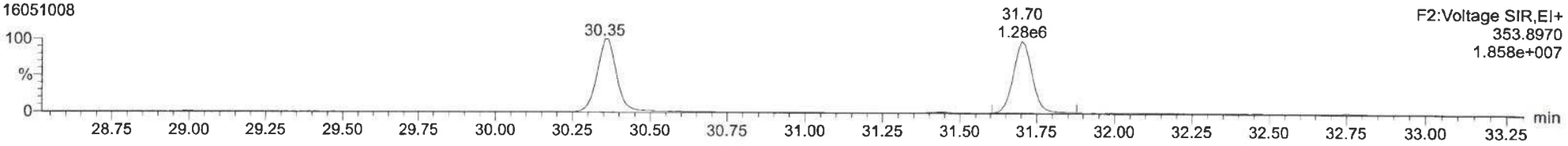
CS5AA 06/30/16 SD

ID: ~~CS4,~~ Name: 16051008, Date: 10-May-2016, Time: 17:15:41, Conditions: AUTOSPEC01, User: pk

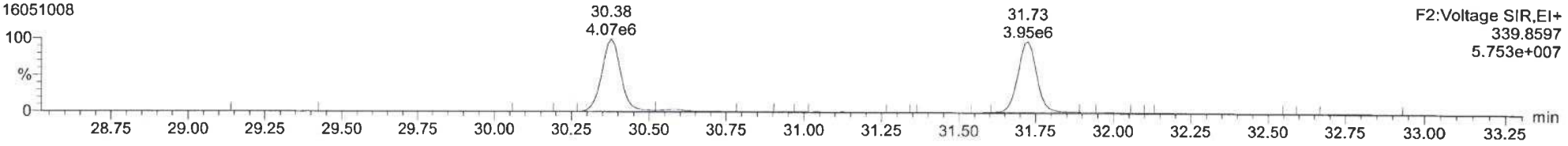
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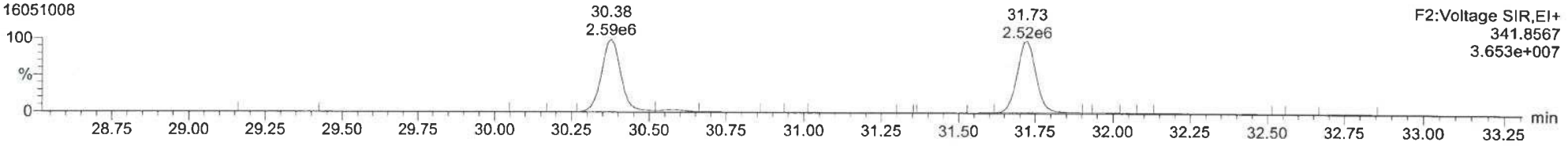
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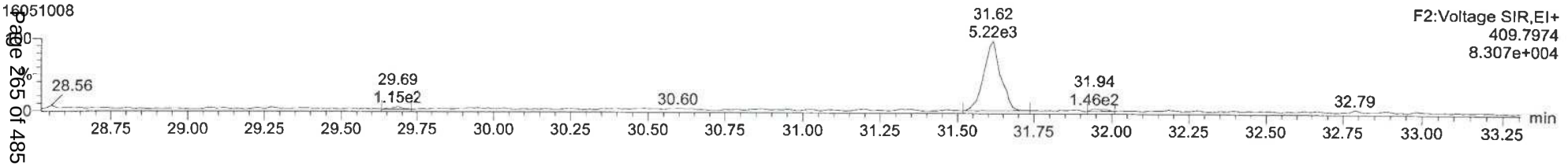
Total-pentafurans



Total-pentafurans



FUNCTION2 HPCDPE



Page 265 of 485

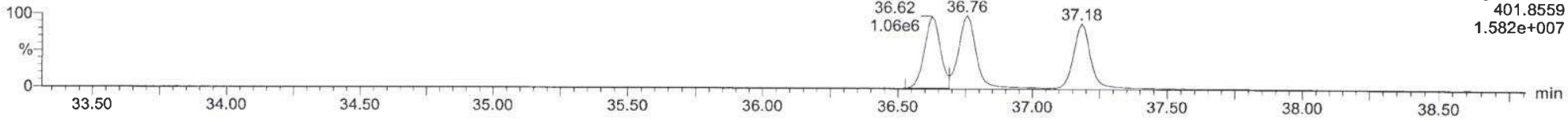
Quantify Sample Report **MassLynx MassLynx V4.1 SCN909**
Dataset: P:\DIOXIN8290.PRO\160510IC.qld
Last Altered: Wednesday, May 11, 2016 09:28:40 Pacific Daylight Time
Printed: Thursday, May 12, 2016 14:37:02 Pacific Daylight Time

Page 237 of 458

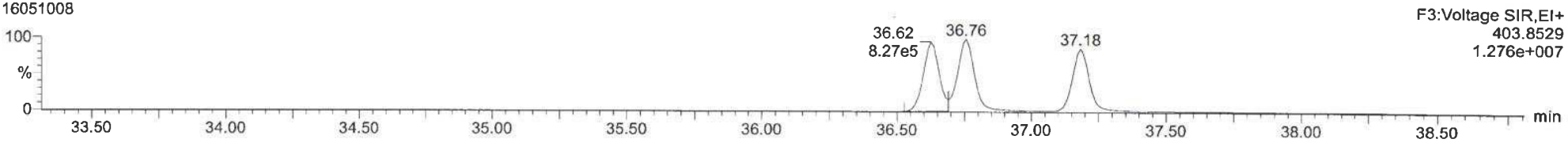
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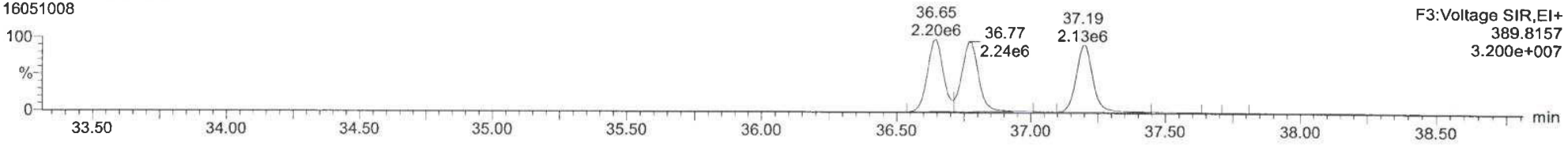
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16051008



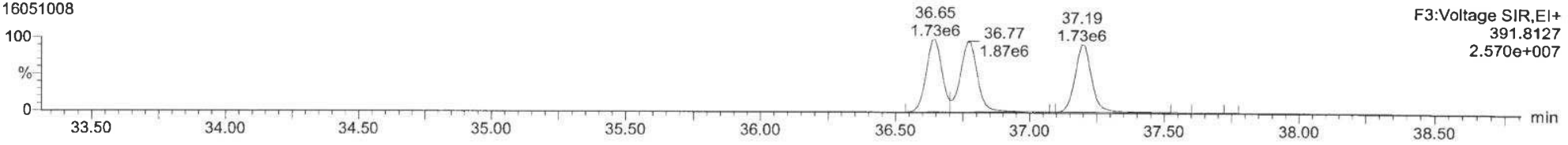
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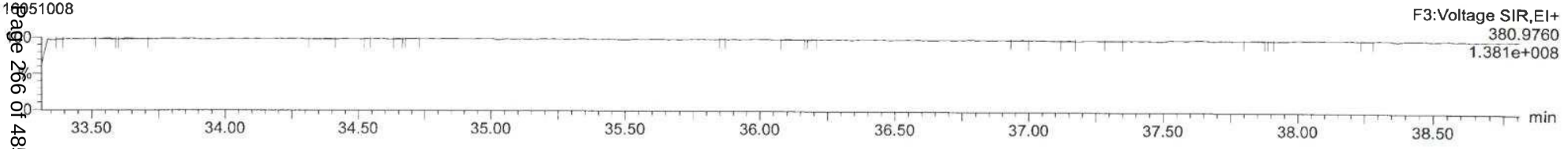
Total-hexadioxins
16051008



Total-hexadioxins
16051008



FUNCTION3 PFK
16051008

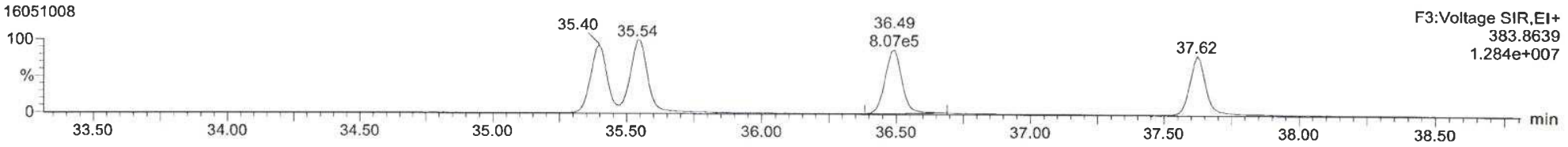


Page 266 of 485

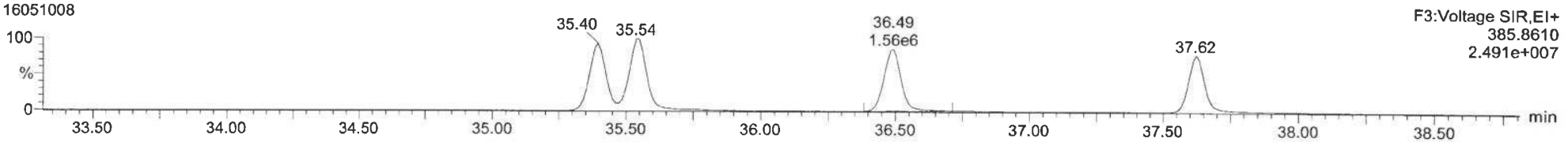
CSSAA 06/30/16

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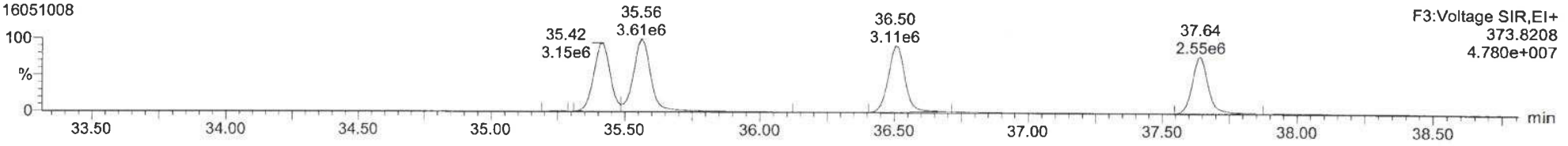
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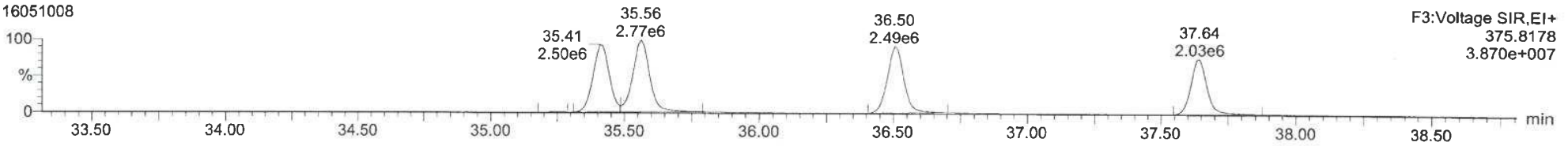
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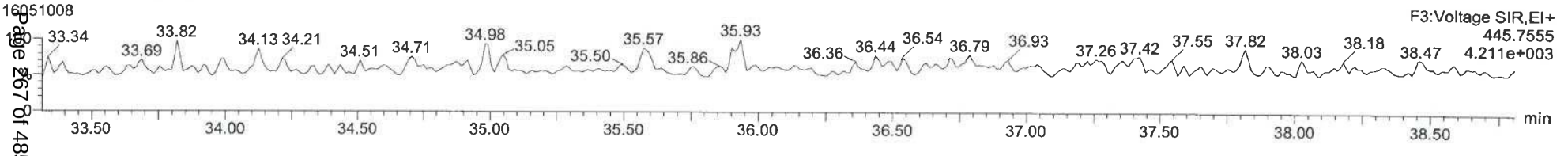
Total-hexafurans



Total-hexafurans



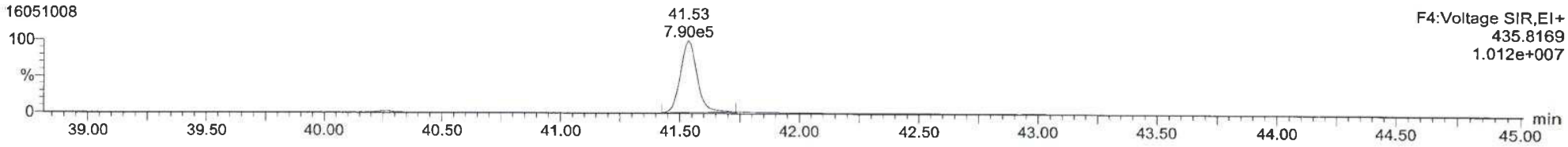
FUNCTION3 OCDPE



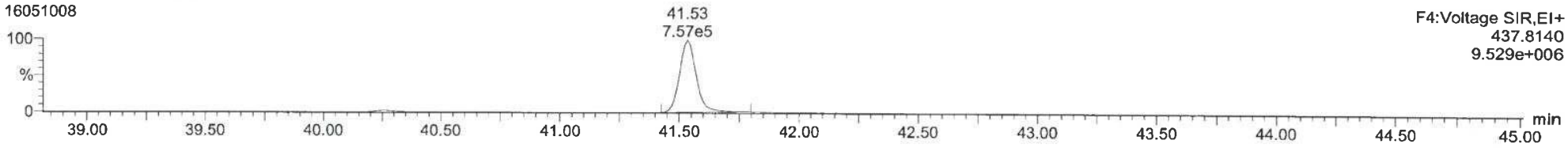
CS5AA 04/30/16 RD

ID: CS4, Name: 16051008, Date: 10-May-2016, Time: 17:15:41, Conditions: AUTOSPEC01, User: pk

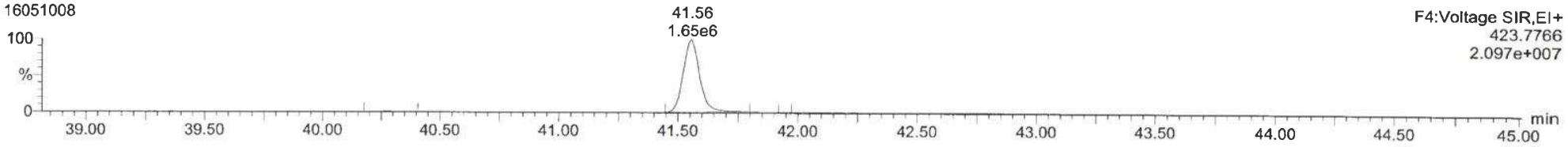
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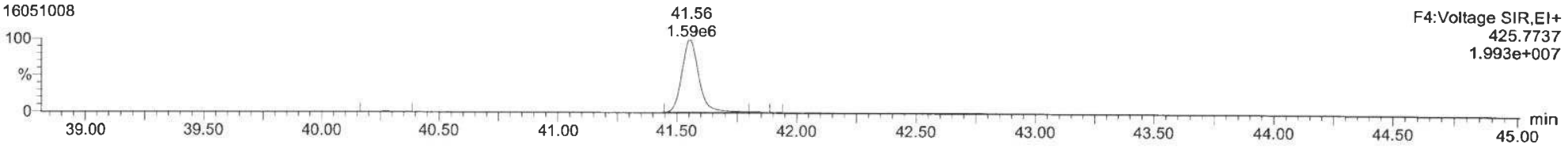
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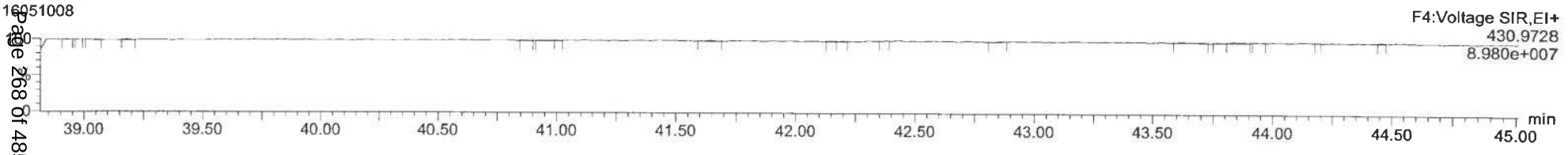
Total-heptadioxins



Total-heptadioxins



FUNCTION4 PFK



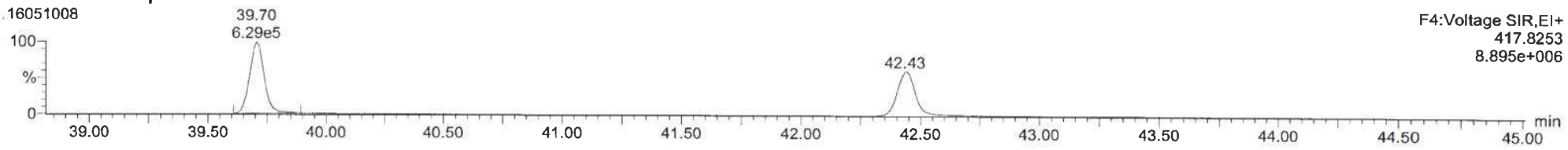
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Last Altered: Wednesday, May 11, 2016 09:28:40 Pacific Daylight Time
Printed: Thursday, May 12, 2016 14:37:02 Pacific Daylight Time

Page 240 of 458

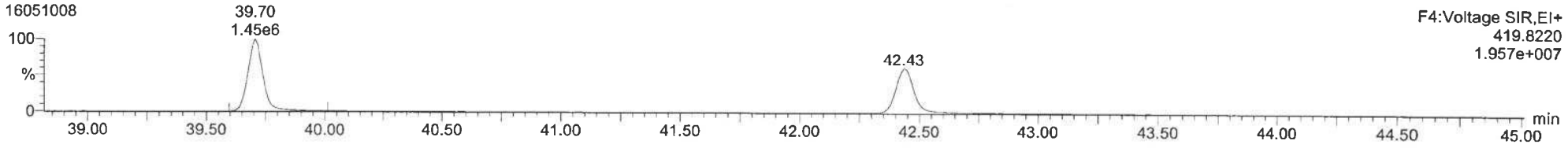
CS5AA 5/30/16

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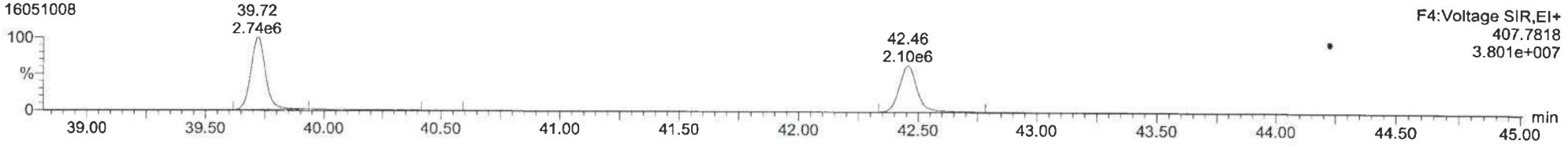
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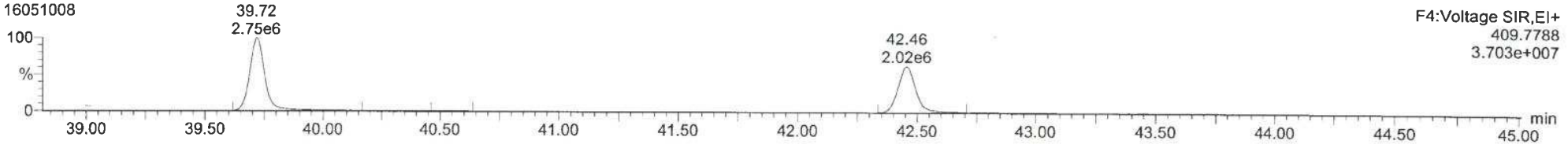
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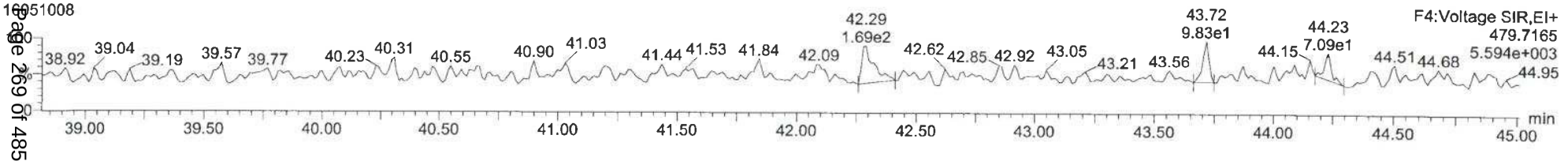
Total-heptafurans



Total-heptafurans



FUNCTION4 NCDPE

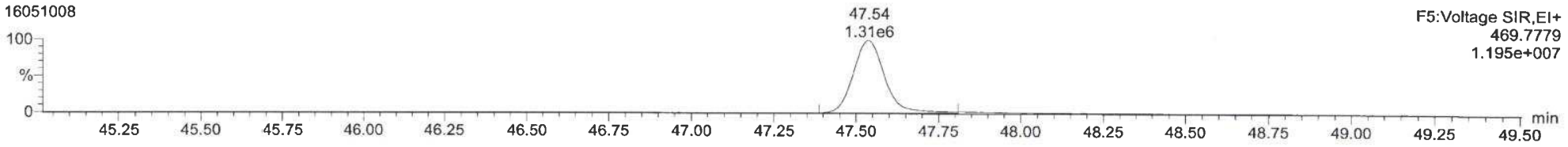


Page 269 of 485

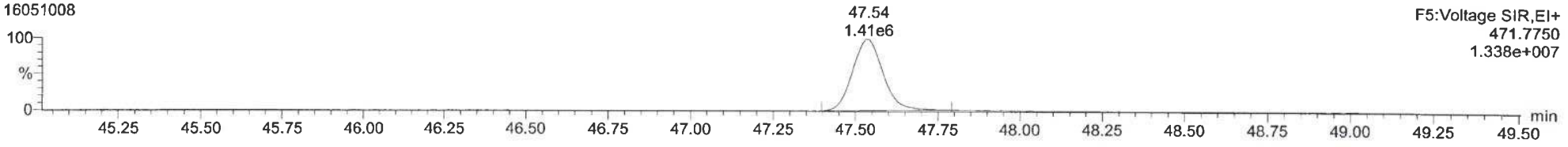
CS5AA 04/30/16

ID: ~~CS4~~, Name: 16051008, Date: 10-May-2016, Time: 17:15:41, Conditions: AUTOSPEC01, User: pk

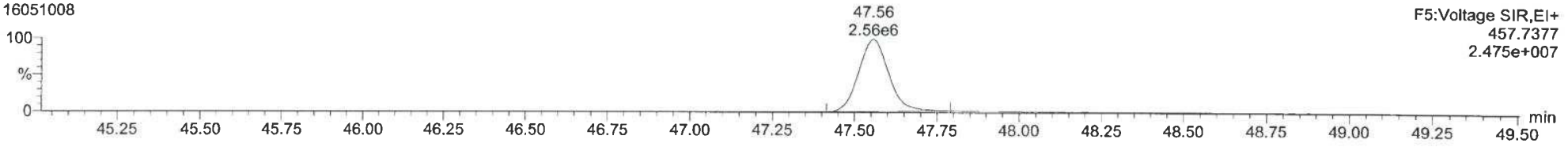
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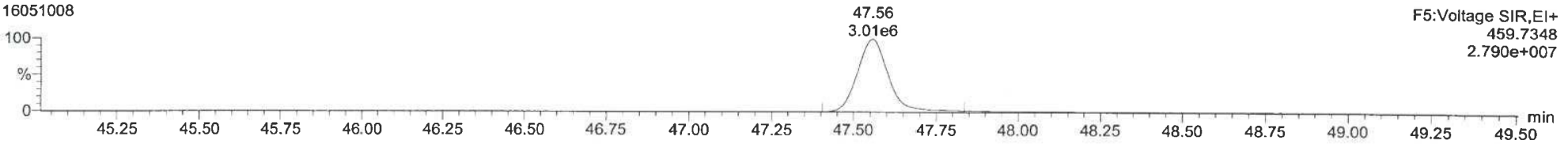
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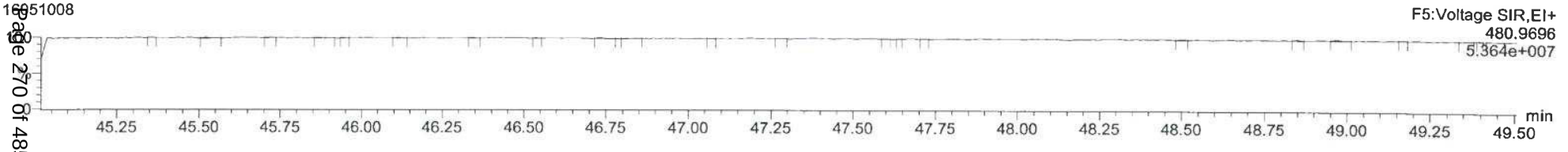
OCDD



OCDD



FUNCTION5 PFK

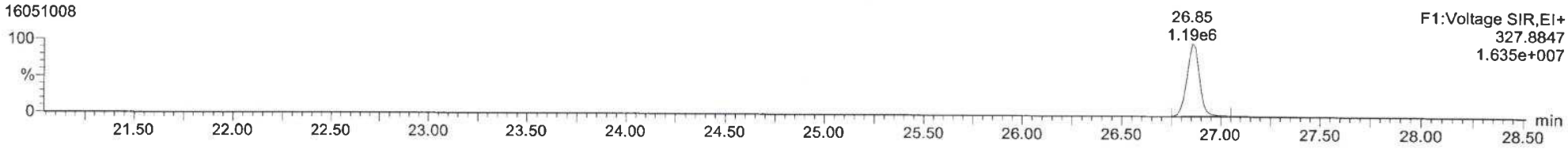


Quantify Sample Report **MassLynx MassLynx V4.1 SCN909**
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Last Altered: Wednesday, May 11, 2016 09:28:40 Pacific Daylight Time
Printed: Thursday, May 12, 2016 14:37:02 Pacific Daylight Time

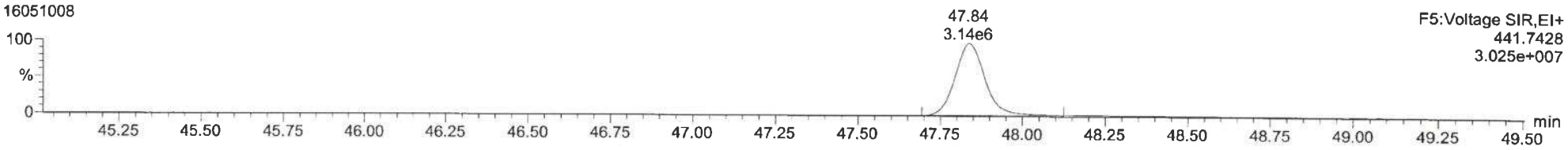
CSSAA 04/30/16

ID: ~~G64~~, Name: 16051008, Date: 10-May-2016, Time: 17:15:41, Conditions: AUTOSPEC01, User: pk

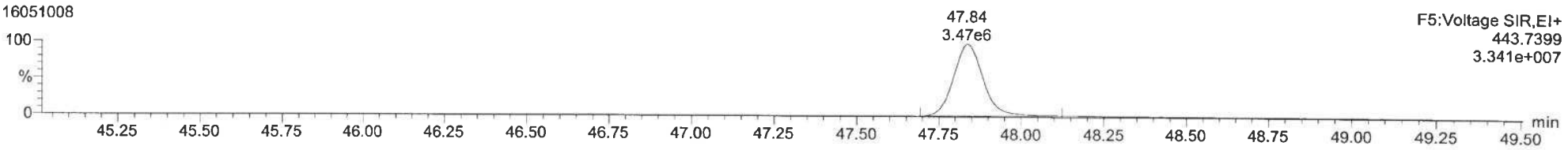
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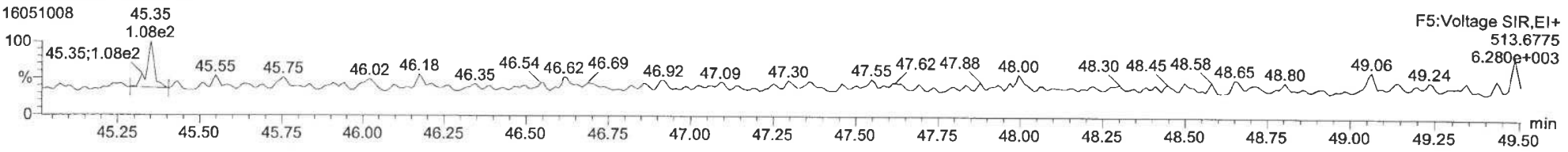
OCDF



OCDF



FUNCTION5 DCDPE



Quantify Sample Summary Report **MassLynx MassLynx V4.1 SCN909**
Dataset: P:\DIOXIN8290.PRO\160510IC.qld
Last Altered: Wednesday, May 11, 2016 09:28:40 Pacific Daylight Time
Printed: Thursday, May 12, 2016 14:37:04 Pacific Daylight Time

Page 243 of 455

Method: P:\DIOXIN8290.pro\MethDB\Dioxin1604143SN.mdb 14 Apr 2016 14:40:15
Calibration: P:\DIOXIN8290.PRO\CurveDB\160510ICAL.cdb 11 May 2016 09:28:40
CS6AA 04/30/16
ID: ~~CS5~~, Name: 16051009, Date: 10-May-2016, Time: 18:09:09, Conditions: AUTOSPEC01, User: pk

Name	RT	RRT	Ion1Area	Ion2Area	RRF	Ratio	Pred R	Noise 1	Noise 2	Height 1	Height 2	S/N	EMPC?	EMPC	pg
2378-TCDF	26.212	1.001	4.35e6	5.57e6	0.935	0.781	0.770	3279	3680	6.11e7	7.84e7	18621.5	NO	206.462	206.462
12378-PeCDF	30.377	1.000	2.72e7	1.72e7	0.952	1.576	1.550	14139	10671	3.91e8	2.49e8	27634.8	NO	1038.923	1038.923
23478-PeCDF	31.725	1.001	2.69e7	1.72e7	0.963	1.570	1.550	14139	10671	3.91e8	2.50e8	27673.1	NO	1035.813	1035.813
123478-HxCDF	35.419	1.001	2.17e7	1.75e7	1.137	1.242	1.240	7978	9889	3.12e8	2.50e8	39150.1	NO	1008.651	1008.651
234678-HxCDF	36.505	1.000	2.27e7	1.82e7	1.164	1.243	1.240	7978	9889	3.15e8	2.54e8	39519.1	NO	1041.959	1041.959
123678-HxCDF	35.562	1.000	2.39e7	1.91e7	1.099	1.252	1.240	7978	9889	3.39e8	2.72e8	42475.3	NO	1015.919	1015.919
123789-HxCDF	37.645	1.001	1.89e7	1.51e7	1.101	1.248	1.240	7978	9889	2.90e8	2.31e8	36301.1	NO	1034.223	1034.223
1234678-HpCDF	39.727	1.001	2.00e7	1.92e7	1.303	1.041	1.050	13198	14124	2.82e8	2.69e8	21353.7	NO	1034.086	1034.086
1234789-HpCDF	42.457	1.000	1.57e7	1.52e7	1.317	1.035	1.050	13198	14124	1.92e8	1.85e8	14512.2	NO	1027.817	1027.817
OCDF	47.846	1.006	2.64e7	2.91e7	1.166	0.906	0.890	7357	6921	2.57e8	2.84e8	34912.8	NO	2093.402	2093.402
2378-TCDD	26.855	1.001	3.13e6	3.99e6	1.134	0.783	0.770	1887	2391	4.28e7	5.53e7	22681.5	NO	204.457	204.457
12378-PeCDD	31.978	1.000	1.70e7	1.09e7	0.975	1.561	1.550	4731	4226	2.43e8	1.57e8	51272.0	NO	1044.238	1044.238
123478-HxCDD	36.647	1.001	1.56e7	1.25e7	1.031	1.249	1.240	3956	4009	2.25e8	1.81e8	56938.3	NO	1020.760	1020.760
123678-HxCDD	36.779	1.001	1.59e7	1.26e7	0.971	1.256	1.240	3956	4009	2.24e8	1.79e8	56542.7	NO	1004.474	1004.474
123789-HxCDD	37.206	1.012	1.51e7	1.21e7	0.947	1.250	1.240	3956	4009	2.17e8	1.74e8	54856.0	NO	1028.413	1028.413
1234678-HpCDD	41.558	1.000	1.24e7	1.19e7	1.028	1.044	1.050	10198	7182	1.65e8	1.59e8	16208.2	NO	1021.448	1021.448
OCDD	47.568	1.000	2.19e7	2.46e7	1.107	0.890	0.890	6830	10054	2.13e8	2.39e8	31234.5	NO	1848.573	1848.573
13C-2378-TCDF	26.198	1.006	2.26e6	2.88e6	1.567	0.783	0.770	8687	4581	3.15e7	4.04e7	3628.1	NO		104.094
13C-12378-PeCDF	30.366	1.166	2.75e6	1.74e6	1.274	1.581	1.550	4421	4290	3.93e7	2.46e7	8890.8	NO		111.735
13C-23478-PeCDF	31.703	1.218	2.71e6	1.71e6	1.235	1.586	1.550	4421	4290	3.80e7	2.42e7	8604.3	NO		113.556
13C-123478-HxCDF	35.397	0.952	1.16e6	2.25e6	1.381	0.517	0.510	3724	6188	1.67e7	3.20e7	4489.5	NO		97.181
13C-123678-HxCDF	35.551	0.956	1.30e6	2.55e6	1.569	0.510	0.510	3724	6188	1.85e7	3.52e7	4967.8	NO		96.347
13C-234678-HxCDF	36.494	0.981	1.15e6	2.22e6	1.345	0.518	0.510	3724	6188	1.62e7	3.09e7	4341.6	NO		98.661
13C-123789-HxCDF	37.623	1.012	1.03e6	1.96e6	1.183	0.525	0.510	3724	6188	1.51e7	2.91e7	4064.1	NO		99.189
13C-1234678-HpCDF	39.705	1.068	9.11e5	2.00e6	1.178	0.456	0.440	3269	5437	1.25e7	2.77e7	3833.3	NO		97.065
13C-1234789-HpCDF	42.446	1.141	7.13e5	1.57e6	0.878	0.455	0.440	3269	5437	8.39e6	1.88e7	2565.2	NO		102.063
13C-1234-TCDD	26.033	0.000	1.37e6	1.78e6	1.000	0.773	0.770	4660	2816	1.91e7	2.45e7	4092.0	NO		100.000
13C-2378-TCDD	26.840	1.031	1.34e6	1.73e6	0.908	0.771	0.770	4660	2816	1.84e7	2.39e7	3939.9	NO		107.342
13C-12378-PeCDD	31.966	1.228	1.68e6	1.06e6	0.756	1.587	1.550	2144	2345	2.38e7	1.50e7	11115.(	NO		114.666
13C-123478-HxCDD	36.625	0.985	1.50e6	1.18e6	1.056	1.275	1.240	3814	2411	2.14e7	1.67e7	5613.2	NO		99.540
13C-123678-HxCDD	36.757	0.988	1.63e6	1.29e6	1.163	1.267	1.240	3814	2411	2.30e7	1.83e7	6041.3	NO		98.664
13C-1234678-HpCDD	41.547	1.117	1.19e6	1.13e6	0.909	1.052	1.050	2959	3067	1.52e7	1.46e7	5142.2	NO		100.275
13C-OCDD	47.550	1.279	2.15e6	2.40e6	0.820	0.894	0.890	4073	4326	2.09e7	2.34e7	5134.0	NO		218.274

Page 244 of 455

Quantify Sample Summary Report **MassLynx MassLynx V4.1 SCN909**
Dataset: P:\DIOXIN8290.PRO\160510IC.qld
Last Altered: Wednesday, May 11, 2016 09:28:40 Pacific Daylight Time
Printed: Thursday, May 12, 2016 14:37:04 Pacific Daylight Time

CS6AA 05/30/16

ID: ~~G65~~, Name: 16051009, Date: 10-May-2016, Time: 18:09:09, Conditions: AUTOSPEC01, User: pk

Name	RT	RRT	Ion1Area	Ion2Area	RRF	Ratio	Pred R	Noise 1	Noise 2	Height 1	Height 2	S/N	EMPC?	EMPC	pg
13C-123789-HxCDD	37.184	0.000	1.41e6	1.13e6	1.000	1.246	1.240	3814	2411	2.01e7	1.62e7	5273.5	NO		100.000
Total-tetrafurans			4.43e6		0.935			3279		6.21e7					210.299
Total-penta1			0.00e0					1229		0.00e0					
Total-pentafurans			5.55e7		0.957			14139		7.98e8					2131.385
Total-hexafurans			8.74e7		1.125			7978		1.26e9					4115.379
Total-heptafurans			3.57e7		1.310			13198		4.74e8					2064.253
Total-Furans			2.09e8		1.114			3279		2.85e9					10614.734
Total-tetradioxins			3.21e6		1.134			1887		4.38e7					209.667
Total-pentadioxins			1.70e7		0.975			4731		2.43e8					1046.711
Total-hexadioxins			4.67e7		0.983			3956		6.67e8					3056.888
Total-heptadioxins			1.25e7		1.028			10198		1.66e8					1025.355
Total-Dioxins			1.01e8		1.028			1887		1.33e9					7187.267
Total-TEQ			3.11e8					1887		4.18e9					17802.000
37CL-2378-TCDD	26.855	1.032	7.52e6		1.067			2672		1.04e8		38914.4			223.753
FUNCTION1 PFK			4.07e6					1439234		6.56e7					
FUNCTION2 PFK			3.78e5					205260		8.03e6					0.000
FUNCTION3 PFK			1.07e6					838846		2.98e7					0.000
FUNCTION4 PFK			2.20e5					549429		8.04e6					
FUNCTION5 PFK			1.25e4					401130		6.64e5					
FUNCTION1 HXCDPE			3.82e2					587		7.05e3					0.000
FUNCTION1 HPCDPE			1.87e3					1160		3.77e4					0.000
FUNCTION2 HPCDPE			3.14e4					1324		4.91e5					0.000
FUNCTION3 OCDPE			1.69e2					533		2.76e3					0.000
FUNCTION4 NCDPE			7.52e1					759		2.16e3					0.000
FUNCTION5 DCDPE			0.00e0					410		0.00e0					

Quantify Sample Report **MassLynx MassLynx V4.1 SCN909**
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Printed: Thursday, May 12, 2016 14:37:04 Pacific Daylight Time

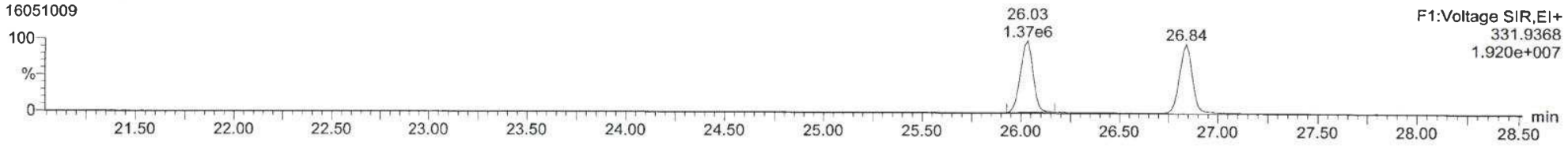
Page 245 of 354

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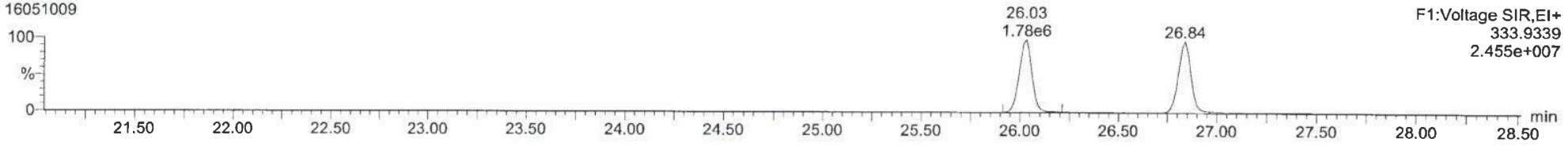
CS6AA 06/30/16

ID: ~~CS5~~, Name: 16051009, Date: 10-May-2016, Time: 18:09:09, Conditions: AUTOSPEC01, User: pk

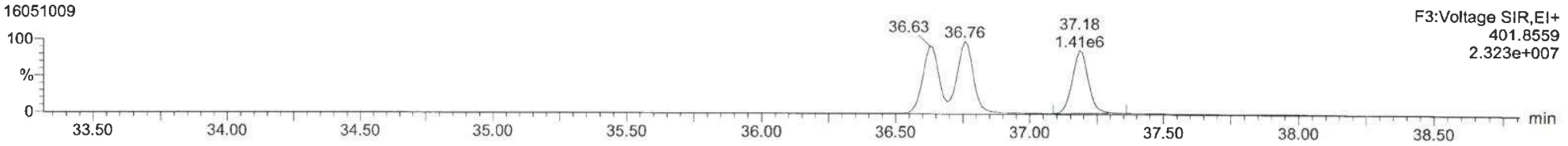
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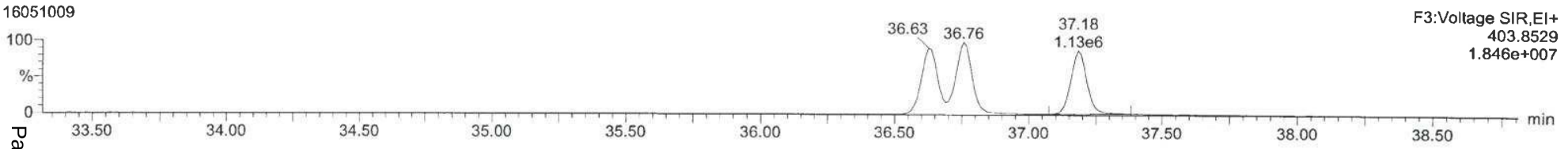
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13C-123789-HxCDD



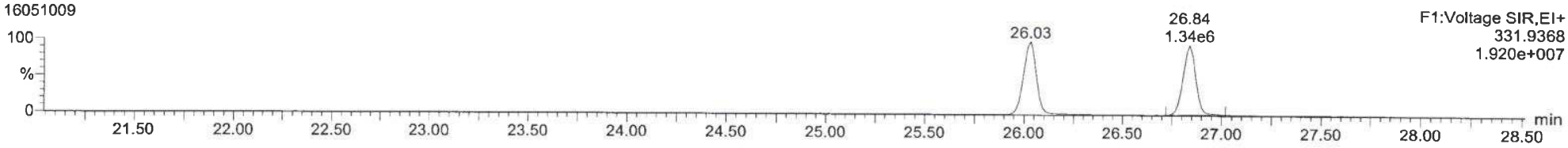
Page 274 of 485

Quantify Sample Report **MassLynx MassLynx V4.1 SCN909**
Dataset: P:\DIOXIN8290.PRO\160510IC.qld
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Printed: Thursday, May 12, 2016 14:37:04 Pacific Daylight Time

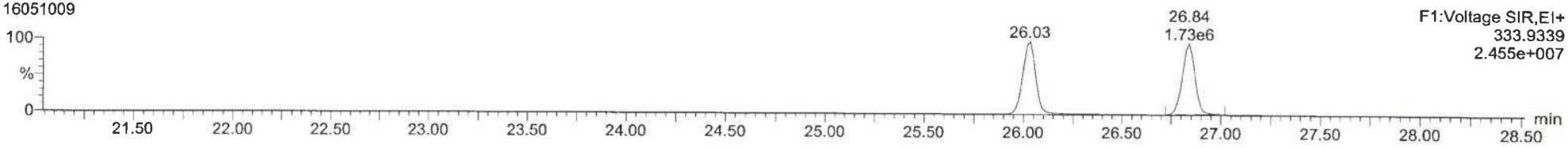
CSLAA 06/30/16

D:~~CS5~~, Name: 16051009, Date: 10-May-2016, Time: 18:09:09, Conditions: AUTOSPEC01, User: pk

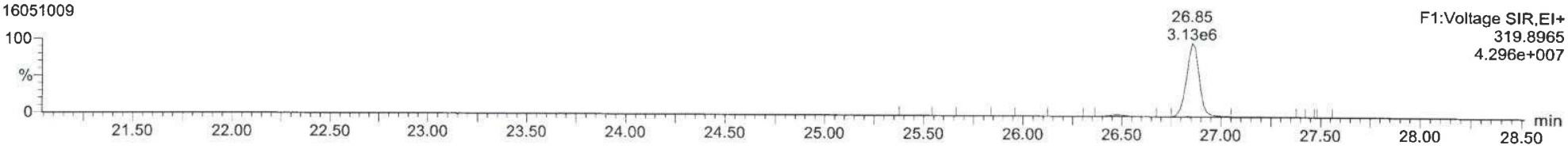
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16051009



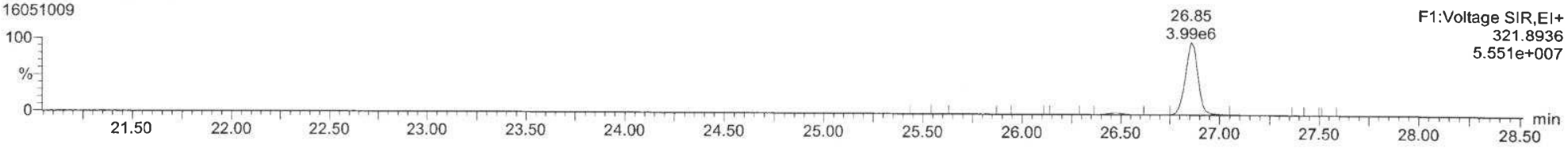
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16051009



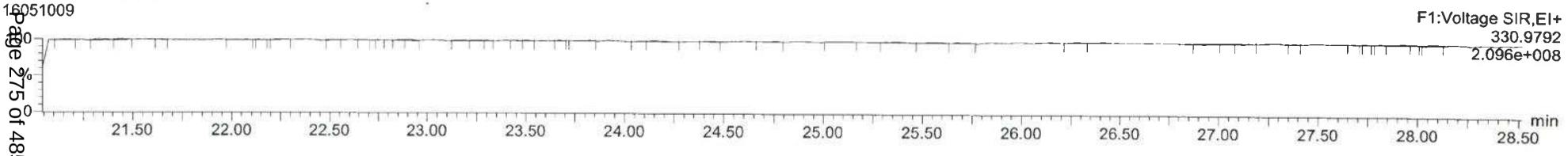
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16051009



Total-tetradioxins
16051009



FUNCTION1 PFK
16051009

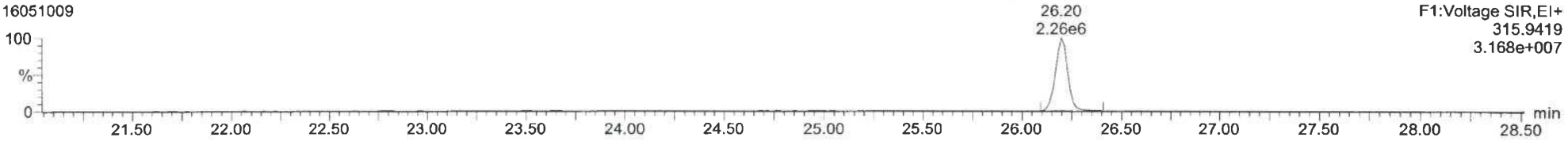


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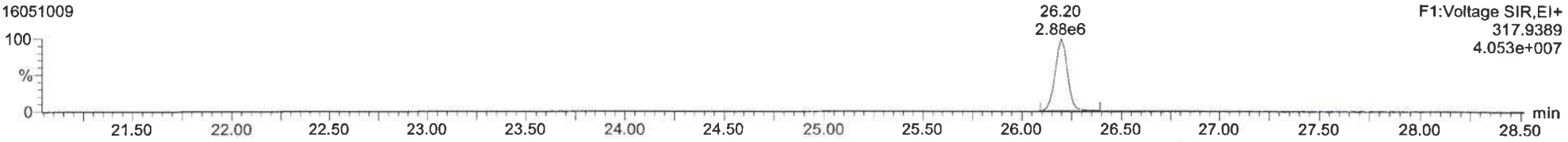
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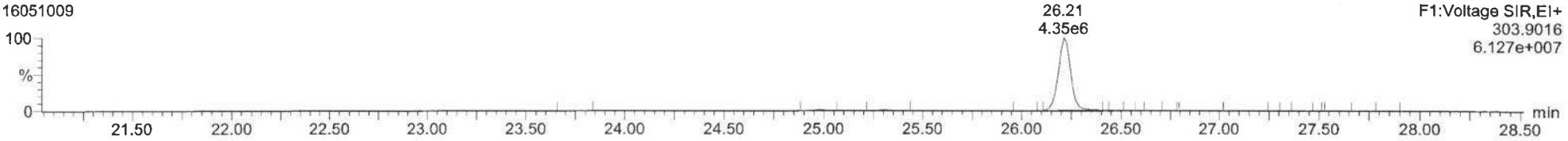
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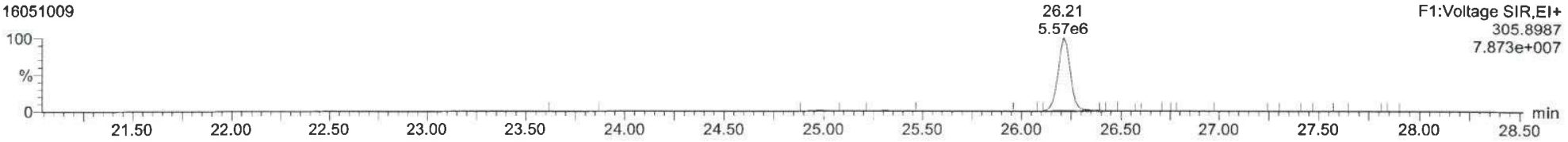
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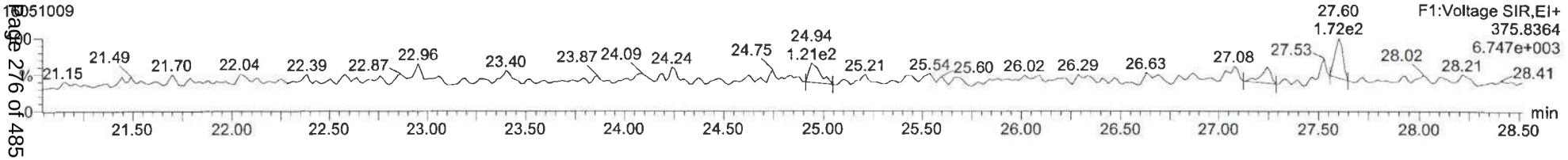
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Total-tetrafurans



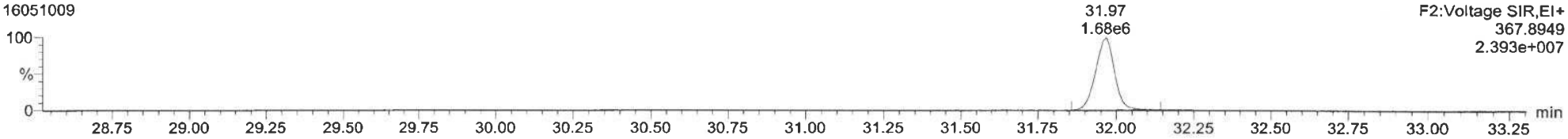
FUNCTION1 HXCDPE



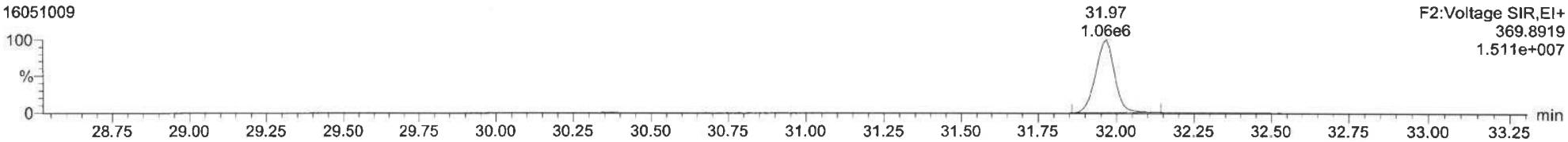
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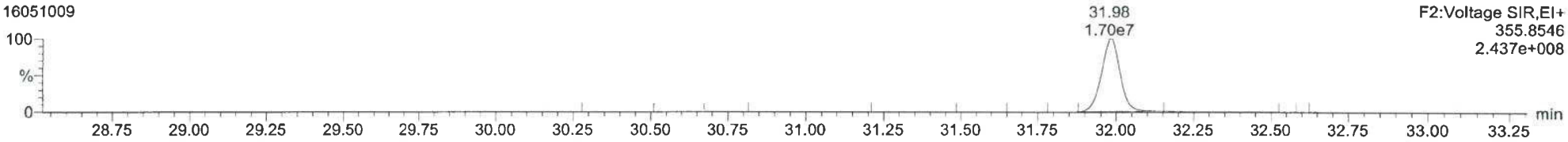
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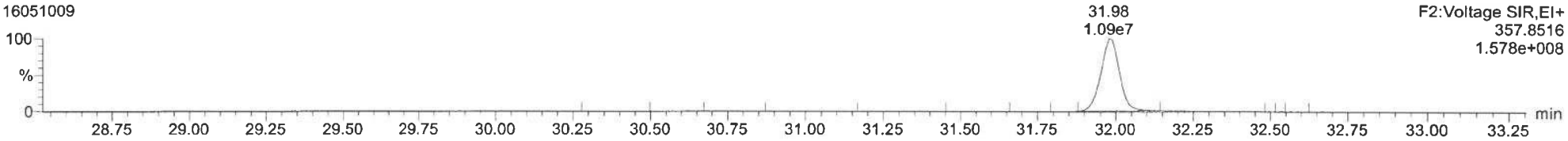
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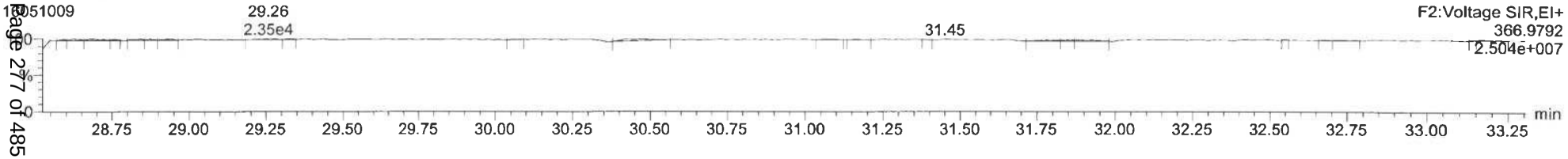
Total-pentadioxins



Total-pentadioxins



FUNCTION2 PFK



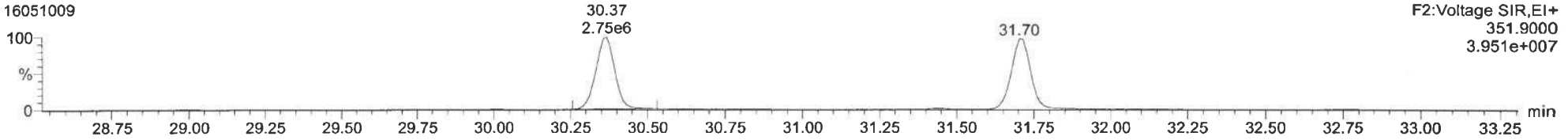
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Printed: Thursday, May 12, 2016 14:37:04 Pacific Daylight Time

Page 249 of 454

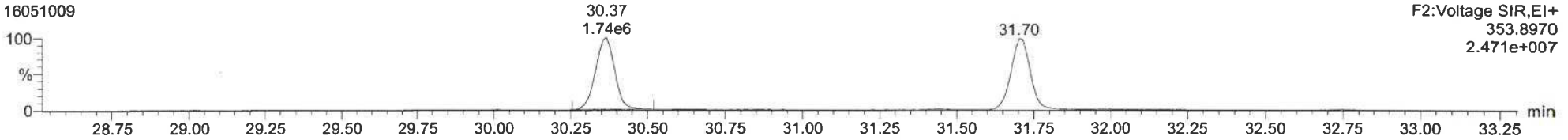
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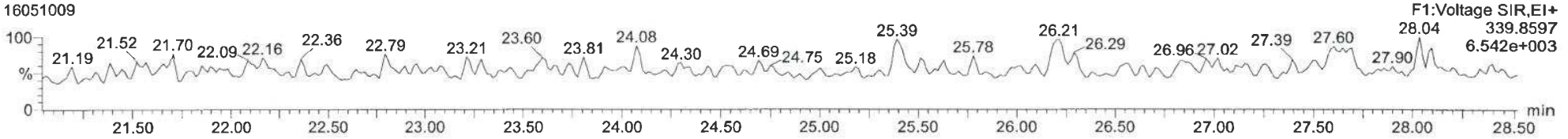
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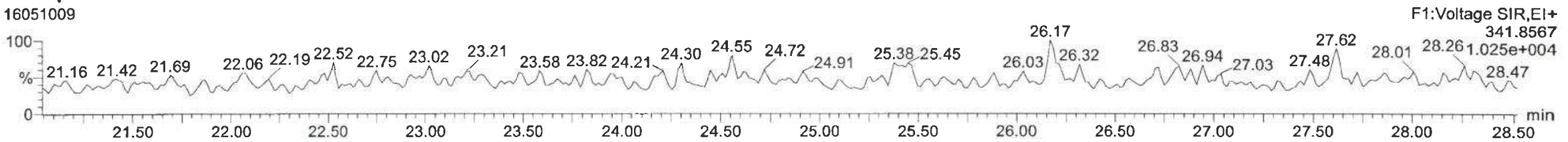
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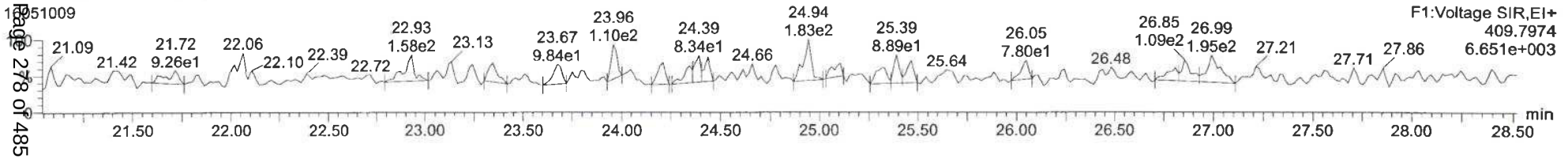
Total-penta1



Total-penta1



FUNCTION1 HPCDPE



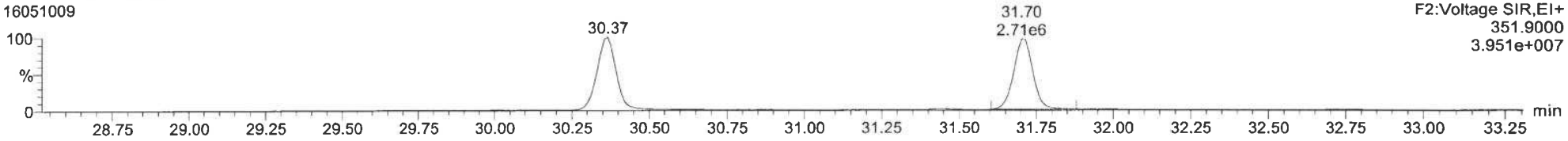
Page 278 of 485

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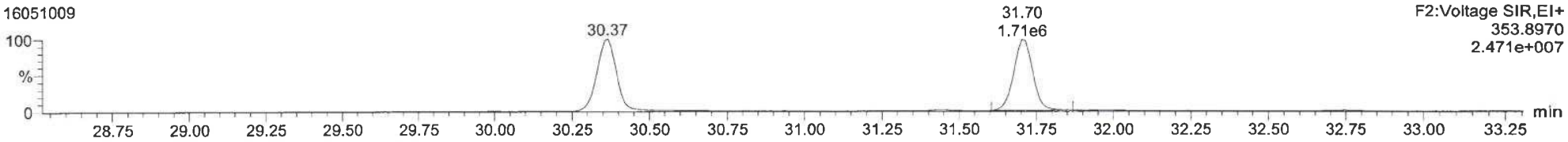
CS6AA 6/30/16

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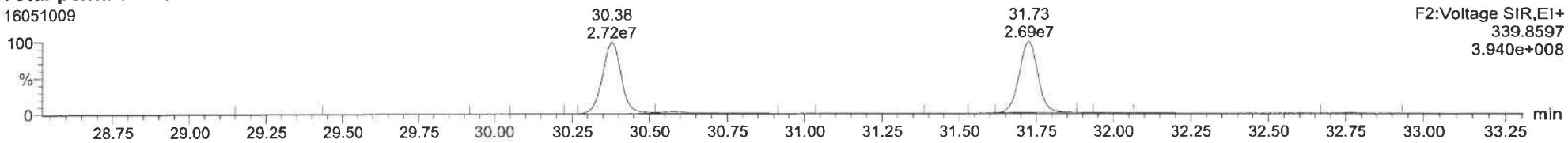
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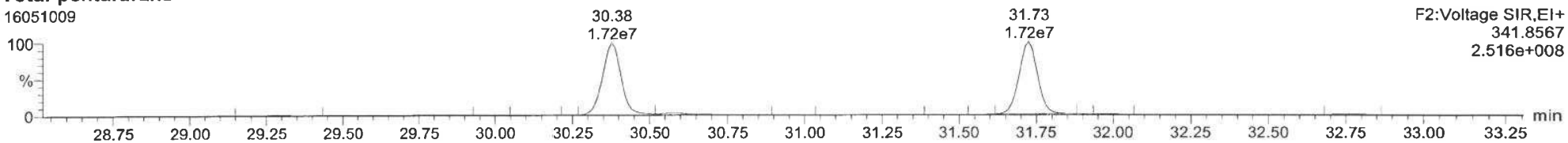
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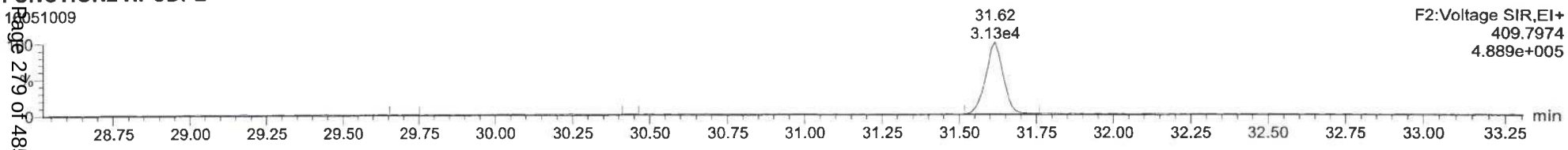
Total-pentafurans



Total-pentafurans



FUNCTION2 HPCDPE



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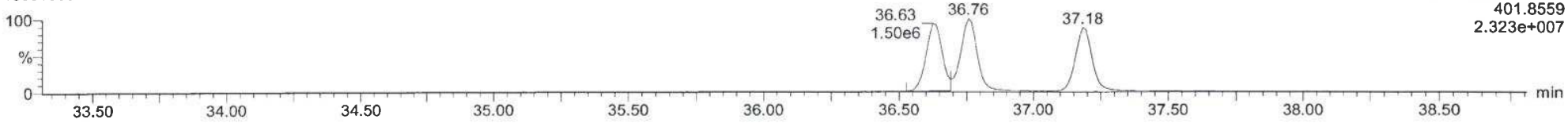
Page 251 of 454

CS6AA 06/30/16

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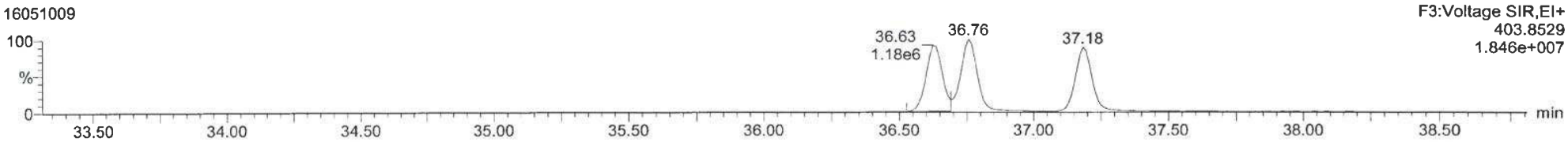
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16051009



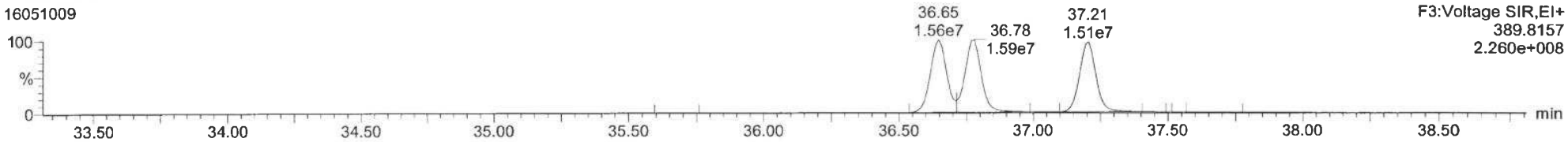
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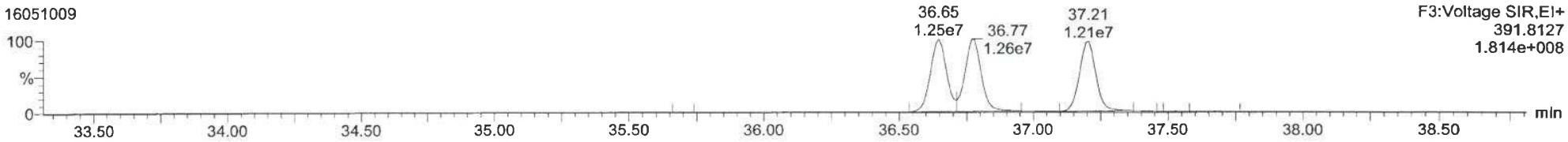
Total-hexadioxins

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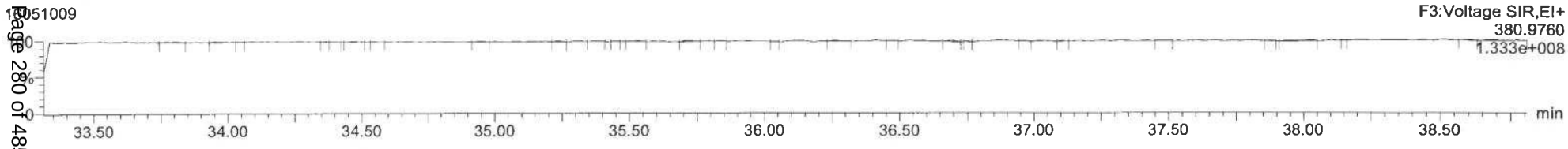
Total-hexadioxins

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FUNCTION3 PFK

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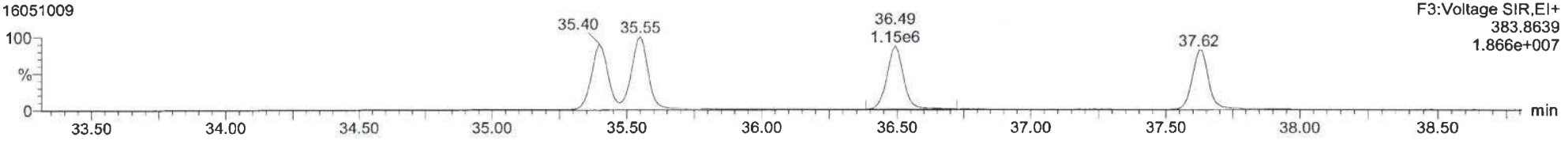
Page 280 of 485

Page 252 of 454

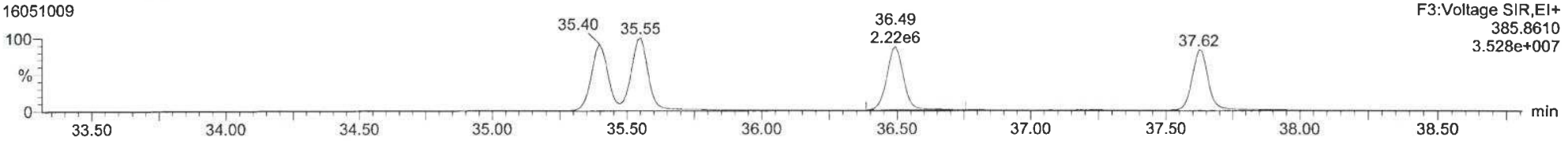
CSCAA 06/30/16

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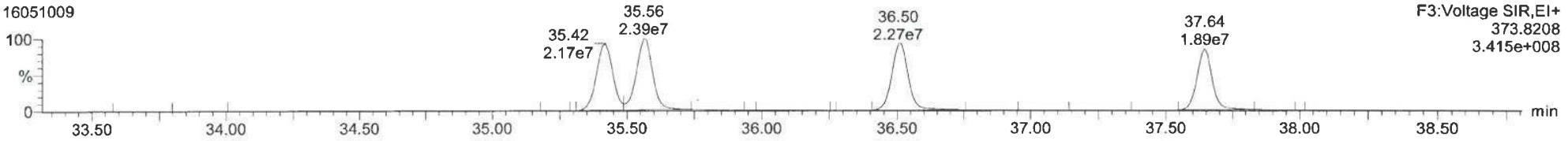
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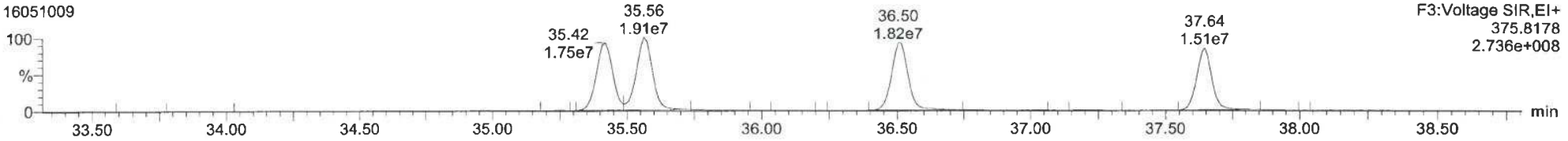
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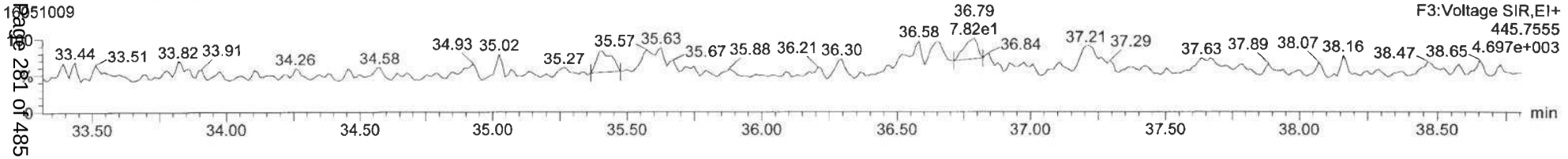
Total-hexafurans



Total-hexafurans



FUNCTION3 OCDPE



Page 281 of 485

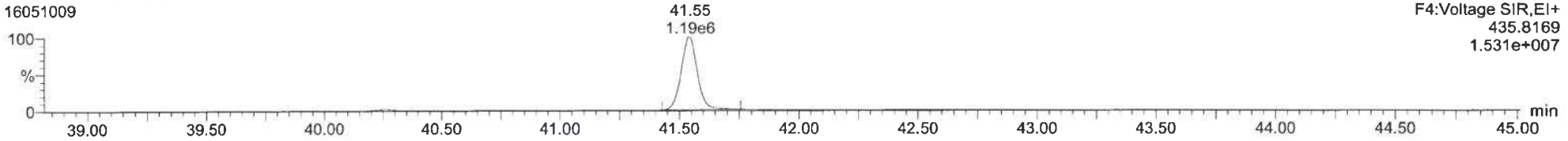
Quantify Sample Report **MassLynx MassLynx V4.1 SCN909**
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Printed: Thursday, May 12, 2016 14:37:04 Pacific Daylight Time

Page 253 of 454

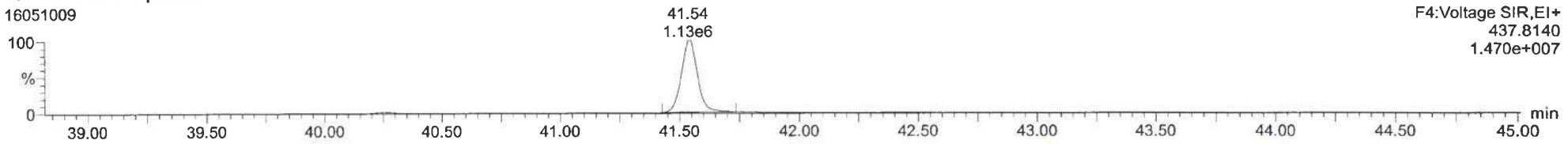
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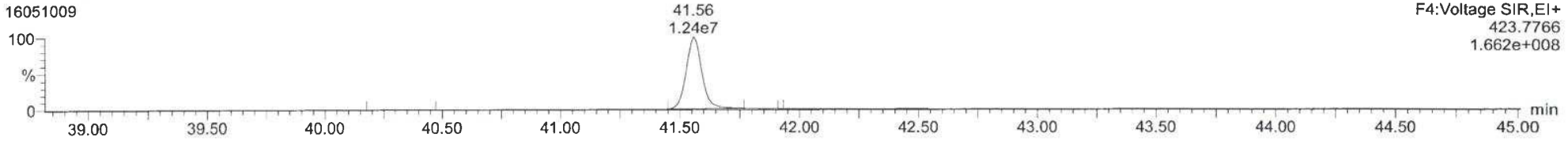
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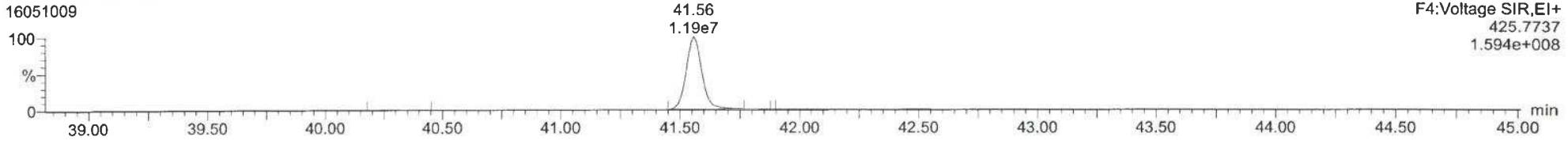
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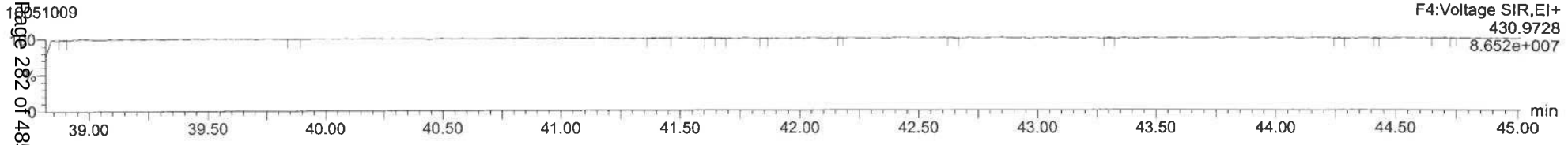
Total-heptadioxins



Total-heptadioxins



FUNCTION4 PFK



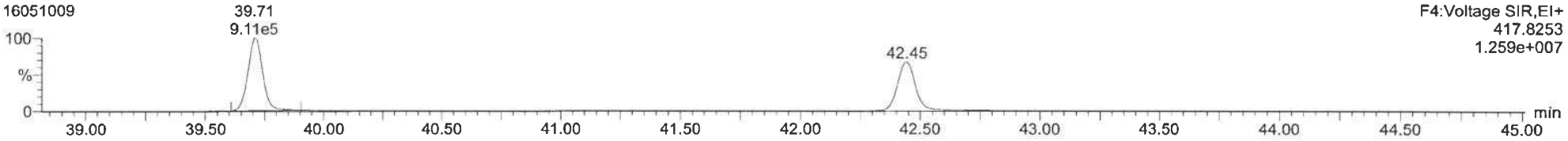
Page 282 of 485

Page 254 of 454

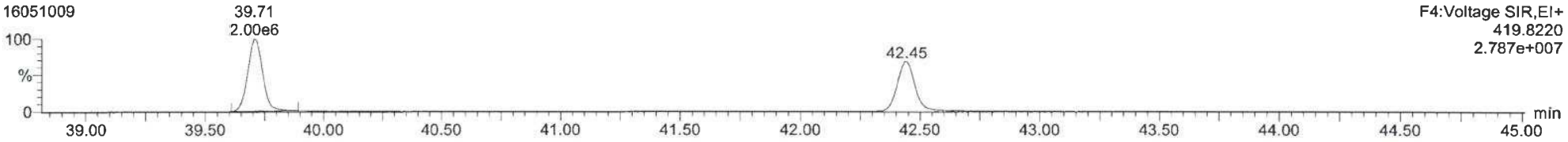
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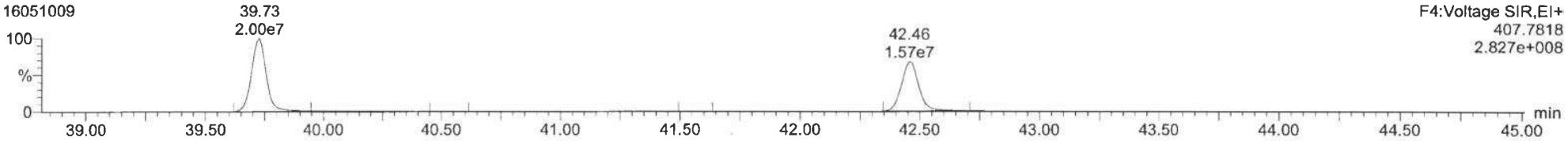
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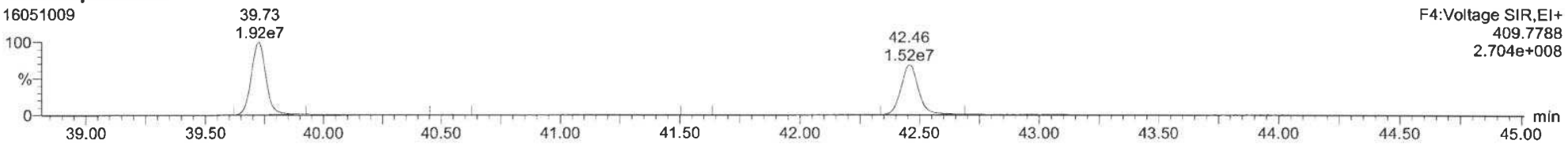
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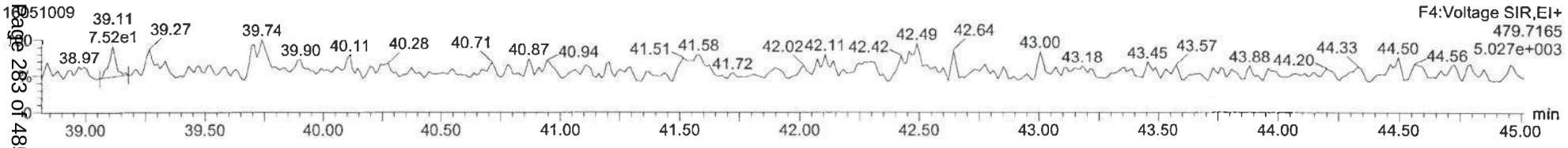
Total-heptafurans



Total-heptafurans



FUNCTION4 NCDPE



Page 283 of 485

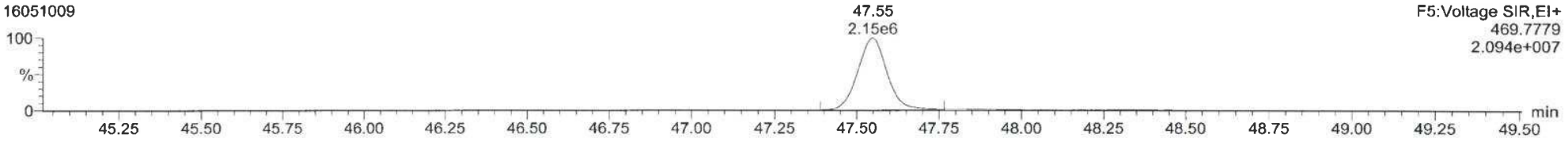
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Last Altered: Wednesday, May 11, 2016 09:28:40 Pacific Daylight Time
Printed: Thursday, May 12, 2016 14:37:04 Pacific Daylight Time

Page 255 of 454

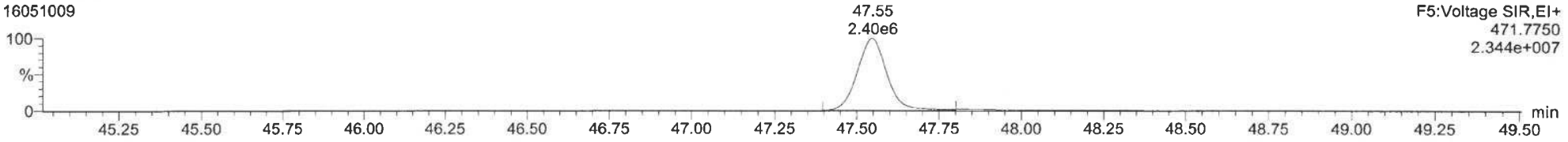
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ID: ~~CS5~~, Name: 16051009, Date: 10-May-2016, Time: 18:09:09, Conditions: AUTOSPEC01, User: pk

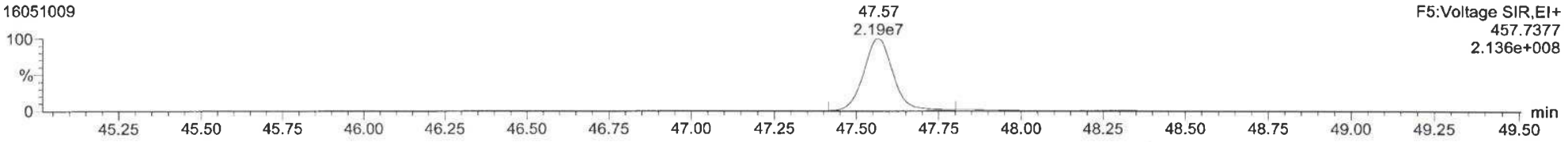
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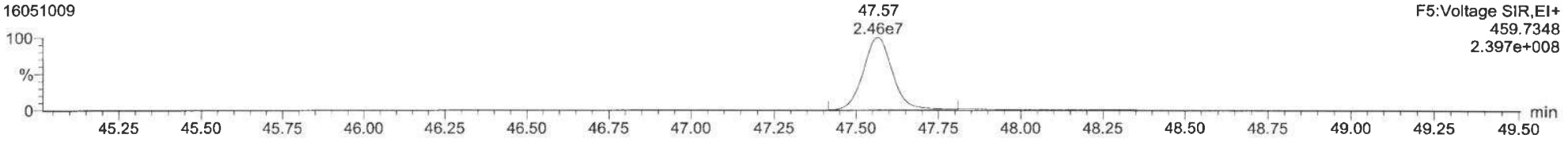
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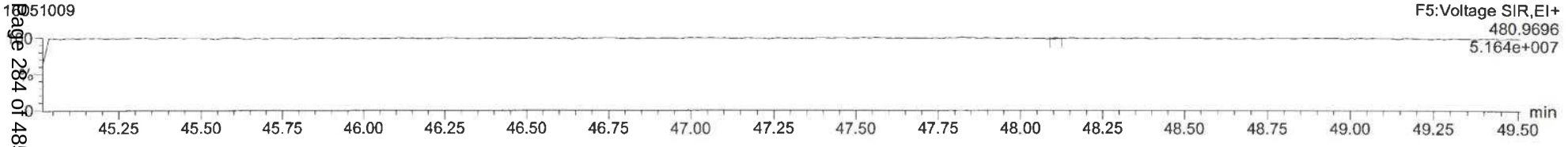
OCDD



OCDD



FUNCTION5 PFK



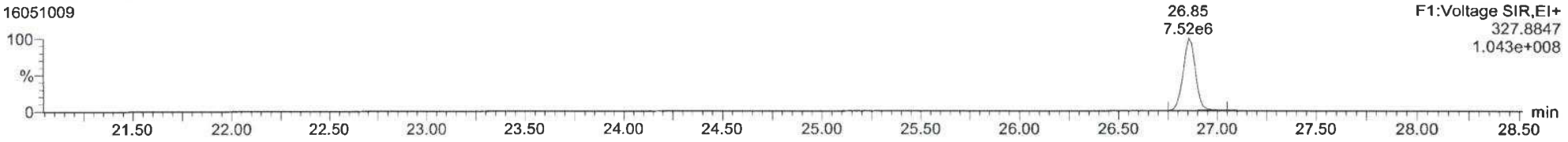
Page 284 of 485

Quantify Sample Report **MassLynx MassLynx V4.1 SCN909**
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Printed: Thursday, May 12, 2016 14:37:04 Pacific Daylight Time

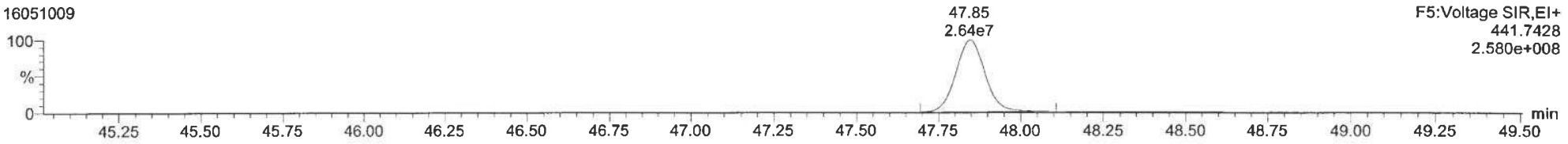
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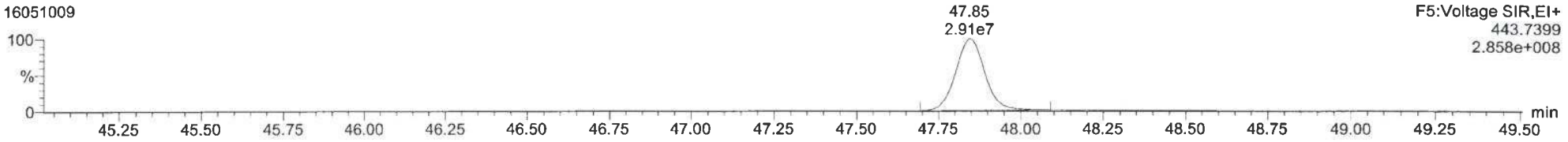
37CL-2378-TCDD



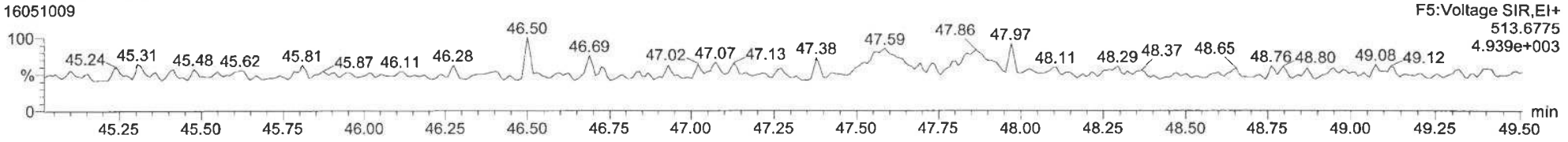
OCDF



OCDF



FUNCTION5 DCDPE



Quantify Sample Summary Report **MassLynx MassLynx V4.1 SCN909**
Dataset: P:\DIOXIN8290.PRO\160510ICV.qld
Last Altered: Thursday, May 12, 2016 14:38:04 Pacific Daylight Time
Printed: Thursday, May 12, 2016 14:39:05 Pacific Daylight Time

Page 257 of 1445

Method: P:\DIOXIN8290.pro\MethDB\Dioxin1604143SN.mdb 14 Apr 2016 14:40:15
Calibration: P:\DIOXIN8290.pro\CurveDB\160510ICAL.cdb 11 May 2016 09:28:40

ID: ICV, Name: 16051010, Date: 10-May-2016, Time: 19:02:32, Conditions: AUTOSPEC01, User: pk

Name	RT	RRT	Ion1Area	Ion2Area	RRF	Ratio	Pred R	Noise 1	Noise 2	Height 1	Height 2	S/N	EMPC?	EMPC	pg
2378-TCDF	26.213	1.001	1.81e5	2.29e5	0.935	0.791	0.770	1350	2309	2.39e6	3.06e6	1769.5	NO	10.142	10.142
12378-PeCDF	30.378	1.000	1.10e6	6.88e5	0.952	1.596	1.550	4659	4072	1.44e7	9.09e6	3090.8	NO	54.644	54.644
23478-PeCDF	31.726	1.000	1.00e6	6.26e5	0.963	1.599	1.550	4659	4072	1.36e7	8.78e6	2910.7	NO	51.287	51.287
123478-HxCDF	35.419	1.001	8.23e5	6.55e5	1.137	1.257	1.240	6492	5936	1.18e7	9.28e6	1810.8	NO	54.450	54.450
234678-HxCDF	36.516	1.001	7.88e5	6.38e5	1.164	1.235	1.240	6492	5936	1.07e7	8.56e6	1649.6	NO	49.624	49.624
123678-HxCDF	35.562	1.000	9.41e5	7.32e5	1.099	1.286	1.240	6492	5936	1.20e7	9.73e6	1845.4	NO	54.220	54.220
123789-HxCDF	37.645	1.001	6.83e5	5.41e5	1.101	1.263	1.240	6492	5936	9.25e6	7.48e6	1424.6	NO	54.675	54.675
1234678-HpCDF	39.727	1.001	6.83e5	6.61e5	1.303	1.033	1.050	4432	5355	9.32e6	9.01e6	2103.2	NO	53.628	53.628
1234789-HpCDF	42.456	1.000	4.99e5	4.85e5	1.317	1.029	1.050	4432	5355	5.63e6	5.43e6	1269.8	NO	50.155	50.155
OCDF	47.837	1.006	8.03e5	8.66e5	1.166	0.928	0.890	2816	3708	7.21e6	7.81e6	2561.4	NO	115.799	115.799
2378-TCDD	26.855	1.001	1.35e5	1.72e5	1.134	0.782	0.770	1548	1493	1.76e6	2.23e6	1138.5	NO	9.199	9.199
12378-PeCDD	31.989	1.001	6.76e5	4.37e5	0.975	1.547	1.550	2037	1423	9.17e6	5.86e6	4502.9	NO	51.541	51.541
123478-HxCDD	36.647	1.000	5.48e5	4.34e5	1.031	1.262	1.240	2099	3603	7.81e6	6.25e6	3723.0	NO	52.204	52.204
123678-HxCDD	36.779	1.001	5.61e5	4.53e5	0.971	1.240	1.240	2099	3603	7.41e6	5.97e6	3530.7	NO	54.495	54.495
123789-HxCDD	37.206	1.012	5.73e5	4.53e5	0.947	1.265	1.240	2099	3603	7.53e6	6.02e6	3586.9	NO	57.915	57.915
1234678-HpCDD	41.558	1.000	4.39e5	4.25e5	1.028	1.035	1.050	3359	1973	5.28e6	5.13e6	1571.7	NO	51.725	51.725
OCDD	47.558	1.000	6.64e5	7.38e5	1.107	0.899	0.890	3202	2490	6.10e6	6.91e6	1904.9	NO	102.495	102.495
13C-2378-TCDF	26.198	1.006	1.91e6	2.42e6	1.567	0.791	0.770	9096	4889	2.55e7	3.23e7	2802.7	NO		88.412
13C-12378-PeCDF	30.367	1.166	2.11e6	1.33e6	1.274	1.585	1.550	4879	5540	2.76e7	1.74e7	5651.9	NO		86.248
13C-23478-PeCDF	31.715	1.218	2.01e6	1.28e6	1.235	1.572	1.550	4879	5540	2.71e7	1.72e7	5552.7	NO		85.315
13C-123478-HxCDF	35.398	0.952	8.19e5	1.57e6	1.381	0.522	0.510	5850	9212	1.15e7	2.22e7	1966.1	NO		90.722
13C-123678-HxCDF	35.551	0.956	9.62e5	1.85e6	1.569	0.521	0.510	5850	9212	1.28e7	2.45e7	2184.0	NO		93.830
13C-234678-HxCDF	36.494	0.981	8.61e5	1.61e6	1.345	0.535	0.510	5850	9212	1.18e7	2.17e7	2015.7	NO		96.270
13C-123789-HxCDF	37.623	1.012	7.06e5	1.33e6	1.183	0.531	0.510	5850	9212	9.64e6	1.83e7	1647.2	NO		90.193
13C-1234678-HpCDF	39.705	1.068	5.95e5	1.33e6	1.178	0.447	0.440	4153	5723	8.02e6	1.75e7	1930.0	NO		85.635
13C-1234789-HpCDF	42.445	1.141	4.57e5	1.03e6	0.878	0.443	0.440	4153	5723	5.21e6	1.17e7	1254.0	NO		88.974
13C-1234-TCDD	26.034	0.000	1.38e6	1.75e6	1.000	0.786	0.770	4051	3612	1.92e7	2.42e7	4727.7	NO		100.000
13C-2378-TCDD	26.840	1.031	1.31e6	1.64e6	0.908	0.796	0.770	4051	3612	1.74e7	2.22e7	4298.9	NO		103.822
13C-12378-PeCDD	31.967	1.228	1.35e6	8.62e5	0.756	1.569	1.550	2512	2723	1.86e7	1.18e7	7402.4	NO		93.738
13C-123478-HxCDD	36.636	0.985	1.02e6	8.06e5	1.056	1.264	1.240	5495	3465	1.43e7	1.12e7	2609.7	NO		90.649
13C-123678-HxCDD	36.757	0.989	1.07e6	8.47e5	1.163	1.261	1.240	5495	3465	1.39e7	1.11e7	2533.8	NO		86.349
13C-1234678-HpCDD	41.547	1.117	8.39e5	7.86e5	0.909	1.067	1.050	3089	3609	1.00e7	9.44e6	3241.4	NO		93.716
13C-OCDD	47.541	1.279	1.19e6	1.28e6	0.820	0.927	0.890	6012	3088	1.08e7	1.18e7	1789.8	NO		158.151

Page 2960 of 4835

Quantify Sample Summary Report **MassLynx MassLynx V4.1 SCN909**
Dataset: P:\DIOXIN8290.PRO\160510ICV.qld
Last Altered: Thursday, May 12, 2016 14:38:04 Pacific Daylight Time
Printed: Thursday, May 12, 2016 14:39:05 Pacific Daylight Time

ID: ICV, Name: 16051010, Date: 10-May-2016, Time: 19:02:32, Conditions: AUTOSPEC01, User: pk

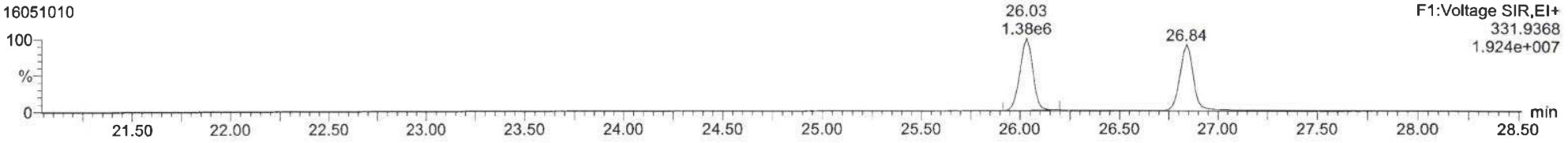
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13C-123789-HxCDD	37.184	0.000	1.06e6	8.48e5	1.000	1.249	1.240	5495	3465	1.45e7	1.14e7	2637.8	NO		100.000
Total-tetrafurans			1.83e5		0.935			1350		2.40e6					10.223
Total-penta1			0.00e0					1239		0.00e0					
Total-pentafurans			2.14e6		0.957			4659		2.85e7					107.913
Total-hexafurans			3.24e6		1.125			6492		4.38e7					213.320
Total-heptafurans			1.18e6		1.310			4432		1.50e7					103.878
Total-Furans			7.55e6		1.114			1350		9.69e7					551.134
Total-tetradioxins			1.35e5		1.134			1548		1.77e6					9.223
Total-pentadioxins			6.84e5		0.975			2037		9.31e6					52.165
Total-hexadioxins			1.69e6		0.983			2099		2.29e7					165.083
Total-heptadioxins			4.46e5		1.028			3359		5.36e6					52.733
Total-Dioxins			3.62e6		1.028			1548		4.54e7					381.699
Total-TEQ			1.12e7					1548		1.42e8					932.833
37CL-2378-TCDD	26.855	1.032	3.09e5		1.067			2113		4.07e6		1926.7			9.280
FUNCTION1 PFK			1.65e5					1523893		5.17e6					
FUNCTION2 PFK			1.81e5					185433		5.06e6					0.000
FUNCTION3 PFK			7.35e5					903414		1.51e7					0.000
FUNCTION4 PFK			2.04e5					510809		6.66e6					
FUNCTION5 PFK			3.02e5					385831		1.10e7					
FUNCTION1 HXCDPE			5.14e2					654		9.38e3					0.000
FUNCTION1 HPCDPE			1.65e3					1192		3.32e4					0.000
FUNCTION2 HPCDPE			7.56e2					954		1.91e4					0.000
FUNCTION3 OCDPE			0.00e0					722		0.00e0					
FUNCTION4 NCDPE			1.91e2					867		5.31e3					0.000
FUNCTION5 DCDPE			0.00e0					432		0.00e0					

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Printed: Thursday, May 12, 2016 14:39:05 Pacific Daylight Time

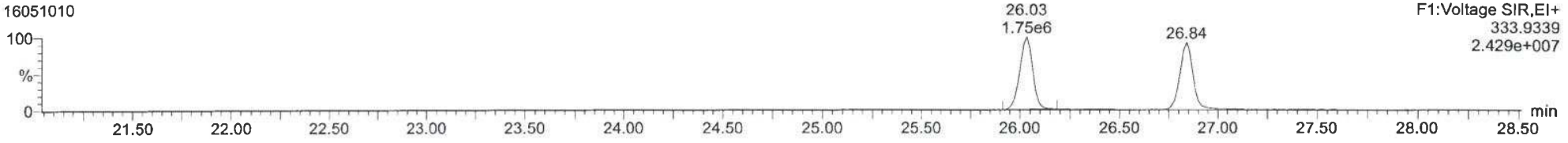
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ID: ICV, Name: 16051010, Date: 10-May-2016, Time: 19:02:32, Conditions: AUTOSPEC01, User: pk

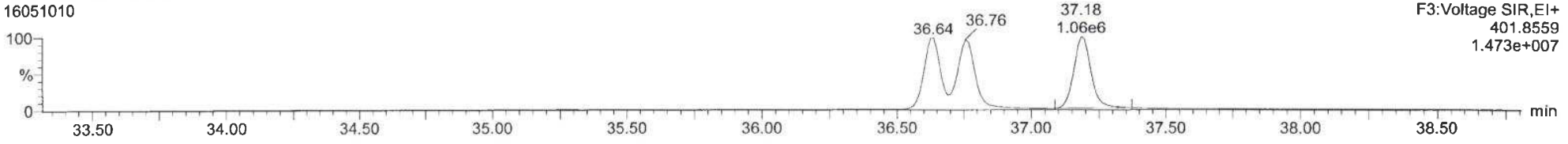
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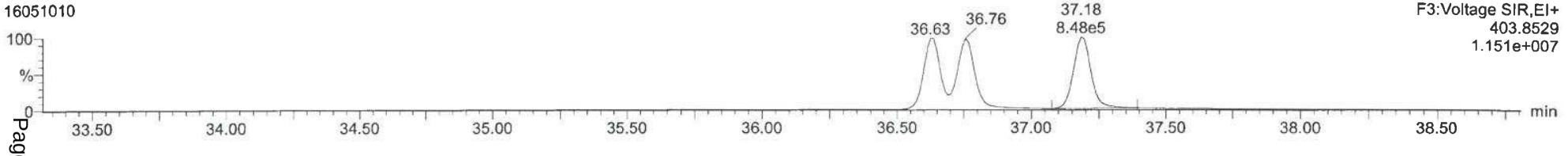
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13C-123789-HxCDD



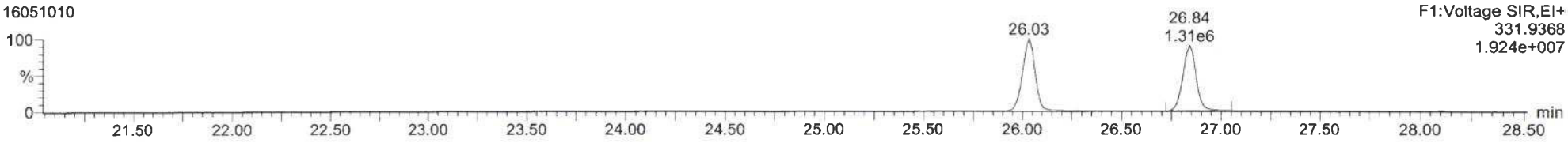
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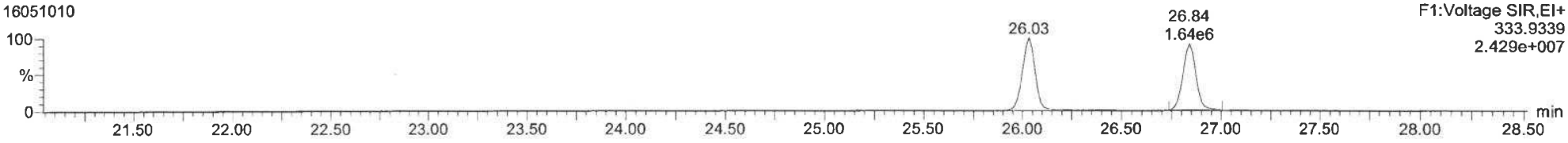
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Last Altered: Thursday, May 12, 2016 14:38:04 Pacific Daylight Time
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ID: ICV, Name: 16051010, Date: 10-May-2016, Time: 19:02:32, Conditions: AUTOSPEC01, User: pk

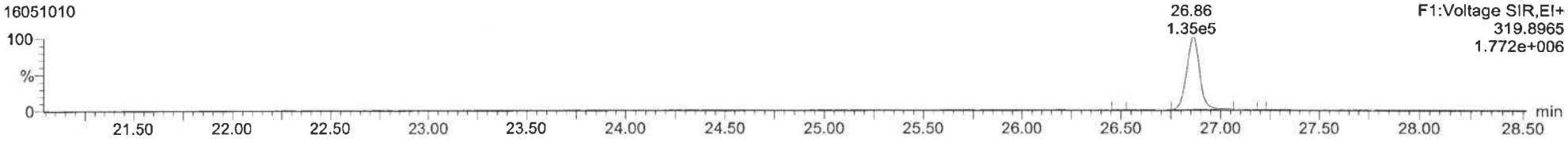
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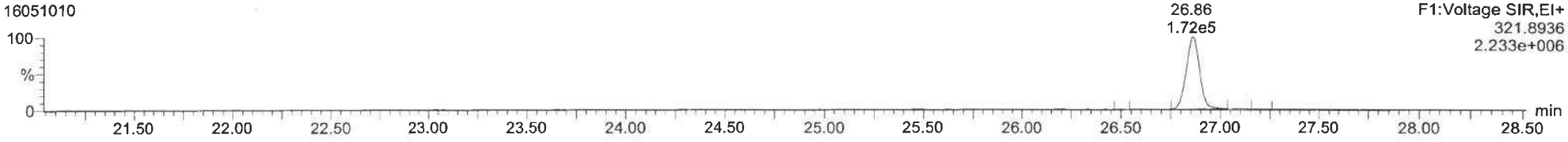
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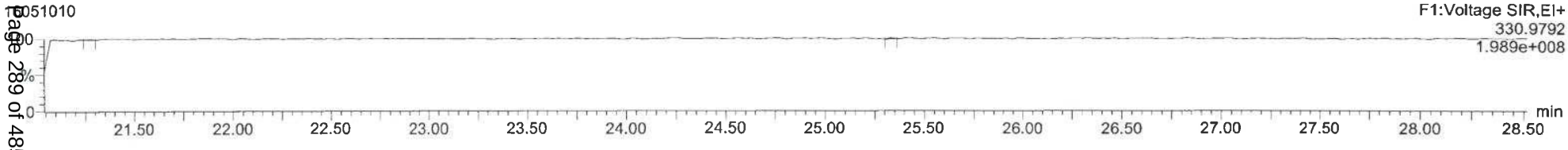
Total-tetradioxins



Total-tetradioxins



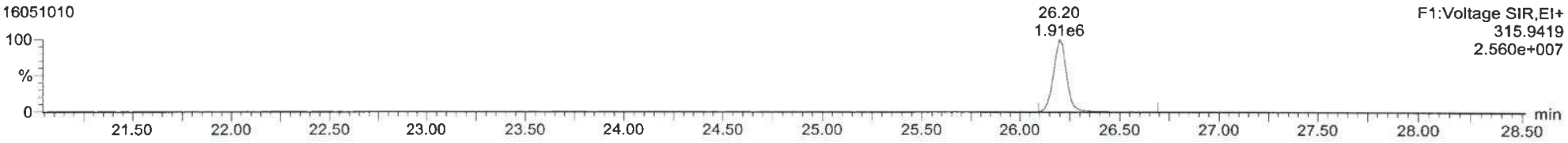
FUNCTION1 PFK



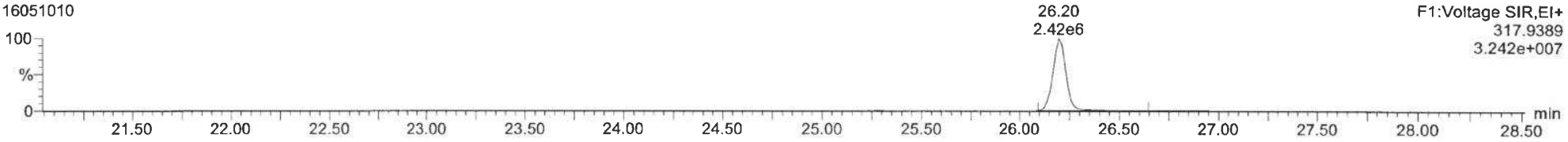
Page 261 of 454

ID: ICV, Name: 16051010, Date: 10-May-2016, Time: 19:02:32, Conditions: AUTOSPEC01, User: pk

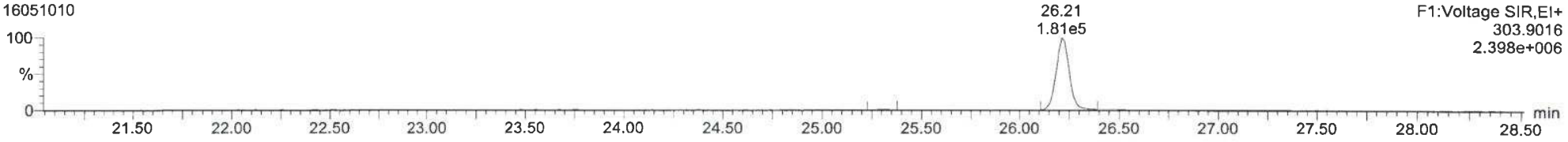
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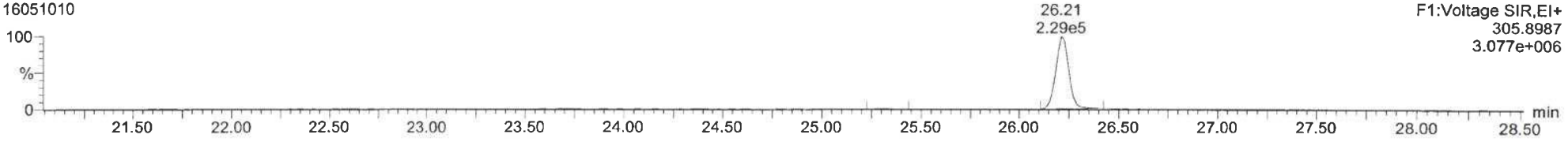
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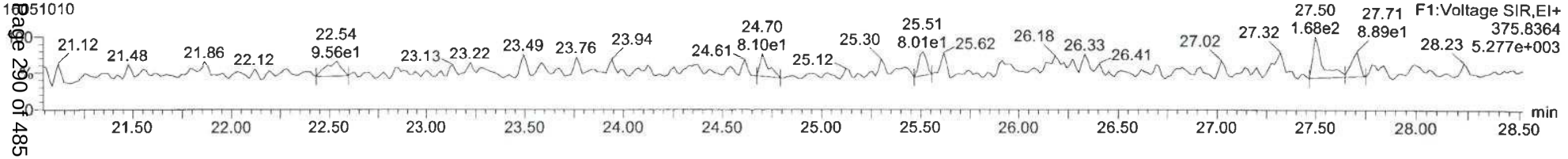
Total-tetrafurans



Total-tetrafurans



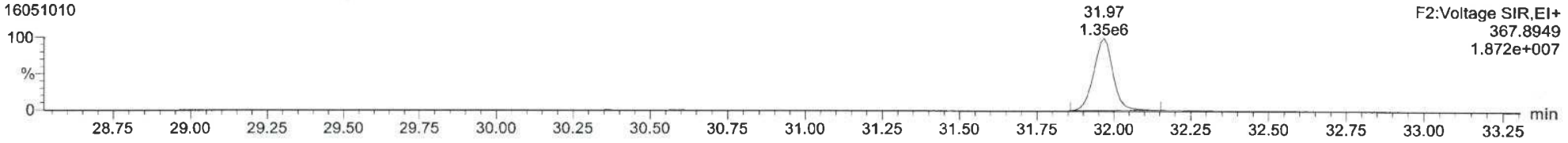
FUNCTION1 HXCDPE



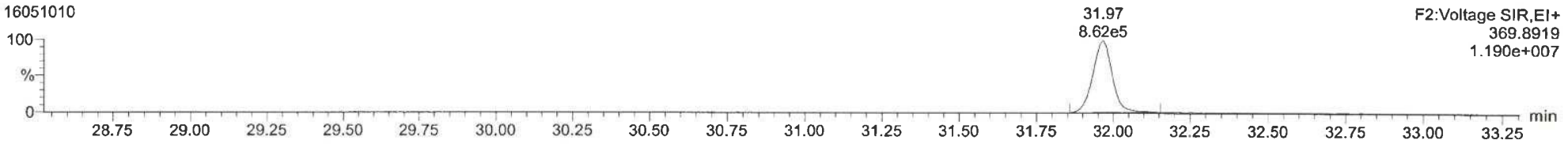
Page 290 of 485

ID: ICV, Name: 16051010, Date: 10-May-2016, Time: 19:02:32, Conditions: AUTOSPEC01, User: pk

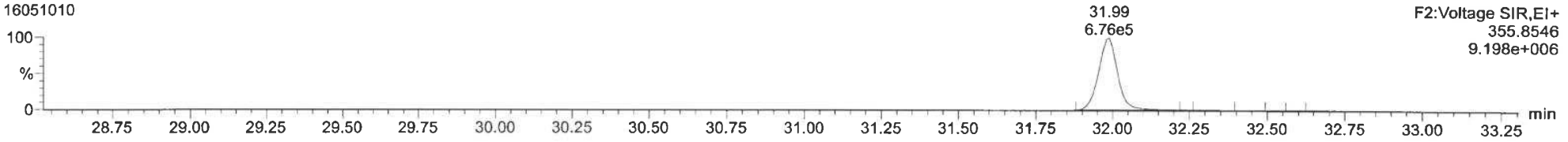
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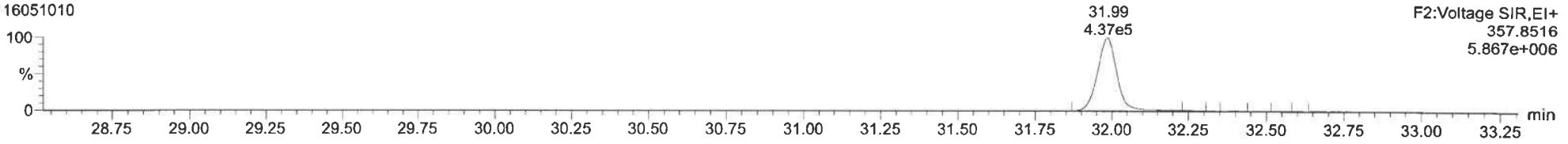
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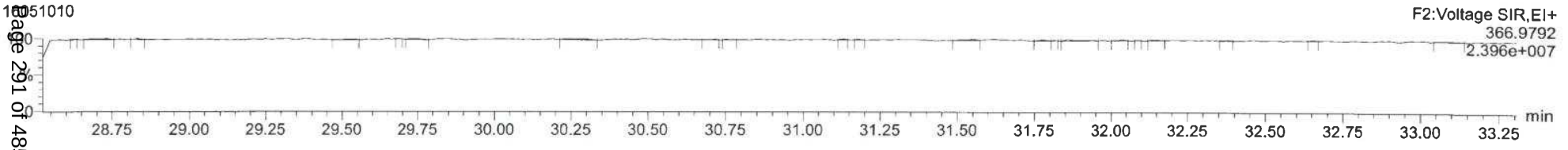
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Total-pentadioxins

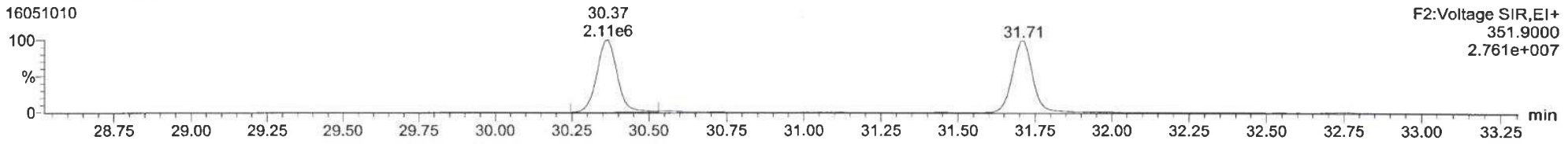


FUNCTION2 PFK

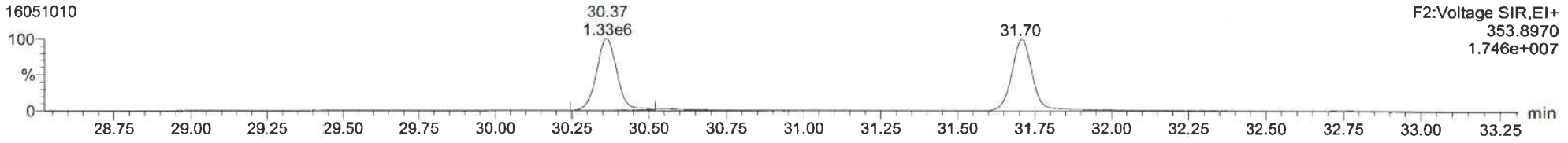


ID: ICV, Name: 16051010, Date: 10-May-2016, Time: 19:02:32, Conditions: AUTOSPEC01, User: pk

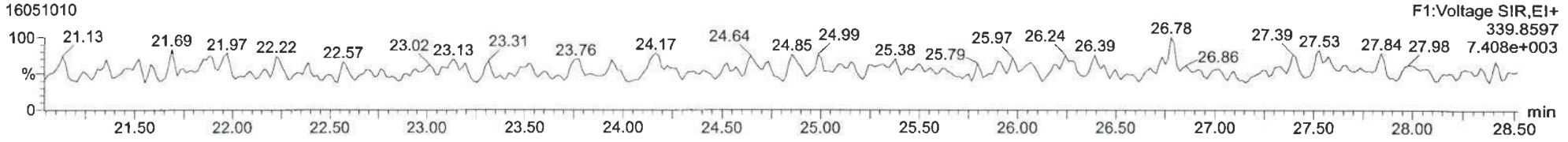
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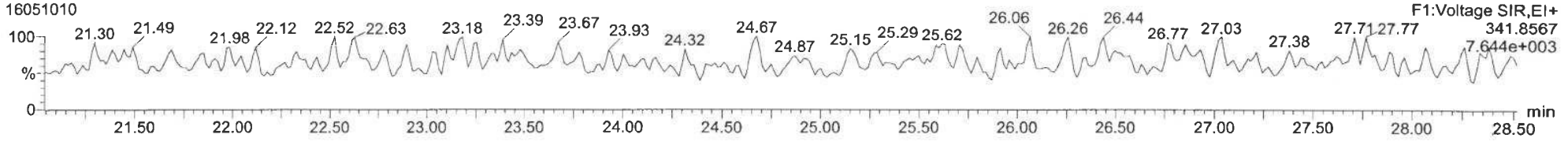
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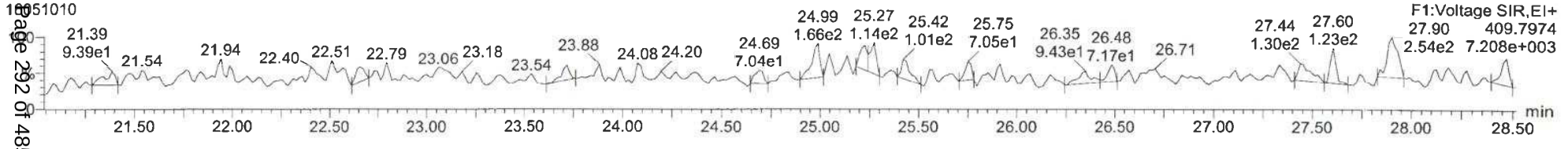
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Total-penta1

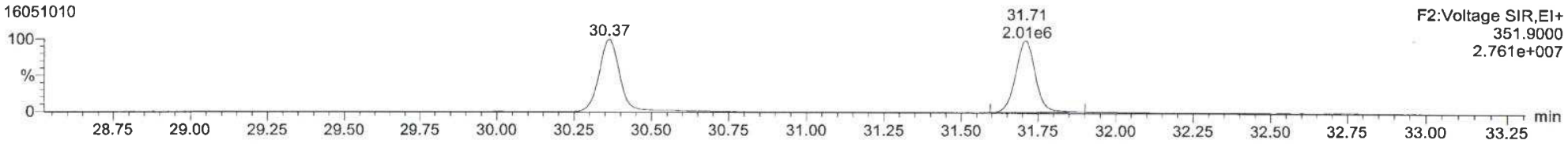


FUNCTION1 HPCDPE

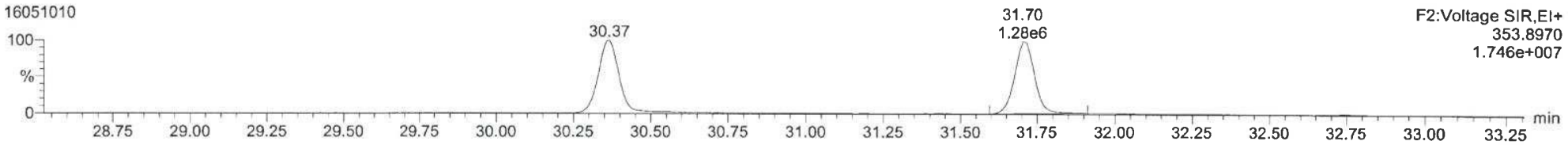


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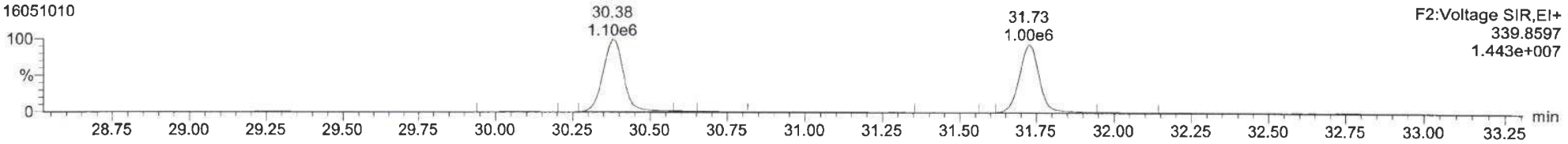
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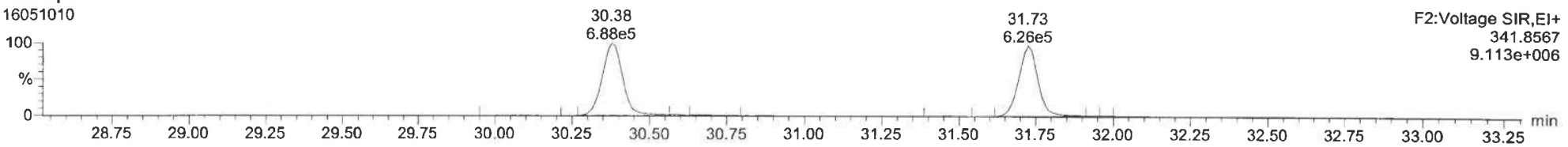
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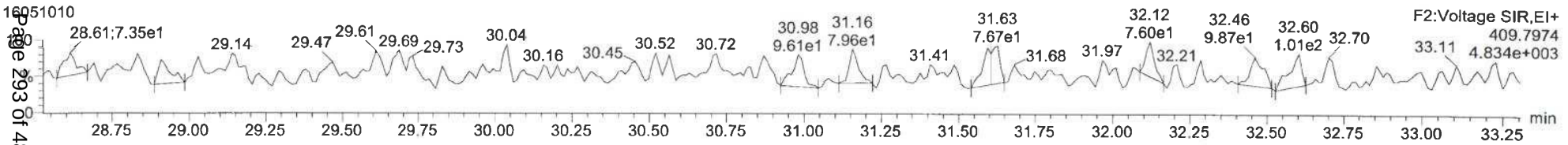
Total-pentafurans



Total-pentafurans



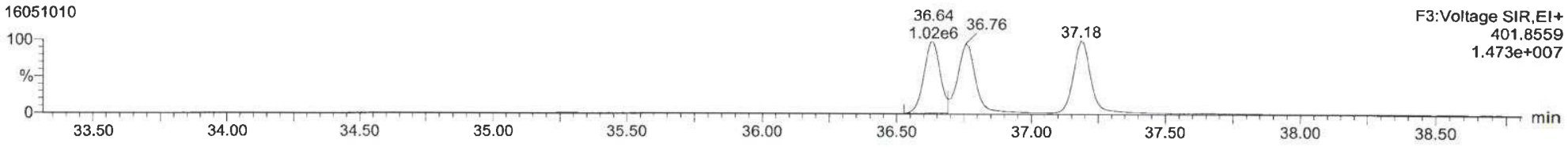
FUNCTION2 HPCDPE



ID: ICV, Name: 16051010, Date: 10-May-2016, Time: 19:02:32, Conditions: AUTOSPEC01, User: pk

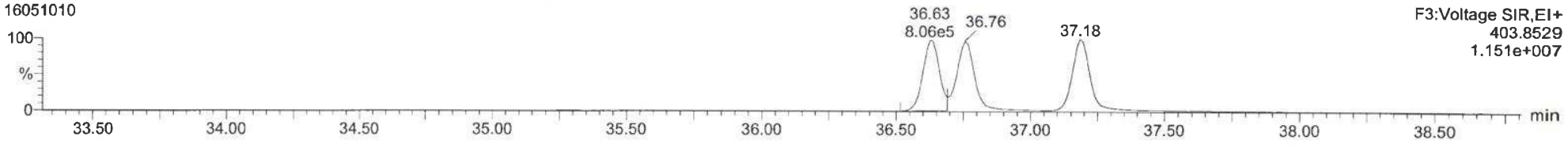
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16051010



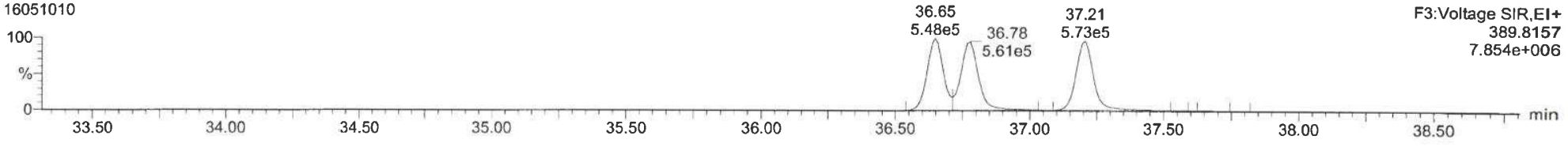
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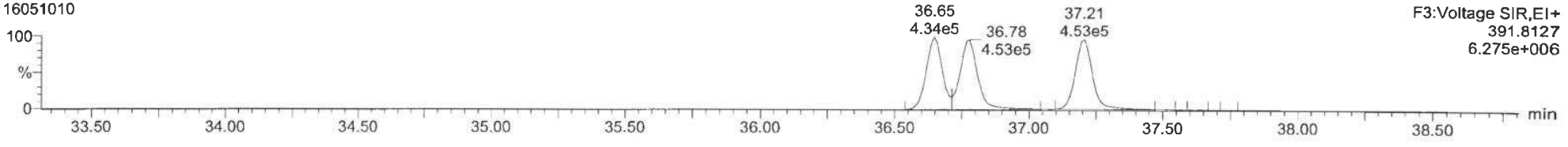
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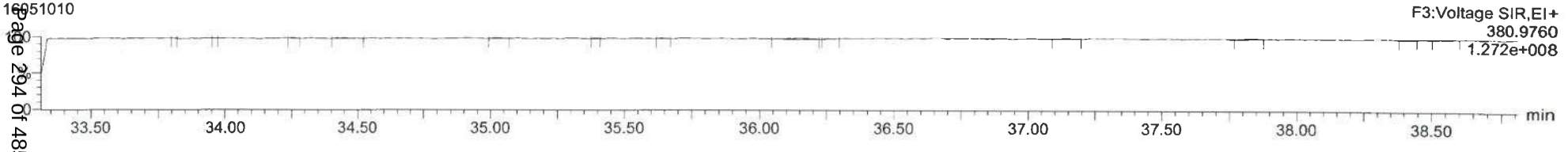
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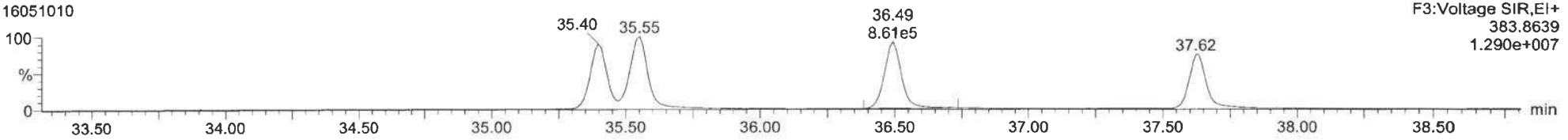
FUNCTION3 PFK

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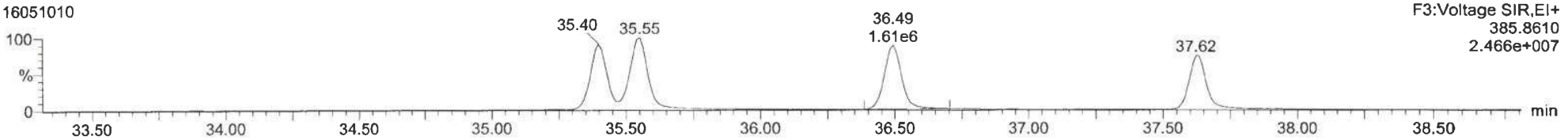


ID: ICV, Name: 16051010, Date: 10-May-2016, Time: 19:02:32, Conditions: AUTOSPEC01, User: pk

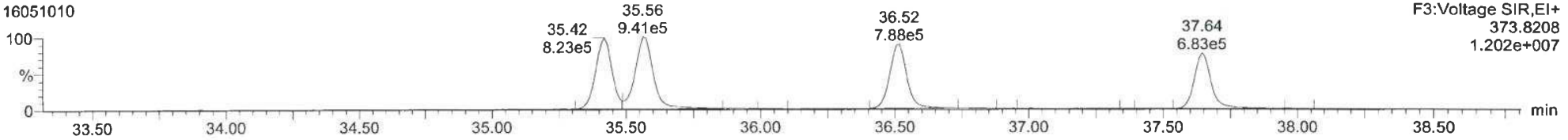
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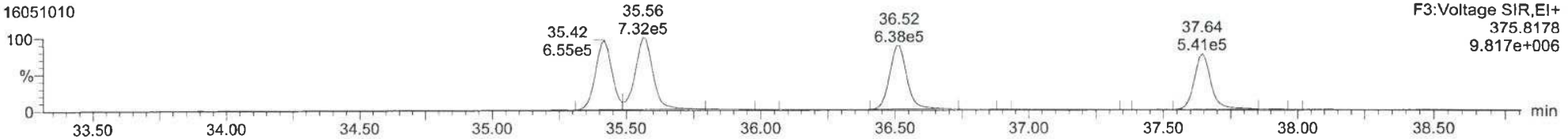
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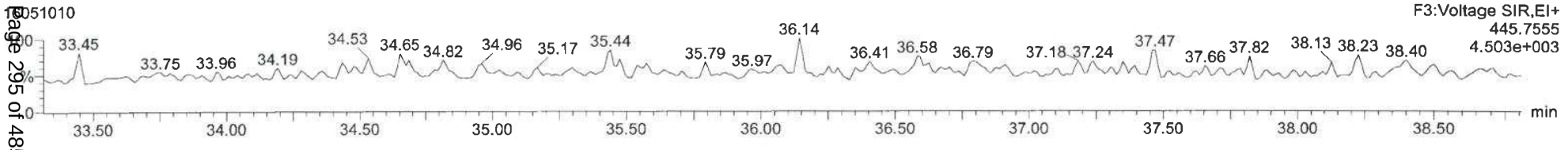
Total-hexafurans



Total-hexafurans



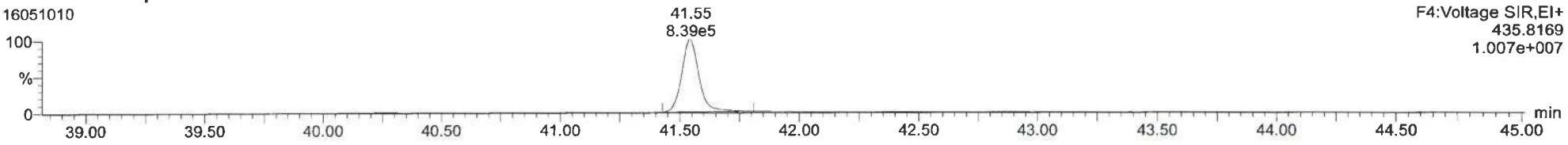
FUNCTION3 OCDPE



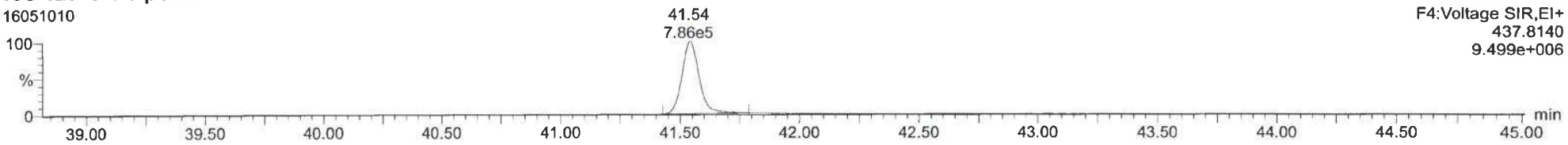
Page 267 of 454

ID: ICV, Name: 16051010, Date: 10-May-2016, Time: 19:02:32, Conditions: AUTOSPEC01, User: pk

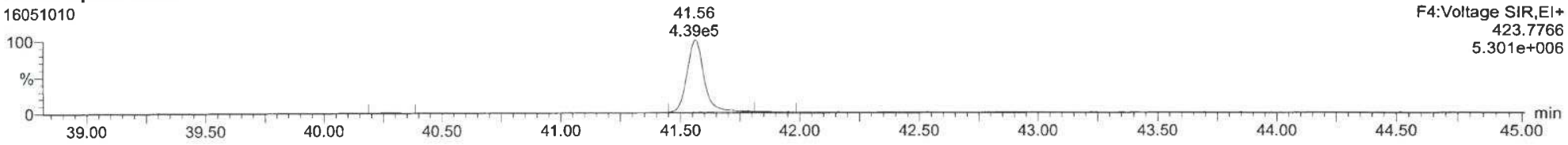
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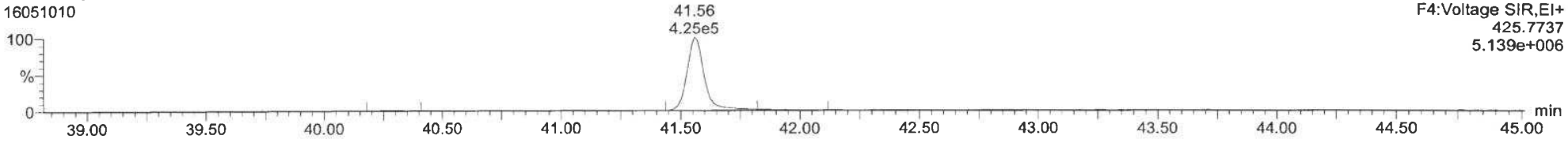
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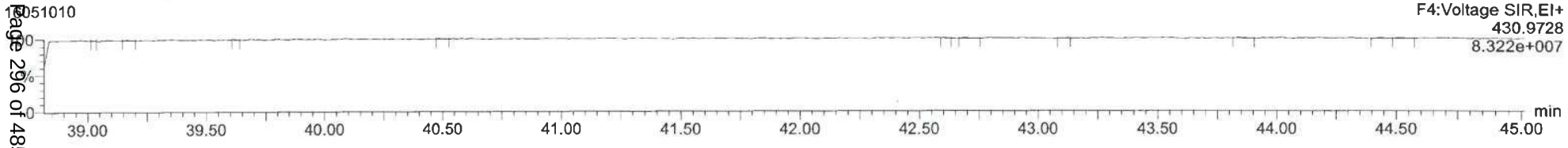
Total-heptadioxins



Total-heptadioxins



FUNCTION4 PFK

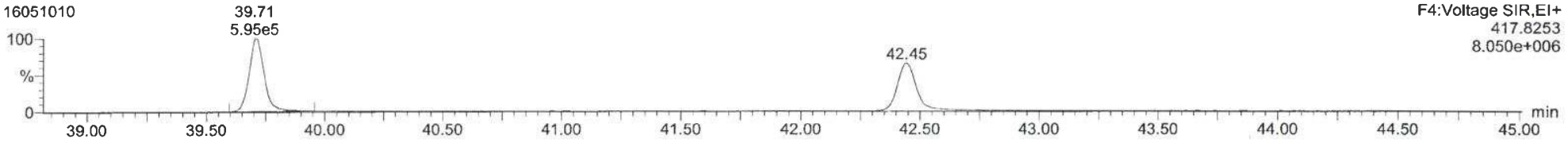


Page 296 of 485

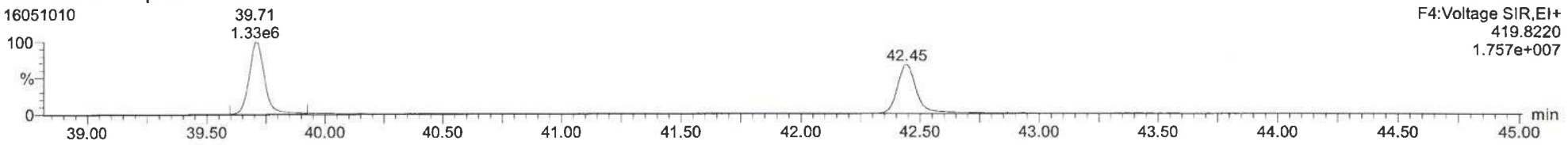
Page 268 of 454

ID: ICV, Name: 16051010, Date: 10-May-2016, Time: 19:02:32, Conditions: AUTOSPEC01, User: pk

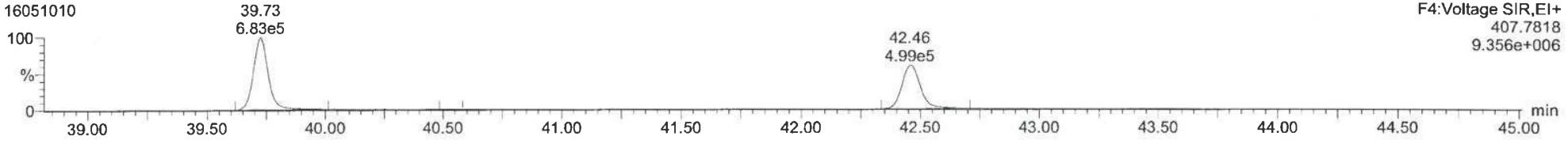
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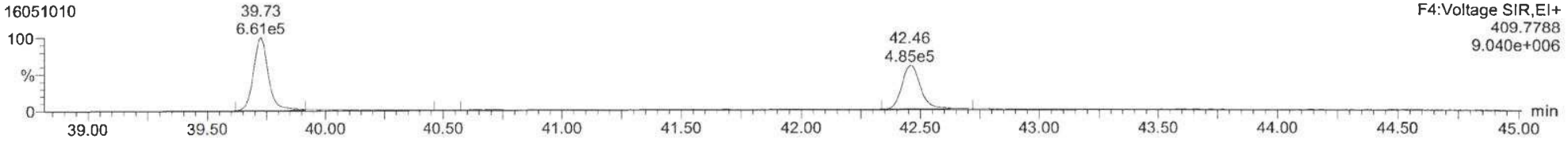
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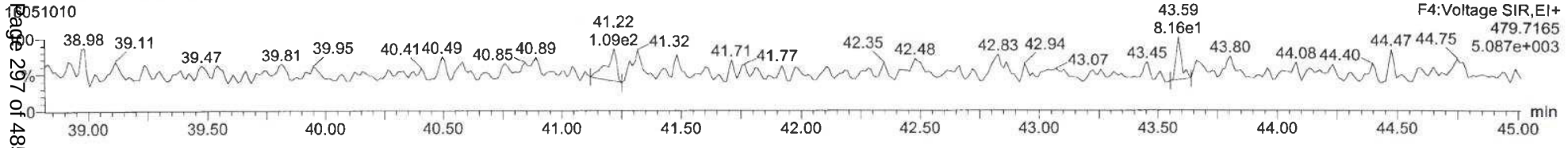
Total-heptafurans



Total-heptafurans



FUNCTION4 NCDPE

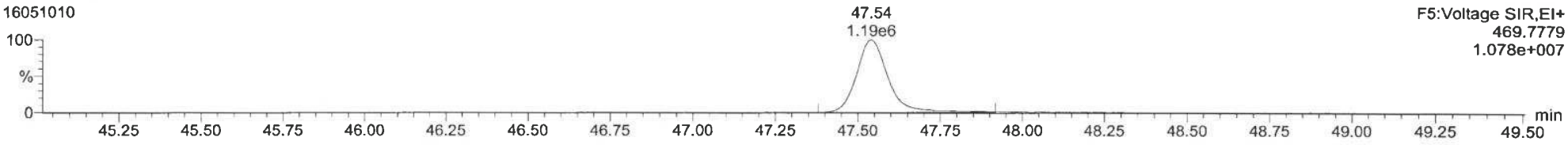


Page 297 of 485

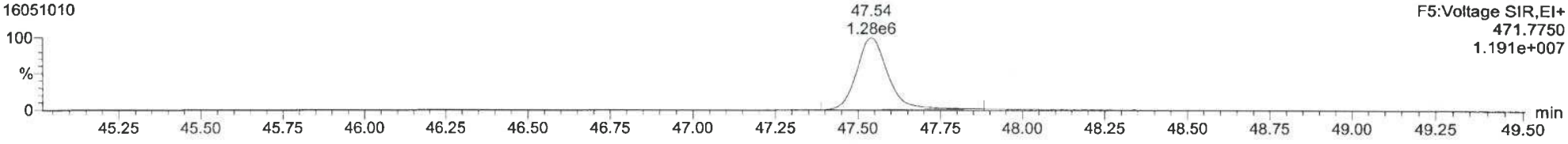
Page 269 of 485

ID: ICV, Name: 16051010, Date: 10-May-2016, Time: 19:02:32, Conditions: AUTOSPEC01, User: pk

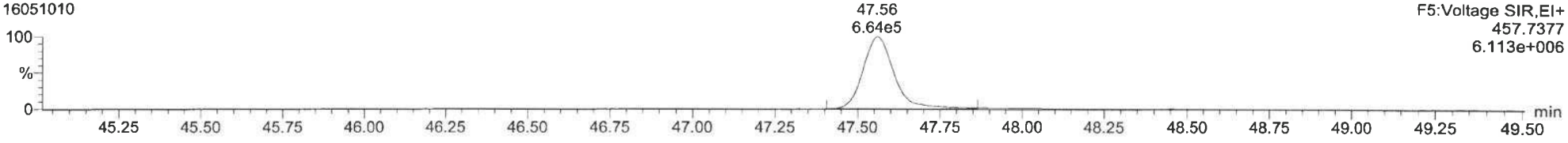
13C-OCDD



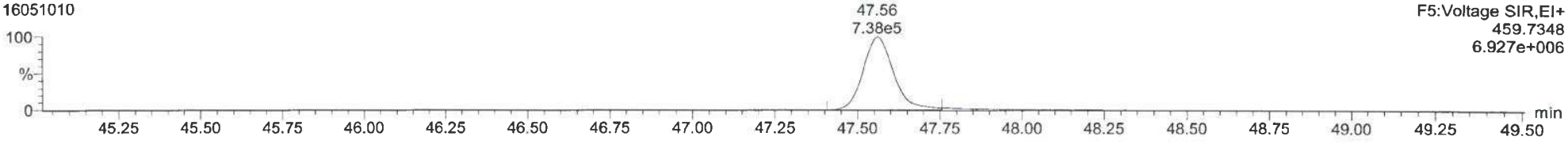
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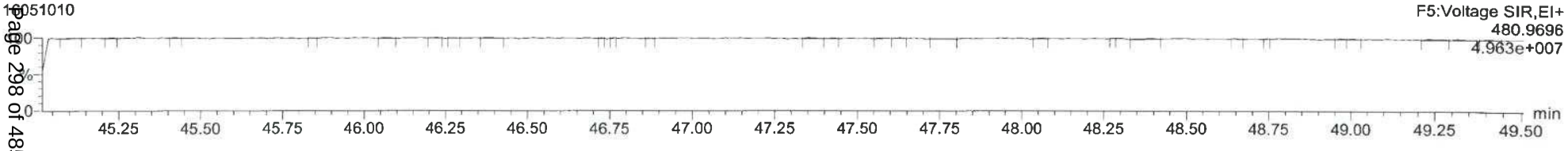
OCDD



OCDD



FUNCTION5 PFK

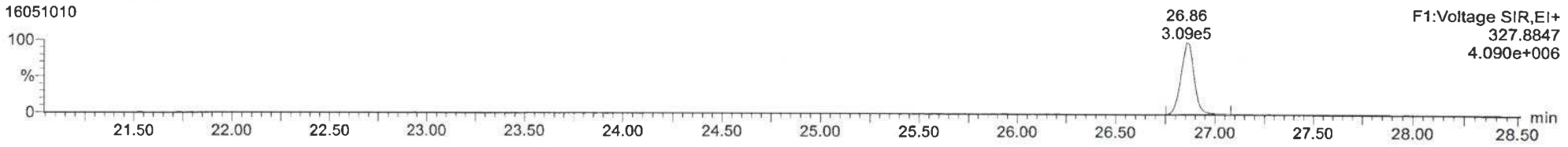


Page 298 of 485

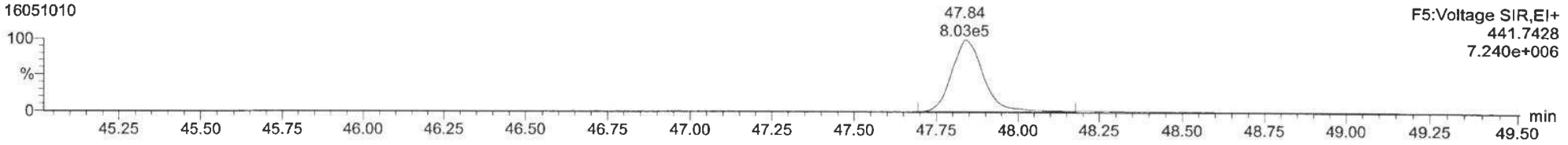
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Dataset: P:\DIOXIN8290.PRO\160510ICV.qld
Last Altered: Thursday, May 12, 2016 14:38:04 Pacific Daylight Time
Printed: Thursday, May 12, 2016 14:39:05 Pacific Daylight Time

ID: ICV, Name: 16051010, Date: 10-May-2016, Time: 19:02:32, Conditions: AUTOSPEC01, User: pk

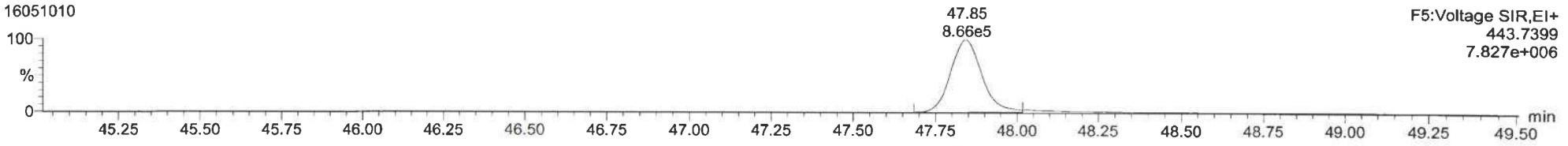
37CL-2378-TCDD



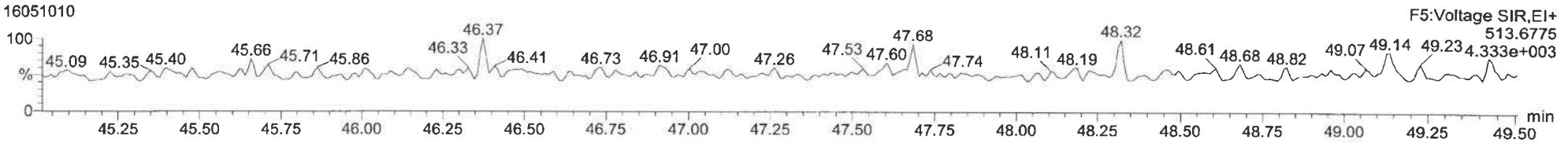
OCDF



OCDF



FUNCTION5 DCDPE



INITIAL CALIBRATION CHECK

EPA 1613B

Laboratory:	Analytical Resources, Inc.	SDG:	16H0071
Client:	Fremont Analytical	Project:	1608094
Instrument ID:	AUTOSPEC01	Calibration:	ZE00016
Lab File ID:	16082302	Calibration Date:	05/10/16 15:20
Sequence:	SEH0246	Injection Date:	08/23/16
Lab Sample ID:	SEH0246-ICV1	Injection Time:	10:42
Sequence Name:	CS301		

		CONC. (ng/mL)		RESPONSE FACTOR			% DRIFT/DIFF	
COMPOUND	TYPE	STD	ICV	ICAL	ICV	MIN	ICV	LIMIT
2,3,7,8-TCDF	A	10.000	10.5	0.9347915	0.9786682		4.7	16
2,3,7,8-TCDD	A	10.000	10.3	1.1339650	1.1668260		2.9	22
1,2,3,7,8-PeCDF	A	50.000	52.8	0.9519161	1.0061280		5.7	18
2,3,4,7,8-PeCDF	A	50.000	53.1	0.9629117	1.0229970		6.2	18
1,2,3,7,8-PeCDD	A	50.000	52.6	0.9753974	1.0270370		5.3	22
1,2,3,4,7,8-HxCDF	A	50.000	52.2	1.1365470	1.1860490		4.4	10
1,2,3,6,7,8-HxCDF	A	50.000	50.2	1.0987420	1.1033730		0.4	12
2,3,4,6,7,8-HxCDF	A	50.000	51.7	1.1635040	1.2032530		3.4	12
1,2,3,7,8,9-HxCDF	A	50.000	51.6	1.1008210	1.1368160		3.3	10
1,2,3,4,7,8-HxCDD	A	50.000	50.6	1.0311670	1.0431560		1.2	22
1,2,3,6,7,8-HxCDD	A	50.000	53.6	0.9714371	1.0410190		7.2	22
1,2,3,7,8,9-HxCDD	A	50.000	51.8	0.9950452	1.0148240		3.6	18
1,2,3,4,6,7,8-HpCDF	A	50.000	52.2	1.3027890	1.3597500		4.4	10
1,2,3,4,7,8,9-HpCDF	A	50.000	51.9	1.3173610	1.3675350		3.8	14
1,2,3,4,6,7,8-HpCDD	A	50.000	51.6	1.0280160	1.0601080		3.1	14
OCDF	A	100.00	105	1.1658070	1.2195980		4.6	37
OCDD	A	100.00	90.9	1.1070210	1.0066770		-9.1	21
13C12-2,3,7,8-TCDF	A	100.00	110	1.5674190	1.7250314		10.1	29
13C12-2,3,7,8-TCDD	A	100.00	106	0.9077481	0.9579337		5.5	18
13C12-1,2,3,7,8-PeCDF	A	100.00	109	1.2740970	1.3864173		8.8	24
13C12-2,3,4,7,8-PeCDF	A	100.00	108	1.2346260	1.3317869		7.9	23
13C12-1,2,3,7,8-PeCDD	A	100.00	105	0.7557554	0.7964048		5.4	38
13C12-1,2,3,4,7,8-HxCDF	A	100.00	103	1.3809190	1.4216632		3.0	24
13C12-1,2,3,6,7,8-HxCDF	A	100.00	106	1.5694530	1.6682744		6.3	30
13C12-2,3,4,6,7,8-HxCDF	A	100.00	104	1.3453300	1.3970195		3.8	27
13C12-1,2,3,7,8,9-HxCDF	A	100.00	105	1.1828950	1.2470798		5.4	26
13C12-1,2,3,4,7,8-HxCDD	A	100.00	103	1.0559040	1.0833022		2.6	15
13C12-1,2,3,6,7,8-HxCDD	A	100.00	99.7	1.1630360	1.1590598		-0.3	15
13C12-1,2,3,4,6,7,8-HpCDF	A	100.00	102	1.1783620	1.2072698		2.5	22
13C12-1,2,3,4,7,8,9-HpCDF	A	100.00	103	0.8777992	0.9026532		2.8	23
13C12-1,2,3,4,6,7,8-HpCDD	A	100.00	101	0.9091061	0.9215858		1.4	18

* Values outside of QC limits

INITIAL CALIBRATION CHECK

EPA 1613B

Laboratory:	Analytical Resources, Inc.	SDG:	16H0071
Client:	Fremont Analytical	Project:	1608094
Instrument ID:	AUTOSPEC01	Calibration:	ZE00016
Lab File ID:	16082302	Calibration Date:	05/10/16 15:20
Sequence:	SEH0246	Injection Date:	08/23/16
Lab Sample ID:	SEH0246-ICV1	Injection Time:	10:42
Sequence Name:	CS301		

		CONC. (ng/mL)		RESPONSE FACTOR			% DRIFT/DIFF	
COMPOUND	TYPE	STD	ICV	ICAL	ICV	MIN	ICV	LIMIT
13C12-OCDD	A	200.00	195	0.8195753	0.7994524		-2.5	52
37C14-2,3,7,8-TCDD	A	10.000	10.7	1.0665580	1.1456753		7.4	

* Values outside of QC limits

Quantify Sample Summary Report **MassLynx MassLynx V4.1 SCN909**
Dataset: C:\MassLynx\Dioxin.pro\160823OPEN.qld
Last Altered: Tuesday, August 23, 2016 14:01:28 Pacific Daylight Time
Printed: Tuesday, August 23, 2016 14:01:53 Pacific Daylight Time

Page 275 of 454

Method: C:\MassLynx\Dioxin.pro\MethDB\Dioxin1608163SN.mdb 17 Aug 2016 15:09:47
Calibration: C:\MassLynx\Dioxin.pro\CurveDB\160510ICAL.cdb 11 May 2016 09:28:40

ID: CS301, Name: 16082302, Date: 23-Aug-2016, Time: 10:42:08, Conditions: AUTOSPEC01, User: PK

Name	RT	RRT	Ion1Area	Ion2Area	RRF	Ratio	Pred R	Noise 1	Noise 2	Height 1	Height 2	S/N	EMPC?	EMPC	pg
2378-TCDF	25.660	1.001	1.26e5	1.59e5	0.935	0.791	0.770	1527	1841	1.88e6	2.34e6	1232.8	NO	10.469	10.469
12378-PeCDF	29.798	1.000	7.25e5	4.56e5	0.952	1.590	1.550	4175	4160	1.07e7	6.80e6	2564.1	NO	52.848	52.848
23478-PeCDF	31.146	1.001	7.11e5	4.42e5	0.963	1.610	1.550	4175	4160	1.04e7	6.36e6	2492.9	NO	53.120	53.120
123478-HxCDF	34.818	1.000	5.55e5	4.36e5	1.137	1.273	1.240	4989	5874	8.09e6	6.40e6	1620.8	NO	52.178	52.178
234678-HxCDF	35.914	1.000	5.50e5	4.39e5	1.164	1.253	1.240	4989	5874	8.00e6	6.37e6	1602.9	NO	51.708	51.708
123678-HxCDF	34.971	1.001	6.04e5	4.78e5	1.099	1.263	1.240	4989	5874	8.50e6	6.76e6	1704.0	NO	50.211	50.211
123789-HxCDF	37.054	1.000	4.66e5	3.67e5	1.101	1.268	1.240	4989	5874	6.40e6	4.98e6	1283.8	NO	51.635	51.635
1234678-HpCDF	39.125	1.000	4.92e5	4.73e5	1.303	1.042	1.050	3094	3139	7.18e6	6.84e6	2321.3	NO	52.186	52.186
1234789-HpCDF	41.756	1.001	3.72e5	3.54e5	1.317	1.052	1.050	3094	3139	4.60e6	4.36e6	1487.7	NO	51.904	51.904
OCDF	46.921	1.006	5.56e5	5.90e5	1.166	0.942	0.890	2396	2848	5.28e6	5.69e6	2202.1	NO	104.614	104.614
2378-TCDD	26.302	1.001	8.51e4	1.04e5	1.134	0.818	0.770	1568	1744	1.25e6	1.54e6	797.6	NO	10.290	10.290
12378-PeCDD	31.398	1.001	4.24e5	2.68e5	0.975	1.586	1.550	3064	1860	6.17e6	3.88e6	2013.8	NO	52.647	52.647
123478-HxCDD	36.045	1.000	3.69e5	2.96e5	1.031	1.246	1.240	3692	4131	5.58e6	4.47e6	1511.3	NO	50.581	50.581
123678-HxCDD	36.177	1.001	3.92e5	3.17e5	0.971	1.235	1.240	3692	4131	5.50e6	4.36e6	1490.6	NO	53.581	53.581
123789-HxCDD	36.604	1.012	3.56e5	2.91e5	0.947	1.224	1.240	3692	4131	4.93e6	3.99e6	1334.3	NO	51.785	51.785
1234678-HpCDD	40.890	1.000	2.92e5	2.83e5	1.028	1.031	1.050	2913	2463	3.70e6	3.66e6	1271.1	NO	51.561	51.561
OCDD	46.669	1.001	4.42e5	5.04e5	1.107	0.876	0.890	2916	3220	4.44e6	4.98e6	1522.7	NO	90.936	90.936
13C-2378-TCDF	25.645	1.007	1.28e6	1.64e6	1.567	0.784	0.770	7410	3471	1.87e7	2.40e7	2526.2	NO		110.056
13C-12378-PeCDF	29.787	1.170	1.43e6	9.18e5	1.274	1.556	1.550	3818	3414	2.12e7	1.34e7	5540.8	NO		108.816
13C-23478-PeCDF	31.124	1.222	1.38e6	8.76e5	1.235	1.573	1.550	3818	3414	2.00e7	1.27e7	5239.0	NO		107.870
13C-123478-HxCDF	34.807	0.951	5.68e5	1.10e6	1.381	0.515	0.510	6315	6245	8.38e6	1.61e7	1326.7	NO		102.950
13C-123678-HxCDF	34.949	0.955	6.63e5	1.30e6	1.569	0.510	0.510	6315	6245	9.21e6	1.77e7	1457.8	NO		106.297
13C-234678-HxCDF	35.903	0.981	5.53e5	1.09e6	1.345	0.508	0.510	6315	6245	7.79e6	1.50e7	1232.8	NO		103.842
13C-123789-HxCDF	37.043	1.012	5.00e5	9.67e5	1.183	0.517	0.510	6315	6245	6.74e6	1.30e7	1067.6	NO		105.426
13C-1234678-HpCDF	39.114	1.069	4.48e5	9.72e5	1.178	0.461	0.440	2483	3884	6.53e6	1.42e7	2628.1	NO		102.453
13C-1234789-HpCDF	41.734	1.140	3.30e5	7.32e5	0.878	0.451	0.440	2483	3884	4.09e6	9.07e6	1649.2	NO		102.831
13C-1234-TCDD	25.466	0.000	7.47e5	9.45e5	1.000	0.791	0.770	3403	1607	1.11e7	1.42e7	3255.1	NO		100.000
13C-2378-TCDD	26.288	1.032	7.16e5	9.05e5	0.908	0.790	0.770	3403	1607	1.01e7	1.26e7	2959.3	NO		105.529
13C-12378-PeCDD	31.376	1.232	8.19e5	5.28e5	0.756	1.550	1.550	1810	1173	1.20e7	7.73e6	6606.8	NO		105.379
13C-123478-HxCDD	36.034	0.985	7.16e5	5.58e5	1.056	1.282	1.240	2699	2392	1.06e7	8.23e6	3934.0	NO		102.595
13C-123678-HxCDD	36.155	0.988	7.70e5	5.93e5	1.163	1.298	1.240	2699	2392	1.07e7	8.37e6	3954.3	NO		99.658
13C-1234678-HpCDD	40.879	1.117	5.62e5	5.22e5	0.909	1.076	1.050	2248	2310	7.16e6	6.75e6	3184.4	NO		101.373
13C-OCDD	46.643	1.275	8.87e5	9.93e5	0.820	0.894	0.890	2854	3191	8.69e6	9.75e6	3046.4	NO		195.089

Page 302 of 485

Quantify Sample Summary Report **MassLynx MassLynx V4.1 SCN909**
Dataset: C:\MassLynx\Dioxin.pro\160823OPEN.qld
Last Altered: Tuesday, August 23, 2016 14:01:28 Pacific Daylight Time
Printed: Tuesday, August 23, 2016 14:01:53 Pacific Daylight Time

ID: CS301, Name: 16082302, Date: 23-Aug-2016, Time: 10:42:08, Conditions: AUTOSPEC01, User: PK

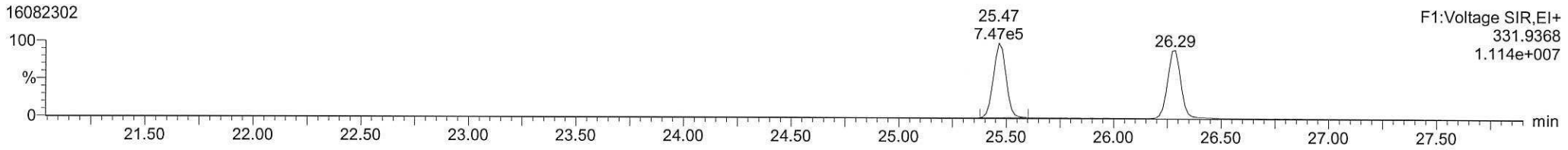
Name	RT	RRT	Ion1Area	Ion2Area	RRF	Ratio	Pred R	Noise 1	Noise 2	Height 1	Height 2	S/N	EMPC?	EMPC	pg
13C-123789-HxCDD	36.593	0.000	6.55e5	5.21e5	1.000	1.257	1.240	2699	2392	9.03e6	7.19e6	3347.0	NO		100.000
Total-tetrafurans			3.83e5		0.935			1527		5.66e6					31.578
Total-penta1			7.51e5					652		1.08e7					58.820
Total-pentafurans			2.16e6		0.957			4175		3.14e7					159.596
Total-hexafurans			2.84e6		1.125			4989		4.08e7					268.652
Total-heptafurans			8.71e5		1.310			3094		1.19e7					104.764
Total-Furans			7.55e6		1.114			1527		1.06e8					728.024
Total-tetradioxins			4.54e5		1.134			1568		5.72e6					56.219
Total-pentadioxins			1.49e6		0.975			3064		1.85e7					185.129
Total-hexadioxins			1.61e6		0.983			3692		2.31e7					224.689
Total-heptadioxins			6.38e5		1.028			2913		8.62e6					112.210
Total-Dioxins			4.64e6		1.028			1568		6.04e7					669.234
Total-TEQ			1.22e7					1568		1.66e8					1397.259
37CL-2378-TCDD	26.302	1.033	1.94e5		1.067			1757		2.79e6		1590.2			10.742
FUNCTION1 PFK			1.45e6					561587		2.85e7					
FUNCTION2 PFK			2.57e5					138386		6.94e6					0.000
FUNCTION3 PFK			3.82e5					447661		1.24e7					0.000
FUNCTION4 PFK			1.87e5					321921		6.54e6					
FUNCTION5 PFK			1.15e5					244115		5.39e6					
FUNCTION1 HXCDPE			1.43e2					486		2.83e3					0.000
FUNCTION1 HPCDPE			1.53e2					761		2.71e3					0.000
FUNCTION2 HPCDPE			1.03e3					797		2.47e4					0.000
FUNCTION3 OCDPE			0.00e0					447		0.00e0					
FUNCTION4 NCDPE			1.71e2					796		5.82e3					0.000
FUNCTION5 DCDPE			0.00e0					468		0.00e0					

Dataset: C:\MassLynx\Dioxin.pro\160823OPEN.qld
Last Altered: Tuesday, August 23, 2016 14:01:28 Pacific Daylight Time
Printed: Tuesday, August 23, 2016 14:01:53 Pacific Daylight Time

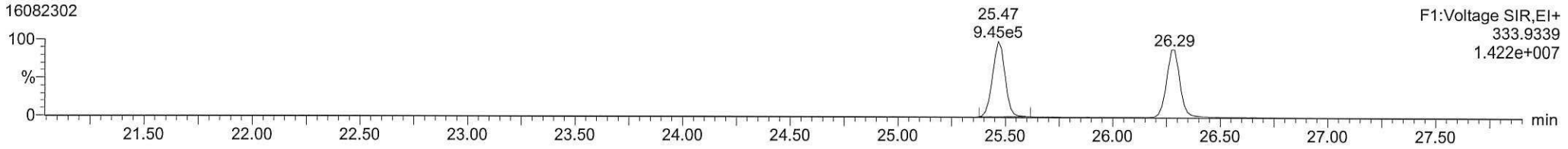
Method: C:\MassLynx\Dioxin.pro\MethDB\Dioxin1608163SN.mdb 17 Aug 2016 15:09:47
Calibration: C:\MassLynx\Dioxin.pro\CurveDB\160510ICAL.cdb 11 May 2016 09:28:40

ID: CS301, Name: 16082302, Date: 23-Aug-2016, Time: 10:42:08, Conditions: AUTOSPEC01, User: PK

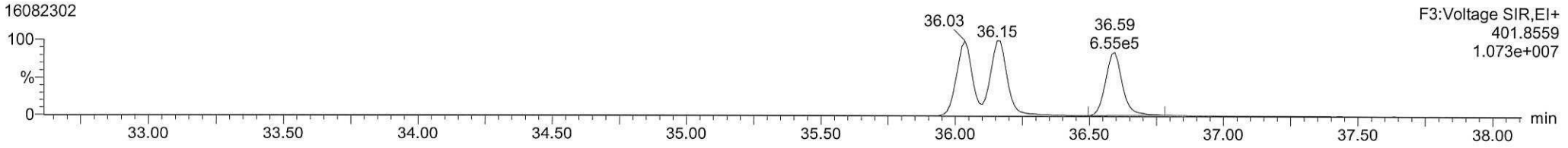
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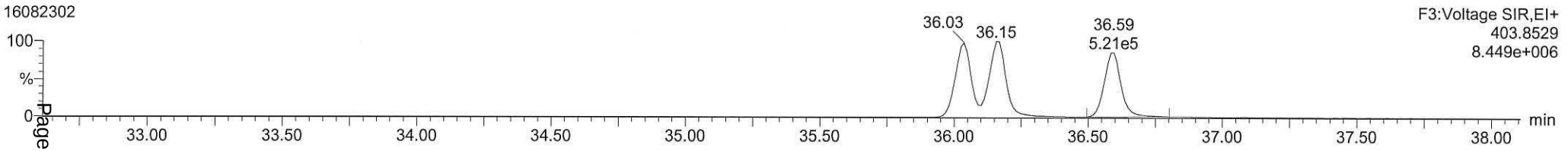
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13C-123789-HxCDD

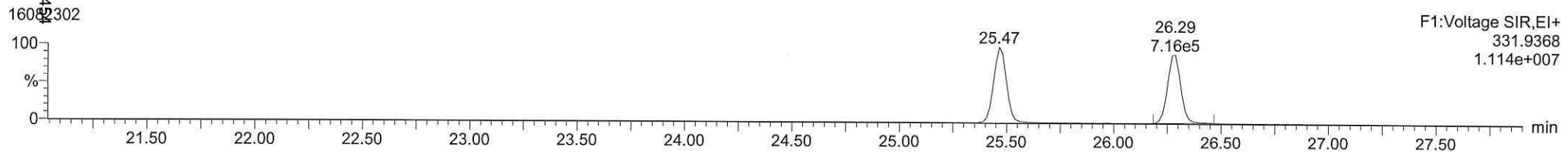


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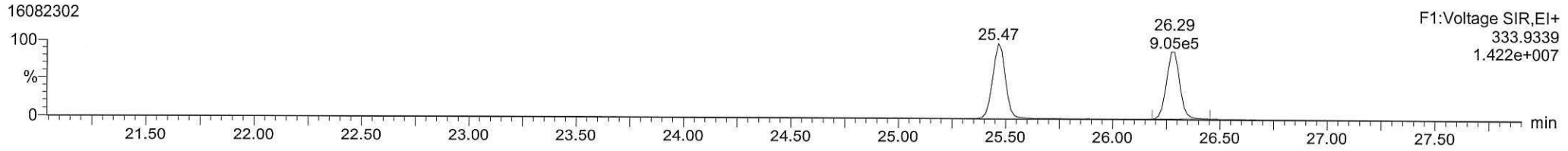


ID: CS301, Name: 16082302, Date: 23-Aug-2016, Time: 10:42:08, Conditions: AUTOSPEC01, User: PK

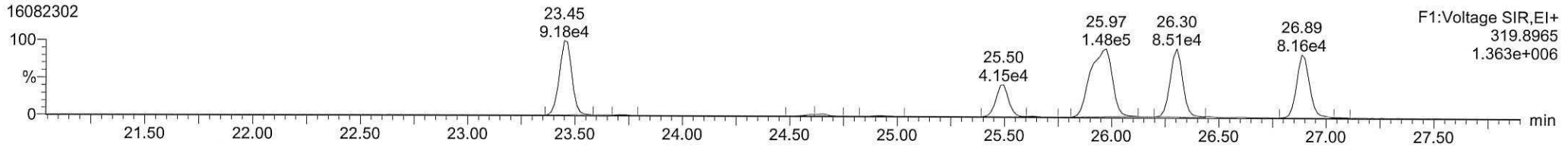
13C-2378-TCDD



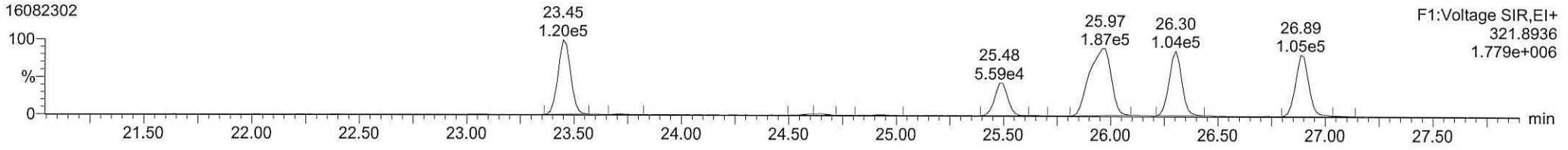
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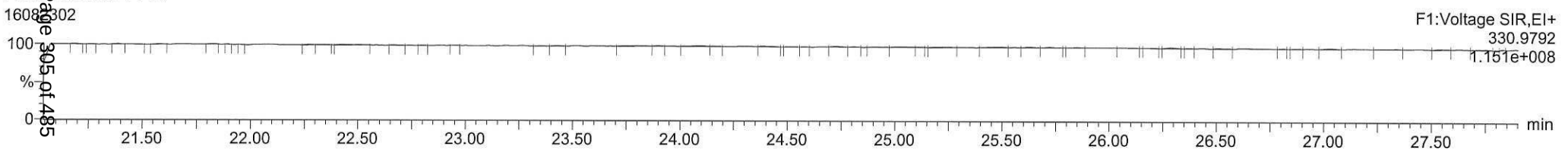
Total-tetradioxins



Total-tetradioxins

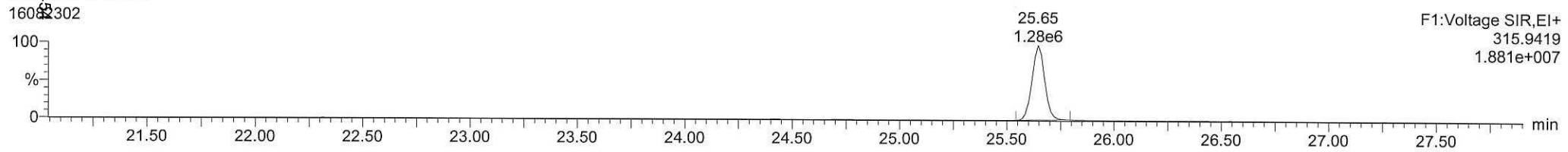


FUNCTION1 PFK

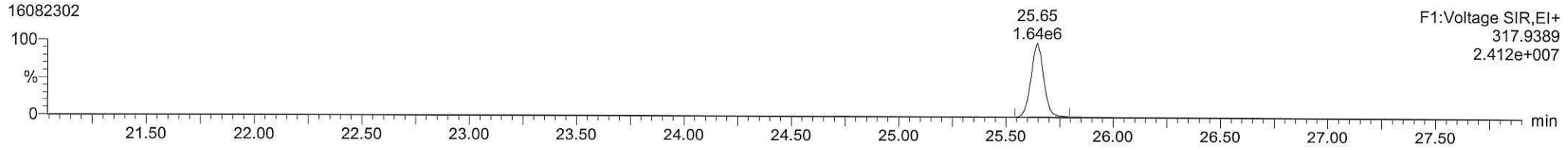


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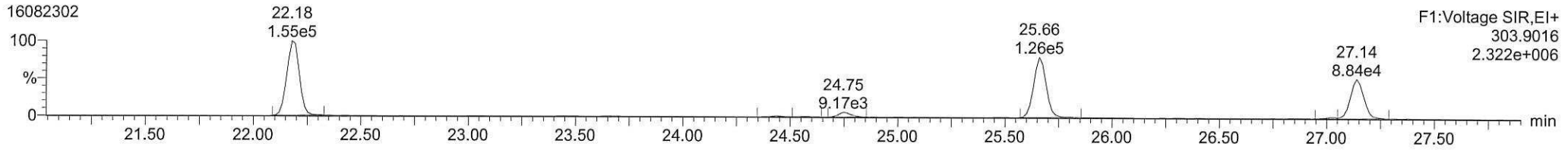
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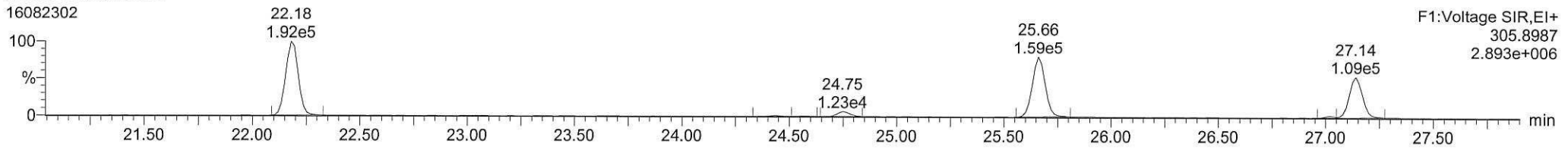
13C-2378-TCDF



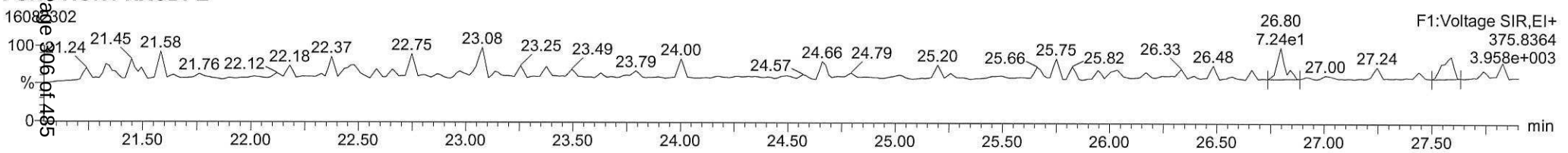
Total-tetrafurans



Total-tetrafurans

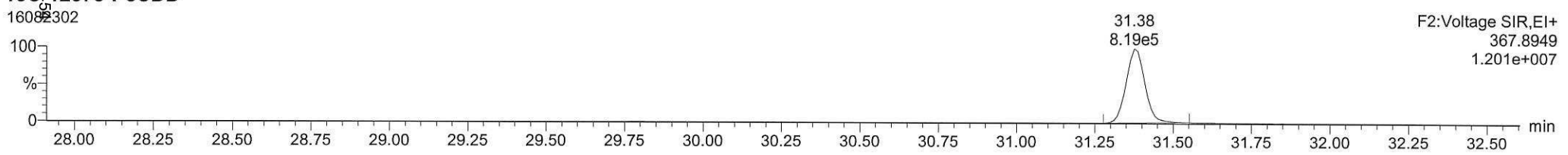


FUNCTION1 HXCDPE

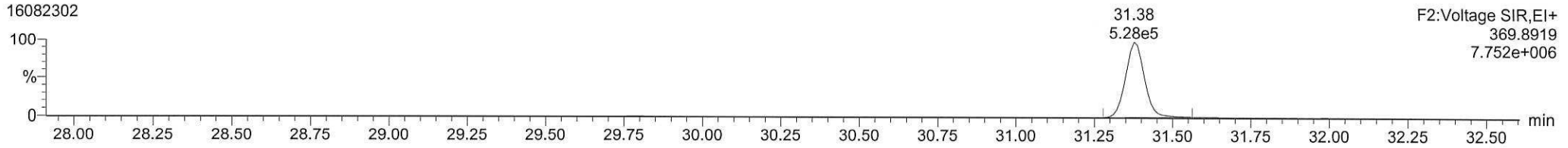


ID: CS301, Name: 16082302, Date: 23-Aug-2016, Time: 10:42:08, Conditions: AUTOSPEC01, User: PK

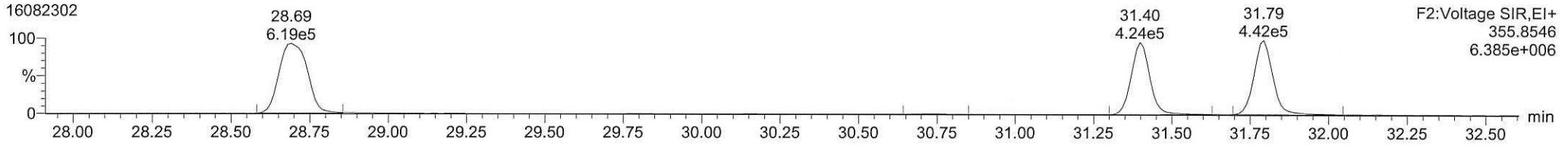
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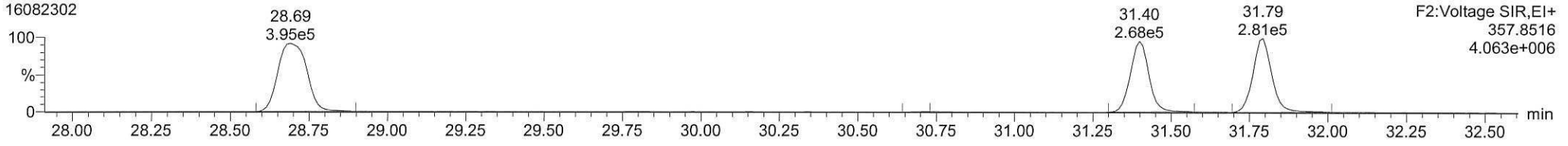
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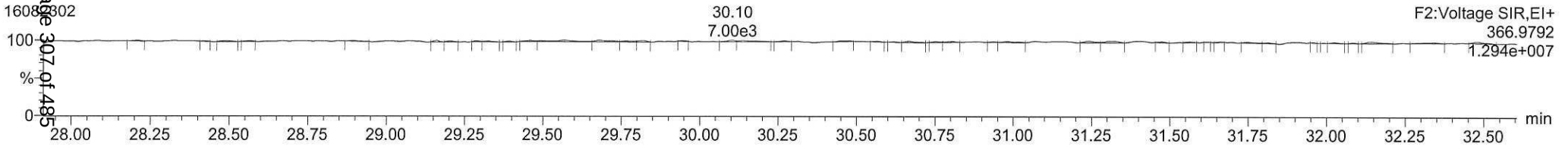
Total-pentadioxins



Total-pentadioxins

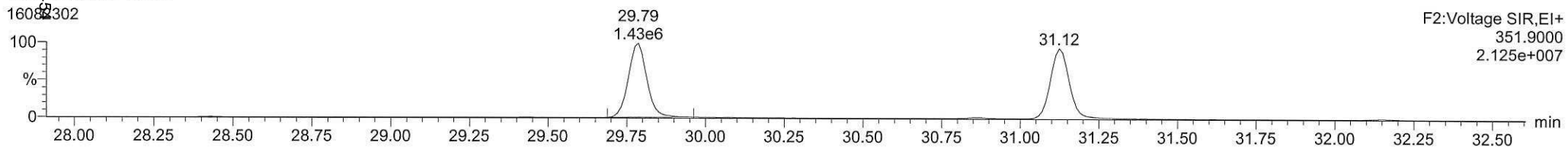


FUNCTION2 PFK

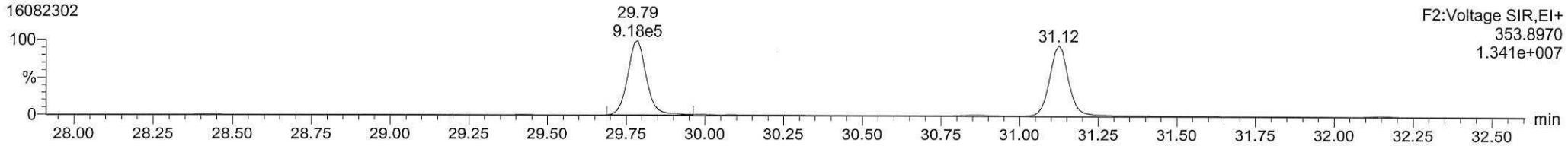


ID: CS301, Name: 16082302, Date: 23-Aug-2016, Time: 10:42:08, Conditions: AUTOSPEC01, User: PK

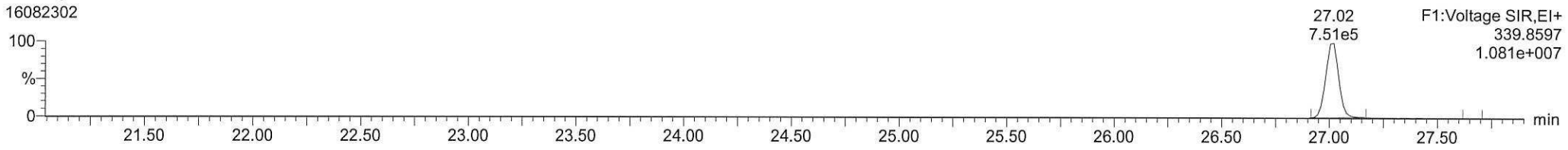
13C-12378-PeCDF



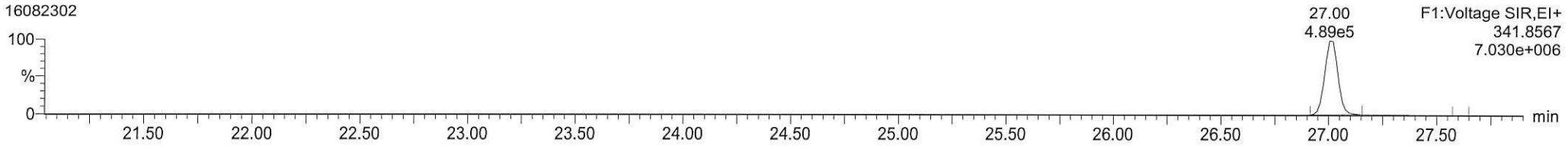
13C-12378-PeCDF



Total-penta1



Total-penta1

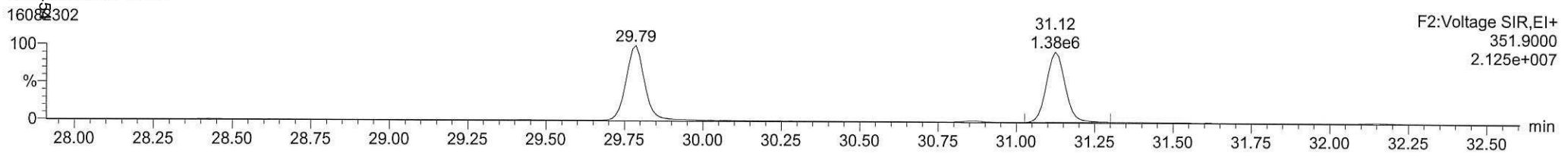


FUNCTION1 HPCDPE

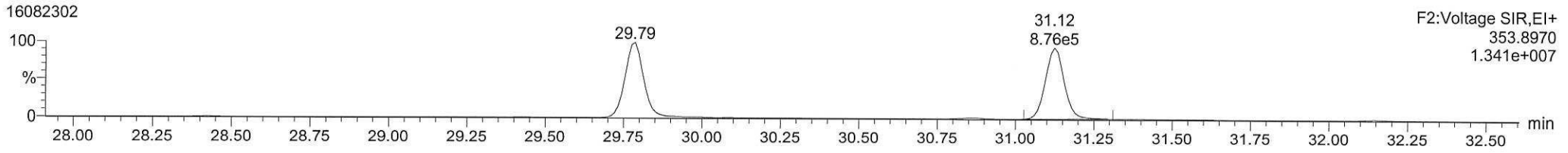


ID: CS301, Name: 16082302, Date: 23-Aug-2016, Time: 10:42:08, Conditions: AUTOSPEC01, User: PK

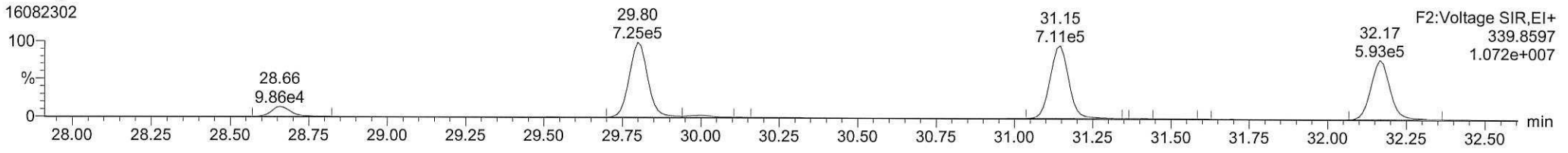
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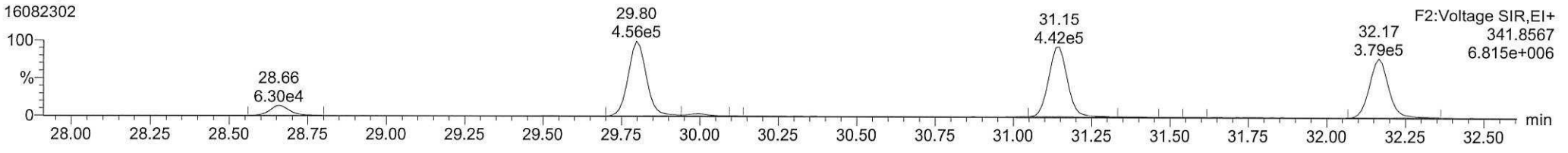
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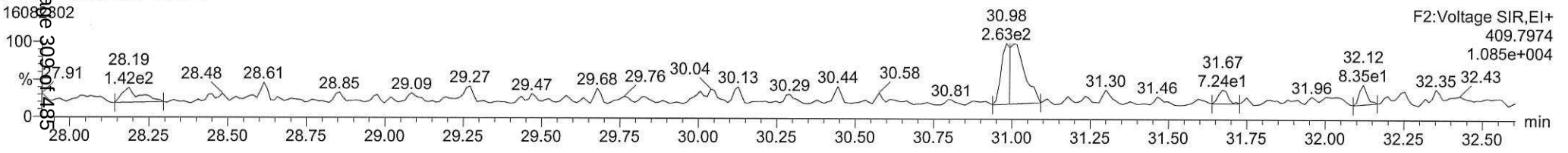
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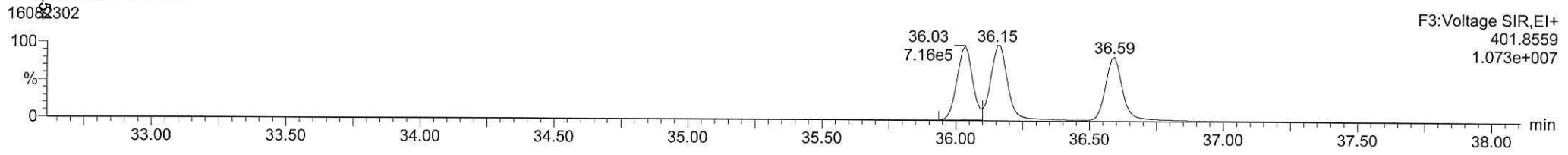
FUNCTION2 HPCDPE



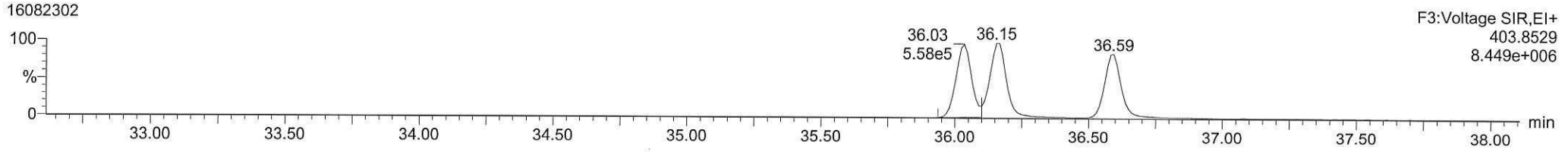
Page 281 of 485

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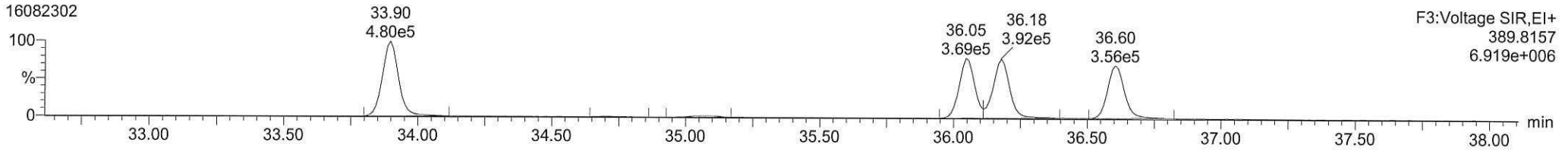
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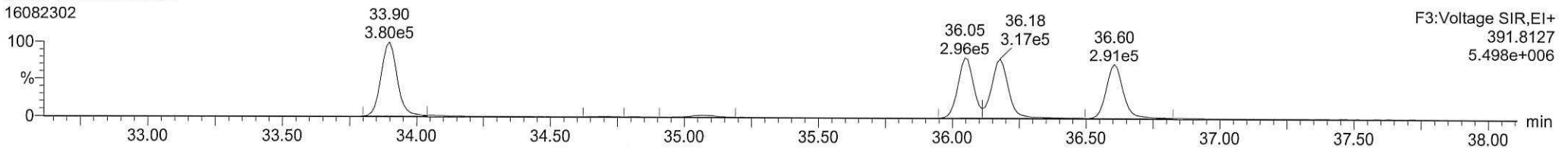
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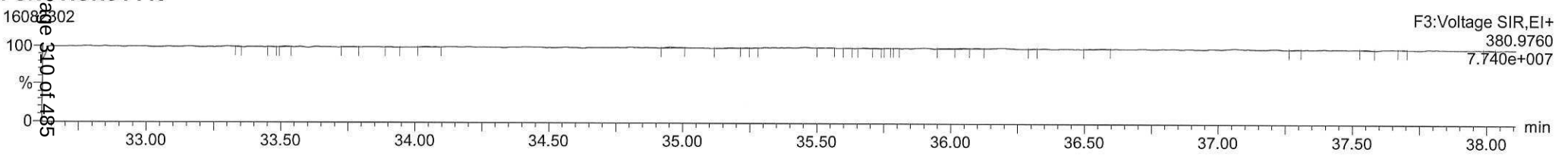


Total-hexadioxins



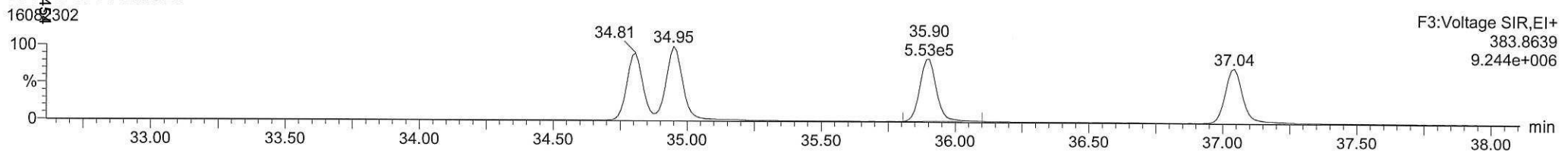
FUNCTION3 PFK

Page 310 of 485

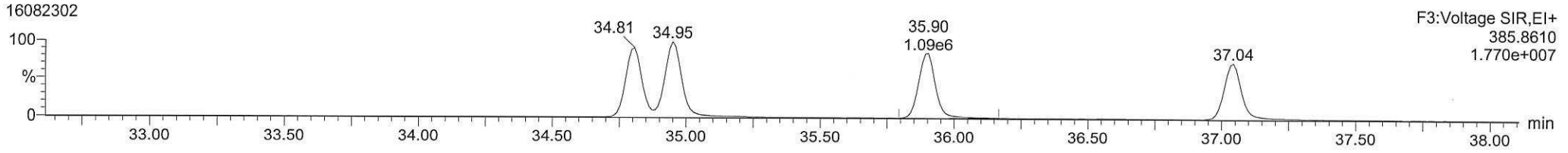


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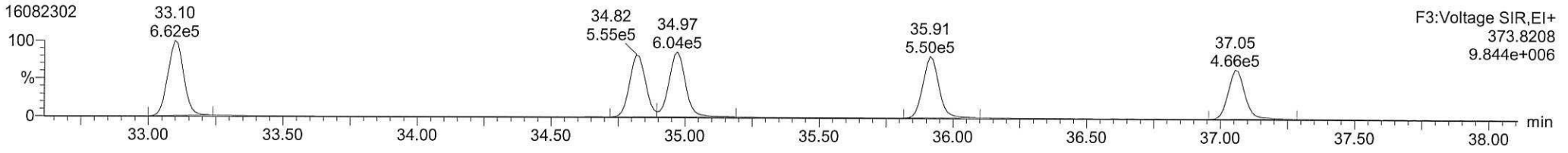
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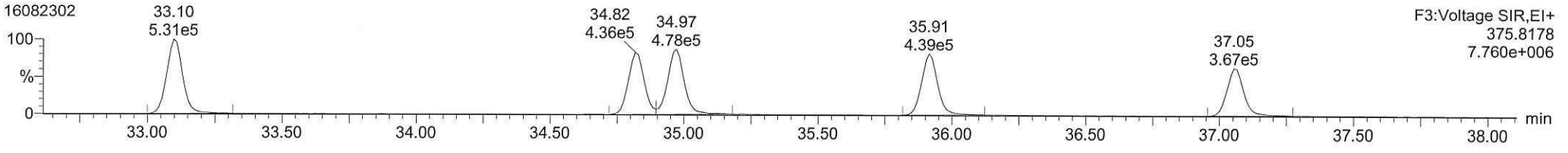
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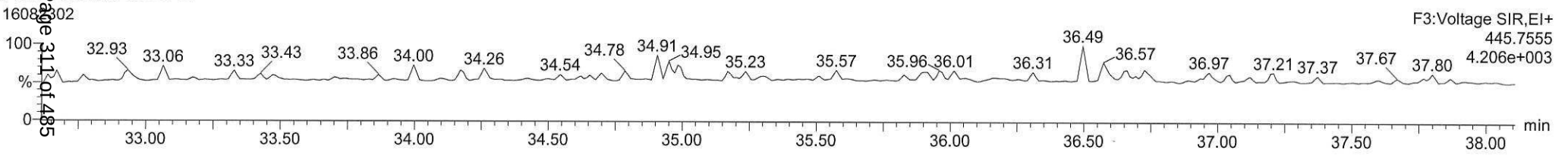
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Total-hexafurans

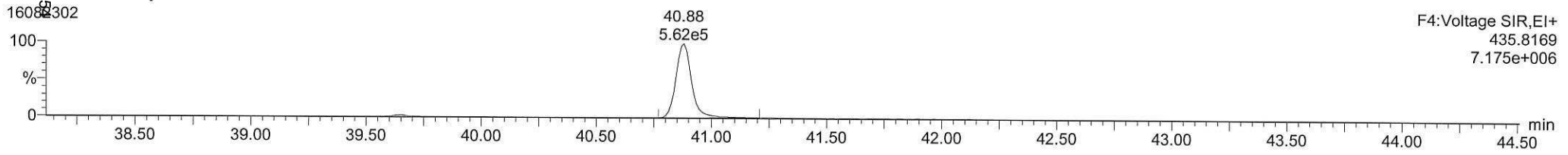


FUNCTION3 OCDPE

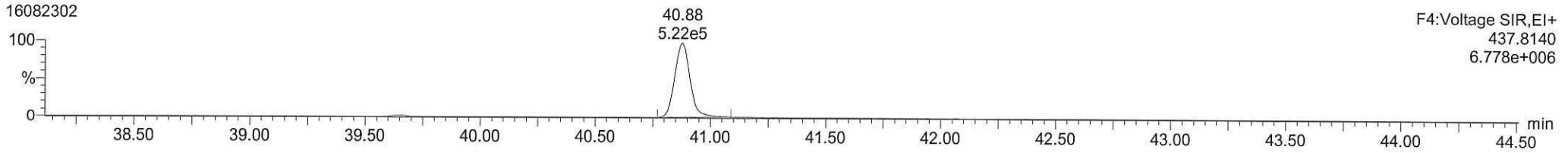


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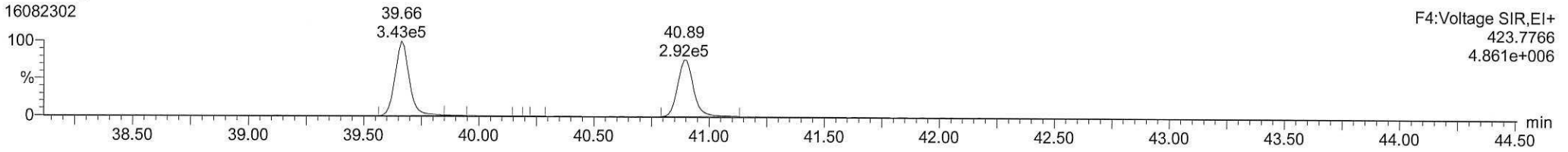
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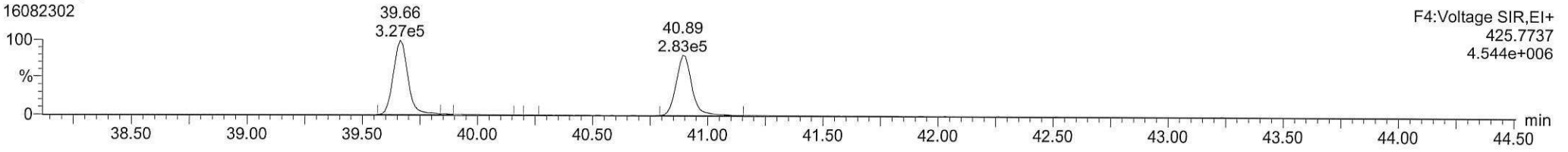
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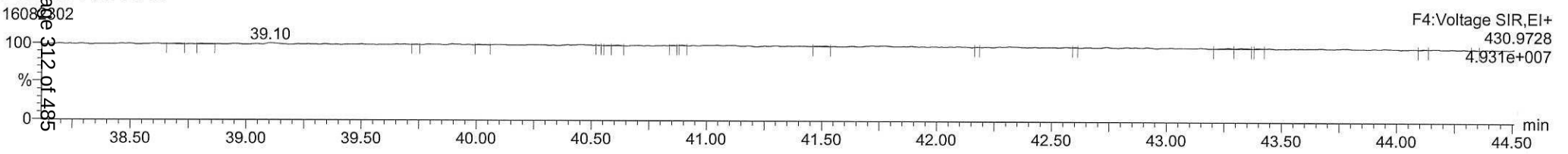
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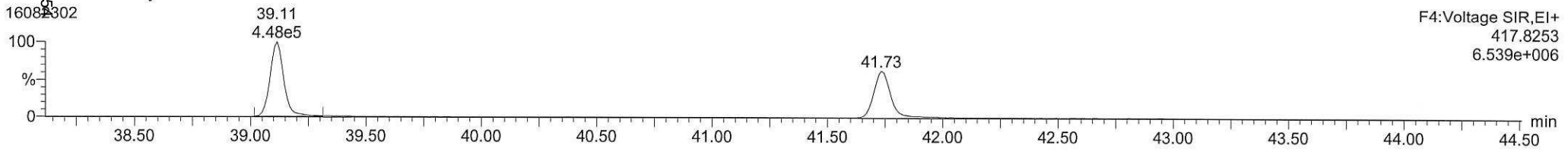


FUNCTION4 PFK

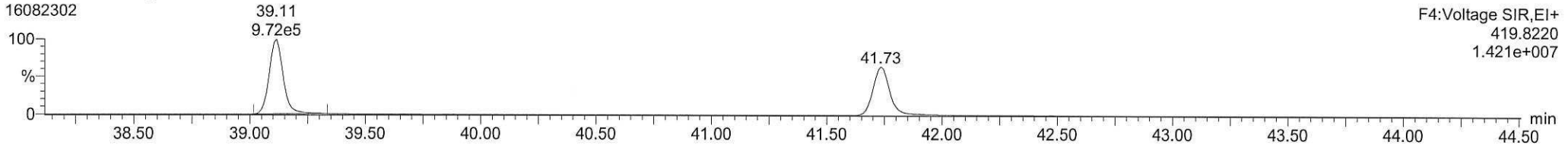


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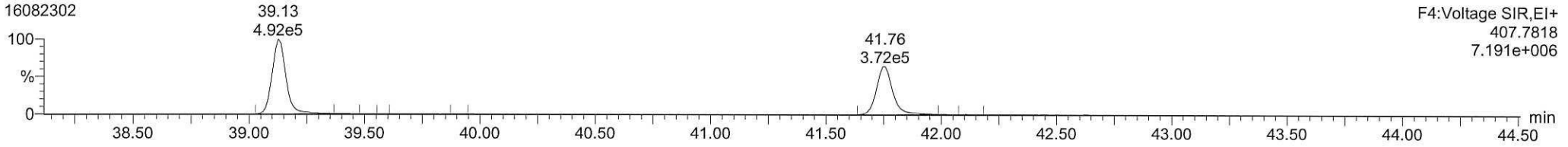
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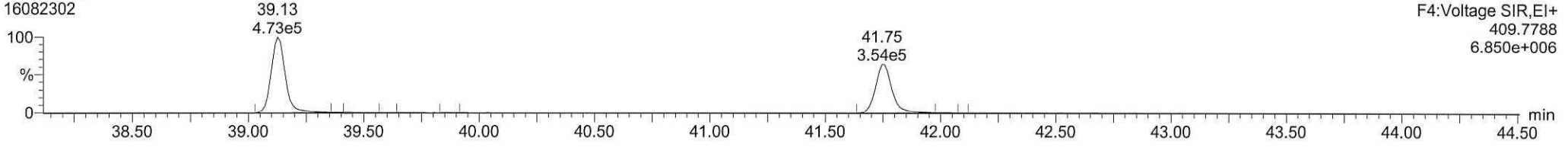
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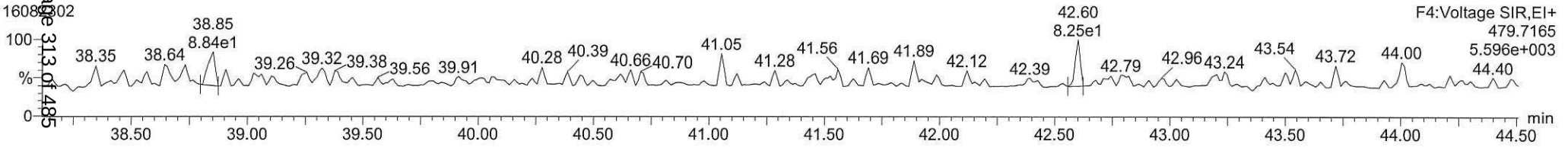
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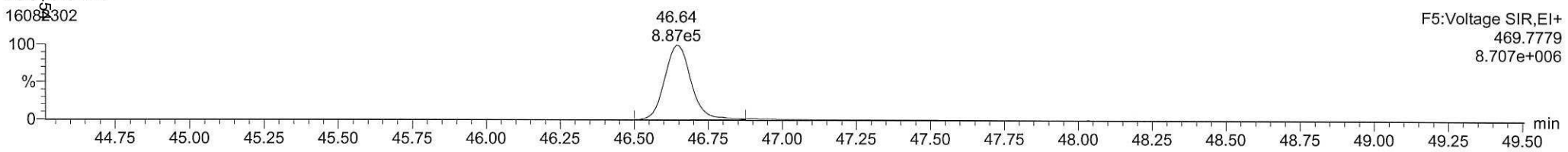


FUNCTION4 NCDPE

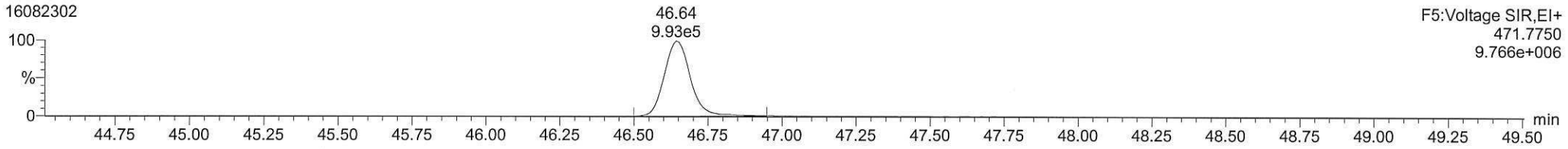


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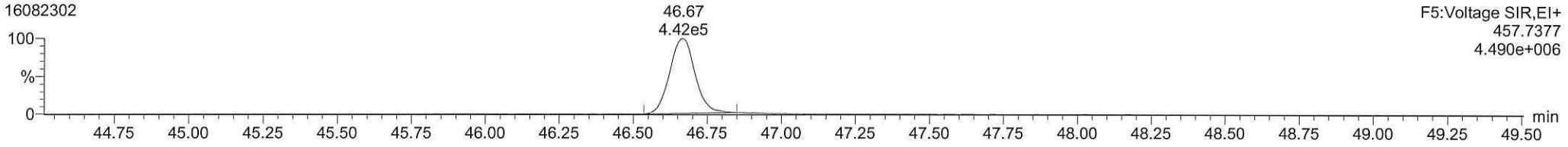
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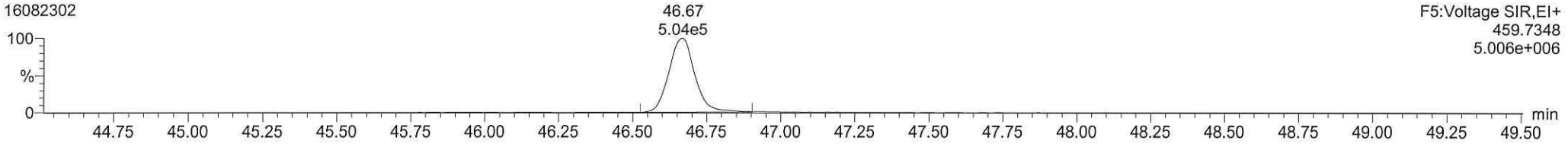
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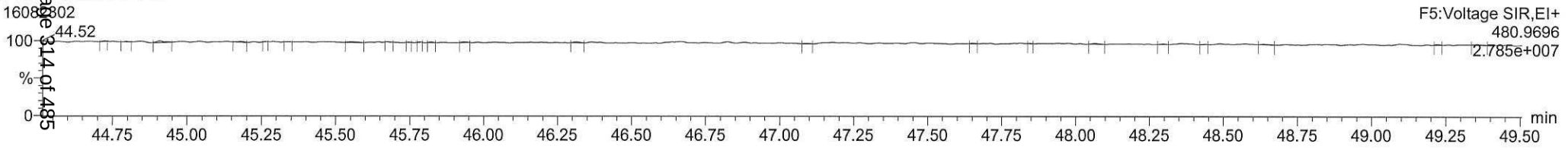
OCDD



OCDD



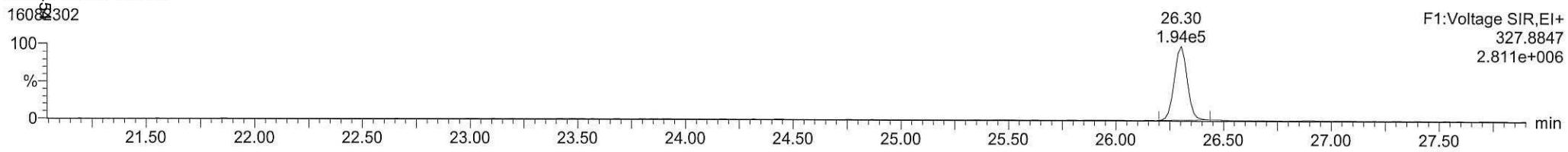
FUNCTION5 PFK



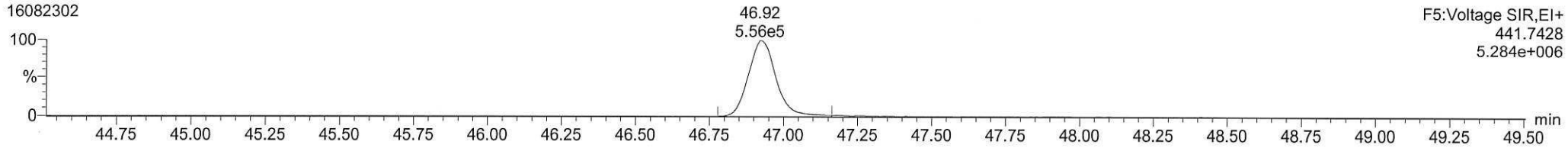
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ID: CS301, Name: 16082302, Date: 23-Aug-2016, Time: 10:42:08, Conditions: AUTOSPEC01, User: PK

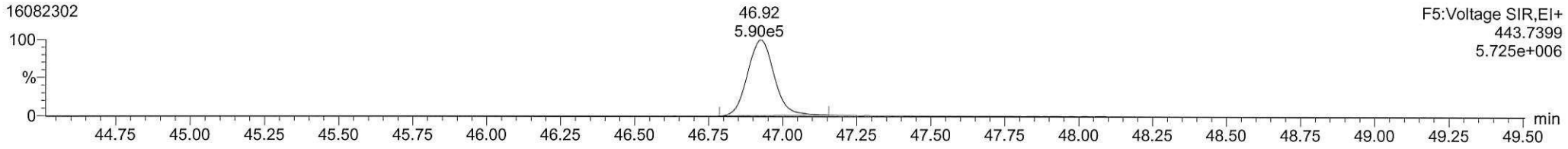
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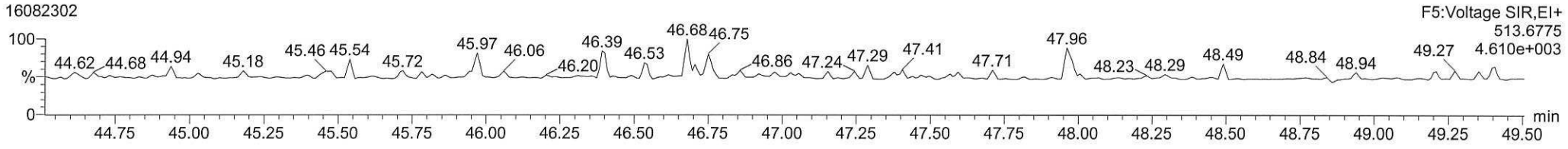
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OCDF

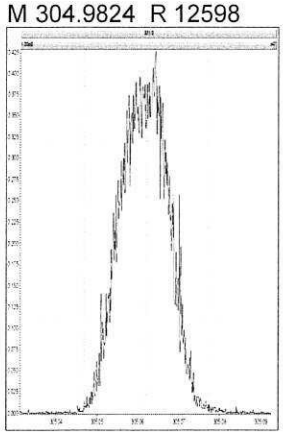


FUNCTION5 DCDPE

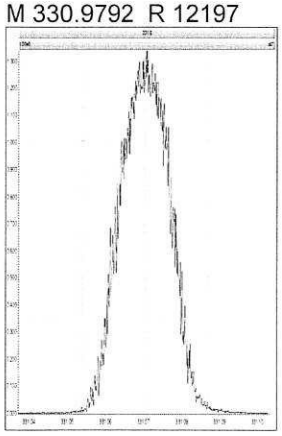


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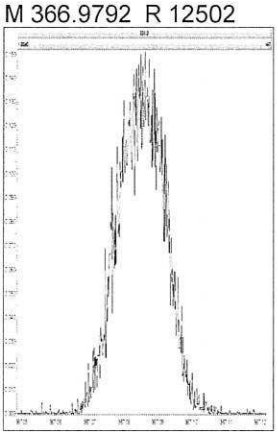
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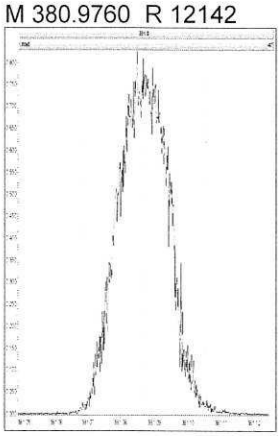
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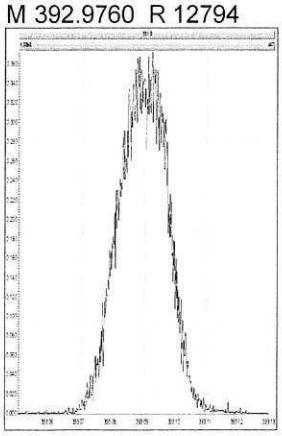
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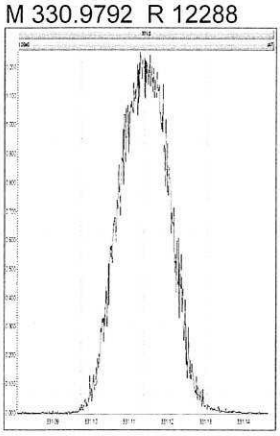
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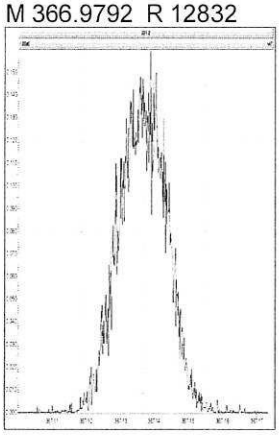
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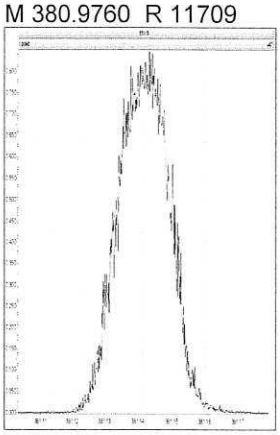
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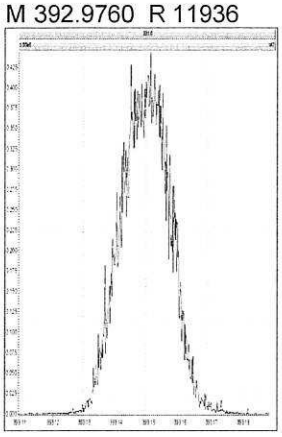
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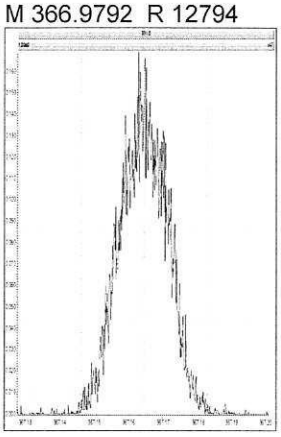
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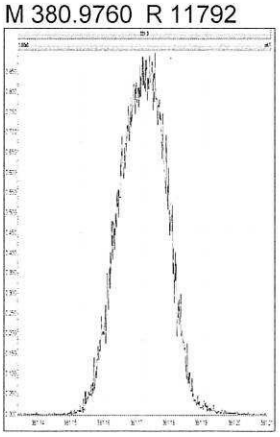
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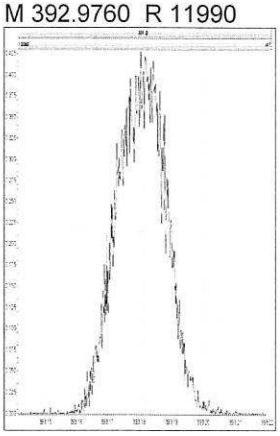
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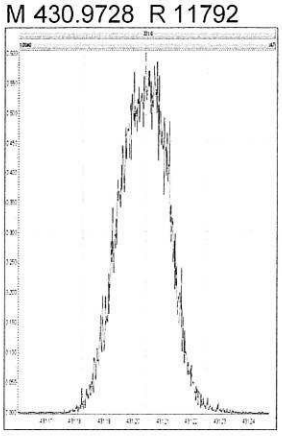
M 380.9760 R 11792



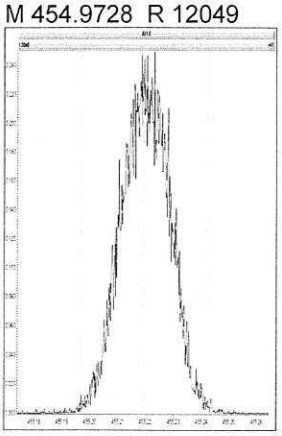
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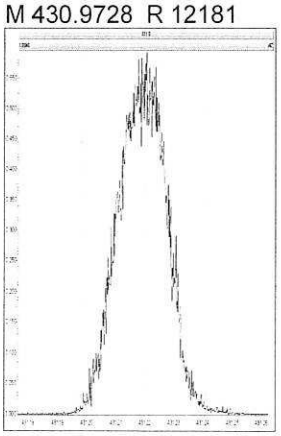
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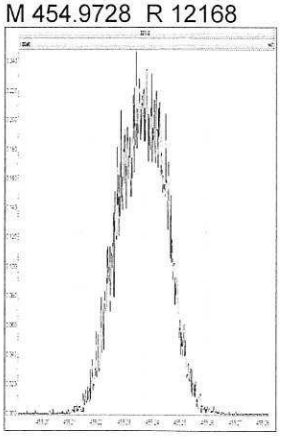
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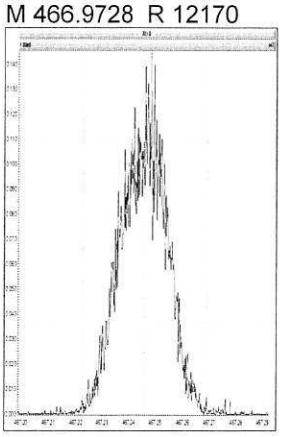


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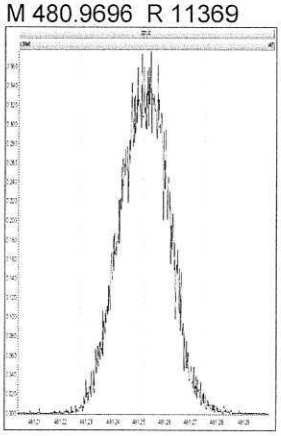


Printed: Tuesday, August 23, 2016 10:35:28 Pacific Daylight Time

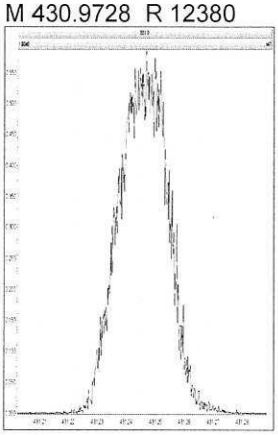
M 466.9728 R 12170



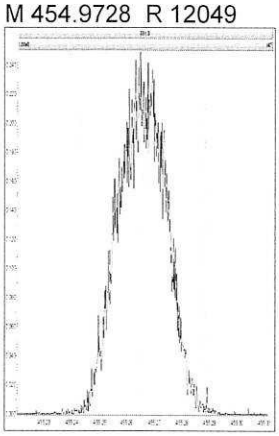
M 480.9696 R 11369



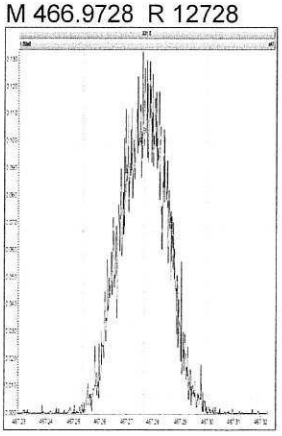
M 430.9728 R 12380



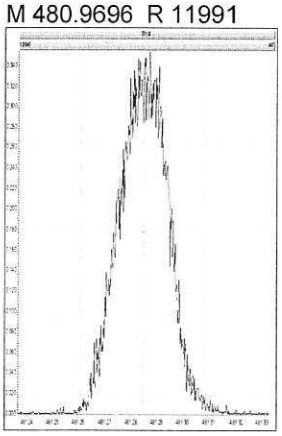
M 454.9728 R 12049



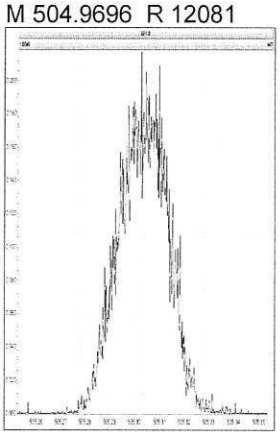
M 466.9728 R 12728

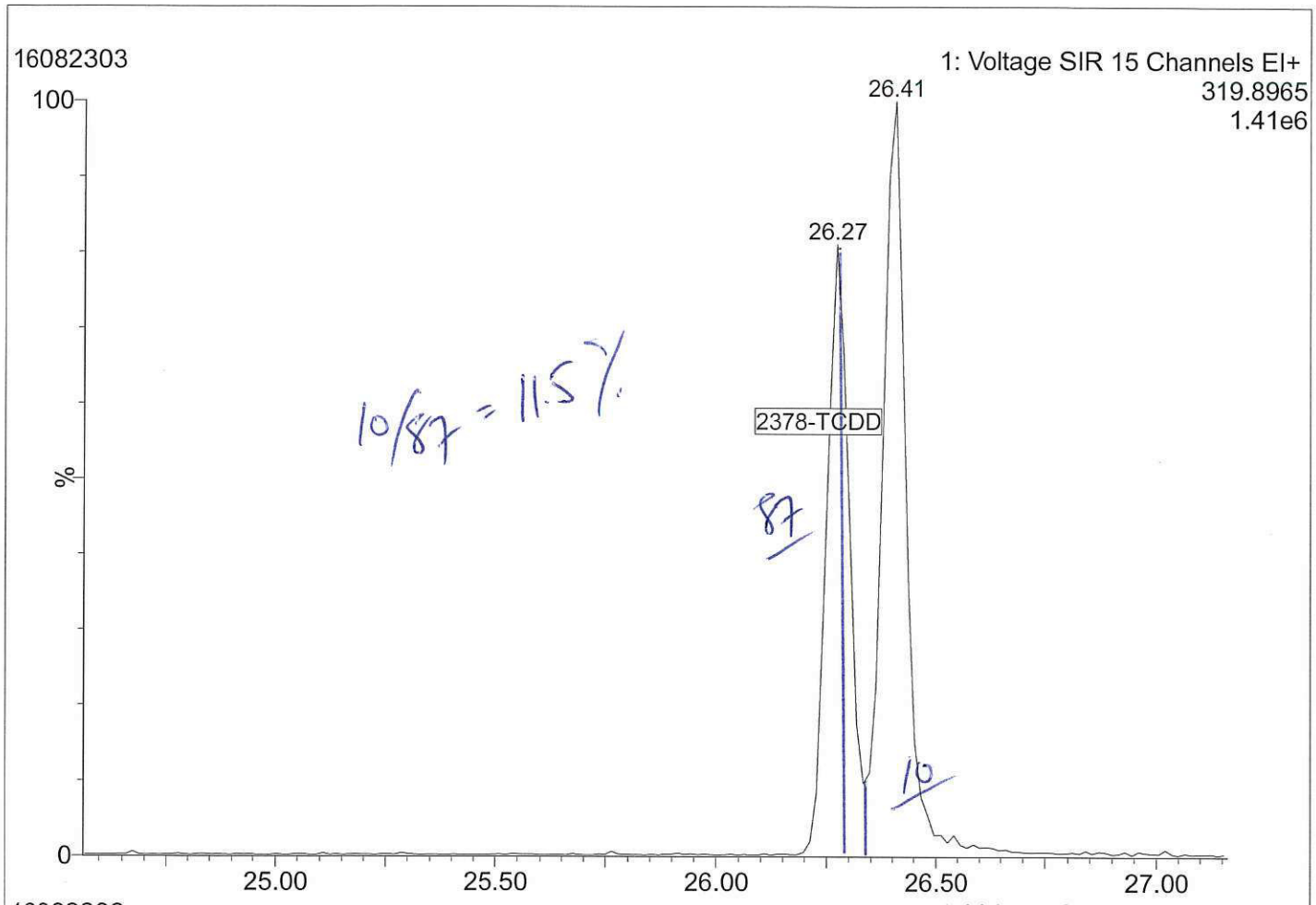


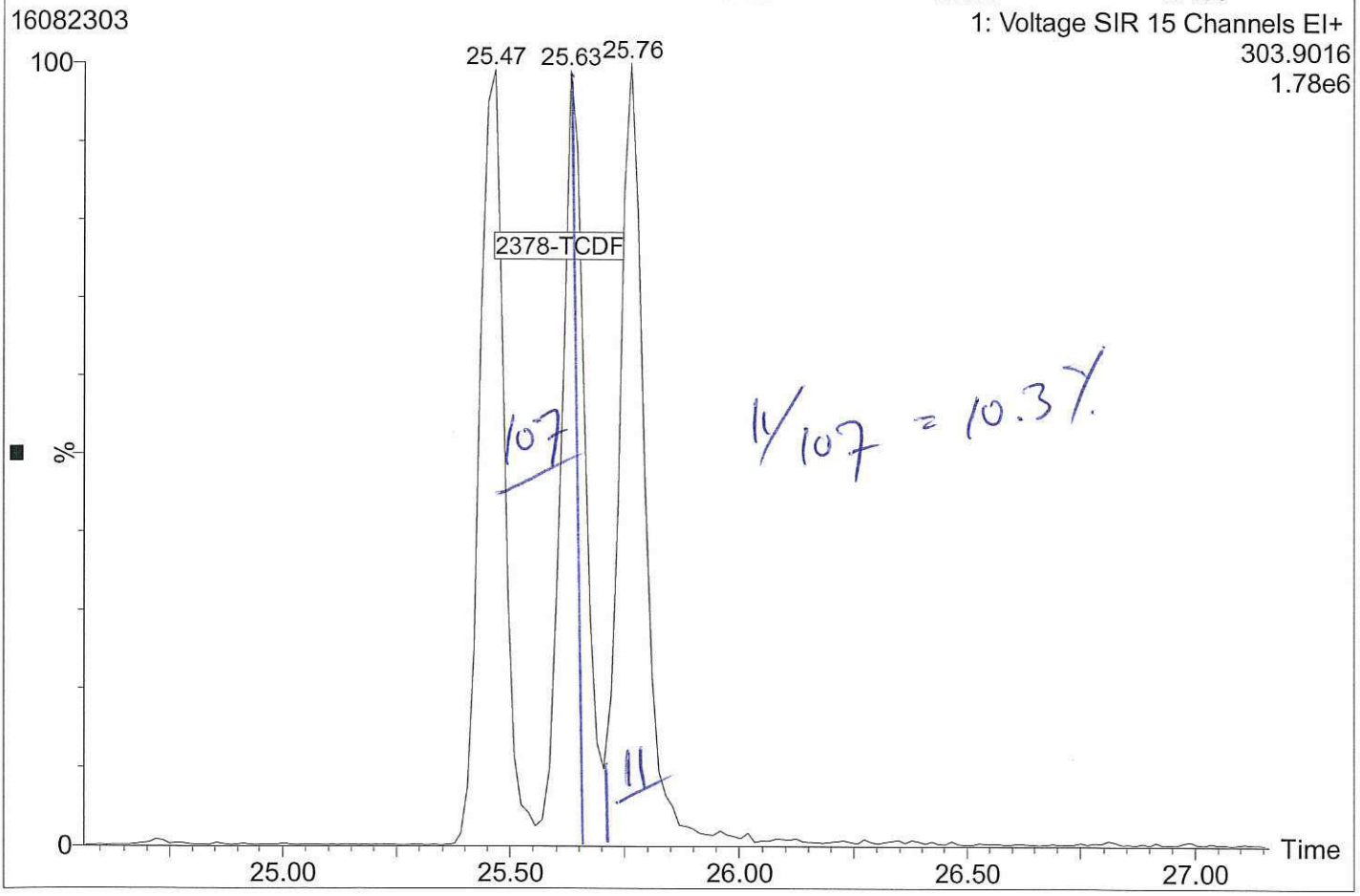
M 480.9696 R 11991

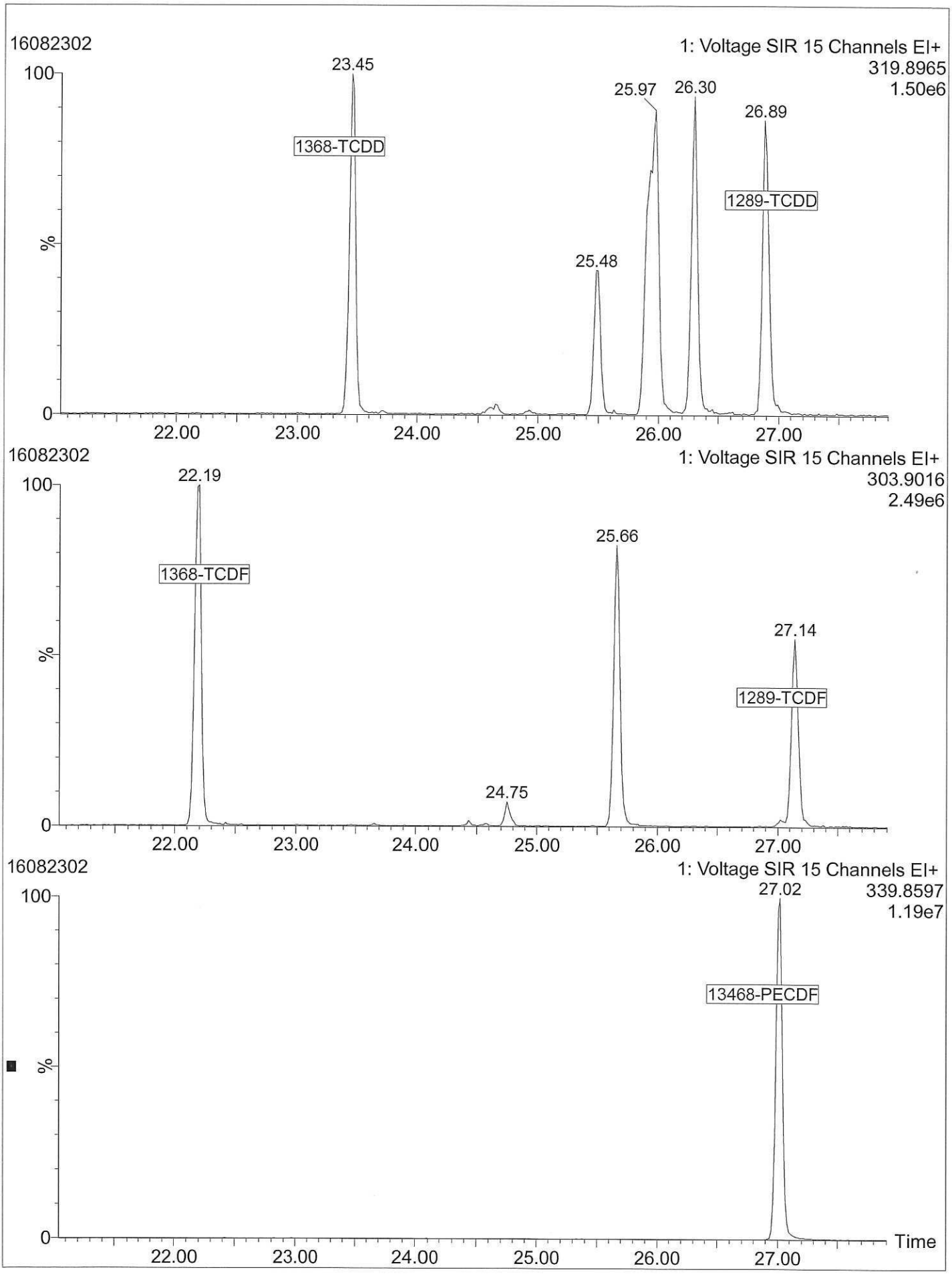


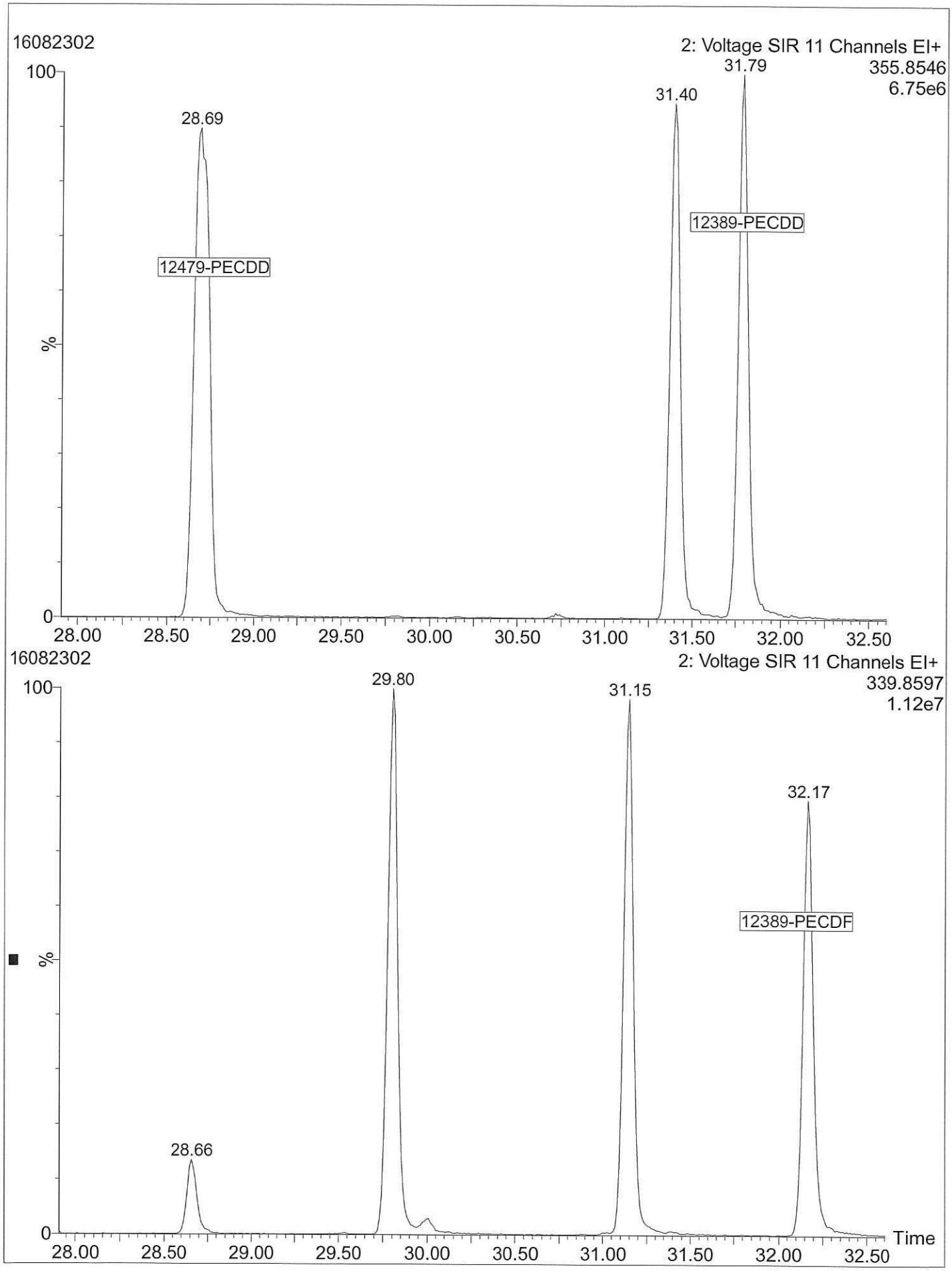
M 504.9696 R 12081

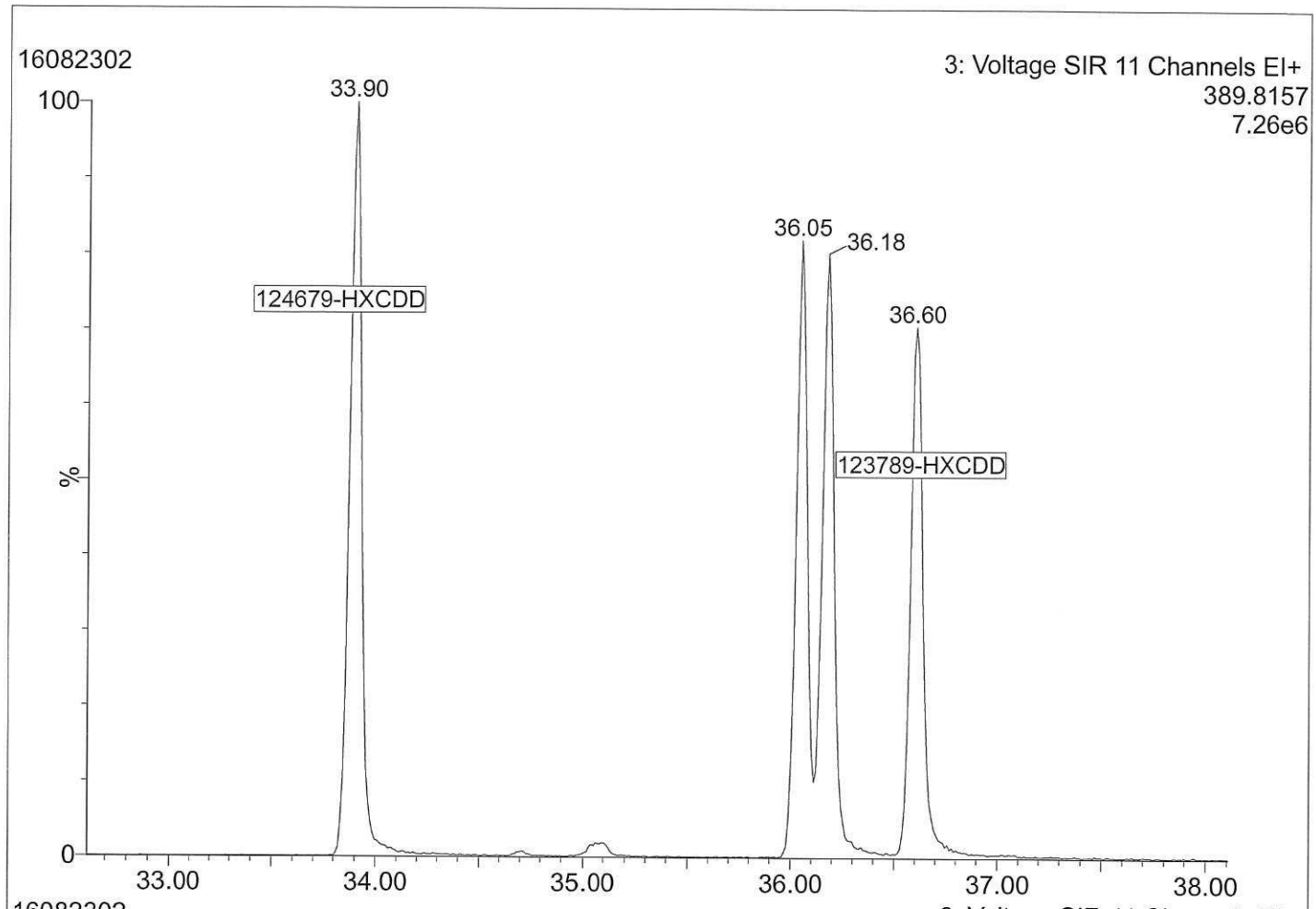


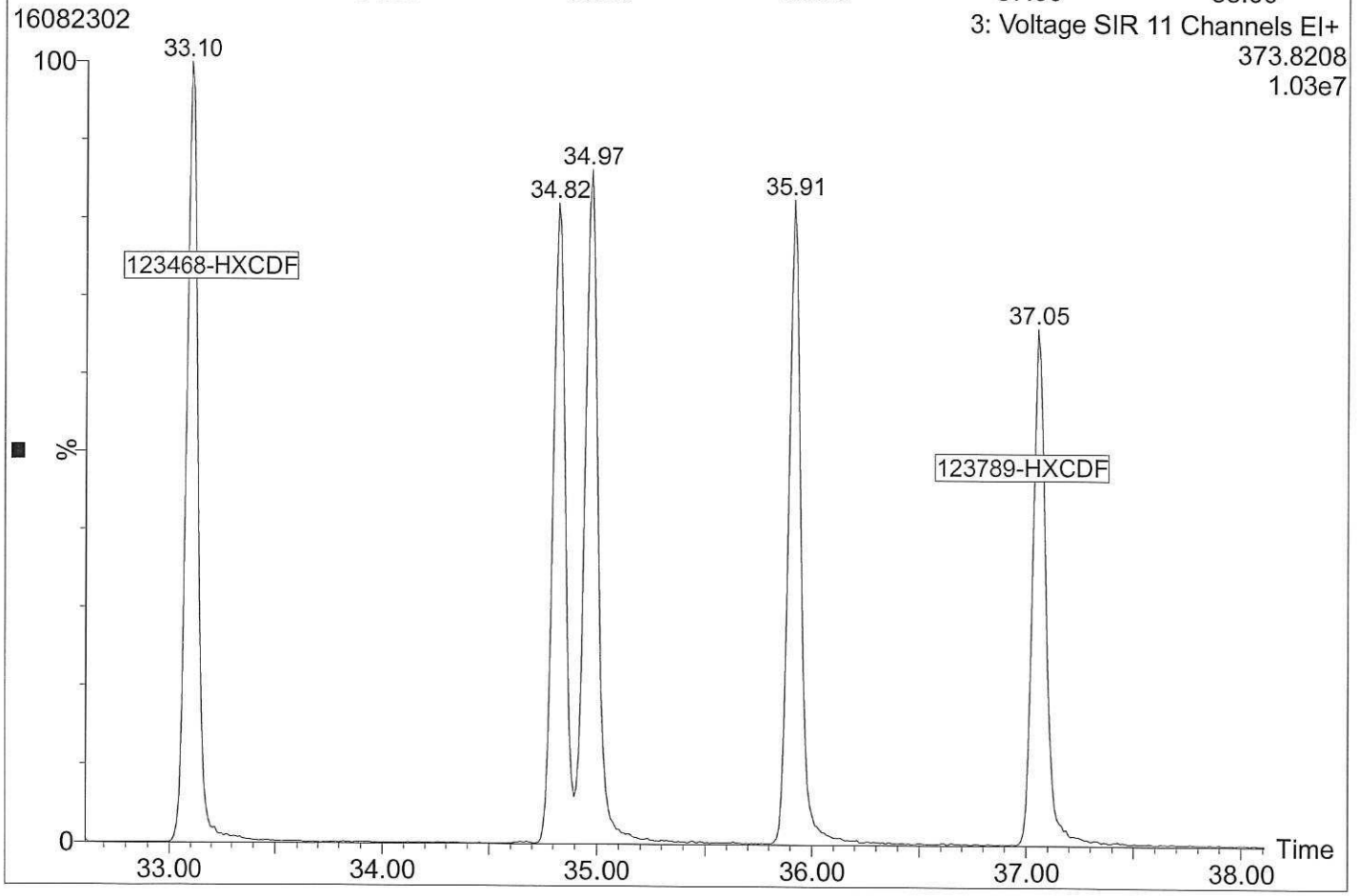

16082303
1: Voltage SIR 15 Channels EI+
319.8965
1.41e6
100
%
0
26.41
26.27
2378-TCDD
87
10
10/87 = 11.5%
25.00
25.50
26.00
26.50
27.00

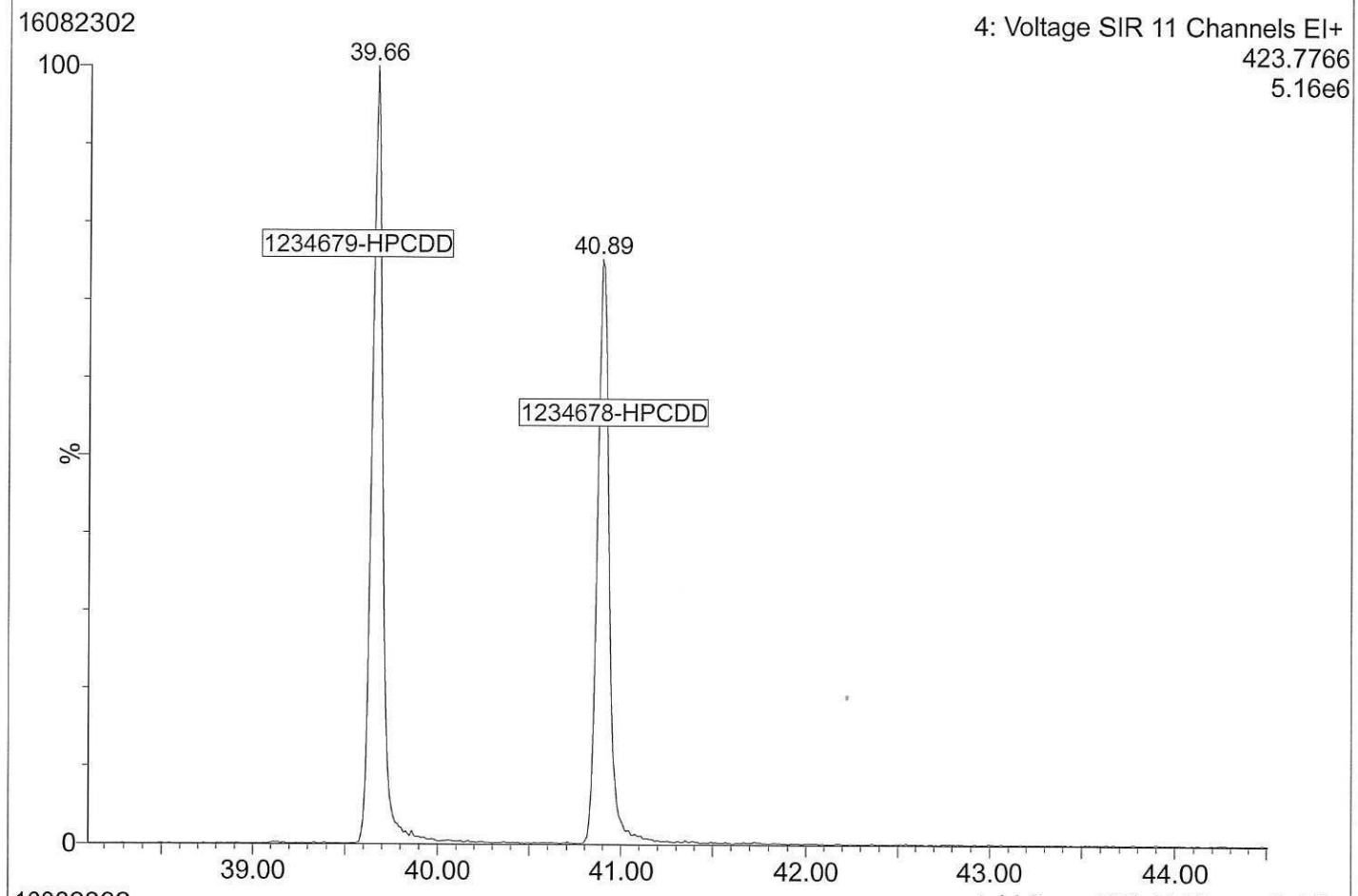

16082303
1: Voltage SIR 15 Channels EI+
303.9016
1.78e6
100
%
0
25.47
25.63
25.76
2378-TCDF
107
11
11/107 = 10.3%
Time
25.00
25.50
26.00
26.50
27.00

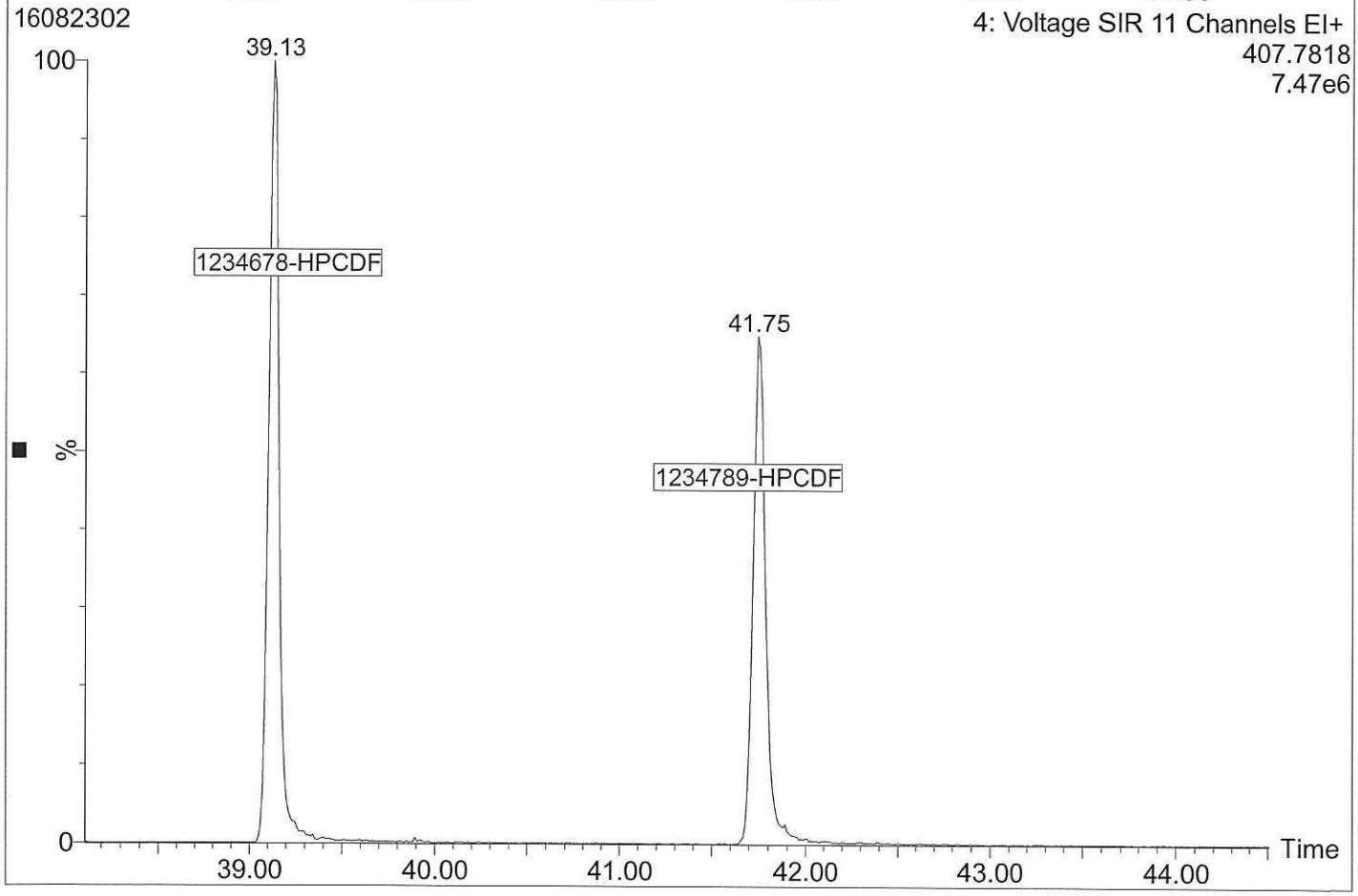

16082302
1: Voltage SIR 15 Channels EI+
319.8965
1.50e6
100
%
0
23.45
1368-TCDD
25.97
26.30
26.89
1289-TCDD
25.48
22.00
23.00
24.00
25.00
26.00
27.00
16082302
1: Voltage SIR 15 Channels EI+
303.9016
2.49e6
100
%
0
22.19
1368-TCDF
25.66
27.14
1289-TCDF
24.75
22.00
23.00
24.00
25.00
26.00
27.00
16082302
1: Voltage SIR 15 Channels EI+
339.8597
1.19e7
100
%
0
27.02
13468-PECDF
Time
22.00
23.00
24.00
25.00
26.00
27.00


16082302
2: Voltage SIR 11 Channels EI+
355.8546
6.75e6
100
%
0
28.69
31.40
31.79
12479-PECDD
12389-PECDD
28.00
28.50
29.00
29.50
30.00
30.50
31.00
31.50
32.00
32.50
16082302
2: Voltage SIR 11 Channels EI+
339.8597
1.12e7
100
%
0
29.80
31.15
32.17
12389-PECDF
28.66
Time
28.00
28.50
29.00
29.50
30.00
30.50
31.00
31.50
32.00
32.50


16082302
3: Voltage SIR 11 Channels EI+
389.8157
7.26e6
100
%
0
33.90
124679-HXCDD
36.05
36.18
36.60
123789-HXCDD
33.00
34.00
35.00
36.00
37.00
38.00


16082302
3: Voltage SIR 11 Channels EI+
373.8208
1.03e7
100
%
0
33.10
123468-HXCDF
34.97
34.82
35.91
37.05
123789-HXCDF
Time
33.00
34.00
35.00
36.00
37.00
38.00


16082302
4: Voltage SIR 11 Channels EI+
423.7766
5.16e6
100
39.66
1234679-HPCDD
40.89
1234678-HPCDD
%
0
39.00
40.00
41.00
42.00
43.00
44.00


16082302
4: Voltage SIR 11 Channels EI+
407.7818
7.47e6
100
39.13
1234678-HPCDF
41.75
1234789-HPCDF
%
0
Time
39.00
40.00
41.00
42.00
43.00
44.00

CONTINUING CALIBRATION CHECK
EPA 1613B

Laboratory:	Analytical Resources, Inc.	SDG:	16H0071
Client:	Fremont Analytical	Project:	1608094
Instrument ID:	AUTOSPEC01	Calibration:	ZE00016
Lab File ID:	16082313	Calibration Date:	05/10/16 15:20
Sequence:	SEH0246	Injection Date:	08/23/16
Lab Sample ID:	SEH0246-CCV1	Injection Time:	20:29
Sequence Name:	CS302		

		CONC. (ng/mL)		RESPONSE FACTOR			% DRIFT/DIFF	
COMPOUND	TYPE	STD	CCV	ICAL	CCV	MIN	CCV	LIMIT
2,3,7,8-TCDF	A	10.000	10.2	0.9347915	0.9516784		1.8	16
2,3,7,8-TCDD	A	10.000	10.3	1.1339650	1.1683890		3.0	22
1,2,3,7,8-PeCDF	A	50.000	50.5	0.9519161	0.9618176		1.0	18
2,3,4,7,8-PeCDF	A	50.000	52.0	0.9629117	1.0007620		3.9	18
1,2,3,7,8-PeCDD	A	50.000	51.9	0.9753974	1.0124140		3.8	22
1,2,3,4,7,8-HxCDF	A	50.000	50.2	1.1365470	1.1403030		0.3	10
1,2,3,6,7,8-HxCDF	A	50.000	49.3	1.0987420	1.0828180		-1.4	12
2,3,4,6,7,8-HxCDF	A	50.000	50.7	1.1635040	1.1806530		1.5	12
1,2,3,7,8,9-HxCDF	A	50.000	50.7	1.1008210	1.1172890		1.5	10
1,2,3,4,7,8-HxCDD	A	50.000	50.3	1.0311670	1.0381310		0.7	22
1,2,3,6,7,8-HxCDD	A	50.000	50.4	0.9714371	0.9796037		0.8	22
1,2,3,7,8,9-HxCDD	A	50.000	52.1	0.9950452	1.0169450		4.3	18
1,2,3,4,6,7,8-HpCDF	A	50.000	50.2	1.3027890	1.3078430		0.4	10
1,2,3,4,7,8,9-HpCDF	A	50.000	49.5	1.3173610	1.3039510		-1.0	14
1,2,3,4,6,7,8-HpCDD	A	50.000	51.2	1.0280160	1.0523180		2.4	14
OCDF	A	100.00	99.9	1.1658070	1.1644920		-0.1	37
OCDD	A	100.00	90.4	1.1070210	1.0010460		-9.6	21
13C12-2,3,7,8-TCDF	A	100.00	102	1.5674190	1.5982346		2.0	29
13C12-2,3,7,8-TCDD	A	100.00	102	0.9077481	0.9257947		2.0	18
13C12-1,2,3,7,8-PeCDF	A	100.00	104	1.2740970	1.3297605		4.4	24
13C12-2,3,4,7,8-PeCDF	A	100.00	106	1.2346260	1.3085647		6.0	23
13C12-1,2,3,7,8-PeCDD	A	100.00	108	0.7557554	0.8157828		7.9	38
13C12-1,2,3,4,7,8-HxCDF	A	100.00	97.0	1.3809190	1.3397052		-3.0	24
13C12-1,2,3,6,7,8-HxCDF	A	100.00	91.6	1.5694530	1.4368548		-8.4	30
13C12-2,3,4,6,7,8-HxCDF	A	100.00	96.3	1.3453300	1.2955716		-3.7	27
13C12-1,2,3,7,8,9-HxCDF	A	100.00	98.6	1.1828950	1.1664199		-1.4	26
13C12-1,2,3,4,7,8-HxCDD	A	100.00	100	1.0559040	1.0556974		-0.02	15
13C12-1,2,3,6,7,8-HxCDD	A	100.00	96.2	1.1630360	1.1192629		-3.8	15
13C12-1,2,3,4,6,7,8-HpCDF	A	100.00	92.4	1.1783620	1.0886939		-7.6	22
13C12-1,2,3,4,7,8,9-HpCDF	A	100.00	93.3	0.8777992	0.8185809		-6.7	23
13C12-1,2,3,4,6,7,8-HpCDD	A	100.00	95.1	0.9091061	0.8650109		-4.9	18
13C12-OCDD	A	200.00	171	0.8195753	0.7024074		-14.3	52
37C14-2,3,7,8-TCDD	A	10.000	10.4	1.0665580	1.1055032		3.7	

* Values outside of QC limits

Quantify Sample Summary Report **MassLynx MassLynx V4.1 SCN909**
Dataset: C:\MassLynx\Dioxin.pro\160823DATA1.qld
Last Altered: Thursday, August 25, 2016 12:51:34 Pacific Daylight Time
Printed: Thursday, August 25, 2016 14:47:14 Pacific Daylight Time

Page 295 of 454

Method: C:\MassLynx\Dioxin.pro\MethDB\Dioxin1608163SN.mdb 17 Aug 2016 15:09:47
Calibration: C:\MassLynx\Dioxin.pro\CurveDB\160510ICAL.cdb 11 May 2016 09:28:40

ID: CS302, Name: 16082313, Date: 23-Aug-2016, Time: 20:29:26, Conditions: AUTOSPEC01, User: PK

Name	RT	RRT	Ion1Area	Ion2Area	RRF	Ratio	Pred R	Noise 1	Noise 2	Height 1	Height 2	S/N	EMPC?	EMPC	pg
2378-TCDF	25.615	1.001	1.69e5	2.19e5	0.935	0.770	0.770	1889	2276	2.41e6	3.14e6	1276.9	NO	10.181	10.181
12378-PeCDF	29.764	1.000	9.94e5	6.39e5	0.952	1.555	1.550	3349	3994	1.49e7	9.53e6	4437.5	NO	50.520	50.520
23478-PeCDF	31.112	1.001	1.02e6	6.50e5	0.963	1.571	1.550	3349	3994	1.52e7	9.53e6	4524.7	NO	51.965	51.965
123478-HxCDF	34.795	1.001	8.11e5	6.41e5	1.137	1.264	1.240	5595	4043	1.23e7	9.70e6	2192.8	NO	50.165	50.165
234678-HxCDF	35.891	1.001	8.06e5	6.48e5	1.164	1.243	1.240	5595	4043	1.21e7	9.58e6	2160.2	NO	50.737	50.737
123678-HxCDF	34.938	1.000	8.25e5	6.54e5	1.099	1.261	1.240	5595	4043	1.20e7	9.61e6	2153.4	NO	49.275	49.275
123789-HxCDF	37.031	1.000	6.87e5	5.51e5	1.101	1.247	1.240	5595	4043	9.87e6	7.85e6	1764.8	NO	50.748	50.748
1234678-HpCDF	39.103	1.000	6.82e5	6.71e5	1.303	1.018	1.050	3975	3364	1.01e7	9.90e6	2547.8	NO	50.194	50.194
1234789-HpCDF	41.733	1.000	5.15e5	5.00e5	1.317	1.030	1.050	3975	3364	6.56e6	6.40e6	1651.0	NO	49.491	49.491
OCDF	46.902	1.006	7.37e5	8.18e5	1.166	0.902	0.890	2288	2506	7.17e6	7.84e6	3133.5	NO	99.887	99.887
2378-TCDD	26.257	1.001	1.22e5	1.54e5	1.134	0.796	0.770	1586	1289	1.77e6	2.28e6	1115.5	NO	10.304	10.304
12378-PeCDD	31.364	1.001	6.41e5	4.13e5	0.975	1.554	1.550	2393	1912	9.57e6	6.20e6	3999.2	NO	51.898	51.898
123478-HxCDD	36.022	1.000	5.80e5	4.62e5	1.031	1.255	1.240	3250	3656	8.83e6	7.00e6	2717.1	NO	50.338	50.338
123678-HxCDD	36.154	1.001	5.82e5	4.60e5	0.971	1.265	1.240	3250	3656	8.48e6	6.64e6	2610.0	NO	50.420	50.420
123789-HxCDD	36.582	1.012	5.65e5	4.55e5	0.947	1.241	1.240	3250	3656	8.24e6	6.69e6	2535.1	NO	52.138	52.138
1234678-HpCDD	40.878	1.000	4.39e5	4.27e5	1.028	1.028	1.050	2028	2449	5.85e6	5.60e6	2883.5	NO	51.182	51.182
OCDD	46.641	1.000	6.36e5	7.01e5	1.107	0.907	0.890	2302	2040	6.45e6	7.22e6	2802.3	NO	90.427	90.427
13C-2378-TCDF	25.600	1.007	1.80e6	2.28e6	1.567	0.789	0.770	3155	3112	2.62e7	3.37e7	8292.6	NO		101.966
13C-12378-PeCDF	29.753	1.170	2.08e6	1.31e6	1.274	1.586	1.550	3939	3438	3.06e7	1.92e7	7777.4	NO		104.369
13C-23478-PeCDF	31.090	1.223	2.05e6	1.29e6	1.235	1.582	1.550	3939	3438	3.09e7	1.94e7	7857.4	NO		105.989
13C-123478-HxCDF	34.773	0.951	8.73e5	1.67e6	1.381	0.522	0.510	3974	4159	1.32e7	2.53e7	3325.1	NO		97.015
13C-123678-HxCDF	34.926	0.955	9.47e5	1.78e6	1.569	0.531	0.510	3974	4159	1.37e7	2.60e7	3437.9	NO		91.551
13C-234678-HxCDF	35.869	0.981	8.39e5	1.62e6	1.345	0.516	0.510	3974	4159	1.24e7	2.40e7	3120.5	NO		96.301
13C-123789-HxCDF	37.020	1.013	7.57e5	1.46e6	1.183	0.518	0.510	3974	4159	1.08e7	2.06e7	2705.5	NO		98.607
13C-1234678-HpCDF	39.092	1.069	6.43e5	1.43e6	1.178	0.451	0.440	2288	3603	9.64e6	2.14e7	4214.6	NO		92.390
13C-1234789-HpCDF	41.711	1.141	4.88e5	1.07e6	0.878	0.457	0.440	2288	3603	6.21e6	1.36e7	2713.6	NO		93.254
13C-2234-TCDD	25.421	0.000	1.13e6	1.43e6	1.000	0.791	0.770	2265	1638	1.64e7	2.06e7	7222.2	NO		100.000
13C-2378-TCDD	26.242	1.032	1.04e6	1.33e6	0.908	0.780	0.770	2265	1638	1.52e7	1.94e7	6707.7	NO		101.988
13C-12378-PeCDD	31.342	1.233	1.28e6	8.05e5	0.756	1.586	1.550	1817	2307	1.92e7	1.21e7	10551.7	NO		107.943
13C-123478-HxCDD	36.012	0.985	1.12e6	8.85e5	1.056	1.268	1.240	2763	2212	1.69e7	1.34e7	6126.9	NO		99.980
13C-123678-HxCDD	36.132	0.988	1.18e6	9.51e5	1.163	1.236	1.240	2763	2212	1.72e7	1.37e7	6216.7	NO		96.236
13C-1234678-HpCDD	40.856	1.117	8.45e5	8.00e5	0.909	1.056	1.050	2418	2133	1.14e7	1.05e7	4713.4	NO		95.150
13C-OCDD	46.624	1.275	1.26e6	1.41e6	0.820	0.898	0.890	2780	2873	1.28e7	1.42e7	4613.5	NO		171.408

Page 324 of 485

Dataset: C:\MassLynx\Dioxin.pro\160823DATA1.qld
Last Altered: Thursday, August 25, 2016 12:51:34 Pacific Daylight Time
Printed: Thursday, August 25, 2016 14:47:14 Pacific Daylight Time

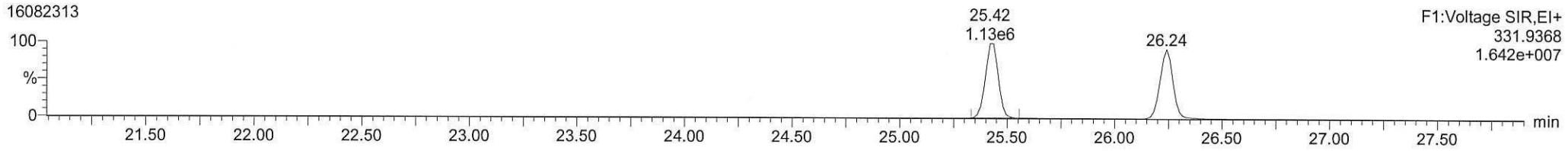
ID: CS302, Name: 16082313, Date: 23-Aug-2016, Time: 20:29:26, Conditions: AUTOSPEC01, User: PK

Name	RT	RRT	Ion1Area	Ion2Area	RRF	Ratio	Pred R	Noise 1	Noise 2	Height 1	Height 2	S/N	EMPC?	EMPC	pg
13C-123789-HxCDD	36.560	0.000	1.06e6	8.38e5	1.000	1.268	1.240	2763	2212	1.56e7	1.23e7	5654.8	NO		100.000
Total-tetrafurans			5.14e5		0.935			1889		7.42e6					30.833
Total-penta1			1.08e6					1229		1.63e7					58.125
Total-pentafurans			3.10e6		0.957			3349		4.57e7					157.222
Total-hexafurans			4.09e6		1.125			5595		6.08e7					262.822
Total-heptafurans			1.20e6		1.310			3975		1.68e7					100.056
Total-Furans			1.07e7		1.114			1889		1.54e8					708.957
Total-tetradioxins			6.72e5		1.134			1586		8.42e6					57.215
Total-pentadioxins			2.28e6		0.975			2393		2.93e7					184.439
Total-hexadioxins			2.51e6		0.983			3250		3.69e7					221.247
Total-heptadioxins			9.52e5		1.028			2028		1.33e7					111.432
Total-Dioxins			7.05e6		1.028			1586		9.43e7					664.771
Total-TEQ			1.78e7					1586		2.48e8					1373.728
37CL-2378-TCDD	26.257	1.033	2.82e5		1.067			919		4.10e6		4463.5			10.365
FUNCTION1 PFK			3.78e6					286892		3.20e7					
FUNCTION2 PFK			7.06e4					77745		2.28e6					0.000
FUNCTION3 PFK			1.30e5					195378		4.93e6					0.000
FUNCTION4 PFK			6.31e4					186438		2.41e6					
FUNCTION5 PFK			1.15e5					126458		4.16e6					
FUNCTION1 HXCDPE			2.57e2					477		3.99e3					0.000
FUNCTION1 HPCDPE			0.00e0					495		0.00e0					
FUNCTION2 HPCDPE			1.46e3					555		2.23e4					0.000
FUNCTION3 OCDPE			0.00e0					671		0.00e0					
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FUNCTION5 DCDPE			0.00e0					697		0.00e0					

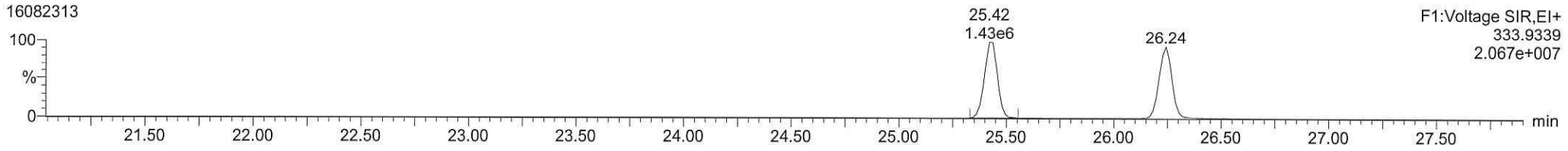
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Calibration: C:\MassLynx\Dioxin.pro\CurveDB\160510ICAL.cdb 11 May 2016 09:28:40

ID: CS302, Name: 16082313, Date: 23-Aug-2016, Time: 20:29:26, Conditions: AUTOSPEC01, User: PK

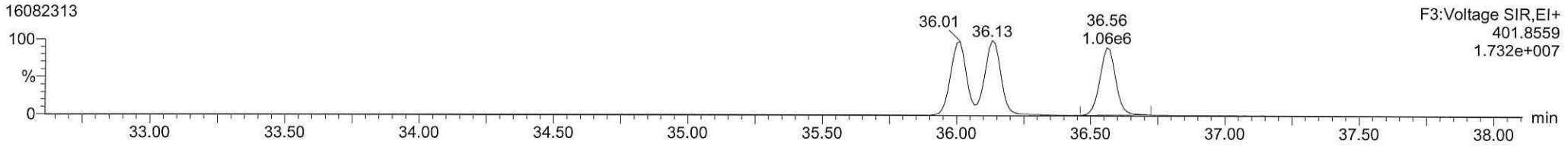
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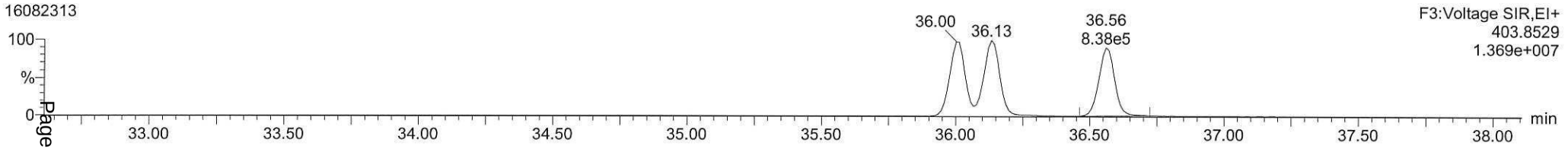
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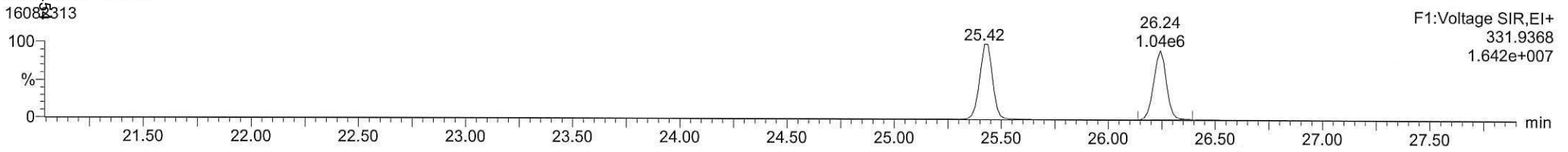
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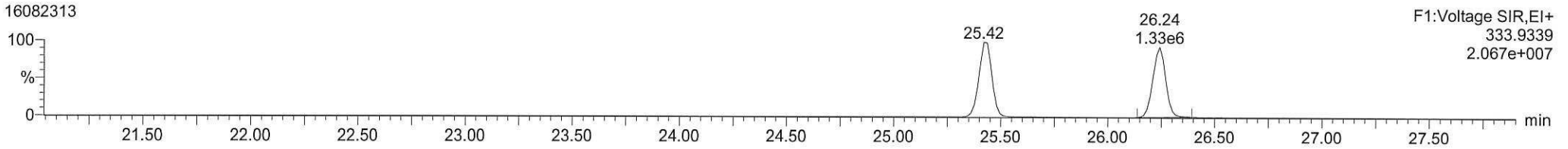
Page 298 of 1454

ID: CS302, Name: 16082313, Date: 23-Aug-2016, Time: 20:29:26, Conditions: AUTOSPEC01, User: PK

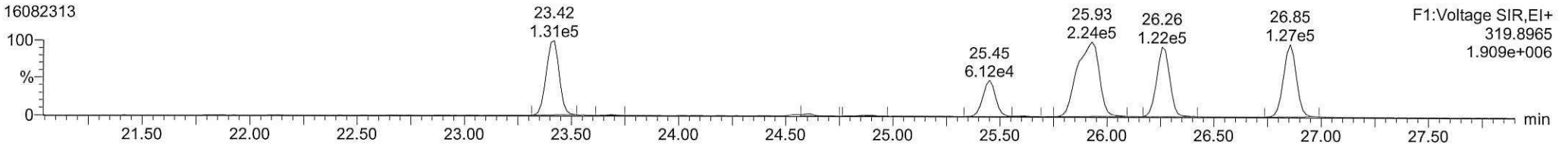
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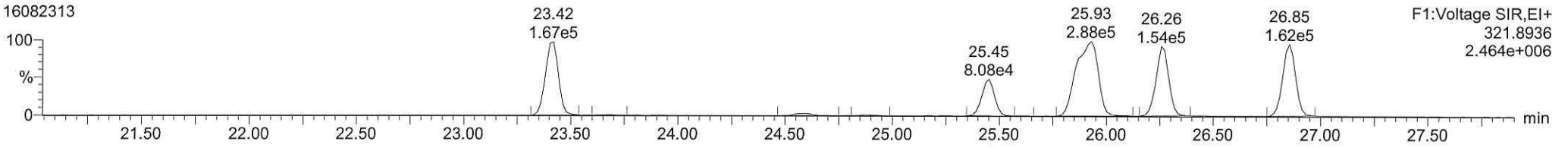
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Total-tetradioxins

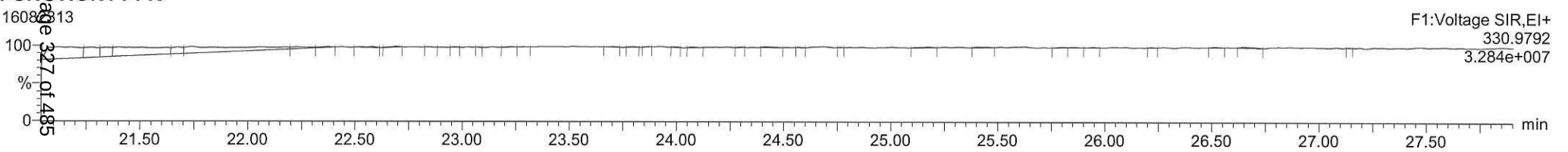


Total-tetradioxins



FUNCTION1 PFK

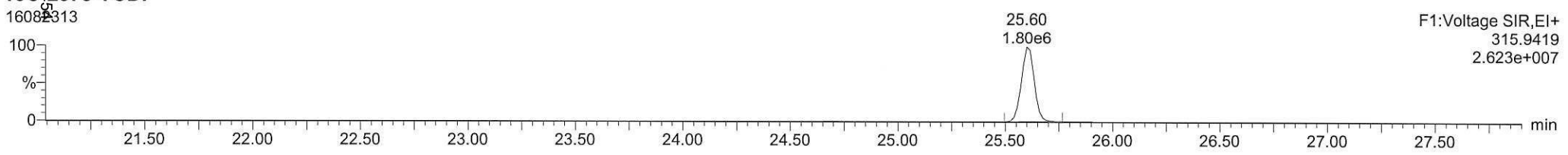
Page 327 of 485



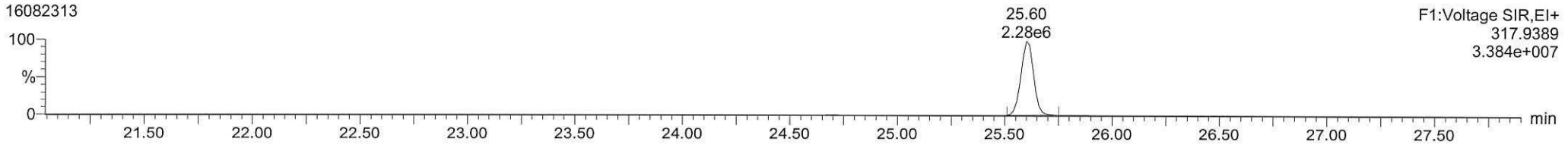
Page 299 of 554

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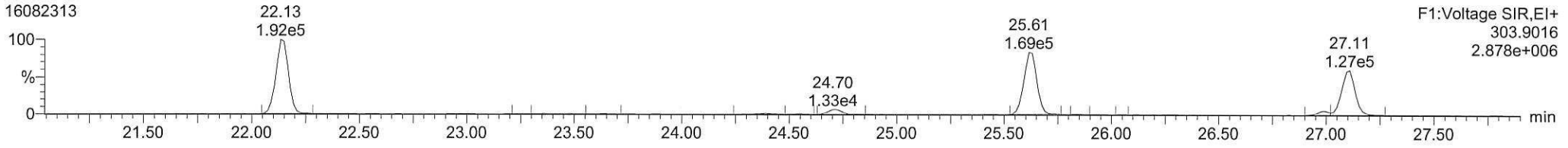
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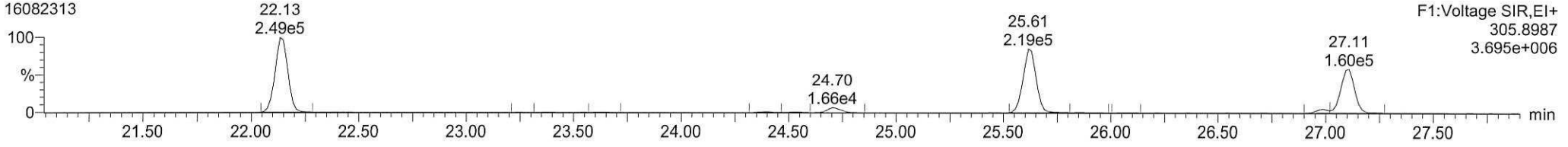
13C-2378-TCDF



Total-tetrafurans

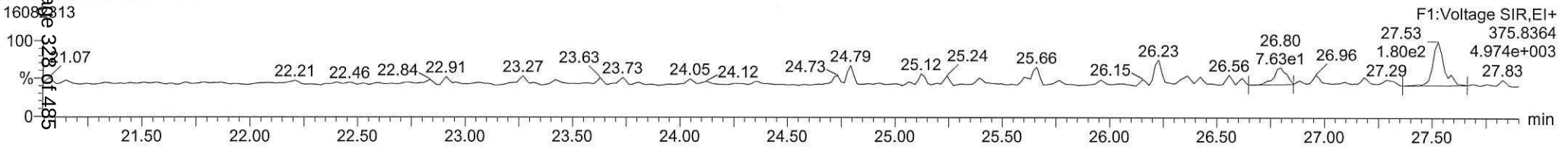


Total-tetrafurans



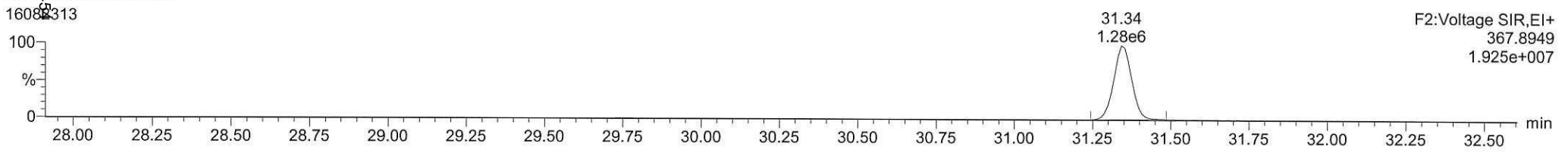
FUNCTION1 HXCDPE

Page 328 of 485

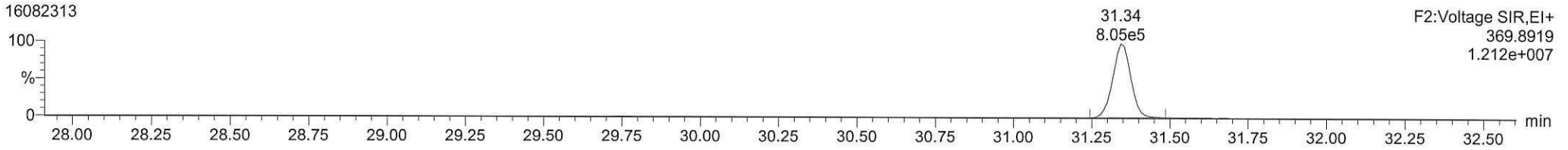


ID: CS302, Name: 16082313, Date: 23-Aug-2016, Time: 20:29:26, Conditions: AUTOSPEC01, User: PK

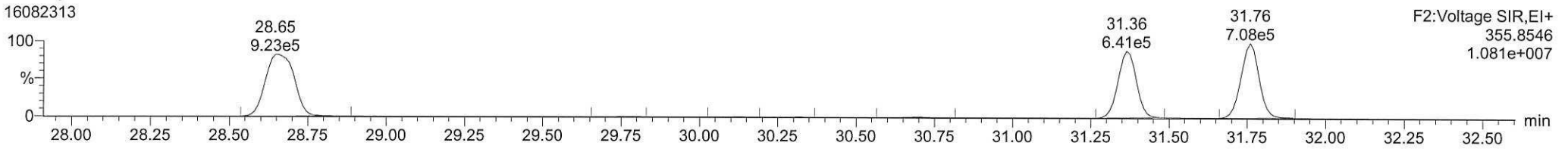
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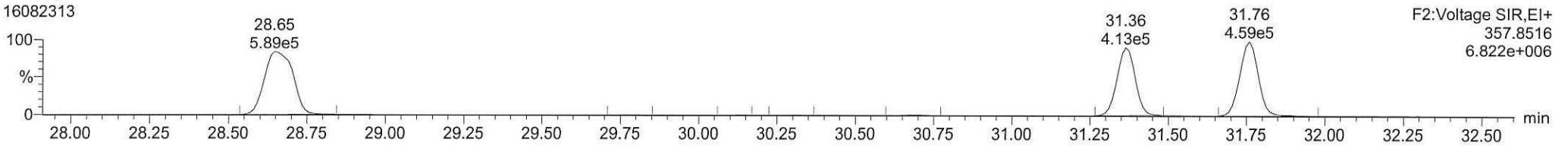
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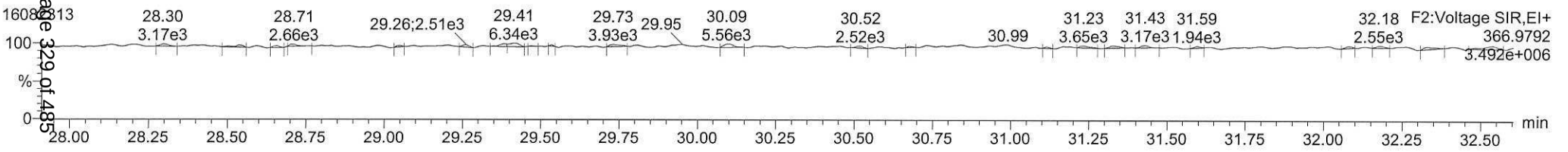
Total-pentadioxins



Total-pentadioxins

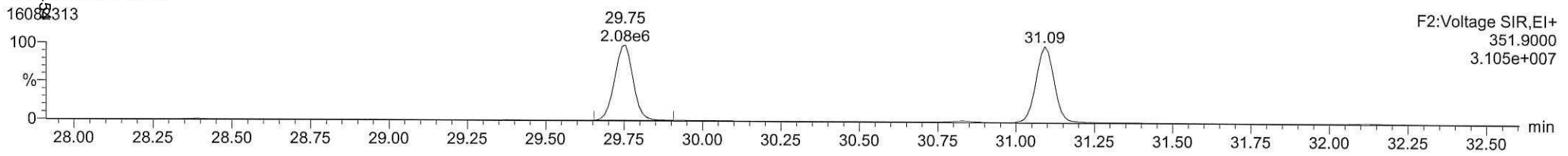


FUNCTION2 PFK

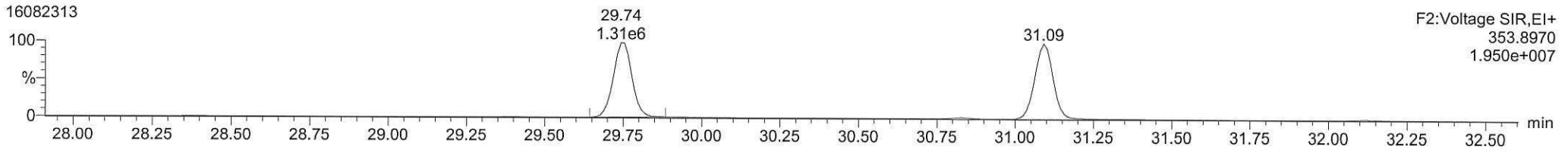


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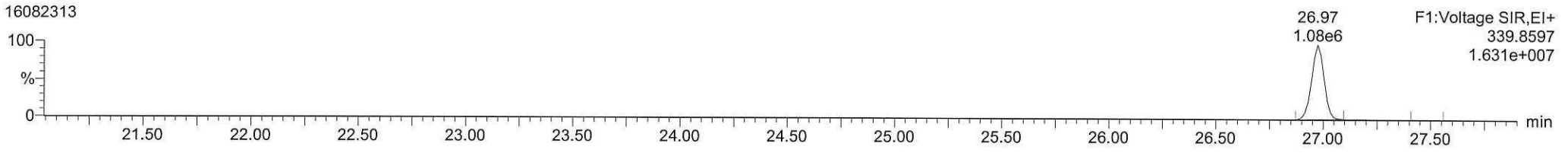
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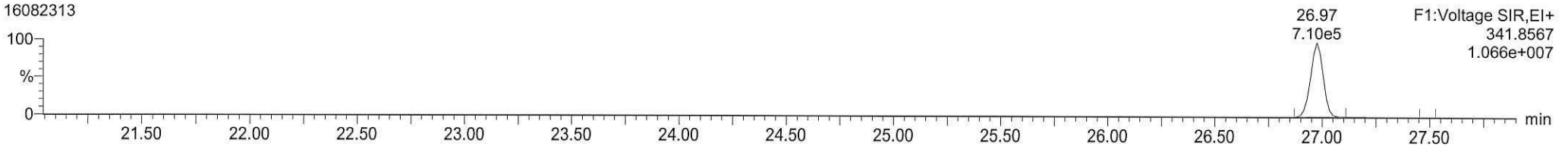
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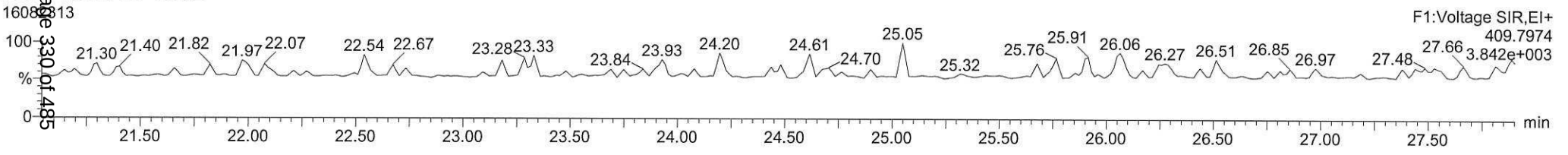
Total-penta1



Total-penta1

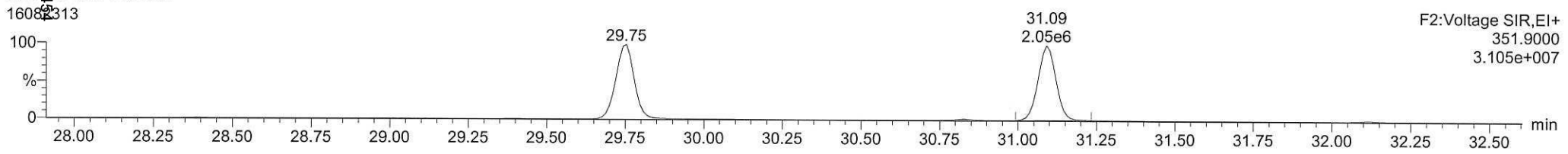


FUNCTION1 HPCDPE

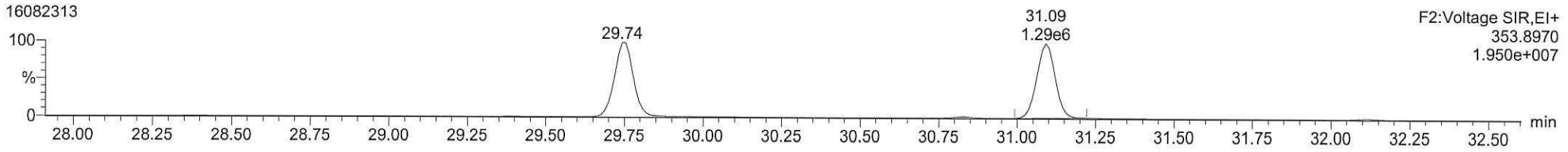


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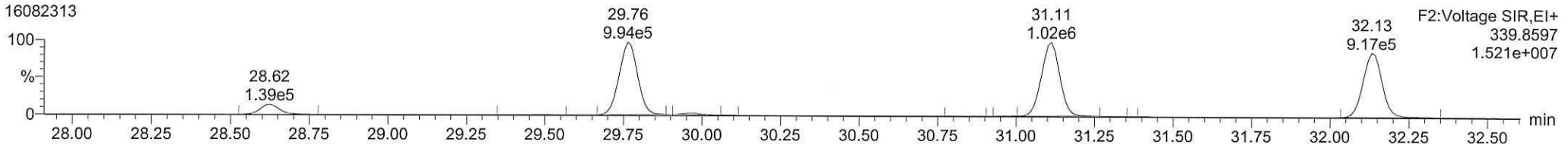
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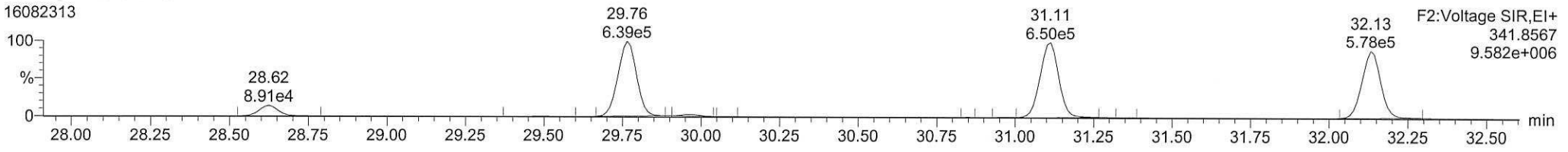
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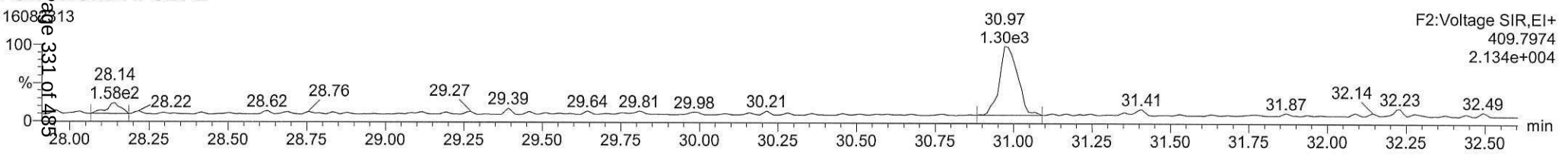
Total-pentafurans



Total-pentafurans

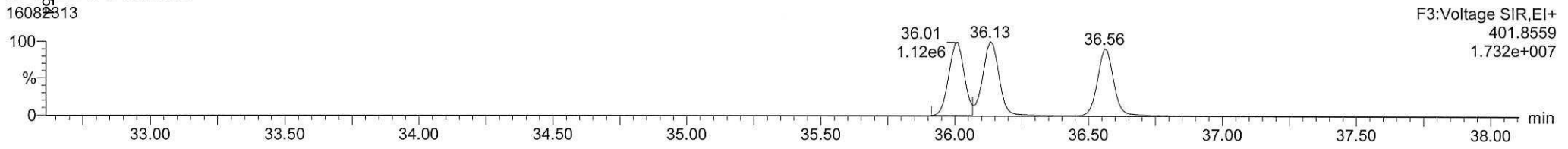


FUNCTION2 HPCDPE

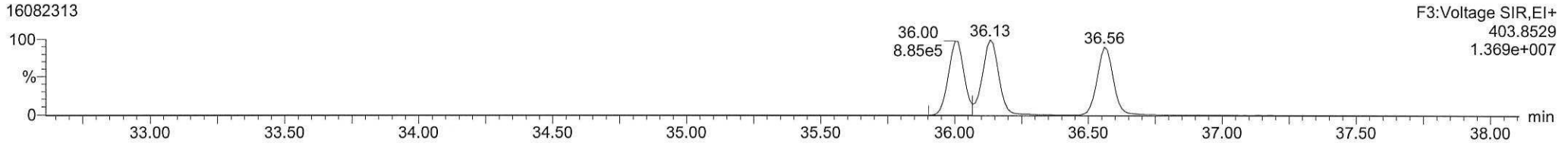


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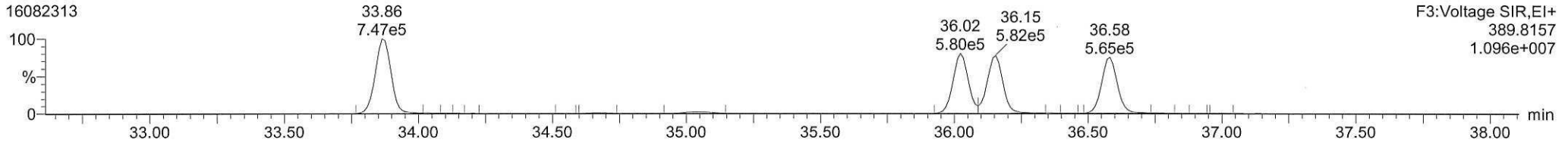
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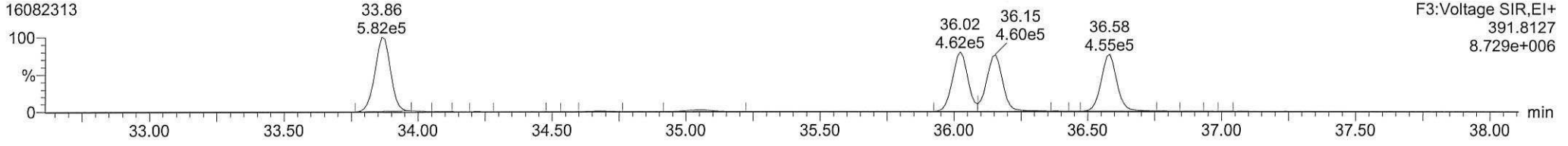
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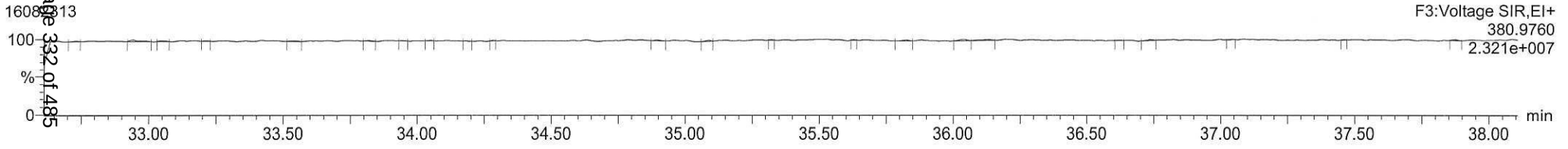
Total-hexadioxins



Total-hexadioxins

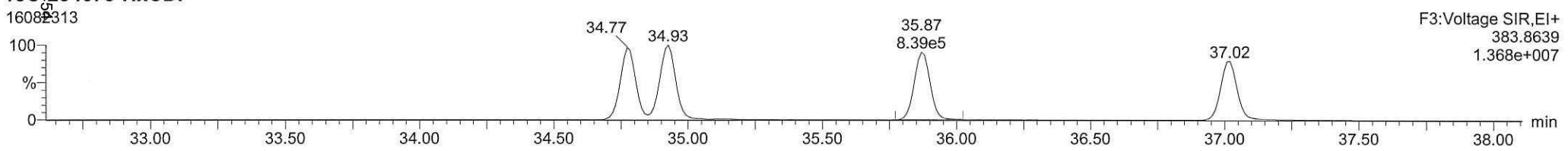


FUNCTION3 PFK

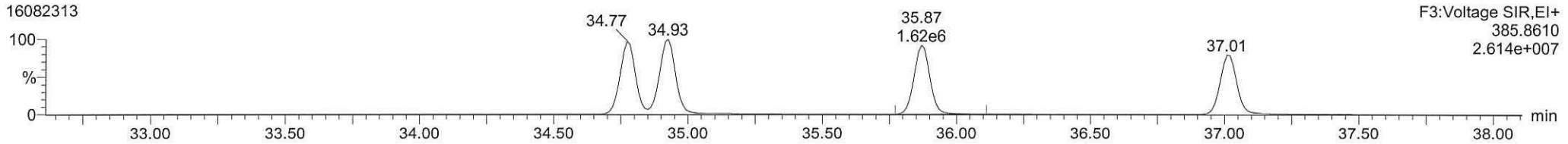


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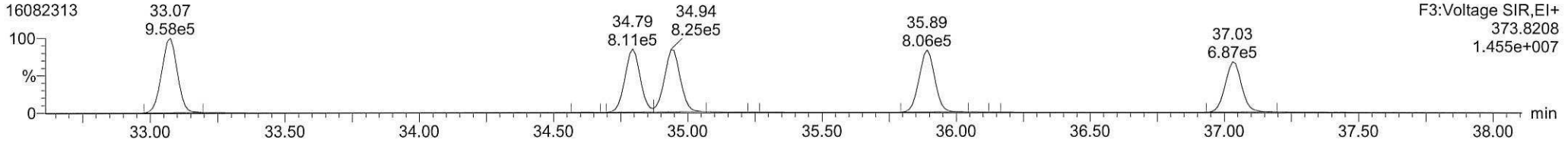
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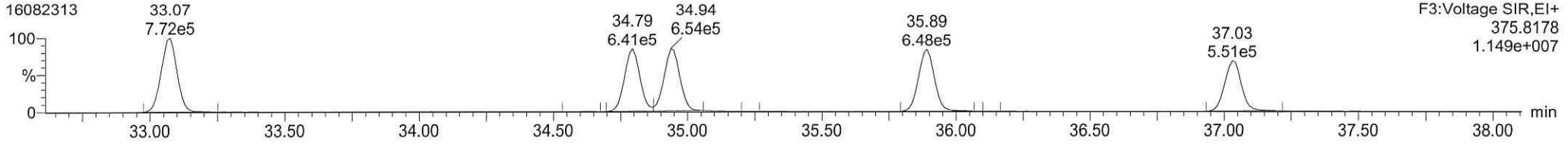
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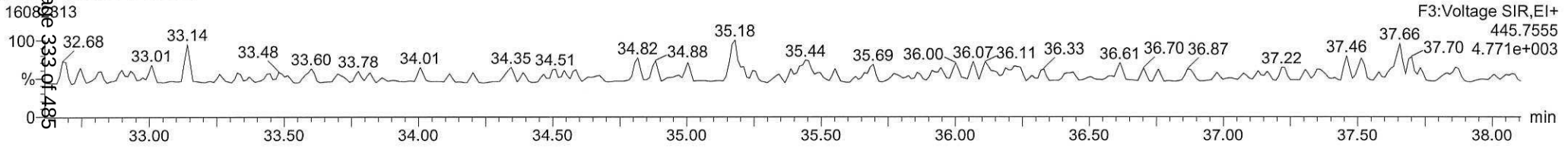
Total-hexafurans



Total-hexafurans



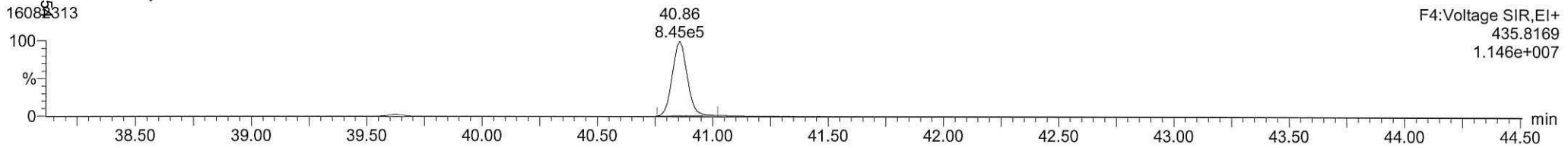
FUNCTION3 OCDPE



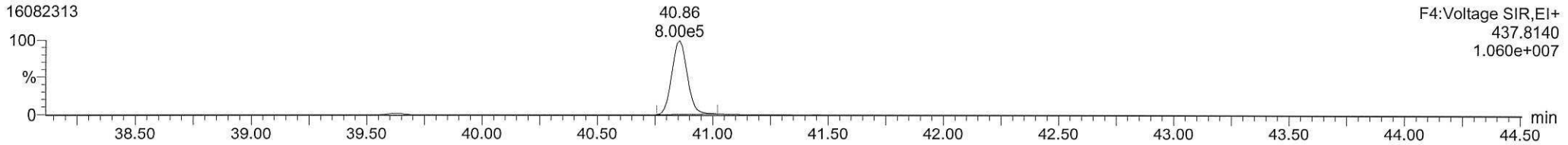
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Printed: Thursday, August 25, 2016 14:47:14 Pacific Daylight Time

ID: CS302, Name: 16082313, Date: 23-Aug-2016, Time: 20:29:26, Conditions: AUTOSPEC01, User: PK

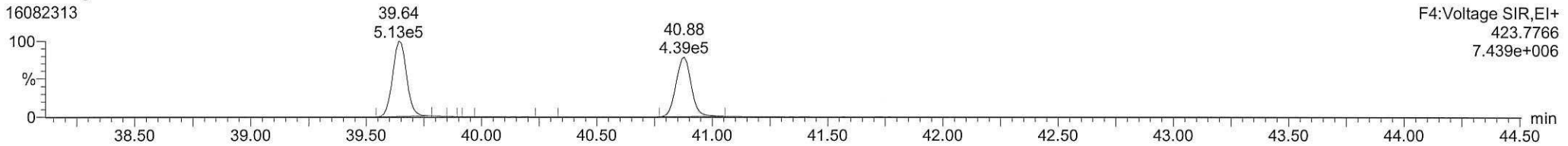
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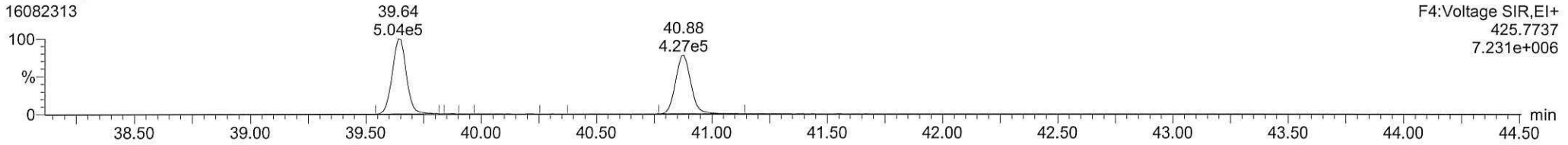
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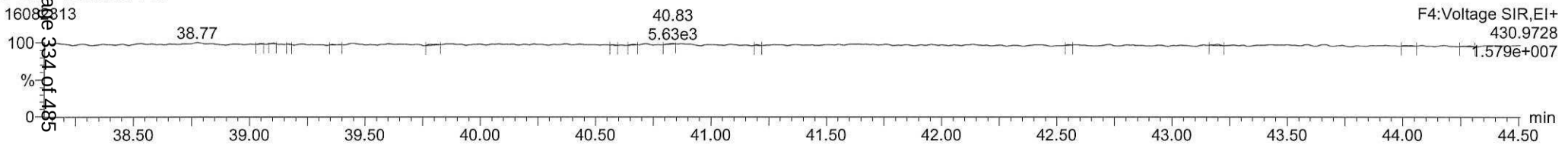
Total-heptadioxins



Total-heptadioxins

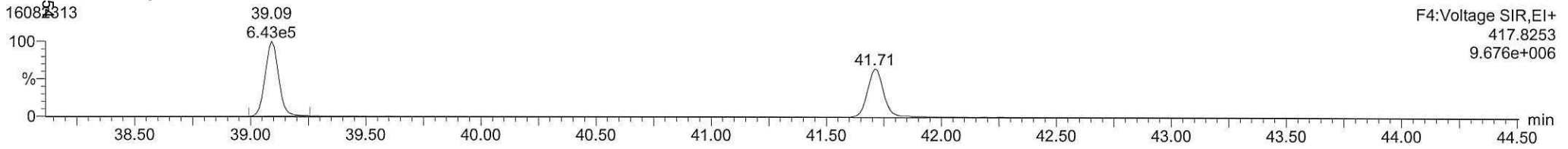


FUNCTION4 PFK

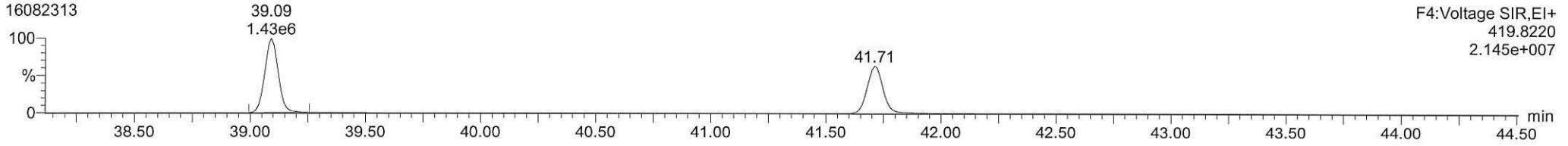


ID: CS302, Name: 16082313, Date: 23-Aug-2016, Time: 20:29:26, Conditions: AUTOSPEC01, User: PK

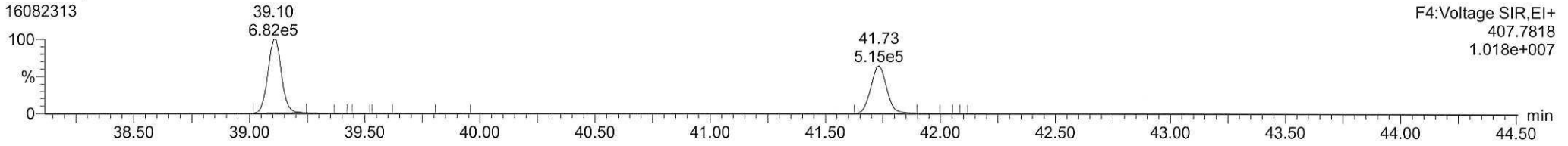
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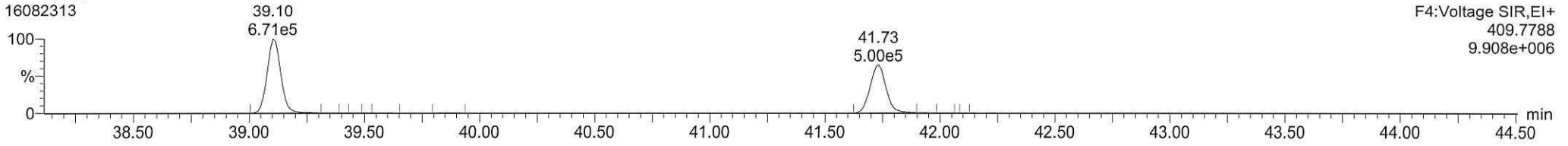
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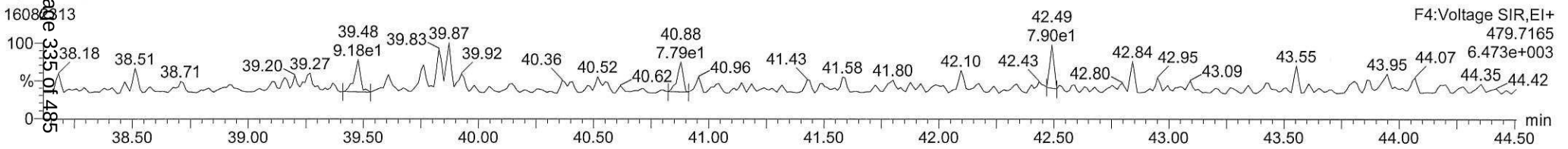
Total-heptafurans



Total-heptafurans



FUNCTION4 NCDPE

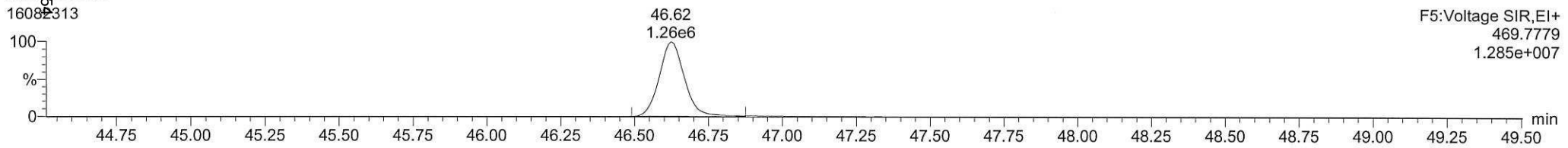


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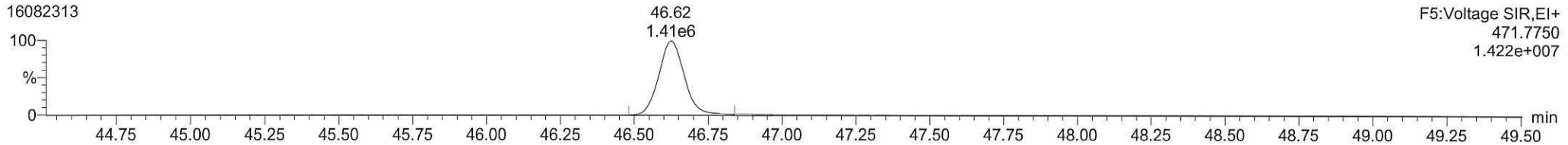
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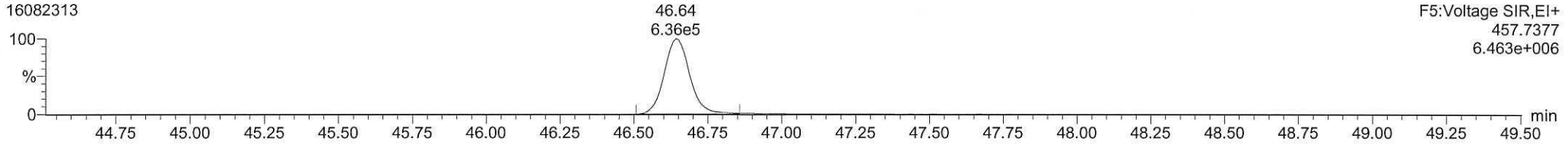
13C-OCDD



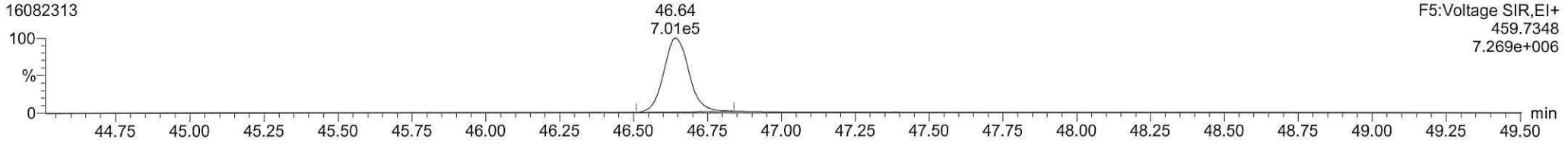
13C-OCDD



OCDD

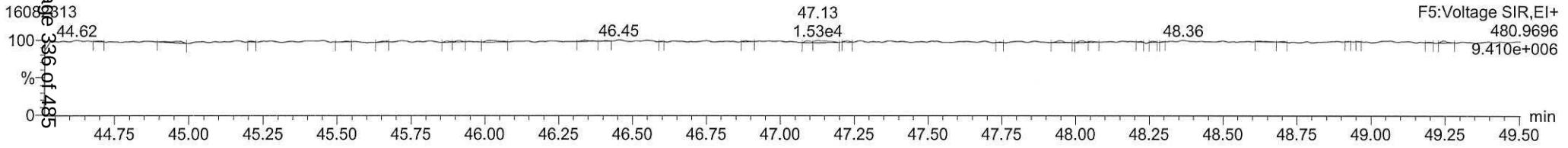


OCDD



FUNCTION5 PFK

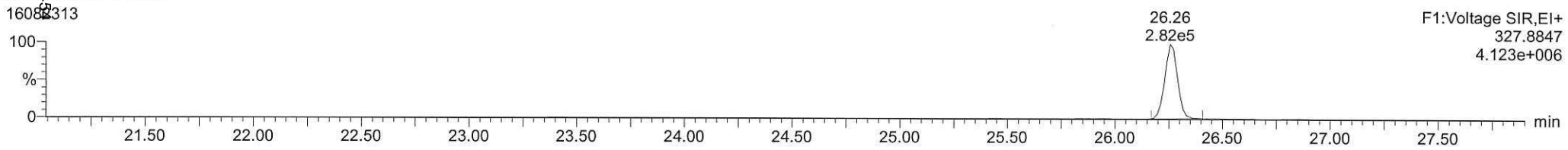
Page 336 of 485



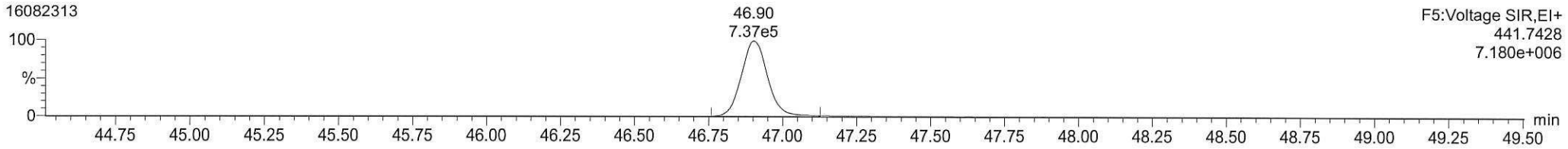
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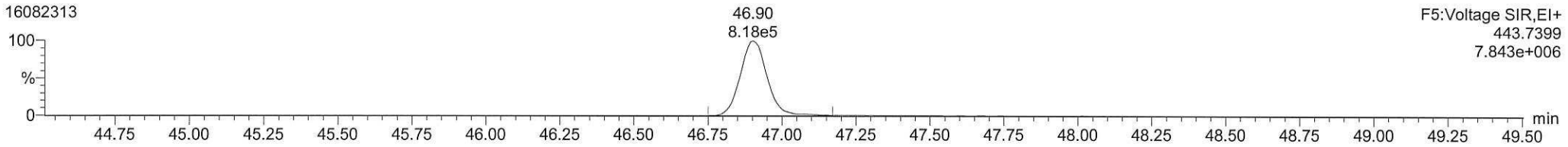
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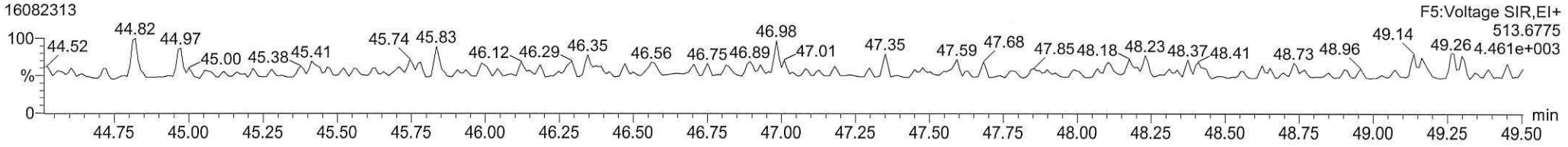
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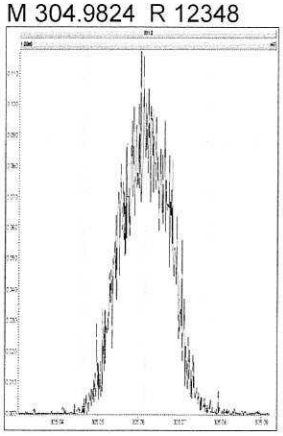
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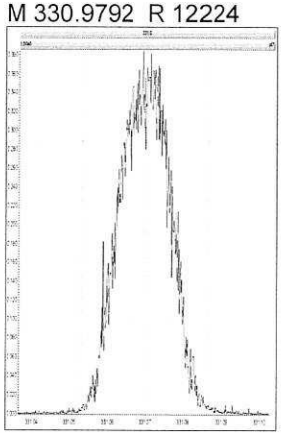
FUNCTION5 DCDPE



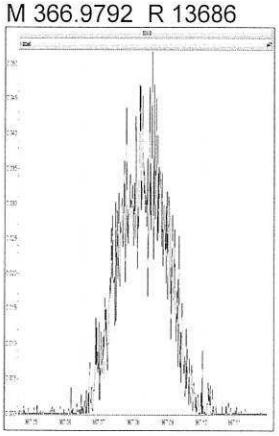
M 304.9824 R 12348



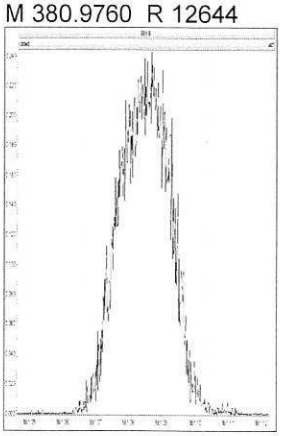
M 330.9792 R 12224



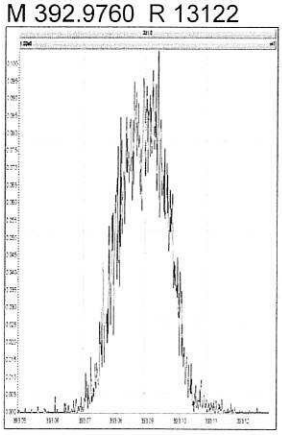
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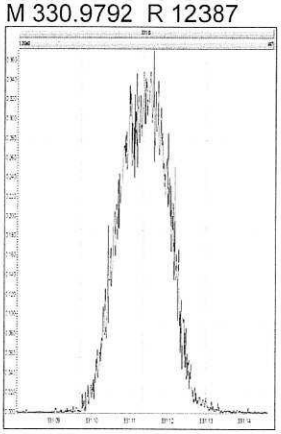
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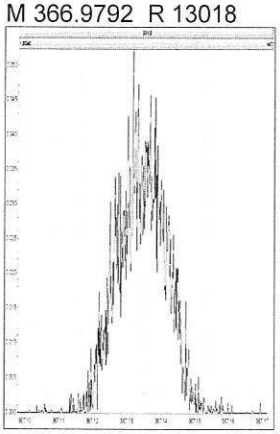
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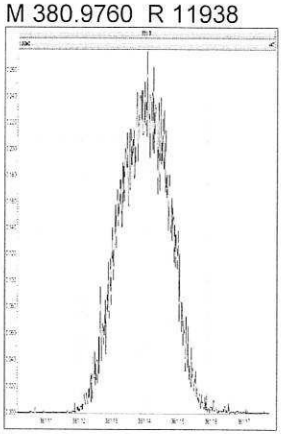
M 330.9792 R 12387



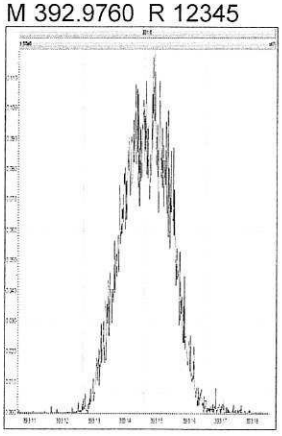
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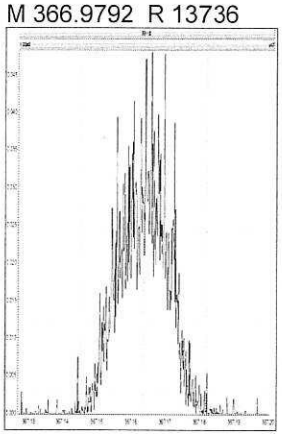
M 380.9760 R 11938



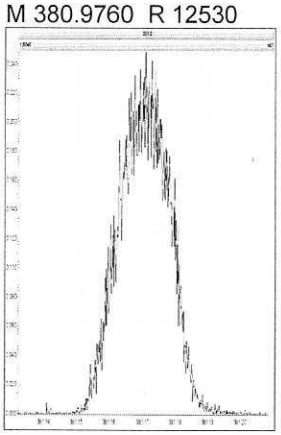
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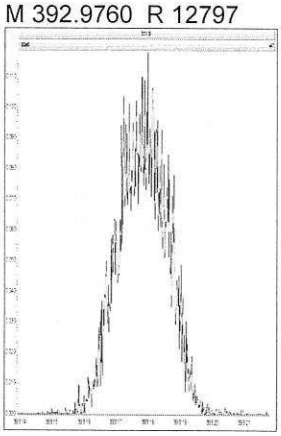
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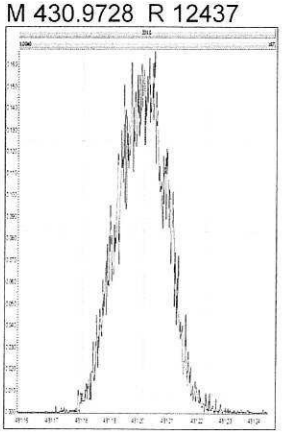
M 380.9760 R 12530



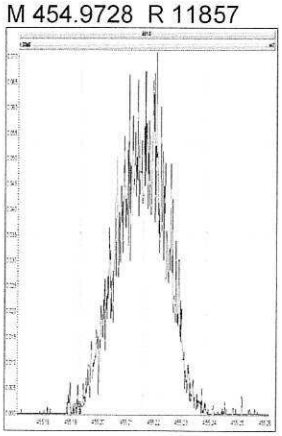
M 392.9760 R 12797



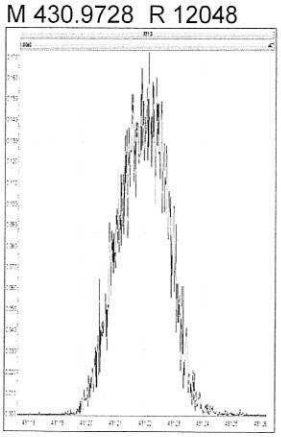
M 430.9728 R 12437



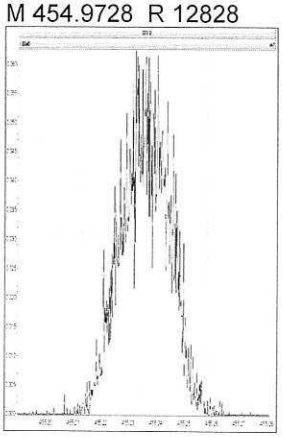
M 454.9728 R 11857



M 430.9728 R 12048

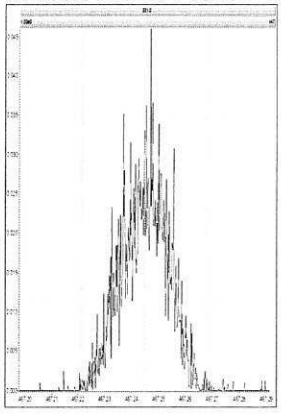


M 454.9728 R 12828

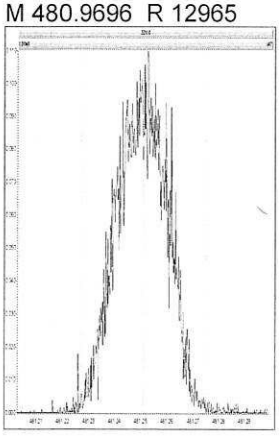


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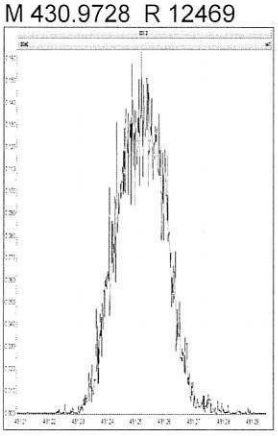
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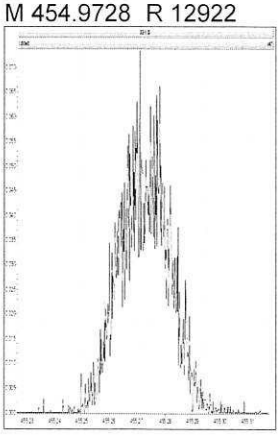
M 480.9696 R 12965



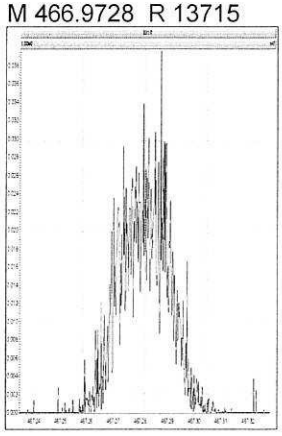
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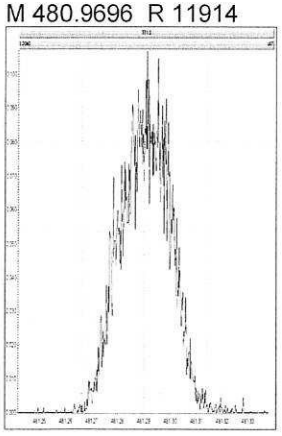
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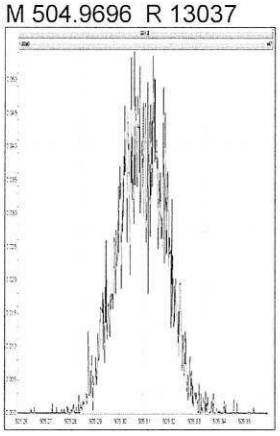
M 466.9728 R 13715



M 480.9696 R 11914



M 504.9696 R 13037



CDD/CDF CHROMATOGRAPHIC RESOLUTION SUMMARY
EPA 1613B

Lab Name: Analytical Resources, Inc. SDG: 16H0071

Instrument .ID: AUTOSPEC01 Lab File ID: 16082303

Date Analyzed: 08/23/16 Time Analyzed: 11:36

Lab Sample ID: SEH0246-RES1 Sequence: SEH0246

Percent Valley Determination for Column: RTX-Dioxin2 ID: 0.25 (mm)

1278-TCDD/2378-TCDD: 11.5

3467-TCDF/2378-TCDF: 10.3

Quality Control (QC) Limits: ≤ 25%

Lab Sample ID	Sample Name	Lab File ID	Data Analyzed	Time Analyzed
SEH0246-ICV1	CS301	16082302	08/23/2016	10:42
SEH0246-RES1	ISC01	16082303	08/23/2016	11:36
BEH0316-BLK1	Blank	16082304	08/23/2016	12:31
BEH0316-BS1	LCS	16082305	08/23/2016	13:23
BEH0316-SRM1	Reference	16082306	08/23/2016	14:16
BEH0316-DUP1	16H0071-01A	16082307	08/23/2016	15:09
16H0071-01	NME:0-4C	16082308	08/23/2016	16:02
16H0071-02	NME:4-7C	16082309	08/23/2016	16:56
SEH0246-CCV1	CS302	16082313	08/23/2016	20:29

Analytical Resources, Incorporated

ANALYSIS BATCH (SEQUENCE) SUMMARY

EPA 1613B

Laboratory:	Analytical Resources, Inc.	SDG:	16H0071
Client:	Fremont Analytical	Project:	1608094
Sequence:	SEE0076	Instrument:	AUTOSPEC01
		Calibration:	ZE00016

Sample Name	Lab Sample ID	Lab File ID	Matrix	Analysis Date/Time
Cal Standard	SEE0076-CAL1	160510ICAL	Solid	05/10/16 13:36
Cal Standard	SEE0076-CAL2	160510ICAL	Solid	05/10/16 14:27
Cal Standard	SEE0076-CAL3	160510ICAL	Solid	05/10/16 15:30
Cal Standard	SEE0076-CAL4	160510ICAL	Solid	05/10/16 16:22
Cal Standard	SEE0076-CAL5	160510ICAL	Solid	05/10/16 17:15
Cal Standard	SEE0076-CAL6	160510ICAL	Solid	05/10/16 18:09

Analytical Resources, Incorporated

ANALYSIS BATCH (SEQUENCE) SUMMARY

EPA 1613B

Laboratory:	Analytical Resources, Inc.	SDG:	16H0071
Client:	Fremont Analytical	Project:	1608094
Sequence:	SEH0246	Instrument:	AUTOSPEC01
		Calibration:	ZE00016

Sample Name	Lab Sample ID	Lab File ID	Matrix	Analysis Date/Time
Initial Cal Check	SEH0246-ICV1	16082302	Solid	08/23/16 10:42
Resolution Check	SEH0246-RES1	16082303	Solid	08/23/16 11:36
Blank	BEH0316-BLK1	16082304	Solid	08/23/16 12:31
LCS	BEH0316-BS1	16082305	Solid	08/23/16 13:23
Reference	BEH0316-SRM1	16082306	Solid	08/23/16 14:16
NME:0-4C	BEH0316-DUP1	16082307	Solid	08/23/16 15:09
NME:0-4C	16H0071-01	16082308	Solid	08/23/16 16:02
NME:4-7C	16H0071-02	16082309	Solid	08/23/16 16:56
Calibration Check	SEH0246-CCV1	16082313	Solid	08/23/16 20:29

1608094
16H0071

Analysis	Matrix	Method
1613B Dioxin	Solid	EPA 1613B

Checklist: DLM02.2 HR-GC/MS Checklist

#	Checklist Item	Response	Analyst Initials	Date
1	Resolution Check > 10,000 ppm	YES	PK	08/26/2016
2	TCDD/TCDF Resolution <= 25%	YES	PK	08/26/2016
3	PCDF markers >= 10 seconds from scan descriptor switch	YES	PK	08/26/2016
4	ICV/CCV meets %D limits	YES	PK	08/26/2016
5	ICV/CCV Ion ratios within limits	YES	PK	08/26/2016
6	ICV/CCV RRT within limits	YES	PK	08/26/2016
7	Manual integrations have been stamped and signed	NO	PK	08/26/2016
	Comments: *EXCEPTION REPORT REQUIRED*			
8	Signal/Noise >= 3.0 for all detectiions	YES	PK	08/26/2016
9	AUTOCHECK: Blank checked for exceedance of criteria	NO *	PK	08/26/2016

Comments:
QC Sample BEH0316-BLK1 failed criteria for 1,2,3,4,6,7,8-HpCDD in 1613B Dioxin.
MDL = 0.705 ng/kg
MRL = 1.00 ng/kg
Result = 1.43 ng/kg
Criterion = 0 x RL

QC Sample BEH0316-BLK1 failed criteria for 1,2,3,4,6,7,8-HpCDF in 1613B Dioxin.
MDL = 0.425 ng/kg
MRL = 1.00 ng/kg
Result = 0.0680 ng/kg
Criterion = 0 x RL
- Estimated Maximum Possible Concentration qualifier for HRGCMS Dioxin

QC Sample BEH0316-BLK1 failed criteria for 1,2,3,7,8,9-HxCDD in 1613B Dioxin.
MDL = 0.300 ng/kg
MRL = 1.00 ng/kg
Result = 0.105 ng/kg
Criterion = 0 x RL
- Estimated Maximum Possible Concentration qualifier for HRGCMS Dioxin

QC Sample BEH0316-BLK1 failed criteria for 1,2,3,7,8,9-HxCDF in 1613B Dioxin.
MDL = 0.386 ng/kg
MRL = 1.00 ng/kg
Result = 0.0479 ng/kg
Criterion = 0 x RL
- Estimated Maximum Possible Concentration qualifier for HRGCMS Dioxin

QC Sample BEH0316-BLK1 failed criteria for 1,2,3,7,8-PeCDF in 1613B Dioxin.

1608094 16H0071		
Analysis	**Matrix**	**Method**
1613B Dioxin	Solid	EPA 1613B

Checklist: DLM02.2 HR-GC/MS Checklist

#	Checklist Item	Response	Analyst Initials	Date

MDL = 0.412 ng/kg
MRL = 1.00 ng/kg
Result = 0.0630 ng/kg
Criterion = 0 x RL

QC Sample BEH0316-BLK1 failed criteria for OCDD in 1613B Dioxin.
MDL = 6.06 ng/kg
MRL = 2.00 ng/kg
Result = 9.96 ng/kg
Criterion = 0 x RL

QC Sample BEH0316-BLK1 failed criteria for OCDF in 1613B Dioxin.
MDL = 0.709 ng/kg
MRL = 2.00 ng/kg
Result = 0.232 ng/kg
Criterion = 0 x RL

QC Sample BEH0316-BLK1 failed criteria for Total HpCDD in 1613B Dioxin.
MRL = 1.00 ng/kg
Result = 3.86 ng/kg
Criterion = 0 x RL

QC Sample BEH0316-BLK1 failed criteria for Total HpCDF in 1613B Dioxin.
MRL = 1.00 ng/kg
Result = 0.0680 ng/kg
Criterion = 0 x RL

QC Sample BEH0316-BLK1 failed criteria for Total HxCDD in 1613B Dioxin.
MRL = 1.00 ng/kg
Result = 0.983 ng/kg
Criterion = 0 x RL

QC Sample BEH0316-BLK1 failed criteria for Total HxCDF in 1613B Dioxin.
MRL = 1.00 ng/kg
Result = 0.0479 ng/kg
Criterion = 0 x RL

QC Sample BEH0316-BLK1 failed criteria for Total PeCDD in 1613B Dioxin.
MRL = 1.00 ng/kg
Result = 0.138 ng/kg
Criterion = 0 x RL

1608094 16H0071		
Analysis	**Matrix**	**Method**
1613B Dioxin	**Solid**	**EPA 1613B**

Checklist: DLM02.2 HR-GC/MS Checklist

#	Checklist Item	Response		Analyst Initials	Date
	QC Sample BEH0316-BLK1 failed criteria for Total PeCDF in 1613B Dioxin. *MRL = 1.00 ng/kg* *Result = 0.0630 ng/kg* *Criterion = 0 x RL*				
	QC Sample BEH0316-BLK1 failed criteria for Total TCDD in 1613B Dioxin. *MRL = 1.00 ng/kg* *Result = 0.360 ng/kg* *Criterion = 0 x RL*				
	QC Sample BEH0316-BLK1 failed criteria for Total TCDF in 1613B Dioxin. *MRL = 1.00 ng/kg* *Result = 0.0276 ng/kg* *Criterion = 0 x RL*				
10	AUTOCHECK: Check Extraction and Cleanup Surrogate recoveries	YES	*	PK	08/26/2016
11	AUTOCHECK: Check blank spike (OPR) recovery	YES	*	PK	08/26/2016
12	Sample values exceeding calibration range	NA		VTS	08/27/2016
13	Samples diluted	NA		VTS	08/27/2016
14	AUTOCHECK: Check %RPD between sample and sample duplicate	NO	*	PK	08/26/2016
	Comments: *Duplicate RPD for 1,2,3,4,6,7,8-HpCDD (38.8%) was above the acceptance limit (25) in BEH0316-DUP1 for 1613B Dioxin* *Duplicate RPD for 1,2,3,7,8,9-HxCDD (47.1%) was above the acceptance limit (25) in BEH0316-DUP1 for 1613B Dioxin* *Duplicate RPD for 1,2,3,7,8-PeCDD (81.0%) was above the acceptance limit (25) in BEH0316-DUP1 for 1613B Dioxin* *- Estimated Maximum Possible Concentration qualifier for HRGCMS Dioxin* *Duplicate RPD for OCDD (27.8%) was above the acceptance limit (25) in BEH0316-DUP1 for 1613B Dioxin*				
15	AUTOCHECK: Check SRM limits for exceedance	NO	*	PK	08/26/2016
	Comments: *Reference Material Recovery for 1,2,3,7,8,9-HxCDF (152%) was outside acceptance limits (50-150) in BEH0316-SRM1 for 1613B Dioxin*				
16	EPA CASE#	NA		VTS	08/27/2016
17	Analyst chechlist completed (PEER)	YES		VTS	08/27/2016
18	Data is locked and status is analyzed (PEER)	YES		VTS	08/27/2016
19	Data file, Batch, and Cleanup .pdf's are attached (PEER)	YES		VTS	08/27/2016

1608094 16H0071		
Analysis	**Matrix**	**Method**
1613B Dioxin	**Solid**	**EPA 1613B**

Checklist: DLM02.2 HR-GC/MS Checklist

#	Checklist Item	Response	Analyst Initials	Date
20	Color warnings have been addressed and (or) qualified (PEER)	YES	VTS	08/27/2016
21	Qualifiers have been correctly added (PEER)	YES	VTS	08/27/2016
22	Checklist completed and status is peer reviewed (REVIEWER)	YES	MW	08/29/2016
23	Dilutions are linear (50-200%) and appropriate (REVIEWER)	NA	MW	08/29/2016
24	All requested samples have been reported (REVIEWER)	YES	MW	08/29/2016
25	Color warnings have been addressed, narrated and (or) qualified (REVIEWER)	YES	MW	08/29/2016
26	Additional Notes (ANALYST, PEER, and REVIEWER)	YES	PK	08/26/2016

Comments:
OCDD MRL at 2. Should be 10. Element managers do not know why. Changed manually to 10.
Peer: Entered new value for tota; pentadioxin in sample 16H0080-05 ar 4.822647 (removed peak at RT 31.87).
*Qualified %RPD failures for BEH0316-DUP1 with a **

Analytical Resources Inc.: Organics Instrument Log

AutoSpec01 Serial No.:GC=CN10921030, MS=P764

Date: 8/23/16 Analysis: Dioxins Analyst: JH

GC Program: 8290D Column No: B766 Column Type: VF-Dioxin2

Inj Vol: 1ul Instrument Tune (IPR): May04/16 1-5 Detector Voltage: 350

Resolution Check Files: 10:35, 21:27 Curve Date: 5/10/16

IS/SS	Ical/Ccal	LCS/ICV
B710	B0002	
	B1146	

#	Acq.Date	Acq.Time	File	ID	Comments
1	23-Aug-16	10:42:08	16082302	CS301	
2	23-Aug-16	11:36:00	16082303	ISC01	
3	23-Aug-16	12:31:47	16082304	BEH0316-BLK1	SBH0246
4	23-Aug-16	13:23:14	16082305	BEH0316-BS1	
5	23-Aug-16	14:16:25	16082306	BEH0316-SRM1	
6	23-Aug-16	15:09:48	16082307	BEH0316-DUP1	
7	23-Aug-16	16:02:59	16082308	16H0071-01	
8	23-Aug-16	16:56:22	16082309	16H0071-02	
9	23-Aug-16	17:49:35	16082310	16H0080-05	
10	23-Aug-16	18:42:59	16082311	16H0103-01	
11	23-Aug-16	19:36:10	16082312	16H0103-02	
12	23-Aug-16	20:29:26	16082313	CS302	
13	23-Aug-16	21:27:25	16082314	TOL E3117	
14	23-Aug-16	22:27:46	16082315	TOL E3118	
15	23-Aug-16	23:20:58	16082316	SAND E3668	

JH 8/25/16

Every line must contain information or be lined out. Make all entries legible.
Start a new page for each QC period. Document All Maintenance Tasks In Element LIMS

Dataset: C:\MassLynx\Dioxin.pro\160823DATA1.qld
Last Altered: Thursday, August 25, 2016 12:51:34 Pacific Daylight Time
Printed: Thursday, August 25, 2016 12:52:26 Pacific Daylight Time

Event	Details	Sample ID
Process Extract		
Process Integrate		
Process Quantify		
Dataset Created		
Dataset Saved	Saved to 'C:\MassLynx\Dioxin.pro\160823DATA1.qld'	
Pre modification peak	Sample:16082304, Compound:OF, RT:46.903	1
Peak modified	Sample:16082304, Compound:OF, RT:46.903	1
Pre modification peak	Sample:16082304, Compound:OF, RT:46.867	1
Peak modified	Sample:16082304, Compound:OF, RT:46.867	1
Peak deleted	Sample:16082304, Compound:TF, RT:25.600	1
Peak deleted	Sample:16082304, Compound:TF, RT:22.836	1
Pre modification peak	Sample:16082304, Compound:PF, RT:29.776	1
Peak modified	Sample:16082304, Compound:PF, RT:29.776	1
Peak deleted	Sample:16082304, Compound:HF, RT:34.796	1
Peak deleted	Sample:16082304, Compound:HF, RT:34.598	1
Peak deleted	Sample:16082304, Compound:HF, RT:33.086	1
Pre modification peak	Sample:16082304, Compound:HPF, RT:39.092	1
Peak modified	Sample:16082304, Compound:HPF, RT:39.092	1
Peak deleted	Sample:16082304, Compound:TD, RT:23.897	1
Peak deleted	Sample:16082304, Compound:TD, RT:26.452	1
Peak deleted	Sample:16082304, Compound:TD, RT:25.436	1
Peak deleted	Sample:16082304, Compound:TD, RT:24.883	1
Pre modification peak	Sample:16082304, Compound:PD, RT:29.151	1
Peak modified	Sample:16082304, Compound:PD, RT:29.151	1
Pre modification peak	Sample:16082304, Compound:PD, RT:29.151	1
Peak modified	Sample:16082304, Compound:PD, RT:29.151	1
Peak deleted	Sample:16082304, Compound:PD, RT:31.365	1
Peak deleted	Sample:16082304, Compound:PD, RT:30.126	1
Peak deleted	Sample:16082304, Compound:HD, RT:35.136	1
Peak deleted	Sample:16082304, Compound:HD, RT:35.015	1
Peak added	Sample:16082304, Compound:HD, RT:35.059	1
Peak added	Sample:16082304, Compound:HD, RT:35.037	1
Peak added	Sample:16082304, Compound:HD, RT:35.059	1
Peak deleted	Sample:16082304, Compound:HD, RT:36.133	1
Peak deleted	Sample:16082304, Compound:HD, RT:36.023	1
Peak modified	Sample:16082304, Compound:HD, RT:35.037	1
Peak deleted	Sample:16082304, Compound:HD, RT:36.155	1
Peak deleted	Sample:16082304, Compound:HPD, RT:41.011	1
Peak deleted	Sample:16082305, Compound:TF, RT:22.986	2
Peak deleted	Sample:16082305, Compound:TF, RT:25.451	2
Peak deleted	Sample:16082305, Compound:TF, RT:25.839	2
Peak deleted	Sample:16082305, Compound:HF, RT:33.074	2
Peak deleted	Sample:16082305, Compound:HF, RT:35.672	2
Peak deleted	Sample:16082305, Compound:HF, RT:35.596	2
Peak deleted	Sample:16082305, Compound:HF, RT:34.620	2
Peak deleted	Sample:16082305, Compound:HF, RT:36.166	2
Peak deleted	Sample:16082305, Compound:HF, RT:36.089	2
Peak deleted	Sample:16082305, Compound:HPF, RT:42.008	2
Peak deleted	Sample:16082305, Compound:HPF, RT:42.074	2
Peak deleted	Sample:16082305, Compound:TD, RT:23.404	2
Peak deleted	Sample:16082305, Compound:PD, RT:30.126	2
Peak deleted	Sample:16082305, Compound:PD, RT:29.161	2
Peak deleted	Sample:16082305, Compound:PD, RT:31.978	2

Event	Details	Sample ID
Peak deleted	Sample:16082305, Compound:HD, RT:35.157	2
Pre modification peak	Sample:16082305, Compound:HD, RT:35.026	2
Peak modified	Sample:16082305, Compound:HD, RT:35.026	2
Peak deleted	Sample:16082305, Compound:HD, RT:34.664	2
Peak deleted	Sample:16082305, Compound:HD, RT:36.374	2
Pre modification peak	Sample:16082306, Compound:TF, RT:23.165	3
Peak modified	Sample:16082306, Compound:TF, RT:23.165	3
Pre modification peak	Sample:16082306, Compound:TF, RT:23.210	3
Peak modified	Sample:16082306, Compound:TF, RT:23.210	3
Pre modification peak	Sample:16082306, Compound:TF, RT:22.986	3
Peak modified	Sample:16082306, Compound:TF, RT:22.986	3
Pre modification peak	Sample:16082306, Compound:TF, RT:22.986	3
Peak modified	Sample:16082306, Compound:TF, RT:22.986	3
Peak deleted	Sample:16082306, Compound:PP, RT:27.737	3
Pre modification peak	Sample:16082306, Compound:PF, RT:28.701	3
Peak modified	Sample:16082306, Compound:PF, RT:28.701	3
Pre modification peak	Sample:16082306, Compound:PF, RT:29.984	3
Peak modified	Sample:16082306, Compound:PF, RT:29.984	3
Pre modification peak	Sample:16082306, Compound:HF, RT:35.892	3
Peak modified	Sample:16082306, Compound:HF, RT:35.892	3
Peak deleted	Sample:16082306, Compound:HF, RT:37.119	3
Peak deleted	Sample:16082306, Compound:TD, RT:26.840	3
Peak deleted	Sample:16082306, Compound:PD, RT:30.850	3
Pre modification peak	Sample:16082306, Compound:PD, RT:30.291	3
Peak modified	Sample:16082306, Compound:PD, RT:30.291	3
Pre modification peak	Sample:16082306, Compound:PD, RT:30.302	3
Peak modified	Sample:16082306, Compound:PD, RT:30.302	3
Peak deleted	Sample:16082307, Compound:TF, RT:24.539	4
Peak deleted	Sample:16082307, Compound:TF, RT:24.300	4
Peak deleted	Sample:16082307, Compound:TF, RT:23.479	4
Peak deleted	Sample:16082307, Compound:TF, RT:22.208	4
Peak deleted	Sample:16082307, Compound:HF, RT:35.913	4
Pre modification peak	Sample:16082307, Compound:HF, RT:37.042	4
Peak modified	Sample:16082307, Compound:HF, RT:37.042	4
Peak added	Sample:16082307, Compound:HF, RT:37.009	4
Peak added	Sample:16082307, Compound:HF, RT:36.999	4
Peak deleted	Sample:16082307, Compound:PD, RT:28.657	4
Pre modification peak	Sample:16082307, Compound:PD, RT:29.140	4
Peak modified	Sample:16082307, Compound:PD, RT:29.140	4
Peak deleted	Sample:16082307, Compound:PD, RT:29.962	4
Peak deleted	Sample:16082307, Compound:PD, RT:29.775	4
Pre modification peak	Sample:16082307, Compound:PD, RT:30.291	4
Peak modified	Sample:16082307, Compound:PD, RT:30.291	4
Pre modification peak	Sample:16082307, Compound:PD, RT:30.269	4
Peak modified	Sample:16082307, Compound:PD, RT:30.269	4
Peak deleted	Sample:16082307, Compound:HD, RT:35.201	4
Peak deleted	Sample:16082307, Compound:HD, RT:34.686	4
Peak deleted	Sample:16082307, Compound:HD, RT:34.642	4
Pre modification peak	Sample:16082307, Compound:HD, RT:36.571	4
Peak modified	Sample:16082307, Compound:HD, RT:36.571	4
Peak deleted	Sample:16082307, Compound:HD, RT:36.330	4
Peak deleted	Sample:16082307, Compound:HD, RT:36.144	4
Peak deleted	Sample:16082307, Compound:HD, RT:36.034	4

Event	Details	Sample ID
Peak deleted	Sample:16082308, Compound:TF, RT:25.600	5
Peak deleted	Sample:16082308, Compound:TF, RT:25.436	5
Peak deleted	Sample:16082308, Compound:TF, RT:24.300	5
Peak deleted	Sample:16082308, Compound:TF, RT:23.508	5
Peak deleted	Sample:16082308, Compound:PP, RT:27.049	5
Peak deleted	Sample:16082308, Compound:HF, RT:33.053	5
Pre modification peak	Sample:16082308, Compound:HF, RT:33.261	5
Peak modified	Sample:16082308, Compound:HF, RT:33.261	5
Peak added	Sample:16082308, Compound:HF, RT:33.294	5
Peak added	Sample:16082308, Compound:HF, RT:33.294	5
Pre modification peak	Sample:16082308, Compound:HF, RT:33.294	5
Peak modified	Sample:16082308, Compound:HF, RT:33.294	5
Peak modified	Sample:16082308, Compound:HF, RT:33.294	5
Peak deleted	Sample:16082308, Compound:TD, RT:23.688	5
Peak deleted	Sample:16082308, Compound:TD, RT:24.629	5
Peak deleted	Sample:16082308, Compound:PD, RT:30.334	5
Peak deleted	Sample:16082308, Compound:PD, RT:30.005	5
Pre modification peak	Sample:16082308, Compound:HD, RT:35.058	5
Peak modified	Sample:16082308, Compound:HD, RT:35.058	5
Pre modification peak	Sample:16082308, Compound:HD, RT:35.036	5
Peak modified	Sample:16082308, Compound:HD, RT:35.036	5
Peak deleted	Sample:16082308, Compound:HD, RT:36.341	5
Peak added	Sample:16082308, Compound:HF, RT:37.021	5
Peak added	Sample:16082308, Compound:HF, RT:37.042	5
Peak deleted	Sample:16082308, Compound:HF, RT:37.021	5
Peak deleted	Sample:16082308, Compound:HF, RT:37.021	5
Peak added	Sample:16082308, Compound:TD, RT:26.272	5
Peak added	Sample:16082308, Compound:TD, RT:26.272	5
Peak deleted	Sample:16082308, Compound:TD, RT:26.272	5
Peak deleted	Sample:16082308, Compound:TD, RT:26.272	5
Pre modification peak	Sample:16082307, Compound:TD, RT:26.272	4
Peak modified	Sample:16082307, Compound:TD, RT:26.272	4
Peak deleted	Sample:16082307, Compound:TD, RT:26.272	4
Pre modification peak	Sample:16082309, Compound:TF, RT:22.971	6
Peak modified	Sample:16082309, Compound:TF, RT:22.971	6
Peak deleted	Sample:16082309, Compound:TF, RT:23.747	6
Peak deleted	Sample:16082309, Compound:TF, RT:26.586	6
Peak deleted	Sample:16082309, Compound:PP, RT:27.049	6
Peak deleted	Sample:16082309, Compound:PF, RT:28.657	6
Peak deleted	Sample:16082309, Compound:PF, RT:31.112	6
Peak deleted	Sample:16082309, Compound:TD, RT:24.211	6
Peak deleted	Sample:16082309, Compound:TD, RT:23.688	6
Peak deleted	Sample:16082309, Compound:TD, RT:23.673	6
Peak deleted	Sample:16082309, Compound:TD, RT:23.882	6
Pre modification peak	Sample:16082309, Compound:TD, RT:23.912	6
Peak modified	Sample:16082309, Compound:TD, RT:23.912	6
Pre modification peak	Sample:16082309, Compound:TD, RT:23.927	6
Peak modified	Sample:16082309, Compound:TD, RT:23.927	6
Peak deleted	Sample:16082309, Compound:TD, RT:26.392	6
Peak deleted	Sample:16082309, Compound:TD, RT:25.899	6
Peak deleted	Sample:16082309, Compound:TD, RT:24.898	6
Pre modification peak	Sample:16082309, Compound:TD, RT:26.257	6
Peak modified	Sample:16082309, Compound:TD, RT:26.257	6

Event	Details	Sample ID
Peak deleted	Sample:16082309, Compound:TD, RT:26.257	6
Pre modification peak	Sample:16082309, Compound:HD, RT:33.853	6
Peak modified	Sample:16082309, Compound:HD, RT:33.853	6
Peak deleted	Sample:16082309, Compound:HD, RT:36.023	6
Peak deleted	Sample:16082309, Compound:HD, RT:35.859	6
Peak deleted	Sample:16082309, Compound:HD, RT:36.166	6
Peak deleted	Sample:16082309, Compound:HD, RT:36.154	6
Peak added	Sample:16082309, Compound:HD, RT:36.122	6
Peak deleted	Sample:16082309, Compound:HD, RT:36.132	6
Peak added	Sample:16082309, Compound:HD, RT:36.132	6
Peak added	Sample:16082309, Compound:HD, RT:36.122	6
Peak added	Sample:16082309, Compound:HD, RT:36.122	6
Peak modified	Sample:16082309, Compound:HD, RT:36.122	6
Peak deleted	Sample:16082309, Compound:HD, RT:36.132	6
Pre modification peak	Sample:16082309, Compound:HD, RT:36.582	6
Peak modified	Sample:16082309, Compound:HD, RT:36.582	6
Peak deleted	Sample:16082310, Compound:TF, RT:26.168	7
Peak deleted	Sample:16082310, Compound:TF, RT:27.199	7
Peak deleted	Sample:16082310, Compound:PF, RT:29.348	7
Pre modification peak	Sample:16082310, Compound:PF, RT:28.668	7
Peak modified	Sample:16082310, Compound:PF, RT:28.668	7
Pre modification peak	Sample:16082310, Compound:PF, RT:29.469	7
Peak modified	Sample:16082310, Compound:PF, RT:29.469	7
Pre modification peak	Sample:16082310, Compound:PF, RT:30.038	7
Peak modified	Sample:16082310, Compound:PF, RT:30.038	7
Peak deleted	Sample:16082310, Compound:PF, RT:30.652	7
Pre modification peak	Sample:16082310, Compound:HF, RT:35.081	7
Peak modified	Sample:16082310, Compound:HF, RT:35.081	7
Peak deleted	Sample:16082310, Compound:HPF, RT:39.071	7
Pre modification peak	Sample:16082310, Compound:TD, RT:25.615	7
Peak modified	Sample:16082310, Compound:TD, RT:25.615	7
Peak deleted	Sample:16082310, Compound:TD, RT:26.959	7
Pre modification peak	Sample:16082310, Compound:PD, RT:30.028	7
Peak modified	Sample:16082310, Compound:PD, RT:30.028	7
Peak deleted	Sample:16082310, Compound:PD, RT:29.304	7
Pre modification peak	Sample:16082310, Compound:PD, RT:30.378	7
Peak modified	Sample:16082310, Compound:PD, RT:30.378	7
Pre modification peak	Sample:16082310, Compound:PD, RT:31.420	7
Peak modified	Sample:16082310, Compound:PD, RT:31.420	7
Peak deleted	Sample:16082310, Compound:HD, RT:35.322	7
Pre modification peak	Sample:16082310, Compound:HD, RT:35.158	7
Peak modified	Sample:16082310, Compound:HD, RT:35.158	7
Pre modification peak	Sample:16082310, Compound:HD, RT:36.506	7
Peak modified	Sample:16082310, Compound:HD, RT:36.506	7
Pre modification peak	Sample:16082310, Compound:HD, RT:36.188	7
Peak modified	Sample:16082310, Compound:HD, RT:36.188	7
Pre modification peak	Sample:16082310, Compound:HD, RT:36.352	7
Peak modified	Sample:16082310, Compound:HD, RT:36.352	7
Pre modification peak	Sample:16082310, Compound:HD, RT:36.352	7
Peak modified	Sample:16082310, Compound:HD, RT:36.352	7
Pre modification peak	Sample:16082311, Compound:TF, RT:24.300	8
Peak modified	Sample:16082311, Compound:TF, RT:24.300	8
Peak deleted	Sample:16082311, Compound:TF, RT:25.242	8

Event	Details	Sample ID
Peak deleted	Sample:16082311, Compound:TF, RT:27.288	8
Peak deleted	Sample:16082311, Compound:TF, RT:26.138	8
Peak deleted	Sample:16082311, Compound:TF, RT:27.094	8
Peak deleted	Sample:16082311, Compound:TF, RT:27.019	8
Pre modification peak	Sample:16082311, Compound:PF, RT:29.173	8
Peak modified	Sample:16082311, Compound:PF, RT:29.173	8
Peak added	Sample:16082311, Compound:PF, RT:29.205	8
Peak modified	Sample:16082311, Compound:PF, RT:29.205	8
Pre modification peak	Sample:16082311, Compound:PF, RT:30.587	8
Peak modified	Sample:16082311, Compound:PF, RT:30.587	8
Pre modification peak	Sample:16082311, Compound:HF, RT:35.179	8
Peak modified	Sample:16082311, Compound:HF, RT:35.179	8
Pre modification peak	Sample:16082311, Compound:HF, RT:35.497	8
Peak modified	Sample:16082311, Compound:HF, RT:35.497	8
Pre modification peak	Sample:16082311, Compound:HF, RT:35.881	8
Peak modified	Sample:16082311, Compound:HF, RT:35.881	8
Peak added	Sample:16082311, Compound:HF, RT:35.913	8
Pre modification peak	Sample:16082311, Compound:HF, RT:37.042	8
Peak modified	Sample:16082311, Compound:HF, RT:37.042	8
Peak deleted	Sample:16082311, Compound:HPF, RT:40.867	8
Peak deleted	Sample:16082311, Compound:HPF, RT:40.035	8
Peak deleted	Sample:16082311, Compound:TD, RT:24.031	8
Pre modification peak	Sample:16082312, Compound:TF, RT:24.330	9
Peak modified	Sample:16082312, Compound:TF, RT:24.330	9
Pre modification peak	Sample:16082312, Compound:TF, RT:27.124	9
Peak modified	Sample:16082312, Compound:TF, RT:27.124	9
Pre modification peak	Sample:16082312, Compound:TF, RT:27.124	9
Peak modified	Sample:16082312, Compound:TF, RT:27.124	9
Pre modification peak	Sample:16082312, Compound:PF, RT:29.326	9
Peak modified	Sample:16082312, Compound:PF, RT:29.326	9
Peak deleted	Sample:16082312, Compound:HF, RT:35.135	9
Peak deleted	Sample:16082312, Compound:HPF, RT:38.730	9
Pre modification peak	Sample:16082312, Compound:HPF, RT:41.766	9
Peak modified	Sample:16082312, Compound:HPF, RT:41.766	9
Peak deleted	Sample:16082312, Compound:TD, RT:24.076	9
Peak deleted	Sample:16082312, Compound:TD, RT:26.153	9
Peak deleted	Sample:16082312, Compound:HPD, RT:41.087	9

Analytical Resources, Incorporated

SURROGATE RECOVERY AND RT SUMMARY

EPA 1613B

Laboratory:	Analytical Resources, Inc.	SDG:	16H0071
Client:	Fremont Analytical	Project:	1608094
Sequence:	SEH0246	Instrument:	AUTOSPEC01
Sample ID:	BEH0316-BLK1	Calibration:	ZE00016
File ID:	16082304	Analyzed:	08/23/16 12:31

Surrogate Compound	Spike Level ng/kg wet	% Recovery	Recovery Limits	RT	Calibration Mean RT	RT Diff	RT Diff Limit	Q
13C12-2,3,7,8-TCDF	200.00	101	24 - 169	25.6003	26.20013	-0.5998	N/A	
13C12-2,3,7,8-TCDD	200.00	101	25 - 164	26.2427	26.84255	-0.5999	N/A	
13C12-1,2,3,7,8-PeCDF	200.00	88.3	24 - 185	29.7427	30.36405	-0.6214	N/A	
13C12-2,3,4,7,8-PeCDF	200.00	88.0	21 - 178	31.0908	31.70687	-0.6161	N/A	
13C12-1,2,3,7,8-PeCDD	200.00	85.4	25 - 181	31.343	31.9626	-0.6196	N/A	
13C12-1,2,3,4,7,8-HxCDF	200.00	100	26 - 152	34.7738	35.39708	-0.6233	N/A	
13C12-1,2,3,6,7,8-HxCDF	200.00	100	26 - 123	34.9163	35.5451	-0.6288	N/A	
13C12-2,3,4,6,7,8-HxCDF	200.00	95.4	28 - 136	35.87	36.48953	-0.6195	N/A	
13C12-1,2,3,7,8,9-HxCDF	200.00	94.6	29 - 147	37.01	37.62217	-0.6122	N/A	
13C12-1,2,3,4,7,8-HxCDD	200.00	101	32 - 141	36.0015	36.6284	-0.6269	N/A	
13C12-1,2,3,6,7,8-HxCDD	200.00	96.6	28 - 130	36.1332	36.75265	-0.6195	N/A	
13C12-1,2,3,4,6,7,8-HpCDF	200.00	89.9	28 - 143	39.0817	39.70478	-0.6231	N/A	
13C12-1,2,3,4,7,8,9-HpCDF	200.00	86.5	26 - 138	41.7013	42.43965	-0.7383	N/A	
13C12-1,2,3,4,6,7,8-HpCDD	200.00	89.5	23 - 140	40.8465	41.53897	-0.6925	N/A	
13C12-OCDD	400.00	64.8	17 - 157	46.6157	47.53868	-0.9230	N/A	
37C14-2,3,7,8-TCDD	80.000	106	35 - 197	26.2577	26.85752	-0.5998	N/A	

* Values outside of QC limits

Analytical Resources, Incorporated

SURROGATE RECOVERY AND RT SUMMARY

EPA 1613B

Laboratory:	Analytical Resources, Inc.	SDG:	16H0071
Client:	Fremont Analytical	Project:	1608094
Sequence:	SEH0246	Instrument:	AUTOSPEC01
Sample ID:	BEH0316-BS1	Calibration:	ZE00016
File ID:	16082305	Analyzed:	08/23/16 13:23

Surrogate Compound	Spike Level ng/kg wet	% Recovery	Recovery Limits	RT	Calibration Mean RT	RT Diff	RT Diff Limit	Q
13C12-2,3,7,8-TCDF	200.00	94.7	24 - 169	25.6	26.20013	-0.6001	N/A	
13C12-2,3,7,8-TCDD	200.00	93.0	25 - 164	26.2423	26.84255	-0.6002	N/A	
13C12-1,2,3,7,8-PeCDF	200.00	84.4	24 - 185	29.7423	30.36405	-0.6217	N/A	
13C12-2,3,4,7,8-PeCDF	200.00	82.6	21 - 178	31.0903	31.70687	-0.6166	N/A	
13C12-1,2,3,7,8-PeCDD	200.00	80.6	25 - 181	31.3427	31.9626	-0.6199	N/A	
13C12-1,2,3,4,7,8-HxCDF	200.00	95.0	26 - 152	34.7625	35.39708	-0.6346	N/A	
13C12-1,2,3,6,7,8-HxCDF	200.00	94.2	26 - 123	34.916	35.5451	-0.6291	N/A	
13C12-2,3,4,6,7,8-HxCDF	200.00	89.5	28 - 136	35.8587	36.48953	-0.6308	N/A	
13C12-1,2,3,7,8,9-HxCDF	200.00	89.8	29 - 147	37.0095	37.62217	-0.6127	N/A	
13C12-1,2,3,4,7,8-HxCDD	200.00	95.6	32 - 141	36.0012	36.6284	-0.6272	N/A	
13C12-1,2,3,6,7,8-HxCDD	200.00	89.2	28 - 130	36.1217	36.75265	-0.6310	N/A	
13C12-1,2,3,4,6,7,8-HpCDF	200.00	80.3	28 - 143	39.0813	39.70478	-0.6235	N/A	
13C12-1,2,3,4,7,8,9-HpCDF	200.00	76.8	26 - 138	41.7012	42.43965	-0.7385	N/A	
13C12-1,2,3,4,6,7,8-HpCDD	200.00	79.9	23 - 140	40.8462	41.53897	-0.6928	N/A	
13C12-OCDD	400.00	58.0	17 - 157	46.6065	47.53868	-0.9322	N/A	
37C14-2,3,7,8-TCDD	80.000	98.5	35 - 197	26.2573	26.85752	-0.6002	N/A	

* Values outside of QC limits

Analytical Resources, Incorporated

SURROGATE RECOVERY AND RT SUMMARY
EPA 1613B

Laboratory:	Analytical Resources, Inc.	SDG:	16H0071
Client:	Fremont Analytical	Project:	1608094
Sequence:	SEH0246	Instrument:	AUTOSPEC01
Sample ID:	BEH0316-SRM1	Calibration:	ZE00016
File ID:	16082306	Analyzed:	08/23/16 14:16

Surrogate Compound	Spike Level ng/kg wet	% Recovery	Recovery Limits	RT	Calibration Mean RT	RT Diff	RT Diff Limit	Q
13C12-2,3,7,8-TCDF	200.00	92.7	24 - 169	25.6152	26.20013	-0.5849	N/A	
13C12-2,3,7,8-TCDD	200.00	91.8	25 - 164	26.2427	26.84255	-0.5999	N/A	
13C12-1,2,3,7,8-PeCDF	200.00	87.7	24 - 185	29.7535	30.36405	-0.6106	N/A	
13C12-2,3,4,7,8-PeCDF	200.00	95.2	21 - 178	31.0908	31.70687	-0.6161	N/A	
13C12-1,2,3,7,8-PeCDD	200.00	90.5	25 - 181	31.3538	31.9626	-0.6088	N/A	
13C12-1,2,3,4,7,8-HxCDF	200.00	84.3	26 - 152	34.7847	35.39708	-0.6124	N/A	
13C12-1,2,3,6,7,8-HxCDF	200.00	82.9	26 - 123	34.9272	35.5451	-0.6179	N/A	
13C12-2,3,4,6,7,8-HxCDF	200.00	84.3	28 - 136	35.8807	36.48953	-0.6088	N/A	
13C12-1,2,3,7,8,9-HxCDF	200.00	90.2	29 - 147	37.0207	37.62217	-0.6015	N/A	
13C12-1,2,3,4,7,8-HxCDD	200.00	87.4	32 - 141	36.0233	36.6284	-0.6051	N/A	
13C12-1,2,3,6,7,8-HxCDD	200.00	83.9	28 - 130	36.1438	36.75265	-0.6089	N/A	
13C12-1,2,3,4,6,7,8-HpCDF	200.00	70.9	28 - 143	39.0922	39.70478	-0.6126	N/A	
13C12-1,2,3,4,7,8,9-HpCDF	200.00	76.7	26 - 138	41.712	42.43965	-0.7276	N/A	
13C12-1,2,3,4,6,7,8-HpCDD	200.00	77.1	23 - 140	40.857	41.53897	-0.6820	N/A	
13C12-OCDD	400.00	67.6	17 - 157	46.6335	47.53868	-0.9052	N/A	
37C14-2,3,7,8-TCDD	80.000	97.9	35 - 197	26.2575	26.85752	-0.6000	N/A	

* Values outside of QC limits

Analytical Resources, Incorporated

SURROGATE RECOVERY AND RT SUMMARY

EPA 1613B

Laboratory:	Analytical Resources, Inc.	SDG:	16H0071
Client:	Fremont Analytical	Project:	1608094
Sequence:	SEH0246	Instrument:	AUTOSPEC01
Sample ID:	BEH0316-DUP1	Calibration:	ZE00016
File ID:	16082307	Analyzed:	08/23/16 15:09

Surrogate Compound	Spike Level ng/kg dry	% Recovery	Recovery Limits	RT	Calibration Mean RT	RT Diff	RT Diff Limit	Q
13C12-2,3,7,8-TCDF	198.77	87.6	24 - 169	25.615	26.20013	-0.5851	N/A	
13C12-2,3,7,8-TCDD	198.77	89.2	25 - 164	26.2425	26.84255	-0.6001	N/A	
13C12-1,2,3,7,8-PeCDF	198.77	80.7	24 - 185	29.7535	30.36405	-0.6106	N/A	
13C12-2,3,4,7,8-PeCDF	198.77	81.4	21 - 178	31.0907	31.70687	-0.6162	N/A	
13C12-1,2,3,7,8-PeCDD	198.77	80.1	25 - 181	31.3428	31.9626	-0.6198	N/A	
13C12-1,2,3,4,7,8-HxCDF	198.77	85.0	26 - 152	34.7735	35.39708	-0.6236	N/A	
13C12-1,2,3,6,7,8-HxCDF	198.77	80.1	26 - 123	34.9268	35.5451	-0.6183	N/A	
13C12-2,3,4,6,7,8-HxCDF	198.77	81.5	28 - 136	35.8695	36.48953	-0.6200	N/A	
13C12-1,2,3,7,8,9-HxCDF	198.77	82.2	29 - 147	37.0205	37.62217	-0.6017	N/A	
13C12-1,2,3,4,7,8-HxCDD	198.77	86.0	32 - 141	36.012	36.6284	-0.6164	N/A	
13C12-1,2,3,6,7,8-HxCDD	198.77	82.1	28 - 130	36.1327	36.75265	-0.6200	N/A	
13C12-1,2,3,4,6,7,8-HpCDF	198.77	72.8	28 - 143	39.0922	39.70478	-0.6126	N/A	
13C12-1,2,3,4,7,8,9-HpCDF	198.77	73.5	26 - 138	41.712	42.43965	-0.7276	N/A	
13C12-1,2,3,4,6,7,8-HpCDD	198.77	76.6	23 - 140	40.857	41.53897	-0.6820	N/A	
13C12-OCDD	397.54	61.4	17 - 157	46.6157	47.53868	-0.9230	N/A	
37C14-2,3,7,8-TCDD	79.508	96.8	35 - 197	26.2723	26.85752	-0.5852	N/A	

* Values outside of QC limits

Analytical Resources, Incorporated

SURROGATE RECOVERY AND RT SUMMARY

EPA 1613B

Laboratory:	Analytical Resources, Inc.	SDG:	16H0071
Client:	Fremont Analytical	Project:	1608094
Sequence:	SEH0246	Instrument:	AUTOSPEC01
Sample ID:	16H0071-01	Calibration:	ZE00016
File ID:	16082308	Analyzed:	08/23/16 16:02

Surrogate Compound	Spike Level ng/kg dry	% Recovery	Recovery Limits	RT	Calibration Mean RT	RT Diff	RT Diff Limit	Q
13C12-2,3,7,8-TCDF	198.59	88.2	24 - 169	25.615	26.20013	-0.5851	N/A	
13C12-2,3,7,8-TCDD	198.59	86.2	25 - 164	26.2425	26.84255	-0.6001	N/A	
13C12-1,2,3,7,8-PeCDF	198.59	88.9	24 - 185	29.7532	30.36405	-0.6108	N/A	
13C12-2,3,4,7,8-PeCDF	198.59	85.9	21 - 178	31.1013	31.70687	-0.6056	N/A	
13C12-1,2,3,7,8-PeCDD	198.59	85.1	25 - 181	31.3533	31.9626	-0.6093	N/A	
13C12-1,2,3,4,7,8-HxCDF	198.59	85.4	26 - 152	34.7843	35.39708	-0.6128	N/A	
13C12-1,2,3,6,7,8-HxCDF	198.59	83.9	26 - 123	34.9268	35.5451	-0.6183	N/A	
13C12-2,3,4,6,7,8-HxCDF	198.59	81.5	28 - 136	35.8695	36.48953	-0.6200	N/A	
13C12-1,2,3,7,8,9-HxCDF	198.59	80.4	29 - 147	37.0205	37.62217	-0.6017	N/A	
13C12-1,2,3,4,7,8-HxCDD	198.59	87.7	32 - 141	36.012	36.6284	-0.6164	N/A	
13C12-1,2,3,6,7,8-HxCDD	198.59	83.5	28 - 130	36.1325	36.75265	-0.6202	N/A	
13C12-1,2,3,4,6,7,8-HpCDF	198.59	72.3	28 - 143	39.0922	39.70478	-0.6126	N/A	
13C12-1,2,3,4,7,8,9-HpCDF	198.59	71.1	26 - 138	41.7117	42.43965	-0.7280	N/A	
13C12-1,2,3,4,6,7,8-HpCDD	198.59	76.3	23 - 140	40.8567	41.53897	-0.6823	N/A	
13C12-OCDD	397.19	58.8	17 - 157	46.6242	47.53868	-0.9145	N/A	
37C14-2,3,7,8-TCDD	79.437	96.4	35 - 197	26.2723	26.85752	-0.5852	N/A	

* Values outside of QC limits

Analytical Resources, Incorporated

SURROGATE RECOVERY AND RT SUMMARY

EPA 1613B

Laboratory:	Analytical Resources, Inc.	SDG:	16H0071
Client:	Fremont Analytical	Project:	1608094
Sequence:	SEH0246	Instrument:	AUTOSPEC01
Sample ID:	16H0071-02	Calibration:	ZE00016
File ID:	16082309	Analyzed:	08/23/16 16:56

Surrogate Compound	Spike Level ng/kg dry	% Recovery	Recovery Limits	RT	Calibration Mean RT	RT Diff	RT Diff Limit	Q
13C12-2,3,7,8-TCDF	199.18	92.7	24 - 169	25.6002	26.20013	-0.5999	N/A	
13C12-2,3,7,8-TCDD	199.18	94.0	25 - 164	26.2425	26.84255	-0.6001	N/A	
13C12-1,2,3,7,8-PeCDF	199.18	83.1	24 - 185	29.7533	30.36405	-0.6107	N/A	
13C12-2,3,4,7,8-PeCDF	199.18	80.4	21 - 178	31.0905	31.70687	-0.6164	N/A	
13C12-1,2,3,7,8-PeCDD	199.18	79.5	25 - 181	31.3425	31.9626	-0.6201	N/A	
13C12-1,2,3,4,7,8-HxCDF	199.18	91.2	26 - 152	34.7733	35.39708	-0.6238	N/A	
13C12-1,2,3,6,7,8-HxCDF	199.18	86.2	26 - 123	34.9158	35.5451	-0.6293	N/A	
13C12-2,3,4,6,7,8-HxCDF	199.18	86.5	28 - 136	35.8695	36.48953	-0.6200	N/A	
13C12-1,2,3,7,8,9-HxCDF	199.18	87.0	29 - 147	37.0095	37.62217	-0.6127	N/A	
13C12-1,2,3,4,7,8-HxCDD	199.18	91.6	32 - 141	36.001	36.6284	-0.6274	N/A	
13C12-1,2,3,6,7,8-HxCDD	199.18	86.7	28 - 130	36.1325	36.75265	-0.6202	N/A	
13C12-1,2,3,4,6,7,8-HpCDF	199.18	78.8	28 - 143	39.0918	39.70478	-0.6130	N/A	
13C12-1,2,3,4,7,8,9-HpCDF	199.18	72.2	26 - 138	41.7115	42.43965	-0.7281	N/A	
13C12-1,2,3,4,6,7,8-HpCDD	199.18	76.9	23 - 140	40.8457	41.53897	-0.6933	N/A	
13C12-OCDD	398.36	54.1	17 - 157	46.6148	47.53868	-0.9239	N/A	
37C14-2,3,7,8-TCDD	79.672	101	35 - 197	26.2575	26.85752	-0.6000	N/A	

* Values outside of QC limits

Analytical Resources, Incorporated

HOLDING TIME SUMMARY

Analysis: EPA 1613B

Laboratory: Analytical Resources, Inc. SDG: 16H0071

Client: Fremont Analytical Project: 1608094

Sample Name	Date Collected	Date Received	Date Prepared	Days to Prep	Max Days to Prep	Date Analyzed	Days to Analysis	Max Days to Analysis	Q
NME:0-4C 16H0071-01	08/10/16 11:30	08/11/16 10:40	08/18/16 15:40	8	365	08/23/16 16:02	5	365	
NME:4-7C 16H0071-02	08/10/16 11:50	08/11/16 10:40	08/18/16 15:40	8	365	08/23/16 16:56	5	365	
Duplicate BEH0316-DUP1	08/10/16 11:30	08/11/16 10:40	08/18/16 15:40	8	365	08/23/16 15:09	5	365	

* Indicates hold time exceedance.

Analytical Resources, Incorporated

METHOD DETECTION AND REPORTING LIMITS

EPA 1613B

Laboratory: Analytical Resources, Inc. SDG: 16H0071

Client: Fremont Analytical Project: 1608094

Matrix: Solid Instrument: AUTOSPEC01

Analyte	MDL	RL	Units
2,3,7,8-TCDF	0.244	1.00	ng/kg
2,3,7,8-TCDD	0.214	1.00	ng/kg
1,2,3,7,8-PeCDF	0.472	1.00	ng/kg
2,3,4,7,8-PeCDF	0.625	1.00	ng/kg
1,2,3,7,8-PeCDD	0.590	1.00	ng/kg
1,2,3,4,7,8-HxCDF	0.784	1.00	ng/kg
1,2,3,6,7,8-HxCDF	0.623	1.00	ng/kg
2,3,4,6,7,8-HxCDF	0.574	1.00	ng/kg
1,2,3,7,8,9-HxCDF	0.953	1.00	ng/kg
1,2,3,4,7,8-HxCDD	0.479	1.00	ng/kg
1,2,3,6,7,8-HxCDD	0.702	1.00	ng/kg
1,2,3,7,8,9-HxCDD	0.722	1.00	ng/kg
1,2,3,4,6,7,8-HpCDF	0.881	1.00	ng/kg
1,2,3,4,7,8,9-HpCDF	0.703	1.00	ng/kg
1,2,3,4,6,7,8-HpCDD	1.14	2.50	ng/kg
OCDF	1.77	2.00	ng/kg
OCDD	9.42	10.0	ng/kg
Total TCDF		1.00	ng/kg
Total TCDD		1.00	ng/kg
Total PeCDF		1.00	ng/kg
Total PeCDD		1.00	ng/kg
Total HxCDF		1.00	ng/kg
Total HxCDD		1.00	ng/kg
Total HpCDF		1.00	ng/kg
Total HpCDD		1.00	ng/kg

NME:0-4C

Form I
ORGANIC ANALYSIS DATA SHEET
EPA 8270D-SIM
Butyl Tins Solid

Laboratory:	Analytical Resources, Inc.			SDG:	16H0071
Client:	Fremont Analytical			Project:	1608094
Matrix:	soil	Laboratory ID:	16H0071-01	File ID:	16082905.D
Sampled:	08/10/16 11:30	Prepared:	08/24/16 10:15	Analyzed:	08/29/16 10:29
Solids:	84.70	Preparation:	EPA 3546 (Microwave)	Initial/Final:	6.13 g / 0.5 mL
Batch:	BEH0443	Sequence:	SEH0310	Calibration:	ZC00001
Instrument:	NT12	Column:	ZB-5MS		

CAS NO.	COMPOUND	DILUTION	CONC. (ug/kg dry)	Q	DL	RL
36643-28-4	Tributyltin Ion	1	3.72	U	0.433	3.72

SURROGATES	ADDED (ug/kg dry)	CONC (ug/kg dry)	% REC	QC LIMITS	Q
Tripentyltin	43.506	25.3	58.1	30 - 160	
Tripropyltin	42.127	22.6	53.7	30 - 160	

Data File: \\target\share\chem3\nt12.i\20160829.b\16082905.D

Page 1

Date : 29-AUG-2016 10:29

Client ID:

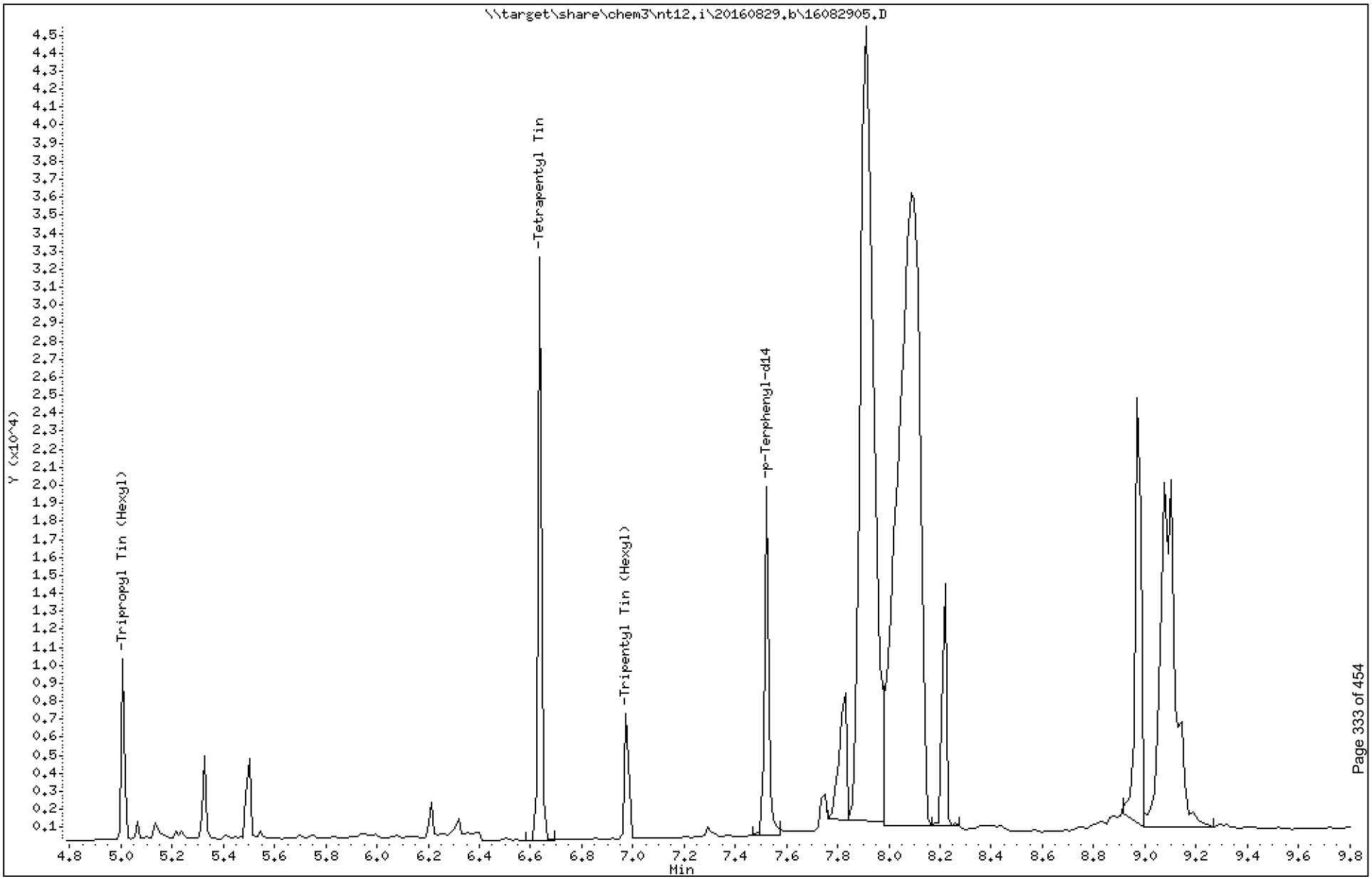
Instrument: nt12.i

Sample Info: 16H0071-01

Operator: JW

Column phase: ZB-5msi

Column diameter: 0.25



ARI Labs, Inc.

Krone1989/8270D-SIM

Data file : \\target\share\chem3\nt12.i\20160829.b\16082905.D
Lab Smp Id: 16H0071-01
Inj Date : 29-AUG-2016 10:29 MS Autotune Date: 03-NOV-2015 14:19
Operator : JW Inst ID: nt12.i
Smp Info : 16H0071-01
Misc Info :
Comment : 2 ul Injection
Method : \\target\share\chem3\nt12.i\20160829.b\BTS.m
Meth Date : 29-Aug-2016 12:24 nt12.i Quant Type: ISTD
Cal Date : 04-MAR-2016 10:21 Cal File: 16030407.D
Als bottle: 8
Dil Factor: 1.00000
Integrator: HP RTE Compound Sublist: sed.sub
Target Version: 4.14
Processing Host: AUTOSPECDATA02

	Compounds	QUANT SIG MASS	RT	EXP RT	REL RT	RESPONSE	CONCENTRATIONS ON-COLUMN (ug/mL)	FINAL (ug/mL)	
$	1 Tripropyl Tin (Hexyl)	291	5.005	5.006	(0.754)	4168	0.31557	0.3156	
	2 Tetrabutyl Tin	289	Compound Not Detected.						
	3 Tributyl Tin (Hexyl)	319	Compound Not Detected.						
*	4 Tetrapentyl Tin	333	6.637	6.637	(1.000)	30027	2.00000		
	5 Dibutyl Tin (Hexyl)	347	Compound Not Detected.						
$	6 Tripentyl Tin (Hexyl)	347	6.972	6.986	(0.927)	3120	0.32967	0.3297	
	7 Butyl Tin (Hexyl)	347	Compound Not Detected.						
*	8 p-Terphenyl-d14	244	7.522	7.522	(1.000)	22142	0.20000		(M)

QC Flag Legend

M - Compound response manually integrated.

ARI Labs, Inc.

INTERNAL STANDARD COMPOUNDS
AREA AND RT SUMMARY

Instrument ID: nt12.i
Lab File ID: 16082905.D
Lab Smp Id: 16H0071-01
Analysis Type: SV
Quant Type: ISTD
Operator: JW
Method File: \\target\share\chem3\nt12.i\20160829.b\BTS.m
Misc Info:

Calibration Date: 29-AUG-2016
Calibration Time: 08:45
Level:
Sample Type:

Test Mode:
Use Initial Calibration Level 4.

		AREA LIMIT			
COMPOUND	STANDARD	LOWER	UPPER	SAMPLE	%DIFF
4 Tetrapentyl Tin	24391	12196	48782	30027	23.11
8 p-Terphenyl-d14	22552	11276	45104	22142	-1.82

		RT LIMIT			
COMPOUND	STANDARD	LOWER	UPPER	SAMPLE	%DIFF
4 Tetrapentyl Tin	6.64	6.14	7.14	6.64	-0.00
8 p-Terphenyl-d14	7.52	7.02	8.02	7.52	-0.00

AREA UPPER LIMIT = +100% of internal standard area.
AREA LOWER LIMIT = - 50% of internal standard area.
RT UPPER LIMIT = + 0.50 minutes of internal standard RT.
RT LOWER LIMIT = - 0.50 minutes of internal standard RT.

REVIEW SUMMARY FOR FILE - 16082905.D

Lab ID: 16H0071-01
nt12.i, 20160829.b\BTS.m,   29-AUG-2016 10:29

RT	CO-ELUTION COMPOUNDS

NO CO-ELUTIONS

Quant Method: ICAL

RRT CHECK

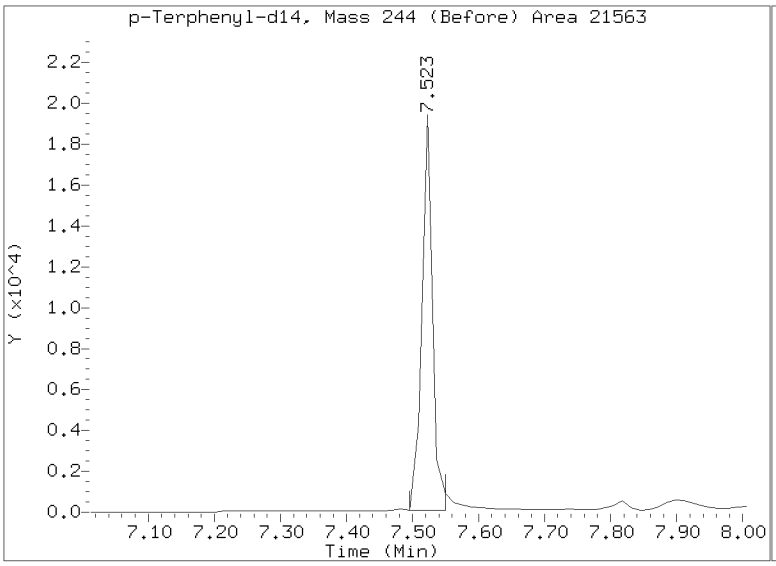
RRT	CCV RRT	DELTA	COMPOUND

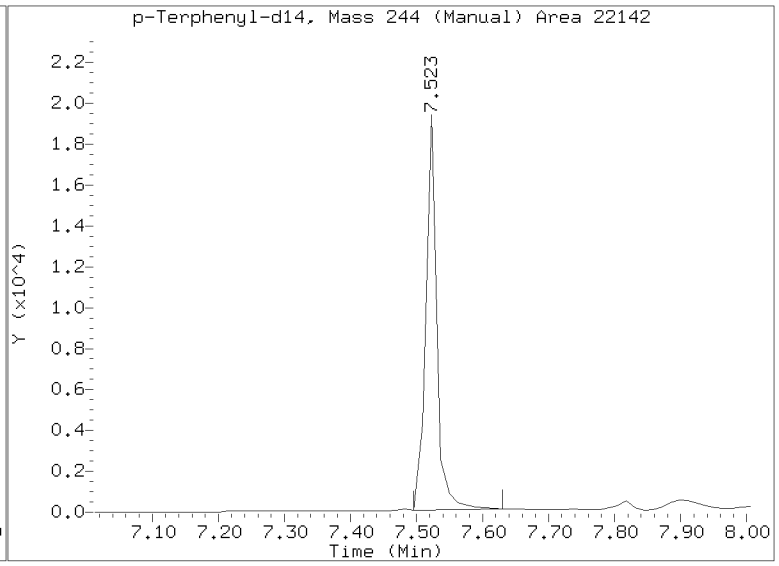
NONE

On Column LOD for nt12.i, 20160829.b\BTS.m, sed.sub = 0.0000

Quant Ion Manual Peak Adjustment Report

Datafile: //target/share/chem3/nt12.i/20160829.b/16082905.D
Injection Date: 29-AUG-2016 10:29
Lab ID:16H0071-01 Client ID:
Report Date: 08/29/2016 12:24





NME:4-7C

Form I
ORGANIC ANALYSIS DATA SHEET
EPA 8270D-SIM
Butyl Tins Solid

Laboratory:	Analytical Resources, Inc.			SDG:	16H0071
Client:	Fremont Analytical			Project:	1608094
Matrix:	soil	Laboratory ID:	16H0071-02	File ID:	16082908.D
Sampled:	08/10/16 11:50	Prepared:	08/24/16 10:15	Analyzed:	08/29/16 11:07
Solids:	86.19	Preparation:	EPA 3546 (Microwave)	Initial/Final:	6.06 g / 0.5 mL
Batch:	BEH0443	Sequence:	SEH0310	Calibration:	ZC00001
Instrument:	NT12	Column:	ZB-5MS		

CAS NO.	COMPOUND	DILUTION	CONC. (ug/kg dry)	Q	DL	RL
36643-28-4	Tributyltin Ion	1	3.70	U	0.431	3.70

SURROGATES	ADDED (ug/kg dry)	CONC (ug/kg dry)	% REC	QC LIMITS	Q
Tripentyltin	43.248	26.2	60.6	30 - 160	
Tripropyltin	41.877	23.4	55.8	30 - 160	

Data File: \\target\share\chem3\nt12.i\20160829.b\16082908.D

Page 1

Date : 29-AUG-2016 11:07

Client ID:

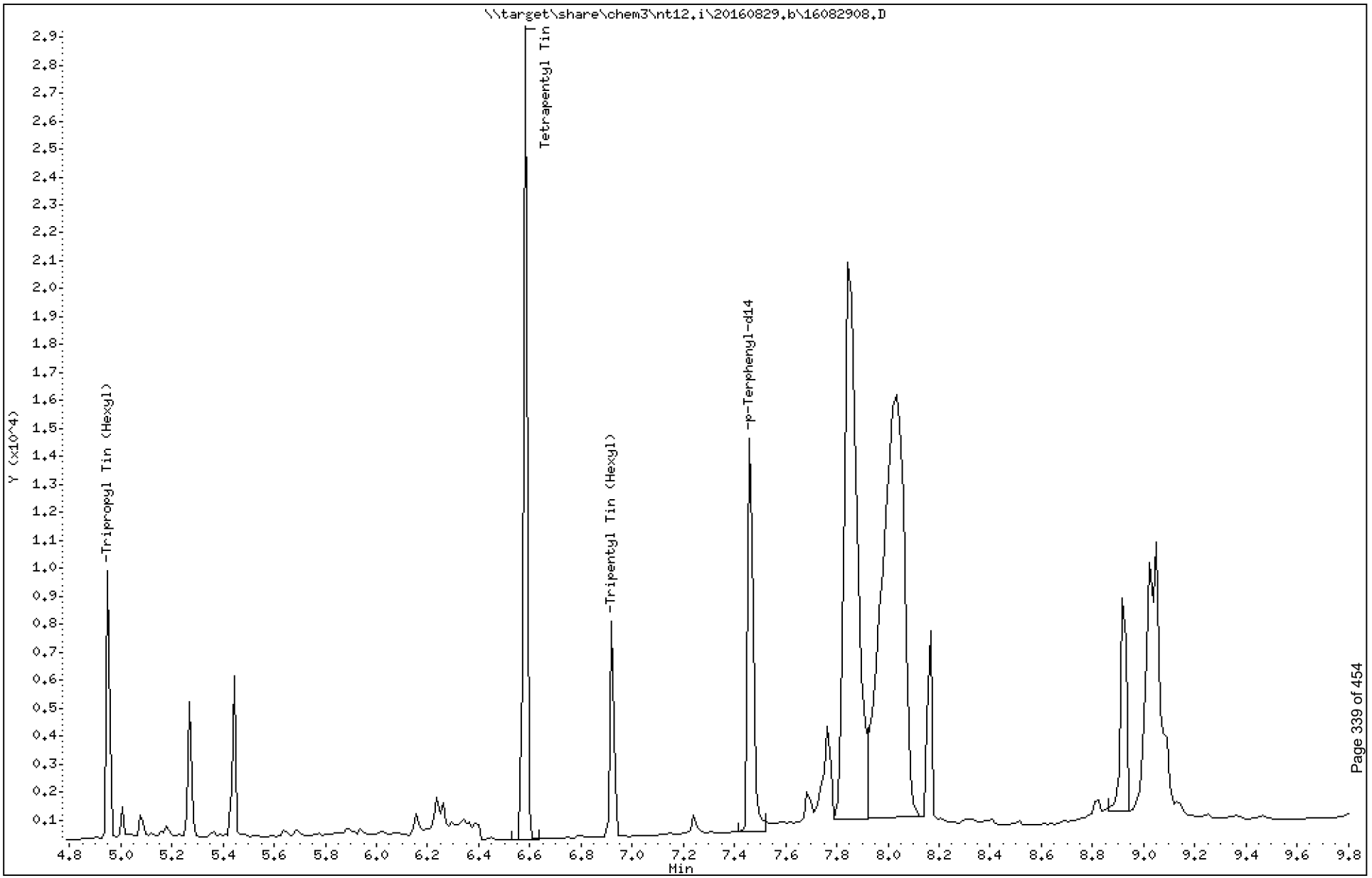
Instrument: nt12.i

Sample Info: 16H0071-02

Operator: JW

Column phase: ZB-5msi

Column diameter: 0.25



ARI Labs, Inc.

Krone1989/8270D-SIM

Data file : \\target\share\chem3\nt12.i\20160829.b\16082908.D
Lab Smp Id: 16H0071-02
Inj Date : 29-AUG-2016 11:07 MS Autotune Date: 03-NOV-2015 14:19
Operator : JW Inst ID: nt12.i
Smp Info : 16H0071-02
Misc Info :
Comment : 2 ul Injection
Method : \\target\share\chem3\nt12.i\20160829.b\BTS.m
Meth Date : 29-Aug-2016 12:24 nt12.i Quant Type: ISTD
Cal Date : 04-MAR-2016 10:21 Cal File: 16030407.D
Als bottle: 11
Dil Factor: 1.00000
Integrator: HP RTE Compound Sublist: sed.sub
Target Version: 4.14
Processing Host: AUTOSPECDATA02

	Compounds	QUANT SIG MASS	RT	EXP RT	REL RT	RESPONSE	CONCENTRATIONS ON-COLUMN (ug/mL)	FINAL (ug/mL)	
$	1 Tripropyl Tin (Hexyl)	291	4.948	5.006	(0.752)	4189	0.32789	0.3279	
	2 Tetrabutyl Tin	289	Compound Not Detected.						
	3 Tributyl Tin (Hexyl)	319	Compound Not Detected.						
*	4 Tetrapentyl Tin	333	6.584	6.637	(1.000)	29044	2.00000		
	5 Dibutyl Tin (Hexyl)	347	Compound Not Detected.						
$	6 Tripentyl Tin (Hexyl)	347	6.919	6.986	(0.928)	3251	0.34399	0.3440	
	7 Butyl Tin (Hexyl)	347	Compound Not Detected.						
*	8 p-Terphenyl-d14	244	7.455	7.522	(1.000)	22111	0.20000		(M)

QC Flag Legend

M - Compound response manually integrated.

ARI Labs, Inc.

INTERNAL STANDARD COMPOUNDS
AREA AND RT SUMMARY

Instrument ID: nt12.i
Lab File ID: 16082908.D
Lab Smp Id: 16H0071-02
Analysis Type: SV
Quant Type: ISTD
Operator: JW
Method File: \\target\share\chem3\nt12.i\20160829.b\BTS.m
Misc Info:

Calibration Date: 29-AUG-2016
Calibration Time: 08:45
Level:
Sample Type:

Test Mode:
Use Initial Calibration Level 4.

		AREA LIMIT			
COMPOUND	STANDARD	LOWER	UPPER	SAMPLE	%DIFF
4 Tetrapentyl Tin	24391	12196	48782	29044	19.08
8 p-Terphenyl-d14	22552	11276	45104	22111	-1.96

		RT LIMIT			
COMPOUND	STANDARD	LOWER	UPPER	SAMPLE	%DIFF
4 Tetrapentyl Tin	6.64	6.14	7.14	6.58	-0.81
8 p-Terphenyl-d14	7.52	7.02	8.02	7.46	-0.89

AREA UPPER LIMIT = +100% of internal standard area.
AREA LOWER LIMIT = - 50% of internal standard area.
RT UPPER LIMIT = + 0.50 minutes of internal standard RT.
RT LOWER LIMIT = - 0.50 minutes of internal standard RT.

REVIEW SUMMARY FOR FILE - 16082908.D

Lab ID: 16H0071-02
nt12.i, 20160829.b\BTS.m,   29-AUG-2016 11:07

RT	CO-ELUTION COMPOUNDS

NO CO-ELUTIONS

Quant Method: ICAL

RRT CHECK

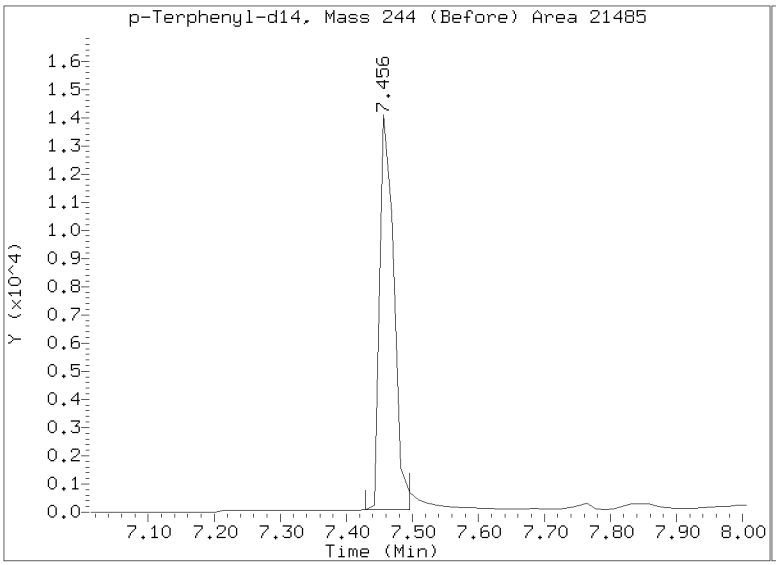
RRT	CCV RRT	DELTA	COMPOUND

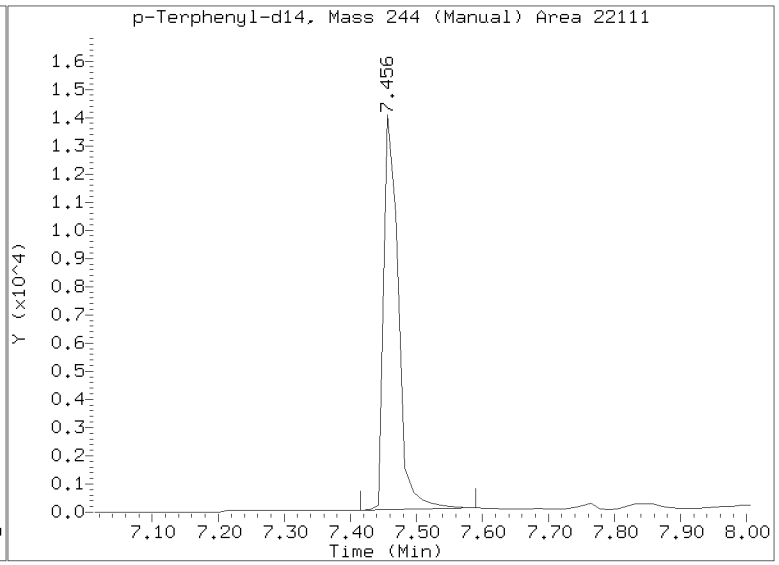
NONE

On Column LOD for nt12.i, 20160829.b\BTS.m, sed.sub = 0.0000

Quant Ion Manual Peak Adjustment Report

Datafile: //target/share/chem3/nt12.i/20160829.b/16082908.D
Injection Date: 29-AUG-2016 11:07
Lab ID:16H0071-02 Client ID:
Report Date: 08/29/2016 12:25





Analytical Resources, Incorporated

Form I

METHOD BLANK DATA SHEET

EPA 8270D-SIM

Blank

Laboratory:	Analytical Resources, Inc.			SDG:	16H0071
Client:	Fremont Analytical			Project:	1608094
Matrix:	Solid	Laboratory ID:	BEH0443-BLK1	File ID:	16082903.D
Sampled:	N/A	Prepared:	08/24/16 10:15	Analyzed:	08/29/16 10:03
Solids:		Preparation:	EPA 3546 (Microwave)	Initial/Final:	5 g / 0.5 mL
Batch:	BEH0443	Sequence:	SEH0310	Calibration:	ZC00001
Instrument:	NT12	Column:	ZB-5MS		

CAS NO.	COMPOUND	DILUTION	CONC. (ug/kg wet)	Q	DL	RL
36643-28-4	Tributyltin Ion	1	3.86	U	0.450	3.86

SURROGATES	ADDED (ug/kg wet)	CONC (ug/kg wet)	% REC	QC LIMITS	Q
Tripentyltin	45.178	25.5	56.3	30 - 160	
Tripropyltin	43.746	25.1	57.3	30 - 160	

Data File: \\target\share\chem3\nt12.i\20160829.b\16082903.D

Date : 29-AUG-2016 10:03

Client ID:

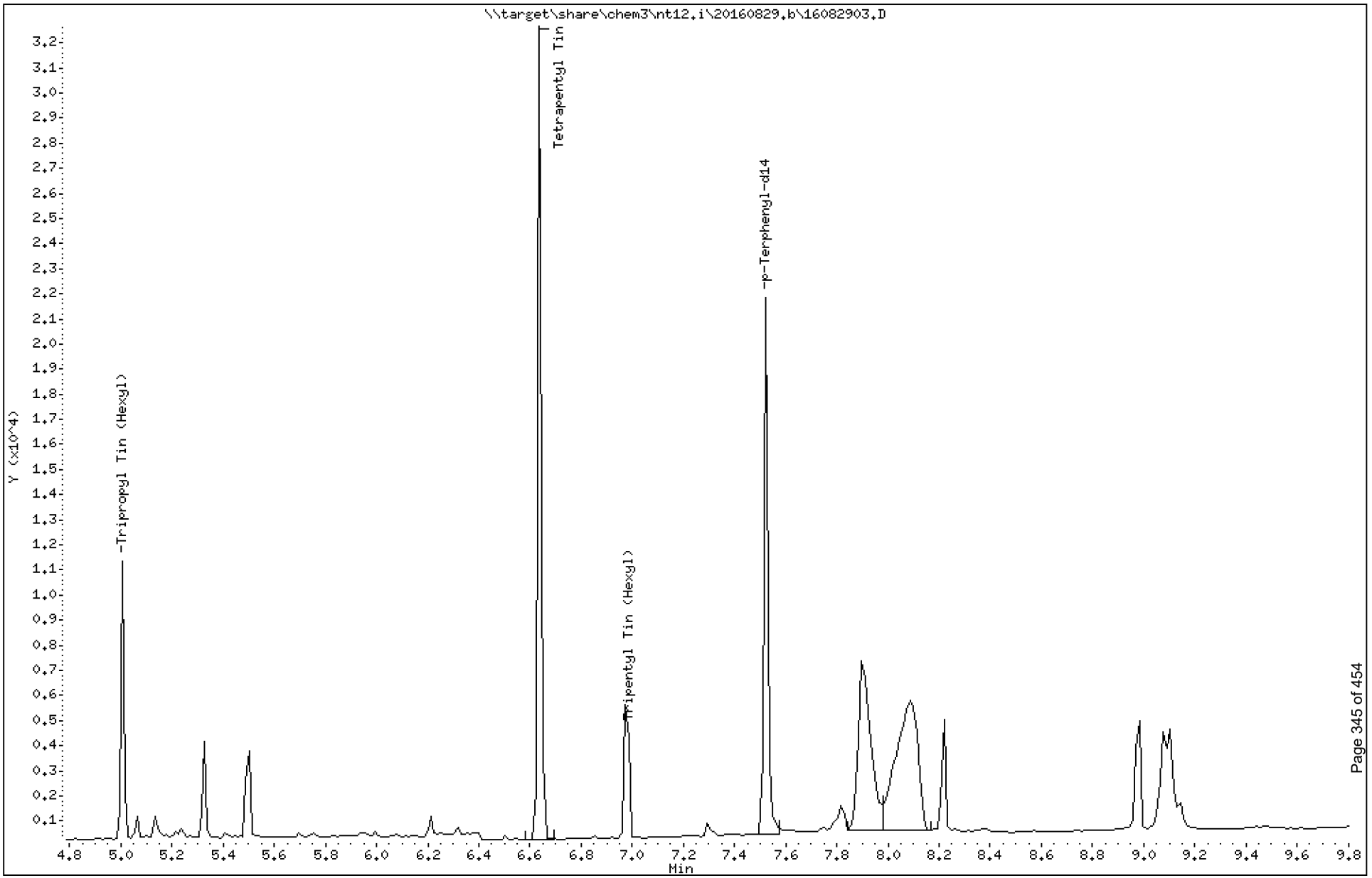
Instrument: nt12.i

Sample Info: BEH0443-BLK1

Operator: JW

Column phase: ZB-5msi

Column diameter: 0.25



ARI Labs, Inc.

Krone1989/8270D-SIM

Data file : \\target\share\chem3\nt12.i\20160829.b\16082903.D
Lab Smp Id: BEH0443-BLK1
Inj Date : 29-AUG-2016 10:03 MS Autotune Date: 03-NOV-2015 14:19
Operator : JW Inst ID: nt12.i
Smp Info : BEH0443-BLK1
Misc Info :
Comment : 2 ul Injection
Method : \\target\share\chem3\nt12.i\20160829.b\BTS.m
Meth Date : 29-Aug-2016 12:24 nt12.i Quant Type: ISTD
Cal Date : 04-MAR-2016 10:21 Cal File: 16030407.D
Als bottle: 6
Dil Factor: 1.00000
Integrator: HP RTE Compound Sublist: sed.sub
Target Version: 4.14
Processing Host: AUTOSPECDATA02

	Compounds	QUANT SIG MASS	RT	EXP RT	REL RT	RESPONSE	CONCENTRATIONS ON-COLUMN (ug/mL)	FINAL (ug/mL)	
$	1 Tripropyl Tin (Hexyl)	291	5.005	5.006	(0.754)	4460	0.33698	0.3370	
	2 Tetrabutyl Tin	289	Compound Not Detected.						
	3 Tributyl Tin (Hexyl)	319	Compound Not Detected.						
*	4 Tetrapentyl Tin	333	6.637	6.637	(1.000)	30089	2.00000		
	5 Dibutyl Tin (Hexyl)	347	Compound Not Detected.						
$	6 Tripentyl Tin (Hexyl)	347	6.986	6.986	(0.929)	3097	0.31986	0.3199	
	7 Butyl Tin (Hexyl)	347	Compound Not Detected.						
*	8 p-Terphenyl-d14	244	7.522	7.522	(1.000)	22653	0.20000		(M)

QC Flag Legend

M - Compound response manually integrated.

ARI Labs, Inc.

INTERNAL STANDARD COMPOUNDS
AREA AND RT SUMMARY

Instrument ID: nt12.i
Lab File ID: 16082903.D
Lab Smp Id: BEH0443-BLK1
Analysis Type: SV
Quant Type: ISTD
Operator: JW
Method File: \\target\share\chem3\nt12.i\20160829.b\BTS.m
Misc Info:

Calibration Date: 29-AUG-2016
Calibration Time: 08:45
Level:
Sample Type:

Test Mode:
Use Initial Calibration Level 4.

		AREA LIMIT			
COMPOUND	STANDARD	LOWER	UPPER	SAMPLE	%DIFF
4 Tetrapentyl Tin	24391	12196	48782	30089	23.36
8 p-Terphenyl-d14	22552	11276	45104	22653	0.45

		RT LIMIT			
COMPOUND	STANDARD	LOWER	UPPER	SAMPLE	%DIFF
4 Tetrapentyl Tin	6.64	6.14	7.14	6.64	-0.00
8 p-Terphenyl-d14	7.52	7.02	8.02	7.52	-0.00

AREA UPPER LIMIT = +100% of internal standard area.
AREA LOWER LIMIT = - 50% of internal standard area.
RT UPPER LIMIT = + 0.50 minutes of internal standard RT.
RT LOWER LIMIT = - 0.50 minutes of internal standard RT.

REVIEW SUMMARY FOR FILE - 16082903.D

Lab ID: BEH0443-BLK1
nt12.i, 20160829.b\BTS.m,   29-AUG-2016 10:03

RT	CO-ELUTION COMPOUNDS

NO CO-ELUTIONS

Quant Method: ICAL

RRT CHECK

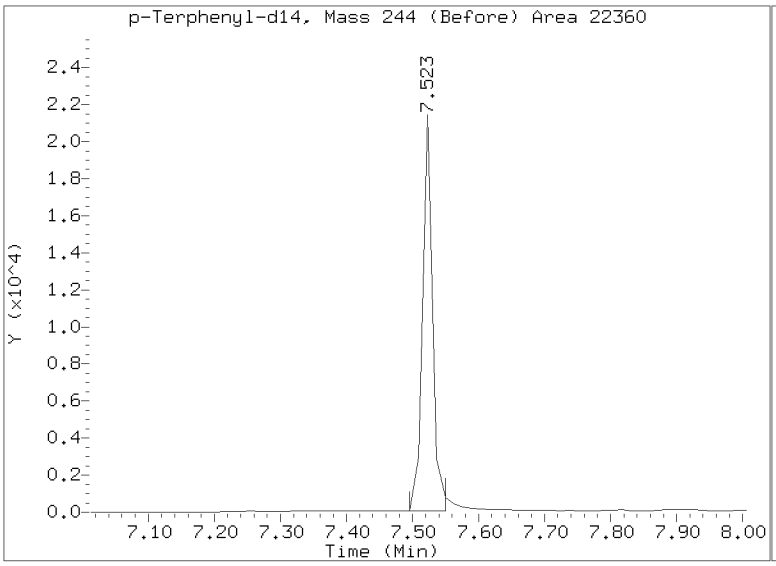
RRT	CCV RRT	DELTA	COMPOUND

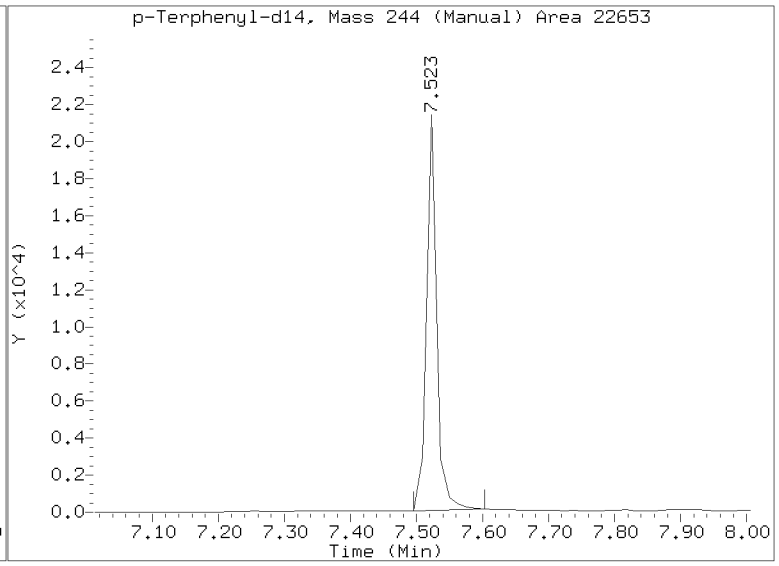
NONE

On Column LOD for nt12.i, 20160829.b\BTS.m, sed.sub = 0.0000

Quant Ion Manual Peak Adjustment Report

Datafile: //target/share/chem3/nt12.i/20160829.b/16082903.D
Injection Date: 29-AUG-2016 10:03
Lab ID:BEH0443-BLK1 Client ID:
Report Date: 08/29/2016 12:24





LCS / LCS DUPLICATE RECOVERY

EPA 8270D-SIM

Laboratory:	Analytical Resources, Inc.	SDG:	16H0071
Client:	Fremont Analytical	Project:	1608094
Matrix:	Solid	Analyzed:	08/29/16 10:16
Batch:	BEH0443	Laboratory ID:	BEH0443-BS1
Preparation:	EPA 3546 (Microwave)	Sequence Name:	LCS
Initial/Final:	5 g / 0.5 mL		

COMPOUND	SPIKE ADDED (ug/kg wet)	LCS CONCENTRATION (ug/kg wet)	LCS % REC. #	QC LIMITS REC.
Tributyltin Ion	44.6	28.4	63.7	30 - 160

* Values outside of QC limits

Data File: \\target\share\chem3\nt12.i\20160829.b\16082904.D

Page 1

Date : 29-AUG-2016 10:16

Client ID:

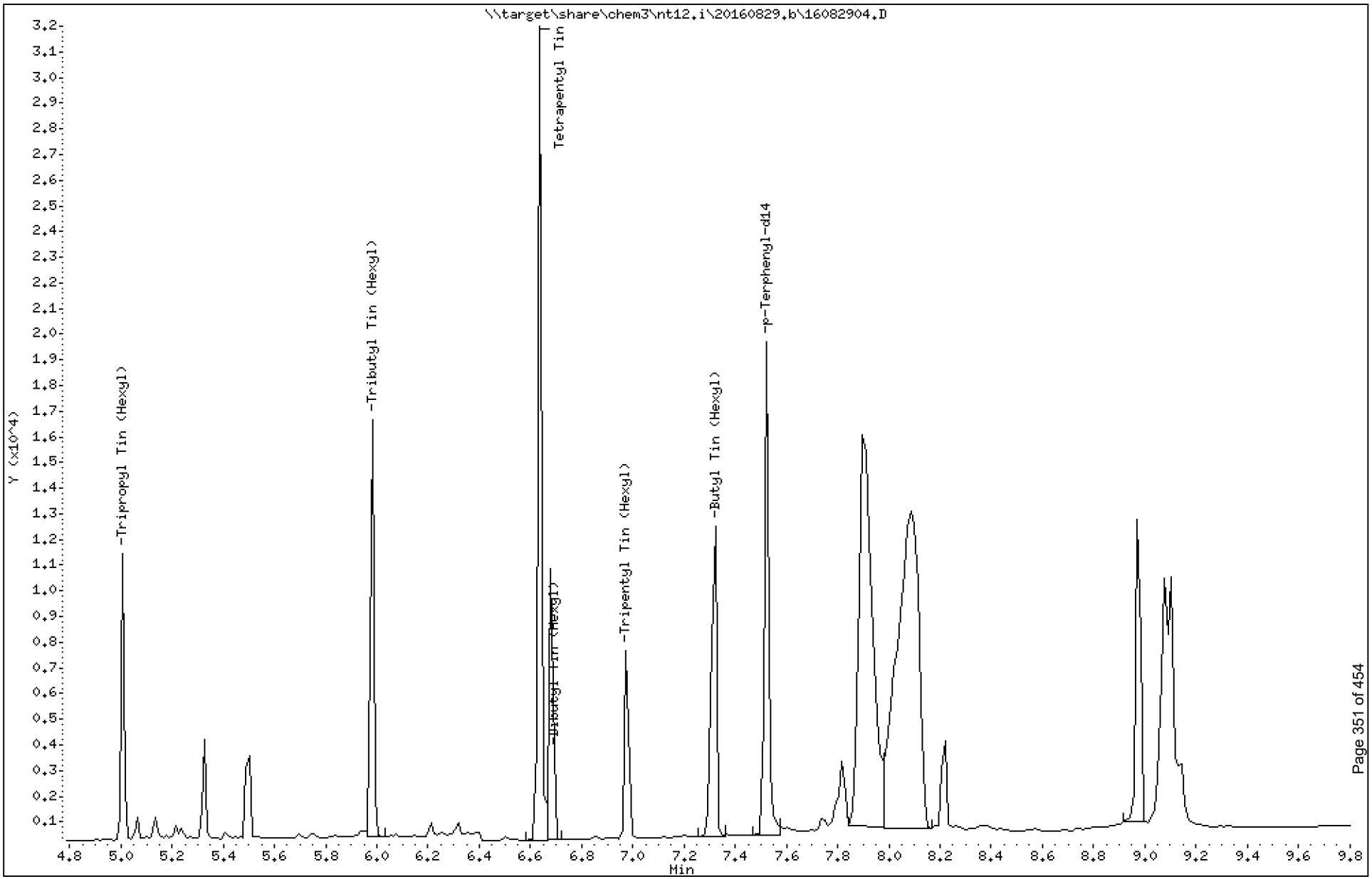
Instrument: nt12.i

Sample Info: BEH0443-BS1

Operator: JW

Column phase: ZB-5msi

Column diameter: 0.25



Data File: \\target\share\chem3\nt12.i\20160829.b\16082904.D

Date : 29-AUG-2016 10:16

Client ID:

Instrument: nt12.i

Sample Info: BEH0443-BS1

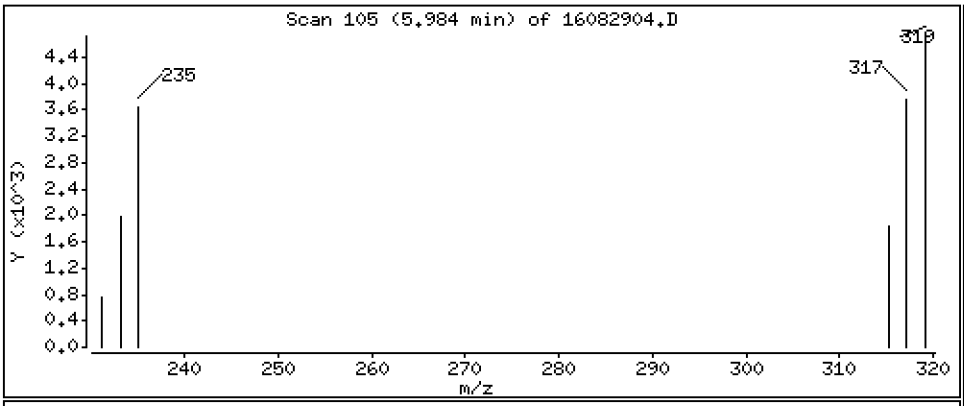
Operator: JW

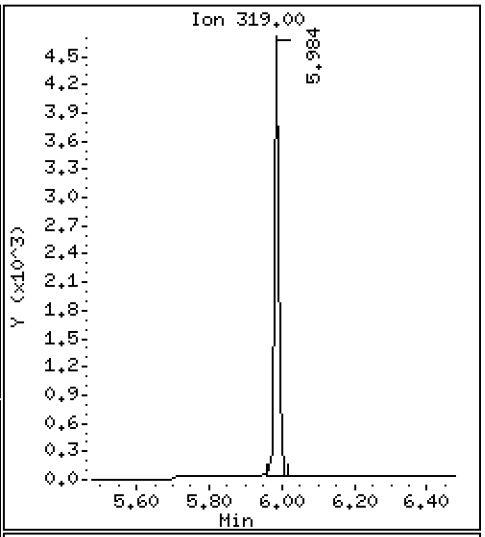
Column phase: ZB-5msi

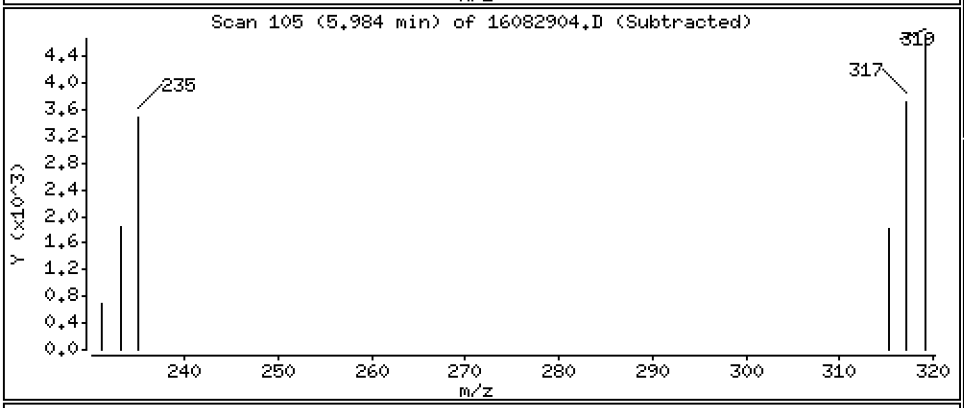
Column diameter: 0.25

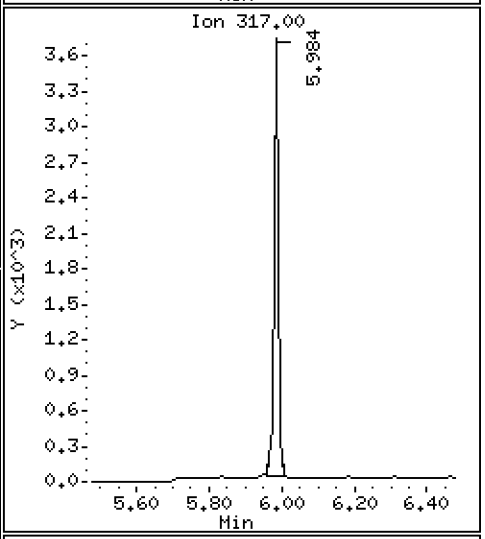
3 Tributyl Tin (Hexyl)

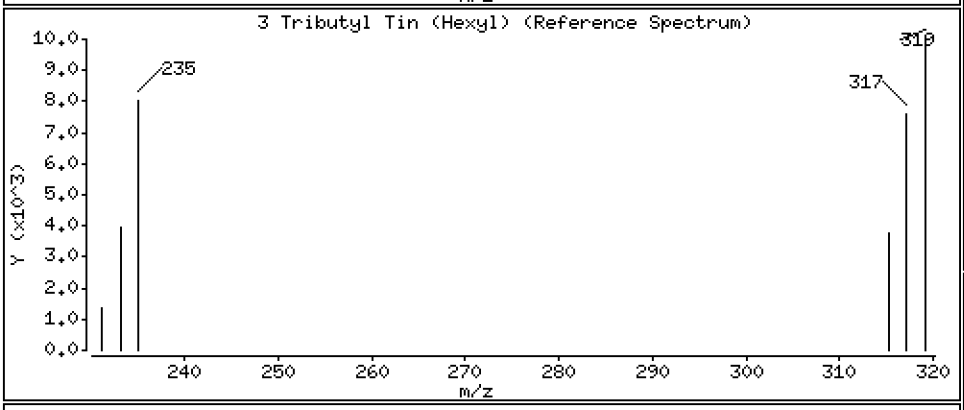
Concentration: 0.3671 ug/mL

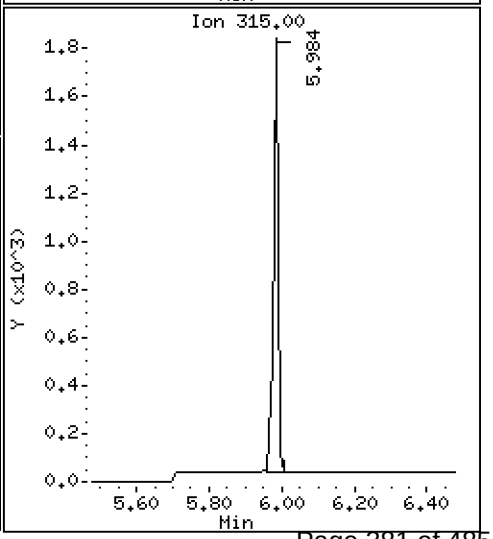


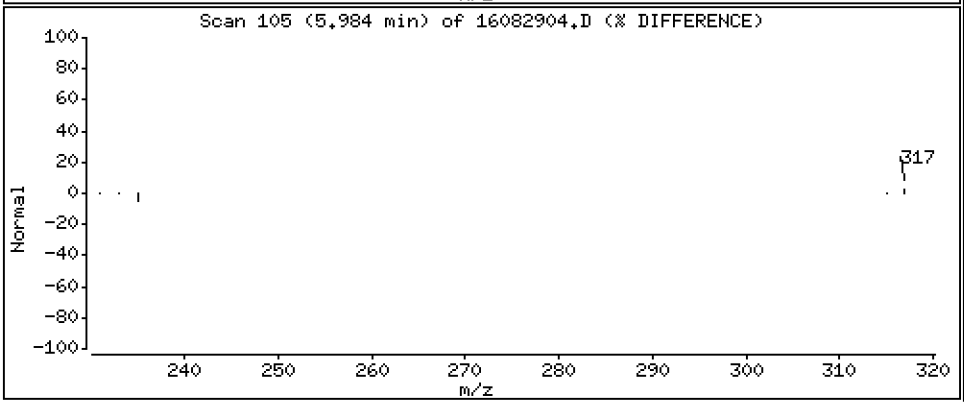












Data File: \\target\share\chem3\nt12.i\20160829.b\16082904.D

Date : 29-AUG-2016 10:16

Client ID:

Instrument: nt12.i

Sample Info: BEH0443-BS1

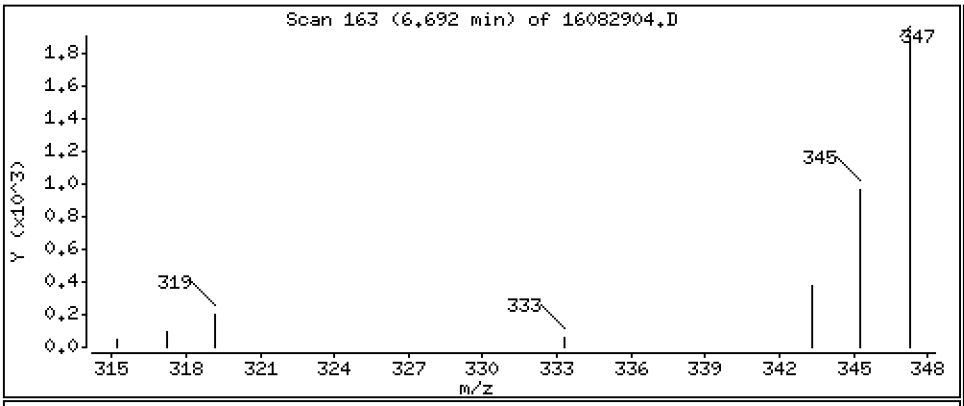
Operator: JW

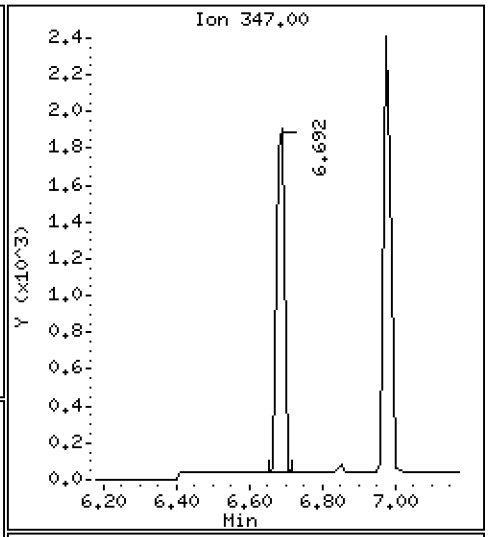
Column phase: ZB-5msi

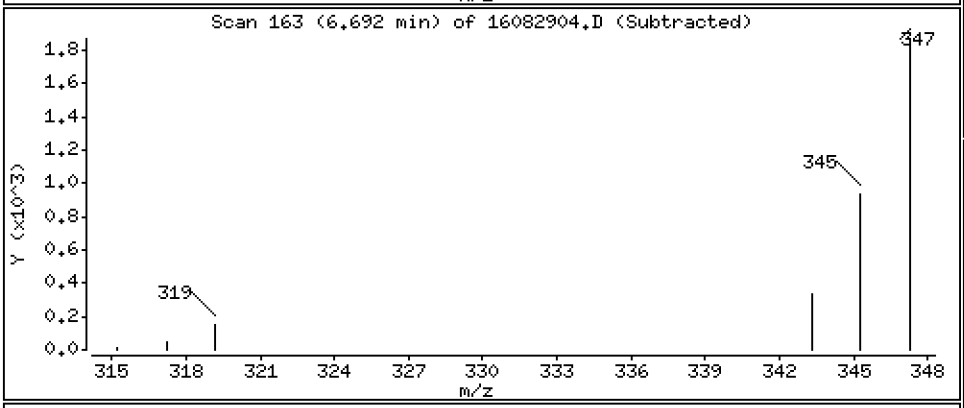
Column diameter: 0.25

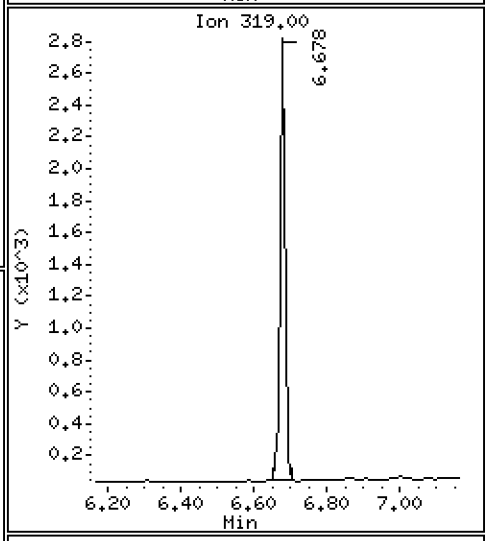
5 Dibutyl Tin (Hexyl)

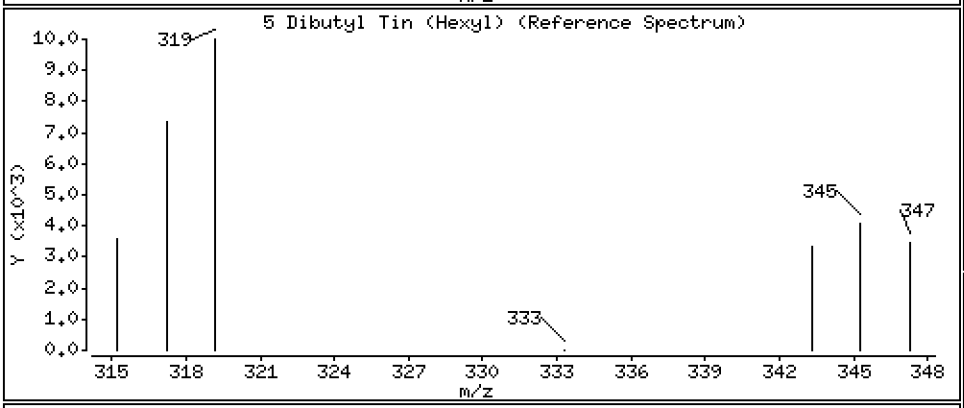
Concentration: 0.4515 ug/mL

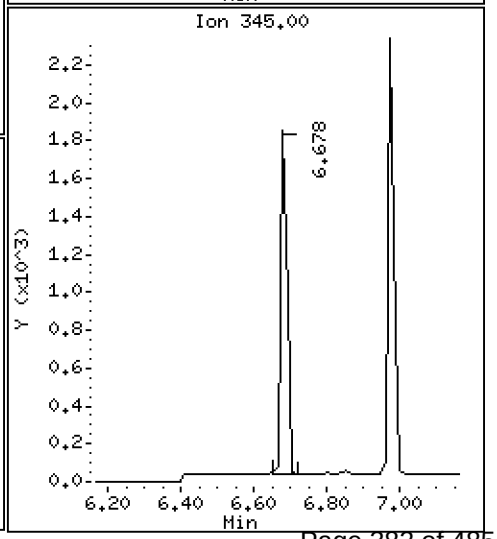


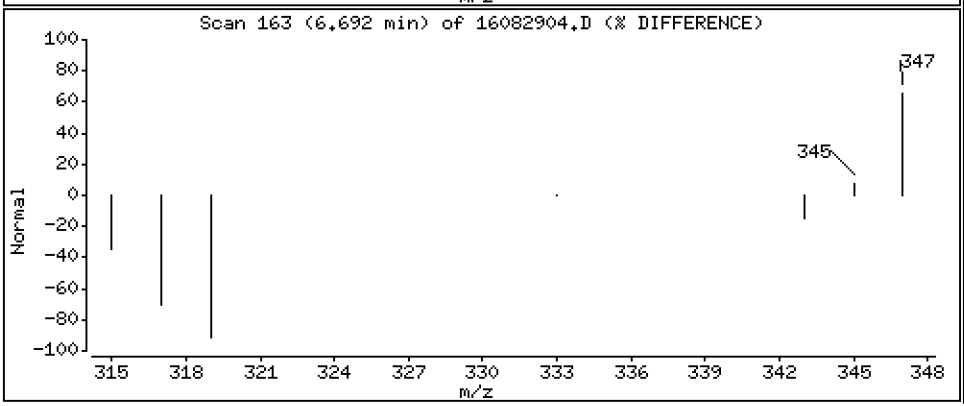












Data File: \\target\share\chem3\nt12.i\20160829.b\16082904.D

Date : 29-AUG-2016 10:16

Client ID:

Instrument: nt12.i

Sample Info: BEH0443-BS1

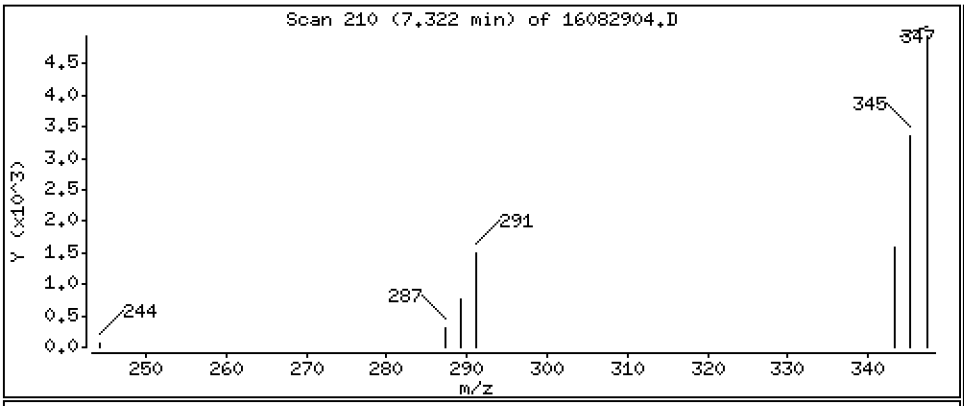
Operator: JW

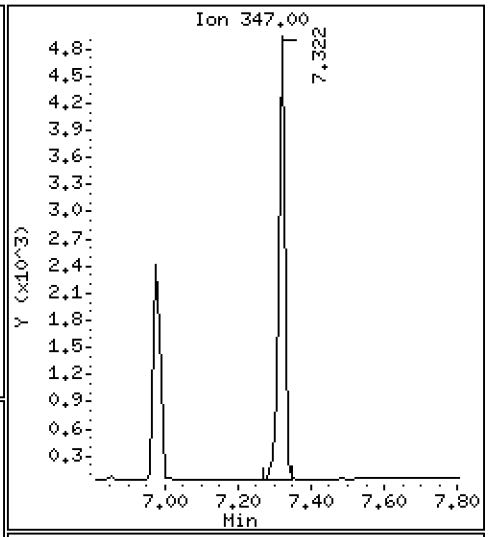
Column phase: ZB-5msi

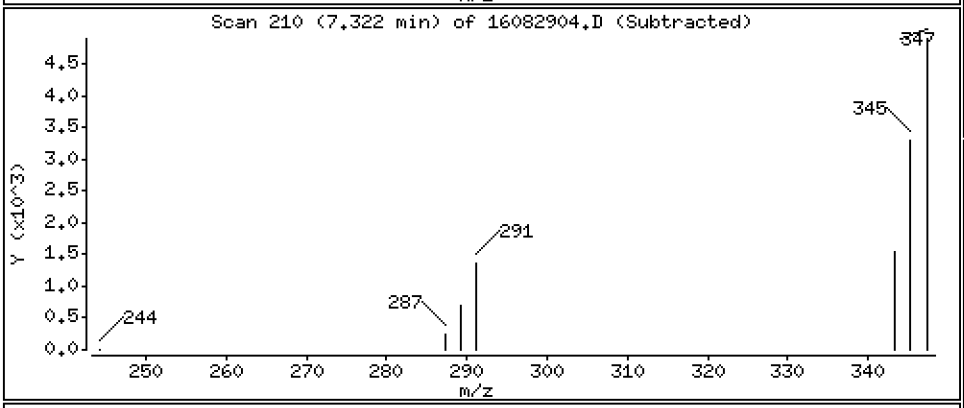
Column diameter: 0.25

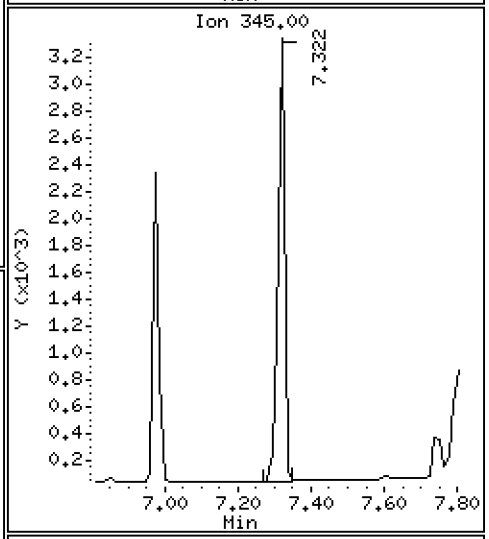
7 Butyl Tin (Hexyl)

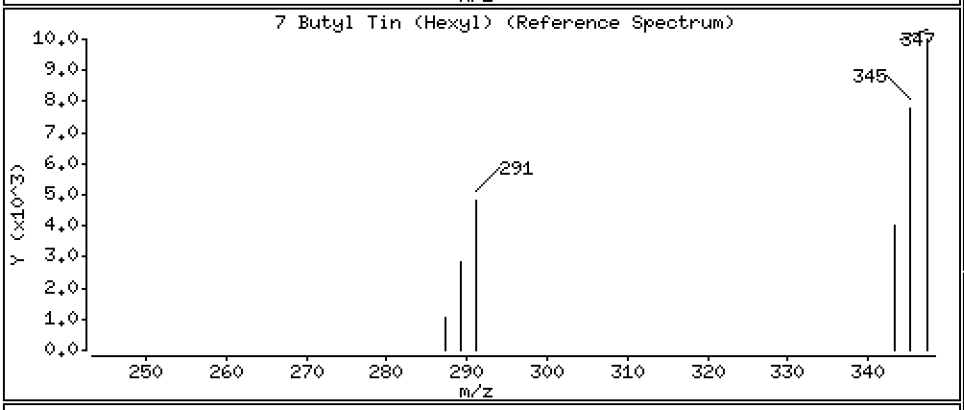
Concentration: 0.5169 ug/mL

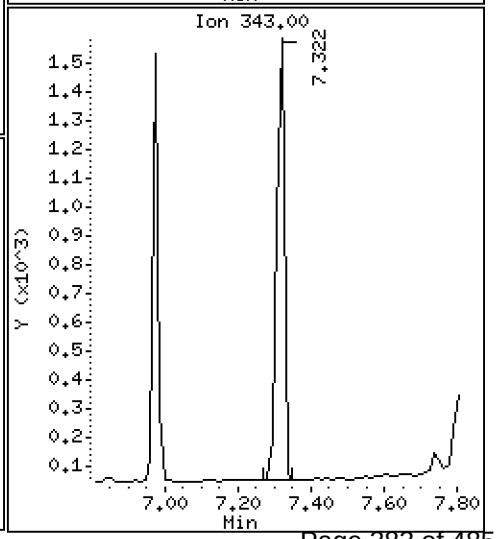


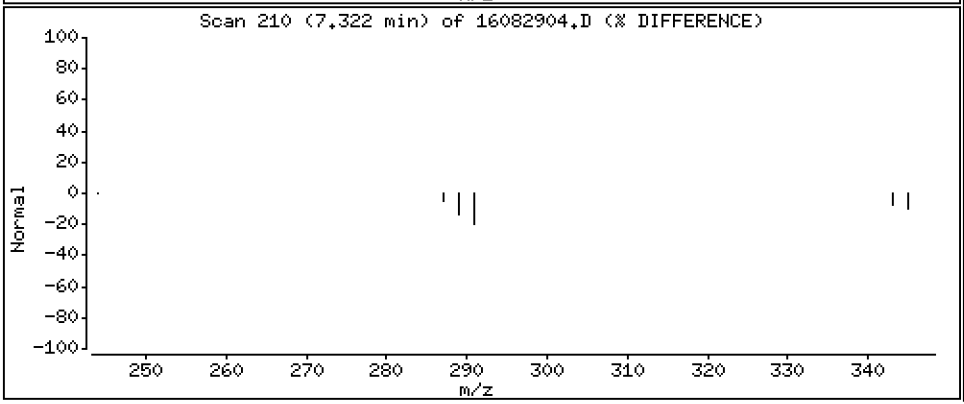












ARI Labs, Inc.

Krone1989/8270D-SIM

Data file : \\target\share\chem3\nt12.i\20160829.b\16082904.D
Lab Smp Id: BEH0443-BS1
Inj Date : 29-AUG-2016 10:16 MS Autotune Date: 03-NOV-2015 14:19
Operator : JW Inst ID: nt12.i
Smp Info : BEH0443-BS1
Misc Info :
Comment : 2 ul Injection
Method : \\target\share\chem3\nt12.i\20160829.b\BTS.m
Meth Date : 29-Aug-2016 12:24 nt12.i Quant Type: ISTD
Cal Date : 04-MAR-2016 10:21 Cal File: 16030407.D
Als bottle: 7
Dil Factor: 1.00000
Integrator: HP RTE Compound Sublist: sed.sub
Target Version: 4.14
Processing Host: AUTOSPECDATA02

	Compounds	QUANT SIG MASS	RT	EXP RT	REL RT	RESPONSE	CONCENTRATIONS ON-COLUMN (ug/mL)	FINAL (ug/mL)
$	1 Tripropyl Tin (Hexyl)	291	5.006	5.006	(0.754)	4419	0.33779	0.3378
	2 Tetrabutyl Tin	289	Compound Not Detected.					
	3 Tributyl Tin (Hexyl)	319	5.984	5.995	(0.902)	4019	0.36706	0.3671
*	4 Tetrapentyl Tin	333	6.637	6.637	(1.000)	29741	2.00000	
	5 Dibutyl Tin (Hexyl)	347	6.691	6.691	(0.889)	2928	0.45155	0.4515
$	6 Tripentyl Tin (Hexyl)	347	6.973	6.986	(0.927)	3310	0.35319	0.3532
	7 Butyl Tin (Hexyl)	347	7.321	7.321	(0.973)	5024	0.51687	0.5169
*	8 p-Terphenyl-d14	244	7.522	7.522	(1.000)	21926	0.20000	(M)

QC Flag Legend

M - Compound response manually integrated.

ARI Labs, Inc.

INTERNAL STANDARD COMPOUNDS
AREA AND RT SUMMARY

Instrument ID: nt12.i
Lab File ID: 16082904.D
Lab Smp Id: BEH0443-BS1
Analysis Type: SV
Quant Type: ISTD
Operator: JW
Method File: \\target\share\chem3\nt12.i\20160829.b\BTS.m
Misc Info:

Calibration Date: 29-AUG-2016
Calibration Time: 08:45
Level:
Sample Type:

Test Mode:
Use Initial Calibration Level 4.

		AREA LIMIT			
COMPOUND	STANDARD	LOWER	UPPER	SAMPLE	%DIFF
4 Tetrapentyl Tin	24391	12196	48782	29741	21.93
8 p-Terphenyl-d14	22552	11276	45104	21926	-2.78

		RT LIMIT			
COMPOUND	STANDARD	LOWER	UPPER	SAMPLE	%DIFF
4 Tetrapentyl Tin	6.64	6.14	7.14	6.64	0.00
8 p-Terphenyl-d14	7.52	7.02	8.02	7.52	0.00

AREA UPPER LIMIT = +100% of internal standard area.
AREA LOWER LIMIT = - 50% of internal standard area.
RT UPPER LIMIT = + 0.50 minutes of internal standard RT.
RT LOWER LIMIT = - 0.50 minutes of internal standard RT.

REVIEW SUMMARY FOR FILE - 16082904.D

Lab ID: BEH0443-BS1
nt12.i, 20160829.b\BTS.m,   29-AUG-2016 10:16

RT	CO-ELUTION COMPOUNDS

NO CO-ELUTIONS

Quant Method: ICAL

RRT CHECK

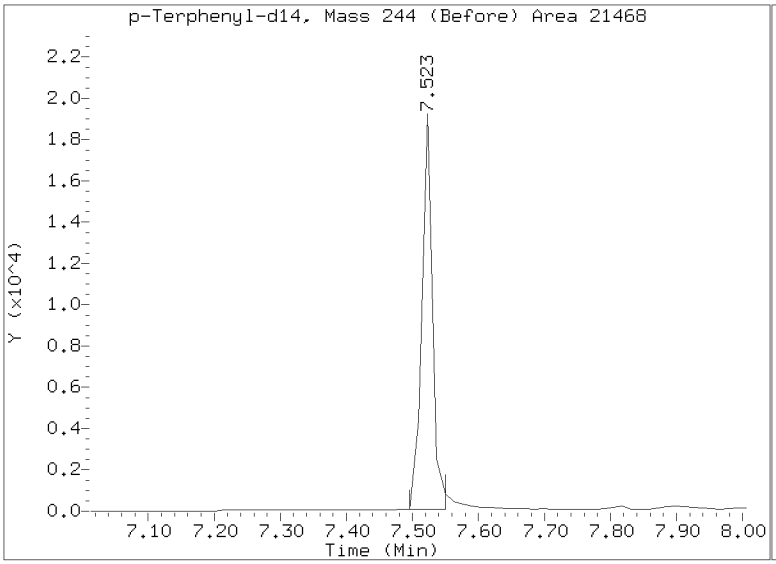
RRT	CCV RRT	DELTA	COMPOUND

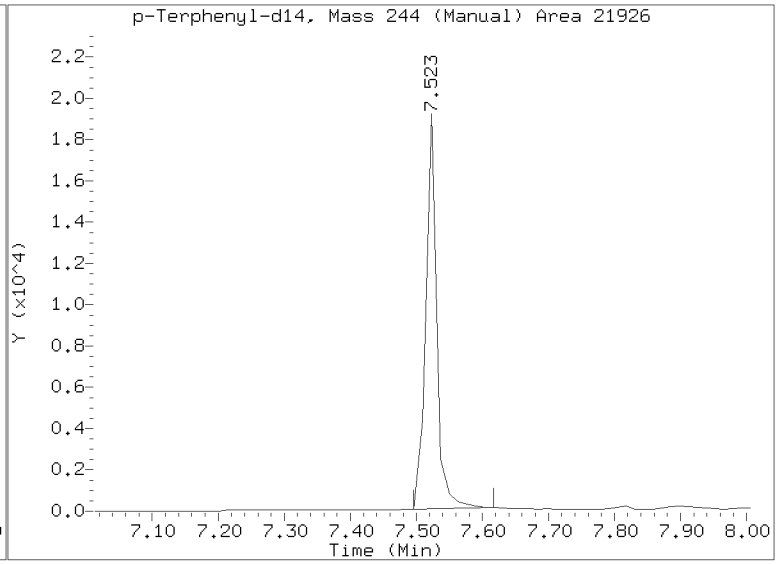
NONE

On Column LOD for nt12.i, 20160829.b\BTS.m, sed.sub = 0.0000

Quant Ion Manual Peak Adjustment Report

Datafile: //target/share/chem3/nt12.i/20160829.b/16082904.D
Injection Date: 29-AUG-2016 10:16
Lab ID:BEH0443-BS1 Client ID:
Report Date: 08/29/2016 12:24





MS / MS DUPLICATE RECOVERY
EPA 8270D-SIM

Laboratory:	Analytical Resources, Inc.	SDG:	16H0071
Client:	Fremont Analytical	Project:	1608094
Matrix:	Solid	Analyzed:	08/29/16 10:41
Batch:	BEH0443	Laboratory ID:	BEH0443-MS1
Preparation:	EPA 3546 (Microwave)	Sequence Name::	Matrix Spike
Initial/Final:	6.14 g / 0.5 mL	Source Sample:	NME:0-4C

COMPOUND	SPIKE ADDED (ug/kg dry)	SAMPLE CONCENTRATION (ug/kg dry)	MS CONCENTRATION (ug/kg dry)	MS % REC. #	QC LIMITS REC.
Tributyltin Ion	42.8	ND	27.8	64.9	30 - 160

* Values outside of QC limits

MS / MS DUPLICATE RECOVERY
EPA 8270D-SIM

Laboratory:	Analytical Resources, Inc.	SDG:	16H0071
Client:	Fremont Analytical	Project:	1608094
Matrix:	Solid	Analyzed:	08/29/16 10:54
Batch:	BEH0443	Laboratory ID:	BEH0443-MSD1
Preparation:	EPA 3546 (Microwave)	Sequence Name::	Matrix Spike Dup
Initial/Final:	6.15 g / 0.5 mL	Source Sample:	NME:0-4C

COMPOUND	SPIKE ADDED (ug/kg dry)	MSD CONCENTRATION (ug/kg dry)	MSD % REC. #	% RPD #	QC LIMITS RPD	QC LIMITS REC.
Tributyltin Ion	42.8	27.6	64.5	0.718	30	30 - 160

* Values outside of QC limits

Data File: \\target\share\chem3\nt12.i\20160829.b\16082906.D

Page 1

Date : 29-AUG-2016 10:41

Client ID:

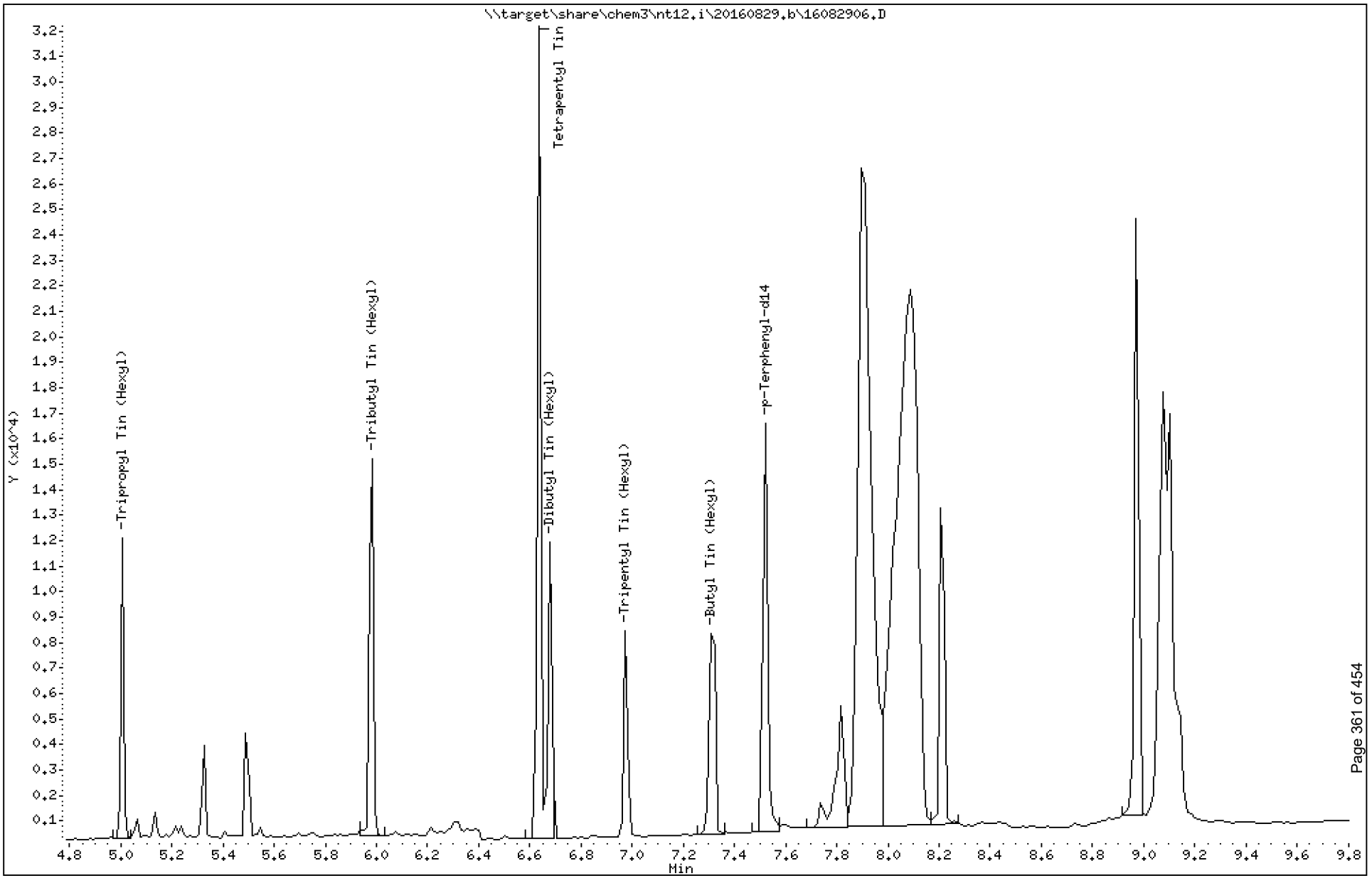
Instrument: nt12.i

Sample Info: BEH0443-MS1

Operator: JW

Column phase: ZB-5msi

Column diameter: 0.25



Data File: \\target\share\chem3\nt12.i\20160829.b\16082906.D

Date : 29-AUG-2016 10:41

Client ID:

Instrument: nt12.i

Sample Info: BEH0443-MS1

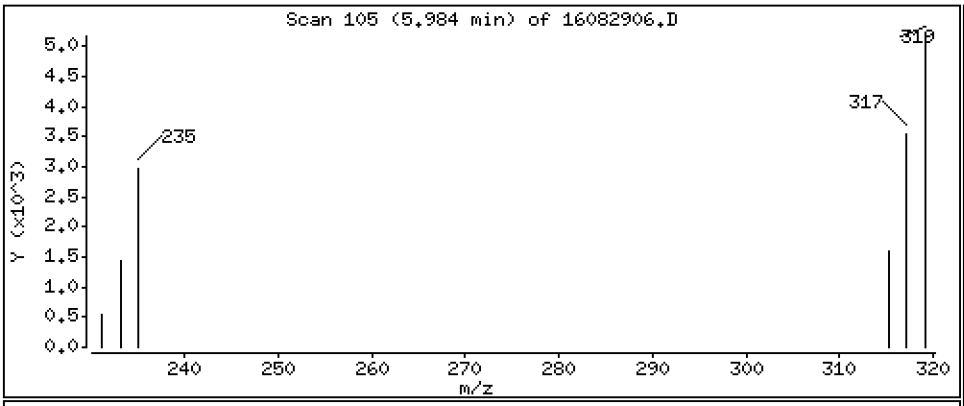
Operator: JW

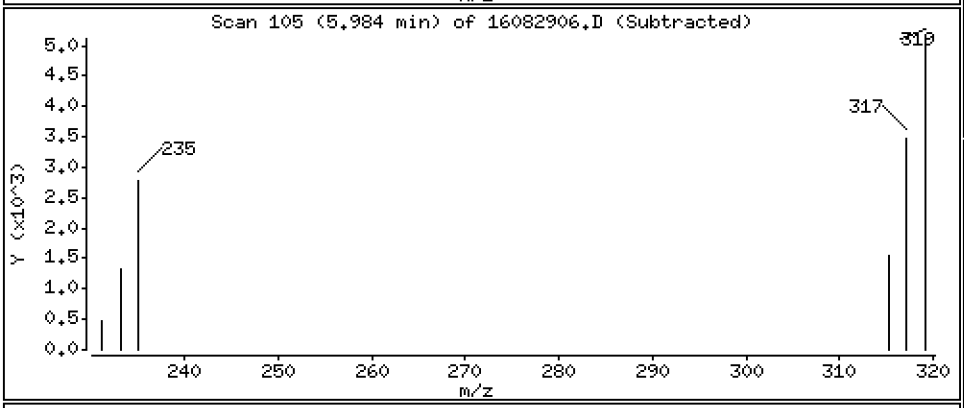
Column phase: ZB-5msi

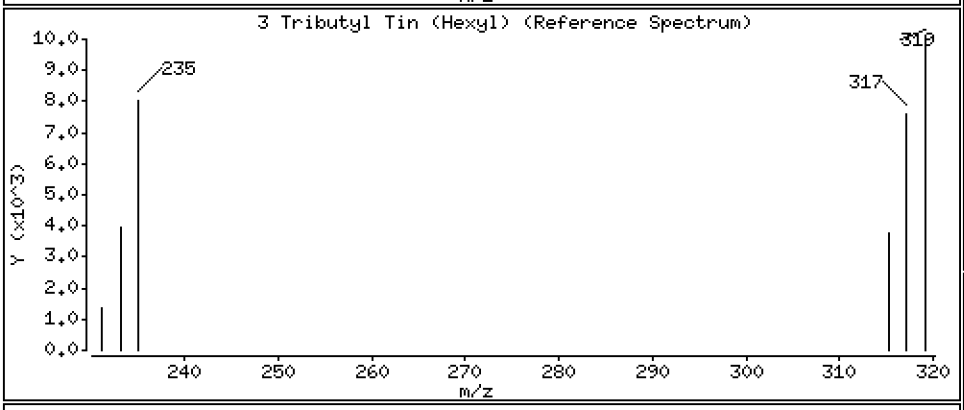
Column diameter: 0.25

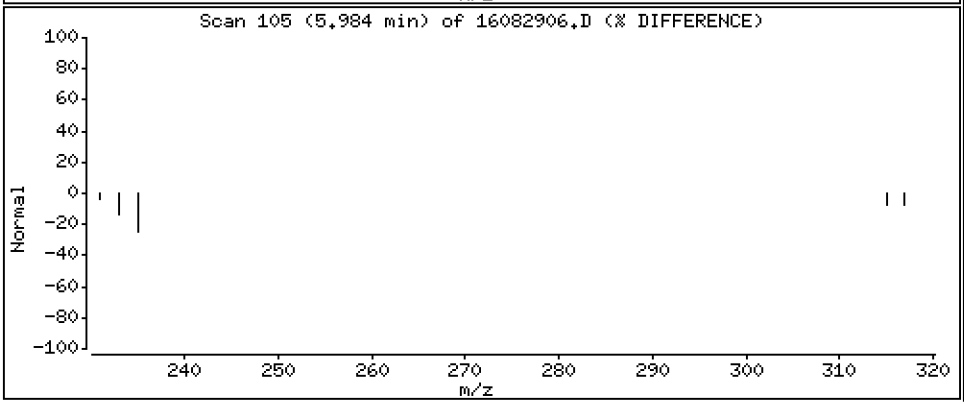
3 Tributyl Tin (Hexyl)

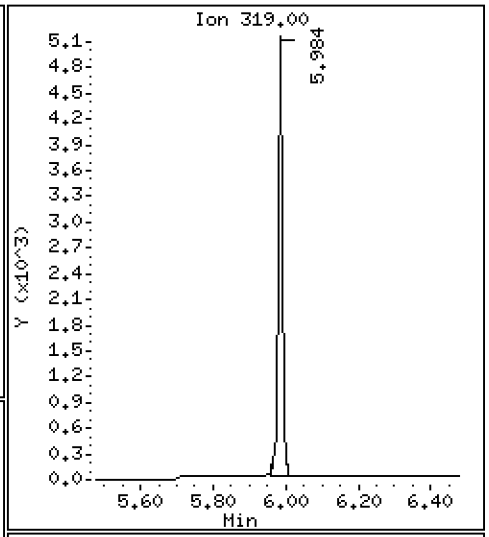
Concentration: 0.3738 ug/mL

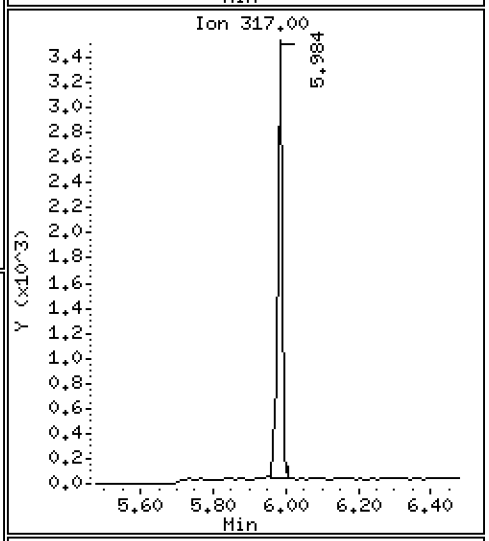


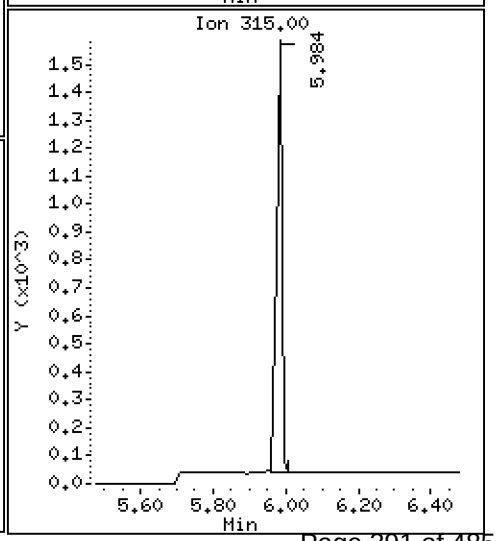












Data File: \\target\share\chem3\nt12.i\20160829.b\16082906.D

Date : 29-AUG-2016 10:41

Client ID:

Instrument: nt12.i

Sample Info: BEH0443-MS1

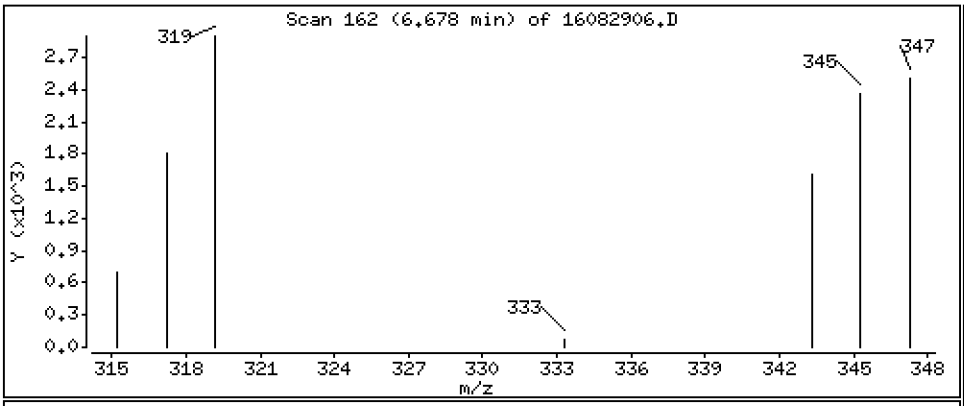
Operator: JW

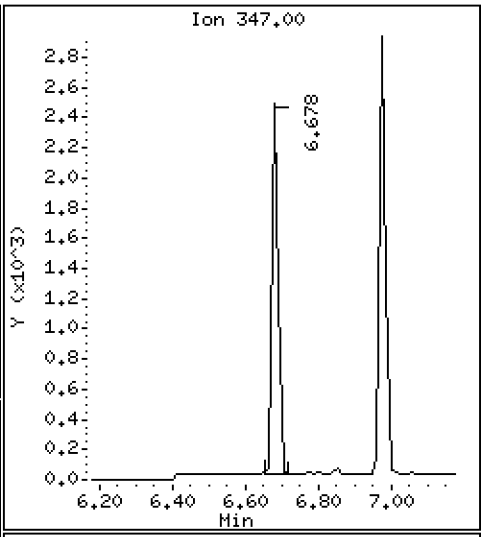
Column phase: ZB-5msi

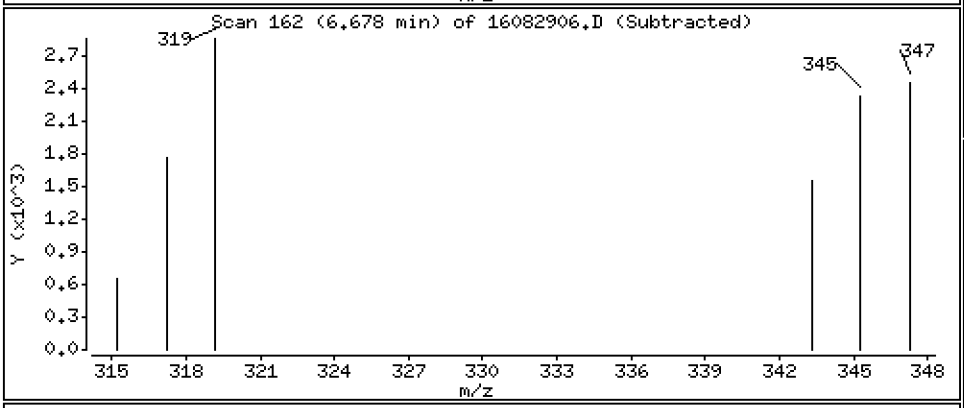
Column diameter: 0.25

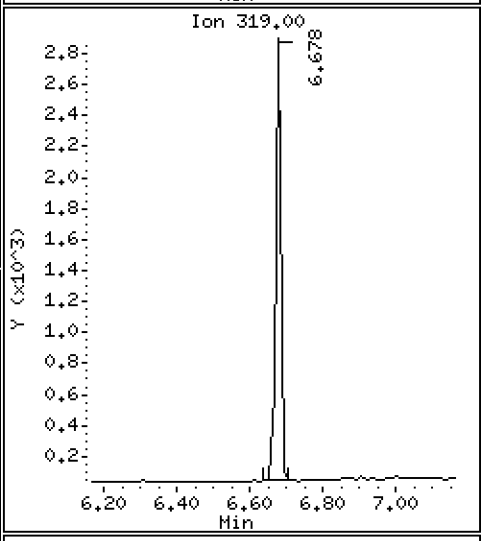
5 Dibutyl Tin (Hexyl)

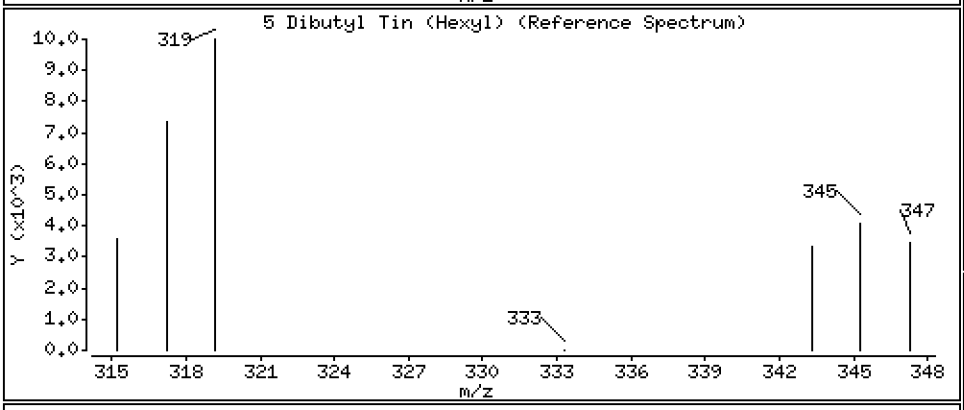
Concentration: 0.4562 ug/mL

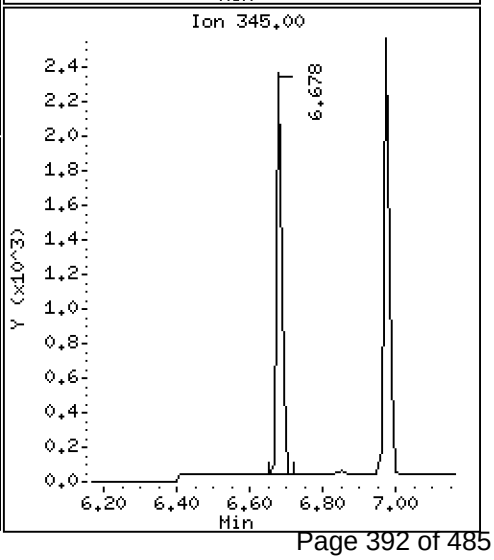


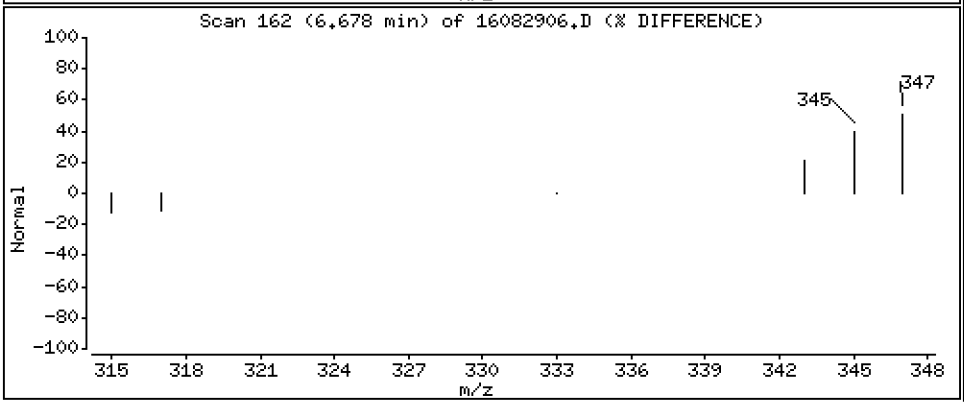












Data File: \\target\share\chem3\nt12.i\20160829.b\16082906.D

Date : 29-AUG-2016 10:41

Client ID:

Instrument: nt12.i

Sample Info: BEH0443-MS1

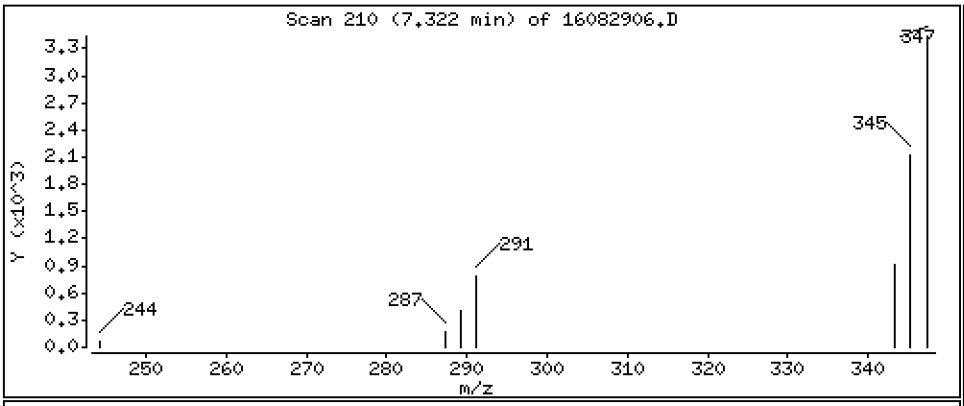
Operator: JW

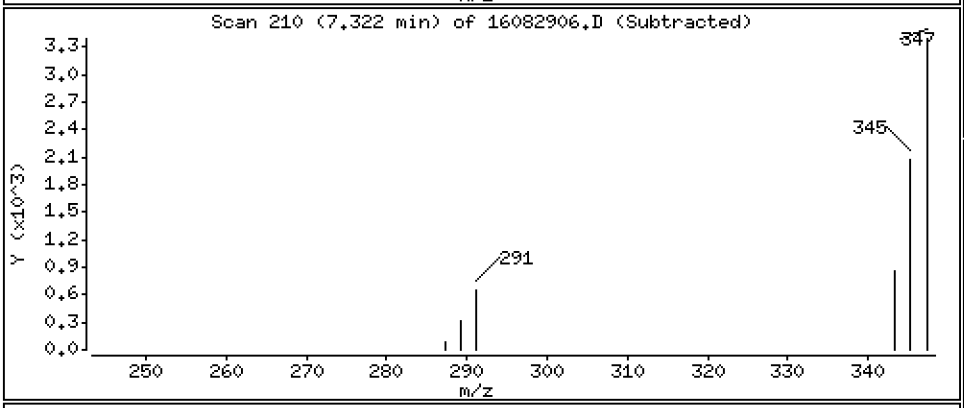
Column phase: ZB-5msi

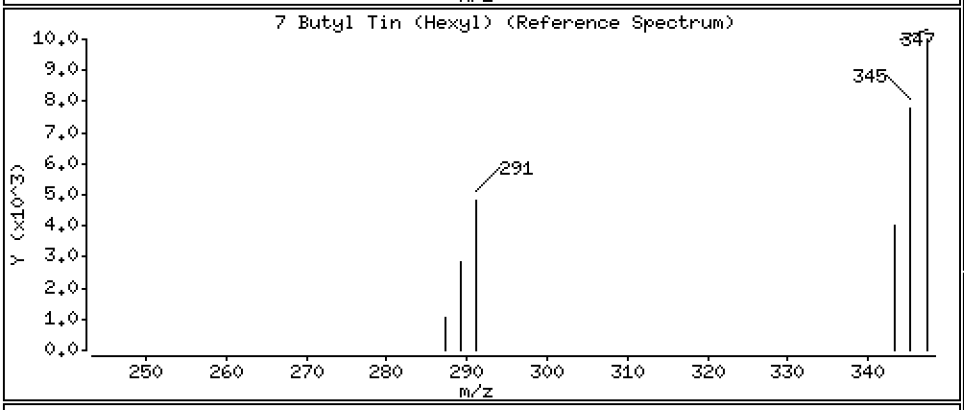
Column diameter: 0.25

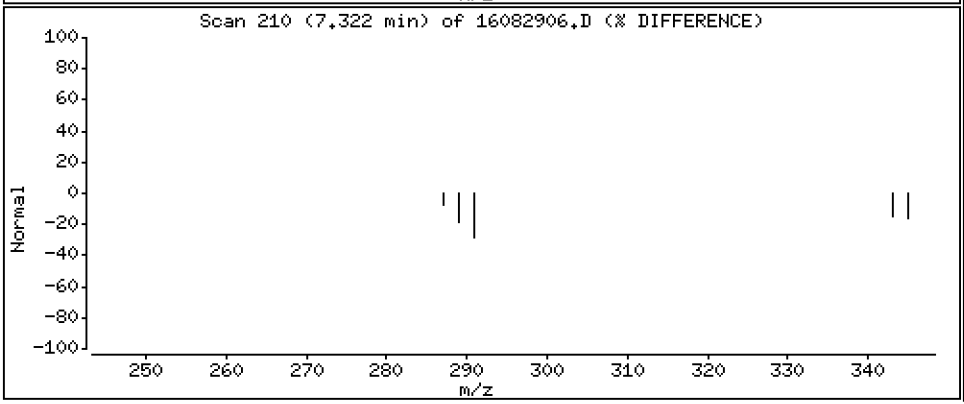
7 Butyl Tin (Hexyl)

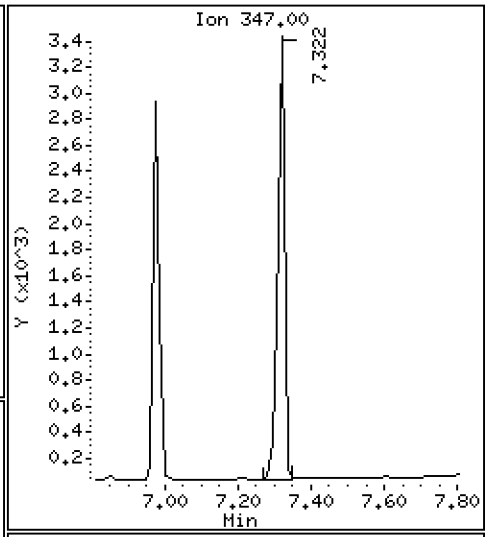
Concentration: 0.4131 ug/mL

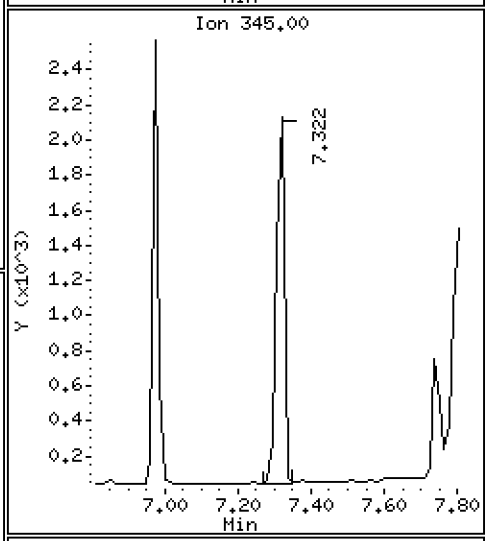


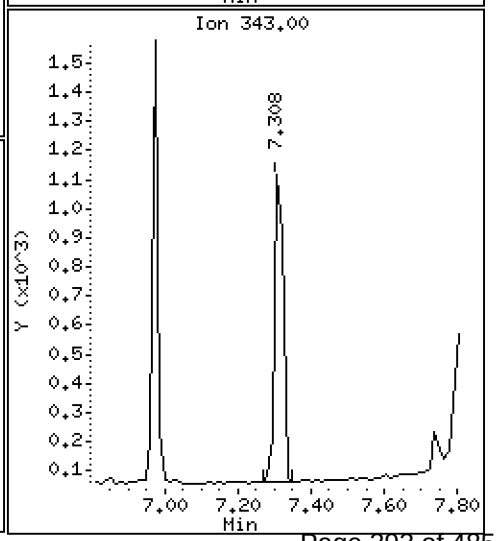












ARI Labs, Inc.

Krone1989/8270D-SIM

Data file : \\target\share\chem3\nt12.i\20160829.b\16082906.D
Lab Smp Id: BEH0443-MS1
Inj Date : 29-AUG-2016 10:41 MS Autotune Date: 03-NOV-2015 14:19
Operator : JW Inst ID: nt12.i
Smp Info : BEH0443-MS1
Misc Info :
Comment : 2 ul Injection
Method : \\target\share\chem3\nt12.i\20160829.b\BTS.m
Meth Date : 29-Aug-2016 12:24 nt12.i Quant Type: ISTD
Cal Date : 04-MAR-2016 10:21 Cal File: 16030407.D
Als bottle: 9
Dil Factor: 1.00000
Integrator: HP RTE Compound Sublist: sed.sub
Target Version: 4.14
Processing Host: AUTOSPECDATA02

	Compounds	QUANT SIG MASS	RT	EXP RT	REL RT	RESPONSE	CONCENTRATIONS ON-COLUMN (ug/mL)	FINAL (ug/mL)	
$	1 Tripropyl Tin (Hexyl)	291	5.006	5.006	(0.754)	4427	0.32820	0.3282	
	2 Tetrabutyl Tin	289	Compound Not Detected.						
	3 Tributyl Tin (Hexyl)	319	5.984	5.995	(0.902)	4220	0.37380	0.3738	
*	4 Tetrapentyl Tin	333	6.638	6.637	(1.000)	30665	2.00000		
	5 Dibutyl Tin (Hexyl)	347	6.678	6.691	(0.888)	2956	0.45618	0.4562	
$	6 Tripentyl Tin (Hexyl)	347	6.973	6.986	(0.927)	3417	0.36486	0.3649	
	7 Butyl Tin (Hexyl)	347	7.321	7.321	(0.973)	4013	0.41314	0.4131	
*	8 p-Terphenyl-d14	244	7.522	7.522	(1.000)	21911	0.20000		(M)

QC Flag Legend

M - Compound response manually integrated.

ARI Labs, Inc.

INTERNAL STANDARD COMPOUNDS
AREA AND RT SUMMARY

Instrument ID: nt12.i
Lab File ID: 16082906.D
Lab Smp Id: BEH0443-MS1
Analysis Type: SV
Quant Type: ISTD
Operator: JW
Method File: \\target\share\chem3\nt12.i\20160829.b\BTS.m
Misc Info:

Calibration Date: 29-AUG-2016
Calibration Time: 08:45
Level:
Sample Type:

Test Mode:
Use Initial Calibration Level 4.

		AREA LIMIT			
COMPOUND	STANDARD	LOWER	UPPER	SAMPLE	%DIFF
4 Tetrapentyl Tin	24391	12196	48782	30665	25.72
8 p-Terphenyl-d14	22552	11276	45104	21911	-2.84

		RT LIMIT			
COMPOUND	STANDARD	LOWER	UPPER	SAMPLE	%DIFF
4 Tetrapentyl Tin	6.64	6.14	7.14	6.64	0.00
8 p-Terphenyl-d14	7.52	7.02	8.02	7.52	0.00

AREA UPPER LIMIT = +100% of internal standard area.
AREA LOWER LIMIT = - 50% of internal standard area.
RT UPPER LIMIT = + 0.50 minutes of internal standard RT.
RT LOWER LIMIT = - 0.50 minutes of internal standard RT.

REVIEW SUMMARY FOR FILE - 16082906.D

Lab ID: BEH0443-MS1
nt12.i, 20160829.b\BTS.m,   29-AUG-2016 10:41

RT	CO-ELUTION COMPOUNDS

NO CO-ELUTIONS

Quant Method: ICAL

RRT CHECK

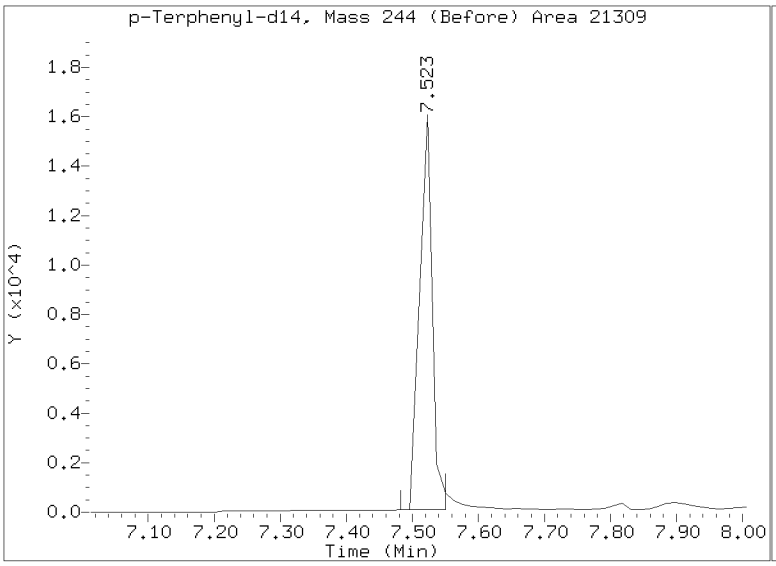
RRT	CCV RRT	DELTA	COMPOUND

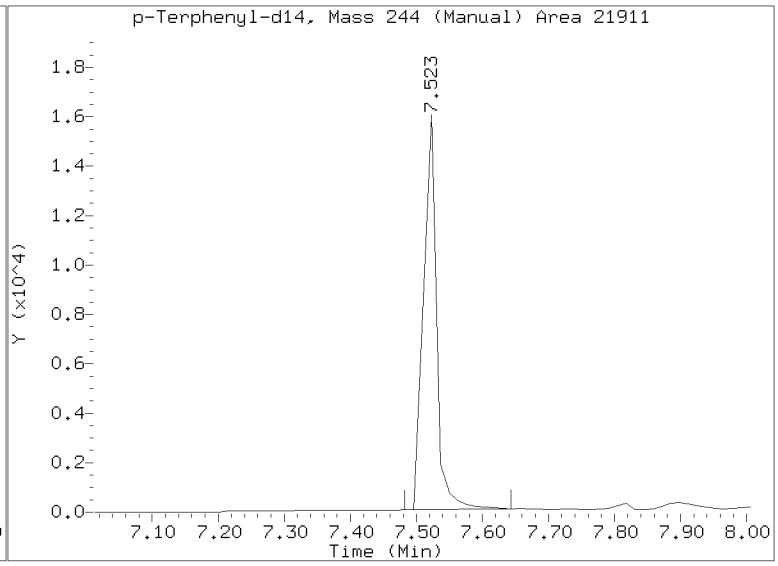
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On Column LOD for nt12.i, 20160829.b\BTS.m, sed.sub = 0.0000

Quant Ion Manual Peak Adjustment Report

Datafile: //target/share/chem3/nt12.i/20160829.b/16082906.D
Injection Date: 29-AUG-2016 10:41
Lab ID:BEH0443-MS1 Client ID:
Report Date: 08/29/2016 12:25





Data File: \\target\share\chem3\nt12.i\20160829.b\16082907.D

Date : 29-AUG-2016 10:54

Client ID:

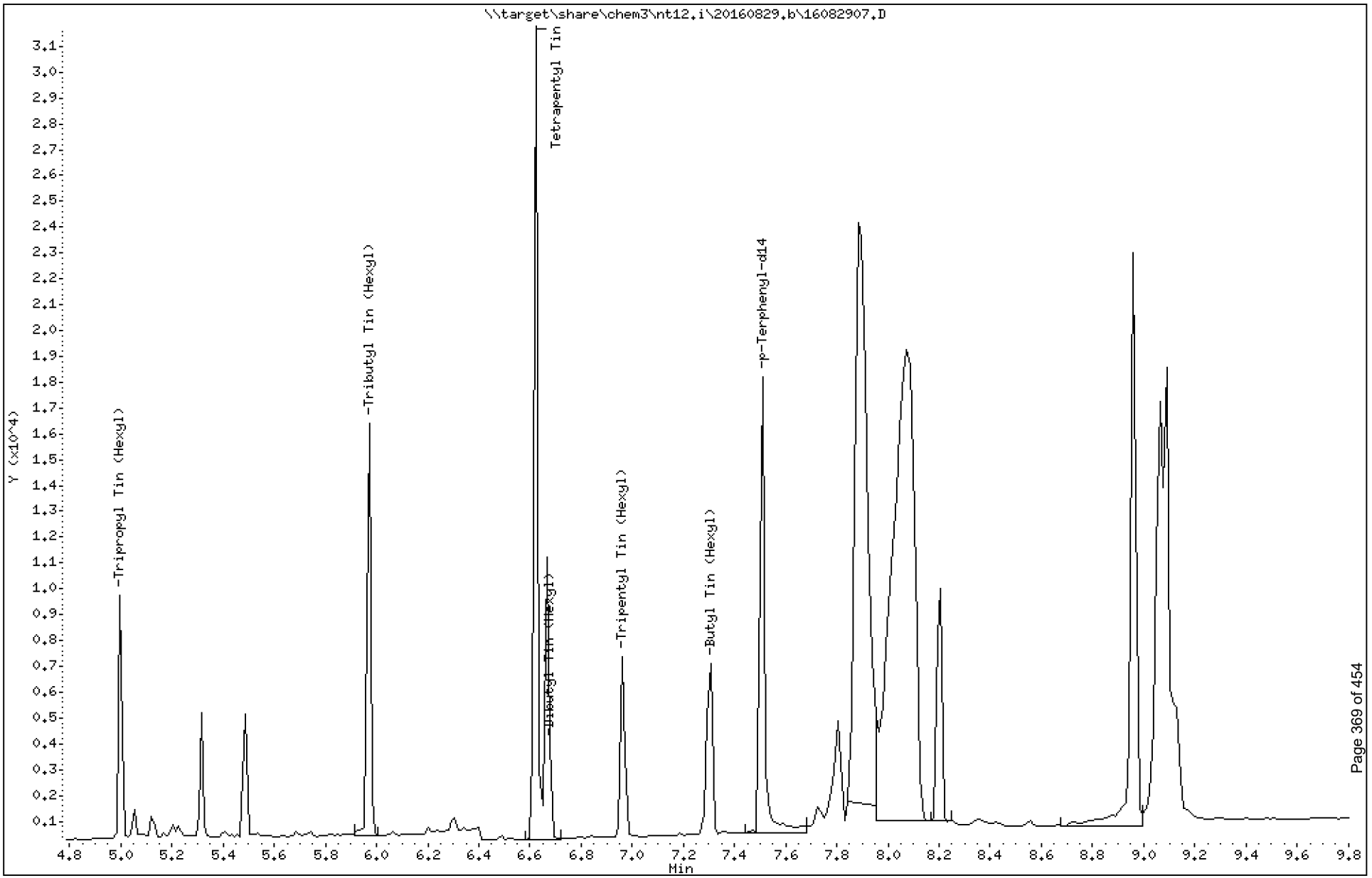
Instrument: nt12.i

Sample Info: BEH0443-MSD1

Operator: JW

Column phase: ZB-5msi

Column diameter: 0.25



Data File: \\target\share\chem3\nt12.i\20160829.b\16082907.D

Date : 29-AUG-2016 10:54

Client ID:

Instrument: nt12.i

Sample Info: BEH0443-MSD1

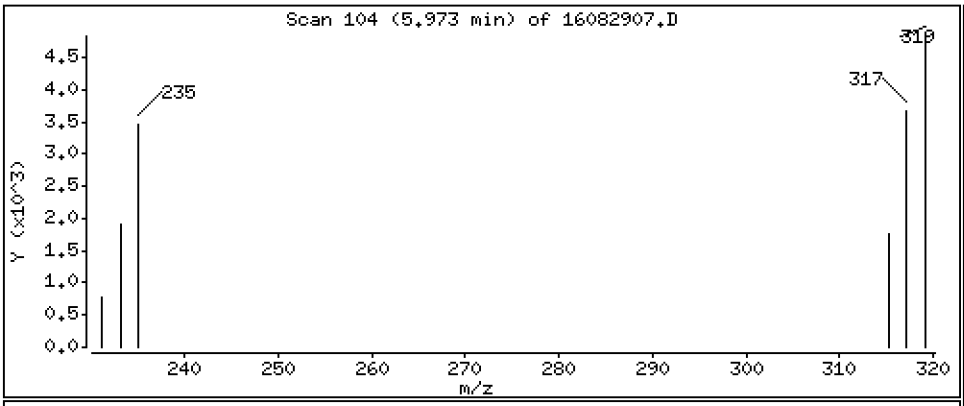
Operator: JW

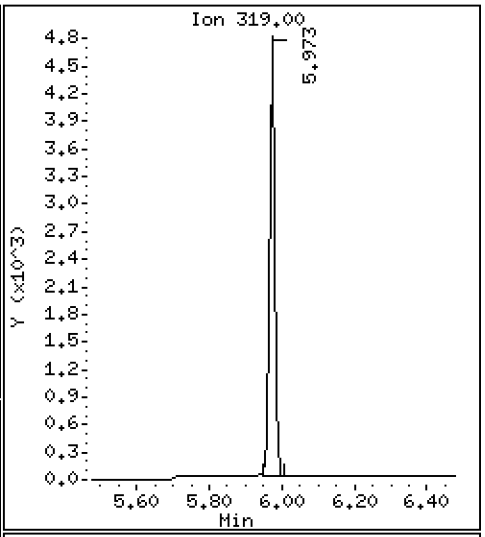
Column phase: ZB-5msi

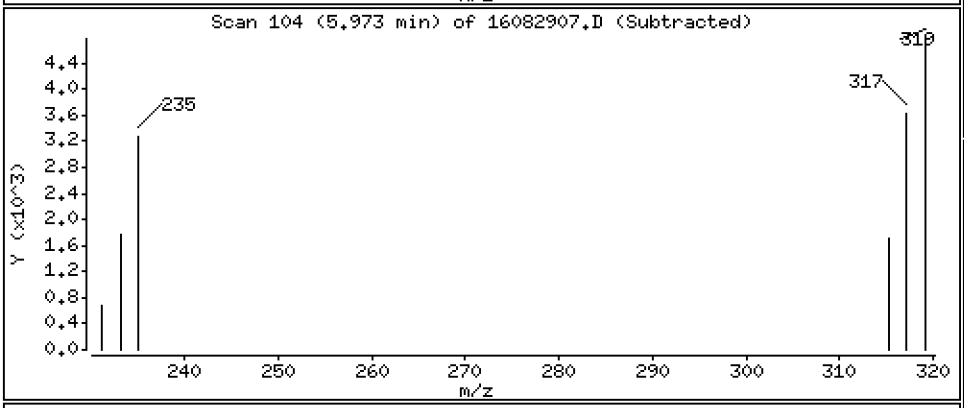
Column diameter: 0.25

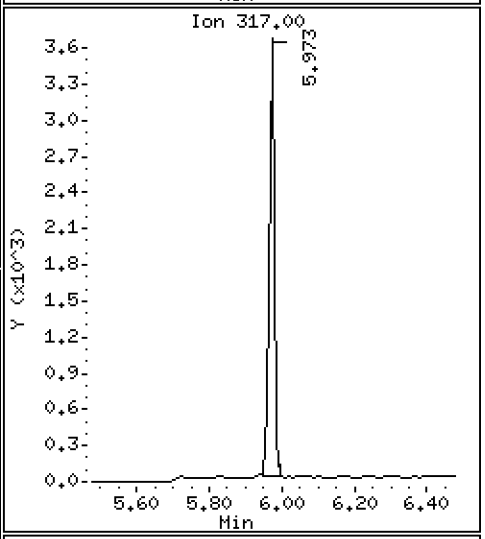
3 Tributyl Tin (Hexyl)

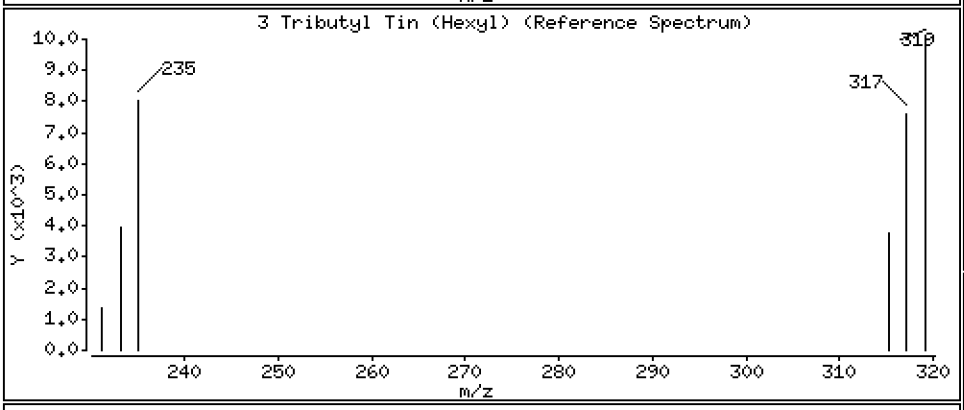
Concentration: 0.3717 ug/mL

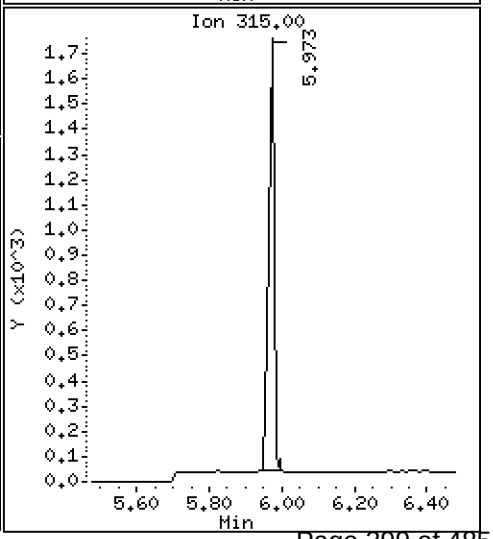


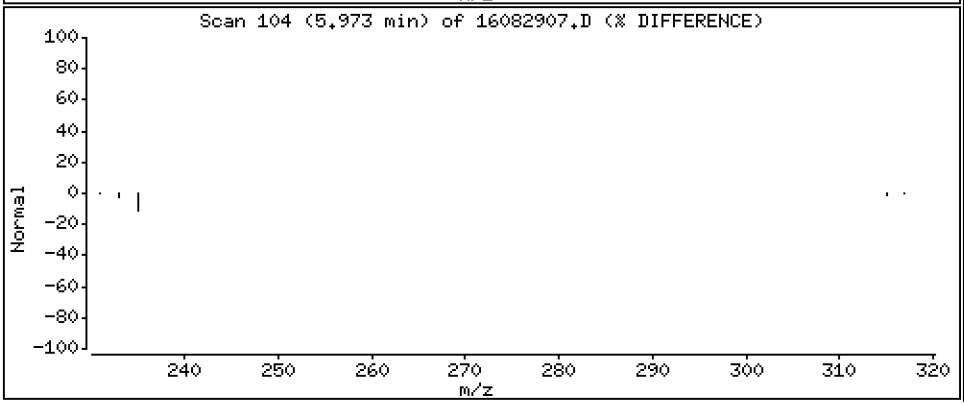












Data File: \\target\share\chem3\nt12.i\20160829.b\16082907.D

Date : 29-AUG-2016 10:54

Client ID:

Instrument: nt12.i

Sample Info: BEH0443-MSD1

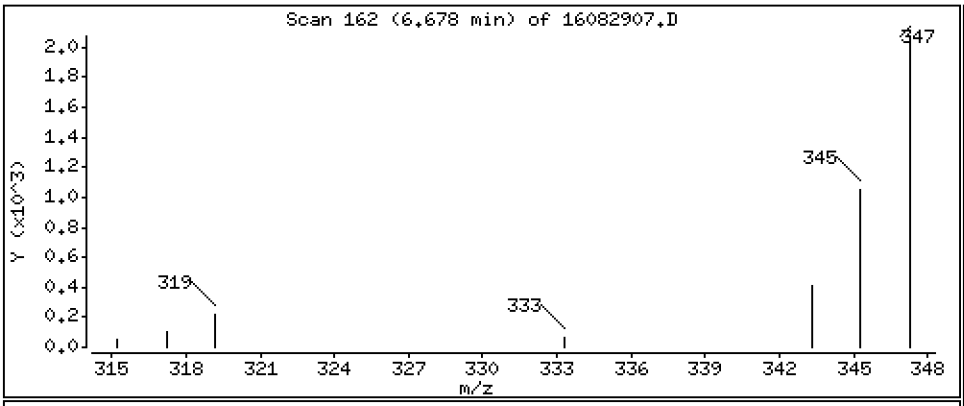
Operator: JW

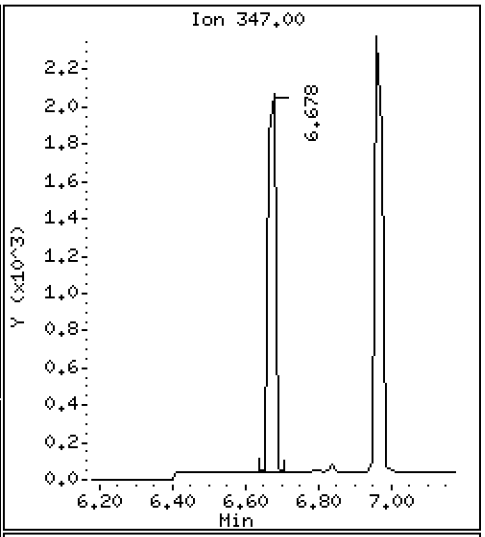
Column phase: ZB-5msi

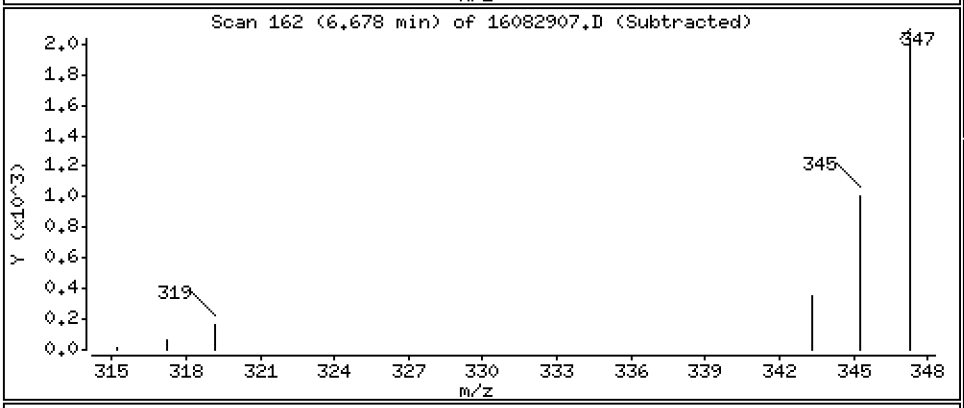
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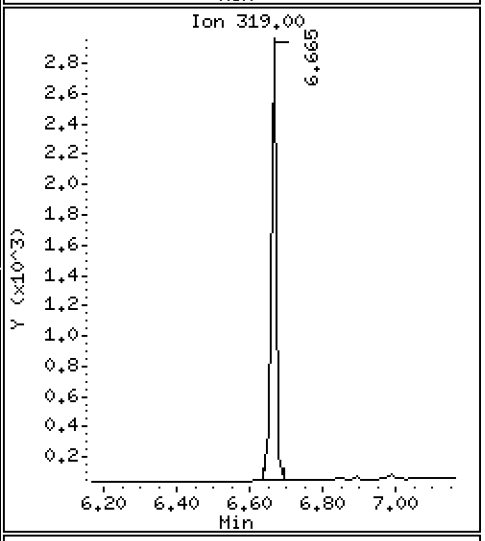
5 Dibutyl Tin (Hexyl)

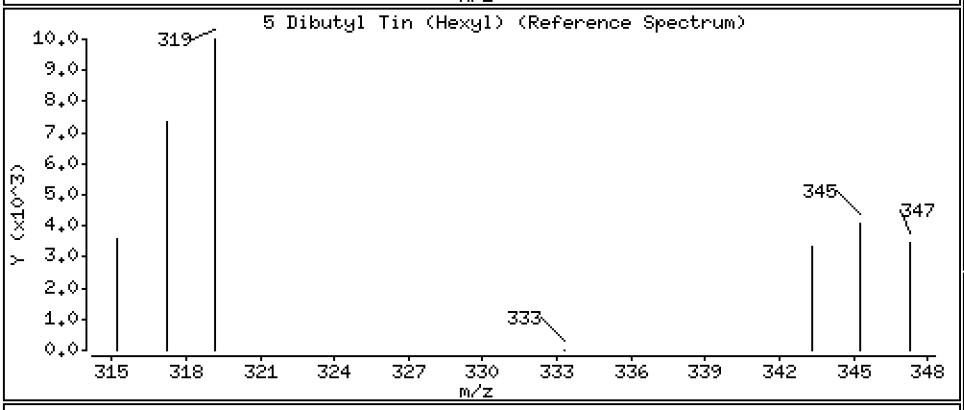
Concentration: 0.4756 ug/mL

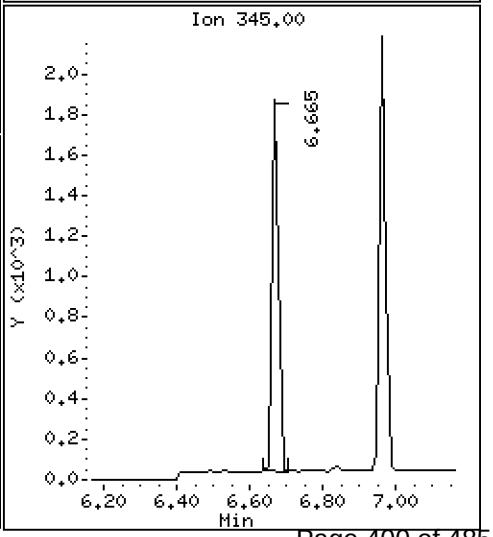


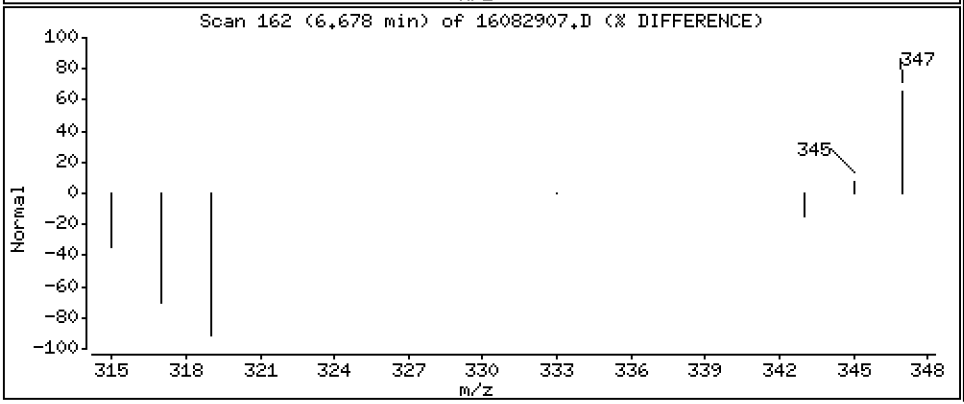












Data File: \\target\share\chem3\nt12.i\20160829.b\16082907.D

Date : 29-AUG-2016 10:54

Client ID:

Instrument: nt12.i

Sample Info: BEH0443-MSD1

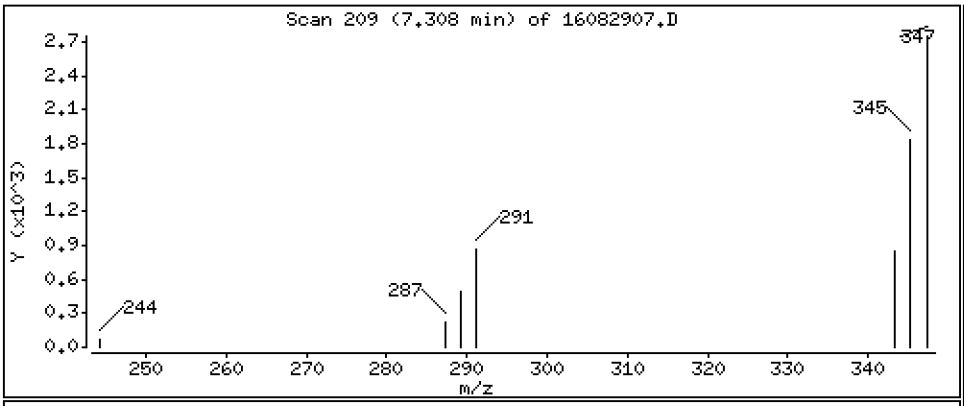
Operator: JW

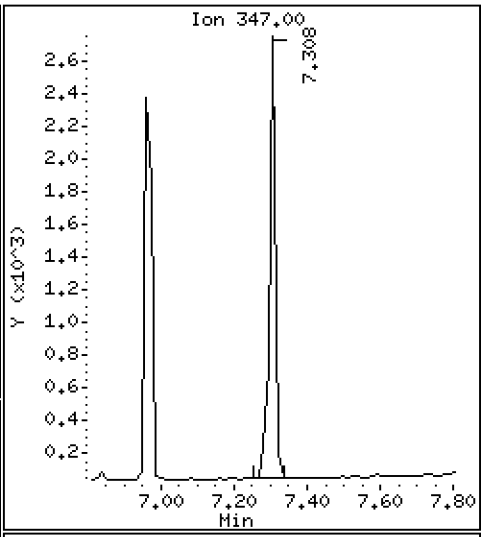
Column phase: ZB-5msi

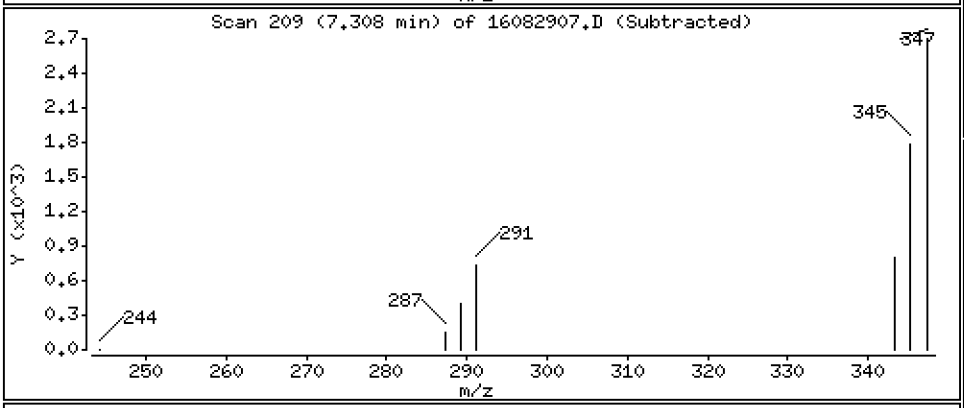
Column diameter: 0.25

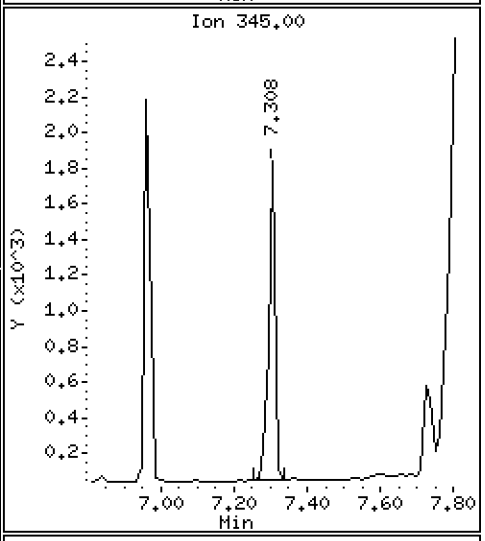
7 Butyl Tin (Hexyl)

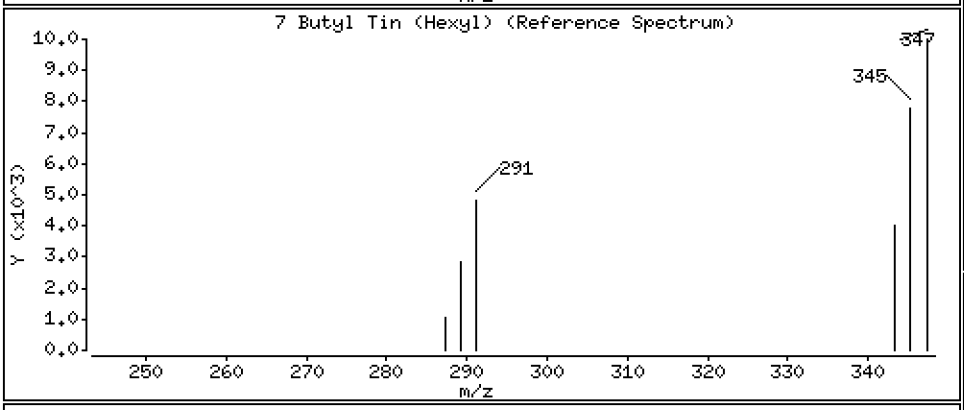
Concentration: 0.3061 ug/mL

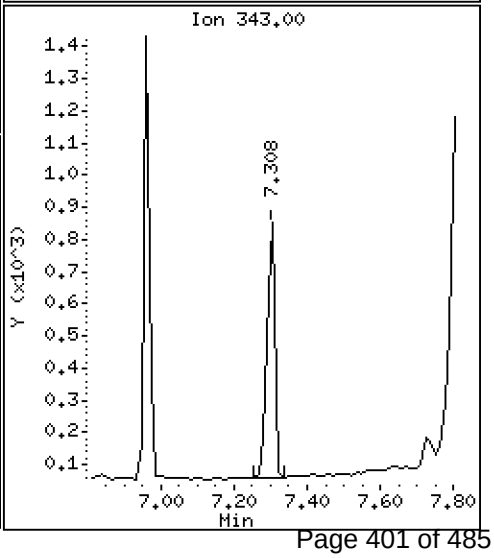


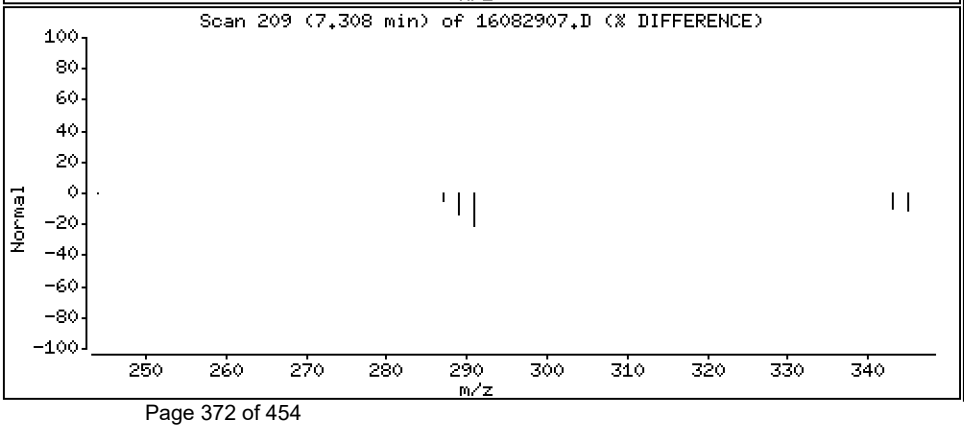












ARI Labs, Inc.

Krone1989/8270D-SIM

Data file : \\target\share\chem3\nt12.i\20160829.b\16082907.D
Lab Smp Id: BEH0443-MSD1
Inj Date : 29-AUG-2016 10:54 MS Autotune Date: 03-NOV-2015 14:19
Operator : JW Inst ID: nt12.i
Smp Info : BEH0443-MSD1
Misc Info :
Comment : 2 ul Injection
Method : \\target\share\chem3\nt12.i\20160829.b\BTS.m
Meth Date : 29-Aug-2016 12:24 nt12.i Quant Type: ISTD
Cal Date : 04-MAR-2016 10:21 Cal File: 16030407.D
Als bottle: 10
Dil Factor: 1.00000
Integrator: HP RTE Compound Sublist: sed.sub
Target Version: 4.14
Processing Host: AUTOSPECDATA02

	Compounds	QUANT SIG MASS	RT	EXP RT	REL RT	RESPONSE	CONCENTRATIONS ON-COLUMN (ug/mL)	FINAL (ug/mL)
$	1 Tripropyl Tin (Hexyl)	291	4.994	5.006	(0.754)	4200	0.31778	0.3178
	2 Tetrabutyl Tin	289	Compound Not Detected.					
	3 Tributyl Tin (Hexyl)	319	5.972	5.995	(0.902)	4112	0.37173	0.3717
*	4 Tetrapentyl Tin	333	6.624	6.637	(1.000)	30047	2.00000	
	5 Dibutyl Tin (Hexyl)	347	6.677	6.691	(0.889)	3117	0.47555	0.4756
$	6 Tripentyl Tin (Hexyl)	347	6.959	6.986	(0.927)	3415	0.36050	0.3605
	7 Butyl Tin (Hexyl)	347	7.308	7.321	(0.973)	3007	0.30605	0.3061
*	8 p-Terphenyl-d14	244	7.509	7.522	(1.000)	22163	0.20000	(M)

QC Flag Legend

M - Compound response manually integrated.

ARI Labs, Inc.

INTERNAL STANDARD COMPOUNDS
AREA AND RT SUMMARY

Instrument ID: nt12.i
Lab File ID: 16082907.D
Lab Smp Id: BEH0443-MSD1
Analysis Type: SV
Quant Type: ISTD
Operator: JW
Method File: \\target\share\chem3\nt12.i\20160829.b\BTS.m
Misc Info:

Calibration Date: 29-AUG-2016
Calibration Time: 08:45
Level:
Sample Type:

Test Mode:
Use Initial Calibration Level 4.

		AREA LIMIT			
COMPOUND	STANDARD	LOWER	UPPER	SAMPLE	%DIFF
4 Tetrapentyl Tin	24391	12196	48782	30047	23.19
8 p-Terphenyl-d14	22552	11276	45104	22163	-1.72

		RT LIMIT			
COMPOUND	STANDARD	LOWER	UPPER	SAMPLE	%DIFF
4 Tetrapentyl Tin	6.64	6.14	7.14	6.62	-0.20
8 p-Terphenyl-d14	7.52	7.02	8.02	7.51	-0.18

AREA UPPER LIMIT = +100% of internal standard area.
AREA LOWER LIMIT = - 50% of internal standard area.
RT UPPER LIMIT = + 0.50 minutes of internal standard RT.
RT LOWER LIMIT = - 0.50 minutes of internal standard RT.

REVIEW SUMMARY FOR FILE - 16082907.D

Lab ID: BEH0443-MSD1
nt12.i, 20160829.b\BTS.m,   29-AUG-2016 10:54

RT	CO-ELUTION COMPOUNDS

NO CO-ELUTIONS

Quant Method: ICAL

RRT CHECK

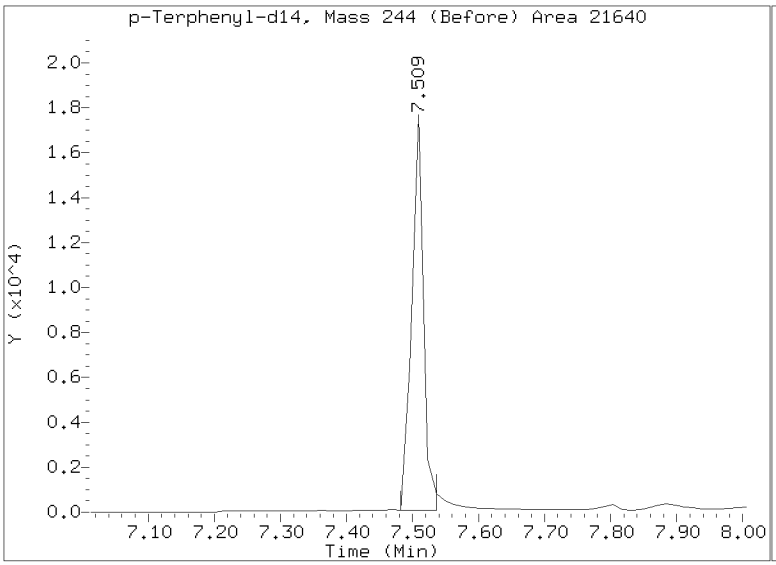
RRT	CCV RRT	DELTA	COMPOUND

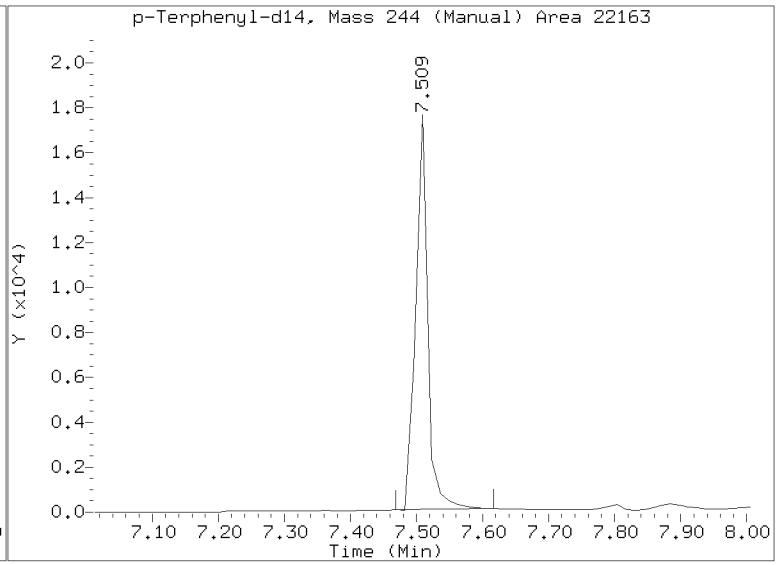
NONE

On Column LOD for nt12.i, 20160829.b\BTS.m, sed.sub = 0.0000

Quant Ion Manual Peak Adjustment Report

Datafile: //target/share/chem3/nt12.i/20160829.b/16082907.D
Injection Date: 29-AUG-2016 10:54
Lab ID:BEH0443-MSD1 Client ID:
Report Date: 08/29/2016 12:25





PREPARATION BATCH SUMMARY

EPA 8270D-SIM

Laboratory: Analytical Resources, Inc. SDG: 16H0071

Client: Fremont Analytical Project: 1608094

Batch: BEH0443 Batch Matrix: Solid Preparation: EPA 3546 (Microwave)

SAMPLE NAME	LAB SAMPLE ID	LAB FILE ID	DATE PREPARED	OBSERVATIONS
NME:0-4C	16H0071-01	16082905.D	08/24/16 10:15	
NME:4-7C	16H0071-02	16082908.D	08/24/16 10:15	
Blank	BEH0443-BLK1	16082903.D	08/24/16 10:15	
LCS	BEH0443-BS1	16082904.D	08/24/16 10:15	
NME:0-4C	BEH0443-MS1	16082906.D	08/24/16 10:15	
NME:0-4C	BEH0443-MSD1	16082907.D	08/24/16 10:15	

Analytical Resources, Incorporated
Analytical Chemists and Consultants

ORGANICS PREPARATION BENCH SHEET

Batch: BEH0443

Prepared using: EPA 3546 (Microwave)

8270D-SIM Butyl Tins in Solid (Version:TBT Only)

Matrix: Solid **Date Prepared:** 08/24/16 **Balance ID:** B139298002 **Set Up By:** SP

The following standards may be missing from this batch!

Designator	Description
QLS 3	QLS Spike

Analysis: 8270D-SIM Butyl Tins

Lab Number & Container	% Solids	Initial (g) Target Dry: 5 (Wet)	Actual Wet Wt (g)	Final Effective Vol (mL)	Vol (mL) to Lab	Extraction Comments
16H0071-01 A	84.7	(5.90)	6.13	0.5	0.5	
16H0071-02 A	86.2	(5.80)	6.06	0.5	0.5	

Batch QC

Lab Number	% Solids	Initial (g) Target Dry: 5 (Wet)	Actual Wet Wt (g)	Final Effective Vol (mL)	Vol (mL) to Lab	Extraction Comments
BEH0443-BLK1	100.0	(5.00)	5.00	0.5	0.5	
BEH0443-BS1	100.0	(5.00)	5.00	0.5	0.5	
BEH0443-MS1	84.7	~~5.90~~	6.14	0.5	0.5	Use 16H0071-01
BEH0443-MSD1	84.7	~~5.90~~	6.15	0.5	0.5	Use 16H0071-01

MU 08/24/16
Client ID verified By Date

MW 8/29/16
Preparation Reviewed By Date

8/24/16 1015
Extraction Date and Time

Printed: 8/24/2016 7:47:23AM

3064F
Page 1 of 2

Analytical Resources, Incorporated
Analytical Chemists and Consultants

ORGANICS PREPARATION BENCH SHEET

Batch: BEH0443

Prepared using: EPA 3546 (Microwave)

8270D-SIM Butyl Tins in Solid (Version:TBT Only)

Prep Steps

Microwave
CT 1 2 (3) 8/24/16
Analyst/Date

TurboVap Hexane Exchange (15 mL)
1 2 3 (4) 5
SP 8/24/16
Analyst/Date

HexMgBr Addition Vortex 45min + Sit Overnight
1 2 (3) (5)
SP 8/24/16
Analyst/Date

(REQ) Derivitize (4mL) Vortex
1 2 (3) (5)
ww 8/25/16
Analyst/Date

(REQ) ~~Alumina~~ Clean SPE **~~(2mL)~~** 1 mL **~~Vortex~~**
~~1 2 3~~
ww 8/25/16
Analyst/Date

TurboVap Post ~~Alumina~~ SPE **Cleanup**
1 2 3 4 (5)
ww 8/25/16
Analyst/Date

Vialing
ww 8/25/16
Analyst/Date

Reagents Used

Station/Reagent	Standard ID
Microwave Analyst: CT Date: 8/24/16	
Anhydrous Sodium Sulfate	E66326
0.10% Tropolone in Methylene Chloride	E661196
Neutral Glass Wool	E662862
Hexane	E662813
Vialing/HexMgBr Addition Analyst: SP Date: 8/24/16	
(Turbovap exchange): Hexane:	E663751
HexylMagnesiumBromide	D665447
Derivitization/~~Alumina~~/Final Vialing Analyst: ww 5:1:DCM Date: 8/25/16	
1:1 HCL/DI H2O	E664452
Anhydrous Sodium Sulfate	E665044
~~0% Alumina~~ SPE DART	E664143
Neutral Glass Wool	N/A
Anhydrous Sodium Sulfate	N/A
(Final Vialing):Hexane	E663848

Surrogates & Spike Standards Used

Type		Standard ID	Vol uL	Analyst	Witness
Surrogate 2.5µg/mL	L	D005181 Exp: 12/11/2016	100µL	CT	SP
Spike 2.5µg/mL	8	D004473 Exp: 11/13/2016	100µL	CT	SP

(V) indicates a virtual standard combining two or more physical standards. In these cases the Standard ID refers to the virtual standard, not the parent standards.

If a Standard ID is missing, but should be present, check the standard definition in Element LIMS to be sure Standard Info 6 has the correct letter or number designator matching the vial designator inthe Standard ID column. If it is correct, check the batch and bench sheet in Element LIMS to be sure the correct standards are selected for surrogate(s) and spike(s).

Analytical Resources, Incorporated
Analytical Chemists and Consultants

Organic Extractions Laboratory Analyst Notes

ARI Job No.: 16H0871 Client ID: Fremont Analytical

Batch ID: BEH0443

Parameter: TBT Client Project: 1608094

Screens: Soil/Sediment/Solid/Other:	Analyst/Date
☐ No Anomalies (standard soil/wet sediment/sand/gravel)=	
☐ Standing Water Decanted (Not shared)=	
☐ Standing Water Homogenized (Shared samples)=	
☐ Clay/Clumps (Difficult to homogenize)=	
☒ Rocks (%+size)? 20.0% −Φ1 10.0% Φ2	lfe 08/13/16
☐ Organics (Leaves/sticks/grass)=	
☐ Oily, obvious fuel/sulfur odors=	
☐ Received in 32oz jar(s)=Homogenized in Pyrex dish=	
☐ Other (Details)=	
Aqueous:	
☐ No Anomalies	
☐ Turbid/Color=	
☐ Particulates(%)=(Note: >5%=Notify Supervisor/Lead)	
☐ Emulsions (%)=	
☐ Oily, obvious fuel/sulfur odors=	
☐ Other (Details)=	
☐ Received in 1.0L Bottle(s)=No Bottle Rinse=	
☐ Other Notes/Comments= (Note problems, concerns, corrective actions).	
☒ Share Samples Y / N	lfe 08/13/16
☒ Multiple Jars Y / N	lfe 08/13/16
☐ Sample Pre-Screens indicate analyte activity=	
☐ Sample weights/volumes reduced based on Pre-Screen=	

Analytical Resources, Incorporated

CLEANUP BATCH SUMMARY

Laboratory:	Analytical Resources, Inc.	SDG:	16H0071
Client:	Fremont Analytical	Project:	1608094
Cleanup Batch:	CEH0190	Cleanup Type:	Alumina

SAMPLE NAME	LAB SAMPLE ID	LAB FILE ID	DATE PREPARED	OBSERVATIONS
NME:0-4C	16H0071-01		08/25/2016	
NME:4-7C	16H0071-02	16082908.D	08/25/2016	
NME:4-7C	16H0071-02	16082309	08/25/2016	
NME:4-7C	16H0071-02		08/25/2016	
NME:0-4C	16H0071-01	16082308	08/25/2016	
NME:0-4C	16H0071-01	16082905.D	08/25/2016	

Analytical Resources, Incorporated
Analytical Chemists and Consultants

CLEANUP BENCH SHEET

CEH0190

Matrix: Solid **Cleanup using: Organics - EPA 3610B Alumina Cleanup** **Printed: 8/25/2016 9:58:40PM**

Lab Number	Sample Container	Sample Name	Extract Container	Initial (mL)	Final (mL)	Analysis	Clean Up Date	Cleaned By	Cleanup Comments
16H0071-01	A	NME:0-4C	A 02	0.5	0.5	8270D-SIM Butyl Tins	8/25/2016	WPW	
16H0071-02	A	NME:4-7C	A 02	0.5	0.5	8270D-SIM Butyl Tins	8/25/2016	WPW	
BEH0443-BLK1	-	Blank	-	0.5	0.5	-	8/25/2016	WPW	
BEH0443-BS1	-	LCS	-	0.5	0.5	-	8/25/2016	WPW	
BEH0443-MS1	-	Matrix Spike	-	0.5	0.5	-	8/25/2016	WPW	
BEH0443-MSD1	-	Matrix Spike Dup	-	0.5	0.5	-	8/25/2016	WPW	

Cleanup Reviewed By Date

MASS SPECTROMETER
INSTRUMENT PERFORMANCE CHECK
EPA 8270D-SIM

Laboratory:	Analytical Resources, Inc.	SDG:	16H0071
Client:	Fremont Analytical	Project:	1608094
Lab File ID:	16030401.D	Injection Date:	03/04/16
Instrument ID:	NT12	Injection Time:	08:51
Sequence:	SEC0013	Lab Sample ID:	SEC0013-TUN1

m/z	ION ABUNDANCE CRITERIA	% RELATIVE ABUNDANCE	
51	10 - 80% of 198	22.6	PASS
68	Less than 2% of 69	0.66	PASS
69	Less than 100% of 198	63.7	PASS
70	Less than 2% of 69	0.451	PASS
127	10 - 80% of 198	56.7	PASS
197	Less than 2% of 198	0.354	PASS
198	Base peak, 100% relative abundance	100	PASS
199	5 - 9% of 198	6.82	PASS
275	10 - 60% of 198	26.7	PASS
365	1 - 100% of 198	3.6	PASS
441	0.1 - 24% of 442	16.1	PASS
442	50 - 200% of 198	94.3	PASS
443	15 - 24% of 442	19.3	PASS

Client Sample ID	Lab Sample ID	Lab File ID	Date Analyzed	Time Analyzed
MS Tune	SEC0013-TUN1	16030401.D	03/04/2016	8:51
Cal Standard	SEC0013-CAL4	16030402.D	03/04/2016	9:02
Cal Standard	SEC0013-CAL5	16030403.D	03/04/2016	9:30
Cal Standard	SEC0013-CAL2	16030404.D	03/04/2016	9:43
Cal Standard	SEC0013-CAL3	16030405.D	03/04/2016	9:56
Cal Standard	SEC0013-CAL1	16030406.D	03/04/2016	10:08
Cal Standard	SEC0013-CAL6	16030407.D	03/04/2016	10:21

MASS SPECTROMETER
INSTRUMENT PERFORMANCE CHECK
EPA 8270D-SIM

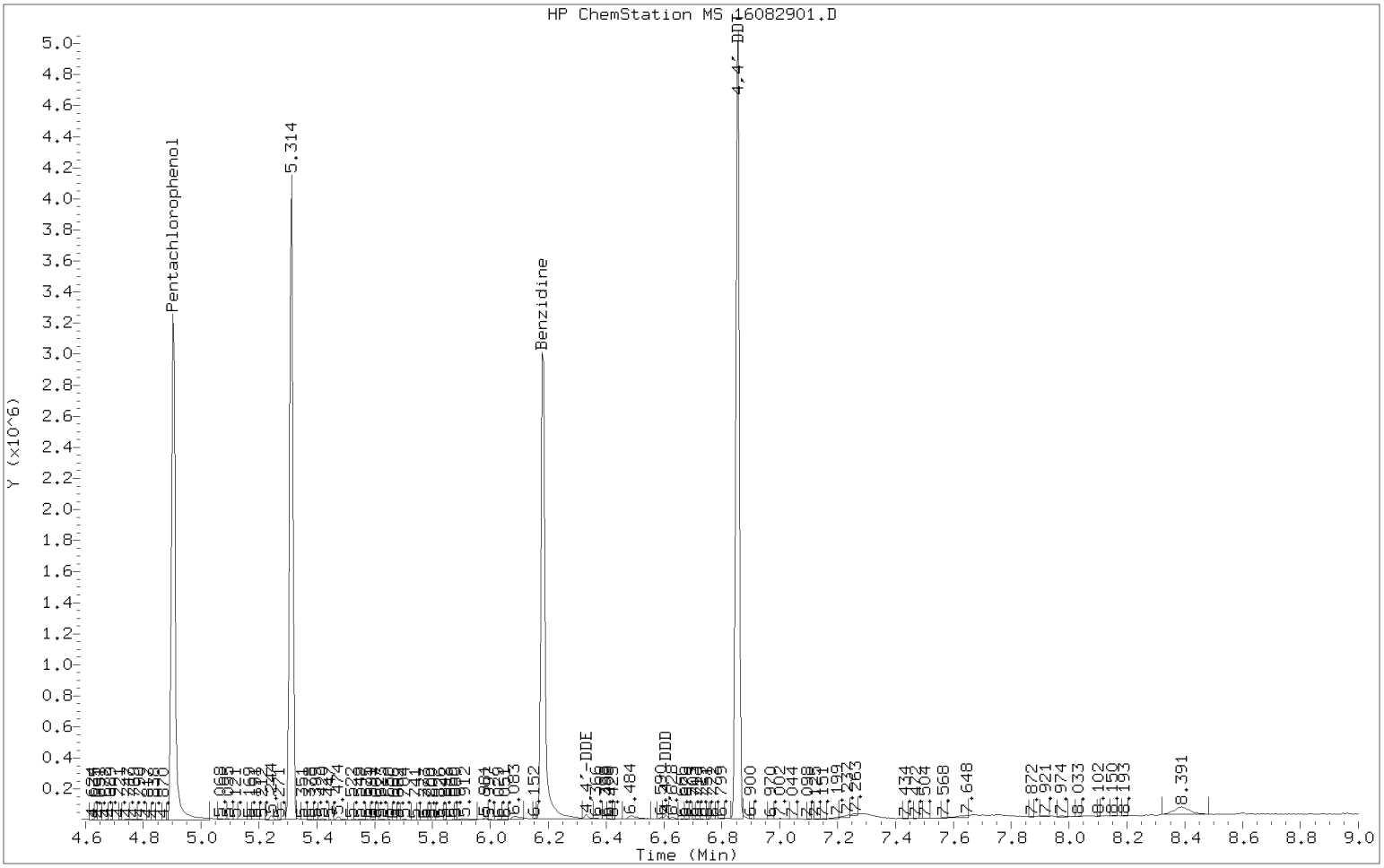
Laboratory:	Analytical Resources, Inc.	SDG:	16H0071
Client:	Fremont Analytical	Project:	1608094
Lab File ID:	16082901.D	Injection Date:	08/29/16
Instrument ID:	NT12	Injection Time:	08:33
Sequence:	SEH0310	Lab Sample ID:	SEH0310-TUN1

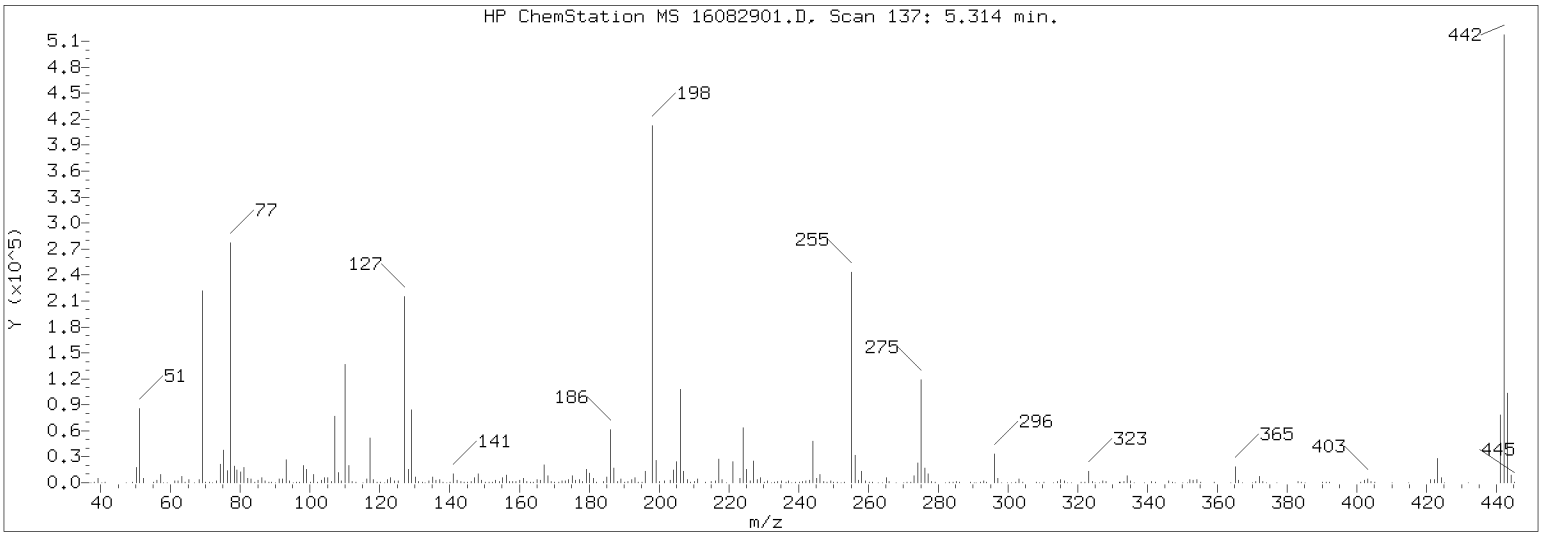
m/z	ION ABUNDANCE CRITERIA	% RELATIVE ABUNDANCE	
51	10 - 80% of 198	22	PASS
68	Less than 2% of 69	1.59	PASS
69	Less than 100% of 198	57.2	PASS
70	Less than 2% of 69	0.568	PASS
127	10 - 80% of 198	52.8	PASS
197	Less than 2% of 198	0	PASS
198	Base peak, 100% relative abundance	100	PASS
199	5 - 9% of 198	6.67	PASS
275	10 - 60% of 198	27.7	PASS
365	1 - 100% of 198	4.19	PASS
441	0.1 - 24% of 442	15.2	PASS
442	50 - 200% of 198	122	PASS
443	15 - 24% of 442	19.6	PASS

Client Sample ID	Lab Sample ID	Lab File ID	Date Analyzed	Time Analyzed
MS Tune	SEH0310-TUN1	16082901.D	08/29/2016	8:33
Initial Cal Check	SEH0310-ICV1	16082902.D	08/29/2016	8:45
Blank	BEH0443-BLK1	16082903.D	08/29/2016	10:03
LCS	BEH0443-BS1	16082904.D	08/29/2016	10:16
NME:0-4C	16H0071-01	16082905.D	08/29/2016	10:29
Matrix Spike	BEH0443-MS1	16082906.D	08/29/2016	10:41
Matrix Spike Dup	BEH0443-MSD1	16082907.D	08/29/2016	10:54
NME:4-7C	16H0071-02	16082908.D	08/29/2016	11:07
Calibration Check	SEH0310-CCV1	16082909.D	08/29/2016	11:19

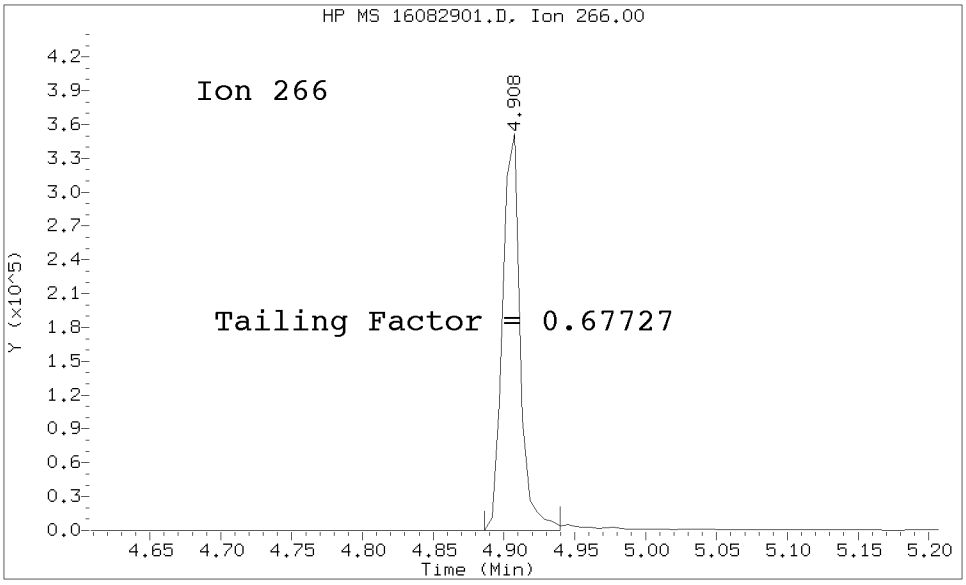
DFTPP TAILING FACTOR AND BREAKDOWN GRAPHIC REPORT

Datafile Analyzed: /20160829.b/16082901.D/16082901.D
Method Used: \20160829.b\df8270.m Inst: nt12
Injection Date: 29-AUG-2016 08:33 Operator: JW
Sample Info: SEH0310-TUN1 SEH0310-TUN1
Report Date: 08/29/2016 12:24



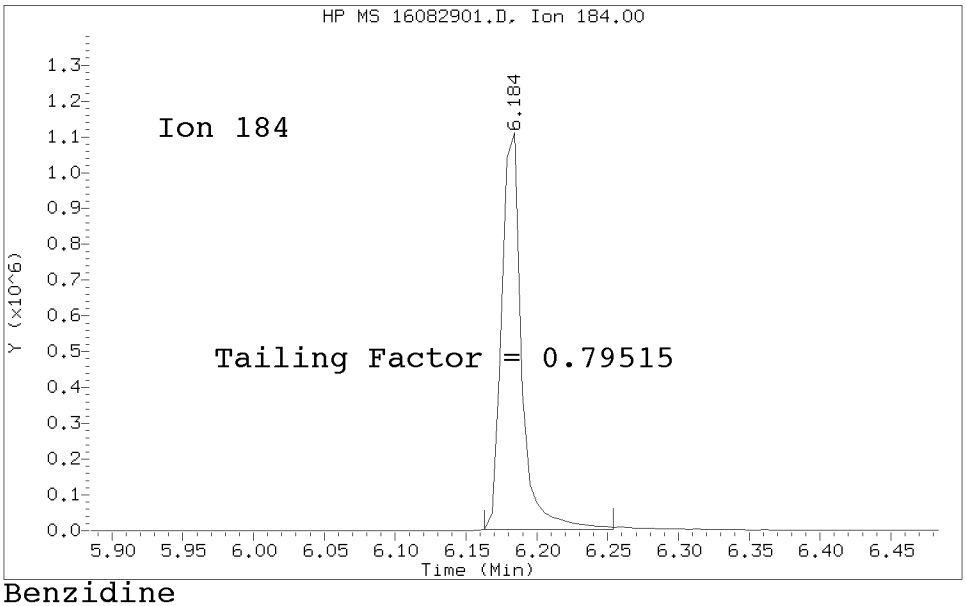


Datafile Analyzed: /20160829.b/16082901.D/16082901.D
Method Used: \20160829.b\df8270.m\sw846ddt.m Inst: nt12
Injection Date: 29-AUG-2016 08:33 Operator: JW
Sample Info: SEH0310-TUN1
Report Date: 08/29/2016 12:24



Pentachlorophenol
==========
Exp. RT = 4.908
Found RT = 4.908

Tail Factor = 0.677 Maximum Allowed = 2.0



Benzidine
==========
Exp. RT = 6.184
Found RT = 6.184

Tail Factor = 0.795 Maximum Allowed = 2.0

8270 TAILING FACTOR/BREAKDOWN SUMMARY RESULTS

TAILING ANALYSIS SUMMARY

Compound	Tail Factor	Max Allowed	Test
Pentachlorophenol	0.6772727	2.000	PASS
Benzidine	0.7951542	2.000	PASS

DDT DEGRADATION BREAKDOWN ANALYSIS SUMMARY

Compound	Response	%Breakdown	Max Allowed	Test
4,4-DDT	789263			N/A
4,4-DDE	2338	0.3	20.0	PASS
4,4-DDD	3984	0.5	20.0	PASS
4,4-DDD + DDE	6322	0.8	20.0	PASS

Tuning Sample, nt12.i/20160829.b/16082901.D, *** PASSED ***

m/e	ION ABUNDANCE CRITERIA	% RELATIVE ABUNDANCE
198	Base Peak, 100% relative abundance	100.00
51	10.00 - 80.00% of mass 198	22.04
68	Less than 2.00% of mass 69	0.91 (1.59)
69	Mass 69 relative abundance	57.18
70	Less than 2.00% of mass 69	0.32 (0.57)
127	10.00 - 80.00% of mass 198	52.75
197	Less than 2.00% of mass 198	0.00
199	5.00 - 9.00% of mass 198	6.67
275	10.00 - 60.00% of mass 198	27.71
365	Greater than 1.00% of mass 198	4.19
441	0.01 - 24.00% of mass 442	18.61 (15.20)
442	50.00 - 200.00% of mass 198	122.46
443	15.00 - 24.00% of mass 442	24.01 (19.61)

Data File: 16082901.D
Spectrum: Avg. Scans 136-138 (5.31), Background Scan 130
Location of Maximum: 442.00
Number of points: 325

m/z	Y	m/z	Y	m/z	Y	m/z	Y
37.00	156	128.00	11299	211.00	2961	301.00	264
38.00	759	129.00	60240	212.00	287	302.00	317
39.00	4218	130.00	4384	213.00	215	303.00	2792
40.00	188	131.00	935	214.00	127	304.00	790
41.00	319	132.00	513	215.00	780	305.00	69
45.00	98	133.00	260	216.00	1517	308.00	435
47.00	52	134.00	1645	217.00	18760	309.00	165
49.00	445	135.00	4528	218.00	2049	310.00	383
50.00	13998	136.00	1989	219.00	223	312.00	72
51.00	64320	137.00	2410	220.00	180	313.00	235
52.00	3317	138.00	552	221.00	16872	314.00	983
53.00	69	139.00	175	222.00	603	315.00	2544
55.00	438	140.00	648	223.00	4001	316.00	1606
56.00	2790	141.00	7403	224.00	43960	317.00	268
57.00	6481	142.00	2263	225.00	11236	318.00	67
58.00	192	143.00	1506	226.00	1369	321.00	814
59.00	118	144.00	440	227.00	17232	322.00	425
61.00	1426	145.00	381	228.00	2427	323.00	8955
62.00	1613	146.00	1275	229.00	3678	324.00	1243
63.00	5445	147.00	4100	230.00	468	325.00	120
64.00	753	148.00	7681	231.00	1610	326.00	207
65.00	2817	149.00	1870	232.00	208	327.00	1576
66.00	65	150.00	475	233.00	374	328.00	960
67.00	174	151.00	953	234.00	1093	329.00	66
68.00	2649	152.00	563	235.00	1491	332.00	936
69.00	166848	153.00	2047	236.00	750	333.00	755
70.00	947	154.00	1441	237.00	1495	334.00	5399
71.00	35	155.00	4000	238.00	78	335.00	1496
72.00	52	156.00	6161	239.00	715	336.00	118
73.00	843	157.00	997	240.00	512	339.00	85
74.00	16205	158.00	1298	241.00	1131	340.00	116
75.00	27528	159.00	992	242.00	2288	341.00	851
76.00	9859	160.00	2054	243.00	2247	342.00	272
77.00	208064	161.00	3382	244.00	32656	346.00	1581
78.00	13808	162.00	976	245.00	3926	347.00	394
79.00	11649	163.00	462	246.00	6511	348.00	65
80.00	9149	164.00	351	247.00	1244	350.00	255
81.00	13458	165.00	2400	248.00	414	351.00	69
82.00	3639	166.00	2145	249.00	1230	352.00	2418
83.00	3350	167.00	14755	250.00	254	353.00	1771
84.00	216	168.00	5808	251.00	349	354.00	2726
85.00	2145	169.00	1432	252.00	327	355.00	372
86.00	3851	170.00	321	253.00	752	359.00	258
87.00	1731	171.00	573	254.00	112	360.00	109
88.00	711	172.00	1130	255.00	168192	364.00	80
89.00	315	173.00	1565	256.00	24040	365.00	12217
90.00	51	174.00	2762	257.00	1770	366.00	1724
91.00	2859	175.00	6169	258.00	9728	367.00	56
92.00	3513	176.00	2048	259.00	1440	370.00	181

93.00	19816	177.00	2689	260.00	357	371.00	935
94.00	1456	178.00	992	261.00	263	372.00	4806
95.00	396	179.00	10363	263.00	65	373.00	1251
96.00	954	180.00	7923	264.00	135	374.00	221
97.00	264	181.00	3575	265.00	3632	377.00	86
98.00	14853	182.00	864	266.00	541	383.00	1235
99.00	11276	183.00	308	270.00	270	384.00	415
100.00	1247	184.00	1110	271.00	384	385.00	115
101.00	7948	185.00	4961	272.00	459	390.00	685
102.00	476	186.00	43464	273.00	5536	391.00	512
103.00	1951	187.00	12681	274.00	15111	392.00	386
104.00	4277	188.00	1004	275.00	80856	401.00	372
105.00	3864	189.00	2792	276.00	10783	402.00	1952
106.00	1246	190.00	361	277.00	7029	403.00	2892
107.00	55904	191.00	1228	278.00	1240	404.00	1125
108.00	8299	192.00	3264	279.00	220	405.00	230
109.00	796	193.00	4173	282.00	173	410.00	70
110.00	100224	194.00	599	283.00	708	415.00	154
111.00	14886	195.00	541	284.00	628	421.00	2353
112.00	1592	196.00	8533	285.00	1076	422.00	2358
113.00	721	198.00	291776	286.00	261	423.00	19240
115.00	134	199.00	19456	288.00	54	424.00	3895
116.00	2865	200.00	1220	289.00	359	425.00	211
117.00	36848	201.00	1424	290.00	242	432.00	101
118.00	2755	202.00	164	291.00	280	435.00	52
119.00	427	203.00	1767	292.00	345	441.00	54296
120.00	713	204.00	10195	293.00	1349	442.00	357312
121.00	194	205.00	17712	294.00	567	443.00	70064
122.00	3005	206.00	76120	295.00	223	444.00	6649
123.00	4335	207.00	9370	296.00	22592	445.00	401
124.00	2154	208.00	2377	297.00	3321		
125.00	1824	209.00	772	298.00	259		
127.00	153920	210.00	641	300.00	51		

INITIAL CALIBRATION DATA

EPA 8270D-SIM

Laboratory:	Analytical Resources, Inc.	SDG:	16H0071
Client:	Fremont Analytical	Project:	1608094
Calibration:	ZC00001	Instrument:	NT12
Calibration Date:	03/04/2016 8:51	Column (1):	ZB-5MS

Compound	Level 01		Level 02		Level 03		Level 04		Level 05		Level 06	
		RF		RF		RF		RF		RF		RF
Tributyltin Ion	0.03865	0.7985481	0.1546	0.7693824	0.3865	0.740144	0.773	0.7814358	1.546	0.7105661	3.092	0.6177469
Dibutyltin Ion	0.0578	5.962817E-02	0.2312	0.06	0.578	5.854264E-02	1.156	5.853139E-02	2.312	6.109149E-02	4.624	5.709348E-02
Butyltin Ion	0.0408	9.410071E-02	0.1632	0.0886354	0.408	9.031706E-02	0.816	8.760199E-02	1.632	9.001717E-02	3.264	8.130321E-02
Tetrabutyltin	0.05	0.9200663	0.2	0.8765914	0.5	0.819962	1	0.8602353	2	0.7785504	4	0.6921297
Tripentyltin	0.07959	8.351332E-02	0.31836	8.181236E-02	0.7959	8.419836E-02	1.5918	9.006294E-02	3.1836	9.365553E-02	6.3672	7.966892E-02
Tripropyltin	0.037215	0.9737237	0.14886	0.9108824	0.37215	0.8821752	0.7443	0.8988562	1.4886	0.8810369	2.9772	0.7317886

INITIAL CALIBRATION DATA

EPA 8270D-SIM

Laboratory:	Analytical Resources, Inc.	SDG:	16H0071
Client:	Fremont Analytical	Project:	1608094
Calibration:	ZC00001	Instrument:	NT12
Calibration Date:	03/04/2016 8:51	Column (1):	ZB-5MS

COMPOUND	Mean RF	RF RSD	Linear COD	Quad COD	Limit Type & Limit	Q
Tributyltin Ion	0.7363039	9.0			RSD (20)	
Dibutyltin Ion	5.914786E-02	2.4			RSD (20)	
Butyltin Ion	8.866259E-02	4.8			RSD (20)	
Tetrabutyltin	0.8245892	9.8			RSD (20)	
Tripentyltin	8.548524E-02	6.2			RSD (20)	
Tripropyltin	0.8797438	9.1			RSD (20)	

Analysis	Matrix	Method
8270D-SIM Butyl Tins	Water	EPA 8270D-SIM

Checklist: Initial Calibration Checklist-SVOA

#	Checklist Item	Response	Analyst Initials	Date
1	Element Calibration Code	YES	JLW	03/04/2016
	Comments: *ZC00001*			
2	DFTPP Tune met criteria	YES	JLW	03/04/2016
3	DDT breakdown <20%	YES	JLW	03/04/2016
4	Peak Tailing factor <= 2%	YES	JLW	03/04/2016
5	ICal meets 20% RSD, LR COD, and QR COD limits	YES	JLW	03/04/2016
6	NO ICAL Q Flag applied	YES	JLW	03/04/2016
7	Manual integrations include before/after pictures	YES	JLW	03/04/2016
8	Spectral Library matches updated	NA	JLW	03/04/2016
9	Internal Standard areas within 50-200% from reference	YES	JLW	03/04/2016
10	Minimum response factors met	YES	JLW	03/04/2016
11	All SCV within +/- 20% (DOD)	NA	JLW	03/04/2016
12	All SCV within +/- 30%	NA	JLW	03/04/2016
	Comments: *No SCV*			
13	NO Linear or Quadratic fits used	YES	JLW	03/04/2016
14	NO Calibration points dropped	YES	JLW	03/04/2016
15	Additional notes	NA	JLW	03/04/2016
16	Reviewer approval (Reviewer)	YES	BB	03/07/2016

* = Indicates Automated Response from Element DataSyst

ARI Labs, Inc.

INITIAL CALIBRATION DATA

Start Cal Date : 04-MAR-2016 09:02
End Cal Date : 04-MAR-2016 10:21
Quant Method : ISTD
Origin : Disabled
Target Version : 4.14
Integrator : HP RTE
Method file : \\target\share\chem3\nt12.i\20160304.b\BTS.m
Last Edit : 04-Mar-2016 10:37 nt12.i
Curve Type : Average

Calibration File Names:
Level 1: \\target\share\chem3\nt12.i\20160304.b\16030406.D
Level 2: \\target\share\chem3\nt12.i\20160304.b\16030404.D
Level 3: \\target\share\chem3\nt12.i\20160304.b\16030405.D
Level 4: \\target\share\chem3\nt12.i\20160304.b\16030402.D
Level 5: \\target\share\chem3\nt12.i\20160304.b\16030403.D
Level 6: \\target\share\chem3\nt12.i\20160304.b\16030407.D

Compound	0.05000 Level 1	0.20000 Level 2	0.50000 Level 3	1.000 Level 4	2.000 Level 5	4.000 Level 6	___ RRF	% RSD
2 Tetrabutyl Tin	0.92007	0.87659	0.81996	0.86024	0.77855	0.69213	0.82459	9.819
3 Tributyl Tin (Hexyl)	0.79855	0.76938	0.74014	0.78144	0.71057	0.61775	0.73630	8.955
5 Dibutyl Tin (Hexyl)	0.05963	0.06000	0.05854	0.05853	0.06109	0.05709	0.05915	2.355
7 Butyl Tin (Hexyl)	0.09410	0.08864	0.09032	0.08760	0.09002	0.08130	0.08866	4.770
$ 1 Tripropyl Tin (Hexyl)	0.97372	0.91088	0.88218	0.89886	0.88104	0.73179	0.87974	9.103
$ 6 Tripentyl Tin (Hexyl)	0.08351	0.08181	0.08420	0.09006	0.09366	0.07967	0.08549	6.203

Analytical Resources, Incorporated
Analytical Chemists and Consultants

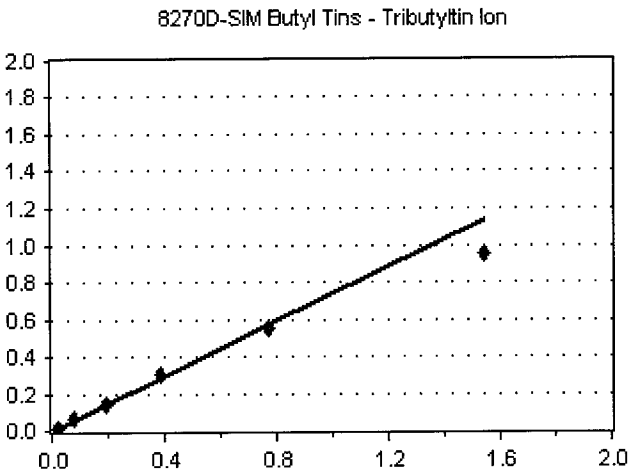
Calibration Report

Instrument: NT12
Calibration ID: ZC00001

Calibration Date: 04-Mar-2016 08:51 By JLW
Last Edit Date: 04-Mar-2016 11:56 By JLW

8270D-SIM Butyl Tins

Tributyltin Ion

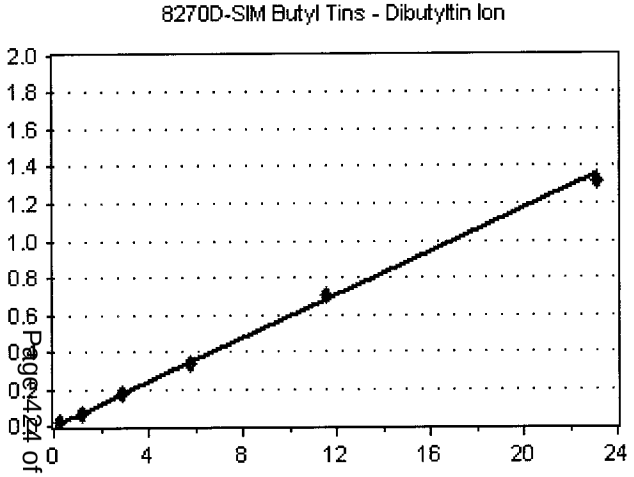


Average RF

RF RSD: 8.95513

[Conc] = 0.7363039 * [Response]

Dibutyltin Ion



Average RF

RF RSD: 2.355004

[Conc] = 5.914786E-02 * [Response]

Analytical Resources, Incorporated
Analytical Chemists and Consultants

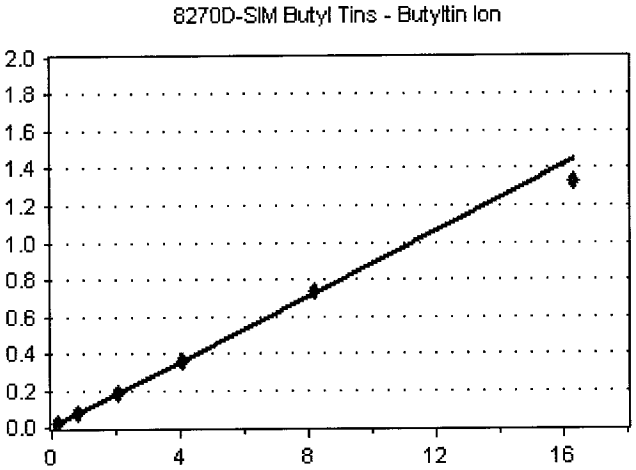
Calibration Report

Instrument: NT12
Calibration ID: ZC00001

Calibration Date: 04-Mar-2016 08:51 By JLW
Last Edit Date: 04-Mar-2016 11:56 By JLW

8270D-SIM Butyl Tins

Butyltin Ion

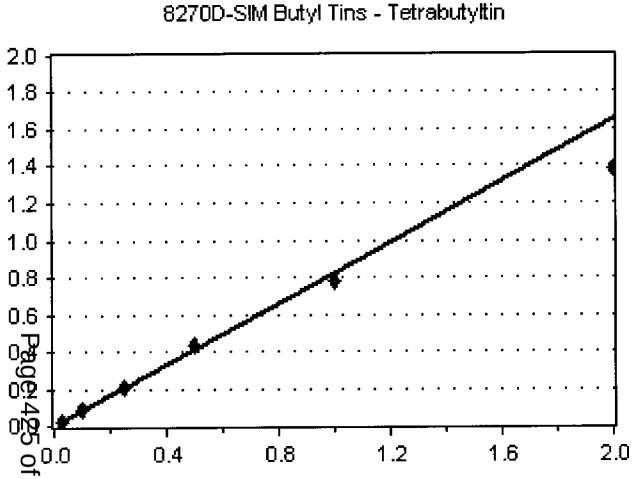


Average RF

RF RSD: 4.770048

[Conc] = 8.866259E-02 * [Response]

Tetrabutyltin



Average RF

RF RSD: 9.81892

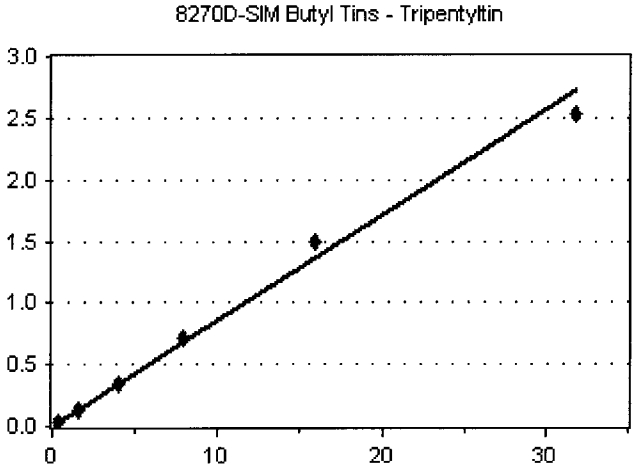
[Conc] = 0.8245892 * [Response]

Calibration Report

Instrument: NT12 **Calibration Date:** 04-Mar-2016 08:51 By JLW
Calibration ID: ZC00001 **Last Edit Date:** 04-Mar-2016 11:56 By JLW

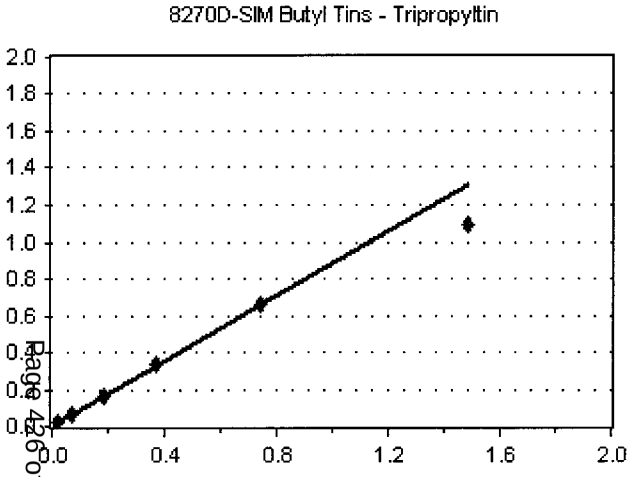
8270D-SIM Butyl Tins

Tripentyltin



Average RF
RF RSD: 6.202613
[Conc] = 8.548524E-02 * [Response]

Tripropyltin



Average RF
RF RSD: 9.102861
[Conc] = 0.8797438 * [Response]

Report Date : 04-Mar-2016 10:38 Page 1

ARI Labs, Inc.
RETENTION TIME SUMMARY REPORT

Method File: \\target\share\chem3\nt12.i\20160304.b\BTS.m
Batch File: \\target\share\chem3\nt12.i\20160304.b
Inst ID: nt12.i

ID:	RT01	RT02	RT03	RT04	RT05	RT06
FILENAME:	16030402	16030403	16030404	16030405	16030406	16030407
INJ.DATE:	04-MAR-2016	04-MAR-2016	04-MAR-2016	04-MAR-2016	04-MAR-2016	04-MAR-2016
INJ.TIME:	09:02	09:30	09:43	09:56	10:08	10:21

	Compound	RT01	RT02	RT03	RT04	RT05	RT06	EXPEC RT	RT WINDOW	AVG RT	STD DEV
$	1 Tripropyl Tin (Hexyl)	5.029	5.029	5.029	5.029	5.029	5.029	5.029	4.929-5.130	5.029	0.000
	2 Tetrabutyl Tin	5.236	5.236	5.236	5.236	5.236	5.236	5.236	5.132-5.341	5.236	0.000
	3 Tributyl Tin (Hexyl)	6.019	6.019	6.019	6.019	6.019	6.019	6.019	5.898-6.139	6.019	0.000
*	4 Tetrapentyl Tin	6.665	6.678	6.665	6.665	6.665	6.665	6.665	6.531-6.798	6.667	0.005
	5 Dibutyl Tin (Hexyl)	6.718	6.718	6.718	6.718	6.718	6.718	6.718	6.584-6.853	6.718	0.000
$	6 Tripentyl Tin (Hexyl)	7.013	7.013	7.013	7.013	7.013	7.013	7.013	6.873-7.154	7.013	0.000
	7 Butyl Tin (Hexyl)	7.349	7.348	7.348	7.348	7.348	7.348	7.349	7.202-7.495	7.348	0.000
*	8 p-Terphenyl-d14	7.550	7.563	7.550	7.550	7.550	7.550	7.550	7.399-7.701	7.552	0.005

Reviewer 1 _____ Date: 3/4/16
Reviewer 2 _____ Date: 3/4/16

MANUAL INTEGRATION SUMMARY FOR DATABATCH - \\target\share\chem3\nt12.i\20160304.b

AR Job No.: TBT Method: BTS.m Instrument: nt12.i Date: 04-MAR-2016

Time	Filename	LabID	ClientId	DF	Manually Integrated Compounds
0902	16030402.D	TBT	ICV	1	NO MANUAL INTEGRATION
0930	16030403.D	TBT	2.0	1	p-Terphenyl-d14,
0943	16030404.D	TBT	0.2	1	NO MANUAL INTEGRATION
0956	16030405.D	TBT	0.5	1	NO MANUAL INTEGRATION
1008	16030406.D	TBT	0.05	1	NO MANUAL INTEGRATION
1021	16030407.D	TBT	4.0	1	NO MANUAL INTEGRATION

Analytical Resources Inc.: Organics Instrument Log

NT-12 Serial No.:GC=US00032558, MS= US01180091

Date: 3/4/16 Analysis: TBT Analyst: JW

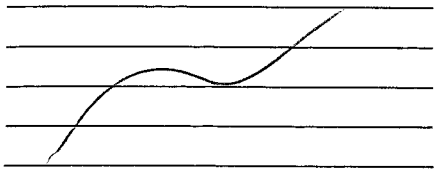
GC Program: BTS Column No: D000793 Column Type: ZB5ms

Instrument Tune (.U): 150303.U EM Voltage: 1576

Calibration File: 16030401.D Cali Code: ZC00001 Injection Vol.: 2ul

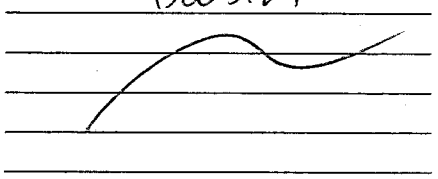
IS/SS

D1001185

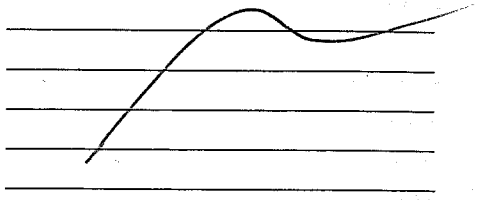


Ical/ICV/CCV

D005205
D005127



SCV



Document All Maintenance Tasks In Element

	Time	Filename	LabID	ClientId	DF				
1	0851	16030401.D	TUNE 25		1	NO ISTDS FOUND			
2	0902	16030402.D	TBT ICV		1	6.66	24391	7.55	22552
3	0930	16030403.D	TBT 2.0		1	6.68	26462	7.56	20971
4	0943	16030404.D	TBT 0.2		1	6.66	25371	7.55	23450
5	0956	16030405.D	TBT 0.5		1	6.66	26811	7.55	23371
6	1008	16030406.D	TBT 0.05		1	6.66	25346	7.55	23613
7	1021	16030407.D	TBT 4.0		1	6.66	30901	7.55	23726
8	1148	16030408.D	AWX3MBS1	AWX3MBS1	1	6.66	26036	7.55	22332
9	1201	16030409.D	AWX3LCSS1	AWX3LCSS1	1	6.66	26267	7.55	22189
10	1213	16030410.D	AWX3A	GAC-1	1	6.66	26137	7.55	21669
11	1226	16030411.D	AWX3B	GAC-2	1	6.66	25198	7.55	20980
12	1239	16030412.D	AWX3C	SF-COMP	1	6.66	25913	7.55	21525
13	1251	16030413.D	TBT CCV		1	6.66	28064	7.55	21764

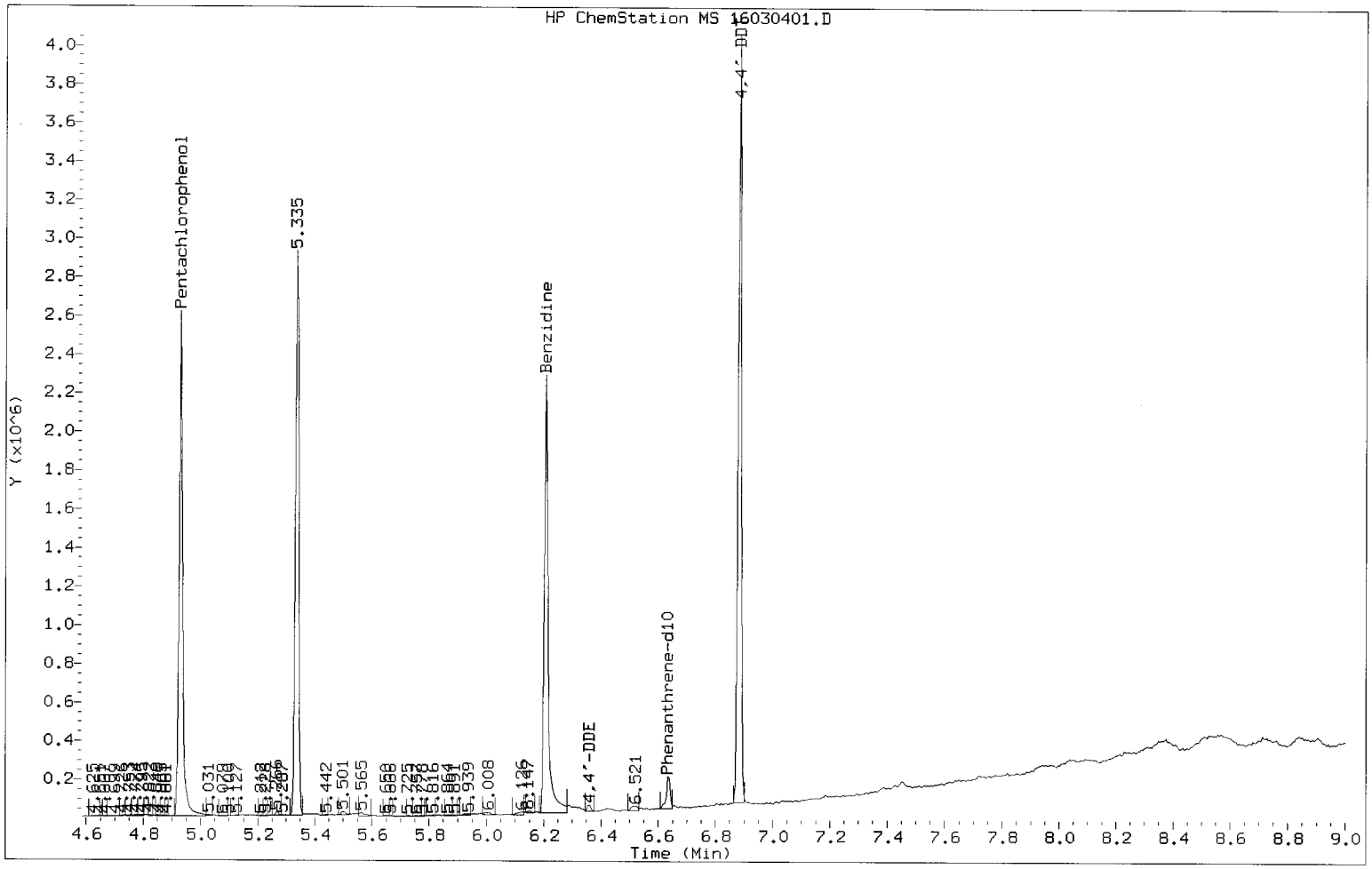
JW

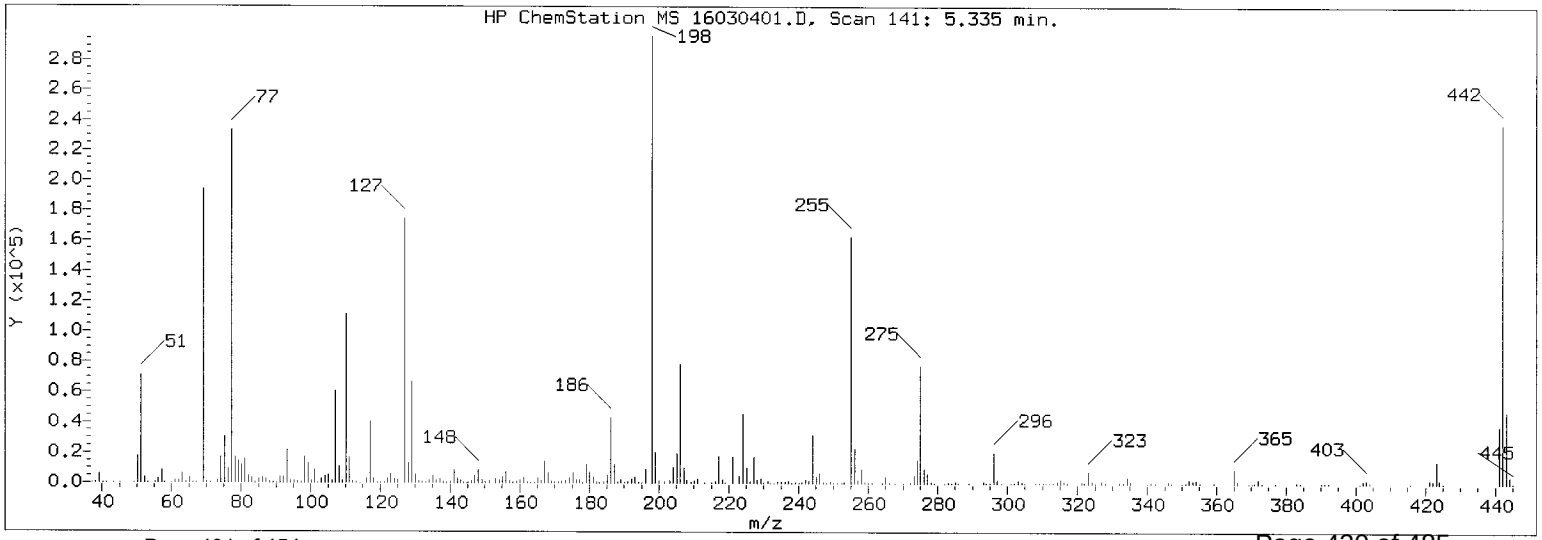
JW 3/7/16

Every line must contain information or be lined out. Make all entries legible.
Start a new 00651ch QC period. Document All Maintenance Tasks In Element

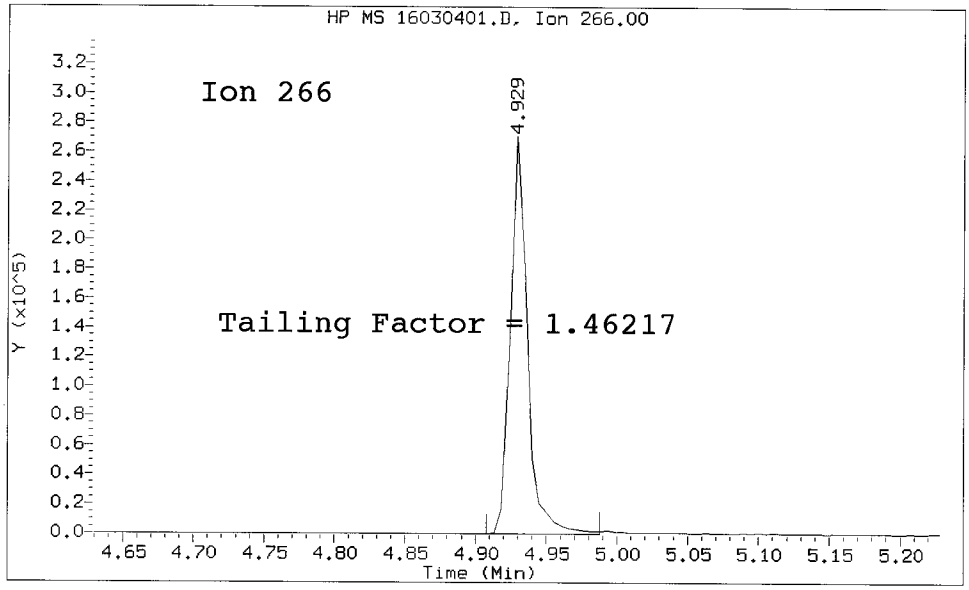
DFTPP TAILING FACTOR AND BREAKDOWN GRAPHIC REPORT

Datafile Analyzed: /20160304.b/16030401.D/16030401.D
Method Used: \20160304.b\df8270.m Inst: nt12
Injection Date: 04-MAR-2016 08:51 Operator: JW
Sample Info: TUNE 25 TUNE 25
Report Date: 03/04/2016 09:14



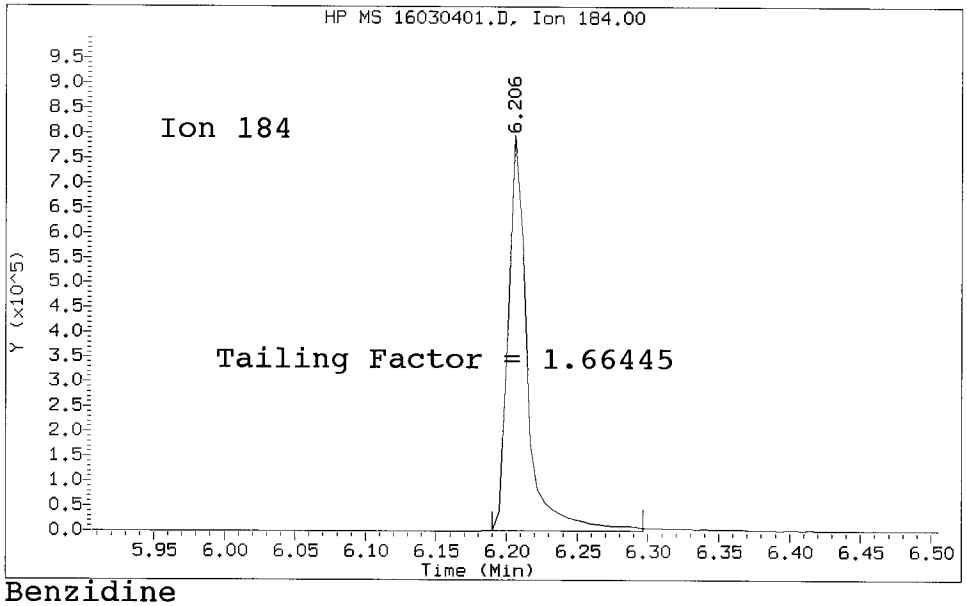


Datafile Analyzed: /20160304.b/16030401.D/16030401.D
Method Used: \20160304.b\df8270.m\sw846ddt.m Inst: nt12
Injection Date: 04-MAR-2016 08:51 Operator: pk
Sample Info: TUNE 25
Report Date: 03/04/2016 09:14



Pentachlorophenol
==========
Exp. RT = 4.929
Found RT = 4.929

Tail Factor = 1.462 Maximum Allowed = 2.0



Benzidine
==========
Exp. RT = 6.206
Found RT = 6.206

Tail Factor = 1.664 Maximum Allowed = 2.0

m/e	ION ABUNDANCE CRITERIA	% RELATIVE ABUNDANCE
198	Base Peak, 100% relative abundance	100.00
51	10.00 - 80.00% of mass 198	22.57
68	Less than 2.00% of mass 69	0.42 (0.66)
69	Mass 69 relative abundance	63.71
70	Less than 2.00% of mass 69	0.29 (0.45)
127	10.00 - 80.00% of mass 198	56.66
197	Less than 2.00% of mass 198	0.35
199	5.00 - 9.00% of mass 198	6.82
275	10.00 - 60.00% of mass 198	26.66
365	Greater than 1.00% of mass 198	3.60
441	0.01 - 24.00% of mass 442	15.14 (16.06)
442	50.00 - 200.00% of mass 198	94.29
443	15.00 - 24.00% of mass 442	18.21 (19.31)

8270 TAILING FACTOR/BREAKDOWN SUMMARY RESULTS

TAILING ANALYSIS SUMMARY

Compound	Tail Factor	Max Allowed	Test
Pentachlorophenol	1.4621711	2.000	PASS
Benzidine	1.6644518	2.000	PASS

DDT DEGRADATION BREAKDOWN ANALYSIS SUMMARY

Compound	Response	%Breakdown	Max Allowed	Test
4,4-DDT	537224			N/A
4,4-DDE	2676	0.5	20.0	PASS
4,4-DDD	2469	0.5	20.0	PASS
4,4-DDD + DDE	5145	0.9	20.0	PASS

Tuning Sample, nt12.i/20160304.b/16030401.D, *** PASSED ***

Data File: 16030401.D
Spectrum: Avg. Scans 140-142 (5.34), Background Scan 136
Location of Maximum: 198.00
Number of points: 311

m/z	Y	m/z	Y	m/z	Y	m/z	Y
37.00	209	125.00	1498	204.00	8427	293.00	1171
38.00	598	127.00	128296	205.00	13941	294.00	276
39.00	3816	128.00	9725	206.00	57800	295.00	333
40.00	244	129.00	49208	207.00	7971	296.00	16338
41.00	6	130.00	3793	208.00	1672	297.00	2157
42.00	64	131.00	866	209.00	631	298.00	56
45.00	50	132.00	419	210.00	965	301.00	211
49.00	394	133.00	229	211.00	2214	302.00	252
50.00	12279	134.00	1436	213.00	75	303.00	1802
51.00	51104	135.00	3635	215.00	694	304.00	607
52.00	2964	136.00	1438	216.00	1130	305.00	55
53.00	254	137.00	1833	217.00	13926	308.00	243
55.00	342	138.00	390	218.00	1988	309.00	206
56.00	2361	139.00	318	219.00	279	310.00	240
57.00	5580	140.00	630	221.00	12385	311.00	61
58.00	248	141.00	5762	223.00	3501	312.00	55
60.00	215	142.00	1997	224.00	33848	313.00	143
61.00	1222	143.00	1350	225.00	8320	314.00	831
62.00	1584	144.00	397	226.00	877	315.00	1958
63.00	4711	145.00	342	227.00	13972	316.00	1112
64.00	718	146.00	1111	228.00	1883	317.00	250
65.00	2405	147.00	3117	229.00	2621	321.00	486
66.00	292	148.00	6598	230.00	371	322.00	274
67.00	86	149.00	1489	231.00	1220	323.00	6219
68.00	952	150.00	490	232.00	189	324.00	994
69.00	144256	151.00	950	233.00	184	325.00	138
70.00	651	152.00	240	234.00	959	326.00	60
71.00	112	153.00	2166	235.00	1053	327.00	1053
73.00	886	154.00	1684	236.00	708	328.00	593
74.00	13310	155.00	3372	237.00	1186	329.00	59
75.00	22992	156.00	5285	238.00	192	332.00	468
76.00	7451	157.00	996	239.00	495	333.00	611
77.00	173824	158.00	790	240.00	384	334.00	3553
78.00	11800	159.00	896	241.00	772	335.00	957
79.00	9700	160.00	1590	242.00	1746	339.00	52
80.00	8351	161.00	2712	243.00	1441	340.00	57
81.00	11152	162.00	774	244.00	24496	341.00	807
82.00	2692	163.00	335	245.00	3180	342.00	173
83.00	2581	164.00	300	246.00	5147	346.00	1165
85.00	1614	165.00	2006	247.00	949	347.00	172
86.00	2455	166.00	1705	248.00	218	350.00	58
87.00	1889	167.00	11015	249.00	960	351.00	142
88.00	578	168.00	5549	250.00	197	352.00	1911
89.00	337	169.00	1053	251.00	73	353.00	1323
90.00	108	170.00	502	252.00	243	354.00	1827
91.00	2643	171.00	583	253.00	426	355.00	384
92.00	2750	172.00	960	254.00	158	356.00	58
93.00	16333	173.00	1238	255.00	126704	359.00	98
94.00	1170	174.00	2371	256.00	18024	365.00	8156

95.00	478	175.00	4906	257.00	1359	366.00	1106
96.00	629	176.00	1425	258.00	7479	369.00	52
97.00	249	177.00	2025	259.00	1046	370.00	211
98.00	11860	178.00	398	260.00	287	371.00	369
99.00	10181	179.00	8800	261.00	295	372.00	3100
100.00	1106	180.00	5850	263.00	62	373.00	642
101.00	6245	181.00	2960	264.00	155	377.00	188
102.00	456	182.00	532	265.00	2845	383.00	869
103.00	1977	183.00	268	266.00	448	384.00	355
104.00	3686	184.00	715	268.00	129	390.00	482
105.00	3295	185.00	4170	269.00	50	391.00	408
106.00	1075	186.00	32328	270.00	156	392.00	181
107.00	45800	187.00	9105	271.00	142	401.00	135
108.00	8160	188.00	965	272.00	405	402.00	1372
109.00	271	189.00	2005	273.00	4442	403.00	1794
110.00	82824	190.00	447	274.00	11294	404.00	826
111.00	12463	191.00	874	275.00	60360	405.00	103
112.00	1310	192.00	2779	276.00	7845	416.00	56
113.00	566	193.00	3248	277.00	4983	421.00	1538
114.00	61	194.00	450	278.00	1005	422.00	1622
115.00	172	195.00	400	279.00	210	423.00	12277
116.00	2273	196.00	6500	282.00	142	424.00	2203
117.00	30496	197.00	801	283.00	591	425.00	251
118.00	2335	198.00	226432	284.00	475	441.00	34280
119.00	398	199.00	15445	285.00	870	442.00	213504
120.00	492	200.00	1269	286.00	176	443.00	41224
122.00	2390	201.00	840	289.00	239	444.00	3925
123.00	3057	202.00	162	290.00	110	445.00	315
124.00	1592	203.00	1603	292.00	145		

ARI Labs, Inc.

Krone1989/8270D-SIM

Data file : \\target\share\chem3\nt12.i\20160304.b\16030402.D
Lab Smp Id: TBT ICV
Inj Date : 04-MAR-2016 09:02 MS Autotune Date: 13-FEB-2016 11:11
Operator : JW Inst ID: nt12.i
Smp Info : TBT ICV
Misc Info :
Comment : 2 ul Injection
Method : \\target\share\chem3\nt12.i\20160304.b\BTS.m
Meth Date : 04-Mar-2016 10:38 jonathonw Quant Type: ISTD
Cal Date : 04-MAR-2016 10:21 Cal File: 16030407.D
Als bottle: 2 Calibration Sample, Level: 4
Dil Factor: 1.00000
Integrator: HP RTE Compound Sublist: sed.sub
Target Version: 4.14
Processing Host: AUTOSPECDATA2

Concentration Formula: Amt * DF * (1000*Vt)/Vo * CpndVariable

Name	Value	Description
DF	1.000	Dilution Factor
Vt	0.50000	Final Extract Volume (mL)
Vo	100.000	Volume Extracted (mL)
Cpnd Variable		Local Compound Variable

	Compounds	QUANT SIG MASS	RT	EXP RT	REL RT	RESPONSE	AMOUNTS CAL-AMT (ug/mL)	ON-COL (ug/mL)
$	1 Tripropyl Tin (Hexyl)	291	5.029	5.029	(0.755)	10962	1.00000	1.022
	2 Tetrabutyl Tin	289	5.236	5.236	(0.786)	10491	1.00000	1.043
	3 Tributyl Tin (Hexyl)	319	6.018	6.018	(0.903)	9530	1.00000	1.061
*	4 Tetrapentyl Tin	333	6.664	6.664	(1.000)	24391	2.00000	
	5 Dibutyl Tin (Hexyl)	347	6.718	6.718	(0.890)	13200	2.00000	1.979
$	6 Tripentyl Tin (Hexyl)	347	7.013	7.013	(0.929)	20311	2.00000	2.107
	7 Butyl Tin (Hexyl)	347	7.348	7.348	(0.973)	19756	2.00000	1.976
*	8 p-Terphenyl-d14	244	7.549	7.549	(1.000)	22552	0.20000	

ARI Labs, Inc.

INTERNAL STANDARD COMPOUNDS
AREA AND RT SUMMARY

Instrument ID: nt12.i
Lab File ID: 16030402.D
Lab Smp Id: TBT ICV
Analysis Type: SV
Quant Type: ISTD
Operator: JW
Method File: \\target\share\chem3\nt12.i\20160304.b\BTS.m
Misc Info:

Calibration Date: 04-MAR-2016
Calibration Time: 09:02

Level: LOW
Sample Type: WATER

Test Mode:
Use Initial Calibration Level 4.

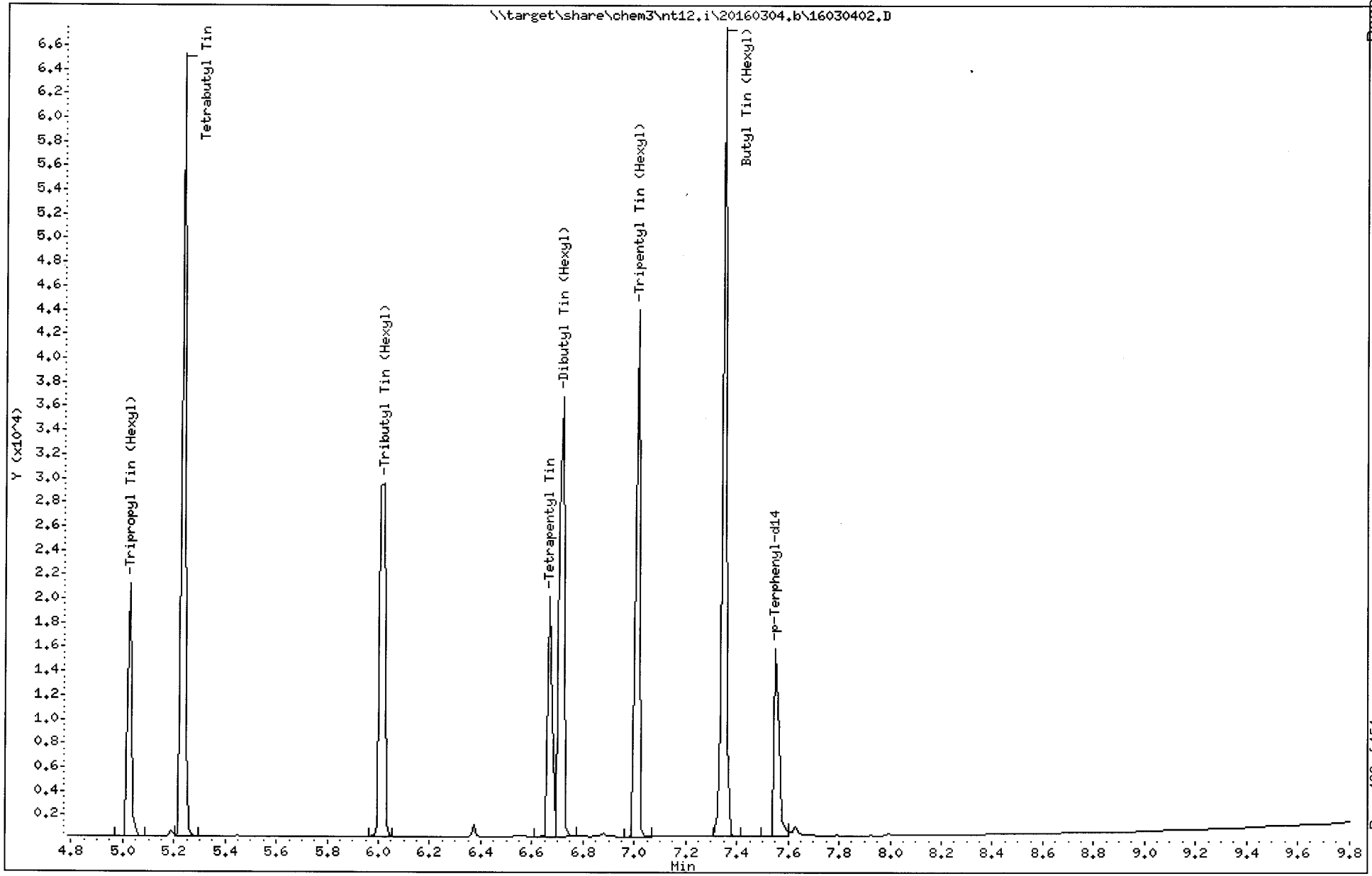
COMPOUND	STANDARD	AREA LIMIT LOWER	AREA LIMIT UPPER	SAMPLE	%DIFF
4 Tetrapentyl Tin	24391	12196	48782	24391	0.00
8 p-Terphenyl-d14	22552	11276	45104	22552	0.00

COMPOUND	STANDARD	RT LIMIT LOWER	RT LIMIT UPPER	SAMPLE	%DIFF
4 Tetrapentyl Tin	6.66	6.16	7.16	6.66	0.00
8 p-Terphenyl-d14	7.55	7.05	8.05	7.55	0.00

AREA UPPER LIMIT = +100% of internal standard area.
AREA LOWER LIMIT = - 50% of internal standard area.
RT UPPER LIMIT = + 0.50 minutes of internal standard RT.
RT LOWER LIMIT = - 0.50 minutes of internal standard RT.

Data File: \\target\share\chem3\nt12.i\20160304.b\16030402.D
Date : 04-MAR-2016 09:02
Client ID:
Sample Info: TBT ICV
Purge Volume: 100.0
Column phase: ZB-5msi

Instrument: nt12.i
Operator: JW
Column diameter: 0.25



REVIEW SUMMARY FOR FILE - 16030402.D

Lab ID: TBT ICV
nt12.i, 20160304.b\BTS.m, 04-MAR-2016 09:02

RT	CO-ELUTION COMPOUNDS

NO CO-ELUTIONS

Quant Method: ICAL

RRT CHECK

RRT	CCV RRT	DELTA	COMPOUND

NONE

On Column LOD for nt12.i,20160304.b\BTS.m,Sublist: sed.sub = 0.0100

Exception: Dibutyl Tin (Hexyl) 0.0200
Exception: Butyl Tin (Hexyl) 0.0200
Exception: Tetrabutyl Tin 0.0200
Exception: Tripropyl Tin (Hexyl) (Surr) 0.0200
Exception: Tripentyl Tin (Hexyl) (Surr) 0.0200

ARI Labs, Inc.

Krone1989/8270D-SIM

Data file : \\target\share\chem3\nt12.i\20160304.b\16030403.D
Lab Smp Id: TBT 2.0
Inj Date : 04-MAR-2016 09:30 MS Autotune Date: 13-FEB-2016 11:11
Operator : JW Inst ID: nt12.i
Smp Info : TBT 2.0
Misc Info :
Comment : 2 ul Injection
Method : \\target\share\chem3\nt12.i\20160304.b\BTS.m
Meth Date : 04-Mar-2016 10:38 jonathonw Quant Type: ISTD
Cal Date : 04-MAR-2016 10:21 Cal File: 16030407.D
Als bottle: 3 Calibration Sample, Level: 5
Dil Factor: 1.00000
Integrator: HP RTE Compound Sublist: sed.sub
Target Version: 4.14
Processing Host: AUTOSPECDATA2

Concentration Formula: Amt * DF * (1000*Vt)/Vo * CpndVariable

Name	Value	Description
DF	1.000	Dilution Factor
Vt	0.50000	Final Extract Volume (mL)
Vo	100.000	Volume Extracted (mL)
Cpnd Variable		Local Compound Variable

	Compounds	QUANT SIG MASS	RT	EXP RT	REL RT	RESPONSE	AMOUNTS CAL-AMT (ug/mL)	AMOUNTS ON-COL (ug/mL)
$	1 Tripropyl Tin (Hexyl)	291	5.029	5.029	(0.753)	23314	2.00000	2.003
	2 Tetrabutyl Tin	289	5.236	5.236	(0.784)	20602	2.00000	1.888
	3 Tributyl Tin (Hexyl)	319	6.018	6.018	(0.901)	18803	2.00000	1.930
*	4 Tetrapentyl Tin	333	6.678	6.664	(1.000)	26462	2.00000	
	5 Dibutyl Tin (Hexyl)	347	6.718	6.718	(0.888)	25623	4.00000	4.131
$	6 Tripentyl Tin (Hexyl)	347	7.013	7.013	(0.927)	39281	4.00000	4.382
	7 Butyl Tin (Hexyl)	347	7.348	7.348	(0.972)	37755	4.00000	4.061
*	8 p-Terphenyl-d14	244	7.563	7.549	(1.000)	20971	0.20000	(M)

QC Flag Legend

M - Compound response manually integrated.

ARI Labs, Inc.

INTERNAL STANDARD COMPOUNDS
AREA AND RT SUMMARY

Instrument ID: nt12.i
Lab File ID: 16030403.D
Lab Smp Id: TBT 2.0
Analysis Type: SV
Quant Type: ISTD
Operator: JW
Method File: \\target\share\chem3\nt12.i\20160304.b\BTS.m
Misc Info:

Calibration Date: 04-MAR-2016
Calibration Time: 09:02

Level: LOW
Sample Type: WATER

Test Mode:
Use Initial Calibration Level 4.

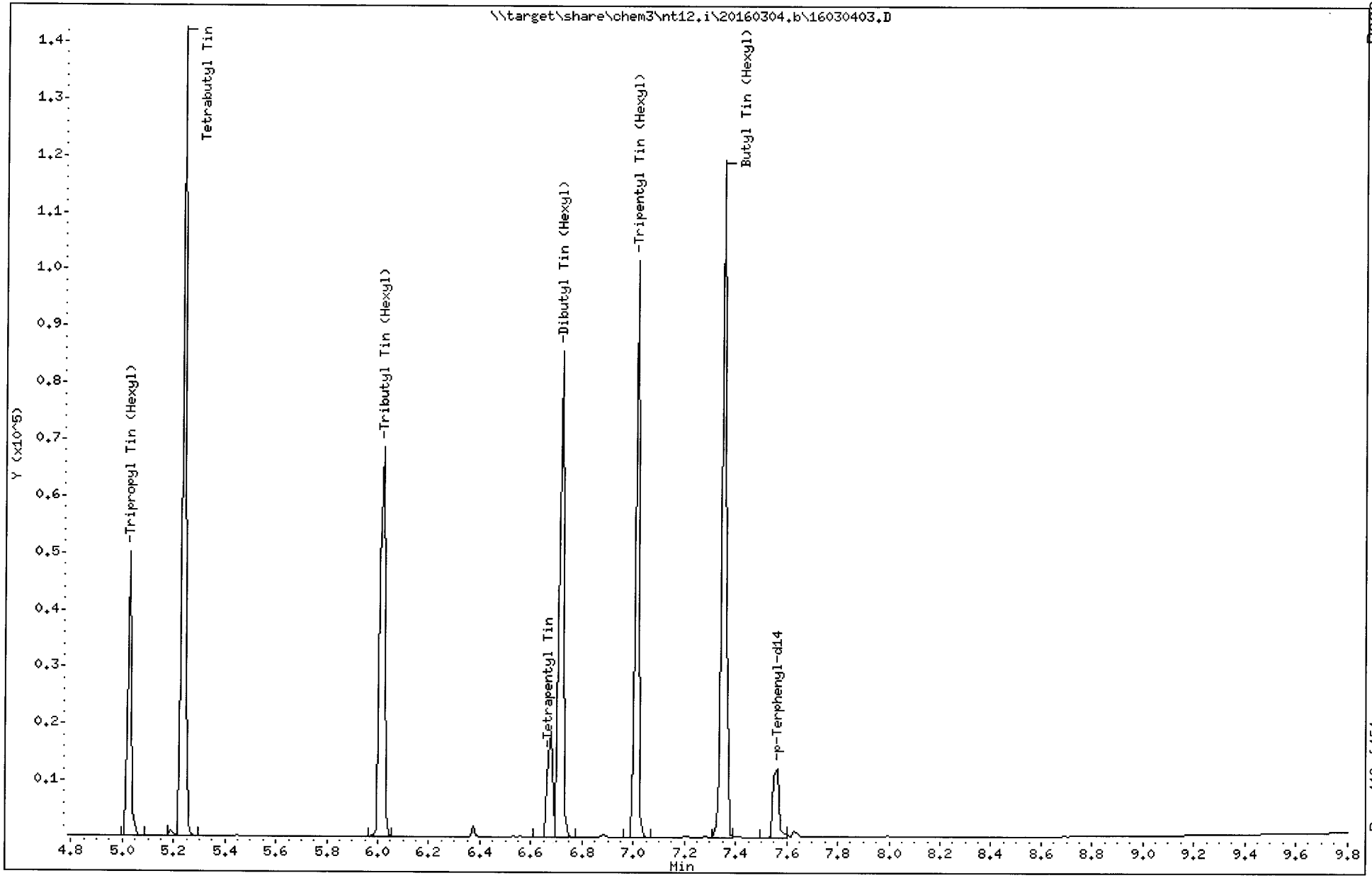
COMPOUND	STANDARD	AREA LIMIT LOWER	AREA LIMIT UPPER	SAMPLE	%DIFF
4 Tetrapentyl Tin	24391	12196	48782	26462	8.49
8 p-Terphenyl-d14	22552	11276	45104	20971	-7.01

COMPOUND	STANDARD	RT LIMIT LOWER	RT LIMIT UPPER	SAMPLE	%DIFF
4 Tetrapentyl Tin	6.66	6.16	7.16	6.68	0.20
8 p-Terphenyl-d14	7.55	7.05	8.05	7.56	0.18

AREA UPPER LIMIT = +100% of internal standard area.
AREA LOWER LIMIT = - 50% of internal standard area.
RT UPPER LIMIT = + 0.50 minutes of internal standard RT.
RT LOWER LIMIT = - 0.50 minutes of internal standard RT.

Data File: \\target\share\chem3\nt12.i\20160304.b\16030403.D
Date : 04-MAR-2016 09:30
Client ID:
Sample Info: TBT 2.0
Purge Volume: 100.0
Column phase: ZB-5msi

Instrument: nt12.i
Operator: JW
Column diameter: 0.25



REVIEW SUMMARY FOR FILE - 16030403.D

Lab ID: TBT 2.0
nt12.i, 20160304.b\BTS.m, 04-MAR-2016 09:30

RT	CO-ELUTION COMPOUNDS

NO CO-ELUTIONS

Quant Method: ICAL

RRT CHECK

RRT	CCV RRT	DELTA	COMPOUND

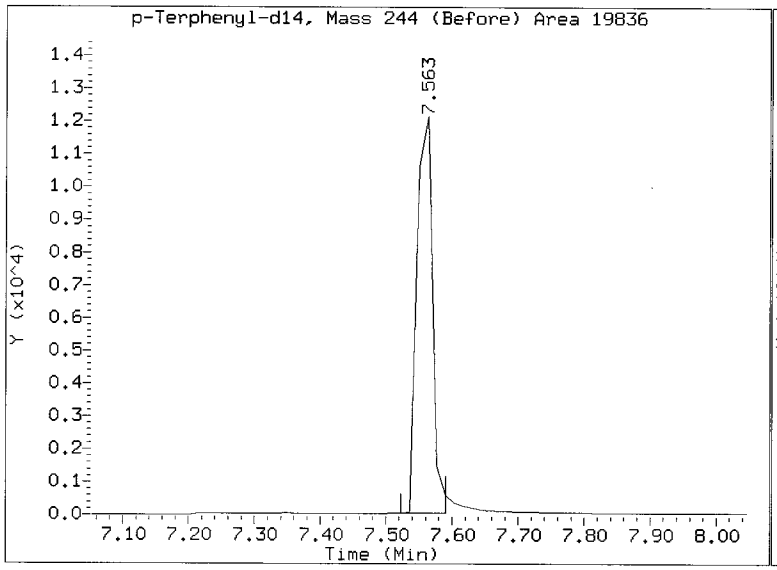
NONE

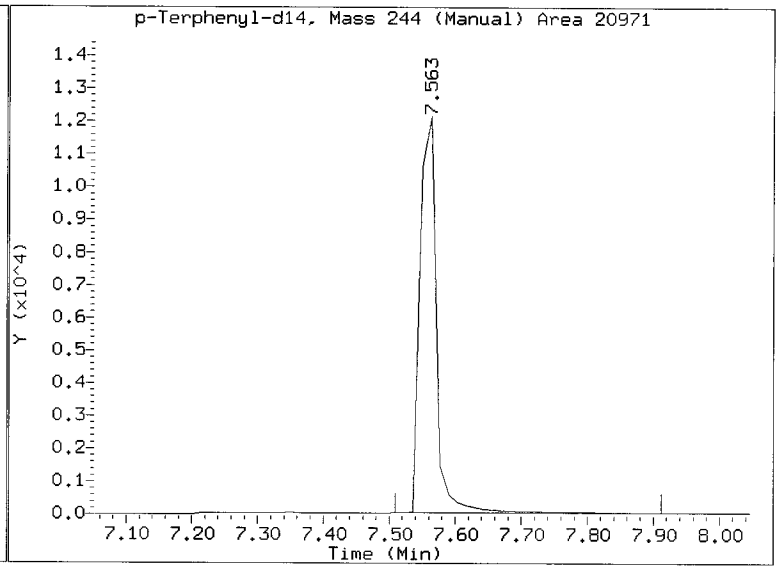
On Column LOD for nt12.i,20160304.b\BTS.m,Sublist: sed.sub = 0.0100

Exception: Dibutyl Tin (Hexyl) 0.0200
Exception: Butyl Tin (Hexyl) 0.0200
Exception: Tetrabutyl Tin 0.0200
Exception: Tripropyl Tin (Hexyl) (Surr) 0.0200
Exception: Tripentyl Tin (Hexyl) (Surr) 0.0200

Quant Ion Manual Peak Adjustment Report

Datafile: //target/share/chem3/nt12.i/20160304.b/16030403.D
Injection Date: 04-MAR-2016 09:30
Lab ID:TBT 2.0 Client ID:
Report Date: 03/04/2016 10:38





ARI Labs, Inc.

Krone1989/8270D-SIM

Data file : \\target\share\chem3\nt12.i\20160304.b\16030404.D
Lab Smp Id: TBT 0.2
Inj Date : 04-MAR-2016 09:43 MS Autotune Date: 13-FEB-2016 11:11
Operator : JW Inst ID: nt12.i
Smp Info : TBT 0.2
Misc Info :
Comment : 2 ul Injection
Method : \\target\share\chem3\nt12.i\20160304.b\BTS.m
Meth Date : 04-Mar-2016 10:38 jonathonw Quant Type: ISTD
Cal Date : 04-MAR-2016 10:21 Cal File: 16030407.D
Als bottle: 4 Calibration Sample, Level: 2
Dil Factor: 1.00000
Integrator: HP RTE Compound Sublist: sed.sub
Target Version: 4.14
Processing Host: AUTOSPECDATA2

Concentration Formula: Amt * DF * (1000*Vt)/Vo * CpndVariable

Name	Value	Description
DF	1.000	Dilution Factor
Vt	0.50000	Final Extract Volume (mL)
Vo	100.000	Volume Extracted (mL)
Cpnd Variable		Local Compound Variable



	Compounds	QUANT SIG MASS	RT	EXP RT	REL RT	RESPONSE	AMOUNTS CAL-AMT (ug/mL)	AMOUNTS ON-COL (ug/mL)
$	1 Tripropyl Tin (Hexyl)	291	5.029	5.029	(0.755)	2311	0.20000	0.2071
	2 Tetrabutyl Tin	289	5.236	5.236	(0.786)	2224	0.20000	0.2126
	3 Tributyl Tin (Hexyl)	319	6.018	6.018	(0.903)	1952	0.20000	0.2090
*	4 Tetrapentyl Tin	333	6.664	6.664	(1.000)	25371	2.00000	
	5 Dibutyl Tin (Hexyl)	347	6.718	6.718	(0.890)	2814	0.40000	0.4058
$	6 Tripentyl Tin (Hexyl)	347	7.013	7.013	(0.929)	3837	0.40000	0.3828
	7 Butyl Tin (Hexyl)	347	7.348	7.348	(0.973)	4157	0.40000	0.3999
*	8 p-Terphenyl-d14	244	7.549	7.549	(1.000)	23450	0.20000	

ARI Labs, Inc.

INTERNAL STANDARD COMPOUNDS
AREA AND RT SUMMARY

Instrument ID: nt12.i
Lab File ID: 16030404.D
Lab Smp Id: TBT 0.2
Analysis Type: SV
Quant Type: ISTD
Operator: JW
Method File: \\target\share\chem3\nt12.i\20160304.b\BTS.m
Misc Info:

Calibration Date: 04-MAR-2016
Calibration Time: 09:02

Level: LOW
Sample Type: WATER

Test Mode:
Use Initial Calibration Level 4.

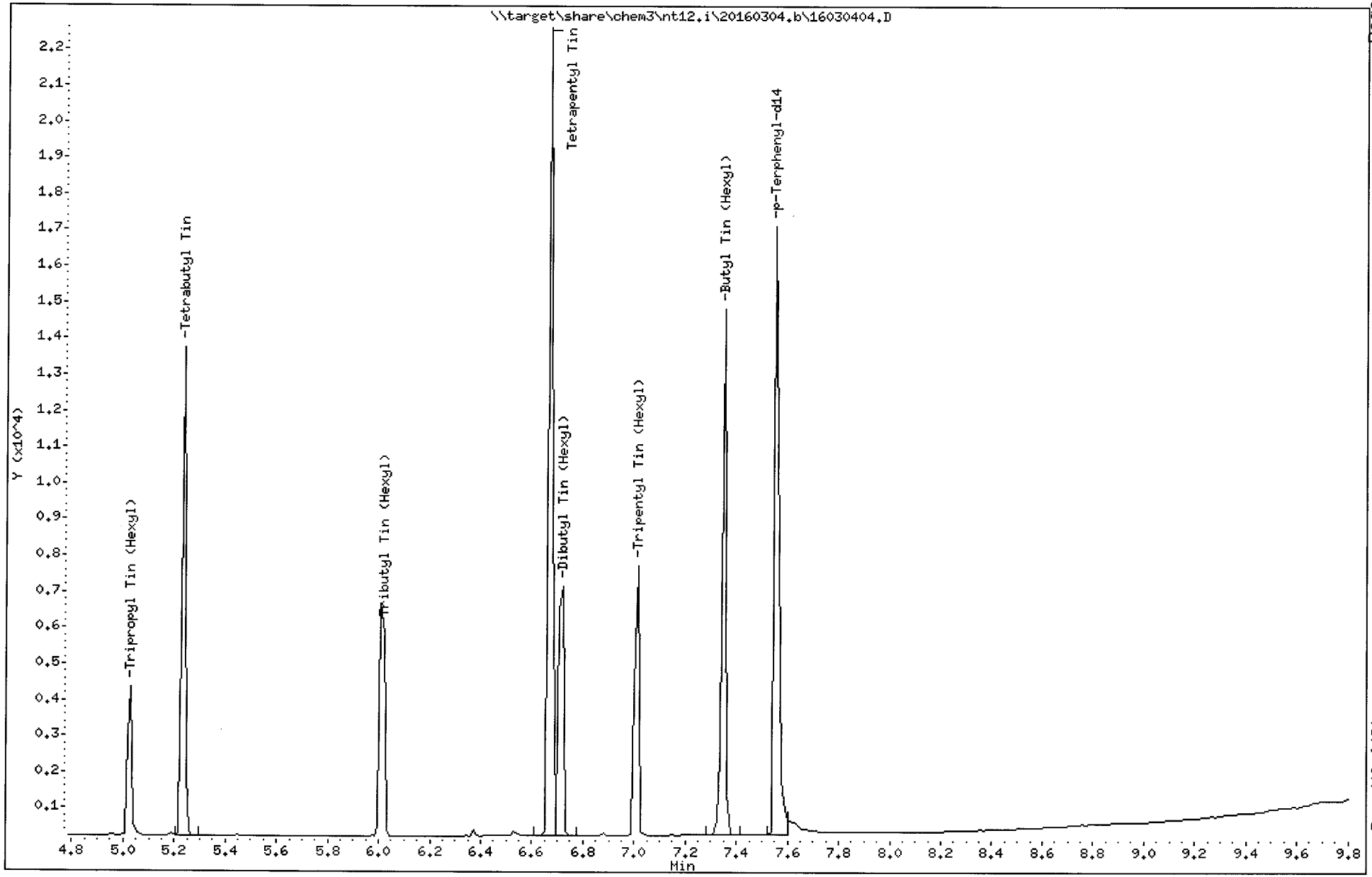
COMPOUND	STANDARD	AREA LIMIT LOWER	AREA LIMIT UPPER	SAMPLE	%DIFF
4 Tetrapentyl Tin	24391	12196	48782	25371	4.02
8 p-Terphenyl-d14	22552	11276	45104	23450	3.98

COMPOUND	STANDARD	RT LIMIT LOWER	RT LIMIT UPPER	SAMPLE	%DIFF
4 Tetrapentyl Tin	6.66	6.16	7.16	6.66	-0.00
8 p-Terphenyl-d14	7.55	7.05	8.05	7.55	-0.00

AREA UPPER LIMIT = +100% of internal standard area.
AREA LOWER LIMIT = - 50% of internal standard area.
RT UPPER LIMIT = + 0.50 minutes of internal standard RT.
RT LOWER LIMIT = - 0.50 minutes of internal standard RT.

Data File: \\target\share\chem3\nt12.i\20160304.b\16030404.D
Date : 04-MAR-2016 09:43
Client ID:
Sample Info: TBT 0.2
Purge Volume: 100.0
Column phase: ZB-5msi

Instrument: nt12.i
Operator: JW
Column diameter: 0.25



REVIEW SUMMARY FOR FILE - 16030404.D

Lab ID: TBT 0.2
nt12.i, 20160304.b\BTS.m, 04-MAR-2016 09:43

RT	CO-ELUTION COMPOUNDS

NO CO-ELUTIONS

Quant Method: ICAL

RRT CHECK

RRT	CCV RRT	DELTA	COMPOUND

NONE

On Column LOD for nt12.i,20160304.b\BTS.m,Sublist: sed.sub = 0.0100

Exception: Dibutyl Tin (Hexyl) 0.0200
Exception: Butyl Tin (Hexyl) 0.0200
Exception: Tetrabutyl Tin 0.0200
Exception: Tripropyl Tin (Hexyl) (Surr) 0.0200
Exception: Tripentyl Tin (Hexyl) (Surr) 0.0200

ARI Labs, Inc.

Krone1989/8270D-SIM

Data file : \\target\share\chem3\nt12.i\20160304.b\16030405.D
Lab Smp Id: TBT 0.5
Inj Date : 04-MAR-2016 09:56 MS Autotune Date: 13-FEB-2016 11:11
Operator : JW Inst ID: nt12.i
Smp Info : TBT 0.5
Misc Info :
Comment : 2 ul Injection
Method : \\target\share\chem3\nt12.i\20160304.b\BTS.m
Meth Date : 04-Mar-2016 10:38 jonathonw Quant Type: ISTD
Cal Date : 04-MAR-2016 10:21 Cal File: 16030407.D
Als bottle: 5 Calibration Sample, Level: 3
Dil Factor: 1.00000
Integrator: HP RTE Compound Sublist: sed.sub
Target Version: 4.14
Processing Host: AUTOSPECDATA2

Concentration Formula: Amt * DF * (1000*Vt)/Vo * CpndVariable

Name	Value	Description
DF	1.000	Dilution Factor
Vt	0.50000	Final Extract Volume (mL)
Vo	100.000	Volume Extracted (mL)
Cpnd Variable		Local Compound Variable

JD 5/9/16

	Compounds	QUANT SIG MASS	RT	EXP RT	REL RT	RESPONSE	AMOUNTS CAL-AMT (ug/mL)	AMOUNTS ON-COL (ug/mL)
$	1 Tripropyl Tin (Hexyl)	291	5.029	5.029	(0.755)	5913	0.50000	0.5014
	2 Tetrabutyl Tin	289	5.236	5.236	(0.786)	5496	0.50000	0.4972
	3 Tributyl Tin (Hexyl)	319	6.018	6.018	(0.903)	4961	0.50000	0.5026
*	4 Tetrapentyl Tin	333	6.664	6.664	(1.000)	26811	2.00000	
	5 Dibutyl Tin (Hexyl)	347	6.718	6.718	(0.890)	6841	1.00000	0.9898
$	6 Tripentyl Tin (Hexyl)	347	7.013	7.013	(0.929)	9839	1.00000	0.9849
	7 Butyl Tin (Hexyl)	347	7.348	7.348	(0.973)	10554	1.00000	1.019
*	8 p-Terphenyl-d14	244	7.549	7.549	(1.000)	23371	0.20000	

ARI Labs, Inc.

INTERNAL STANDARD COMPOUNDS
AREA AND RT SUMMARY

Instrument ID: nt12.i
Lab File ID: 16030405.D
Lab Smp Id: TBT 0.5
Analysis Type: SV
Quant Type: ISTD
Operator: JW
Method File: \\target\share\chem3\nt12.i\20160304.b\BTS.m
Misc Info:

Calibration Date: 04-MAR-2016
Calibration Time: 09:02

Level: LOW
Sample Type: WATER

Test Mode:
Use Initial Calibration Level 4.

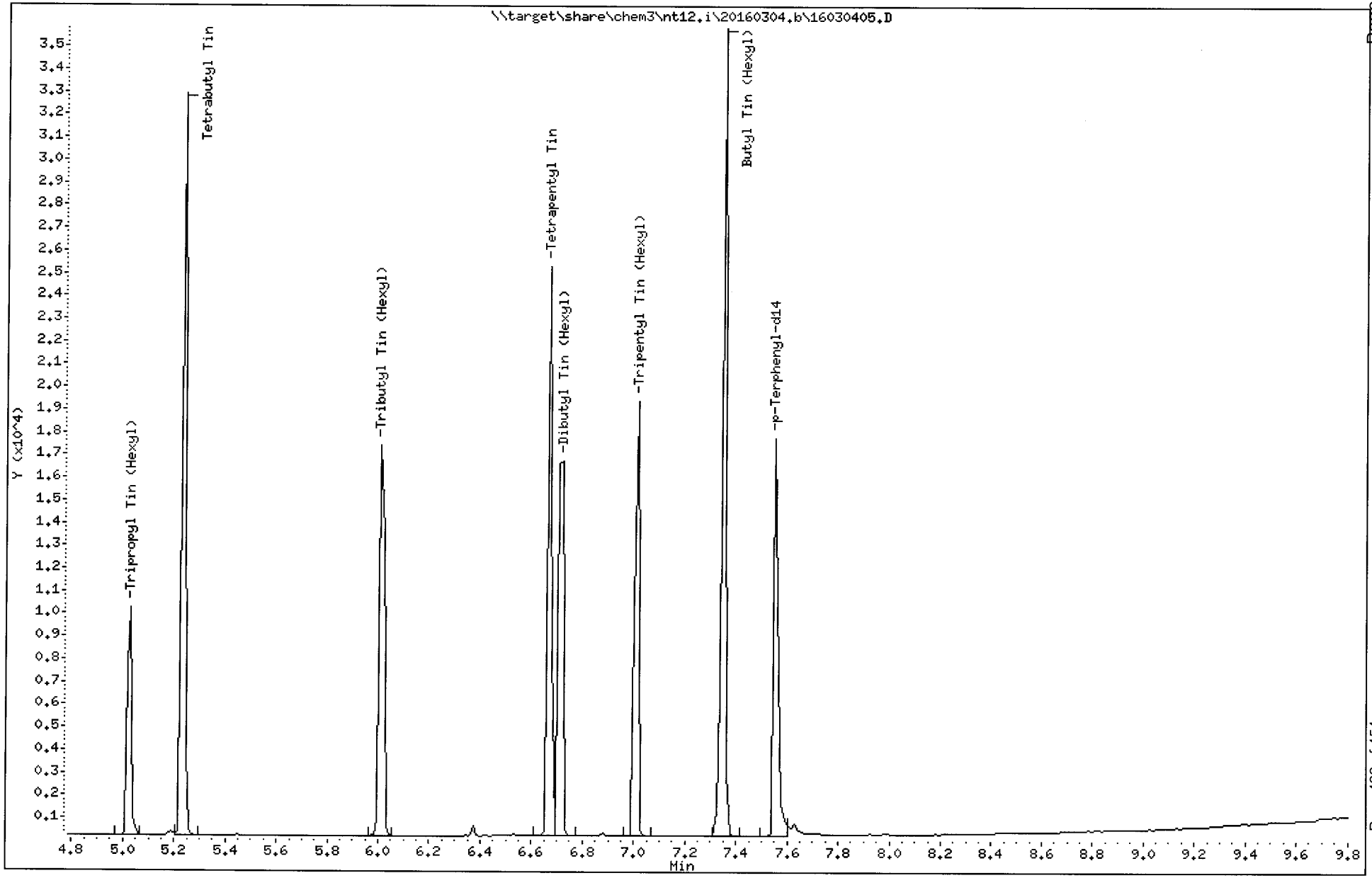
COMPOUND	STANDARD	AREA LIMIT LOWER	AREA LIMIT UPPER	SAMPLE	%DIFF
4 Tetrapentyl Tin	24391	12196	48782	26811	9.92
8 p-Terphenyl-d14	22552	11276	45104	23371	3.63

COMPOUND	STANDARD	RT LIMIT LOWER	RT LIMIT UPPER	SAMPLE	%DIFF
4 Tetrapentyl Tin	6.66	6.16	7.16	6.66	-0.00
8 p-Terphenyl-d14	7.55	7.05	8.05	7.55	-0.00

AREA UPPER LIMIT = +100% of internal standard area.
AREA LOWER LIMIT = - 50% of internal standard area.
RT UPPER LIMIT = + 0.50 minutes of internal standard RT.
RT LOWER LIMIT = - 0.50 minutes of internal standard RT.

Data File: \\target\share\chem3\nt12.i\20160304.b\16030405.D
Date : 04-MAR-2016 09:56
Client ID:
Sample Info: TBT 0.5
Purge Volume: 100.0
Column phase: ZB-5msi

Instrument: nt12.i
Operator: JW
Column diameter: 0.25



REVIEW SUMMARY FOR FILE - 16030405.D

Lab ID: TBT 0.5
nt12.i, 20160304.b\BTS.m, 04-MAR-2016 09:56

RT	CO-ELUTION COMPOUNDS

NO CO-ELUTIONS

Quant Method: ICAL

RRT CHECK

RRT	CCV RRT	DELTA	COMPOUND

NONE

On Column LOD for nt12.i,20160304.b\BTS.m,Sublist: sed.sub = 0.0100

Exception: Dibutyl Tin (Hexyl) 0.0200
Exception: Butyl Tin (Hexyl) 0.0200
Exception: Tetrabutyl Tin 0.0200
Exception: Tripropyl Tin (Hexyl) (Surr) 0.0200
Exception: Tripentyl Tin (Hexyl) (Surr) 0.0200

ARI Labs, Inc.

Krone1989/8270D-SIM

Data file : \\target\share\chem3\nt12.i\20160304.b\16030406.D
Lab Smp Id: TBT 0.05
Inj Date : 04-MAR-2016 10:08 MS Autotune Date: 13-FEB-2016 11:11
Operator : JW Inst ID: nt12.i
Smp Info : TBT 0.05
Misc Info :
Comment : 2 ul Injection
Method : \\target\share\chem3\nt12.i\20160304.b\BTS.m
Meth Date : 04-Mar-2016 10:38 jonathonw Quant Type: ISTD
Cal Date : 04-MAR-2016 10:21 Cal File: 16030407.D
Als bottle: 6 Calibration Sample, Level: 1
Dil Factor: 1.00000
Integrator: HP RTE Compound Sublist: sed.sub
Target Version: 4.14
Processing Host: AUTOSPECDATA2

Concentration Formula: Amt * DF * (1000*Vt)/Vo * CpndVariable

Name	Value	Description
DF	1.000	Dilution Factor
Vt	0.50000	Final Extract Volume (mL)
Vo	100.000	Volume Extracted (mL)
Cpnd Variable		Local Compound Variable

	Compounds	QUANT SIG MASS	RT	EXP RT	REL RT	RESPONSE	AMOUNTS CAL-AMT (ug/mL)	ON-COL (ug/mL)
$	1 Tripropyl Tin (Hexyl)	291	5.029	5.029	(0.755)	617	0.05000	0.05534
	2 Tetrabutyl Tin	289	5.236	5.236	(0.786)	583	0.05000	0.05579
	3 Tributyl Tin (Hexyl)	319	6.018	6.018	(0.903)	506	0.05000	0.05423
*	4 Tetrapentyl Tin	333	6.664	6.664	(1.000)	25346	2.00000	
	5 Dibutyl Tin (Hexyl)	347	6.718	6.718	(0.890)	704	0.10000	0.1008
$	6 Tripentyl Tin (Hexyl)	347	7.013	7.013	(0.929)	986	0.10000	0.09769
	7 Butyl Tin (Hexyl)	347	7.348	7.348	(0.973)	1111	0.10000	0.1061
*	8 p-Terphenyl-d14	244	7.549	7.549	(1.000)	23613	0.20000	

ARI Labs, Inc.

INTERNAL STANDARD COMPOUNDS
AREA AND RT SUMMARY

Instrument ID: nt12.i
Lab File ID: 16030406.D
Lab Smp Id: TBT 0.05
Analysis Type: SV
Quant Type: ISTD
Operator: JW
Method File: \\target\share\chem3\nt12.i\20160304.b\BTS.m
Misc Info:

Calibration Date: 04-MAR-2016
Calibration Time: 09:02

Level: LOW
Sample Type: WATER

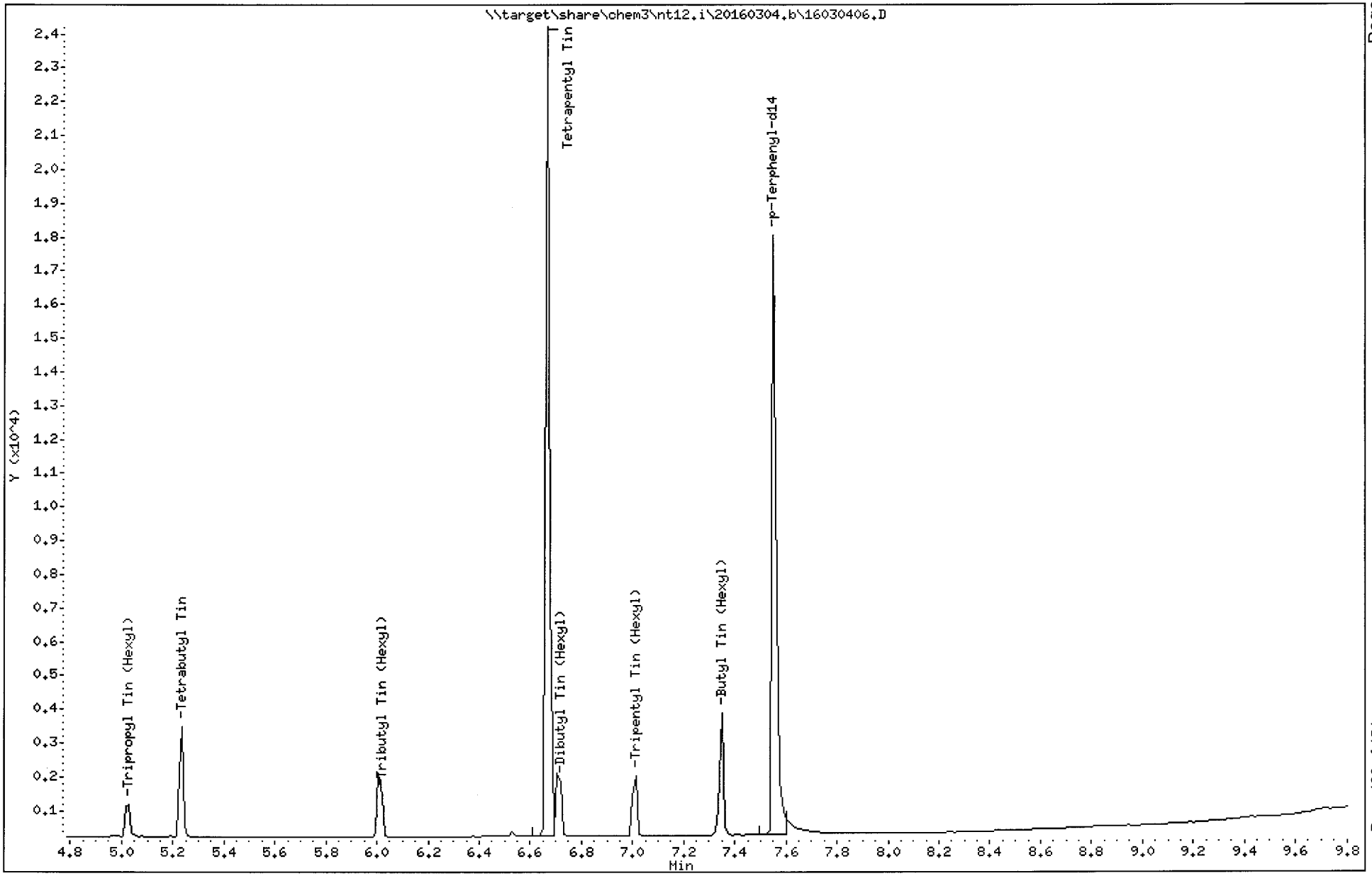
Test Mode:
Use Initial Calibration Level 4.

COMPOUND	STANDARD	AREA LIMIT LOWER	AREA LIMIT UPPER	SAMPLE	%DIFF
4 Tetrapentyl Tin	24391	12196	48782	25346	3.92
8 p-Terphenyl-d14	22552	11276	45104	23613	4.70

COMPOUND	STANDARD	RT LIMIT LOWER	RT LIMIT UPPER	SAMPLE	%DIFF
4 Tetrapentyl Tin	6.66	6.16	7.16	6.66	-0.00
8 p-Terphenyl-d14	7.55	7.05	8.05	7.55	-0.00

AREA UPPER LIMIT = +100% of internal standard area.
AREA LOWER LIMIT = - 50% of internal standard area.
RT UPPER LIMIT = + 0.50 minutes of internal standard RT.
RT LOWER LIMIT = - 0.50 minutes of internal standard RT.

Data File: \\target\share\chem3\nt12.i\20160304.b\16030406.D
Date : 04-MAR-2016 10:08
Client ID:
Instrument: nt12.i
Sample Info: TBT 0.05
Purge Volume: 100.0
Operator: JW
Column phase: ZB-5msi
Column diameter: 0.25



REVIEW SUMMARY FOR FILE - 16030406.D

Lab ID: TBT 0.05
nt12.i, 20160304.b\BTS.m, 04-MAR-2016 10:08

RT	CO-ELUTION COMPOUNDS

NO CO-ELUTIONS

Quant Method: ICAL

RRT CHECK

RRT	CCV RRT	DELTA	COMPOUND

NONE

On Column LOD for nt12.i,20160304.b\BTS.m,Sublist: sed.sub = 0.0100

Exception: Dibutyl Tin (Hexyl) 0.0200
Exception: Butyl Tin (Hexyl) 0.0200
Exception: Tetrabutyl Tin 0.0200
Exception: Tripropyl Tin (Hexyl) (Surr) 0.0200
Exception: Tripentyl Tin (Hexyl) (Surr) 0.0200

ARI Labs, Inc.

Krone1989/8270D-SIM

Data file : \\target\share\chem3\nt12.i\20160304.b\16030407.D
Lab Smp Id: TBT 4.0
Inj Date : 04-MAR-2016 10:21 MS Autotune Date: 13-FEB-2016 11:11
Operator : JW Inst ID: nt12.i
Smp Info : TBT 4.0
Misc Info :
Comment : 2 ul Injection
Method : \\target\share\chem3\nt12.i\20160304.b\BTS.m
Meth Date : 04-Mar-2016 10:38 jonathonw Quant Type: ISTD
Cal Date : 04-MAR-2016 10:21 Cal File: 16030407.D
Als bottle: 7 Calibration Sample, Level: 6
Dil Factor: 1.00000
Integrator: HP RTE Compound Sublist: sed.sub
Target Version: 4.14
Processing Host: AUTOSPECDATA2

Concentration Formula: Amt * DF * (1000*Vt)/Vo * CpndVariable

Name	Value	Description
DF	1.000	Dilution Factor
Vt	0.50000	Final Extract Volume (mL)
Vo	100.000	Volume Extracted (mL)
Cpnd Variable		Local Compound Variable

	Compounds	QUANT SIG MASS	RT	EXP RT	REL RT	RESPONSE	AMOUNTS CAL-AMT (ug/mL)	AMOUNTS ON-COL (ug/mL)
$	1 Tripropyl Tin (Hexyl)	291	5.029	5.029	(0.755)	45226	4.00000	3.327
	2 Tetrabutyl Tin	289	5.236	5.236	(0.786)	42775	4.00000	3.357
	3 Tributyl Tin (Hexyl)	319	6.018	6.018	(0.903)	38178	4.00000	3.356
*	4 Tetrapentyl Tin	333	6.664	6.664	(1.000)	30901	2.00000	
	5 Dibutyl Tin (Hexyl)	347	6.718	6.718	(0.890)	54184	8.00000	7.722
$	6 Tripentyl Tin (Hexyl)	347	7.013	7.013	(0.929)	75609	8.00000	7.456
	7 Butyl Tin (Hexyl)	347	7.348	7.348	(0.973)	77160	8.00000	7.336
*	8 p-Terphenyl-d14	244	7.549	7.549	(1.000)	23726	0.20000	

ARI Labs, Inc.

INTERNAL STANDARD COMPOUNDS
AREA AND RT SUMMARY

Instrument ID: nt12.i
Lab File ID: 16030407.D
Lab Smp Id: TBT 4.0
Analysis Type: SV
Quant Type: ISTD
Operator: JW
Method File: \\target\share\chem3\nt12.i\20160304.b\BTS.m
Misc Info:

Calibration Date: 04-MAR-2016
Calibration Time: 09:02

Level: LOW
Sample Type: WATER

Test Mode:
Use Initial Calibration Level 4.

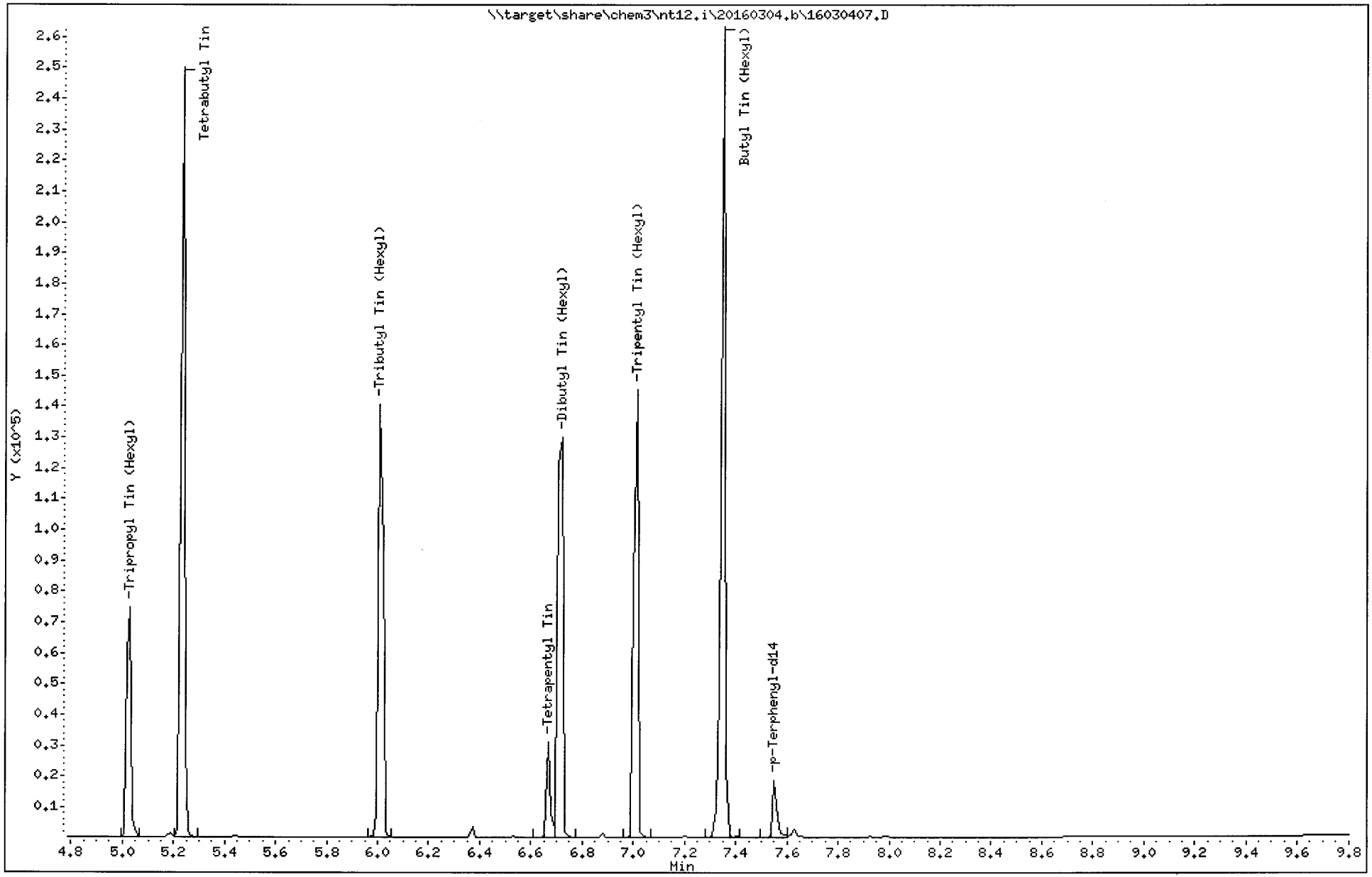
COMPOUND	STANDARD	AREA LIMIT LOWER	AREA LIMIT UPPER	SAMPLE	%DIFF
4 Tetrapentyl Tin	24391	12196	48782	30901	26.69
8 p-Terphenyl-d14	22552	11276	45104	23726	5.21

COMPOUND	STANDARD	RT LIMIT LOWER	RT LIMIT UPPER	SAMPLE	%DIFF
4 Tetrapentyl Tin	6.66	6.16	7.16	6.66	-0.00
8 p-Terphenyl-d14	7.55	7.05	8.05	7.55	-0.00

AREA UPPER LIMIT = +100% of internal standard area.
AREA LOWER LIMIT = - 50% of internal standard area.
RT UPPER LIMIT = + 0.50 minutes of internal standard RT.
RT LOWER LIMIT = - 0.50 minutes of internal standard RT.

Data File: \\target\share\chem3\nt12.i\20160304.b\16030407.D
Date : 04-MAR-2016 10:21
Client ID:
Sample Info: TBT 4.0
Purge Volume: 100.0
Column phase: ZB-5msi

Instrument: nt12.i
Operator: JW
Column diameter: 0.25



REVIEW SUMMARY FOR FILE - 16030407.D

Lab ID: TBT 4.0
nt12.i, 20160304.b\BTS.m, 04-MAR-2016 10:21

RT	CO-ELUTION COMPOUNDS

NO CO-ELUTIONS

Quant Method: ICAL

RRT CHECK

RRT	CCV RRT	DELTA	COMPOUND

NONE

On Column LOD for nt12.i,20160304.b\BTS.m,Sublist: sed.sub = 0.0100

Exception: Dibutyl Tin (Hexyl) 0.0200
Exception: Butyl Tin (Hexyl) 0.0200
Exception: Tetrabutyl Tin 0.0200
Exception: Tripropyl Tin (Hexyl) (Surr) 0.0200
Exception: Tripentyl Tin (Hexyl) (Surr) 0.0200

INITIAL CALIBRATION CHECK

EPA 8270D-SIM

Laboratory:	Analytical Resources, Inc.	SDG:	16H0071
Client:	Fremont Analytical	Project:	1608094
Instrument ID:	NT12	Calibration:	ZC00001
Lab File ID:	16082902.D	Calibration Date:	03/04/16 08:51
Sequence:	SEH0310	Injection Date:	08/29/16
Lab Sample ID:	SEH0310-ICV1	Injection Time:	08:45
Sequence Name:	Initial Cal Check		

		CONC. (ug/mL)		RESPONSE FACTOR			% DRIFT/DIFF	
COMPOUND	TYPE	STD	ICV	ICAL	ICV	MIN	ICV	LIMIT
Tributyltin Ion	A	0.77300	0.747	0.7363039	0.7114151	0.01	-3.4	20
Tripentyltin	A	1.5918	1.51	0.0854852	0.0808945	0.01	-5.3	20
Tripropyltin	A	0.74430	0.735	0.8797438	0.8688015	0.01	-1.2	20

* Values outside of QC limits

Data File: \\target\share\chem3\nt12.i\20160829.b\16082902.D

Page 1

Date : 29-AUG-2016 08:45

Client ID:

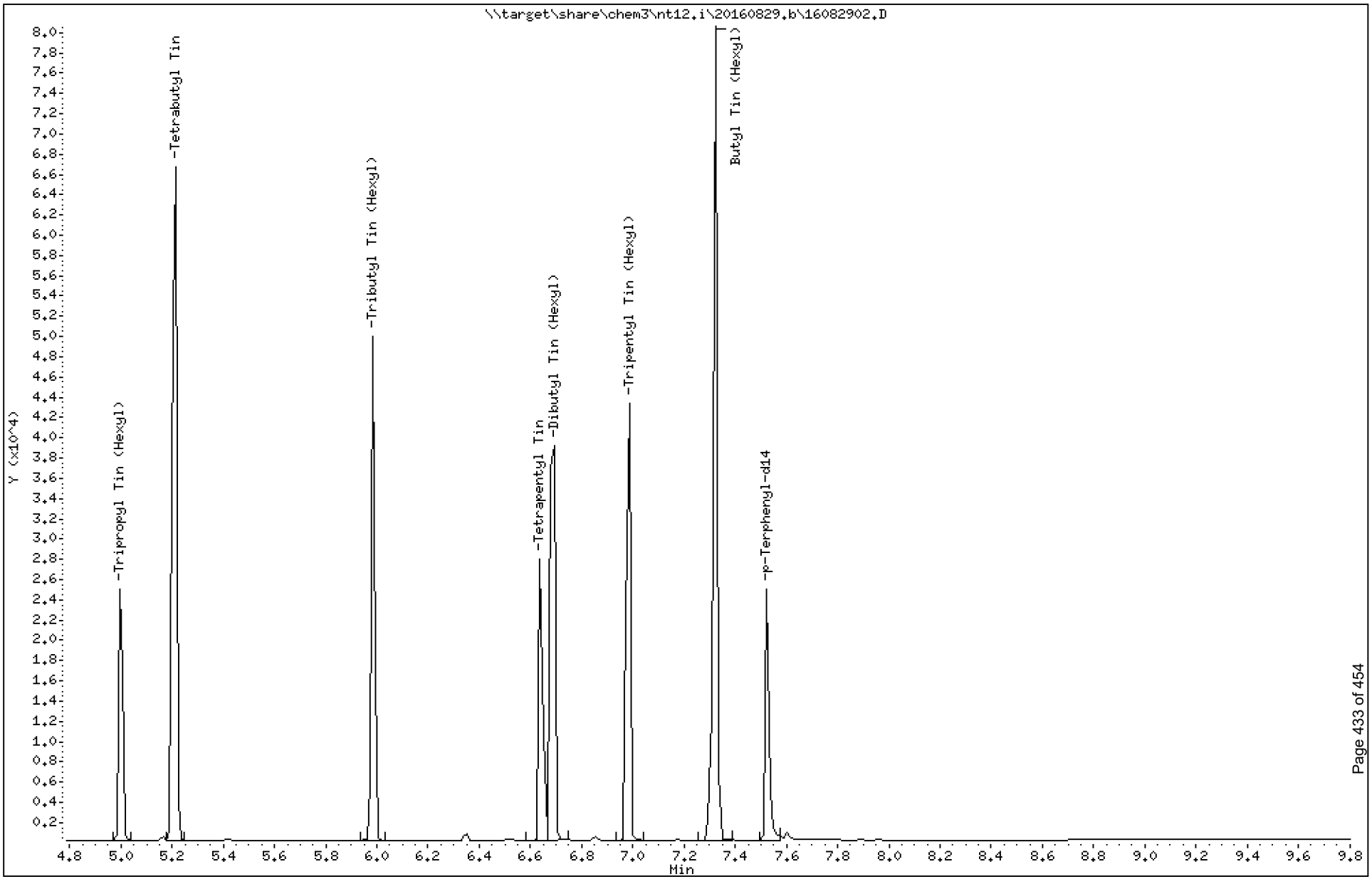
Instrument: nt12.i

Sample Info: SEH0310-ICV1

Operator: JW

Column phase: ZB-5msi

Column diameter: 0.25



ARI Labs, Inc.

Krone1989/8270D-SIM

Data file : \\target\share\chem3\nt12.i\20160829.b\16082902.D
Lab Smp Id: SEH0310-ICV1
Inj Date : 29-AUG-2016 08:45 MS Autotune Date: 03-NOV-2015 14:19
Operator : JW Inst ID: nt12.i
Smp Info : SEH0310-ICV1
Misc Info :
Comment : 2 ul Injection
Method : \\target\share\chem3\nt12.i\20160829.b\BTS.m
Meth Date : 29-Aug-2016 12:24 nt12.i Quant Type: ISTD
Cal Date : 04-MAR-2016 10:21 Cal File: 16030407.D
Als bottle: 2 Continuing Calibration Sample
Dil Factor: 1.00000
Integrator: HP RTE Compound Sublist: sed.sub
Target Version: 4.14
Processing Host: AUTOSPECDATA02

	Compounds	QUANT SIG MASS	RT	EXP RT	REL RT	RESPONSE	AMOUNTS CAL-AMT (ug/mL)	ON-COL (ug/mL)
$	1 Tripropyl Tin (Hexyl)	291	5.006	5.006	(0.754)	13403	1.00000	0.9876
	2 Tetrabutyl Tin	289	5.213	5.213	(0.785)	12599	1.00000	0.9904
	3 Tributyl Tin (Hexyl)	319	5.995	5.995	(0.903)	10975	1.00000	0.9662
*	4 Tetrapentyl Tin	333	6.637	6.637	(1.000)	30854	2.00000	
	5 Dibutyl Tin (Hexyl)	347	6.691	6.691	(0.890)	15859	2.00000	1.986
$	6 Tripentyl Tin (Hexyl)	347	6.986	6.986	(0.929)	21848	2.00000	1.893
	7 Butyl Tin (Hexyl)	347	7.321	7.321	(0.973)	23984	2.00000	2.003
*	8 p-Terphenyl-d14	244	7.522	7.522	(1.000)	27008	0.20000	

ARI Labs, Inc.

INTERNAL STANDARD COMPOUNDS
AREA AND RT SUMMARY

Instrument ID: nt12.i
Lab File ID: 16082902.D
Lab Smp Id: SEH0310-ICV1
Analysis Type: SV
Quant Type: ISTD
Operator: JW
Method File: \\target\share\chem3\nt12.i\20160829.b\BTS.m
Misc Info:

Calibration Date: 29-AUG-2016
Calibration Time: 11:19
Level:
Sample Type:

Test Mode:
Use Initial Calibration Level 4.

		AREA LIMIT			
COMPOUND	STANDARD	LOWER	UPPER	SAMPLE	%DIFF
4 Tetrapentyl Tin	24391	12196	48782	30854	26.50
8 p-Terphenyl-d14	22552	11276	45104	27008	19.76

		RT LIMIT			
COMPOUND	STANDARD	LOWER	UPPER	SAMPLE	%DIFF
4 Tetrapentyl Tin	6.64	6.14	7.14	6.64	0.00
8 p-Terphenyl-d14	7.52	7.02	8.02	7.52	0.00

AREA UPPER LIMIT = +100% of internal standard area.
AREA LOWER LIMIT = - 50% of internal standard area.
RT UPPER LIMIT = + 0.50 minutes of internal standard RT.
RT LOWER LIMIT = - 0.50 minutes of internal standard RT.

REVIEW SUMMARY FOR FILE - 16082902.D

Lab ID: SEH0310-ICV1
nt12.i, 20160829.b\BTS.m,   29-AUG-2016 08:45

RT	CO-ELUTION COMPOUNDS

NO CO-ELUTIONS

Quant Method: ICAL

On Column LOD for nt12.i, 20160829.b\BTS.m, sed.sub = 0.0000

Q-FLAG SUMMARY FOR DATABATCH - \\target\share\chem3\nt12.i\20160829.b

Instrument: nt12.i Date: 29-AUG-2016 Method: 20160829.b\BTS.m

INITIAL CAL: 04-MAR-2016

Compound	%RSD or R^2
NO Q-FLAGS	

ICV CAL: 16082902.D 29-AUG-2016 08:45

Compound	%D
NO Q-FLAGS	

CONTINUING CALIBRATION CHECK
EPA 8270D-SIM

Laboratory:	Analytical Resources, Inc.	SDG:	16H0071
Client:	Fremont Analytical	Project:	1608094
Instrument ID:	NT12	Calibration:	ZC00001
Lab File ID:	16082909.D	Calibration Date:	03/04/16 08:51
Sequence:	SEH0310	Injection Date:	08/29/16
Lab Sample ID:	SEH0310-CCV1	Injection Time:	11:19
Sequence Name:	Calibration Check		

		CONC. (ug/mL)		RESPONSE FACTOR			% DRIFT/DIFF	
COMPOUND	TYPE	STD	CCV	ICAL	CCV	MIN	CCV	LIMIT
Tributyltin Ion	A	0.77300	0.725	0.7363039	0.6907960	0.01	-6.2	50
Tripentyltin	A	1.5918	1.84	0.0854852	0.0986814	0.01	15.4	50
Tripropyltin	A	0.74430	0.647	0.8797438	0.7642301	0.01	-13.1	50

* Values outside of QC limits

Data File: \\target\share\chem3\nt12.i\20160829.b\16082909.D

Page 1

Date : 29-AUG-2016 11:19

Client ID:

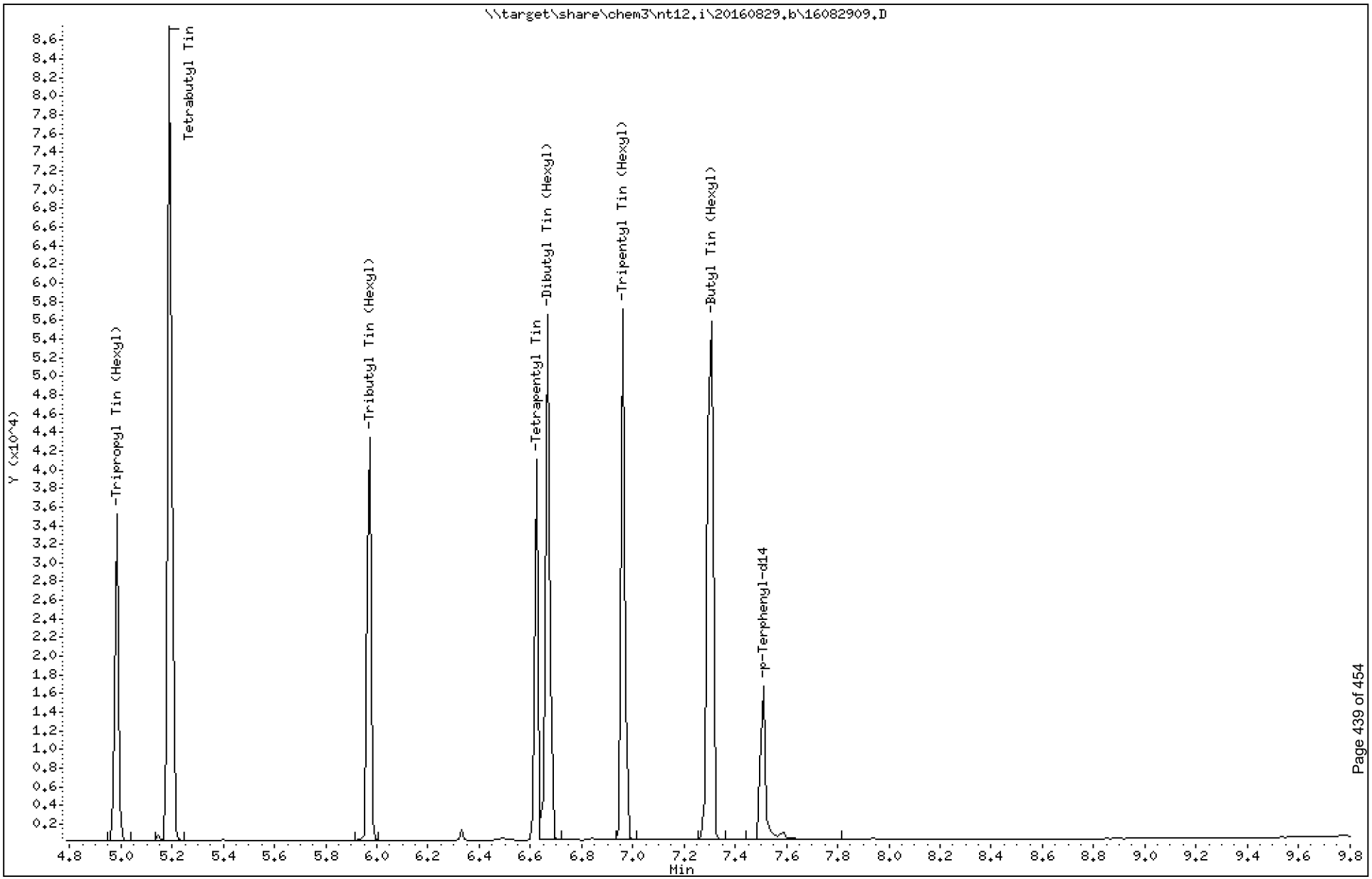
Instrument: nt12.i

Sample Info: SEH0310-CCV1

Operator: JW

Column phase: ZB-5msi

Column diameter: 0.25



ARI Labs, Inc.

Krone1989/8270D-SIM

Data file : \\target\share\chem3\nt12.i\20160829.b\16082909.D
Lab Smp Id: SEH0310-CCV1
Inj Date : 29-AUG-2016 11:19 MS Autotune Date: 03-NOV-2015 14:19
Operator : JW Inst ID: nt12.i
Smp Info : SEH0310-CCV1
Misc Info : CCV
Comment : 2 ul Injection
Method : \\target\share\chem3\nt12.i\20160829.b\BTS.m
Meth Date : 29-Aug-2016 12:25 nt12.i Quant Type: ISTD
Cal Date : 04-MAR-2016 10:21 Cal File: 16030407.D
Als bottle: 2 Continuing Calibration Sample
Dil Factor: 1.00000
Integrator: HP RTE Compound Sublist: sed.sub
Target Version: 4.14
Processing Host: AUTOSPECDATA02

	Compounds	QUANT SIG MASS	RT	EXP RT	REL RT	RESPONSE	AMOUNTS CAL-AMT (ug/mL)	ON-COL (ug/mL)	
$	1 Tripropyl Tin (Hexyl)	291	4.983	4.983	(0.752)	13883	1.00000	0.8687	
	2 Tetrabutyl Tin	289	5.190	5.190	(0.783)	12367	1.00000	0.8256	
	3 Tributyl Tin (Hexyl)	319	5.972	5.972	(0.902)	12549	1.00000	0.9382	
*	4 Tetrapentyl Tin	333	6.624	6.624	(1.000)	36332	2.00000		
	5 Dibutyl Tin (Hexyl)	347	6.678	6.678	(0.889)	15115	2.00000	2.217	
$	6 Tripentyl Tin (Hexyl)	347	6.959	6.959	(0.927)	22750	2.00000	2.309	
	7 Butyl Tin (Hexyl)	347	7.308	7.308	(0.973)	25834	2.00000	2.528	
*	8 p-Terphenyl-d14	244	7.509	7.509	(1.000)	23054	0.20000		(M)

QC Flag Legend

M - Compound response manually integrated.

ARI Labs, Inc.

INTERNAL STANDARD COMPOUNDS
AREA AND RT SUMMARY

Instrument ID: nt12.i
Lab File ID: 16082909.D
Lab Smp Id: SEH0310-CCV1
Analysis Type: SV
Quant Type: ISTD
Operator: JW
Method File: \\target\share\chem3\nt12.i\20160829.b\BTS.m
Misc Info: CCV

Calibration Date: 29-AUG-2016
Calibration Time: 08:45
Level:
Sample Type:

Test Mode:
Use Initial Calibration Level 4.

		AREA LIMIT			
COMPOUND	STANDARD	LOWER	UPPER	SAMPLE	%DIFF
4 Tetrapentyl Tin	24391	12196	48782	36332	48.96
8 p-Terphenyl-d14	22552	11276	45104	23054	2.23

		RT LIMIT			
COMPOUND	STANDARD	LOWER	UPPER	SAMPLE	%DIFF
4 Tetrapentyl Tin	6.62	6.12	7.12	6.62	0.00
8 p-Terphenyl-d14	7.51	7.01	8.01	7.51	0.00

AREA UPPER LIMIT = +100% of internal standard area.
AREA LOWER LIMIT = - 50% of internal standard area.
RT UPPER LIMIT = + 0.50 minutes of internal standard RT.
RT LOWER LIMIT = - 0.50 minutes of internal standard RT.

REVIEW SUMMARY FOR FILE - 16082909.D

Lab ID: SEH0310-CCV1
nt12.i, 20160829.b\BTS.m,   29-AUG-2016 11:19

RT	CO-ELUTION COMPOUNDS

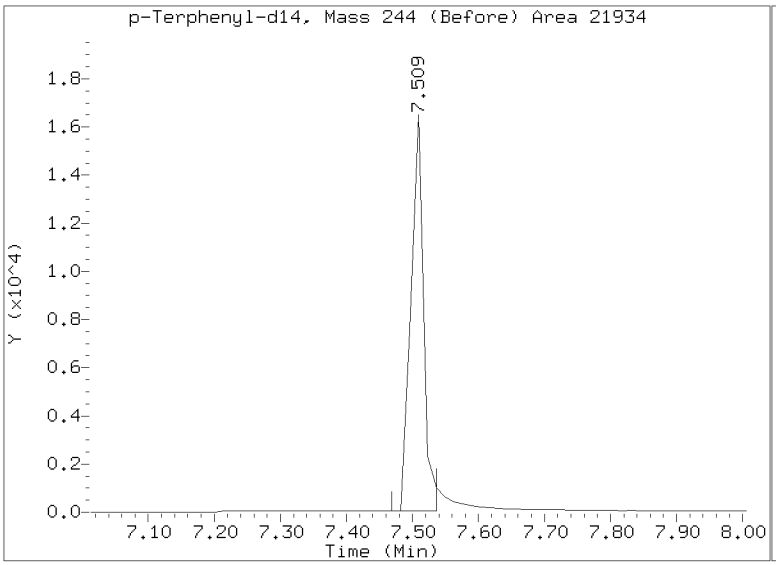
NO CO-ELUTIONS

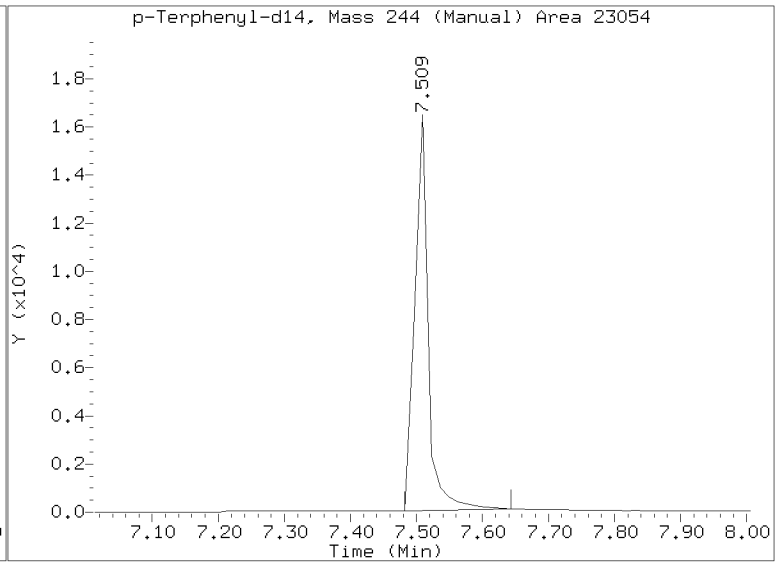
Quant Method: ICAL

On Column LOD for nt12.i, 20160829.b\BTS.m, sed.sub = 0.0000

Quant Ion Manual Peak Adjustment Report

Datafile: //target/share/chem3/nt12.i/20160829.b/16082909.D
Injection Date: 29-AUG-2016 11:19
Lab ID:SEH0310-CCV1 Client ID:
Report Date: 08/29/2016 12:25





Q-FLAG SUMMARY FOR DATABATCH - \\target\share\chem3\nt12.i\20160829.b

Instrument: nt12.i Date: 29-AUG-2016 Method: 20160829.b\BTS.m

INITIAL CAL: 04-MAR-2016

Compound	%RSD or R^2
NO Q-FLAGS	

CONTINUING CAL: 16082909.D 29-AUG-2016 11:19

Compound	%D
NO Q-FLAGS	

Analytical Resources, Incorporated

ANALYSIS BATCH (SEQUENCE) SUMMARY

EPA 8270D-SIM

Laboratory:	Analytical Resources, Inc.	SDG:	16H0071
Client:	Fremont Analytical	Project:	1608094
Sequence:	SEC0013	Instrument:	NT12
		Calibration:	ZC00001

Sample Name	Lab Sample ID	Lab File ID	Matrix	Analysis Date/Time
MS Tune	SEC0013-TUN1	16030401.D	Water	03/04/16 08:51
Cal Standard	SEC0013-CAL4	16030402.D	Water	03/04/16 09:02
Cal Standard	SEC0013-CAL5	16030403.D	Water	03/04/16 09:30
Cal Standard	SEC0013-CAL2	16030404.D	Water	03/04/16 09:43
Cal Standard	SEC0013-CAL3	16030405.D	Water	03/04/16 09:56
Cal Standard	SEC0013-CAL1	16030406.D	Water	03/04/16 10:08
Cal Standard	SEC0013-CAL6	16030407.D	Water	03/04/16 10:21

Analytical Resources, Incorporated

ANALYSIS BATCH (SEQUENCE) SUMMARY

EPA 8270D-SIM

Laboratory:	Analytical Resources, Inc.	SDG:	16H0071
Client:	Fremont Analytical	Project:	1608094
Sequence:	SEH0310	Instrument:	NT12
		Calibration:	ZC00001

Sample Name	Lab Sample ID	Lab File ID	Matrix	Analysis Date/Time
MS Tune	SEH0310-TUN1	16082901.D	Solid	08/29/16 08:33
Initial Cal Check	SEH0310-ICV1	16082902.D	Solid	08/29/16 08:45
Blank	BEH0443-BLK1	16082903.D	Solid	08/29/16 10:03
LCS	BEH0443-BS1	16082904.D	Solid	08/29/16 10:16
NME:0-4C	16H0071-01	16082905.D	Solid	08/29/16 10:29
NME:0-4C	BEH0443-MS1	16082906.D	Solid	08/29/16 10:41
NME:0-4C	BEH0443-MSD1	16082907.D	Solid	08/29/16 10:54
NME:4-7C	16H0071-02	16082908.D	Solid	08/29/16 11:07
Calibration Check	SEH0310-CCV1	16082909.D	Solid	08/29/16 11:19

1608094
16H0071

Analysis	Matrix	Method
8270D-SIM Butyl Tins	Solid	EPA 8270D-SIM

Checklist: Analyst Checklist-SVOA

#	Checklist Item	Response		Analyst Initials	Date
1	DFTPP abundance and time criteria met	YES		JLW	08/29/2016
2	DDT Breakdown <20% and Peak Tailing <=2	YES		JLW	08/29/2016
3	ICV/CCV Meets %D	YES		JLW	08/29/2016
4	ICAL/ICV/CCV Q Flag - NONE required	YES		JLW	08/29/2016
5	Internal Standard areas within 50-200%	YES		JLW	08/29/2016
6	Retention times within windows and Coelution summary checked	YES		JLW	08/29/2016
7	Manual integrations include summary and before/after pictures	YES		JLW	08/29/2016
8	Project specific requirements have been met	YES		JLW	08/29/2016
9	Sample dilution factors have been correctly applied	NA		JLW	08/29/2016
10	AUTOCHECK: Blank checked for exceedence of criteria	YES	*	JLW	08/29/2016
11	AUTOCHECK: Check blank spike recovery	YES	*	JLW	08/29/2016
12	AUTOCHECK: Check blank spike/blank spike duplicate RPD. If exceeded include outliers in exception report.	NA	*	JLW	08/29/2016
13	AUTOCHECK: Compounds in method designated as blank spike compounds are present	YES	*	JLW	08/29/2016
14	AUTOCHECK: Check %RPD between sample and sample duplicate	NA	*	JLW	08/29/2016
15	AUTOCHECK: Matrix spike recoveries within limits	YES	*	JLW	08/29/2016
16	AUTOCHECK: Matrix spike/matrix spike duplicate RPD within limits	YES	*	JLW	08/29/2016
17	AUTOCHECK: List of compounds listed as spiked are present	YES	*	JLW	08/29/2016
18	AUTOCHECK: Check SRM limits for exceedance	NA	*	JLW	08/29/2016
19	AUTOCHECK: Check Surrogate recoveries	YES	*	JLW	08/29/2016
20	AUTOCHECK: Checks Surrogate spike list against Analysis	YES	*	JLW	08/29/2016
21	Analyst checklist completed (PEER)				12/30/1899
22	Data is locked and Status is Analyzed (PEER)				12/30/1899
23	Data file, Calibration, Sequence, Batch, and Cleanup PDF's are attached (PEER)				12/30/1899
24	Color warnings have been addressed and (or) qualified (PEER)	YES		MW	08/29/2016
25	Qualifers have been correctly added (PEER)	YES		MW	08/29/2016
26	Checklist completed and status is peer reviewed (REVIEWER)	YES		MW	08/29/2016

1608094
16H0071

Analysis	Matrix	Method
8270D-SIM Butyl Tins	Solid	EPA 8270D-SIM

Checklist: Analyst Checklist-SVOA

#	Checklist Item	Response	Analyst Initials	Date
27	Dilutions are linear (50-200%) and appropriate (REVIEWER)	NA	MW	08/29/2016
28	All requested samples have been reported (REVIEWER)	YES	MW	08/29/2016
29	Color warnings have been addressed, narrated and (or) qualified (REVIEWER)	NA	MW	08/29/2016
30	Additional Notes (ANALYST, PEER, and REVIEWER)	NA	JLW	08/29/2016

MANUAL INTEGRATION SUMMARY FOR DATABATCH - \\target\share\chem3\nt12.i\20160829.b

AR Job No.: SEH0 Method: df8270.m Instrument: nt12.i Date: 29-AUG-2016

Time	Filename	LabID	ClientId	DF	Manually Integrated Compounds
0833	16082901.D	SEH0310-TUN1		1	NO MANUAL INTEGRATION
0845	16082902.D	SEH0310-ICV1		1	NO MANUAL INTEGRATION
1003	16082903.D	BEH0443-BLK1		1	p-Terphenyl-d14,
1016	16082904.D	BEH0443-BS1		1	p-Terphenyl-d14,
1029	16082905.D	16H0071-01		1	p-Terphenyl-d14,
1041	16082906.D	BEH0443-MS1		1	p-Terphenyl-d14,
1054	16082907.D	BEH0443-MSD1		1	p-Terphenyl-d14,
1107	16082908.D	16H0071-02		1	p-Terphenyl-d14,
1119	16082909.D	SEH0310-CCV1		1	p-Terphenyl-d14,

SURROGATE RECOVERY AND RT SUMMARY

EPA 8270D-SIM

Laboratory:	Analytical Resources, Inc.	SDG/WO:	16H0071
Client:	Fremont Analytical	Project:	1608094
Sequence:	SEH0310	Instrument:	NT12
Calibration:	ZC00001	Calibration Date:	03/04/2016

Surrogate Compound	Spike Level ug/kg wet	% Recovery	Recovery Limits	RT	Calibration Mean RT	RT Diff	RT Diff Limit	Q
BEH0443-BLK1 (Solid)				Lab File ID: 16082903.D			Analyzed: 08/29/16 10:03	
Tripentyltin	45.178	56.3	30 - 160	6.986	7.013	-0.0270	N/A	
Tripropyltin	43.746	57.3	30 - 160	5.005	5.029	-0.0240	N/A	
BEH0443-BS1 (Solid)				Lab File ID: 16082904.D			Analyzed: 08/29/16 10:16	
Tripentyltin	45.178	63.5	30 - 160	6.973	7.013	-0.0400	N/A	
Tripropyltin	43.746	57.5	30 - 160	5.006	5.029	-0.0230	N/A	
16H0071-01 (Solid)				Lab File ID: 16082905.D			Analyzed: 08/29/16 10:29	
Tripentyltin	43.506	58.1	30 - 160	6.972	7.013	-0.0410	N/A	
Tripropyltin	42.127	53.7	30 - 160	5.005	5.029	-0.0240	N/A	
BEH0443-MS1 (Solid)				Lab File ID: 16082906.D			Analyzed: 08/29/16 10:41	
Tripentyltin	43.438	64.3	30 - 160	6.973	7.013	-0.0400	N/A	
Tripropyltin	42.061	55.8	30 - 160	5.006	5.029	-0.0230	N/A	
BEH0443-MSD1 (Solid)				Lab File ID: 16082907.D			Analyzed: 08/29/16 10:54	
Tripentyltin	43.367	63.5	30 - 160	6.959	7.013	-0.0540	N/A	
Tripropyltin	41.993	54.1	30 - 160	4.994	5.029	-0.0350	N/A	
16H0071-02 (Solid)				Lab File ID: 16082908.D			Analyzed: 08/29/16 11:07	
Tripentyltin	43.248	60.6	30 - 160	6.919	7.013	-0.0940	N/A	
Tripropyltin	41.877	55.8	30 - 160	4.948	5.029	-0.0810	N/A	

INTERNAL STANDARD AREA AND RT SUMMARY

EPA 8270D-SIM

Laboratory: Analytical Resources, Inc.
SDG: 16H0071
Client: Fremont Analytical
Project: 1608094
Sequence: SEH0310
Instrument: NT12
Calibration: ZC00001

Internal Standard	Response	RT	Reference Response	Reference RT	Area %	Area % Limits	RT Diff	RT Diff Limit	Q
Initial Cal Check (SEH0310-ICV1)		(Solid)		Lab File ID: 16082902.D				Analyzed: 08/29/16 08:45	
Tetrapentyltin	30854	6.637	24391	6.664	126	50 - 200	0.0270	+/-0.50	
p-Terphenyl-d14	27008	7.522	22552	7.549	120	50 - 200	0.0270	+/-0.50	
Blank (BEH0443-BLK1)		(Solid)		Lab File ID: 16082903.D				Analyzed: 08/29/16 10:03	
Tetrapentyltin	30089	6.637	24391	6.664	123	50 - 200	0.0270	+/-0.50	
p-Terphenyl-d14	22653	7.522	22552	7.549	100	50 - 200	0.0270	+/-0.50	
LCS (BEH0443-BS1)		(Solid)		Lab File ID: 16082904.D				Analyzed: 08/29/16 10:16	
Tetrapentyltin	29741	6.637	24391	6.664	122	50 - 200	0.0270	+/-0.50	
p-Terphenyl-d14	21468	7.522	22552	7.549	95	50 - 200	0.0270	+/-0.50	
NME:0-4C (16H0071-01)		(Solid)		Lab File ID: 16082905.D				Analyzed: 08/29/16 10:29	
Tetrapentyltin	30027	6.637	24391	6.664	123	50 - 200	0.0270	+/-0.50	
p-Terphenyl-d14	22142	7.522	22552	7.549	98	50 - 200	0.0270	+/-0.50	
Matrix Spike (BEH0443-MS1)		(Solid)		Lab File ID: 16082906.D				Analyzed: 08/29/16 10:41	
Tetrapentyltin	30665	6.638	24391	6.664	126	50 - 200	0.0260	+/-0.50	
p-Terphenyl-d14	21911	7.522	22552	7.549	97	50 - 200	0.0270	+/-0.50	
Matrix Spike Dup (BEH0443-MSD1)		(Solid)		Lab File ID: 16082907.D				Analyzed: 08/29/16 10:54	
Tetrapentyltin	30047	6.624	24391	6.664	123	50 - 200	0.0400	+/-0.50	
p-Terphenyl-d14	22163	7.509	22552	7.549	98	50 - 200	0.0400	+/-0.50	
NME:4-7C (16H0071-02)		(Solid)		Lab File ID: 16082908.D				Analyzed: 08/29/16 11:07	
Tetrapentyltin	29044	6.584	24391	6.664	119	50 - 200	0.0800	+/-0.50	
p-Terphenyl-d14	22111	7.455	22552	7.549	98	50 - 200	0.0940	+/-0.50	

Analytical Resources, Incorporated

HOLDING TIME SUMMARY

Analysis: EPA 8270D-SIM

Laboratory: Analytical Resources, Inc. SDG: 16H0071

Client: Fremont Analytical Project: 1608094

Sample Name	Date Collected	Date Received	Date Prepared	Days to Prep	Max Days to Prep	Date Analyzed	Days to Analysis	Max Days to Analysis	Q
NME:0-4C 16H0071-01	08/10/16 11:30	08/11/16 10:40	08/24/16 10:15	14	14	08/29/16 10:29	5	40	
NME:4-7C 16H0071-02	08/10/16 11:50	08/11/16 10:40	08/24/16 10:15	14	14	08/29/16 11:07	5	40	
Matrix Spike BEH0443-MS1	08/10/16 11:30	08/11/16 10:40	08/24/16 10:15	14	14	08/29/16 10:41	5	40	
Matrix Spike Dup BEH0443-MSD1	08/10/16 11:30	08/11/16 10:40	08/24/16 10:15	14	14	08/29/16 10:54	5	40	

* Indicates hold time exceedance.

Analytical Resources, Incorporated

METHOD DETECTION AND REPORTING LIMITS

EPA 8270D-SIM

Laboratory: Analytical Resources, Inc. SDG: 16H0071

Client: Fremont Analytical Project: 1608094

Matrix: Solid Instrument: NT12

Analyte	MDL	RL	Units
Tributyltin Ion	0.450	3.86	ug/kg

Analytical Resources, Incorporated

METHOD DETECTION AND REPORTING LIMITS

EPA 8270D-SIM

Laboratory: Analytical Resources, Inc. SDG: 16H0071

Client: Fremont Analytical Project: 1608094

Matrix: Water Instrument: NT12

Analyte	MDL	RL	Units
Tributyltin Ion	0.043	0.193	ug/L
Dibutyltin Ion	0.096	0.289	ug/L
Butyltin Ion	0.108	0.204	ug/L

Sample Log-In Check List

Client Name:	**SW**	Work Order Number:	**1608094**
Logged by:	**Clare Griggs**	Date Received:	**8/10/2016 12:40:00 PM**

Chain of Custody

1.	Is Chain of Custody complete?	Yes ☑	No ☐	Not Present ☐
2.	How was the sample delivered?	Client		

Log In

3.	Coolers are present?	Yes ☑	No ☐	NA ☐
4.	Shipping container/cooler in good condition?	Yes ☑	No ☐	
5.	Custody Seals present on shipping container/cooler? (Refer to comments for Custody Seals not intact)	Yes ☐	No ☐	Not Required ☑
6.	Was an attempt made to cool the samples?	Yes ☑	No ☐	NA ☐
7.	Were all items received at a temperature of >0°C to 10.0°C *	Yes ☑	No ☐	NA ☐
8.	Sample(s) in proper container(s)?	Yes ☑	No ☐	
9.	Sufficient sample volume for indicated test(s)?	Yes ☑	No ☐	
10.	Are samples properly preserved?	Yes ☑	No ☐	
11.	Was preservative added to bottles?	Yes ☐	No ☑	NA ☐
12.	Is there headspace in the VOA vials?	Yes ☐	No ☐	NA ☑
13.	Did all samples containers arrive in good condition(unbroken)?	Yes ☑	No ☐	
14.	Does paperwork match bottle labels?	Yes ☑	No ☐	
15.	Are matrices correctly identified on Chain of Custody?	Yes ☑	No ☐	
16.	Is it clear what analyses were requested?	Yes ☑	No ☐	
17.	Were all holding times able to be met?	Yes ☑	No ☐	

Special Handling (if applicable)

18.	Was client notified of all discrepancies with this order?	Yes ☐	No ☐	NA ☑

Person Notified: _____ Date _____

By Whom: _____ Via: ☐ eMail ☐ Phone ☐ Fax ☐ In Person

Regarding: _____

Client Instructions: _____

19. Additional remarks:

Item Information

Item #	Temp ºC
Cooler	3.0
Sample	2.6

* Note: DoD/ELAP and TNI require items to be received at 4°C +/- 2°C

Chain of Custody Record and Laboratory Services Agreement

Fremont Analytical

3600 Fremont Ave N. Tel: 206-352-3790
Seattle, WA 98103 Fax: 206-352-7178

Date: 08/10/2016 Laboratory Project No (internal): 1608094

Page: _____ of: _____

Client: SHANNON & WILSON, INC.
Address: 400 NORTH 34th ST
City, State, Zip: SEATTLE WA
Telephone: 206-695-6918 Fax: _____

Project Name: NME
Project No: 21-1-22000-110 Collected by: DJR
Location: MERCER ISLAND - EAST CHANNEL CROSSING
Report To (PM): DAVID RANDALL
PM Email: DJR@SHANWIL.COM

*Matrix Codes: A = Air, AQ = Aqueous, B = Bulk, O = Other, P = Product, S = Soil, SD = Sediment, SL = Solid, W = Water, DW = Drinking Water, GW = Ground Water, SW = Storm Water, WW = Waste Water

Sample Name	Sample Date	Sample Time	Sample Type (Matrix)*	VOCs (EPA 8260 / 624)	GX/BTEX	BTEX	ORGANOCHLORINE PESTICIDES (EPA 8081)	Gasoline Range Organics (GX)	Hydrocarbon Identification (HCID)	Diesel/Heavy Oil Range Organics (DX)	SVOCs (EPA 8270 / 625) LOW LEVEL	PAHs (EPA 8270 - SIM) LOW LEVEL	PCBs (EPA 8082 / 608) LOW LEVEL	Metals** (EPA 6020 / 200.8)	Total (T)	Dissolved (D)	Anions (IC)***	EDB (8011)	DIXONS/FURANS	ORGANOTINS (TRIBUTYLTIN)	FISH-BIOASSAY (HOLD)	Comments
1 NME:0-4C	8/10/16	1130	SOIL			X				X		X	X					X	X			3 JARS PER SAMPLE
2 NME:4-7C	8/10/16	1150	SOIL			X				X		X	X					X	X			3 JARS PER SAMPLE
3																						
4																						
5																						
6																						
7																						
8																						
9																						
10																						

**Metals Analysis (Circle): MTCA-5 RCRA-8 Priority Pollutants TAL *Individual:* (Ag) Al (As) B Ba Be Ca (Cd) Co (Cr) (Cu) Fe (Hg) K Mg Mn Mo Na Ni (Pb) (Sb) (Se) Sr Sn Ti Tl U V (Zn)

***Anions (Circle): Nitrate Nitrite Chloride Sulfate Bromide O-Phosphate Fluoride Nitrate+Nitrite

Sample Disposal: ☐ Return to Client ☐ Disposal by Lab (Samples will be held for 30 days unless otherwise noted. A fee may be assessed if samples are retained after 30 days.)

Turn-around times for samples received after 4:00pm will begin on the following business day.

Special Remarks: PLEASE HOLD SAMPLES FOR FISH BIOASSAY.

I represent that I am authorized to enter into this Agreement with Fremont Analytical on behalf of the Client named above, that I have verified Client's agreement to each of the terms on the front and backside of this Agreement.

Relinquished	Date/Time	Received	Date/Time
x	8/10/16 1240	x	8/10/16 1240
Relinquished	Date/Time	Received	Date/Time
x		x	

TAT → SameDay^ NextDay^ 2 Day 3 Day (STD)

^Please coordinate with the lab in advance

APPENDIX E

EXISTING SUBSURFACE EXPLORATIONS

Draft

APPENDIX E

EXISTING SUBSURFACE EXPLORATIONS

TABLE OF CONTENTS

FIGURES

E-1 Log of Existing Boring B-1 (1962)
E-2 Log of Existing Boring B-1 (1967)
E-3 Log of Existing Boring B-2 (1968)
E-4 Log of Existing Boring B-15
E-5 Log of Existing Boring B-19
E-6 Log of Existing Boring B-29
E-7 Log of Existing Boring B-30
E-8 Log of Existing Boring B-31
E-9 Log of Existing Boring B-13 (3 Sheets)
E-10 Log of Existing Boring B-203 (3 Sheets)
E-11 Log of Existing Boring B-5
E-12 Log of Existing Boring BH-2
E-13 Log of Existing Boring EP-1
E-14 Log of Existing Boring EP-3
E-15 Log of Existing Boring B-A-ECB-1p (5 Sheets)
E-16 Log of Existing Boring B-A-ECB-3DST (6 Sheets)
E-17 Log of Existing Boring B-A-ECB-4p (5 Sheets)
E-18 Log of Existing Boring E320-B-14B (4 Sheets)
E-19 Log of Existing Boring F-27
E-20 Log of Existing Boring F-45
E-21 Log of Existing Boring H-5 (2 Sheets)
E-22 Log of Existing Boring H-6 (2 Sheets)
E-23 Log of Existing Boring H-7 (2 Sheets)
E-24 Log of Existing Boring H-12 (2 Sheets)
E-25 Log of Existing Boring H-14 (2 Sheets)
E-26 Log of Existing Boring H-15 (2 Sheets)
E-27 Log of Existing Boring H-16 (2 Sheets)
E-28 Log of Existing Boring H-20 (2 Sheets)
E-29 Log of Existing Boring H-24 (2 Sheets)
E-30 Log of Existing Boring H-33 (2 Sheets)
E-31 Log of Existing Boring H-34 (2 Sheets)
E-32 Log of Existing Boring H-36 (2 Sheets)
E-33 Log of Existing Boring H-38 (3 Sheets)
E-34 Log of Existing Boring H-40 (3 Sheets)
E-35 Log of Existing Boring H-42 (2 Sheets)

Draft

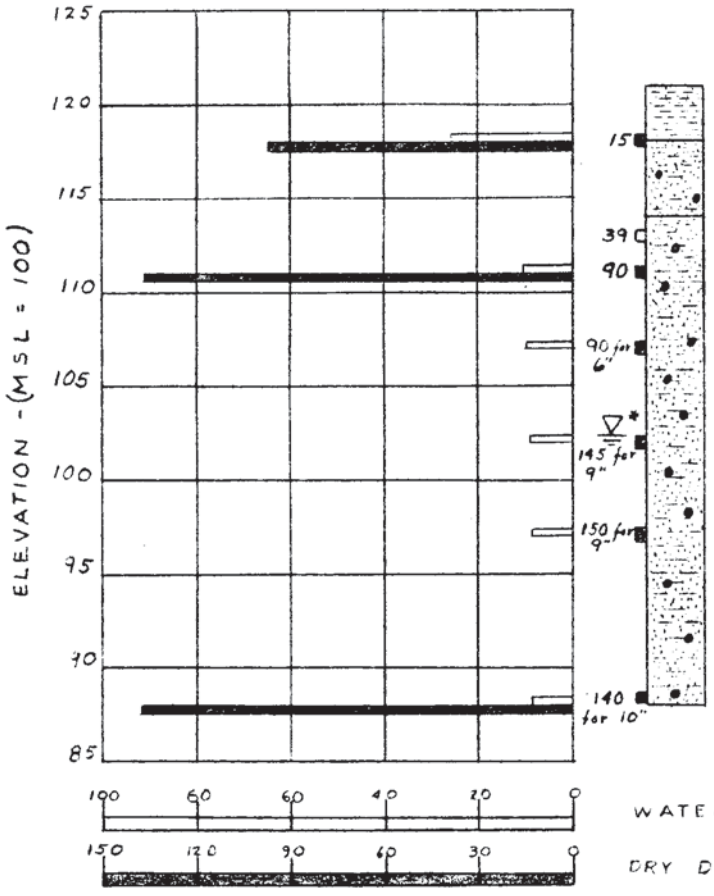
FIGURES (cont.)

E-36 Log of Existing Boring H-48 (3 Sheets)
E-37 Log of Existing Boring H-50 (2 Sheets)
E-38 Log of Existing Boring OW-2 (2 Sheets)
E-39 Log of Existing Boring TP-4
E-40 Log of Existing Boring B-1 (3 Sheets)
E-41 Log of Existing Boring B-2 (3 Sheets)
E-42 Log of Existing Boring B-4
E-43 Log of Existing Boring B-7 (2 Sheets)

CALCULATION SHEET

METROPOLITAN ENGINEERS
SEATTLE, WASHINGTON

BORING NO. 1
ELEVATION : 121.0
DATE DRILLED: 7-16-62



* OVERNIGHT WATER LEVEL WITH CASING @ EL 106 & BORING @ EL 88

■ SAMPLED USING 3.25" O.D. DAMES & MOORE SAMPLER

□ SAMPLE MISSED

15 ■ BLOWS REQUIRED TO DRIVE SAMPLER ONE FOOT

NOTES :

1. CASING INSTALLED TO ELEVATION 106 DURING DRILLING.
2. WATER LEVEL ROSE TO ELEVATION 117 WITHIN 1/2 HOUR AFTER PULLING CASING & TO ELEVATION 118 WITHIN SEVERAL HOURS.
3. HOLE BACKFILLED WITH "PEA GRAVEL."

DATE	BY	JOB NO.	TITLE	PLATE
3-12-63	JCN	R209A	LOG OF BORING # 1	3.

FIG. E-1

BORING B1

ELEVATION 128
LOCATION N218,769 E 1,654,209
DATE DRILLED 12-13-67

ELEVATION - ft (MSL = EL. 100)	W %	γd pcf	N' 1	N' 2	N' 3	ATTERBERG LIMITS LL	ATTERBERG LIMITS PL	ATTERBERG LIMITS PI	UNCONFINED COMPRESSIVE STRENGTH ksf	SHEAR STRAIN %	
130	38.6	78	3	4	7						BROWN SILT, SOME ROOTS AND SOME SAND
	39.1	83	8	14					q_u=3.93	2.3	MOTTLED GRAY BROWN TO TAN SILTY CLAY TO CLAY – VERY STIFF TO HARD
120	35.0	88	9	16		81.2	32.8	48.4	q_u=6.32	1.3	GRADES TO MOTTLED GRAY AND TAN
	35.8	87	8	17							GRADES TO GRAY
110	34.6	88	11	21		84.8	33.8	51.0			CONTAINS FAINT VERY THIN SILT LAMINATIONS
	30.0	94	10	22		63.7	32.7	31.0	q_u=11.36	2.5	GRADES OCCASIONAL VERY THIN SILT POCKETS
100	30.8	87	10	19		70.3	33.0	36.7			
	32.5	88	9	26		59.3	33.3	26.0	q_u=9.14	2.7	GRADES TO GRAY SILTY CLAY AND CLAYEY SILT – HARD, BRITTLE
90	29.2	94	11	33					q_u=8.46	4.0	CONTAINS THIN VERY FINE SAND SEAMS, SOME FINE – MED. SAND POCKETS AND LENSES WITH OCCASIONAL GRAVEL, SOME LAMINATIONS.
	34.6	87	8	22					q_u=8.46	2.7	
80	29.6	94	21	43					q_u=15.60	3.0	
	31.6	92	8	20					q_u=12.20	3.8	
70	30.4	94	16	40					q_u=11.50	3.0	
60											

NOTES: 1. WATER LEVEL NOT RECORDED
2. ON COMPLETION, BORING BACKFILLED WITH NATIVE MATERIAL

LEGEND:
W DENOTES MOISTURE CONTENT IN PER CENT OF DRY WEIGHT
γd DENOTES DRY DENSITY IN PCF
N' NUMBER OF BLOWS REQUIRED TO DRIVE SAMPLER EACH 6 INCHES, DRIVING WEIGHT = 140 lbs, FALLING DISTANCE = 30 INCHES, SAMPLER O.D. = 3⅛"
q_u UNCONFINED COMPRESSIVE STRENGTH

DATE	BY	CHECKED	APPROVED	JOB NO.	METROPOLITAN ENGINEERS SEATTLE, WASHINGTON	TITLE	PLATE
	CH.H			R208H		LOG OF BORING	3

FIG. E-2

BORING B2

ELEVATION 130.3
LOCATION N 208,701 / E 1,650,195
DATE DRILLED 2-27-68

W %	γ_d pcf	N' 1	2	3	ATTERBERG LIMITS LL	PL	PI	UNCONFINED COMPRESSIVE STRENGTH ksf	SHEAR STRAIN %
26.1	96	4	6					q_u = 6.40	5.8
36.3	87	4	12						
41.1	81	6	9		81.5	34.7	46.8	q_u = 2.10	11.7
35.9	83	5	16						
34.8	89	6	15		77.5	32.1	45.4	q_u = 3.96	2.0
35.1	87	6	17						
36.4	85	7	17		68.4	35.3	33.1		
30.0	93	6	19						
32.1	91	7	18					q_u = 14.06	3.7
32.7	89	6	22					q_u = 12.00	2.7

ELEVATION - ft (MSL = EL 100)

130
120
110
100
90
80
70

MOTTLED BROWN CLAY WITH SOME FINE SAND, OCCASIONAL PEBBLES AND ORGANIC MATERIAL - STIFF

BROWN GRAY SILTY CLAY TO CLAY - MASSIVE, VERY STIFF

GRADES GRAY

OCCASIONAL THIN VERY FINE SAND SEAMS

NOTES: 1. WATER LEVEL NOT RECORDED
2. ON COMPLETION, BORING BACKFILLED WITH NATIVE MATERIAL.

DATE	BY	CHECKED	APPROVED	JOB NO.	METROPOLITAN ENGINEERS SEATTLE, WASHINGTON	TITLE	PLATE
	CHW			R208H		LOG OF BORING	4

FIG. E-3

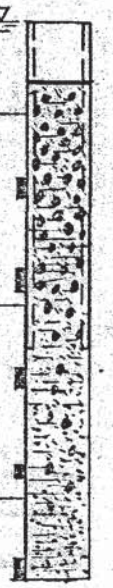
CALCULATION SHEET

METROPOLITAN ENGINEERS
SEATTLE, WASHINGTON

BORING 15

ELEVATION: 114.8
LOCATION: STA. 5+79 (230' Lt) N 213 977 E 1662 270
DATE DRILLED: 4-22-68

W %	γd pcf	N1		
		1	2	3
9.0	127.	34	96	
10.8	132	22	32	
9.7	133	70	100	
9.5	142	120		
9.7	130.	70	70/3"	



WATER

BROWN SILTY SAND & GRAVEL (GLACIAL TILL?) VERY COMPACT.

GRADES GRAY

GRADES SLIGHTLY CLAYEY

NOTE: UPON COMPLETION, CASING REMOVED & BORING BACKFILLED W/ PEA GRAVEL.

ELEVATION - FT (MSL = EL 100)

DATE	BY	JOB NO.	TITLE	PLATE
	G	R208G	LOG OF BORING	A-15

FIG. E-4

CALCULATION SHEET

METROPOLITAN ENGINEERS

SEATTLE, WASHINGTON

BORING 19

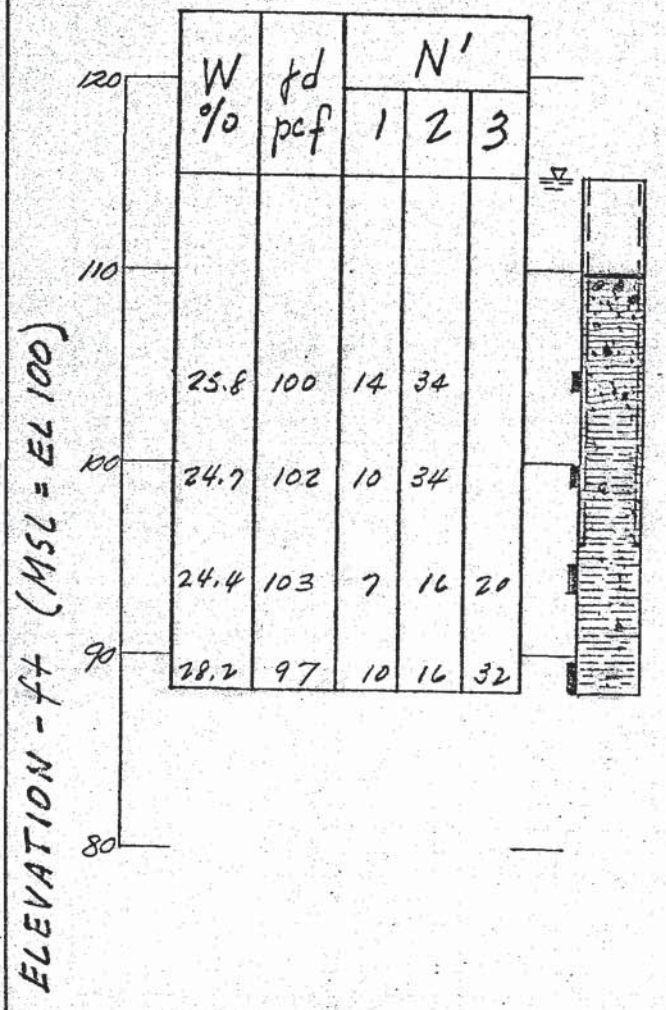
ELEVATION : 114.8
LOCATION : STA. 26+20 (110' LT) N 215062 E 1660 701
DATE DRILLED : 4-24-68

WATER

BROWN SILT, OCC. GRAVEL - VERY STIFF

SOME FINE SAND

NOTE: UPON COMPLETION, CASING REMOVED, & BORING BACKFILLED W/ PEA GRAVEL



	BY	JOB NO.	TITLE	PLATE
	G	R208G	LOG OF BORING	A-19

FIG. E-5

CALCULATION SHEET

METROPOLITAN ENGINEERS
SEATTLE, WASHINGTON

BORING B29

ELEVATION: 188.8 N218599
LOCATION: STA. 36+55 (23' E1654765
DATE DRILLED: 4-23-68

W %	γd pcf	N" 1	2	3
17.8		9	15	
13.7	115	25	25/2"	
13.1		50		
31.7	92	13	20	
23.1	90	19	40	

ELEVATION - FT (MSL = EL 100)
190
180
170
160

BROWN SILT, SOME VERY FINE SAND & PEBBLES - VERY STIFF TO HARD. (TILL?)
SOME VERY FINE SAND LAMINATIONS

LAYERED, BROWN FINE - VERY FINE SAND, SILT & FINE SANDY SILT, OCC. PEBBLES - HARD & VERY COMPACT.

GRAY SILTY CLAY TO CLAY - HARD.

SOME VERY FINE SAND POCKETS

NOTES 1. WATER LEVEL NOT RECORDED.
2. BORING BACKFILLED W/ NATIVE MATERIAL.

DATE	BY	JOB NO.	TITLE	PLATE
	A	R2089	LOG OF BORING	A-29

FIG. E-6

CALCULATION SHEET

METROPOLITAN ENGINEERS
SEATTLE, WASHINGTON

BORING B30

ELEVATION: 189.9
LOCATION: STA. 32+09 (33' Lt.) N 218,171 E 1654,755
DATE DRILLED: 4-24-68

W %	γd pcf	N" 1	2	3
18.1	103	8	35	
12.8		60		
14.4	114	35	50/5"	
13.9	119	47	50/5"	
12.1	118	48	50/4"	
6.0		70		

ELEVATION - Ft (MSL = EL 100)

190
180
170
160

BROWN VERY FINE SANDY SILT W/ OCC. PEBBLES - HARD.

GRADES TO SILTY VERY FINE SAND W/ SOME PEBBLES (TILL?)

GRAY SILT TO CLAYEY SILT W/ SOME SAND & OCC. PEBBLES (CLAY TILL?) - HARD.

LAYERS OF SILTY FINE SAND W/ PEBBLES.

ENCOUNTERED SOME WATER AT EL. 168 ±

CONTAINS GRAVEL

NOTES: 1. WATER LEVEL NOT RECORDED.
2. BORING BACKFILLED WITH NATIVE MATERIAL.

DATE	BY	JOB NO.	TITLE	PLATE
	GL	R-208G	LOG OF BORING	A-30

FIG. E-7

CALCULATION SHEET

METROPOLITAN ENGINEERS

SEATTLE, WASHINGTON

BORING B31

ELEVATION: 185.2

LOCATION: STA. 25+94 (25' Rt.) N 218088 E 1655347

DATE DRILLED: 4-24-68

W/ %	γd pcf	N 1	N 2	N 3
8.5	96	6	5	
24.0	101	6	8	
19.5	111	18	40	
20.1	110	14	25	
20.7	106	14	30	



ELEVATION - ft (MSL = EL 100)

190

180

170

160

BROWN SAND & GRAVEL, & SILTY SAND & GRAVEL (FILL)

LAYERED GREEN GRAY - BROWN SILT, CLAY & SILTY FINE SAND - STIFF.

GRAY CLAYEY SILT W/ FINE SAND LAYERS - HARD.

GRADES TO GRAY SILT W/ SOME THIN VERY FINE SAND LAYERS, OCC. PEBBLES.

GRADES TO LAMINATED SILT, VERY FINE SANDY SILT & SILTY VERY FINE SAND.

NOTES: 1. WATER LEVEL NOT RECORDED.
2. BORING BACKFILLED WITH NATIVE MATERIAL.

DATE	BY	JOB NO.	TITLE	PLATE
	G	R208G	LOG OF BORING	A-31

FIG. E-8

SOIL BORING LOG

PROJECT NO.: S19746.A1

BORING NO.: **B-13**

PROJECT: I-90 HAUL ROAD
BORING LOCATION: SEE MAP
DRILLING METHOD AND EQUIPMENT: MOBILE B-61 HOLLOW STEM AUGER
CONTRACTOR: WSDOT
DEPTH TO WATER SURFACE AND DATE: NOT MEASURABLE

ELEVATION: 78.7' ± 1/2'
DATE: 7/6/85
START TIME: 1000
COMPLETION: 1445
LOGGER: A.E. ERICKSON
PAGE: 1 OF: 3

DEPTH ELEVATION	DEPTH FT BELOW SURFACE	SAMPLE INTERVAL	SAMPLE TYPE AND NUMBER	SAMPLE RECOVERY	STANDARD PENETRATION TEST RESULTS 6"-6"-6" (N)	SOIL DESCRIPTION	SYMBOLIC LOG	COMMENTS
79						7 1/2" Asphalt Concrete		
						SANDY GRAVEL with COBBLES, 5" minus cobbles, dense, (GP)		Very hard drilling on cobbles and gravel to 4.5'
75								Fractured gravel in top 6" of sampler
	5		S-1 JAR	12"	22-7-8 (15)	CLAY, medium plastic ~~SANDY SILT, low PI, 10 to 25%~~ fine sand, brown & gray mottled, slightly moist, stiff, ~~(ML)~~ (CL)		
70								
	10		S-2 TUBE	24"		SANDY SILT--~~SILTY SAND,~~ low to no PI, 42% medium to fine sand lenses, gray & brown mottle, moist, soft, (ML ~~SM~~)		Push 100 psi
			S-3 JAR	16"	5-7-12 (19)	~~SANDY SILT-SILTY SAND, same as S-2, (ML-SM)~~ SILT, med. plastic 5-10% fine sand (ML)		
65	15		S-4 JAR	14"	5-5-6 (11)	SILTY SAND, poorly graded, medium to fine sand, 15 to 30% fines, w/1/8" thick plant roots, gray, moist, medium, (SM)		
60								
	20		S-5 TUBE	24"		SANDY SILT, low to no PI, 5 to 15% very fine sand, brown w/gray mottle, moist, medium, (ML)		Push 100 psi
			S-6 JAR	18"	2-2-3 (5)	~~SANDY~~ non plastic SILT, ~~same as S-5,~~ brown w/red mottles, horizontal bedding to 6' above tip, gray sandier silt in tip, (ML)		
55	25							

FIG. E-9

NOTE: Soil descriptions on this log are a summary of field logs, visual classifications, and laboratory tests, if any.

SOIL BORING LOG

PROJECT NO.: S19746.A1

BORING NO.: B-13

PROJECT: I-90 HAUL ROAD
BORING LOCATION: SEE MAP
DRILLING METHOD AND EQUIPMENT: MOBILE B-61 HOLLOW STEM AUGER
CONTRACTOR: WSDOT
DEPTH TO WATER SURFACE AND DATE: NOT MEASURABLE

ELEVATION: 78.7' ± 1/2'
DATE: 7/6/85
START TIME: 1000
COMPLETION: 1445
LOGGER: A.E. ERICKSON
PAGE: 2 OF: 3

DEPTH ELEVATION / FT BELOW SURFACE	SAMPLE INTERVAL	SAMPLE TYPE AND NUMBER	SAMPLE RECOVERY	STANDARD PENETRATION TEST RESULTS 6"-6"-6" (N)	SOIL DESCRIPTION	SYMBOLIC LOG	COMMENTS
25		S-7 TUBE	24"		2" SANDY SILT (ML) over SILTY SAND, poorly graded, medium to fine sand, gray, wet, loose (SM)		Push 50 psi
		S-8 JAR	18"	2-1-2 (3)	~~CLAYEY~~ SILT, ~~low~~ to medium to highly plastic PI, 1/8" medium sand layer, gray, moist, soft ~~(ML-CL)~~ (MH)		
30		S-9 TUBE	24"		~~SANDY~~ SILT, in tip, (ML)		0 psi push 200 psi push
		S-10 JAR	18"	7-10-12 (22)	~~SANDY~~ SILT, low PI, 5 to 15% fine sand with horizontal bed of medium to fine silty sand and sand layers, gray, moist, stiff (ML)		No auger cutting return Gravelly zone
35		S-11 JAR		4-10-10 (20)	~~SANDY~~ SILT, with SAND, low PI, layers (2 to 4") of silty sand and sandy silt, gray, moist, layers vary from soft to stiff (ML)		8' of water on rods Limited auger cuttings at top of hole Harder drilling
40		S-12 TUBE	6"		SILTY SAND with GRAVEL in tip, gray, moist, dense, (SM)		Tip of tube bent 600 psi for 6" push
		S-13 JAR	18"	10-18-22 (40)	~~SILTY SAND with GRAVEL~~ SANDY SILT, poorly graded, 5 to 20% 1" minus gravel, in lenses w/bands of red sand, medium to fine sand with 15 to 30% fines, gray, moist, dense, ~~(SM)~~ (ML)		
45		S-14 JAR	18"	6-5-5 (10)	SANDY SILT, low PI, occasional gravel, 1/2" minus, 5 to 20% fine sand w/1/8" medium sand layers, gray, moist, medium, dense w/soft spots, (ML)		
50							Limited auger cuttings return

NOTE: Soil descriptions on this log are a summary of field logs visual classifications, and laboratory tests.

FIG. E-9

SOIL BORING LOG

PROJECT NO.: S19746.A1

BORING NO.: B-13

PROJECT: I-90 HAUL ROAD
BORING LOCATION: SEE MAP
DRILLING METHOD AND EQUIPMENT: MOBILE B-61 HOLLOWSTEM AUGER
CONTRACTOR: WSDOT
DEPTH TO WATER SURFACE AND DATE: NOT MEASURABLE

ELEVATION: 78.7' ± 1/2'
DATE: 7/6/85
START TIME: 1200
COMPLETION: 1445
LOGGER: A.E. ERICKSON
PAGE: 3 OF: 3

DEPTH ELEVATION / FT BELOW SURFACE	SAMPLE INTERVAL	SAMPLE TYPE AND NUMBER	SAMPLE RECOVERY	STANDARD PENETRATION TEST RESULTS 6"-6"-6" (N)	SOIL DESCRIPTION	SYMBOLIC LOG	COMMENTS
50		S-15 JAR	18"	11-21-30 (51)	~~SANDY~~ SILT, low PI, 5 to 15% very fine sand, 1" coarse to fine silty sand layer, laminated silt beds, gray, slightly moist, hard, (ML)		Smooth drilling
55		S-16 JAR	18"	14-14-18 (32)	~~SANDY~~ SILT, same as S-15; 1" layer of hard cube fractured clayey silt, (ML)		
60		S-17 JAR	18"	6-13-45 (58)	SANDY SILT, same as S-15 except moist. Top of sample contains 6 inches of well graded sand, (ML)		
					End of Boring = 62 feet		Insufficient time available for water to stabilize in boring prior to auger removal. Therefore, the depth to water surface is considered unmeasurable.

FIG. E-9

NOTE: Soil descriptions on this log are a summary of field logs, visual classifications, and laboratory tests, if any.

DATE DRILLED: 9/12-13/85

SUMMARY: BORING NO. B-203

ELEVATION: 120.7

THIS SUMMARY APPLIES ONLY AT THE LOCATION OF THIS BORING AND AT THE TIME OF DRILLING. SUBSURFACE CONDITIONS MAY DIFFER AT OTHER LOCATIONS AND MAY CHANGE AT THIS LOCATION WITH THE PASSAGE OF TIME. THE DATA PRESENTED IS A SIMPLIFICATION OF ACTUAL CONDITIONS ENCOUNTERED.

DEPTH IN FEET	SAMPLE NO.*	SAMPLE	BLOWS/6"	OTHER TESTS**	FIELD MOISTURE % OF DRY WEIGHT	DRY DENSITY PCF	DESCRIPTION	SYMBOL	MOISTURE	CONSISTENCY
0							ROAD FILL **GRAVELLY SAND**; brown, fine to coarse, trace to little silt		very moist	medium
10	1X		24 19 12				FILL **SANDY SILT**; mottled gray and yellowish-brown, fine to medium, little fine gravel, trace clay, trace wood fragments		wet	loose to medium dense
15	2X		8 4 5							
	3C		3 3 7		23.4	98	(possible slide debris)			
20	4A		2 3 3		21.7				very moist	loose
25	5C		8 8 8		11.9	123	RECENT ALLUVIUM **SAND**; gray, fine to medium, little fine gravel, little to trace silt	SP/ SM	wet	medium dense
30	6A		13 12 12	G A	15.2		GLACIAL TILL (Weathered) **CLAYEY SILT**; mottled gray & brown, some fine to coarse sand, trace fine to coarse gravel	ML	very moist	stiff
35	7C		24 28 68		12.1	124	(Unweathered) **SANDY SILT/SILTY SAND**; gray, fine to medium, little fine to coarse gravel	ML/ SM	moist	very dense
40							(Continued)			

* A. 2" split-spoon sampler
B. 3" O.D. thin-wall sampler C. 3-1/4" O.D. x 2-1/2" liner D. 3-1/2" O.D. split barrel sampler X. sample not recovered

** A - Atterberg, C - consolidation, DS - direct shear, G - grain size, T - triaxial, P - permeability

water level
impervious seal
piezometer tip

Project No. 85-5136

SHOREWOOD SLIDE AREA
for WSDOT

Drawing No. A-3

Converse Consultants Geotechnical Engineering and Applied Sciences

FIG. E-10

DATE DRILLED: 9/12-13/85

SUMMARY: BORING NO. B-203 (Cont.)

ELEVATION:

THIS SUMMARY APPLIES ONLY AT THE LOCATION OF THIS BORING AND AT THE TIME OF DRILLING. SUBSURFACE CONDITIONS MAY DIFFER AT OTHER LOCATIONS AND MAY CHANGE AT THIS LOCATION WITH THE PASSAGE OF TIME. THE DATA PRESENTED IS A SIMPLIFICATION OF ACTUAL CONDITIONS ENCOUNTERED.

DEPTH IN FEET	SAMPLE NO.*	SAMPLE	BLOWS/6"	OTHER TESTS**	FIELD MOISTURE % OF DRY WEIGHT	DRY DENSITY PCF	DESCRIPTION	SYMBOL	MOISTURE	CONSISTENCY
40	8A		45 60/1"	A	13.4		GLACIAL TILL **SANDY SILT/SILTY SAND** (Continued)	ML/ SM	moist	very dense
							LACUSTRINE DEPOSITS			
45	9C		11 15 25		34.8	88	**CLAYEY SILT/SILTY CLAY**; gray, trace fine sand, thinly laminated to thinly bedded, occasional laminations of sandy silt, slightly fissured, occasional slickensides and zones of slickensides	MH/ CH	moist	very stiff
50	10A		16 19 23	A	42.9					
							occasional zones of numerous slickensides			stiff
55	11C		15 19 29		28.0	94	occasional laminations of dark gray clay			
60	12A		8 14 18	A	36.1				moist	very stiff
							occasional thin interbeds of sandy silt			
65	13X		12 16 18							
70	14A		9 10 11		30.1		thin laminations to thin interbeds of fine to medium sand, intensely slickensided between 70' and 71.5'			stiff
75	15C		22 29 37		31.3	92	disturbed interbeds of sandy silt		very moist	hard
							SANDY SILT; gray, fine, thin laminations of silty clay and clayey silt	ML		
80							(Continued)			

* A. 2" split-spoon sampler
B. 3" O.D. thin-wall sampler C. 3-1/4" O.D. x 2-1/2" liner D. 3-1/2" O.D. split barrel sampler X. sample not recovered

** A - Atterberg, C - consolidation, DS - direct shear, G - grain size, T - triaxial, P - permeability

water level
impervious seal
piezometer tip

Project No. 85-5136

SHOREWOOD SLIDE AREA
for WSDOT

Drawing No. A-3 (CONT.)

Converse Consultants Geotechnical Engineering and Applied Sciences

FIG. E-10

DATE DRILLED: 9/12-13/85

SUMMARY: BORING NO. B-203 (Cont.)

ELEVATION:

THIS SUMMARY APPLIES ONLY AT THE LOCATION OF THIS BORING AND AT THE TIME OF DRILLING. SUBSURFACE CONDITIONS MAY DIFFER AT OTHER LOCATIONS AND MAY CHANGE AT THIS LOCATION WITH THE PASSAGE OF TIME. THE DATA PRESENTED IS A SIMPLIFICATION OF ACTUAL CONDITIONS ENCOUNTERED.

DEPTH IN FEET	SAMPLE NO.*	SAMPLE	BLOWS/6"	OTHER TESTS**	FIELD MOISTURE % OF DRY WEIGHT	DRY DENSITY PCF	DESCRIPTION	SYMBOL	MOISTURE	CONSISTENCY
80	16A		18 18 26	G	24.0		LACUSTRINE DEPOSITS SANDY SILT (Continued)	ML	wet	hard
85	17C		16 13 21		28.6	96				
90	18A		15 26 42		26.6					
95							Bottom of boring at depth 91.5' Slope indicator installed to depth 90.5', annulus grouted with cement			

* A. 2" split-spoon sampler
B. 3" O.D. thin-wall sampler C. 3-1/4" O.D. x 2-1/2" liner X. sample not recovered
D. 3-1/2" O.D. split barrel sampler

** A - Atterberg, C - consolidation, DS - direct shear, G - grain size, T - triaxial, P - permeability

water level
impervious seal
piezometer tip

SHOREWOOD SLIDE AREA
for WSDOT

Project No.
85-5136

Drawing No.
A-3 (CONT.)

Converse Consultants Geotechnical Engineering and Applied Sciences

FIG. E-10

SUMMARY: BORING NO. 5

DATE DRILLED: JAN. 5,6, 79

THIS SUMMARY APPLIES ONLY AT THE LOCATION OF THIS BORING AND AT TIME OF DRILLING. SUBSURFACE CONDITIONS MAY DIFFER AT OTHER LOCATIONS AND MAY CHANGE AT THIS LOCATION WITH THE PASSAGE OF TIME. THE DATA PRESENTED ARE A SIMPLIFICATION OF ACTUAL CONDITIONS ENCOUNTERED.

ELEVATION:

DEPTH IN FEET	SAMPLE NO.(1)	BLOWS/FOOT	GRAPHIC SYMBOL	DESCRIPTION
0				COMPACTED FILL:
				GRAVELLY SAND — GREY-BROWN, FINE TO MEDIUM, MEDIUM DENSE, DRY.
	1	10		SANDY SILT — LIGHT BROWN, LOOSE WITH CHUNKS OF MORE COHESIVE MATERIAL, DRY.
5				GLACIAL TILL: (WEATHERED)
	2	17		SILTY SAND — BROWN, OXIDIZED, VERY FINE TO MEDIUM SAND AND LITTLE GRAVEL, TRACE OF CLAY. SOME DISCRETE ZONES INCLUDE MORE SAND, VERY STIFF, SLIGHTLY MOIST.
	3	58		
10	4	180/9"		BECOMES HARD.
	5	146		
15	6	46		Zone of disturbed material — DISTURBED MATERIAL CHUNKS OF HARD SILTY CLAY IN CLAYEY SILT MATRIX, LITTLE FINE TO MEDIUM SAND.
	7	13		LACUSTRINE DEPOSITS: (WEATHERED)
20	8	21		SILTY CLAY — MOTTLED BROWN, LAMINATED TO MEDIUM BEDDED WITH VERY THIN BEDS OF CLAYEY SILT AND OCCASIONAL LAMINATIONS OF GREY, FINE GRAINED SAND. STIFF TO VERY STIFF, SLIGHTLY MOIST TO DRY.
	9	30		FRESH, GREY, BELOW 20'.
25				WITH SOME VERY THIN TO MEDIUM BEDS OF CLAYEY SILT.
	10	26		
	11	25		
30	12	30		
	13	21		
35	14	25		
	15	26		
40	16	35		SILT — (LAMINATED TO MEDIUM BEDDED, UNWEATHERED) BLUE-GREY, WITH LITTLE CLAY, VERY STIFF TO HARD, DRY.
	17	24		WITH OCCASIONAL LAMINATIONS OF VERY FINE SAND AND TRACE OF VERY FINE SAND IN SILT MATRIX.
45	18	41		SILTY SAND — GREY-BROWN, VERY FINE WITH TRACE OF CLAY, DENSE, SLIGHTLY MOIST.
	19	26		
50				CLAYEY SILT TO SILT — WITH LITTLE CLAY, VERY STIFF TO HARD, DRY. INDISTINCT BEDDING.
	20	28		
	21	30		LL= 37.1; PL= 25.1; PI=12.0 (ML)
55				
	22	38		
	23	37		
60	24	30		
65				BOTTOM OF BORING AT DEPTH 62.0'. NO GROUNDWATER ENCOUNTERED. COMPLETED JANUARY 6, 1979.

(1) SAMPLER TYPE: 2" SPLIT-SPOON SAMPLER

DRY HOLE OBSERVED 1/26/79.

PROPOSED I-90 GEOTECHNICAL REVIEW
Mercer Island, Washington
for HDR

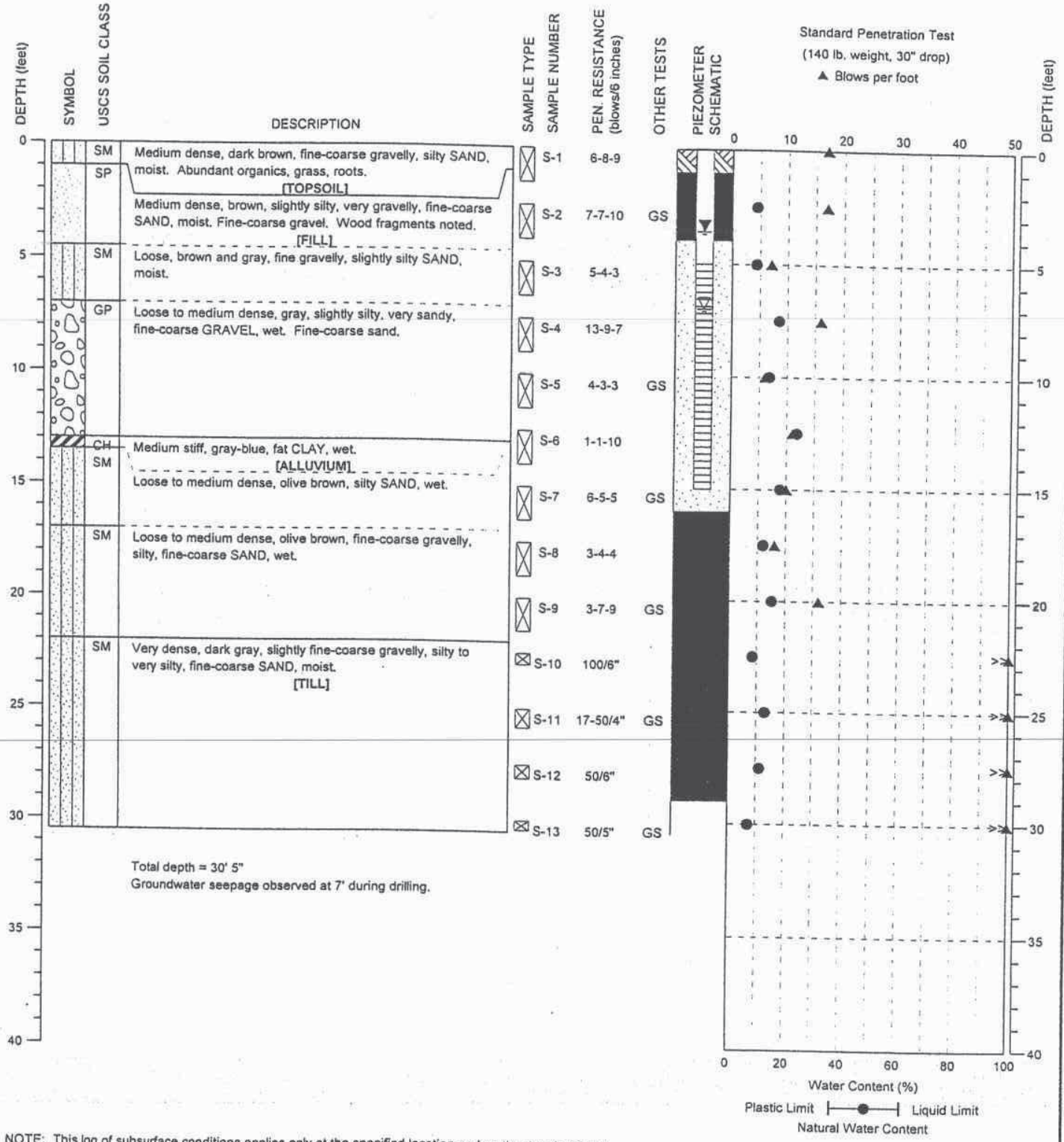
Project No.
78-5168

Drawing No.
FIG. E-11

ConverseWardDavisDixon Geotechnical Consultants

DRILLING COMPANY: Holocene Drilling
DRILLING METHOD: Hollow Stem Auger
SAMPLING METHOD: SPT w/autohammer
SURFACE ELEVATION: 26 ± feet

LOCATION: See Figure 2
DATE STARTED: 6/6/2000
DATE COMPLETED: 6/6/2000
LOGGED BY: BKH



Total depth = 30' 5"
Groundwater seepage observed at 7' during drilling.

NOTE: This log of subsurface conditions applies only at the specified location and on the date indicated and therefore may not necessarily be indicative of other times and/or locations.

HWA GEOSCIENCES INC.

Sweyolocken Pump Station
Bellevue, Washington

BORING:
BH-2

PAGE: 1 of 1

PZO 99003.GPJ 8/17/00

PROJECT NO.: 99003-200

FIG. E-12

EXPLORATION PIT LOG

Number EP-1

0

Medium stiff to stiff, dry to moist, tan to gray, slightly mottled, fractured, silty CLAY. (Slide Debris)

5

10

Hard, moist, gray, silty CLAY, fractures into small blocks.

BOH @ 13'
Note: No seepage:; no caving.

15

Number EP-2

0

Medium stiff to stiff, dry to moist, tan, gray at 2' and below, fractured, silty CLAY.. (Slide Debris)
Becoming very moist to wet at 6'; and medium stiff again.

5

10

BOH @ 13-1/2'
Note: No seepage; no caving.

15

Subsurface conditions depicted represent our observation at the time and location of this exploratory hole, modified by geologic interpretation, engineering analysis, and judgment. They are not necessarily representative of other times and location. We will not accept responsibility for the use or interpretation by others of information presented on this log.

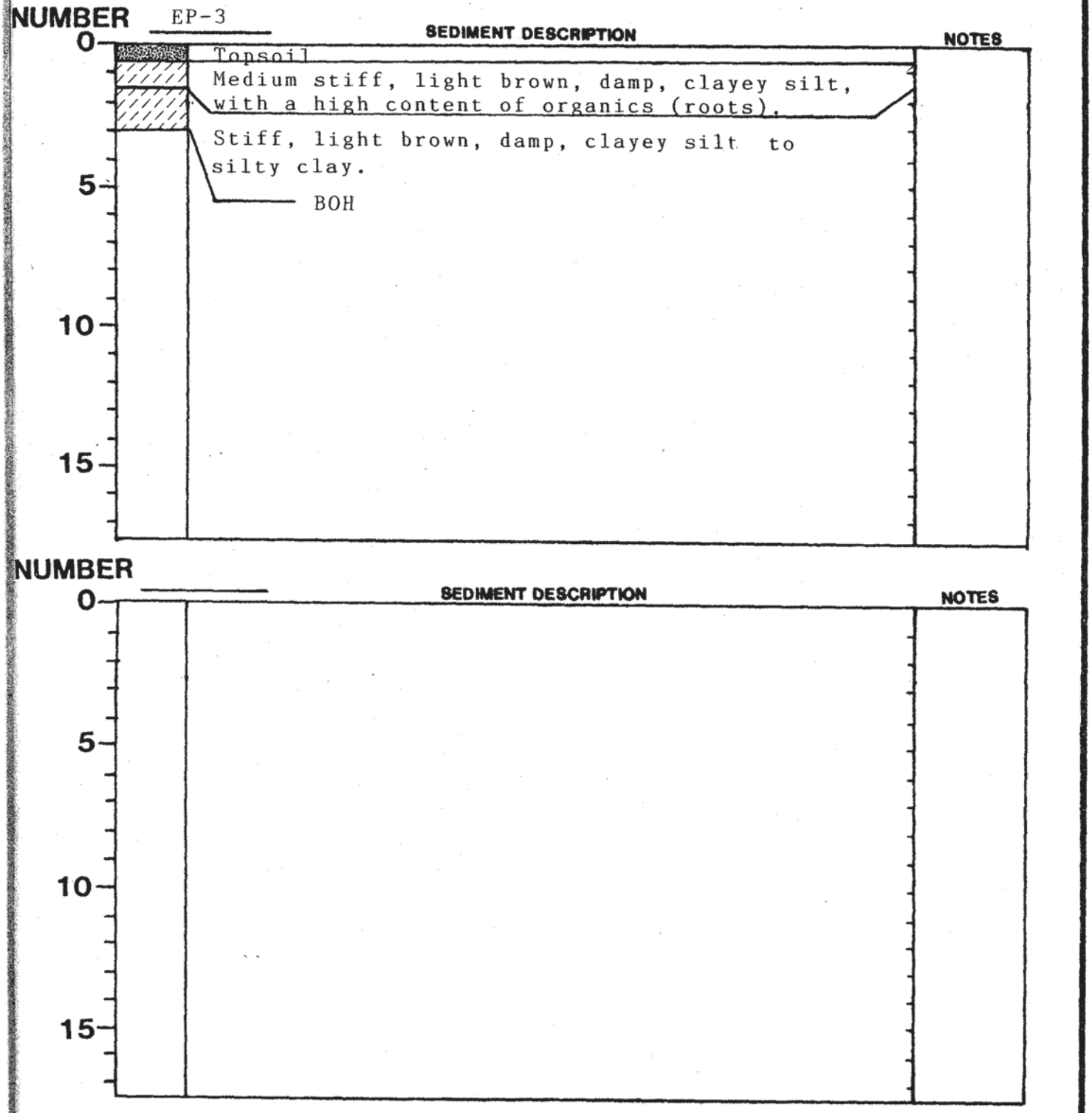
Reviewed By

Associated Earth Sciences, Inc.
911 Fifth Avenue, Suite 100
Kirkland, Washington 98033
Phone: 206-827-7701
Fax: 206-827-5424

Bianco Property
Mercer Island, Washington
Project No. G94110A
August 1994

FIG. E-13

EXPLORATION PIT LOGS



Sears Residence

Mercer Island, Washington

ASSOCIATED EARTH SCIENCES, INC

8608-10 | August 1986

FIG. E-14

CH2MHILL

PROJECT NUMBER:	BORING NUMBER:	
393372.H3.03.04.04.01	B-A-ECB-1p	SHEET 1 OF 5

SOIL BORING LOG

PROJECT : Sound Transit East Link

LOCATION : Under I90 bridge at East Mercer Boat Launch Park, Mercer Island. (213871.5 N, 1301971.9

ELEVATION : 53.9

DRILLING CONTRACTOR : Gregory Drilling, Inc., Redmond, Washington

DRILLING METHOD AND EQUIPMENT : Hollow stem auger/Mud rotary drilling, 140-lb auto hammer with 30" drop, CME 85 truck-mounted rig

WATER LEVELS : High of 5.1' bgs (6/18/2010). See graph for additional details. START : 4/21/2010 END : 4/21/2010 LOGGER : S. Brancheau

DEPTH BELOW GROUND SURFACE (ft)	INTERVAL (ft)	RECOVERY (ft)	#TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6" (N)	SOIL DESCRIPTION **SOIL NAME (USCS GROUP SYMBOL),** COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
					Surface is approximately 6" of asphalt.	Began drilling at 8:36am on 4/21/2010 with hollow-stem auger.
5	5.0					
	6.5	1.5	SS-1	5-9-10 (19)	**SANDY SILT OR SILT WITH SAND (ML),** gray, dry to slightly moist, very stiff, nonplastic, estimated 25-35% fine sand, homogeneous appearance.	Switched to mud rotary drilling after SS-1.
10	10.0					
	11.5	1.5	SS-2	24-41-38 (79)	**SANDY SILT, ML,** dark gray, dry to slightly moist, hard, nonplastic, fine sand, fine subrounded gravel scattered throughout.	**See laboratory results for SS-2.**
						Very chattery drilling at 13.5.
15	15.0					
	16.5	1.2	SS-3	16-23-23 (46)	**SANDY SILT (ML),** same as above.	Driller notes more gravels at 15'. 3" of fine gravel slough on top of sample.
						Hard, slow drilling from 15' to 20'.
20	20.0					
	21.5	1.3	SS-4	8-13-20 (33)	**SANDY SILT (ML),** same as above except more fine to medium sand.	3" of fine gravel slough on top of sample.
25	25.0					
	26.5	1.2	SS-5	17-38-41 (79)	**SILT WITH SAND, ML,** dark gray, dry to moist, hard, nonplastic, fine sand with trace medium sand, fine subrounded gravel.	**See laboratory results for SS-5.** 4" of fine gravel slough on top of sample.
						Slight drilling rate increase from 28' to 30'.
30						

FIG. E-15

CH2MHILL

PROJECT NUMBER:	BORING NUMBER:	
393372.H3.03.04.04.01	B-A-ECB-1p	SHEET 2 OF 5

SOIL BORING LOG

PROJECT : Sound Transit East Link

LOCATION : Under I90 bridge at East Mercer Boat Launch Park, Mercer Island. (213871.5 N, 1301971.9

ELEVATION : 53.9

DRILLING CONTRACTOR : Gregory Drilling, Inc., Redmond, Washington

DRILLING METHOD AND EQUIPMENT : Hollow stem auger/Mud rotary drilling, 140-lb auto hammer with 30" drop, CME 85 truck-mounted rig

WATER LEVELS : High of 5.1' bgs (6/18/2010). See graph for additional details. START : 4/21/2010 END : 4/21/2010 LOGGER : S. Brancheau

DEPTH BELOW GROUND SURFACE (ft)	INTERVAL (ft)	RECOVERY (ft)	#TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6" (N)	SOIL DESCRIPTION **SOIL NAME (USCS GROUP SYMBOL),** COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
	30.0					2" of fine gravel slough on top of sample.
	31.5	1.2	SS-6	20-31-50 (81)	**SANDY SILT (ML),** dark gray, dry to moist, hard, nonplastic, estimated 35-40% fine sand, 1" fine to medium sand lenses at 30' and 31.1'.	
35	35.0					
	36.5	1.1	SS-7	18-36-43 (79)	**SILTY SAND, SM,** dark gray, slightly moist from 35'-35.5' and wet from 35.5'-36.1', very dense, fine sand, nonplastic fines.	**See laboratory results for SS-7.** 3" of fine gravel slough on top of sample.
40	40.0					
	41.0	0.7	SS-8	36-50/6" (50/6")	**SILTY SAND (SM),** similar to above except dry to slightly moist, 2" sand and gravel lens at 40.8'.	
45	45.0					
	45.9	0.7	SS-9	42-50/5" (50/5")	**45'-45.4' - A: SANDY SILT (ML),** gray, dry to slightly moist, hard, nonplastic, estimated 35% fine sand. **45.4'-45.7' - B: SILTY SAND (SM),** gray, moist to wet, very dense, fine to medium sand, estimated 15% nonplastic fines.	
50	50.0					
	50.7	0.5	SS-10	36-50/3" (50/3")	**SANDY SILT, ML,** dark gray, dry, hard, nonplastic, fine to coarse sand, predominantly fine sand, homogeneous appearance.	**See laboratory results for SS-10.** Hard and slow drilling from 50' to 55'.
55	55.0					
	55.9	0.8	SS-11	32-50/5" (50/5")	**SANDY SILT (ML),** same as above.	Slight drilling rate increase from 58' to 60'.
60						

FIG. E-15

CH2MHILL

PROJECT NUMBER:	BORING NUMBER:	
393372.H3.03.04.04.01	B-A-ECB-1p	SHEET 3 OF 5

SOIL BORING LOG

PROJECT : Sound Transit East Link

LOCATION : Under I90 bridge at East Mercer Boat Launch Park, Mercer Island. (213871.5 N, 1301971.9

ELEVATION : 53.9

DRILLING CONTRACTOR : Gregory Drilling, Inc., Redmond, Washington

DRILLING METHOD AND EQUIPMENT : Hollow stem auger/Mud rotary drilling, 140-lb auto hammer with 30" drop, CME 85 truck-mounted rig

WATER LEVELS : High of 5.1' bgs (6/18/2010). See graph for additional details. START : 4/21/2010 END : 4/21/2010 LOGGER : S. Brancheau

DEPTH BELOW GROUND SURFACE (ft)	INTERVAL (ft)	RECOVERY (ft)	#TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6" (N)	SOIL DESCRIPTION **SOIL NAME (USCS GROUP SYMBOL),** COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
	60.0 60.9	0.7	SS-12	41-50/5" (50/5")	**SILTY SAND WITH GRAVEL, SM,** gray, wet, very dense, fine to coarse sand, nonplastic fines, fine subrounded gravel.	**See laboratory results for SS-12.**
						Chattery drilling at 63.5'.
65	65.0 65.9	0.7	SS-13	37-50/5" (50/5")	**SILTY SAND (SM),** dark gray, moist to wet, very dense, predominantly fine sand, estimated 35-40% nonplastic fines.	6" of fine gravel slough on top of sample.
						Driller notes 3" clay layer at 68'.
70	70.0 70.4	0.3	SS-14	50/5" (50/5")	**SILTY SAND (SM),** same as above except dry.	Driller notes some gravels at 69.5'.
75						Hard and slow drilling from 70' to 80'.
80	80.0 81.5	1.5	SS-15	38-42-37 (79)	**80'-81' - A: SILT WITH SAND (ML),** dark gray, dry, hard, nonplastic, estimated 20% fine sand. **81'-81.5' - B: SILT (ML),** similar to above except trace fine sand.	Slight drilling rate increase from 80'-85'.
85						Drilling rate decreases from 85' to 90'.
90						

FIG. E-15

CH2MHILL

PROJECT NUMBER:	BORING NUMBER:	
393372.H3.03.04.04.01	B-A-ECB-1p	SHEET 4 OF 5

SOIL BORING LOG

PROJECT : Sound Transit East Link

LOCATION : Under I90 bridge at East Mercer Boat Launch Park, Mercer Island. (213871.5 N, 1301971.9

ELEVATION : 53.9

DRILLING CONTRACTOR : Gregory Drilling, Inc., Redmond, Washington

DRILLING METHOD AND EQUIPMENT : Hollow stem auger/Mud rotary drilling, 140-lb auto hammer with 30" drop, CME 85 truck-mounted rig

WATER LEVELS : High of 5.1' bgs (6/18/2010). See graph for additional details. START : 4/21/2010 END : 4/21/2010 LOGGER : S. Brancheau

DEPTH BELOW GROUND SURFACE (ft)	INTERVAL (ft)	RECOVERY (ft)	#TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6" (N)	SOIL DESCRIPTION **SOIL NAME (USCS GROUP SYMBOL),** COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
	90.0					
	91.5	1.4	SS-16	15-17-23 (40)	**FAT CLAY, CH,** dark gray, dry to moist, hard, plastic, trace fine sand, homogeneous appearance.	**See laboratory results for SS-16.**
95						Hard and slow drilling from 90' to 100'.
100	100.0					
	101.5	1.5	SS-17	9-16-20 (36)	**FAT CLAY (CH),** same as above.	
105						
110	110.0					
	111.5	1.5	SS-18	14-18-28 (46)	**FAT CLAY (CH),** same as above.	
115						
120						

FIG. E-15

CH2MHILL

PROJECT NUMBER:	BORING NUMBER:	
393372.H3.03.04.04.01	B-A-ECB-1p	SHEET 5 OF 5

SOIL BORING LOG

PROJECT : Sound Transit East Link

LOCATION : Under I90 bridge at East Mercer Boat Launch Park, Mercer Island. (213871.5 N, 1301971.9

ELEVATION : 53.9

DRILLING CONTRACTOR : Gregory Drilling, Inc., Redmond, Washington

DRILLING METHOD AND EQUIPMENT : Hollow stem auger/Mud rotary drilling, 140-lb auto hammer with 30" drop, CME 85 truck-mounted rig

WATER LEVELS : High of 5.1' bgs (6/18/2010). See graph for additional details. START : 4/21/2010 END : 4/21/2010 LOGGER : S. Brancheau

DEPTH BELOW GROUND SURFACE (ft)	INTERVAL (ft)	RECOVERY (ft)	#TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6" (N)	SOIL DESCRIPTION **SOIL NAME (USCS GROUP SYMBOL),** COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
	120.0 121.5	1.5	SS-19	14-23-30 (53)	**SILT (ML),** dark gray, dry, hard, predominantly nonplastic with low plasticity lenses, estimated 10% fine sand, trace fine subrounded gravel.	Drilling completed at 16:35pm on 4/21/2010. Completed piezometer installation on 4/22/2010.
					Bottom of hole at 121.5 ft below ground surface.	**PIEZOMETER INSTALLATION LOG:** **Ecology Tag: BBT-240.** Well is 2-inch diameter schedule 40 PVC with 0.01" slotted screen installed from 60' to 70'. 0' to 1' - Flush concrete monument. 1' to 4' - 3/8" Bentonite chips. 4' to 50' - Portland-brand cement grout. 50' to 55' - 3/8" Bentonite chips. 55' to 70' - Colorado silica sand. 70' to 75' - 3/8" Bentonite chips. 75' to 121.5' - Bentonite-cement grout. **VIBRATING WIRE PIEZOMETER INFORMATION:** **Ecology Tag: BBT-241.** Vibrating Wire sensor was placed on same 2-inch PVC pipe at 40'. Encased in Portland cement grout from 4' to 50'. Serial #: 94628

125 130 135 140 145 150

FIG. E-15

CH2MHILL

PROJECT NUMBER:	BORING NUMBER:	
393372.H3.03.04.04.01	B-A-ECB-3DST	SHEET 1 OF 6

SOIL BORING LOG

PROJECT : Sound Transit East Link

LOCATION : Enatai Park at Shore, Middle of Bridge, Bellevue. (214355.6 N, 1303620.1 E)

ELEVATION : 22.5

DRILLING CONTRACTOR : Gregory Drilling, Inc., Redmond, Washington

DRILLING METHOD AND EQUIPMENT : Hollow stem auger/Mud rotary drilling, 140-lb auto hammer with 30" drop, CME 85 truck-mounted rig

WATER LEVELS : Not noted.

START : 11/30/2009

END : 12/1/2009

LOGGER : M. Thompson

DEPTH BELOW GROUND SURFACE (ft)	INTERVAL (ft)	RECOVERY (ft)	#TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6" (N)	SOIL DESCRIPTION **SOIL NAME (USCS GROUP SYMBOL),** COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
					Surface is gravel.	Began drilling at 8:10am on 11/30/2009 with hollow-stem auger.
5	5.0					
	6.5	0.8	SS-1	10-20-21 (41)	**SILTY SAND (SM),** brown, moist to wet, dense, fine to coarse sand, estimated 15% nonplastic fines, estimated 5-15% fine to coarse subangular gravel up to 3/4".	
10	10.0					
	10.9	0.2	SS-2	31-50/5" (50/5")	**SILTY SAND, SM,** brown, wet, very dense, fine to coarse sand, nonplastic fines, trace fine gravel.	**See laboratory results for SS-2.**
15	15.0					
	16.3	0.7	SS-3	6-28-50/4" (78/10")	**WELL GRADED SAND WITH SILT AND GRAVEL (SW-SM),** brown, wet, very dense, fine to coarse sand, estimated less than 10% nonplastic fines, estimated 15% fine to coarse subangular gravel.	Switched to mud rotary drilling after SS-3. Very chattery drilling at 16'.
20	20.0					
	21.5	1.1	SS-4	17-30-46 (76)	**SANDY SILT, ML,** light brown, moist, hard, nonplastic fines, fine sand.	**See laboratory results for SS-4.**
25	25.0					
	26.5	1.2	SS-5	18-33-50 (83)	**POORLY GRADED SAND (SP),** light brown to brown, wet, very dense, fine to medium sand, trace nonplastic fines, trace fine gravel.	
30						

FIG. E-16

CH2MHILL

PROJECT NUMBER:	BORING NUMBER:	
393372.H3.03.04.04.01	B-A-ECB-3DST	SHEET 2 OF 6

SOIL BORING LOG

PROJECT : Sound Transit East Link

LOCATION : Enatai Park at Shore, Middle of Bridge, Bellevue. (214355.6 N, 1303620.1 E)

ELEVATION : 22.5

DRILLING CONTRACTOR : Gregory Drilling, Inc., Redmond, Washington

DRILLING METHOD AND EQUIPMENT : Hollow stem auger/Mud rotary drilling, 140-lb auto hammer with 30" drop, CME 85 truck-mounted rig

WATER LEVELS : Not noted.

START : 11/30/2009

END : 12/1/2009

LOGGER : M. Thompson

DEPTH BELOW GROUND SURFACE (ft)	INTERVAL (ft)	RECOVERY (ft)	#TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6" (N)	SOIL DESCRIPTION **SOIL NAME (USCS GROUP SYMBOL),** COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
	30.0 31.0	1.0	SS-66	25-50/6" (50/6")	**POORLY GRADED SAND (SP),** light brown to brown, wet, very dense, fine to medium sand, trace nonplastic fines, trace fine gravel.	
35	35.0 36.0	0.7	SS-7	19-50/6" (50/6")	**SILT WITH SAND, ML,** light brown, moist, hard, nonplastic fines, fine sand.	**See laboratory results for SS-7.**
40	40.0 41.5	0.8	SS-8	16-39-44 (83)	**WELL GRADED SAND WITH SILT AND GRAVEL, SW-SM,** brown, moist to wet, very dense, fine to coarse sand, nonplastic fines, fine gravel.	**See laboratory results for SS-8.**
45	45.0 45.9	0.7	SS-9	33-50/5" (50/5")	**POORLY GRADED SAND WITH SILT (SP-SM),** light brown, moist to wet, very dense, fine sand, estimated 5-15% nonplastic fines.	
50	50.0 50.5	0.3	SS-10	50/6" (50/6")	**POORLY GRADED SAND WITH SILT AND GRAVEL (SP-SM),** grayish-brown, moist to wet, very dense, fine sand, estimated 5-15% nonplastic fines, estimated 10-15% broken coarse gravel.	
55	55.0 55.9	0.5	SS-11	36-50/5" (50/5")	**SILTY SAND (SM),** gray, moist, very dense, fine sand, estimated 15-25% nonplastic fines.	
60						

FIG. E-16

CH2MHILL

PROJECT NUMBER:	BORING NUMBER:	
393372.H3.03.04.04.01	B-A-ECB-3DST	SHEET 3 OF 6

SOIL BORING LOG

PROJECT : Sound Transit East Link

LOCATION : Enatai Park at Shore, Middle of Bridge, Bellevue. (214355.6 N, 1303620.1 E)

ELEVATION : 22.5

DRILLING CONTRACTOR : Gregory Drilling, Inc., Redmond, Washington

DRILLING METHOD AND EQUIPMENT : Hollow stem auger/Mud rotary drilling, 140-lb auto hammer with 30" drop, CME 85 truck-mounted rig

WATER LEVELS : Not noted.

START : 11/30/2009

END : 12/1/2009

LOGGER : M. Thompson

DEPTH BELOW GROUND SURFACE (ft)	INTERVAL (ft)	RECOVERY (ft)	#TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6" (N)	SOIL DESCRIPTION **SOIL NAME (USCS GROUP SYMBOL),** COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
	60.0 60.9	0.4	SS-12	16-50/5" (50/5")	**SILTY SAND, SM,** grayish-brown, moist, very dense, fine to medium sand, nonplastic fines, trace fine gravel.	**See laboratory results for SS-12.** Sampler filled with gravel slough from above. SPT values may be artificially high.
65	65.0 65.4	0.4	SS-13	50/5" (50/5")	**SILTY SAND (SM),** similar to above except gray.	
70	70.0	0.2	SS-14	50/4" (50/4")	**SILTY SAND (SM),** same as above.	
75	75.0	0.2	SS-15	50/4" (50/4")	**SILTY SAND WITH GRAVEL, SM,** gray, moist, very dense, fine to medium sand, nonplastic fines, estimated 10-20% fine to coarse gravel up to 3/4".	**See laboratory results for SS-15.** Driller notes gravels at about 78'.
80	80.0 80.4	0.2	SS-16	50/5" (50/5")	**POORLY GRADED SAND WITH SILT or SILTY SAND (SP-SM/SM),** gray, wet, very dense, fine to coarse sand, estimated 10-20% nonplastic fines, trace fine gravel.	
85	85.0 85.5	0.6	SS-17	50/6" (50/6")	**POORLY GRADED SAND WITH SILT (SP-SM),** gray, moist, very dense, fine to medium sand, estimated 5-15% nonplastic fines, trace fine gravel.	
90						

FIG. E-16

CH2MHILL

PROJECT NUMBER:	BORING NUMBER:	
393372.H3.03.04.04.01	B-A-ECB-3DST	SHEET 4 OF 6

SOIL BORING LOG

PROJECT : Sound Transit East Link

LOCATION : Enatai Park at Shore, Middle of Bridge, Bellevue. (214355.6 N, 1303620.1 E)

ELEVATION : 22.5

DRILLING CONTRACTOR : Gregory Drilling, Inc., Redmond, Washington

DRILLING METHOD AND EQUIPMENT : Hollow stem auger/Mud rotary drilling, 140-lb auto hammer with 30" drop, CME 85 truck-mounted rig

WATER LEVELS : Not noted.

START : 11/30/2009 END : 12/1/2009 LOGGER : M. Thompson

DEPTH BELOW GROUND SURFACE (ft)	INTERVAL (ft)	RECOVERY (ft)	#TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6" (N)	SOIL DESCRIPTION **SOIL NAME (USCS GROUP SYMBOL),** COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
	90.0	0.2	SS-18	50/3" (50/3")	**SILTY SAND WITH GRAVEL (SM),** gray, moist, very dense, fine to coarse sand, estimated 15-25% nonplastic fines, estimated 10-20% fine to coarse subangular gravel up to 3/4".	Rig chatter at 91'.
95	95.0					
	95.4	0.3	SS-19	50/5" (50/5")	**POORLY GRADED SAND (SP),** gray, wet, very dense, fine to coarse sand, trace nonplastic fines.	
						Rig chatter at 98'.
100	100.0					
	100.4	0.2	SS-20	50/4" (50/4")	**POORLY GRADED SAND WITH SILT AND GRAVEL, SP-SM,** gray, wet, very dense, fine to coarse sand, nonplastic fines, fine to coarse subrounded gravel.	**See laboratory results for SS-20.**
105	105.0					
	105.7	0.5	SS-21	39-50/2" (50/2")	**105.0'-105.3' - A: POORLY GRADED SAND (SP),** gray, moist, very dense, fine to coarse sand, trace nonplastic fines. **105.3'-105.5' - B: SILTY SAND (SM),** gray, dry to moist, very dense, fine to medium sand, estimated 30-45% nonplastic fines.	
110	110.0					
		0.2	SS-22	50/3" (50/3")	**SILTY SAND (SM),** same as above.	
						Drilling stopped at 15:50pm on 11/30/2009. Drilling continued at 8:32am on 12/1/2009.
115	115.0					
	115.8	0.6	SS-23	38-50/3" (50/3")	**SILTY SAND, SM,** dark gray, moist, very dense, fine to medium sand, nonplastic fines.	**See laboratory results for SS-23.**
120						

FIG. E-16

CH2MHILL

PROJECT NUMBER:	BORING NUMBER:	
393372.H3.03.04.04.01	B-A-ECB-3DST	SHEET 5 OF 6

SOIL BORING LOG

PROJECT : Sound Transit East Link

LOCATION : Enatai Park at Shore, Middle of Bridge, Bellevue. (214355.6 N, 1303620.1 E)

ELEVATION : 22.5

DRILLING CONTRACTOR : Gregory Drilling, Inc., Redmond, Washington

DRILLING METHOD AND EQUIPMENT : Hollow stem auger/Mud rotary drilling, 140-lb auto hammer with 30" drop, CME 85 truck-mounted rig

WATER LEVELS : Not noted.

START : 11/30/2009

END : 12/1/2009

LOGGER : M. Thompson

DEPTH BELOW GROUND SURFACE (ft)	INTERVAL (ft)	RECOVERY (ft)	#TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6" (N)	SOIL DESCRIPTION **SOIL NAME (USCS GROUP SYMBOL),** COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
120.0	0.2	SS-24		50/4" (50/4")	**SILTY SAND (SM),** dark gray, moist, very dense, fine sand, estimated 30-45% nonplastic fines, trace fine gravel.	
125 125.0						
125.7	0.5	SS-25		28-50/2" (50/2")	**SILT WITH SAND, ML,** gray, moist, hard, nonplastic fines, fine sand.	**See laboratory results for SS-25.**
130 130.0						
	0.1	SS-26		50/3" (50/3")	**POOR RECOVERY** similar to above, except more gravel and wet.	
135						
140 140.0						
	0.1	SS-27		50/2" (50/2")	**SILTY SAND (SM),** similar to above, except more sand.	
145						
						Very hard and slow drilling from 145' to 150'. Not a lot of gravel.
150						

FIG. E-16

CH2MHILL

PROJECT NUMBER:	BORING NUMBER:	
393372.H3.03.04.04.01	B-A-ECB-3DST	SHEET 6 OF 6

SOIL BORING LOG

PROJECT : Sound Transit East Link

LOCATION : Enatai Park at Shore, Middle of Bridge, Bellevue. (214355.6 N, 1303620.1 E)

ELEVATION : 22.5

DRILLING CONTRACTOR : Gregory Drilling, Inc., Redmond, Washington

DRILLING METHOD AND EQUIPMENT : Hollow stem auger/Mud rotary drilling, 140-lb auto hammer with 30" drop, CME 85 truck-mounted rig

WATER LEVELS : Not noted.

START : 11/30/2009

END : 12/1/2009

LOGGER : M. Thompson

DEPTH BELOW GROUND SURFACE (ft)	INTERVAL (ft)	RECOVERY (ft)	#TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6" (N)	SOIL DESCRIPTION **SOIL NAME (USCS GROUP SYMBOL),** COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
150.0		0.1	SS-28	50/1" (50/1")	**SILTY SAND (SM),** same as above. Bottom of hole at 150.1 ft below ground surface.	Drilling completed at 14:05pm on 12/1/2009. **Downhole Seismic Test Casing Installation:** **Ecology Tag: BBT 219.** 3-inch diameter, schedule 40 PVC casing installed to 149.5' 0' to 1' - Flush concrete monument. 1' to 2' - 3/8" Bentonite chips. 2' to 149.5' - Bentonite-cement grout. 149.5' to 150' - Collapsed native material.
155						
160						
165						
170						
175						
180						

FIG. E-16

CH2MHILL

PROJECT NUMBER:	BORING NUMBER:	
393372.H3.03.04.04.01	B-A-ECB-4p	SHEET 1 OF 5

SOIL BORING LOG

PROJECT : Sound Transit East Link

LOCATION : Enatai Beach Parking Lot, Under I90, Bellevue. (214480.2 N, 1303916.4 E)

ELEVATION : 49.6

DRILLING CONTRACTOR : Gregory Drilling, Inc., Redmond, Washington

DRILLING METHOD AND EQUIPMENT : Mud rotary drilling, 140-lb auto hammer with 30" drop, CME 85 truck-mounted rig

WATER LEVELS : High of 14.7' bgs (6/18/2010). See graph for additional details. START : 4/23/2010 END : 4/23/2010 LOGGER : S. Brancheau

DEPTH BELOW GROUND SURFACE (ft)	INTERVAL (ft)	RECOVERY (ft)	#TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6" (N)	SOIL DESCRIPTION **SOIL NAME (USCS GROUP SYMBOL),** COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
					Surface is approximately 3" of asphalt.	Began drilling at 8:50am on 4/23/2010 with mud rotary.
5	5.0					
	6.5	0.9	SS-1	13-19-21 (40)	**WELL GRADED SAND (SW),** brown, dry to slightly moist, dense, fine to coarse sand, estimated less than 5% nonplastic fines, trace fine gravel.	
						Chattery drilling from 8' to 10'.
10	10.0					
	10.8	0.5	SS-2	34-50/4" (50/4")	**WELL GRADED GRAVEL WITH SILT AND SAND, GW-GM,** brown, moist, very dense, fine to coarse angular to subrounded gravel, nonplastic fines, fine to coarse sand.	**See laboratory results for SS-2.** 4" of gravel slough on top of sample.
15	15.0					
	16.4	1.0	SS-3	45-41-50/5" (91/11")	**WELL GRADED SAND WITH SILT (SW-SM),** brown, dry to moist, very dense, fine to coarse sand, estimated 5-10% nonplastic fines, estimated 10% fine subangular to subrounded gravel.	5" of gravel slough on top of sample.
						Very chattery drilling from 18'-20'.
20	20.0					
		0.1	SS-4	50/3" (50/3")	**WELL GRADED SAND WITH SILT AND GRAVEL (SW-SM),** poor recovery, similar to above except estimated 20% fine to coarse subangular to subrounded gravel, broken gravel lodged in split spoon shoe.	Sampler bounced with no advancement final 30 blows.
						Drilling rate very slow from 20'-25'.
25	25.0					
	26.5	1.2	SS-5	30-45-50 (95)	**POORLY GRADED SAND WITH SILT, SP-SM,** brown, dry to slightly moist, very dense, fine to medium sand, nonplastic fines.	**See laboratory results for SS-5.**
30						

FIG. E-17

CH2MHILL

PROJECT NUMBER:	BORING NUMBER:	
393372.H3.03.04.04.01	B-A-ECB-4p	SHEET 2 OF 5

SOIL BORING LOG

PROJECT : Sound Transit East Link

LOCATION : Enatai Beach Parking Lot, Under I90, Bellevue. (214480.2 N, 1303916.4 E)

ELEVATION : 49.6

DRILLING CONTRACTOR : Gregory Drilling, Inc., Redmond, Washington

DRILLING METHOD AND EQUIPMENT : Mud rotary drilling, 140-lb auto hammer with 30" drop, CME 85 truck-mounted rig

WATER LEVELS : High of 14.7' bgs (6/18/2010). See graph for additional details. START : 4/23/2010 END : 4/23/2010 LOGGER : S. Brancheau

DEPTH BELOW GROUND SURFACE (ft)	INTERVAL (ft)	RECOVERY (ft)	#TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6" (N)	SOIL DESCRIPTION **SOIL NAME (USCS GROUP SYMBOL),** COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
	30.0	0.2	SS-6	50/5" (50/5")	**POORLY GRADED SAND WITH SILT (SP-SM),** similar to above except moist.	Sampler bounced with no advancement final 20 blows. 4" of gravel slough on top of sample.
35	35.0					
	36.5	1.1	SS-7	33-42-50/6" (92/12")	**35'-35.8' - A: SANDY SILT (ML),** grayish-brown, moist, hard, nonplastic, estimated 35% fine sand, 1" wet medium sand lens at 35.2'. **35.8'-36.1' - B: POORLY GRADED SAND WITH SILT (SP-SM),** grayish-brown with some orange iron-oxide stains, moist to wet, very dense, fine to medium sand, estimated 5-10% nonplastic fines.	6" of gravel slough on top of sample.
40	40.0					
		0.1	SS-8	50/3" (50/3")	**SILTY SAND WITH GRAVEL, SM,** grayish-brown, moist, very dense, fine to coarse sand, predominantly fine sand, nonplastic fines, fine subrounded gravel.	**See laboratory results for SS-8.** Sampler bounced with no advancement final 30 blows. 16" of gravel slough in sampler.
45	45.0					
	46.5	1.2	SS-9	30-42-44 (86)	**POORLY GRADED SAND (SP),** grayish-brown, moist to wet, very dense, fine to medium sand, predominantly medium sand, 1" coarse sand and gravel seam at 45.7', estimated less than 5% nonplastic fines, trace coarse subrounded gravel.	3" of gravel slough on top of sample.
50	50.0					
		0.2	SS-10	50/3" (50/3")	**WELL GRADED SAND WITH GRAVEL (SW),** grayish-brown, moist to wet, very dense, fine to coarse sand, estimated 40% angular to subrounded gravel, trace nonplastic fines, gravel lodged in split spoon shoe.	2" of gravel slough on top of sample. Very chattery drilling from 50'-55'.
55	55.0					
	55.8	0.1	SS-11	14-50/4" (50/4")	**WELL GRADED SAND WITH GRAVEL (SW),** poor recovery, same as above.	Very chattery drilling from 55' -58'. Less drill chatter, slightly faster drill rate from 58'-60'.
60						Very chattery drilling at 60'.

FIG. E-17

CH2MHILL

PROJECT NUMBER:	BORING NUMBER:	
393372.H3.03.04.04.01	B-A-ECB-4p	SHEET 3 OF 5

SOIL BORING LOG

PROJECT : Sound Transit East Link

LOCATION : Enatai Beach Parking Lot, Under I90, Bellevue. (214480.2 N, 1303916.4 E)

ELEVATION : 49.6

DRILLING CONTRACTOR : Gregory Drilling, Inc., Redmond, Washington

DRILLING METHOD AND EQUIPMENT : Mud rotary drilling, 140-lb auto hammer with 30" drop, CME 85 truck-mounted rig

WATER LEVELS : High of 14.7' bgs (6/18/2010). See graph for additional details. START : 4/23/2010 END : 4/23/2010 LOGGER : S. Brancheau

DEPTH BELOW GROUND SURFACE (ft)	INTERVAL (ft)	RECOVERY (ft)	#TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6" (N)	SOIL DESCRIPTION **SOIL NAME (USCS GROUP SYMBOL),** COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
	60.0 61.0	0.8	SS-12	35-50/6" (50/6")	**WELL GRADED SAND WITH SILT, SW-SM,** grayish-brown, moist to wet, very dense, fine to coarse sand, predominantly fine to medium sand, nonplastic fines, fine subangular gravel.	**See laboratory results for SS-12.**
65						Slow, constant drill rate with minor drill chatter from 60'-70'.
70	70.0 70.5	0.4	SS-13	50/6" (50/6")	**WELL GRADED SAND WITH SILT AND GRAVEL (SW-SM),** similar to above except estimated 20-25% fine to coarse angular to subrounded gravel.	6" of gravel slough on top of sample.
75						Very chattery drilling from 72' to 77'
80	80.0 81.0	0.9	SS-14	34-50/6" (50/6")	**POORLY GRADED SAND WITH SILT, SP-SM,** brownish-gray, 0.75" orange iron-oxied stained band at 80.5', moist to wet, very dense, fine to coarse sand, predominantly fine sand, nonplastic fines, fine gravel.	**See laboratory results for SS-14.**
85						Very chattery drilling from 84'-85'
90						

FIG. E-17

CH2MHILL

PROJECT NUMBER:	BORING NUMBER:	
393372.H3.03.04.04.01	B-A-ECB-4p	SHEET 4 OF 5

SOIL BORING LOG

PROJECT : Sound Transit East Link

LOCATION : Enatai Beach Parking Lot, Under I90, Bellevue. (214480.2 N, 1303916.4 E)

ELEVATION : 49.6

DRILLING CONTRACTOR : Gregory Drilling, Inc., Redmond, Washington

DRILLING METHOD AND EQUIPMENT : Mud rotary drilling, 140-lb auto hammer with 30" drop, CME 85 truck-mounted rig

WATER LEVELS : High of 14.7' bgs (6/18/2010). See graph for additional details. START : 4/23/2010 END : 4/23/2010 LOGGER : S. Brancheau

DEPTH BELOW GROUND SURFACE (ft)	INTERVAL (ft)	RECOVERY (ft)	#TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6" (N)	SOIL DESCRIPTION **SOIL NAME (USCS GROUP SYMBOL),** COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
	90.0 91.0	0.7	SS-15	43-50/6" (50/6")	**POORLY GRADED SAND WITH SILT (SP-SM),** same as above.	2" of gravel slough on top of sample. Very chattery drilling at 91'.
95						Slight rig chatter from 94'-95'.
						Consistant minor drill chatter from 95' to 100'.
100	100.0 100.4	0.2	SS-16	50/5" (50/5")	**SILTY SAND (SM),** gray, dry to slightly moist, very dense, fine sand, estimated 35% nonplastic fines.	4" of gravel slough on top of sample.
105	105.0 105.5	0.3	SS-17	50/6" (50/6")	**SILTY SAND, SM,** similar to above except moist, less nonplastic fines.	**See laboratory results for SS-17.** 3" of gravel slough on top of sample. Very chattery, rig bouncing at 108'.
110	110.0 110.4	0.3	SS-18	50/5" (50/5")	**POORLY GRADED SAND WITH SILT (SP-SM),** gray, moist to wet, very dense, fine to medium sand, estimated 5% nonplastic fines.	4" of gravel slough on top of sample.
115						Very chattery drilling at 116'.
120						

FIG. E-17

CH2MHILL

PROJECT NUMBER:	BORING NUMBER:	
393372.H3.03.04.04.01	B-A-ECB-4p	SHEET 5 OF 5

SOIL BORING LOG

PROJECT : Sound Transit East Link

LOCATION : Enatai Beach Parking Lot, Under I90, Bellevue. (214480.2 N, 1303916.4 E)

ELEVATION : 49.6

DRILLING CONTRACTOR : Gregory Drilling, Inc., Redmond, Washington

DRILLING METHOD AND EQUIPMENT : Mud rotary drilling, 140-lb auto hammer with 30" drop, CME 85 truck-mounted rig

WATER LEVELS : High of 14.7' bgs (6/18/2010). See graph for additional details. START : 4/23/2010 END : 4/23/2010 LOGGER : S. Brancheau

DEPTH BELOW GROUND SURFACE (ft)	INTERVAL (ft)	RECOVERY (ft)	#TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6" (N)	SOIL DESCRIPTION **SOIL NAME (USCS GROUP SYMBOL),** COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
120.0	0.2	SS-19		50/3" (50/3")	**SILTY SAND (SM),** gray, moist, very dense, fine to medium sand, predominantly fine sand, estimated 25-30% nonplastic fines, trace fine subangular gravel. Bottom of hole at 120.3 ft below ground surface.	Drilling completed at 16:19pm on 4/23/2010. Continued with piezometer installation on 4/26/2010. **PIEZOMETER INSTALLATION LOG:** **Ecology Tag: BBT-242.** Well is 2-inch schedule 40 PVC with 0.01" slotted screen installed from 80' to 90' 0' to 1' - Flush concrete monument. 1' to 75' - 3/8" Bentonite chips. 75' to 90' - Colorado silica sand. 90' to 120.3' - Bentonite-cement grout.

125
130
135
140
145
150

FIG. E-17

RECORD OF BOREHOLE E320-B-014B

SHEET 1 of 4

PROJECT: Sound Transit East Link/WA
PROJECT NUMBER: 113-93533.0320
LOCATION: I-90 W HOV On-ramp
DRILLING METHOD: Mud Rotary
DRILLING DATE: 3/9/2013
DRILL RIG: B-61 Mobile Drill Truck
DATUM: Sound Transit East Coordinate System
COORDINATES: N: 543,383.98 E: 1,634,249.54
ELEVATION: 43.63
INCLINATION: -90

DEPTH (Ft)	BORING METHOD	DESCRIPTION	USCS	GRAPHIC LOG	ELEV. / DEPTH (Ft)	NUMBER	TYPE	BLOWS per 6 in (140 lb hammer 30 inch drop)	N	REC / ATT	PENETRATION RESISTANCE BLOWS / ft ◆ (10 20 30 40) PL MC LL (20 40 60 80)	NOTES WATER LEVELS
0	4.9-inch Diameter Bit, Mud Rotary	0.0 - 4.5 Compact, brown, (SM), wet, silty fine to coarse SAND, some fine to coarse gravel, [FILL, Hf].	SM									
						S-1	SS	8-10-13	23	1.0 / 1.5	◆	
					39.1							
5		4.5 - 18.0 Compact, brown, (SM/GM), wet, silty fine to coarse SAND and fine to coarse GRAVEL, [FILL, Hf].			4.5	S-2	SS	11-12-8	20	1.3 / 1.5	◆	
						S-3	SS	8-13-14	27	1.3 / 1.5	● ◆	S-3@7.5ft %G-35.2 %S-63.7 %F-1.1
10		Grades to trace organics.	SM / GM			S-4	SS	5-9-12	21	1.5 / 1.5	◆	
		Grades to trace gravel.				S-5	SS	8-13-7	20	1.2 / 1.5	◆	
15		Grades to some gravel, diamict structure.				S-6	SS	5-14-14	28	1.3 / 1.5	◆	
					25.6							
		18.0 - 23.0 Very dense, gray, (SM), silty fine SAND, some fine to coarse gravel, diamict structure, [FILL, Hf].			18.0							
20			SM			S-7	SS	22-30-44	>50	1.5 / 1.5	● >>◆	S-7@20ft %G-37.6 %S-47.9 %F-14.5
					20.6							
		23.0 - 28.0 Compact, gray, (GM), dry, fine to coarse sandy fine to coarse GRAVEL, clay lenses, stratified, [FILL, Hf].			23.0							
25			GM			S-8	SS	13-6-8	14	0.7 / 1.5	◆	
					15.6							
		28.0 - 38.0 Compact, brown, (SM), silty fine to medium SAND, some fine to coarse gravel, heterogeneous, [FILL, Hf].	SM		28.0							
30		Log continued on next page										

1 in to 4 ft
DRILLING CONTRACTOR: Holocene Drilling Inc.
DRILLER: Matt Graham
LOGGED: Chris Smith
CHECKED: D. Findley/ E. Scott
DATE: 5/31/2013

FINAL DESIGN PARTNERS.

ST LOG 11393533 ST PROJECT.GPJ 113.93533SOUND TRANSIT.GDT 14/3/12

FIG. E-18

RECORD OF BOREHOLE E320-B-014B

PROJECT: Sound Transit East Link/WA
PROJECT NUMBER: 113-93533.0320
LOCATION: I-90 W HOV On-ramp
DRILLING METHOD: Mud Rotary
DRILLING DATE: 3/9/2013
DRILL RIG: B-61 Mobile Drill Truck
DATUM: Sound Transit East Coordinate System
COORDINATES: N: 543,383.98 E: 1,634,249.54
ELEVATION: 43.63
INCLINATION: -90

DEPTH (Ft)	BORING METHOD	DESCRIPTION	USCS	GRAPHIC LOG	ELEV. / DEPTH (Ft)	NUMBER	TYPE	BLOWS per 6 in (140 lb hammer 30 inch drop)	N	REC / ATT	PENETRATION RESISTANCE BLOWS / ft ◆ (10 20 30 40; PL MC LL; 20 40 60 80)	NOTES WATER LEVELS
30	4.9-inch Diameter Bit, Mud Rotary	28.0 - 38.0 Compact, brown, (SM), silty fine to medium SAND, some fine to coarse gravel, heterogeneous, [FILL, Hf].	SM			S-9	SS	13-8-17	25	1.2 / 1.5	◆	
35		Brick fragment observed in Sample S-10 at 35 ft bgs.				S-10	SS	50/6"	>50	1.0 / 1.5	●	S-10@35ft %G-6.1 %S-62.0 %F-31.9
					5.6 / 38.0							
40		38.0 - 93.0 Very dense, gray, (SM), damp, clayey silty fine SAND, some fine to coarse GRAVEL, non-stratified, [TILL, Qvt].				S-11	SS	50/5"	>50	0.7 / 0.4		
45						S-12	SS	30-50/4"	>50	0.8 / 0.8		
50		Lens of wet fine to medium sand.	SM			S-13	SS	26-43-50/5"	>50	1.2 / 1.5		
55						S-14	SS	50/6"	>50	0.4 / 1.5		
60		Log continued on next page										

1 in to 4 ft
DRILLING CONTRACTOR: Holocene Drilling Inc.
DRILLER: Matt Graham
LOGGED: Chris Smith
CHECKED: D. Findley/ E. Scott
DATE: 5/31/2013

FINAL DESIGN PARTNERS.

ST LOG 11393533 ST PROJECT.GPJ 113.93533SOUND TRANSIT.GDT 14/3/12

FIG. E-18

RECORD OF BOREHOLE E320-B-014B

PROJECT: Sound Transit East Link/WA
PROJECT NUMBER: 113-93533.0320
LOCATION: I-90 W HOV On-ramp
DRILLING METHOD: Mud Rotary
DRILLING DATE: 3/9/2013
DRILL RIG: B-61 Mobile Drill Truck
DATUM: Sound Transit East Coordinate System
COORDINATES: N: 543,383.98 E: 1,634,249.54
ELEVATION: 43.63
INCLINATION: -90

DEPTH (Ft)	BORING METHOD	SOIL PROFILE DESCRIPTION	USCS	GRAPHIC LOG	ELEV. / DEPTH (Ft)	SAMPLES NUMBER	TYPE	BLOWS per 6 in (140 lb hammer 30 inch drop)	N	REC / ATT	PENETRATION RESISTANCE BLOWS / ft ◆ (10 20 30 40; PL MC LL; 20 40 60 80)	NOTES WATER LEVELS
60	4.9-inch Diameter Bit, Mud Rotary	38.0 - 93.0 Very dense, gray, (SM), damp, clayey silty fine SAND, some fine to coarse GRAVEL, non-stratified, [TILL, Qvt].	SM			S-15	SS	50/5"	>50	0.5 / 0.4		>>
65						S-16	SS	50/6"	>50	0.4 / 0.5		>>
70						S-17	SS	33-50/6"	>50	0.8 / 1.0	●	>> S-17@70ft %G-9.3 %S-51.6 %F-39.1
75						S-18	SS	50/5"	>50	0.3 / 1.5		>>
80						S-19	SS	27-45-50/3"	>50	1.5 / 1.3		>>
85						S-20	SS	50/6"	>50	0.4 / 1.5		>>
90												

Log continued on next page

1 in to 4 ft
DRILLING CONTRACTOR: Holocene Drilling Inc.
DRILLER: Matt Graham
LOGGED: Chris Smith
CHECKED: D. Findley/ E. Scott
DATE: 5/31/2013

FINAL DESIGN PARTNERS.

ST LOG 11393533 ST PROJECT.GPJ 113.93533SOUND TRANSIT.GDT 14/3/12

FIG. E-18

RECORD OF BOREHOLE E320-B-014B

SHEET 4 of 4

PROJECT: Sound Transit East Link/WA
PROJECT NUMBER: 113-93533.0320
LOCATION: I-90 W HOV On-ramp
DRILLING METHOD: Mud Rotary
DRILLING DATE: 3/9/2013
DRILL RIG: B-61 Mobile Drill Truck
DATUM: Sound Transit East Coordinate System
COORDINATES: N: 543,383.98 E: 1,634,249.54
ELEVATION: 43.63
INCLINATION: -90

DEPTH (Ft)	BORING METHOD	SOIL PROFILE DESCRIPTION	USCS	GRAPHIC LOG	ELEV. / DEPTH (Ft)	SAMPLES NUMBER	TYPE	BLOWS per 6 in (140 lb hammer 30 inch drop)	N	REC / ATT	PENETRATION RESISTANCE BLOWS / ft ◆ (10 20 30 40; PL MC LL; 20 40 60 80)	NOTES WATER LEVELS
90	4.9-inch Diameter Bit, Mud Rotary	38.0 - 93.0 Very dense, gray, (SM), damp, clayey silty fine SAND, some fine to coarse GRAVEL, non-stratified, [TILL, Qvt].	SM			S-21	SS	50/6"	>50	0.5 / 0.5		>>
					-49.4							
		93.0 - 101.5 Very dense, gray, (SM), dry, silty fine to medium SAND, little fine to coarse gravel, non-stratified, [PRE-VASHON FLUVIAL DEPOSITS, Qpnf].			93.0							
95			SM			S-22	SS	31-50/6"	>50	1.0 / 1.0		>> S-22@95ft %G-1.6 %S-68.1 %F-30.3
100						S-23	SS	29-39-41	>50	1.5 / 1.5		>>
					-57.9							
		Boring completed at 101.5 ft. Backfilled with 3/8 inch bentonite chips.			101.5							
105												
110												
115												
120												

1 in to 4 ft
DRILLING CONTRACTOR: Holocene Drilling Inc.
DRILLER: Matt Graham
LOGGED: Chris Smith
CHECKED: D. Findley/ E. Scott
DATE: 5/31/2013

FINAL DESIGN PARTNERS.

ST LOG 11393533 ST PROJECT.GPJ 113.93533SOUND TRANSIT.GDT 14/3/12

FIG. E-18

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STATE HIGHWAY COMMISSION
DEPARTMENT OF HIGHWAYS
LOG OF TEST BORING

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t. No. 90
S.H. No. 2 Section ECB to EUL Job No. Y-826-3
de No. F-27 Station E-N Sta. 394 + 66 Offset 28' Rt. Ground Elev. 16.5'
pe of Boring Hollow Stem Auger Water Table 4' Casing
spector DF Kellum Date 4.26.67 Sheet No. 1 of 1

PTH	BLOWS PER FT.	PROFILE	SAMPLE TUBE NOS.	DESCRIPTION OF MATERIAL
		FILL Tan silty medium SAND		
			S-1	Standard penetration 2.5'-4.0' 5/6" 4/6" 5/6" 1.5' recov.
				~~Tan silty medium SAND, damp~~
5		Brown PEAT		Easy drilling below 4'
				Sand and PEAT in auger return
		?		
		Gray and brown CLAY sand?	S-2	Standard penetration 7.5'-9.0' 6/6" 8/6" 9/6"
				Gray and brown mottled CLAY, peat fragments
10			S-3	2½" Shelby 9.0'-10.3' 1.0' recov. Encl. collapsed
				~~Top silty CLAY ? wet~~
		Brown wet gravelly silty SAND		Bottom gravelly SAND
			S-4	Standard penetration 12.5'-14.0' 9/6" 19/6" 14/6"
				Brown, wet gravelly silty SAND, free water
15		TILL Brown color change Gray silty gravelly SAND		
			S-5	Standard penetration 17.5'-18.0' 55/6"
				Tan well graded silty gravelly SAND. TILL
20				Damp to wet
22.9'			S-6	Standard penetration 22.5'-22.9' 50/5"
		END OF BORING 22.9'		Gray well graded silty gravelly SAND, TILL. Damp

FIG. E-19

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No. 90

S.H. No. 2 Section ECB to EUL Job No. Y-826-3

Ite No. F-45 Station E-N Sta. 394 + 00 Offset 46' Lt. Ground Elev. 12.5'

Type of Boring Washbore Water Table 2.5' Casing

Inspector D.F. Kellum Date 4.24.67 Sheet No. 1 of 1

DEPTH	BLOWS PER FT	PROFILE	SAMPLE TUBE NOS.	DESCRIPTION OF MATERIAL
		silty sandy PEAT	S-1	Standard penetration 0.0'-1.5' 1/6" 1/6" 1/6"
				Dark brown peaty SOIL : silty sandy PEAT, CLAY
		clayey silt SAND	S-2	2½" Shelby 1.0' recov.
				Gray clayey silty SAND
5		Brown saturated silty gravelly SAND	S-3	Standard penetration 5.0'-6.5' 3/6" 8/6" 29/6"
				Brown saturated very silty gravelly SAND
		TILL LIKE		
0		Brown gravelly silty SAND with clean sandy zones	S-4	Standard penetration 10.0'-11.5' 23/6" 25/6" 28/6"
				Brown well graded gravelly very silty SAND TILL-LIKE
5			S-5	Standard penetration 15.0'-15.5' 60/6"
.5				Gray well graded silty gravelly SAND with zone
		END OF BORING 15.5'		clean gravelly sand in bit, water bearing

FIG. E-20

F. F. 26.66 (Rev. 10-64)

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CONTROL SECTION & 1705

F.A.P. No. 90
P.S.H.
S.S.H. No. 2 Section 3RD LAKE WASH. BRIDGE: EAST CHANNEL BRIDGE #12 Job No. L-2058
Hole No. H-5 Station REV 363+85 Offset 84' LT. ℄ Ground Elev. 63.0
Type of Boring AUGER 8C48-B Water Table DRY HOLE Casing AUGER 50.5
Inspector CALVIN LOCKWOOD Date 16-SEPT-1966 Sheet No. 1 of 2

CORWIN PLACE TO EAST CHANNEL BRIDGE

DEPTH	BLOWS PER FT.	PROFILE	SAMPLE TUBE NOS.	DESCRIPTION OF MATERIAL
			↑1	IN YARD - VERY LOOSE TO VERY DENSE BROWN SILTY
	2		1 >	SAND & GRAVEL - ALL GRADES TO 5" DIAMETER
			↓3	(LAYER SILT & EXTREMELY FINE SAND 1.5 TO 2.5)
				#1 - STD. PENETROMETER 0.5-2.5 (0.8 RECOVERY)
5				
			↑17	#2 - STD. PENETROMETER 5.5-7.5 (1.5 RECOVERY)
	70		32 >	
			↓66	
10				
	130/10"		↑31	#3 - STD. PENETROMETER 10.5-11.3 (0.8 RECOVERY)
			↓4"-108	
				VERY DENSE BROWN SLIGHTLY SILTY FINE SAND
15				WITH ALL SIZES GRAVEL SCATTERED THRUOUT
	134		↑34 >	#4 - STD. PENETROMETER 15.5-16.5 (1.0 RECOVERY)
			↓160	
20				#5 - STD. PENETROMETER 20.5-20.8 (POOR RECOVERY - ROCK IN BIT)
	140/4"		X4"-140	VERY DENSE BROWN SLIGHTLY SILTY ALL GRADES
				SAND & GRAVEL WITH OCCASIONAL BOULDERS
25				
	125/3"		X3"-125	#6 - STD. PENETROMETER 25.5-25.7 (0.2 RECOVERY)
30				#7 - STD. PENETROMETER 30.5-31.5 (1.0 RECOVERY)
	138		↑44 >	VERY DENSE BROWN SLIGHTLY SILTY FINE SAND
			↓94	WITH OCCASIONAL PIECE OF ASSORTED SIZES GRAVEL
35				

FIG. E-21

T. F. 26.66 (Rev. 10-64)

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S.R. No. 90
P.S.H.
S.S.H. No. 2 Section 3RD LAKE WASH. BRIDGE & E. CHANNEL-PIER #2 Job No. L-2058
Hole No. H-5 Station REV 363+85 Offset 84' LT. ℄ Ground Elev. 63.0
Type of Boring AUGER Water Table DRY HOLE Casing AUGER 50.5
Inspector CALVIN LOCKWOOD Date 16-SEPT-1966 Sheet No. 2 of 2

CORWIN PLACE TO EAST CHANNEL BRIDGE

DEPTH	BLOWS PER FT.	PROFILE	SAMPLE TUBE NOS.	DESCRIPTION OF MATERIAL
35				
	133		↕ 55 / 78	#8-STD. PENETROMETER 35.5-36.5 (1.0 RECOVERY)
40				
	160		↕ 27 / 50 / 110	#9-STD. PENETROMETER 40.5-42.0 (1.5 RECOVERY)
				(THIS SAMPLE ALMOST DRY & WITH MIXTURE OF ALL GRADES SAND)
45				#10-STD. PENETROMETER 45.5-45.8 (0.3 RECOVERY)
	100/4"		X 4"/100	VERY DENSE BROWN ALL GRADES SAND & FINE & MEDIUM GRAVEL — QUITE CLEAN
50				
	150		↕ 65 / 85	#11-STD. PENETROMETER 50.5-51.5 (1.0 RECOVERY)
55				TOTAL DEPTH DRILLED 51.5
				DRILLING STOPPED AFTER PENETRATING OVER 45 FT. OF VERY GOOD BEARING MATERIAL
				WATER LEVEL: DRY HOLE - CAVED AT ~26.0 FT. UPON AUGER REMOVAL
				SAMPLES DRY TO 14.0, MOIST TO END OF HOLE

FIG. E-21

F. 26.66 (Rev. 10-64)

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CONTROL SECTION: 1705

R. No. 90
S.H.
S.H. No. 2 Section CORWIN PLACE TO EAST CHANNEL BRIDGE 3RD LAKE WASH. BRIDGE: EAST CHANNEL-PIER #11 Job No. L-2058
Hole No. H-6 Station REV 362+33 Offset 83' LT. ℄ Ground Elev. 48.5
Type of Boring AUGER 8C48-8 Water Table -35.0 Casing AUGER 43.5
Inspector CALVIN LOCKWOOD Date 20-SEPT-1966 Sheet No. 1 of 2

DEPTH	BLOWS PER FT.	PROFILE	SAMPLE TUBE NOS.	DESCRIPTION OF MATERIAL
				EDGE OF ROAD - DENSE BROWN SILTY ALL GRADES SAND & GRAVEL FOREIGN FILL MATERIAL
			6	#1 - STD. PENETROMETER 1.5-3.5 (1.4 RECOVERY)
	19		8 11	SLIGHTLY COMPACT BROWN SILT & EXTREMELY FINE
			11	TO FINE SAND WITH ALL GRADES SAND & FINE &
5				MEDIUM GRAVEL THINLY SCATTERED THRUOUT
				#2 - STD. PENETROMETER 6.5-8.5 (1.9 RECOVERY)
			6	COMPACT BROWN SILT & EXTREMELY FINE TO FINE
	26		10 16	SAND WITH TRACE FINE GRAVEL
			21	
10				
				#3 - STD. PENETROMETER 11.5-13.5 (1.9 RECOVERY)
	15		5 10	
	45		22 23	DENSE TO VERY DENSE BROWN ALL GRADES SAND
15				& GRAVEL - QUITE CLEAN TO SLIGHTLY SILTY
			30 70	#4 - STD. PENETROMETER 16.5-17.5 (1.2 RECOVERY)
	100			
20				
	40/10"		40 11.70	#5 - STD. PENETROMETER 21.5-22.1 (1.2 RECOVERY)
			ON BOULDER	VERY DENSE BROWN FINE SAND - QUITE CLEAN
				WITH OCCASIONAL PIECE OF ASSORTED SIZES GRAVEL
25				
			19	#6 - STD. PENETROMETER 26.5-28.2 (1.7 RECOVERY)
	92		30 62	
			2"-50	
30				
			33	#7 - STD. PENETROMETER 31.5-32.7 (1.0 RECOVERY)
	158/8"		58 2"-100	
35				

FIG. E-22

H. F. 26.66 (Rev. 10-64)

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S.R. No. 90
P.S.H.
S.S.H. No. 2 Section CORWIN PLACE TO EAST CHANNEL BRIDGE 3ED LAKE WASH. BRIDGE / EAST CHANNEL PIER #1 Job No. L-2058
Hole No. H-6 Station REV 362+35 Offset 83' Lt. ℄ Ground Elev. 48.5
Type of Boring AUGER Water Table -35.0 Casing AUGER 43.5
Inspector CALVIN LOCKWOOD Date 20-SEPT-1966 Sheet No. 2 of 2

DEPTH 35	BLOWS PER FT.	PROFILE	SAMPLE TUBE NOS.	DESCRIPTION OF MATERIAL
			↑27 60 ↓106	#8-STD. PENETROMETER 36.5-36.0 (1.4 RECOVERY)
	166			
40				
				(APPROXIMATELY 1 FT. CAVE BACK AT 41.5)
	116/6"		↑116	#9-STD. PENETROMETER 41.5-42.0 (0.5 RECOVERY)
			↑67 ↓102	VERY DENSE BROWN ALL GRADES SAND & FINE & MEDIUM GRAVEL
45	169			#10-STD. PENETROMETER 43.5-44.5 (1.0 RECOVERY)
				TOTAL DEPTH DRILLED 44.5
				DRILLING STOPPED WITH OVER 30 FT. VERY DENSE MATERIAL
				DRY HOLE TO 35.0 - THEN WET - HOLE CAVED AT -26.0 UPON AUGER REMOVAL
				SAMPLES DRY TO 6.0, MOIST TO WET 6.0 TO 12.5, MOIST 12.5 TO 35.0, WET 35.0 TO 44.5
				2" GALVANIZED PIPE & ELECTRIC FLEXIBLE CONDUIT ON WEST EDGE OF HOLE
				AUGER HIT LARGE BOULDER AT 43.5 - UNABLE TO CUT THROUGH

FIG. E-22

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P.S.H.
F.A.H. No. 2 Section 3RD LAKE WN. BRIDGE: EAST CHANNEL-PIER #10 Job No. L-2058
Hole No. H-7 Station REV 360+46 Offset 108' RT. ℄ Ground Elev. 51.2
Type of Boring AUGER BCAS-8 Water Table -52.0 Casing AUGER 66.0
Inspector CALVIN LOCKWOOD Date 21-SEPT-1966 Sheet No. 1 of 2

CORWIN PLACE TO EAST CHANNEL BRIDGE

DEPTH	BLOWS PER FT.	PROFILE	SAMPLE TUBE NOS.	DESCRIPTION OF MATERIAL
	9		4 4 5 5	EDGE OF ROADWAY EMBANKMENT - FOREIGN FILL MATERIAL - LOOSE BROWN ALL GRADES SAND & GRAVEL WITH OCCASIONAL BOULDERS (SEE SAMPLES)
				#1 - STD. PENETROMETER 0.0 - 2.0 (1.0 RECOVERY)
5				
	18		4 7 11 11	#2 - STD. PENETROMETER 6.0 - 8.0 (1.9 RECOVERY) SLIGHTLY COMPACT TO COMPACT GREY SILTY ALL GRADES SAND & FINE & MEDIUM GRAVEL
10				
	22		9 9 13 11	#3 - STD. PENETROMETER 11.0 - 13.0 (1.6 RECOVERY)
15				
	31		9 17 14 13	#4 - STD. PENETROMETER 16.0 - 18.0 (1.0 RECOVERY)
20				
	29		14 13 14 16	#5 - STD. PENETROMETER 21.0 - 23.0 (1.5 RECOVERY)
25				
	20		6 8 12 10	#6 - STD. PENETROMETER 26.0 - 28.0 (1.4 RECOVERY)
30				STIFF BROWN SILT WITH SMALL AMOUNT FINE & MEDIUM GRAVEL THINLY SCATTERED THRUOUT
	12		4 5 7 9	#7 - STD. PENETROMETER 31.0 - 33.0 (1.5 RECOVERY)
35				

FIG. E-23

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S.R. No. 90
P.S.H. ~~S.H.~~ No. 2 Section 3RD LAKE WASH. BRIDGE & E. CHANNEL PIER #10 Job No. L-2058
Hole No. H-7 Station REV 360+46 Offset 108' RT. ℄ Ground Elev. 51.2
Type of Boring AUGER Water Table -52.0 Casing AUGER 66.0
Inspector CALVIN LOCKWOOD Date 21-SEPT-1966 Sheet No. 2 of 2

DEPTH	BLOWS PER FT.	PROFILE	SAMPLE TUBE NOS.	DESCRIPTION OF MATERIAL
~~35~~				COMPACT MIXED BROWN & GREY SILTY ALL GRADES
	34		11 16 18 20	SAND & GRAVEL
				#8 - STD. PENETROMETER 36.0-38.0 (1.6 RECOVERY)
40				
	110		56 54	#9 - STD. PENETROMETER 41.0-42.0 (0.9 RECOVERY) (THIS SAMPLE ALL BROWN)
45				(WATER AT 45.0)
				VERY DENSE BROWN SLIGHTLY SILTY EXTREMELY FINE
	126		30 96	TO FINE SAND WITH OCCASIONAL PIECE OF FINE OR MEDIUM GRAVEL
				#10 - STD. PENETROMETER 46.0-47.0 (1.0 RECOVERY)
50				
	124		19 34 90	#11 - STD. PENETROMETER 51.0-52.5 (1.5 RECOVERY)
55				
				(1.5 FT. CAVEBACK IN AUGER AT 56.0)
	124		44 80	#12 - STD. PENETROMETER 56.0-57.0 (0.7 RECOVERY)
				WATER LEVEL: -52.0 TAKEN IMMEDIATELY WITH AUGER IN PLACE - HOLE CAVED -39.0 UPON AUGER REMOVAL
60				
	144/10"		27 64 4"-80	#13 - STD. PENETROMETER 61.0-62.3 (1.1 RECOVERY)
				SAMPLES DRY TO 5.0, MOIST 5.0 TO 45.0, WET THEREON
65				
	132		38 94	#14 - STD. PENETROMETER 66.0-67.0 (1.0 RECOVERY)
				TOTAL DEPTH DRILLED 67.0
				DRILLING STOPPED UPON PENETRATING 20 FT. OR VERY DENSE
70				BEARING MATERIAL & REACHING BEYOND LAKE LEVEL

FIG. E-23

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S.R. No. 90 3RD. LAKE WASH. BR. EAST CHANNEL
P.S.H.
~~S.H.~~ No. 2 Section CORWIN PLACE TO EAST CHANNEL BR. Job No. L-2058
Hole No. H-12 Station REV. 359 +16 Pier No. 9 Offset 94' RT. ℄ Ground Elev. 10.5
Type of Boring WASH BORE & ROTARY Water Table 2'6" BELOW GR. Casing 3"X 20'
Inspector E.E. DUVALL Date 18 OCT. 1966 Sheet No. 1 of 2

DEPTH	BLOWS PER FT.	PROFILE	SAMPLE TUBE NOS.	DESCRIPTION OF MATERIAL
				0' TO 3' SLIGHTLY COMPACT BROWN FINE TO COARSE SANDY ALL SIZES GRAVEL TO 6" BOULDERS SLIGHTLY SILTY - DRY
			8 8 9 = 17	D-1 PENETROMETER 3'6" TO 5'6" RECOVERY 1'9"
5	17			
			15	3' TO 10' COMPACT TO DENSE BROWN FINE TO COARSE SILTY SAND WITH ALL SIZE OF GRAVEL - WET
10				D-2 PENETROMETER 10'6" TO 12'6" RECOVERY 1'8"
			19 24 26 = 104	
	50			10' TO 12' DENSE BROWN EXTREMELY FINE SILTY SAND DAMP ~ LAYERED WITH FINE TO COARSE BROWN SAND WITH FINE GRAVEL WET
15				D-3 PENETROMETER 15' TO 15'11" RECOVERY 3"
	196/11"		96 100	12' TO 18' VERY DENSE BROWN FINE SILTY SAND WITH SCATTERED MEDIUM & COARSE SAND & FINE TO COARSE GRAVEL SCATTERED IN MATERIAL DAMP
20				D-4 PENETROMETER 20' TO 20'6" RECOVERY 6"
	175/6"		175	18' TO 28' VERY DENSE BROWN & GREY WITH SMALL AMOUNT RUST BROWN FINE SILTY SAND WITH FEW MEDIUM & COARSE SAND SCATTERED OCCASIONAL PIECE GRAVEL ALL SIZES SCATTERED IN MATERIAL ~ DAMP
25				
			29 86 50	D-5 PENETROMETER 25'6" TO 26'3" RECOVERY 1'
	136/8"			28' TO 31' VERY DENSE BROWN FINE TO MEDIUM SOME COARSE SILTY SAND WITH OCCASIONAL PIECE SCATTERED GRAVEL ~ DAMP
30				
			15 43 104	D-6 PENETROMETER 30' TO 31'6" RECOVERY 1'
	147			31' TO 33' VERY DENSE BROWN FINE TO COARSE SANDY GRAVEL SLIGHTLY SILTY WET
35				

FIG. E-24

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P.S.H.
S.S.H. No. 2 Section CORWIN PLACE TO EAST CHANNEL BR. Job No. L-2058
Hole No. H-12 Station REV. 359+16 PIER No. 9 Offset 94' RT. ℄ Ground Elev. 10.5
Type of Boring WASH BORE & ROTARY Water Table 2'6" BELOW GR. Casing 3"x 20'
Inspector E.E. DUVALL Date 18 OCT. 1966 Sheet No. 2 of 2

DEPTH	BLOWS PER FT.	PROFILE	SAMPLE TUBE NOS.	DESCRIPTION OF MATERIAL
				D-7 PENETROMETER 37' TO 38'3" RECOVERY 0
			31 60 63	
	123/9"			
40				D-8 PENETROMETER 40' TO 41' RECOVERY 6"
	151		59 92	
				33' TO 44'4" VERY DENSE BROWN FINE TO COARSE SAND SLIGHTLY SILTY WITH OCCASIONAL THIN SILT LENS & TRACE OF SCATTERED FINE GRAVEL DAMP
45	120/4"		X 120	
				D-9 PENETROMETER 44' TO 44'4" RECOVERY 0
				STOPPED HOLE AT 44'4"
				WATER TABLE 2'6" BELOW GROUND WITH 20' CASING AFTER PULLING CASING WATER TABLE SAME

FIG. E-24

H. F. 26.66 (Rev. 10-64)

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P.S.H.
S.S.H. No. 2 — Section CORWIN PLACE TO EAST CHANNEL B.R. — Job No. L-2058
Hole No. H-14 — Station REV. 336+74 PER No. 6 — Offset 9' LT. & — Ground Elev. -23.5
Type of Boring WASH BORE & ROTARY — Water Table HOLE DRILLED IN LAKE — Casing 3"x65' IN GR. 32'
Inspector E. E. DUVALL & C. R. LOCKWOOD — Date OCT. 6 1966 — Sheet No. 1 of 2

DEPTH	BLOWS PER FT.	PROFILE	SAMPLE TUBE NOS.	DESCRIPTION OF MATERIAL
	3		1 / 1 / 2 / 2	D-1 PENETROMETER 0'TO 2' RECOVERY 8" SURFACE HAS SCATTERED ALL SIZES GRAVEL WITH OCCASIONAL BOULDER - INFORMATION FROM SKIN DIVER
5				0'TO 1' VERY LOOSE PEA GRAVEL WITH SILT & SAND SATURATED
				D-2 PENETROMETER 7'TO 9' RECOVERY 1'9"
	58		23 / 26 / 32 / 32	1'TO 4' LOOSE BROWN SILT & SAND WITH SCATTERED ALL SIZES GRAVEL - SATURATED
10				4'TO 5' SAME - COMPACT & DAMP
				5'TO 6'6" DENSE GREY CLAYEY SILT WITH SAND & SCATTERED ALL SIZES GRAVEL - DAMP
	43		23 / 16 / 27 / 33	D-3 PENETROMETER 12'TO 14' RECOVERY 1'6" 11'4" HIT 4"TO 5" BOULDER
15				17' HIT 3"TO 4" PIECE GRAVEL
				6'6"TO 11' DENSE BROWN EXTREMELY FINE TO FINE SILTY SAND WITH SOME MED. & COARSE SAND ALL SIZES OF GRAVEL SCATTERED THRUOUT WITH
	81		36 / 35 / 46 / 100/4"	OCCASIONAL BOULDER - DAMP
20				D-4 PENETROMETER 18'TO 19'10" RECOVERY 6" RECOVERY 6" WASH
25	113		23 / 46 / 67 / 87	D-5 PENETROMETER 24'TO 26' RECOVERY 1'6" 11'TO 42'9" DENSE TO VERY DENSE GREY EXTREMELY FINE TO FINE SILTY SAND WITH SOME MED. & COARSE SAND ALL SIZES GRAVEL SCATTERED THRUOUT WITH OCCASIONAL
30				BOULDER - DAMP
	180/8"		90 / 90/2"	D-6 PENETROMETER 30'TO 30'8" RECOVERY 8"
35				

FIG. E-25

H. F. 26.66 (Rev. 10-64)

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LOG OF TEST BORING

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P.S.H.
~~S.S.H.~~ No. 2 Section CORWIN PLACE TO EAST CHANNEL BR. Job No. L-2058
Hole No. H-14 Station REV. 336+74 PIER No. 6 Offset 9' LT. & Ground Elev. -23.5
Type of Boring WASH BORE & ROTARY Water Table HOLE DRILLED IN LAKE Casing 3"X65' IN GR. 32'
Inspector E.E. DUVALL & C.R. LOCKWOOD Date OCT. 6, 1966 Sheet No. 2 of 2

DEPTH	BLOWS PER FT.	PROFILE	SAMPLE TUBE NOS.	DESCRIPTION OF MATERIAL
	140/7"		80 60/1"	D-7 PENETROMETER 36'TO 36'7" RECOVERY 0
40				
~~35~~	130/6"		130	D-8 PENETROMETER 42'3" TO 42'9" RECOVERY 6"
45				STOPPED HOLE 42'9"
				WATER DEPTH 30'6"
				TOP WATER ELEV. +7.0

FIG. E-25

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P.S.H.
~~S.S.H.~~ No. 2 Section CORWIN PLACE TO EAST CHANNEL BR. Job No. L-2058
Hole No. H-15 Station REV. 339+78 PER No. 7 Offset 17' LT. ℄ Ground Elev. -27.0
Type of Boring WASH BORE & ROTARY Water Table HOLE DRILLED IN LAKE Casing 8" X 70.5
Inspector E.E. DUVALL & C.R. LOCKWOOD Date OCT. 11, 1966 Sheet No. 1 of 2

DEPTH	BLOWS PER FT.	PROFILE	SAMPLE TUBE NOS.	DESCRIPTION OF MATERIAL
	10		3 / 4	D-1 PENETROMETER 0' TO 2' RECOVERY 2
	40		21 / 19	0' TO 1' STIFF GREY CLAYEY SILT WITH SMALL AMOUNT OF VERY FINE SAND
5	65		34 / 33	D-2 PENETROMETER 4' TO 6' RECOVERY 1'6"
			32 / 42	1' TO 18' DENSE TO VERY DENSE GREY SILTY EXTREMELY FINE TO FINE SAND WITH SMALL AMOUNT ASSORTED SIZE SAND ALL SIZES GRAVEL SCATTERED THRUOUT WITH OCCASIONAL BOULDER
10	122		46 / 46 / 76	D-3 PENETROMETER 9' TO 10'6" RECOVERY 1'
				12' HIT 4" TO 6" BOULDER
15	185/3"		X 185	D-4 PENETROMETER 14' TO 14'3" RECOVERY 3"
				18' TO 22'6" VERY DENSE BROWN FINE TO COARSE SAND SLIGHTLY SILTY WITH SCATTERED ALL SIZES GRAVEL THRUOUT
20			14	D-5 PENETROMETER 19'6" TO 20'8" RECOVERY 2"
	111/8"		61 / 50/2"	22'6" TO VERY DENSE GREY SILTY EXTREMELY FINE TO FINE SAND WITH SMALL AMOUNT ASSORTED SIZE SAND ALL SIZES GRAVEL SCATTERED THRUOUT WITH OCCASIONAL BOULDER
25	147/6"		147	D-6 PENETROMETER 24'6" TO 25' RECOVERY 6"
				D-6 RECOVERY 6" WASH 24' SAME MATERIAL - BUT CONTAINS MORE GRAVEL
30	165/6"		165	D-7 PENETROMETER 29'6" TO 30' RECOVERY 0
				(MOSTLY FINE SAND THIS SAMPLE AREA)
35	160/5"		S-4160	D-8 PENETROMETER 34.0-34.4 (0.4 RECOVERY) PS

FIG. E-26

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P.S.H.
~~S.B.H.~~ No. 2 Section CORWIN PLACE TO EAST CHANNEL BRIDGE 3RD LAKE WASH. BRIDGE: EAST CHANNEL-PIER #7 Job No. L-2058
Hole No. H-15 Station REV 339+78 21C55-4 Offset 17' Lt. ℄ Ground Elev. -27.0
Type of Boring WASH BORE & ROTARY Water Table LAKE LEVEL ±7.0 Casing 3" 70.5
Inspector E.E. DUVALL & C. LOCKWOOD Date OCT-11-1966 Sheet No. 2 of 2

DEPTH 35	BLOWS PER FT.	PROFILE	SAMPLE TUBE NOS.	DESCRIPTION OF MATERIAL
				(34.5 TO 40.0 WITH GRAVEL SCATTERED THRU OUT)
40				
	150/5"		S5"-150	#9-STD. PENETROMETER 40.0-40.4 (0.4 RECOVERY)
				(SMALL AMOUNT GRAVEL 43.0 TO 46.0)
45				
46.4	180/5"		S5"-180	#10-STD. PENETROMETER 46.0-46.4 (0.4 RECOVERY)
				TOTAL DEPTH DRILLED 46.4
50				

FIG. E-26

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P.S.H.
~~S.S.H.~~ No. 2 Section CORWIN PLACE TO EAST CHANNEL BR. Job No. L-2058
Hole No. H-16 Station REV. 342+75 PIER No. 8 Offset ℄ Ground Elev. -5.0
Type of Boring WASH BORE & ROTARY Water Table HOLE DRILLED IN LAKE Casing 3"X40' IN GR. 26
Inspector E. E. DUVALL & C. R. LOCKWOOD Date OCT. 13, 1966 Sheet No. 1 of 2

DEPTH	BLOWS PER FT.	PROFILE	SAMPLE TUBE NOS.	DESCRIPTION OF MATERIAL
	4		2 2 2 4	D-1 PENETROMETER 0' TO 2' RECOVERY 1" 0' TO 3' LOOSE GREY FINE SANDY SILT WITH SCATTERED FINE GRAVEL - SATURATED
5				D-2 PENETROMETER 5'4" TO 7'4" RECOVERY 1'6"
	37		23 20 17 20	3' TO 9'6" COMPACT BROWN FINE TO COARSE SILTY SAND WITH FINE TO MED. GRAVEL SCATTERED THRUOUT - WET LOST ALL WATER 0' TO 9'6" 9'6" TO 56'11" LOST VERY SMALL AMOUNT WATER
10				D-3 PENETROMETER 10'4" TO 10'10" RECOVERY 10"
	109/6"		100	9'6" TO 18' VERY DENSE BROWN FINE TO COARSE SILTY SAND WITH ALL SIZES GRAVEL SCATTERED THRUOUT - DAMP
15				
	115		25 90	D-4 PENETROMETER 16' TO 17' RECOVERY 9" 18' TO 23'6" VERY DENSE BROWN VERY FINE SAND LAYERED WITH VERY FINE SAND WITH ALL GRADES GRAVEL
20				
	145/9"		27 65 80/3"	D-5 PENETROMETER 21' TO 22'3" RECOVERY 1'2" 23'6" TO 40' VERY DENSE GREY SILTY VERY FINE SAND WITH SCATTERED FINE & SMALL AMOUNT COARSE SAND & FINE TO MED. WITH OCCASIONAL COARSE GRAVEL THINLY SCATTERED THRUOUT
25				
	154/9"		54 100/3"	D-6 PENETROMETER 26' TO 26'9" RECOVERY 6"
30				
	162/9"		62 100/3"	D-7 PENETROMETER 30'7" TO 31'4" RECOVERY 6"
35				

FIG. E-27

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P.S.H.
~~S.S.H.~~ No. 2 Section CORWIN PLACE TO EAST CHANNEL BR Job No. L-3058
Hole No. H-16 Station REV. 342+75 PIER No. 8 Offset & Ground Elev. -5.0
Type of Boring WASH BORE & ROTARY Water Table HOLE IN LAKE DRILLED Casing 3"x40' IN GR. 26'
Inspector E.E. DUVALL & C.R. LOCKWOOD Date OCT. 13, 1966 Sheet No. 2 of 2

DEPTH	BLOWS PER FT.	PROFILE	SAMPLE TUBE NOS.	DESCRIPTION OF MATERIAL
	115/6"		X 115	D-8 PENETROMETER 36'6" TO 37' RECOVERY 0
40				
				D-9 PENETROMETER 41' TO 42'6" RECOVERY 0
	166		↑ 12 ↓ 45 121	
45				
				D-10 PENETROMETER 46' TO 46'11" RECOVERY 8"
	100/5"		↕ 56 100/5"	40' TO 56'11" NEAR THE SAME MATERIAL VERY DENSE GREY EXTREMELY FINE TO FINE SILT SAND WITH MORE MED. & COARSE SAND & FINE TO MED. WITH OCCASIONAL COARSE PIECE OF GRAVEL SCATTERED THRUOUT ~ DAMP
50				
55				
				D-11 PENETROMETER 56' TO 56'11" RECOVERY 9"
	100/5"		↕ 76 100/5"	
				STOPPED HOLE 56'11"
				WATER DEPTH 12'
				TOP WATER ELEV. +7.0
				AT 26' WHEN USEING ROTARY WE TURNED OFF LAST 5' OF CASING & LEFT IN HOLE

FIG. E-27

H. F. 23.66 ( ). 10-64)

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S.R. No. 90 3RD. LAKE WASH. BR. EAST CHANNEL
P.S.H.
~~S.S.H.~~ No. 2 Section CORWIN PLACE TO EAST CHANNEL BR. Job No. L-2058
Hole No. H-20 Station REV. 360+19 PIER # 10 Offset 48' RT. REV. ℄ Ground Elev. 29.3
Type of Boring WASH BORE Water Table 17'6" BELOW GROUND Casing 3" X 40'
Inspector E.E. DUVALL Date APRIL 25, 1967 Sheet No. 1 of 2

DEPTH	BLOWS PER FT.	PROFILE	SAMPLE TUBE NOS.	DESCRIPTION OF MATERIAL
	5		3 3 STD. PEN. 1 2 1	TOP SOIL - LOOSE DARK BROWN SANDY SILT, SCATTERED FINE GRAVEL
				SANDY SILT - VERY LOOSE, RUST BROWN, SCATTERED ROOTS, WOOD & PIECES FINE GRAVEL, DAMP
5	58		19 90 STD. PEN. 28 40 2	GRAVEL - DENSE, SANDY FINE TO COARSE, GRAYISH BROWN SILT BINDER, 0" TO 1" GRAVEL WITH OCCASIONAL LARGER PIECE, GRAVEL TIGHTLY PLACED, SCATTERED SAND LAYERS 4" TO 6", DAMP
10				
	65		24 31 STD. PEN. 34 43 3	SAND - VERY DENSE, BROWN, FINE TO MEDIUM, DAMP
15				SAND - VERY DENSE, BROWN, FINE TO MEDIUM, WITH SCATTERED COARSE SAND, SILTY, SCATTERED PIECES
	200/7"		100 100/1" STD. PEN. 4	FINE GRAVEL, DAMP
20				SANDY GRAVEL - VERY DENSE, BROWN, FINE GRAVEL, FINE TO COARSE SAND, SLIGHTLY SILTY, QUITE DAMP
	144/8"		61 94 STD. PEN. 50/2" 5	
				SAND - VERY DENSE, BROWN, FINE TO COARSE, SCATTERED PEA GRAVEL, SLIGHTLY SILTY, DAMP
25				
	150		25 60 STD. PEN. 90 88/3" 6	
				SAND - VERY DENSE, BROWN, FINE TO MEDIUM, WITH
30				SCATTERED COARSE, SILT BINDER, SCATTERED PIECES -

FIG. E-28

H. F. 25.66 (. 10-64)

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P.S.H.
S.S.H. No. 2 Section CORWIN PLACE TO EAST CHANNEL BR. Job No. L-2058
Hole No. H-30 Station REV. 360+79 Pier # 10 Offset 48' RT. REV. ℄ Ground Elev. -29.3
Type of Boring WASH BORE Water Table 17'6" BELOW GR. Casing 8"X 40'
Inspector E. E. DUVALL Date APRIL 25, 67 Sheet No. 2 of 2

DEPTH	BLOWS PER FT.	PROFILE	SAMPLE TUBE NOS.	DESCRIPTION OF MATERIAL
	144/6"		77 144 STD. PEN. 7	FINE GRAVEL, SLIGHTLY, DAMP
				SAND - SAME AS 23' TO 29'6" (23 / 29'6")
				SAND - VERY DENSE, BROWN, FINE TO COARSE,
35				SILT BINDER, SCATTERED FINE GRAVEL, DAMP
	166/6"		166 STD. PEN. 8	
40				
	260/6"		50 260 STD. PEN. 9	TEST BORING STOPPED 41'-0"
				WATER TABLE - 17'6" BELOW GROUND
				WITH 40' CASING, AFTER PULLING CASING
				WATER TABLE 17'6" BELOW GROUND

FIG. E-28

H. F. 26.66 (Rev. 10-64)

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S.R. No. 90
P.S.H.
~~S.S.H.~~ No. 2 Section 3RD LAKE WASH. BRIDGE: EAST CHANNEL: PIER #10 Job No. L-2058
Hole No. H-24 Station REV 360+75 Offset 72' LT. ℄ Ground Elev. 38.0
Type of Boring AUGER 8C48-8 Water Table HOLE CAVED Casing AUGER 54.0
Inspector CALVIN LOCKWOOD Date 26-APRIL-1967 Sheet No. 1 of 2

CORWIN PLACE TO EAST CHANNEL BRIDGE C.S. 1705

DEPTH	BLOWS PER FT.	PROFILE	SAMPLE TUBE NOS.	DESCRIPTION OF MATERIAL
	26		18 / 16 STD. PEN. 1 — 10 / 10	IN DRIVEWAY — SILTY SAND & GRAVEL — COMPACT, BROWN, ALL GRADES SAND & FINE & MEDIUM GRAVEL
	26		8 / 8 STD. PEN. 2 — 18 / 18	
5				
	39		16 / 18 STD. PEN. 3 — 21 / 28	
10				SAND — DENSE, BROWN, SLIGHTLY SILTY, FINE — WITH TRACE FINE & MEDIUM GRAVEL
15	100/5"		5" / 100 STD. PEN. 4	SAND & GRAVEL — VERY DENSE, BROWN, ALL GRADES SAND, & GRAVEL UP TO COBBLE SIZE (14.0 – 14.4 — NO RECOVERY — ROCK IN BIT)
				SAND — VERY DENSE, BROWN, FINE — WITH OCCASIONAL PIECE FINE OR MEDIUM GRAVEL — CLEAN
20	140/10"		40 / 42 / 100 STD. PEN. 5	19.0 – 19.8
25	120/3"		3" / 120 STD. PEN. 6	SAND & GRAVEL — VERY DENSE, BROWN, ALL GRADES SAND & GRAVEL UP TO COBBLE SIZE (POOR RECOVERY)
30	100/6"		100 STD. PEN. 7	SAND — VERY DENSE, BROWN, FINE — WITH OCCASIONAL PIECE FINE OR MEDIUM GRAVEL — CLEAN

FIG. E-29

(Rev. 10-64)

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S.R. No. 90
P.S.H.
~~S.C.H.~~ No. 2 Section 3RD LK. WASH. BRIDGE: EAST CHANNEL - PIER #10 Job No. L-2058
Hole No. H-24 Station REV 360+75 Offset 72' LT. ℄ Ground Elev. 38.0
Type of Boring AUGER Water Table HOLE CAVED Casing AUGER 54.0
Inspector CALVIN LOCKWOOD Date 26-APRIL-1967 Sheet No. 2 of 2

CORWIN PLACE TO EAST CHANNEL BRIDGE

DEPTH	BLOWS PER FT.	PROFILE	SAMPLE TUBE NOS.	DESCRIPTION OF MATERIAL
30				
				SILTY SAND & GRAVEL — VERY DENSE, BROWN, ALL GRADE
				SAND, & FINE & MEDIUM GRAVEL
35	144/8"		84 21'60 STD. PEN. 8 34.0-34.7	
	50/0"		80 X STD. PEN. 5	(ATTEMPTED DRIVE — NO RECOVERY — REFUSAL)
40				
	96/6"		96 STD. PEN. 10	— POOR RECOVERY — (2 ATTEMPTS TO MAKE RECOVERY)
45				
50	118		42 76 STD. PEN. 11	
55	132		38 94 STD. PEN. 13	TEST BORING STOPPED AT 55.0
				HOLE CAVED AT -6.0 UPON AUGER REMOVAL — DRY TO THERE
				WATER CAME IN TO HOLE AT -29.0 WHILE DRILLING
				SAMPLES MOIST THROUGHOUT HOLE

FIG. E-29

H. F. 26.66 (Rev. 10-64)

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S.R. No. 90 3RD. LAKE WASH. BR. EAST CHANNEL
P.S.H.
S.~~S.H.~~ No. 2 Section CORWIN PLACE TO EAST CHANNEL BR. Job No. 1-2058
Hole No. H-33 Station REV. 326+67 PIER No. 1 Offset 150' LT. ℄ Ground Elev. 47.0
Type of Boring WASH BORE & ROTARY Water Table ELEV. 43.0 Casing 3"X 40'
Inspector E. E. DUVALL Date MAY 18, 1967 Sheet No. 1 of 2
Copy to C.S. 1705

DEPTH	BLOWS PER FT.	PROFILE	SAMPLE TUBE NOS.	DESCRIPTION OF MATERIAL
			4	SURFACE- DRIVE WAY, BLACK TOP & GRAVEL
	12		5 7 STD. PEN. 7 1	CLAYEY SILT- SLIGHTLY COMPACT, BROWN & GRAY, TRACE SAND & FINE GRAVEL, DAMP
5				SILTY GRAVELY SAND - COMPACT BROWN, FINE TO
	35		13 17 STD. PEN. 18 19 2	COARSE SAND, GRAVEL UP TO 2", DAMP
				CLAYEY SILT - COMPACT BROWN, SCATTERED SAND, TRACE FINE GRAVEL, DAMP
10				
	36		11 16 STD. PEN. 20 18 3	SANDY SILT & SILT - COMPACT GRAY, EXTREMELY FINE SANDY SILT & EXTREMELY FINE SAND, SLIGHTLY CLAYEY SLIGHT TRACE FINE GRAVEL, DAMP
15				
	28		10 11 STD. PEN. 17 26 4	
	37		12 18 STD. PEN. 19 33 5	SAND - SILTY, COMPACT GRAY, FINE TO COARSE, DAMP
20				SANDY SILT - COMPACT GRAY, EXTREMELY FINE, LAYERED WITH EXTREMELY FINE SAND, SOME SCATTERED COARSE SAND, SCATTERED PIECES FINE GRAVEL, OCCASIONAL PIECE TO 2", SLIGHTLY CLAYEY, DAMP
25	38		11 16 STD. PEN. 22 24 6	
30				

FIG. E-30

H. F. 26.66 (Rev. 10-64)

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S.R. No. 90 3RD. LAKE WASH. BR. EAST CHANNEL C.S. 1705
P.S.H.
~~S.S.H.~~ No. 2 Section CORWIN PLACE TO EAST CHANNEL BR. Job No. L-2058
Hole No. H-33 Station REV. 326+67 PIER No. 1 Offset 150' LT. E Ground Elev. 47.0
Type of Boring WASH BORE & ROTARY Water Table ELEV. 43.0 Casing 3" X 40'
Inspector E.E. DUVALL Date MAY 18, 1967 Sheet No. 2 of 2

DEPTH	BLOWS PER FT.	PROFILE	SAMPLE TUBE NOS.	DESCRIPTION OF MATERIAL
	33		12 STD. 12 PEN. 21 32 7	
35	96 95/6"		11 STD. 16 PEN. 20 95 8	SANDY SILT- VERY DENSE, GRAY, FINE, SLIGHTLY CLAYEY, OCCASIONAL SCATTERED FINE GRAVEL, DAMP
				SAND - VERY DENSE, GRAY, FINE TO MEDIUM WITH SCATTERED COARSE, SCATTERED PIECES FINE
40	135		24 STD. 60 PEN. 75 9	GRAVEL, SILTY, DAMP
				SILTY SAND - VERY DENSE GRAY, EXTREMELY FINE TO FINE, OCCASIONAL SCATTERED FINE GRAVEL, DAMP
45				
	92		29 STD. 38 PEN. 54 75 10	
50				
			35 STD. 96 PEN. 67 11	SANDY GRAVEL - FINE, VERY DENSE, GRAY, SILTY DAMP
	113			
				SILT - VERY DENSE GRAY, OCCASIONAL PIECE
55				FINE GRAVEL, DAMP
			STD. PEN. 76 120 12	
	120/5"			
60				TEST BORING STOPPED AT 60'-0"

FIG. E-30

H. F. 26.66 (Rev. 5-67)

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S.H. ____ S.R. 90 Section Lake Washington East Channel Bridge Job No. L-2058
Hole No. H-34 Sub Section Pier #3 Cont. Sec. 1705-U
Station ~~331+34~~ 331+70.5 Offset 140' Lt. ℄ Ground El. -20'
Type of Boring Wash Bore - Rotate Casing NX3" 21.0' W.T. El. 9.1'
Inspector Donald L. Nebgen Date June 26, 1969 Sheet 1 of 2

DEPTH	BLOWS PER FT.	PROFILE	SAMPLE TUBE NOS.	DESCRIPTION OF MATERIAL
	1		1 Std. Pen	SAND & GRAVEL - slightly silty - fine to coarse - brown - very loose
	13		5 8 1	GRAVELLY SAND - very silty fine to coarse - gray
				slightly compact to dense
5				GRAVELLY SAND - very silty fine to coarse
	~~104~~		33 49 55 Std. Pen 2	light brown - very dense
10				slightly less silt 10.0' to 14.0'
	~~90~~		27 42 48 Std. Pen 3	
15				GRAVELLY SAND - Very silty fine to coarse
	131		60 71 Std. Pen 4	Gray - very dense (Sandy till)
20				

FIG. E-31

F. 26.66-A (Rev. 5-67)

Hole No. H-34 Sub Section East Channel Bridge Pier #3 Sheet 2 of 2

DEPTH	BLOWS PER FT.	PROFILE	SAMPLE TUBE NOS.	DESCRIPTION OF MATERIAL
	110/10"		50 Std. 60/4" Pen 5	
25				
	124		43 Std. 81 Pen 6	
30				
	81		26 Std. 30 Pen 51 7	
35				
	140		56 Std. 84 Pen 8	
40				
	119		54 Std. 65 Pen 9	TEST BORING STOPPED AT 42.0'
45				

FIG. E-31

H. F. 26.66 (Rev. 5-67)

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LOG OF TEST BORING

S.H. ____ S.R. 90 Section Lake Washington East Channel Bridge Job No. L-2058
Hole No. H-36 Sub Section Pier #4 Cont. Sec. 1705
Station 333+66 ~~333+65.5~~ Offset ~~85'~~ 125' Lt. ℄ Ground El. -10.4'
Type of Boring Wash. Bore & Rotary Casing NX3" 18.0' W.T. El. 9.1'
Inspector Donald L. Nebgen Date July 1, 1969 Sheet 1 of 2

DEPTH	BLOWS PER FT.	PROFILE	SAMPLE TUBE NOS.	DESCRIPTION OF MATERIAL
				SAND & GRAVEL - slightly silty fine to coarse
				Brown - loose
			16 Std.	
	34		18 Pen	GRAVELLY SAND - Very silty fine to coarse with
			16	
			17 ▽1	scattered cobbles - brown - compact to dense
5				
			25 Std.	
	36		20 Pen	
			16	
			18 ▽2	
10				
			26 Std.	
	68		31 Pen	
			37 ▽3	
15				
				GRAVELLY SAND - very silty fine to coarse
	95/6"		95 Std. Pen	Gray - very dense (Sandy till)
			4	
20				

FIG. E-32

F. 26.66-A (Rev. 5-67)

Hole No. H-36 Sub Section East Channel Bridge Pier #4 Sheet 2 of 2

DEPTH	BLOWS PER FT.	PROFILE	SAMPLE TUBE NOS.	DESCRIPTION OF MATERIAL
			31 ↑ Std.	
			65 ↓ Pen	
25	115/10"		50/4" 5	
			65 ↑ Std.	
			50/3" ↓ Pen	
30	115/9"		6	
			70 ↑ Std.	
			50/3" ↓ Pen	
35	120/9"		7	
	133		62 ↑ Std.	
			71 ↓ Pen	
40			8	
			↑ Std.	
			124 Pen	
45	124		9	TEST BORING STOPPED AT 45.0'

FIG. E-32

H. F. 26.66 (Rev. 5-67)

WASHINGTON
STATE HIGHWAY COMMISSION
DEPARTMENT OF HIGHWAYS

LOG OF TEST BORING

Original to Materials Engineer
Copy to Bridge Engineer
Copy to District Engineer
Copy to _____

S.H. _____ S.R. 90 Section Lake Washington East Channel Bridges Job No. L-2058
Hole No. H-38 Sub Section Pier #8 Cont. Sec. 1705-U
Station 359+22 Offset 105' Lt. ℄ Reverse Lanes Ground El. 19.1'
Type of Boring Wash Bore Casing NX3" 45.0' W.T. El. 10.6'
Inspector Donald L. Nebgen Date July 11, 1969 Sheet 1 of 3

DEPTH	BLOWS PER FT.	PROFILE	SAMPLE TUBE NOS.	DESCRIPTION OF MATERIAL
	12		4 Std. Pen 1	SAND & GRAVEL - silty fine to coarse with organic material - brown - slightly compact
5				SAND & GRAVEL - silty fine to coarse - wet
	2		2 Std. Pen 2	very loose - brown
				SAND & GRAVEL - silty fine to coarse with scattered cobbles - brown - dense
10	46		16 Std. Pen 3	
				SAND - silty fine to coarse with scattered sandy silt lenses - brown - dense
15	57		16 Std. Pen 4	
				SAND & GRAVEL - silty fine to coarse with scattered cobbles - brown - very dense
20				

FIG. E-33

F. 26.66-A (Rev. 5-67)

Hole No. H-38 Sub Section East Channel Bridge Pier #8 Sheet 2 of 3

DEPTH	BLOWS PER FT.	PROFILE	SAMPLE TUBE NOS.	DESCRIPTION OF MATERIAL
	100/6"		42 Std. 100 Pen 5	
25				SAND - silty fine to coarse with scattered layers
	108/8"		58 Std. 50/2" Pen 6	fine gravel - brown - very dense
30				
	73/6"		32 Std. 73 Pen 7	
35				
	98		50 Std. 40 Pen 58 8	
40				
	116		49 Std. 67 Pen 9	
				SAND & GRAVEL - silty fine to coarse with
				scattered cobbles - brown - very dense
45				

FIG. E-33

F. 26.66-A (Rev. 5-67)

Hole No. H-38 Sub Section East Channel Bridge Pier #8 Sheet 3 of 3

DEPTH	BLOWS PER FT.	PROFILE	SAMPLE TUBE NOS.	DESCRIPTION OF MATERIAL
	141	▽	83 Std. 58 Pen 10	TEST BORING STOPPED AT 46.0'
50				

FIG. E-33

H. F. 26.66 (Rev. 5-67)

WASHINGTON
STATE HIGHWAY COMMISSION
DEPARTMENT OF HIGHWAYS

LOG OF TEST BORING

Original to Materials Engineer
Copy to Bridge Engineer
Copy to District Engineer
Copy to _____

S.H. _____ S.R. 90 Section Lake Washington East Channel Bridge Job No. L-2058
Hole No. H-40 Sub Section Pier #9 Cont. Sec. 1705
Station 361+59 Offset 101' Rt. ℄ Reverse Lanes Ground El. 52.6'
Type of Boring Wash. Bore Casing NX 3" 60.0' W.T. El. 7.1'
Inspector Donald L. Nebgen Date August 14, 1969 Sheet 1 of 3

DEPTH	BLOWS PER FT.	PROFILE	SAMPLE TUBE NOS.	DESCRIPTION OF MATERIAL
				FILL - Sandy silt with fine to coarse sand
	16		10 Std. 6 Pen 10 1 35	gravel & cobbles - brown - slightly compact to dense
	16		12 Std. 9 Pen 7 2 12	
0				
	39		20 Std. 20 Pen 19 3 16	
5				
	38		30 Std. 22 Pen 16 4 15	
				SAND & GRAVEL - silty fine to coarse with
				scattered cobbles - gray - dense
)				

FIG. E-34

F. 26.66-A (Rev. 5-67)

Hole No. H-40 Sub Section East Channel Bridge Pier #9 Sheet 2 of 3

DEPTH	BLOWS PER FT.	PROFILE	SAMPLE TUBE NOS.	DESCRIPTION OF MATERIAL
			36 Std. 26 Pen 23 5 33	
	49			
				SAND - silty fine with fine gravels, silt lenses
25				& traces peat - gray - slightly compact
			10 Std. 9 Pen 11 6 13	
	20			
				SAND & GRAVEL - silty fine to coarse with
				scattered cobbles - brown - dense
30				
			36 Std. 30 Pen 19 7 18	
	37			
				SAND - silty fine to coarse with scattered
				gravels & silt lenses - brown - very dense
35				
			26 Std. 38 Pen 45 8	
	83			
				SAND GRAVEL & COBBLES - silty fine to coarse
				with scattered small boulders - brown - very dense
40				
			Std.	
	100/3"		100/3"Pen 9	
45				

FIG. E-34

F. 26.66-A (Rev. 5-67)

Hole No. H-40 Sub Section East Channel Bridge Pier #9 Sheet 3 of 3

DEPTH	BLOWS PER FT.	PROFILE	SAMPLE TUBE NOS.	DESCRIPTION OF MATERIAL
	100/3"		Std. 100/3"Pen 10	
				SAND - SILTY FINE to coarse with scattered gravels
				& cobbles silt lenses - brown - very dense
50				
	170/10"		70 Std. 100/4" Pen 11	
55				
	130/9"		80 Std. 50/3" Pen 12	
60				
	100/6"		100 Std. Pen 13	TEST BORING STOPPED AT 60.5'

FIG. E-34

I. F. 26.66 (Rev. 5-67)

WASHINGTON
STATE HIGHWAY COMMISSION
DEPARTMENT OF HIGHWAYS

LOG OF TEST BORING

Original to Materials Engineer
Copy to Bridge Engineer
Copy to District Engineer
Copy to _____

S.H. _____ S.R. 90 Section Lake Washington Job No. L-2058
Hole No. H-42 Sub Section East Channel Bridge Cont. Sec. 1705
Station 361+59 Pier No. 9 Offset 110' Lt. ℄ Rev. Ground El. 43.9
Type of Boring Wash Bore & Rotary Casing 3" X 22'6" W.T. El. 13.9
Inspector Scovill, Nebgen, Duvall Date August 14-19, 1969 Sheet 1 of 2

EPTH	BLOWS PER FT.	PROFILE	SAMPLE TUBE NOS.	DESCRIPTION OF MATERIAL
	23		8 Std. 11 Pen 12 9 1	SILT, SAND, SILTY CLAY, MIXED & LAYERED thinly scattered gravels, brown, damp to
	22		8 Std. 10 Pen 12 17 2	wet
	63		29 Std. 30 Pen 33 37 3	
0				SAND - gravelly, silty, brown, wet occasional scattered cobble & boulder
	135		45 Std. 90 Pen 4	
5				
	100/4"			20'6" blast 2 sticks 50% 8" X 1 1/8" cobble or boulder
			100 Std. Pen 5	
0				

FIG. E-35

F. 26.66-A (Rev. 5-67)

Hole No. H-42 Sub Section East Channel Bridge Sheet 2 of 2

DEPTH	BLOWS PER FT.	PROFILE	SAMPLE TUBE NOS.	DESCRIPTION OF MATERIAL
				SAND - gravelly, silty, brown wet occasional
				scattered cobble & boulder
	175/5"		175 Std. Pen 6	
				SAND with layers silty sand, thinly
25				scattered gravel, brown & grayish brown
				damp
			40 Std. Pen	
	118/8"		68 50/2" 7	
30				
				Gravel, sandy, brown
			30 Std. Pen	Sand with layers silty sand thinly
	194		88 106 8	scattered gravel, brown & grayish brown
35				damp
				Sand - gravelly, silty, brown, damp
40				
	120/6"		120 Std. Pen 9	STOPPED TEST BORING AT 40'-6"
45				

FIG. E-35

H. F. 26.66 (Rev. 5-67)

WASHINGTON
STATE HIGHWAY COMMISSION
DEPARTMENT OF HIGHWAYS

Original to Materials Engineer
Copy to Bridge Engineer
Copy to District Engineer
Copy to

LOG OF TEST BORING

S.H. S.R. 90 Section Lake Washington Job No. L-2058
Hole No. H-48 Sub Section Retaining Wall No. Mercer Way Cont. Sec. 1705
Station 325+62 No. Mercer Way Offset 26' Rt. ℄ Ground El. 43.6
Type of Boring Wash Bore & Rotary Casing 3" X 10' W.T. El. 36.6
Inspector E. E. Duvall Date Aug. 25 & 26, 1969 Sheet 1 of 3

DEPTH	BLOWS PER FT.	PROFILE	SAMPLE TUBE NOS.	DESCRIPTION OF MATERIAL
			B C U-1	SILT - dark brown, roots, dry
			D E	CLAY & SILT - brown & gray, scattered sand &
			6 11 12 15 Std. Pen 2	pieces gravel, slightly damp
	23			
				SANDY SILT - scattered pieces gravel, slightly
			A U-3	clayey, brown some gray, damp
			10 11 13 16 Std. Pen 4	
	24			
			13 24 33 44 Std. Pen 5	
	57			
				CLAYEY SILT - scattered sand gray, damp
			11 16 23 35 Std. Pen 6	
	39			
	53		13 21 Std. Pen	

FIG. E-36

F. 26.66-A (Rev. 5-67)

Hole No. H-48 Sub Section Retaining Wall, No. Mercer Way Sheet 2 of 3

DEPTH	BLOWS PER FT.	PROFILE	SAMPLE TUBE NOS.	DESCRIPTION OF MATERIAL
	53		32 41 ▼7	
				SAND - slight trace gravel, layered with
				sandy silt & silty sand, gray, damp
	73		23 ▲ Std. 33 Pen	
			40 58 ▼8	
	108		16 ▲ Std. 33 Pen	
			75 ▼9	
	53		21 ▲ Std. 26 Pen	
			27 47 ▼10	
	56		19 ▲ Std. 28 Pen	
			28 45 ▼11	
	62		17 ▲ Std. 24 Pen	

FIG. E-36

F. 26.66-A (Rev. 5-67)

Hole No. H-48 Sub Section Retaining Wall No. Mercer Way Sheet 3 of 3

DEPTH	BLOWS PER FT.	PROFILE	SAMPLE TUBE NOS.	DESCRIPTION OF MATERIAL
	62	↓	38	SAND - slight trace gravel, layered with
		↓	80 ↓ 12	sandy silt & silty sand, gray, damp
				Stopped test boring at 46'-0"

FIG. E-36

I. F. 26.66 (Rev. 5-67)

WASHINGTON
STATE HIGHWAY COMMISSION
DEPARTMENT OF HIGHWAYS

LOG OF TEST BORING

Original to Materials Engineer
Copy to Bridge Engineer
Copy to District Engineer
Copy to

S.H. ____ S.R. 90 Section Lake Washington Job No. L-2058
Hole No. H-50 Sub Section East Channel Bridge Pier No. 2 Cont. Sec. 1705
Station 329+12 Offset 140' Lt. ℄ Rev. Ground El. 30.4
Type of Boring Wash Bore & Rotary Casing 3" X 2' W.T. El. 26.4
Inspector E. E. Duvall Date Aug. 27 1969 Sheet 1 of 2

DEPTH	BLOWS PER FT.	PROFILE	SAMPLE TUBE NOS.	DESCRIPTION OF MATERIAL
	47		13 Std. 21 Pen 26 29 1	SAND - silt binder, scattered pieces gravel
				brown, dry
	132		16 Std. 37 Pen 55 76 2	sandy silt - gray, scattered pieces gravel
				occasional cobble, damp
			56 Std. Pen 113 3	SAME MATERIAL - brown, contain more gravel
	113/6"			
				CLAY - gray, occasional piece gravel, damp
			12	
	41		17 Std. 24 Pen 29 4	
	32		7 Std. 13 Pen 19 20 5	

FIG. E-37

F. 26.66-A (Rev. 5-67)

Hole No. H-50 Sub Section East Channel Bridge Pier No. 2 Sheet 2 of 2

DEPTH	BLOWS PER FT.	PROFILE	SAMPLE TUBE NOS.	DESCRIPTION OF MATERIAL
				CLAY - Gray, occasional piece gravel, damp
	45		14 Std. 19 Pen 26 28 6	
				SILTY CLAY, Gray, damp
	81		19 Std. 37 Pen 44 7	CLAY - Gray, occasional piece gravel, damp
	36		19 Std. 16 Pen 20 20 8	
	41		15 Std. 19 Pen 22 23 9	
	37		15 Std. 18 Pen 19 20 10	STOPPED TEST BORING AT 45'-0"

FIG. E-37

HWY Form 351-003 (H. F. 26.66)
(Revised 5-67).

WASHINGTON
STATE HIGHWAY COMMISSION
DEPARTMENT OF HIGHWAYS

Original to Materials Engineer
Copy to Bridge Engineer
Copy to District Engineer
Copy to

LOG OF TEST BORING

S.H. ____ S.R. I-5 Section East Channel Bridge Job No. L-5594
Hole No. O.W. #2 Sub Section Pier 2 Cont. Sec. 1704
Station L 339+15 Offset 80.0' Lt. Ground El. 24.8'
Type of Boring M-7 Casing 7" X 42 W.T. El. ____
Inspector Dan Jones Date 2-8-78 Sheet 1 of 2

DEPTH	BLOWS PER FT.	PROFILE	SAMPLE TUBE NOS.	DESCRIPTION OF MATERIAL
				Fill
				SAND , Mottled, fine to coarse, gravelly
			1	silty, slightly clayey, contains pieces of
	P-11		3 8	concrete and wood, damp.
			4	Seepage -5.0' to -5.5'
5				Penetrometer Tip on wood -5.0'
	P-2 12		34 2	Original Ground
			10 34	SAND - grey, fine to coarse, gravelly
				silty, slightly clayey with cobbles,
				damp.
10				
	P-3 147		22 47 100	Seepage -9.0'
15				
	P-4 125		26 58 67	

FIG. E-38

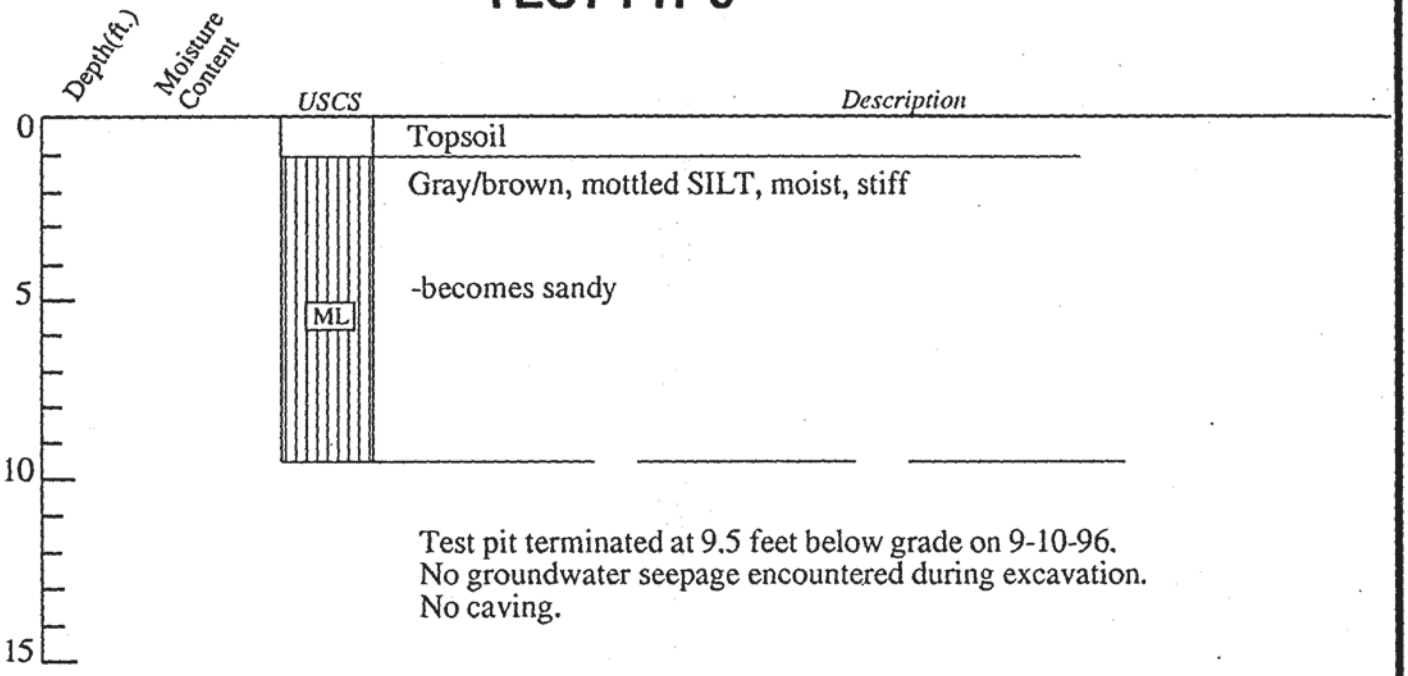
WY Form 351-003-a (H. F. 26.66-A).
Revised 5-67.

Hole No. O.W. #2 Sub Section Pier 2 Sheet 2 of 2

DEPTH	BLOWS PER FT.	PROFILE	SAMPLE TUBE NOS.	DESCRIPTION OF MATERIAL
20	P-5 107		26 37 70	
				CLAY-SILT - bluish, slightly sandy
				with thin silt lenses, and
25				piece of gravel, fairly dry.
	P-6 43		15 18 25	
				1" wet fine sand lenses -25.3'
30				
	P-7 30		8 13 17	
35				
	P-8 31		8 13 18	
40				
	P-9 31		8 13 18	
				Piezometer installed

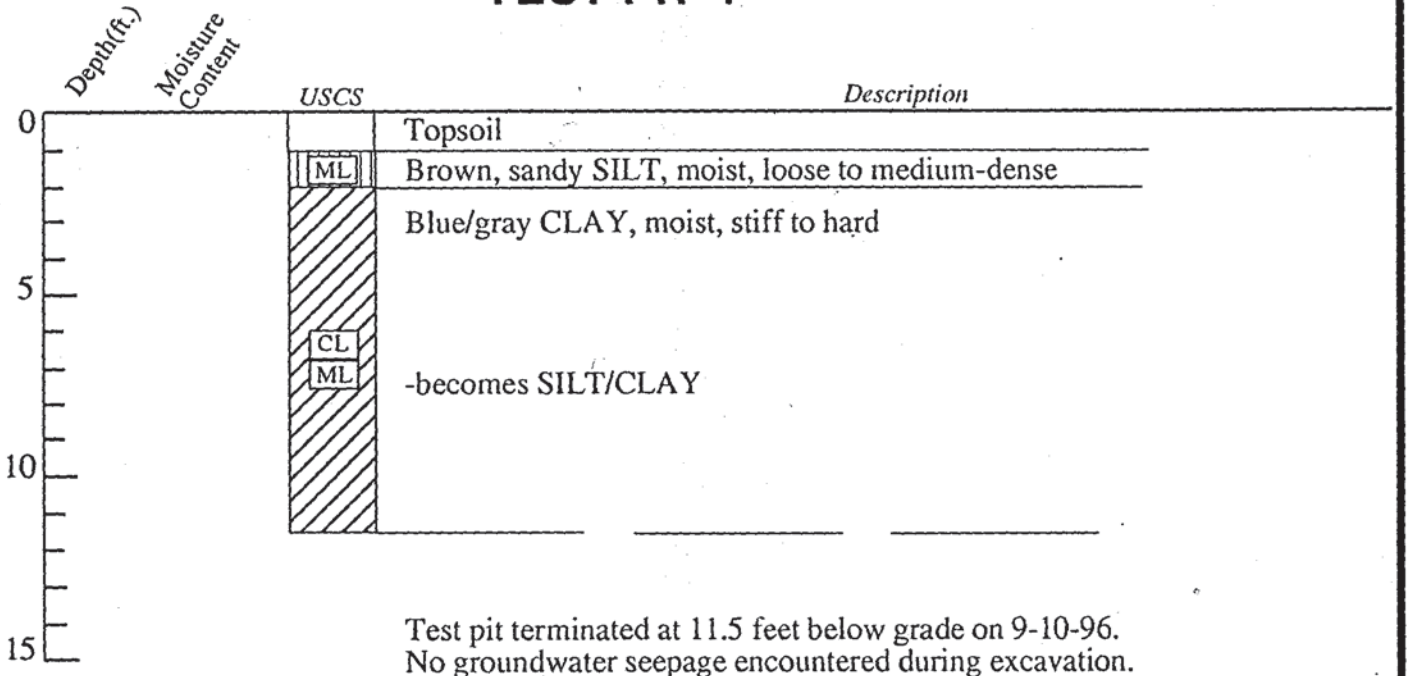
FIG. E-38

TEST PIT 3



Test pit terminated at 9.5 feet below grade on 9-10-96.
No groundwater seepage encountered during excavation.
No caving.

TEST PIT 4



Test pit terminated at 11.5 feet below grade on 9-10-96.
No groundwater seepage encountered during excavation.
No caving.

GEOTECH
CONSULTANTS, INC.

TEST PIT LOGS
SE 33rd STREET
MERCER ISLAND, WA

Job No:	Date:	Logged by:	Plate:
96316	SEP 1996	DBG	4

FIG. E-39

PROJECT: Voyager Building | JOB NO. J-1630 | BORING B-1 | PAGE 1 OF 3

Location: Mercer Island, WA | Approximate Elevation: 90 feet

Depth (ft)	Soil Description	Sample Type	Sample Number	Ground Water	Penetration Resistance (▲ Standard, △ Other; Blows per foot: 0, 10, 20, 30, 40, 50)	N-values	Testing
	2.5 inches asphalt over 4 inches gravelly SAND (fill)						
	Soft to medium stiff, moist to wet, light brown, silty CLAY with some fine sand (fill)						
	Loose, wet to saturated, light brown, silty SAND with trace to some gravel (fill)						
5			S-1		▲ ●	9	
10	Dense to very dense, moist to wet, light brown, silty gravelly SAND (Blowcounts may be overstated)		S-2		● ▲	32	
15			S-3		● ▲	64	
	Medium dense, moist to wet, light brown, silty, fine to medium SAND with trace gravel						
20			S-4		●▲	20	
25							

Explanation

- 2-inch O.D. split spoon sample
- 3-inch I.D Shelby tube sample
- ⊗ No Recovery
- ▼ ATD — Groundwater level at time of drilling or date of measurement

Monitoring Well Key

- Clean Sand
- Bentonite
- Grout/Concrete
- Screened Casing
- Blank Casing

Moisture Content

0 10 20 30 40 50

Plastic Limit — Natural — Liquid Limit

Testing Key:

GSA: Grain Size Analysis

ATT: Atterberg Limits (plastic & liquid limit)

Zipper Zeman Associates, Inc. Geotechnical & Environmental Consulting	BORING LOG	Figure A-1
	Date Drilled: 5/29/03	Logged By: GDS

FIG. E-40

PROJECT: Voyager Building | JOB NO. J-1630 | BORING B-1 | PAGE 2 OF 3

Location: Mercer Island, WA | Approximate Elevation: 90 feet

Depth (ft)	Soil Description	Sample Type	Sample Number	Ground Water	Penetration Resistance (▲ Standard, △ Other; Blows per foot: 0 10 20 30 40 50)	N-values	Testing
	Medium dense, moist to wet, light brown, silty, fine to medium SAND with trace gravel. Interbeds of wet, fine to medium SAND.		S-5			17	
30	Very stiff, moist, blue-gray, sandy SILT with some clay and trace gravel.		S-6			16	
35	Very stiff to hard, moist, blue-gray, clayey SILT with some fine sandy SILT partings. Disturbed, slickensides.		S-7			33	
40	Stiff		S-8		Non-Plastic	9	Att.
45			S-9			23	
50							

0 10 20 30 40 50

Moisture Content

Plastic Limit — Natural — Liquid Limit

Explanation

- 2-inch O.D. split spoon sample
- 3-inch I.D Shelby tube sample
- No Recovery
- ATD — Groundwater level at time of drilling or date of measurement

Monitoring Well Key

- Clean Sand
- Bentonite
- Grout/Concrete
- Screen Casing
- Blank Casing

Testing Key:

GSA: Grain Size Analysis

ATT: Atterberg Limits (plastic & liquid limit)

Zipper Zeman Associates, Inc. Geotechnical & Environmental Consulting	BORING LOG	Figure A-1
	Date Drilled: 5/29/03	Logged By: GDS

FIG. E-40

PROJECT: Voyager Building | JOB NO. J-1630 | BORING B-1 | PAGE 3 OF 3

Location: Mercer Island, WA | Approximate Elevation: 90 feet

Depth (ft)	Soil Description	Sample Type	Sample Number	Ground Water	Penetration Resistance (▲ Standard, △ Other; Blows per foot: 0 10 20 30 40 50)	N-values	Testing
	Very stiff to hard, moist, blue-gray, clayey SILT with SILT partings. Slickensides.		S-10		●	26	
55			S-11		▲ ●	24	
60			S-12		● ▲	36	
	Boring completed at 61.5 feet on 5/29/03 Groundwater seepage encountered at 10, 20, 33 and 40 feet at time of drilling						
65							
70							
75							

Explanation

- 2-inch O.D. split spoon sample
- 3-inch I.D Shelby tube sample
- ⊗ No Recovery
- ▼ ATD — Groundwater level at time of drilling or date of measurement

Monitoring Well Key

- Clean Sand
- Bentonite
- Grout/Concrete
- Screened Casing
- Blank Casing

0 10 20 30 40 50

Moisture Content

Plastic Limit — Natural — Liquid Limit

Testing Key:

GSA: Grain Size Analysis

ATT: Atterberg Limits (plastic & liquid limit)

Zipper Zeman Associates, Inc. Geotechnical & Environmental Consulting	BORING LOG	Figure A-1
	Date Drilled: 5/29/03	Logged By: GDS

FIG. E-40

PROJECT: Voyager Building | **JOB NO.** J-1630 | **BORING** B-2 | **PAGE** 1 OF 3

Location: Mercer Island, WA | **Approximate Elevation:** 90 feet

Depth (ft)	Soil Description	Sample Type	Sample Number	Ground Water	Penetration Resistance (▲ Standard, △ Other; Blows per foot: 0 10 20 30 40 50)	N-values	Testing
	3.5 inches asphalt over 6 inches gravelly SAND						
	Soft, wet, light brown, silty CLAY with some fine sand (fill).						
	Loose, wet to saturated, light brown, silty, fine to medium SAND. Interbedded clayey silt layers (fill).						
5			S-1		▲ ●	4	
	Medium stiff, moist to wet, light brown, silty CLAY with some fine sand. Interbedded sand and silt layers.						
10			S-2		▲ ● ⊢——⊣	6	ATT
	Loose, moist to wet, light brown, silty, fine to medium SAND with clasts of tan, clayey silt. Some water bearing sand lenses observed.						
15			S-3		▲ ●	6	
20	Loose to dense, moist, light brown, silty SAND with trace to some gravel. Some mottling observed at 21.5 feet (Blowcounts may be overstated).		S-4		▲ ●	8	
25							

Explanation

- 2-inch O.D. split spoon sample
- 3-inch I.D Shelby tube sample
- ⊗ No Recovery
- ▼ ATD — Groundwater level at time of drilling or date of measurement

Monitoring Well Key:

- Clean Sand
- Bentonite
- Grout/Concrete
- Screened Casing
- Blank Casing

Moisture Content (0 10 20 30 40 50)

Plastic Limit — Natural — Liquid Limit

Testing Key:

GSA: Grain Size Analysis

ATT: Atterberg Limits (plastic & liquid limit)

Zipper Zeman Associates, Inc. Geotechnical & Environmental Consulting	BORING LOG	Figure A-2
	Date Drilled: 5/29/03	Logged By: GDS

FIG. E-41

PROJECT: Voyager Building | JOB NO. J-1630 | BORING B-2 | PAGE 2 OF 3

Location: Mercer Island, WA | Approximate Elevation: 90 feet

Depth (ft)	Soil Description	Sample Type	Sample Number	Ground Water	Penetration Resistance (▲ Standard, △ Other; Blows per foot: 0 10 20 30 40 50)	N-values	Testing
	Loose to dense, moist, light brown, silty SAND with trace to some gravel. Interbeds of fine to medium sand. (Blowcounts may be overstated).		S-5			44	
30	Very stiff, moist, blue-gray, sandy SILT with some clay and trace gravel (disturbed).		S-6			28	
35	Very stiff to hard, moist, blue-gray, clayey SILT with fine sandy SILT partings. Disturbed, slickensides.		S-7			28	
40			S-8			47	
45			S-9			45	
50							

Explanation

- 2-inch O.D. split spoon sample
- 3-inch I.D Shelby tube sample
- No Recovery
- ATD — Groundwater level at time of drilling or date of measurement

Monitoring Well Key

- Clean Sand
- Bentonite
- Grout/Concrete
- Screen Casing
- Blank Casing

0 10 20 30 40 50

Moisture Content

Plastic Limit — Natural — Liquid Limit

Testing Key:

GSA: Grain Size Analysis

ATT: Atterberg Limits (plastic & liquid limit)

Zipper Zeman Associates, Inc. Geotechnical & Environmental Consulting	BORING LOG	Figure A-2
	Date Drilled: 5/29/03	Logged By: GDS

FIG. E-41

PROJECT: Voyager Building | JOB NO. J-1630 | BORING B-2 | PAGE 3 OF 3

Location: Mercer Island, WA | Approximate Elevation: 90 feet

Depth (ft)	Soil Description	Sample Type	Sample Number	Ground Water	Penetration Resistance (▲ Standard, △ Other; Blows per foot: 0 10 20 30 40 50)	N-values	Testing
55	Very stiff to hard, moist, blue-gray, clayey SILT with fine sandy SILT partings. Disturbed, slickensides.		S-10		▲ ●	22	
60			S-11		▲ ●	25	
65			S-12		●	28	
70	Boring completed at 61.5 feet on 5/29/03. Groundwater seepage encountered at 15, 25 and 40 feet at time of drilling.						
75							

0 10 20 30 40 50

Moisture Content: Plastic Limit — Natural — Liquid Limit

Explanation

- 2-inch O.D. split spoon sample
- 3-inch I.D Shelby tube sample
- No Recovery
- ATD: Groundwater level at time of drilling or date of measurement

Monitoring Well Key

- Clean Sand
- Bentonite
- Grout/Concrete
- Screened Casing
- Blank Casing

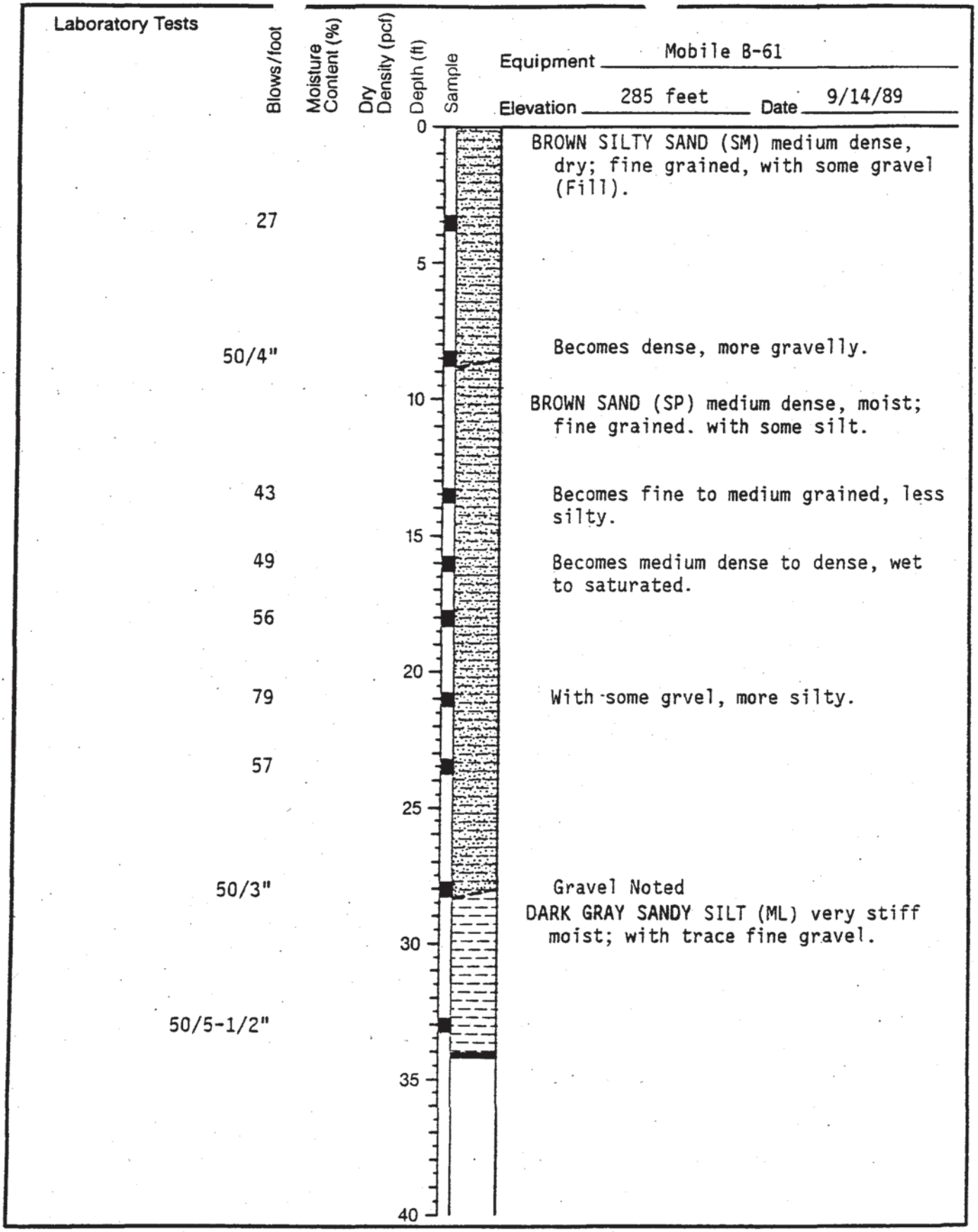
Testing Key:

GSA: Grain Size Analysis

ATT: Atterberg Limits (plastic & liquid limit)

Zipper Zeman Associates, Inc. Geotechnical & Environmental Consulting	BORING LOG	Figure A-2
	Date Drilled: 5/29/03	Logged By: GDS

FIG. E-41



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Log of Boring 4

Covenant Shores II
Mercer Island, Washington

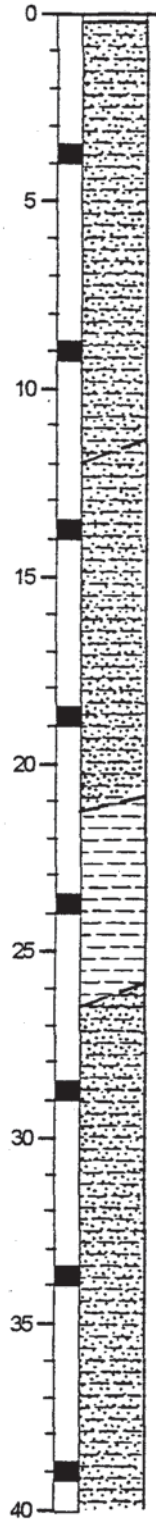
PLATE
A6

JOB NUMBER	DRAWN	APPROVED	DATE	REVISED	DATE
14,830.003	SAC	KJS	18 Sept 89		

FIG. E-42

Equipment Mobile B-61

Land Surface Elevation 88 feet Date 6/16/93



Laboratory Tests	Moisture Content (%)	Dry Density (pcf)	Blows per Foot	Depth	Sample	
				0		Asphalt Pavement.
						BROWN SILTY SAND (SM) loose to medium dense, moist; fine grained, with a trace of fine gravel.
MD	11.2	92	10			
				5		
			18			
				10		GRAY SILTY SAND (SM) medium dense, moist to wet; fine to medium grained.
DS,SA	22.2	107	12			
				15		
						Becomes less silty, saturated, medium to coarse grained, with some fine gravel.
MD	15.0	109	18			
				20		
						BROWN SANDY SILT (ML) stiff, wet to saturated; fine grained.
MD	24.3	103	13			
				25		
						GRAY SILTY SAND (SM) medium dense, wet; fine grained.
			14			
				30		
DS	20.2	113	31			Becomes dense.
				35		
			32			With coarse gravel.
				40		

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Log of Boring 7 (0-40')

Wehmueller/Covenant Shores Building 8
Mercer Island, Washington

PLATE **A3a**

JOB NUMBER	DRAWN	APPROVED	DATE	REVISED	DATE
14,830.006	KM	GHS	30 Jul 93		

FIG. E-43

Equipment Mobile B-61

Land Surface Elevation 88 feet Date 6/16/93

Laboratory Tests	Moisture Content (%)	Dry Density (pcf)	Blows per Foot	Depth	Sample	
				40		
MD	22.7	106	34			BROWN SANDY SILT (ML) very stiff, wet; with a trace of fine gravel.
				45		
			46			GRAY SANDY SILT (ML) stiff, wet to saturated; with some fine sand lenses, and a trace of fine gravel.
				50		
LL,PL,MD	26.2	100	62			Becomes very stiff.
				55		
MD	27.1	97	38			
				60		
			63			
				65		Groundwater encountered at 18 feet during drilling. 3/4" Dia. PVC Piezometer installed; screened interval from 37'-32'. Depth to water in piezometer on 7/16/93 measured at 18.5 feet.
				70		
				75		
				80		

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Log of Boring 7 (40-64.5')

Wehmueller/Covenant Shores Building 8
Mercer Island, Washington

PLATE **A3b**

JOB NUMBER	DRAWN	APPROVED	DATE	REVISED	DATE
14,830.006	KM	GHS	30 Jul 93		

FIG. E-43