LANDAU ASSOCIATES

TECHNICAL MEMORANDUM

TO: Debbie Taege, The Boeing Company

FROM: Erin Waibel, RG and Sarah Fees, LG

DATE: June 30, 2023

RE: February 2023 Coolant Area Investigation,
LAI-8 LNAPL Evaluation and Recoverability Assessment
Boeing Portland
Gresham, Oregon
Project No. 0025116.123.430

Introduction

This technical memorandum presents the 2023 evaluation of investigation activities near the 2006 Coolant Release Area adjacent to Building 85-105 at the Boeing Portland Site (Site; Figure 1). Investigation activities included additional total petroleum hydrocarbon (TPH) groundwater sampling, light non-aqueous phase liquid (LNAPL) evaluation, and an assessment of LNAPL recoverability at groundwater monitoring well LAI-8.

Investigation activities were conducted in 2023 due to recent TPH concentrations being detected at concentrations above the site-specific cleanup level and the presence of LNAPL at LAI-8 (Landau 2023). Measurable free product (LNAPL) was observed in LAI-8 and reported to Oregon Department of Environmental Quality (ODEQ) on February 9, 2023. Apex Laboratories' (Apex) forensics group was contracted to evaluate whether the LNAPL was a result of the known 2006 coolant release or a possible new release. Sampling of various products used onsite were compared to the LNAPL collected from LAI-8. No evidence exists supporting a new release as discussed in this document.

Coolant Release Area Background and Timeline

In 2006, coolant (mixture of mineral oil and glycerin; HOCUT 795-B) used in the facility metal fabrications operations was discovered in the 85-105 building footing drain sump (building sump; Figure 2). This coolant release lead to a number of investigation and treatment activities under ODEQ's supervision and approval as described below. A general summary of the coolant release activities leading up to the 2023 TPH investigation activities is as follows:

- September 2006: Identification of coolant release.
- 2007 to 2017: Cleanup activities to address coolant release including sump treatment and *in situ* anaerobic injection activities.
- 2018 to 2022: Dissolved TPH identified in well LAI-8 above Site-specific cleanup levels.

- 2023: Additional investigation of TPH in well LAI-8 and vicinity to determine source. LNAPL was observed in LAI-8 and reported to ODEQ.

September 2006 Coolant Area Release: Coolant impacts were discovered at the building sump. Prior to the coolant release, water in the building sump was being routed to the groundwater extraction and treatment system (GETS) for treatment due to being a collection point for trichloroethene (TCE)-contaminated groundwater. After the coolant release, water within the building sump was disconnected from the GETS and containerized for treatment. An investigation was conducted to identify the extent of groundwater impacted by the coolant release and the source was determined to be a faulty weld joint in the subgrade coolant flume system and a leaking coolant milling machine (Landau 2007a). A Site-specific cleanup level (1.35 milligrams per liter [mg/L]) for TPH (sum of TPH diesel-range and oil-range) was developed for groundwater contamination. Initial groundwater analytical results indicated low-level TPH concentrations (near the Site-specific cleanup level) for samples collected from BOP-10(s), E-6, LAI-2, LAI-3, and LAI-6, which decreased to below reporting limits by mid-October 2006. TPH concentrations at LAI-4, LAI-7, and LAI-8 were elevated and routinely above the Site-specific cleanup level. Monitoring well LAI-8 was periodically dry and sampling data has been less frequent at this location than others.

Soil samples were collected during the 2006 Coolant Release Area monitoring well installation (LAI-1 through LAI-8). A total of 24 soil boring samples were analyzed. Results were below the laboratory report limits except at LAI-5 from 5 to 6 feet (ft; 45.6 milligrams per kilogram [mg/kg]) and LAI-8 from 20 to 21 ft (21.0 mg/kg).[1] Soil concentrations were well below the cleanup level (9,800 mg/kg).

2007–2012 Sump Treatment System: To address coolant-impacted groundwater, accumulated building sump water was disconnected from the GETS and rerouted to the sump treatment system (STS), a temporary oil-water separator with in-line monitoring, and (as needed) a secondary organoclay/granular-activated carbon system prior to being discharged to the City of Gresham sanitary sewer under a wastewater acceptance permit. The STS operated between 2007 and 2012, and after a period of time with no additional coolant accumulation in the building sump, the STS was shut down with ODEQ approval in August 2012 (ODEQ 2012). Since shutdown of the STS, accumulated water in the sump has been redirected to the GETS (similar to pre-2006 configuration).

2008–2017 *In Situ* Aerobic Treatment Near Building Sump: To address residual and isolated coolant impacts in the shallow TGA between the point of release and the building sump, enhanced aerobic biodegradation was implemented as an interim remedial action measure (IRAM; Landau 2007b) as approved by ODEQ (2007). Biodegradation has been stimulated by injecting a mixture of potable water and an oxygen-releasing compound (EHC-O™) into injection wells installed directly upgradient of the area where the highest groundwater concentrations were observed (near LAI-4; Figure 2).[2] A total of eight EHC-O injections have been completed between February 2008 and June 2017.

[1] The silica gel and acid wash preparatory step were not completed by the laboratory.
[2] Coolant Release Area injection wells IW-1 through IW-5 were decommissioned in January 2023, because the injection wells are no longer usable due to the EHC-O™ slurry which has solidified and blocked the injection well screen. Multiple unsuccessful attempts have been made to clear the injection wells over the past several years and during each EHC-O injection event.

1999–2017 Groundwater Extraction at DP-1: Extraction well DP-1 was operational from November 1999 (prior to the 2006 Coolant Release Area) until November 2017. Other neighboring extraction wells, E-6 and E-7 were shut down in 2003. Movement of TPH contamination from the 2006 Coolant Release Area is highly probable due to groundwater extraction at DP-1. Extraction rates ranged from less than 1 gallon per minute (gpm) up to 5.35 gpm between September 2006 (coolant release) and November 2017 (extraction well shutdown).

DP-1 operation resulted in dry conditions at monitoring well LAI-8 where no groundwater samples were collected from November 2011 to February 2018 when the average extraction rate was 2.8 gpm. Dry conditions at LAI-8 periodically occurred from 2006 to 2011, when the average extraction rate at DP-1 was 0.89 gpm. Before LAI-8 became consistently dry from DP-1 drawdown (2011–2017), TPH results at LAI-8 (between September 2006 and August 2011) fluctuated near the Site-specific cleanup level with a maximum concentration of 6.7 mg/L (June 2007).

November 2017 Chlorinated Volatile Organic Compound (cVOC) Stagnation Area #2 Injection to Present: Extraction well DP-1 (Figure 2) was temporarily shut down on November 28, 2017 because of its proximity to bioremediation injection in Stagnation Area #2 and has remained shut down through present. The injection solution consisted of a solution of potable water, crude glycerin, blackstrap molasses, and ferrous chloride. A total of 83,159 gallons of injection solution was injected into three wells (E6, E7, and BOP-10[i]). The shutdown of DP-1 has resulted in rebounding of the water table where it had been depressed locally due to pumping. The localized rise in groundwater elevation resulted in re-saturation of well LAI-8 and the ability to sample groundwater at LAI-8 again in mid-2018. The concentrations of dissolved TPH in LAI-8 since sampling resumed in 2018 have been much higher than prior (September 2006–August 2011; maximum concentration of 6.7 mg/L) results, with a maximum of 1,950 mg/L in August 2018, followed by a consistent decline through May 2021 when concentrations were detected at only 2.6 mg/L. These TPH detections in 2018 through mid-2021 appeared to be false positives resulting from the December 2017 electron donor injection to Stagnation Area #2 as discussed in the 2018 and 2019 Annual Progress Reports (Landau 2019, 2020). This was plausible, given that LAI-8 is located approximately 95 ft from Stagnation Area #2 (slightly upgradient to cross gradient of this stagnation area; Figure 2) and within the theoretical 100-ft radius of injection of well BOP-10(i). [3] However, TPH concentrations increased again to the highest observed concentrations of 3,730 mg/L (August 2021) and 2,146 mg/L (November 2021). In 2022, TPH concentrations at LAI-8 ranged from 215 mg/L to 1,182 mg/L. Additional TPH sampling was conducted in 2022 at and near LAI-8 to further evaluate TPH concentrations in this area. It was determined that the increased TPH concentrations were located in the immediate vicinity of LAI-8 and DP-1 and did not appear to be migrating (Landau 2023). LNAPL was observed in LAI-8 and reported to ODEQ on February 9, 2023. A plot of groundwater elevations at LAI-8 and DP-1 and TPH concentrations at LAI-8 is presented on Figure 3.

[3] Glycerin was used as a component of the 2017 cVOC Stagnation Area #2 injection substrate and is a component of the coolant mixture; glycerin could be a potential false positive using the Method TPH-Dx analysis.

2023 TPH Investigation

Based on the TPH concentrations detected at LAI-8 from 2018 through 2022, an investigation was conducted to determine the cause of the TPH concentration increases. It was suspected that the increases could be due to migration of the prior 2006 coolant release induced by previous pumping at DP-1, LAI-8's proximity to the electron donor injection at Stagnation Area #2, or a potential new, unknown release.

In February 2023, a one-time sampling event was conducted at all Coolant Release Area wells (LAI-1 through LAI-8) and wells in the immediate vicinity to further investigate the TPH concentrations in groundwater. Additional wells were selected based on proximity to LAI-8 and well screen depth and include BOP-10(s), DP-1 (shallow interval), and E-6 (deeper interval).

Historically, groundwater samples were only analyzed using Method TPH-Dx with silica gel cleanup. However, the Coolant Release Area has not been evaluated to determine whether polar metabolites, organic matter, or nonpetroleum-related chemicals exist in large quantities (i.e., TPH-Dx analysis without silica gel cleanup). Groundwater samples were collected from 11 sampling locations (Figure 4):

- LAI-1 through LAI-8: Shallow Coolant Release Area monitoring wells installed in 2006.
- DP-1s: Shallow interval of shutdown extraction well DP-1.
- BOP-10(s): Shallow, downgradient of well LAI-8.
- E6: Shutdown extraction well, downgradient of well LAI-8, and used as injection well in 2017 cVOC Stagnation Area #2 injection.

Groundwater samples were analyzed for TPH by Method TPH-Dx with and without silica gel cleanup and volatile organic compounds (VOCs) by Method 8260 to assist with Apex's forensic evaluation.

LNAPL measurements were conducted at all monitoring locations, and LNAPL was only identified at LAI-8. LNAPL product was collected from LAI-8 and submitted to Triton for physical analysis and Apex for forensic analysis. In addition, several product samples from the Facility and injection substrates were collected and submitted to Apex for reference sample comparison purposes:

- Pure Coolant (Hocut 795-B water soluble cutting oil),
- Coolant Mix (10 percent Hocut 795-B, 90 percent water, and trace tramp oil),
- Syntilo (petroleum-based product currently in use within Building 85-105), and
- Glycerin and Molasses (2017 cVOC stagnation area injection substrates).

Groundwater Results

Groundwater analytical results for TPH-D and VOCs are presented in Tables 1 and 2.

- **Without Silica Gel Cleanup:** All 11 sampling locations had detections above the laboratory reporting limit in the diesel-range and no detections in the oil-range. All diesel concentrations were less than 1 mg/L except for LAI-8 (152 mg/L) and DP-1s (9.15 mg/L).

- **With Silica Gel Cleanup:** Only three of the 11 sampling locations had detections above the laboratory reporting limit in the diesel-range, and no detections in the oil-range. LAI-8 and DP-1s had concentrations above the site-specific cleanup level (1.35 mg/L) with concentrations of 115 mg/L and 7.94 mg/L, respectively. LAI-4 had a low-level detection below the cleanup levels at a concentration of 0.0813 mg/L. Prior to 2018, monitoring well LAI-4 historically had the highest TPH concentrations (maximum of 31,800 mg/L in September 2006) and most frequent detections.

These data indicate minor amounts of polar metabolites, organic matter, or nonpetroleum-related chemicals exist at all 11 sampling locations. Most locations 'cleaned up' during the silica gel cleanup step, which indicates the dissolved-phase hydrocarbon exceedances are in the immediate area around LAI-8 and DP-1s. Historically high TPH concentrations (maximum of 31,800 mg/L in September 2006) observed at LAI-4 have responded well to the *in situ* aerobic treatment near the Building Sump that occurred between 2008 and 2017, and TPH concentrations were below the Site-specific cleanup level at LAI-4 in February 2023 (third occurrence out of more than 60 sampling events). A discussion of Apex's forensic evaluation is provided in Attachment 1. Other notable information from the forensic evaluation indicates that LAI-8, E6, and BOP-10(s) have polar/semi-polar bundle with discrete peaks (Group B wells in the Apex evaluation). Landau interprets these discrete peaks could potentially be due to electron donor from the 2017 cVOC Stagnation Area #2 injection. The electron donor was injected into three wells: E6, E7, and BOP-10(i). BOP-10(i) is the intermediate zone which is screened approximately 20 ft deeper than neighboring well BOP-10(s), and all three wells in Group B are at or within the theoretical 100-ft radius of injection. For E6 and BOP-10(s), the bundle of erratic peaks were completely removed with silica gel cleanup.

LNAPL Results

In 2023, measurable free product (LNAPL) was observed in LAI-8 and reported to ODEQ on February 9, 2023. LNAPL was not observed at any other monitoring locations during the February 2023 groundwater investigation. The LNAPL product within LAI-8 is described as *dark brown and translucent*, which is consistent with sheen present at LAI-4 in 2006 and described as *heavy transparent brown sheen*. LAI-4 historically had the highest TPH concentrations and most frequent detections. In 2006, measurable free product was noted at LAI-4, however, LNAPL has not been identified in LAI-4 in 2023. Sheen was also described at LAI-8 periodically starting in November 2006 indicating LNAPL may be entrapped in the saturated soil in the immediate vicinity of LAI-8, which is consistent with the low-level TPH observed in soil at LAI-8 from 20 to 21 ft below ground surface during well installation.

Forensic analysis of LNAPL samples (Attachment 1) concluded that the various product samples (pure coolant, coolant mix, and Syntilo) showed significant differences in chemical composition from the 2023 LNAPL sample at LAI-8. The evaluation did not identify any clear evidence of a new release of product or dissolved-phase contamination. The evaluation supports the contamination present as being related to the historical 2006 Coolant Release.

Physical analysis (e.g., density, specific gravity, kinematic viscosity, interfacial tension, surface tension) of the LAI-8 LNAPL sample was conducted by Triton Analytics (Attachment 2). Physical properties were used to determine LNAPL transmissivity as discussed below.

LNAPL Extent and Recoverability

Monthly LNAPL measurements began in February 2023; in-well LNAPL thickness measurements have ranged from 0.06 ft to 1.40 ft. In-well LNAPL thickness is defined as the observed thickness of LNAPL in a monitoring well and is not necessarily indicative of the quantity, mobility, "thickness," or interval of LNAPL in the subsurface (Interstate Technology & Regulatory Council [ITRC] 2018). In-well thickness is highly variable and depends on hydrogeologic conditions, water table flux, well construction, capillary pressure, and the physical properties of the LNAPL (e.g., density, viscosity, interfacial tension, and wettability). In general, a monitoring well can be thought of as a very large pore space. Because the well is much larger than the pore spaces in the surrounding soil formation, the pore entry pressure is lower and LNAPL will preferentially accumulate in the well as the water table drops through the smear zone, even if the LNAPL is not migrating within the surrounding soil formation. Detectable LNAPL in a well cannot be used as a metric for determining the mobility or recoverability of the LNAPL from the subsurface.

To the maximum extent practicable free product should be removed (OAR 340-122-0235). Key concepts and metrics to assess LNAPL recoverability include saturation and residual saturation, mobility, and transmissivity. In particular, LNAPL transmissivity is a key metric to determine if the LNAPL is potentially recoverable, or if the LNAPL is associated with residual saturation. These concepts are discussed with respect to the LNAPL at LAI-8 below.

LNAPL Saturation and Residual Saturation

LNAPL saturation is the fraction of pore space containing LNAPL relative to total pore space in a representative volume of a porous medium (soil). Residual LNAPL saturation is defined as the saturation level where a LNAPL becomes discontinuous and is immobilized by capillary forces (i.e., where capillary pressure is equal or greater than to pore entry pressure; ITRC 2018). LNAPL accumulated in LAI-8 because the decrease in pore entry pressure allowed LNAPL to flow into the monitoring well (analogous to a very large pore space). Accumulation of LNAPL in a monitoring well does not necessarily mean that the LNAPL is recoverable or that it is mobile or migrating in the surrounding soil formation.

LNAPL Mobility and Migration

The presence of LNAPL in a well is an indication that, under current conditions, the LNAPL immediately adjacent to the well is mobile into the large pore that is the well. However, it does not mean that the LNAPL is mobile or migrating in the surrounding soil formation (ITRC 2018). Accumulation of LNAPL in a well is also not necessarily an indicator of recoverability. Recoverability depends on several factors beyond just the presence of LNAPL in a well. Migrating LNAPL is LNAPL that spreads laterally because of LNAPL head (ITRC 2018). Data collected from multiple wells and in February 2023 indicate that LNAPL is not migrating laterally from LAI-8. Additionally, as a result of *in situ* treatment described above, the dissolved groundwater contaminated plume is shrinking laterally over time.

LNAPL Transmissivity

LNAPL transmissivity (LNAPL T_n) is the key indicator of LNAPL recoverability (removal of free-phase LNAPL from the subsurface). LNAPL T_n is a reliable indicator of the ability of LNAPL to migrate through a formation and depends on soil type, LNAPL physical properties, LNAPL saturation, and quantity of mobile LNAPL. Because LNAPL T_n is related to all key variables that effect recoverability, it is the best metric to use for assessment in place of using standalone in-well thickness measurements (ITRC 2018). The higher the LNAPL T_n, the greater the LNAPL recoverability. LNAPL T_n has been well studied and the ITRC has published extensive guidance on its use for LNAPL sites (ITRC 2018). Hydraulic or pneumatic recovery extraction systems can practically recover LNAPL T_n to values of 0.1 square feet per day (ft^2/day) to 0.8 ft^2/day (ITRC 2018). If the LNAPL T_n is below this acceptable LNAPL T_n range, then the rate of LNAPL recovery is beyond the practical active recovery range. Even when LNAPL T_n is below the practical recovery range, occasional or consistent in-well LNAPL may be present for the reasons described above. When LNAPL transmissivity is below 0.1 to 0.8 ft^2/day, the recovery rate has reached asymptotic conditions and ongoing active LNAPL recovery or free product mass removal will be minimal and generally no greater than passive LNAPL migration into the well. When LNAPL T_n is low, the formation of LNAPL saturation is at or below residual LNAPL saturation and hydraulic recovery will not remove a significant volume of contaminant mass.

The calculated LNAPL T_n in the vicinity of LAI-8 is 0.0007 ft^2/day to 0.0408 ft^2/day using the simplified Darcy's law calculation based on LNAPL product and Site parameters (Table 3). The calculated LNAPL T_n is an order of magnitude or more below the lowest acceptable criteria for active hydraulic or pneumatic recovery. This data indicates the LNAPL body at LAI-8 is stable and no significant mass recovery will occur using hydraulic or pneumatic active recovery technologies based on the published ITRC guidance.

Conclusions and Recommendations

No evidence exists supporting a new release, and the LNAPL and TPH concentrations present within monitoring well LAI-8 is consistent with the 2006 coolant release. LNAPL mass recovery is impracticable using hydraulic or pneumatic recovery technologies based on the calculated LNAPL transmissivity.

TPH in Groundwater

Data indicate *in situ* aerobic treatment near the Building Sump from 2008 through 2017 has reduced TPH concentrations to below the Site-specific cleanup levels at the highest TPH concentration location (LAI-4). Current TPH concentrations are low and only exceed the Site-specific cleanup level at two locations, LAI-8 and DP-1 (shallow interval), in a localized area. The likely explanation for increased TPH-Dx concentrations at LAI-8 is movement of contamination from the 2006 Coolant Release Area due to extraction at DP-1 through November 2017 and proximity to the electron donor from the cVOC

Stagnation Area injection as potentially indicated by the Group B "bundle of discrete peaks" shown in the chromatogram response.

LNAPL at Monitoring Well LAI-8

LNAPL at LAI-8 does not appear to be migrating and groundwater TPH concentrations are low at neighboring wells. Mass recovery will be impracticable using enhanced hydraulic or pneumatic recovery technologies as demonstrated by the calculated LNAPL T_n; LNAPL cannot be completely removed from the soil and groundwater bearing zone in the vicinity of LAI-8 by active hydraulic recovery methods. The multiple lines of evidence to support this conclusion are as follows:

- The calculated LNAPL transmissivity in the vicinity of LAI-8 is 0.0007 ft^2/day to 0.0408 ft^2/day using a simplified Darcy's law calculation based on the LNAPL physical properties and Site parameters. The calculated LNAPL transmissivity is well below the lowest acceptable criteria (0.1 to 0.8 ft^2/day) for active hydraulic or pneumatic recovery. LNAPL transmissivity is a reliable metric for demonstrating *in situ* recovery potential.
- Based on the low rate of LNAPL transmissivity, the recovery of LNAPL mass under active recovery via hydraulic or pneumatic enhancement will not be significantly greater than LNAPL recovery under passive conditions.
- Review of sample collection forms from 2006 to Present at the Coolant Release Area monitoring wells indicate that sheen has periodically been present at LAI-8 dating back to November 2006. LNAPL described at LAI-8 is consistent with measurable product descriptions at LAI-4 in 2006.

Recommendations/Action

- Due to the complex nature of the groundwater sample matrix (coolant mix and influence of the cVOC Stagnation Area #2 injection), there have been inconsistencies in the silica gel cleanup technique. Starting in 2023, TPH-D groundwater samples will be submitted to Apex instead of the current laboratory (Eurofins Lancaster Laboratories) for its unique expertise in TPH analysis, and Apex will use a polar surrogate to monitor the effectiveness of the silica gel column cleanup.
- TPH groundwater monitoring will continue at LAI-8, DP-1s, and downgradient well BOP-10(s) on a quarterly basis throughout 2023. A complete evaluation of these results will be provided in the annual report (anticipated submittal mid-March 2024).
- Passive recovery of mobile LNAPL fraction at LAI-8 has been implemented prior to sampling in February and May using a bailer; however, beginning in July 2023 passive recovery will be undertaken using sorbent passive down-well socks. A down-well sock will be left in-place between sampling events, prior to groundwater sampling the down-well sock will be removed and the LNAPL fraction recovered will be recorded and presented in the annual report.

Use of This Report

This Technical Memorandum has been prepared for the exclusive use of The Boeing Company for specific application to the February 2023 Coolant Area investigation and LNAPL evaluation and recoverability for monitoring well LAI-8. No other party is entitled to rely on the information, conclusions, and recommendations included in this document without the express written consent of Landau. Further, the reuse of information, conclusions, and recommendations provided herein for extensions of the project or for any other project, without review and authorization by Landau, shall be at the user's sole risk. Landau warrants that within the limitations of scope, schedule, and budget, our services have been provided in a manner consistent with that level of care and skill ordinarily exercised by members of the profession currently practicing in the same locality under similar conditions as this project. We make no other warranty, either express or implied.

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EMW/CMG/SEF/ljl
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Attachments

Figure 1: Boeing Portland Site Map
Figure 2: Coolant Release Area
Figure 3: TPH-Dx at LAI-8 and Groundwater Elevations
Figure 4: Coolant Release Area Groundwater Results February 2023
Table 1: TPH-Dx Analytical Results
Table 2: VOC Analytical Results
Table 3: Monitoring Well LAI-8 Transmissivity Calculations
Attachment 1: Apex Laboratories Forensic Evaluation Report
Attachment 2: Triton Analytics Certificate of Analysis

References

ITRC. 2018. Light Non-Aqueous Phase Liquid (LNAPL) Site Management: LCSM Evolution, Decision Process, and Remedial Technologies. Appendix C – Transmissivity (T_n) Appendix. LNAPL-3. Washington, D.C. Interstate Technology & Regulatory Council.

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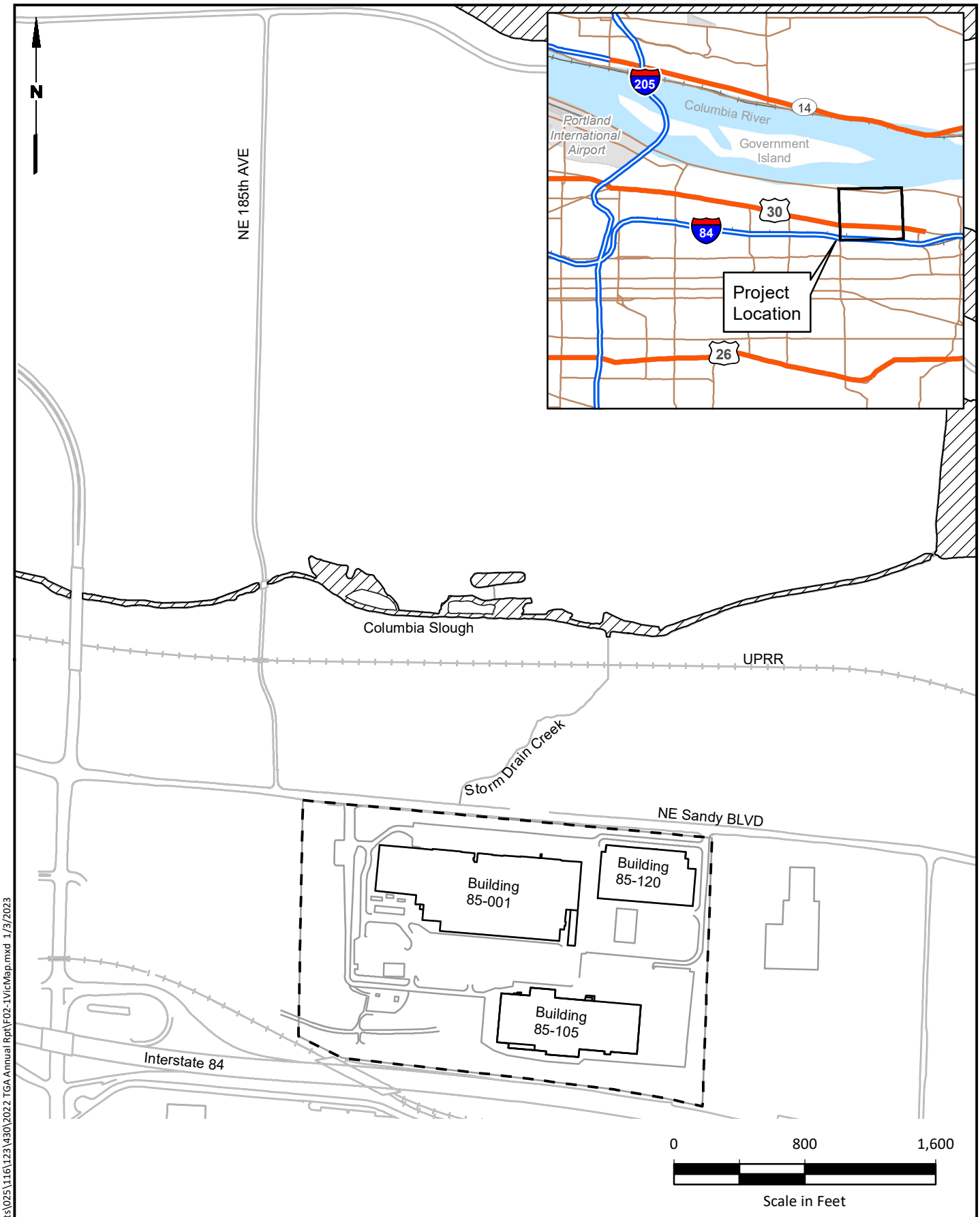

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Boeing Portland Gresham, Oregon	**Boeing Portland Site Map**	Figure 1

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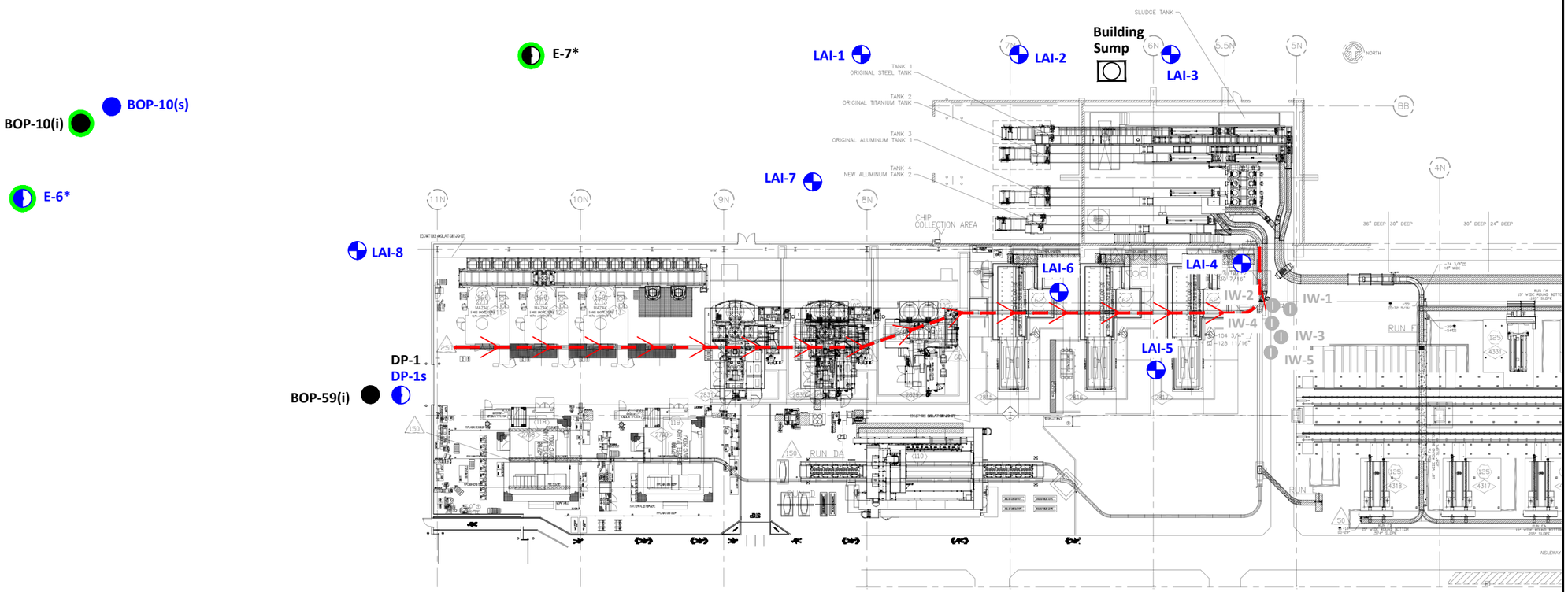

Legend

- EHC-O Injection Well (Decommissioned in January 2023)
- 2017 cVOC Stagnation Area Injection Well
- * Extraction Well Shutdown in 2003 Prior to Coolant Area Release
- Coolant Flume and Direction
- Groundwater Flow Direction

February 2023 Coolant Area Investigation

- TGA Extraction Well
- TGA Monitoring Well
- Coolant Release Monitoring Well

Not Part of February 2023 Coolant Area Investigation

- TGA Extraction Well
- TGA Monitoring Well
- Coolant Release Monitoring Well

Notes

1. Figure only shows northwest portion of the building.
2. Black and white reproduction of this color original may reduce its effectiveness and lead to incorrect interpretation.

0 50 100
Scale in Feet

Source: Boeing, 2006

Boeing Portland Gresham, Oregon	**Coolant Release Area**	Figure 2

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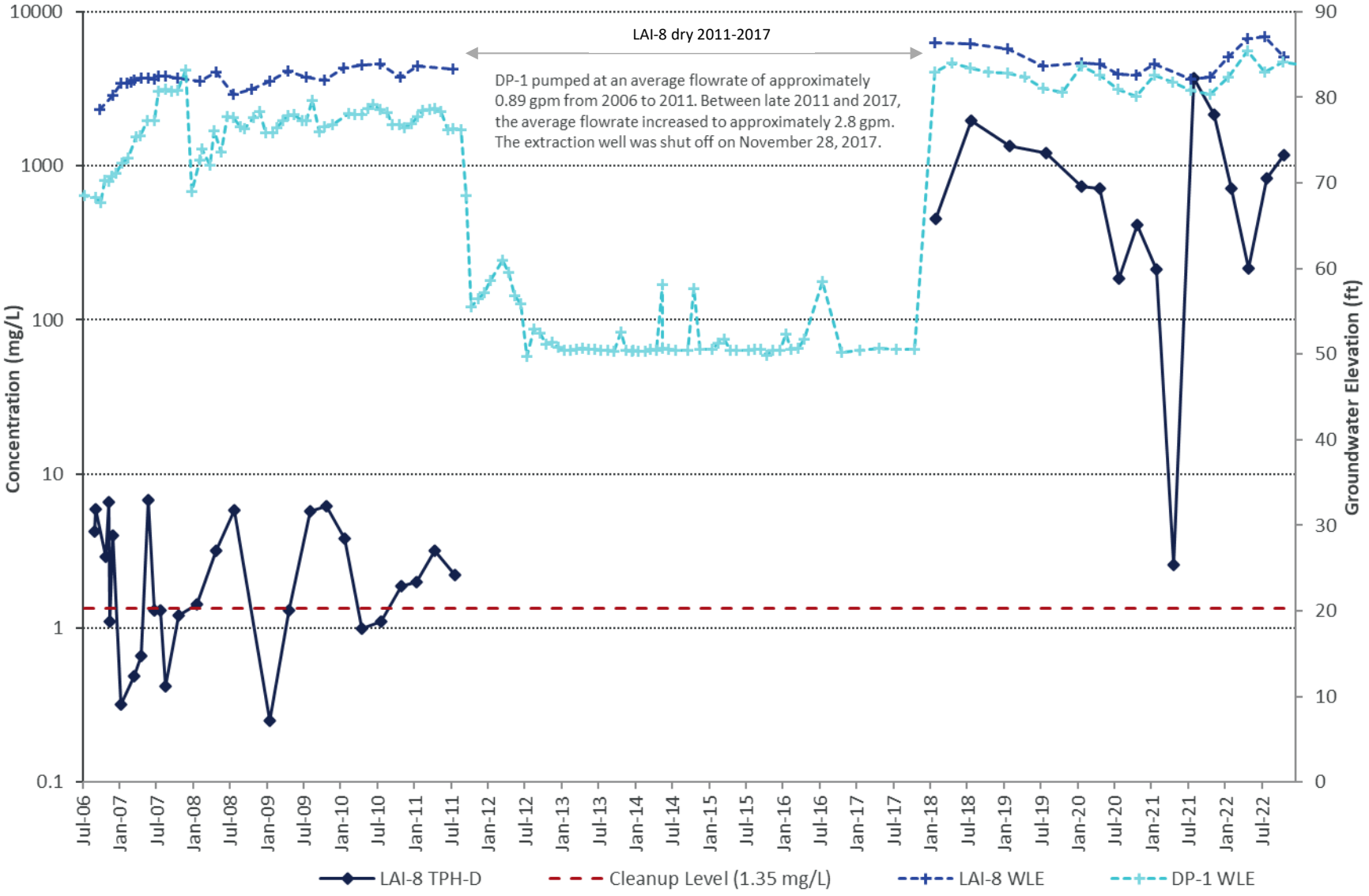

WLE = water level elevation

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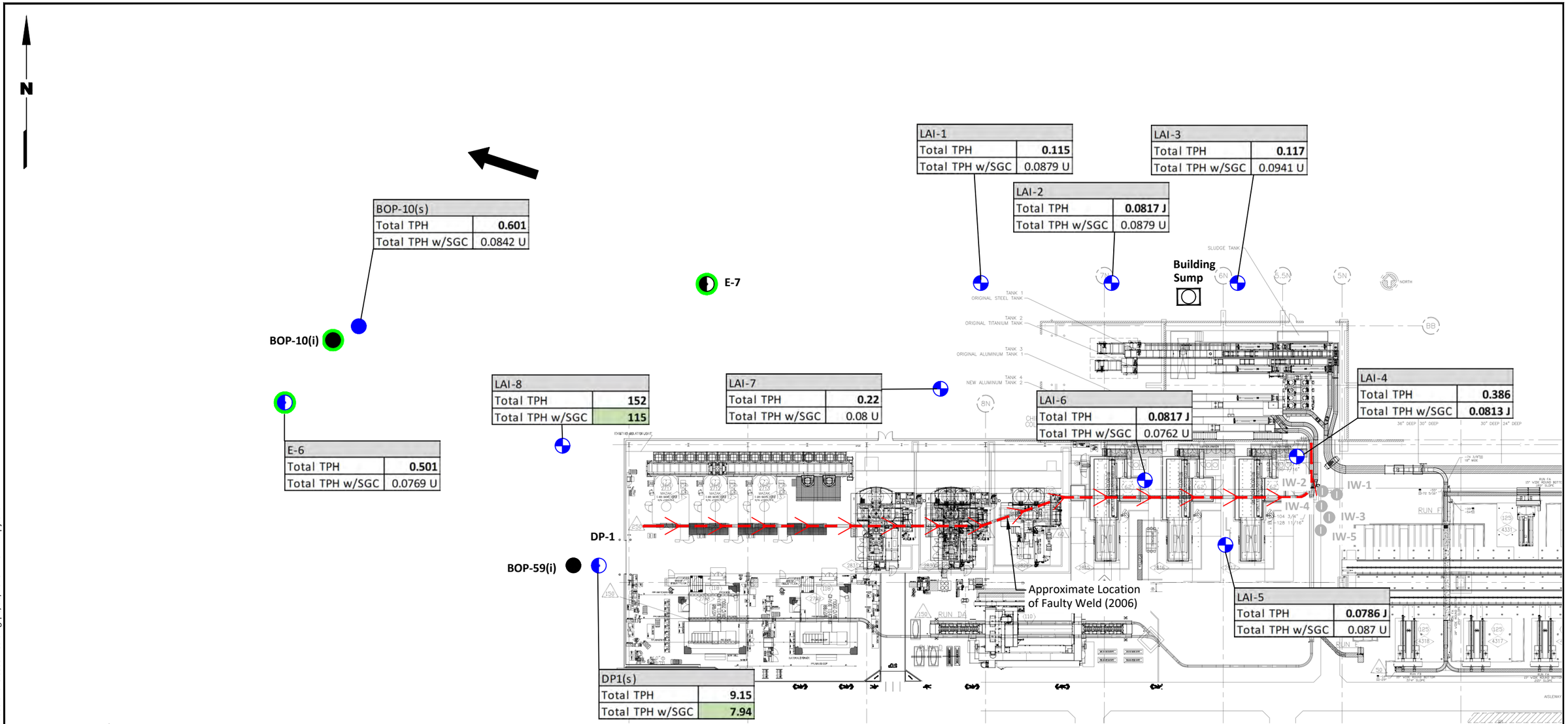
Boeing Portland Gresham, Oregon	**TPH-Dx at LAI-8 and Groundwater Elevations**	Figure 3



Legend

- EHC-O Injection Well (Decommissioned in January 2023)
- 2017 cVOC Stagnation Area Injection Well
- Coolant Flume and Direction
- Groundwater Flow Direction

LAI-8	
Total TPH	152
Total TPH w/SGC	115

Well ID
TPH (mg/L)
TPH with silica gel cleanup (mg/L)

Result exceeds Site-specific cleanup level (1.35 mg/L)

February 2023 Coolant Area Investigation

- TGA Extraction Well
- TGA Monitoring Well
- Coolant Release Monitoring Well

Not Part of February 2023 Coolant Area Investigation

- TGA Extraction Well
- TGA Monitoring Well
- Coolant Release Monitoring Well

Notes

1. Figure only shows northwest portion of the building.
2. U = compound undetected at reported concentration
   J = result is an estimated quantity
   SGC = silica gel cleanup
   TPH = Total petroleum hydrocarbon
3. All results are posted in mg/L
4. Green box - Result exceeds Site-specific cleanup level (1.35 mg/L)
5. Bold concentration indicates detected analyte.
6. Black and white reproduction of this color original may reduce its effectiveness and lead to incorrect interpretation.

0 50 100
Scale in Feet

Source: Boeing, 2006

Boeing Portland Gresham, Oregon	**Coolant Release Area Groundwater Results February 2023**	Figure 4

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Table 1
TPH-Dx Analytical Results
85-105 Coolant Release Area
Boeing Portland
Gresham, Oregon

Field Sample ID	Sample Date	Diesel (without Silica Gel Cleanup)	Motor Oil (without Silica Gel Cleanup)	Total TPH (without Silica Gel Cleanup)	Diesel (with Silica Gel Cleanup)	Motor Oil (with Silica Gel Cleanup)	Total TPH (with Silica Gel Cleanup)
Site-Specific Cleanup Level:		--	--	--	--	--	1.35
BOP-10s	2/8/2023	**0.601**	0.0842 U	**0.601**	0.0421 U	0.0842 U	0.0842 U
DP1s	2/8/2023	**9.15**	0.784 U	**9.15**	**7.94**	0.0784 U	**7.94**
E-6	2/10/2023	**0.501**	0.0769 U	**0.501**	0.0385 U	0.0769 U	0.0769 U
LAI-1	2/9/2023	**0.115**	0.0879 U	**0.115**	0.044 U	0.0879 U	0.0879 U
LAI-2	2/10/2023	**0.0817 J**	0.0879 U	**0.0817 J**	0.044 U	0.0879 U	0.0879 U
LAI-3	2/10/2023	**0.117**	0.0941 U	**0.117**	0.0471 U	0.0941 U	0.0941 U
LAI-4	2/8/2023	**0.386**	0.0816 U	**0.386**	**0.0813 J**	0.0816 U	**0.0813 J**
LAI-5	2/9/2023	**0.0786 J**	0.087 U	**0.0786 J**	0.0435 U	0.087 U	0.087 U
LAI-6	2/9/2023	**0.0817 J**	0.0941 U	**0.0817 J**	0.0381 U	0.0762 U	0.0762 U
LAI-7	2/8/2023	**0.22**	0.08 U	**0.22**	0.04 U	0.08 U	0.08 U
LAI-8	2/8/2023	**152**	8.99 U	**152**	**115**	8.99 U	**115**

Notes:

All results are in mg/L.

Bold text indicates detected analyte.

Green shading indicates detected analyte exceeds applicable cleanup level.

U = The analyte was analyzed for, but was not detected above the level of the reported sample quantitation limit.

J = The result is an estimated quantity. The associated numerical value is the approximate concentration.

Acronyms/Abbreviations:

ID = Identification

mg/L = milligrams per liter

TPH = total petroleum hydrocarbons

Table 2
VOC Analytical Results
85-105 Coolant Release Area
Boeing Portland
Gresham, Oregon

Analyte	Site-Specific Cleanup Level	Location ID, Laboratory SDG, Sample Date										
		BOP-10s 2/8/2023 A3B0408	DP1s 2/8/2023 A3B0408	E-6 2/10/2023 A3B0416	LAI-1 2/9/2023 A3B0408	LAI-2 2/10/2023 A3B0416	LAI-3 2/10/2023 A3B0416	LAI-4 2/8/2023 A3B0408	LAI-5 2/9/2023 A3B0408	LAI-6 2/9/2023 A3B0408	LAI-7 2/8/2023 A3B0408	LAI-8 2/8/2023 A3B0408
Volatile Organic Compounds (µg/L; SW-846 8260D)												
1,1,1,2-Tetrachloroethane	N/A	0.200 U	0.200 U	0.200 U	0.200 U	0.200 U	0.200 U	0.200 U	0.200 U	0.200 U	0.200 U	0.400 U
1,1,1-Trichloroethane	200	0.200 U	0.200 U	0.200 U	0.200 U	0.200 U	0.200 U	0.200 U	0.200 U	0.200 U	0.200 U	0.400 U
1,1,2,2-Tetrachloroethane	N/A	0.250 U	0.250 U	0.250 U	0.250 U	0.250 U	0.250 U	0.250 U	0.250 U	0.250 U	0.250 U	0.500 U
1,1,2-Trichloroethane	N/A	0.250 U	0.250 U	0.250 U	0.250 U	0.250 U	0.250 U	0.250 U	0.250 U	0.250 U	0.250 U	0.500 U
1,1-Dichloroethane	N/A	0.200 U	0.200 U	0.200 U	0.200 U	0.200 U	0.200 U	0.200 U	0.200 U	0.200 U	0.200 U	0.400 U
1,1-Dichloroethene	7	0.200 U	0.200 U	0.200 U	0.200 U	0.200 U	0.200 U	0.200 U	0.200 U	0.200 U	0.200 U	0.400 U
1,1-Dichloropropene	N/A	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	1.00 U
1,2,3-Trichlorobenzene	N/A	1.00 U	1.00 U	1.00 U	1.00 U	1.00 U	1.00 U	1.00 U	1.00 U	1.00 U	1.00 U	2.00 U
1,2,3-Trichloropropane	N/A	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	1.00 U
1,2,4-Trichlorobenzene	N/A	1.00 U	1.00 U	1.00 U	1.00 U	1.00 U	1.00 U	1.00 U	1.00 U	1.00 U	1.00 U	2.00 U
1,2,4-Trimethylbenzene	N/A	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	1.00 U
1,2-Dibromo-3-chloropropane	N/A	2.50 U	2.50 U	2.50 U	2.50 U	2.50 U	2.50 U	2.50 U	2.50 U	2.50 U	2.50 U	5.00 U
1,2-Dichlorobenzene	N/A	0.250 U	0.250 U	0.250 U	0.250 U	0.250 U	0.250 U	0.250 U	0.250 U	0.250 U	0.250 U	0.500 U
1,2-Dichloroethane	N/A	0.200 U	0.200 U	0.200 U	0.200 U	0.200 U	0.200 U	0.200 U	0.200 U	0.200 U	0.200 U	0.400 U
1,2-Dichloropropane	N/A	0.250 U	0.250 U	0.250 U	0.250 U	0.250 U	0.250 U	0.250 U	0.250 U	0.250 U	0.250 U	0.500 U
1,3,5-Trimethylbenzene	N/A	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	1.00 U
1,3-Dichlorobenzene	N/A	0.250 U	0.250 U	0.250 U	0.250 U	0.250 U	0.250 U	0.250 U	0.250 U	0.250 U	0.250 U	0.500 U
1,3-Dichloropropane	N/A	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	1.00 U
1,4-Dichlorobenzene	N/A	0.250 U	0.250 U	0.250 U	0.250 U	0.250 U	0.250 U	0.250 U	0.250 U	0.250 U	0.250 U	0.500 U
2,2-Dichloropropane	N/A	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	1.00 U
2-Butanone/MEK	N/A	5.00 U	5.00 U	5.00 U	5.00 U	5.00 U	5.00 U	5.00 U	5.00 U	5.00 U	5.00 U	**48.8**
2-Chlorotoluene	N/A	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	1.00 U
2-Hexanone	N/A	5.00 U	5.00 U	5.00 U	5.00 U	5.00 U	5.00 U	5.00 U	5.00 U	5.00 U	5.00 U	**14.4 J**
4-Chlorotoluene	N/A	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	1.00 U
4-Isopropyltoluene	N/A	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	1.00 U
4-Methyl-2-pentanone (MIBK)	N/A	5.00 U	5.00 U	5.00 U	5.00 U	5.00 U	5.00 U	5.00 U	5.00 U	5.00 U	5.00 U	10.0 U
Acetone	N/A	10.0 U	10.0 U	**77.0**	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U	20.0 U	**422**
Acrylonitrile	N/A	1.00 U	1.00 U	1.00 U	1.00 U	1.00 U	1.00 U	1.00 U	1.00 U	1.00 U	1.00 U	2.00 U
Benzene	N/A	0.100 U	0.100 U	0.100 U	0.100 U	0.100 U	0.100 U	0.100 U	0.100 U	0.100 U	0.100 U	0.200 U
Bromobenzene	N/A	0.250 U	0.250 U	0.250 U	0.250 U	0.250 U	0.250 U	0.250 U	0.250 U	0.250 U	0.250 U	0.500 U
Bromochloromethane	N/A	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	1.00 U
Bromodichloromethane	N/A	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	1.00 U
Bromoform	N/A	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	1.00 U
Bromomethane	N/A	5.00 U	5.00 U	5.00 U	5.00 U	5.00 U	5.00 U	5.00 U	5.00 U	5.00 U	5.00 U	10.0 U
Carbon Disulfide	N/A	5.00 U	5.00 U	5.00 U	5.00 U	5.00 U	5.00 U	5.00 U	5.00 U	5.00 U	5.00 U	10.0 U
Carbon Tetrachloride	N/A	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	1.00 U
Chlorobenzene	N/A	0.250 U	0.250 U	0.250 U	0.250 U	0.250 U	0.250 U	0.250 U	0.250 U	0.250 U	0.250 U	0.500 U
Chloroethane	N/A	5.00 U	5.00 U	5.00 U	5.00 U	5.00 U	5.00 U	5.00 U	5.00 U	5.00 U	5.00 U	10.0 U
Chloroform	N/A	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	1.00 U
Chloromethane	N/A	2.50 U	2.50 U	2.50 U	2.50 U	2.50 U	2.50 U	2.50 U	2.50 U	2.50 U	2.50 U	5.00 U
cis-1,2-Dichloroethene	70	**0.550**	0.200 U	**56.9**	0.200 U	0.200 U	0.200 U	0.200 U	**0.420**	0.200 U	**4.33**	**3.52**
cis-1,3-Dichloropropene	N/A	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	1.00 U

Table 2
VOC Analytical Results
85-105 Coolant Release Area
Boeing Portland
Gresham, Oregon

Analyte	Site-Specific Cleanup Level	Location ID, Laboratory SDG, Sample Date										
		BOP-10s 2/8/2023 A3B0408	DP1s 2/8/2023 A3B0408	E-6 2/10/2023 A3B0416	LAI-1 2/9/2023 A3B0408	LAI-2 2/10/2023 A3B0416	LAI-3 2/10/2023 A3B0416	LAI-4 2/8/2023 A3B0408	LAI-5 2/9/2023 A3B0408	LAI-6 2/9/2023 A3B0408	LAI-7 2/8/2023 A3B0408	LAI-8 2/8/2023 A3B0408
Dibromochloromethane	N/A	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	1.00 U
Dibromomethane	N/A	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	1.00 U
Dichlorodifluoromethane	N/A	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	1.00 U
Ethylbenzene	N/A	0.250 U	0.250 U	0.250 U	0.250 U	0.250 U	0.250 U	0.250 U	0.250 U	0.250 U	0.250 U	0.500 U
Ethylene Dibromide	N/A	0.250 U	0.250 U	0.250 U	0.250 U	0.250 U	0.250 U	0.250 U	0.250 U	0.250 U	0.250 U	0.500 U
Hexachlorobutadiene	N/A	2.50 U	2.50 U	2.50 U	2.50 U	2.50 U	2.50 U	2.50 U	2.50 U	2.50 U	2.50 U	5.00 U
Isopropylbenzene	N/A	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	1.00 U
m,p-Xylene	N/A	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	1.00 U
Methylene Chloride	N/A	5.00 U	5.00 U	5.00 U	5.00 U	5.00 U	5.00 U	5.00 U	5.00 U	5.00 U	5.00 U	10.0 U
Methyl-tert-butyl ether	N/A	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	1.00 U
Naphthalene	N/A	1.00 U	1.00 U	1.00 U	1.00 U	1.00 U	1.00 U	1.00 U	1.00 U	1.00 U	1.00 U	2.00 U
n-Butylbenzene	N/A	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	1.00 U
n-Propylbenzene	N/A	0.250 U	0.250 U	0.250 U	0.250 U	0.250 U	0.250 U	0.250 U	0.250 U	0.250 U	0.250 U	0.500 U
o-Xylene	N/A	0.250 U	0.250 U	0.250 U	0.250 U	0.250 U	0.250 U	0.250 U	0.250 U	0.250 U	0.250 U	0.500 U
sec-Butylbenzene	N/A	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	1.00 U
Styrene	N/A	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	1.00 U
tert-Butylbenzene	N/A	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	1.00 U
Tetrachloroethene	5	**0.630**	0.200 U	0.200 U	**4.73**	**0.960**	**0.210 J**	0.200 U	0.200 U	0.200 U	**1.12**	0.400 U
Toluene	N/A	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	1.00 U
trans-1,2-Dichloroethene	N/A	0.200 U	0.200 U	**0.920**	0.200 U	0.200 U	0.200 U	0.200 U	0.200 U	0.200 U	**0.210 J**	0.400 U
trans-1,3-Dichloropropene	N/A	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	1.00 U
Trichloroethene	5	**0.770**	0.200 U	**4.61**	**0.890**	0.200 U	0.200 U	0.200 U	**0.600**	0.200 U	**3.50**	**0.700 J**
Trichlorofluoromethane (CFC 11)	N/A	1.00 U	1.00 U	1.00 U	1.00 U	1.00 U	1.00 U	1.00 U	1.00 U	1.00 U	1.00 U	2.00 U
Vinyl Chloride	2	0.200 U	0.200 U	**10.8** [a]	0.200 U	0.200 U	0.200 U	0.200 U	0.200 U	0.200 U	0.200 U	**0.600 J**

Notes:

[a] Enhanced biodegradation is occurring at E-6, vinyl chloride concentrations have generally been decreasing since May 2020.

Bold text indicates detected analyte**.**

Green shading indicates detected analyte exceeds applicable cleanup level.

U = The analyte was analyzed for, but was not detected above the level of the reported sample quantitation limit.

J = The result is an estimated quantity. The associated numerical value is the approximate concentration of the analyte in the sample

Acronyms/Abbreviations:

µg/L = micrograms per liter
ID = Identification
N/A = not applicable
SDG = sample delivery group

Table 3
Monitoring Well LAI-8 Transmissivity Calculations
LNAPL Recoverability Assessment
Boeing Portland
Gresham, Oregon

Parameters	Value	Reference Document
Groundwater Hydraulic Conductivity, K_w (feet/day)	See below	Phase I Investigation (Section 4.2.4; Landau 1988) 0.45-30 ft/day in TGA wells, at BOP-10i (near well LAI-8) 0.50 ft/day.
LNAPL Relative Permeability, k_{rn} (dimensionless)	0.28	assume 0.28; See ITRC LNAPL-3 Guidance, Appendix C - Section 3.2.1
Groundwater Density, ρ_w (grams/milliliter)	1.0002	Triton Analytics Report at 13 deg C
Groundwater Viscosity, μ_w (centipose)	1	assume 1 cP at 20 deg C
LNAPL Density, ρ_n (grams/milliliter)	0.948	Triton Analytics Report
LNAPL Viscosity, μ_n (centipose)	273	Triton Analytics Report at 13 deg C
LNAPL Thickness in well, b_n (feet)	1.4	Maximum LNAPL thickness measured to date (May 11, 2023)
$T_n = K_w \cdot k_{rn} \cdot \frac{\rho_n \mu_w}{\rho_w \mu_n} \cdot b_n$ **T_n (ft^2/day)=**	**0.0007**	0.5 ft/day Kw (Landau 1988; well BOP-10i adjacent to 2006 Coolant Release Area)
	0.0408	30 ft/day Kw (Landau 1988; well BOP-4i maximum value for site-TGA wells)

Abbreviations and Acronyms:

cP = centipose

deg C = degrees Celsius

ft^2/day = square feet per day

g/mL = grams per milliliter

ITRC = Interstate Technology & Regulatory Council

Landau = Landau Associates, Inc.

LNAPL = light non-aqueous phase liquid

Reference:

Landau. 1988. Final Report: Phase I Investigation, Boeing Portland. Landau Associates, Inc. March 17.

ATTACHMENT 1

Apex Laboratories Forensic Evaluation Report

June 29, 2023

Erin Waibel
Landau Associates
1500 SW First Avenue, Suite 1015
Portland, OR 97201

Dear Ms. Waibel:

Included are the results from the characterization of the product and water samples for your Boeing Portland 85-105 Investigation, 025116.123.450 project. The samples were collected on February 7, 8, and 9, 2023 and submitted in good condition to Apex Forensics on February 9, 2023. The samples were assigned work order number A3B0408 and placed in a refrigerator maintained at 6°C until removed for sample processing.

1.0 INTRODUCTION

This Site has been impacted by dissolved and free phase contaminants since sometime prior to 2007. The focus of this investigation was to determine whether or not the data indicates that a significant additional release of DRO/RRO range material has occurred recently (i.e. within the last 5 years).

As part of this evaluation, we completed testing on the water and product samples submitted in order to characterize and quantify the Diesel Range Organic (DRO) and Residual Range Organic (RRO) contamination present. In addition, historical data provided which included DRO/RRO measurements made at the Site in between 2006 and 2023 were included in the evaluation.

The summary of findings provided below includes a description of the water, product, and water soluble fraction (WSF) testing completed at Apex; characterization of the contamination based on this testing; and a comparison of these results to the historical data provided. This summary includes characterization of the single location currently impacted with LNAPL (LAI-8). In addition, the LNAPL at this location was compared to reference materials of products currently used at the on-site manufacturing facility.

2.0 WATER SAMPLE ANALYSIS SUMMARY

The water samples BOP-10s-0223, DP1-S-0223, E-6-0223-SP, LAI-1-0223, LAI-2-0223, LAI-3-0223, LAI-4-0223-SP, LAI-5-0223, LAI-6-0223, LAI-7-0223-SP, and LAI-8-0223-SP were analyzed for DRO and RRO with and without silica gel column cleanup (SGCC) using a gas chromatograph fitted with a flame ionization detector (GC/FID) following WADOE Method NWTPH-Dx. These samples as well as the samples Tripblank1-020823, Tripblank1-020923, Tripblank3-020823, and Tripblank1-021023 were analyzed for volatile organic compounds (VOCs) using a GC fitted with a mass spectrometer (MS) following EPA Method 8260D. The results of this testing, including the associated quality assurance, are enclosed as Appendix A. The GC/FID traces generated from the NWTPH-Dx with and without silica gel column cleanup analysis are provided as Appendices B and C, respectively.

3.0 PRODUCT SAMPLE ANALYSIS SUMMARY

The product samples Coolant-0223, CoolantMix-0223, Syntilo-0223, and LAI-8-Prod-0223 were analyzed using the American Society for Testing and Materials (ASTM) Method D2887-14. The ASTM Method D2887-14 was completed in order to determine the boiling range and chemical composition of the fuel or fuels present in these samples. Due to the varying viscosity and water solubility of the products submitted for ASTM D2887-14 characterization, multiple extraction techniques were needed as follows:

- **LAI-8-Prod-0223 (A3B0408-04)**: This sample was soluble in methylene chloride and not soluble in water. This sample was too viscous to pull directly into a syringe. The sample was prepared by diluting 0.2 grams of the sample into 1.8 mL of methylene chloride containing the retention time marker pentacosane.

- **Coolant-0223 (A3B0408-01)**: This sample was soluble in methylene chloride and water but was too viscous to pull into a syringe. The sample was prepared by diluting 0.2 grams of the sample into 1.8 mL of methylene chloride containing a retention time marker pentacosane.

- **CoolantMix-0223 (A3B0408-02)**: This sample was soluble in water and had little to no solubility directly into methylene chloride. 10 milliliters (ml) of the sample, 100 mL of deionized water, and 10 mL of methylene containing the retention time marker pentacosane were added to a 500 mL separatory funnel. The separatory funnel was shaken for 2-3 minutes and the contents were allowed to settle overnight. Due to an emulsion that formed in the separatory funnel, only 200 uL of solvent was recovered. This 200 uL of solvent was added to 200 uL of methylene chloride containing a retention time marker.

- **Syntilo-0223 (A3B0408-03)**: This sample was soluble in water and had little to no solubility directly into methylene chloride. 10 mL of the sample, 100 mL of deionized water, and 10 mL of methylene chloride containing the retention time marker pentacosane were added to a 500 mL separatory funnel. The separatory

funnel was shaken for 2-3 minutes and the contents were allowed to settle overnight. An adequate volume of solvent was recovered for the D2887-14 analysis.

The extracts were then analyzed using an Agilent 6890 GC/FID. SGCC was also performed on the extracts, and the extracts were reanalyzed using GC/FID. The GC/FID traces generated are enclosed as Appendix D. GC/FID traces of the method blank associated with the analytical batch as well as reference standards are also provided.

The GC/FID traces of the samples yielded detailed information on the boiling range and general chemical composition of the material that elutes under the ASTM Method D2887-14 GC/FID conditions between 36°C and 545°C. Detailed summaries characterizing the material identified in the samples Coolant-0223, CoolantMix-0223, Syntilo-0223, and LAI-8-Prod-0223 are enclosed.

4.0 DISCUSSION OF WATER RESULTS

4.1 REVIEW OF DRO RESULTS BEFORE AND AFTER SILICA GEL COLUMN CLEANUP

In 2023, Landau submitted 11 water samples to Apex for analysis of DRO/RRO before and after SGCC following WADOE Method NWTPH-Dx. The DRO quantifications for this testing are provided in Table 1.[1] These measurements were used to estimate the level of nonpolar and polar/semi-polar metabolite fractions present at each location. The results of this evaluation are summarized in Table 1.

Table 1. 2023 Apex DRO Results – Estimate of Non-Polar and Polar Metabolite Fractions (ug/L)

Sample ID	Group	Apex Lab ID	DRO (ug/L)	Estimated DRO Attributable to Non-Polar Compounds[2]	Estimated DRO Attributable to Polar Metabolites[3]
BOP-10s-0223	A & B	A3B0408-15	600	<42	600
DP1S-0223	A&C	A3B0408-06RE1	9,200	7,900	1,300
E-6-0223-SP	A & B	A3B0416-05RE1	500	<39	500
LAI-1-0223	A	A3B0408-11	120	<44	120
LAI-2-0223	A	A3B0416-02	82	<44	82
LAI-3-0223	A	A3B0416-03	120	<47	120
LAI-4-0223SP	A	A3B0408-07	390	81	310
LAI-5-0223	A	A3B0408-10	79	<44	79
LAI-6-0223	A	A3B0408-09	82	<38	82
LAI-7-0223-SP	A	A3B0408-08	220	<40	220
LAI-8-0223-SP	A&B&C	A3B0416-04RE1	150,000	120,000	35,000

As shown in Table 1, the BOP-10S-0223, DP1S, E-6-0223-SP, and LAI-8-0223-SP locations all contained 500 ppb or more DRO range material prior to the SGCC being performed. After

[1] All of the material present in these samples was quantified as DRO, therefore no RRO results are presented in Table 1.
[2] This value is equal to the DRO result after silica gel cleanup.
[3] This range was calculated as the DRO minus DRO with silica gel result. When DRO after silica gel column cleanup was non-detect, it was assumed that all material in the sample was polar/semi-polar in origin.

SGCC was performed, all locations except DP1S and LAI-8-0223-SP contained less than 100 ppb DRO range material due to non-polar compounds.

4.2 REVIEW OF NWTPH-DX GC/FID TRACES

The NWTPH-Dx GC/FID traces generated for the samples in Table 1 were then reviewed. For reference purposes, the GC/FID trace for one of the method blanks associated with these samples is provided as Figure 1. The GC/FID trace of an undegraded diesel fuel standard is provided as Figure 2.

In Figures 1 and 2, the peak corresponding to the extraction solvent is seen eluting between approximately 0.8 and 2.0 minutes on the GC/FID traces. Peaks corresponding to the surrogate compound (added as quality assurance check for this GC analysis) are seen eluting at approximately 6.2 minutes. The GC/FID trace of the method blank also shows presence of peaks eluting between 2.2 and 3.8 minutes which are indicative of laboratory contamination. The peaks corresponding to the extraction solvent, surrogate compound, and laboratory contamination are labeled on the GC/FID traces with a blue "x".

Figure 1. GC/FID trace of Method Blank

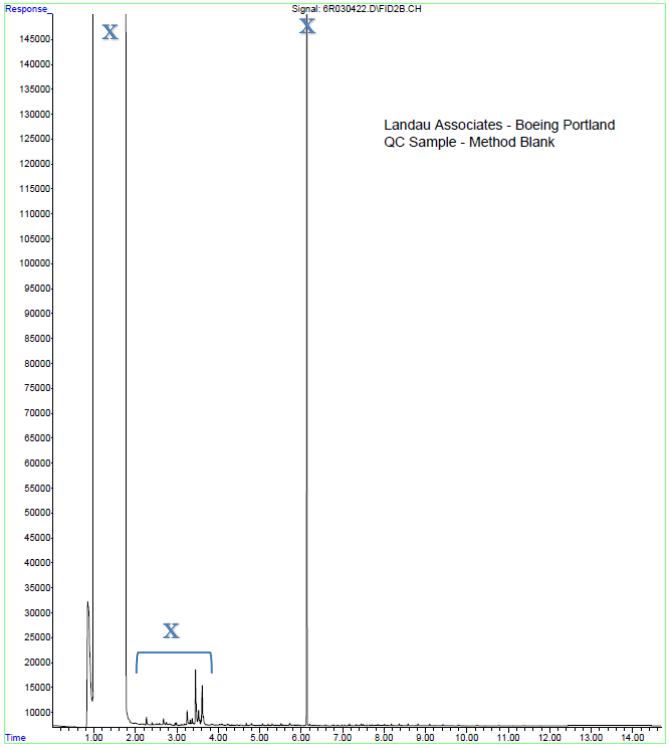
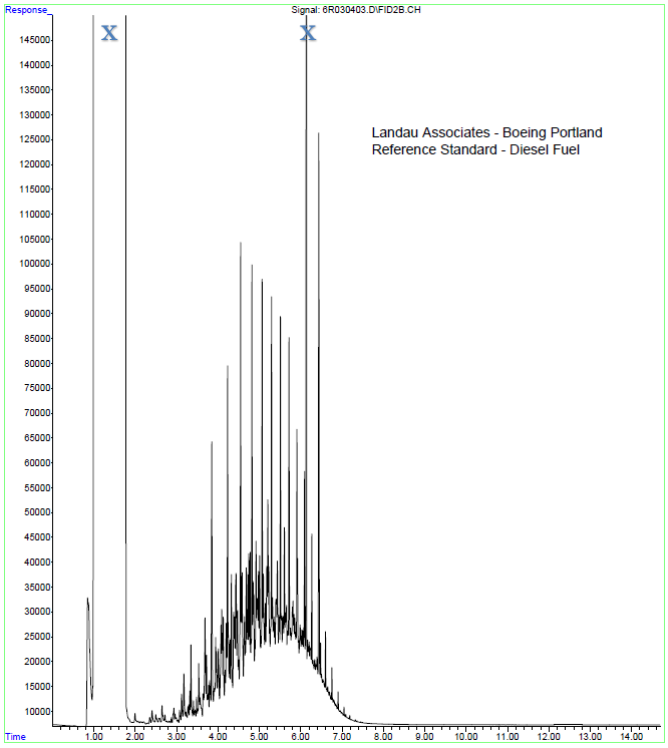


Figure 2. GC/FID trace of Diesel Fuel Standard



4.3 GROUPINGS OF MATERIALS IDENTIFIED

Based on the polarity and boiling point distribution of the contamination present in the water samples, three distinct material groups were identified. These materials are labeled in Table 1 as Group A, Group B, and Group C and are described as follows:

4.3.1 Dissolved Phase Group A – Polar/Semi-Polar Unresolved Complex Mixture

Based on review of the GC/FID traces generated, a portion or all of the material impacting the samples collected from the BOP-10s, DP1S, E-6, LAI-1, LAI-2, LAI-3, LAI-4, LAI-5, LAI-6, LAI-7, and LAI-8 locations is a medium to high boiling material. This material appears on the GC/FID traces as an irregular pattern of peaks on top of a broad hump or unresolved complex mixture (UCM). This material elutes between approximately *n*-C_{16} and *n*-C_{38} showing a maximum near *n*-C_{27}. This correlates to a temperature range of approximately 287°C to 512°C with a maximum near 423°C.

With the exception of the DP1S and LAI-8 samples, after SGCC was employed this polar UCM was substantially reduced or removed, indicating that the vast majority and/or all of the material present, depending on location, is polar/semi-polar in nature. For example, the GC/FID traces of the sample LAI-3-0223 before and after silica gel column cleanup are provided as Figures 3 and 4, respectively.

Figure 3. GC/FID trace of LAI-3-0223 before SGCC

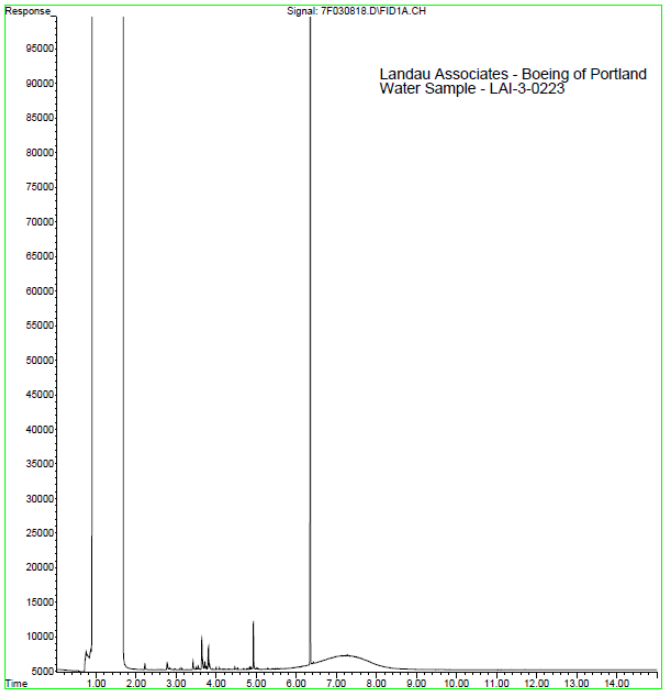
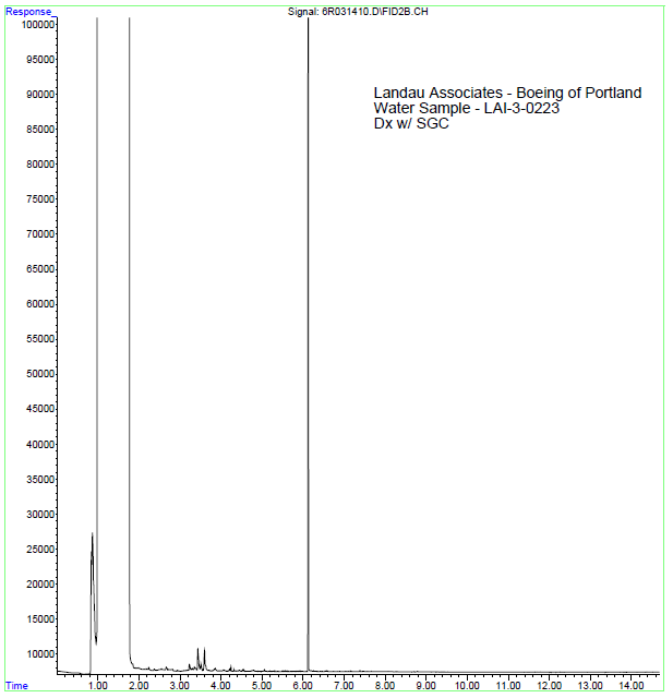


Figure 4. GC/FID trace of LAI-3-0223 after SGCC



It should be noted that the samples collected from the LAI-1, LAI-2, LAI-3, LAI-5, LAI-6 and possibly LAI-4 locations contain a single isolated polar/semi-polar peak eluting just before *n*-C_{14} on the GC/FID traces. This peak is characteristic of most samples in this group.

4.3.2 Dissolved Phase Group B – Polar/Semi-Polar Bundle of Discrete Peaks

Based on the GC/FID traces generated, the samples collected from the BOP-10s, E-6, and LAI-8 locations all contain an erratic pattern of peaks eluting between approximately *n*-C_{10} and *n*-C_{12} showing a maximum near *n*-C_{11}. This correlates to a temperature range of

approximately 174°C to 216°C with a maximum near 196°C. The bundle of erratic peaks present in the samples BOP-10s and E-6 appears to have been removed completely with SGCC of the sample extracts. That indicates that this bundle of discrete peaks is polar/semi-polar in origin.

Please note that for the sample LAI-8 which contains a mixture of materials, including a significant UCM, this bundle of polar/semi-polar peaks was only partially removed. This indicates that the SGCC cleanup procedure may not have been adequate to completely remove these polar/semi-polar compounds in this sample matrix. Because of this, we would recommend that any additional testing for NWTPH-DRO/RRO using SGCC require use of a polar surrogate, such as capric acid, to monitor the effectiveness of the SGCC.

For example, the GC/FID traces of the samples E-6-0223-SP before and after SGCC are provided as Figures 5 and 6, respectively.

Figure 5. GC/FID trace of E-6-0223-SP before SGCC

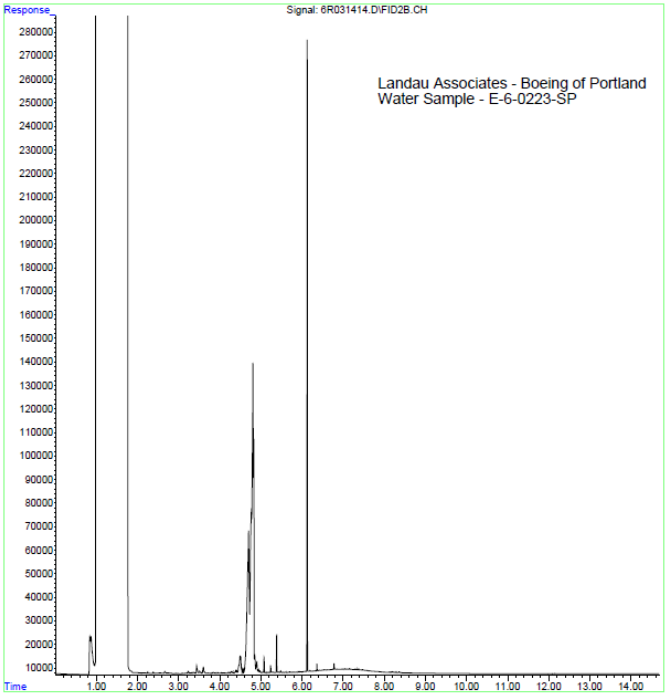
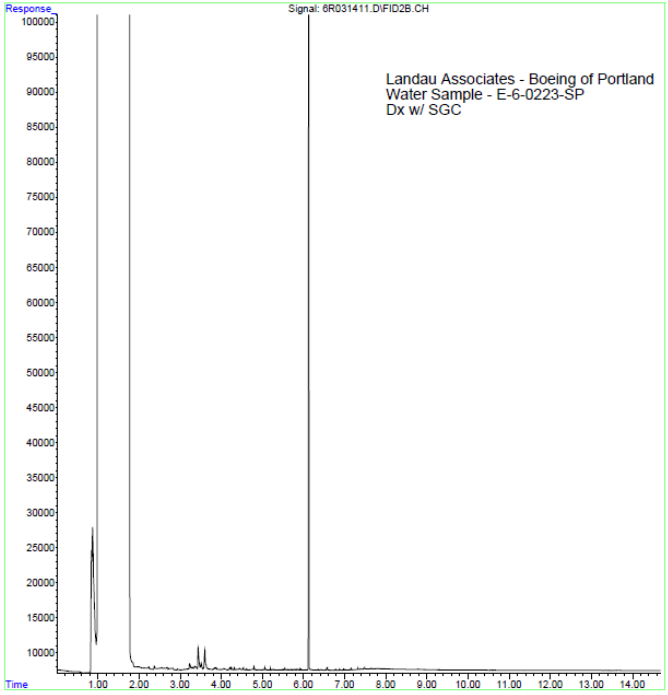


Figure 6. GC/FID trace of E-6-0223-SP after SGCC



It should also be noted the discrete bundle of polar compounds are the dominant contaminants at only the E-6 and BOP-10s locations. The discrete bundle of polar compounds are also present at LAI-8, but it is not the dominant contamination present at this location.

4.3.3 Dissolved Phase Group C – Non-Polar Unresolved Complex Mixture

Based on review of the GC/FID traces generated, the samples collected from the DP1S and LAI-8 locations contain medium to high boiling material that elutes as a broad hump or UCM. This material elutes between approximately *n*-C_{14} and *n*-C_{34} showing a maximum near

n-C_{17}. This correlates to a temperature range of approximately 254°C to 484°C with a maximum near 302°C.

After SGCC was employed, the level of DRO was reduced somewhat but the majority of this medium to high boiling material passed through the silica gel column and, therefore, would be considered non-polar/hydrocarbon in nature. This mass of dissolved phase impact of medium to high boiling, nonpolar compounds is higher than generally expected given the low water solubility of non-polar compounds in this boiling range. This indicates that the SGCC at these locations may have had significantly reduced effectiveness due to contaminant mass/matrix interference and/or contaminated sediment or sheen was present in these samples.

For example, the GC/FID traces of the samples DP1S-0223 before and after SGCC are provided as Figures 7 and 8, respectively.

Figure 7. GC/FID trace of DP1S-0223 before SGCC

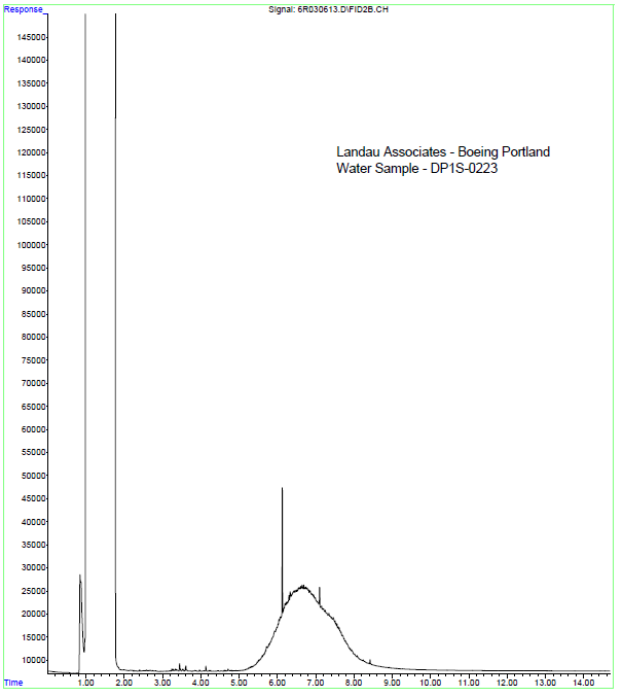
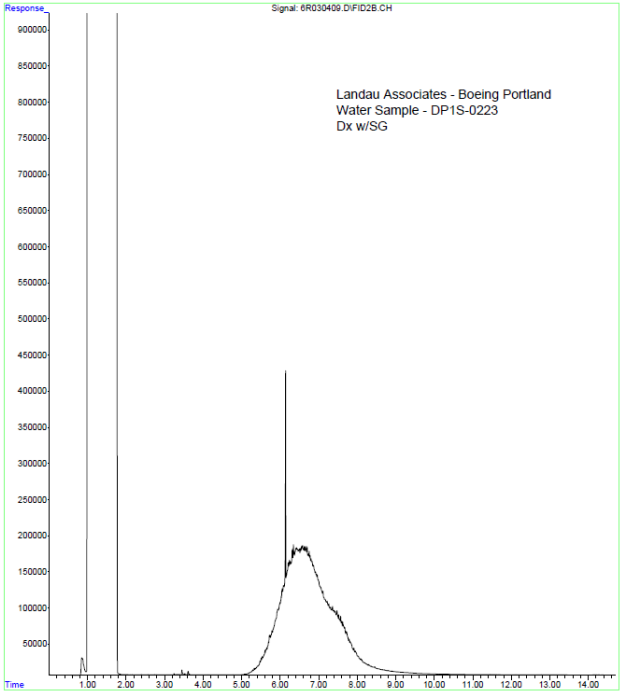


Figure 8. GC/FID trace of DP1S-0223 after SGCC



5.0 COMPARISON OF DRO/RRO FOR 2023, 2022, and 2006 SAMPLING EVENTS

The evaluation completed included comparison of the DRO quantifications of select water samples submitted to Apex in 2023, Eurofins in 2022/2023, and ARI in 2006. All of this testing was completed following NWPTH Methodology and included some type of silica gel and/or acid cleanup, although the specific procedure varied from lab to lab. The DRO quantifications after the silica gel and/or acid cleanup that were included in this evaluation are summarized in Table 2 below.

Table 2. Apex (2023), Eurofins (2022-2023), and ARI (2006) DRO+RRO after silica gel cleanup (ug/L)

Sample ID	2023 Estimated DRO Attributable to Non-Polar Compounds[4]	2022-2023 Estimated DRO(x) Attributable to Non-Polar Compounds	2006 Estimated DRO(x) Attributable to Non-Polar Compounds (ug/L)
	Apex Laboratory	Eurofins	Analytical Resources, Inc.
BOP-10s	<42	170 – 1,044	480 – 795
DP1S	7,900	15,500 – 60,000	not analyzed
E-6	<39	723 – 3,540	367 - <750
LAI-1	<44	not analyzed	<750
LAI-2	<44	101	477 - <750
LAI-3	<47	not analyzed	605 - <750
LAI-4	81	721 – 17,000	270,000 – 31,800,000
LAI-5	<44	130	<750 – 1,390
LAI-6	<38	<360	<750 – 1,680
LAI-7	<40	450 – 910	720 – 4,300
LAI-8	115,000	215,000 – 1,182,000	1,100 – 6,600

Based on review of Table 2, we have the following findings regarding the DRO quantifications provided by the laboratories at this Site:

- For locations BOP-10s, E-6, LAI-3, LAI-4, and LAI-7, the historical quantifications of DRO after silica gel cleanup are an order of magnitude or more higher than the quantifications from samples collected in 2023 and analyzed by Apex. This indicates that at these locations either a substantial decrease in contamination has occurred recently and/or the historical testing data may not be reliable including in the effectiveness of the silica gel cleanup methods employed by ARI and/or Eurofins.

  Please note that at locations BOP-10s and E-6 the quantification by Apex prior to SGCC does appear to be similar to the quantifications by Eurofins and/or ARI after their silica gel cleanup, whether they used a slurry/acid or SGCC procedure. If we assume that a similar level of contamination has been present at these sample locations for the 2006, 2022, and 2023 sampling events, this comparison provides some evidence that the silica gel cleanup procedure completed by these labs may be significantly less effective at removal of polar/semi-polar constituents compared to SGCC completed at Apex.

- For locations LAI-1, LAI-2, LAI-5 and LAI-6, the historical quantifications for NWTPH were similar or at least somewhat consistent with the quantifications from samples collected in 2023 and analyzed by Apex. These locations are where all three laboratories found the least contaminant mass present during the 2006, 2022, and 2023 sampling events.

- For locations DP1S and LAI-8, the historical quantifications were both substantially higher and lower than that measured by Apex during the 2023 sampling event. This provides further evidence that the measurement of the DRO at these locations is likely impacted by the presence of LNAPL, the presence of contaminated sediment in the water

[4] This value is equal to the DRO result after silica gel cleanup.

sample collected, and/or variability in the effectiveness of the silica gel cleanup method procedure used by the different laboratories.[5]

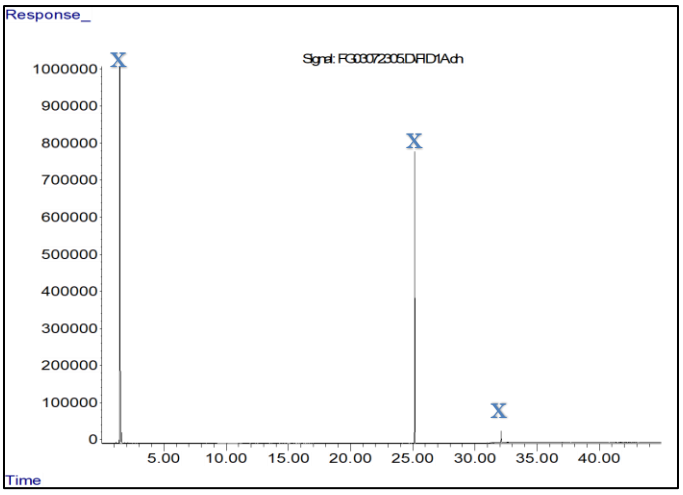
6.0 DISCUSSION OF PRODUCT TESTING RESULTS

One location at the Site (LAI-8) is currently impacted with a LNAPL sheen. However, LNAPL sheen has been identified on and off at the LAI-8 location as well as at least 3 other locations (LAI-4, LAI-5, and DP1S) during one or more sampling events between 2006 and 2023.

A sample of the LNAPL at the location LAI-8 was submitted to Apex for characterization using ASTM Method D2887-14. Reference materials of products currently used at the on-site manufacturing facility were also submitted for comparison. These samples include Coolant-0223, CoolantMix-0223, and Syntilo-0223.

The ASTM D2887-14 GC/FID trace for one of the method blanks associated with these samples is provided as Figure 9. The peak corresponding to the extraction solvent is seen eluting near 1.6 minutes on this GC/FID trace. The peak corresponding to the surrogate compound (added as quality assurance check for this GC analysis) is seen eluting at approximately 25.2 minutes. The GC/FID trace also shows presence of a peak eluting near 32.2 minutes which is indicative of laboratory contamination. The peaks corresponding to the extraction solvent, surrogate compound, and laboratory contamination are labeled on the GC/FID trace with a blue "x".

Figure 9. ASTM D2887-14 GC/FID trace of Method Blank



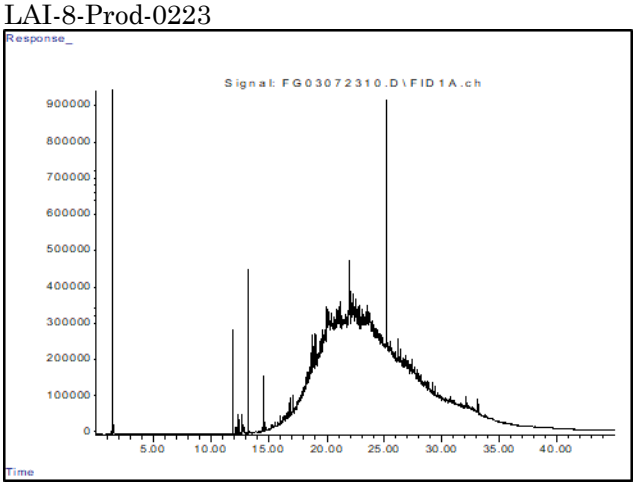
[5] From the documents provided, it appears that in 2006 ARI was using a silica slurry with acid cleanup which is included in the NWTPH methodology.

6.1 CHARACTERIZATION OF SITE SAMPLE LAI-8-PROD-0223

The sample LAI-8-PROD-0223 was viscous, soluble in methylene chloride, and appeared not soluble in water. The ASTM D2887-14 GC/FID trace of the sample LAI-8-Prod-0223 is provided in Figure 10.

As shown, the material elutes as a medium to high boiling UCM as well as a pattern of discrete peaks. This material elutes from approximately *n*-C_{11} to *n*-C_{44} showing a maximum near *n*-C_{22}. This correlates with a temperature range of approximately 195°C to 548°C with a maximum near 369°C. Additional testing is available to further characterize the discrete peaks present, if warranted.

Figure 10. ASTM D2887-14 GC/FID trace of LAI-8-Prod-0223



6.1 COMPARISON OF REFERENCE STANDARD COOLANT-0223 TO SITE SAMPLE LAI-8-PROD-0223

The reference sample Coolant-0223 was viscous and soluble in methylene chloride as well as water. The ASTM D2887-14 GC/FID trace of the reference standard Coolant-0223 is provided in Figure 11.

As shown, the material elutes as a medium to high boiling UCM as well as discrete peaks, some of which are broad. This material elutes from *n*-C_9 to *n*-C_{38} showing a maximum near *n*-C_{22}. This correlates with a temperature range of approximately 151°C to 512°C with a maximum near 369°C.

Figure 11. ASTM D2887-14 GC/FID trace of Coolant-0223

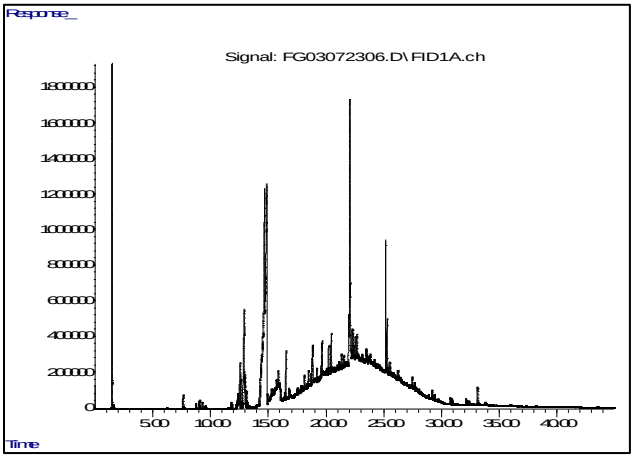


Figure 12. ASTM D2887-4 GC/FID trace of LAI-8-Prod-0223

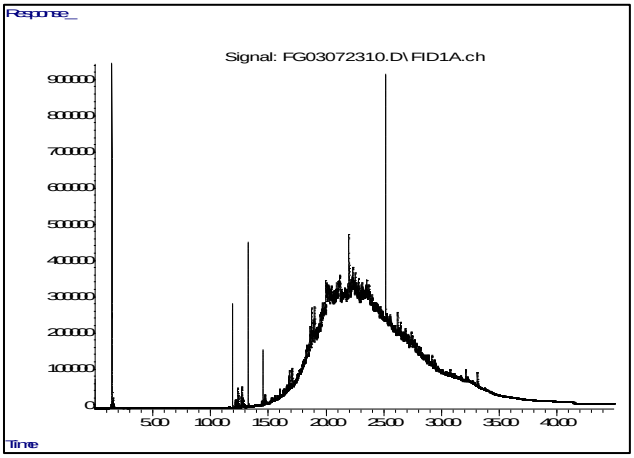
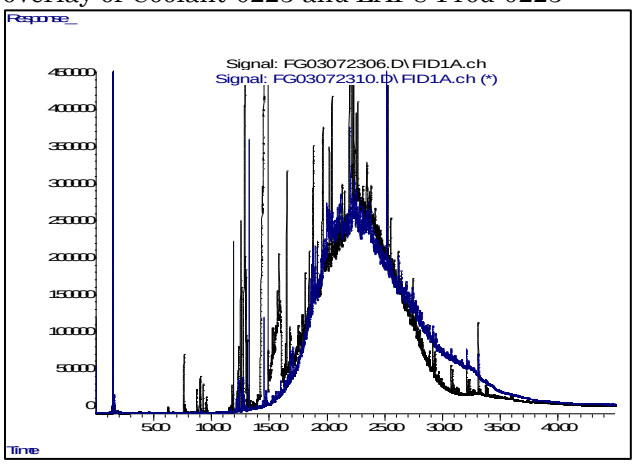


Figure 13. Detailed ASTM D2887-14 GC/FID overlay of Coolant-0223 and LAI-8-Prod-0223



For comparison, the GC/FID trace of the sample LAI-8-Prod-0223 is provided as Figure 12 and a detailed overlay of the GC/FID traces generated for Coolant-0223 and LAI-8-Prod-0223 is provided as Figure 13.[6]

Review of Figure 13 shows that significant differences exist in the chemical composition of the reference standard Coolant-0223 and the sample LAI-8-Prod-0223. Specifically, although the UCM present in both samples shows a similar maximum boiling point, the UCM shows a significantly higher proportion of high boiling material in the sample LAI-8-Prod-0223 compared to the reference standard Coolant-0223. The suite and abundance of the individual peaks identified in the sample LAI-8-Prod-0223 compared to the reference standard Coolant-0223 also shows substantial variability.

[6] For the GC/FID overlays provided in Figures 13, 16, and 19, the reference standard is outlined in black and the site sample LAI-8-Prod-0223 is outlined in blue.

6.2 COMPARISON OF REFERENCE STANDARD COOLANTMIX-0223 TO SITE SAMPLE LAI-8-PROD-0223

The reference standard CoolantMix-0223 was soluble in water and appeared to have little to no solubility directly into methylene chloride. Therefore, this sample required separatory funnel extraction prior to the ASTM D2887-14 analysis. The GC/FID trace of the water-extracted reference standard CoolantMix-0223 is provided in Figure 14.

As shown, the GC/FID trace shows the presence of a medium to high boiling UCM as well a few discrete peaks. This material elutes from *n*-C_{13} to *n*-C_{42} showing a maximum near *n*-C_{22}. This correlates with a temperature range of approximately 235°C to 537°C with a maximum near 369°C.

Figure 14. ASTM D2887-14 GC/FID trace of Water-Extracted CoolantMix-0223

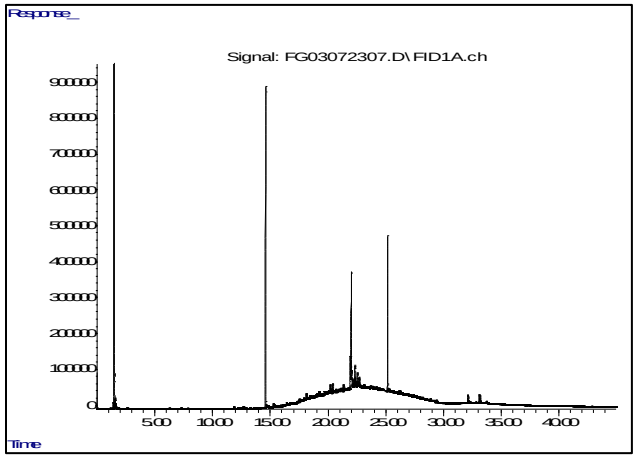


Figure 15. ASTM D2887-4 GC/FID of LAI-8-Prod-0223

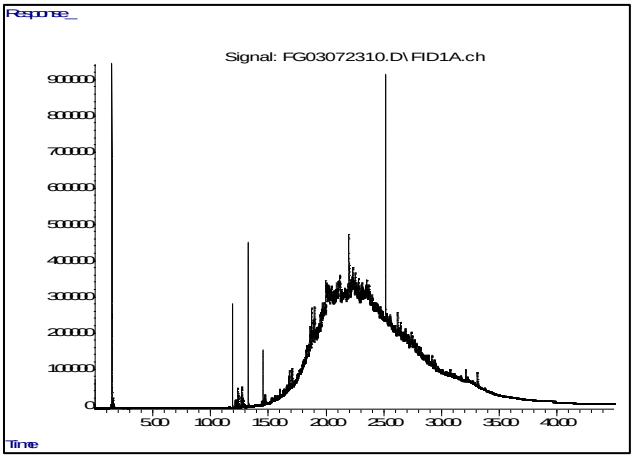
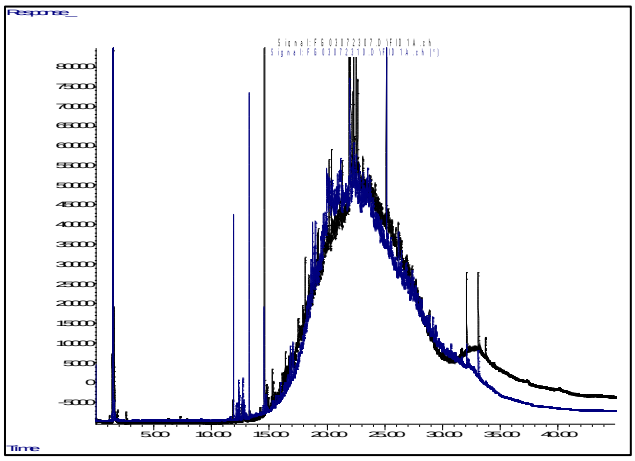


Figure 16. Detailed ASTM D2887-4 GC/FID Overlay of Water-Extracted CoolantMix-0223 and LAI-8-Prod-0223



For comparison, the GC/FID trace for the sample LAI-8-Prod-0223 is provided as Figure 15 and a detailed overlay of the GC/FID traces generated for this water-extracted reference standard and the sample LAI-8-Prod-0223 is provided as Figure 16.

Review of Figure 16 shows that significant differences exist in the chemical composition of the water-extracted reference standard CoolantMix-0223 and the sample LAI-8-Prod-0223. Specifically, although the UCM present in both samples shows a similar maximum boiling point, the UCM shows a significantly lower proportion of high boiling material in the sample LAI-8-Prod-0223 compared to the reference standard Coolant-0223. The suite and abundance of the individual peaks identified in the sample LAI-8-Prod-0223 compared to the water-extracted reference standard CoolantMix-0223 also shows substantial variability.

6.3 COMPARISON OF REFERENCE STANDARD SYNTILO-0223 TO SITE SAMPLE LAI-8-PROD-0223

The reference sample Syntilo-0223 was soluble in water and appeared to have little to no solubility directly into methylene chloride. Therefore, this sample required separatory funnel extraction prior to the ASTM D2887-14 analysis. The ASTM D2887-14 GC/FID trace of the water-extracted reference standard Syntilo-0223 is provided in Figure 17.

As shown, the GC/FID trace shows a series of broad, medium to high boiling peaks eluting from *n*-C_{10} to *n*-C_{44} showing a maximum near *n*-C_{14}. This correlates with a temperature range of approximately 174°C to 548°C with a maximum near 254°C.

Figure 17. ASTM D2887-14 GC/FID trace of Water-Extracted Syntilo-0223

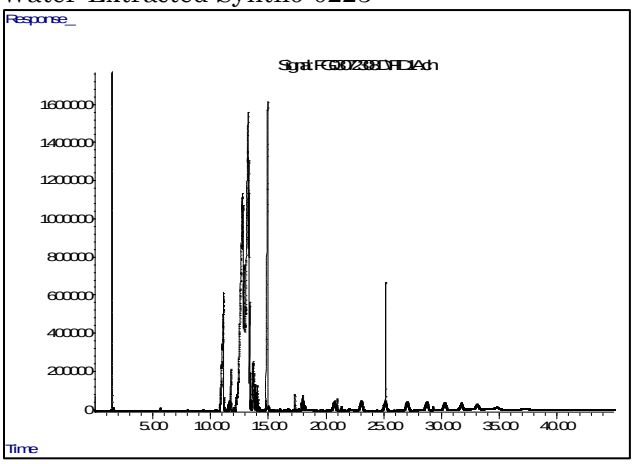


Figure 18. ASTM D2887-4 GC/FID trace of LAI-8-Prod-0223

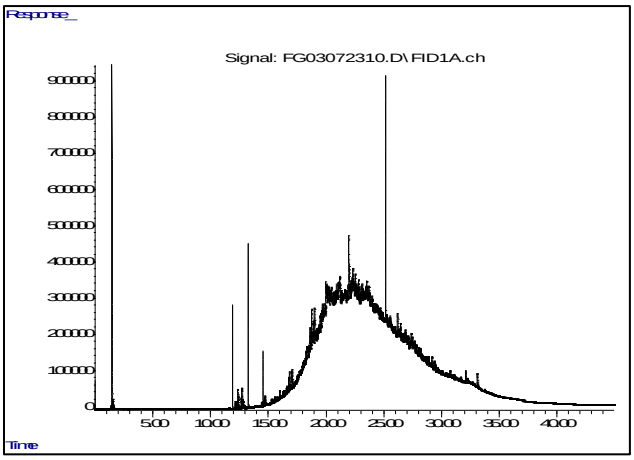
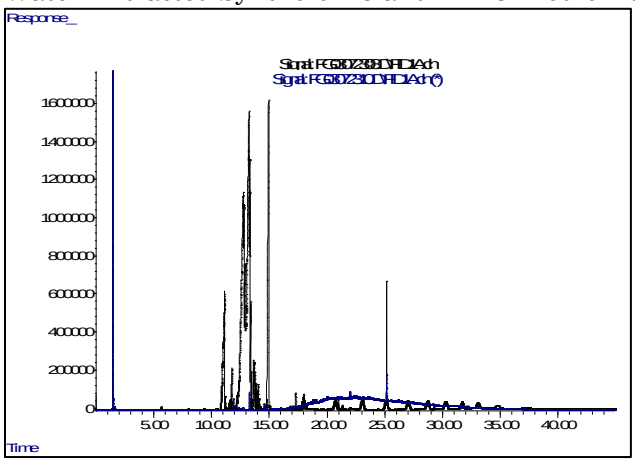


Figure 19. ASTM D2887-4 GC/FID Overlay of
Water-Extracted Syntilo-0223 and LAI-8-Prod-0223



For comparison, the GC/FID trace for the sample LAI-8-Prod-0223 is provided as Figure 18 and an overlay of the GC/FID traces generated for the water-extracted reference standard and the sample LAI-8-Prod-0223 is provided as Figure 19.

Review of Figure 19 shows that a high level of variability exists in the chemical composition of the reference standard Syntilo-0223 and the sample LAI-8-Prod-0223.

CONCLUSION

The primary purpose of this investigation was to determine if there is evidence that a new product release is impacting the Site. The evaluation did not identify any clear evidence of a substantial new release of product or dissolved phase contamination at the Site. The evaluation completed does support the contamination present as being related to historical releases. The primary evidence supporting these findings are:

- The dissolved contaminant mass measured by Apex in all but one location does not show an increase when compared to historical data.

- The one location, LAI-8, where the DRO testing identified an increase in the dissolved contaminant mass with time has been impacted by LNAPL sheen on and off since 2006. Although the data does support that this LNAPL sheen may be more consistently present at this location over the last 5 years, this evaluation indicates that this change is likely related to migration of LNAPL from a historical release or releases as opposed to a significant new release at the Site.

- Comparison of the product sample from LAI-8 with the reference standards of products currently used at the facility showed significant differences in chemical composition.

Based on this evaluation we would also recommend considering some changes in sampling and analytical testing utilized at this Site. This includes requiring the laboratory conducting

the NTWPH testing to use silica gel column cleanup procedures only (as opposed to silica slurry and/or acid based cleanups) and require the use of a polar surrogate to monitor efficiency of polar/semi-polar removal from the extract.[7]

We would also strongly recommend thorough documentation and measurement of any LNAPL or LNAPL sheens at all monitoring locations including photo documentation. This information can be used to qualify any NWTPH testing results from locations with any indications of LNAPL as potentially including a biased high measurement of the dissolved phase contamination present.

Lastly, if warranted, additional testing is available using GCMS or other technologies to further characterize the chemical composition of the contaminants at the Site. Please let us know if you would like to discuss this further.

We appreciate this opportunity to be of service to you and hope you will call if you should have any questions.

Respectfully,

Kurt Johnson, Senior Chemist
Director of Forensic Services
Apex Laboratories, LLC

Enclosures

[7] Draft guidance from WADOE issued in 2022 limits silica gel cleanup procedures to non-acid techniques as well as use of a silica gel column (as opposed to simply mixing the silica gel in with the extract).

Date of Report: 06/29/23
Date Received: 03/09/23
Project: Boeing Portland 85-105 Investigation, 025116.123.450, A3B0408
Date Analyzed: 03/07/23

RESULTS FROM THE ANALYSIS OF THE PRODUCT SAMPLE FOR FORENSIC EVALUATION BY CAPILLARY GAS CHROMATOGRAPHY USING A FLAME IONIZATION DETECTOR (FID) BY ASTM METHOD D2887-14

Sample ID	GC Characterization
Coolant-0223 A3B0408-01	The GC trace using the flame ionization detector (FID) showed the presence of medium to high boiling compounds. The patterns displayed by these peaks represent the reference material Coolant-0223. The medium to high boiling compounds appear as an irregular pattern of peaks on top of a broad hump or unresolved complex mixture (UCM). This material elutes from *n*-C_9 to *n*-C_{38} showing a maximum near *n*-C_{22}. This correlates with a temperature range of approximately 151°C to 512°C with a maximum near 369°C. The large peak seen near 25.2 minutes on the GC trace is pentacosane, added as a retention time marker and quality assurance check for this GC analysis. The peak at 1.6 minutes corresponds to the extraction solvent, carbon disulfide. The peak near 32.2 minutes is indicative of laboratory contamination.

Date of Report: 06/29/23
Date Received: 03/09/23
Project: Boeing Portland 85-105 Investigation, 025116.123.450, A3B0408
Date Analyzed: 03/07/23

RESULTS FROM THE ANALYSIS OF THE WATER-EXTRACTED PRODUCT SAMPLE FOR FORENSIC EVALUATION BY CAPILLARY GAS CHROMATOGRAPHY USING A FLAME IONIZATION DETECTOR (FID) BY ASTM METHOD D2887-14

Sample ID	GC Characterization
CoolantMix-0223 A3B0408-02	The GC trace using the flame ionization detector (FID) showed the presence of medium to high boiling compounds. The patterns displayed by these peaks represent the water soluble fraction of the reference material CoolantMix-0223. The medium to high boiling compounds appear as an irregular pattern of peaks on top of a broad hump or unresolved complex mixture (UCM). This material elutes from n-C_{13} to n-C_{42} showing a maximum near n-C_{22}. This correlates with a temperature range of approximately 235°C to 537°C with a maximum near 369°C. The large peak seen near 25.2 minutes on the GC trace is pentacosane, added as a retention time marker and quality assurance check for this GC analysis. The peak at 1.6 minutes corresponds to the extraction solvent, carbon disulfide. The peak near 32.2 minutes is indicative of laboratory contamination.

Date of Report: 06/29/23
Date Received: 03/09/23
Project: Boeing Portland 85-105 Investigation, 025116.123.450, A3B0408
Date Analyzed: 03/07/23

RESULTS FROM THE ANALYSIS OF THE WATER-EXTRACTED PRODUCT SAMPLE FOR FORENSIC EVALUATION BY CAPILLARY GAS CHROMATOGRAPHY USING A FLAME IONIZATION DETECTOR (FID) BY ASTM METHOD D2887-14

Sample ID	GC Characterization
Syntilo-0223 A3B0408-03	The GC trace using the flame ionization detector (FID) showed the presence of medium to high boiling compounds. The patterns displayed by these peaks represent the water soluble fraction of the reference material Syntilo-0223. The medium to high boiling compounds appear as an irregular pattern of peaks eluting from *n*-C_{10} to *n*-C_{44} showing a maximum near *n*-C_{14}. This correlates with a temperature range of approximately 174°C to 548°C with a maximum near 254°C. The large peak seen near 25.2 minutes on the GC trace is pentacosane, added as a retention time marker and quality assurance check for this GC analysis. The peak at 1.6 minutes corresponds to the extraction solvent, carbon disulfide. The peak near 32.2 minutes is indicative of laboratory contamination.

Date of Report: 06/29/23
Date Received: 03/09/23
Project: Boeing Portland 85-105 Investigation, 025116.123.450, A3B0408
Date Analyzed: 03/07/23

RESULTS FROM THE ANALYSIS OF THE PRODUCT SAMPLE FOR FORENSIC EVALUATION BY CAPILLARY GAS CHROMATOGRAPHY USING A FLAME IONIZATION DETECTOR (FID) BY ASTM METHOD D2887-14

Sample ID	GC Characterization
LAI-8-Prod-0223 A3B0408-04	The GC trace using the flame ionization detector (FID) showed the presence of medium to high boiling compounds. The patterns displayed by these peaks represent the reference material LAI-8-Prod-0223. The medium to high boiling compounds appear as an irregular pattern of peaks on top of a broad hump or unresolved complex mixture (UCM). This material elutes from *n*-C_{11} to *n*-C_{44} showing a maximum near *n*-C_{22}. This correlates with a temperature range of approximately 195°C to 548°C with a maximum near 369°C. The large peak seen near 25.2 minutes on the GC trace is pentacosane, added as a retention time marker and quality assurance check for this GC analysis. The peak at 1.6 minutes corresponds to the extraction solvent, carbon disulfide. The peak near 32.2 minutes is indicative of laboratory contamination.

APPENDIX A

Apex Laboratories, LLC
6700 S.W. Sandburg Street
Tigard, OR 97223
503-718-2323
ORELAP ID: **OR100062**

ANALYTICAL REPORT

Tuesday, May 2, 2023

Erin Waibel
Landau Associates
1500 SW First Avenue Suite 1015
Portland, OR 97201

RE: A3B0408 - Boeing Portland 85-105 Investigation - 025116.123.450

Thank you for using Apex Laboratories. We greatly appreciate your business and strive to provide the highest quality services to the environmental industry.

Enclosed are the results of analyses for work order A3B0408, which was received by the laboratory on 2/9/2023 at 4:10:00PM.

If you have any questions concerning this report or the services we offer, please feel free to contact me by email at: mpoquiz@apex-labs.com, or by phone at 503-718-2323.

Please note: All samples will be disposed of within 30 days of sample receipt, unless prior arrangements have been made.

Cooler Receipt Information

(See Cooler Receipt Form for details)

Cooler #1	1.5 degC	Cooler #2	3.2 degC
Cooler #3	1.8 degC		

This Final Report is the official version of the data results for this sample submission, unless superseded by a subsequent, labeled amended report.
All other deliverables derived from this data, including Electronic Data Deliverables (EDDs), CLP-like forms, client requested summary sheets, and all other products are considered secondary to this report.

Apex Laboratories

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.

Michele Poquiz For Kurt Johnson, Senior Chemist

Apex Laboratories, LLC
6700 S.W. Sandburg Street
Tigard, OR 97223
503-718-2323
ORELAP ID: OR100062

ANALYTICAL REPORT

Landau Associates	Project: **Boeing Portland 85-105 Investigation**	
1500 SW First Avenue Suite 1015	Project Number: **025116.123.450**	**Report ID:**
Portland, OR 97201	Project Manager: **Erin Waibel**	**A3B0408 - 05 02 23 1421**

ANALYTICAL REPORT FOR SAMPLES

SAMPLE INFORMATION

Client Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
LAI-8-0223-SP	A3B0408-05	Water	02/08/23 11:45	02/09/23 16:10
DP1S-0223	A3B0408-06	Water	02/08/23 11:30	02/09/23 16:10
LAI-4-0223-SP	A3B0408-07	Water	02/08/23 14:35	02/09/23 16:10
LAI-7-0223-SP	A3B0408-08	Water	02/08/23 15:30	02/09/23 16:10
LAI-6-0223	A3B0408-09	Water	02/09/23 10:35	02/09/23 16:10
LAI-5-0223	A3B0408-10	Water	02/09/23 12:37	02/09/23 16:10
LAI-1-0223	A3B0408-11	Water	02/09/23 15:10	02/09/23 16:10
Tripblank1-020923	A3B0408-12	Water	02/09/23 00:00	02/09/23 16:10
Tripblank1-020823	A3B0408-13	Water	02/08/23 00:00	02/09/23 16:10
Tripblank3-020823	A3B0408-14	Water	02/08/23 00:00	02/09/23 16:10
BOP-10s-0223	A3B0408-15	Water	02/08/23 14:12	02/09/23 16:10

Apex Laboratories

Michele Poquiz For Kurt Johnson, Senior Chemist

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APEX LABORATORIES

Apex Laboratories, LLC
6700 S.W. Sandburg Street
Tigard, OR 97223
503-718-2323
ORELAP ID: **OR100062**

ANALYTICAL REPORT

Landau Associates	Project: **Boeing Portland 85-105 Investigation**	
1500 SW First Avenue Suite 1015	Project Number: **025116.123.450**	**Report ID:**
Portland, OR 97201	Project Manager: **Erin Waibel**	**A3B0408 - 05 02 23 1421**

ANALYTICAL SAMPLE RESULTS

Diesel and/or Oil Hydrocarbons by NWTPH-Dx

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
DP1S-0223 (A3B0408-06RE1)				**Matrix: Water**		**Batch: 23B0762**		
Diesel	**9150**	392	784	ug/L	10	03/06/23 09:42	NWTPH-Dx LL	**F-13**
Oil	ND	784	1570	ug/L	10	03/06/23 09:42	NWTPH-Dx LL	
Surrogate: o-Terphenyl (Surr)		*Recovery: 82 %*		*Limits: 50-150 %*	*10*	*03/06/23 09:42*	*NWTPH-Dx LL*	*S-05*
LAI-4-0223-SP (A3B0408-07)				**Matrix: Water**		**Batch: 23B0762**		
Diesel	**386**	40.8	81.6	ug/L	1	03/04/23 15:29	NWTPH-Dx LL	**F-13**
Oil	ND	81.6	163	ug/L	1	03/04/23 15:29	NWTPH-Dx LL	
Surrogate: o-Terphenyl (Surr)		*Recovery: 93 %*		*Limits: 50-150 %*	*1*	*03/04/23 15:29*	*NWTPH-Dx LL*	
LAI-7-0223-SP (A3B0408-08)				**Matrix: Water**		**Batch: 23B0762**		
Diesel	**220**	40.0	80.0	ug/L	1	03/04/23 16:29	NWTPH-Dx LL	**F-13**
Oil	ND	80.0	160	ug/L	1	03/04/23 16:29	NWTPH-Dx LL	
Surrogate: o-Terphenyl (Surr)		*Recovery: 99 %*		*Limits: 50-150 %*	*1*	*03/04/23 16:29*	*NWTPH-Dx LL*	
LAI-6-0223 (A3B0408-09)				**Matrix: Water**		**Batch: 23B0762**		
Diesel	**81.7**	47.1	94.1	ug/L	1	03/04/23 17:30	NWTPH-Dx LL	**J, F-13**
Oil	ND	94.1	188	ug/L	1	03/04/23 17:30	NWTPH-Dx LL	
Surrogate: o-Terphenyl (Surr)		*Recovery: 102 %*		*Limits: 50-150 %*	*1*	*03/04/23 17:30*	*NWTPH-Dx LL*	
LAI-5-0223 (A3B0408-10)				**Matrix: Water**		**Batch: 23B0762**		
Diesel	**78.6**	43.5	87.0	ug/L	1	03/04/23 18:31	NWTPH-Dx LL	**J, F-13**
Oil	ND	87.0	174	ug/L	1	03/04/23 18:31	NWTPH-Dx LL	
Surrogate: o-Terphenyl (Surr)		*Recovery: 101 %*		*Limits: 50-150 %*	*1*	*03/04/23 18:31*	*NWTPH-Dx LL*	
LAI-1-0223 (A3B0408-11)				**Matrix: Water**		**Batch: 23B0762**		
Diesel	**115**	44.0	87.9	ug/L	1	03/04/23 19:31	NWTPH-Dx LL	**F-13**
Oil	ND	87.9	176	ug/L	1	03/04/23 19:31	NWTPH-Dx LL	
Surrogate: o-Terphenyl (Surr)		*Recovery: 96 %*		*Limits: 50-150 %*	*1*	*03/04/23 19:31*	*NWTPH-Dx LL*	
BOP-10s-0223 (A3B0408-15)				**Matrix: Water**		**Batch: 23B0762**		
Diesel	**601**	42.1	84.2	ug/L	1	03/04/23 20:32	NWTPH-Dx LL	**F-13**
Oil	ND	84.2	168	ug/L	1	03/04/23 20:32	NWTPH-Dx LL	
Surrogate: o-Terphenyl (Surr)		*Recovery: 87 %*		*Limits: 50-150 %*	*1*	*03/04/23 20:32*	*NWTPH-Dx LL*	

Apex Laboratories

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Michele Poquiz For Kurt Johnson, Senior Chemist

Apex Laboratories, LLC
6700 S.W. Sandburg Street
Tigard, OR 97223
503-718-2323
ORELAP ID: **OR100062**

ANALYTICAL REPORT

Landau Associates	Project: **Boeing Portland 85-105 Investigation**	
1500 SW First Avenue Suite 1015	Project Number: **025116.123.450**	**Report ID:**
Portland, OR 97201	Project Manager: **Erin Waibel**	**A3B0408 - 05 02 23 1421**

ANALYTICAL SAMPLE RESULTS

Diesel and/or Oil Hydrocarbons by NWTPH-Dx with Silica Gel Column Cleanup

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
DP1S-0223 (A3B0408-06)				**Matrix: Water**		**Batch: 23B0763**		
Diesel	**7940**	39.2	78.4	ug/L	1	03/04/23 10:04	NWTPH-Dx/SGC	**F-13**
Oil	ND	78.4	157	ug/L	1	03/04/23 10:04	NWTPH-Dx/SGC	
Surrogate: o-Terphenyl (Surr)		*Recovery: 100 %*		*Limits: 50-150 %*	*1*	*03/04/23 10:04*	*NWTPH-Dx/SGC*	
LAI-4-0223-SP (A3B0408-07)				**Matrix: Water**		**Batch: 23B0763**		
Diesel	**81.3**	40.8	81.6	ug/L	1	03/04/23 10:25	NWTPH-Dx/SGC	**J, F-13**
Oil	ND	81.6	163	ug/L	1	03/04/23 10:25	NWTPH-Dx/SGC	
Surrogate: o-Terphenyl (Surr)		*Recovery: 96 %*		*Limits: 50-150 %*	*1*	*03/04/23 10:25*	*NWTPH-Dx/SGC*	
LAI-7-0223-SP (A3B0408-08)				**Matrix: Water**		**Batch: 23B0763**		
Diesel	ND	40.0	80.0	ug/L	1	03/04/23 11:05	NWTPH-Dx/SGC	
Oil	ND	80.0	160	ug/L	1	03/04/23 11:05	NWTPH-Dx/SGC	
Surrogate: o-Terphenyl (Surr)		*Recovery: 104 %*		*Limits: 50-150 %*	*1*	*03/04/23 11:05*	*NWTPH-Dx/SGC*	
LAI-6-0223 (A3B0408-09)				**Matrix: Water**		**Batch: 23B0763**		
Diesel	ND	38.1	76.2	ug/L	1	03/04/23 11:25	NWTPH-Dx/SGC	
Oil	ND	76.2	152	ug/L	1	03/04/23 11:25	NWTPH-Dx/SGC	
Surrogate: o-Terphenyl (Surr)		*Recovery: 96 %*		*Limits: 50-150 %*	*1*	*03/04/23 11:25*	*NWTPH-Dx/SGC*	
LAI-5-0223 (A3B0408-10)				**Matrix: Water**		**Batch: 23B0763**		
Diesel	ND	43.5	87.0	ug/L	1	03/04/23 12:06	NWTPH-Dx/SGC	
Oil	ND	87.0	174	ug/L	1	03/04/23 12:06	NWTPH-Dx/SGC	
Surrogate: o-Terphenyl (Surr)		*Recovery: 112 %*		*Limits: 50-150 %*	*1*	*03/04/23 12:06*	*NWTPH-Dx/SGC*	
LAI-1-0223 (A3B0408-11)				**Matrix: Water**		**Batch: 23B0763**		
Diesel	ND	44.0	87.9	ug/L	1	03/04/23 12:26	NWTPH-Dx/SGC	
Oil	ND	87.9	176	ug/L	1	03/04/23 12:26	NWTPH-Dx/SGC	
Surrogate: o-Terphenyl (Surr)		*Recovery: 92 %*		*Limits: 50-150 %*	*1*	*03/04/23 12:26*	*NWTPH-Dx/SGC*	
BOP-10s-0223 (A3B0408-15)				**Matrix: Water**		**Batch: 23B0763**		
Diesel	ND	42.1	84.2	ug/L	1	03/04/23 12:47	NWTPH-Dx/SGC	
Oil	ND	84.2	168	ug/L	1	03/04/23 12:47	NWTPH-Dx/SGC	
Surrogate: o-Terphenyl (Surr)		*Recovery: 88 %*		*Limits: 50-150 %*	*1*	*03/04/23 12:47*	*NWTPH-Dx/SGC*	

Apex Laboratories

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Michele Poquiz For Kurt Johnson, Senior Chemist

Apex Laboratories, LLC
6700 S.W. Sandburg Street
Tigard, OR 97223
503-718-2323
ORELAP ID: **OR100062**

Landau Associates	Project: **Boeing Portland 85-105 Investigation**	
1500 SW First Avenue Suite 1015	Project Number: **025116.123.450**	**Report ID:**
Portland, OR 97201	Project Manager: **Erin Waibel**	**A3B0408 - 05 02 23 1421**

ANALYTICAL SAMPLE RESULTS

Volatile Organic Compounds by EPA 8260D

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
LAI-8-0223-SP (A3B0408-05RE1)				**Matrix: Water**		**Batch: 23B0617**		
Acetone	**422**	20.0	40.0	ug/L	2	02/16/23 16:23	EPA 8260D	**ICV-01**
Acrylonitrile	ND	2.00	4.00	ug/L	2	02/16/23 16:23	EPA 8260D	
Benzene	ND	0.200	0.400	ug/L	2	02/16/23 16:23	EPA 8260D	
Bromobenzene	ND	0.500	1.00	ug/L	2	02/16/23 16:23	EPA 8260D	
Bromochloromethane	ND	1.00	2.00	ug/L	2	02/16/23 16:23	EPA 8260D	
Bromodichloromethane	ND	1.00	2.00	ug/L	2	02/16/23 16:23	EPA 8260D	
Bromoform	ND	1.00	2.00	ug/L	2	02/16/23 16:23	EPA 8260D	
Bromomethane	ND	10.0	10.0	ug/L	2	02/16/23 16:23	EPA 8260D	
2-Butanone (MEK)	**48.8**	10.0	20.0	ug/L	2	02/16/23 16:23	EPA 8260D	**ICV-01**
n-Butylbenzene	ND	1.00	2.00	ug/L	2	02/16/23 16:23	EPA 8260D	
sec-Butylbenzene	ND	1.00	2.00	ug/L	2	02/16/23 16:23	EPA 8260D	
tert-Butylbenzene	ND	1.00	2.00	ug/L	2	02/16/23 16:23	EPA 8260D	
Carbon disulfide	ND	10.0	20.0	ug/L	2	02/16/23 16:23	EPA 8260D	
Carbon tetrachloride	ND	1.00	2.00	ug/L	2	02/16/23 16:23	EPA 8260D	
Chlorobenzene	ND	0.500	1.00	ug/L	2	02/16/23 16:23	EPA 8260D	
Chloroethane	ND	10.0	10.0	ug/L	2	02/16/23 16:23	EPA 8260D	
Chloroform	ND	1.00	2.00	ug/L	2	02/16/23 16:23	EPA 8260D	
Chloromethane	ND	5.00	10.0	ug/L	2	02/16/23 16:23	EPA 8260D	
2-Chlorotoluene	ND	1.00	2.00	ug/L	2	02/16/23 16:23	EPA 8260D	
4-Chlorotoluene	ND	1.00	2.00	ug/L	2	02/16/23 16:23	EPA 8260D	
Dibromochloromethane	ND	1.00	2.00	ug/L	2	02/16/23 16:23	EPA 8260D	
1,2-Dibromo-3-chloropropane	ND	5.00	10.0	ug/L	2	02/16/23 16:23	EPA 8260D	
1,2-Dibromoethane (EDB)	ND	0.500	1.00	ug/L	2	02/16/23 16:23	EPA 8260D	
Dibromomethane	ND	1.00	2.00	ug/L	2	02/16/23 16:23	EPA 8260D	
1,2-Dichlorobenzene	ND	0.500	1.00	ug/L	2	02/16/23 16:23	EPA 8260D	
1,3-Dichlorobenzene	ND	0.500	1.00	ug/L	2	02/16/23 16:23	EPA 8260D	
1,4-Dichlorobenzene	ND	0.500	1.00	ug/L	2	02/16/23 16:23	EPA 8260D	
Dichlorodifluoromethane	ND	1.00	2.00	ug/L	2	02/16/23 16:23	EPA 8260D	
1,1-Dichloroethane	ND	0.400	0.800	ug/L	2	02/16/23 16:23	EPA 8260D	
1,2-Dichloroethane (EDC)	ND	0.400	0.800	ug/L	2	02/16/23 16:23	EPA 8260D	
1,1-Dichloroethene	ND	0.400	0.800	ug/L	2	02/16/23 16:23	EPA 8260D	
cis-1,2-Dichloroethene	**3.52**	0.400	0.800	ug/L	2	02/16/23 16:23	EPA 8260D	
trans-1,2-Dichloroethene	ND	0.400	0.800	ug/L	2	02/16/23 16:23	EPA 8260D	

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ORELAP ID: **OR100062**

ANALYTICAL REPORT

Landau Associates	Project: **Boeing Portland 85-105 Investigation**	
1500 SW First Avenue Suite 1015	Project Number: **025116.123.450**	**Report ID:**
Portland, OR 97201	Project Manager: **Erin Waibel**	**A3B0408 - 05 02 23 1421**

ANALYTICAL SAMPLE RESULTS

Volatile Organic Compounds by EPA 8260D

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
LAI-8-0223-SP (A3B0408-05RE1)				**Matrix: Water**		**Batch: 23B0617**		
1,2-Dichloropropane	ND	0.500	1.00	ug/L	2	02/16/23 16:23	EPA 8260D	
1,3-Dichloropropane	ND	1.00	2.00	ug/L	2	02/16/23 16:23	EPA 8260D	
2,2-Dichloropropane	ND	1.00	2.00	ug/L	2	02/16/23 16:23	EPA 8260D	
1,1-Dichloropropene	ND	1.00	2.00	ug/L	2	02/16/23 16:23	EPA 8260D	
cis-1,3-Dichloropropene	ND	1.00	2.00	ug/L	2	02/16/23 16:23	EPA 8260D	
trans-1,3-Dichloropropene	ND	1.00	2.00	ug/L	2	02/16/23 16:23	EPA 8260D	
Ethylbenzene	ND	0.500	1.00	ug/L	2	02/16/23 16:23	EPA 8260D	
Hexachlorobutadiene	ND	5.00	10.0	ug/L	2	02/16/23 16:23	EPA 8260D	
2-Hexanone	**14.4**	10.0	20.0	ug/L	2	02/16/23 16:23	EPA 8260D	**J**
Isopropylbenzene	ND	1.00	2.00	ug/L	2	02/16/23 16:23	EPA 8260D	
4-Isopropyltoluene	ND	1.00	2.00	ug/L	2	02/16/23 16:23	EPA 8260D	
Methylene chloride	ND	10.0	20.0	ug/L	2	02/16/23 16:23	EPA 8260D	
4-Methyl-2-pentanone (MiBK)	ND	10.0	20.0	ug/L	2	02/16/23 16:23	EPA 8260D	
Methyl tert-butyl ether (MTBE)	ND	1.00	2.00	ug/L	2	02/16/23 16:23	EPA 8260D	
Naphthalene	ND	2.00	4.00	ug/L	2	02/16/23 16:23	EPA 8260D	
n-Propylbenzene	ND	0.500	1.00	ug/L	2	02/16/23 16:23	EPA 8260D	
Styrene	ND	1.00	2.00	ug/L	2	02/16/23 16:23	EPA 8260D	
1,1,1,2-Tetrachloroethane	ND	0.400	0.800	ug/L	2	02/16/23 16:23	EPA 8260D	
1,1,2,2-Tetrachloroethane	ND	0.500	1.00	ug/L	2	02/16/23 16:23	EPA 8260D	
Tetrachloroethene (PCE)	ND	0.400	0.800	ug/L	2	02/16/23 16:23	EPA 8260D	
Toluene	ND	1.00	2.00	ug/L	2	02/16/23 16:23	EPA 8260D	
1,2,3-Trichlorobenzene	ND	2.00	4.00	ug/L	2	02/16/23 16:23	EPA 8260D	
1,2,4-Trichlorobenzene	ND	2.00	4.00	ug/L	2	02/16/23 16:23	EPA 8260D	
1,1,1-Trichloroethane	ND	0.400	0.800	ug/L	2	02/16/23 16:23	EPA 8260D	
1,1,2-Trichloroethane	ND	0.500	1.00	ug/L	2	02/16/23 16:23	EPA 8260D	
Trichloroethene (TCE)	**0.700**	0.400	0.800	ug/L	2	02/16/23 16:23	EPA 8260D	**J**
Trichlorofluoromethane	ND	2.00	4.00	ug/L	2	02/16/23 16:23	EPA 8260D	
1,2,3-Trichloropropane	ND	1.00	2.00	ug/L	2	02/16/23 16:23	EPA 8260D	
1,2,4-Trimethylbenzene	ND	1.00	2.00	ug/L	2	02/16/23 16:23	EPA 8260D	
1,3,5-Trimethylbenzene	ND	1.00	2.00	ug/L	2	02/16/23 16:23	EPA 8260D	
Vinyl chloride	**0.600**	0.400	0.800	ug/L	2	02/16/23 16:23	EPA 8260D	**J**
m,p-Xylene	ND	1.00	2.00	ug/L	2	02/16/23 16:23	EPA 8260D	
o-Xylene	ND	0.500	1.00	ug/L	2	02/16/23 16:23	EPA 8260D	

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Michele Poquiz For Kurt Johnson, Senior Chemist

APEX LABORATORIES

Apex Laboratories, LLC
6700 S.W. Sandburg Street
Tigard, OR 97223
503-718-2323
ORELAP ID: **OR100062**

ANALYTICAL REPORT

Landau Associates	Project: **Boeing Portland 85-105 Investigation**	
1500 SW First Avenue Suite 1015	Project Number: **025116.123.450**	**Report ID:**
Portland, OR 97201	Project Manager: **Erin Waibel**	**A3B0408 - 05 02 23 1421**

ANALYTICAL SAMPLE RESULTS

Volatile Organic Compounds by EPA 8260D

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
LAI-8-0223-SP (A3B0408-05RE1)				**Matrix: Water**		**Batch: 23B0617**		
Surrogate: 1,4-Difluorobenzene (Surr)			*Recovery: 95 %*	*Limits: 80-120 %*	*1*	*02/16/23 16:23*	*EPA 8260D*	
Toluene-d8 (Surr)			*102 %*	*80-120 %*	*1*	*02/16/23 16:23*	*EPA 8260D*	
4-Bromofluorobenzene (Surr)			*92 %*	*80-120 %*	*1*	*02/16/23 16:23*	*EPA 8260D*	
DP1S-0223 (A3B0408-06RE1)				**Matrix: Water**		**Batch: 23B0617**		
Acetone	ND	10.0	20.0	ug/L	1	02/16/23 16:45	EPA 8260D	
Acrylonitrile	ND	1.00	2.00	ug/L	1	02/16/23 16:45	EPA 8260D	
Benzene	ND	0.100	0.200	ug/L	1	02/16/23 16:45	EPA 8260D	
Bromobenzene	ND	0.250	0.500	ug/L	1	02/16/23 16:45	EPA 8260D	
Bromochloromethane	ND	0.500	1.00	ug/L	1	02/16/23 16:45	EPA 8260D	
Bromodichloromethane	ND	0.500	1.00	ug/L	1	02/16/23 16:45	EPA 8260D	
Bromoform	ND	0.500	1.00	ug/L	1	02/16/23 16:45	EPA 8260D	
Bromomethane	ND	5.00	5.00	ug/L	1	02/16/23 16:45	EPA 8260D	
2-Butanone (MEK)	ND	5.00	10.0	ug/L	1	02/16/23 16:45	EPA 8260D	
n-Butylbenzene	ND	0.500	1.00	ug/L	1	02/16/23 16:45	EPA 8260D	
sec-Butylbenzene	ND	0.500	1.00	ug/L	1	02/16/23 16:45	EPA 8260D	
tert-Butylbenzene	ND	0.500	1.00	ug/L	1	02/16/23 16:45	EPA 8260D	
Carbon disulfide	ND	5.00	10.0	ug/L	1	02/16/23 16:45	EPA 8260D	
Carbon tetrachloride	ND	0.500	1.00	ug/L	1	02/16/23 16:45	EPA 8260D	
Chlorobenzene	ND	0.250	0.500	ug/L	1	02/16/23 16:45	EPA 8260D	
Chloroethane	ND	5.00	5.00	ug/L	1	02/16/23 16:45	EPA 8260D	
Chloroform	ND	0.500	1.00	ug/L	1	02/16/23 16:45	EPA 8260D	
Chloromethane	ND	2.50	5.00	ug/L	1	02/16/23 16:45	EPA 8260D	
2-Chlorotoluene	ND	0.500	1.00	ug/L	1	02/16/23 16:45	EPA 8260D	
4-Chlorotoluene	ND	0.500	1.00	ug/L	1	02/16/23 16:45	EPA 8260D	
Dibromochloromethane	ND	0.500	1.00	ug/L	1	02/16/23 16:45	EPA 8260D	
1,2-Dibromo-3-chloropropane	ND	2.50	5.00	ug/L	1	02/16/23 16:45	EPA 8260D	
1,2-Dibromoethane (EDB)	ND	0.250	0.500	ug/L	1	02/16/23 16:45	EPA 8260D	
Dibromomethane	ND	0.500	1.00	ug/L	1	02/16/23 16:45	EPA 8260D	
1,2-Dichlorobenzene	ND	0.250	0.500	ug/L	1	02/16/23 16:45	EPA 8260D	
1,3-Dichlorobenzene	ND	0.250	0.500	ug/L	1	02/16/23 16:45	EPA 8260D	
1,4-Dichlorobenzene	ND	0.250	0.500	ug/L	1	02/16/23 16:45	EPA 8260D	
Dichlorodifluoromethane	ND	0.500	1.00	ug/L	1	02/16/23 16:45	EPA 8260D	
1,1-Dichloroethane	ND	0.200	0.400	ug/L	1	02/16/23 16:45	EPA 8260D	

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Michele Poquiz For Kurt Johnson, Senior Chemist

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503-718-2323
ORELAP ID: **OR100062**

Landau Associates	Project: **Boeing Portland 85-105 Investigation**	
1500 SW First Avenue Suite 1015	Project Number: **025116.123.450**	**Report ID:**
Portland, OR 97201	Project Manager: **Erin Waibel**	**A3B0408 - 05 02 23 1421**

ANALYTICAL SAMPLE RESULTS

Volatile Organic Compounds by EPA 8260D

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
DP1S-0223 (A3B0408-06RE1)				**Matrix: Water**		**Batch: 23B0617**		
1,2-Dichloroethane (EDC)	ND	0.200	0.400	ug/L	1	02/16/23 16:45	EPA 8260D	
1,1-Dichloroethene	ND	0.200	0.400	ug/L	1	02/16/23 16:45	EPA 8260D	
cis-1,2-Dichloroethene	ND	0.200	0.400	ug/L	1	02/16/23 16:45	EPA 8260D	
trans-1,2-Dichloroethene	ND	0.200	0.400	ug/L	1	02/16/23 16:45	EPA 8260D	
1,2-Dichloropropane	ND	0.250	0.500	ug/L	1	02/16/23 16:45	EPA 8260D	
1,3-Dichloropropane	ND	0.500	1.00	ug/L	1	02/16/23 16:45	EPA 8260D	
2,2-Dichloropropane	ND	0.500	1.00	ug/L	1	02/16/23 16:45	EPA 8260D	
1,1-Dichloropropene	ND	0.500	1.00	ug/L	1	02/16/23 16:45	EPA 8260D	
cis-1,3-Dichloropropene	ND	0.500	1.00	ug/L	1	02/16/23 16:45	EPA 8260D	
trans-1,3-Dichloropropene	ND	0.500	1.00	ug/L	1	02/16/23 16:45	EPA 8260D	
Ethylbenzene	ND	0.250	0.500	ug/L	1	02/16/23 16:45	EPA 8260D	
Hexachlorobutadiene	ND	2.50	5.00	ug/L	1	02/16/23 16:45	EPA 8260D	
2-Hexanone	ND	5.00	10.0	ug/L	1	02/16/23 16:45	EPA 8260D	
Isopropylbenzene	ND	0.500	1.00	ug/L	1	02/16/23 16:45	EPA 8260D	
4-Isopropyltoluene	ND	0.500	1.00	ug/L	1	02/16/23 16:45	EPA 8260D	
Methylene chloride	ND	5.00	10.0	ug/L	1	02/16/23 16:45	EPA 8260D	
4-Methyl-2-pentanone (MiBK)	ND	5.00	10.0	ug/L	1	02/16/23 16:45	EPA 8260D	
Methyl tert-butyl ether (MTBE)	ND	0.500	1.00	ug/L	1	02/16/23 16:45	EPA 8260D	
Naphthalene	ND	1.00	2.00	ug/L	1	02/16/23 16:45	EPA 8260D	
n-Propylbenzene	ND	0.250	0.500	ug/L	1	02/16/23 16:45	EPA 8260D	
Styrene	ND	0.500	1.00	ug/L	1	02/16/23 16:45	EPA 8260D	
1,1,1,2-Tetrachloroethane	ND	0.200	0.400	ug/L	1	02/16/23 16:45	EPA 8260D	
1,1,2,2-Tetrachloroethane	ND	0.250	0.500	ug/L	1	02/16/23 16:45	EPA 8260D	
Tetrachloroethene (PCE)	ND	0.200	0.400	ug/L	1	02/16/23 16:45	EPA 8260D	
Toluene	ND	0.500	1.00	ug/L	1	02/16/23 16:45	EPA 8260D	
1,2,3-Trichlorobenzene	ND	1.00	2.00	ug/L	1	02/16/23 16:45	EPA 8260D	
1,2,4-Trichlorobenzene	ND	1.00	2.00	ug/L	1	02/16/23 16:45	EPA 8260D	
1,1,1-Trichloroethane	ND	0.200	0.400	ug/L	1	02/16/23 16:45	EPA 8260D	
1,1,2-Trichloroethane	ND	0.250	0.500	ug/L	1	02/16/23 16:45	EPA 8260D	
Trichloroethene (TCE)	ND	0.200	0.400	ug/L	1	02/16/23 16:45	EPA 8260D	
Trichlorofluoromethane	ND	1.00	2.00	ug/L	1	02/16/23 16:45	EPA 8260D	
1,2,3-Trichloropropane	ND	0.500	1.00	ug/L	1	02/16/23 16:45	EPA 8260D	
1,2,4-Trimethylbenzene	ND	0.500	1.00	ug/L	1	02/16/23 16:45	EPA 8260D	

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APEX LABORATORIES

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ORELAP ID: **OR100062**

ANALYTICAL REPORT

Landau Associates	Project: **Boeing Portland 85-105 Investigation**	
1500 SW First Avenue Suite 1015	Project Number: **025116.123.450**	**Report ID:**
Portland, OR 97201	Project Manager: **Erin Waibel**	**A3B0408 - 05 02 23 1421**

ANALYTICAL SAMPLE RESULTS

Volatile Organic Compounds by EPA 8260D

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
DP1S-0223 (A3B0408-06RE1)				**Matrix: Water**		**Batch: 23B0617**		
1,3,5-Trimethylbenzene	ND	0.500	1.00	ug/L	1	02/16/23 16:45	EPA 8260D	
Vinyl chloride	ND	0.200	0.400	ug/L	1	02/16/23 16:45	EPA 8260D	
m,p-Xylene	ND	0.500	1.00	ug/L	1	02/16/23 16:45	EPA 8260D	
o-Xylene	ND	0.250	0.500	ug/L	1	02/16/23 16:45	EPA 8260D	
Surrogate: 1,4-Difluorobenzene (Surr)		*Recovery:*	*96 %*	*Limits: 80-120 %*	*1*	*02/16/23 16:45*	*EPA 8260D*	
Toluene-d8 (Surr)			*105 %*	*80-120 %*	*1*	*02/16/23 16:45*	*EPA 8260D*	
4-Bromofluorobenzene (Surr)			*99 %*	*80-120 %*	*1*	*02/16/23 16:45*	*EPA 8260D*	
LAI-4-0223-SP (A3B0408-07RE1)				**Matrix: Water**		**Batch: 23B0617**		
Acetone	ND	10.0	20.0	ug/L	1	02/16/23 17:07	EPA 8260D	
Acrylonitrile	ND	1.00	2.00	ug/L	1	02/16/23 17:07	EPA 8260D	
Benzene	ND	0.100	0.200	ug/L	1	02/16/23 17:07	EPA 8260D	
Bromobenzene	ND	0.250	0.500	ug/L	1	02/16/23 17:07	EPA 8260D	
Bromochloromethane	ND	0.500	1.00	ug/L	1	02/16/23 17:07	EPA 8260D	
Bromodichloromethane	ND	0.500	1.00	ug/L	1	02/16/23 17:07	EPA 8260D	
Bromoform	ND	0.500	1.00	ug/L	1	02/16/23 17:07	EPA 8260D	
Bromomethane	ND	5.00	5.00	ug/L	1	02/16/23 17:07	EPA 8260D	
2-Butanone (MEK)	ND	5.00	10.0	ug/L	1	02/16/23 17:07	EPA 8260D	
n-Butylbenzene	ND	0.500	1.00	ug/L	1	02/16/23 17:07	EPA 8260D	
sec-Butylbenzene	ND	0.500	1.00	ug/L	1	02/16/23 17:07	EPA 8260D	
tert-Butylbenzene	ND	0.500	1.00	ug/L	1	02/16/23 17:07	EPA 8260D	
Carbon disulfide	ND	5.00	10.0	ug/L	1	02/16/23 17:07	EPA 8260D	
Carbon tetrachloride	ND	0.500	1.00	ug/L	1	02/16/23 17:07	EPA 8260D	
Chlorobenzene	ND	0.250	0.500	ug/L	1	02/16/23 17:07	EPA 8260D	
Chloroethane	ND	5.00	5.00	ug/L	1	02/16/23 17:07	EPA 8260D	
Chloroform	ND	0.500	1.00	ug/L	1	02/16/23 17:07	EPA 8260D	
Chloromethane	ND	2.50	5.00	ug/L	1	02/16/23 17:07	EPA 8260D	
2-Chlorotoluene	ND	0.500	1.00	ug/L	1	02/16/23 17:07	EPA 8260D	
4-Chlorotoluene	ND	0.500	1.00	ug/L	1	02/16/23 17:07	EPA 8260D	
Dibromochloromethane	ND	0.500	1.00	ug/L	1	02/16/23 17:07	EPA 8260D	
1,2-Dibromo-3-chloropropane	ND	2.50	5.00	ug/L	1	02/16/23 17:07	EPA 8260D	
1,2-Dibromoethane (EDB)	ND	0.250	0.500	ug/L	1	02/16/23 17:07	EPA 8260D	
Dibromomethane	ND	0.500	1.00	ug/L	1	02/16/23 17:07	EPA 8260D	
1,2-Dichlorobenzene	ND	0.250	0.500	ug/L	1	02/16/23 17:07	EPA 8260D	

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ORELAP ID: **OR100062**

Landau Associates	Project: **Boeing Portland 85-105 Investigation**	
1500 SW First Avenue Suite 1015	Project Number: **025116.123.450**	**Report ID:**
Portland, OR 97201	Project Manager: **Erin Waibel**	**A3B0408 - 05 02 23 1421**

ANALYTICAL SAMPLE RESULTS

Volatile Organic Compounds by EPA 8260D

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
LAI-4-0223-SP (A3B0408-07RE1)				**Matrix: Water**		**Batch: 23B0617**		
1,3-Dichlorobenzene	ND	0.250	0.500	ug/L	1	02/16/23 17:07	EPA 8260D	
1,4-Dichlorobenzene	ND	0.250	0.500	ug/L	1	02/16/23 17:07	EPA 8260D	
Dichlorodifluoromethane	ND	0.500	1.00	ug/L	1	02/16/23 17:07	EPA 8260D	
1,1-Dichloroethane	ND	0.200	0.400	ug/L	1	02/16/23 17:07	EPA 8260D	
1,2-Dichloroethane (EDC)	ND	0.200	0.400	ug/L	1	02/16/23 17:07	EPA 8260D	
1,1-Dichloroethene	ND	0.200	0.400	ug/L	1	02/16/23 17:07	EPA 8260D	
cis-1,2-Dichloroethene	ND	0.200	0.400	ug/L	1	02/16/23 17:07	EPA 8260D	
trans-1,2-Dichloroethene	ND	0.200	0.400	ug/L	1	02/16/23 17:07	EPA 8260D	
1,2-Dichloropropane	ND	0.250	0.500	ug/L	1	02/16/23 17:07	EPA 8260D	
1,3-Dichloropropane	ND	0.500	1.00	ug/L	1	02/16/23 17:07	EPA 8260D	
2,2-Dichloropropane	ND	0.500	1.00	ug/L	1	02/16/23 17:07	EPA 8260D	
1,1-Dichloropropene	ND	0.500	1.00	ug/L	1	02/16/23 17:07	EPA 8260D	
cis-1,3-Dichloropropene	ND	0.500	1.00	ug/L	1	02/16/23 17:07	EPA 8260D	
trans-1,3-Dichloropropene	ND	0.500	1.00	ug/L	1	02/16/23 17:07	EPA 8260D	
Ethylbenzene	ND	0.250	0.500	ug/L	1	02/16/23 17:07	EPA 8260D	
Hexachlorobutadiene	ND	2.50	5.00	ug/L	1	02/16/23 17:07	EPA 8260D	
2-Hexanone	ND	5.00	10.0	ug/L	1	02/16/23 17:07	EPA 8260D	
Isopropylbenzene	ND	0.500	1.00	ug/L	1	02/16/23 17:07	EPA 8260D	
4-Isopropyltoluene	ND	0.500	1.00	ug/L	1	02/16/23 17:07	EPA 8260D	
Methylene chloride	ND	5.00	10.0	ug/L	1	02/16/23 17:07	EPA 8260D	
4-Methyl-2-pentanone (MiBK)	ND	5.00	10.0	ug/L	1	02/16/23 17:07	EPA 8260D	
Methyl tert-butyl ether (MTBE)	ND	0.500	1.00	ug/L	1	02/16/23 17:07	EPA 8260D	
Naphthalene	ND	1.00	2.00	ug/L	1	02/16/23 17:07	EPA 8260D	
n-Propylbenzene	ND	0.250	0.500	ug/L	1	02/16/23 17:07	EPA 8260D	
Styrene	ND	0.500	1.00	ug/L	1	02/16/23 17:07	EPA 8260D	
1,1,1,2-Tetrachloroethane	ND	0.200	0.400	ug/L	1	02/16/23 17:07	EPA 8260D	
1,1,2,2-Tetrachloroethane	ND	0.250	0.500	ug/L	1	02/16/23 17:07	EPA 8260D	
Tetrachloroethene (PCE)	ND	0.200	0.400	ug/L	1	02/16/23 17:07	EPA 8260D	
Toluene	ND	0.500	1.00	ug/L	1	02/16/23 17:07	EPA 8260D	
1,2,3-Trichlorobenzene	ND	1.00	2.00	ug/L	1	02/16/23 17:07	EPA 8260D	
1,2,4-Trichlorobenzene	ND	1.00	2.00	ug/L	1	02/16/23 17:07	EPA 8260D	
1,1,1-Trichloroethane	ND	0.200	0.400	ug/L	1	02/16/23 17:07	EPA 8260D	
1,1,2-Trichloroethane	ND	0.250	0.500	ug/L	1	02/16/23 17:07	EPA 8260D	

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ORELAP ID: OR100062

ANALYTICAL REPORT

Landau Associates	Project: Boeing Portland 85-105 Investigation	
1500 SW First Avenue Suite 1015	Project Number: 025116.123.450	Report ID:
Portland, OR 97201	Project Manager: Erin Waibel	A3B0408 - 05 02 23 1421

ANALYTICAL SAMPLE RESULTS

Volatile Organic Compounds by EPA 8260D

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
LAI-4-0223-SP (A3B0408-07RE1)				**Matrix: Water**		**Batch: 23B0617**		
Trichloroethene (TCE)	ND	0.200	0.400	ug/L	1	02/16/23 17:07	EPA 8260D	
Trichlorofluoromethane	ND	1.00	2.00	ug/L	1	02/16/23 17:07	EPA 8260D	
1,2,3-Trichloropropane	ND	0.500	1.00	ug/L	1	02/16/23 17:07	EPA 8260D	
1,2,4-Trimethylbenzene	ND	0.500	1.00	ug/L	1	02/16/23 17:07	EPA 8260D	
1,3,5-Trimethylbenzene	ND	0.500	1.00	ug/L	1	02/16/23 17:07	EPA 8260D	
Vinyl chloride	ND	0.200	0.400	ug/L	1	02/16/23 17:07	EPA 8260D	
m,p-Xylene	ND	0.500	1.00	ug/L	1	02/16/23 17:07	EPA 8260D	
o-Xylene	ND	0.250	0.500	ug/L	1	02/16/23 17:07	EPA 8260D	
Surrogate: 1,4-Difluorobenzene (Surr)			*Recovery: 98 %*	*Limits: 80-120 %*	*1*	*02/16/23 17:07*	*EPA 8260D*	
Toluene-d8 (Surr)			*104 %*	*80-120 %*	*1*	*02/16/23 17:07*	*EPA 8260D*	
4-Bromofluorobenzene (Surr)			*100 %*	*80-120 %*	*1*	*02/16/23 17:07*	*EPA 8260D*	
LAI-7-0223-SP (A3B0408-08RE1)				**Matrix: Water**		**Batch: 23B0617**		
Acetone	ND	20.0	20.0	ug/L	1	02/16/23 17:29	EPA 8260D	
Acrylonitrile	ND	1.00	2.00	ug/L	1	02/16/23 17:29	EPA 8260D	
Benzene	ND	0.100	0.200	ug/L	1	02/16/23 17:29	EPA 8260D	
Bromobenzene	ND	0.250	0.500	ug/L	1	02/16/23 17:29	EPA 8260D	
Bromochloromethane	ND	0.500	1.00	ug/L	1	02/16/23 17:29	EPA 8260D	
Bromodichloromethane	ND	0.500	1.00	ug/L	1	02/16/23 17:29	EPA 8260D	
Bromoform	ND	0.500	1.00	ug/L	1	02/16/23 17:29	EPA 8260D	
Bromomethane	ND	5.00	5.00	ug/L	1	02/16/23 17:29	EPA 8260D	
2-Butanone (MEK)	ND	5.00	10.0	ug/L	1	02/16/23 17:29	EPA 8260D	
n-Butylbenzene	ND	0.500	1.00	ug/L	1	02/16/23 17:29	EPA 8260D	
sec-Butylbenzene	ND	0.500	1.00	ug/L	1	02/16/23 17:29	EPA 8260D	
tert-Butylbenzene	ND	0.500	1.00	ug/L	1	02/16/23 17:29	EPA 8260D	
Carbon disulfide	ND	5.00	10.0	ug/L	1	02/16/23 17:29	EPA 8260D	
Carbon tetrachloride	ND	0.500	1.00	ug/L	1	02/16/23 17:29	EPA 8260D	
Chlorobenzene	ND	0.250	0.500	ug/L	1	02/16/23 17:29	EPA 8260D	
Chloroethane	ND	5.00	5.00	ug/L	1	02/16/23 17:29	EPA 8260D	
Chloroform	ND	0.500	1.00	ug/L	1	02/16/23 17:29	EPA 8260D	
Chloromethane	ND	2.50	5.00	ug/L	1	02/16/23 17:29	EPA 8260D	
2-Chlorotoluene	ND	0.500	1.00	ug/L	1	02/16/23 17:29	EPA 8260D	
4-Chlorotoluene	ND	0.500	1.00	ug/L	1	02/16/23 17:29	EPA 8260D	
Dibromochloromethane	ND	0.500	1.00	ug/L	1	02/16/23 17:29	EPA 8260D	

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Michele Poquiz For Kurt Johnson, Senior Chemist

APEX LABORATORIES

Apex Laboratories, LLC
6700 S.W. Sandburg Street
Tigard, OR 97223
503-718-2323
ORELAP ID: **OR100062**

ANALYTICAL REPORT

Landau Associates	Project: **Boeing Portland 85-105 Investigation**	
1500 SW First Avenue Suite 1015	Project Number: **025116.123.450**	**Report ID:**
Portland, OR 97201	Project Manager: **Erin Waibel**	**A3B0408 - 05 02 23 1421**

ANALYTICAL SAMPLE RESULTS

Volatile Organic Compounds by EPA 8260D

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
LAI-7-0223-SP (A3B0408-08RE1)				**Matrix: Water**		**Batch: 23B0617**		
1,2-Dibromo-3-chloropropane	ND	2.50	5.00	ug/L	1	02/16/23 17:29	EPA 8260D	
1,2-Dibromoethane (EDB)	ND	0.250	0.500	ug/L	1	02/16/23 17:29	EPA 8260D	
Dibromomethane	ND	0.500	1.00	ug/L	1	02/16/23 17:29	EPA 8260D	
1,2-Dichlorobenzene	ND	0.250	0.500	ug/L	1	02/16/23 17:29	EPA 8260D	
1,3-Dichlorobenzene	ND	0.250	0.500	ug/L	1	02/16/23 17:29	EPA 8260D	
1,4-Dichlorobenzene	ND	0.250	0.500	ug/L	1	02/16/23 17:29	EPA 8260D	
Dichlorodifluoromethane	ND	0.500	1.00	ug/L	1	02/16/23 17:29	EPA 8260D	
1,1-Dichloroethane	ND	0.200	0.400	ug/L	1	02/16/23 17:29	EPA 8260D	
1,2-Dichloroethane (EDC)	ND	0.200	0.400	ug/L	1	02/16/23 17:29	EPA 8260D	
1,1-Dichloroethene	ND	0.200	0.400	ug/L	1	02/16/23 17:29	EPA 8260D	
cis-1,2-Dichloroethene	**4.33**	0.200	0.400	ug/L	1	02/16/23 17:29	EPA 8260D	
trans-1,2-Dichloroethene	**0.210**	0.200	0.400	ug/L	1	02/16/23 17:29	EPA 8260D	**J**
1,2-Dichloropropane	ND	0.250	0.500	ug/L	1	02/16/23 17:29	EPA 8260D	
1,3-Dichloropropane	ND	0.500	1.00	ug/L	1	02/16/23 17:29	EPA 8260D	
2,2-Dichloropropane	ND	0.500	1.00	ug/L	1	02/16/23 17:29	EPA 8260D	
1,1-Dichloropropene	ND	0.500	1.00	ug/L	1	02/16/23 17:29	EPA 8260D	
cis-1,3-Dichloropropene	ND	0.500	1.00	ug/L	1	02/16/23 17:29	EPA 8260D	
trans-1,3-Dichloropropene	ND	0.500	1.00	ug/L	1	02/16/23 17:29	EPA 8260D	
Ethylbenzene	ND	0.250	0.500	ug/L	1	02/16/23 17:29	EPA 8260D	
Hexachlorobutadiene	ND	2.50	5.00	ug/L	1	02/16/23 17:29	EPA 8260D	
2-Hexanone	ND	5.00	10.0	ug/L	1	02/16/23 17:29	EPA 8260D	
Isopropylbenzene	ND	0.500	1.00	ug/L	1	02/16/23 17:29	EPA 8260D	
4-Isopropyltoluene	ND	0.500	1.00	ug/L	1	02/16/23 17:29	EPA 8260D	
Methylene chloride	ND	5.00	10.0	ug/L	1	02/16/23 17:29	EPA 8260D	
4-Methyl-2-pentanone (MiBK)	ND	5.00	10.0	ug/L	1	02/16/23 17:29	EPA 8260D	
Methyl tert-butyl ether (MTBE)	ND	0.500	1.00	ug/L	1	02/16/23 17:29	EPA 8260D	
Naphthalene	ND	1.00	2.00	ug/L	1	02/16/23 17:29	EPA 8260D	
n-Propylbenzene	ND	0.250	0.500	ug/L	1	02/16/23 17:29	EPA 8260D	
Styrene	ND	0.500	1.00	ug/L	1	02/16/23 17:29	EPA 8260D	
1,1,1,2-Tetrachloroethane	ND	0.200	0.400	ug/L	1	02/16/23 17:29	EPA 8260D	
1,1,2,2-Tetrachloroethane	ND	0.250	0.500	ug/L	1	02/16/23 17:29	EPA 8260D	
Tetrachloroethene (PCE)	**1.12**	0.200	0.400	ug/L	1	02/16/23 17:29	EPA 8260D	
Toluene	ND	0.500	1.00	ug/L	1	02/16/23 17:29	EPA 8260D	

Apex Laboratories

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Michele Poquiz For Kurt Johnson, Senior Chemist

Apex Laboratories, LLC
6700 S.W. Sandburg Street
Tigard, OR 97223
503-718-2323
ORELAP ID: OR100062

ANALYTICAL REPORT

Landau Associates	Project: Boeing Portland 85-105 Investigation	
1500 SW First Avenue Suite 1015	Project Number: 025116.123.450	Report ID:
Portland, OR 97201	Project Manager: Erin Waibel	A3B0408 - 05 02 23 1421

ANALYTICAL SAMPLE RESULTS

Volatile Organic Compounds by EPA 8260D

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
LAI-7-0223-SP (A3B0408-08RE1)				**Matrix: Water**		**Batch: 23B0617**		
1,2,3-Trichlorobenzene	ND	1.00	2.00	ug/L	1	02/16/23 17:29	EPA 8260D	
1,2,4-Trichlorobenzene	ND	1.00	2.00	ug/L	1	02/16/23 17:29	EPA 8260D	
1,1,1-Trichloroethane	ND	0.200	0.400	ug/L	1	02/16/23 17:29	EPA 8260D	
1,1,2-Trichloroethane	ND	0.250	0.500	ug/L	1	02/16/23 17:29	EPA 8260D	
Trichloroethene (TCE)	**3.50**	0.200	0.400	ug/L	1	02/16/23 17:29	EPA 8260D	
Trichlorofluoromethane	ND	1.00	2.00	ug/L	1	02/16/23 17:29	EPA 8260D	
1,2,3-Trichloropropane	ND	0.500	1.00	ug/L	1	02/16/23 17:29	EPA 8260D	
1,2,4-Trimethylbenzene	ND	0.500	1.00	ug/L	1	02/16/23 17:29	EPA 8260D	
1,3,5-Trimethylbenzene	ND	0.500	1.00	ug/L	1	02/16/23 17:29	EPA 8260D	
Vinyl chloride	ND	0.200	0.400	ug/L	1	02/16/23 17:29	EPA 8260D	
m,p-Xylene	ND	0.500	1.00	ug/L	1	02/16/23 17:29	EPA 8260D	
o-Xylene	ND	0.250	0.500	ug/L	1	02/16/23 17:29	EPA 8260D	
Surrogate: 1,4-Difluorobenzene (Surr)			*Recovery: 96 %*	*Limits: 80-120 %*	*1*	*02/16/23 17:29*	*EPA 8260D*	
Toluene-d8 (Surr)			*105 %*	*80-120 %*	*1*	*02/16/23 17:29*	*EPA 8260D*	
4-Bromofluorobenzene (Surr)			*99 %*	*80-120 %*	*1*	*02/16/23 17:29*	*EPA 8260D*	
LAI-6-0223 (A3B0408-09RE1)				**Matrix: Water**		**Batch: 23B0617**		
Acetone	ND	10.0	20.0	ug/L	1	02/16/23 17:51	EPA 8260D	
Acrylonitrile	ND	1.00	2.00	ug/L	1	02/16/23 17:51	EPA 8260D	
Benzene	ND	0.100	0.200	ug/L	1	02/16/23 17:51	EPA 8260D	
Bromobenzene	ND	0.250	0.500	ug/L	1	02/16/23 17:51	EPA 8260D	
Bromochloromethane	ND	0.500	1.00	ug/L	1	02/16/23 17:51	EPA 8260D	
Bromodichloromethane	ND	0.500	1.00	ug/L	1	02/16/23 17:51	EPA 8260D	
Bromoform	ND	0.500	1.00	ug/L	1	02/16/23 17:51	EPA 8260D	
Bromomethane	ND	5.00	5.00	ug/L	1	02/16/23 17:51	EPA 8260D	
2-Butanone (MEK)	ND	5.00	10.0	ug/L	1	02/16/23 17:51	EPA 8260D	
n-Butylbenzene	ND	0.500	1.00	ug/L	1	02/16/23 17:51	EPA 8260D	
sec-Butylbenzene	ND	0.500	1.00	ug/L	1	02/16/23 17:51	EPA 8260D	
tert-Butylbenzene	ND	0.500	1.00	ug/L	1	02/16/23 17:51	EPA 8260D	
Carbon disulfide	ND	5.00	10.0	ug/L	1	02/16/23 17:51	EPA 8260D	
Carbon tetrachloride	ND	0.500	1.00	ug/L	1	02/16/23 17:51	EPA 8260D	
Chlorobenzene	ND	0.250	0.500	ug/L	1	02/16/23 17:51	EPA 8260D	
Chloroethane	ND	5.00	5.00	ug/L	1	02/16/23 17:51	EPA 8260D	
Chloroform	ND	0.500	1.00	ug/L	1	02/16/23 17:51	EPA 8260D	

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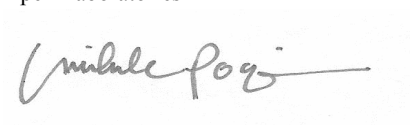

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Michele Poquiz For Kurt Johnson, Senior Chemist

Apex Laboratories, LLC
6700 S.W. Sandburg Street
Tigard, OR 97223
503-718-2323
ORELAP ID: OR100062

ANALYTICAL REPORT

Landau Associates	Project: **Boeing Portland 85-105 Investigation**	
1500 SW First Avenue Suite 1015	Project Number: **025116.123.450**	**Report ID:**
Portland, OR 97201	Project Manager: **Erin Waibel**	**A3B0408 - 05 02 23 1421**

ANALYTICAL SAMPLE RESULTS

Volatile Organic Compounds by EPA 8260D

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
LAI-6-0223 (A3B0408-09RE1)				**Matrix: Water**		**Batch: 23B0617**		
Chloromethane	ND	2.50	5.00	ug/L	1	02/16/23 17:51	EPA 8260D	
2-Chlorotoluene	ND	0.500	1.00	ug/L	1	02/16/23 17:51	EPA 8260D	
4-Chlorotoluene	ND	0.500	1.00	ug/L	1	02/16/23 17:51	EPA 8260D	
Dibromochloromethane	ND	0.500	1.00	ug/L	1	02/16/23 17:51	EPA 8260D	
1,2-Dibromo-3-chloropropane	ND	2.50	5.00	ug/L	1	02/16/23 17:51	EPA 8260D	
1,2-Dibromoethane (EDB)	ND	0.250	0.500	ug/L	1	02/16/23 17:51	EPA 8260D	
Dibromomethane	ND	0.500	1.00	ug/L	1	02/16/23 17:51	EPA 8260D	
1,2-Dichlorobenzene	ND	0.250	0.500	ug/L	1	02/16/23 17:51	EPA 8260D	
1,3-Dichlorobenzene	ND	0.250	0.500	ug/L	1	02/16/23 17:51	EPA 8260D	
1,4-Dichlorobenzene	ND	0.250	0.500	ug/L	1	02/16/23 17:51	EPA 8260D	
Dichlorodifluoromethane	ND	0.500	1.00	ug/L	1	02/16/23 17:51	EPA 8260D	
1,1-Dichloroethane	ND	0.200	0.400	ug/L	1	02/16/23 17:51	EPA 8260D	
1,2-Dichloroethane (EDC)	ND	0.200	0.400	ug/L	1	02/16/23 17:51	EPA 8260D	
1,1-Dichloroethene	ND	0.200	0.400	ug/L	1	02/16/23 17:51	EPA 8260D	
cis-1,2-Dichloroethene	ND	0.200	0.400	ug/L	1	02/16/23 17:51	EPA 8260D	
trans-1,2-Dichloroethene	ND	0.200	0.400	ug/L	1	02/16/23 17:51	EPA 8260D	
1,2-Dichloropropane	ND	0.250	0.500	ug/L	1	02/16/23 17:51	EPA 8260D	
1,3-Dichloropropane	ND	0.500	1.00	ug/L	1	02/16/23 17:51	EPA 8260D	
2,2-Dichloropropane	ND	0.500	1.00	ug/L	1	02/16/23 17:51	EPA 8260D	
1,1-Dichloropropene	ND	0.500	1.00	ug/L	1	02/16/23 17:51	EPA 8260D	
cis-1,3-Dichloropropene	ND	0.500	1.00	ug/L	1	02/16/23 17:51	EPA 8260D	
trans-1,3-Dichloropropene	ND	0.500	1.00	ug/L	1	02/16/23 17:51	EPA 8260D	
Ethylbenzene	ND	0.250	0.500	ug/L	1	02/16/23 17:51	EPA 8260D	
Hexachlorobutadiene	ND	2.50	5.00	ug/L	1	02/16/23 17:51	EPA 8260D	
2-Hexanone	ND	5.00	10.0	ug/L	1	02/16/23 17:51	EPA 8260D	
Isopropylbenzene	ND	0.500	1.00	ug/L	1	02/16/23 17:51	EPA 8260D	
4-Isopropyltoluene	ND	0.500	1.00	ug/L	1	02/16/23 17:51	EPA 8260D	
Methylene chloride	ND	5.00	10.0	ug/L	1	02/16/23 17:51	EPA 8260D	
4-Methyl-2-pentanone (MiBK)	ND	5.00	10.0	ug/L	1	02/16/23 17:51	EPA 8260D	
Methyl tert-butyl ether (MTBE)	ND	0.500	1.00	ug/L	1	02/16/23 17:51	EPA 8260D	
Naphthalene	ND	1.00	2.00	ug/L	1	02/16/23 17:51	EPA 8260D	
n-Propylbenzene	ND	0.250	0.500	ug/L	1	02/16/23 17:51	EPA 8260D	
Styrene	ND	0.500	1.00	ug/L	1	02/16/23 17:51	EPA 8260D	

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6700 S.W. Sandburg Street
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503-718-2323
ORELAP ID: OR100062

ANALYTICAL REPORT

Landau Associates	Project: Boeing Portland 85-105 Investigation	
1500 SW First Avenue Suite 1015	Project Number: 025116.123.450	Report ID:
Portland, OR 97201	Project Manager: Erin Waibel	A3B0408 - 05 02 23 1421

ANALYTICAL SAMPLE RESULTS

Volatile Organic Compounds by EPA 8260D

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
LAI-6-0223 (A3B0408-09RE1)				**Matrix: Water**		**Batch: 23B0617**		
1,1,1,2-Tetrachloroethane	ND	0.200	0.400	ug/L	1	02/16/23 17:51	EPA 8260D	
1,1,2,2-Tetrachloroethane	ND	0.250	0.500	ug/L	1	02/16/23 17:51	EPA 8260D	
Tetrachloroethene (PCE)	ND	0.200	0.400	ug/L	1	02/16/23 17:51	EPA 8260D	
Toluene	ND	0.500	1.00	ug/L	1	02/16/23 17:51	EPA 8260D	
1,2,3-Trichlorobenzene	ND	1.00	2.00	ug/L	1	02/16/23 17:51	EPA 8260D	
1,2,4-Trichlorobenzene	ND	1.00	2.00	ug/L	1	02/16/23 17:51	EPA 8260D	
1,1,1-Trichloroethane	ND	0.200	0.400	ug/L	1	02/16/23 17:51	EPA 8260D	
1,1,2-Trichloroethane	ND	0.250	0.500	ug/L	1	02/16/23 17:51	EPA 8260D	
Trichloroethene (TCE)	ND	0.200	0.400	ug/L	1	02/16/23 17:51	EPA 8260D	
Trichlorofluoromethane	ND	1.00	2.00	ug/L	1	02/16/23 17:51	EPA 8260D	
1,2,3-Trichloropropane	ND	0.500	1.00	ug/L	1	02/16/23 17:51	EPA 8260D	
1,2,4-Trimethylbenzene	ND	0.500	1.00	ug/L	1	02/16/23 17:51	EPA 8260D	
1,3,5-Trimethylbenzene	ND	0.500	1.00	ug/L	1	02/16/23 17:51	EPA 8260D	
Vinyl chloride	ND	0.200	0.400	ug/L	1	02/16/23 17:51	EPA 8260D	
m,p-Xylene	ND	0.500	1.00	ug/L	1	02/16/23 17:51	EPA 8260D	
o-Xylene	ND	0.250	0.500	ug/L	1	02/16/23 17:51	EPA 8260D	
Surrogate: 1,4-Difluorobenzene (Surr)			*Recovery: 95 %*	*Limits: 80-120 %*	*1*	*02/16/23 17:51*	*EPA 8260D*	
Toluene-d8 (Surr)			*105 %*	*80-120 %*	*1*	*02/16/23 17:51*	*EPA 8260D*	
4-Bromofluorobenzene (Surr)			*96 %*	*80-120 %*	*1*	*02/16/23 17:51*	*EPA 8260D*	
LAI-5-0223 (A3B0408-10RE1)				**Matrix: Water**		**Batch: 23B0617**		
Acetone	ND	10.0	20.0	ug/L	1	02/16/23 18:14	EPA 8260D	
Acrylonitrile	ND	1.00	2.00	ug/L	1	02/16/23 18:14	EPA 8260D	
Benzene	ND	0.100	0.200	ug/L	1	02/16/23 18:14	EPA 8260D	
Bromobenzene	ND	0.250	0.500	ug/L	1	02/16/23 18:14	EPA 8260D	
Bromochloromethane	ND	0.500	1.00	ug/L	1	02/16/23 18:14	EPA 8260D	
Bromodichloromethane	ND	0.500	1.00	ug/L	1	02/16/23 18:14	EPA 8260D	
Bromoform	ND	0.500	1.00	ug/L	1	02/16/23 18:14	EPA 8260D	
Bromomethane	ND	5.00	5.00	ug/L	1	02/16/23 18:14	EPA 8260D	
2-Butanone (MEK)	ND	5.00	10.0	ug/L	1	02/16/23 18:14	EPA 8260D	
n-Butylbenzene	ND	0.500	1.00	ug/L	1	02/16/23 18:14	EPA 8260D	
sec-Butylbenzene	ND	0.500	1.00	ug/L	1	02/16/23 18:14	EPA 8260D	
tert-Butylbenzene	ND	0.500	1.00	ug/L	1	02/16/23 18:14	EPA 8260D	
Carbon disulfide	ND	5.00	10.0	ug/L	1	02/16/23 18:14	EPA 8260D	

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Michele Poquiz For Kurt Johnson, Senior Chemist

Apex Laboratories, LLC
6700 S.W. Sandburg Street
Tigard, OR 97223
503-718-2323
ORELAP ID: **OR100062**

Landau Associates	Project: **Boeing Portland 85-105 Investigation**	
1500 SW First Avenue Suite 1015	Project Number: **025116.123.450**	**Report ID:**
Portland, OR 97201	Project Manager: **Erin Waibel**	**A3B0408 - 05 02 23 1421**

ANALYTICAL SAMPLE RESULTS

Volatile Organic Compounds by EPA 8260D

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
LAI-5-0223 (A3B0408-10RE1)				**Matrix: Water**		**Batch: 23B0617**		
Carbon tetrachloride	ND	0.500	1.00	ug/L	1	02/16/23 18:14	EPA 8260D	
Chlorobenzene	ND	0.250	0.500	ug/L	1	02/16/23 18:14	EPA 8260D	
Chloroethane	ND	5.00	5.00	ug/L	1	02/16/23 18:14	EPA 8260D	
Chloroform	ND	0.500	1.00	ug/L	1	02/16/23 18:14	EPA 8260D	
Chloromethane	ND	2.50	5.00	ug/L	1	02/16/23 18:14	EPA 8260D	
2-Chlorotoluene	ND	0.500	1.00	ug/L	1	02/16/23 18:14	EPA 8260D	
4-Chlorotoluene	ND	0.500	1.00	ug/L	1	02/16/23 18:14	EPA 8260D	
Dibromochloromethane	ND	0.500	1.00	ug/L	1	02/16/23 18:14	EPA 8260D	
1,2-Dibromo-3-chloropropane	ND	2.50	5.00	ug/L	1	02/16/23 18:14	EPA 8260D	
1,2-Dibromoethane (EDB)	ND	0.250	0.500	ug/L	1	02/16/23 18:14	EPA 8260D	
Dibromomethane	ND	0.500	1.00	ug/L	1	02/16/23 18:14	EPA 8260D	
1,2-Dichlorobenzene	ND	0.250	0.500	ug/L	1	02/16/23 18:14	EPA 8260D	
1,3-Dichlorobenzene	ND	0.250	0.500	ug/L	1	02/16/23 18:14	EPA 8260D	
1,4-Dichlorobenzene	ND	0.250	0.500	ug/L	1	02/16/23 18:14	EPA 8260D	
Dichlorodifluoromethane	ND	0.500	1.00	ug/L	1	02/16/23 18:14	EPA 8260D	
1,1-Dichloroethane	ND	0.200	0.400	ug/L	1	02/16/23 18:14	EPA 8260D	
1,2-Dichloroethane (EDC)	ND	0.200	0.400	ug/L	1	02/16/23 18:14	EPA 8260D	
1,1-Dichloroethene	ND	0.200	0.400	ug/L	1	02/16/23 18:14	EPA 8260D	
cis-1,2-Dichloroethene	**0.420**	0.200	0.400	ug/L	1	02/16/23 18:14	EPA 8260D	
trans-1,2-Dichloroethene	ND	0.200	0.400	ug/L	1	02/16/23 18:14	EPA 8260D	
1,2-Dichloropropane	ND	0.250	0.500	ug/L	1	02/16/23 18:14	EPA 8260D	
1,3-Dichloropropane	ND	0.500	1.00	ug/L	1	02/16/23 18:14	EPA 8260D	
2,2-Dichloropropane	ND	0.500	1.00	ug/L	1	02/16/23 18:14	EPA 8260D	
1,1-Dichloropropene	ND	0.500	1.00	ug/L	1	02/16/23 18:14	EPA 8260D	
cis-1,3-Dichloropropene	ND	0.500	1.00	ug/L	1	02/16/23 18:14	EPA 8260D	
trans-1,3-Dichloropropene	ND	0.500	1.00	ug/L	1	02/16/23 18:14	EPA 8260D	
Ethylbenzene	ND	0.250	0.500	ug/L	1	02/16/23 18:14	EPA 8260D	
Hexachlorobutadiene	ND	2.50	5.00	ug/L	1	02/16/23 18:14	EPA 8260D	
2-Hexanone	ND	5.00	10.0	ug/L	1	02/16/23 18:14	EPA 8260D	
Isopropylbenzene	ND	0.500	1.00	ug/L	1	02/16/23 18:14	EPA 8260D	
4-Isopropyltoluene	ND	0.500	1.00	ug/L	1	02/16/23 18:14	EPA 8260D	
Methylene chloride	ND	5.00	10.0	ug/L	1	02/16/23 18:14	EPA 8260D	
4-Methyl-2-pentanone (MiBK)	ND	5.00	10.0	ug/L	1	02/16/23 18:14	EPA 8260D	

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Michele Poquiz For Kurt Johnson, Senior Chemist

APEX LABORATORIES

Apex Laboratories, LLC
6700 S.W. Sandburg Street
Tigard, OR 97223
503-718-2323
ORELAP ID: **OR100062**

ANALYTICAL REPORT

Landau Associates	Project: **Boeing Portland 85-105 Investigation**	
1500 SW First Avenue Suite 1015	Project Number: **025116.123.450**	**Report ID:**
Portland, OR 97201	Project Manager: **Erin Waibel**	**A3B0408 - 05 02 23 1421**

ANALYTICAL SAMPLE RESULTS

Volatile Organic Compounds by EPA 8260D

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
LAI-5-0223 (A3B0408-10RE1)				**Matrix: Water**		**Batch: 23B0617**		
Methyl tert-butyl ether (MTBE)	ND	0.500	1.00	ug/L	1	02/16/23 18:14	EPA 8260D	
Naphthalene	ND	1.00	2.00	ug/L	1	02/16/23 18:14	EPA 8260D	
n-Propylbenzene	ND	0.250	0.500	ug/L	1	02/16/23 18:14	EPA 8260D	
Styrene	ND	0.500	1.00	ug/L	1	02/16/23 18:14	EPA 8260D	
1,1,1,2-Tetrachloroethane	ND	0.200	0.400	ug/L	1	02/16/23 18:14	EPA 8260D	
1,1,2,2-Tetrachloroethane	ND	0.250	0.500	ug/L	1	02/16/23 18:14	EPA 8260D	
Tetrachloroethene (PCE)	ND	0.200	0.400	ug/L	1	02/16/23 18:14	EPA 8260D	
Toluene	ND	0.500	1.00	ug/L	1	02/16/23 18:14	EPA 8260D	
1,2,3-Trichlorobenzene	ND	1.00	2.00	ug/L	1	02/16/23 18:14	EPA 8260D	
1,2,4-Trichlorobenzene	ND	1.00	2.00	ug/L	1	02/16/23 18:14	EPA 8260D	
1,1,1-Trichloroethane	ND	0.200	0.400	ug/L	1	02/16/23 18:14	EPA 8260D	
1,1,2-Trichloroethane	ND	0.250	0.500	ug/L	1	02/16/23 18:14	EPA 8260D	
Trichloroethene (TCE)	**0.600**	0.200	0.400	ug/L	1	02/16/23 18:14	EPA 8260D	
Trichlorofluoromethane	ND	1.00	2.00	ug/L	1	02/16/23 18:14	EPA 8260D	
1,2,3-Trichloropropane	ND	0.500	1.00	ug/L	1	02/16/23 18:14	EPA 8260D	
1,2,4-Trimethylbenzene	ND	0.500	1.00	ug/L	1	02/16/23 18:14	EPA 8260D	
1,3,5-Trimethylbenzene	ND	0.500	1.00	ug/L	1	02/16/23 18:14	EPA 8260D	
Vinyl chloride	ND	0.200	0.400	ug/L	1	02/16/23 18:14	EPA 8260D	
m,p-Xylene	ND	0.500	1.00	ug/L	1	02/16/23 18:14	EPA 8260D	
o-Xylene	ND	0.250	0.500	ug/L	1	02/16/23 18:14	EPA 8260D	
Surrogate: 1,4-Difluorobenzene (Surr)		*Recovery:*	*93 %*	*Limits:*	*80-120 %*	*1*	*02/16/23 18:14*	*EPA 8260D*	
Toluene-d8 (Surr)			*103 %*		*80-120 %*	*1*	*02/16/23 18:14*	*EPA 8260D*	
4-Bromofluorobenzene (Surr)			*98 %*		*80-120 %*	*1*	*02/16/23 18:14*	*EPA 8260D*	
LAI-1-0223 (A3B0408-11RE1)				**Matrix: Water**		**Batch: 23B0617**		
Acetone	ND	10.0	20.0	ug/L	1	02/16/23 18:36	EPA 8260D	
Acrylonitrile	ND	1.00	2.00	ug/L	1	02/16/23 18:36	EPA 8260D	
Benzene	ND	0.100	0.200	ug/L	1	02/16/23 18:36	EPA 8260D	
Bromobenzene	ND	0.250	0.500	ug/L	1	02/16/23 18:36	EPA 8260D	
Bromochloromethane	ND	0.500	1.00	ug/L	1	02/16/23 18:36	EPA 8260D	
Bromodichloromethane	ND	0.500	1.00	ug/L	1	02/16/23 18:36	EPA 8260D	
Bromoform	ND	0.500	1.00	ug/L	1	02/16/23 18:36	EPA 8260D	
Bromomethane	ND	5.00	5.00	ug/L	1	02/16/23 18:36	EPA 8260D	
2-Butanone (MEK)	ND	5.00	10.0	ug/L	1	02/16/23 18:36	EPA 8260D	

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Michele Poquiz For Kurt Johnson, Senior Chemist

Apex Laboratories, LLC
6700 S.W. Sandburg Street
Tigard, OR 97223
503-718-2323
ORELAP ID: **OR100062**

Landau Associates	Project: **Boeing Portland 85-105 Investigation**	
1500 SW First Avenue Suite 1015	Project Number: **025116.123.450**	**Report ID:**
Portland, OR 97201	Project Manager: **Erin Waibel**	**A3B0408 - 05 02 23 1421**

ANALYTICAL SAMPLE RESULTS

Volatile Organic Compounds by EPA 8260D

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
LAI-1-0223 (A3B0408-11RE1)				**Matrix: Water**		**Batch: 23B0617**		
n-Butylbenzene	ND	0.500	1.00	ug/L	1	02/16/23 18:36	EPA 8260D	
sec-Butylbenzene	ND	0.500	1.00	ug/L	1	02/16/23 18:36	EPA 8260D	
tert-Butylbenzene	ND	0.500	1.00	ug/L	1	02/16/23 18:36	EPA 8260D	
Carbon disulfide	ND	5.00	10.0	ug/L	1	02/16/23 18:36	EPA 8260D	
Carbon tetrachloride	ND	0.500	1.00	ug/L	1	02/16/23 18:36	EPA 8260D	
Chlorobenzene	ND	0.250	0.500	ug/L	1	02/16/23 18:36	EPA 8260D	
Chloroethane	ND	5.00	5.00	ug/L	1	02/16/23 18:36	EPA 8260D	
Chloroform	ND	0.500	1.00	ug/L	1	02/16/23 18:36	EPA 8260D	
Chloromethane	ND	2.50	5.00	ug/L	1	02/16/23 18:36	EPA 8260D	
2-Chlorotoluene	ND	0.500	1.00	ug/L	1	02/16/23 18:36	EPA 8260D	
4-Chlorotoluene	ND	0.500	1.00	ug/L	1	02/16/23 18:36	EPA 8260D	
Dibromochloromethane	ND	0.500	1.00	ug/L	1	02/16/23 18:36	EPA 8260D	
1,2-Dibromo-3-chloropropane	ND	2.50	5.00	ug/L	1	02/16/23 18:36	EPA 8260D	
1,2-Dibromoethane (EDB)	ND	0.250	0.500	ug/L	1	02/16/23 18:36	EPA 8260D	
Dibromomethane	ND	0.500	1.00	ug/L	1	02/16/23 18:36	EPA 8260D	
1,2-Dichlorobenzene	ND	0.250	0.500	ug/L	1	02/16/23 18:36	EPA 8260D	
1,3-Dichlorobenzene	ND	0.250	0.500	ug/L	1	02/16/23 18:36	EPA 8260D	
1,4-Dichlorobenzene	ND	0.250	0.500	ug/L	1	02/16/23 18:36	EPA 8260D	
Dichlorodifluoromethane	ND	0.500	1.00	ug/L	1	02/16/23 18:36	EPA 8260D	
1,1-Dichloroethane	ND	0.200	0.400	ug/L	1	02/16/23 18:36	EPA 8260D	
1,2-Dichloroethane (EDC)	ND	0.200	0.400	ug/L	1	02/16/23 18:36	EPA 8260D	
1,1-Dichloroethene	ND	0.200	0.400	ug/L	1	02/16/23 18:36	EPA 8260D	
cis-1,2-Dichloroethene	ND	0.200	0.400	ug/L	1	02/16/23 18:36	EPA 8260D	
trans-1,2-Dichloroethene	ND	0.200	0.400	ug/L	1	02/16/23 18:36	EPA 8260D	
1,2-Dichloropropane	ND	0.250	0.500	ug/L	1	02/16/23 18:36	EPA 8260D	
1,3-Dichloropropane	ND	0.500	1.00	ug/L	1	02/16/23 18:36	EPA 8260D	
2,2-Dichloropropane	ND	0.500	1.00	ug/L	1	02/16/23 18:36	EPA 8260D	
1,1-Dichloropropene	ND	0.500	1.00	ug/L	1	02/16/23 18:36	EPA 8260D	
cis-1,3-Dichloropropene	ND	0.500	1.00	ug/L	1	02/16/23 18:36	EPA 8260D	
trans-1,3-Dichloropropene	ND	0.500	1.00	ug/L	1	02/16/23 18:36	EPA 8260D	
Ethylbenzene	ND	0.250	0.500	ug/L	1	02/16/23 18:36	EPA 8260D	
Hexachlorobutadiene	ND	2.50	5.00	ug/L	1	02/16/23 18:36	EPA 8260D	
2-Hexanone	ND	5.00	10.0	ug/L	1	02/16/23 18:36	EPA 8260D	

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Michele Poquiz For Kurt Johnson, Senior Chemist

APEX LABORATORIES

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6700 S.W. Sandburg Street
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ORELAP ID: **OR100062**

ANALYTICAL REPORT

Landau Associates	Project: **Boeing Portland 85-105 Investigation**	
1500 SW First Avenue Suite 1015	Project Number: **025116.123.450**	**Report ID:**
Portland, OR 97201	Project Manager: **Erin Waibel**	**A3B0408 - 05 02 23 1421**

ANALYTICAL SAMPLE RESULTS

Volatile Organic Compounds by EPA 8260D

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
LAI-1-0223 (A3B0408-11RE1)				**Matrix: Water**		**Batch: 23B0617**		
Isopropylbenzene	ND	0.500	1.00	ug/L	1	02/16/23 18:36	EPA 8260D	
4-Isopropyltoluene	ND	0.500	1.00	ug/L	1	02/16/23 18:36	EPA 8260D	
Methylene chloride	ND	5.00	10.0	ug/L	1	02/16/23 18:36	EPA 8260D	
4-Methyl-2-pentanone (MiBK)	ND	5.00	10.0	ug/L	1	02/16/23 18:36	EPA 8260D	
Methyl tert-butyl ether (MTBE)	ND	0.500	1.00	ug/L	1	02/16/23 18:36	EPA 8260D	
Naphthalene	ND	1.00	2.00	ug/L	1	02/16/23 18:36	EPA 8260D	
n-Propylbenzene	ND	0.250	0.500	ug/L	1	02/16/23 18:36	EPA 8260D	
Styrene	ND	0.500	1.00	ug/L	1	02/16/23 18:36	EPA 8260D	
1,1,1,2-Tetrachloroethane	ND	0.200	0.400	ug/L	1	02/16/23 18:36	EPA 8260D	
1,1,2,2-Tetrachloroethane	ND	0.250	0.500	ug/L	1	02/16/23 18:36	EPA 8260D	
Tetrachloroethene (PCE)	**4.73**	0.200	0.400	ug/L	1	02/16/23 18:36	EPA 8260D	
Toluene	ND	0.500	1.00	ug/L	1	02/16/23 18:36	EPA 8260D	
1,2,3-Trichlorobenzene	ND	1.00	2.00	ug/L	1	02/16/23 18:36	EPA 8260D	
1,2,4-Trichlorobenzene	ND	1.00	2.00	ug/L	1	02/16/23 18:36	EPA 8260D	
1,1,1-Trichloroethane	ND	0.200	0.400	ug/L	1	02/16/23 18:36	EPA 8260D	
1,1,2-Trichloroethane	ND	0.250	0.500	ug/L	1	02/16/23 18:36	EPA 8260D	
Trichloroethene (TCE)	**0.890**	0.200	0.400	ug/L	1	02/16/23 18:36	EPA 8260D	
Trichlorofluoromethane	ND	1.00	2.00	ug/L	1	02/16/23 18:36	EPA 8260D	
1,2,3-Trichloropropane	ND	0.500	1.00	ug/L	1	02/16/23 18:36	EPA 8260D	
1,2,4-Trimethylbenzene	ND	0.500	1.00	ug/L	1	02/16/23 18:36	EPA 8260D	
1,3,5-Trimethylbenzene	ND	0.500	1.00	ug/L	1	02/16/23 18:36	EPA 8260D	
Vinyl chloride	ND	0.200	0.400	ug/L	1	02/16/23 18:36	EPA 8260D	
m,p-Xylene	ND	0.500	1.00	ug/L	1	02/16/23 18:36	EPA 8260D	
o-Xylene	ND	0.250	0.500	ug/L	1	02/16/23 18:36	EPA 8260D	
Surrogate: 1,4-Difluorobenzene (Surr)		*Recovery:*	*94 %*	*Limits:*	*80-120 %*	*1*	*02/16/23 18:36*	*EPA 8260D*	
Toluene-d8 (Surr)			*101 %*		*80-120 %*	*1*	*02/16/23 18:36*	*EPA 8260D*	
4-Bromofluorobenzene (Surr)			*97 %*		*80-120 %*	*1*	*02/16/23 18:36*	*EPA 8260D*	
Tripblank1-020923 (A3B0408-12)				**Matrix: Water**		**Batch: 23B0509**		**V-01**
Acetone	ND	10.0	20.0	ug/L	1	02/14/23 17:55	EPA 8260D	
Acrylonitrile	ND	1.00	2.00	ug/L	1	02/14/23 17:55	EPA 8260D	
Benzene	ND	0.100	0.200	ug/L	1	02/14/23 17:55	EPA 8260D	
Bromobenzene	ND	0.250	0.500	ug/L	1	02/14/23 17:55	EPA 8260D	
Bromochloromethane	ND	0.500	1.00	ug/L	1	02/14/23 17:55	EPA 8260D	

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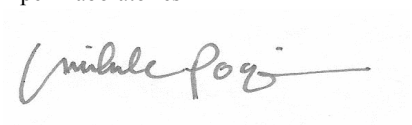

Michele Poquiz For Kurt Johnson, Senior Chemist

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Apex Laboratories, LLC
6700 S.W. Sandburg Street
Tigard, OR 97223
503-718-2323
ORELAP ID: **OR100062**

Landau Associates	Project: **Boeing Portland 85-105 Investigation**	
1500 SW First Avenue Suite 1015	Project Number: **025116.123.450**	**Report ID:**
Portland, OR 97201	Project Manager: **Erin Waibel**	**A3B0408 - 05 02 23 1421**

ANALYTICAL SAMPLE RESULTS

Volatile Organic Compounds by EPA 8260D

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
Tripblank1-020923 (A3B0408-12)				**Matrix: Water**		**Batch: 23B0509**		**V-01**
Bromodichloromethane	ND	0.500	1.00	ug/L	1	02/14/23 17:55	EPA 8260D	
Bromoform	ND	0.500	1.00	ug/L	1	02/14/23 17:55	EPA 8260D	
Bromomethane	ND	5.00	5.00	ug/L	1	02/14/23 17:55	EPA 8260D	
2-Butanone (MEK)	ND	5.00	10.0	ug/L	1	02/14/23 17:55	EPA 8260D	
n-Butylbenzene	ND	0.500	1.00	ug/L	1	02/14/23 17:55	EPA 8260D	
sec-Butylbenzene	ND	0.500	1.00	ug/L	1	02/14/23 17:55	EPA 8260D	
tert-Butylbenzene	ND	0.500	1.00	ug/L	1	02/14/23 17:55	EPA 8260D	
Carbon disulfide	ND	5.00	10.0	ug/L	1	02/14/23 17:55	EPA 8260D	
Carbon tetrachloride	ND	0.500	1.00	ug/L	1	02/14/23 17:55	EPA 8260D	
Chlorobenzene	ND	0.250	0.500	ug/L	1	02/14/23 17:55	EPA 8260D	
Chloroethane	ND	5.00	5.00	ug/L	1	02/14/23 17:55	EPA 8260D	
Chloroform	ND	0.500	1.00	ug/L	1	02/14/23 17:55	EPA 8260D	
Chloromethane	ND	2.50	5.00	ug/L	1	02/14/23 17:55	EPA 8260D	
2-Chlorotoluene	ND	0.500	1.00	ug/L	1	02/14/23 17:55	EPA 8260D	
4-Chlorotoluene	ND	0.500	1.00	ug/L	1	02/14/23 17:55	EPA 8260D	
Dibromochloromethane	ND	0.500	1.00	ug/L	1	02/14/23 17:55	EPA 8260D	
1,2-Dibromo-3-chloropropane	ND	2.50	5.00	ug/L	1	02/14/23 17:55	EPA 8260D	
1,2-Dibromoethane (EDB)	ND	0.250	0.500	ug/L	1	02/14/23 17:55	EPA 8260D	
Dibromomethane	ND	0.500	1.00	ug/L	1	02/14/23 17:55	EPA 8260D	
1,2-Dichlorobenzene	ND	0.250	0.500	ug/L	1	02/14/23 17:55	EPA 8260D	
1,3-Dichlorobenzene	ND	0.250	0.500	ug/L	1	02/14/23 17:55	EPA 8260D	
1,4-Dichlorobenzene	ND	0.250	0.500	ug/L	1	02/14/23 17:55	EPA 8260D	
Dichlorodifluoromethane	ND	0.500	1.00	ug/L	1	02/14/23 17:55	EPA 8260D	
1,1-Dichloroethane	ND	0.200	0.400	ug/L	1	02/14/23 17:55	EPA 8260D	
1,2-Dichloroethane (EDC)	ND	0.200	0.400	ug/L	1	02/14/23 17:55	EPA 8260D	
1,1-Dichloroethene	ND	0.200	0.400	ug/L	1	02/14/23 17:55	EPA 8260D	
cis-1,2-Dichloroethene	ND	0.200	0.400	ug/L	1	02/14/23 17:55	EPA 8260D	
trans-1,2-Dichloroethene	ND	0.200	0.400	ug/L	1	02/14/23 17:55	EPA 8260D	
1,2-Dichloropropane	ND	0.250	0.500	ug/L	1	02/14/23 17:55	EPA 8260D	
1,3-Dichloropropane	ND	0.500	1.00	ug/L	1	02/14/23 17:55	EPA 8260D	
2,2-Dichloropropane	ND	0.500	1.00	ug/L	1	02/14/23 17:55	EPA 8260D	
1,1-Dichloropropene	ND	0.500	1.00	ug/L	1	02/14/23 17:55	EPA 8260D	
cis-1,3-Dichloropropene	ND	0.500	1.00	ug/L	1	02/14/23 17:55	EPA 8260D	

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Michele Poquiz For Kurt Johnson, Senior Chemist

Apex Laboratories, LLC
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Tigard, OR 97223
503-718-2323
ORELAP ID: OR100062

ANALYTICAL REPORT

Landau Associates	Project: Boeing Portland 85-105 Investigation	
1500 SW First Avenue Suite 1015	Project Number: 025116.123.450	Report ID:
Portland, OR 97201	Project Manager: Erin Waibel	A3B0408 - 05 02 23 1421

ANALYTICAL SAMPLE RESULTS

Volatile Organic Compounds by EPA 8260D

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
Tripblank1-020923 (A3B0408-12)				**Matrix: Water**		**Batch: 23B0509**		V-01
trans-1,3-Dichloropropene	ND	0.500	1.00	ug/L	1	02/14/23 17:55	EPA 8260D	
Ethylbenzene	ND	0.250	0.500	ug/L	1	02/14/23 17:55	EPA 8260D	
Hexachlorobutadiene	ND	2.50	5.00	ug/L	1	02/14/23 17:55	EPA 8260D	
2-Hexanone	ND	5.00	10.0	ug/L	1	02/14/23 17:55	EPA 8260D	
Isopropylbenzene	ND	0.500	1.00	ug/L	1	02/14/23 17:55	EPA 8260D	
4-Isopropyltoluene	ND	0.500	1.00	ug/L	1	02/14/23 17:55	EPA 8260D	
Methylene chloride	ND	5.00	10.0	ug/L	1	02/14/23 17:55	EPA 8260D	
4-Methyl-2-pentanone (MiBK)	ND	5.00	10.0	ug/L	1	02/14/23 17:55	EPA 8260D	
Methyl tert-butyl ether (MTBE)	ND	0.500	1.00	ug/L	1	02/14/23 17:55	EPA 8260D	
Naphthalene	ND	1.00	2.00	ug/L	1	02/14/23 17:55	EPA 8260D	
n-Propylbenzene	ND	0.250	0.500	ug/L	1	02/14/23 17:55	EPA 8260D	
Styrene	ND	0.500	1.00	ug/L	1	02/14/23 17:55	EPA 8260D	
1,1,1,2-Tetrachloroethane	ND	0.200	0.400	ug/L	1	02/14/23 17:55	EPA 8260D	
1,1,2,2-Tetrachloroethane	ND	0.250	0.500	ug/L	1	02/14/23 17:55	EPA 8260D	
Tetrachloroethene (PCE)	ND	0.200	0.400	ug/L	1	02/14/23 17:55	EPA 8260D	
Toluene	ND	0.500	1.00	ug/L	1	02/14/23 17:55	EPA 8260D	
1,2,3-Trichlorobenzene	ND	1.00	2.00	ug/L	1	02/14/23 17:55	EPA 8260D	
1,2,4-Trichlorobenzene	ND	1.00	2.00	ug/L	1	02/14/23 17:55	EPA 8260D	
1,1,1-Trichloroethane	ND	0.200	0.400	ug/L	1	02/14/23 17:55	EPA 8260D	
1,1,2-Trichloroethane	ND	0.250	0.500	ug/L	1	02/14/23 17:55	EPA 8260D	
Trichloroethene (TCE)	ND	0.200	0.400	ug/L	1	02/14/23 17:55	EPA 8260D	
Trichlorofluoromethane	ND	1.00	2.00	ug/L	1	02/14/23 17:55	EPA 8260D	
1,2,3-Trichloropropane	ND	0.500	1.00	ug/L	1	02/14/23 17:55	EPA 8260D	
1,2,4-Trimethylbenzene	ND	0.500	1.00	ug/L	1	02/14/23 17:55	EPA 8260D	
1,3,5-Trimethylbenzene	ND	0.500	1.00	ug/L	1	02/14/23 17:55	EPA 8260D	
Vinyl chloride	ND	0.200	0.400	ug/L	1	02/14/23 17:55	EPA 8260D	
m,p-Xylene	ND	0.500	1.00	ug/L	1	02/14/23 17:55	EPA 8260D	
o-Xylene	ND	0.250	0.500	ug/L	1	02/14/23 17:55	EPA 8260D	
Surrogate: 1,4-Difluorobenzene (Surr)			*Recovery: 96 %*	*Limits: 80-120 %*	*1*	*02/14/23 17:55*	*EPA 8260D*	
Toluene-d8 (Surr)			*102 %*	*80-120 %*	*1*	*02/14/23 17:55*	*EPA 8260D*	
4-Bromofluorobenzene (Surr)			*100 %*	*80-120 %*	*1*	*02/14/23 17:55*	*EPA 8260D*	
Tripblank1-020823 (A3B0408-13)				**Matrix: Water**		**Batch: 23B0509**		V-01
Acetone	ND	10.0	20.0	ug/L	1	02/14/23 18:17	EPA 8260D	

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Michele Poquiz For Kurt Johnson, Senior Chemist

APEX LABORATORIES

Apex Laboratories, LLC
6700 S.W. Sandburg Street
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503-718-2323
ORELAP ID: **OR100062**

ANALYTICAL REPORT

Landau Associates	Project: **Boeing Portland 85-105 Investigation**	
1500 SW First Avenue Suite 1015	Project Number: **025116.123.450**	**Report ID:**
Portland, OR 97201	Project Manager: **Erin Waibel**	**A3B0408 - 05 02 23 1421**

ANALYTICAL SAMPLE RESULTS

Volatile Organic Compounds by EPA 8260D

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
Tripblank1-020823 (A3B0408-13)				**Matrix: Water**		**Batch: 23B0509**		**V-01**
Acrylonitrile	ND	1.00	2.00	ug/L	1	02/14/23 18:17	EPA 8260D	
Benzene	ND	0.100	0.200	ug/L	1	02/14/23 18:17	EPA 8260D	
Bromobenzene	ND	0.250	0.500	ug/L	1	02/14/23 18:17	EPA 8260D	
Bromochloromethane	ND	0.500	1.00	ug/L	1	02/14/23 18:17	EPA 8260D	
Bromodichloromethane	ND	0.500	1.00	ug/L	1	02/14/23 18:17	EPA 8260D	
Bromoform	ND	0.500	1.00	ug/L	1	02/14/23 18:17	EPA 8260D	
Bromomethane	ND	5.00	5.00	ug/L	1	02/14/23 18:17	EPA 8260D	
2-Butanone (MEK)	ND	5.00	10.0	ug/L	1	02/14/23 18:17	EPA 8260D	
n-Butylbenzene	ND	0.500	1.00	ug/L	1	02/14/23 18:17	EPA 8260D	
sec-Butylbenzene	ND	0.500	1.00	ug/L	1	02/14/23 18:17	EPA 8260D	
tert-Butylbenzene	ND	0.500	1.00	ug/L	1	02/14/23 18:17	EPA 8260D	
Carbon disulfide	ND	5.00	10.0	ug/L	1	02/14/23 18:17	EPA 8260D	
Carbon tetrachloride	ND	0.500	1.00	ug/L	1	02/14/23 18:17	EPA 8260D	
Chlorobenzene	ND	0.250	0.500	ug/L	1	02/14/23 18:17	EPA 8260D	
Chloroethane	ND	5.00	5.00	ug/L	1	02/14/23 18:17	EPA 8260D	
Chloroform	ND	0.500	1.00	ug/L	1	02/14/23 18:17	EPA 8260D	
Chloromethane	ND	2.50	5.00	ug/L	1	02/14/23 18:17	EPA 8260D	
2-Chlorotoluene	ND	0.500	1.00	ug/L	1	02/14/23 18:17	EPA 8260D	
4-Chlorotoluene	ND	0.500	1.00	ug/L	1	02/14/23 18:17	EPA 8260D	
Dibromochloromethane	ND	0.500	1.00	ug/L	1	02/14/23 18:17	EPA 8260D	
1,2-Dibromo-3-chloropropane	ND	2.50	5.00	ug/L	1	02/14/23 18:17	EPA 8260D	
1,2-Dibromoethane (EDB)	ND	0.250	0.500	ug/L	1	02/14/23 18:17	EPA 8260D	
Dibromomethane	ND	0.500	1.00	ug/L	1	02/14/23 18:17	EPA 8260D	
1,2-Dichlorobenzene	ND	0.250	0.500	ug/L	1	02/14/23 18:17	EPA 8260D	
1,3-Dichlorobenzene	ND	0.250	0.500	ug/L	1	02/14/23 18:17	EPA 8260D	
1,4-Dichlorobenzene	ND	0.250	0.500	ug/L	1	02/14/23 18:17	EPA 8260D	
Dichlorodifluoromethane	ND	0.500	1.00	ug/L	1	02/14/23 18:17	EPA 8260D	
1,1-Dichloroethane	ND	0.200	0.400	ug/L	1	02/14/23 18:17	EPA 8260D	
1,2-Dichloroethane (EDC)	ND	0.200	0.400	ug/L	1	02/14/23 18:17	EPA 8260D	
1,1-Dichloroethene	ND	0.200	0.400	ug/L	1	02/14/23 18:17	EPA 8260D	
cis-1,2-Dichloroethene	ND	0.200	0.400	ug/L	1	02/14/23 18:17	EPA 8260D	
trans-1,2-Dichloroethene	ND	0.200	0.400	ug/L	1	02/14/23 18:17	EPA 8260D	
1,2-Dichloropropane	ND	0.250	0.500	ug/L	1	02/14/23 18:17	EPA 8260D	

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Michele Poquiz For Kurt Johnson, Senior Chemist

APEX LABORATORIES

Apex Laboratories, LLC
6700 S.W. Sandburg Street
Tigard, OR 97223
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ORELAP ID: **OR100062**

ANALYTICAL REPORT

Landau Associates	Project: **Boeing Portland 85-105 Investigation**	
1500 SW First Avenue Suite 1015	Project Number: **025116.123.450**	**Report ID:**
Portland, OR 97201	Project Manager: **Erin Waibel**	**A3B0408 - 05 02 23 1421**

ANALYTICAL SAMPLE RESULTS

Volatile Organic Compounds by EPA 8260D

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
Tripblank1-020823 (A3B0408-13)				**Matrix: Water**		**Batch: 23B0509**		**V-01**
1,3-Dichloropropane	ND	0.500	1.00	ug/L	1	02/14/23 18:17	EPA 8260D	
2,2-Dichloropropane	ND	0.500	1.00	ug/L	1	02/14/23 18:17	EPA 8260D	
1,1-Dichloropropene	ND	0.500	1.00	ug/L	1	02/14/23 18:17	EPA 8260D	
cis-1,3-Dichloropropene	ND	0.500	1.00	ug/L	1	02/14/23 18:17	EPA 8260D	
trans-1,3-Dichloropropene	ND	0.500	1.00	ug/L	1	02/14/23 18:17	EPA 8260D	
Ethylbenzene	ND	0.250	0.500	ug/L	1	02/14/23 18:17	EPA 8260D	
Hexachlorobutadiene	ND	2.50	5.00	ug/L	1	02/14/23 18:17	EPA 8260D	
2-Hexanone	ND	5.00	10.0	ug/L	1	02/14/23 18:17	EPA 8260D	
Isopropylbenzene	ND	0.500	1.00	ug/L	1	02/14/23 18:17	EPA 8260D	
4-Isopropyltoluene	ND	0.500	1.00	ug/L	1	02/14/23 18:17	EPA 8260D	
Methylene chloride	ND	5.00	10.0	ug/L	1	02/14/23 18:17	EPA 8260D	
4-Methyl-2-pentanone (MiBK)	ND	5.00	10.0	ug/L	1	02/14/23 18:17	EPA 8260D	
Methyl tert-butyl ether (MTBE)	ND	0.500	1.00	ug/L	1	02/14/23 18:17	EPA 8260D	
Naphthalene	ND	1.00	2.00	ug/L	1	02/14/23 18:17	EPA 8260D	
n-Propylbenzene	ND	0.250	0.500	ug/L	1	02/14/23 18:17	EPA 8260D	
Styrene	ND	0.500	1.00	ug/L	1	02/14/23 18:17	EPA 8260D	
1,1,1,2-Tetrachloroethane	ND	0.200	0.400	ug/L	1	02/14/23 18:17	EPA 8260D	
1,1,2,2-Tetrachloroethane	ND	0.250	0.500	ug/L	1	02/14/23 18:17	EPA 8260D	
Tetrachloroethene (PCE)	ND	0.200	0.400	ug/L	1	02/14/23 18:17	EPA 8260D	
Toluene	ND	0.500	1.00	ug/L	1	02/14/23 18:17	EPA 8260D	
1,2,3-Trichlorobenzene	ND	1.00	2.00	ug/L	1	02/14/23 18:17	EPA 8260D	
1,2,4-Trichlorobenzene	ND	1.00	2.00	ug/L	1	02/14/23 18:17	EPA 8260D	
1,1,1-Trichloroethane	ND	0.200	0.400	ug/L	1	02/14/23 18:17	EPA 8260D	
1,1,2-Trichloroethane	ND	0.250	0.500	ug/L	1	02/14/23 18:17	EPA 8260D	
Trichloroethene (TCE)	ND	0.200	0.400	ug/L	1	02/14/23 18:17	EPA 8260D	
Trichlorofluoromethane	ND	1.00	2.00	ug/L	1	02/14/23 18:17	EPA 8260D	
1,2,3-Trichloropropane	ND	0.500	1.00	ug/L	1	02/14/23 18:17	EPA 8260D	
1,2,4-Trimethylbenzene	ND	0.500	1.00	ug/L	1	02/14/23 18:17	EPA 8260D	
1,3,5-Trimethylbenzene	ND	0.500	1.00	ug/L	1	02/14/23 18:17	EPA 8260D	
Vinyl chloride	ND	0.200	0.400	ug/L	1	02/14/23 18:17	EPA 8260D	
m,p-Xylene	ND	0.500	1.00	ug/L	1	02/14/23 18:17	EPA 8260D	
o-Xylene	ND	0.250	0.500	ug/L	1	02/14/23 18:17	EPA 8260D	
Surrogate: 1,4-Difluorobenzene (Surr)		*Recovery: 94 %*		*Limits: 80-120 %*	*1*	*02/14/23 18:17*	*EPA 8260D*	

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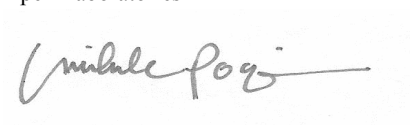

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Michele Poquiz For Kurt Johnson, Senior Chemist

Apex Laboratories, LLC
6700 S.W. Sandburg Street
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ORELAP ID: **OR100062**

Landau Associates	Project: **Boeing Portland 85-105 Investigation**	
1500 SW First Avenue Suite 1015	Project Number: **025116.123.450**	**Report ID:**
Portland, OR 97201	Project Manager: **Erin Waibel**	**A3B0408 - 05 02 23 1421**

ANALYTICAL SAMPLE RESULTS

Volatile Organic Compounds by EPA 8260D

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
Tripblank1-020823 (A3B0408-13)				**Matrix: Water**		**Batch: 23B0509**		**V-01**
Surrogate: Toluene-d8 (Surr)			*Recovery: 108 %*	*Limits: 80-120 %*	*1*	*02/14/23 18:17*	*EPA 8260D*	
4-Bromofluorobenzene (Surr)			*98 %*	*80-120 %*	*1*	*02/14/23 18:17*	*EPA 8260D*	
Tripblank3-020823 (A3B0408-14)				**Matrix: Water**		**Batch: 23B0509**		**V-01**
Acetone	ND	10.0	20.0	ug/L	1	02/14/23 18:39	EPA 8260D	
Acrylonitrile	ND	1.00	2.00	ug/L	1	02/14/23 18:39	EPA 8260D	
Benzene	ND	0.100	0.200	ug/L	1	02/14/23 18:39	EPA 8260D	
Bromobenzene	ND	0.250	0.500	ug/L	1	02/14/23 18:39	EPA 8260D	
Bromochloromethane	ND	0.500	1.00	ug/L	1	02/14/23 18:39	EPA 8260D	
Bromodichloromethane	ND	0.500	1.00	ug/L	1	02/14/23 18:39	EPA 8260D	
Bromoform	ND	0.500	1.00	ug/L	1	02/14/23 18:39	EPA 8260D	
Bromomethane	ND	5.00	5.00	ug/L	1	02/14/23 18:39	EPA 8260D	
2-Butanone (MEK)	ND	5.00	10.0	ug/L	1	02/14/23 18:39	EPA 8260D	
n-Butylbenzene	ND	0.500	1.00	ug/L	1	02/14/23 18:39	EPA 8260D	
sec-Butylbenzene	ND	0.500	1.00	ug/L	1	02/14/23 18:39	EPA 8260D	
tert-Butylbenzene	ND	0.500	1.00	ug/L	1	02/14/23 18:39	EPA 8260D	
Carbon disulfide	ND	5.00	10.0	ug/L	1	02/14/23 18:39	EPA 8260D	
Carbon tetrachloride	ND	0.500	1.00	ug/L	1	02/14/23 18:39	EPA 8260D	
Chlorobenzene	ND	0.250	0.500	ug/L	1	02/14/23 18:39	EPA 8260D	
Chloroethane	ND	5.00	5.00	ug/L	1	02/14/23 18:39	EPA 8260D	
Chloroform	ND	0.500	1.00	ug/L	1	02/14/23 18:39	EPA 8260D	
Chloromethane	ND	2.50	5.00	ug/L	1	02/14/23 18:39	EPA 8260D	
2-Chlorotoluene	ND	0.500	1.00	ug/L	1	02/14/23 18:39	EPA 8260D	
4-Chlorotoluene	ND	0.500	1.00	ug/L	1	02/14/23 18:39	EPA 8260D	
Dibromochloromethane	ND	0.500	1.00	ug/L	1	02/14/23 18:39	EPA 8260D	
1,2-Dibromo-3-chloropropane	ND	2.50	5.00	ug/L	1	02/14/23 18:39	EPA 8260D	
1,2-Dibromoethane (EDB)	ND	0.250	0.500	ug/L	1	02/14/23 18:39	EPA 8260D	
Dibromomethane	ND	0.500	1.00	ug/L	1	02/14/23 18:39	EPA 8260D	
1,2-Dichlorobenzene	ND	0.250	0.500	ug/L	1	02/14/23 18:39	EPA 8260D	
1,3-Dichlorobenzene	ND	0.250	0.500	ug/L	1	02/14/23 18:39	EPA 8260D	
1,4-Dichlorobenzene	ND	0.250	0.500	ug/L	1	02/14/23 18:39	EPA 8260D	
Dichlorodifluoromethane	ND	0.500	1.00	ug/L	1	02/14/23 18:39	EPA 8260D	
1,1-Dichloroethane	ND	0.200	0.400	ug/L	1	02/14/23 18:39	EPA 8260D	
1,2-Dichloroethane (EDC)	ND	0.200	0.400	ug/L	1	02/14/23 18:39	EPA 8260D	

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503-718-2323
ORELAP ID: **OR100062**

Landau Associates	Project: **Boeing Portland 85-105 Investigation**	
1500 SW First Avenue Suite 1015	Project Number: **025116.123.450**	**Report ID:**
Portland, OR 97201	Project Manager: **Erin Waibel**	**A3B0408 - 05 02 23 1421**

ANALYTICAL SAMPLE RESULTS

Volatile Organic Compounds by EPA 8260D

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
Tripblank3-020823 (A3B0408-14)				**Matrix: Water**		**Batch: 23B0509**		**V-01**
1,1-Dichloroethene	ND	0.200	0.400	ug/L	1	02/14/23 18:39	EPA 8260D	
cis-1,2-Dichloroethene	ND	0.200	0.400	ug/L	1	02/14/23 18:39	EPA 8260D	
trans-1,2-Dichloroethene	ND	0.200	0.400	ug/L	1	02/14/23 18:39	EPA 8260D	
1,2-Dichloropropane	ND	0.250	0.500	ug/L	1	02/14/23 18:39	EPA 8260D	
1,3-Dichloropropane	ND	0.500	1.00	ug/L	1	02/14/23 18:39	EPA 8260D	
2,2-Dichloropropane	ND	0.500	1.00	ug/L	1	02/14/23 18:39	EPA 8260D	
1,1-Dichloropropene	ND	0.500	1.00	ug/L	1	02/14/23 18:39	EPA 8260D	
cis-1,3-Dichloropropene	ND	0.500	1.00	ug/L	1	02/14/23 18:39	EPA 8260D	
trans-1,3-Dichloropropene	ND	0.500	1.00	ug/L	1	02/14/23 18:39	EPA 8260D	
Ethylbenzene	ND	0.250	0.500	ug/L	1	02/14/23 18:39	EPA 8260D	
Hexachlorobutadiene	ND	2.50	5.00	ug/L	1	02/14/23 18:39	EPA 8260D	
2-Hexanone	ND	5.00	10.0	ug/L	1	02/14/23 18:39	EPA 8260D	
Isopropylbenzene	ND	0.500	1.00	ug/L	1	02/14/23 18:39	EPA 8260D	
4-Isopropyltoluene	ND	0.500	1.00	ug/L	1	02/14/23 18:39	EPA 8260D	
Methylene chloride	ND	5.00	10.0	ug/L	1	02/14/23 18:39	EPA 8260D	
4-Methyl-2-pentanone (MiBK)	ND	5.00	10.0	ug/L	1	02/14/23 18:39	EPA 8260D	
Methyl tert-butyl ether (MTBE)	ND	0.500	1.00	ug/L	1	02/14/23 18:39	EPA 8260D	
Naphthalene	ND	1.00	2.00	ug/L	1	02/14/23 18:39	EPA 8260D	
n-Propylbenzene	ND	0.250	0.500	ug/L	1	02/14/23 18:39	EPA 8260D	
Styrene	ND	0.500	1.00	ug/L	1	02/14/23 18:39	EPA 8260D	
1,1,1,2-Tetrachloroethane	ND	0.200	0.400	ug/L	1	02/14/23 18:39	EPA 8260D	
1,1,2,2-Tetrachloroethane	ND	0.250	0.500	ug/L	1	02/14/23 18:39	EPA 8260D	
Tetrachloroethene (PCE)	ND	0.200	0.400	ug/L	1	02/14/23 18:39	EPA 8260D	
Toluene	ND	0.500	1.00	ug/L	1	02/14/23 18:39	EPA 8260D	
1,2,3-Trichlorobenzene	ND	1.00	2.00	ug/L	1	02/14/23 18:39	EPA 8260D	
1,2,4-Trichlorobenzene	ND	1.00	2.00	ug/L	1	02/14/23 18:39	EPA 8260D	
1,1,1-Trichloroethane	ND	0.200	0.400	ug/L	1	02/14/23 18:39	EPA 8260D	
1,1,2-Trichloroethane	ND	0.250	0.500	ug/L	1	02/14/23 18:39	EPA 8260D	
Trichloroethene (TCE)	ND	0.200	0.400	ug/L	1	02/14/23 18:39	EPA 8260D	
Trichlorofluoromethane	ND	1.00	2.00	ug/L	1	02/14/23 18:39	EPA 8260D	
1,2,3-Trichloropropane	ND	0.500	1.00	ug/L	1	02/14/23 18:39	EPA 8260D	
1,2,4-Trimethylbenzene	ND	0.500	1.00	ug/L	1	02/14/23 18:39	EPA 8260D	
1,3,5-Trimethylbenzene	ND	0.500	1.00	ug/L	1	02/14/23 18:39	EPA 8260D	

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APEX LABORATORIES

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6700 S.W. Sandburg Street
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ORELAP ID: **OR100062**

ANALYTICAL REPORT

Landau Associates	Project: **Boeing Portland 85-105 Investigation**	
1500 SW First Avenue Suite 1015	Project Number: **025116.123.450**	**Report ID:**
Portland, OR 97201	Project Manager: **Erin Waibel**	**A3B0408 - 05 02 23 1421**

ANALYTICAL SAMPLE RESULTS

Volatile Organic Compounds by EPA 8260D

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
Tripblank3-020823 (A3B0408-14)				**Matrix: Water**		**Batch: 23B0509**		**V-01**
Vinyl chloride	ND	0.200	0.400	ug/L	1	02/14/23 18:39	EPA 8260D	
m,p-Xylene	ND	0.500	1.00	ug/L	1	02/14/23 18:39	EPA 8260D	
o-Xylene	ND	0.250	0.500	ug/L	1	02/14/23 18:39	EPA 8260D	
Surrogate: 1,4-Difluorobenzene (Surr)			*Recovery: 97 %*	*Limits: 80-120 %*	*1*	*02/14/23 18:39*	*EPA 8260D*	
Toluene-d8 (Surr)			*105 %*	*80-120 %*	*1*	*02/14/23 18:39*	*EPA 8260D*	
4-Bromofluorobenzene (Surr)			*98 %*	*80-120 %*	*1*	*02/14/23 18:39*	*EPA 8260D*	
BOP-10s-0223 (A3B0408-15RE1)				**Matrix: Water**		**Batch: 23B0617**		
Acetone	ND	10.0	20.0	ug/L	1	02/16/23 18:58	EPA 8260D	
Acrylonitrile	ND	1.00	2.00	ug/L	1	02/16/23 18:58	EPA 8260D	
Benzene	ND	0.100	0.200	ug/L	1	02/16/23 18:58	EPA 8260D	
Bromobenzene	ND	0.250	0.500	ug/L	1	02/16/23 18:58	EPA 8260D	
Bromochloromethane	ND	0.500	1.00	ug/L	1	02/16/23 18:58	EPA 8260D	
Bromodichloromethane	ND	0.500	1.00	ug/L	1	02/16/23 18:58	EPA 8260D	
Bromoform	ND	0.500	1.00	ug/L	1	02/16/23 18:58	EPA 8260D	
Bromomethane	ND	5.00	5.00	ug/L	1	02/16/23 18:58	EPA 8260D	
2-Butanone (MEK)	ND	5.00	10.0	ug/L	1	02/16/23 18:58	EPA 8260D	
n-Butylbenzene	ND	0.500	1.00	ug/L	1	02/16/23 18:58	EPA 8260D	
sec-Butylbenzene	ND	0.500	1.00	ug/L	1	02/16/23 18:58	EPA 8260D	
tert-Butylbenzene	ND	0.500	1.00	ug/L	1	02/16/23 18:58	EPA 8260D	
Carbon disulfide	ND	5.00	10.0	ug/L	1	02/16/23 18:58	EPA 8260D	
Carbon tetrachloride	ND	0.500	1.00	ug/L	1	02/16/23 18:58	EPA 8260D	
Chlorobenzene	ND	0.250	0.500	ug/L	1	02/16/23 18:58	EPA 8260D	
Chloroethane	ND	5.00	5.00	ug/L	1	02/16/23 18:58	EPA 8260D	
Chloroform	ND	0.500	1.00	ug/L	1	02/16/23 18:58	EPA 8260D	
Chloromethane	ND	2.50	5.00	ug/L	1	02/16/23 18:58	EPA 8260D	
2-Chlorotoluene	ND	0.500	1.00	ug/L	1	02/16/23 18:58	EPA 8260D	
4-Chlorotoluene	ND	0.500	1.00	ug/L	1	02/16/23 18:58	EPA 8260D	
Dibromochloromethane	ND	0.500	1.00	ug/L	1	02/16/23 18:58	EPA 8260D	
1,2-Dibromo-3-chloropropane	ND	2.50	5.00	ug/L	1	02/16/23 18:58	EPA 8260D	
1,2-Dibromoethane (EDB)	ND	0.250	0.500	ug/L	1	02/16/23 18:58	EPA 8260D	
Dibromomethane	ND	0.500	1.00	ug/L	1	02/16/23 18:58	EPA 8260D	
1,2-Dichlorobenzene	ND	0.250	0.500	ug/L	1	02/16/23 18:58	EPA 8260D	
1,3-Dichlorobenzene	ND	0.250	0.500	ug/L	1	02/16/23 18:58	EPA 8260D	

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Michele Poquiz For Kurt Johnson, Senior Chemist

Apex Laboratories, LLC
6700 S.W. Sandburg Street
Tigard, OR 97223
503-718-2323
ORELAP ID: **OR100062**

Landau Associates	Project: **Boeing Portland 85-105 Investigation**	
1500 SW First Avenue Suite 1015	Project Number: **025116.123.450**	**Report ID:**
Portland, OR 97201	Project Manager: **Erin Waibel**	**A3B0408 - 05 02 23 1421**

ANALYTICAL SAMPLE RESULTS

Volatile Organic Compounds by EPA 8260D

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
BOP-10s-0223 (A3B0408-15RE1)				**Matrix: Water**		**Batch: 23B0617**		
1,4-Dichlorobenzene	ND	0.250	0.500	ug/L	1	02/16/23 18:58	EPA 8260D	
Dichlorodifluoromethane	ND	0.500	1.00	ug/L	1	02/16/23 18:58	EPA 8260D	
1,1-Dichloroethane	ND	0.200	0.400	ug/L	1	02/16/23 18:58	EPA 8260D	
1,2-Dichloroethane (EDC)	ND	0.200	0.400	ug/L	1	02/16/23 18:58	EPA 8260D	
1,1-Dichloroethene	ND	0.200	0.400	ug/L	1	02/16/23 18:58	EPA 8260D	
cis-1,2-Dichloroethene	**0.550**	0.200	0.400	ug/L	1	02/16/23 18:58	EPA 8260D	
trans-1,2-Dichloroethene	ND	0.200	0.400	ug/L	1	02/16/23 18:58	EPA 8260D	
1,2-Dichloropropane	ND	0.250	0.500	ug/L	1	02/16/23 18:58	EPA 8260D	
1,3-Dichloropropane	ND	0.500	1.00	ug/L	1	02/16/23 18:58	EPA 8260D	
2,2-Dichloropropane	ND	0.500	1.00	ug/L	1	02/16/23 18:58	EPA 8260D	
1,1-Dichloropropene	ND	0.500	1.00	ug/L	1	02/16/23 18:58	EPA 8260D	
cis-1,3-Dichloropropene	ND	0.500	1.00	ug/L	1	02/16/23 18:58	EPA 8260D	
trans-1,3-Dichloropropene	ND	0.500	1.00	ug/L	1	02/16/23 18:58	EPA 8260D	
Ethylbenzene	ND	0.250	0.500	ug/L	1	02/16/23 18:58	EPA 8260D	
Hexachlorobutadiene	ND	2.50	5.00	ug/L	1	02/16/23 18:58	EPA 8260D	
2-Hexanone	ND	5.00	10.0	ug/L	1	02/16/23 18:58	EPA 8260D	
Isopropylbenzene	ND	0.500	1.00	ug/L	1	02/16/23 18:58	EPA 8260D	
4-Isopropyltoluene	ND	0.500	1.00	ug/L	1	02/16/23 18:58	EPA 8260D	
Methylene chloride	ND	5.00	10.0	ug/L	1	02/16/23 18:58	EPA 8260D	
4-Methyl-2-pentanone (MiBK)	ND	5.00	10.0	ug/L	1	02/16/23 18:58	EPA 8260D	
Methyl tert-butyl ether (MTBE)	ND	0.500	1.00	ug/L	1	02/16/23 18:58	EPA 8260D	
Naphthalene	ND	1.00	2.00	ug/L	1	02/16/23 18:58	EPA 8260D	
n-Propylbenzene	ND	0.250	0.500	ug/L	1	02/16/23 18:58	EPA 8260D	
Styrene	ND	0.500	1.00	ug/L	1	02/16/23 18:58	EPA 8260D	
1,1,1,2-Tetrachloroethane	ND	0.200	0.400	ug/L	1	02/16/23 18:58	EPA 8260D	
1,1,2,2-Tetrachloroethane	ND	0.250	0.500	ug/L	1	02/16/23 18:58	EPA 8260D	
Tetrachloroethene (PCE)	**0.630**	0.200	0.400	ug/L	1	02/16/23 18:58	EPA 8260D	
Toluene	ND	0.500	1.00	ug/L	1	02/16/23 18:58	EPA 8260D	
1,2,3-Trichlorobenzene	ND	1.00	2.00	ug/L	1	02/16/23 18:58	EPA 8260D	
1,2,4-Trichlorobenzene	ND	1.00	2.00	ug/L	1	02/16/23 18:58	EPA 8260D	
1,1,1-Trichloroethane	ND	0.200	0.400	ug/L	1	02/16/23 18:58	EPA 8260D	
1,1,2-Trichloroethane	ND	0.250	0.500	ug/L	1	02/16/23 18:58	EPA 8260D	
Trichloroethene (TCE)	**0.770**	0.200	0.400	ug/L	1	02/16/23 18:58	EPA 8260D	

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Michele Poquiz For Kurt Johnson, Senior Chemist

APEX LABORATORIES

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503-718-2323
ORELAP ID: **OR100062**

ANALYTICAL REPORT

Landau Associates	Project: **Boeing Portland 85-105 Investigation**	
1500 SW First Avenue Suite 1015	Project Number: **025116.123.450**	**Report ID:**
Portland, OR 97201	Project Manager: **Erin Waibel**	**A3B0408 - 05 02 23 1421**

ANALYTICAL SAMPLE RESULTS

Volatile Organic Compounds by EPA 8260D

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
BOP-10s-0223 (A3B0408-15RE1)				**Matrix: Water**		**Batch: 23B0617**		
Trichlorofluoromethane	ND	1.00	2.00	ug/L	1	02/16/23 18:58	EPA 8260D	
1,2,3-Trichloropropane	ND	0.500	1.00	ug/L	1	02/16/23 18:58	EPA 8260D	
1,2,4-Trimethylbenzene	ND	0.500	1.00	ug/L	1	02/16/23 18:58	EPA 8260D	
1,3,5-Trimethylbenzene	ND	0.500	1.00	ug/L	1	02/16/23 18:58	EPA 8260D	
Vinyl chloride	ND	0.200	0.400	ug/L	1	02/16/23 18:58	EPA 8260D	
m,p-Xylene	ND	0.500	1.00	ug/L	1	02/16/23 18:58	EPA 8260D	
o-Xylene	ND	0.250	0.500	ug/L	1	02/16/23 18:58	EPA 8260D	
Surrogate: 1,4-Difluorobenzene (Surr)		*Recovery:*	*96 %*	*Limits: 80-120 %*	*1*	*02/16/23 18:58*	*EPA 8260D*	
Toluene-d8 (Surr)			*104 %*	*80-120 %*	*1*	*02/16/23 18:58*	*EPA 8260D*	
4-Bromofluorobenzene (Surr)			*96 %*	*80-120 %*	*1*	*02/16/23 18:58*	*EPA 8260D*	

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ORELAP ID: **OR100062**

Landau Associates	Project: **Boeing Portland 85-105 Investigation**	
1500 SW First Avenue Suite 1015	Project Number: **025116.123.450**	**Report ID:**
Portland, OR 97201	Project Manager: **Erin Waibel**	**A3B0408 - 05 02 23 1421**

QUALITY CONTROL (QC) SAMPLE RESULTS

Diesel and/or Oil Hydrocarbons by NWTPH-Dx

Analyte	Result	Detection L Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 23B0762 - EPA 3510C (Fuels/Acid Ext.)									Water			
Blank (23B0762-BLK1)				Prepared: 02/21/23 06:55		Analyzed: 03/04/23 14:28						
NWTPH-Dx LL												
Diesel	ND	40.0	80.0	ug/L	1	---	---	---	---	---	---	
Oil	ND	80.0	160	ug/L	1	---	---	---	---	---	---	
Surr: o-Terphenyl (Surr)		*Recovery: 106 %*		*Limits: 50-150 %*		*Dilution: 1x*						
Blank (23B0762-BLK2)				Prepared: 02/21/23 06:55		Analyzed: 02/22/23 09:09						
NWTPH-Dx LL												
Diesel	ND	40.0	80.0	ug/L	1	---	---	---	---	---	---	
Oil	ND	80.0	160	ug/L	1	---	---	---	---	---	---	
Surr: o-Terphenyl (Surr)		*Recovery: 77 %*		*Limits: 50-150 %*		*Dilution: 1x*						
LCS (23B0762-BS1)				Prepared: 02/21/23 06:55		Analyzed: 03/04/23 14:48						
NWTPH-Dx LL												
Diesel	470	40.0	80.0	ug/L	1	500	---	94	36-132%	---	---	
Surr: o-Terphenyl (Surr)		*Recovery: 138 %*		*Limits: 50-150 %*		*Dilution: 1x*						
LCS (23B0762-BS2)				Prepared: 02/21/23 06:55		Analyzed: 02/22/23 09:29						
NWTPH-Dx LL												
Diesel	278	40.0	80.0	ug/L	1	500	---	56	36-132%	---	---	
Surr: o-Terphenyl (Surr)		*Recovery: 82 %*		*Limits: 50-150 %*		*Dilution: 1x*						
LCS Dup (23B0762-BSD1)				Prepared: 02/21/23 06:55		Analyzed: 03/04/23 15:08						**Q-19**
NWTPH-Dx LL												
Diesel	402	40.0	80.0	ug/L	1	500	---	80	36-132%	16	30%	
Surr: o-Terphenyl (Surr)		*Recovery: 131 %*		*Limits: 50-150 %*		*Dilution: 1x*						
LCS Dup (23B0762-BSD2)				Prepared: 02/21/23 06:55		Analyzed: 02/22/23 09:49						**Q-19**
NWTPH-Dx LL												
Diesel	263	40.0	80.0	ug/L	1	500	---	53	36-132%	6	30%	
Surr: o-Terphenyl (Surr)		*Recovery: 85 %*		*Limits: 50-150 %*		*Dilution: 1x*						

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503-718-2323
ORELAP ID: OR100062

ANALYTICAL REPORT

Landau Associates	Project: Boeing Portland 85-105 Investigation	
1500 SW First Avenue Suite 1015	Project Number: 025116.123.450	Report ID:
Portland, OR 97201	Project Manager: Erin Waibel	A3B0408 - 05 02 23 1421

QUALITY CONTROL (QC) SAMPLE RESULTS

Diesel and/or Oil Hydrocarbons by NWTPH-Dx with Silica Gel Column Cleanup

Analyte	Result	Detection L Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 23B0763 - EPA 3510C (Fuels/Acid Ext.) w/Silica Gel Column									Water			
Blank (23B0763-BLK1)				Prepared: 02/21/23 06:55	Analyzed: 03/04/23 09:04							
NWTPH-Dx/SGC												
Diesel	ND	40.0	80.0	ug/L	1	---	---	---	---	---	---	
Oil	ND	80.0	160	ug/L	1	---	---	---	---	---	---	
Surr: o-Terphenyl (Surr)			*Recovery: 76 %*	*Limits: 50-150 %*		*Dilution: 1x*						
LCS (23B0763-BS1)				Prepared: 02/21/23 06:55	Analyzed: 03/04/23 09:24							
NWTPH-Dx/SGC												
Diesel	262	40.0	80.0	ug/L	1	500	---	52	36-132%	---	---	
Surr: o-Terphenyl (Surr)			*Recovery: 87 %*	*Limits: 50-150 %*		*Dilution: 1x*						
LCS Dup (23B0763-BSD1)				Prepared: 02/21/23 06:55	Analyzed: 03/04/23 09:44							Q-19
NWTPH-Dx/SGC												
Diesel	277	40.0	80.0	ug/L	1	500	---	55	36-132%	6	30%	
Surr: o-Terphenyl (Surr)			*Recovery: 85 %*	*Limits: 50-150 %*		*Dilution: 1x*						

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ORELAP ID: **OR100062**

ANALYTICAL REPORT

Landau Associates	Project: **Boeing Portland 85-105 Investigation**	
1500 SW First Avenue Suite 1015	Project Number: **025116.123.450**	**Report ID:**
Portland, OR 97201	Project Manager: **Erin Waibel**	**A3B0408 - 05 02 23 1421**

QUALITY CONTROL (QC) SAMPLE RESULTS

Volatile Organic Compounds by EPA 8260D

Analyte	Result	Detection L Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 23B0509 - EPA 5030C							**Water**					
Blank (23B0509-BLK1)			Prepared: 02/14/23 08:30 Analyzed: 02/14/23 10:53									
EPA 8260D												
Acetone	ND	10.0	20.0	ug/L	1	---	---	---	---	---	---	
Acrylonitrile	ND	1.00	2.00	ug/L	1	---	---	---	---	---	---	
Benzene	ND	0.100	0.200	ug/L	1	---	---	---	---	---	---	
Bromobenzene	ND	0.250	0.500	ug/L	1	---	---	---	---	---	---	
Bromochloromethane	ND	0.500	1.00	ug/L	1	---	---	---	---	---	---	
Bromodichloromethane	ND	0.500	1.00	ug/L	1	---	---	---	---	---	---	
Bromoform	ND	0.500	1.00	ug/L	1	---	---	---	---	---	---	
Bromomethane	ND	5.00	5.00	ug/L	1	---	---	---	---	---	---	
2-Butanone (MEK)	ND	5.00	10.0	ug/L	1	---	---	---	---	---	---	
n-Butylbenzene	ND	0.500	1.00	ug/L	1	---	---	---	---	---	---	
sec-Butylbenzene	ND	0.500	1.00	ug/L	1	---	---	---	---	---	---	
tert-Butylbenzene	ND	0.500	1.00	ug/L	1	---	---	---	---	---	---	
Carbon disulfide	ND	5.00	10.0	ug/L	1	---	---	---	---	---	---	
Carbon tetrachloride	ND	0.500	1.00	ug/L	1	---	---	---	---	---	---	
Chlorobenzene	ND	0.250	0.500	ug/L	1	---	---	---	---	---	---	
Chloroethane	ND	5.00	5.00	ug/L	1	---	---	---	---	---	---	
Chloroform	ND	0.500	1.00	ug/L	1	---	---	---	---	---	---	
Chloromethane	ND	2.50	5.00	ug/L	1	---	---	---	---	---	---	
2-Chlorotoluene	ND	0.500	1.00	ug/L	1	---	---	---	---	---	---	
4-Chlorotoluene	ND	0.500	1.00	ug/L	1	---	---	---	---	---	---	
Dibromochloromethane	ND	0.500	1.00	ug/L	1	---	---	---	---	---	---	
1,2-Dibromo-3-chloropropane	ND	2.50	5.00	ug/L	1	---	---	---	---	---	---	
1,2-Dibromoethane (EDB)	ND	0.250	0.500	ug/L	1	---	---	---	---	---	---	
Dibromomethane	ND	0.500	1.00	ug/L	1	---	---	---	---	---	---	
1,2-Dichlorobenzene	ND	0.250	0.500	ug/L	1	---	---	---	---	---	---	
1,3-Dichlorobenzene	ND	0.250	0.500	ug/L	1	---	---	---	---	---	---	
1,4-Dichlorobenzene	ND	0.250	0.500	ug/L	1	---	---	---	---	---	---	
Dichlorodifluoromethane	ND	0.500	1.00	ug/L	1	---	---	---	---	---	---	
1,1-Dichloroethane	ND	0.200	0.400	ug/L	1	---	---	---	---	---	---	
1,2-Dichloroethane (EDC)	ND	0.200	0.400	ug/L	1	---	---	---	---	---	---	
1,1-Dichloroethene	ND	0.200	0.400	ug/L	1	---	---	---	---	---	---	
cis-1,2-Dichloroethene	ND	0.200	0.400	ug/L	1	---	---	---	---	---	---	
trans-1,2-Dichloroethene	ND	0.200	0.400	ug/L	1	---	---	---	---	---	---	

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503-718-2323
ORELAP ID: **OR100062**

ANALYTICAL REPORT

Landau Associates	Project: **Boeing Portland 85-105 Investigation**	
1500 SW First Avenue Suite 1015	Project Number: **025116.123.450**	**Report ID:**
Portland, OR 97201	Project Manager: **Erin Waibel**	**A3B0408 - 05 02 23 1421**

QUALITY CONTROL (QC) SAMPLE RESULTS

Volatile Organic Compounds by EPA 8260D

Analyte	Result	Detection L Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 23B0509 - EPA 5030C							**Water**					
Blank (23B0509-BLK1)			Prepared: 02/14/23 08:30 Analyzed: 02/14/23 10:53									
1,2-Dichloropropane	ND	0.250	0.500	ug/L	1	---	---	---	---	---	---	
1,3-Dichloropropane	ND	0.500	1.00	ug/L	1	---	---	---	---	---	---	
2,2-Dichloropropane	ND	0.500	1.00	ug/L	1	---	---	---	---	---	---	
1,1-Dichloropropene	ND	0.500	1.00	ug/L	1	---	---	---	---	---	---	
cis-1,3-Dichloropropene	ND	0.500	1.00	ug/L	1	---	---	---	---	---	---	
trans-1,3-Dichloropropene	ND	0.500	1.00	ug/L	1	---	---	---	---	---	---	
Ethylbenzene	ND	0.250	0.500	ug/L	1	---	---	---	---	---	---	
Hexachlorobutadiene	ND	2.50	5.00	ug/L	1	---	---	---	---	---	---	
2-Hexanone	ND	5.00	10.0	ug/L	1	---	---	---	---	---	---	
Isopropylbenzene	ND	0.500	1.00	ug/L	1	---	---	---	---	---	---	
4-Isopropyltoluene	ND	0.500	1.00	ug/L	1	---	---	---	---	---	---	
Methylene chloride	ND	5.00	10.0	ug/L	1	---	---	---	---	---	---	
4-Methyl-2-pentanone (MiBK)	ND	5.00	10.0	ug/L	1	---	---	---	---	---	---	
Methyl tert-butyl ether (MTBE)	ND	0.500	1.00	ug/L	1	---	---	---	---	---	---	
Naphthalene	ND	1.00	2.00	ug/L	1	---	---	---	---	---	---	
n-Propylbenzene	ND	0.250	0.500	ug/L	1	---	---	---	---	---	---	
Styrene	ND	0.500	1.00	ug/L	1	---	---	---	---	---	---	
1,1,1,2-Tetrachloroethane	ND	0.200	0.400	ug/L	1	---	---	---	---	---	---	
1,1,2,2-Tetrachloroethane	ND	0.250	0.500	ug/L	1	---	---	---	---	---	---	
Tetrachloroethene (PCE)	ND	0.200	0.400	ug/L	1	---	---	---	---	---	---	
Toluene	ND	0.500	1.00	ug/L	1	---	---	---	---	---	---	
1,2,3-Trichlorobenzene	ND	1.00	2.00	ug/L	1	---	---	---	---	---	---	
1,2,4-Trichlorobenzene	ND	1.00	2.00	ug/L	1	---	---	---	---	---	---	
1,1,1-Trichloroethane	ND	0.200	0.400	ug/L	1	---	---	---	---	---	---	
1,1,2-Trichloroethane	ND	0.250	0.500	ug/L	1	---	---	---	---	---	---	
Trichloroethene (TCE)	ND	0.200	0.400	ug/L	1	---	---	---	---	---	---	
Trichlorofluoromethane	ND	1.00	2.00	ug/L	1	---	---	---	---	---	---	
1,2,3-Trichloropropane	ND	0.500	1.00	ug/L	1	---	---	---	---	---	---	
1,2,4-Trimethylbenzene	ND	0.500	1.00	ug/L	1	---	---	---	---	---	---	
1,3,5-Trimethylbenzene	ND	0.500	1.00	ug/L	1	---	---	---	---	---	---	
Vinyl chloride	ND	0.200	0.400	ug/L	1	---	---	---	---	---	---	
m,p-Xylene	ND	0.500	1.00	ug/L	1	---	---	---	---	---	---	
o-Xylene	ND	0.250	0.500	ug/L	1	---	---	---	---	---	---	

Surr: 1,4-Difluorobenzene (Surr) *Recovery: 95 %* *Limits: 80-120 %* *Dilution: 1x*

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Michele Poquiz For Kurt Johnson, Senior Chemist

Apex Laboratories, LLC
6700 S.W. Sandburg Street
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503-718-2323
ORELAP ID: **OR100062**

Landau Associates	Project: **Boeing Portland 85-105 Investigation**	
1500 SW First Avenue Suite 1015	Project Number: **025116.123.450**	**Report ID:**
Portland, OR 97201	Project Manager: **Erin Waibel**	**A3B0408 - 05 02 23 1421**

QUALITY CONTROL (QC) SAMPLE RESULTS

Volatile Organic Compounds by EPA 8260D

Analyte	Result	Detection L Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 23B0509 - EPA 5030C												**Water**
Blank (23B0509-BLK1)				Prepared: 02/14/23 08:30 Analyzed: 02/14/23 10:53								
Surr: Toluene-d8 (Surr)			*Recovery: 107 %*	*Limits: 80-120 %*				*Dilution: 1x*				
4-Bromofluorobenzene (Surr)			*99 %*	*80-120 %*				*"*				
LCS (23B0509-BS1)				Prepared: 02/14/23 08:30 Analyzed: 02/14/23 09:58								
EPA 8260D												
Acetone	39.5	10.0	20.0	ug/L	1	40.0	---	99	80-120%	---	---	ICV-01
Acrylonitrile	19.9	1.00	2.00	ug/L	1	20.0	---	99	80-120%	---	---	
Benzene	19.3	0.100	0.200	ug/L	1	20.0	---	97	80-120%	---	---	
Bromobenzene	18.6	0.250	0.500	ug/L	1	20.0	---	93	80-120%	---	---	
Bromochloromethane	22.5	0.500	1.00	ug/L	1	20.0	---	112	80-120%	---	---	
Bromodichloromethane	21.8	0.500	1.00	ug/L	1	20.0	---	109	80-120%	---	---	
Bromoform	22.4	0.500	1.00	ug/L	1	20.0	---	112	80-120%	---	---	
Bromomethane	24.2	5.00	5.00	ug/L	1	20.0	---	**121**	**80-120%**	---	---	Q-56
2-Butanone (MEK)	38.2	5.00	10.0	ug/L	1	40.0	---	96	80-120%	---	---	ICV-01
n-Butylbenzene	21.5	0.500	1.00	ug/L	1	20.0	---	108	80-120%	---	---	
sec-Butylbenzene	21.6	0.500	1.00	ug/L	1	20.0	---	108	80-120%	---	---	
tert-Butylbenzene	19.9	0.500	1.00	ug/L	1	20.0	---	99	80-120%	---	---	
Carbon disulfide	21.6	5.00	10.0	ug/L	1	20.0	---	108	80-120%	---	---	
Carbon tetrachloride	23.7	0.500	1.00	ug/L	1	20.0	---	119	80-120%	---	---	
Chlorobenzene	19.8	0.250	0.500	ug/L	1	20.0	---	99	80-120%	---	---	
Chloroethane	34.9	5.00	5.00	ug/L	1	20.0	---	**175**	**80-120%**	---	---	Q-56
Chloroform	21.4	0.500	1.00	ug/L	1	20.0	---	107	80-120%	---	---	
Chloromethane	19.3	2.50	5.00	ug/L	1	20.0	---	97	80-120%	---	---	
2-Chlorotoluene	19.7	0.500	1.00	ug/L	1	20.0	---	99	80-120%	---	---	
4-Chlorotoluene	19.3	0.500	1.00	ug/L	1	20.0	---	96	80-120%	---	---	
Dibromochloromethane	21.5	0.500	1.00	ug/L	1	20.0	---	107	80-120%	---	---	
1,2-Dibromo-3-chloropropane	16.3	2.50	5.00	ug/L	1	20.0	---	81	80-120%	---	---	
1,2-Dibromoethane (EDB)	19.5	0.250	0.500	ug/L	1	20.0	---	97	80-120%	---	---	
Dibromomethane	20.7	0.500	1.00	ug/L	1	20.0	---	103	80-120%	---	---	
1,2-Dichlorobenzene	20.3	0.250	0.500	ug/L	1	20.0	---	101	80-120%	---	---	
1,3-Dichlorobenzene	19.8	0.250	0.500	ug/L	1	20.0	---	99	80-120%	---	---	
1,4-Dichlorobenzene	19.6	0.250	0.500	ug/L	1	20.0	---	98	80-120%	---	---	
Dichlorodifluoromethane	23.2	0.500	1.00	ug/L	1	20.0	---	116	80-120%	---	---	
1,1-Dichloroethane	20.8	0.200	0.400	ug/L	1	20.0	---	104	80-120%	---	---	

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Michele Poquiz For Kurt Johnson, Senior Chemist

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503-718-2323
ORELAP ID: OR100062

ANALYTICAL REPORT

Landau Associates	Project: Boeing Portland 85-105 Investigation	
1500 SW First Avenue Suite 1015	Project Number: 025116.123.450	Report ID:
Portland, OR 97201	Project Manager: Erin Waibel	A3B0408 - 05 02 23 1421

QUALITY CONTROL (QC) SAMPLE RESULTS

Volatile Organic Compounds by EPA 8260D

Analyte	Result	Detection L Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 23B0509 - EPA 5030C							**Water**					
LCS (23B0509-BS1)			Prepared: 02/14/23 08:30		Analyzed: 02/14/23 09:58							
1,2-Dichloroethane (EDC)	22.7	0.200	0.400	ug/L	1	20.0	---	114	80-120%	---	---	
1,1-Dichloroethene	22.6	0.200	0.400	ug/L	1	20.0	---	113	80-120%	---	---	
cis-1,2-Dichloroethene	19.7	0.200	0.400	ug/L	1	20.0	---	98	80-120%	---	---	
trans-1,2-Dichloroethene	19.8	0.200	0.400	ug/L	1	20.0	---	99	80-120%	---	---	
1,2-Dichloropropane	19.3	0.250	0.500	ug/L	1	20.0	---	97	80-120%	---	---	
1,3-Dichloropropane	20.5	0.500	1.00	ug/L	1	20.0	---	102	80-120%	---	---	
2,2-Dichloropropane	22.0	0.500	1.00	ug/L	1	20.0	---	110	80-120%	---	---	
1,1-Dichloropropene	19.9	0.500	1.00	ug/L	1	20.0	---	99	80-120%	---	---	
cis-1,3-Dichloropropene	20.0	0.500	1.00	ug/L	1	20.0	---	100	80-120%	---	---	
trans-1,3-Dichloropropene	22.7	0.500	1.00	ug/L	1	20.0	---	114	80-120%	---	---	
Ethylbenzene	20.4	0.250	0.500	ug/L	1	20.0	---	102	80-120%	---	---	
Hexachlorobutadiene	19.5	2.50	5.00	ug/L	1	20.0	---	97	80-120%	---	---	
2-Hexanone	37.3	5.00	10.0	ug/L	1	40.0	---	93	80-120%	---	---	
Isopropylbenzene	20.8	0.500	1.00	ug/L	1	20.0	---	104	80-120%	---	---	
4-Isopropyltoluene	21.0	0.500	1.00	ug/L	1	20.0	---	105	80-120%	---	---	
Methylene chloride	20.0	5.00	10.0	ug/L	1	20.0	---	100	80-120%	---	---	
4-Methyl-2-pentanone (MiBK)	38.6	5.00	10.0	ug/L	1	40.0	---	96	80-120%	---	---	
Methyl tert-butyl ether (MTBE)	18.4	0.500	1.00	ug/L	1	20.0	---	92	80-120%	---	---	
Naphthalene	17.6	1.00	2.00	ug/L	1	20.0	---	88	80-120%	---	---	
n-Propylbenzene	20.6	0.250	0.500	ug/L	1	20.0	---	103	80-120%	---	---	
Styrene	20.4	0.500	1.00	ug/L	1	20.0	---	102	80-120%	---	---	
1,1,1,2-Tetrachloroethane	19.5	0.200	0.400	ug/L	1	20.0	---	97	80-120%	---	---	
1,1,2,2-Tetrachloroethane	20.1	0.250	0.500	ug/L	1	20.0	---	100	80-120%	---	---	
Tetrachloroethene (PCE)	19.2	0.200	0.400	ug/L	1	20.0	---	96	80-120%	---	---	
Toluene	19.3	0.500	1.00	ug/L	1	20.0	---	97	80-120%	---	---	
1,2,3-Trichlorobenzene	19.5	1.00	2.00	ug/L	1	20.0	---	97	80-120%	---	---	
1,2,4-Trichlorobenzene	17.6	1.00	2.00	ug/L	1	20.0	---	88	80-120%	---	---	
1,1,1-Trichloroethane	22.1	0.200	0.400	ug/L	1	20.0	---	111	80-120%	---	---	
1,1,2-Trichloroethane	20.8	0.250	0.500	ug/L	1	20.0	---	104	80-120%	---	---	
Trichloroethene (TCE)	18.2	0.200	0.400	ug/L	1	20.0	---	91	80-120%	---	---	
Trichlorofluoromethane	27.4	1.00	2.00	ug/L	1	20.0	---	**137**	**80-120%**	---	---	Q-56
1,2,3-Trichloropropane	21.7	0.500	1.00	ug/L	1	20.0	---	109	80-120%	---	---	
1,2,4-Trimethylbenzene	21.5	0.500	1.00	ug/L	1	20.0	---	108	80-120%	---	---	
1,3,5-Trimethylbenzene	20.5	0.500	1.00	ug/L	1	20.0	---	102	80-120%	---	---	

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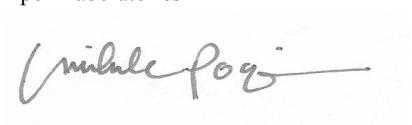

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Michele Poquiz For Kurt Johnson, Senior Chemist

APEX LABORATORIES

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ORELAP ID: **OR100062**

ANALYTICAL REPORT

Landau Associates	Project: **Boeing Portland 85-105 Investigation**	
1500 SW First Avenue Suite 1015	Project Number: **025116.123.450**	**Report ID:**
Portland, OR 97201	Project Manager: **Erin Waibel**	**A3B0408 - 05 02 23 1421**

QUALITY CONTROL (QC) SAMPLE RESULTS

Volatile Organic Compounds by EPA 8260D

Analyte	Result	Detection L Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 23B0509 - EPA 5030C							**Water**					
LCS (23B0509-BS1)			Prepared: 02/14/23 08:30 Analyzed: 02/14/23 09:58									
Vinyl chloride	22.2	0.200	0.400	ug/L	1	20.0	---	111	80-120%	---	---	
m,p-Xylene	41.3	0.500	1.00	ug/L	1	40.0	---	103	80-120%	---	---	
o-Xylene	19.6	0.250	0.500	ug/L	1	20.0	---	98	80-120%	---	---	
Surr: 1,4-Difluorobenzene (Surr)			*Recovery: 94 %*		*Limits: 80-120 %*		*Dilution: 1x*					
Toluene-d8 (Surr)			*101 %*		*80-120 %*		*"*					
4-Bromofluorobenzene (Surr)			*91 %*		*80-120 %*		*"*					
Duplicate (23B0509-DUP1)			Prepared: 02/14/23 10:22 Analyzed: 02/14/23 12:00									
QC Source Sample: Non-SDG (A3B0393-04)												
Acetone	ND	10.0	20.0	ug/L	1	---	ND	---	---	---	30%	
Acrylonitrile	ND	1.00	2.00	ug/L	1	---	ND	---	---	---	30%	
Benzene	**11.4**	0.100	0.200	ug/L	1	---	11.3	---	---	1	30%	
Bromobenzene	ND	0.250	0.500	ug/L	1	---	ND	---	---	---	30%	
Bromochloromethane	ND	0.500	1.00	ug/L	1	---	ND	---	---	---	30%	
Bromodichloromethane	ND	0.500	1.00	ug/L	1	---	ND	---	---	---	30%	
Bromoform	ND	0.500	1.00	ug/L	1	---	ND	---	---	---	30%	
Bromomethane	ND	5.00	5.00	ug/L	1	---	ND	---	---	---	30%	
2-Butanone (MEK)	ND	5.00	10.0	ug/L	1	---	ND	---	---	---	30%	
n-Butylbenzene	ND	0.500	1.00	ug/L	1	---	ND	---	---	---	30%	
sec-Butylbenzene	ND	0.500	1.00	ug/L	1	---	ND	---	---	---	30%	
tert-Butylbenzene	ND	0.500	1.00	ug/L	1	---	ND	---	---	---	30%	
Carbon disulfide	ND	5.00	10.0	ug/L	1	---	ND	---	---	---	30%	
Carbon tetrachloride	ND	0.500	1.00	ug/L	1	---	ND	---	---	---	30%	
Chlorobenzene	ND	0.250	0.500	ug/L	1	---	ND	---	---	---	30%	
Chloroethane	ND	5.00	5.00	ug/L	1	---	ND	---	---	---	30%	
Chloroform	ND	0.500	1.00	ug/L	1	---	ND	---	---	---	30%	
Chloromethane	ND	2.50	5.00	ug/L	1	---	ND	---	---	---	30%	
2-Chlorotoluene	ND	0.500	1.00	ug/L	1	---	ND	---	---	---	30%	
4-Chlorotoluene	ND	0.500	1.00	ug/L	1	---	ND	---	---	---	30%	
Dibromochloromethane	ND	0.500	1.00	ug/L	1	---	ND	---	---	---	30%	
1,2-Dibromo-3-chloropropane	ND	2.50	5.00	ug/L	1	---	ND	---	---	---	30%	
1,2-Dibromoethane (EDB)	ND	0.250	0.500	ug/L	1	---	ND	---	---	---	30%	
Dibromomethane	ND	0.500	1.00	ug/L	1	---	ND	---	---	---	30%	
1,2-Dichlorobenzene	ND	0.250	0.500	ug/L	1	---	ND	---	---	---	30%	

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503-718-2323
ORELAP ID: **OR100062**

Landau Associates	Project: **Boeing Portland 85-105 Investigation**	
1500 SW First Avenue Suite 1015	Project Number: **025116.123.450**	**Report ID:**
Portland, OR 97201	Project Manager: **Erin Waibel**	**A3B0408 - 05 02 23 1421**

QUALITY CONTROL (QC) SAMPLE RESULTS

Volatile Organic Compounds by EPA 8260D

Analyte	Result	Detection L Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 23B0509 - EPA 5030C							**Water**					
Duplicate (23B0509-DUP1)			Prepared: 02/14/23 10:22		Analyzed: 02/14/23 12:00							
QC Source Sample: Non-SDG (A3B0393-04)												
1,3-Dichlorobenzene	ND	0.250	0.500	ug/L	1	---	ND	---	---	---	30%	
1,4-Dichlorobenzene	ND	0.250	0.500	ug/L	1	---	ND	---	---	---	30%	
Dichlorodifluoromethane	ND	0.500	1.00	ug/L	1	---	ND	---	---	---	30%	
1,1-Dichloroethane	ND	0.200	0.400	ug/L	1	---	ND	---	---	---	30%	
1,2-Dichloroethane (EDC)	ND	0.200	0.400	ug/L	1	---	ND	---	---	---	30%	
1,1-Dichloroethene	ND	0.200	0.400	ug/L	1	---	ND	---	---	---	30%	
cis-1,2-Dichloroethene	ND	0.200	0.400	ug/L	1	---	ND	---	---	---	30%	
trans-1,2-Dichloroethene	ND	0.200	0.400	ug/L	1	---	ND	---	---	---	30%	
1,2-Dichloropropane	ND	0.250	0.500	ug/L	1	---	ND	---	---	---	30%	
1,3-Dichloropropane	ND	0.500	1.00	ug/L	1	---	ND	---	---	---	30%	
2,2-Dichloropropane	ND	0.500	1.00	ug/L	1	---	ND	---	---	---	30%	
1,1-Dichloropropene	ND	0.500	1.00	ug/L	1	---	ND	---	---	---	30%	
cis-1,3-Dichloropropene	ND	0.500	1.00	ug/L	1	---	ND	---	---	---	30%	
trans-1,3-Dichloropropene	ND	0.500	1.00	ug/L	1	---	ND	---	---	---	30%	
Ethylbenzene	**4.45**	0.250	0.500	ug/L	1	---	4.25	---	---	5	30%	
Hexachlorobutadiene	ND	2.50	5.00	ug/L	1	---	ND	---	---	---	30%	
2-Hexanone	ND	5.00	10.0	ug/L	1	---	ND	---	---	---	30%	
Isopropylbenzene	**0.550**	0.500	1.00	ug/L	1	---	0.530	---	---	4	30%	J
4-Isopropyltoluene	ND	0.500	1.00	ug/L	1	---	ND	---	---	---	30%	
Methylene chloride	ND	5.00	10.0	ug/L	1	---	ND	---	---	---	30%	
4-Methyl-2-pentanone (MiBK)	ND	5.00	10.0	ug/L	1	---	ND	---	---	---	30%	
Methyl tert-butyl ether (MTBE)	ND	0.500	1.00	ug/L	1	---	ND	---	---	---	30%	
Naphthalene	**2.69**	1.00	2.00	ug/L	1	---	2.49	---	---	8	30%	
n-Propylbenzene	**0.760**	0.250	0.500	ug/L	1	---	0.780	---	---	3	30%	
Styrene	ND	0.500	1.00	ug/L	1	---	ND	---	---	---	30%	
1,1,1,2-Tetrachloroethane	ND	0.200	0.400	ug/L	1	---	ND	---	---	---	30%	
1,1,2,2-Tetrachloroethane	ND	0.250	0.500	ug/L	1	---	ND	---	---	---	30%	
Tetrachloroethene (PCE)	ND	0.200	0.400	ug/L	1	---	ND	---	---	---	30%	
Toluene	ND	0.500	1.00	ug/L	1	---	ND	---	---	---	30%	
1,2,3-Trichlorobenzene	ND	1.00	2.00	ug/L	1	---	ND	---	---	---	30%	
1,2,4-Trichlorobenzene	ND	1.00	2.00	ug/L	1	---	ND	---	---	---	30%	
1,1,1-Trichloroethane	ND	0.200	0.400	ug/L	1	---	ND	---	---	---	30%	
1,1,2-Trichloroethane	ND	0.250	0.500	ug/L	1	---	ND	---	---	---	30%	

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ANALYTICAL REPORT

Landau Associates	Project: Boeing Portland 85-105 Investigation	
1500 SW First Avenue Suite 1015	Project Number: 025116.123.450	Report ID:
Portland, OR 97201	Project Manager: Erin Waibel	A3B0408 - 05 02 23 1421

QUALITY CONTROL (QC) SAMPLE RESULTS

Volatile Organic Compounds by EPA 8260D

Analyte	Result	Detection L Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 23B0509 - EPA 5030C												**Water**
Duplicate (23B0509-DUP1)			Prepared: 02/14/23 10:22 Analyzed: 02/14/23 12:00									
QC Source Sample: Non-SDG (A3B0393-04)												
Trichloroethene (TCE)	ND	0.200	0.400	ug/L	1	---	ND	---	---	---	30%	
Trichlorofluoromethane	ND	1.00	2.00	ug/L	1	---	ND	---	---	---	30%	
1,2,3-Trichloropropane	ND	0.500	1.00	ug/L	1	---	ND	---	---	---	30%	
1,2,4-Trimethylbenzene	**2.85**	0.500	1.00	ug/L	1	---	2.73	---	---	4	30%	
1,3,5-Trimethylbenzene	ND	0.500	1.00	ug/L	1	---	ND	---	---	---	30%	
Vinyl chloride	ND	0.200	0.400	ug/L	1	---	ND	---	---	---	30%	
m,p-Xylene	**0.840**	0.500	1.00	ug/L	1	---	0.760	---	---	10	30%	J
o-Xylene	**5.89**	0.250	0.500	ug/L	1	---	5.58	---	---	5	30%	
Surr: 1,4-Difluorobenzene (Surr)			*Recovery: 94 %*		*Limits: 80-120 %*				*Dilution: 1x*			
Toluene-d8 (Surr)			*106 %*		*80-120 %*				*"*			
4-Bromofluorobenzene (Surr)			*94 %*		*80-120 %*				*"*			
Duplicate (23B0509-DUP2)			Prepared: 02/14/23 10:22 Analyzed: 02/14/23 13:29									
QC Source Sample: Non-SDG (A3B0406-03)												
Acetone	ND	10.0	20.0	ug/L	1	---	ND	---	---	---	30%	
Acrylonitrile	ND	1.00	2.00	ug/L	1	---	ND	---	---	---	30%	
Benzene	ND	0.100	0.200	ug/L	1	---	ND	---	---	---	30%	
Bromobenzene	ND	0.250	0.500	ug/L	1	---	ND	---	---	---	30%	
Bromochloromethane	ND	0.500	1.00	ug/L	1	---	ND	---	---	---	30%	
Bromodichloromethane	ND	0.500	1.00	ug/L	1	---	ND	---	---	---	30%	
Bromoform	ND	0.500	1.00	ug/L	1	---	ND	---	---	---	30%	
Bromomethane	ND	5.00	5.00	ug/L	1	---	ND	---	---	---	30%	
2-Butanone (MEK)	ND	5.00	10.0	ug/L	1	---	ND	---	---	---	30%	
n-Butylbenzene	ND	0.500	1.00	ug/L	1	---	ND	---	---	---	30%	
sec-Butylbenzene	ND	0.500	1.00	ug/L	1	---	ND	---	---	---	30%	
tert-Butylbenzene	ND	0.500	1.00	ug/L	1	---	ND	---	---	---	30%	
Carbon disulfide	ND	5.00	10.0	ug/L	1	---	ND	---	---	---	30%	
Carbon tetrachloride	ND	0.500	1.00	ug/L	1	---	ND	---	---	---	30%	
Chlorobenzene	ND	0.250	0.500	ug/L	1	---	ND	---	---	---	30%	
Chloroethane	ND	5.00	5.00	ug/L	1	---	ND	---	---	---	30%	
Chloroform	ND	0.500	1.00	ug/L	1	---	ND	---	---	---	30%	
Chloromethane	ND	2.50	5.00	ug/L	1	---	ND	---	---	---	30%	
2-Chlorotoluene	ND	0.500	1.00	ug/L	1	---	ND	---	---	---	30%	

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Michele Poquiz For Kurt Johnson, Senior Chemist

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ORELAP ID: OR100062

ANALYTICAL REPORT

Landau Associates	Project: Boeing Portland 85-105 Investigation	
1500 SW First Avenue Suite 1015	Project Number: 025116.123.450	Report ID:
Portland, OR 97201	Project Manager: Erin Waibel	A3B0408 - 05 02 23 1421

QUALITY CONTROL (QC) SAMPLE RESULTS

Volatile Organic Compounds by EPA 8260D

Analyte	Result	Detection L Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 23B0509 - EPA 5030C							Water					
Duplicate (23B0509-DUP2)			Prepared: 02/14/23 10:22 Analyzed: 02/14/23 13:29									
QC Source Sample: Non-SDG (A3B0406-03)												
4-Chlorotoluene	ND	0.500	1.00	ug/L	1	---	ND	---	---	---	30%	
Dibromochloromethane	ND	0.500	1.00	ug/L	1	---	ND	---	---	---	30%	
1,2-Dibromo-3-chloropropane	ND	2.50	5.00	ug/L	1	---	ND	---	---	---	30%	
1,2-Dibromoethane (EDB)	ND	0.250	0.500	ug/L	1	---	ND	---	---	---	30%	
Dibromomethane	ND	0.500	1.00	ug/L	1	---	ND	---	---	---	30%	
1,2-Dichlorobenzene	ND	0.250	0.500	ug/L	1	---	ND	---	---	---	30%	
1,3-Dichlorobenzene	ND	0.250	0.500	ug/L	1	---	ND	---	---	---	30%	
1,4-Dichlorobenzene	ND	0.250	0.500	ug/L	1	---	ND	---	---	---	30%	
Dichlorodifluoromethane	ND	0.500	1.00	ug/L	1	---	ND	---	---	---	30%	
1,1-Dichloroethane	ND	0.200	0.400	ug/L	1	---	ND	---	---	---	30%	
1,2-Dichloroethane (EDC)	ND	0.200	0.400	ug/L	1	---	ND	---	---	---	30%	
1,1-Dichloroethene	ND	0.200	0.400	ug/L	1	---	ND	---	---	---	30%	
cis-1,2-Dichloroethene	ND	0.200	0.400	ug/L	1	---	ND	---	---	---	30%	
trans-1,2-Dichloroethene	ND	0.200	0.400	ug/L	1	---	ND	---	---	---	30%	
1,2-Dichloropropane	ND	0.250	0.500	ug/L	1	---	ND	---	---	---	30%	
1,3-Dichloropropane	ND	0.500	1.00	ug/L	1	---	ND	---	---	---	30%	
2,2-Dichloropropane	ND	0.500	1.00	ug/L	1	---	ND	---	---	---	30%	
1,1-Dichloropropene	ND	0.500	1.00	ug/L	1	---	ND	---	---	---	30%	
cis-1,3-Dichloropropene	ND	0.500	1.00	ug/L	1	---	ND	---	---	---	30%	
trans-1,3-Dichloropropene	ND	0.500	1.00	ug/L	1	---	ND	---	---	---	30%	
Ethylbenzene	ND	0.250	0.500	ug/L	1	---	ND	---	---	---	30%	
Hexachlorobutadiene	ND	2.50	5.00	ug/L	1	---	ND	---	---	---	30%	
2-Hexanone	ND	5.00	10.0	ug/L	1	---	ND	---	---	---	30%	
Isopropylbenzene	ND	0.500	1.00	ug/L	1	---	ND	---	---	---	30%	
4-Isopropyltoluene	ND	0.500	1.00	ug/L	1	---	ND	---	---	---	30%	
Methylene chloride	ND	5.00	10.0	ug/L	1	---	ND	---	---	---	30%	
4-Methyl-2-pentanone (MiBK)	ND	5.00	10.0	ug/L	1	---	ND	---	---	---	30%	
Methyl tert-butyl ether (MTBE)	ND	0.500	1.00	ug/L	1	---	ND	---	---	---	30%	
Naphthalene	ND	1.00	2.00	ug/L	1	---	ND	---	---	---	30%	
n-Propylbenzene	ND	0.250	0.500	ug/L	1	---	ND	---	---	---	30%	
Styrene	ND	0.500	1.00	ug/L	1	---	ND	---	---	---	30%	
1,1,1,2-Tetrachloroethane	ND	0.200	0.400	ug/L	1	---	ND	---	---	---	30%	
1,1,2,2-Tetrachloroethane	ND	0.250	0.500	ug/L	1	---	ND	---	---	---	30%	

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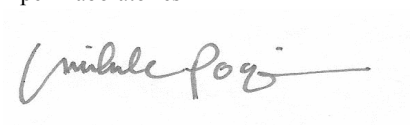

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Michele Poquiz For Kurt Johnson, Senior Chemist

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ORELAP ID: OR100062

ANALYTICAL REPORT

Landau Associates	Project: Boeing Portland 85-105 Investigation	
1500 SW First Avenue Suite 1015	Project Number: 025116.123.450	Report ID:
Portland, OR 97201	Project Manager: Erin Waibel	A3B0408 - 05 02 23 1421

QUALITY CONTROL (QC) SAMPLE RESULTS

Volatile Organic Compounds by EPA 8260D

Analyte	Result	Detection L Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 23B0509 - EPA 5030C												Water
Duplicate (23B0509-DUP2)			Prepared: 02/14/23 10:22 Analyzed: 02/14/23 13:29									
QC Source Sample: Non-SDG (A3B0406-03)												
Tetrachloroethene (PCE)	ND	0.200	0.400	ug/L	1	---	ND	---	---	---	30%	
Toluene	ND	0.500	1.00	ug/L	1	---	ND	---	---	---	30%	
1,2,3-Trichlorobenzene	ND	1.00	2.00	ug/L	1	---	ND	---	---	---	30%	
1,2,4-Trichlorobenzene	ND	1.00	2.00	ug/L	1	---	ND	---	---	---	30%	
1,1,1-Trichloroethane	ND	0.200	0.400	ug/L	1	---	ND	---	---	---	30%	
1,1,2-Trichloroethane	ND	0.250	0.500	ug/L	1	---	ND	---	---	---	30%	
Trichloroethene (TCE)	ND	0.200	0.400	ug/L	1	---	ND	---	---	---	30%	
Trichlorofluoromethane	ND	1.00	2.00	ug/L	1	---	ND	---	---	---	30%	
1,2,3-Trichloropropane	ND	0.500	1.00	ug/L	1	---	ND	---	---	---	30%	
1,2,4-Trimethylbenzene	ND	0.500	1.00	ug/L	1	---	ND	---	---	---	30%	
1,3,5-Trimethylbenzene	ND	0.500	1.00	ug/L	1	---	ND	---	---	---	30%	
Vinyl chloride	ND	0.200	0.400	ug/L	1	---	ND	---	---	---	30%	
m,p-Xylene	ND	0.500	1.00	ug/L	1	---	ND	---	---	---	30%	
o-Xylene	ND	0.250	0.500	ug/L	1	---	ND	---	---	---	30%	
Surr: 1,4-Difluorobenzene (Surr)			*Recovery: 96 %*		*Limits: 80-120 %*				*Dilution: 1x*			
Toluene-d8 (Surr)			*104 %*		*80-120 %*				*"*			
4-Bromofluorobenzene (Surr)			*100 %*		*80-120 %*				*"*			
Matrix Spike (23B0509-MS1)			Prepared: 02/14/23 10:22 Analyzed: 02/14/23 14:35									
QC Source Sample: Non-SDG (A3B0406-06)												
EPA 8260D												
Acetone	1090	10.0	20.0	ug/L	1	40.0	1070	47	39-160%	---	---	E, ICV-01
Acrylonitrile	22.5	1.00	2.00	ug/L	1	20.0	ND	99	63-135%	---	---	
Benzene	48.9	0.100	0.200	ug/L	1	20.0	29.5	97	79-120%	---	---	
Bromobenzene	18.5	0.250	0.500	ug/L	1	20.0	ND	92	80-120%	---	---	
Bromochloromethane	21.1	0.500	1.00	ug/L	1	20.0	ND	106	78-123%	---	---	
Bromodichloromethane	21.2	0.500	1.00	ug/L	1	20.0	ND	106	79-125%	---	---	
Bromoform	20.2	0.500	1.00	ug/L	1	20.0	ND	101	66-130%	---	---	
Bromomethane	82.5	5.00	5.00	ug/L	1	20.0	61.0	108	53-141%	---	---	Q-54
2-Butanone (MEK)	113	5.00	10.0	ug/L	1	40.0	69.1	110	56-143%	---	---	ICV-01
n-Butylbenzene	23.5	0.500	1.00	ug/L	1	20.0	0.690	114	75-128%	---	---	
sec-Butylbenzene	21.4	0.500	1.00	ug/L	1	20.0	1.07	102	77-126%	---	---	
tert-Butylbenzene	19.7	0.500	1.00	ug/L	1	20.0	ND	99	78-124%	---	---	

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ORELAP ID: **OR100062**

Landau Associates	Project: **Boeing Portland 85-105 Investigation**	
1500 SW First Avenue Suite 1015	Project Number: **025116.123.450**	**Report ID:**
Portland, OR 97201	Project Manager: **Erin Waibel**	**A3B0408 - 05 02 23 1421**

QUALITY CONTROL (QC) SAMPLE RESULTS

Volatile Organic Compounds by EPA 8260D

Analyte	Result	Detection L Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 23B0509 - EPA 5030C							**Water**					
Matrix Spike (23B0509-MS1)			Prepared: 02/14/23 10:22		Analyzed: 02/14/23 14:35							
QC Source Sample: Non-SDG (A3B0406-06)												
Carbon disulfide	28.3	5.00	10.0	ug/L	1	20.0	ND	**141**	**64-133%**	---	---	Q-01
Carbon tetrachloride	24.6	0.500	1.00	ug/L	1	20.0	ND	123	72-136%	---	---	
Chlorobenzene	19.6	0.250	0.500	ug/L	1	20.0	ND	98	80-120%	---	---	
Chloroethane	43.8	5.00	5.00	ug/L	1	20.0	13.3	**152**	**60-138%**	---	---	Q-54e
Chloroform	21.2	0.500	1.00	ug/L	1	20.0	ND	106	79-124%	---	---	
Chloromethane	144	2.50	5.00	ug/L	1	20.0	127	84	50-139%	---	---	
2-Chlorotoluene	18.9	0.500	1.00	ug/L	1	20.0	ND	95	79-122%	---	---	
4-Chlorotoluene	18.6	0.500	1.00	ug/L	1	20.0	ND	93	78-122%	---	---	
Dibromochloromethane	20.9	0.500	1.00	ug/L	1	20.0	ND	105	74-126%	---	---	
1,2-Dibromo-3-chloropropane	20.4	2.50	5.00	ug/L	1	20.0	ND	102	62-128%	---	---	
1,2-Dibromoethane (EDB)	20.2	0.250	0.500	ug/L	1	20.0	ND	101	77-121%	---	---	
Dibromomethane	20.3	0.500	1.00	ug/L	1	20.0	ND	102	79-123%	---	---	
1,2-Dichlorobenzene	19.4	0.250	0.500	ug/L	1	20.0	ND	97	80-120%	---	---	
1,3-Dichlorobenzene	18.8	0.250	0.500	ug/L	1	20.0	ND	94	80-120%	---	---	
1,4-Dichlorobenzene	18.3	0.250	0.500	ug/L	1	20.0	ND	92	79-120%	---	---	
Dichlorodifluoromethane	23.0	0.500	1.00	ug/L	1	20.0	ND	115	32-152%	---	---	
1,1-Dichloroethane	21.0	0.200	0.400	ug/L	1	20.0	ND	105	77-125%	---	---	
1,2-Dichloroethane (EDC)	20.7	0.200	0.400	ug/L	1	20.0	ND	102	73-128%	---	---	
1,1-Dichloroethene	23.5	0.200	0.400	ug/L	1	20.0	ND	118	71-131%	---	---	
cis-1,2-Dichloroethene	20.6	0.200	0.400	ug/L	1	20.0	ND	103	78-123%	---	---	
trans-1,2-Dichloroethene	21.7	0.200	0.400	ug/L	1	20.0	ND	108	75-124%	---	---	
1,2-Dichloropropane	20.1	0.250	0.500	ug/L	1	20.0	ND	101	78-122%	---	---	
1,3-Dichloropropane	19.6	0.500	1.00	ug/L	1	20.0	ND	98	80-120%	---	---	
2,2-Dichloropropane	21.0	0.500	1.00	ug/L	1	20.0	ND	105	60-139%	---	---	
1,1-Dichloropropene	22.1	0.500	1.00	ug/L	1	20.0	ND	110	79-125%	---	---	
cis-1,3-Dichloropropene	19.1	0.500	1.00	ug/L	1	20.0	ND	96	75-124%	---	---	
trans-1,3-Dichloropropene	21.2	0.500	1.00	ug/L	1	20.0	ND	106	73-127%	---	---	
Ethylbenzene	177	0.250	0.500	ug/L	1	20.0	180	**-13**	**79-121%**	---	---	Q-03
Hexachlorobutadiene	17.2	2.50	5.00	ug/L	1	20.0	ND	86	66-134%	---	---	
2-Hexanone	54.6	5.00	10.0	ug/L	1	40.0	10.6	110	57-139%	---	---	
Isopropylbenzene	29.8	0.500	1.00	ug/L	1	20.0	9.06	104	72-131%	---	---	
4-Isopropyltoluene	26.0	0.500	1.00	ug/L	1	20.0	3.15	114	77-127%	---	---	
Methylene chloride	20.9	5.00	10.0	ug/L	1	20.0	ND	104	74-124%	---	---	

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APEX LABORATORIES

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ORELAP ID: **OR100062**

ANALYTICAL REPORT

Landau Associates	Project: **Boeing Portland 85-105 Investigation**	
1500 SW First Avenue Suite 1015	Project Number: **025116.123.450**	**Report ID:**
Portland, OR 97201	Project Manager: **Erin Waibel**	**A3B0408 - 05 02 23 1421**

QUALITY CONTROL (QC) SAMPLE RESULTS

Volatile Organic Compounds by EPA 8260D

Analyte	Result	Detection L Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 23B0509 - EPA 5030C								**Water**				
Matrix Spike (23B0509-MS1)			Prepared: 02/14/23 10:22 Analyzed: 02/14/23 14:35									
QC Source Sample: Non-SDG (A3B0406-06)												
4-Methyl-2-pentanone (MiBK)	64.1	5.00	10.0	ug/L	1	40.0	22.9	103	67-130%	---	---	
Methyl tert-butyl ether (MTBE)	18.6	0.500	1.00	ug/L	1	20.0	ND	93	71-124%	---	---	
Naphthalene	95.8	1.00	2.00	ug/L	1	20.0	83.8	**60**	**61-128%**	---	---	Q-03
n-Propylbenzene	40.6	0.250	0.500	ug/L	1	20.0	21.4	96	76-126%	---	---	
Styrene	18.8	0.500	1.00	ug/L	1	20.0	ND	94	78-123%	---	---	
1,1,1,2-Tetrachloroethane	18.4	0.200	0.400	ug/L	1	20.0	ND	92	78-124%	---	---	
1,1,2,2-Tetrachloroethane	20.4	0.250	0.500	ug/L	1	20.0	ND	102	71-121%	---	---	
Tetrachloroethene (PCE)	19.9	0.200	0.400	ug/L	1	20.0	ND	100	74-129%	---	---	
Toluene	116	0.500	1.00	ug/L	1	20.0	107	**43**	**80-121%**	---	---	Q-01
1,2,3-Trichlorobenzene	19.4	1.00	2.00	ug/L	1	20.0	ND	97	69-129%	---	---	
1,2,4-Trichlorobenzene	18.0	1.00	2.00	ug/L	1	20.0	ND	90	69-130%	---	---	
1,1,1-Trichloroethane	22.3	0.200	0.400	ug/L	1	20.0	ND	111	74-131%	---	---	
1,1,2-Trichloroethane	19.3	0.250	0.500	ug/L	1	20.0	ND	97	80-120%	---	---	
Trichloroethene (TCE)	18.3	0.200	0.400	ug/L	1	20.0	ND	92	79-123%	---	---	
Trichlorofluoromethane	27.0	1.00	2.00	ug/L	1	20.0	ND	135	65-141%	---	---	Q-54b
1,2,3-Trichloropropane	20.8	0.500	1.00	ug/L	1	20.0	ND	104	73-122%	---	---	
1,2,4-Trimethylbenzene	264	0.500	1.00	ug/L	1	20.0	269	**-25**	**76-124%**	---	---	E, Q-03
1,3,5-Trimethylbenzene	84.9	0.500	1.00	ug/L	1	20.0	69.3	78	75-124%	---	---	
Vinyl chloride	25.1	0.200	0.400	ug/L	1	20.0	ND	126	58-137%	---	---	
m,p-Xylene	627	0.500	1.00	ug/L	1	40.0	802	**-437**	**80-121%**	---	---	Q-03, E
o-Xylene	393	0.250	0.500	ug/L	1	20.0	443	**-251**	**78-122%**	---	---	E, Q-03
Surr: 1,4-Difluorobenzene (Surr)			*Recovery: 98 %*			*Limits: 80-120 %*			*Dilution: 1x*			
Toluene-d8 (Surr)			*99 %*			*80-120 %*			*"*			
4-Bromofluorobenzene (Surr)			*95 %*			*80-120 %*			*"*			

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ANALYTICAL REPORT

Landau Associates	Project: Boeing Portland 85-105 Investigation	
1500 SW First Avenue Suite 1015	Project Number: 025116.123.450	Report ID:
Portland, OR 97201	Project Manager: Erin Waibel	A3B0408 - 05 02 23 1421

QUALITY CONTROL (QC) SAMPLE RESULTS

Volatile Organic Compounds by EPA 8260D

Analyte	Result	Detection L Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 23B0617 - EPA 5030C												**Water**
Blank (23B0617-BLK1)			Prepared: 02/16/23 08:30 Analyzed: 02/16/23 11:05									
EPA 8260D												
Acetone	ND	10.0	20.0	ug/L	1	---	---	---	---	---	---	
Acrylonitrile	ND	1.00	2.00	ug/L	1	---	---	---	---	---	---	
Benzene	ND	0.100	0.200	ug/L	1	---	---	---	---	---	---	
Bromobenzene	ND	0.250	0.500	ug/L	1	---	---	---	---	---	---	
Bromochloromethane	ND	0.500	1.00	ug/L	1	---	---	---	---	---	---	
Bromodichloromethane	ND	0.500	1.00	ug/L	1	---	---	---	---	---	---	
Bromoform	ND	0.500	1.00	ug/L	1	---	---	---	---	---	---	
Bromomethane	ND	5.00	5.00	ug/L	1	---	---	---	---	---	---	
2-Butanone (MEK)	ND	5.00	10.0	ug/L	1	---	---	---	---	---	---	
n-Butylbenzene	ND	0.500	1.00	ug/L	1	---	---	---	---	---	---	
sec-Butylbenzene	ND	0.500	1.00	ug/L	1	---	---	---	---	---	---	
tert-Butylbenzene	ND	0.500	1.00	ug/L	1	---	---	---	---	---	---	
Carbon disulfide	ND	5.00	10.0	ug/L	1	---	---	---	---	---	---	
Carbon tetrachloride	ND	0.500	1.00	ug/L	1	---	---	---	---	---	---	
Chlorobenzene	ND	0.250	0.500	ug/L	1	---	---	---	---	---	---	
Chloroethane	ND	5.00	5.00	ug/L	1	---	---	---	---	---	---	
Chloroform	ND	0.500	1.00	ug/L	1	---	---	---	---	---	---	
Chloromethane	ND	2.50	5.00	ug/L	1	---	---	---	---	---	---	
2-Chlorotoluene	ND	0.500	1.00	ug/L	1	---	---	---	---	---	---	
4-Chlorotoluene	ND	0.500	1.00	ug/L	1	---	---	---	---	---	---	
Dibromochloromethane	ND	0.500	1.00	ug/L	1	---	---	---	---	---	---	
1,2-Dibromo-3-chloropropane	ND	2.50	5.00	ug/L	1	---	---	---	---	---	---	
1,2-Dibromoethane (EDB)	ND	0.250	0.500	ug/L	1	---	---	---	---	---	---	
Dibromomethane	ND	0.500	1.00	ug/L	1	---	---	---	---	---	---	
1,2-Dichlorobenzene	ND	0.250	0.500	ug/L	1	---	---	---	---	---	---	
1,3-Dichlorobenzene	ND	0.250	0.500	ug/L	1	---	---	---	---	---	---	
1,4-Dichlorobenzene	ND	0.250	0.500	ug/L	1	---	---	---	---	---	---	
Dichlorodifluoromethane	ND	0.500	1.00	ug/L	1	---	---	---	---	---	---	
1,1-Dichloroethane	ND	0.200	0.400	ug/L	1	---	---	---	---	---	---	
1,2-Dichloroethane (EDC)	ND	0.200	0.400	ug/L	1	---	---	---	---	---	---	
1,1-Dichloroethene	ND	0.200	0.400	ug/L	1	---	---	---	---	---	---	
cis-1,2-Dichloroethene	ND	0.200	0.400	ug/L	1	---	---	---	---	---	---	
trans-1,2-Dichloroethene	ND	0.200	0.400	ug/L	1	---	---	---	---	---	---	

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Michele Poquiz For Kurt Johnson, Senior Chemist

APEX LABORATORIES

Apex Laboratories, LLC
6700 S.W. Sandburg Street
Tigard, OR 97223
503-718-2323
ORELAP ID: **OR100062**

ANALYTICAL REPORT

Landau Associates	Project: **Boeing Portland 85-105 Investigation**	
1500 SW First Avenue Suite 1015	Project Number: **025116.123.450**	**Report ID:**
Portland, OR 97201	Project Manager: **Erin Waibel**	**A3B0408 - 05 02 23 1421**

QUALITY CONTROL (QC) SAMPLE RESULTS

Volatile Organic Compounds by EPA 8260D

Analyte	Result	Detection L Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 23B0617 - EPA 5030C								**Water**				
Blank (23B0617-BLK1)			Prepared: 02/16/23 08:30		Analyzed: 02/16/23 11:05							
1,2-Dichloropropane	ND	0.250	0.500	ug/L	1	---	---	---	---	---	---	
1,3-Dichloropropane	ND	0.500	1.00	ug/L	1	---	---	---	---	---	---	
2,2-Dichloropropane	ND	0.500	1.00	ug/L	1	---	---	---	---	---	---	
1,1-Dichloropropene	ND	0.500	1.00	ug/L	1	---	---	---	---	---	---	
cis-1,3-Dichloropropene	ND	0.500	1.00	ug/L	1	---	---	---	---	---	---	
trans-1,3-Dichloropropene	ND	0.500	1.00	ug/L	1	---	---	---	---	---	---	
Ethylbenzene	ND	0.250	0.500	ug/L	1	---	---	---	---	---	---	
Hexachlorobutadiene	ND	2.50	5.00	ug/L	1	---	---	---	---	---	---	
2-Hexanone	ND	5.00	10.0	ug/L	1	---	---	---	---	---	---	
Isopropylbenzene	ND	0.500	1.00	ug/L	1	---	---	---	---	---	---	
4-Isopropyltoluene	ND	0.500	1.00	ug/L	1	---	---	---	---	---	---	
Methylene chloride	ND	5.00	10.0	ug/L	1	---	---	---	---	---	---	
4-Methyl-2-pentanone (MiBK)	ND	5.00	10.0	ug/L	1	---	---	---	---	---	---	
Methyl tert-butyl ether (MTBE)	ND	0.500	1.00	ug/L	1	---	---	---	---	---	---	
Naphthalene	ND	1.00	2.00	ug/L	1	---	---	---	---	---	---	
n-Propylbenzene	ND	0.250	0.500	ug/L	1	---	---	---	---	---	---	
Styrene	ND	0.500	1.00	ug/L	1	---	---	---	---	---	---	
1,1,1,2-Tetrachloroethane	ND	0.200	0.400	ug/L	1	---	---	---	---	---	---	
1,1,2,2-Tetrachloroethane	ND	0.250	0.500	ug/L	1	---	---	---	---	---	---	
Tetrachloroethene (PCE)	ND	0.200	0.400	ug/L	1	---	---	---	---	---	---	
Toluene	ND	0.500	1.00	ug/L	1	---	---	---	---	---	---	
1,2,3-Trichlorobenzene	ND	1.00	2.00	ug/L	1	---	---	---	---	---	---	
1,2,4-Trichlorobenzene	ND	1.00	2.00	ug/L	1	---	---	---	---	---	---	
1,1,1-Trichloroethane	ND	0.200	0.400	ug/L	1	---	---	---	---	---	---	
1,1,2-Trichloroethane	ND	0.250	0.500	ug/L	1	---	---	---	---	---	---	
Trichloroethene (TCE)	ND	0.200	0.400	ug/L	1	---	---	---	---	---	---	
Trichlorofluoromethane	ND	1.00	2.00	ug/L	1	---	---	---	---	---	---	
1,2,3-Trichloropropane	ND	0.500	1.00	ug/L	1	---	---	---	---	---	---	
1,2,4-Trimethylbenzene	ND	0.500	1.00	ug/L	1	---	---	---	---	---	---	
1,3,5-Trimethylbenzene	ND	0.500	1.00	ug/L	1	---	---	---	---	---	---	
Vinyl chloride	ND	0.200	0.400	ug/L	1	---	---	---	---	---	---	
m,p-Xylene	ND	0.500	1.00	ug/L	1	---	---	---	---	---	---	
o-Xylene	ND	0.250	0.500	ug/L	1	---	---	---	---	---	---	

Surr: 1,4-Difluorobenzene (Surr) *Recovery: 96 %* *Limits: 80-120 %* *Dilution: 1x*

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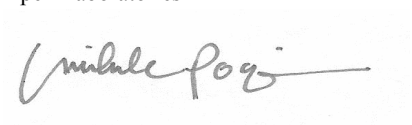

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Michele Poquiz For Kurt Johnson, Senior Chemist

Apex Laboratories, LLC
6700 S.W. Sandburg Street
Tigard, OR 97223
503-718-2323
ORELAP ID: **OR100062**

Landau Associates	Project: **Boeing Portland 85-105 Investigation**	
1500 SW First Avenue Suite 1015	Project Number: **025116.123.450**	**Report ID:**
Portland, OR 97201	Project Manager: **Erin Waibel**	**A3B0408 - 05 02 23 1421**

QUALITY CONTROL (QC) SAMPLE RESULTS

Volatile Organic Compounds by EPA 8260D

Analyte	Result	Detection L Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 23B0617 - EPA 5030C												**Water**
Blank (23B0617-BLK1)				Prepared: 02/16/23 08:30 Analyzed: 02/16/23 11:05								
Surr: Toluene-d8 (Surr)			*Recovery: 104 %*	*Limits: 80-120 %*				*Dilution: 1x*				
4-Bromofluorobenzene (Surr)			*100 %*	*80-120 %*				*"*				
LCS (23B0617-BS1)				Prepared: 02/16/23 08:30 Analyzed: 02/16/23 10:19								
EPA 8260D												
Acetone	42.2	10.0	20.0	ug/L	1	40.0	---	106	80-120%	---	---	ICV-01
Acrylonitrile	18.0	1.00	2.00	ug/L	1	20.0	---	90	80-120%	---	---	
Benzene	19.7	0.100	0.200	ug/L	1	20.0	---	98	80-120%	---	---	
Bromobenzene	17.4	0.250	0.500	ug/L	1	20.0	---	87	80-120%	---	---	
Bromochloromethane	21.6	0.500	1.00	ug/L	1	20.0	---	108	80-120%	---	---	
Bromodichloromethane	22.2	0.500	1.00	ug/L	1	20.0	---	111	80-120%	---	---	
Bromoform	23.1	0.500	1.00	ug/L	1	20.0	---	116	80-120%	---	---	
Bromomethane	13.2	5.00	5.00	ug/L	1	20.0	---	**66**	**80-120%**	---	---	Q-55
2-Butanone (MEK)	38.0	5.00	10.0	ug/L	1	40.0	---	95	80-120%	---	---	ICV-01
n-Butylbenzene	21.6	0.500	1.00	ug/L	1	20.0	---	108	80-120%	---	---	
sec-Butylbenzene	21.7	0.500	1.00	ug/L	1	20.0	---	108	80-120%	---	---	
tert-Butylbenzene	19.5	0.500	1.00	ug/L	1	20.0	---	97	80-120%	---	---	
Carbon disulfide	22.2	5.00	10.0	ug/L	1	20.0	---	111	80-120%	---	---	
Carbon tetrachloride	25.5	0.500	1.00	ug/L	1	20.0	---	**128**	**80-120%**	---	---	Q-56
Chlorobenzene	20.3	0.250	0.500	ug/L	1	20.0	---	101	80-120%	---	---	
Chloroethane	34.3	5.00	5.00	ug/L	1	20.0	---	**171**	**80-120%**	---	---	Q-56
Chloroform	21.7	0.500	1.00	ug/L	1	20.0	---	109	80-120%	---	---	
Chloromethane	17.6	2.50	5.00	ug/L	1	20.0	---	88	80-120%	---	---	
2-Chlorotoluene	19.2	0.500	1.00	ug/L	1	20.0	---	96	80-120%	---	---	
4-Chlorotoluene	19.0	0.500	1.00	ug/L	1	20.0	---	95	80-120%	---	---	
Dibromochloromethane	22.2	0.500	1.00	ug/L	1	20.0	---	111	80-120%	---	---	
1,2-Dibromo-3-chloropropane	16.1	2.50	5.00	ug/L	1	20.0	---	81	80-120%	---	---	
1,2-Dibromoethane (EDB)	20.9	0.250	0.500	ug/L	1	20.0	---	104	80-120%	---	---	
Dibromomethane	20.8	0.500	1.00	ug/L	1	20.0	---	104	80-120%	---	---	
1,2-Dichlorobenzene	19.5	0.250	0.500	ug/L	1	20.0	---	97	80-120%	---	---	
1,3-Dichlorobenzene	19.6	0.250	0.500	ug/L	1	20.0	---	98	80-120%	---	---	
1,4-Dichlorobenzene	18.8	0.250	0.500	ug/L	1	20.0	---	94	80-120%	---	---	
Dichlorodifluoromethane	26.2	0.500	1.00	ug/L	1	20.0	---	**131**	**80-120%**	---	---	Q-56
1,1-Dichloroethane	20.2	0.200	0.400	ug/L	1	20.0	---	101	80-120%	---	---	

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Michele Poquiz For Kurt Johnson, Senior Chemist

APEX LABORATORIES

Apex Laboratories, LLC
6700 S.W. Sandburg Street
Tigard, OR 97223
503-718-2323
ORELAP ID: **OR100062**

ANALYTICAL REPORT

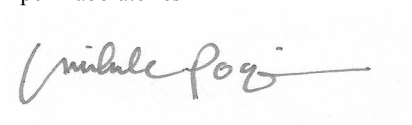
Landau Associates	Project: **Boeing Portland 85-105 Investigation**	
1500 SW First Avenue Suite 1015	Project Number: **025116.123.450**	**Report ID:**
Portland, OR 97201	Project Manager: **Erin Waibel**	**A3B0408 - 05 02 23 1421**

QUALITY CONTROL (QC) SAMPLE RESULTS

Volatile Organic Compounds by EPA 8260D

Analyte	Result	Detection L Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 23B0617 - EPA 5030C							**Water**					
LCS (23B0617-BS1)			Prepared: 02/16/23 08:30		Analyzed: 02/16/23 10:19							
1,2-Dichloroethane (EDC)	22.9	0.200	0.400	ug/L	1	20.0	---	114	80-120%	---	---	
1,1-Dichloroethene	23.2	0.200	0.400	ug/L	1	20.0	---	116	80-120%	---	---	
cis-1,2-Dichloroethene	20.5	0.200	0.400	ug/L	1	20.0	---	102	80-120%	---	---	
trans-1,2-Dichloroethene	20.5	0.200	0.400	ug/L	1	20.0	---	103	80-120%	---	---	
1,2-Dichloropropane	19.4	0.250	0.500	ug/L	1	20.0	---	97	80-120%	---	---	
1,3-Dichloropropane	21.0	0.500	1.00	ug/L	1	20.0	---	105	80-120%	---	---	
2,2-Dichloropropane	22.8	0.500	1.00	ug/L	1	20.0	---	114	80-120%	---	---	
1,1-Dichloropropene	21.0	0.500	1.00	ug/L	1	20.0	---	105	80-120%	---	---	
cis-1,3-Dichloropropene	21.1	0.500	1.00	ug/L	1	20.0	---	105	80-120%	---	---	
trans-1,3-Dichloropropene	23.2	0.500	1.00	ug/L	1	20.0	---	116	80-120%	---	---	
Ethylbenzene	21.4	0.250	0.500	ug/L	1	20.0	---	107	80-120%	---	---	
Hexachlorobutadiene	18.8	2.50	5.00	ug/L	1	20.0	---	94	80-120%	---	---	
2-Hexanone	37.0	5.00	10.0	ug/L	1	40.0	---	93	80-120%	---	---	
Isopropylbenzene	21.8	0.500	1.00	ug/L	1	20.0	---	109	80-120%	---	---	
4-Isopropyltoluene	20.5	0.500	1.00	ug/L	1	20.0	---	103	80-120%	---	---	
Methylene chloride	19.9	5.00	10.0	ug/L	1	20.0	---	99	80-120%	---	---	
4-Methyl-2-pentanone (MiBK)	39.6	5.00	10.0	ug/L	1	40.0	---	99	80-120%	---	---	
Methyl tert-butyl ether (MTBE)	18.5	0.500	1.00	ug/L	1	20.0	---	93	80-120%	---	---	
Naphthalene	16.7	1.00	2.00	ug/L	1	20.0	---	83	80-120%	---	---	
n-Propylbenzene	20.5	0.250	0.500	ug/L	1	20.0	---	102	80-120%	---	---	
Styrene	20.9	0.500	1.00	ug/L	1	20.0	---	105	80-120%	---	---	
1,1,1,2-Tetrachloroethane	20.5	0.200	0.400	ug/L	1	20.0	---	103	80-120%	---	---	
1,1,2,2-Tetrachloroethane	19.6	0.250	0.500	ug/L	1	20.0	---	98	80-120%	---	---	
Tetrachloroethene (PCE)	20.2	0.200	0.400	ug/L	1	20.0	---	101	80-120%	---	---	
Toluene	20.4	0.500	1.00	ug/L	1	20.0	---	102	80-120%	---	---	
1,2,3-Trichlorobenzene	18.4	1.00	2.00	ug/L	1	20.0	---	92	80-120%	---	---	
1,2,4-Trichlorobenzene	17.2	1.00	2.00	ug/L	1	20.0	---	86	80-120%	---	---	
1,1,1-Trichloroethane	22.2	0.200	0.400	ug/L	1	20.0	---	111	80-120%	---	---	
1,1,2-Trichloroethane	21.1	0.250	0.500	ug/L	1	20.0	---	106	80-120%	---	---	
Trichloroethene (TCE)	17.8	0.200	0.400	ug/L	1	20.0	---	89	80-120%	---	---	
Trichlorofluoromethane	28.2	1.00	2.00	ug/L	1	20.0	---	**141**	**80-120%**	---	---	Q-56
1,2,3-Trichloropropane	20.8	0.500	1.00	ug/L	1	20.0	---	104	80-120%	---	---	
1,2,4-Trimethylbenzene	20.7	0.500	1.00	ug/L	1	20.0	---	103	80-120%	---	---	
1,3,5-Trimethylbenzene	19.9	0.500	1.00	ug/L	1	20.0	---	99	80-120%	---	---	

Apex Laboratories



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ORELAP ID: OR100062

ANALYTICAL REPORT

Landau Associates	Project: Boeing Portland 85-105 Investigation	
1500 SW First Avenue Suite 1015	Project Number: 025116.123.450	Report ID:
Portland, OR 97201	Project Manager: Erin Waibel	A3B0408 - 05 02 23 1421

QUALITY CONTROL (QC) SAMPLE RESULTS

Volatile Organic Compounds by EPA 8260D

Analyte	Result	Detection L Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 23B0617 - EPA 5030C									Water			
LCS (23B0617-BS1)			Prepared: 02/16/23 08:30 Analyzed: 02/16/23 10:19									
Vinyl chloride	21.8	0.200	0.400	ug/L	1	20.0	---	109	80-120%	---	---	
m,p-Xylene	43.5	0.500	1.00	ug/L	1	40.0	---	109	80-120%	---	---	
o-Xylene	20.6	0.250	0.500	ug/L	1	20.0	---	103	80-120%	---	---	
Surr: 1,4-Difluorobenzene (Surr)			*Recovery: 93 %*		*Limits: 80-120 %*				*Dilution: 1x*			
Toluene-d8 (Surr)			*102 %*		*80-120 %*				*"*			
4-Bromofluorobenzene (Surr)			*87 %*		*80-120 %*				*"*			
Duplicate (23B0617-DUP1)			Prepared: 02/16/23 10:58 Analyzed: 02/16/23 14:09									
QC Source Sample: Non-SDG (A3B0550-01)												
Acetone	ND	10.0	20.0	ug/L	1	---	ND	---	---	---	30%	
Acrylonitrile	ND	1.00	2.00	ug/L	1	---	ND	---	---	---	30%	
Benzene	ND	0.100	0.200	ug/L	1	---	ND	---	---	---	30%	
Bromobenzene	ND	0.250	0.500	ug/L	1	---	ND	---	---	---	30%	
Bromochloromethane	ND	0.500	1.00	ug/L	1	---	ND	---	---	---	30%	
Bromodichloromethane	ND	0.500	1.00	ug/L	1	---	ND	---	---	---	30%	
Bromoform	ND	0.500	1.00	ug/L	1	---	ND	---	---	---	30%	
Bromomethane	ND	5.00	5.00	ug/L	1	---	ND	---	---	---	30%	
2-Butanone (MEK)	ND	5.00	10.0	ug/L	1	---	ND	---	---	---	30%	
n-Butylbenzene	ND	0.500	1.00	ug/L	1	---	ND	---	---	---	30%	
sec-Butylbenzene	ND	0.500	1.00	ug/L	1	---	ND	---	---	---	30%	
tert-Butylbenzene	ND	0.500	1.00	ug/L	1	---	ND	---	---	---	30%	
Carbon disulfide	ND	5.00	10.0	ug/L	1	---	ND	---	---	---	30%	
Carbon tetrachloride	ND	0.500	1.00	ug/L	1	---	ND	---	---	---	30%	
Chlorobenzene	ND	0.250	0.500	ug/L	1	---	ND	---	---	---	30%	
Chloroethane	ND	5.00	5.00	ug/L	1	---	ND	---	---	---	30%	
Chloroform	ND	0.500	1.00	ug/L	1	---	ND	---	---	---	30%	
Chloromethane	ND	2.50	5.00	ug/L	1	---	ND	---	---	---	30%	
2-Chlorotoluene	ND	0.500	1.00	ug/L	1	---	ND	---	---	---	30%	
4-Chlorotoluene	ND	0.500	1.00	ug/L	1	---	ND	---	---	---	30%	
Dibromochloromethane	ND	0.500	1.00	ug/L	1	---	ND	---	---	---	30%	
1,2-Dibromo-3-chloropropane	ND	2.50	5.00	ug/L	1	---	ND	---	---	---	30%	
1,2-Dibromoethane (EDB)	ND	0.250	0.500	ug/L	1	---	ND	---	---	---	30%	
Dibromomethane	ND	0.500	1.00	ug/L	1	---	ND	---	---	---	30%	
1,2-Dichlorobenzene	ND	0.250	0.500	ug/L	1	---	ND	---	---	---	30%	

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Michele Poquiz For Kurt Johnson, Senior Chemist

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ORELAP ID: OR100062

ANALYTICAL REPORT

Landau Associates	Project: Boeing Portland 85-105 Investigation	
1500 SW First Avenue Suite 1015	Project Number: 025116.123.450	Report ID:
Portland, OR 97201	Project Manager: Erin Waibel	A3B0408 - 05 02 23 1421

QUALITY CONTROL (QC) SAMPLE RESULTS

Volatile Organic Compounds by EPA 8260D

Analyte	Result	Detection L Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 23B0617 - EPA 5030C							Water					
Duplicate (23B0617-DUP1)			Prepared: 02/16/23 10:58 Analyzed: 02/16/23 14:09									
QC Source Sample: Non-SDG (A3B0550-01)												
1,3-Dichlorobenzene	ND	0.250	0.500	ug/L	1	---	ND	---	---	---	30%	
1,4-Dichlorobenzene	ND	0.250	0.500	ug/L	1	---	ND	---	---	---	30%	
Dichlorodifluoromethane	ND	0.500	1.00	ug/L	1	---	ND	---	---	---	30%	
1,1-Dichloroethane	ND	0.200	0.400	ug/L	1	---	ND	---	---	---	30%	
1,2-Dichloroethane (EDC)	ND	0.200	0.400	ug/L	1	---	ND	---	---	---	30%	
1,1-Dichloroethene	ND	0.200	0.400	ug/L	1	---	ND	---	---	---	30%	
cis-1,2-Dichloroethene	ND	0.200	0.400	ug/L	1	---	ND	---	---	---	30%	
trans-1,2-Dichloroethene	ND	0.200	0.400	ug/L	1	---	ND	---	---	---	30%	
1,2-Dichloropropane	ND	0.250	0.500	ug/L	1	---	ND	---	---	---	30%	
1,3-Dichloropropane	ND	0.500	1.00	ug/L	1	---	ND	---	---	---	30%	
2,2-Dichloropropane	ND	0.500	1.00	ug/L	1	---	ND	---	---	---	30%	
1,1-Dichloropropene	ND	0.500	1.00	ug/L	1	---	ND	---	---	---	30%	
cis-1,3-Dichloropropene	ND	0.500	1.00	ug/L	1	---	ND	---	---	---	30%	
trans-1,3-Dichloropropene	ND	0.500	1.00	ug/L	1	---	ND	---	---	---	30%	
Ethylbenzene	ND	0.250	0.500	ug/L	1	---	ND	---	---	---	30%	
Hexachlorobutadiene	ND	2.50	5.00	ug/L	1	---	ND	---	---	---	30%	
2-Hexanone	ND	5.00	10.0	ug/L	1	---	ND	---	---	---	30%	
Isopropylbenzene	ND	0.500	1.00	ug/L	1	---	ND	---	---	---	30%	
4-Isopropyltoluene	ND	0.500	1.00	ug/L	1	---	ND	---	---	---	30%	
Methylene chloride	ND	5.00	10.0	ug/L	1	---	ND	---	---	---	30%	
4-Methyl-2-pentanone (MiBK)	ND	5.00	10.0	ug/L	1	---	ND	---	---	---	30%	
Methyl tert-butyl ether (MTBE)	ND	0.500	1.00	ug/L	1	---	ND	---	---	---	30%	
Naphthalene	ND	1.00	2.00	ug/L	1	---	ND	---	---	---	30%	
n-Propylbenzene	ND	0.250	0.500	ug/L	1	---	ND	---	---	---	30%	
Styrene	ND	0.500	1.00	ug/L	1	---	ND	---	---	---	30%	
1,1,1,2-Tetrachloroethane	ND	0.200	0.400	ug/L	1	---	ND	---	---	---	30%	
1,1,2,2-Tetrachloroethane	ND	0.250	0.500	ug/L	1	---	ND	---	---	---	30%	
Tetrachloroethene (PCE)	ND	0.200	0.400	ug/L	1	---	ND	---	---	---	30%	
Toluene	ND	0.500	1.00	ug/L	1	---	ND	---	---	---	30%	
1,2,3-Trichlorobenzene	ND	1.00	2.00	ug/L	1	---	ND	---	---	---	30%	
1,2,4-Trichlorobenzene	ND	1.00	2.00	ug/L	1	---	ND	---	---	---	30%	
1,1,1-Trichloroethane	ND	0.200	0.400	ug/L	1	---	ND	---	---	---	30%	
1,1,2-Trichloroethane	ND	0.250	0.500	ug/L	1	---	ND	---	---	---	30%	

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ORELAP ID: **OR100062**

ANALYTICAL REPORT

Landau Associates	Project: **Boeing Portland 85-105 Investigation**	
1500 SW First Avenue Suite 1015	Project Number: **025116.123.450**	**Report ID:**
Portland, OR 97201	Project Manager: **Erin Waibel**	**A3B0408 - 05 02 23 1421**

QUALITY CONTROL (QC) SAMPLE RESULTS

Volatile Organic Compounds by EPA 8260D

Analyte	Result	Detection L Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 23B0617 - EPA 5030C							**Water**					
Duplicate (23B0617-DUP1)			Prepared: 02/16/23 10:58 Analyzed: 02/16/23 14:09									
QC Source Sample: Non-SDG (A3B0550-01)												
Trichloroethene (TCE)	ND	0.200	0.400	ug/L	1	---	ND	---	---	---	30%	
Trichlorofluoromethane	ND	1.00	2.00	ug/L	1	---	ND	---	---	---	30%	
1,2,3-Trichloropropane	ND	0.500	1.00	ug/L	1	---	ND	---	---	---	30%	
1,2,4-Trimethylbenzene	ND	0.500	1.00	ug/L	1	---	ND	---	---	---	30%	
1,3,5-Trimethylbenzene	ND	0.500	1.00	ug/L	1	---	ND	---	---	---	30%	
Vinyl chloride	ND	0.200	0.400	ug/L	1	---	ND	---	---	---	30%	
m,p-Xylene	ND	0.500	1.00	ug/L	1	---	ND	---	---	---	30%	
o-Xylene	ND	0.250	0.500	ug/L	1	---	ND	---	---	---	30%	
Surr: 1,4-Difluorobenzene (Surr)			*Recovery: 98 %*		*Limits: 80-120 %*		*Dilution: 1x*					
Toluene-d8 (Surr)			*104 %*		*80-120 %*		*"*					
4-Bromofluorobenzene (Surr)			*101 %*		*80-120 %*		*"*					
Matrix Spike (23B0617-MS1)			Prepared: 02/16/23 10:58 Analyzed: 02/16/23 15:38									
QC Source Sample: Non-SDG (A3B0550-04)												
EPA 8260D												
Acetone	38.8	10.0	20.0	ug/L	1	40.0	ND	97	39-160%	---	---	ICV-01
Acrylonitrile	17.9	1.00	2.00	ug/L	1	20.0	ND	89	63-135%	---	---	
Benzene	20.3	0.100	0.200	ug/L	1	20.0	ND	102	79-120%	---	---	
Bromobenzene	18.8	0.250	0.500	ug/L	1	20.0	ND	94	80-120%	---	---	
Bromochloromethane	22.6	0.500	1.00	ug/L	1	20.0	ND	113	78-123%	---	---	
Bromodichloromethane	24.5	0.500	1.00	ug/L	1	20.0	1.11	117	79-125%	---	---	
Bromoform	22.9	0.500	1.00	ug/L	1	20.0	ND	114	66-130%	---	---	
Bromomethane	20.6	5.00	5.00	ug/L	1	20.0	ND	103	53-141%	---	---	Q-54g
2-Butanone (MEK)	40.0	5.00	10.0	ug/L	1	40.0	ND	100	56-143%	---	---	ICV-01
n-Butylbenzene	22.7	0.500	1.00	ug/L	1	20.0	ND	113	75-128%	---	---	
sec-Butylbenzene	22.6	0.500	1.00	ug/L	1	20.0	ND	113	77-126%	---	---	
tert-Butylbenzene	20.0	0.500	1.00	ug/L	1	20.0	ND	100	78-124%	---	---	
Carbon disulfide	23.5	5.00	10.0	ug/L	1	20.0	ND	118	64-133%	---	---	
Carbon tetrachloride	26.5	0.500	1.00	ug/L	1	20.0	ND	132	72-136%	---	---	Q-54f
Chlorobenzene	20.8	0.250	0.500	ug/L	1	20.0	ND	104	80-120%	---	---	
Chloroethane	36.6	5.00	5.00	ug/L	1	20.0	ND	**183**	**60-138%**	---	---	Q-54d
Chloroform	35.9	0.500	1.00	ug/L	1	20.0	12.5	117	79-124%	---	---	
Chloromethane	19.1	2.50	5.00	ug/L	1	20.0	ND	96	50-139%	---	---	

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ANALYTICAL REPORT

Landau Associates	Project: Boeing Portland 85-105 Investigation	
1500 SW First Avenue Suite 1015	Project Number: 025116.123.450	Report ID:
Portland, OR 97201	Project Manager: Erin Waibel	A3B0408 - 05 02 23 1421

QUALITY CONTROL (QC) SAMPLE RESULTS

Volatile Organic Compounds by EPA 8260D

Analyte	Result	Detection L Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 23B0617 - EPA 5030C							**Water**					
Matrix Spike (23B0617-MS1)			Prepared: 02/16/23 10:58 Analyzed: 02/16/23 15:38									
QC Source Sample: Non-SDG (A3B0550-04)												
2-Chlorotoluene	20.2	0.500	1.00	ug/L	1	20.0	ND	101	79-122%	---	---	
4-Chlorotoluene	19.2	0.500	1.00	ug/L	1	20.0	ND	96	78-122%	---	---	
Dibromochloromethane	22.2	0.500	1.00	ug/L	1	20.0	ND	111	74-126%	---	---	
1,2-Dibromo-3-chloropropane	17.8	2.50	5.00	ug/L	1	20.0	ND	89	62-128%	---	---	
1,2-Dibromoethane (EDB)	20.8	0.250	0.500	ug/L	1	20.0	ND	104	77-121%	---	---	
Dibromomethane	21.1	0.500	1.00	ug/L	1	20.0	ND	106	79-123%	---	---	
1,2-Dichlorobenzene	20.7	0.250	0.500	ug/L	1	20.0	ND	104	80-120%	---	---	
1,3-Dichlorobenzene	20.0	0.250	0.500	ug/L	1	20.0	ND	100	80-120%	---	---	
1,4-Dichlorobenzene	19.8	0.250	0.500	ug/L	1	20.0	ND	99	79-120%	---	---	
Dichlorodifluoromethane	29.0	0.500	1.00	ug/L	1	20.0	ND	145	32-152%	---	---	Q-54a
1,1-Dichloroethane	21.8	0.200	0.400	ug/L	1	20.0	ND	109	77-125%	---	---	
1,2-Dichloroethane (EDC)	24.2	0.200	0.400	ug/L	1	20.0	ND	121	73-128%	---	---	
1,1-Dichloroethene	24.5	0.200	0.400	ug/L	1	20.0	ND	122	71-131%	---	---	
cis-1,2-Dichloroethene	20.0	0.200	0.400	ug/L	1	20.0	ND	100	78-123%	---	---	
trans-1,2-Dichloroethene	21.6	0.200	0.400	ug/L	1	20.0	ND	108	75-124%	---	---	
1,2-Dichloropropane	20.0	0.250	0.500	ug/L	1	20.0	ND	100	78-122%	---	---	
1,3-Dichloropropane	20.7	0.500	1.00	ug/L	1	20.0	ND	104	80-120%	---	---	
2,2-Dichloropropane	21.8	0.500	1.00	ug/L	1	20.0	ND	109	60-139%	---	---	
1,1-Dichloropropene	21.4	0.500	1.00	ug/L	1	20.0	ND	107	79-125%	---	---	
cis-1,3-Dichloropropene	19.0	0.500	1.00	ug/L	1	20.0	ND	95	75-124%	---	---	
trans-1,3-Dichloropropene	23.3	0.500	1.00	ug/L	1	20.0	ND	116	73-127%	---	---	
Ethylbenzene	21.7	0.250	0.500	ug/L	1	20.0	ND	108	79-121%	---	---	
Hexachlorobutadiene	19.8	2.50	5.00	ug/L	1	20.0	ND	99	66-134%	---	---	
2-Hexanone	37.1	5.00	10.0	ug/L	1	40.0	ND	93	57-139%	---	---	
Isopropylbenzene	22.2	0.500	1.00	ug/L	1	20.0	ND	111	72-131%	---	---	
4-Isopropyltoluene	21.7	0.500	1.00	ug/L	1	20.0	ND	108	77-127%	---	---	
Methylene chloride	20.0	5.00	10.0	ug/L	1	20.0	ND	100	74-124%	---	---	
4-Methyl-2-pentanone (MiBK)	37.9	5.00	10.0	ug/L	1	40.0	ND	95	67-130%	---	---	
Methyl tert-butyl ether (MTBE)	20.9	0.500	1.00	ug/L	1	20.0	1.72	96	71-124%	---	---	
Naphthalene	17.1	1.00	2.00	ug/L	1	20.0	ND	86	61-128%	---	---	
n-Propylbenzene	21.6	0.250	0.500	ug/L	1	20.0	ND	108	76-126%	---	---	
Styrene	20.7	0.500	1.00	ug/L	1	20.0	ND	104	78-123%	---	---	
1,1,1,2-Tetrachloroethane	20.9	0.200	0.400	ug/L	1	20.0	ND	104	78-124%	---	---	

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ORELAP ID: **OR100062**

Landau Associates	Project: **Boeing Portland 85-105 Investigation**	
1500 SW First Avenue Suite 1015	Project Number: **025116.123.450**	**Report ID:**
Portland, OR 97201	Project Manager: **Erin Waibel**	**A3B0408 - 05 02 23 1421**

QUALITY CONTROL (QC) SAMPLE RESULTS

Volatile Organic Compounds by EPA 8260D

Analyte	Result	Detection L Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 23B0617 - EPA 5030C							**Water**					
Matrix Spike (23B0617-MS1)			Prepared: 02/16/23 10:58 Analyzed: 02/16/23 15:38									
QC Source Sample: Non-SDG (A3B0550-04)												
1,1,2,2-Tetrachloroethane	20.5	0.250	0.500	ug/L	1	20.0	ND	102	71-121%	---	---	
Tetrachloroethene (PCE)	20.1	0.200	0.400	ug/L	1	20.0	ND	101	74-129%	---	---	
Toluene	20.7	0.500	1.00	ug/L	1	20.0	ND	103	80-121%	---	---	
1,2,3-Trichlorobenzene	19.7	1.00	2.00	ug/L	1	20.0	ND	98	69-129%	---	---	
1,2,4-Trichlorobenzene	17.2	1.00	2.00	ug/L	1	20.0	ND	86	69-130%	---	---	
1,1,1-Trichloroethane	24.4	0.200	0.400	ug/L	1	20.0	ND	122	74-131%	---	---	
1,1,2-Trichloroethane	20.3	0.250	0.500	ug/L	1	20.0	ND	102	80-120%	---	---	
Trichloroethene (TCE)	18.4	0.200	0.400	ug/L	1	20.0	ND	92	79-123%	---	---	
Trichlorofluoromethane	29.1	1.00	2.00	ug/L	1	20.0	ND	**146**	**65-141%**	---	---	Q-54c
1,2,3-Trichloropropane	21.3	0.500	1.00	ug/L	1	20.0	ND	106	73-122%	---	---	
1,2,4-Trimethylbenzene	21.4	0.500	1.00	ug/L	1	20.0	ND	107	76-124%	---	---	
1,3,5-Trimethylbenzene	21.1	0.500	1.00	ug/L	1	20.0	ND	106	75-124%	---	---	
Vinyl chloride	24.9	0.200	0.400	ug/L	1	20.0	ND	124	58-137%	---	---	
m,p-Xylene	44.3	0.500	1.00	ug/L	1	40.0	ND	111	80-121%	---	---	
o-Xylene	20.4	0.250	0.500	ug/L	1	20.0	ND	102	78-122%	---	---	
Surr: 1,4-Difluorobenzene (Surr)			*Recovery: 94 %*		*Limits: 80-120 %*			*Dilution: 1x*				
Toluene-d8 (Surr)			*100 %*		*80-120 %*			*"*				
4-Bromofluorobenzene (Surr)			*88 %*		*80-120 %*			*"*				

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ANALYTICAL REPORT

Landau Associates	Project: Boeing Portland 85-105 Investigation	
1500 SW First Avenue Suite 1015	Project Number: 025116.123.450	Report ID:
Portland, OR 97201	Project Manager: Erin Waibel	A3B0408 - 05 02 23 1421

SAMPLE PREPARATION INFORMATION

Diesel and/or Oil Hydrocarbons by NWTPH-Dx

Prep: EPA 3510C (Fuels/Acid Ext.)

Lab Number	Matrix	Method	Sampled	Prepared	Sample Initial/Final	Default Initial/Final	RL Prep Factor
Batch: 23B0762							
A3B0408-06RE1	Water	NWTPH-Dx LL	02/08/23 11:30	02/21/23 06:55	1020mL/2mL	1000mL/2mL	0.98
A3B0408-07	Water	NWTPH-Dx LL	02/08/23 14:35	02/21/23 06:55	980mL/2mL	1000mL/2mL	1.02
A3B0408-08	Water	NWTPH-Dx LL	02/08/23 15:30	02/21/23 06:55	1000mL/2mL	1000mL/2mL	1.00
A3B0408-09	Water	NWTPH-Dx LL	02/09/23 10:35	02/21/23 06:55	850mL/2mL	1000mL/2mL	1.18
A3B0408-10	Water	NWTPH-Dx LL	02/09/23 12:37	02/21/23 06:55	920mL/2mL	1000mL/2mL	1.09
A3B0408-11	Water	NWTPH-Dx LL	02/09/23 15:10	02/21/23 06:55	910mL/2mL	1000mL/2mL	1.10
A3B0408-15	Water	NWTPH-Dx LL	02/08/23 14:12	02/21/23 06:55	950mL/2mL	1000mL/2mL	1.05

Diesel and/or Oil Hydrocarbons by NWTPH-Dx with Silica Gel Column Cleanup

Prep: EPA 3510C (Fuels/Acid Ext.) w/Silica Gel Column

Lab Number	Matrix	Method	Sampled	Prepared	Sample Initial/Final	Default Initial/Final	RL Prep Factor
Batch: 23B0763							
A3B0408-06	Water	NWTPH-Dx/SGC	02/08/23 11:30	02/21/23 06:55	1020mL/2mL	1000mL/2mL	0.98
A3B0408-07	Water	NWTPH-Dx/SGC	02/08/23 14:35	02/21/23 06:55	980mL/2mL	1000mL/2mL	1.02
A3B0408-08	Water	NWTPH-Dx/SGC	02/08/23 15:30	02/21/23 06:55	1000mL/2mL	1000mL/2mL	1.00
A3B0408-09	Water	NWTPH-Dx/SGC	02/09/23 10:35	02/21/23 06:55	1050mL/2mL	1000mL/2mL	0.95
A3B0408-10	Water	NWTPH-Dx/SGC	02/09/23 12:37	02/21/23 06:55	920mL/2mL	1000mL/2mL	1.09
A3B0408-11	Water	NWTPH-Dx/SGC	02/09/23 15:10	02/21/23 06:55	910mL/2mL	1000mL/2mL	1.10
A3B0408-15	Water	NWTPH-Dx/SGC	02/08/23 14:12	02/21/23 06:55	950mL/2mL	1000mL/2mL	1.05

Volatile Organic Compounds by EPA 8260D

Prep: EPA 5030C

Lab Number	Matrix	Method	Sampled	Prepared	Sample Initial/Final	Default Initial/Final	RL Prep Factor
Batch: 23B0509							
A3B0408-12	Water	EPA 8260D	02/09/23 00:00	02/14/23 14:23	5mL/5mL	5mL/5mL	1.00
A3B0408-13	Water	EPA 8260D	02/08/23 00:00	02/14/23 14:23	5mL/5mL	5mL/5mL	1.00
A3B0408-14	Water	EPA 8260D	02/08/23 00:00	02/14/23 14:23	5mL/5mL	5mL/5mL	1.00
Batch: 23B0617							
A3B0408-05RE1	Water	EPA 8260D	02/08/23 11:45	02/16/23 10:58	5mL/5mL	5mL/5mL	1.00
A3B0408-06RE1	Water	EPA 8260D	02/08/23 11:30	02/16/23 10:58	5mL/5mL	5mL/5mL	1.00
A3B0408-07RE1	Water	EPA 8260D	02/08/23 14:35	02/16/23 10:58	5mL/5mL	5mL/5mL	1.00
A3B0408-08RE1	Water	EPA 8260D	02/08/23 15:30	02/16/23 10:58	5mL/5mL	5mL/5mL	1.00
A3B0408-09RE1	Water	EPA 8260D	02/09/23 10:35	02/16/23 10:58	5mL/5mL	5mL/5mL	1.00
A3B0408-10RE1	Water	EPA 8260D	02/09/23 12:37	02/16/23 10:58	5mL/5mL	5mL/5mL	1.00

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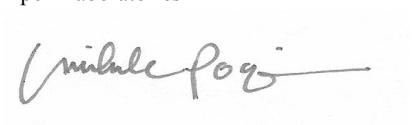

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Michele Poquiz For Kurt Johnson, Senior Chemist

Apex Laboratories, LLC
6700 S.W. Sandburg Street
Tigard, OR 97223
503-718-2323
ORELAP ID: **OR100062**

ANALYTICAL REPORT

Landau Associates	Project: **Boeing Portland 85-105 Investigation**	
1500 SW First Avenue Suite 1015	Project Number: **025116.123.450**	**Report ID:**
Portland, OR 97201	Project Manager: **Erin Waibel**	**A3B0408 - 05 02 23 1421**

SAMPLE PREPARATION INFORMATION

Volatile Organic Compounds by EPA 8260D

Prep: EPA 5030C

Lab Number	Matrix	Method	Sampled	Prepared	Sample Initial/Final	Default Initial/Final	RL Prep Factor
A3B0408-11RE1	Water	EPA 8260D	02/09/23 15:10	02/16/23 10:58	5mL/5mL	5mL/5mL	1.00
A3B0408-15RE1	Water	EPA 8260D	02/08/23 14:12	02/16/23 10:58	5mL/5mL	5mL/5mL	1.00

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QUALIFIER DEFINITIONS

Client Sample and Quality Control (QC) Sample Qualifier Definitions:

Apex Laboratories

E	Estimated Value. The result is above the calibration range of the instrument.
F-13	The chromatographic pattern does not resemble the fuel standard used for quantitation
ICV-01	Estimated Result. Initial Calibration Verification (ICV) failed high. There is no effect on non-detect results.
J	Estimated Result. Result detected below the lowest point of the calibration curve, but above the specified MDL.
Q-01	Spike recovery and/or RPD is outside acceptance limits.
Q-03	Spike recovery and/or RPD is outside control limits due to the high concentration of analyte present in the sample.
Q-19	Blank Spike Duplicate (BSD) sample analyzed in place of Matrix Spike/Duplicate samples due to limited sample amount available for analysis.
Q-54	Daily Continuing Calibration Verification recovery for this analyte failed the +/-20% criteria listed in EPA method 8260/8270 by +1%. The results are reported as Estimated Values.
Q-54a	Daily Continuing Calibration Verification recovery for this analyte failed the +/-20% criteria listed in EPA method 8260/8270 by +11%. The results are reported as Estimated Values.
Q-54b	Daily Continuing Calibration Verification recovery for this analyte failed the +/-20% criteria listed in EPA method 8260/8270 by +17%. The results are reported as Estimated Values.
Q-54c	Daily Continuing Calibration Verification recovery for this analyte failed the +/-20% criteria listed in EPA method 8260/8270 by +21%. The results are reported as Estimated Values.
Q-54d	Daily Continuing Calibration Verification recovery for this analyte failed the +/-20% criteria listed in EPA method 8260/8270 by +51%. The results are reported as Estimated Values.
Q-54e	Daily Continuing Calibration Verification recovery for this analyte failed the +/-20% criteria listed in EPA method 8260/8270 by +55%. The results are reported as Estimated Values.
Q-54f	Daily Continuing Calibration Verification recovery for this analyte failed the +/-20% criteria listed in EPA method 8260/8270 by +8%. The results are reported as Estimated Values.
Q-54g	Daily Continuing Calibration Verification recovery for this analyte failed the +/-20% criteria listed in EPA method 8260/8270 by -14%. The results are reported as Estimated Values.
Q-55	Daily CCV/LCS recovery for this analyte was below the +/-20% criteria listed in EPA 8260, however there is adequate sensitivity to ensure detection at the reporting level.
Q-56	Daily CCV/LCS recovery for this analyte was above the +/-20% criteria listed in EPA 8260
S-05	Surrogate recovery is estimated due to sample dilution required for high analyte concentration and/or matrix interference.
V-01	Sample aliquot taken from VOA vial with headspace (air bubble greater than 6 mm diameter).

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ANALYTICAL REPORT

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1500 SW First Avenue Suite 1015	Project Number: **025116.123.450**	**Report ID:**
Portland, OR 97201	Project Manager: **Erin Waibel**	**A3B0408 - 05 02 23 1421**

REPORTING NOTES AND CONVENTIONS:

Abbreviations:

DET Analyte DETECTED at or above the detection or reporting limit.

ND Analyte NOT DETECTED at or above the detection or reporting limit.

NR Result Not Reported

RPD Relative Percent Difference. RPDs for Matrix Spikes and Matrix Spike Duplicates are based on concentration, not recovery.

Detection Limits: Limit of Detection (LOD)

Limits of Detection (LODs) are normally set at a level of one half the validated Limit of Quantitation (LOQ).
If no value is listed ('-----'), then the data has not been evaluated below the Reporting Limit.

Reporting Limits: Limit of Quantitation (LOQ)

Validated Limits of Quantitation (LOQs) are reported as the Reporting Limits for all analyses where the LOQ, MRL, PQL or CRL are requested. The LOQ represents a level at or above the low point of the calibration curve, that has been validated according to Apex Laboratories' comprehensive LOQ policies and procedures.

Reporting Conventions:

Basis: Results for soil samples are generally reported on a 100% dry weight basis.
The Result Basis is listed following the units as " dry", " wet", or " " (blank) designation.

" dry" Sample results and Reporting Limits are reported on a dry weight basis. (i.e. "ug/kg dry")
See Percent Solids section for details of dry weight analysis.

" wet" Sample results and Reporting Limits for this analysis are normally dry weight corrected, but have not been modified in this case.

" " Results without 'wet' or 'dry' designation are not normally dry weight corrected. These results are considered 'As Received'.

QC Source:

In cases where there is insufficient sample provided for Sample Duplicates and/or Matrix Spikes, a Lab Control Sample Duplicate (LCS Dup) may be analyzed to demonstrate accuracy and precision of the extraction batch.

Non-Client Batch QC Samples (Duplicates and Matrix Spike/Duplicates) may not be included in this report. Please request a Full QC report if this data is required.

Miscellaneous Notes:

" --- " QC results are not applicable. For example, % Recoveries for Blanks and Duplicates, % RPD for Blanks, Blank Spikes and Matrix Spikes, etc.

" *** " Used to indicate a possible discrepancy with the Sample and Sample Duplicate results when the %RPD is not available. In this case, either the Sample or the Sample Duplicate has a reportable result for this analyte, while the other is Non Detect (ND).

Blanks:

Standard practice is to evaluate the results from Blank QC Samples down to a level equal to ½ the Reporting Limit (RL).
-For Blank hits falling between ½ the RL and the RL (J flagged hits), the associated sample and QC data will receive a 'B-02' qualifier.
-For Blank hits above the RL, the associated sample and QC data will receive a 'B' qualifier, per Apex Laboratories' Blank Policy.

Apex Laboratories

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Landau Associates	Project: **Boeing Portland 85-105 Investigation**	
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Portland, OR 97201	Project Manager: **Erin Waibel**	**A3B0408 - 05 02 23 1421**

REPORTING NOTES AND CONVENTIONS (Cont.):

Blanks (Cont.):

Sample results flagged with a 'B' or 'B-02' qualifier are potentially biased high if the sample results are less than ten times the level found in the blank for inorganic analyses, or less than five times the level found in the blank for organic analyses.

'B' and 'B-02' qualifications are only applied to sample results detected above the Reporting Level.

Preparation Notes:

Mixed Matrix Samples:

Water Samples:

Water samples containing significant amounts of sediment are decanted or separated prior to extraction, and only the water portion analyzed, unless otherwise directed by the client.

Soil and Sediment Samples:

Soil and Sediment samples containing significant amounts of water are decanted prior to extraction, and only the solid portion analyzed, unless otherwise directed by the client.

Sampling and Preservation Notes:

Certain regulatory programs, such as National Pollutant Discharge Elimination System (NPDES), require that activities such as sample filtration (for dissolved metals, orthophosphate, hexavalent chromium, etc.) and testing of short hold analytes (pH, Dissolved Oxygen, etc.) be performed in the field (on-site) within a short time window. In addition, sample matrix spikes are required for some analyses, and sufficient volume must be provided, and billable site specific QC requested, if this is required. All regulatory permits should be reviewed to ensure that these requirements are being met.

Data users should be aware of which regulations pertain to the samples they submit for testing. If related sample collection activities are not approved for a particular regulatory program, results should be considered estimates. Apex Laboratories will qualify these analytes according to the most stringent requirements, however results for samples that are for non-regulatory purposes may be acceptable.

Samples that have been filtered and preserved at Apex Laboratories per client request are listed in the preparation section of the report with the date and time of filtration listed.

Apex Laboratories maintains detailed records on sample receipt, including client label verification, cooler temperature, sample preservation, hold time compliance and field filtration. Data is qualified as necessary, and the lack of qualification indicates compliance with required parameters.

Michele Poquiz For Kurt Johnson, Senior Chemist

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ANALYTICAL REPORT

Landau Associates	Project: **Boeing Portland 85-105 Investigation**	
1500 SW First Avenue Suite 1015	Project Number: **025116.123.450**	**Report ID:**
Portland, OR 97201	Project Manager: **Erin Waibel**	**A3B0408 - 05 02 23 1421**

LABORATORY ACCREDITATION INFORMATION

ORELAP Certification ID: OR100062 (Primary Accreditation) - EPA ID: OR01039

All methods and analytes reported from work performed at Apex Laboratories are included on Apex Laboratories' ORELAP Scope of Certification, with the exception of any analyte(s) listed below:

Apex Laboratories

Matrix	Analysis	TNI_ID	Analyte	TNI_ID	Accreditation

All reported analytes are included in Apex Laboratories' current ORELAP scope.

Secondary Accreditations

Apex Laboratories also maintains reciprocal accreditation with non-TNI states (Washington DOE), as well as other state specific accreditations not listed here.

Subcontract Laboratory Accreditations

Subcontracted data falls outside of Apex Laboratories' Scope of Accreditation.
Please see the Subcontract Laboratory report for full details, or contact your Project Manager for more information.

Field Testing Parameters

Results for Field Tested data are provded by the client or sampler, and fall outside of Apex Laboratories' Scope of Accreditation.

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ANALYTICAL REPORT

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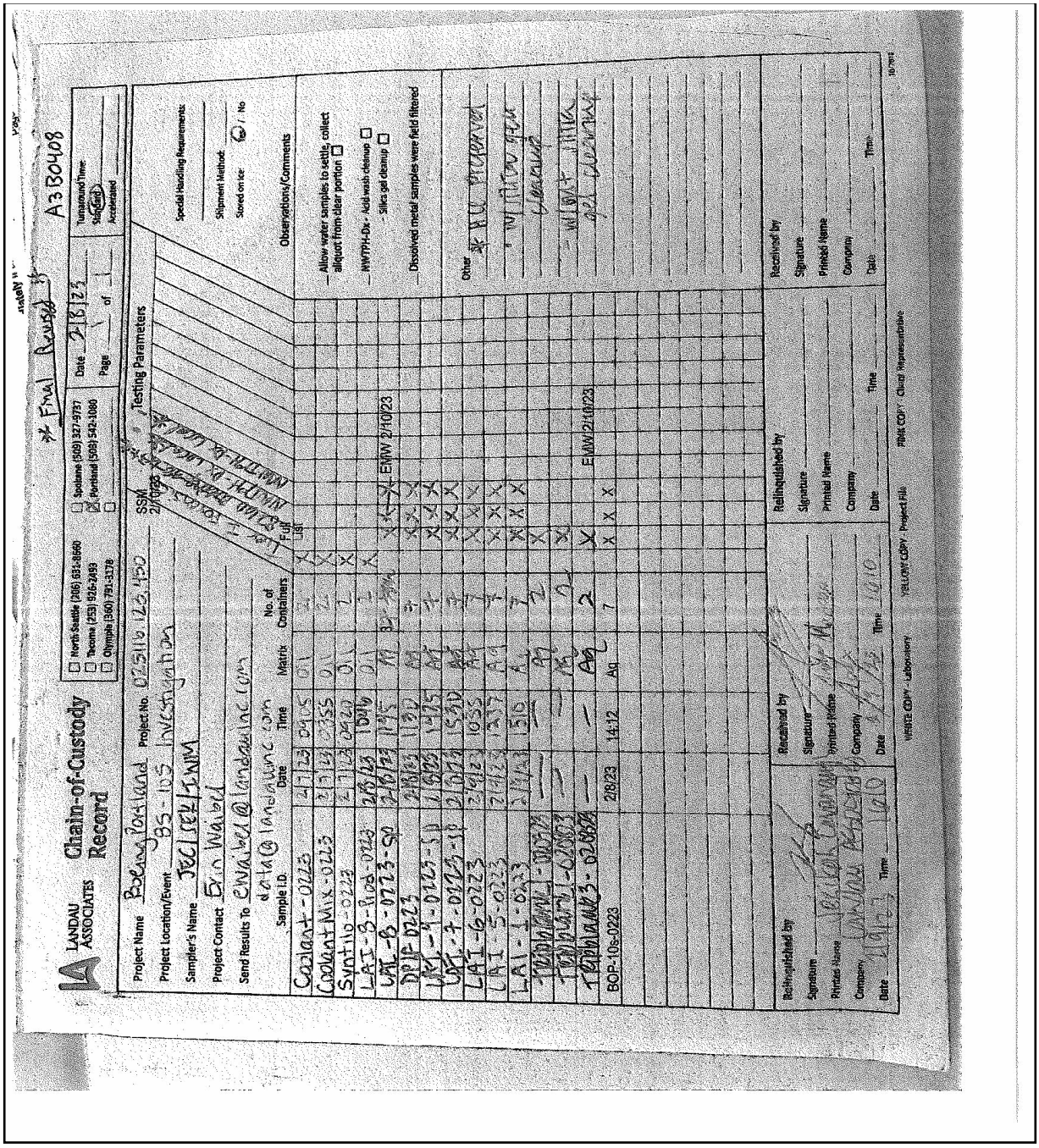

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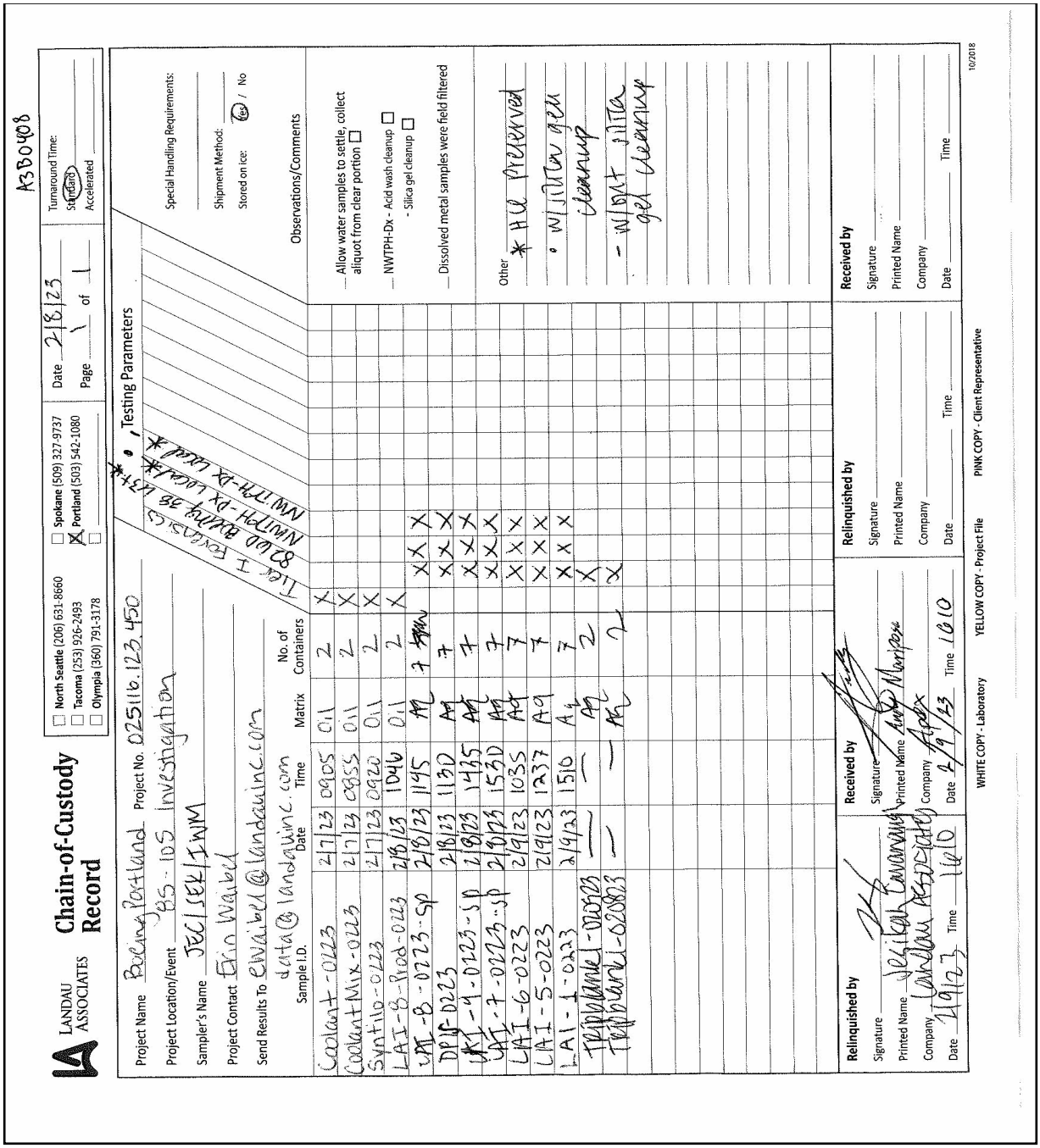

Apex Laboratories

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Portland, OR 97201	Project Manager: **Erin Waibel**	**A3B0408 - 05 02 23 1421**

APEX LABS COOLER RECEIPT FORM

Client: Landau Element WO#: A3B0408

Project/Project #: Boeing Portland #025116.123.450

Delivery Info:

Date/time received: 2/9/23 @ 1610 By: AJM

Delivered by: Apex ✓ Client ESS FedEx UPS Radio Morgan SDS Evergreen Other

Cooler Inspection Date/time inspected: 2/9/23 @ 1830 By: AJM

Chain of Custody included? Yes ✓ No

Signed/dated by client? Yes ✓ No

	Cooler #1	Cooler #2	Cooler #3	Cooler #4	Cooler #5	Cooler #6	Cooler #7
Temperature (°C)	1.5	3.2	1.8				
Custody seals? (Y/N)	N	N	N				
Received on ice? (Y/N)	Y	Y	Y				
Temp. blanks? (Y/N)	Y	Y	Y				
Ice type: (Gel/Real/Other)	Real	Real	Real				
Condition (In/Out):	In	In	In				

Cooler out of temp? (Y/N) Possible reason why:

Green dots applied to out of temperature samples? Yes (No)

Out of temperature samples form initiated? Yes (No)

Sample Inspection: Date/time inspected: 2-10-23 @ 950 By: DJS

All samples intact? Yes ✓ No ___ Comments:

Bottle labels/COCs agree? Yes ___ No ✓ Comments: LAI-1-0223 container ID reads BOP-1-0223. Received 7 ~~samples~~ DJS 2-10-23 containers not on CoC, labeled BOP-105-0223X taken 2/8/23@1412.

COC/container discrepancies form initiated? Yes ___ No ___

Containers/volumes received appropriate for analysis? Yes ✓ No ___ Comments: Coolant + Coolant Mix + Syntilo + LAI-8-Prod Oil matrix listed on COC, but is liquid matrix

Do VOA vials have visible headspace? Yes ✓ No ___ NA ___

Comments LAI-8-0223-SP=3/3 sed, LAI-7-0223 SP=3/3 sed, LAI-6-0223=3/3 sed, LAI-5-0223=3/3 sed.

Water samples: pH checked: Yes ✓ No ___ NA ___ pH appropriate? Yes ✓ No ___ NA ___

Comments:

Additional information: LAI-1-0223=3/3 sed; Trip blank 1-020923=2/2 HS, Trip blank 1-020823=2/2 HS. Trip blank 3-020823=2/2 HS.

Labeled by: DJS Witness: AMW Cooler Inspected by: AMW

Form Y-003 R-00

Apex Laboratories

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Apex Laboratories, LLC
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Tigard, OR 97223
503-718-2323
ORELAP ID: **OR100062**

ANALYTICAL REPORT

AMENDED REPORT

Tuesday, May 2, 2023

Erin Waibel
Landau Associates
1500 SW First Avenue Suite 1015
Portland, OR 97201

RE: A3B0416 - Boeing of Portland - 025116.123.450

Thank you for using Apex Laboratories. We greatly appreciate your business and strive to provide the highest quality services to the environmental industry.

Enclosed are the results of analyses for work order A3B0416, which was received by the laboratory on 2/10/2023 at 5:14:00PM.

If you have any questions concerning this report or the services we offer, please feel free to contact me by email at: mpoquiz@apex-labs.com, or by phone at 503-718-2323.

Please note: All samples will be disposed of within 30 days of sample receipt, unless prior arrangements have been made.

Cooler Receipt Information

(See Cooler Receipt Form for details)

Cooler #1	4.9 degC	Cooler #2	5.1 degC

This Final Report is the official version of the data results for this sample submission, unless superseded by a subsequent, labeled amended report.
All other deliverables derived from this data, including Electronic Data Deliverables (EDDs), CLP-like forms, client requested summary sheets, and all other products are considered secondary to this report.

Apex Laboratories

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ANALYTICAL REPORT

AMENDED REPORT

Landau Associates	Project: **Boeing of Portland**	
1500 SW First Avenue Suite 1015	Project Number: **025116.123.450**	**Report ID:**
Portland, OR 97201	Project Manager: **Erin Waibel**	**A3B0416 - 05 02 23 1432**

ANALYTICAL REPORT FOR SAMPLES

SAMPLE INFORMATION

Client Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
Tripblank1-021023	**A3B0416-01**	**Water**	**02/10/23 00:00**	**02/10/23 17:14**
LAI-2-0223	**A3B0416-02**	**Water**	**02/10/23 09:15**	**02/10/23 17:14**
LAI-3-0223	**A3B0416-03**	**Water**	**02/10/23 11:47**	**02/10/23 17:14**
LAI-8-0223-SP	**A3B0416-04**	**Water**	**02/08/23 11:45**	**02/10/23 17:14**
E-6-0223-SP	**A3B0416-05**	**Water**	**02/10/23 10:30**	**02/10/23 17:14**

Apex Laboratories

Michele Poquiz For Kurt Johnson, Senior Chemist

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ORELAP ID: OR100062

ANALYTICAL REPORT

AMENDED REPORT

Landau Associates	Project: Boeing of Portland	
1500 SW First Avenue Suite 1015	Project Number: 025116.123.450	Report ID:
Portland, OR 97201	Project Manager: Erin Waibel	A3B0416 - 05 02 23 1432

ANALYTICAL CASE NARRATIVE

A3B0416	Apex Laboratories

Amended Report Revision 1:

This report supersedes all previous reports.

NWTPH-Dx Note-

The samples LAI-2-0223 (Apex ID: A3B0416-02), LAI-3 0223 (Apex ID: A3B0416-03), LAI-8-0223- SP (Apex ID: A3B0416-04), and E-6-0223-SP (A3B0416-05) were originally analyzed for diesel and oil hydrocarbons by NWTPH-Dx and NWTPH-Dx with Acid/Silica Gel Cleanup. The results were reported to the analytical reporting limits. The samples have been reanalyzed out of hold for diesel and oil hydrocarbons by NWTPH-Dx Low Level and NWTPH-Dx with Silica Gel Column Cleanup. The results have been reported to the method detection limits.

Michele Poquiz
Forensics Project Manager
3/16/2023

Sample Identification Changes-

The following sample IDs have been edited from the original final report. Three samples were reported as having a prefix of "LA1" was changed to "LAI".

Sample LA1-2-0223 is now reported as LAI-2-0223 (Apex ID: A3B0416-02).
Sample LA1-3-0223 is now reported as LAI-3 0223 (Apex ID: A3B0416-03).
Sample LA1-8-0223-SP is now reported as LAI-8-0223-SP (Apex ID: A3B0416-04).

Darrell Auvil
Client Services Manager
3/14/2023

Apex Laboratories, LLC
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ANALYTICAL REPORT

AMENDED REPORT

Landau Associates	Project: Boeing of Portland	
1500 SW First Avenue Suite 1015	Project Number: 025116.123.450	Report ID:
Portland, OR 97201	Project Manager: Erin Waibel	A3B0416 - 05 02 23 1432

ANALYTICAL SAMPLE RESULTS

Diesel and/or Oil Hydrocarbons by NWTPH-Dx

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
LAI-2-0223 (A3B0416-02)				**Matrix: Water**		**Batch: 23C0314**		**H-02**
Diesel	**81.7**	44.0	87.9	ug/L	1	03/09/23 00:25	NWTPH-Dx LL	**J**
Oil	ND	87.9	176	ug/L	1	03/09/23 00:25	NWTPH-Dx LL	
Surrogate: o-Terphenyl (Surr)		*Recovery: 65 %*		*Limits: 50-150 %*	*1*	*03/09/23 00:25*	*NWTPH-Dx LL*	
LAI-3-0223 (A3B0416-03)				**Matrix: Water**		**Batch: 23C0314**		**H-02**
Diesel	**117**	47.1	94.1	ug/L	1	03/09/23 00:46	NWTPH-Dx LL	**F-13**
Oil	ND	94.1	188	ug/L	1	03/09/23 00:46	NWTPH-Dx LL	
Surrogate: o-Terphenyl (Surr)		*Recovery: 75 %*		*Limits: 50-150 %*	*1*	*03/09/23 00:46*	*NWTPH-Dx LL*	
LAI-8-0223-SP (A3B0416-04RE1)				**Matrix: Water**		**Batch: 23C0314**		**H-02**
Diesel	**152000**	4490	8990	ug/L	100	03/14/23 09:19	NWTPH-Dx LL	**F-13**
Oil	ND	8990	18000	ug/L	100	03/14/23 09:19	NWTPH-Dx LL	
Surrogate: o-Terphenyl (Surr)		*Recovery: %*		*Limits: 50-150 %*	*100*	*03/14/23 09:19*	*NWTPH-Dx LL*	*S-01*
E-6-0223-SP (A3B0416-05RE1)				**Matrix: Water**		**Batch: 23C0314**		**H-02**
Diesel	**501**	38.5	76.9	ug/L	1	03/14/23 08:26	NWTPH-Dx LL	**F-13**
Oil	ND	76.9	154	ug/L	1	03/14/23 08:26	NWTPH-Dx LL	
Surrogate: o-Terphenyl (Surr)		*Recovery: 84 %*		*Limits: 50-150 %*	*1*	*03/14/23 08:26*	*NWTPH-Dx LL*	

Apex Laboratories

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Michele Poquiz For Kurt Johnson, Senior Chemist

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6700 S.W. Sandburg Street
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503-718-2323
ORELAP ID: OR100062

ANALYTICAL REPORT

AMENDED REPORT

Landau Associates	Project: **Boeing of Portland**	
1500 SW First Avenue Suite 1015	Project Number: **025116.123.450**	**Report ID:**
Portland, OR 97201	Project Manager: **Erin Waibel**	**A3B0416 - 05 02 23 1432**

ANALYTICAL SAMPLE RESULTS

Diesel and/or Oil Hydrocarbons by NWTPH-Dx with Silica Gel Column Cleanup

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
LAI-2-0223 (A3B0416-02)				**Matrix: Water**		**Batch: 23C0468**		**H-02**
Diesel	ND	44.0	87.9	ug/L	1	03/14/23 06:38	NWTPH-Dx/SGC	
Oil	ND	87.9	176	ug/L	1	03/14/23 06:38	NWTPH-Dx/SGC	
Surrogate: o-Terphenyl (Surr)		*Recovery: 65 %*		*Limits: 50-150 %*	*1*	*03/14/23 06:38*	*NWTPH-Dx/SGC*	
LAI-3-0223 (A3B0416-03)				**Matrix: Water**		**Batch: 23C0468**		**H-02**
Diesel	ND	47.1	94.1	ug/L	1	03/14/23 06:58	NWTPH-Dx/SGC	
Oil	ND	94.1	188	ug/L	1	03/14/23 06:58	NWTPH-Dx/SGC	
Surrogate: o-Terphenyl (Surr)		*Recovery: 72 %*		*Limits: 50-150 %*	*1*	*03/14/23 06:58*	*NWTPH-Dx/SGC*	
LAI-8-0223-SP (A3B0416-04)				**Matrix: Water**		**Batch: 23C0468**		**H-02**
Diesel	**115000**	4490	8990	ug/L	100	03/14/23 07:38	NWTPH-Dx/SGC	**F-13**
Oil	ND	8990	18000	ug/L	100	03/14/23 07:38	NWTPH-Dx/SGC	
Surrogate: o-Terphenyl (Surr)		*Recovery: %*		*Limits: 50-150 %*	*100*	*03/14/23 07:38*	*NWTPH-Dx/SGC*	*S-01*
E-6-0223-SP (A3B0416-05)				**Matrix: Water**		**Batch: 23C0468**		**H-02**
Diesel	ND	38.5	76.9	ug/L	1	03/14/23 07:18	NWTPH-Dx/SGC	
Oil	ND	76.9	154	ug/L	1	03/14/23 07:18	NWTPH-Dx/SGC	
Surrogate: o-Terphenyl (Surr)		*Recovery: 76 %*		*Limits: 50-150 %*	*1*	*03/14/23 07:18*	*NWTPH-Dx/SGC*	

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Michele Poquiz For Kurt Johnson, Senior Chemist

Apex Laboratories, LLC
6700 S.W. Sandburg Street
Tigard, OR 97223
503-718-2323
ORELAP ID: OR100062

ANALYTICAL REPORT

AMENDED REPORT

Landau Associates	Project: Boeing of Portland	
1500 SW First Avenue Suite 1015	Project Number: 025116.123.450	Report ID:
Portland, OR 97201	Project Manager: Erin Waibel	A3B0416 - 05 02 23 1432

ANALYTICAL SAMPLE RESULTS

Volatile Organic Compounds by EPA 8260D

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
Tripblank1-021023 (A3B0416-01)				**Matrix: Water**		**Batch: 23B0659**		
Acetone	ND	10.0	20.0	ug/L	1	02/17/23 13:42	EPA 8260D	
Acrylonitrile	ND	1.00	2.00	ug/L	1	02/17/23 13:42	EPA 8260D	
Benzene	ND	0.100	0.200	ug/L	1	02/17/23 13:42	EPA 8260D	
Bromobenzene	ND	0.250	0.500	ug/L	1	02/17/23 13:42	EPA 8260D	
Bromochloromethane	ND	0.500	1.00	ug/L	1	02/17/23 13:42	EPA 8260D	
Bromodichloromethane	ND	0.500	1.00	ug/L	1	02/17/23 13:42	EPA 8260D	
Bromoform	ND	0.500	1.00	ug/L	1	02/17/23 13:42	EPA 8260D	
Bromomethane	ND	5.00	5.00	ug/L	1	02/17/23 13:42	EPA 8260D	
2-Butanone (MEK)	ND	5.00	10.0	ug/L	1	02/17/23 13:42	EPA 8260D	
n-Butylbenzene	ND	0.500	1.00	ug/L	1	02/17/23 13:42	EPA 8260D	
sec-Butylbenzene	ND	0.500	1.00	ug/L	1	02/17/23 13:42	EPA 8260D	
tert-Butylbenzene	ND	0.500	1.00	ug/L	1	02/17/23 13:42	EPA 8260D	
Carbon disulfide	ND	5.00	10.0	ug/L	1	02/17/23 13:42	EPA 8260D	
Carbon tetrachloride	ND	0.500	1.00	ug/L	1	02/17/23 13:42	EPA 8260D	
Chlorobenzene	ND	0.250	0.500	ug/L	1	02/17/23 13:42	EPA 8260D	
Chloroethane	ND	5.00	5.00	ug/L	1	02/17/23 13:42	EPA 8260D	
Chloroform	ND	0.500	1.00	ug/L	1	02/17/23 13:42	EPA 8260D	
Chloromethane	ND	2.50	5.00	ug/L	1	02/17/23 13:42	EPA 8260D	
2-Chlorotoluene	ND	0.500	1.00	ug/L	1	02/17/23 13:42	EPA 8260D	
4-Chlorotoluene	ND	0.500	1.00	ug/L	1	02/17/23 13:42	EPA 8260D	
Dibromochloromethane	ND	0.500	1.00	ug/L	1	02/17/23 13:42	EPA 8260D	
1,2-Dibromo-3-chloropropane	ND	2.50	5.00	ug/L	1	02/17/23 13:42	EPA 8260D	
1,2-Dibromoethane (EDB)	ND	0.250	0.500	ug/L	1	02/17/23 13:42	EPA 8260D	
Dibromomethane	ND	0.500	1.00	ug/L	1	02/17/23 13:42	EPA 8260D	
1,2-Dichlorobenzene	ND	0.250	0.500	ug/L	1	02/17/23 13:42	EPA 8260D	
1,3-Dichlorobenzene	ND	0.250	0.500	ug/L	1	02/17/23 13:42	EPA 8260D	
1,4-Dichlorobenzene	ND	0.250	0.500	ug/L	1	02/17/23 13:42	EPA 8260D	
Dichlorodifluoromethane	ND	0.500	1.00	ug/L	1	02/17/23 13:42	EPA 8260D	
1,1-Dichloroethane	ND	0.200	0.400	ug/L	1	02/17/23 13:42	EPA 8260D	
1,2-Dichloroethane (EDC)	ND	0.200	0.400	ug/L	1	02/17/23 13:42	EPA 8260D	
1,1-Dichloroethene	ND	0.200	0.400	ug/L	1	02/17/23 13:42	EPA 8260D	
cis-1,2-Dichloroethene	ND	0.200	0.400	ug/L	1	02/17/23 13:42	EPA 8260D	
trans-1,2-Dichloroethene	ND	0.200	0.400	ug/L	1	02/17/23 13:42	EPA 8260D	

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Michele Poquiz For Kurt Johnson, Senior Chemist

APEX LABORATORIES

Apex Laboratories, LLC
6700 S.W. Sandburg Street
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ORELAP ID: **OR100062**

ANALYTICAL REPORT

AMENDED REPORT

Landau Associates
1500 SW First Avenue Suite 1015
Portland, OR 97201

Project: **Boeing of Portland**
Project Number: **025116.123.450**
Project Manager: **Erin Waibel**

Report ID:
A3B0416 - 05 02 23 1432

ANALYTICAL SAMPLE RESULTS

Volatile Organic Compounds by EPA 8260D

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
Tripblank1-021023 (A3B0416-01)				**Matrix: Water**		**Batch: 23B0659**		
1,2-Dichloropropane	ND	0.250	0.500	ug/L	1	02/17/23 13:42	EPA 8260D	
1,3-Dichloropropane	ND	0.500	1.00	ug/L	1	02/17/23 13:42	EPA 8260D	
2,2-Dichloropropane	ND	0.500	1.00	ug/L	1	02/17/23 13:42	EPA 8260D	
1,1-Dichloropropene	ND	0.500	1.00	ug/L	1	02/17/23 13:42	EPA 8260D	
cis-1,3-Dichloropropene	ND	0.500	1.00	ug/L	1	02/17/23 13:42	EPA 8260D	
trans-1,3-Dichloropropene	ND	0.500	1.00	ug/L	1	02/17/23 13:42	EPA 8260D	
Ethylbenzene	ND	0.250	0.500	ug/L	1	02/17/23 13:42	EPA 8260D	
Hexachlorobutadiene	ND	2.50	5.00	ug/L	1	02/17/23 13:42	EPA 8260D	
2-Hexanone	ND	5.00	10.0	ug/L	1	02/17/23 13:42	EPA 8260D	
Isopropylbenzene	ND	0.500	1.00	ug/L	1	02/17/23 13:42	EPA 8260D	
4-Isopropyltoluene	ND	0.500	1.00	ug/L	1	02/17/23 13:42	EPA 8260D	
Methylene chloride	ND	5.00	10.0	ug/L	1	02/17/23 13:42	EPA 8260D	
4-Methyl-2-pentanone (MiBK)	ND	5.00	10.0	ug/L	1	02/17/23 13:42	EPA 8260D	
Methyl tert-butyl ether (MTBE)	ND	0.500	1.00	ug/L	1	02/17/23 13:42	EPA 8260D	
Naphthalene	ND	1.00	2.00	ug/L	1	02/17/23 13:42	EPA 8260D	
n-Propylbenzene	ND	0.250	0.500	ug/L	1	02/17/23 13:42	EPA 8260D	
Styrene	ND	0.500	1.00	ug/L	1	02/17/23 13:42	EPA 8260D	
1,1,1,2-Tetrachloroethane	ND	0.200	0.400	ug/L	1	02/17/23 13:42	EPA 8260D	
1,1,2,2-Tetrachloroethane	ND	0.250	0.500	ug/L	1	02/17/23 13:42	EPA 8260D	
Tetrachloroethene (PCE)	ND	0.200	0.400	ug/L	1	02/17/23 13:42	EPA 8260D	
Toluene	ND	0.500	1.00	ug/L	1	02/17/23 13:42	EPA 8260D	
1,2,3-Trichlorobenzene	ND	1.00	2.00	ug/L	1	02/17/23 13:42	EPA 8260D	
1,2,4-Trichlorobenzene	ND	1.00	2.00	ug/L	1	02/17/23 13:42	EPA 8260D	
1,1,1-Trichloroethane	ND	0.200	0.400	ug/L	1	02/17/23 13:42	EPA 8260D	
1,1,2-Trichloroethane	ND	0.250	0.500	ug/L	1	02/17/23 13:42	EPA 8260D	
Trichloroethene (TCE)	ND	0.200	0.400	ug/L	1	02/17/23 13:42	EPA 8260D	
Trichlorofluoromethane	ND	1.00	2.00	ug/L	1	02/17/23 13:42	EPA 8260D	
1,2,3-Trichloropropane	ND	0.500	1.00	ug/L	1	02/17/23 13:42	EPA 8260D	
1,2,4-Trimethylbenzene	ND	0.500	1.00	ug/L	1	02/17/23 13:42	EPA 8260D	
1,3,5-Trimethylbenzene	ND	0.500	1.00	ug/L	1	02/17/23 13:42	EPA 8260D	
Vinyl chloride	ND	0.200	0.400	ug/L	1	02/17/23 13:42	EPA 8260D	
m,p-Xylene	ND	0.500	1.00	ug/L	1	02/17/23 13:42	EPA 8260D	
o-Xylene	ND	0.250	0.500	ug/L	1	02/17/23 13:42	EPA 8260D	

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Michele Poquiz For Kurt Johnson, Senior Chemist

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Tigard, OR 97223
503-718-2323
ORELAP ID: OR100062

ANALYTICAL REPORT

AMENDED REPORT

Landau Associates	Project: **Boeing of Portland**	
1500 SW First Avenue Suite 1015	Project Number: **025116.123.450**	**Report ID:**
Portland, OR 97201	Project Manager: **Erin Waibel**	**A3B0416 - 05 02 23 1432**

ANALYTICAL SAMPLE RESULTS

Volatile Organic Compounds by EPA 8260D

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
Tripblank1-021023 (A3B0416-01)				**Matrix: Water**		**Batch: 23B0659**		
Surrogate: 1,4-Difluorobenzene (Surr)			*Recovery: 93 %*	*Limits: 80-120 %*	*1*	*02/17/23 13:42*	*EPA 8260D*	
Toluene-d8 (Surr)			*104 %*	*80-120 %*	*1*	*02/17/23 13:42*	*EPA 8260D*	
4-Bromofluorobenzene (Surr)			*99 %*	*80-120 %*	*1*	*02/17/23 13:42*	*EPA 8260D*	
LAI-2-0223 (A3B0416-02RE1)				**Matrix: Water**		**Batch: 23B0617**		
Acetone	ND	10.0	20.0	ug/L	1	02/16/23 19:20	EPA 8260D	
Acrylonitrile	ND	1.00	2.00	ug/L	1	02/16/23 19:20	EPA 8260D	
Benzene	ND	0.100	0.200	ug/L	1	02/16/23 19:20	EPA 8260D	
Bromobenzene	ND	0.250	0.500	ug/L	1	02/16/23 19:20	EPA 8260D	
Bromochloromethane	ND	0.500	1.00	ug/L	1	02/16/23 19:20	EPA 8260D	
Bromodichloromethane	ND	0.500	1.00	ug/L	1	02/16/23 19:20	EPA 8260D	
Bromoform	ND	0.500	1.00	ug/L	1	02/16/23 19:20	EPA 8260D	
Bromomethane	ND	5.00	5.00	ug/L	1	02/16/23 19:20	EPA 8260D	
2-Butanone (MEK)	ND	5.00	10.0	ug/L	1	02/16/23 19:20	EPA 8260D	
n-Butylbenzene	ND	0.500	1.00	ug/L	1	02/16/23 19:20	EPA 8260D	
sec-Butylbenzene	ND	0.500	1.00	ug/L	1	02/16/23 19:20	EPA 8260D	
tert-Butylbenzene	ND	0.500	1.00	ug/L	1	02/16/23 19:20	EPA 8260D	
Carbon disulfide	ND	5.00	10.0	ug/L	1	02/16/23 19:20	EPA 8260D	
Carbon tetrachloride	ND	0.500	1.00	ug/L	1	02/16/23 19:20	EPA 8260D	
Chlorobenzene	ND	0.250	0.500	ug/L	1	02/16/23 19:20	EPA 8260D	
Chloroethane	ND	5.00	5.00	ug/L	1	02/16/23 19:20	EPA 8260D	
Chloroform	ND	0.500	1.00	ug/L	1	02/16/23 19:20	EPA 8260D	
Chloromethane	ND	2.50	5.00	ug/L	1	02/16/23 19:20	EPA 8260D	
2-Chlorotoluene	ND	0.500	1.00	ug/L	1	02/16/23 19:20	EPA 8260D	
4-Chlorotoluene	ND	0.500	1.00	ug/L	1	02/16/23 19:20	EPA 8260D	
Dibromochloromethane	ND	0.500	1.00	ug/L	1	02/16/23 19:20	EPA 8260D	
1,2-Dibromo-3-chloropropane	ND	2.50	5.00	ug/L	1	02/16/23 19:20	EPA 8260D	
1,2-Dibromoethane (EDB)	ND	0.250	0.500	ug/L	1	02/16/23 19:20	EPA 8260D	
Dibromomethane	ND	0.500	1.00	ug/L	1	02/16/23 19:20	EPA 8260D	
1,2-Dichlorobenzene	ND	0.250	0.500	ug/L	1	02/16/23 19:20	EPA 8260D	
1,3-Dichlorobenzene	ND	0.250	0.500	ug/L	1	02/16/23 19:20	EPA 8260D	
1,4-Dichlorobenzene	ND	0.250	0.500	ug/L	1	02/16/23 19:20	EPA 8260D	
Dichlorodifluoromethane	ND	0.500	1.00	ug/L	1	02/16/23 19:20	EPA 8260D	
1,1-Dichloroethane	ND	0.200	0.400	ug/L	1	02/16/23 19:20	EPA 8260D	

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Michele Poquiz For Kurt Johnson, Senior Chemist

Apex Laboratories, LLC

6700 S.W. Sandburg Street
Tigard, OR 97223
503-718-2323
ORELAP ID: **OR100062**

Landau Associates	Project: **Boeing of Portland**	
1500 SW First Avenue Suite 1015	Project Number: **025116.123.450**	**Report ID:**
Portland, OR 97201	Project Manager: **Erin Waibel**	**A3B0416 - 05 02 23 1432**

ANALYTICAL SAMPLE RESULTS

Volatile Organic Compounds by EPA 8260D

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
LAI-2-0223 (A3B0416-02RE1)				**Matrix: Water**		**Batch: 23B0617**		
1,2-Dichloroethane (EDC)	ND	0.200	0.400	ug/L	1	02/16/23 19:20	EPA 8260D	
1,1-Dichloroethene	ND	0.200	0.400	ug/L	1	02/16/23 19:20	EPA 8260D	
cis-1,2-Dichloroethene	ND	0.200	0.400	ug/L	1	02/16/23 19:20	EPA 8260D	
trans-1,2-Dichloroethene	ND	0.200	0.400	ug/L	1	02/16/23 19:20	EPA 8260D	
1,2-Dichloropropane	ND	0.250	0.500	ug/L	1	02/16/23 19:20	EPA 8260D	
1,3-Dichloropropane	ND	0.500	1.00	ug/L	1	02/16/23 19:20	EPA 8260D	
2,2-Dichloropropane	ND	0.500	1.00	ug/L	1	02/16/23 19:20	EPA 8260D	
1,1-Dichloropropene	ND	0.500	1.00	ug/L	1	02/16/23 19:20	EPA 8260D	
cis-1,3-Dichloropropene	ND	0.500	1.00	ug/L	1	02/16/23 19:20	EPA 8260D	
trans-1,3-Dichloropropene	ND	0.500	1.00	ug/L	1	02/16/23 19:20	EPA 8260D	
Ethylbenzene	ND	0.250	0.500	ug/L	1	02/16/23 19:20	EPA 8260D	
Hexachlorobutadiene	ND	2.50	5.00	ug/L	1	02/16/23 19:20	EPA 8260D	
2-Hexanone	ND	5.00	10.0	ug/L	1	02/16/23 19:20	EPA 8260D	
Isopropylbenzene	ND	0.500	1.00	ug/L	1	02/16/23 19:20	EPA 8260D	
4-Isopropyltoluene	ND	0.500	1.00	ug/L	1	02/16/23 19:20	EPA 8260D	
Methylene chloride	ND	5.00	10.0	ug/L	1	02/16/23 19:20	EPA 8260D	
4-Methyl-2-pentanone (MiBK)	ND	5.00	10.0	ug/L	1	02/16/23 19:20	EPA 8260D	
Methyl tert-butyl ether (MTBE)	ND	0.500	1.00	ug/L	1	02/16/23 19:20	EPA 8260D	
Naphthalene	ND	1.00	2.00	ug/L	1	02/16/23 19:20	EPA 8260D	
n-Propylbenzene	ND	0.250	0.500	ug/L	1	02/16/23 19:20	EPA 8260D	
Styrene	ND	0.500	1.00	ug/L	1	02/16/23 19:20	EPA 8260D	
1,1,1,2-Tetrachloroethane	ND	0.200	0.400	ug/L	1	02/16/23 19:20	EPA 8260D	
1,1,2,2-Tetrachloroethane	ND	0.250	0.500	ug/L	1	02/16/23 19:20	EPA 8260D	
Tetrachloroethene (PCE)	**0.960**	0.200	0.400	ug/L	1	02/16/23 19:20	EPA 8260D	
Toluene	ND	0.500	1.00	ug/L	1	02/16/23 19:20	EPA 8260D	
1,2,3-Trichlorobenzene	ND	1.00	2.00	ug/L	1	02/16/23 19:20	EPA 8260D	
1,2,4-Trichlorobenzene	ND	1.00	2.00	ug/L	1	02/16/23 19:20	EPA 8260D	
1,1,1-Trichloroethane	ND	0.200	0.400	ug/L	1	02/16/23 19:20	EPA 8260D	
1,1,2-Trichloroethane	ND	0.250	0.500	ug/L	1	02/16/23 19:20	EPA 8260D	
Trichloroethene (TCE)	ND	0.200	0.400	ug/L	1	02/16/23 19:20	EPA 8260D	
Trichlorofluoromethane	ND	1.00	2.00	ug/L	1	02/16/23 19:20	EPA 8260D	
1,2,3-Trichloropropane	ND	0.500	1.00	ug/L	1	02/16/23 19:20	EPA 8260D	
1,2,4-Trimethylbenzene	ND	0.500	1.00	ug/L	1	02/16/23 19:20	EPA 8260D	

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Michele Poquiz For Kurt Johnson, Senior Chemist

Apex Laboratories, LLC
6700 S.W. Sandburg Street
Tigard, OR 97223
503-718-2323
ORELAP ID: OR100062

ANALYTICAL REPORT

AMENDED REPORT

Landau Associates	Project: **Boeing of Portland**	
1500 SW First Avenue Suite 1015	Project Number: **025116.123.450**	**Report ID:**
Portland, OR 97201	Project Manager: **Erin Waibel**	**A3B0416 - 05 02 23 1432**

ANALYTICAL SAMPLE RESULTS

Volatile Organic Compounds by EPA 8260D

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
LAI-2-0223 (A3B0416-02RE1)				**Matrix: Water**		**Batch: 23B0617**		
1,3,5-Trimethylbenzene	ND	0.500	1.00	ug/L	1	02/16/23 19:20	EPA 8260D	
Vinyl chloride	ND	0.200	0.400	ug/L	1	02/16/23 19:20	EPA 8260D	
m,p-Xylene	ND	0.500	1.00	ug/L	1	02/16/23 19:20	EPA 8260D	
o-Xylene	ND	0.250	0.500	ug/L	1	02/16/23 19:20	EPA 8260D	
Surrogate: 1,4-Difluorobenzene (Surr)		*Recovery:*	*95 %*	*Limits:*	*80-120 %*	*1*	*02/16/23 19:20*	*EPA 8260D*
Toluene-d8 (Surr)			*103 %*		*80-120 %*	*1*	*02/16/23 19:20*	*EPA 8260D*
4-Bromofluorobenzene (Surr)			*102 %*		*80-120 %*	*1*	*02/16/23 19:20*	*EPA 8260D*
LAI-3-0223 (A3B0416-03RE1)				**Matrix: Water**		**Batch: 23B0617**		
Acetone	ND	10.0	20.0	ug/L	1	02/16/23 19:42	EPA 8260D	
Acrylonitrile	ND	1.00	2.00	ug/L	1	02/16/23 19:42	EPA 8260D	
Benzene	ND	0.100	0.200	ug/L	1	02/16/23 19:42	EPA 8260D	
Bromobenzene	ND	0.250	0.500	ug/L	1	02/16/23 19:42	EPA 8260D	
Bromochloromethane	ND	0.500	1.00	ug/L	1	02/16/23 19:42	EPA 8260D	
Bromodichloromethane	ND	0.500	1.00	ug/L	1	02/16/23 19:42	EPA 8260D	
Bromoform	ND	0.500	1.00	ug/L	1	02/16/23 19:42	EPA 8260D	
Bromomethane	ND	5.00	5.00	ug/L	1	02/16/23 19:42	EPA 8260D	
2-Butanone (MEK)	ND	5.00	10.0	ug/L	1	02/16/23 19:42	EPA 8260D	
n-Butylbenzene	ND	0.500	1.00	ug/L	1	02/16/23 19:42	EPA 8260D	
sec-Butylbenzene	ND	0.500	1.00	ug/L	1	02/16/23 19:42	EPA 8260D	
tert-Butylbenzene	ND	0.500	1.00	ug/L	1	02/16/23 19:42	EPA 8260D	
Carbon disulfide	ND	5.00	10.0	ug/L	1	02/16/23 19:42	EPA 8260D	
Carbon tetrachloride	ND	0.500	1.00	ug/L	1	02/16/23 19:42	EPA 8260D	
Chlorobenzene	ND	0.250	0.500	ug/L	1	02/16/23 19:42	EPA 8260D	
Chloroethane	ND	5.00	5.00	ug/L	1	02/16/23 19:42	EPA 8260D	
Chloroform	ND	0.500	1.00	ug/L	1	02/16/23 19:42	EPA 8260D	
Chloromethane	ND	2.50	5.00	ug/L	1	02/16/23 19:42	EPA 8260D	
2-Chlorotoluene	ND	0.500	1.00	ug/L	1	02/16/23 19:42	EPA 8260D	
4-Chlorotoluene	ND	0.500	1.00	ug/L	1	02/16/23 19:42	EPA 8260D	
Dibromochloromethane	ND	0.500	1.00	ug/L	1	02/16/23 19:42	EPA 8260D	
1,2-Dibromo-3-chloropropane	ND	2.50	5.00	ug/L	1	02/16/23 19:42	EPA 8260D	
1,2-Dibromoethane (EDB)	ND	0.250	0.500	ug/L	1	02/16/23 19:42	EPA 8260D	
Dibromomethane	ND	0.500	1.00	ug/L	1	02/16/23 19:42	EPA 8260D	
1,2-Dichlorobenzene	ND	0.250	0.500	ug/L	1	02/16/23 19:42	EPA 8260D	

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Michele Poquiz For Kurt Johnson, Senior Chemist

APEX LABORATORIES

Apex Laboratories, LLC
6700 S.W. Sandburg Street
Tigard, OR 97223
503-718-2323
ORELAP ID: **OR100062**

ANALYTICAL REPORT

AMENDED REPORT

Landau Associates
1500 SW First Avenue Suite 1015
Portland, OR 97201

Project: **Boeing of Portland**
Project Number: **025116.123.450**
Project Manager: **Erin Waibel**

Report ID:
A3B0416 - 05 02 23 1432

ANALYTICAL SAMPLE RESULTS

Volatile Organic Compounds by EPA 8260D

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
LAI-3-0223 (A3B0416-03RE1)				**Matrix: Water**		**Batch: 23B0617**		
1,3-Dichlorobenzene	ND	0.250	0.500	ug/L	1	02/16/23 19:42	EPA 8260D	
1,4-Dichlorobenzene	ND	0.250	0.500	ug/L	1	02/16/23 19:42	EPA 8260D	
Dichlorodifluoromethane	ND	0.500	1.00	ug/L	1	02/16/23 19:42	EPA 8260D	
1,1-Dichloroethane	ND	0.200	0.400	ug/L	1	02/16/23 19:42	EPA 8260D	
1,2-Dichloroethane (EDC)	ND	0.200	0.400	ug/L	1	02/16/23 19:42	EPA 8260D	
1,1-Dichloroethene	ND	0.200	0.400	ug/L	1	02/16/23 19:42	EPA 8260D	
cis-1,2-Dichloroethene	ND	0.200	0.400	ug/L	1	02/16/23 19:42	EPA 8260D	
trans-1,2-Dichloroethene	ND	0.200	0.400	ug/L	1	02/16/23 19:42	EPA 8260D	
1,2-Dichloropropane	ND	0.250	0.500	ug/L	1	02/16/23 19:42	EPA 8260D	
1,3-Dichloropropane	ND	0.500	1.00	ug/L	1	02/16/23 19:42	EPA 8260D	
2,2-Dichloropropane	ND	0.500	1.00	ug/L	1	02/16/23 19:42	EPA 8260D	
1,1-Dichloropropene	ND	0.500	1.00	ug/L	1	02/16/23 19:42	EPA 8260D	
cis-1,3-Dichloropropene	ND	0.500	1.00	ug/L	1	02/16/23 19:42	EPA 8260D	
trans-1,3-Dichloropropene	ND	0.500	1.00	ug/L	1	02/16/23 19:42	EPA 8260D	
Ethylbenzene	ND	0.250	0.500	ug/L	1	02/16/23 19:42	EPA 8260D	
Hexachlorobutadiene	ND	2.50	5.00	ug/L	1	02/16/23 19:42	EPA 8260D	
2-Hexanone	ND	5.00	10.0	ug/L	1	02/16/23 19:42	EPA 8260D	
Isopropylbenzene	ND	0.500	1.00	ug/L	1	02/16/23 19:42	EPA 8260D	
4-Isopropyltoluene	ND	0.500	1.00	ug/L	1	02/16/23 19:42	EPA 8260D	
Methylene chloride	ND	5.00	10.0	ug/L	1	02/16/23 19:42	EPA 8260D	
4-Methyl-2-pentanone (MiBK)	ND	5.00	10.0	ug/L	1	02/16/23 19:42	EPA 8260D	
Methyl tert-butyl ether (MTBE)	ND	0.500	1.00	ug/L	1	02/16/23 19:42	EPA 8260D	
Naphthalene	ND	1.00	2.00	ug/L	1	02/16/23 19:42	EPA 8260D	
n-Propylbenzene	ND	0.250	0.500	ug/L	1	02/16/23 19:42	EPA 8260D	
Styrene	ND	0.500	1.00	ug/L	1	02/16/23 19:42	EPA 8260D	
1,1,1,2-Tetrachloroethane	ND	0.200	0.400	ug/L	1	02/16/23 19:42	EPA 8260D	
1,1,2,2-Tetrachloroethane	ND	0.250	0.500	ug/L	1	02/16/23 19:42	EPA 8260D	
Tetrachloroethene (PCE)	**0.210**	0.200	0.400	ug/L	1	02/16/23 19:42	EPA 8260D	**J**
Toluene	ND	0.500	1.00	ug/L	1	02/16/23 19:42	EPA 8260D	
1,2,3-Trichlorobenzene	ND	1.00	2.00	ug/L	1	02/16/23 19:42	EPA 8260D	
1,2,4-Trichlorobenzene	ND	1.00	2.00	ug/L	1	02/16/23 19:42	EPA 8260D	
1,1,1-Trichloroethane	ND	0.200	0.400	ug/L	1	02/16/23 19:42	EPA 8260D	
1,1,2-Trichloroethane	ND	0.250	0.500	ug/L	1	02/16/23 19:42	EPA 8260D	

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Michele Poquiz For Kurt Johnson, Senior Chemist

Apex Laboratories, LLC
6700 S.W. Sandburg Street
Tigard, OR 97223
503-718-2323
ORELAP ID: OR100062

ANALYTICAL REPORT

AMENDED REPORT

Landau Associates	Project: **Boeing of Portland**	
1500 SW First Avenue Suite 1015	Project Number: **025116.123.450**	**Report ID:**
Portland, OR 97201	Project Manager: **Erin Waibel**	**A3B0416 - 05 02 23 1432**

ANALYTICAL SAMPLE RESULTS

Volatile Organic Compounds by EPA 8260D

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
LAI-3-0223 (A3B0416-03RE1)				**Matrix: Water**		**Batch: 23B0617**		
Trichloroethene (TCE)	ND	0.200	0.400	ug/L	1	02/16/23 19:42	EPA 8260D	
Trichlorofluoromethane	ND	1.00	2.00	ug/L	1	02/16/23 19:42	EPA 8260D	
1,2,3-Trichloropropane	ND	0.500	1.00	ug/L	1	02/16/23 19:42	EPA 8260D	
1,2,4-Trimethylbenzene	ND	0.500	1.00	ug/L	1	02/16/23 19:42	EPA 8260D	
1,3,5-Trimethylbenzene	ND	0.500	1.00	ug/L	1	02/16/23 19:42	EPA 8260D	
Vinyl chloride	ND	0.200	0.400	ug/L	1	02/16/23 19:42	EPA 8260D	
m,p-Xylene	ND	0.500	1.00	ug/L	1	02/16/23 19:42	EPA 8260D	
o-Xylene	ND	0.250	0.500	ug/L	1	02/16/23 19:42	EPA 8260D	
Surrogate: 1,4-Difluorobenzene (Surr)		*Recovery:*	*96 %*	*Limits: 80-120 %*	*1*	*02/16/23 19:42*	*EPA 8260D*	
Toluene-d8 (Surr)			*104 %*	*80-120 %*	*1*	*02/16/23 19:42*	*EPA 8260D*	
4-Bromofluorobenzene (Surr)			*95 %*	*80-120 %*	*1*	*02/16/23 19:42*	*EPA 8260D*	
E-6-0223-SP (A3B0416-05RE1)				**Matrix: Water**		**Batch: 23B0617**		
Acetone	**77.0**	10.0	20.0	ug/L	1	02/16/23 20:04	EPA 8260D	**ICV-01**
Acrylonitrile	ND	1.00	2.00	ug/L	1	02/16/23 20:04	EPA 8260D	
Benzene	ND	0.100	0.200	ug/L	1	02/16/23 20:04	EPA 8260D	
Bromobenzene	ND	0.250	0.500	ug/L	1	02/16/23 20:04	EPA 8260D	
Bromochloromethane	ND	0.500	1.00	ug/L	1	02/16/23 20:04	EPA 8260D	
Bromodichloromethane	ND	0.500	1.00	ug/L	1	02/16/23 20:04	EPA 8260D	
Bromoform	ND	0.500	1.00	ug/L	1	02/16/23 20:04	EPA 8260D	
Bromomethane	ND	5.00	5.00	ug/L	1	02/16/23 20:04	EPA 8260D	
2-Butanone (MEK)	ND	5.00	10.0	ug/L	1	02/16/23 20:04	EPA 8260D	
n-Butylbenzene	ND	0.500	1.00	ug/L	1	02/16/23 20:04	EPA 8260D	
sec-Butylbenzene	ND	0.500	1.00	ug/L	1	02/16/23 20:04	EPA 8260D	
tert-Butylbenzene	ND	0.500	1.00	ug/L	1	02/16/23 20:04	EPA 8260D	
Carbon disulfide	ND	5.00	10.0	ug/L	1	02/16/23 20:04	EPA 8260D	
Carbon tetrachloride	ND	0.500	1.00	ug/L	1	02/16/23 20:04	EPA 8260D	
Chlorobenzene	ND	0.250	0.500	ug/L	1	02/16/23 20:04	EPA 8260D	
Chloroethane	ND	5.00	5.00	ug/L	1	02/16/23 20:04	EPA 8260D	
Chloroform	ND	0.500	1.00	ug/L	1	02/16/23 20:04	EPA 8260D	
Chloromethane	ND	2.50	5.00	ug/L	1	02/16/23 20:04	EPA 8260D	
2-Chlorotoluene	ND	0.500	1.00	ug/L	1	02/16/23 20:04	EPA 8260D	
4-Chlorotoluene	ND	0.500	1.00	ug/L	1	02/16/23 20:04	EPA 8260D	
Dibromochloromethane	ND	0.500	1.00	ug/L	1	02/16/23 20:04	EPA 8260D	

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Michele Poquiz For Kurt Johnson, Senior Chemist

Apex Laboratories, LLC
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503-718-2323
ORELAP ID: OR100062

ANALYTICAL REPORT

AMENDED REPORT

Landau Associates	Project: **Boeing of Portland**	
1500 SW First Avenue Suite 1015	Project Number: **025116.123.450**	**Report ID:**
Portland, OR 97201	Project Manager: **Erin Waibel**	**A3B0416 - 05 02 23 1432**

ANALYTICAL SAMPLE RESULTS

Volatile Organic Compounds by EPA 8260D

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
E-6-0223-SP (A3B0416-05RE1)				**Matrix: Water**		**Batch: 23B0617**		
1,2-Dibromo-3-chloropropane	ND	2.50	5.00	ug/L	1	02/16/23 20:04	EPA 8260D	
1,2-Dibromoethane (EDB)	ND	0.250	0.500	ug/L	1	02/16/23 20:04	EPA 8260D	
Dibromomethane	ND	0.500	1.00	ug/L	1	02/16/23 20:04	EPA 8260D	
1,2-Dichlorobenzene	ND	0.250	0.500	ug/L	1	02/16/23 20:04	EPA 8260D	
1,3-Dichlorobenzene	ND	0.250	0.500	ug/L	1	02/16/23 20:04	EPA 8260D	
1,4-Dichlorobenzene	ND	0.250	0.500	ug/L	1	02/16/23 20:04	EPA 8260D	
Dichlorodifluoromethane	ND	0.500	1.00	ug/L	1	02/16/23 20:04	EPA 8260D	
1,1-Dichloroethane	ND	0.200	0.400	ug/L	1	02/16/23 20:04	EPA 8260D	
1,2-Dichloroethane (EDC)	ND	0.200	0.400	ug/L	1	02/16/23 20:04	EPA 8260D	
1,1-Dichloroethene	ND	0.200	0.400	ug/L	1	02/16/23 20:04	EPA 8260D	
cis-1,2-Dichloroethene	**56.9**	0.200	0.400	ug/L	1	02/16/23 20:04	EPA 8260D	
trans-1,2-Dichloroethene	**0.920**	0.200	0.400	ug/L	1	02/16/23 20:04	EPA 8260D	
1,2-Dichloropropane	ND	0.250	0.500	ug/L	1	02/16/23 20:04	EPA 8260D	
1,3-Dichloropropane	ND	0.500	1.00	ug/L	1	02/16/23 20:04	EPA 8260D	
2,2-Dichloropropane	ND	0.500	1.00	ug/L	1	02/16/23 20:04	EPA 8260D	
1,1-Dichloropropene	ND	0.500	1.00	ug/L	1	02/16/23 20:04	EPA 8260D	
cis-1,3-Dichloropropene	ND	0.500	1.00	ug/L	1	02/16/23 20:04	EPA 8260D	
trans-1,3-Dichloropropene	ND	0.500	1.00	ug/L	1	02/16/23 20:04	EPA 8260D	
Ethylbenzene	ND	0.250	0.500	ug/L	1	02/16/23 20:04	EPA 8260D	
Hexachlorobutadiene	ND	2.50	5.00	ug/L	1	02/16/23 20:04	EPA 8260D	
2-Hexanone	ND	5.00	10.0	ug/L	1	02/16/23 20:04	EPA 8260D	
Isopropylbenzene	ND	0.500	1.00	ug/L	1	02/16/23 20:04	EPA 8260D	
4-Isopropyltoluene	ND	0.500	1.00	ug/L	1	02/16/23 20:04	EPA 8260D	
Methylene chloride	ND	5.00	10.0	ug/L	1	02/16/23 20:04	EPA 8260D	
4-Methyl-2-pentanone (MiBK)	ND	5.00	10.0	ug/L	1	02/16/23 20:04	EPA 8260D	
Methyl tert-butyl ether (MTBE)	ND	0.500	1.00	ug/L	1	02/16/23 20:04	EPA 8260D	
Naphthalene	ND	1.00	2.00	ug/L	1	02/16/23 20:04	EPA 8260D	
n-Propylbenzene	ND	0.250	0.500	ug/L	1	02/16/23 20:04	EPA 8260D	
Styrene	ND	0.500	1.00	ug/L	1	02/16/23 20:04	EPA 8260D	
1,1,1,2-Tetrachloroethane	ND	0.200	0.400	ug/L	1	02/16/23 20:04	EPA 8260D	
1,1,2,2-Tetrachloroethane	ND	0.250	0.500	ug/L	1	02/16/23 20:04	EPA 8260D	
Tetrachloroethene (PCE)	ND	0.200	0.400	ug/L	1	02/16/23 20:04	EPA 8260D	
Toluene	ND	0.500	1.00	ug/L	1	02/16/23 20:04	EPA 8260D	

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Michele Poquiz For Kurt Johnson, Senior Chemist

Apex Laboratories, LLC
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503-718-2323
ORELAP ID: OR100062

ANALYTICAL REPORT

AMENDED REPORT

Landau Associates	Project: **Boeing of Portland**	
1500 SW First Avenue Suite 1015	Project Number: **025116.123.450**	**Report ID:**
Portland, OR 97201	Project Manager: **Erin Waibel**	**A3B0416 - 05 02 23 1432**

ANALYTICAL SAMPLE RESULTS

Volatile Organic Compounds by EPA 8260D

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
E-6-0223-SP (A3B0416-05RE1)				**Matrix: Water**		**Batch: 23B0617**		
1,2,3-Trichlorobenzene	ND	1.00	2.00	ug/L	1	02/16/23 20:04	EPA 8260D	
1,2,4-Trichlorobenzene	ND	1.00	2.00	ug/L	1	02/16/23 20:04	EPA 8260D	
1,1,1-Trichloroethane	ND	0.200	0.400	ug/L	1	02/16/23 20:04	EPA 8260D	
1,1,2-Trichloroethane	ND	0.250	0.500	ug/L	1	02/16/23 20:04	EPA 8260D	
Trichloroethene (TCE)	**4.61**	0.200	0.400	ug/L	1	02/16/23 20:04	EPA 8260D	
Trichlorofluoromethane	ND	1.00	2.00	ug/L	1	02/16/23 20:04	EPA 8260D	
1,2,3-Trichloropropane	ND	0.500	1.00	ug/L	1	02/16/23 20:04	EPA 8260D	
1,2,4-Trimethylbenzene	ND	0.500	1.00	ug/L	1	02/16/23 20:04	EPA 8260D	
1,3,5-Trimethylbenzene	ND	0.500	1.00	ug/L	1	02/16/23 20:04	EPA 8260D	
Vinyl chloride	**10.8**	0.200	0.400	ug/L	1	02/16/23 20:04	EPA 8260D	
m,p-Xylene	ND	0.500	1.00	ug/L	1	02/16/23 20:04	EPA 8260D	
o-Xylene	ND	0.250	0.500	ug/L	1	02/16/23 20:04	EPA 8260D	
Surrogate: 1,4-Difluorobenzene (Surr)		*Recovery: 94 %*		*Limits: 80-120 %*	*1*	*02/16/23 20:04*	*EPA 8260D*	
Toluene-d8 (Surr)		*103 %*		*80-120 %*	*1*	*02/16/23 20:04*	*EPA 8260D*	
4-Bromofluorobenzene (Surr)		*98 %*		*80-120 %*	*1*	*02/16/23 20:04*	*EPA 8260D*	

Apex Laboratories

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Michele Poquiz For Kurt Johnson, Senior Chemist

Apex Laboratories, LLC
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503-718-2323
ORELAP ID: OR100062

ANALYTICAL REPORT

AMENDED REPORT

Landau Associates	Project: **Boeing of Portland**	
1500 SW First Avenue Suite 1015	Project Number: **025116.123.450**	**Report ID:**
Portland, OR 97201	Project Manager: **Erin Waibel**	**A3B0416 - 05 02 23 1432**

QUALITY CONTROL (QC) SAMPLE RESULTS

Diesel and/or Oil Hydrocarbons by NWTPH-Dx

Analyte	Result	Detection L Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 23C0314 - EPA 3510C (Fuels/Acid Ext.)									Water			
Blank (23C0314-BLK1)				Prepared: 03/08/23 12:39		Analyzed: 03/08/23 23:23						
NWTPH-Dx LL												
Diesel	ND	40.0	80.0	ug/L	1	---	---	---	---	---	---	
Oil	ND	80.0	160	ug/L	1	---	---	---	---	---	---	
Surr: o-Terphenyl (Surr)			*Recovery: 73 %*	*Limits: 50-150 %*		*Dilution: 1x*						
LCS (23C0314-BS1)				Prepared: 03/08/23 12:39		Analyzed: 03/08/23 23:44						
NWTPH-Dx LL												
Diesel	303	40.0	80.0	ug/L	1	500	---	61	36-132%	---	---	
Surr: o-Terphenyl (Surr)			*Recovery: 73 %*	*Limits: 50-150 %*		*Dilution: 1x*						
LCS Dup (23C0314-BSD1)				Prepared: 03/08/23 12:39		Analyzed: 03/09/23 00:05						**Q-19**
NWTPH-Dx LL												
Diesel	291	40.0	80.0	ug/L	1	500	---	58	36-132%	4	30%	
Surr: o-Terphenyl (Surr)			*Recovery: 79 %*	*Limits: 50-150 %*		*Dilution: 1x*						

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ANALYTICAL REPORT

AMENDED REPORT

Landau Associates	Project: **Boeing of Portland**	
1500 SW First Avenue Suite 1015	Project Number: **025116.123.450**	**Report ID:**
Portland, OR 97201	Project Manager: **Erin Waibel**	**A3B0416 - 05 02 23 1432**

QUALITY CONTROL (QC) SAMPLE RESULTS

Diesel and/or Oil Hydrocarbons by NWTPH-Dx with Silica Gel Column Cleanup

Analyte	Result	Detection L Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 23C0468 - EPA 3510C (Fuels/Acid Ext.) w/Silica Gel Column								**Water**				
Blank (23C0468-BLK1)				Prepared: 03/08/23 12:39 Analyzed: 03/14/23 05:37								
NWTPH-Dx/SGC												
Diesel	ND	40.0	80.0	ug/L	1	---	---	---	---	---	---	
Oil	ND	80.0	160	ug/L	1	---	---	---	---	---	---	
Surr: o-Terphenyl (Surr)			*Recovery: 70 %*	*Limits: 50-150 %*			*Dilution: 1x*					
LCS (23C0468-BS1)				Prepared: 03/08/23 12:39 Analyzed: 03/14/23 05:57								
NWTPH-Dx/SGC												
Diesel	274	40.0	80.0	ug/L	1	500	---	55	36-132%	---	---	
Surr: o-Terphenyl (Surr)			*Recovery: 71 %*	*Limits: 50-150 %*			*Dilution: 1x*					
LCS Dup (23C0468-BSD1)				Prepared: 03/08/23 12:39 Analyzed: 03/14/23 06:18								**Q-19**
NWTPH-Dx/SGC												
Diesel	313	40.0	80.0	ug/L	1	500	---	63	36-132%	13	30%	
Surr: o-Terphenyl (Surr)			*Recovery: 75 %*	*Limits: 50-150 %*			*Dilution: 1x*					

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Apex Laboratories, LLC
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503-718-2323
ORELAP ID: OR100062

ANALYTICAL REPORT

AMENDED REPORT

Landau Associates	Project: **Boeing of Portland**	
1500 SW First Avenue Suite 1015	Project Number: **025116.123.450**	**Report ID:**
Portland, OR 97201	Project Manager: **Erin Waibel**	**A3B0416 - 05 02 23 1432**

QUALITY CONTROL (QC) SAMPLE RESULTS

Volatile Organic Compounds by EPA 8260D

Analyte	Result	Detection L Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 23B0509 - EPA 5030C							**Water**					
Blank (23B0509-BLK1)			Prepared: 02/14/23 08:30 Analyzed: 02/14/23 10:53									
EPA 8260D												
Acetone	ND	10.0	20.0	ug/L	1	---	---	---	---	---	---	
Acrylonitrile	ND	1.00	2.00	ug/L	1	---	---	---	---	---	---	
Benzene	ND	0.100	0.200	ug/L	1	---	---	---	---	---	---	
Bromobenzene	ND	0.250	0.500	ug/L	1	---	---	---	---	---	---	
Bromochloromethane	ND	0.500	1.00	ug/L	1	---	---	---	---	---	---	
Bromodichloromethane	ND	0.500	1.00	ug/L	1	---	---	---	---	---	---	
Bromoform	ND	0.500	1.00	ug/L	1	---	---	---	---	---	---	
Bromomethane	ND	5.00	5.00	ug/L	1	---	---	---	---	---	---	
2-Butanone (MEK)	ND	5.00	10.0	ug/L	1	---	---	---	---	---	---	
n-Butylbenzene	ND	0.500	1.00	ug/L	1	---	---	---	---	---	---	
sec-Butylbenzene	ND	0.500	1.00	ug/L	1	---	---	---	---	---	---	
tert-Butylbenzene	ND	0.500	1.00	ug/L	1	---	---	---	---	---	---	
Carbon disulfide	ND	5.00	10.0	ug/L	1	---	---	---	---	---	---	
Carbon tetrachloride	ND	0.500	1.00	ug/L	1	---	---	---	---	---	---	
Chlorobenzene	ND	0.250	0.500	ug/L	1	---	---	---	---	---	---	
Chloroethane	ND	5.00	5.00	ug/L	1	---	---	---	---	---	---	
Chloroform	ND	0.500	1.00	ug/L	1	---	---	---	---	---	---	
Chloromethane	ND	2.50	5.00	ug/L	1	---	---	---	---	---	---	
2-Chlorotoluene	ND	0.500	1.00	ug/L	1	---	---	---	---	---	---	
4-Chlorotoluene	ND	0.500	1.00	ug/L	1	---	---	---	---	---	---	
Dibromochloromethane	ND	0.500	1.00	ug/L	1	---	---	---	---	---	---	
1,2-Dibromo-3-chloropropane	ND	2.50	5.00	ug/L	1	---	---	---	---	---	---	
1,2-Dibromoethane (EDB)	ND	0.250	0.500	ug/L	1	---	---	---	---	---	---	
Dibromomethane	ND	0.500	1.00	ug/L	1	---	---	---	---	---	---	
1,2-Dichlorobenzene	ND	0.250	0.500	ug/L	1	---	---	---	---	---	---	
1,3-Dichlorobenzene	ND	0.250	0.500	ug/L	1	---	---	---	---	---	---	
1,4-Dichlorobenzene	ND	0.250	0.500	ug/L	1	---	---	---	---	---	---	
Dichlorodifluoromethane	ND	0.500	1.00	ug/L	1	---	---	---	---	---	---	
1,1-Dichloroethane	ND	0.200	0.400	ug/L	1	---	---	---	---	---	---	
1,2-Dichloroethane (EDC)	ND	0.200	0.400	ug/L	1	---	---	---	---	---	---	
1,1-Dichloroethene	ND	0.200	0.400	ug/L	1	---	---	---	---	---	---	
cis-1,2-Dichloroethene	ND	0.200	0.400	ug/L	1	---	---	---	---	---	---	
trans-1,2-Dichloroethene	ND	0.200	0.400	ug/L	1	---	---	---	---	---	---	

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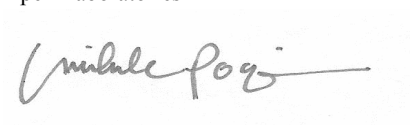

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Michele Poquiz For Kurt Johnson, Senior Chemist

Apex Laboratories, LLC
6700 S.W. Sandburg Street
Tigard, OR 97223
503-718-2323
ORELAP ID: OR100062

ANALYTICAL REPORT

AMENDED REPORT

Landau Associates	Project: **Boeing of Portland**	
1500 SW First Avenue Suite 1015	Project Number: **025116.123.450**	**Report ID:**
Portland, OR 97201	Project Manager: **Erin Waibel**	**A3B0416 - 05 02 23 1432**

QUALITY CONTROL (QC) SAMPLE RESULTS

Volatile Organic Compounds by EPA 8260D

Analyte	Result	Detection L Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 23B0509 - EPA 5030C							**Water**					
Blank (23B0509-BLK1)			Prepared: 02/14/23 08:30 Analyzed: 02/14/23 10:53									
1,2-Dichloropropane	ND	0.250	0.500	ug/L	1	---	---	---	---	---	---	
1,3-Dichloropropane	ND	0.500	1.00	ug/L	1	---	---	---	---	---	---	
2,2-Dichloropropane	ND	0.500	1.00	ug/L	1	---	---	---	---	---	---	
1,1-Dichloropropene	ND	0.500	1.00	ug/L	1	---	---	---	---	---	---	
cis-1,3-Dichloropropene	ND	0.500	1.00	ug/L	1	---	---	---	---	---	---	
trans-1,3-Dichloropropene	ND	0.500	1.00	ug/L	1	---	---	---	---	---	---	
Ethylbenzene	ND	0.250	0.500	ug/L	1	---	---	---	---	---	---	
Hexachlorobutadiene	ND	2.50	5.00	ug/L	1	---	---	---	---	---	---	
2-Hexanone	ND	5.00	10.0	ug/L	1	---	---	---	---	---	---	
Isopropylbenzene	ND	0.500	1.00	ug/L	1	---	---	---	---	---	---	
4-Isopropyltoluene	ND	0.500	1.00	ug/L	1	---	---	---	---	---	---	
Methylene chloride	ND	5.00	10.0	ug/L	1	---	---	---	---	---	---	
4-Methyl-2-pentanone (MiBK)	ND	5.00	10.0	ug/L	1	---	---	---	---	---	---	
Methyl tert-butyl ether (MTBE)	ND	0.500	1.00	ug/L	1	---	---	---	---	---	---	
Naphthalene	ND	1.00	2.00	ug/L	1	---	---	---	---	---	---	
n-Propylbenzene	ND	0.250	0.500	ug/L	1	---	---	---	---	---	---	
Styrene	ND	0.500	1.00	ug/L	1	---	---	---	---	---	---	
1,1,1,2-Tetrachloroethane	ND	0.200	0.400	ug/L	1	---	---	---	---	---	---	
1,1,2,2-Tetrachloroethane	ND	0.250	0.500	ug/L	1	---	---	---	---	---	---	
Tetrachloroethene (PCE)	ND	0.200	0.400	ug/L	1	---	---	---	---	---	---	
Toluene	ND	0.500	1.00	ug/L	1	---	---	---	---	---	---	
1,2,3-Trichlorobenzene	ND	1.00	2.00	ug/L	1	---	---	---	---	---	---	
1,2,4-Trichlorobenzene	ND	1.00	2.00	ug/L	1	---	---	---	---	---	---	
1,1,1-Trichloroethane	ND	0.200	0.400	ug/L	1	---	---	---	---	---	---	
1,1,2-Trichloroethane	ND	0.250	0.500	ug/L	1	---	---	---	---	---	---	
Trichloroethene (TCE)	ND	0.200	0.400	ug/L	1	---	---	---	---	---	---	
Trichlorofluoromethane	ND	1.00	2.00	ug/L	1	---	---	---	---	---	---	
1,2,3-Trichloropropane	ND	0.500	1.00	ug/L	1	---	---	---	---	---	---	
1,2,4-Trimethylbenzene	ND	0.500	1.00	ug/L	1	---	---	---	---	---	---	
1,3,5-Trimethylbenzene	ND	0.500	1.00	ug/L	1	---	---	---	---	---	---	
Vinyl chloride	ND	0.200	0.400	ug/L	1	---	---	---	---	---	---	
m,p-Xylene	ND	0.500	1.00	ug/L	1	---	---	---	---	---	---	
o-Xylene	ND	0.250	0.500	ug/L	1	---	---	---	---	---	---	

Surr: 1,4-Difluorobenzene (Surr) *Recovery: 95 %* *Limits: 80-120 %* *Dilution: 1x*

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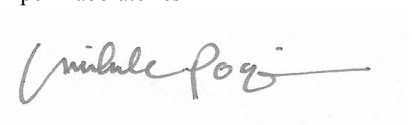

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Michele Poquiz For Kurt Johnson, Senior Chemist

APEX LABORATORIES

Apex Laboratories, LLC
6700 S.W. Sandburg Street
Tigard, OR 97223
503-718-2323
ORELAP ID: **OR100062**

ANALYTICAL REPORT

AMENDED REPORT

Landau Associates
1500 SW First Avenue Suite 1015
Portland, OR 97201

Project: **Boeing of Portland**
Project Number: **025116.123.450**
Project Manager: **Erin Waibel**

Report ID:
A3B0416 - 05 02 23 1432

QUALITY CONTROL (QC) SAMPLE RESULTS

Volatile Organic Compounds by EPA 8260D

Analyte	Result	Detection L Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 23B0509 - EPA 5030C									**Water**			
Blank (23B0509-BLK1)				Prepared: 02/14/23 08:30 Analyzed: 02/14/23 10:53								
Surr: Toluene-d8 (Surr)			*Recovery: 107 %*	*Limits: 80-120 %*				*Dilution: 1x*				
4-Bromofluorobenzene (Surr)			*99 %*	*80-120 %*				*"*				
LCS (23B0509-BS1)				Prepared: 02/14/23 08:30 Analyzed: 02/14/23 09:58								
EPA 8260D												
Acetone	39.5	10.0	20.0	ug/L	1	40.0	---	99	80-120%	---	---	ICV-01
Acrylonitrile	19.9	1.00	2.00	ug/L	1	20.0	---	99	80-120%	---	---	
Benzene	19.3	0.100	0.200	ug/L	1	20.0	---	97	80-120%	---	---	
Bromobenzene	18.6	0.250	0.500	ug/L	1	20.0	---	93	80-120%	---	---	
Bromochloromethane	22.5	0.500	1.00	ug/L	1	20.0	---	112	80-120%	---	---	
Bromodichloromethane	21.8	0.500	1.00	ug/L	1	20.0	---	109	80-120%	---	---	
Bromoform	22.4	0.500	1.00	ug/L	1	20.0	---	112	80-120%	---	---	
Bromomethane	24.2	5.00	5.00	ug/L	1	20.0	---	**121**	**80-120%**	---	---	Q-56
2-Butanone (MEK)	38.2	5.00	10.0	ug/L	1	40.0	---	96	80-120%	---	---	ICV-01
n-Butylbenzene	21.5	0.500	1.00	ug/L	1	20.0	---	108	80-120%	---	---	
sec-Butylbenzene	21.6	0.500	1.00	ug/L	1	20.0	---	108	80-120%	---	---	
tert-Butylbenzene	19.9	0.500	1.00	ug/L	1	20.0	---	99	80-120%	---	---	
Carbon disulfide	21.6	5.00	10.0	ug/L	1	20.0	---	108	80-120%	---	---	
Carbon tetrachloride	23.7	0.500	1.00	ug/L	1	20.0	---	119	80-120%	---	---	
Chlorobenzene	19.8	0.250	0.500	ug/L	1	20.0	---	99	80-120%	---	---	
Chloroethane	34.9	5.00	5.00	ug/L	1	20.0	---	**175**	**80-120%**	---	---	Q-56
Chloroform	21.4	0.500	1.00	ug/L	1	20.0	---	107	80-120%	---	---	
Chloromethane	19.3	2.50	5.00	ug/L	1	20.0	---	97	80-120%	---	---	
2-Chlorotoluene	19.7	0.500	1.00	ug/L	1	20.0	---	99	80-120%	---	---	
4-Chlorotoluene	19.3	0.500	1.00	ug/L	1	20.0	---	96	80-120%	---	---	
Dibromochloromethane	21.5	0.500	1.00	ug/L	1	20.0	---	107	80-120%	---	---	
1,2-Dibromo-3-chloropropane	16.3	2.50	5.00	ug/L	1	20.0	---	81	80-120%	---	---	
1,2-Dibromoethane (EDB)	19.5	0.250	0.500	ug/L	1	20.0	---	97	80-120%	---	---	
Dibromomethane	20.7	0.500	1.00	ug/L	1	20.0	---	103	80-120%	---	---	
1,2-Dichlorobenzene	20.3	0.250	0.500	ug/L	1	20.0	---	101	80-120%	---	---	
1,3-Dichlorobenzene	19.8	0.250	0.500	ug/L	1	20.0	---	99	80-120%	---	---	
1,4-Dichlorobenzene	19.6	0.250	0.500	ug/L	1	20.0	---	98	80-120%	---	---	
Dichlorodifluoromethane	23.2	0.500	1.00	ug/L	1	20.0	---	116	80-120%	---	---	
1,1-Dichloroethane	20.8	0.200	0.400	ug/L	1	20.0	---	104	80-120%	---	---	

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Michele Poquiz For Kurt Johnson, Senior Chemist

APEX LABORATORIES

Apex Laboratories, LLC
6700 S.W. Sandburg Street
Tigard, OR 97223
503-718-2323
ORELAP ID: **OR100062**

ANALYTICAL REPORT

AMENDED REPORT

Landau Associates
1500 SW First Avenue Suite 1015
Portland, OR 97201

Project: **Boeing of Portland**
Project Number: **025116.123.450**
Project Manager: **Erin Waibel**

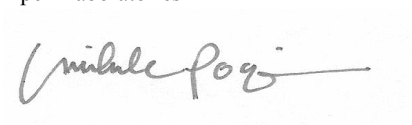
Report ID:
A3B0416 - 05 02 23 1432

QUALITY CONTROL (QC) SAMPLE RESULTS

Volatile Organic Compounds by EPA 8260D

Analyte	Result	Detection L Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 23B0509 - EPA 5030C							**Water**					
LCS (23B0509-BS1)			Prepared: 02/14/23 08:30		Analyzed: 02/14/23 09:58							
1,2-Dichloroethane (EDC)	22.7	0.200	0.400	ug/L	1	20.0	---	114	80-120%	---	---	
1,1-Dichloroethene	22.6	0.200	0.400	ug/L	1	20.0	---	113	80-120%	---	---	
cis-1,2-Dichloroethene	19.7	0.200	0.400	ug/L	1	20.0	---	98	80-120%	---	---	
trans-1,2-Dichloroethene	19.8	0.200	0.400	ug/L	1	20.0	---	99	80-120%	---	---	
1,2-Dichloropropane	19.3	0.250	0.500	ug/L	1	20.0	---	97	80-120%	---	---	
1,3-Dichloropropane	20.5	0.500	1.00	ug/L	1	20.0	---	102	80-120%	---	---	
2,2-Dichloropropane	22.0	0.500	1.00	ug/L	1	20.0	---	110	80-120%	---	---	
1,1-Dichloropropene	19.9	0.500	1.00	ug/L	1	20.0	---	99	80-120%	---	---	
cis-1,3-Dichloropropene	20.0	0.500	1.00	ug/L	1	20.0	---	100	80-120%	---	---	
trans-1,3-Dichloropropene	22.7	0.500	1.00	ug/L	1	20.0	---	114	80-120%	---	---	
Ethylbenzene	20.4	0.250	0.500	ug/L	1	20.0	---	102	80-120%	---	---	
Hexachlorobutadiene	19.5	2.50	5.00	ug/L	1	20.0	---	97	80-120%	---	---	
2-Hexanone	37.3	5.00	10.0	ug/L	1	40.0	---	93	80-120%	---	---	
Isopropylbenzene	20.8	0.500	1.00	ug/L	1	20.0	---	104	80-120%	---	---	
4-Isopropyltoluene	21.0	0.500	1.00	ug/L	1	20.0	---	105	80-120%	---	---	
Methylene chloride	20.0	5.00	10.0	ug/L	1	20.0	---	100	80-120%	---	---	
4-Methyl-2-pentanone (MiBK)	38.6	5.00	10.0	ug/L	1	40.0	---	96	80-120%	---	---	
Methyl tert-butyl ether (MTBE)	18.4	0.500	1.00	ug/L	1	20.0	---	92	80-120%	---	---	
Naphthalene	17.6	1.00	2.00	ug/L	1	20.0	---	88	80-120%	---	---	
n-Propylbenzene	20.6	0.250	0.500	ug/L	1	20.0	---	103	80-120%	---	---	
Styrene	20.4	0.500	1.00	ug/L	1	20.0	---	102	80-120%	---	---	
1,1,1,2-Tetrachloroethane	19.5	0.200	0.400	ug/L	1	20.0	---	97	80-120%	---	---	
1,1,2,2-Tetrachloroethane	20.1	0.250	0.500	ug/L	1	20.0	---	100	80-120%	---	---	
Tetrachloroethene (PCE)	19.2	0.200	0.400	ug/L	1	20.0	---	96	80-120%	---	---	
Toluene	19.3	0.500	1.00	ug/L	1	20.0	---	97	80-120%	---	---	
1,2,3-Trichlorobenzene	19.5	1.00	2.00	ug/L	1	20.0	---	97	80-120%	---	---	
1,2,4-Trichlorobenzene	17.6	1.00	2.00	ug/L	1	20.0	---	88	80-120%	---	---	
1,1,1-Trichloroethane	22.1	0.200	0.400	ug/L	1	20.0	---	111	80-120%	---	---	
1,1,2-Trichloroethane	20.8	0.250	0.500	ug/L	1	20.0	---	104	80-120%	---	---	
Trichloroethene (TCE)	18.2	0.200	0.400	ug/L	1	20.0	---	91	80-120%	---	---	
Trichlorofluoromethane	27.4	1.00	2.00	ug/L	1	20.0	---	**137**	**80-120%**	---	---	Q-56
1,2,3-Trichloropropane	21.7	0.500	1.00	ug/L	1	20.0	---	109	80-120%	---	---	
1,2,4-Trimethylbenzene	21.5	0.500	1.00	ug/L	1	20.0	---	108	80-120%	---	---	
1,3,5-Trimethylbenzene	20.5	0.500	1.00	ug/L	1	20.0	---	102	80-120%	---	---	

Apex Laboratories



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ORELAP ID: OR100062

ANALYTICAL REPORT

AMENDED REPORT

Landau Associates	Project: Boeing of Portland	
1500 SW First Avenue Suite 1015	Project Number: 025116.123.450	Report ID:
Portland, OR 97201	Project Manager: Erin Waibel	A3B0416 - 05 02 23 1432

QUALITY CONTROL (QC) SAMPLE RESULTS

Volatile Organic Compounds by EPA 8260D

Analyte	Result	Detection L Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 23B0509 - EPA 5030C									Water			
LCS (23B0509-BS1)			Prepared: 02/14/23 08:30 Analyzed: 02/14/23 09:58									
Vinyl chloride	22.2	0.200	0.400	ug/L	1	20.0	---	111	80-120%	---	---	
m,p-Xylene	41.3	0.500	1.00	ug/L	1	40.0	---	103	80-120%	---	---	
o-Xylene	19.6	0.250	0.500	ug/L	1	20.0	---	98	80-120%	---	---	
Surr: 1,4-Difluorobenzene (Surr)			*Recovery: 94 %*		*Limits: 80-120 %*				*Dilution: 1x*			
Toluene-d8 (Surr)			*101 %*		*80-120 %*				*"*			
4-Bromofluorobenzene (Surr)			*91 %*		*80-120 %*				*"*			
Duplicate (23B0509-DUP1)			Prepared: 02/14/23 10:22 Analyzed: 02/14/23 12:00									
QC Source Sample: Non-SDG (A3B0393-04)												
Acetone	ND	10.0	20.0	ug/L	1	---	ND	---	---	---	30%	
Acrylonitrile	ND	1.00	2.00	ug/L	1	---	ND	---	---	---	30%	
Benzene	**11.4**	0.100	0.200	ug/L	1	---	11.3	---	---	1	30%	
Bromobenzene	ND	0.250	0.500	ug/L	1	---	ND	---	---	---	30%	
Bromochloromethane	ND	0.500	1.00	ug/L	1	---	ND	---	---	---	30%	
Bromodichloromethane	ND	0.500	1.00	ug/L	1	---	ND	---	---	---	30%	
Bromoform	ND	0.500	1.00	ug/L	1	---	ND	---	---	---	30%	
Bromomethane	ND	5.00	5.00	ug/L	1	---	ND	---	---	---	30%	
2-Butanone (MEK)	ND	5.00	10.0	ug/L	1	---	ND	---	---	---	30%	
n-Butylbenzene	ND	0.500	1.00	ug/L	1	---	ND	---	---	---	30%	
sec-Butylbenzene	ND	0.500	1.00	ug/L	1	---	ND	---	---	---	30%	
tert-Butylbenzene	ND	0.500	1.00	ug/L	1	---	ND	---	---	---	30%	
Carbon disulfide	ND	5.00	10.0	ug/L	1	---	ND	---	---	---	30%	
Carbon tetrachloride	ND	0.500	1.00	ug/L	1	---	ND	---	---	---	30%	
Chlorobenzene	ND	0.250	0.500	ug/L	1	---	ND	---	---	---	30%	
Chloroethane	ND	5.00	5.00	ug/L	1	---	ND	---	---	---	30%	
Chloroform	ND	0.500	1.00	ug/L	1	---	ND	---	---	---	30%	
Chloromethane	ND	2.50	5.00	ug/L	1	---	ND	---	---	---	30%	
2-Chlorotoluene	ND	0.500	1.00	ug/L	1	---	ND	---	---	---	30%	
4-Chlorotoluene	ND	0.500	1.00	ug/L	1	---	ND	---	---	---	30%	
Dibromochloromethane	ND	0.500	1.00	ug/L	1	---	ND	---	---	---	30%	
1,2-Dibromo-3-chloropropane	ND	2.50	5.00	ug/L	1	---	ND	---	---	---	30%	
1,2-Dibromoethane (EDB)	ND	0.250	0.500	ug/L	1	---	ND	---	---	---	30%	
Dibromomethane	ND	0.500	1.00	ug/L	1	---	ND	---	---	---	30%	
1,2-Dichlorobenzene	ND	0.250	0.500	ug/L	1	---	ND	---	---	---	30%	

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Michele Poquiz For Kurt Johnson, Senior Chemist

APEX LABORATORIES

Apex Laboratories, LLC
6700 S.W. Sandburg Street
Tigard, OR 97223
503-718-2323
ORELAP ID: **OR100062**

ANALYTICAL REPORT

AMENDED REPORT

Landau Associates
1500 SW First Avenue Suite 1015
Portland, OR 97201

Project: **Boeing of Portland**
Project Number: **025116.123.450**
Project Manager: **Erin Waibel**

Report ID:
A3B0416 - 05 02 23 1432

QUALITY CONTROL (QC) SAMPLE RESULTS

Volatile Organic Compounds by EPA 8260D

Analyte	Result	Detection L Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 23B0509 - EPA 5030C							**Water**					
Duplicate (23B0509-DUP1)			Prepared: 02/14/23 10:22		Analyzed: 02/14/23 12:00							
QC Source Sample: Non-SDG (A3B0393-04)												
1,3-Dichlorobenzene	ND	0.250	0.500	ug/L	1	---	ND	---	---	---	30%	
1,4-Dichlorobenzene	ND	0.250	0.500	ug/L	1	---	ND	---	---	---	30%	
Dichlorodifluoromethane	ND	0.500	1.00	ug/L	1	---	ND	---	---	---	30%	
1,1-Dichloroethane	ND	0.200	0.400	ug/L	1	---	ND	---	---	---	30%	
1,2-Dichloroethane (EDC)	ND	0.200	0.400	ug/L	1	---	ND	---	---	---	30%	
1,1-Dichloroethene	ND	0.200	0.400	ug/L	1	---	ND	---	---	---	30%	
cis-1,2-Dichloroethene	ND	0.200	0.400	ug/L	1	---	ND	---	---	---	30%	
trans-1,2-Dichloroethene	ND	0.200	0.400	ug/L	1	---	ND	---	---	---	30%	
1,2-Dichloropropane	ND	0.250	0.500	ug/L	1	---	ND	---	---	---	30%	
1,3-Dichloropropane	ND	0.500	1.00	ug/L	1	---	ND	---	---	---	30%	
2,2-Dichloropropane	ND	0.500	1.00	ug/L	1	---	ND	---	---	---	30%	
1,1-Dichloropropene	ND	0.500	1.00	ug/L	1	---	ND	---	---	---	30%	
cis-1,3-Dichloropropene	ND	0.500	1.00	ug/L	1	---	ND	---	---	---	30%	
trans-1,3-Dichloropropene	ND	0.500	1.00	ug/L	1	---	ND	---	---	---	30%	
Ethylbenzene	**4.45**	0.250	0.500	ug/L	1	---	4.25	---	---	5	30%	
Hexachlorobutadiene	ND	2.50	5.00	ug/L	1	---	ND	---	---	---	30%	
2-Hexanone	ND	5.00	10.0	ug/L	1	---	ND	---	---	---	30%	
Isopropylbenzene	**0.550**	0.500	1.00	ug/L	1	---	0.530	---	---	4	30%	J
4-Isopropyltoluene	ND	0.500	1.00	ug/L	1	---	ND	---	---	---	30%	
Methylene chloride	ND	5.00	10.0	ug/L	1	---	ND	---	---	---	30%	
4-Methyl-2-pentanone (MiBK)	ND	5.00	10.0	ug/L	1	---	ND	---	---	---	30%	
Methyl tert-butyl ether (MTBE)	ND	0.500	1.00	ug/L	1	---	ND	---	---	---	30%	
Naphthalene	**2.69**	1.00	2.00	ug/L	1	---	2.49	---	---	8	30%	
n-Propylbenzene	**0.760**	0.250	0.500	ug/L	1	---	0.780	---	---	3	30%	
Styrene	ND	0.500	1.00	ug/L	1	---	ND	---	---	---	30%	
1,1,1,2-Tetrachloroethane	ND	0.200	0.400	ug/L	1	---	ND	---	---	---	30%	
1,1,2,2-Tetrachloroethane	ND	0.250	0.500	ug/L	1	---	ND	---	---	---	30%	
Tetrachloroethene (PCE)	ND	0.200	0.400	ug/L	1	---	ND	---	---	---	30%	
Toluene	ND	0.500	1.00	ug/L	1	---	ND	---	---	---	30%	
1,2,3-Trichlorobenzene	ND	1.00	2.00	ug/L	1	---	ND	---	---	---	30%	
1,2,4-Trichlorobenzene	ND	1.00	2.00	ug/L	1	---	ND	---	---	---	30%	
1,1,1-Trichloroethane	ND	0.200	0.400	ug/L	1	---	ND	---	---	---	30%	
1,1,2-Trichloroethane	ND	0.250	0.500	ug/L	1	---	ND	---	---	---	30%	

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Tigard, OR 97223
503-718-2323
ORELAP ID: OR100062

ANALYTICAL REPORT

AMENDED REPORT

Landau Associates	Project: **Boeing of Portland**	
1500 SW First Avenue Suite 1015	Project Number: **025116.123.450**	**Report ID:**
Portland, OR 97201	Project Manager: **Erin Waibel**	**A3B0416 - 05 02 23 1432**

QUALITY CONTROL (QC) SAMPLE RESULTS

Volatile Organic Compounds by EPA 8260D

Analyte	Result	Detection L Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 23B0509 - EPA 5030C							**Water**					
Duplicate (23B0509-DUP1)			Prepared: 02/14/23 10:22 Analyzed: 02/14/23 12:00									
QC Source Sample: Non-SDG (A3B0393-04)												
Trichloroethene (TCE)	ND	0.200	0.400	ug/L	1	---	ND	---	---	---	30%	
Trichlorofluoromethane	ND	1.00	2.00	ug/L	1	---	ND	---	---	---	30%	
1,2,3-Trichloropropane	ND	0.500	1.00	ug/L	1	---	ND	---	---	---	30%	
1,2,4-Trimethylbenzene	**2.85**	0.500	1.00	ug/L	1	---	2.73	---	---	4	30%	
1,3,5-Trimethylbenzene	ND	0.500	1.00	ug/L	1	---	ND	---	---	---	30%	
Vinyl chloride	ND	0.200	0.400	ug/L	1	---	ND	---	---	---	30%	
m,p-Xylene	**0.840**	0.500	1.00	ug/L	1	---	0.760	---	---	10	30%	J
o-Xylene	**5.89**	0.250	0.500	ug/L	1	---	5.58	---	---	5	30%	
Surr: 1,4-Difluorobenzene (Surr)			*Recovery: 94 %*		*Limits: 80-120 %*		*Dilution: 1x*					
Toluene-d8 (Surr)			*106 %*		*80-120 %*		*"*					
4-Bromofluorobenzene (Surr)			*94 %*		*80-120 %*		*"*					
Duplicate (23B0509-DUP2)			Prepared: 02/14/23 10:22 Analyzed: 02/14/23 13:29									
QC Source Sample: Non-SDG (A3B0406-03)												
Acetone	ND	10.0	20.0	ug/L	1	---	ND	---	---	---	30%	
Acrylonitrile	ND	1.00	2.00	ug/L	1	---	ND	---	---	---	30%	
Benzene	ND	0.100	0.200	ug/L	1	---	ND	---	---	---	30%	
Bromobenzene	ND	0.250	0.500	ug/L	1	---	ND	---	---	---	30%	
Bromochloromethane	ND	0.500	1.00	ug/L	1	---	ND	---	---	---	30%	
Bromodichloromethane	ND	0.500	1.00	ug/L	1	---	ND	---	---	---	30%	
Bromoform	ND	0.500	1.00	ug/L	1	---	ND	---	---	---	30%	
Bromomethane	ND	5.00	5.00	ug/L	1	---	ND	---	---	---	30%	
2-Butanone (MEK)	ND	5.00	10.0	ug/L	1	---	ND	---	---	---	30%	
n-Butylbenzene	ND	0.500	1.00	ug/L	1	---	ND	---	---	---	30%	
sec-Butylbenzene	ND	0.500	1.00	ug/L	1	---	ND	---	---	---	30%	
tert-Butylbenzene	ND	0.500	1.00	ug/L	1	---	ND	---	---	---	30%	
Carbon disulfide	ND	5.00	10.0	ug/L	1	---	ND	---	---	---	30%	
Carbon tetrachloride	ND	0.500	1.00	ug/L	1	---	ND	---	---	---	30%	
Chlorobenzene	ND	0.250	0.500	ug/L	1	---	ND	---	---	---	30%	
Chloroethane	ND	5.00	5.00	ug/L	1	---	ND	---	---	---	30%	
Chloroform	ND	0.500	1.00	ug/L	1	---	ND	---	---	---	30%	
Chloromethane	ND	2.50	5.00	ug/L	1	---	ND	---	---	---	30%	
2-Chlorotoluene	ND	0.500	1.00	ug/L	1	---	ND	---	---	---	30%	

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Michele Poquiz For Kurt Johnson, Senior Chemist

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6700 S.W. Sandburg Street
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ORELAP ID: **OR100062**

Landau Associates
1500 SW First Avenue Suite 1015
Portland, OR 97201

Project: **Boeing of Portland**
Project Number: **025116.123.450**
Project Manager: **Erin Waibel**

Report ID:
A3B0416 - 05 02 23 1432

QUALITY CONTROL (QC) SAMPLE RESULTS

Volatile Organic Compounds by EPA 8260D

Analyte	Result	Detection L Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 23B0509 - EPA 5030C							**Water**					
Duplicate (23B0509-DUP2)			Prepared: 02/14/23 10:22		Analyzed: 02/14/23 13:29							
QC Source Sample: Non-SDG (A3B0406-03)												
4-Chlorotoluene	ND	0.500	1.00	ug/L	1	---	ND	---	---	---	30%	
Dibromochloromethane	ND	0.500	1.00	ug/L	1	---	ND	---	---	---	30%	
1,2-Dibromo-3-chloropropane	ND	2.50	5.00	ug/L	1	---	ND	---	---	---	30%	
1,2-Dibromoethane (EDB)	ND	0.250	0.500	ug/L	1	---	ND	---	---	---	30%	
Dibromomethane	ND	0.500	1.00	ug/L	1	---	ND	---	---	---	30%	
1,2-Dichlorobenzene	ND	0.250	0.500	ug/L	1	---	ND	---	---	---	30%	
1,3-Dichlorobenzene	ND	0.250	0.500	ug/L	1	---	ND	---	---	---	30%	
1,4-Dichlorobenzene	ND	0.250	0.500	ug/L	1	---	ND	---	---	---	30%	
Dichlorodifluoromethane	ND	0.500	1.00	ug/L	1	---	ND	---	---	---	30%	
1,1-Dichloroethane	ND	0.200	0.400	ug/L	1	---	ND	---	---	---	30%	
1,2-Dichloroethane (EDC)	ND	0.200	0.400	ug/L	1	---	ND	---	---	---	30%	
1,1-Dichloroethene	ND	0.200	0.400	ug/L	1	---	ND	---	---	---	30%	
cis-1,2-Dichloroethene	ND	0.200	0.400	ug/L	1	---	ND	---	---	---	30%	
trans-1,2-Dichloroethene	ND	0.200	0.400	ug/L	1	---	ND	---	---	---	30%	
1,2-Dichloropropane	ND	0.250	0.500	ug/L	1	---	ND	---	---	---	30%	
1,3-Dichloropropane	ND	0.500	1.00	ug/L	1	---	ND	---	---	---	30%	
2,2-Dichloropropane	ND	0.500	1.00	ug/L	1	---	ND	---	---	---	30%	
1,1-Dichloropropene	ND	0.500	1.00	ug/L	1	---	ND	---	---	---	30%	
cis-1,3-Dichloropropene	ND	0.500	1.00	ug/L	1	---	ND	---	---	---	30%	
trans-1,3-Dichloropropene	ND	0.500	1.00	ug/L	1	---	ND	---	---	---	30%	
Ethylbenzene	ND	0.250	0.500	ug/L	1	---	ND	---	---	---	30%	
Hexachlorobutadiene	ND	2.50	5.00	ug/L	1	---	ND	---	---	---	30%	
2-Hexanone	ND	5.00	10.0	ug/L	1	---	ND	---	---	---	30%	
Isopropylbenzene	ND	0.500	1.00	ug/L	1	---	ND	---	---	---	30%	
4-Isopropyltoluene	ND	0.500	1.00	ug/L	1	---	ND	---	---	---	30%	
Methylene chloride	ND	5.00	10.0	ug/L	1	---	ND	---	---	---	30%	
4-Methyl-2-pentanone (MiBK)	ND	5.00	10.0	ug/L	1	---	ND	---	---	---	30%	
Methyl tert-butyl ether (MTBE)	ND	0.500	1.00	ug/L	1	---	ND	---	---	---	30%	
Naphthalene	ND	1.00	2.00	ug/L	1	---	ND	---	---	---	30%	
n-Propylbenzene	ND	0.250	0.500	ug/L	1	---	ND	---	---	---	30%	
Styrene	ND	0.500	1.00	ug/L	1	---	ND	---	---	---	30%	
1,1,1,2-Tetrachloroethane	ND	0.200	0.400	ug/L	1	---	ND	---	---	---	30%	
1,1,2,2-Tetrachloroethane	ND	0.250	0.500	ug/L	1	---	ND	---	---	---	30%	

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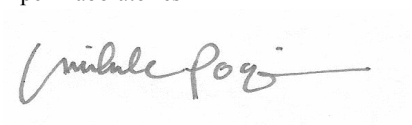

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ORELAP ID: OR100062

ANALYTICAL REPORT

AMENDED REPORT

Landau Associates	Project: **Boeing of Portland**	
1500 SW First Avenue Suite 1015	Project Number: **025116.123.450**	**Report ID:**
Portland, OR 97201	Project Manager: **Erin Waibel**	**A3B0416 - 05 02 23 1432**

QUALITY CONTROL (QC) SAMPLE RESULTS

Volatile Organic Compounds by EPA 8260D

Analyte	Result	Detection L Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 23B0509 - EPA 5030C							**Water**					
Duplicate (23B0509-DUP2)			Prepared: 02/14/23 10:22 Analyzed: 02/14/23 13:29									
QC Source Sample: Non-SDG (A3B0406-03)												
Tetrachloroethene (PCE)	ND	0.200	0.400	ug/L	1	---	ND	---	---	---	30%	
Toluene	ND	0.500	1.00	ug/L	1	---	ND	---	---	---	30%	
1,2,3-Trichlorobenzene	ND	1.00	2.00	ug/L	1	---	ND	---	---	---	30%	
1,2,4-Trichlorobenzene	ND	1.00	2.00	ug/L	1	---	ND	---	---	---	30%	
1,1,1-Trichloroethane	ND	0.200	0.400	ug/L	1	---	ND	---	---	---	30%	
1,1,2-Trichloroethane	ND	0.250	0.500	ug/L	1	---	ND	---	---	---	30%	
Trichloroethene (TCE)	ND	0.200	0.400	ug/L	1	---	ND	---	---	---	30%	
Trichlorofluoromethane	ND	1.00	2.00	ug/L	1	---	ND	---	---	---	30%	
1,2,3-Trichloropropane	ND	0.500	1.00	ug/L	1	---	ND	---	---	---	30%	
1,2,4-Trimethylbenzene	ND	0.500	1.00	ug/L	1	---	ND	---	---	---	30%	
1,3,5-Trimethylbenzene	ND	0.500	1.00	ug/L	1	---	ND	---	---	---	30%	
Vinyl chloride	ND	0.200	0.400	ug/L	1	---	ND	---	---	---	30%	
m,p-Xylene	ND	0.500	1.00	ug/L	1	---	ND	---	---	---	30%	
o-Xylene	ND	0.250	0.500	ug/L	1	---	ND	---	---	---	30%	
Surr: 1,4-Difluorobenzene (Surr)			*Recovery: 96 %*		*Limits: 80-120 %*		*Dilution: 1x*					
Toluene-d8 (Surr)			*104 %*		*80-120 %*		*"*					
4-Bromofluorobenzene (Surr)			*100 %*		*80-120 %*		*"*					
Matrix Spike (23B0509-MS1)			Prepared: 02/14/23 10:22 Analyzed: 02/14/23 14:35									
QC Source Sample: Non-SDG (A3B0406-06)												
EPA 8260D												
Acetone	1090	10.0	20.0	ug/L	1	40.0	1070	47	39-160%	---	---	E, ICV-01
Acrylonitrile	22.5	1.00	2.00	ug/L	1	20.0	ND	99	63-135%	---	---	
Benzene	48.9	0.100	0.200	ug/L	1	20.0	29.5	97	79-120%	---	---	
Bromobenzene	18.5	0.250	0.500	ug/L	1	20.0	ND	92	80-120%	---	---	
Bromochloromethane	21.1	0.500	1.00	ug/L	1	20.0	ND	106	78-123%	---	---	
Bromodichloromethane	21.2	0.500	1.00	ug/L	1	20.0	ND	106	79-125%	---	---	
Bromoform	20.2	0.500	1.00	ug/L	1	20.0	ND	101	66-130%	---	---	
Bromomethane	82.5	5.00	5.00	ug/L	1	20.0	61.0	108	53-141%	---	---	Q-54
2-Butanone (MEK)	113	5.00	10.0	ug/L	1	40.0	69.1	110	56-143%	---	---	ICV-01
n-Butylbenzene	23.5	0.500	1.00	ug/L	1	20.0	0.690	114	75-128%	---	---	
sec-Butylbenzene	21.4	0.500	1.00	ug/L	1	20.0	1.07	102	77-126%	---	---	
tert-Butylbenzene	19.7	0.500	1.00	ug/L	1	20.0	ND	99	78-124%	---	---	

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ANALYTICAL REPORT

AMENDED REPORT

Landau Associates
1500 SW First Avenue Suite 1015
Portland, OR 97201

Project: **Boeing of Portland**
Project Number: **025116.123.450**
Project Manager: **Erin Waibel**

Report ID:
A3B0416 - 05 02 23 1432

QUALITY CONTROL (QC) SAMPLE RESULTS

Volatile Organic Compounds by EPA 8260D

Analyte	Result	Detection L Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 23B0509 - EPA 5030C							**Water**					
Matrix Spike (23B0509-MS1)			Prepared: 02/14/23 10:22		Analyzed: 02/14/23 14:35							
QC Source Sample: Non-SDG (A3B0406-06)												
Carbon disulfide	28.3	5.00	10.0	ug/L	1	20.0	ND	**141**	**64-133%**	---	---	Q-01
Carbon tetrachloride	24.6	0.500	1.00	ug/L	1	20.0	ND	123	72-136%	---	---	
Chlorobenzene	19.6	0.250	0.500	ug/L	1	20.0	ND	98	80-120%	---	---	
Chloroethane	43.8	5.00	5.00	ug/L	1	20.0	13.3	**152**	**60-138%**	---	---	Q-54g
Chloroform	21.2	0.500	1.00	ug/L	1	20.0	ND	106	79-124%	---	---	
Chloromethane	144	2.50	5.00	ug/L	1	20.0	127	84	50-139%	---	---	
2-Chlorotoluene	18.9	0.500	1.00	ug/L	1	20.0	ND	95	79-122%	---	---	
4-Chlorotoluene	18.6	0.500	1.00	ug/L	1	20.0	ND	93	78-122%	---	---	
Dibromochloromethane	20.9	0.500	1.00	ug/L	1	20.0	ND	105	74-126%	---	---	
1,2-Dibromo-3-chloropropane	20.4	2.50	5.00	ug/L	1	20.0	ND	102	62-128%	---	---	
1,2-Dibromoethane (EDB)	20.2	0.250	0.500	ug/L	1	20.0	ND	101	77-121%	---	---	
Dibromomethane	20.3	0.500	1.00	ug/L	1	20.0	ND	102	79-123%	---	---	
1,2-Dichlorobenzene	19.4	0.250	0.500	ug/L	1	20.0	ND	97	80-120%	---	---	
1,3-Dichlorobenzene	18.8	0.250	0.500	ug/L	1	20.0	ND	94	80-120%	---	---	
1,4-Dichlorobenzene	18.3	0.250	0.500	ug/L	1	20.0	ND	92	79-120%	---	---	
Dichlorodifluoromethane	23.0	0.500	1.00	ug/L	1	20.0	ND	115	32-152%	---	---	
1,1-Dichloroethane	21.0	0.200	0.400	ug/L	1	20.0	ND	105	77-125%	---	---	
1,2-Dichloroethane (EDC)	20.7	0.200	0.400	ug/L	1	20.0	ND	102	73-128%	---	---	
1,1-Dichloroethene	23.5	0.200	0.400	ug/L	1	20.0	ND	118	71-131%	---	---	
cis-1,2-Dichloroethene	20.6	0.200	0.400	ug/L	1	20.0	ND	103	78-123%	---	---	
trans-1,2-Dichloroethene	21.7	0.200	0.400	ug/L	1	20.0	ND	108	75-124%	---	---	
1,2-Dichloropropane	20.1	0.250	0.500	ug/L	1	20.0	ND	101	78-122%	---	---	
1,3-Dichloropropane	19.6	0.500	1.00	ug/L	1	20.0	ND	98	80-120%	---	---	
2,2-Dichloropropane	21.0	0.500	1.00	ug/L	1	20.0	ND	105	60-139%	---	---	
1,1-Dichloropropene	22.1	0.500	1.00	ug/L	1	20.0	ND	110	79-125%	---	---	
cis-1,3-Dichloropropene	19.1	0.500	1.00	ug/L	1	20.0	ND	96	75-124%	---	---	
trans-1,3-Dichloropropene	21.2	0.500	1.00	ug/L	1	20.0	ND	106	73-127%	---	---	
Ethylbenzene	177	0.250	0.500	ug/L	1	20.0	180	**-13**	**79-121%**	---	---	Q-03
Hexachlorobutadiene	17.2	2.50	5.00	ug/L	1	20.0	ND	86	66-134%	---	---	
2-Hexanone	54.6	5.00	10.0	ug/L	1	40.0	10.6	110	57-139%	---	---	
Isopropylbenzene	29.8	0.500	1.00	ug/L	1	20.0	9.06	104	72-131%	---	---	
4-Isopropyltoluene	26.0	0.500	1.00	ug/L	1	20.0	3.15	114	77-127%	---	---	
Methylene chloride	20.9	5.00	10.0	ug/L	1	20.0	ND	104	74-124%	---	---	

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Michele Poquiz For Kurt Johnson, Senior Chemist

Apex Laboratories, LLC
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Tigard, OR 97223
503-718-2323
ORELAP ID: OR100062

ANALYTICAL REPORT

AMENDED REPORT

Landau Associates	Project: **Boeing of Portland**	
1500 SW First Avenue Suite 1015	Project Number: **025116.123.450**	**Report ID:**
Portland, OR 97201	Project Manager: **Erin Waibel**	**A3B0416 - 05 02 23 1432**

QUALITY CONTROL (QC) SAMPLE RESULTS

Volatile Organic Compounds by EPA 8260D

Analyte	Result	Detection L Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 23B0509 - EPA 5030C								**Water**				
Matrix Spike (23B0509-MS1)			Prepared: 02/14/23 10:22 Analyzed: 02/14/23 14:35									
QC Source Sample: Non-SDG (A3B0406-06)												
4-Methyl-2-pentanone (MiBK)	64.1	5.00	10.0	ug/L	1	40.0	22.9	103	67-130%	---	---	
Methyl tert-butyl ether (MTBE)	18.6	0.500	1.00	ug/L	1	20.0	ND	93	71-124%	---	---	
Naphthalene	95.8	1.00	2.00	ug/L	1	20.0	83.8	**60**	**61-128%**	---	---	Q-03
n-Propylbenzene	40.6	0.250	0.500	ug/L	1	20.0	21.4	96	76-126%	---	---	
Styrene	18.8	0.500	1.00	ug/L	1	20.0	ND	94	78-123%	---	---	
1,1,1,2-Tetrachloroethane	18.4	0.200	0.400	ug/L	1	20.0	ND	92	78-124%	---	---	
1,1,2,2-Tetrachloroethane	20.4	0.250	0.500	ug/L	1	20.0	ND	102	71-121%	---	---	
Tetrachloroethene (PCE)	19.9	0.200	0.400	ug/L	1	20.0	ND	100	74-129%	---	---	
Toluene	116	0.500	1.00	ug/L	1	20.0	107	**43**	**80-121%**	---	---	Q-01
1,2,3-Trichlorobenzene	19.4	1.00	2.00	ug/L	1	20.0	ND	97	69-129%	---	---	
1,2,4-Trichlorobenzene	18.0	1.00	2.00	ug/L	1	20.0	ND	90	69-130%	---	---	
1,1,1-Trichloroethane	22.3	0.200	0.400	ug/L	1	20.0	ND	111	74-131%	---	---	
1,1,2-Trichloroethane	19.3	0.250	0.500	ug/L	1	20.0	ND	97	80-120%	---	---	
Trichloroethene (TCE)	18.3	0.200	0.400	ug/L	1	20.0	ND	92	79-123%	---	---	
Trichlorofluoromethane	27.0	1.00	2.00	ug/L	1	20.0	ND	135	65-141%	---	---	Q-54c
1,2,3-Trichloropropane	20.8	0.500	1.00	ug/L	1	20.0	ND	104	73-122%	---	---	
1,2,4-Trimethylbenzene	264	0.500	1.00	ug/L	1	20.0	269	**-25**	**76-124%**	---	---	E, Q-03
1,3,5-Trimethylbenzene	84.9	0.500	1.00	ug/L	1	20.0	69.3	78	75-124%	---	---	
Vinyl chloride	25.1	0.200	0.400	ug/L	1	20.0	ND	126	58-137%	---	---	
m,p-Xylene	627	0.500	1.00	ug/L	1	40.0	802	**-437**	**80-121%**	---	---	Q-03, E
o-Xylene	393	0.250	0.500	ug/L	1	20.0	443	**-251**	**78-122%**	---	---	E, Q-03
Surr: 1,4-Difluorobenzene (Surr)			*Recovery: 98 %*			*Limits: 80-120 %*			*Dilution: 1x*			
Toluene-d8 (Surr)			*99 %*			*80-120 %*			*"*			
4-Bromofluorobenzene (Surr)			*95 %*			*80-120 %*			*"*			

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Michele Poquiz For Kurt Johnson, Senior Chemist

Apex Laboratories, LLC
6700 S.W. Sandburg Street
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ORELAP ID: **OR100062**

Landau Associates
1500 SW First Avenue Suite 1015
Portland, OR 97201

Project: **Boeing of Portland**
Project Number: **025116.123.450**
Project Manager: **Erin Waibel**

Report ID:
A3B0416 - 05 02 23 1432

QUALITY CONTROL (QC) SAMPLE RESULTS

Volatile Organic Compounds by EPA 8260D

Analyte	Result	Detection L Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 23B0617 - EPA 5030C												**Water**
Blank (23B0617-BLK1)			Prepared: 02/16/23 08:30 Analyzed: 02/16/23 11:05									
EPA 8260D												
Acetone	ND	10.0	20.0	ug/L	1	---	---	---	---	---	---	
Acrylonitrile	ND	1.00	2.00	ug/L	1	---	---	---	---	---	---	
Benzene	ND	0.100	0.200	ug/L	1	---	---	---	---	---	---	
Bromobenzene	ND	0.250	0.500	ug/L	1	---	---	---	---	---	---	
Bromochloromethane	ND	0.500	1.00	ug/L	1	---	---	---	---	---	---	
Bromodichloromethane	ND	0.500	1.00	ug/L	1	---	---	---	---	---	---	
Bromoform	ND	0.500	1.00	ug/L	1	---	---	---	---	---	---	
Bromomethane	ND	5.00	5.00	ug/L	1	---	---	---	---	---	---	
2-Butanone (MEK)	ND	5.00	10.0	ug/L	1	---	---	---	---	---	---	
n-Butylbenzene	ND	0.500	1.00	ug/L	1	---	---	---	---	---	---	
sec-Butylbenzene	ND	0.500	1.00	ug/L	1	---	---	---	---	---	---	
tert-Butylbenzene	ND	0.500	1.00	ug/L	1	---	---	---	---	---	---	
Carbon disulfide	ND	5.00	10.0	ug/L	1	---	---	---	---	---	---	
Carbon tetrachloride	ND	0.500	1.00	ug/L	1	---	---	---	---	---	---	
Chlorobenzene	ND	0.250	0.500	ug/L	1	---	---	---	---	---	---	
Chloroethane	ND	5.00	5.00	ug/L	1	---	---	---	---	---	---	
Chloroform	ND	0.500	1.00	ug/L	1	---	---	---	---	---	---	
Chloromethane	ND	2.50	5.00	ug/L	1	---	---	---	---	---	---	
2-Chlorotoluene	ND	0.500	1.00	ug/L	1	---	---	---	---	---	---	
4-Chlorotoluene	ND	0.500	1.00	ug/L	1	---	---	---	---	---	---	
Dibromochloromethane	ND	0.500	1.00	ug/L	1	---	---	---	---	---	---	
1,2-Dibromo-3-chloropropane	ND	2.50	5.00	ug/L	1	---	---	---	---	---	---	
1,2-Dibromoethane (EDB)	ND	0.250	0.500	ug/L	1	---	---	---	---	---	---	
Dibromomethane	ND	0.500	1.00	ug/L	1	---	---	---	---	---	---	
1,2-Dichlorobenzene	ND	0.250	0.500	ug/L	1	---	---	---	---	---	---	
1,3-Dichlorobenzene	ND	0.250	0.500	ug/L	1	---	---	---	---	---	---	
1,4-Dichlorobenzene	ND	0.250	0.500	ug/L	1	---	---	---	---	---	---	
Dichlorodifluoromethane	ND	0.500	1.00	ug/L	1	---	---	---	---	---	---	
1,1-Dichloroethane	ND	0.200	0.400	ug/L	1	---	---	---	---	---	---	
1,2-Dichloroethane (EDC)	ND	0.200	0.400	ug/L	1	---	---	---	---	---	---	
1,1-Dichloroethene	ND	0.200	0.400	ug/L	1	---	---	---	---	---	---	
cis-1,2-Dichloroethene	ND	0.200	0.400	ug/L	1	---	---	---	---	---	---	
trans-1,2-Dichloroethene	ND	0.200	0.400	ug/L	1	---	---	---	---	---	---	

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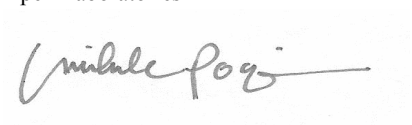

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ORELAP ID: OR100062

ANALYTICAL REPORT

AMENDED REPORT

Landau Associates	Project: **Boeing of Portland**	
1500 SW First Avenue Suite 1015	Project Number: **025116.123.450**	**Report ID:**
Portland, OR 97201	Project Manager: **Erin Waibel**	**A3B0416 - 05 02 23 1432**

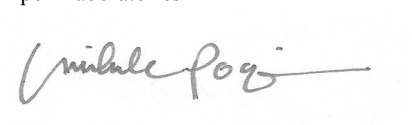
QUALITY CONTROL (QC) SAMPLE RESULTS

Volatile Organic Compounds by EPA 8260D

Analyte	Result	Detection L Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 23B0617 - EPA 5030C							**Water**					
Blank (23B0617-BLK1)			Prepared: 02/16/23 08:30 Analyzed: 02/16/23 11:05									
1,2-Dichloropropane	ND	0.250	0.500	ug/L	1	---	---	---	---	---	---	
1,3-Dichloropropane	ND	0.500	1.00	ug/L	1	---	---	---	---	---	---	
2,2-Dichloropropane	ND	0.500	1.00	ug/L	1	---	---	---	---	---	---	
1,1-Dichloropropene	ND	0.500	1.00	ug/L	1	---	---	---	---	---	---	
cis-1,3-Dichloropropene	ND	0.500	1.00	ug/L	1	---	---	---	---	---	---	
trans-1,3-Dichloropropene	ND	0.500	1.00	ug/L	1	---	---	---	---	---	---	
Ethylbenzene	ND	0.250	0.500	ug/L	1	---	---	---	---	---	---	
Hexachlorobutadiene	ND	2.50	5.00	ug/L	1	---	---	---	---	---	---	
2-Hexanone	ND	5.00	10.0	ug/L	1	---	---	---	---	---	---	
Isopropylbenzene	ND	0.500	1.00	ug/L	1	---	---	---	---	---	---	
4-Isopropyltoluene	ND	0.500	1.00	ug/L	1	---	---	---	---	---	---	
Methylene chloride	ND	5.00	10.0	ug/L	1	---	---	---	---	---	---	
4-Methyl-2-pentanone (MiBK)	ND	5.00	10.0	ug/L	1	---	---	---	---	---	---	
Methyl tert-butyl ether (MTBE)	ND	0.500	1.00	ug/L	1	---	---	---	---	---	---	
Naphthalene	ND	1.00	2.00	ug/L	1	---	---	---	---	---	---	
n-Propylbenzene	ND	0.250	0.500	ug/L	1	---	---	---	---	---	---	
Styrene	ND	0.500	1.00	ug/L	1	---	---	---	---	---	---	
1,1,1,2-Tetrachloroethane	ND	0.200	0.400	ug/L	1	---	---	---	---	---	---	
1,1,2,2-Tetrachloroethane	ND	0.250	0.500	ug/L	1	---	---	---	---	---	---	
Tetrachloroethene (PCE)	ND	0.200	0.400	ug/L	1	---	---	---	---	---	---	
Toluene	ND	0.500	1.00	ug/L	1	---	---	---	---	---	---	
1,2,3-Trichlorobenzene	ND	1.00	2.00	ug/L	1	---	---	---	---	---	---	
1,2,4-Trichlorobenzene	ND	1.00	2.00	ug/L	1	---	---	---	---	---	---	
1,1,1-Trichloroethane	ND	0.200	0.400	ug/L	1	---	---	---	---	---	---	
1,1,2-Trichloroethane	ND	0.250	0.500	ug/L	1	---	---	---	---	---	---	
Trichloroethene (TCE)	ND	0.200	0.400	ug/L	1	---	---	---	---	---	---	
Trichlorofluoromethane	ND	1.00	2.00	ug/L	1	---	---	---	---	---	---	
1,2,3-Trichloropropane	ND	0.500	1.00	ug/L	1	---	---	---	---	---	---	
1,2,4-Trimethylbenzene	ND	0.500	1.00	ug/L	1	---	---	---	---	---	---	
1,3,5-Trimethylbenzene	ND	0.500	1.00	ug/L	1	---	---	---	---	---	---	
Vinyl chloride	ND	0.200	0.400	ug/L	1	---	---	---	---	---	---	
m,p-Xylene	ND	0.500	1.00	ug/L	1	---	---	---	---	---	---	
o-Xylene	ND	0.250	0.500	ug/L	1	---	---	---	---	---	---	

Surr: 1,4-Difluorobenzene (Surr) *Recovery: 96 %* *Limits: 80-120 %* *Dilution: 1x*

Apex Laboratories



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503-718-2323
ORELAP ID: **OR100062**

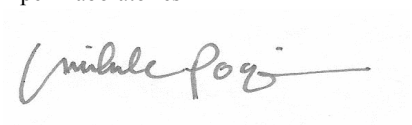
Landau Associates	Project: **Boeing of Portland**	
1500 SW First Avenue Suite 1015	Project Number: **025116.123.450**	**Report ID:**
Portland, OR 97201	Project Manager: **Erin Waibel**	**A3B0416 - 05 02 23 1432**

QUALITY CONTROL (QC) SAMPLE RESULTS

Volatile Organic Compounds by EPA 8260D

Analyte	Result	Detection L Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 23B0617 - EPA 5030C									**Water**			
Blank (23B0617-BLK1)				Prepared: 02/16/23 08:30 Analyzed: 02/16/23 11:05								
Surr: Toluene-d8 (Surr)			*Recovery: 104 %*	*Limits: 80-120 %*				*Dilution: 1x*				
4-Bromofluorobenzene (Surr)			*100 %*	*80-120 %*				*"*				
LCS (23B0617-BS1)				Prepared: 02/16/23 08:30 Analyzed: 02/16/23 10:19								
EPA 8260D												
Acetone	42.2	10.0	20.0	ug/L	1	40.0	---	106	80-120%	---	---	ICV-01
Acrylonitrile	18.0	1.00	2.00	ug/L	1	20.0	---	90	80-120%	---	---	
Benzene	19.7	0.100	0.200	ug/L	1	20.0	---	98	80-120%	---	---	
Bromobenzene	17.4	0.250	0.500	ug/L	1	20.0	---	87	80-120%	---	---	
Bromochloromethane	21.6	0.500	1.00	ug/L	1	20.0	---	108	80-120%	---	---	
Bromodichloromethane	22.2	0.500	1.00	ug/L	1	20.0	---	111	80-120%	---	---	
Bromoform	23.1	0.500	1.00	ug/L	1	20.0	---	116	80-120%	---	---	
Bromomethane	13.2	5.00	5.00	ug/L	1	20.0	---	**66**	**80-120%**	---	---	Q-55
2-Butanone (MEK)	38.0	5.00	10.0	ug/L	1	40.0	---	95	80-120%	---	---	ICV-01
n-Butylbenzene	21.6	0.500	1.00	ug/L	1	20.0	---	108	80-120%	---	---	
sec-Butylbenzene	21.7	0.500	1.00	ug/L	1	20.0	---	108	80-120%	---	---	
tert-Butylbenzene	19.5	0.500	1.00	ug/L	1	20.0	---	97	80-120%	---	---	
Carbon disulfide	22.2	5.00	10.0	ug/L	1	20.0	---	111	80-120%	---	---	
Carbon tetrachloride	25.5	0.500	1.00	ug/L	1	20.0	---	**128**	**80-120%**	---	---	Q-56
Chlorobenzene	20.3	0.250	0.500	ug/L	1	20.0	---	101	80-120%	---	---	
Chloroethane	34.3	5.00	5.00	ug/L	1	20.0	---	**171**	**80-120%**	---	---	Q-56
Chloroform	21.7	0.500	1.00	ug/L	1	20.0	---	109	80-120%	---	---	
Chloromethane	17.6	2.50	5.00	ug/L	1	20.0	---	88	80-120%	---	---	
2-Chlorotoluene	19.2	0.500	1.00	ug/L	1	20.0	---	96	80-120%	---	---	
4-Chlorotoluene	19.0	0.500	1.00	ug/L	1	20.0	---	95	80-120%	---	---	
Dibromochloromethane	22.2	0.500	1.00	ug/L	1	20.0	---	111	80-120%	---	---	
1,2-Dibromo-3-chloropropane	16.1	2.50	5.00	ug/L	1	20.0	---	81	80-120%	---	---	
1,2-Dibromoethane (EDB)	20.9	0.250	0.500	ug/L	1	20.0	---	104	80-120%	---	---	
Dibromomethane	20.8	0.500	1.00	ug/L	1	20.0	---	104	80-120%	---	---	
1,2-Dichlorobenzene	19.5	0.250	0.500	ug/L	1	20.0	---	97	80-120%	---	---	
1,3-Dichlorobenzene	19.6	0.250	0.500	ug/L	1	20.0	---	98	80-120%	---	---	
1,4-Dichlorobenzene	18.8	0.250	0.500	ug/L	1	20.0	---	94	80-120%	---	---	
Dichlorodifluoromethane	26.2	0.500	1.00	ug/L	1	20.0	---	**131**	**80-120%**	---	---	Q-56
1,1-Dichloroethane	20.2	0.200	0.400	ug/L	1	20.0	---	101	80-120%	---	---	

Apex Laboratories



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APEX LABORATORIES

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ORELAP ID: **OR100062**

ANALYTICAL REPORT

AMENDED REPORT

Landau Associates
1500 SW First Avenue Suite 1015
Portland, OR 97201

Project: **Boeing of Portland**
Project Number: **025116.123.450**
Project Manager: **Erin Waibel**

Report ID:
A3B0416 - 05 02 23 1432

QUALITY CONTROL (QC) SAMPLE RESULTS

Volatile Organic Compounds by EPA 8260D

Analyte	Result	Detection L Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 23B0617 - EPA 5030C							**Water**					
LCS (23B0617-BS1)			Prepared: 02/16/23 08:30		Analyzed: 02/16/23 10:19							
1,2-Dichloroethane (EDC)	22.9	0.200	0.400	ug/L	1	20.0	---	114	80-120%	---	---	
1,1-Dichloroethene	23.2	0.200	0.400	ug/L	1	20.0	---	116	80-120%	---	---	
cis-1,2-Dichloroethene	20.5	0.200	0.400	ug/L	1	20.0	---	102	80-120%	---	---	
trans-1,2-Dichloroethene	20.5	0.200	0.400	ug/L	1	20.0	---	103	80-120%	---	---	
1,2-Dichloropropane	19.4	0.250	0.500	ug/L	1	20.0	---	97	80-120%	---	---	
1,3-Dichloropropane	21.0	0.500	1.00	ug/L	1	20.0	---	105	80-120%	---	---	
2,2-Dichloropropane	22.8	0.500	1.00	ug/L	1	20.0	---	114	80-120%	---	---	
1,1-Dichloropropene	21.0	0.500	1.00	ug/L	1	20.0	---	105	80-120%	---	---	
cis-1,3-Dichloropropene	21.1	0.500	1.00	ug/L	1	20.0	---	105	80-120%	---	---	
trans-1,3-Dichloropropene	23.2	0.500	1.00	ug/L	1	20.0	---	116	80-120%	---	---	
Ethylbenzene	21.4	0.250	0.500	ug/L	1	20.0	---	107	80-120%	---	---	
Hexachlorobutadiene	18.8	2.50	5.00	ug/L	1	20.0	---	94	80-120%	---	---	
2-Hexanone	37.0	5.00	10.0	ug/L	1	40.0	---	93	80-120%	---	---	
Isopropylbenzene	21.8	0.500	1.00	ug/L	1	20.0	---	109	80-120%	---	---	
4-Isopropyltoluene	20.5	0.500	1.00	ug/L	1	20.0	---	103	80-120%	---	---	
Methylene chloride	19.9	5.00	10.0	ug/L	1	20.0	---	99	80-120%	---	---	
4-Methyl-2-pentanone (MiBK)	39.6	5.00	10.0	ug/L	1	40.0	---	99	80-120%	---	---	
Methyl tert-butyl ether (MTBE)	18.5	0.500	1.00	ug/L	1	20.0	---	93	80-120%	---	---	
Naphthalene	16.7	1.00	2.00	ug/L	1	20.0	---	83	80-120%	---	---	
n-Propylbenzene	20.5	0.250	0.500	ug/L	1	20.0	---	102	80-120%	---	---	
Styrene	20.9	0.500	1.00	ug/L	1	20.0	---	105	80-120%	---	---	
1,1,1,2-Tetrachloroethane	20.5	0.200	0.400	ug/L	1	20.0	---	103	80-120%	---	---	
1,1,2,2-Tetrachloroethane	19.6	0.250	0.500	ug/L	1	20.0	---	98	80-120%	---	---	
Tetrachloroethene (PCE)	20.2	0.200	0.400	ug/L	1	20.0	---	101	80-120%	---	---	
Toluene	20.4	0.500	1.00	ug/L	1	20.0	---	102	80-120%	---	---	
1,2,3-Trichlorobenzene	18.4	1.00	2.00	ug/L	1	20.0	---	92	80-120%	---	---	
1,2,4-Trichlorobenzene	17.2	1.00	2.00	ug/L	1	20.0	---	86	80-120%	---	---	
1,1,1-Trichloroethane	22.2	0.200	0.400	ug/L	1	20.0	---	111	80-120%	---	---	
1,1,2-Trichloroethane	21.1	0.250	0.500	ug/L	1	20.0	---	106	80-120%	---	---	
Trichloroethene (TCE)	17.8	0.200	0.400	ug/L	1	20.0	---	89	80-120%	---	---	
Trichlorofluoromethane	28.2	1.00	2.00	ug/L	1	20.0	---	**141**	**80-120%**	---	---	Q-56
1,2,3-Trichloropropane	20.8	0.500	1.00	ug/L	1	20.0	---	104	80-120%	---	---	
1,2,4-Trimethylbenzene	20.7	0.500	1.00	ug/L	1	20.0	---	103	80-120%	---	---	
1,3,5-Trimethylbenzene	19.9	0.500	1.00	ug/L	1	20.0	---	99	80-120%	---	---	

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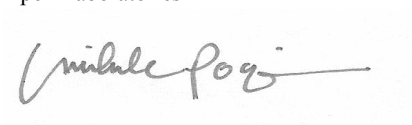

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Michele Poquiz For Kurt Johnson, Senior Chemist

Apex Laboratories, LLC
6700 S.W. Sandburg Street
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503-718-2323
ORELAP ID: **OR100062**

Landau Associates
1500 SW First Avenue Suite 1015
Portland, OR 97201

Project: **Boeing of Portland**
Project Number: **025116.123.450**
Project Manager: **Erin Waibel**

Report ID:
A3B0416 - 05 02 23 1432

QUALITY CONTROL (QC) SAMPLE RESULTS

Volatile Organic Compounds by EPA 8260D

Analyte	Result	Detection L Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 23B0617 - EPA 5030C									**Water**			
LCS (23B0617-BS1)			Prepared: 02/16/23 08:30		Analyzed: 02/16/23 10:19							
Vinyl chloride	21.8	0.200	0.400	ug/L	1	20.0	---	109	80-120%	---	---	
m,p-Xylene	43.5	0.500	1.00	ug/L	1	40.0	---	109	80-120%	---	---	
o-Xylene	20.6	0.250	0.500	ug/L	1	20.0	---	103	80-120%	---	---	
Surr: 1,4-Difluorobenzene (Surr)			*Recovery: 93 %*		*Limits: 80-120 %*				*Dilution: 1x*			
Toluene-d8 (Surr)			*102 %*		*80-120 %*				*"*			
4-Bromofluorobenzene (Surr)			*87 %*		*80-120 %*				*"*			
Duplicate (23B0617-DUP1)			Prepared: 02/16/23 10:58		Analyzed: 02/16/23 14:09							
QC Source Sample: Non-SDG (A3B0550-01)												
Acetone	ND	10.0	20.0	ug/L	1	---	ND	---	---	---	30%	
Acrylonitrile	ND	1.00	2.00	ug/L	1	---	ND	---	---	---	30%	
Benzene	ND	0.100	0.200	ug/L	1	---	ND	---	---	---	30%	
Bromobenzene	ND	0.250	0.500	ug/L	1	---	ND	---	---	---	30%	
Bromochloromethane	ND	0.500	1.00	ug/L	1	---	ND	---	---	---	30%	
Bromodichloromethane	ND	0.500	1.00	ug/L	1	---	ND	---	---	---	30%	
Bromoform	ND	0.500	1.00	ug/L	1	---	ND	---	---	---	30%	
Bromomethane	ND	5.00	5.00	ug/L	1	---	ND	---	---	---	30%	
2-Butanone (MEK)	ND	5.00	10.0	ug/L	1	---	ND	---	---	---	30%	
n-Butylbenzene	ND	0.500	1.00	ug/L	1	---	ND	---	---	---	30%	
sec-Butylbenzene	ND	0.500	1.00	ug/L	1	---	ND	---	---	---	30%	
tert-Butylbenzene	ND	0.500	1.00	ug/L	1	---	ND	---	---	---	30%	
Carbon disulfide	ND	5.00	10.0	ug/L	1	---	ND	---	---	---	30%	
Carbon tetrachloride	ND	0.500	1.00	ug/L	1	---	ND	---	---	---	30%	
Chlorobenzene	ND	0.250	0.500	ug/L	1	---	ND	---	---	---	30%	
Chloroethane	ND	5.00	5.00	ug/L	1	---	ND	---	---	---	30%	
Chloroform	ND	0.500	1.00	ug/L	1	---	ND	---	---	---	30%	
Chloromethane	ND	2.50	5.00	ug/L	1	---	ND	---	---	---	30%	
2-Chlorotoluene	ND	0.500	1.00	ug/L	1	---	ND	---	---	---	30%	
4-Chlorotoluene	ND	0.500	1.00	ug/L	1	---	ND	---	---	---	30%	
Dibromochloromethane	ND	0.500	1.00	ug/L	1	---	ND	---	---	---	30%	
1,2-Dibromo-3-chloropropane	ND	2.50	5.00	ug/L	1	---	ND	---	---	---	30%	
1,2-Dibromoethane (EDB)	ND	0.250	0.500	ug/L	1	---	ND	---	---	---	30%	
Dibromomethane	ND	0.500	1.00	ug/L	1	---	ND	---	---	---	30%	
1,2-Dichlorobenzene	ND	0.250	0.500	ug/L	1	---	ND	---	---	---	30%	

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APEX LABORATORIES

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ORELAP ID: **OR100062**

ANALYTICAL REPORT

AMENDED REPORT

Landau Associates
1500 SW First Avenue Suite 1015
Portland, OR 97201

Project: **Boeing of Portland**
Project Number: **025116.123.450**
Project Manager: **Erin Waibel**

Report ID:
A3B0416 - 05 02 23 1432

QUALITY CONTROL (QC) SAMPLE RESULTS

Volatile Organic Compounds by EPA 8260D

Analyte	Result	Detection L Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 23B0617 - EPA 5030C							**Water**					
Duplicate (23B0617-DUP1)			Prepared: 02/16/23 10:58 Analyzed: 02/16/23 14:09									
QC Source Sample: Non-SDG (A3B0550-01)												
1,3-Dichlorobenzene	ND	0.250	0.500	ug/L	1	---	ND	---	---	---	30%	
1,4-Dichlorobenzene	ND	0.250	0.500	ug/L	1	---	ND	---	---	---	30%	
Dichlorodifluoromethane	ND	0.500	1.00	ug/L	1	---	ND	---	---	---	30%	
1,1-Dichloroethane	ND	0.200	0.400	ug/L	1	---	ND	---	---	---	30%	
1,2-Dichloroethane (EDC)	ND	0.200	0.400	ug/L	1	---	ND	---	---	---	30%	
1,1-Dichloroethene	ND	0.200	0.400	ug/L	1	---	ND	---	---	---	30%	
cis-1,2-Dichloroethene	ND	0.200	0.400	ug/L	1	---	ND	---	---	---	30%	
trans-1,2-Dichloroethene	ND	0.200	0.400	ug/L	1	---	ND	---	---	---	30%	
1,2-Dichloropropane	ND	0.250	0.500	ug/L	1	---	ND	---	---	---	30%	
1,3-Dichloropropane	ND	0.500	1.00	ug/L	1	---	ND	---	---	---	30%	
2,2-Dichloropropane	ND	0.500	1.00	ug/L	1	---	ND	---	---	---	30%	
1,1-Dichloropropene	ND	0.500	1.00	ug/L	1	---	ND	---	---	---	30%	
cis-1,3-Dichloropropene	ND	0.500	1.00	ug/L	1	---	ND	---	---	---	30%	
trans-1,3-Dichloropropene	ND	0.500	1.00	ug/L	1	---	ND	---	---	---	30%	
Ethylbenzene	ND	0.250	0.500	ug/L	1	---	ND	---	---	---	30%	
Hexachlorobutadiene	ND	2.50	5.00	ug/L	1	---	ND	---	---	---	30%	
2-Hexanone	ND	5.00	10.0	ug/L	1	---	ND	---	---	---	30%	
Isopropylbenzene	ND	0.500	1.00	ug/L	1	---	ND	---	---	---	30%	
4-Isopropyltoluene	ND	0.500	1.00	ug/L	1	---	ND	---	---	---	30%	
Methylene chloride	ND	5.00	10.0	ug/L	1	---	ND	---	---	---	30%	
4-Methyl-2-pentanone (MiBK)	ND	5.00	10.0	ug/L	1	---	ND	---	---	---	30%	
Methyl tert-butyl ether (MTBE)	ND	0.500	1.00	ug/L	1	---	ND	---	---	---	30%	
Naphthalene	ND	1.00	2.00	ug/L	1	---	ND	---	---	---	30%	
n-Propylbenzene	ND	0.250	0.500	ug/L	1	---	ND	---	---	---	30%	
Styrene	ND	0.500	1.00	ug/L	1	---	ND	---	---	---	30%	
1,1,1,2-Tetrachloroethane	ND	0.200	0.400	ug/L	1	---	ND	---	---	---	30%	
1,1,2,2-Tetrachloroethane	ND	0.250	0.500	ug/L	1	---	ND	---	---	---	30%	
Tetrachloroethene (PCE)	ND	0.200	0.400	ug/L	1	---	ND	---	---	---	30%	
Toluene	ND	0.500	1.00	ug/L	1	---	ND	---	---	---	30%	
1,2,3-Trichlorobenzene	ND	1.00	2.00	ug/L	1	---	ND	---	---	---	30%	
1,2,4-Trichlorobenzene	ND	1.00	2.00	ug/L	1	---	ND	---	---	---	30%	
1,1,1-Trichloroethane	ND	0.200	0.400	ug/L	1	---	ND	---	---	---	30%	
1,1,2-Trichloroethane	ND	0.250	0.500	ug/L	1	---	ND	---	---	---	30%	

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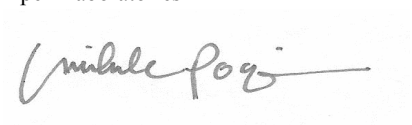

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Michele Poquiz For Kurt Johnson, Senior Chemist

APEX LABORATORIES

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ORELAP ID: **OR100062**

ANALYTICAL REPORT

AMENDED REPORT

Landau Associates
1500 SW First Avenue Suite 1015
Portland, OR 97201

Project: **Boeing of Portland**
Project Number: **025116.123.450**
Project Manager: **Erin Waibel**

Report ID:
A3B0416 - 05 02 23 1432

QUALITY CONTROL (QC) SAMPLE RESULTS

Volatile Organic Compounds by EPA 8260D

Analyte	Result	Detection L Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 23B0617 - EPA 5030C							**Water**					
Duplicate (23B0617-DUP1)			Prepared: 02/16/23 10:58 Analyzed: 02/16/23 14:09									
QC Source Sample: Non-SDG (A3B0550-01)												
Trichloroethene (TCE)	ND	0.200	0.400	ug/L	1	---	ND	---	---	---	30%	
Trichlorofluoromethane	ND	1.00	2.00	ug/L	1	---	ND	---	---	---	30%	
1,2,3-Trichloropropane	ND	0.500	1.00	ug/L	1	---	ND	---	---	---	30%	
1,2,4-Trimethylbenzene	ND	0.500	1.00	ug/L	1	---	ND	---	---	---	30%	
1,3,5-Trimethylbenzene	ND	0.500	1.00	ug/L	1	---	ND	---	---	---	30%	
Vinyl chloride	ND	0.200	0.400	ug/L	1	---	ND	---	---	---	30%	
m,p-Xylene	ND	0.500	1.00	ug/L	1	---	ND	---	---	---	30%	
o-Xylene	ND	0.250	0.500	ug/L	1	---	ND	---	---	---	30%	
Surr: 1,4-Difluorobenzene (Surr)			*Recovery: 98 %*		*Limits: 80-120 %*		*Dilution: 1x*					
Toluene-d8 (Surr)			*104 %*		*80-120 %*		*"*					
4-Bromofluorobenzene (Surr)			*101 %*		*80-120 %*		*"*					
Matrix Spike (23B0617-MS1)			Prepared: 02/16/23 10:58 Analyzed: 02/16/23 15:38									
QC Source Sample: Non-SDG (A3B0550-04)												
EPA 8260D												
Acetone	38.8	10.0	20.0	ug/L	1	40.0	ND	97	39-160%	---	---	ICV-01
Acrylonitrile	17.9	1.00	2.00	ug/L	1	20.0	ND	89	63-135%	---	---	
Benzene	20.3	0.100	0.200	ug/L	1	20.0	ND	102	79-120%	---	---	
Bromobenzene	18.8	0.250	0.500	ug/L	1	20.0	ND	94	80-120%	---	---	
Bromochloromethane	22.6	0.500	1.00	ug/L	1	20.0	ND	113	78-123%	---	---	
Bromodichloromethane	24.5	0.500	1.00	ug/L	1	20.0	1.11	117	79-125%	---	---	
Bromoform	22.9	0.500	1.00	ug/L	1	20.0	ND	114	66-130%	---	---	
Bromomethane	20.6	5.00	5.00	ug/L	1	20.0	ND	103	53-141%	---	---	Q-54l
2-Butanone (MEK)	40.0	5.00	10.0	ug/L	1	40.0	ND	100	56-143%	---	---	ICV-01
n-Butylbenzene	22.7	0.500	1.00	ug/L	1	20.0	ND	113	75-128%	---	---	
sec-Butylbenzene	22.6	0.500	1.00	ug/L	1	20.0	ND	113	77-126%	---	---	
tert-Butylbenzene	20.0	0.500	1.00	ug/L	1	20.0	ND	100	78-124%	---	---	
Carbon disulfide	23.5	5.00	10.0	ug/L	1	20.0	ND	118	64-133%	---	---	
Carbon tetrachloride	26.5	0.500	1.00	ug/L	1	20.0	ND	132	72-136%	---	---	Q-54j
Chlorobenzene	20.8	0.250	0.500	ug/L	1	20.0	ND	104	80-120%	---	---	
Chloroethane	36.6	5.00	5.00	ug/L	1	20.0	ND	**183**	**60-138%**	---	---	Q-54f
Chloroform	35.9	0.500	1.00	ug/L	1	20.0	12.5	117	79-124%	---	---	
Chloromethane	19.1	2.50	5.00	ug/L	1	20.0	ND	96	50-139%	---	---	

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Report ID:
A3B0416 - 05 02 23 1432

QUALITY CONTROL (QC) SAMPLE RESULTS

Volatile Organic Compounds by EPA 8260D

Analyte	Result	Detection L Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 23B0617 - EPA 5030C							**Water**					
Matrix Spike (23B0617-MS1)			Prepared: 02/16/23 10:58		Analyzed: 02/16/23 15:38							
QC Source Sample: Non-SDG (A3B0550-04)												
2-Chlorotoluene	20.2	0.500	1.00	ug/L	1	20.0	ND	101	79-122%	---	---	
4-Chlorotoluene	19.2	0.500	1.00	ug/L	1	20.0	ND	96	78-122%	---	---	
Dibromochloromethane	22.2	0.500	1.00	ug/L	1	20.0	ND	111	74-126%	---	---	
1,2-Dibromo-3-chloropropane	17.8	2.50	5.00	ug/L	1	20.0	ND	89	62-128%	---	---	
1,2-Dibromoethane (EDB)	20.8	0.250	0.500	ug/L	1	20.0	ND	104	77-121%	---	---	
Dibromomethane	21.1	0.500	1.00	ug/L	1	20.0	ND	106	79-123%	---	---	
1,2-Dichlorobenzene	20.7	0.250	0.500	ug/L	1	20.0	ND	104	80-120%	---	---	
1,3-Dichlorobenzene	20.0	0.250	0.500	ug/L	1	20.0	ND	100	80-120%	---	---	
1,4-Dichlorobenzene	19.8	0.250	0.500	ug/L	1	20.0	ND	99	79-120%	---	---	
Dichlorodifluoromethane	29.0	0.500	1.00	ug/L	1	20.0	ND	145	32-152%	---	---	Q-54a
1,1-Dichloroethane	21.8	0.200	0.400	ug/L	1	20.0	ND	109	77-125%	---	---	
1,2-Dichloroethane (EDC)	24.2	0.200	0.400	ug/L	1	20.0	ND	121	73-128%	---	---	
1,1-Dichloroethene	24.5	0.200	0.400	ug/L	1	20.0	ND	122	71-131%	---	---	
cis-1,2-Dichloroethene	20.0	0.200	0.400	ug/L	1	20.0	ND	100	78-123%	---	---	
trans-1,2-Dichloroethene	21.6	0.200	0.400	ug/L	1	20.0	ND	108	75-124%	---	---	
1,2-Dichloropropane	20.0	0.250	0.500	ug/L	1	20.0	ND	100	78-122%	---	---	
1,3-Dichloropropane	20.7	0.500	1.00	ug/L	1	20.0	ND	104	80-120%	---	---	
2,2-Dichloropropane	21.8	0.500	1.00	ug/L	1	20.0	ND	109	60-139%	---	---	
1,1-Dichloropropene	21.4	0.500	1.00	ug/L	1	20.0	ND	107	79-125%	---	---	
cis-1,3-Dichloropropene	19.0	0.500	1.00	ug/L	1	20.0	ND	95	75-124%	---	---	
trans-1,3-Dichloropropene	23.3	0.500	1.00	ug/L	1	20.0	ND	116	73-127%	---	---	
Ethylbenzene	21.7	0.250	0.500	ug/L	1	20.0	ND	108	79-121%	---	---	
Hexachlorobutadiene	19.8	2.50	5.00	ug/L	1	20.0	ND	99	66-134%	---	---	
2-Hexanone	37.1	5.00	10.0	ug/L	1	40.0	ND	93	57-139%	---	---	
Isopropylbenzene	22.2	0.500	1.00	ug/L	1	20.0	ND	111	72-131%	---	---	
4-Isopropyltoluene	21.7	0.500	1.00	ug/L	1	20.0	ND	108	77-127%	---	---	
Methylene chloride	20.0	5.00	10.0	ug/L	1	20.0	ND	100	74-124%	---	---	
4-Methyl-2-pentanone (MiBK)	37.9	5.00	10.0	ug/L	1	40.0	ND	95	67-130%	---	---	
Methyl tert-butyl ether (MTBE)	20.9	0.500	1.00	ug/L	1	20.0	1.72	96	71-124%	---	---	
Naphthalene	17.1	1.00	2.00	ug/L	1	20.0	ND	86	61-128%	---	---	
n-Propylbenzene	21.6	0.250	0.500	ug/L	1	20.0	ND	108	76-126%	---	---	
Styrene	20.7	0.500	1.00	ug/L	1	20.0	ND	104	78-123%	---	---	
1,1,1,2-Tetrachloroethane	20.9	0.200	0.400	ug/L	1	20.0	ND	104	78-124%	---	---	

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Michele Poquiz For Kurt Johnson, Senior Chemist

Apex Laboratories, LLC
6700 S.W. Sandburg Street
Tigard, OR 97223
503-718-2323
ORELAP ID: OR100062

ANALYTICAL REPORT

AMENDED REPORT

Landau Associates	Project: **Boeing of Portland**	
1500 SW First Avenue Suite 1015	Project Number: **025116.123.450**	**Report ID:**
Portland, OR 97201	Project Manager: **Erin Waibel**	**A3B0416 - 05 02 23 1432**

QUALITY CONTROL (QC) SAMPLE RESULTS

Volatile Organic Compounds by EPA 8260D

Analyte	Result	Detection L Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 23B0617 - EPA 5030C							**Water**					
Matrix Spike (23B0617-MS1)			Prepared: 02/16/23 10:58 Analyzed: 02/16/23 15:38									
QC Source Sample: Non-SDG (A3B0550-04)												
1,1,2,2-Tetrachloroethane	20.5	0.250	0.500	ug/L	1	20.0	ND	102	71-121%	---	---	
Tetrachloroethene (PCE)	20.1	0.200	0.400	ug/L	1	20.0	ND	101	74-129%	---	---	
Toluene	20.7	0.500	1.00	ug/L	1	20.0	ND	103	80-121%	---	---	
1,2,3-Trichlorobenzene	19.7	1.00	2.00	ug/L	1	20.0	ND	98	69-129%	---	---	
1,2,4-Trichlorobenzene	17.2	1.00	2.00	ug/L	1	20.0	ND	86	69-130%	---	---	
1,1,1-Trichloroethane	24.4	0.200	0.400	ug/L	1	20.0	ND	122	74-131%	---	---	
1,1,2-Trichloroethane	20.3	0.250	0.500	ug/L	1	20.0	ND	102	80-120%	---	---	
Trichloroethene (TCE)	18.4	0.200	0.400	ug/L	1	20.0	ND	92	79-123%	---	---	
Trichlorofluoromethane	29.1	1.00	2.00	ug/L	1	20.0	ND	**146**	**65-141%**	---	---	Q-54d
1,2,3-Trichloropropane	21.3	0.500	1.00	ug/L	1	20.0	ND	106	73-122%	---	---	
1,2,4-Trimethylbenzene	21.4	0.500	1.00	ug/L	1	20.0	ND	107	76-124%	---	---	
1,3,5-Trimethylbenzene	21.1	0.500	1.00	ug/L	1	20.0	ND	106	75-124%	---	---	
Vinyl chloride	24.9	0.200	0.400	ug/L	1	20.0	ND	124	58-137%	---	---	
m,p-Xylene	44.3	0.500	1.00	ug/L	1	40.0	ND	111	80-121%	---	---	
o-Xylene	20.4	0.250	0.500	ug/L	1	20.0	ND	102	78-122%	---	---	
Surr: 1,4-Difluorobenzene (Surr)			*Recovery: 94 %*			*Limits: 80-120 %*			*Dilution: 1x*			
Toluene-d8 (Surr)			*100 %*			*80-120 %*			*"*			
4-Bromofluorobenzene (Surr)			*88 %*			*80-120 %*			*"*			

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APEX LABORATORIES

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6700 S.W. Sandburg Street
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503-718-2323
ORELAP ID: **OR100062**

ANALYTICAL REPORT

AMENDED REPORT

Landau Associates
1500 SW First Avenue Suite 1015
Portland, OR 97201

Project: **Boeing of Portland**
Project Number: **025116.123.450**
Project Manager: **Erin Waibel**

Report ID:
A3B0416 - 05 02 23 1432

QUALITY CONTROL (QC) SAMPLE RESULTS

Volatile Organic Compounds by EPA 8260D

Analyte	Result	Detection L Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 23B0659 - EPA 5030C							**Water**					
Blank (23B0659-BLK1)			Prepared: 02/17/23 09:28 Analyzed: 02/17/23 13:20									
EPA 8260D												
Acetone	ND	10.0	20.0	ug/L	1	---	---	---	---	---	---	
Acrylonitrile	ND	1.00	2.00	ug/L	1	---	---	---	---	---	---	
Benzene	ND	0.100	0.200	ug/L	1	---	---	---	---	---	---	
Bromobenzene	ND	0.250	0.500	ug/L	1	---	---	---	---	---	---	
Bromochloromethane	ND	0.500	1.00	ug/L	1	---	---	---	---	---	---	
Bromodichloromethane	ND	0.500	1.00	ug/L	1	---	---	---	---	---	---	
Bromoform	ND	0.500	1.00	ug/L	1	---	---	---	---	---	---	
Bromomethane	ND	5.00	5.00	ug/L	1	---	---	---	---	---	---	
2-Butanone (MEK)	ND	5.00	10.0	ug/L	1	---	---	---	---	---	---	
n-Butylbenzene	ND	0.500	1.00	ug/L	1	---	---	---	---	---	---	
sec-Butylbenzene	ND	0.500	1.00	ug/L	1	---	---	---	---	---	---	
tert-Butylbenzene	ND	0.500	1.00	ug/L	1	---	---	---	---	---	---	
Carbon disulfide	ND	5.00	10.0	ug/L	1	---	---	---	---	---	---	
Carbon tetrachloride	ND	0.500	1.00	ug/L	1	---	---	---	---	---	---	
Chlorobenzene	ND	0.250	0.500	ug/L	1	---	---	---	---	---	---	
Chloroethane	ND	5.00	5.00	ug/L	1	---	---	---	---	---	---	
Chloroform	ND	0.500	1.00	ug/L	1	---	---	---	---	---	---	
Chloromethane	ND	2.50	5.00	ug/L	1	---	---	---	---	---	---	
2-Chlorotoluene	ND	0.500	1.00	ug/L	1	---	---	---	---	---	---	
4-Chlorotoluene	ND	0.500	1.00	ug/L	1	---	---	---	---	---	---	
Dibromochloromethane	ND	0.500	1.00	ug/L	1	---	---	---	---	---	---	
1,2-Dibromo-3-chloropropane	ND	2.50	5.00	ug/L	1	---	---	---	---	---	---	
1,2-Dibromoethane (EDB)	ND	0.250	0.500	ug/L	1	---	---	---	---	---	---	
Dibromomethane	ND	0.500	1.00	ug/L	1	---	---	---	---	---	---	
1,2-Dichlorobenzene	ND	0.250	0.500	ug/L	1	---	---	---	---	---	---	
1,3-Dichlorobenzene	ND	0.250	0.500	ug/L	1	---	---	---	---	---	---	
1,4-Dichlorobenzene	ND	0.250	0.500	ug/L	1	---	---	---	---	---	---	
Dichlorodifluoromethane	ND	0.500	1.00	ug/L	1	---	---	---	---	---	---	
1,1-Dichloroethane	ND	0.200	0.400	ug/L	1	---	---	---	---	---	---	
1,2-Dichloroethane (EDC)	ND	0.200	0.400	ug/L	1	---	---	---	---	---	---	
1,1-Dichloroethene	ND	0.200	0.400	ug/L	1	---	---	---	---	---	---	
cis-1,2-Dichloroethene	ND	0.200	0.400	ug/L	1	---	---	---	---	---	---	
trans-1,2-Dichloroethene	ND	0.200	0.400	ug/L	1	---	---	---	---	---	---	

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Michele Poquiz For Kurt Johnson, Senior Chemist

APEX LABORATORIES

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ORELAP ID: **OR100062**

ANALYTICAL REPORT

AMENDED REPORT

Landau Associates
1500 SW First Avenue Suite 1015
Portland, OR 97201

Project: **Boeing of Portland**
Project Number: **025116.123.450**
Project Manager: **Erin Waibel**

Report ID:
A3B0416 - 05 02 23 1432

QUALITY CONTROL (QC) SAMPLE RESULTS

Volatile Organic Compounds by EPA 8260D

Analyte	Result	Detection L Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 23B0659 - EPA 5030C								**Water**				
Blank (23B0659-BLK1)			Prepared: 02/17/23 09:28		Analyzed: 02/17/23 13:20							
1,2-Dichloropropane	ND	0.250	0.500	ug/L	1	---	---	---	---	---	---	
1,3-Dichloropropane	ND	0.500	1.00	ug/L	1	---	---	---	---	---	---	
2,2-Dichloropropane	ND	0.500	1.00	ug/L	1	---	---	---	---	---	---	
1,1-Dichloropropene	ND	0.500	1.00	ug/L	1	---	---	---	---	---	---	
cis-1,3-Dichloropropene	ND	0.500	1.00	ug/L	1	---	---	---	---	---	---	
trans-1,3-Dichloropropene	ND	0.500	1.00	ug/L	1	---	---	---	---	---	---	
Ethylbenzene	ND	0.250	0.500	ug/L	1	---	---	---	---	---	---	
Hexachlorobutadiene	ND	2.50	5.00	ug/L	1	---	---	---	---	---	---	
2-Hexanone	ND	5.00	10.0	ug/L	1	---	---	---	---	---	---	
Isopropylbenzene	ND	0.500	1.00	ug/L	1	---	---	---	---	---	---	
4-Isopropyltoluene	ND	0.500	1.00	ug/L	1	---	---	---	---	---	---	
Methylene chloride	ND	5.00	10.0	ug/L	1	---	---	---	---	---	---	
4-Methyl-2-pentanone (MiBK)	ND	5.00	10.0	ug/L	1	---	---	---	---	---	---	
Methyl tert-butyl ether (MTBE)	ND	0.500	1.00	ug/L	1	---	---	---	---	---	---	
Naphthalene	ND	1.00	2.00	ug/L	1	---	---	---	---	---	---	
n-Propylbenzene	ND	0.250	0.500	ug/L	1	---	---	---	---	---	---	
Styrene	ND	0.500	1.00	ug/L	1	---	---	---	---	---	---	
1,1,1,2-Tetrachloroethane	ND	0.200	0.400	ug/L	1	---	---	---	---	---	---	
1,1,2,2-Tetrachloroethane	ND	0.250	0.500	ug/L	1	---	---	---	---	---	---	
Tetrachloroethene (PCE)	ND	0.200	0.400	ug/L	1	---	---	---	---	---	---	
Toluene	ND	0.500	1.00	ug/L	1	---	---	---	---	---	---	
1,2,3-Trichlorobenzene	ND	1.00	2.00	ug/L	1	---	---	---	---	---	---	
1,2,4-Trichlorobenzene	ND	1.00	2.00	ug/L	1	---	---	---	---	---	---	
1,1,1-Trichloroethane	ND	0.200	0.400	ug/L	1	---	---	---	---	---	---	
1,1,2-Trichloroethane	ND	0.250	0.500	ug/L	1	---	---	---	---	---	---	
Trichloroethene (TCE)	ND	0.200	0.400	ug/L	1	---	---	---	---	---	---	
Trichlorofluoromethane	ND	1.00	2.00	ug/L	1	---	---	---	---	---	---	
1,2,3-Trichloropropane	ND	0.500	1.00	ug/L	1	---	---	---	---	---	---	
1,2,4-Trimethylbenzene	ND	0.500	1.00	ug/L	1	---	---	---	---	---	---	
1,3,5-Trimethylbenzene	ND	0.500	1.00	ug/L	1	---	---	---	---	---	---	
Vinyl chloride	ND	0.200	0.400	ug/L	1	---	---	---	---	---	---	
m,p-Xylene	ND	0.500	1.00	ug/L	1	---	---	---	---	---	---	
o-Xylene	ND	0.250	0.500	ug/L	1	---	---	---	---	---	---	

Surr: 1,4-Difluorobenzene (Surr) *Recovery: 97 %* *Limits: 80-120 %* *Dilution: 1x*

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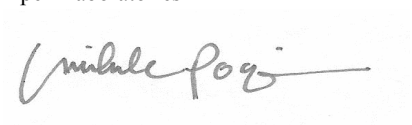

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6700 S.W. Sandburg Street
Tigard, OR 97223
503-718-2323
ORELAP ID: **OR100062**

Landau Associates	Project: **Boeing of Portland**	
1500 SW First Avenue Suite 1015	Project Number: **025116.123.450**	**Report ID:**
Portland, OR 97201	Project Manager: **Erin Waibel**	**A3B0416 - 05 02 23 1432**

QUALITY CONTROL (QC) SAMPLE RESULTS

Volatile Organic Compounds by EPA 8260D

Analyte	Result	Detection L Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 23B0659 - EPA 5030C									**Water**			
Blank (23B0659-BLK1)				Prepared: 02/17/23 09:28 Analyzed: 02/17/23 13:20								
Surr: Toluene-d8 (Surr)			*Recovery: 107 %*	*Limits: 80-120 %*				*Dilution: 1x*				
4-Bromofluorobenzene (Surr)			*102 %*	*80-120 %*				*"*				
LCS (23B0659-BS1)				Prepared: 02/17/23 09:28 Analyzed: 02/17/23 12:19								
EPA 8260D												
Acetone	39.3	10.0	20.0	ug/L	1	40.0	---	98	80-120%	---	---	ICV-01
Acrylonitrile	17.8	1.00	2.00	ug/L	1	20.0	---	89	80-120%	---	---	
Benzene	19.7	0.100	0.200	ug/L	1	20.0	---	98	80-120%	---	---	
Bromobenzene	19.0	0.250	0.500	ug/L	1	20.0	---	95	80-120%	---	---	
Bromochloromethane	21.7	0.500	1.00	ug/L	1	20.0	---	109	80-120%	---	---	
Bromodichloromethane	22.3	0.500	1.00	ug/L	1	20.0	---	112	80-120%	---	---	
Bromoform	23.5	0.500	1.00	ug/L	1	20.0	---	118	80-120%	---	---	
Bromomethane	25.8	5.00	5.00	ug/L	1	20.0	---	**129**	**80-120%**	---	---	Q-56
2-Butanone (MEK)	36.4	5.00	10.0	ug/L	1	40.0	---	91	80-120%	---	---	ICV-01
n-Butylbenzene	21.5	0.500	1.00	ug/L	1	20.0	---	107	80-120%	---	---	
sec-Butylbenzene	21.7	0.500	1.00	ug/L	1	20.0	---	109	80-120%	---	---	
tert-Butylbenzene	19.1	0.500	1.00	ug/L	1	20.0	---	96	80-120%	---	---	
Carbon disulfide	22.5	5.00	10.0	ug/L	1	20.0	---	112	80-120%	---	---	
Carbon tetrachloride	25.2	0.500	1.00	ug/L	1	20.0	---	**126**	**80-120%**	---	---	Q-56
Chlorobenzene	20.4	0.250	0.500	ug/L	1	20.0	---	102	80-120%	---	---	
Chloroethane	38.1	5.00	5.00	ug/L	1	20.0	---	**191**	**80-120%**	---	---	Q-56
Chloroform	21.5	0.500	1.00	ug/L	1	20.0	---	108	80-120%	---	---	
Chloromethane	19.6	2.50	5.00	ug/L	1	20.0	---	98	80-120%	---	---	
2-Chlorotoluene	19.6	0.500	1.00	ug/L	1	20.0	---	98	80-120%	---	---	
4-Chlorotoluene	19.1	0.500	1.00	ug/L	1	20.0	---	95	80-120%	---	---	
Dibromochloromethane	22.0	0.500	1.00	ug/L	1	20.0	---	110	80-120%	---	---	
1,2-Dibromo-3-chloropropane	16.0	2.50	5.00	ug/L	1	20.0	---	80	80-120%	---	---	
1,2-Dibromoethane (EDB)	20.8	0.250	0.500	ug/L	1	20.0	---	104	80-120%	---	---	
Dibromomethane	21.6	0.500	1.00	ug/L	1	20.0	---	108	80-120%	---	---	
1,2-Dichlorobenzene	19.8	0.250	0.500	ug/L	1	20.0	---	99	80-120%	---	---	
1,3-Dichlorobenzene	20.1	0.250	0.500	ug/L	1	20.0	---	101	80-120%	---	---	
1,4-Dichlorobenzene	19.8	0.250	0.500	ug/L	1	20.0	---	99	80-120%	---	---	
Dichlorodifluoromethane	26.3	0.500	1.00	ug/L	1	20.0	---	**132**	**80-120%**	---	---	Q-56
1,1-Dichloroethane	21.0	0.200	0.400	ug/L	1	20.0	---	105	80-120%	---	---	

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ANALYTICAL REPORT

AMENDED REPORT

Landau Associates
1500 SW First Avenue Suite 1015
Portland, OR 97201

Project: **Boeing of Portland**
Project Number: **025116.123.450**
Project Manager: **Erin Waibel**

Report ID:
A3B0416 - 05 02 23 1432

QUALITY CONTROL (QC) SAMPLE RESULTS

Volatile Organic Compounds by EPA 8260D

Analyte	Result	Detection L Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 23B0659 - EPA 5030C							**Water**					
LCS (23B0659-BS1)			Prepared: 02/17/23 09:28		Analyzed: 02/17/23 12:19							
1,2-Dichloroethane (EDC)	23.9	0.200	0.400	ug/L	1	20.0	---	120	80-120%	---	---	
1,1-Dichloroethene	23.1	0.200	0.400	ug/L	1	20.0	---	115	80-120%	---	---	
cis-1,2-Dichloroethene	19.8	0.200	0.400	ug/L	1	20.0	---	99	80-120%	---	---	
trans-1,2-Dichloroethene	20.4	0.200	0.400	ug/L	1	20.0	---	102	80-120%	---	---	
1,2-Dichloropropane	19.1	0.250	0.500	ug/L	1	20.0	---	96	80-120%	---	---	
1,3-Dichloropropane	20.7	0.500	1.00	ug/L	1	20.0	---	103	80-120%	---	---	
2,2-Dichloropropane	23.2	0.500	1.00	ug/L	1	20.0	---	116	80-120%	---	---	
1,1-Dichloropropene	20.4	0.500	1.00	ug/L	1	20.0	---	102	80-120%	---	---	
cis-1,3-Dichloropropene	20.4	0.500	1.00	ug/L	1	20.0	---	102	80-120%	---	---	
trans-1,3-Dichloropropene	22.8	0.500	1.00	ug/L	1	20.0	---	114	80-120%	---	---	
Ethylbenzene	21.4	0.250	0.500	ug/L	1	20.0	---	107	80-120%	---	---	
Hexachlorobutadiene	20.6	2.50	5.00	ug/L	1	20.0	---	103	80-120%	---	---	
2-Hexanone	35.7	5.00	10.0	ug/L	1	40.0	---	89	80-120%	---	---	
Isopropylbenzene	21.6	0.500	1.00	ug/L	1	20.0	---	108	80-120%	---	---	
4-Isopropyltoluene	20.5	0.500	1.00	ug/L	1	20.0	---	102	80-120%	---	---	
Methylene chloride	20.1	5.00	10.0	ug/L	1	20.0	---	100	80-120%	---	---	
4-Methyl-2-pentanone (MiBK)	37.4	5.00	10.0	ug/L	1	40.0	---	93	80-120%	---	---	
Methyl tert-butyl ether (MTBE)	18.1	0.500	1.00	ug/L	1	20.0	---	91	80-120%	---	---	
Naphthalene	16.4	1.00	2.00	ug/L	1	20.0	---	82	80-120%	---	---	
n-Propylbenzene	20.6	0.250	0.500	ug/L	1	20.0	---	103	80-120%	---	---	
Styrene	20.7	0.500	1.00	ug/L	1	20.0	---	103	80-120%	---	---	
1,1,1,2-Tetrachloroethane	20.4	0.200	0.400	ug/L	1	20.0	---	102	80-120%	---	---	
1,1,2,2-Tetrachloroethane	19.7	0.250	0.500	ug/L	1	20.0	---	99	80-120%	---	---	
Tetrachloroethene (PCE)	20.1	0.200	0.400	ug/L	1	20.0	---	101	80-120%	---	---	
Toluene	20.3	0.500	1.00	ug/L	1	20.0	---	101	80-120%	---	---	
1,2,3-Trichlorobenzene	18.6	1.00	2.00	ug/L	1	20.0	---	93	80-120%	---	---	
1,2,4-Trichlorobenzene	17.1	1.00	2.00	ug/L	1	20.0	---	86	80-120%	---	---	
1,1,1-Trichloroethane	23.3	0.200	0.400	ug/L	1	20.0	---	116	80-120%	---	---	
1,1,2-Trichloroethane	20.3	0.250	0.500	ug/L	1	20.0	---	102	80-120%	---	---	
Trichloroethene (TCE)	18.6	0.200	0.400	ug/L	1	20.0	---	93	80-120%	---	---	
Trichlorofluoromethane	29.4	1.00	2.00	ug/L	1	20.0	---	**147**	**80-120%**	---	---	Q-56
1,2,3-Trichloropropane	21.1	0.500	1.00	ug/L	1	20.0	---	106	80-120%	---	---	
1,2,4-Trimethylbenzene	20.6	0.500	1.00	ug/L	1	20.0	---	103	80-120%	---	---	
1,3,5-Trimethylbenzene	20.4	0.500	1.00	ug/L	1	20.0	---	102	80-120%	---	---	

Apex Laboratories

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Michele Poquiz For Kurt Johnson, Senior Chemist

Apex Laboratories, LLC
6700 S.W. Sandburg Street
Tigard, OR 97223
503-718-2323
ORELAP ID: OR100062

ANALYTICAL REPORT

AMENDED REPORT

Landau Associates	Project: Boeing of Portland	
1500 SW First Avenue Suite 1015	Project Number: 025116.123.450	Report ID:
Portland, OR 97201	Project Manager: Erin Waibel	A3B0416 - 05 02 23 1432

QUALITY CONTROL (QC) SAMPLE RESULTS

Volatile Organic Compounds by EPA 8260D

Analyte	Result	Detection L Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 23B0659 - EPA 5030C									Water			
LCS (23B0659-BS1)			Prepared: 02/17/23 09:28 Analyzed: 02/17/23 12:19									
Vinyl chloride	23.6	0.200	0.400	ug/L	1	20.0	---	118	80-120%	---	---	
m,p-Xylene	43.4	0.500	1.00	ug/L	1	40.0	---	109	80-120%	---	---	
o-Xylene	19.9	0.250	0.500	ug/L	1	20.0	---	100	80-120%	---	---	
Surr: 1,4-Difluorobenzene (Surr)			*Recovery: 92 %*		*Limits: 80-120 %*				*Dilution: 1x*			
Toluene-d8 (Surr)			*98 %*		*80-120 %*				*"*			
4-Bromofluorobenzene (Surr)			*87 %*		*80-120 %*				*"*			
Duplicate (23B0659-DUP1)			Prepared: 02/17/23 09:28 Analyzed: 02/17/23 15:11									
QC Source Sample: Non-SDG (A3B0405-02)												
Acetone	**3160**	10.0	20.0	ug/L	1	---	3390	---	---	7	30%	E
Acrylonitrile	ND	1.00	2.00	ug/L	1	---	ND	---	---	---	30%	
Benzene	ND	0.100	0.200	ug/L	1	---	ND	---	---	---	30%	
Bromobenzene	ND	0.250	0.500	ug/L	1	---	ND	---	---	---	30%	
Bromochloromethane	ND	0.500	1.00	ug/L	1	---	ND	---	---	---	30%	
Bromodichloromethane	ND	1.00	1.00	ug/L	1	---	ND	---	---	---	30%	
Bromoform	**2.05**	0.500	1.00	ug/L	1	---	1.86	---	---	10	30%	
Bromomethane	ND	5.00	5.00	ug/L	1	---	ND	---	---	---	30%	
2-Butanone (MEK)	ND	5.00	10.0	ug/L	1	---	ND	---	---	---	30%	
n-Butylbenzene	ND	0.500	1.00	ug/L	1	---	ND	---	---	---	30%	
sec-Butylbenzene	ND	0.500	1.00	ug/L	1	---	ND	---	---	---	30%	
tert-Butylbenzene	ND	0.500	1.00	ug/L	1	---	ND	---	---	---	30%	
Carbon disulfide	ND	5.00	10.0	ug/L	1	---	ND	---	---	---	30%	
Carbon tetrachloride	ND	0.500	1.00	ug/L	1	---	ND	---	---	---	30%	
Chlorobenzene	ND	0.250	0.500	ug/L	1	---	ND	---	---	---	30%	
Chloroethane	ND	5.00	5.00	ug/L	1	---	ND	---	---	---	30%	
Chloroform	**4.13**	0.500	1.00	ug/L	1	---	4.76	---	---	14	30%	
Chloromethane	ND	2.50	5.00	ug/L	1	---	ND	---	---	---	30%	
2-Chlorotoluene	ND	0.500	1.00	ug/L	1	---	ND	---	---	---	30%	
4-Chlorotoluene	ND	0.500	1.00	ug/L	1	---	ND	---	---	---	30%	
Dibromochloromethane	ND	0.500	1.00	ug/L	1	---	ND	---	---	---	30%	
1,2-Dibromo-3-chloropropane	ND	2.50	5.00	ug/L	1	---	ND	---	---	---	30%	
1,2-Dibromoethane (EDB)	ND	0.250	0.500	ug/L	1	---	ND	---	---	---	30%	
Dibromomethane	ND	0.500	1.00	ug/L	1	---	ND	---	---	---	30%	
1,2-Dichlorobenzene	ND	0.250	0.500	ug/L	1	---	ND	---	---	---	30%	

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Michele Poquiz For Kurt Johnson, Senior Chemist

APEX LABORATORIES

Apex Laboratories, LLC
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Tigard, OR 97223
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ORELAP ID: **OR100062**

ANALYTICAL REPORT

AMENDED REPORT

Landau Associates
1500 SW First Avenue Suite 1015
Portland, OR 97201

Project: **Boeing of Portland**
Project Number: **025116.123.450**
Project Manager: **Erin Waibel**

Report ID:
A3B0416 - 05 02 23 1432

QUALITY CONTROL (QC) SAMPLE RESULTS

Volatile Organic Compounds by EPA 8260D

Analyte	Result	Detection L Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 23B0659 - EPA 5030C							**Water**					
Duplicate (23B0659-DUP1)			Prepared: 02/17/23 09:28		Analyzed: 02/17/23 15:11							
QC Source Sample: Non-SDG (A3B0405-02)												
1,3-Dichlorobenzene	ND	0.250	0.500	ug/L	1	---	ND	---	---	---	30%	
1,4-Dichlorobenzene	ND	0.250	0.500	ug/L	1	---	ND	---	---	---	30%	
Dichlorodifluoromethane	ND	0.500	1.00	ug/L	1	---	ND	---	---	---	30%	
1,1-Dichloroethane	ND	0.200	0.400	ug/L	1	---	ND	---	---	---	30%	
1,2-Dichloroethane (EDC)	ND	0.200	0.400	ug/L	1	---	ND	---	---	---	30%	
1,1-Dichloroethene	ND	0.200	0.400	ug/L	1	---	ND	---	---	---	30%	
cis-1,2-Dichloroethene	ND	0.200	0.400	ug/L	1	---	ND	---	---	---	30%	
trans-1,2-Dichloroethene	ND	0.200	0.400	ug/L	1	---	ND	---	---	---	30%	
1,2-Dichloropropane	ND	0.250	0.500	ug/L	1	---	ND	---	---	---	30%	
1,3-Dichloropropane	ND	0.500	1.00	ug/L	1	---	ND	---	---	---	30%	
2,2-Dichloropropane	ND	0.500	1.00	ug/L	1	---	ND	---	---	---	30%	
1,1-Dichloropropene	ND	0.500	1.00	ug/L	1	---	ND	---	---	---	30%	
cis-1,3-Dichloropropene	ND	0.500	1.00	ug/L	1	---	ND	---	---	---	30%	
trans-1,3-Dichloropropene	ND	0.500	1.00	ug/L	1	---	ND	---	---	---	30%	
Ethylbenzene	ND	0.250	0.500	ug/L	1	---	ND	---	---	---	30%	
Hexachlorobutadiene	ND	2.50	5.00	ug/L	1	---	ND	---	---	---	30%	
2-Hexanone	ND	5.00	10.0	ug/L	1	---	ND	---	---	---	30%	
Isopropylbenzene	ND	0.500	1.00	ug/L	1	---	ND	---	---	---	30%	
4-Isopropyltoluene	ND	0.500	1.00	ug/L	1	---	ND	---	---	---	30%	
Methylene chloride	ND	5.00	10.0	ug/L	1	---	ND	---	---	---	30%	
4-Methyl-2-pentanone (MiBK)	ND	5.00	10.0	ug/L	1	---	ND	---	---	---	30%	
Methyl tert-butyl ether (MTBE)	ND	0.500	1.00	ug/L	1	---	ND	---	---	---	30%	
Naphthalene	ND	1.00	2.00	ug/L	1	---	ND	---	---	---	30%	
n-Propylbenzene	ND	0.250	0.500	ug/L	1	---	ND	---	---	---	30%	
Styrene	ND	0.500	1.00	ug/L	1	---	ND	---	---	---	30%	
1,1,1,2-Tetrachloroethane	ND	0.200	0.400	ug/L	1	---	ND	---	---	---	30%	
1,1,2,2-Tetrachloroethane	ND	0.250	0.500	ug/L	1	---	ND	---	---	---	30%	
Tetrachloroethene (PCE)	ND	0.200	0.400	ug/L	1	---	ND	---	---	---	30%	
Toluene	ND	0.500	1.00	ug/L	1	---	ND	---	---	---	30%	
1,2,3-Trichlorobenzene	ND	1.00	2.00	ug/L	1	---	ND	---	---	---	30%	
1,2,4-Trichlorobenzene	ND	1.00	2.00	ug/L	1	---	ND	---	---	---	30%	
1,1,1-Trichloroethane	ND	0.200	0.400	ug/L	1	---	ND	---	---	---	30%	
1,1,2-Trichloroethane	ND	0.250	0.500	ug/L	1	---	ND	---	---	---	30%	

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Michele Poquiz For Kurt Johnson, Senior Chemist

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503-718-2323
ORELAP ID: OR100062

ANALYTICAL REPORT

AMENDED REPORT

Landau Associates	Project: **Boeing of Portland**	
1500 SW First Avenue Suite 1015	Project Number: **025116.123.450**	**Report ID:**
Portland, OR 97201	Project Manager: **Erin Waibel**	**A3B0416 - 05 02 23 1432**

QUALITY CONTROL (QC) SAMPLE RESULTS

Volatile Organic Compounds by EPA 8260D

Analyte	Result	Detection L Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 23B0659 - EPA 5030C							**Water**					
Duplicate (23B0659-DUP1)			Prepared: 02/17/23 09:28		Analyzed: 02/17/23 15:11							
QC Source Sample: Non-SDG (A3B0405-02)												
Trichloroethene (TCE)	ND	0.200	0.400	ug/L	1	---	ND	---	---	---	30%	
Trichlorofluoromethane	ND	1.00	2.00	ug/L	1	---	ND	---	---	---	30%	
1,2,3-Trichloropropane	ND	0.500	1.00	ug/L	1	---	ND	---	---	---	30%	
1,2,4-Trimethylbenzene	ND	0.500	1.00	ug/L	1	---	ND	---	---	---	30%	
1,3,5-Trimethylbenzene	ND	0.500	1.00	ug/L	1	---	ND	---	---	---	30%	
Vinyl chloride	ND	0.200	0.400	ug/L	1	---	ND	---	---	---	30%	
m,p-Xylene	ND	0.500	1.00	ug/L	1	---	ND	---	---	---	30%	
o-Xylene	ND	0.250	0.500	ug/L	1	---	ND	---	---	---	30%	
Surr: 1,4-Difluorobenzene (Surr)			*Recovery: 95 %*		*Limits: 80-120 %*			*Dilution: 1x*				
Toluene-d8 (Surr)			*104 %*		*80-120 %*			*"*				
4-Bromofluorobenzene (Surr)			*101 %*		*80-120 %*			*"*				
Matrix Spike (23B0659-MS1)			Prepared: 02/17/23 09:28		Analyzed: 02/17/23 16:40							
QC Source Sample: Non-SDG (A3B0480-01)												
EPA 8260D												
Acetone	43.0	10.0	20.0	ug/L	1	40.0	ND	107	39-160%	---	---	ICV-01
Acrylonitrile	17.0	1.00	2.00	ug/L	1	20.0	ND	85	63-135%	---	---	
Benzene	18.6	0.100	0.200	ug/L	1	20.0	ND	93	79-120%	---	---	
Bromobenzene	17.1	0.250	0.500	ug/L	1	20.0	ND	85	80-120%	---	---	
Bromochloromethane	20.4	0.500	1.00	ug/L	1	20.0	ND	102	78-123%	---	---	
Bromodichloromethane	21.2	0.500	1.00	ug/L	1	20.0	ND	106	79-125%	---	---	
Bromoform	22.0	0.500	1.00	ug/L	1	20.0	ND	110	66-130%	---	---	
Bromomethane	25.7	5.00	5.00	ug/L	1	20.0	ND	128	53-141%	---	---	Q-54k
2-Butanone (MEK)	35.0	5.00	10.0	ug/L	1	40.0	ND	88	56-143%	---	---	
n-Butylbenzene	19.9	0.500	1.00	ug/L	1	20.0	ND	99	75-128%	---	---	
sec-Butylbenzene	20.0	0.500	1.00	ug/L	1	20.0	ND	100	77-126%	---	---	
tert-Butylbenzene	17.8	0.500	1.00	ug/L	1	20.0	ND	89	78-124%	---	---	
Carbon disulfide	21.6	5.00	10.0	ug/L	1	20.0	ND	108	64-133%	---	---	
Carbon tetrachloride	25.2	0.500	1.00	ug/L	1	20.0	ND	126	72-136%	---	---	Q-54h
Chlorobenzene	18.9	0.250	0.500	ug/L	1	20.0	ND	95	80-120%	---	---	
Chloroethane	36.6	5.00	5.00	ug/L	1	20.0	ND	**183**	**60-138%**	---	---	Q-54i
Chloroform	20.8	0.500	1.00	ug/L	1	20.0	ND	104	79-124%	---	---	
Chloromethane	19.3	2.50	5.00	ug/L	1	20.0	ND	96	50-139%	---	---	

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APEX LABORATORIES

ANALYTICAL REPORT

AMENDED REPORT

Apex Laboratories, LLC
6700 S.W. Sandburg Street
Tigard, OR 97223
503-718-2323
ORELAP ID: **OR100062**

Landau Associates	Project: **Boeing of Portland**	
1500 SW First Avenue Suite 1015	Project Number: **025116.123.450**	**Report ID:**
Portland, OR 97201	Project Manager: **Erin Waibel**	**A3B0416 - 05 02 23 1432**

QUALITY CONTROL (QC) SAMPLE RESULTS

Volatile Organic Compounds by EPA 8260D

Analyte	Result	Detection L Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 23B0659 - EPA 5030C							**Water**					
Matrix Spike (23B0659-MS1)			Prepared: 02/17/23 09:28		Analyzed: 02/17/23 16:40							
QC Source Sample: Non-SDG (A3B0480-01)												
2-Chlorotoluene	17.3	0.500	1.00	ug/L	1	20.0	ND	87	79-122%	---	---	
4-Chlorotoluene	17.1	0.500	1.00	ug/L	1	20.0	ND	85	78-122%	---	---	
Dibromochloromethane	19.9	0.500	1.00	ug/L	1	20.0	ND	99	74-126%	---	---	
1,2-Dibromo-3-chloropropane	16.0	2.50	5.00	ug/L	1	20.0	ND	80	62-128%	---	---	
1,2-Dibromoethane (EDB)	19.0	0.250	0.500	ug/L	1	20.0	ND	95	77-121%	---	---	
Dibromomethane	20.0	0.500	1.00	ug/L	1	20.0	ND	100	79-123%	---	---	
1,2-Dichlorobenzene	18.3	0.250	0.500	ug/L	1	20.0	ND	92	80-120%	---	---	
1,3-Dichlorobenzene	18.3	0.250	0.500	ug/L	1	20.0	ND	91	80-120%	---	---	
1,4-Dichlorobenzene	18.1	0.250	0.500	ug/L	1	20.0	ND	90	79-120%	---	---	
Dichlorodifluoromethane	26.0	0.500	1.00	ug/L	1	20.0	ND	130	32-152%	---	---	Q-54b
1,1-Dichloroethane	20.1	0.200	0.400	ug/L	1	20.0	ND	101	77-125%	---	---	
1,2-Dichloroethane (EDC)	21.9	0.200	0.400	ug/L	1	20.0	ND	110	73-128%	---	---	
1,1-Dichloroethene	22.9	0.200	0.400	ug/L	1	20.0	ND	114	71-131%	---	---	
cis-1,2-Dichloroethene	18.8	0.200	0.400	ug/L	1	20.0	ND	94	78-123%	---	---	
trans-1,2-Dichloroethene	19.6	0.200	0.400	ug/L	1	20.0	ND	98	75-124%	---	---	
1,2-Dichloropropane	17.5	0.250	0.500	ug/L	1	20.0	ND	88	78-122%	---	---	
1,3-Dichloropropane	18.8	0.500	1.00	ug/L	1	20.0	ND	94	80-120%	---	---	
2,2-Dichloropropane	20.1	0.500	1.00	ug/L	1	20.0	ND	101	60-139%	---	---	
1,1-Dichloropropene	19.9	0.500	1.00	ug/L	1	20.0	ND	99	79-125%	---	---	
cis-1,3-Dichloropropene	16.4	0.500	1.00	ug/L	1	20.0	ND	82	75-124%	---	---	
trans-1,3-Dichloropropene	20.7	0.500	1.00	ug/L	1	20.0	ND	104	73-127%	---	---	
Ethylbenzene	20.0	0.250	0.500	ug/L	1	20.0	ND	100	79-121%	---	---	
Hexachlorobutadiene	17.5	2.50	5.00	ug/L	1	20.0	ND	87	66-134%	---	---	
2-Hexanone	31.1	5.00	10.0	ug/L	1	40.0	ND	78	57-139%	---	---	
Isopropylbenzene	20.2	0.500	1.00	ug/L	1	20.0	ND	101	72-131%	---	---	
4-Isopropyltoluene	19.3	0.500	1.00	ug/L	1	20.0	ND	97	77-127%	---	---	
Methylene chloride	19.2	5.00	10.0	ug/L	1	20.0	ND	96	74-124%	---	---	
4-Methyl-2-pentanone (MiBK)	33.6	5.00	10.0	ug/L	1	40.0	ND	84	67-130%	---	---	
Methyl tert-butyl ether (MTBE)	17.1	0.500	1.00	ug/L	1	20.0	ND	85	71-124%	---	---	
Naphthalene	14.4	1.00	2.00	ug/L	1	20.0	ND	72	61-128%	---	---	
n-Propylbenzene	18.8	0.250	0.500	ug/L	1	20.0	ND	94	76-126%	---	---	
Styrene	17.7	0.500	1.00	ug/L	1	20.0	ND	88	78-123%	---	---	
1,1,1,2-Tetrachloroethane	18.3	0.200	0.400	ug/L	1	20.0	ND	92	78-124%	---	---	

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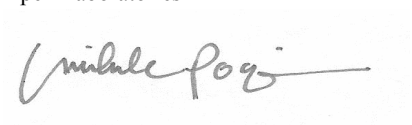

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Michele Poquiz For Kurt Johnson, Senior Chemist

Apex Laboratories, LLC

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ORELAP ID: **OR100062**

Landau Associates	Project: **Boeing of Portland**	
1500 SW First Avenue Suite 1015	Project Number: **025116.123.450**	**Report ID:**
Portland, OR 97201	Project Manager: **Erin Waibel**	**A3B0416 - 05 02 23 1432**

QUALITY CONTROL (QC) SAMPLE RESULTS

Volatile Organic Compounds by EPA 8260D

Analyte	Result	Detection L Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 23B0659 - EPA 5030C							**Water**					
Matrix Spike (23B0659-MS1)			Prepared: 02/17/23 09:28		Analyzed: 02/17/23 16:40							
QC Source Sample: Non-SDG (A3B0480-01)												
1,1,2,2-Tetrachloroethane	18.7	0.250	0.500	ug/L	1	20.0	ND	94	71-121%	---	---	
Tetrachloroethene (PCE)	19.6	0.200	0.400	ug/L	1	20.0	ND	98	74-129%	---	---	
Toluene	18.7	0.500	1.00	ug/L	1	20.0	ND	94	80-121%	---	---	
1,2,3-Trichlorobenzene	17.3	1.00	2.00	ug/L	1	20.0	ND	87	69-129%	---	---	
1,2,4-Trichlorobenzene	15.5	1.00	2.00	ug/L	1	20.0	ND	78	69-130%	---	---	
1,1,1-Trichloroethane	22.4	0.200	0.400	ug/L	1	20.0	ND	112	74-131%	---	---	
1,1,2-Trichloroethane	18.8	0.250	0.500	ug/L	1	20.0	ND	94	80-120%	---	---	
Trichloroethene (TCE)	17.2	0.200	0.400	ug/L	1	20.0	0.550	83	79-123%	---	---	
Trichlorofluoromethane	27.7	1.00	2.00	ug/L	1	20.0	ND	139	65-141%	---	---	Q-54e
1,2,3-Trichloropropane	18.1	0.500	1.00	ug/L	1	20.0	ND	91	73-122%	---	---	
1,2,4-Trimethylbenzene	19.3	0.500	1.00	ug/L	1	20.0	ND	96	76-124%	---	---	
1,3,5-Trimethylbenzene	18.8	0.500	1.00	ug/L	1	20.0	ND	94	75-124%	---	---	
Vinyl chloride	22.9	0.200	0.400	ug/L	1	20.0	ND	114	58-137%	---	---	
m,p-Xylene	40.8	0.500	1.00	ug/L	1	40.0	ND	102	80-121%	---	---	
o-Xylene	18.2	0.250	0.500	ug/L	1	20.0	ND	91	78-122%	---	---	
Surr: 1,4-Difluorobenzene (Surr)			*Recovery: 95 %*		*Limits: 80-120 %*			*Dilution: 1x*				
Toluene-d8 (Surr)			*99 %*		*80-120 %*			*"*				
4-Bromofluorobenzene (Surr)			*89 %*		*80-120 %*			*"*				

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Apex Laboratories, LLC
6700 S.W. Sandburg Street
Tigard, OR 97223
503-718-2323
ORELAP ID: OR100062

ANALYTICAL REPORT

AMENDED REPORT

Landau Associates	Project: **Boeing of Portland**	
1500 SW First Avenue Suite 1015	Project Number: **025116.123.450**	**Report ID:**
Portland, OR 97201	Project Manager: **Erin Waibel**	**A3B0416 - 05 02 23 1432**

SAMPLE PREPARATION INFORMATION

Diesel and/or Oil Hydrocarbons by NWTPH-Dx

Prep: EPA 3510C (Fuels/Acid Ext.)

Lab Number	Matrix	Method	Sampled	Prepared	Sample Initial/Final	Default Initial/Final	RL Prep Factor
Batch: 23C0314							
A3B0416-02	Water	NWTPH-Dx LL	02/10/23 09:15	03/08/23 12:39	910mL/2mL	1000mL/2mL	1.10
A3B0416-03	Water	NWTPH-Dx LL	02/10/23 11:47	03/08/23 12:39	850mL/2mL	1000mL/2mL	1.18
A3B0416-04RE1	Water	NWTPH-Dx LL	02/08/23 11:45	03/08/23 12:39	890mL/2mL	1000mL/2mL	1.12
A3B0416-05RE1	Water	NWTPH-Dx LL	02/10/23 10:30	03/08/23 12:39	1040mL/2mL	1000mL/2mL	0.96

Diesel and/or Oil Hydrocarbons by NWTPH-Dx with Silica Gel Column Cleanup

Prep: EPA 3510C (Fuels/Acid Ext.) w/Silica Gel Column

Lab Number	Matrix	Method	Sampled	Prepared	Sample Initial/Final	Default Initial/Final	RL Prep Factor
Batch: 23C0468							
A3B0416-02	Water	NWTPH-Dx/SGC	02/10/23 09:15	03/08/23 12:39	910mL/2mL	1000mL/2mL	1.10
A3B0416-03	Water	NWTPH-Dx/SGC	02/10/23 11:47	03/08/23 12:39	850mL/2mL	1000mL/2mL	1.18
A3B0416-04	Water	NWTPH-Dx/SGC	02/08/23 11:45	03/08/23 12:39	890mL/2mL	1000mL/2mL	1.12
A3B0416-05	Water	NWTPH-Dx/SGC	02/10/23 10:30	03/08/23 12:39	1040mL/2mL	1000mL/2mL	0.96

Volatile Organic Compounds by EPA 8260D

Prep: EPA 5030C

Lab Number	Matrix	Method	Sampled	Prepared	Sample Initial/Final	Default Initial/Final	RL Prep Factor
Batch: 23B0617							
A3B0416-02RE1	Water	EPA 8260D	02/10/23 09:15	02/16/23 10:58	5mL/5mL	5mL/5mL	1.00
A3B0416-03RE1	Water	EPA 8260D	02/10/23 11:47	02/16/23 10:58	5mL/5mL	5mL/5mL	1.00
A3B0416-05RE1	Water	EPA 8260D	02/10/23 10:30	02/16/23 10:58	5mL/5mL	5mL/5mL	1.00
Batch: 23B0659							
A3B0416-01	Water	EPA 8260D	02/10/23 00:00	02/17/23 09:28	5mL/5mL	5mL/5mL	1.00

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1500 SW First Avenue Suite 1015	Project Number: **025116.123.450**	**Report ID:**
Portland, OR 97201	Project Manager: **Erin Waibel**	**A3B0416 - 05 02 23 1432**

QUALIFIER DEFINITIONS

Client Sample and Quality Control (QC) Sample Qualifier Definitions:

Apex Laboratories

E	Estimated Value. The result is above the calibration range of the instrument.
F-13	The chromatographic pattern does not resemble the fuel standard used for quantitation
H-02	This sample was extracted outside of the recommended holding time.
ICV-01	Estimated Result. Initial Calibration Verification (ICV) failed high. There is no effect on non-detect results.
J	Estimated Result. Result detected below the lowest point of the calibration curve, but above the specified MDL.
Q-01	Spike recovery and/or RPD is outside acceptance limits.
Q-03	Spike recovery and/or RPD is outside control limits due to the high concentration of analyte present in the sample.
Q-19	Blank Spike Duplicate (BSD) sample analyzed in place of Matrix Spike/Duplicate samples due to limited sample amount available for analysis.
Q-54	Daily Continuing Calibration Verification recovery for this analyte failed the +/-20% criteria listed in EPA method 8260/8270 by +1%. The results are reported as Estimated Values.
Q-54a	Daily Continuing Calibration Verification recovery for this analyte failed the +/-20% criteria listed in EPA method 8260/8270 by +11%. The results are reported as Estimated Values.
Q-54b	Daily Continuing Calibration Verification recovery for this analyte failed the +/-20% criteria listed in EPA method 8260/8270 by +12%. The results are reported as Estimated Values.
Q-54c	Daily Continuing Calibration Verification recovery for this analyte failed the +/-20% criteria listed in EPA method 8260/8270 by +17%. The results are reported as Estimated Values.
Q-54d	Daily Continuing Calibration Verification recovery for this analyte failed the +/-20% criteria listed in EPA method 8260/8270 by +21%. The results are reported as Estimated Values.
Q-54e	Daily Continuing Calibration Verification recovery for this analyte failed the +/-20% criteria listed in EPA method 8260/8270 by +27%. The results are reported as Estimated Values.
Q-54f	Daily Continuing Calibration Verification recovery for this analyte failed the +/-20% criteria listed in EPA method 8260/8270 by +51%. The results are reported as Estimated Values.
Q-54g	Daily Continuing Calibration Verification recovery for this analyte failed the +/-20% criteria listed in EPA method 8260/8270 by +55%. The results are reported as Estimated Values.
Q-54h	Daily Continuing Calibration Verification recovery for this analyte failed the +/-20% criteria listed in EPA method 8260/8270 by +6%. The results are reported as Estimated Values.
Q-54i	Daily Continuing Calibration Verification recovery for this analyte failed the +/-20% criteria listed in EPA method 8260/8270 by +71%. The results are reported as Estimated Values.
Q-54j	Daily Continuing Calibration Verification recovery for this analyte failed the +/-20% criteria listed in EPA method 8260/8270 by +8%. The results are reported as Estimated Values.

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Michele Poquiz For Kurt Johnson, Senior Chemist

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Portland, OR 97201	Project Manager: **Erin Waibel**	**A3B0416 - 05 02 23 1432**

Q-54k Daily Continuing Calibration Verification recovery for this analyte failed the +/-20% criteria listed in EPA method 8260/8270 by +9%. The results are reported as Estimated Values.

Q-54l Daily Continuing Calibration Verification recovery for this analyte failed the +/-20% criteria listed in EPA method 8260/8270 by -14%. The results are reported as Estimated Values.

Q-55 Daily CCV/LCS recovery for this analyte was below the +/-20% criteria listed in EPA 8260, however there is adequate sensitivity to ensure detection at the reporting level.

Q-56 Daily CCV/LCS recovery for this analyte was above the +/-20% criteria listed in EPA 8260

S-01 Surrogate recovery for this sample is not available due to sample dilution required from high analyte concentration and/or matrix interference.

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Portland, OR 97201	Project Manager: **Erin Waibel**	**A3B0416 - 05 02 23 1432**

REPORTING NOTES AND CONVENTIONS:

Abbreviations:

DET Analyte DETECTED at or above the detection or reporting limit.

ND Analyte NOT DETECTED at or above the detection or reporting limit.

NR Result Not Reported

RPD Relative Percent Difference. RPDs for Matrix Spikes and Matrix Spike Duplicates are based on concentration, not recovery.

Detection Limits: Limit of Detection (LOD)

Limits of Detection (LODs) are normally set at a level of one half the validated Limit of Quantitation (LOQ).
If no value is listed ('-----'), then the data has not been evaluated below the Reporting Limit.

Reporting Limits: Limit of Quantitation (LOQ)

Validated Limits of Quantitation (LOQs) are reported as the Reporting Limits for all analyses where the LOQ, MRL, PQL or CRL are requested. The LOQ represents a level at or above the low point of the calibration curve, that has been validated according to Apex Laboratories' comprehensive LOQ policies and procedures.

Reporting Conventions:

Basis: Results for soil samples are generally reported on a 100% dry weight basis.
The Result Basis is listed following the units as " dry", " wet", or " " (blank) designation.

" dry" Sample results and Reporting Limits are reported on a dry weight basis. (i.e. "ug/kg dry")
See Percent Solids section for details of dry weight analysis.

" wet" Sample results and Reporting Limits for this analysis are normally dry weight corrected, but have not been modified in this case.

" " Results without 'wet' or 'dry' designation are not normally dry weight corrected. These results are considered 'As Received'.

QC Source:

In cases where there is insufficient sample provided for Sample Duplicates and/or Matrix Spikes, a Lab Control Sample Duplicate (LCS Dup) may be analyzed to demonstrate accuracy and precision of the extraction batch.

Non-Client Batch QC Samples (Duplicates and Matrix Spike/Duplicates) may not be included in this report. Please request a Full QC report if this data is required.

Miscellaneous Notes:

" --- " QC results are not applicable. For example, % Recoveries for Blanks and Duplicates, % RPD for Blanks, Blank Spikes and Matrix Spikes, etc.

" *** " Used to indicate a possible discrepancy with the Sample and Sample Duplicate results when the %RPD is not available. In this case, either the Sample or the Sample Duplicate has a reportable result for this analyte, while the other is Non Detect (ND).

Blanks:

Standard practice is to evaluate the results from Blank QC Samples down to a level equal to ½ the Reporting Limit (RL).
-For Blank hits falling between ½ the RL and the RL (J flagged hits), the associated sample and QC data will receive a 'B-02' qualifier.
-For Blank hits above the RL, the associated sample and QC data will receive a 'B' qualifier, per Apex Laboratories' Blank Policy.

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REPORTING NOTES AND CONVENTIONS (Cont.):

Blanks (Cont.):

Sample results flagged with a 'B' or 'B-02' qualifier are potentially biased high if the sample results are less than ten times the level found in the blank for inorganic analyses, or less than five times the level found in the blank for organic analyses.

'B' and 'B-02' qualifications are only applied to sample results detected above the Reporting Level.

Preparation Notes:

Mixed Matrix Samples:

Water Samples:

Water samples containing significant amounts of sediment are decanted or separated prior to extraction, and only the water portion analyzed, unless otherwise directed by the client.

Soil and Sediment Samples:

Soil and Sediment samples containing significant amounts of water are decanted prior to extraction, and only the solid portion analyzed, unless otherwise directed by the client.

Sampling and Preservation Notes:

Certain regulatory programs, such as National Pollutant Discharge Elimination System (NPDES), require that activities such as sample filtration (for dissolved metals, orthophosphate, hexavalent chromium, etc.) and testing of short hold analytes (pH, Dissolved Oxygen, etc.) be performed in the field (on-site) within a short time window. In addition, sample matrix spikes are required for some analyses, and sufficient volume must be provided, and billable site specific QC requested, if this is required. All regulatory permits should be reviewed to ensure that these requirements are being met.

Data users should be aware of which regulations pertain to the samples they submit for testing. If related sample collection activities are not approved for a particular regulatory program, results should be considered estimates. Apex Laboratories will qualify these analytes according to the most stringent requirements, however results for samples that are for non-regulatory purposes may be acceptable.

Samples that have been filtered and preserved at Apex Laboratories per client request are listed in the preparation section of the report with the date and time of filtration listed.

Apex Laboratories maintains detailed records on sample receipt, including client label verification, cooler temperature, sample preservation, hold time compliance and field filtration. Data is qualified as necessary, and the lack of qualification indicates compliance with required parameters.

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LABORATORY ACCREDITATION INFORMATION

ORELAP Certification ID: OR100062 (Primary Accreditation) - EPA ID: OR01039

All methods and analytes reported from work performed at Apex Laboratories are included on Apex Laboratories' ORELAP Scope of Certification, with the exception of any analyte(s) listed below:

Apex Laboratories

Matrix	Analysis	TNI_ID	Analyte	TNI_ID	Accreditation

All reported analytes are included in Apex Laboratories' current ORELAP scope.

Secondary Accreditations

Apex Laboratories also maintains reciprocal accreditation with non-TNI states (Washington DOE), as well as other state specific accreditations not listed here.

Subcontract Laboratory Accreditations

Subcontracted data falls outside of Apex Laboratories' Scope of Accreditation.
Please see the Subcontract Laboratory report for full details, or contact your Project Manager for more information.

Field Testing Parameters

Results for Field Tested data are provded by the client or sampler, and fall outside of Apex Laboratories' Scope of Accreditation.

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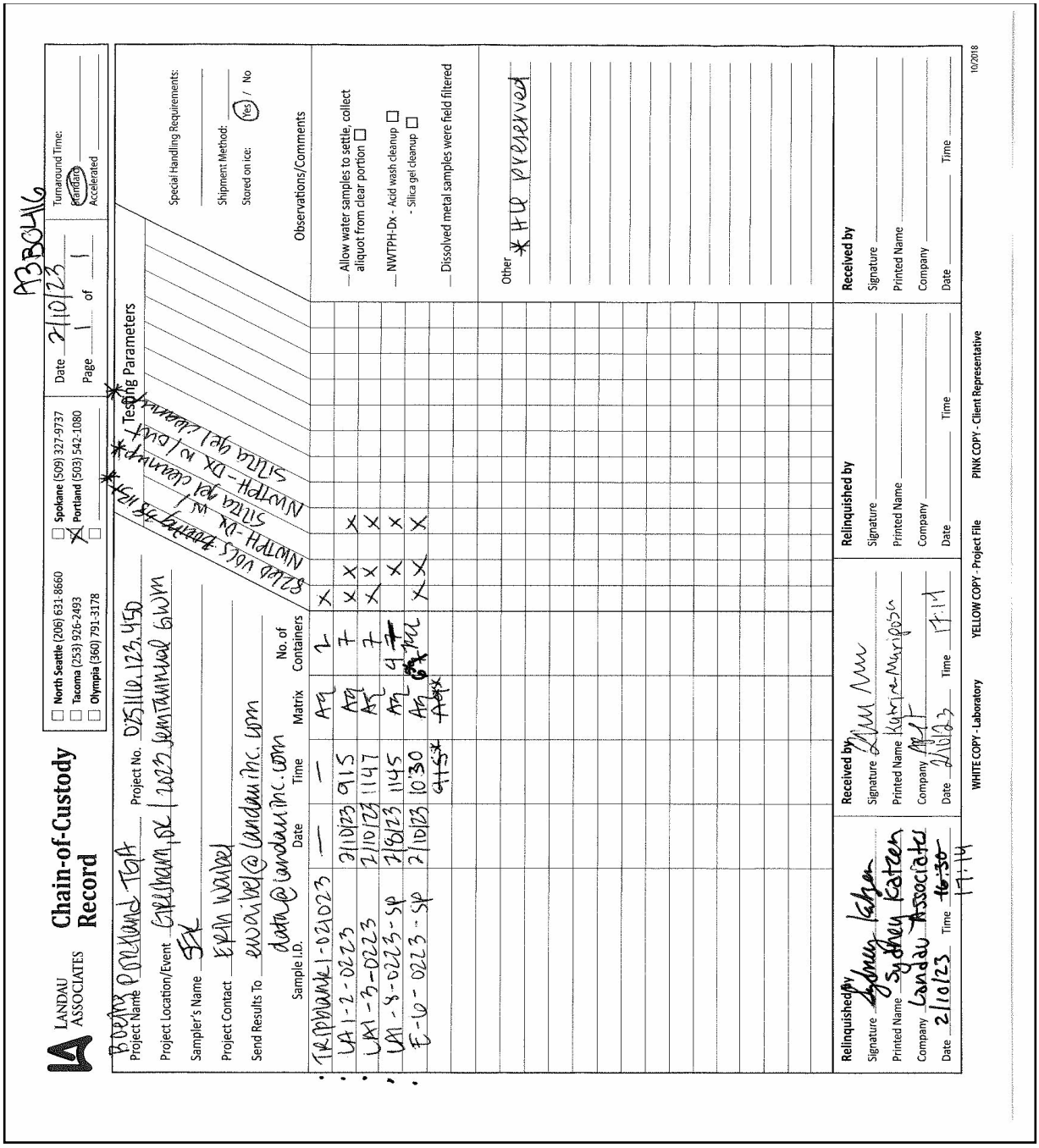

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Portland, OR 97201	Project Manager: **Erin Waibel**	**A3B0416 - 05 02 23 1432**

APEX LABS COOLER RECEIPT FORM

Client: Landau Associates Element WO#: A3 B04116

Project/Project #: Boeing Portland TGA # 025116.123.450

Delivery Info:

Date/time received: 2/10/23 @ 1714 By: KAM

Delivered by: Apex__ Client X ESS__ FedEx__ UPS__ Radio__ Morgan__ SDS__ Evergreen__ Other__

Cooler Inspection Date/time inspected: 2/10/23 @ 1716 By: KAM

Chain of Custody included? Yes X No

Signed/dated by client? Yes X No

	Cooler #1	Cooler #2	Cooler #3	Cooler #4	Cooler #5	Cooler #6	Cooler #7
Temperature (°C)	4.9	5.1					
Custody seals? (Y/N)	N	N					
Received on ice? (Y/N)	Y	Y					
Temp. blanks? (Y/N)	N	N					
Ice type: (Gel/Real/Other)	Real	Real					
Condition (In/Out):	In	In					

Cooler out of temp? (Y/N) Possible reason why:

Green dots applied to out of temperature samples? Yes/No

Out of temperature samples form initiated? Yes/No

Sample Inspection: Date/time inspected: 2/10/23 @ 1815 By: RKP

All samples intact? Yes X No__ Comments:

Bottle labels/COCs agree? Yes__ No X Comments: Containers read BOP-LAI8-0223, E-6-0223.

COC/container discrepancies form initiated? Yes__ No X

Containers/volumes received appropriate for analysis? Yes X No__ Comments:

Do VOA vials have visible headspace? Yes__ No X NA__

Comments 3/3 sed. for LAI-2 + LAI-3

Water samples: pH checked: Yes X No__ NA__ pH appropriate? Yes X No__ NA__

Comments:

Additional information:

Labeled by: RKP Witness: KAM Cooler Inspected by: RKP

Form Y-003 R-00

Apex Laboratories

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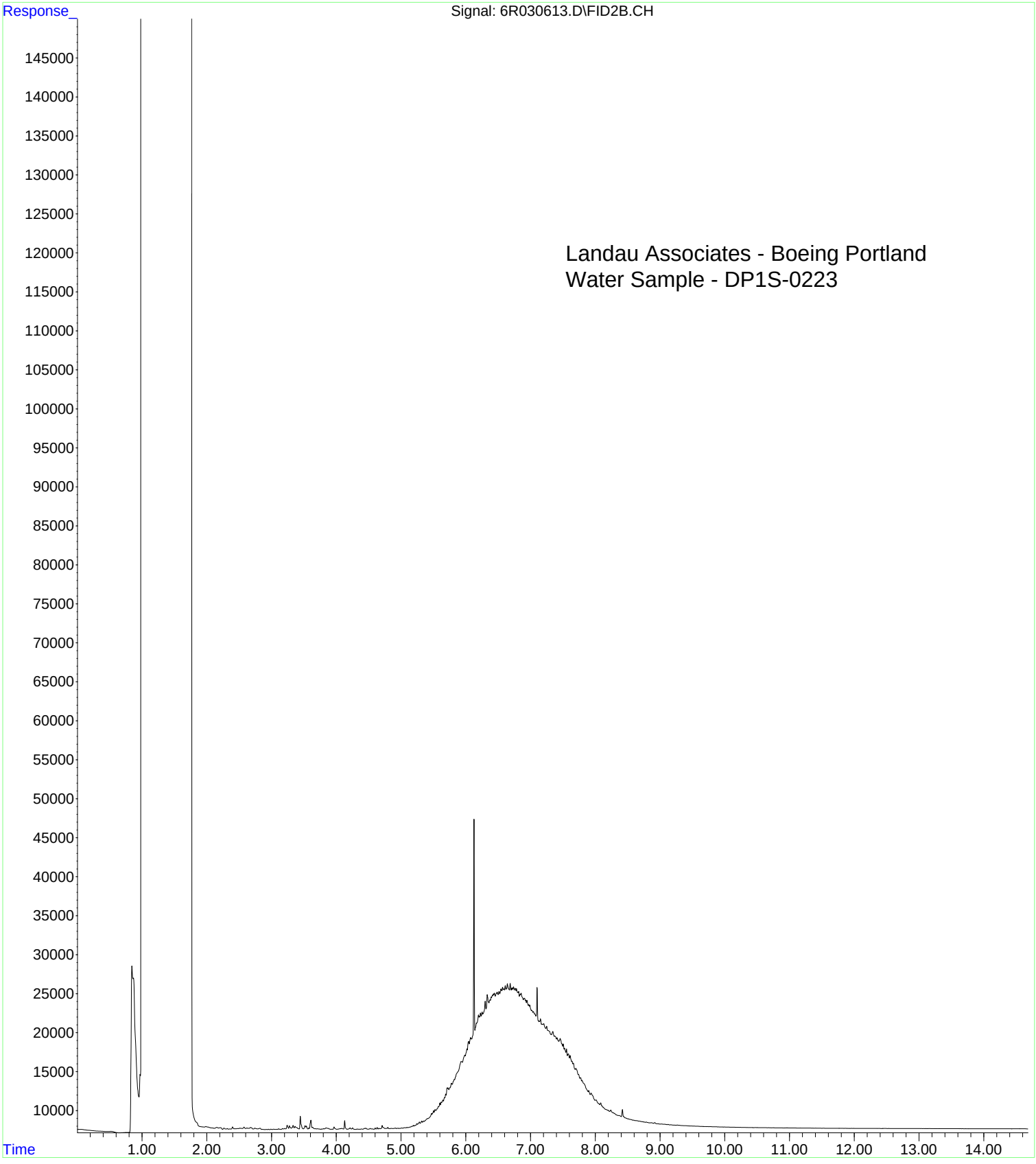
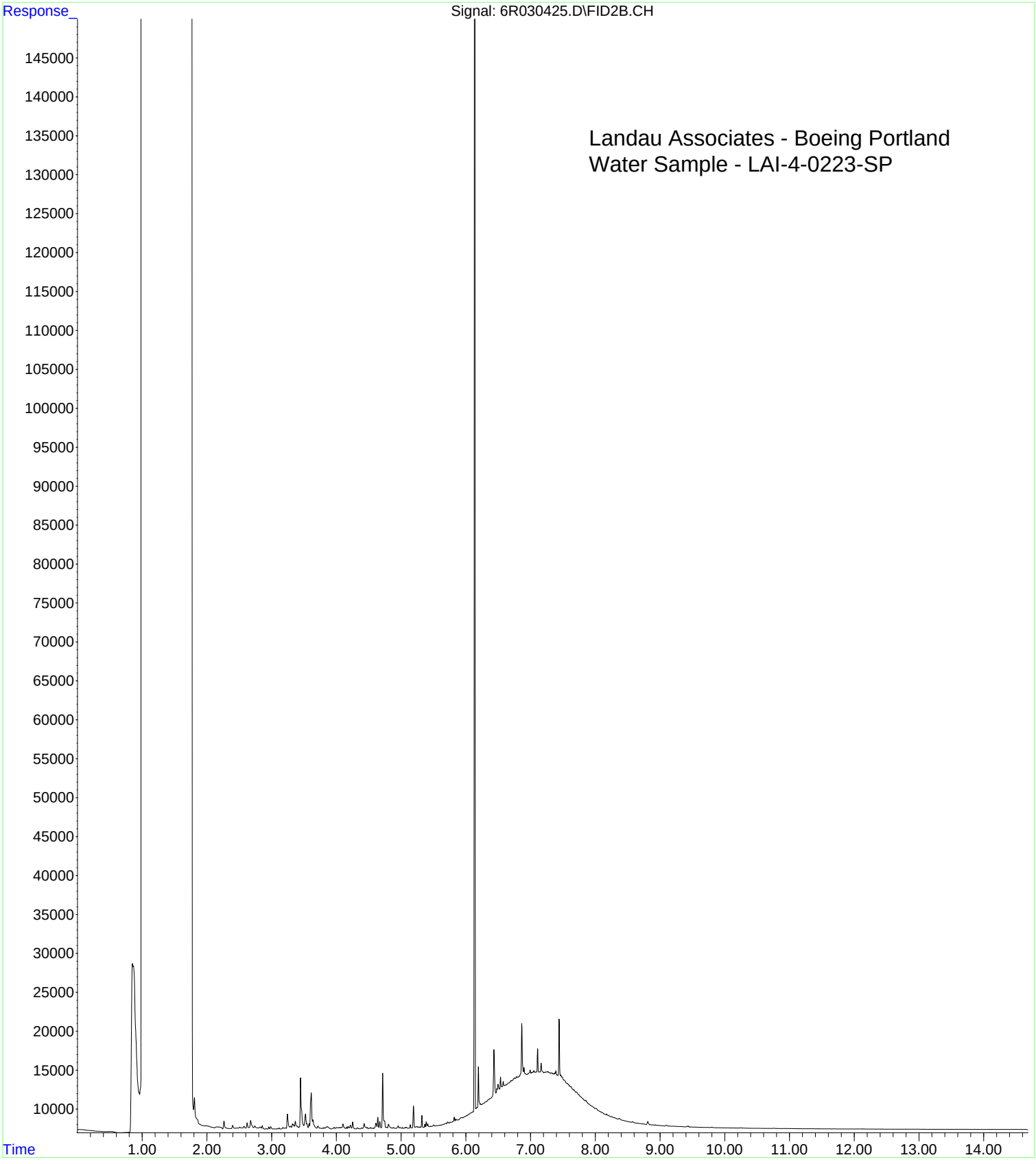
APPENDIX B

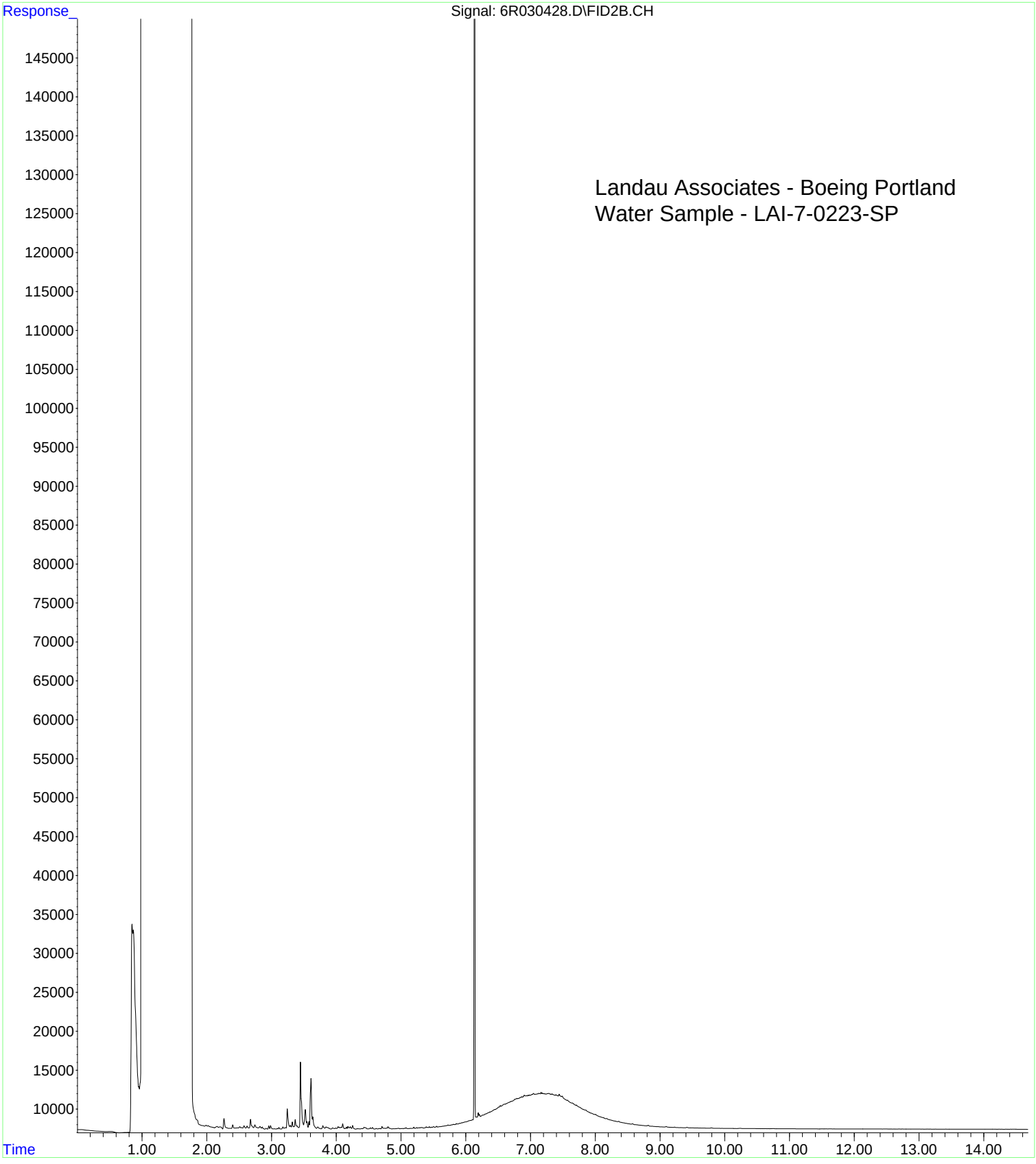
File :C:\msdchem\1\data\3C06024\6R030613.D
Operator : BLL
Acquired : 06 Mar 2023 9:42 am using AcqMethod 6F71215A.M
Instrument : HP G1530A
Sample Name: A3B0408-06RE1@10
Misc Info :
Vial Number: 60



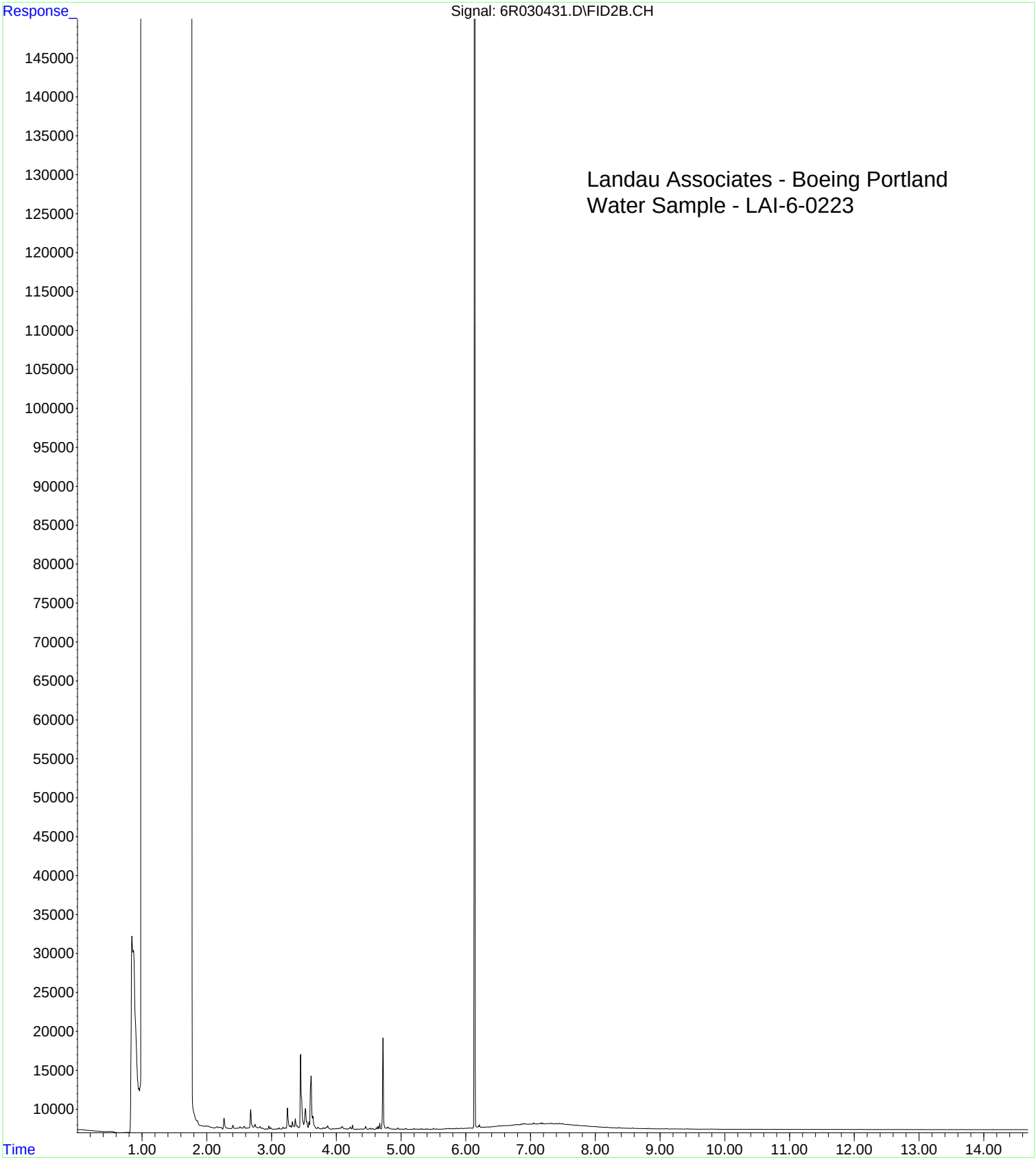
File :C:\msdchem\1\data\3C04033\6R030425.D
Operator : BLL
Acquired : 04 Mar 2023 3:29 pm using AcqMethod 6F71215A.M
Instrument : HP G1530A
Sample Name: A3B0408-07
Misc Info :
Vial Number: 68



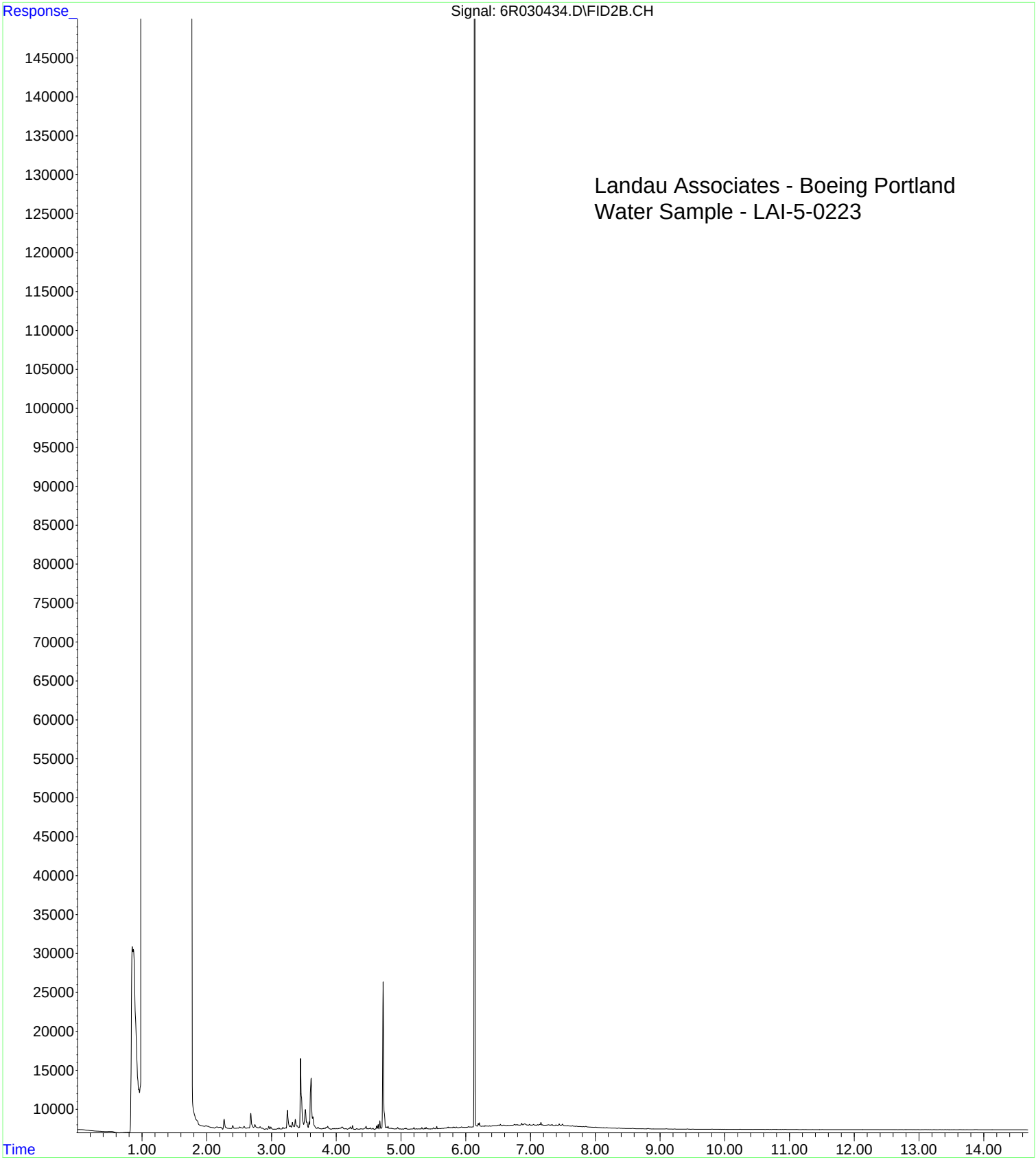
File :C:\msdchem\1\data\3C04033\6R030428.D
Operator : BLL
Acquired : 04 Mar 2023 4:29 pm using AcqMethod 6F71215A.M
Instrument : HP G1530A
Sample Name: A3B0408-08
Misc Info :
Vial Number: 69



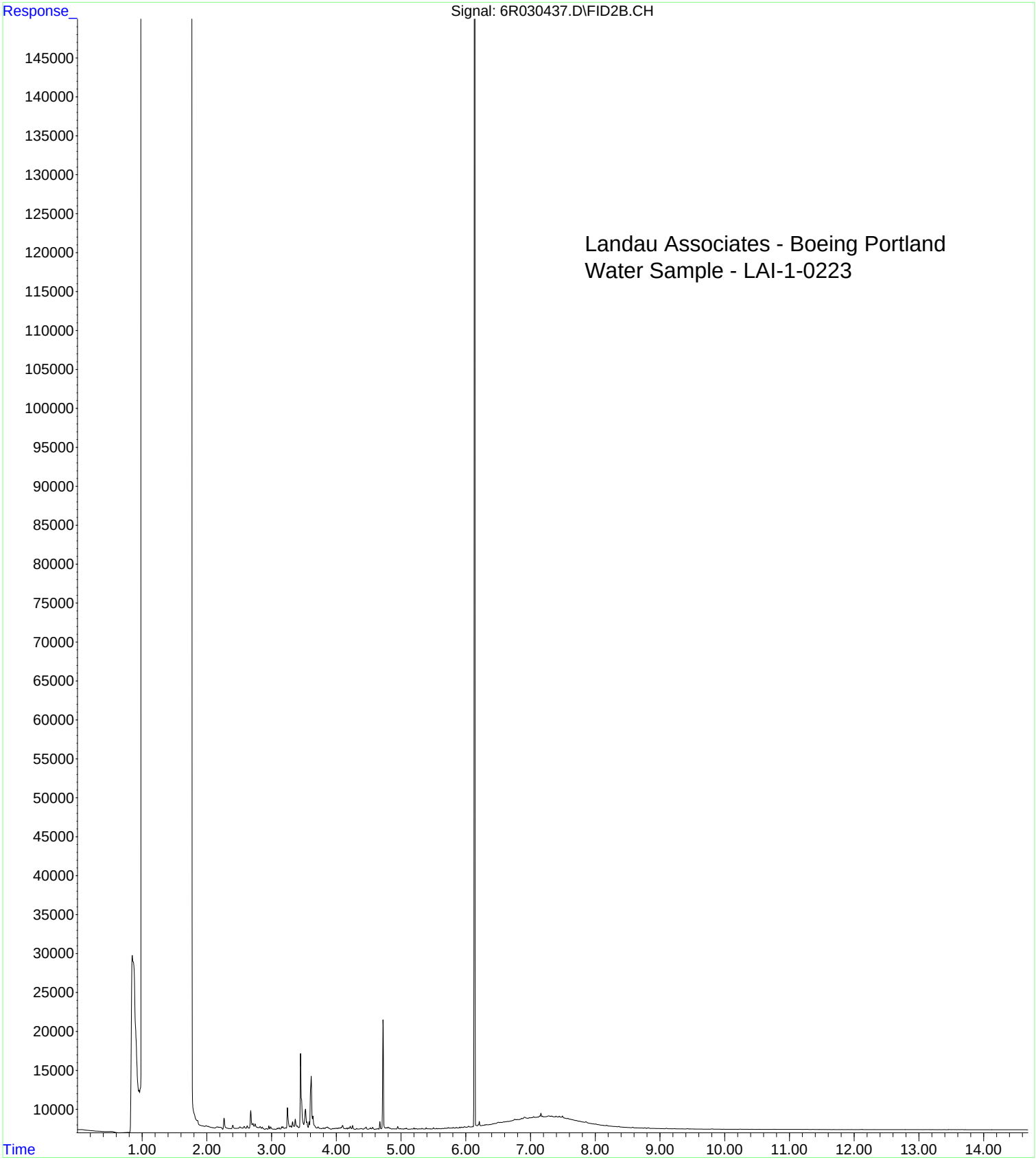
File :C:\msdchem\1\data\3C04033\6R030431.D
Operator : BLL
Acquired : 04 Mar 2023 5:30 pm using AcqMethod 6F71215A.M
Instrument : HP G1530A
Sample Name: A3B0408-09
Misc Info :
Vial Number: 70



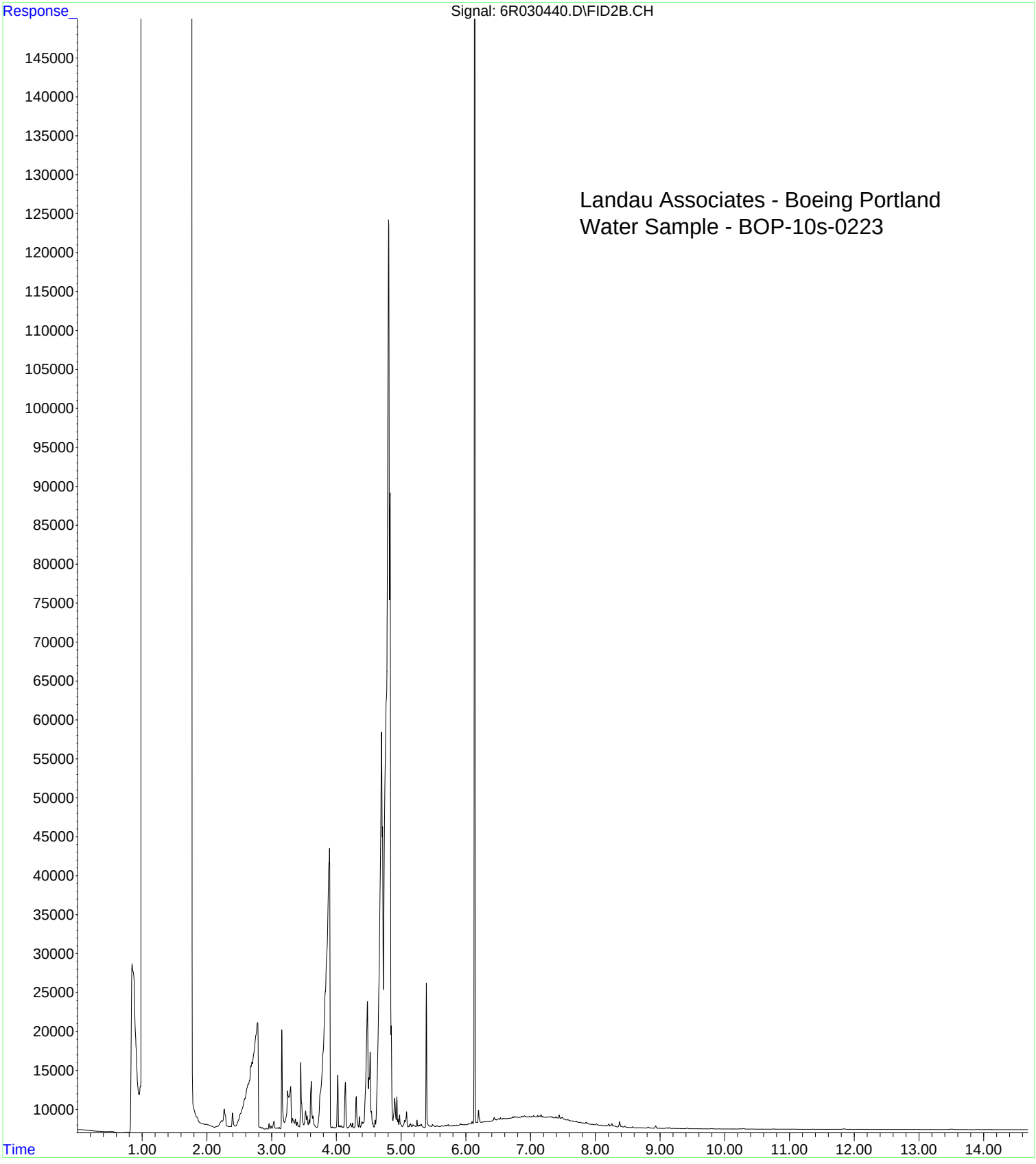
File :C:\msdchem\1\data\3C04033\6R030434.D
Operator : BLL
Acquired : 04 Mar 2023 6:31 pm using AcqMethod 6F71215A.M
Instrument : HP G1530A
Sample Name: A3B0408-10
Misc Info :
Vial Number: 71



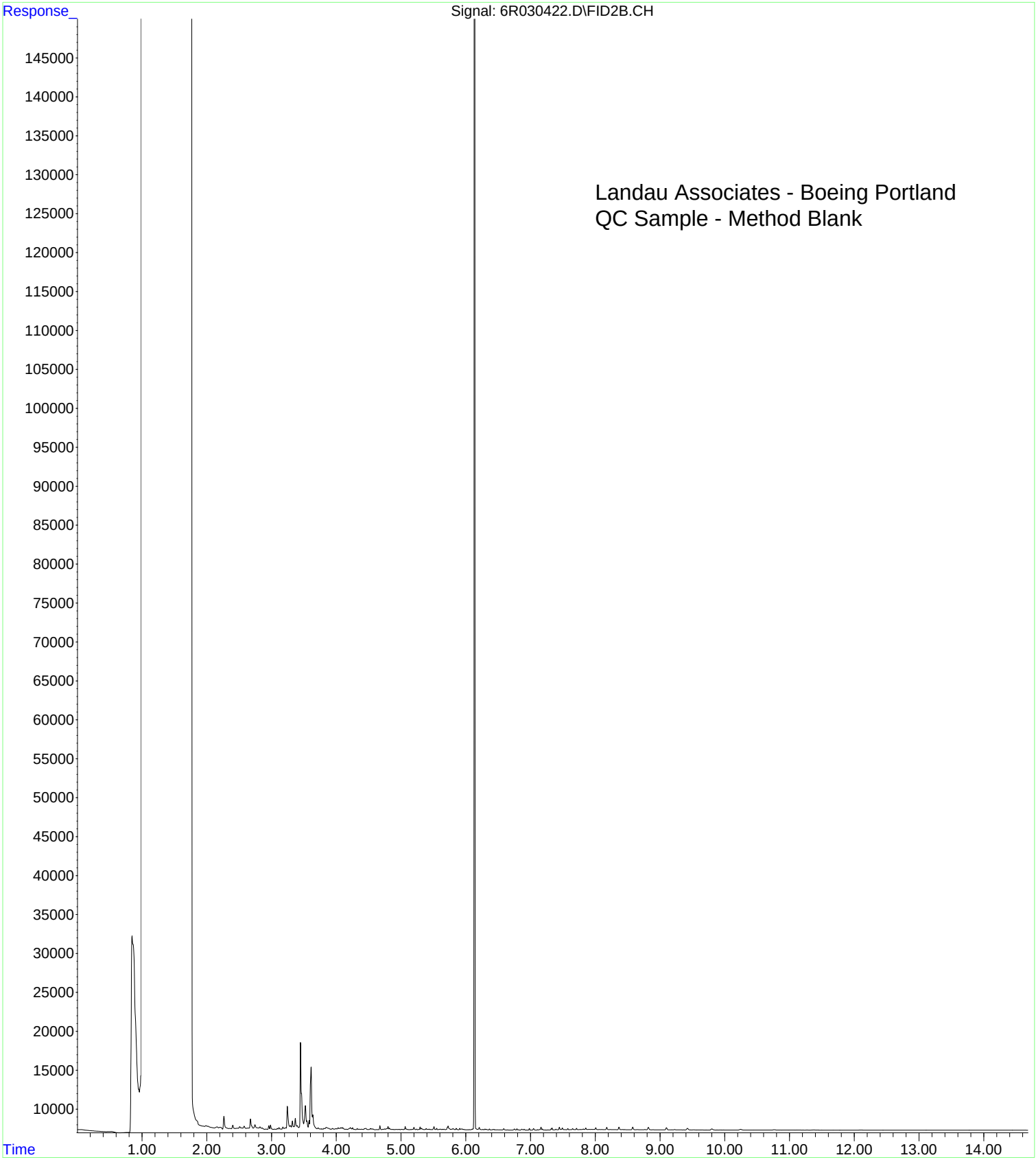
File :C:\msdchem\1\data\3C04033\6R030437.D
Operator : BLL
Acquired : 04 Mar 2023 7:31 pm using AcqMethod 6F71215A.M
Instrument : HP G1530A
Sample Name: A3B0408-11
Misc Info :
Vial Number: 72



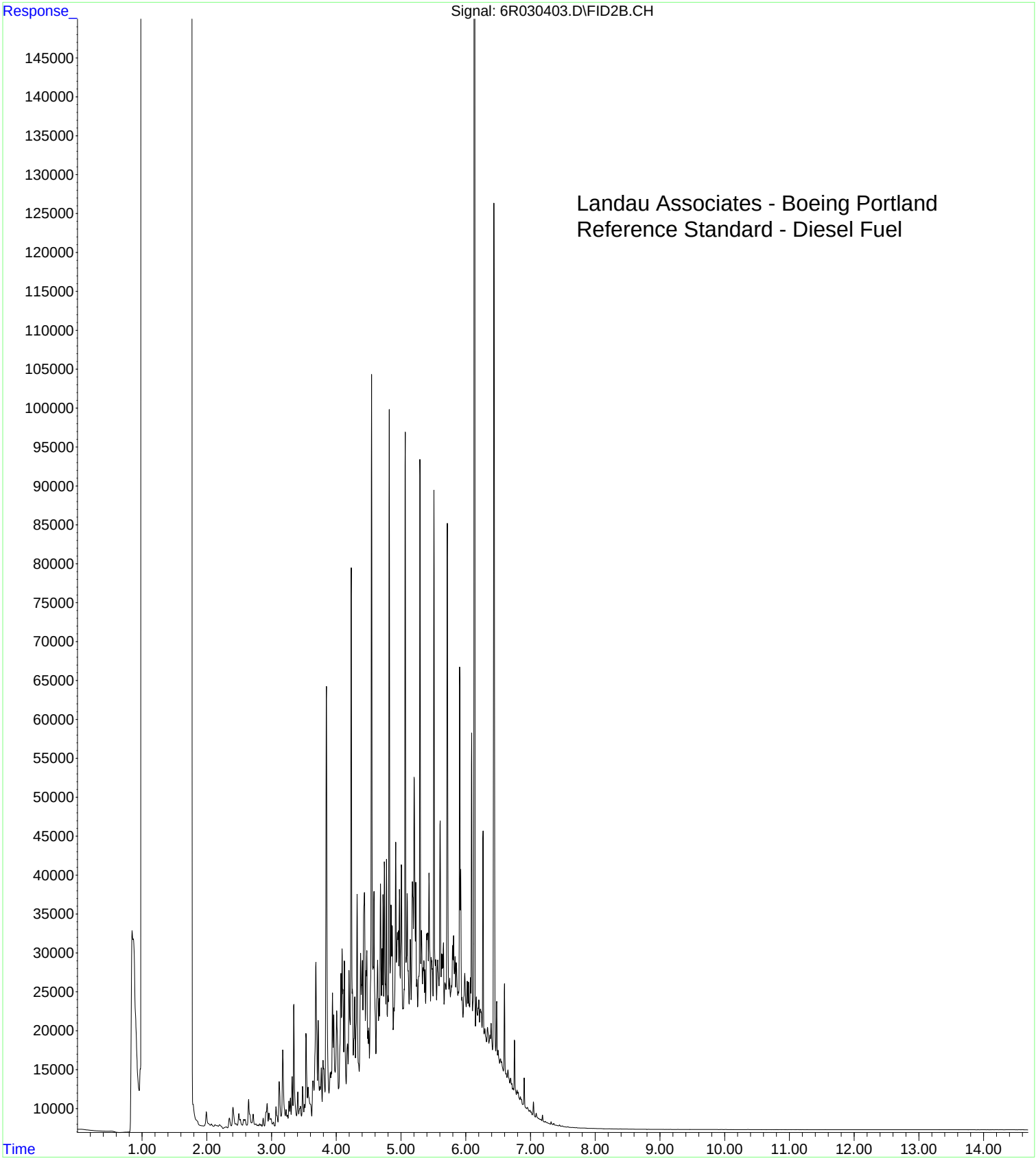
File :C:\msdchem\1\data\3C04033\6R030440.D
Operator : BLL
Acquired : 04 Mar 2023 8:32 pm using AcqMethod 6F71215A.M
Instrument : HP G1530A
Sample Name: A3B0408-15
Misc Info :
Vial Number: 73



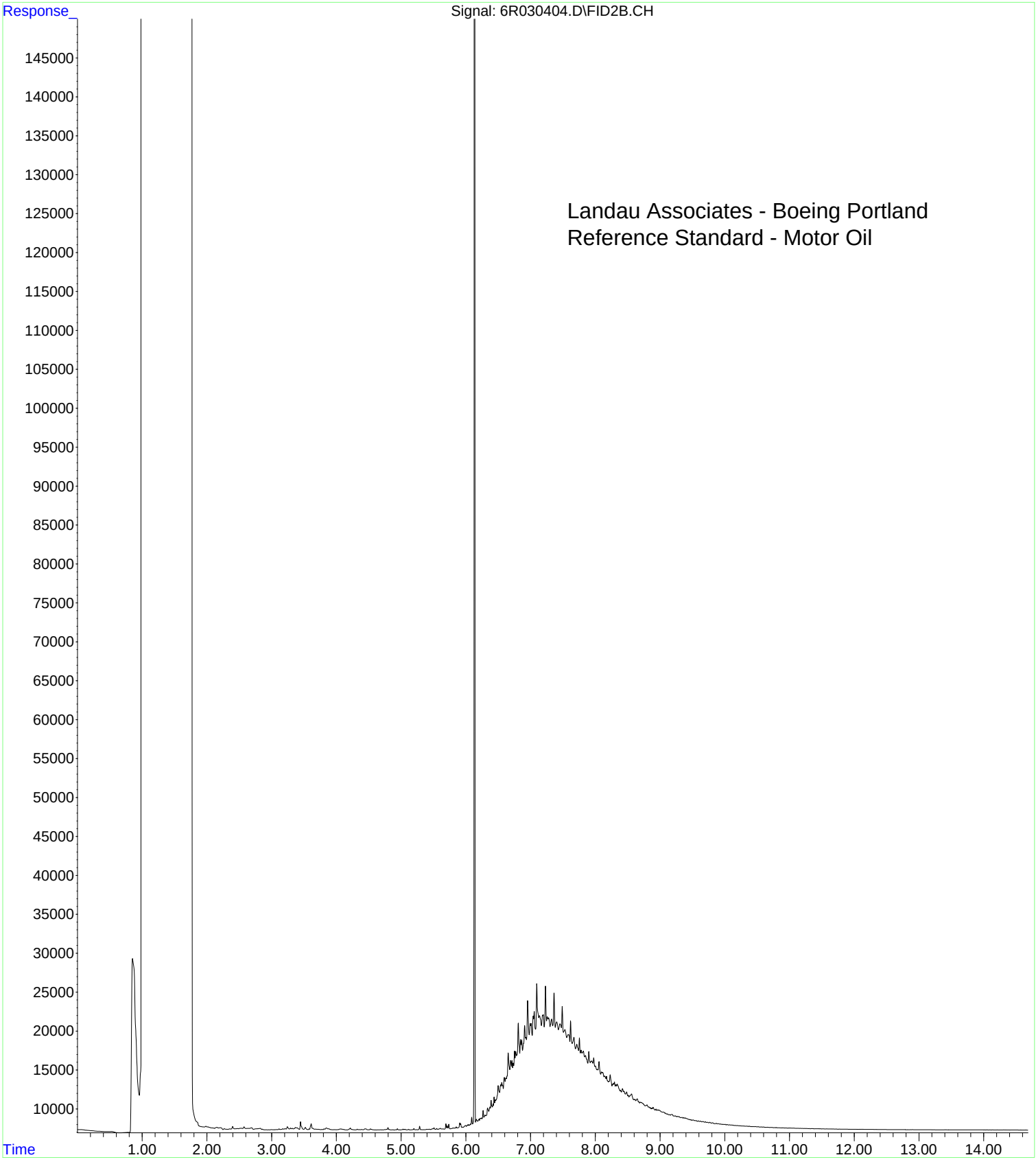
File :C:\msdchem\1\data\3C04033\6R030422.D
Operator : BLL
Acquired : 04 Mar 2023 2:28 pm using AcqMethod 6F71215A.M
Instrument : HP G1530A
Sample Name: 23B0762-BLK1
Misc Info :
Vial Number: 65



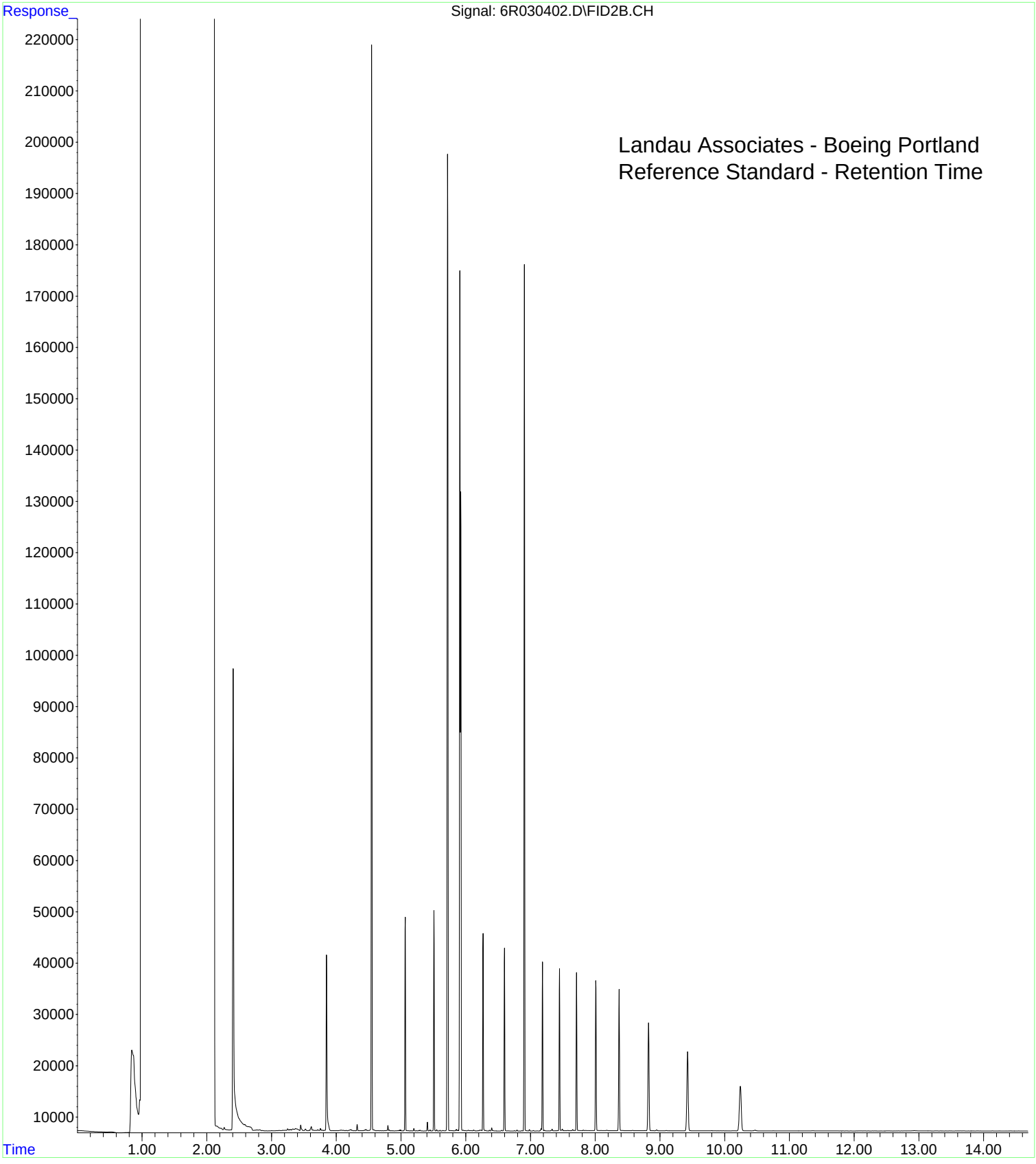
File :C:\msdchem\1\data\3C04033\6R030403.D
Operator : BLL
Acquired : 04 Mar 2023 8:03 am using AcqMethod 6F71215A.M
Instrument : HP G1530A
Sample Name: 3C04033-CCV1
Misc Info :
Vial Number: 51



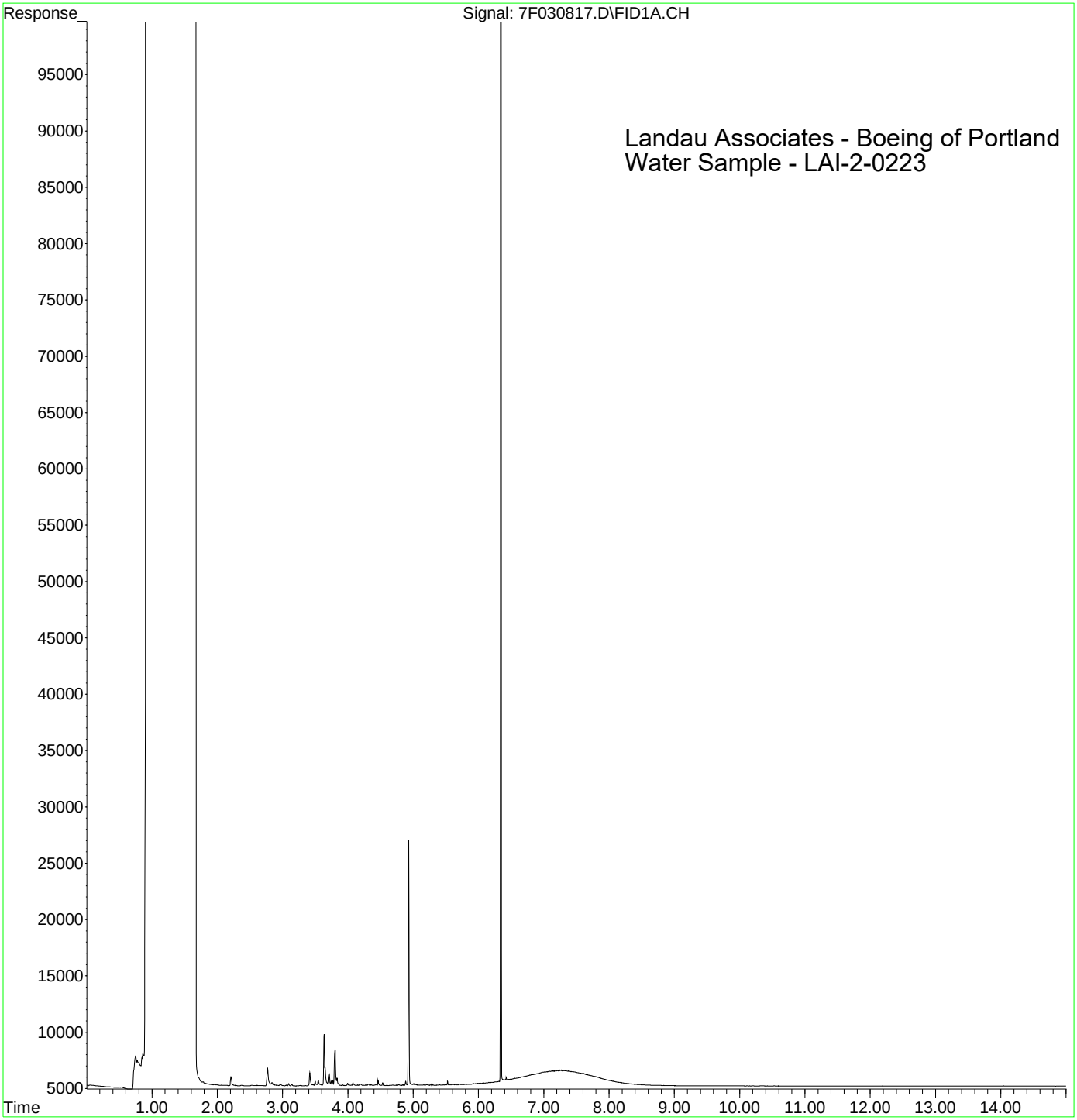
File :C:\msdchem\1\data\3C04033\6R030404.D
Operator : BLL
Acquired : 04 Mar 2023 8:23 am using AcqMethod 6F71215A.M
Instrument : HP G1530A
Sample Name: 3C04033-CCV2
Misc Info :
Vial Number: 52



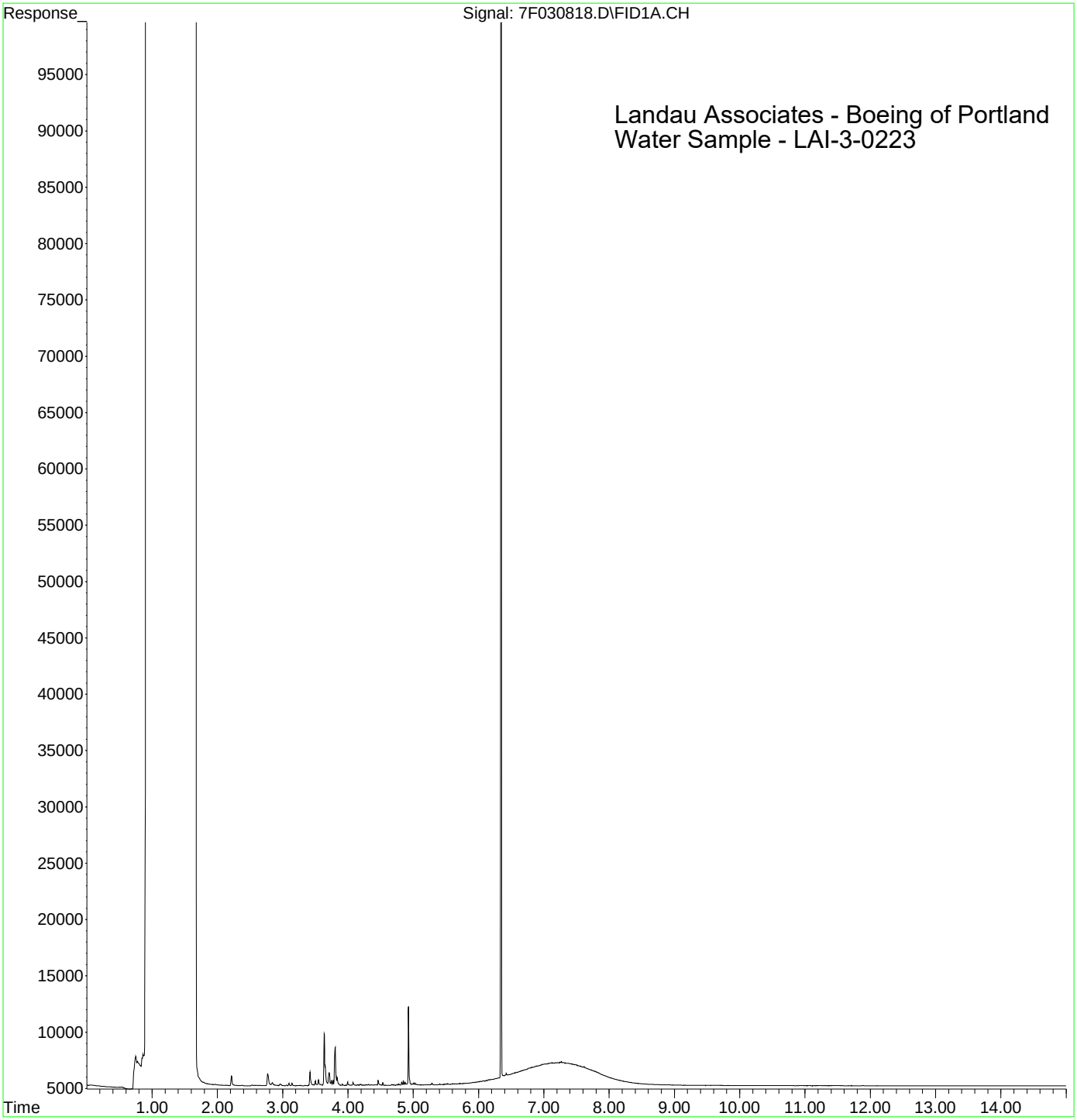
File :C:\msdchem\1\data\3C04033\6R030402.D
Operator : BLL
Acquired : 04 Mar 2023 7:43 am using AcqMethod 6F71215A.M
Instrument : HP G1530A
Sample Name: 3C04033-RES1
Misc Info :
Vial Number: 95



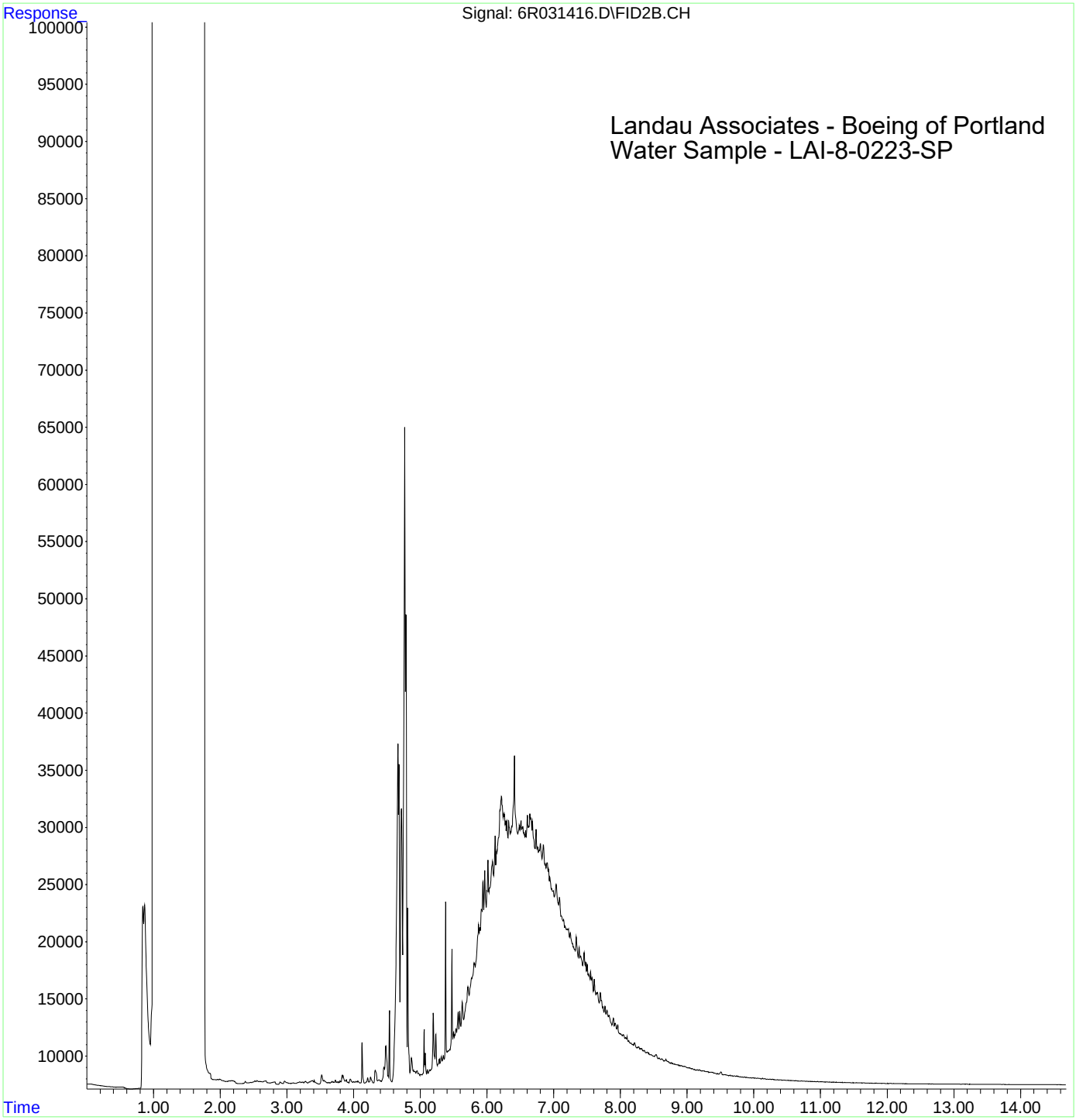
File   :C:\msdchem\1\data\2023-1\3C08059\7F030817.D
Operator   : BLL
Acquired   : 09 Mar 2023 12:25 am using AcqMethod FID7ACQ.M
Instrument :   HP G1530A
Sample Name: A3B0416-02
Misc Info :
Vial Number: 12



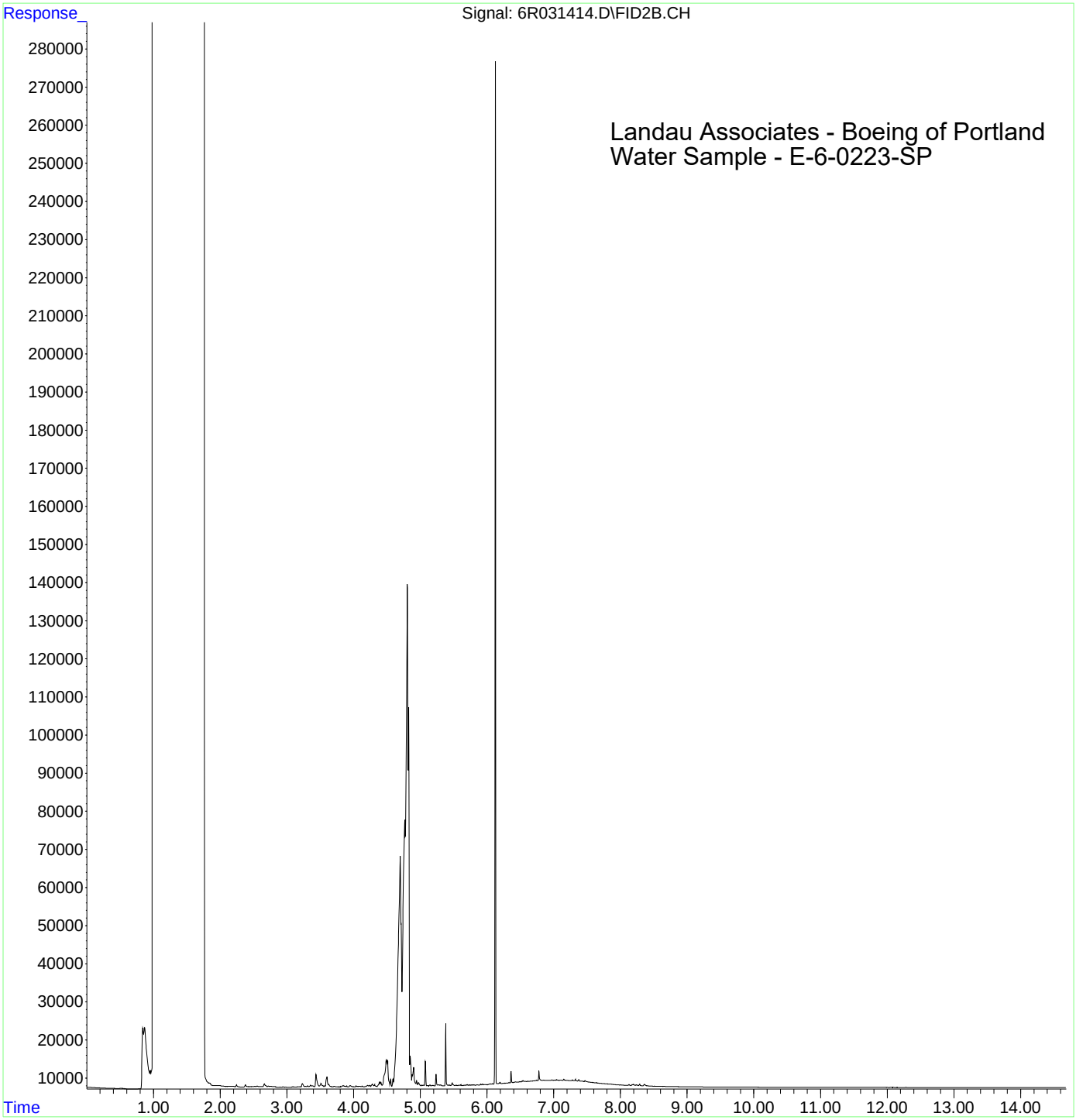
File :C:\msdchem\1\data\2023-1\3C08059\7F030818.D
Operator : BLL
Acquired : 09 Mar 2023 12:46 am using AcqMethod FID7ACQ.M
Instrument : HP G1530A
Sample Name: A3B0416-03
Misc Info :
Vial Number: 13



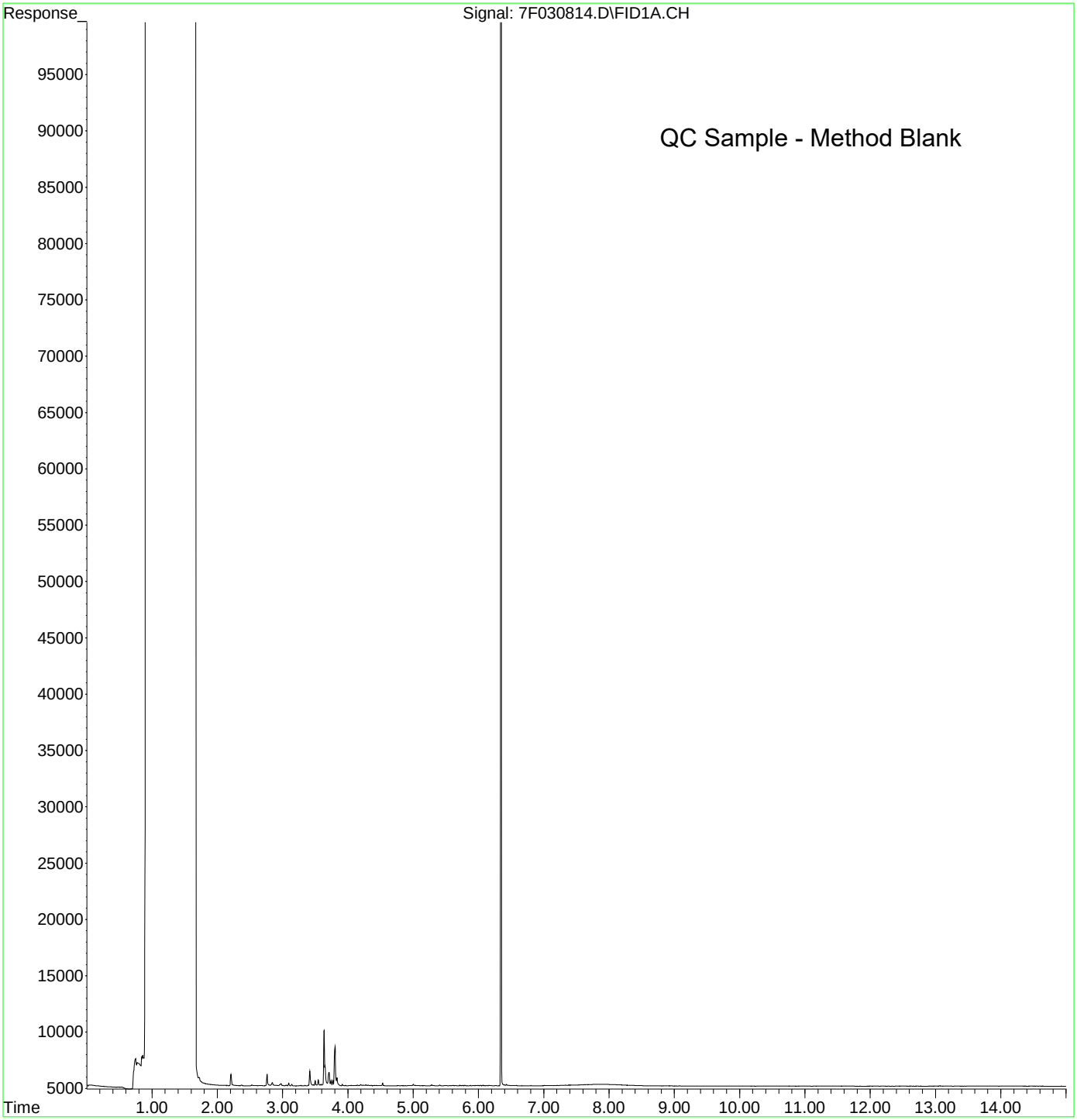
File :M:\DUALFID6\1\DATA\2023-03\3C14034\6R031416.D
Operator : BLL
Acquired : 14 Mar 2023 9:19 am using AcqMethod 6F71215A.M
Instrument : HP G1530A
Sample Name: A3B0416-04RE1@100
Misc Info :
Vial Number: 61



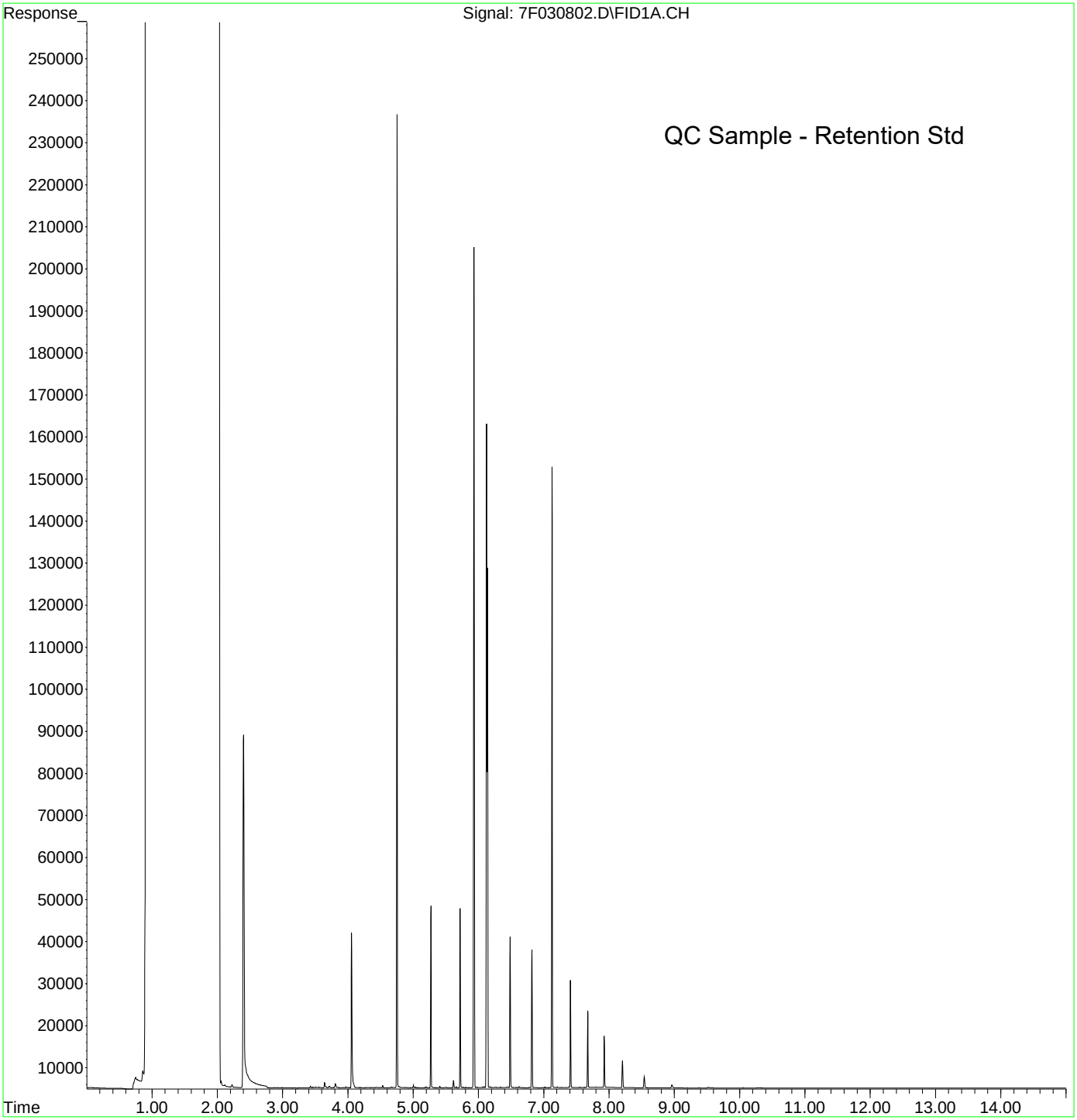
File :M:\DUALFID6\1\DATA\2023-03\3C14034\6R031414.D
Operator : BLL
Acquired : 14 Mar 2023 8:26 am using AcqMethod 6F71215A.M
Instrument : HP G1530A
Sample Name: A3B0416-05RE1
Misc Info :
Vial Number: 60



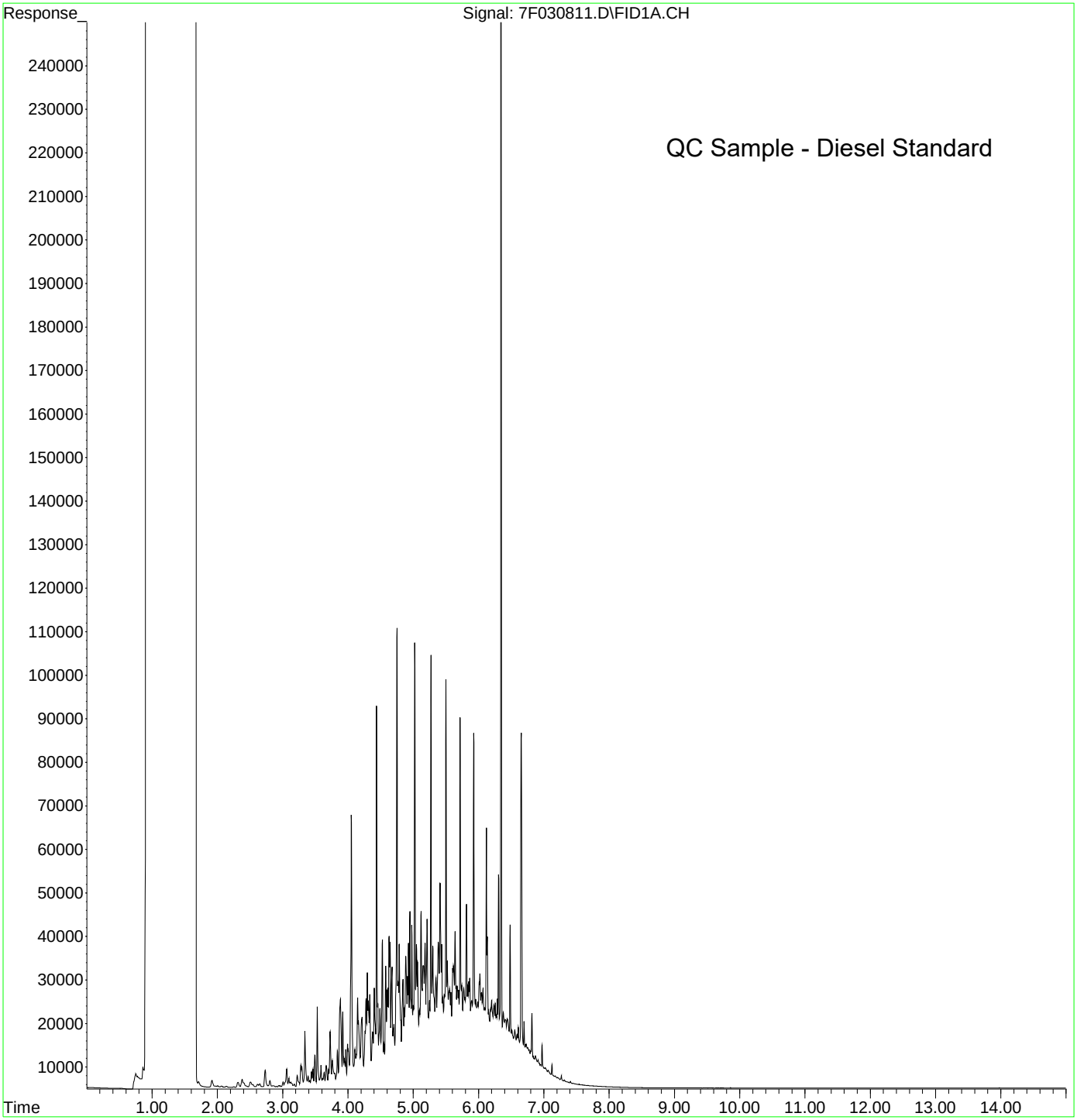
File :C:\msdchem\1\data\2023-1\3C08059\7F030814.D
Operator : BLL
Acquired : 08 Mar 2023 11:23 pm using AcqMethod FID7ACQ.M
Instrument : HP G1530A
Sample Name: 23C0314-BLK1
Misc Info :
Vial Number: 9



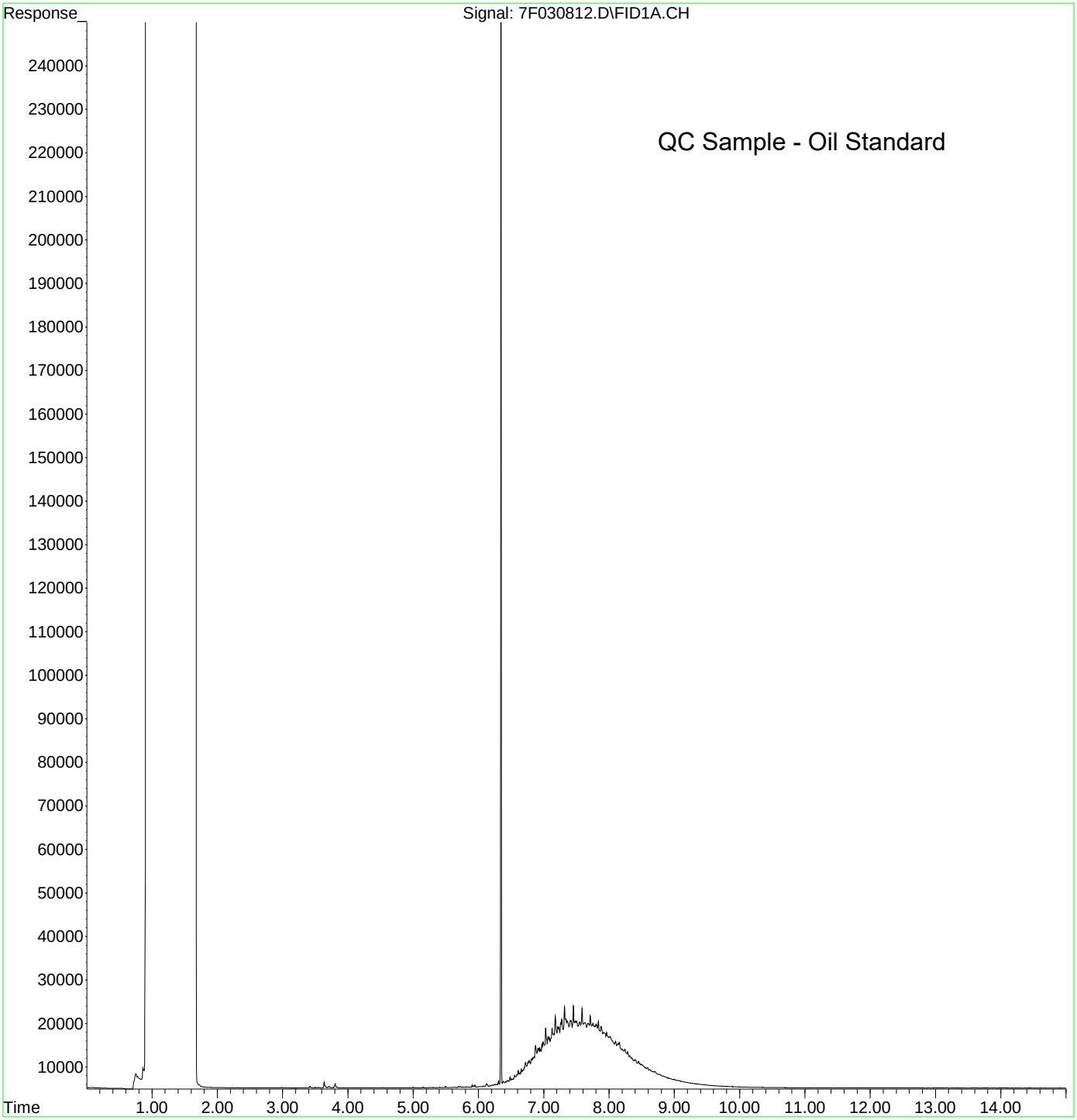
File :C:\msdchem\1\data\2023-1\3C08059\7F030802.D
Operator : BLL
Acquired : 08 Mar 2023 4:55 pm using AcqMethod FID7ACQ.M
Instrument : HP G1530A
Sample Name: 3C08059-RES1
Misc Info :
Vial Number: 94



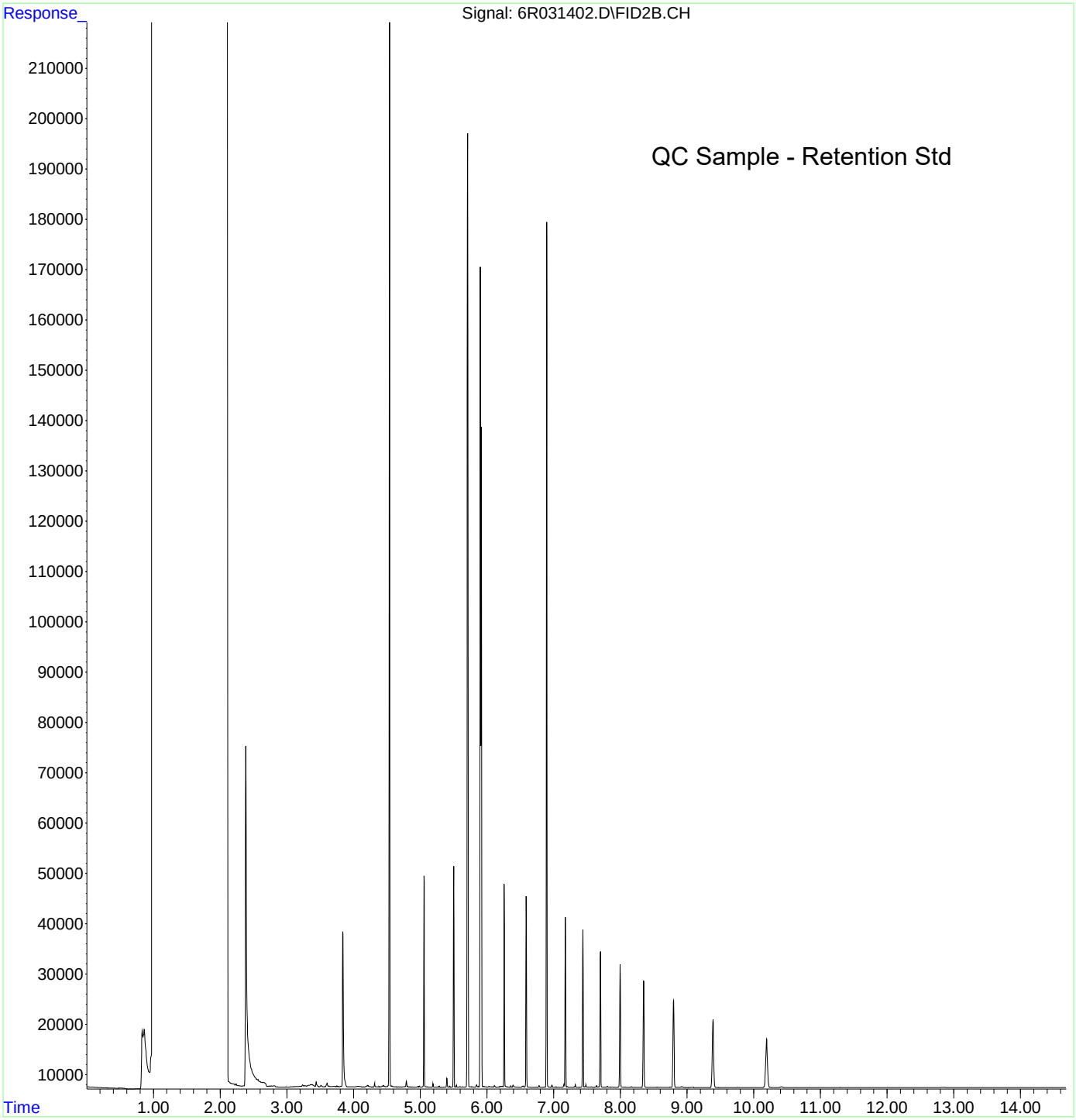
File :C:\msdchem\1\data\2023-1\3C08059\7F030811.D
Operator : BLL
Acquired : 08 Mar 2023 10:22 pm using AcqMethod FID7ACQ.M
Instrument : HP G1530A
Sample Name: 3C08059-CCV3
Misc Info :
Vial Number: 7



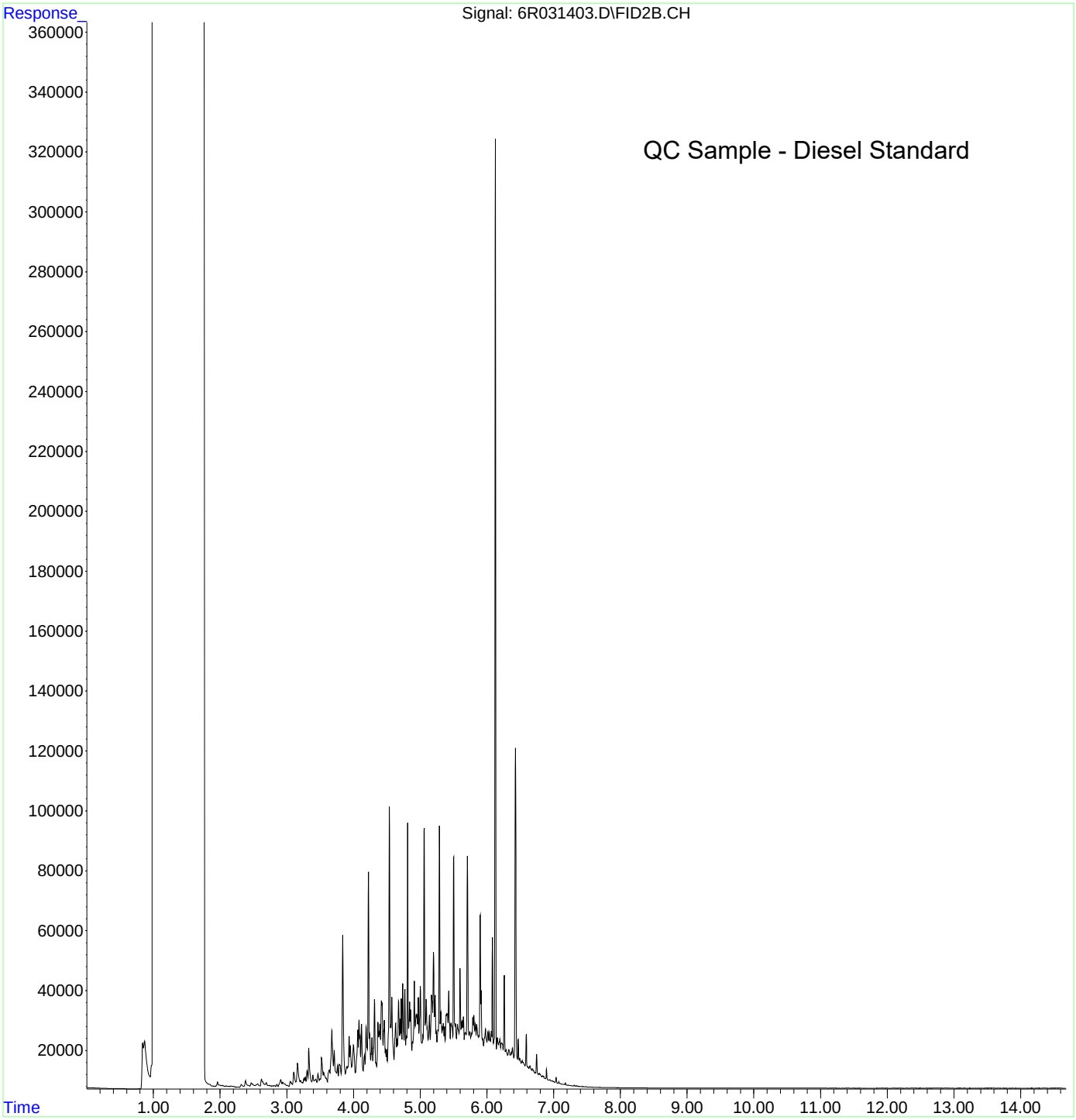
File :C:\msdchem\1\data\2023-1\3C08059\7F030812.D
Operator : BLL
Acquired : 08 Mar 2023 10:43 pm using AcqMethod FID7ACQ.M
Instrument : HP G1530A
Sample Name: 3C08059-CCV4
Misc Info :
Vial Number: 8



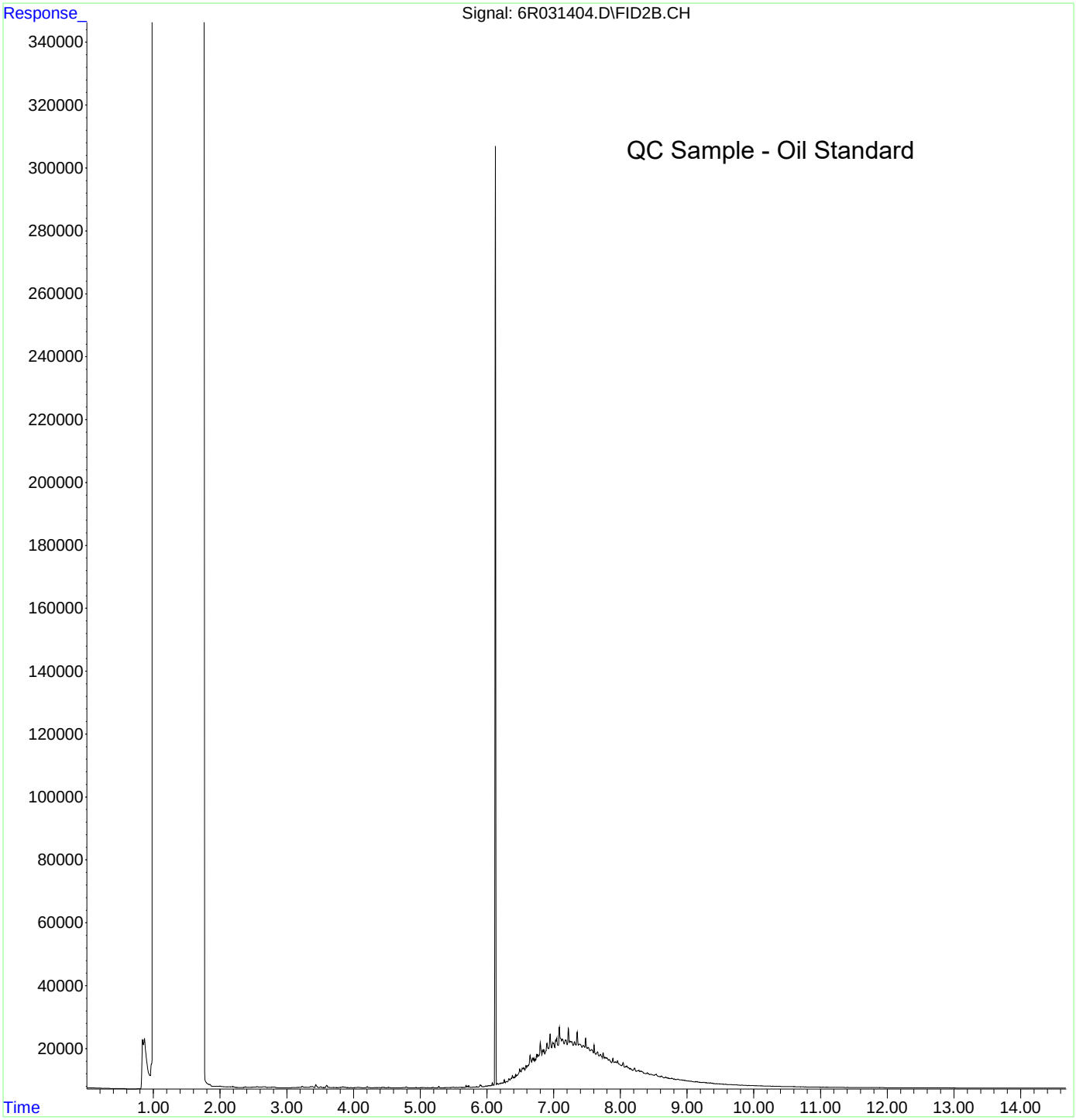
File   :M:\DUALFID6\1\DATA\2023-03\3C14034\6R031402.D
Operator   : BLL
Acquired   : 14 Mar 2023   4:16 am using AcqMethod 6F71215A.M
Instrument :   HP G1530A
Sample Name: 3C14033-RES1
Misc Info :
Vial Number: 95



File   :M:\DUALFID6\1\DATA\2023-03\3C14034\6R031403.D
Operator   : BLL
Acquired   : 14 Mar 2023   4:36 am using AcqMethod 6F71215A.M
Instrument :   HP G1530A
Sample Name: 3C14033-CCV1
Misc Info :
Vial Number: 51

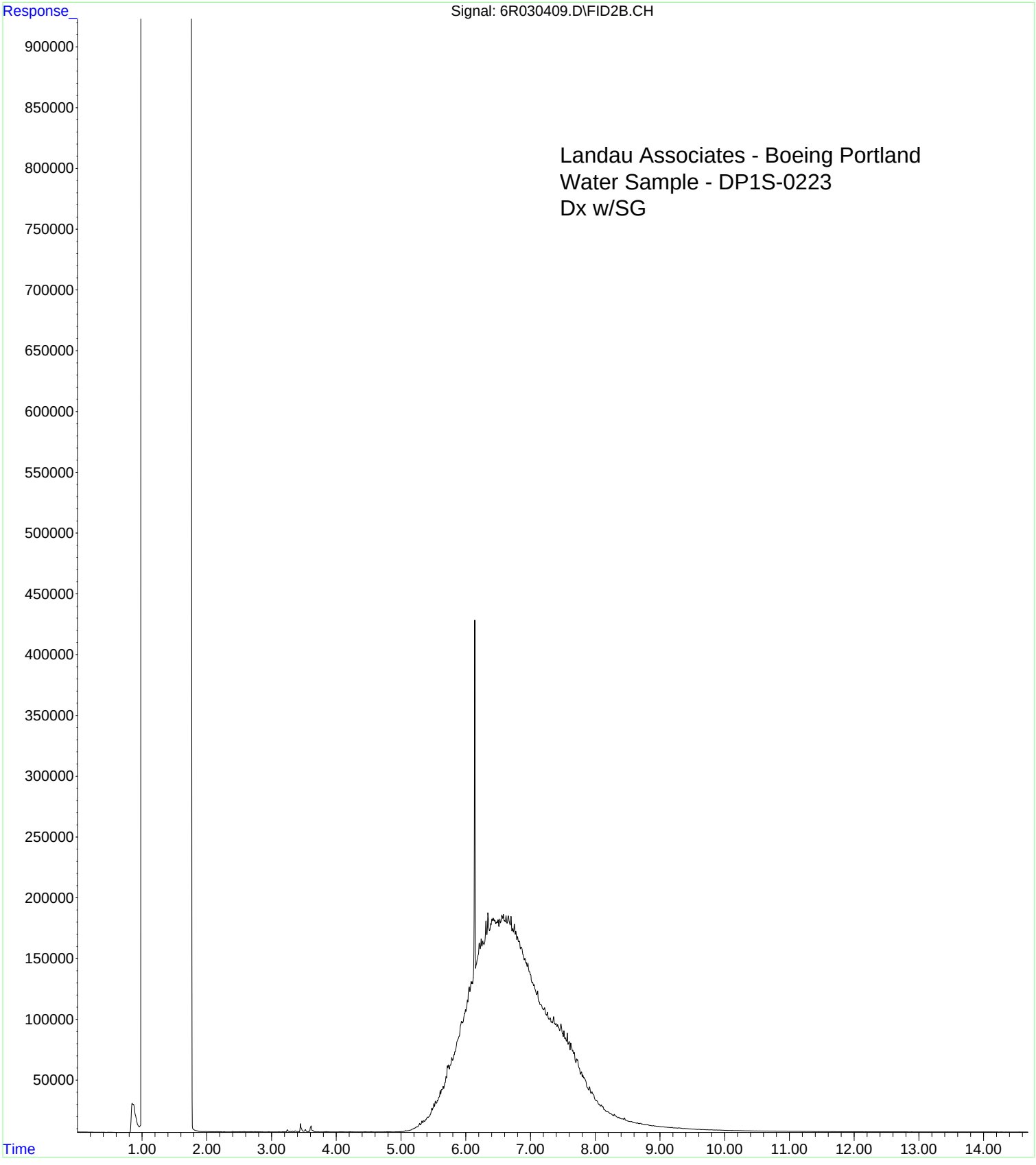


File :M:\DUALFID6\1\DATA\2023-03\3C14034\6R031404.D
Operator : BLL
Acquired : 14 Mar 2023 4:57 am using AcqMethod 6F71215A.M
Instrument : HP G1530A
Sample Name: 3C14033-CCV2
Misc Info :
Vial Number: 52

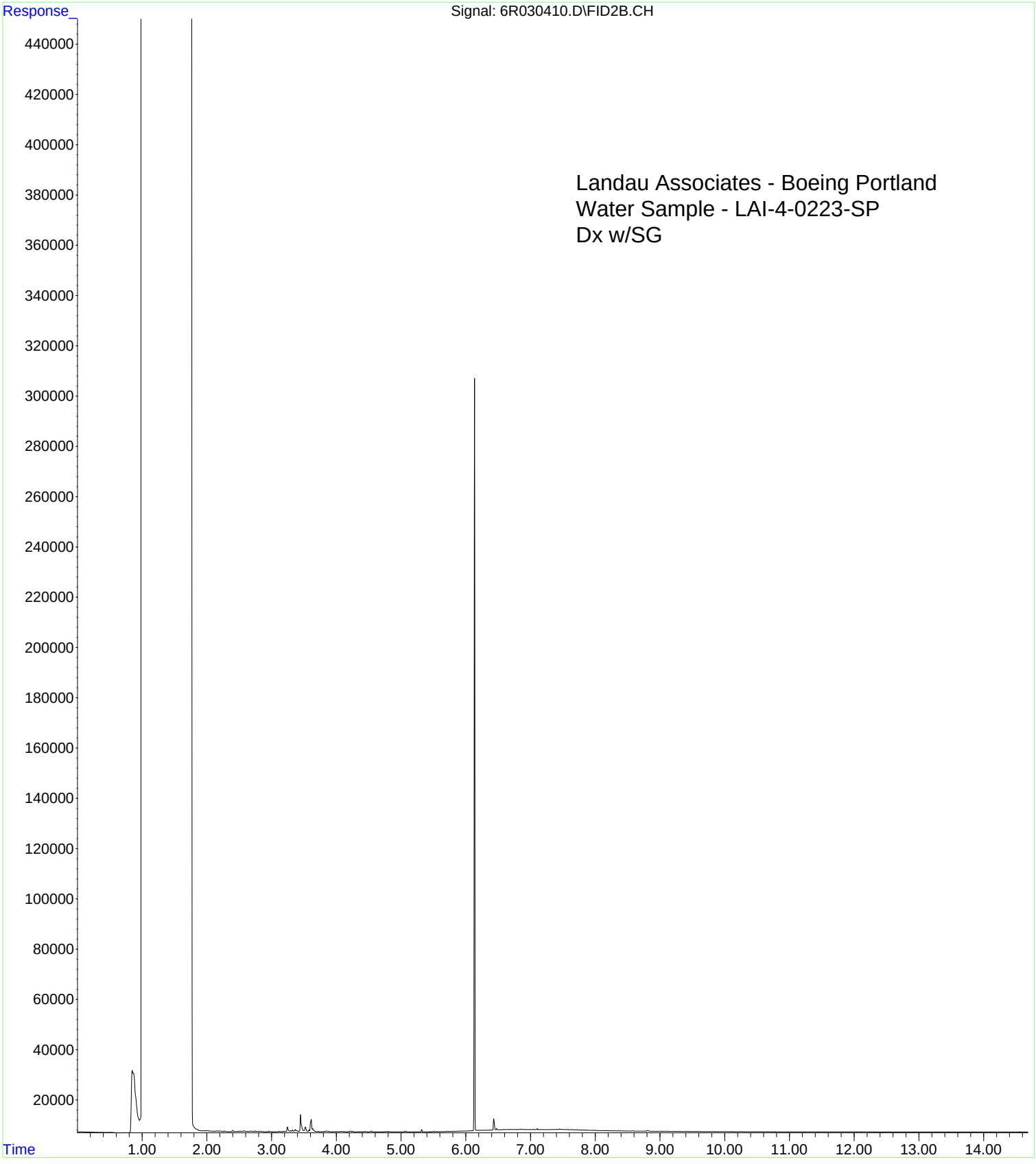


APPENDIX C

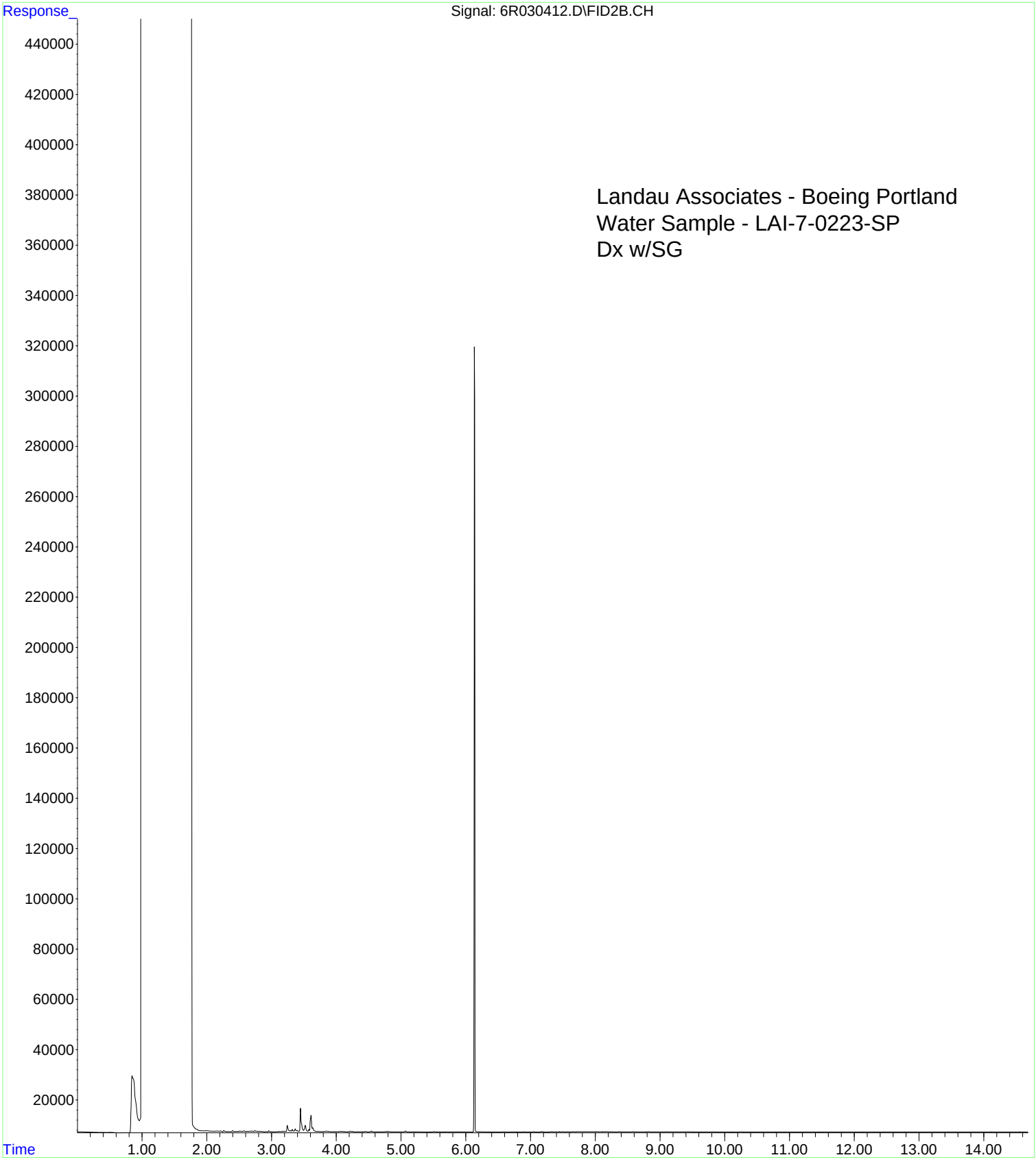
File :C:\msdchem\1\data\3C04033\6R030409.D
Operator : BLL
Acquired : 04 Mar 2023 10:04 am using AcqMethod 6F71215A.M
Instrument : HP G1530A
Sample Name: A3B0408-06
Misc Info :
Vial Number: 56



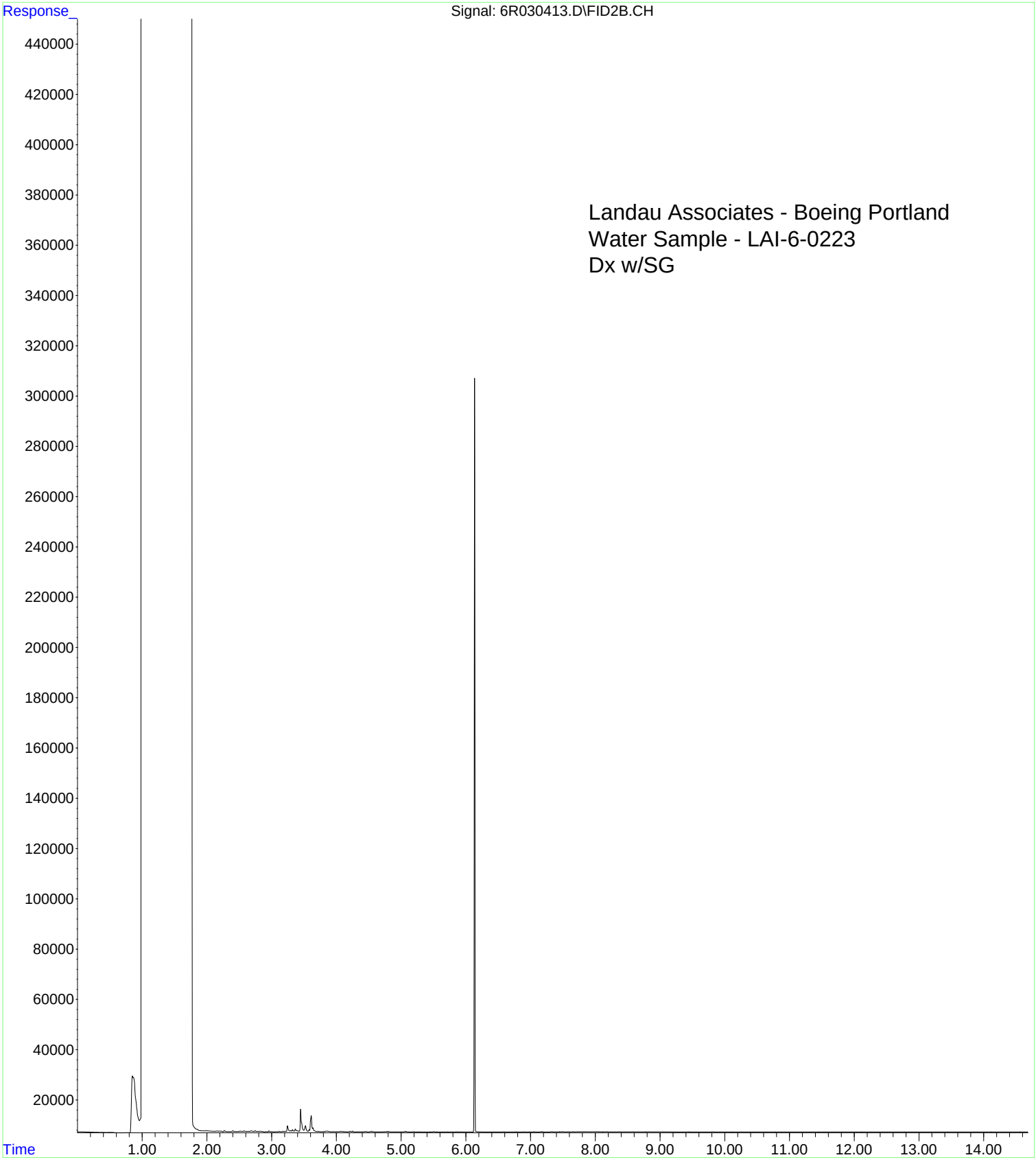
File :C:\msdchem\1\data\3C04033\6R030410.D
Operator : BLL
Acquired : 04 Mar 2023 10:25 am using AcqMethod 6F71215A.M
Instrument : HP G1530A
Sample Name: A3B0408-07
Misc Info :
Vial Number: 57



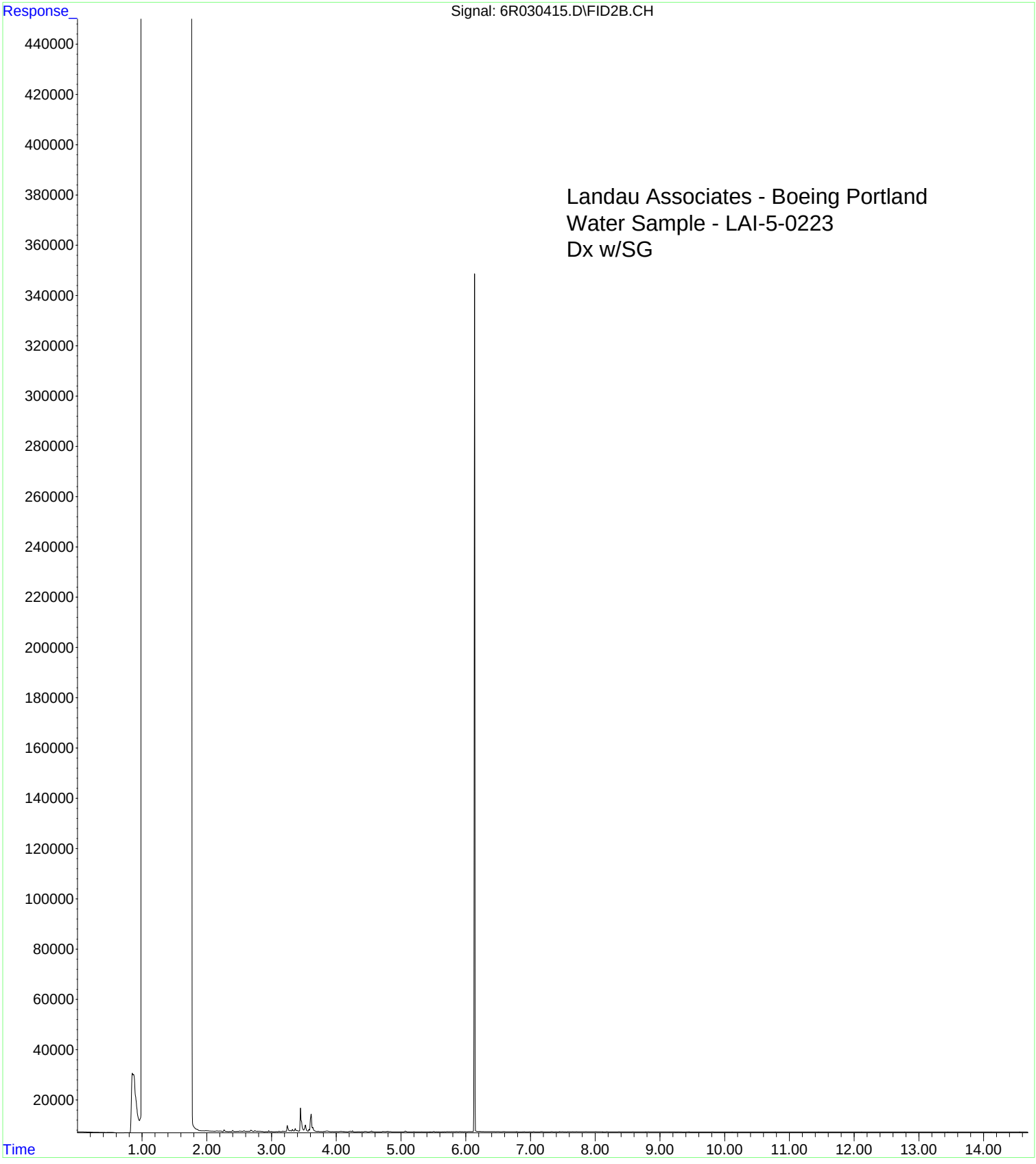
File :C:\msdchem\1\data\3C04033\6R030412.D
Operator : BLL
Acquired : 04 Mar 2023 11:05 am using AcqMethod 6F71215A.M
Instrument : HP G1530A
Sample Name: A3B0408-08
Misc Info :
Vial Number: 58



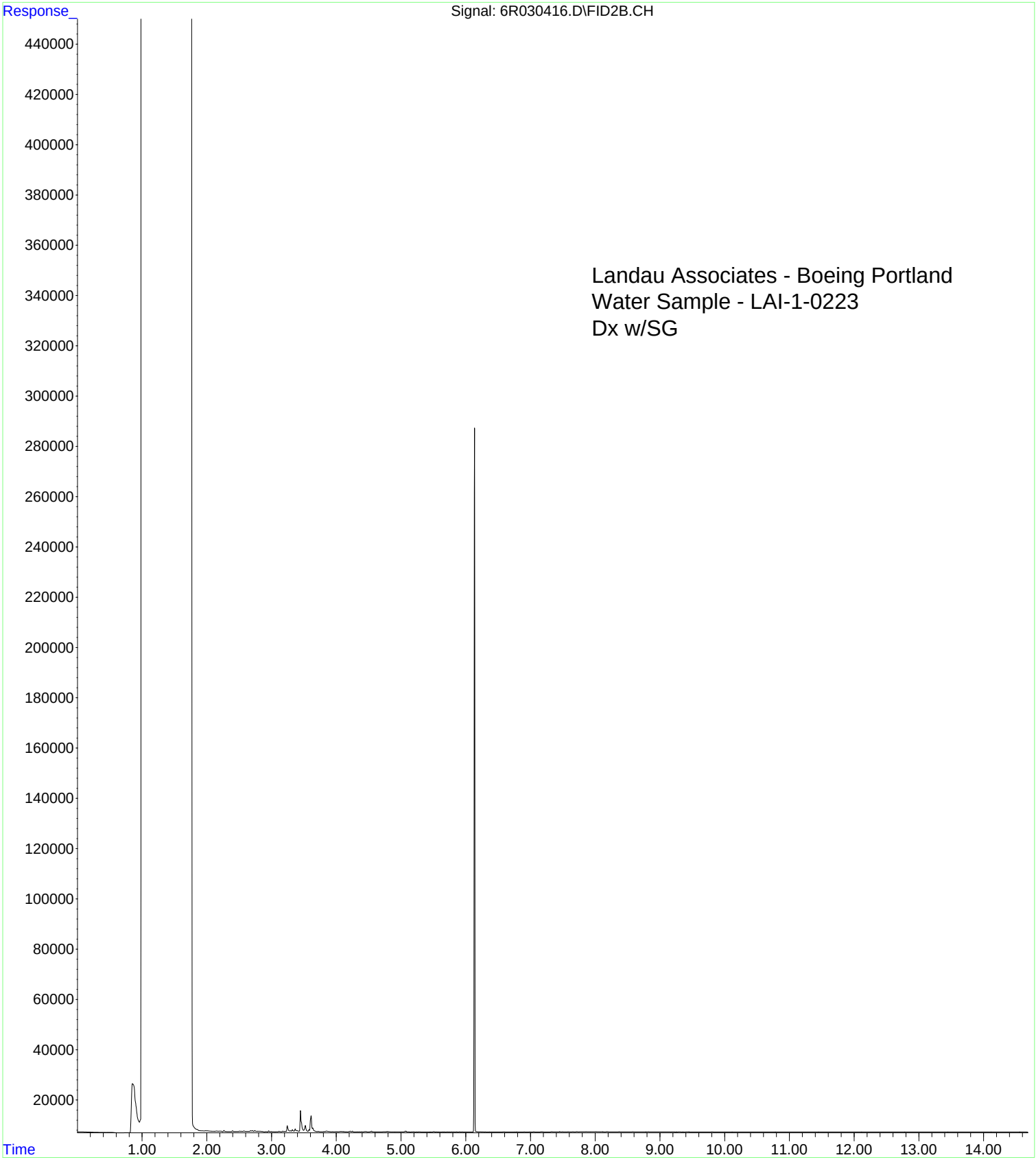
File :C:\msdchem\1\data\3C04033\6R030413.D
Operator : BLL
Acquired : 04 Mar 2023 11:25 am using AcqMethod 6F71215A.M
Instrument : HP G1530A
Sample Name: A3B0408-09
Misc Info :
Vial Number: 59



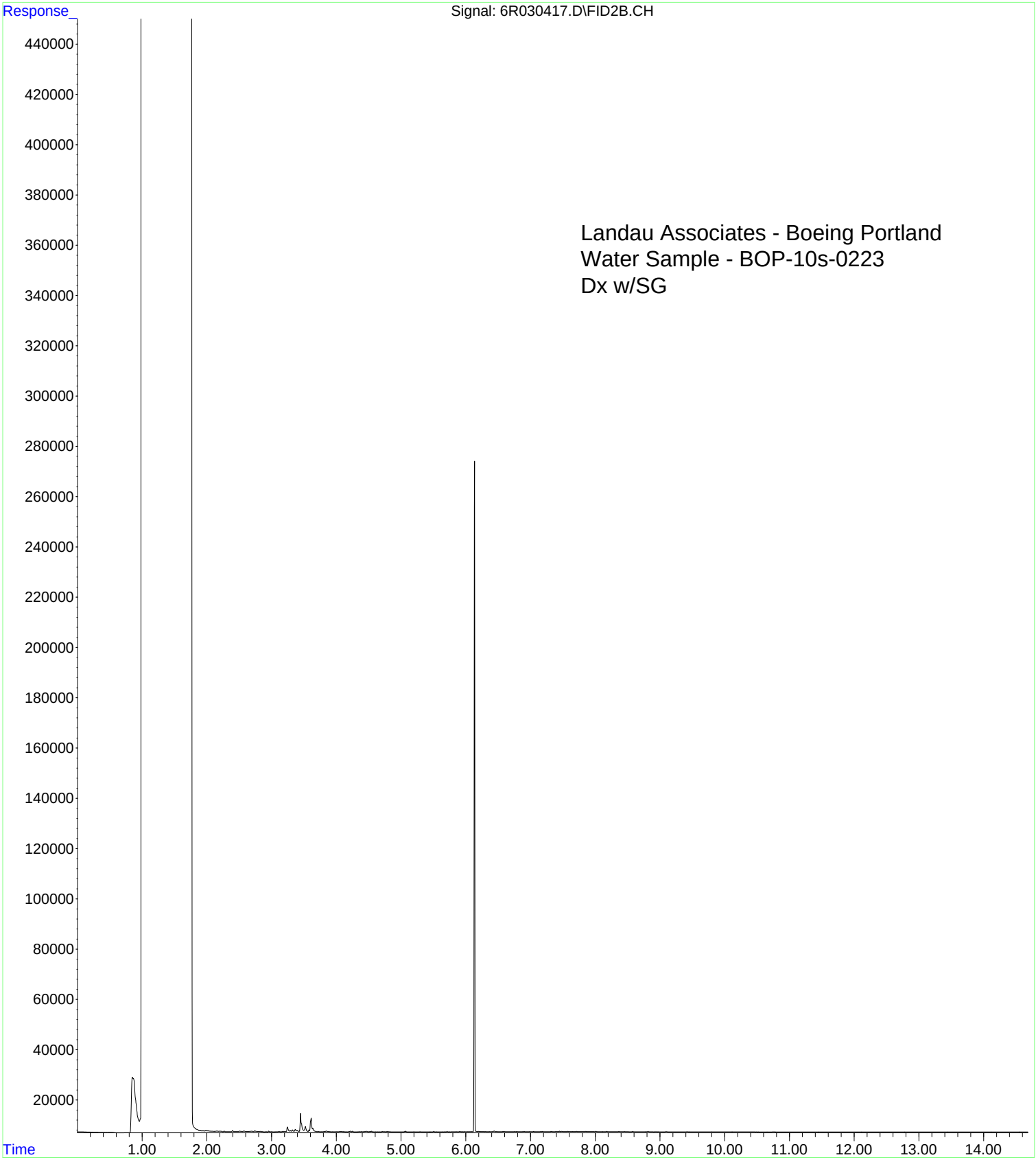
File :C:\msdchem\1\data\3C04033\6R030415.D
Operator : BLL
Acquired : 04 Mar 2023 12:06 pm using AcqMethod 6F71215A.M
Instrument : HP G1530A
Sample Name: A3B0408-10
Misc Info :
Vial Number: 60



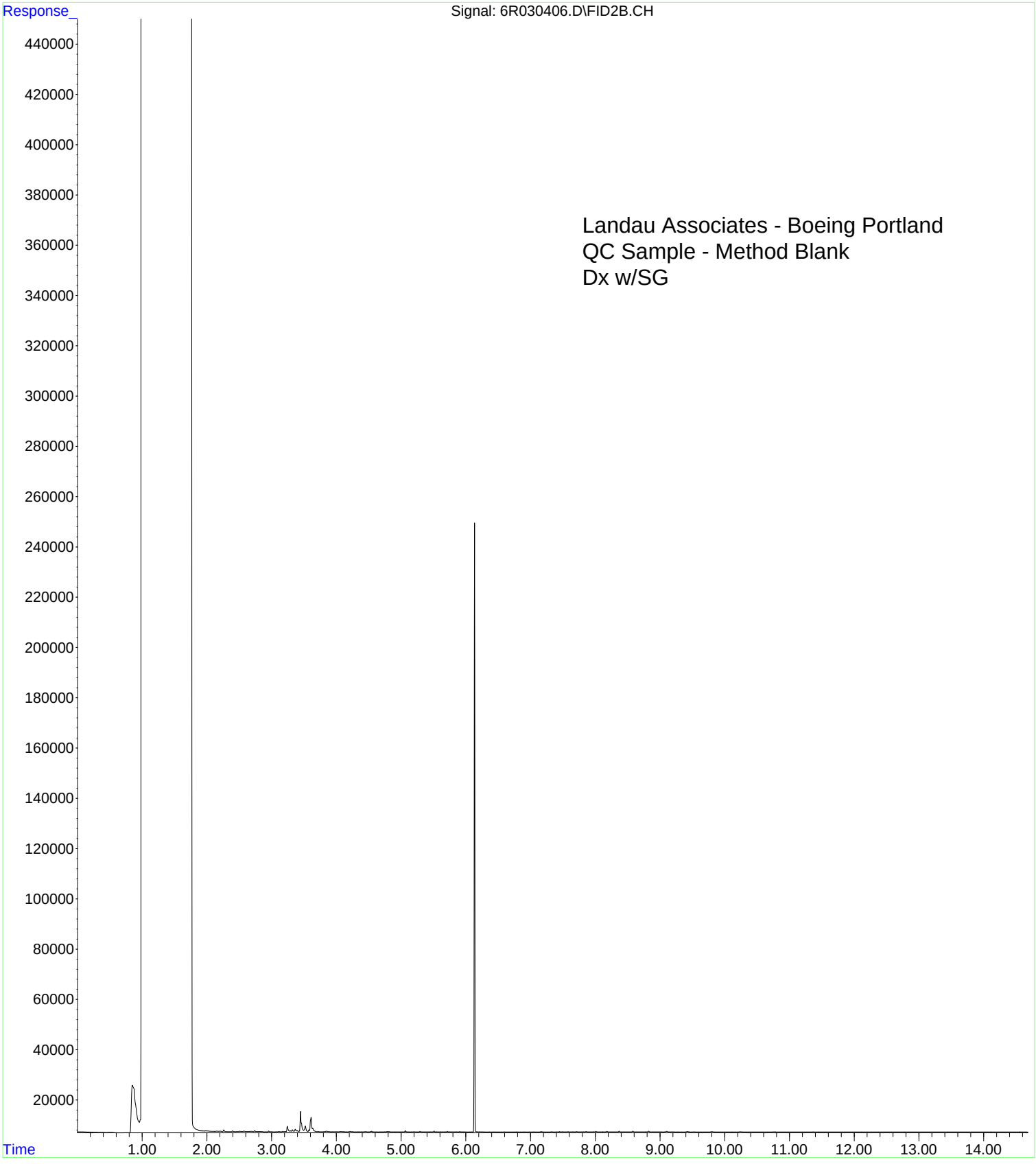
File :C:\msdchem\1\data\3C04033\6R030416.D
Operator : BLL
Acquired : 04 Mar 2023 12:26 pm using AcqMethod 6F71215A.M
Instrument : HP G1530A
Sample Name: A3B0408-11
Misc Info :
Vial Number: 61



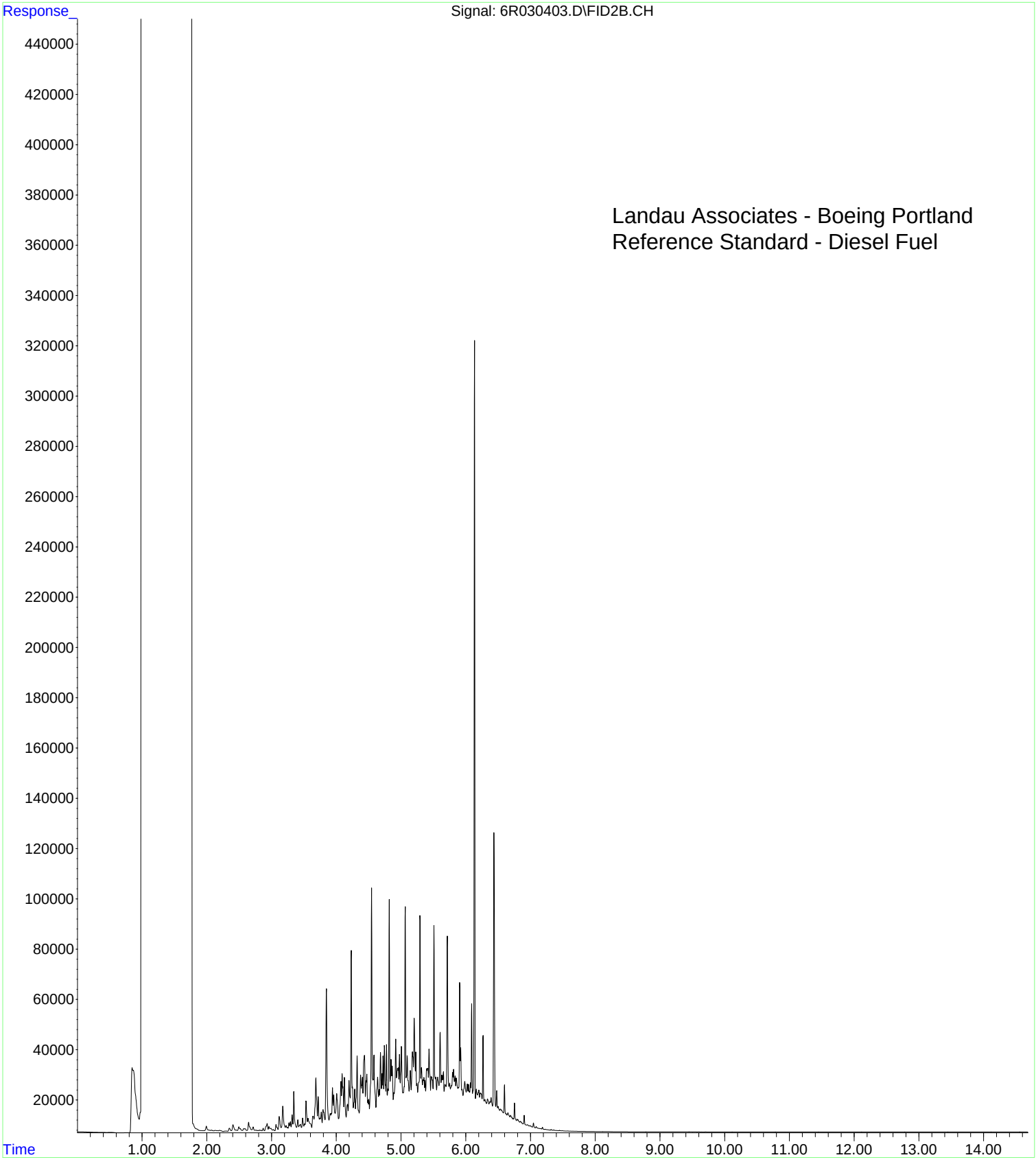
File :C:\msdchem\1\data\3C04033\6R030417.D
Operator : BLL
Acquired : 04 Mar 2023 12:47 pm using AcqMethod 6F71215A.M
Instrument : HP G1530A
Sample Name: A3B0408-15
Misc Info :
Vial Number: 62



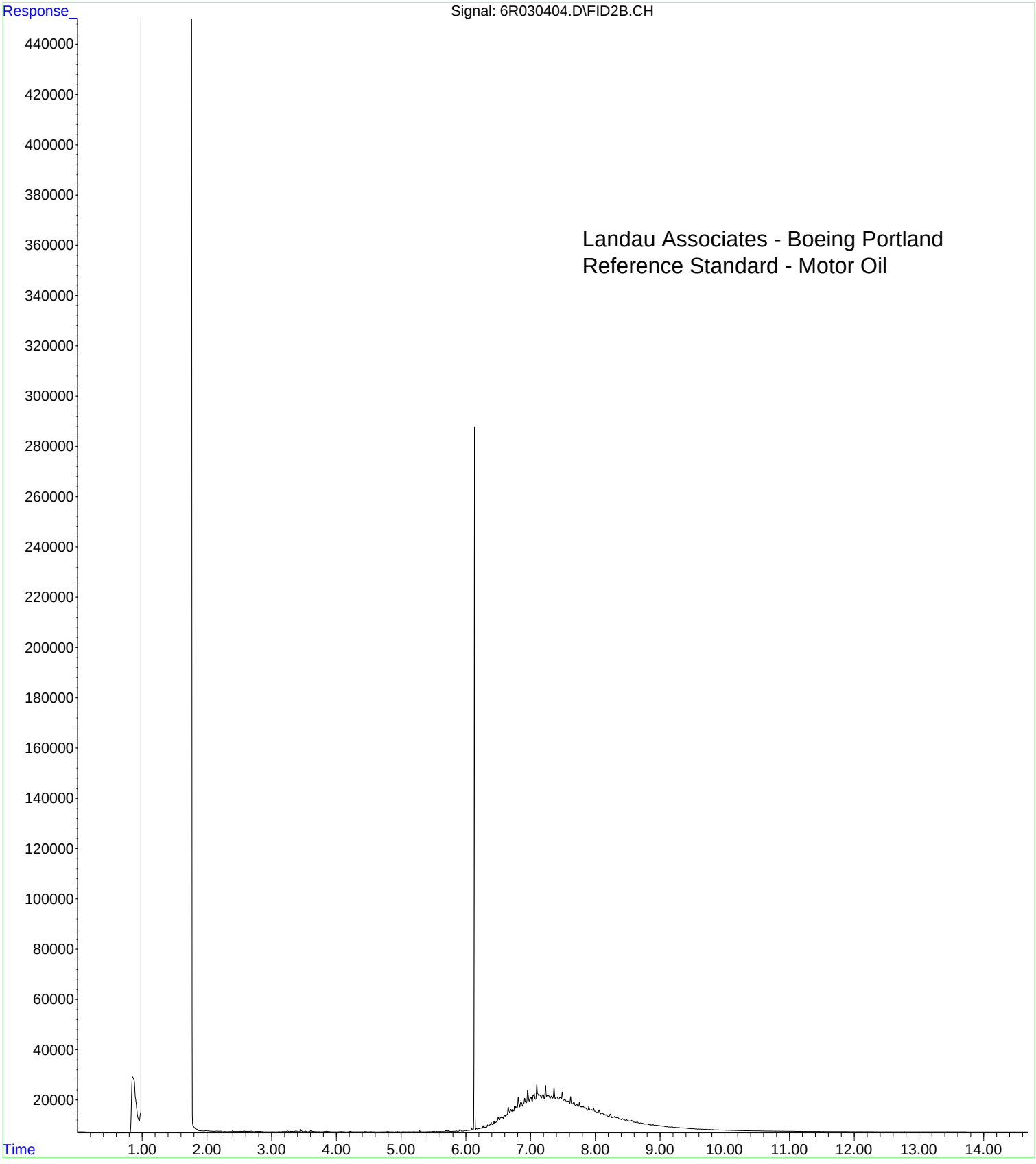
File :C:\msdchem\1\data\3C04033\6R030406.D
Operator : BLL
Acquired : 04 Mar 2023 9:04 am using AcqMethod 6F71215A.M
Instrument : HP G1530A
Sample Name: 23B0763-BLK1
Misc Info :
Vial Number: 53



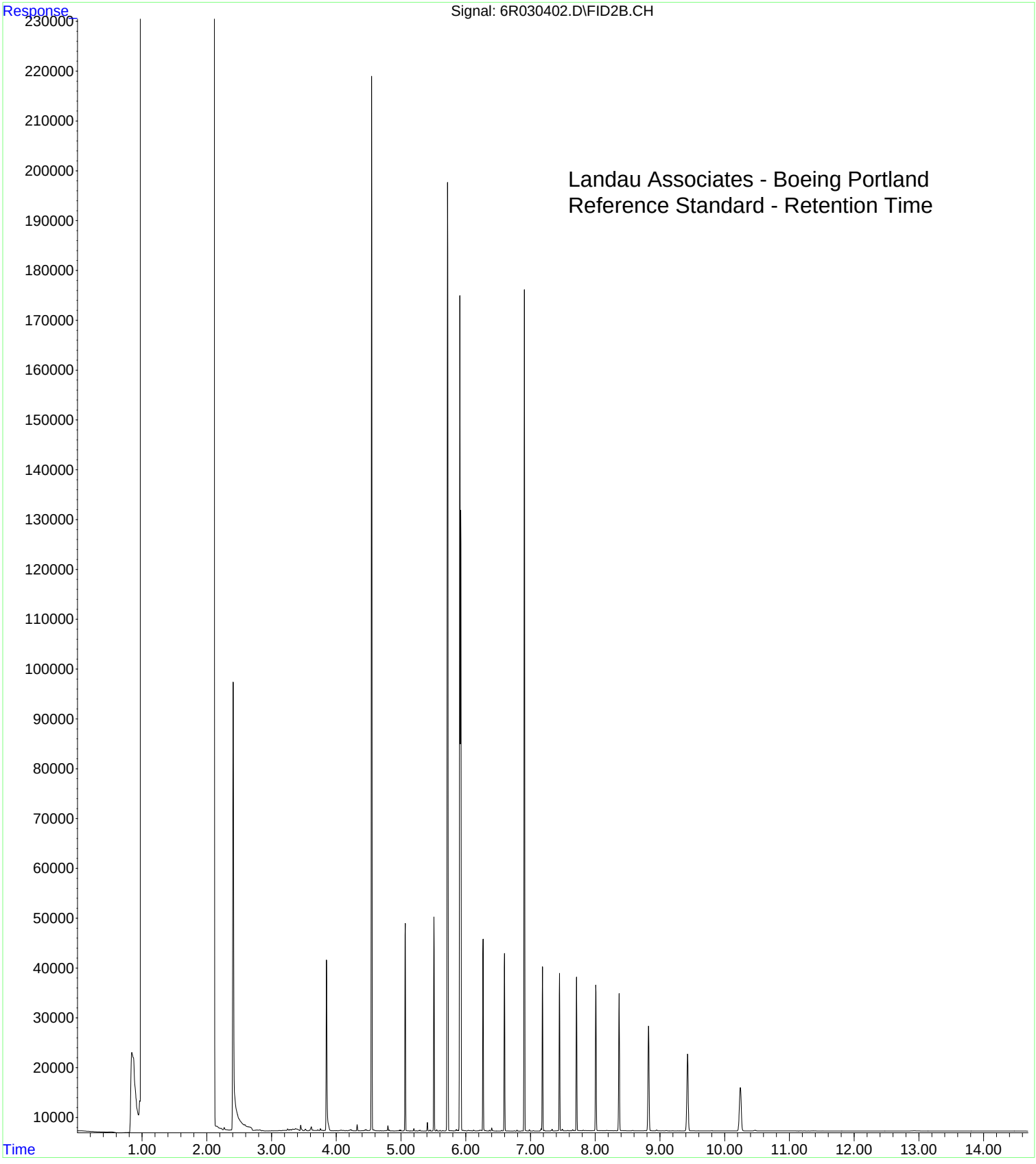
File :C:\msdchem\1\data\3C04033\6R030403.D
Operator : BLL
Acquired : 04 Mar 2023 8:03 am using AcqMethod 6F71215A.M
Instrument : HP G1530A
Sample Name: 3C04033-CCV1
Misc Info :
Vial Number: 51



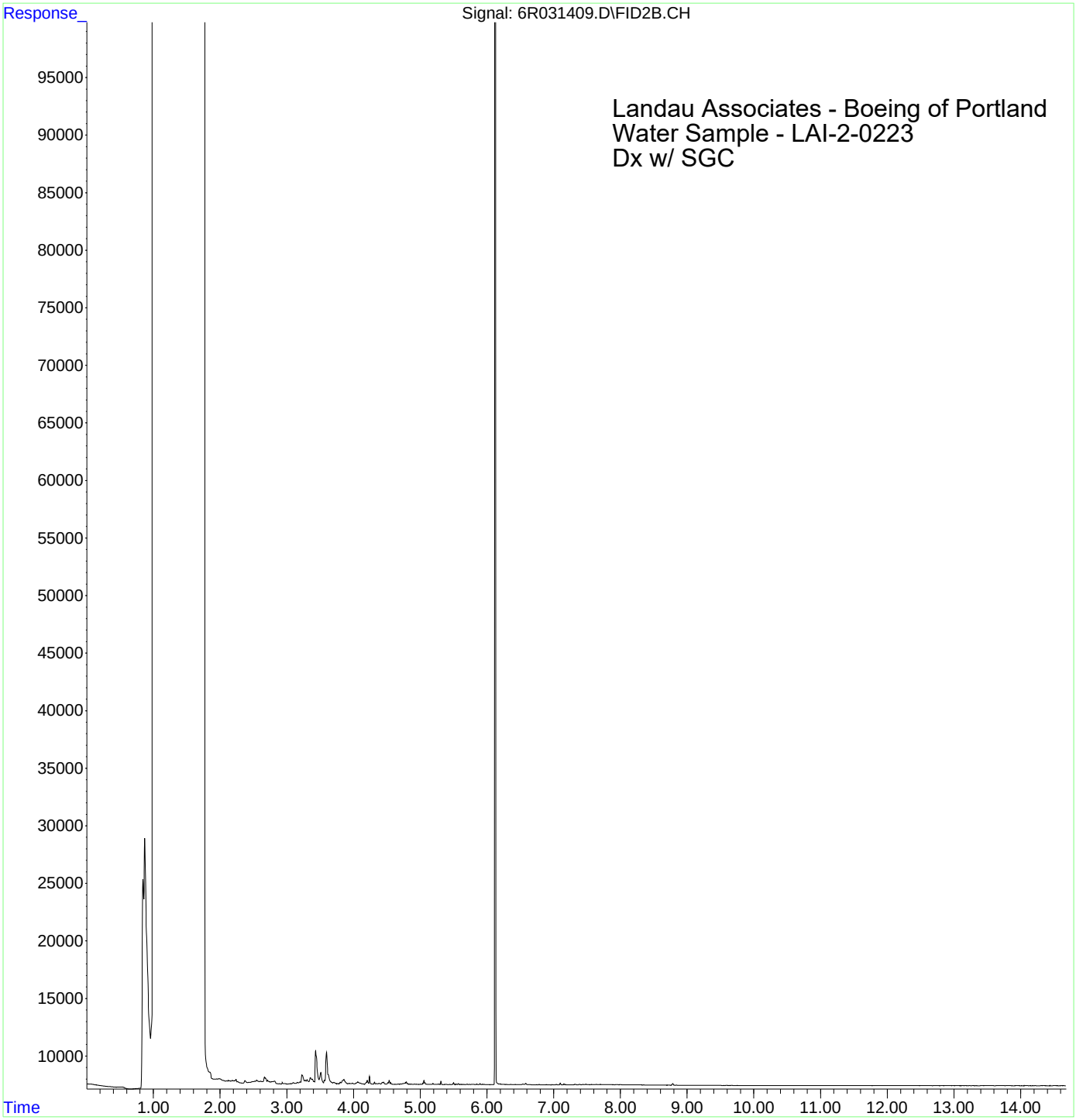
File :C:\msdchem\1\data\3C04033\6R030404.D
Operator : BLL
Acquired : 04 Mar 2023 8:23 am using AcqMethod 6F71215A.M
Instrument : HP G1530A
Sample Name: 3C04033-CCV2
Misc Info :
Vial Number: 52



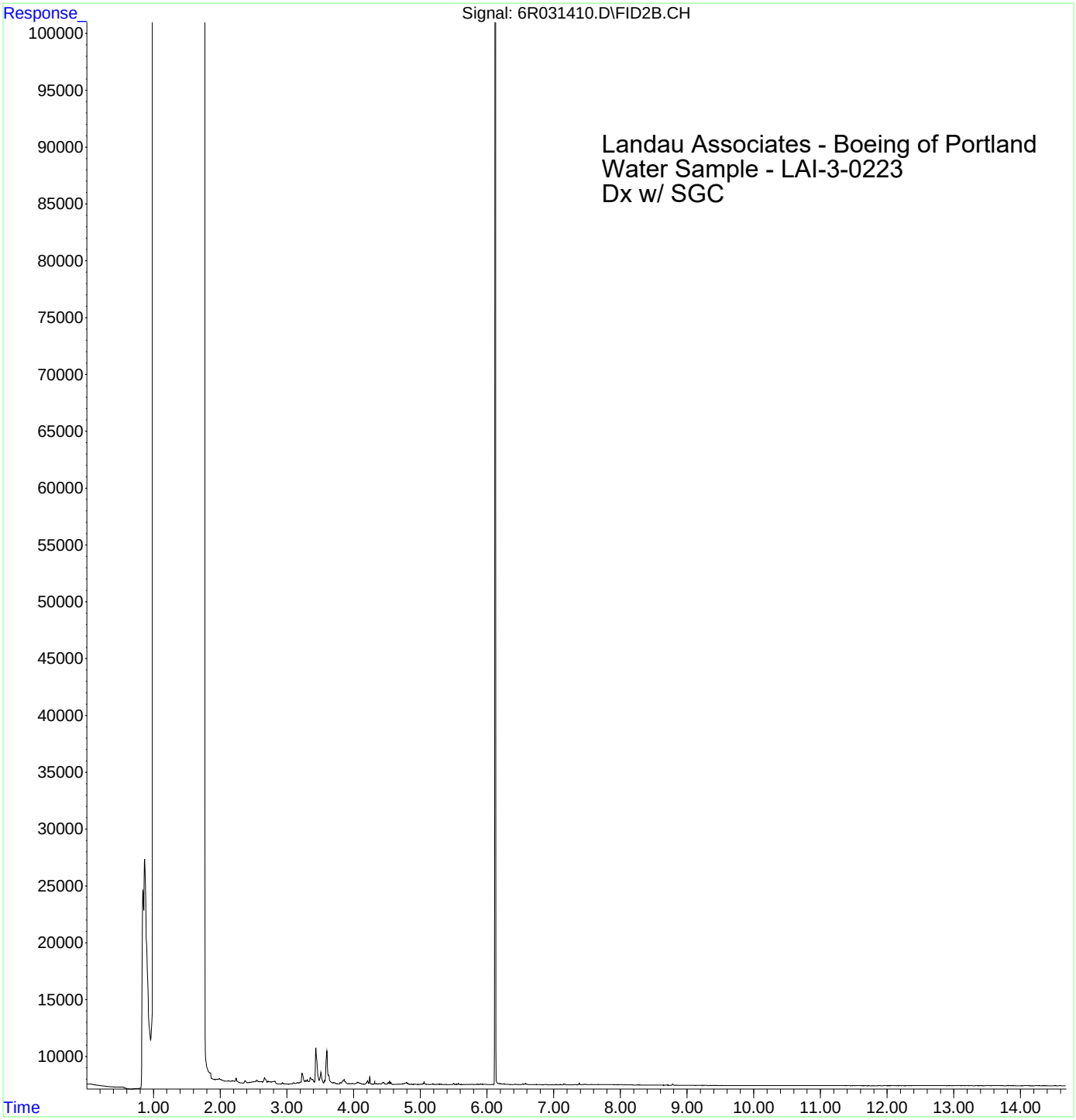
File :C:\msdchem\1\data\3C04033\6R030402.D
Operator : BLL
Acquired : 04 Mar 2023 7:43 am using AcqMethod 6F71215A.M
Instrument : HP G1530A
Sample Name: 3C04033-RES1
Misc Info :
Vial Number: 95



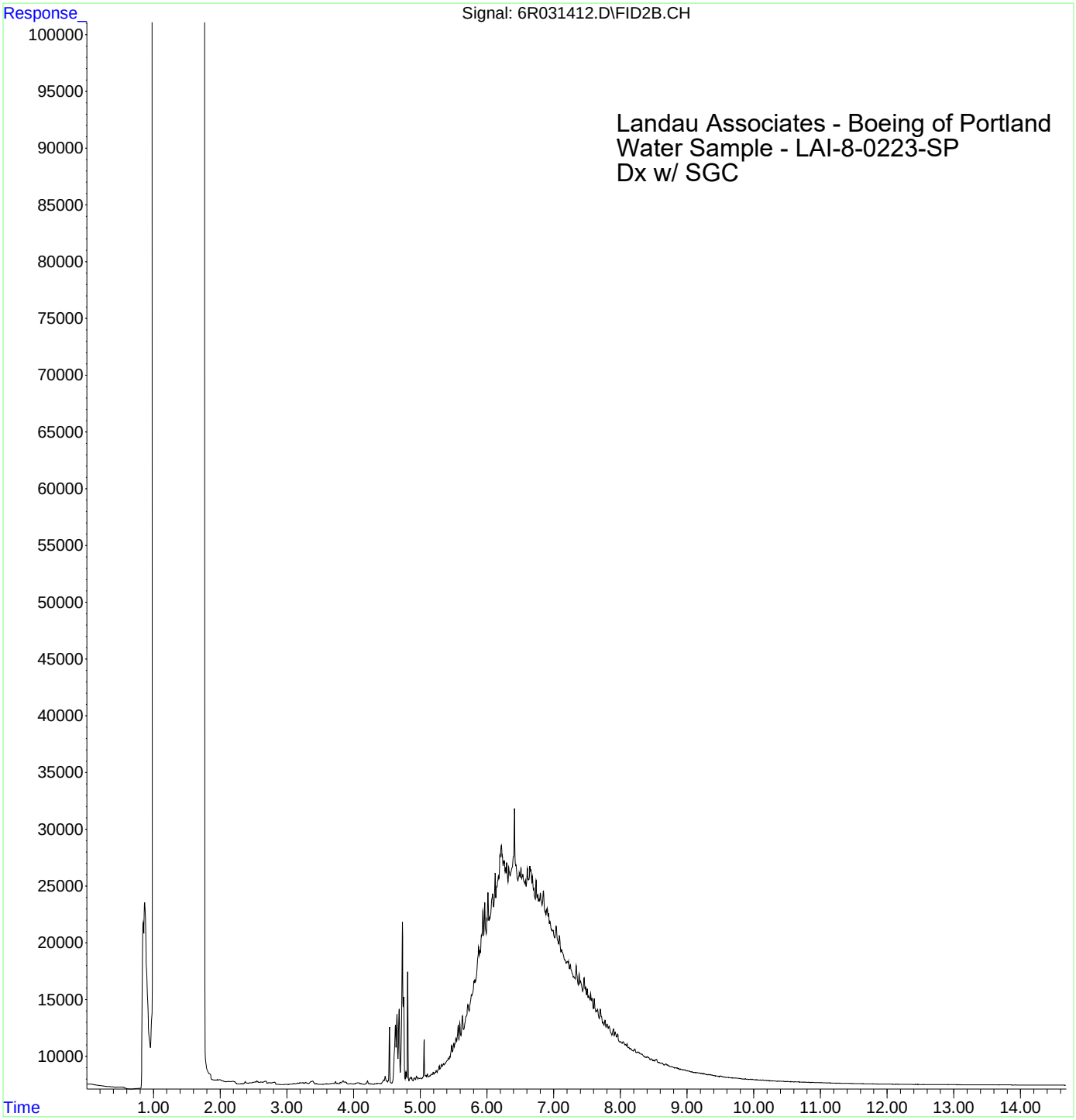
File   :M:\DUALFID6\1\DATA\2023-03\3C14034\6R031409.D
Operator   : BLL
Acquired   : 14 Mar 2023   6:38 am using AcqMethod 6F71215A.M
Instrument :   HP G1530A
Sample Name: A3B0416-02
Misc Info :
Vial Number: 56



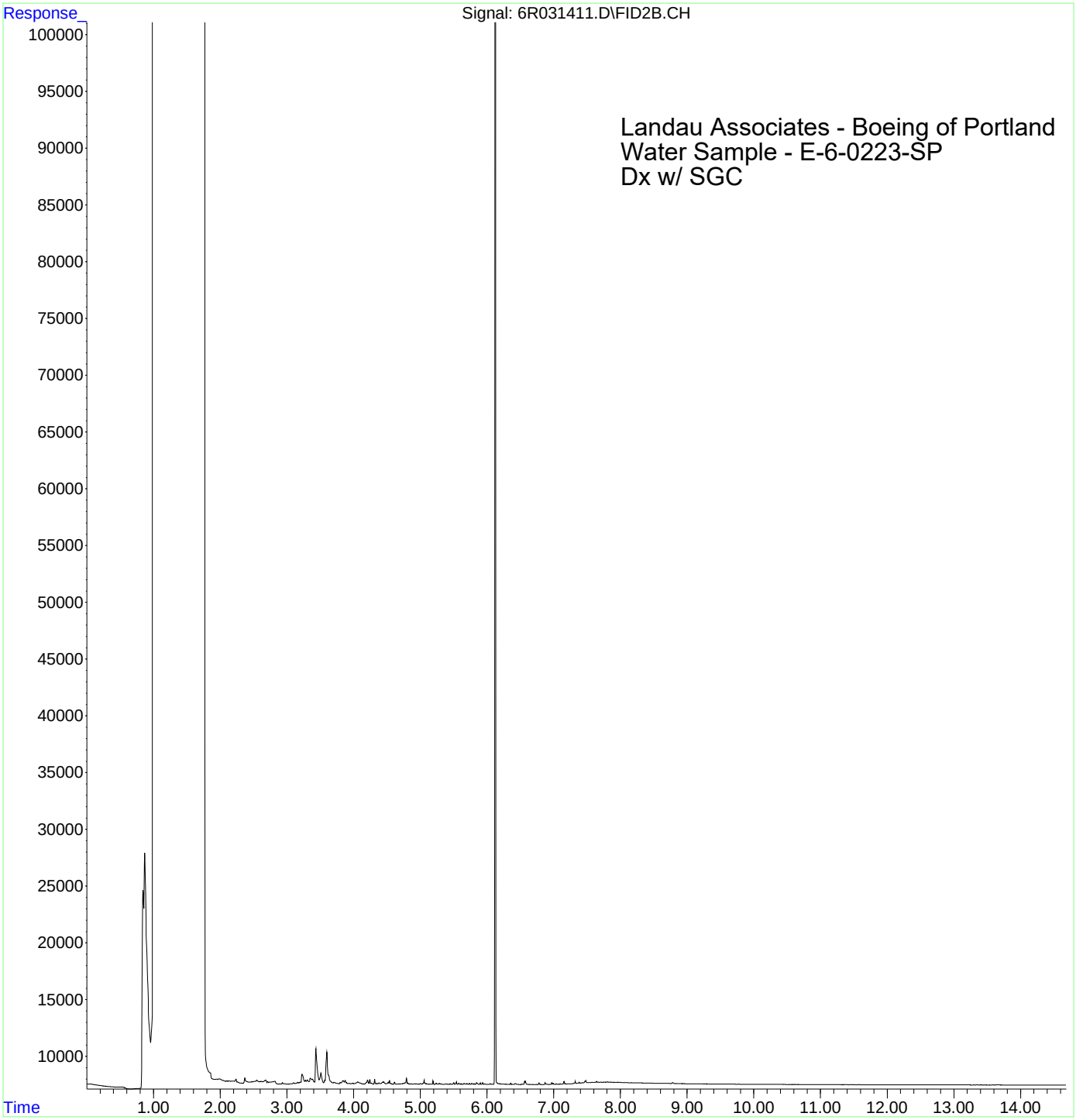
File   :M:\DUALFID6\1\DATA\2023-03\3C14034\6R031410.D
Operator   : BLL
Acquired   : 14 Mar 2023   6:58 am using AcqMethod 6F71215A.M
Instrument :   HP G1530A
Sample Name: A3B0416-03
Misc Info :
Vial Number: 57



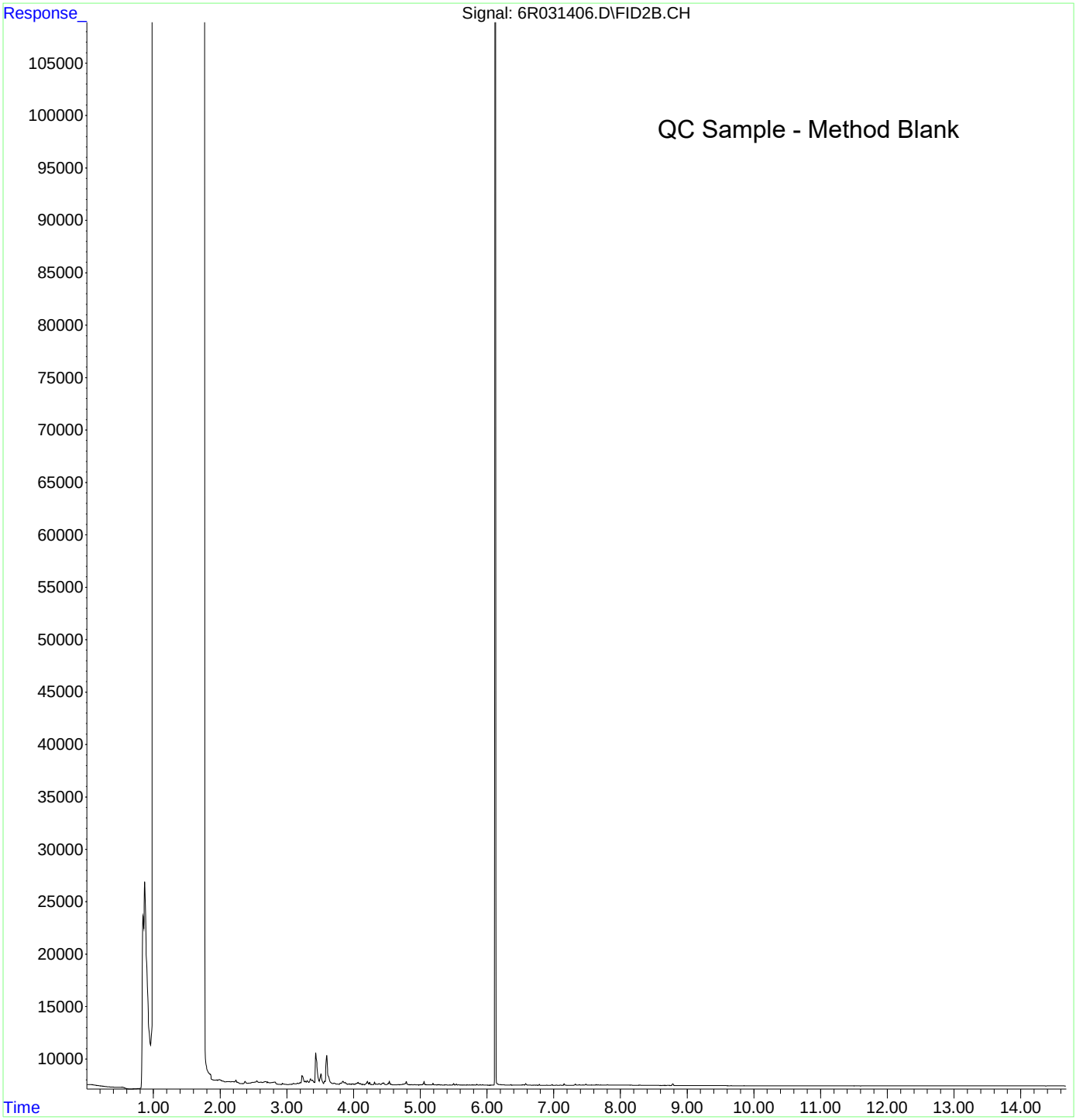
File   :M:\DUALFID6\1\DATA\2023-03\3C14034\6R031412.D
Operator   : BLL
Acquired   : 14 Mar 2023   7:38 am using AcqMethod 6F71215A.M
Instrument :   HP G1530A
Sample Name: A3B0416-04@100
Misc Info :
Vial Number: 59



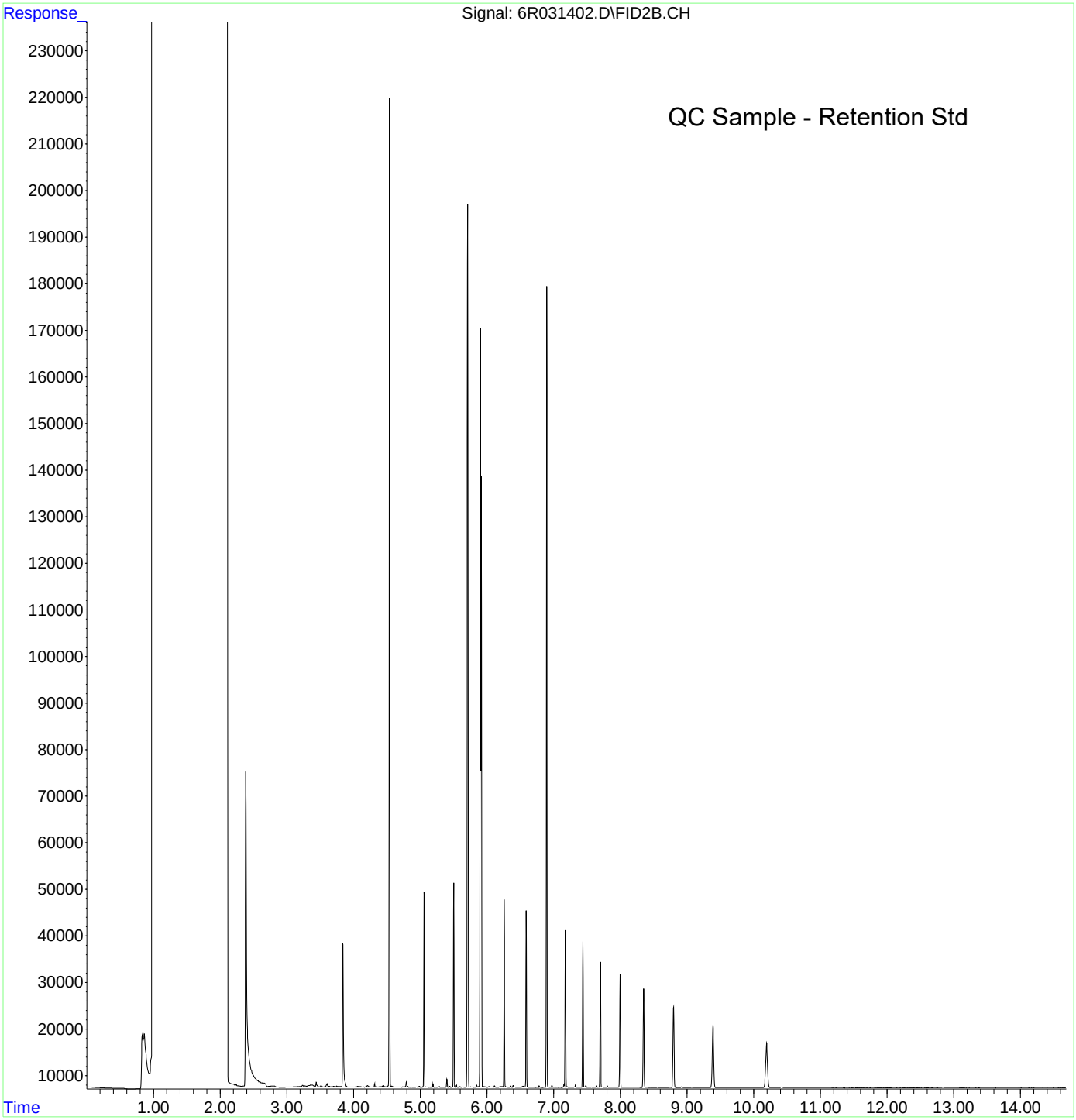
File :M:\DUALFID6\1\DATA\2023-03\3C14034\6R031411.D
Operator : BLL
Acquired : 14 Mar 2023 7:18 am using AcqMethod 6F71215A.M
Instrument : HP G1530A
Sample Name: A3B0416-05
Misc Info :
Vial Number: 58



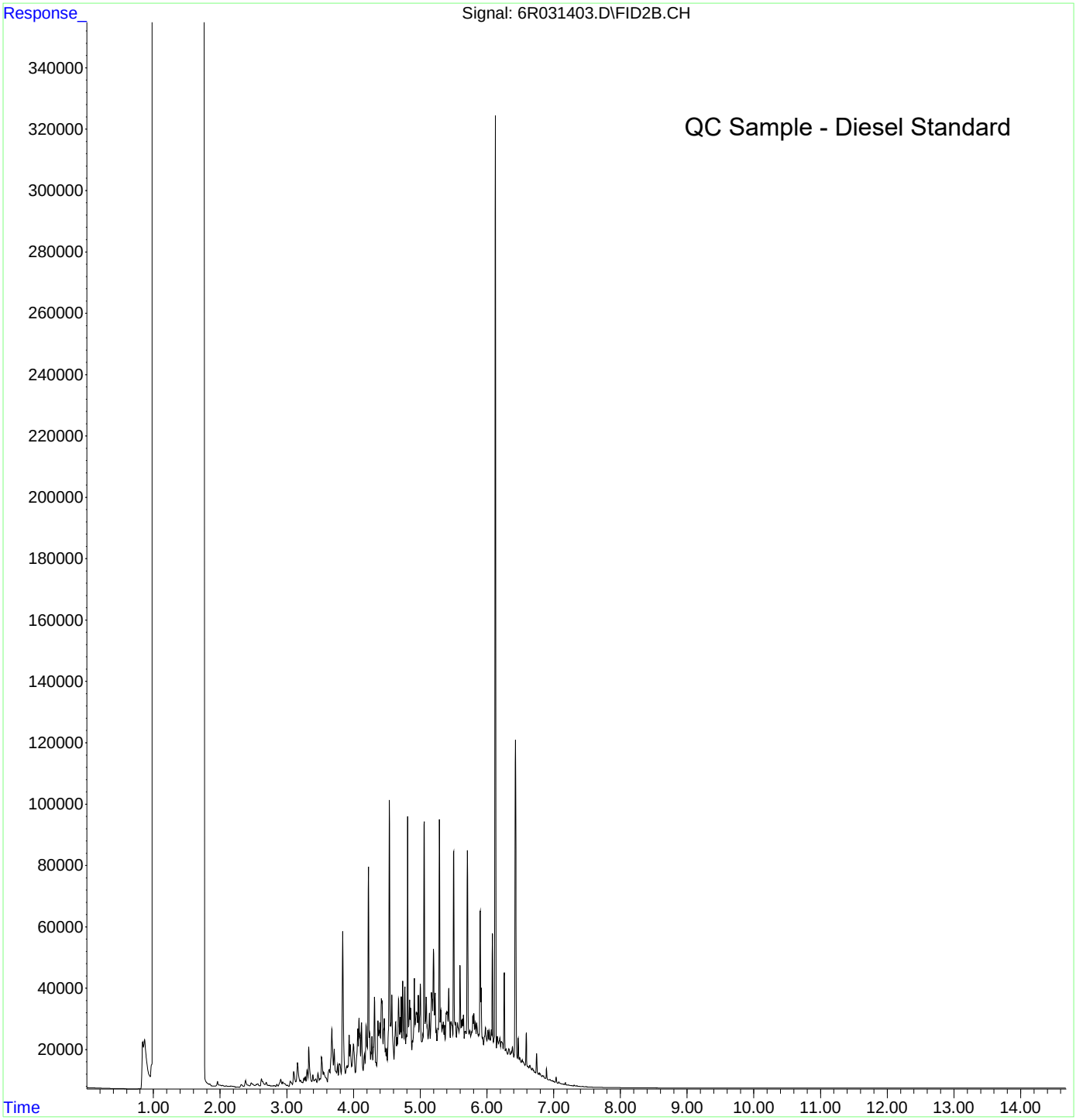
File :M:\DUALFID6\1\DATA\2023-03\3C14034\6R031406.D
Operator : BLL
Acquired : 14 Mar 2023 5:37 am using AcqMethod 6F71215A.M
Instrument : HP G1530A
Sample Name: 23C0468-BLK1
Misc Info :
Vial Number: 53



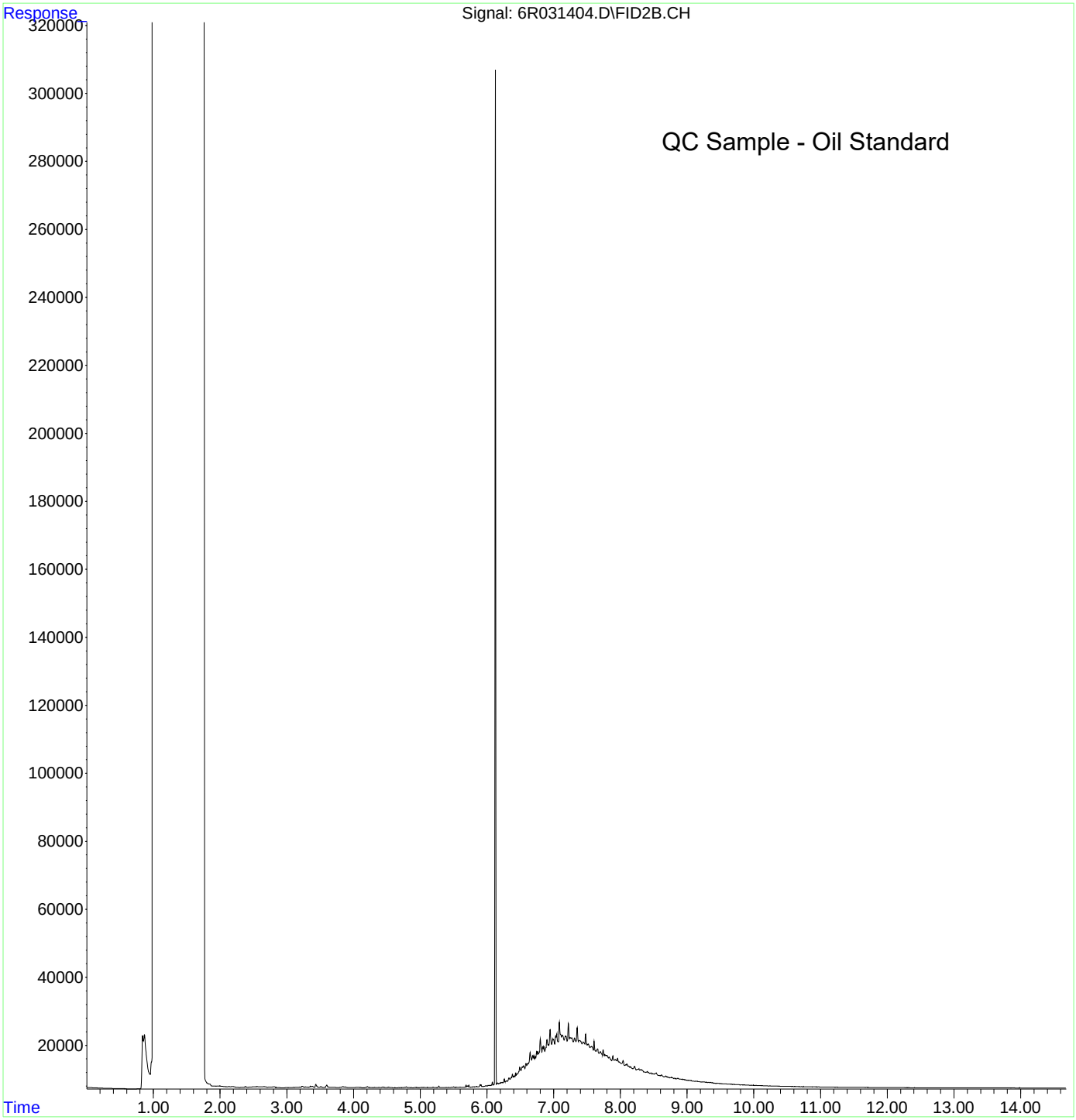
File :M:\DUALFID6\1\DATA\2023-03\3C14034\6R031402.D
Operator : BLL
Acquired : 14 Mar 2023 4:16 am using AcqMethod 6F71215A.M
Instrument : HP G1530A
Sample Name: 3C14033-RES1
Misc Info :
Vial Number: 95



File :M:\DUALFID6\1\DATA\2023-03\3C14034\6R031403.D
Operator : BLL
Acquired : 14 Mar 2023 4:36 am using AcqMethod 6F71215A.M
Instrument : HP G1530A
Sample Name: 3C14033-CCV1
Misc Info :
Vial Number: 51

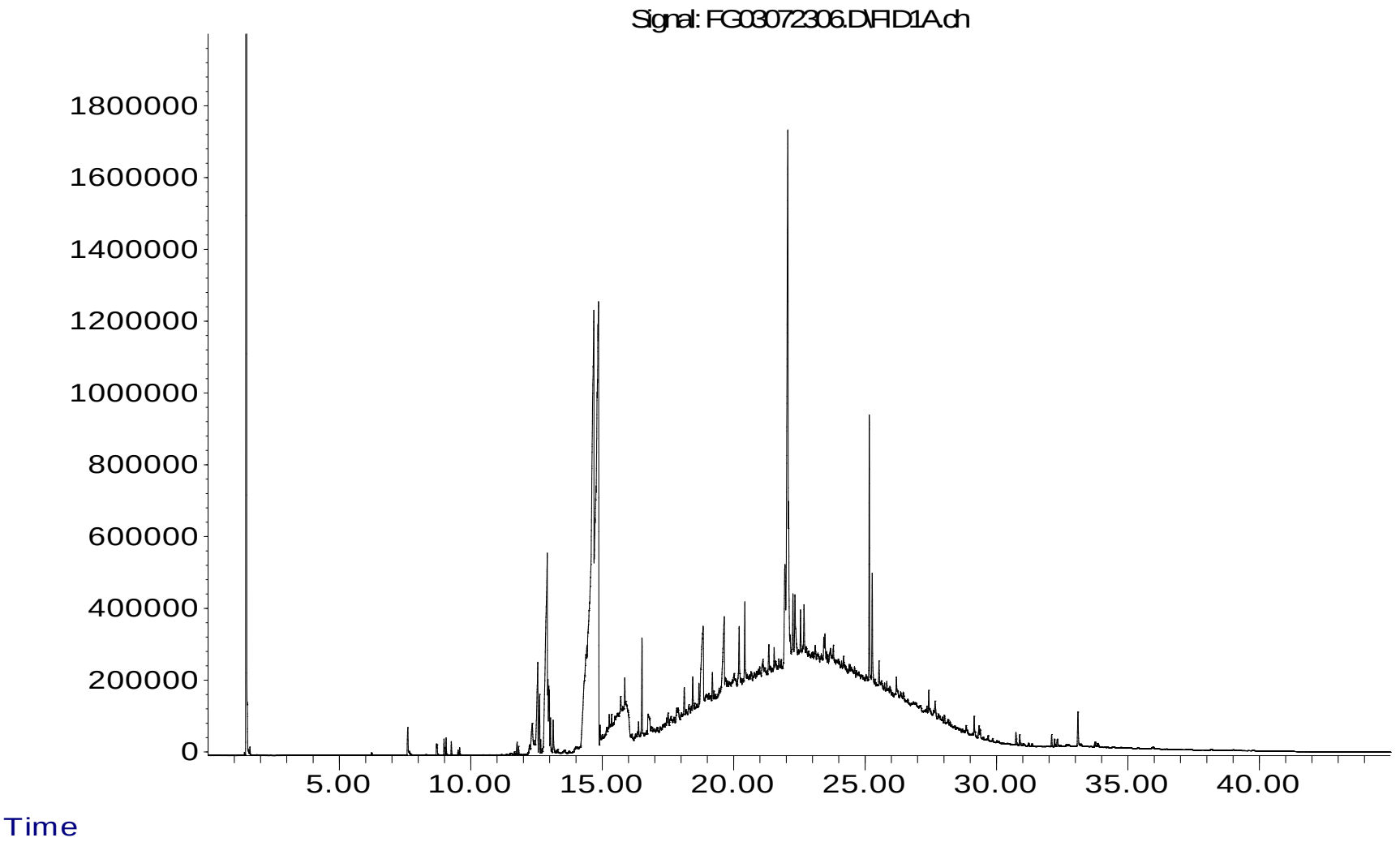


File   :M:\DUALFID6\1\DATA\2023-03\3C14034\6R031404.D
Operator   : BLL
Acquired   : 14 Mar 2023   4:57 am using AcqMethod 6F71215A.M
Instrument :   HP G1530A
Sample Name: 3C14033-CCV2
Misc Info :
Vial Number: 52

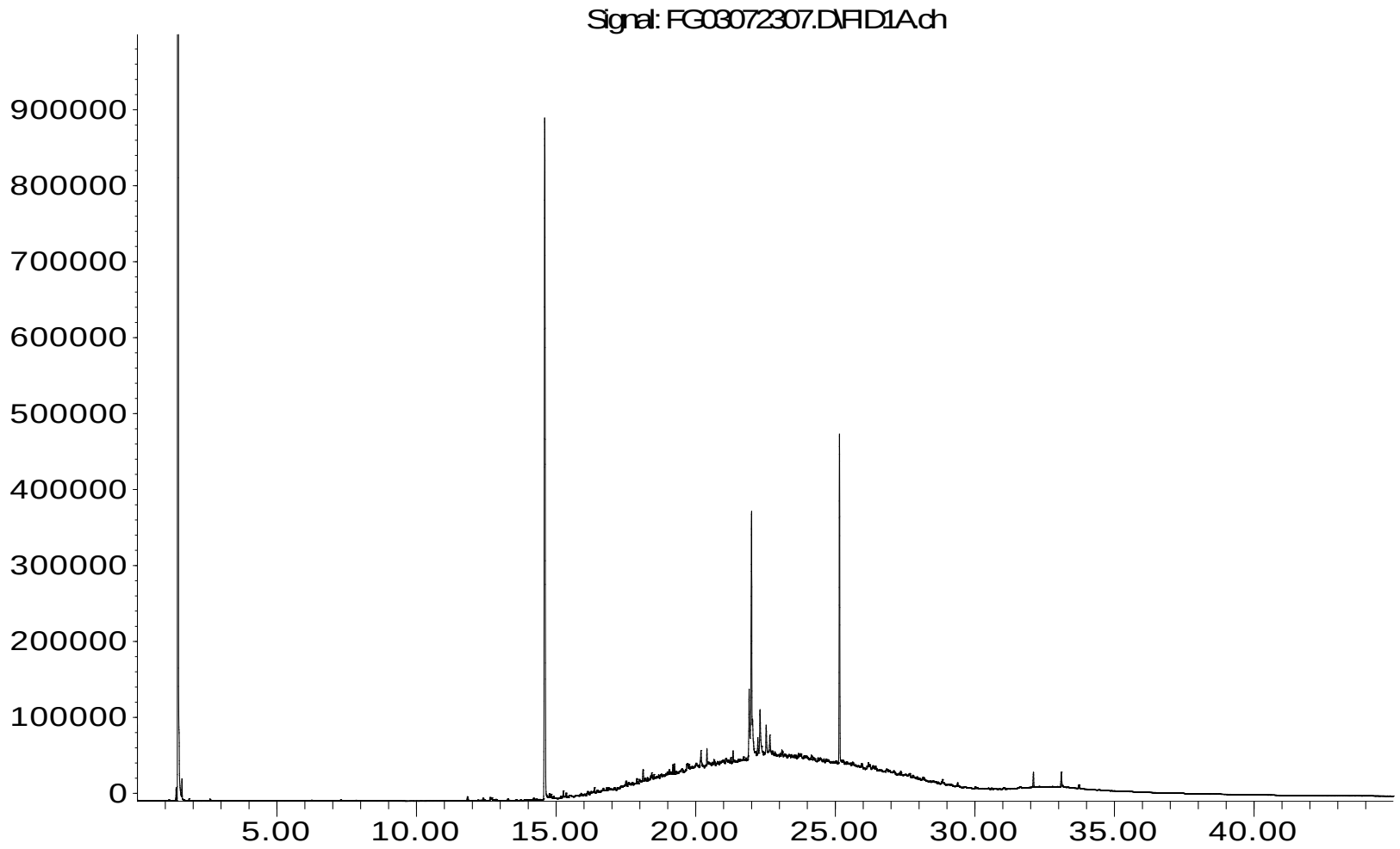


APPENDIX D

Product Sample: Coolant-0223 (A3B0408-01)
Landau Associates - Boeing Portland
Sequence Date: March 7, 2023

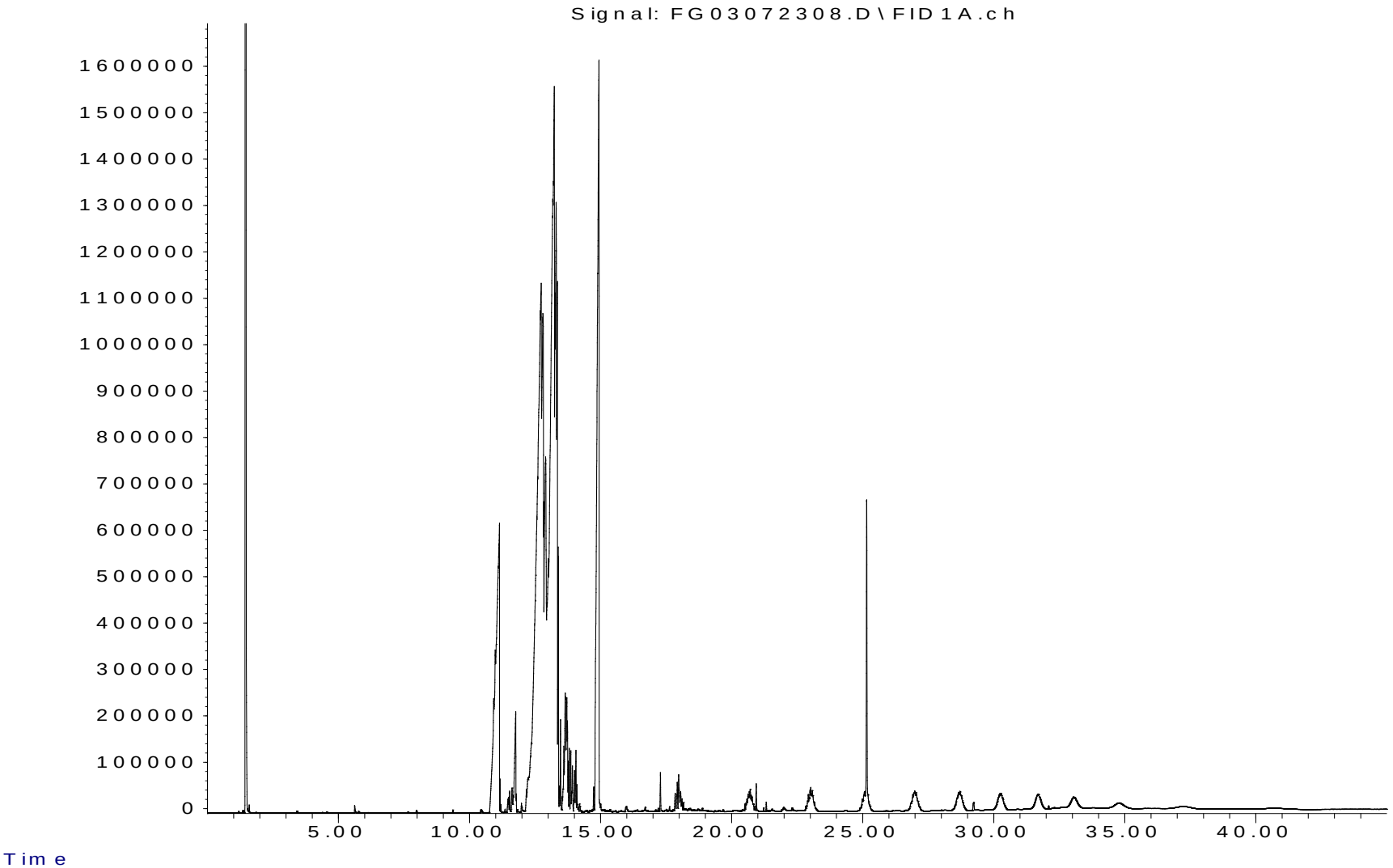


Product Sample: CoolantMix-0223 (A3B0408-02)
Landau Associates - Boeing Portland
Sequence Date: March 7, 2023

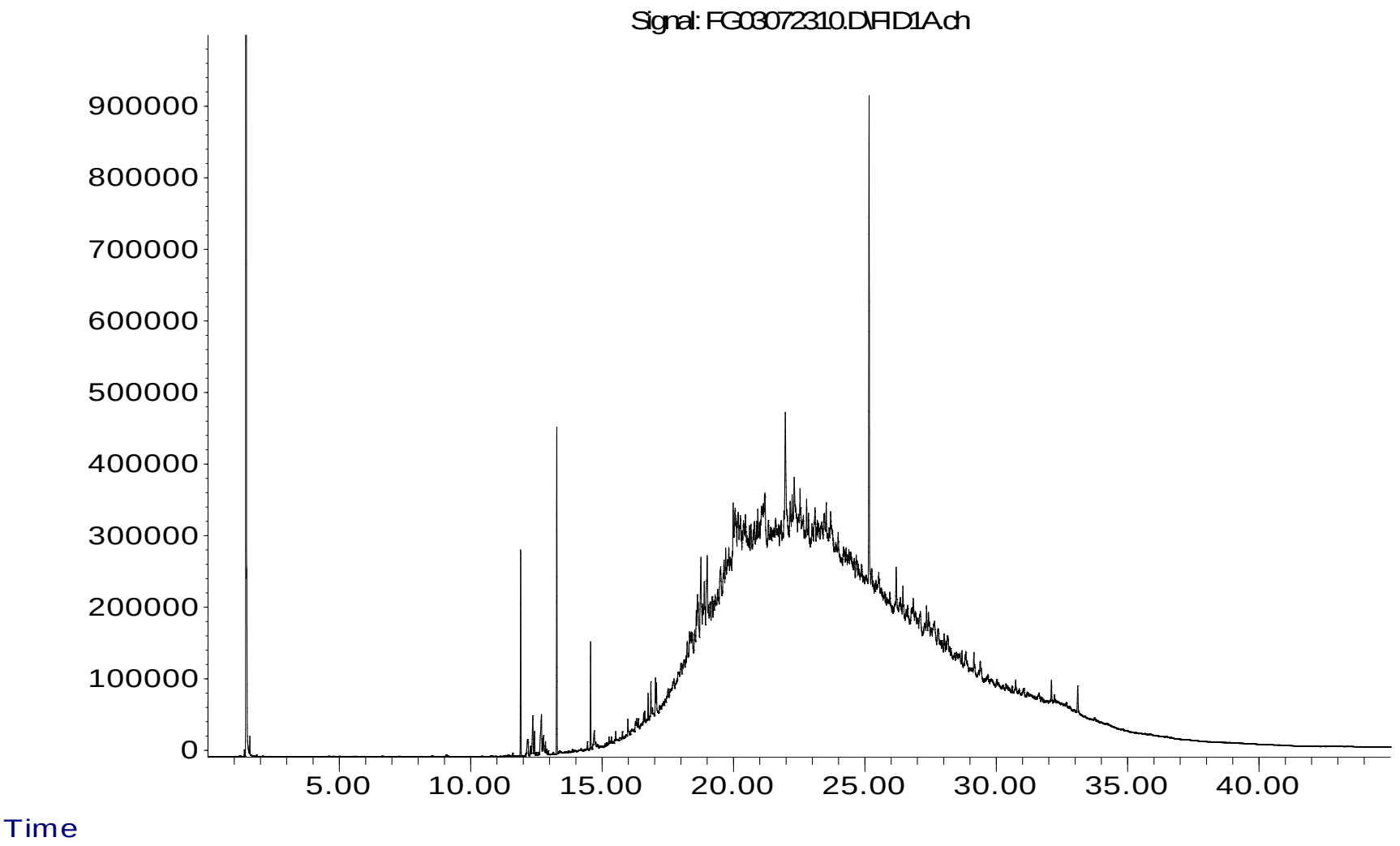


ASTM D2887-14 GC/FID

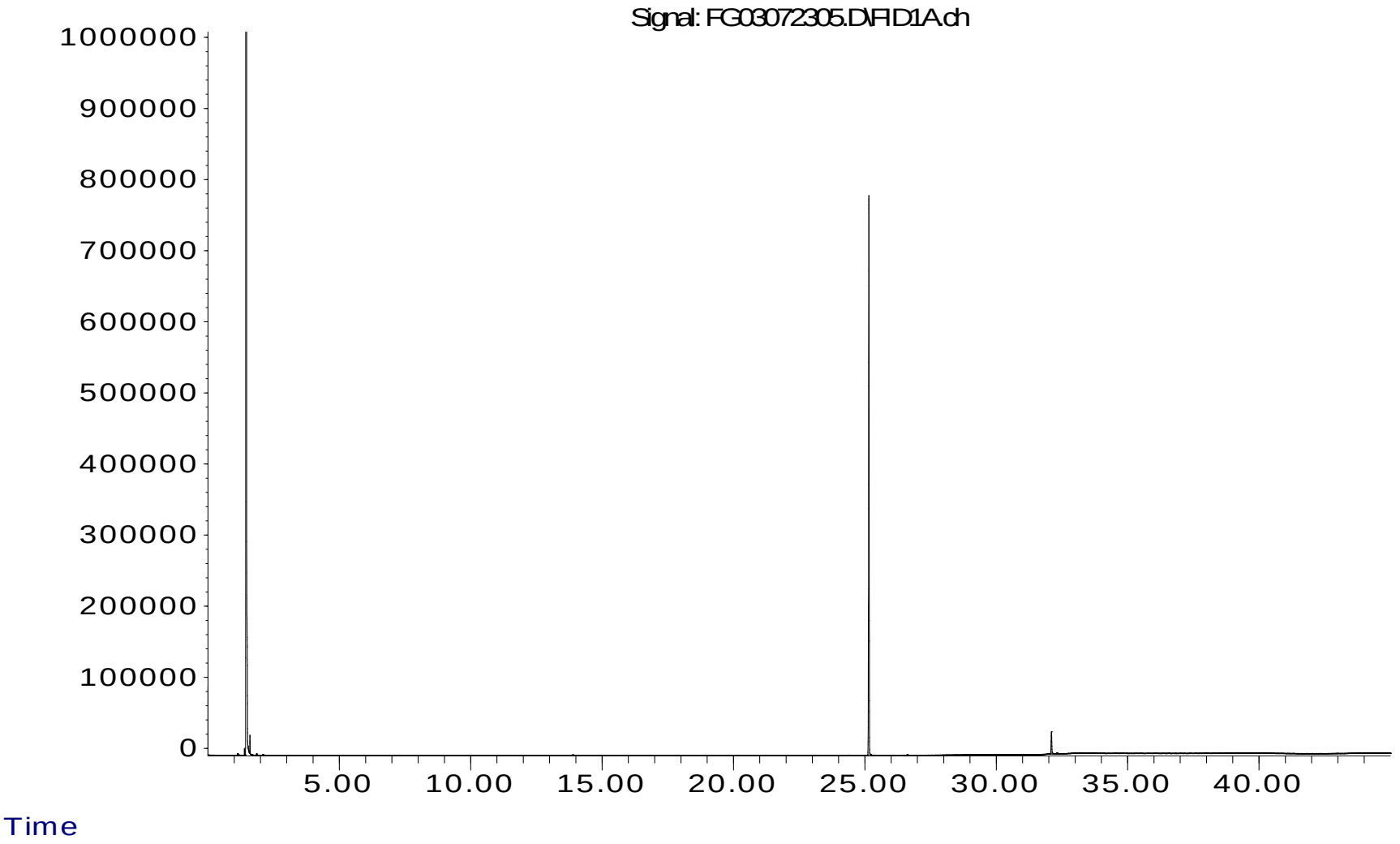
Product Sample: Syntilo-0223 (A3B0408-03)
Landau Associates - Boeing Portland
Sequence Date: March 7, 2023



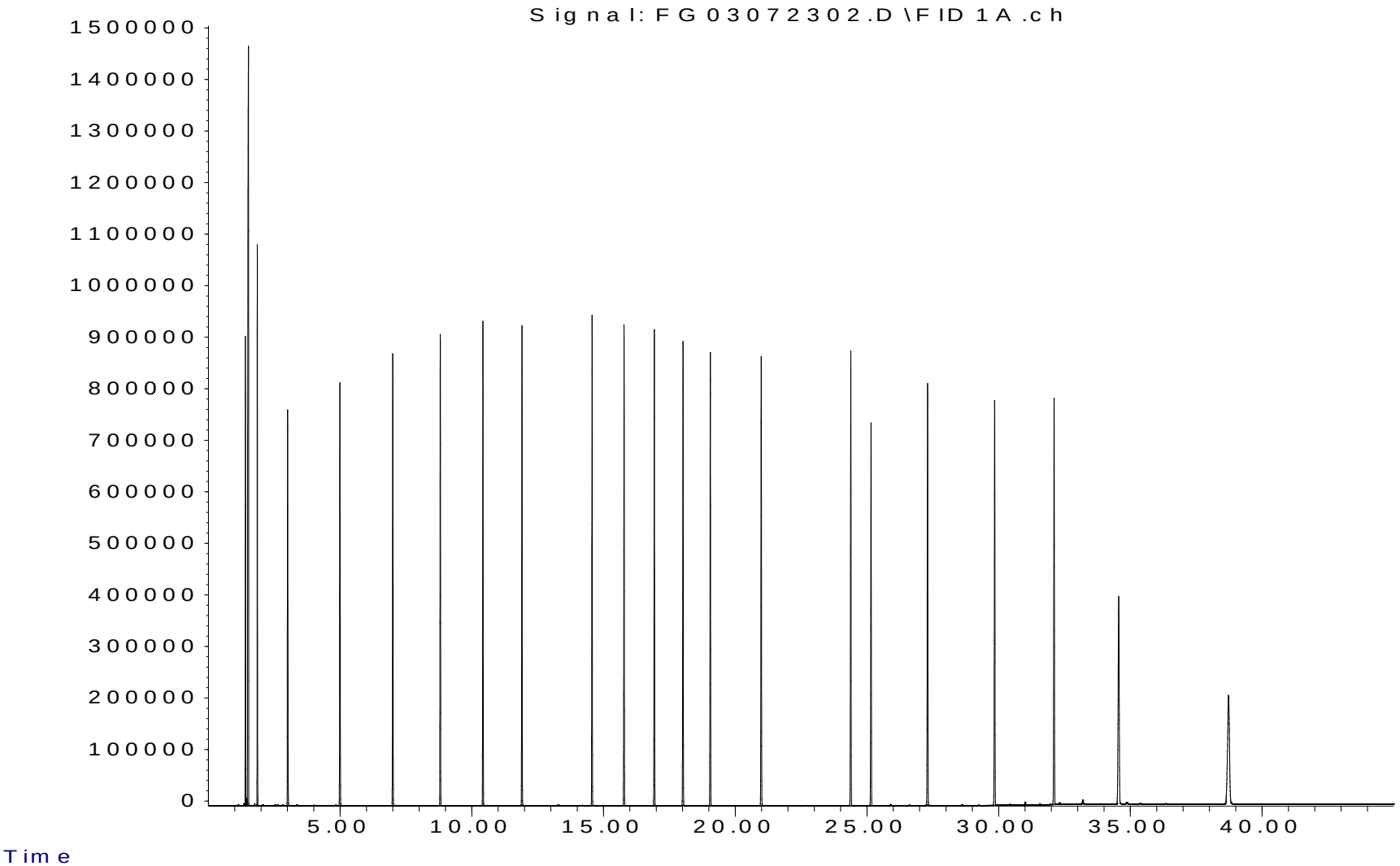
Product Sample: LAI-8-Prod-0223 (A3B0408-04)
Landau Associates - Boeing Portland
Sequence Date: March 7, 2023



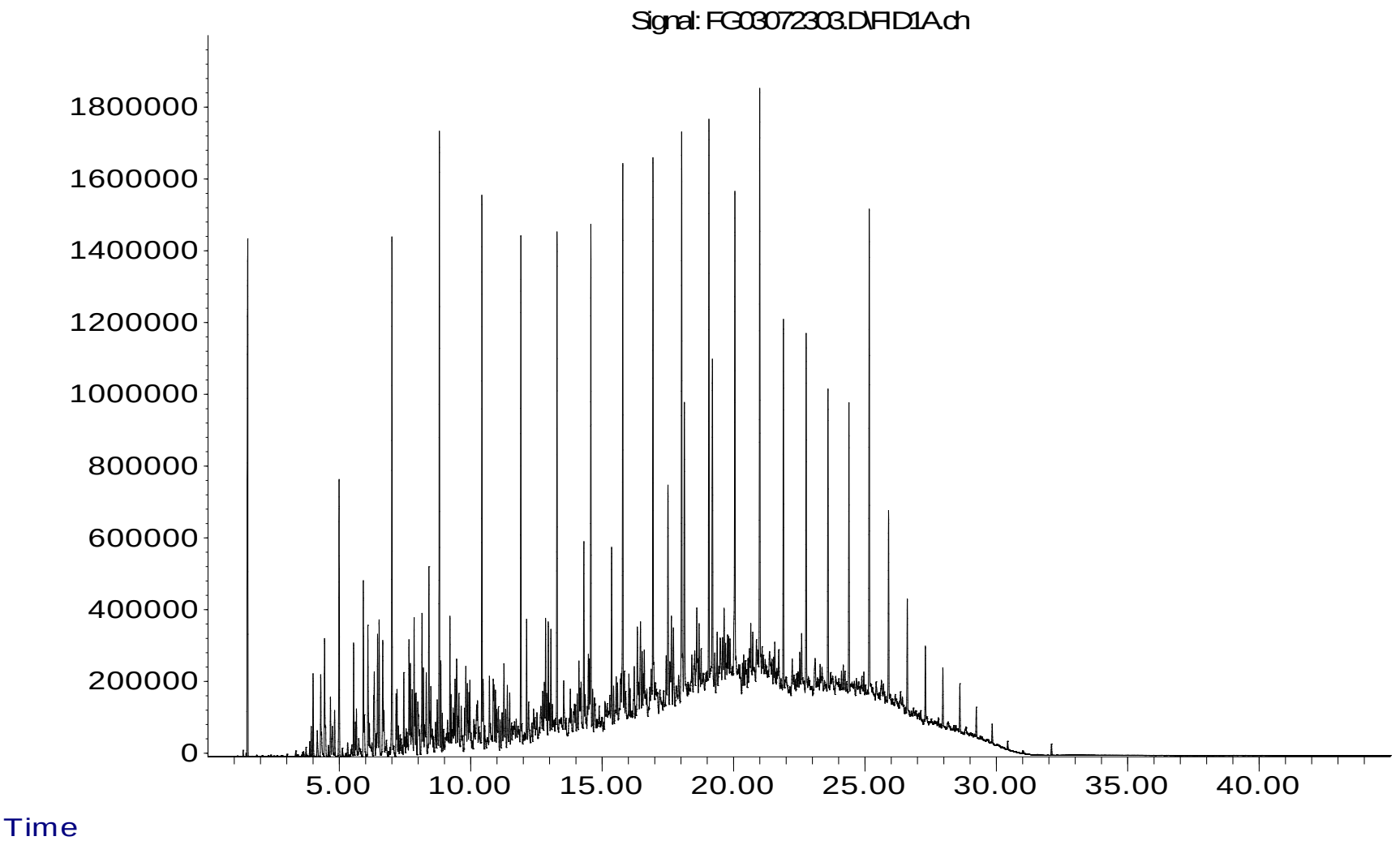
QC Sample: Method Blank
Sequence Date: March 7, 2023



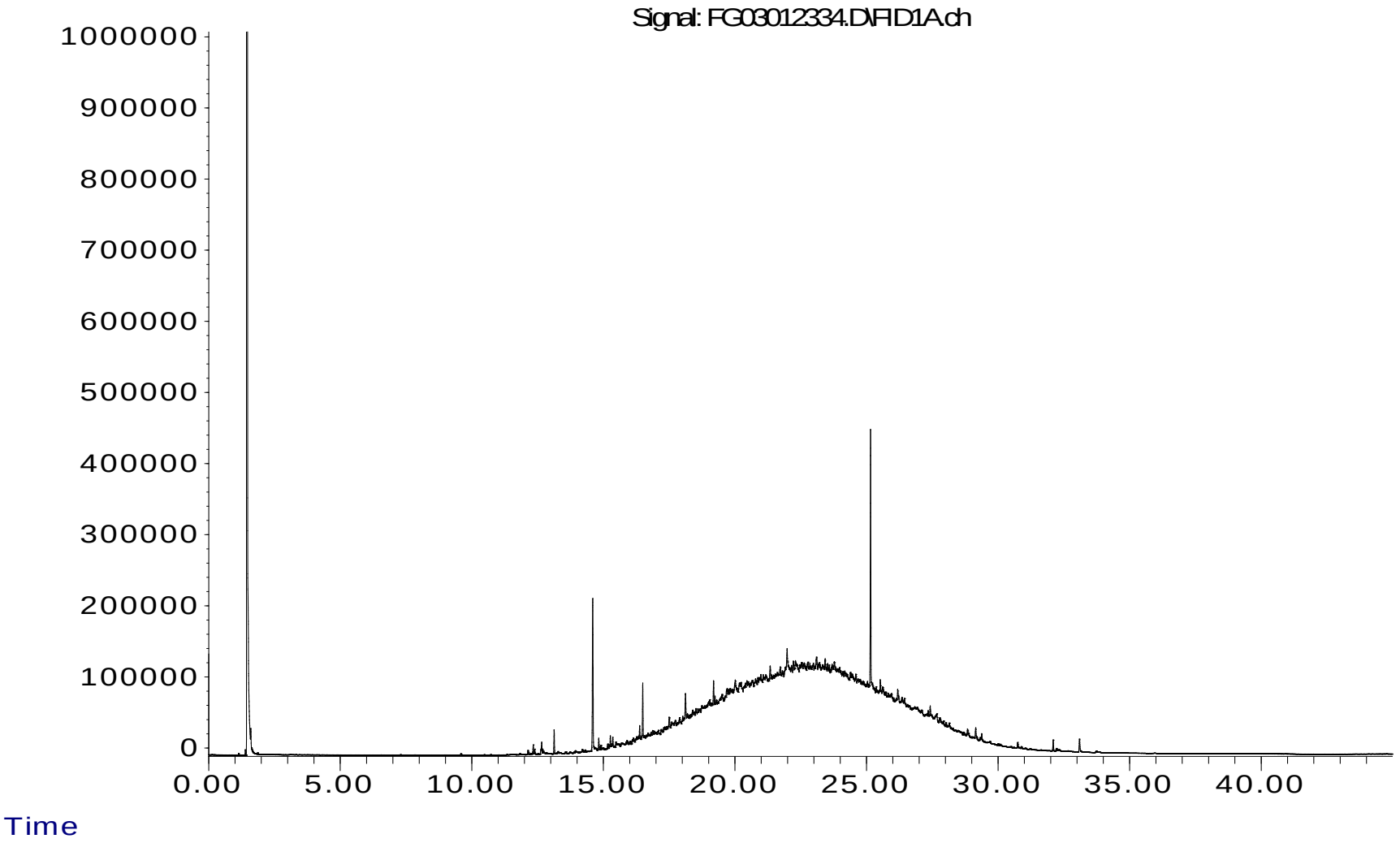
ASTM Reference Sample: 2887 Alk A
Sequence Date: March 7, 2023



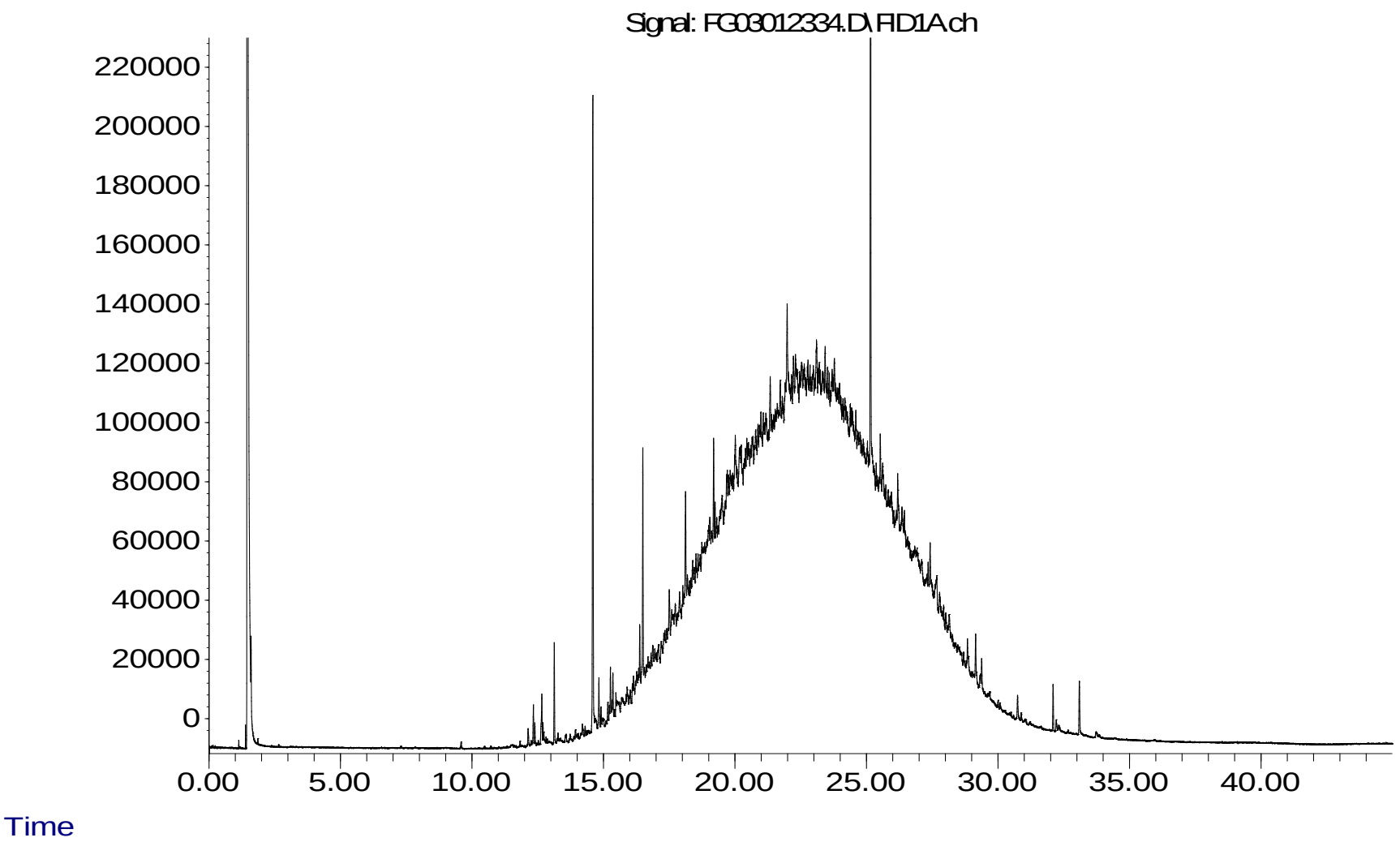
ASTM Reference Sample: 2887 Gas/Oil A
Sequence Date: March 7, 2023



Product Sample: Coolant-0223 (A3B0408-01)
Landau Associates - Boeing Portland 85-105 Investigation
Sequence Date: March 1, 2023



Product Sample: Coolant-0223 (A3B0408-01) DETAIL
Landau Associates - Boeing Portland 85-105 Investigation
Sequence Date: March 1, 2023

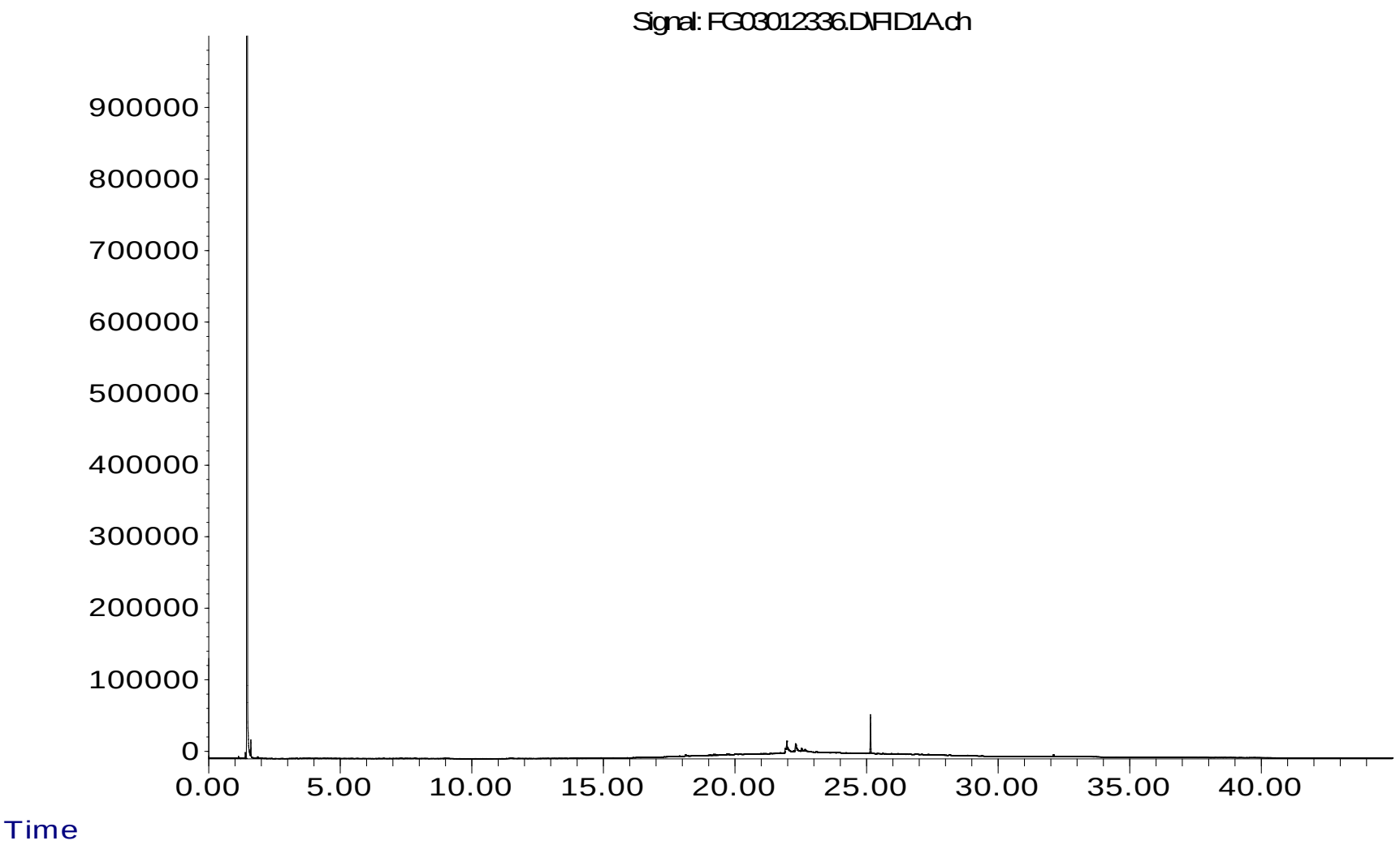


APEX FORENSICS
A DIVISION OF APEX LABORATORIES

ASTM D2887-14 GC/FID

Silica Gel Column Cleanup

Product Sample: Coolant Mix-0223 (A3B0408-02)
Landau Associates - Boeing Portland 85-105 Investigation
Sequence Date: March 1, 2023

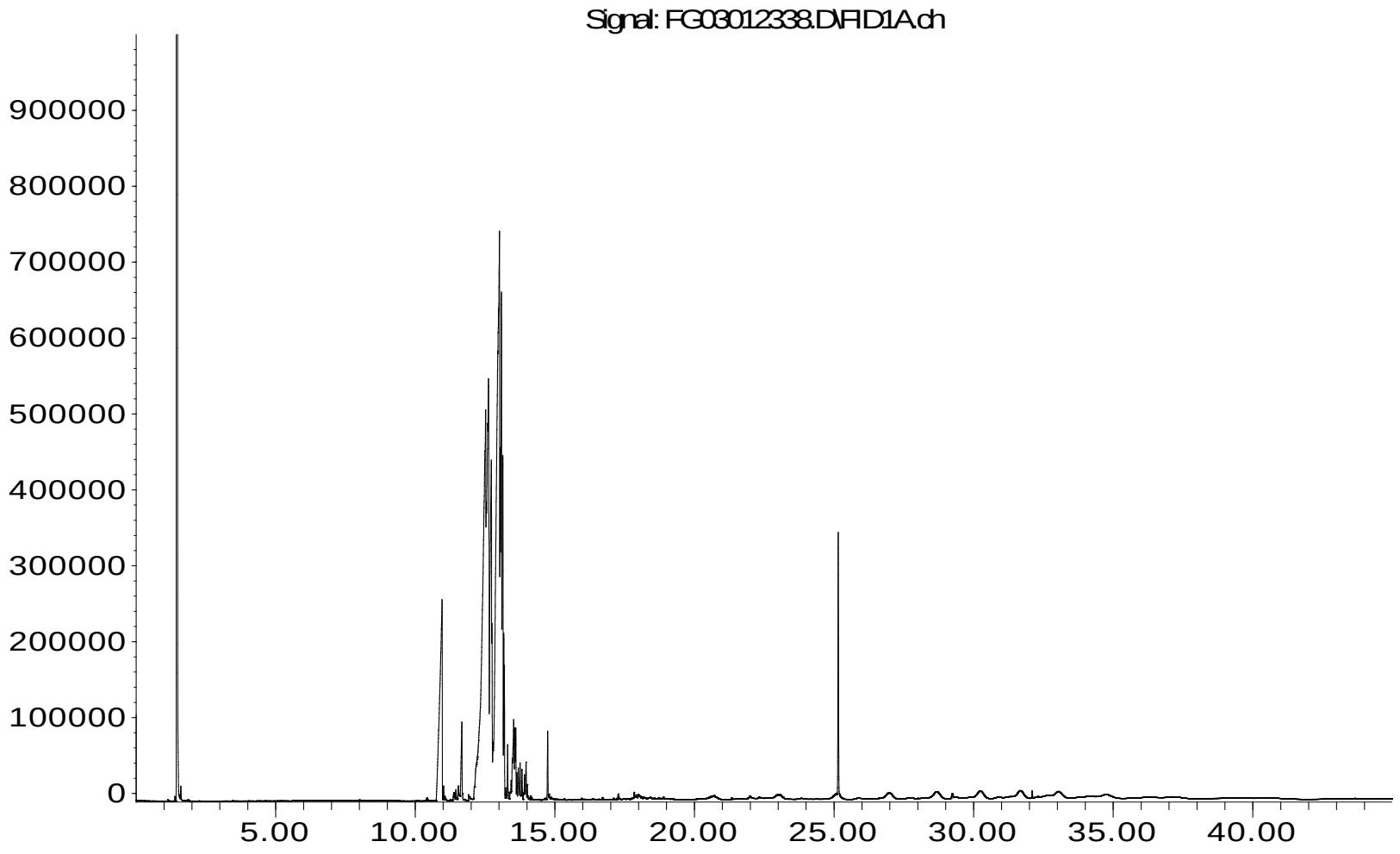


APEX FORENSICS
A DIVISION OF APEX LABORATORIES

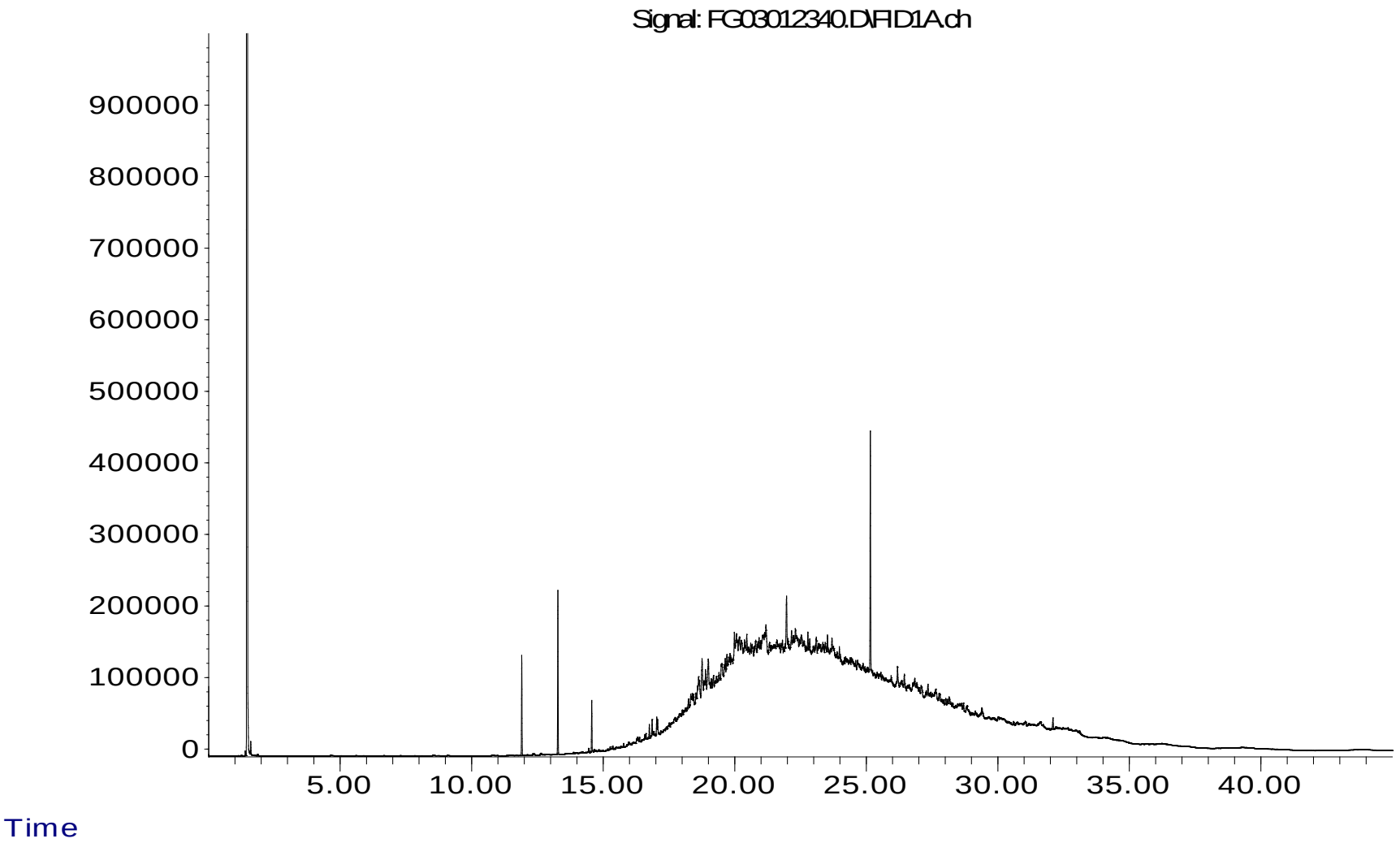
ASTM D2887-14 GC/FID

Silica Gel Column Cleanup

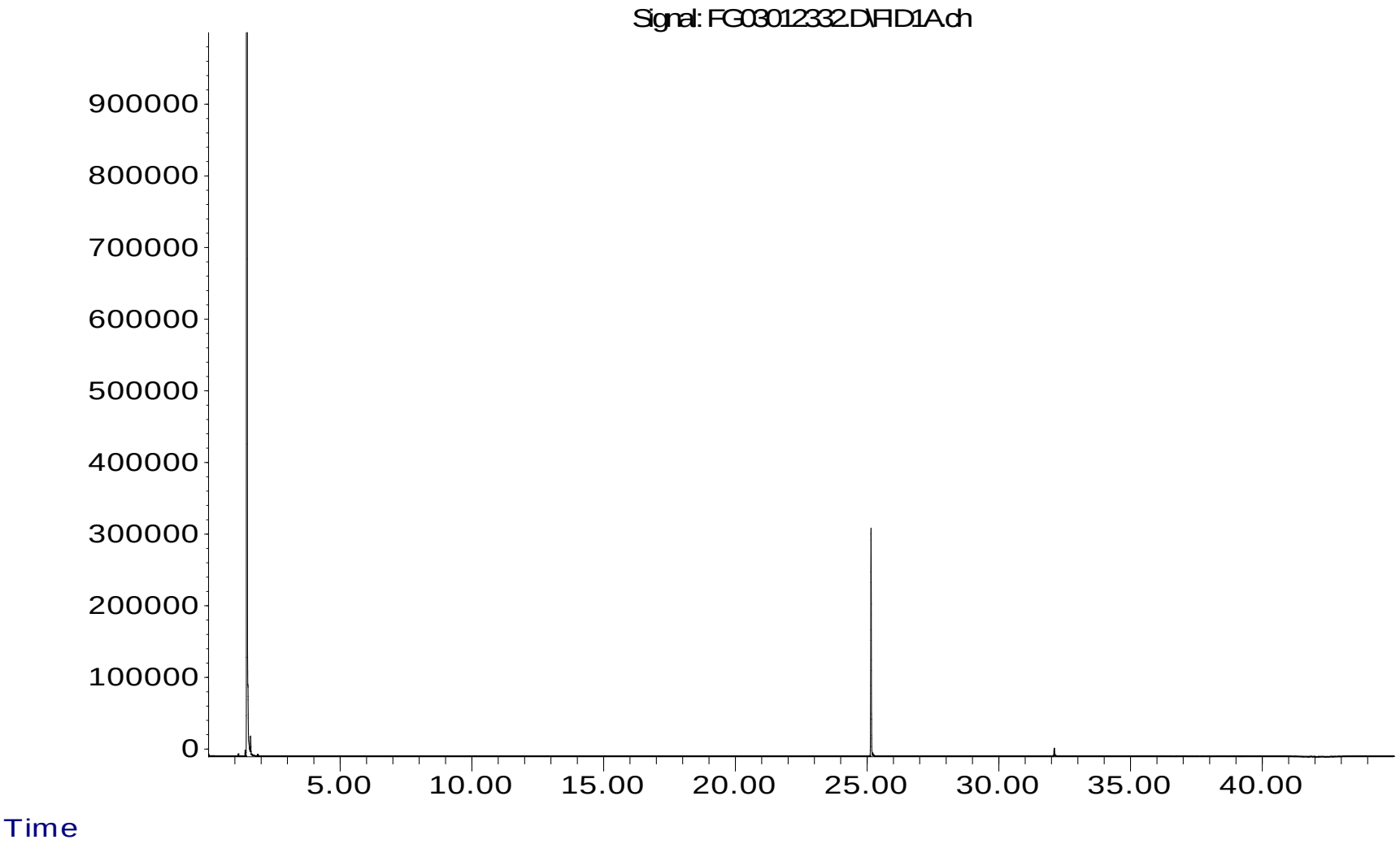
Product Sample: Syntilo-0223 (A3B0408-03)
Landau Associates - Boeing Portland 85-105 Investigation
Sequence Date: March 1, 2023



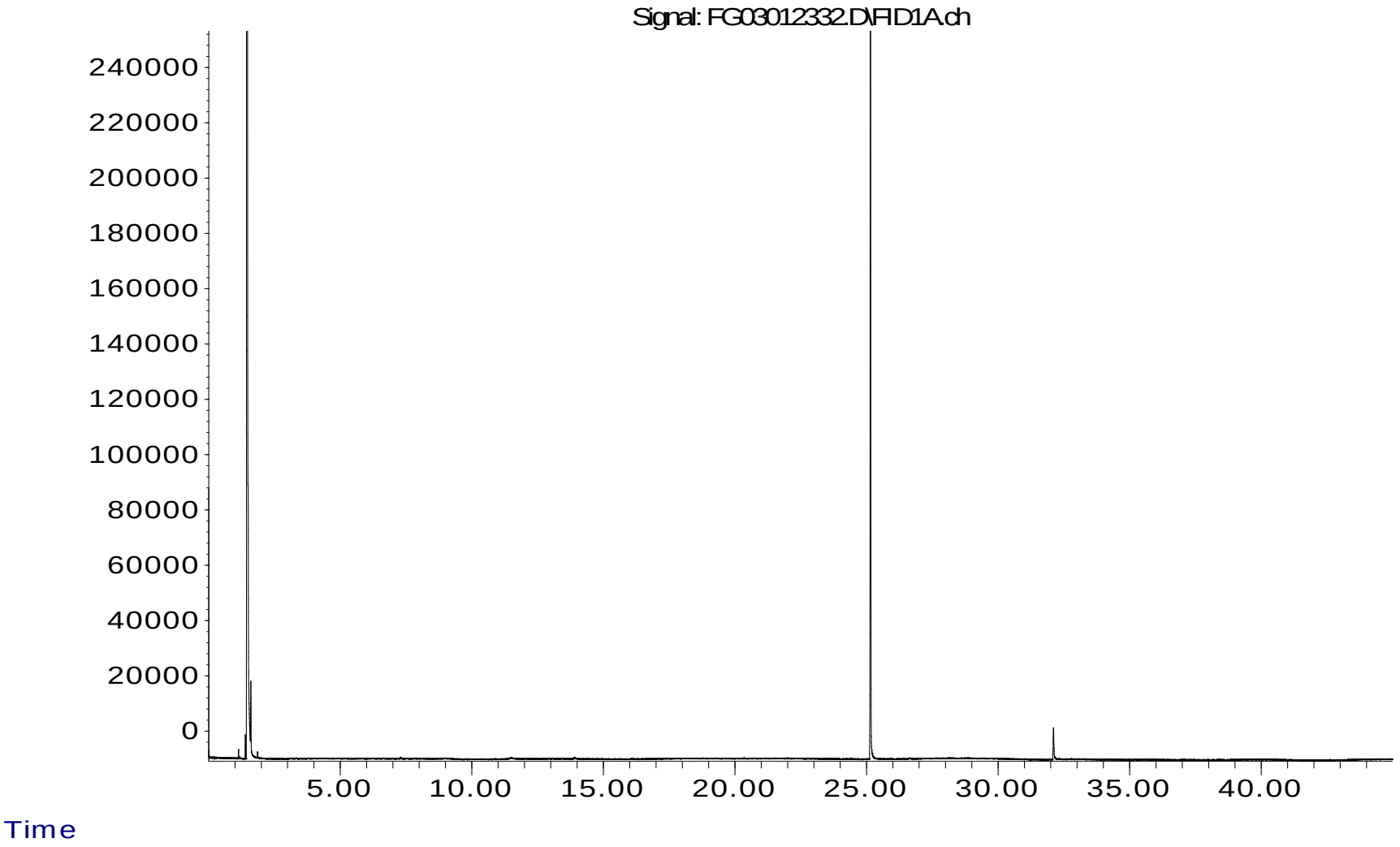
Product Sample: LAI-8-Prod-0223 (A3B0408-04)
Landau Associates - Boeing Portland 85-105 Investigation
Sequence Date: March 1, 2023



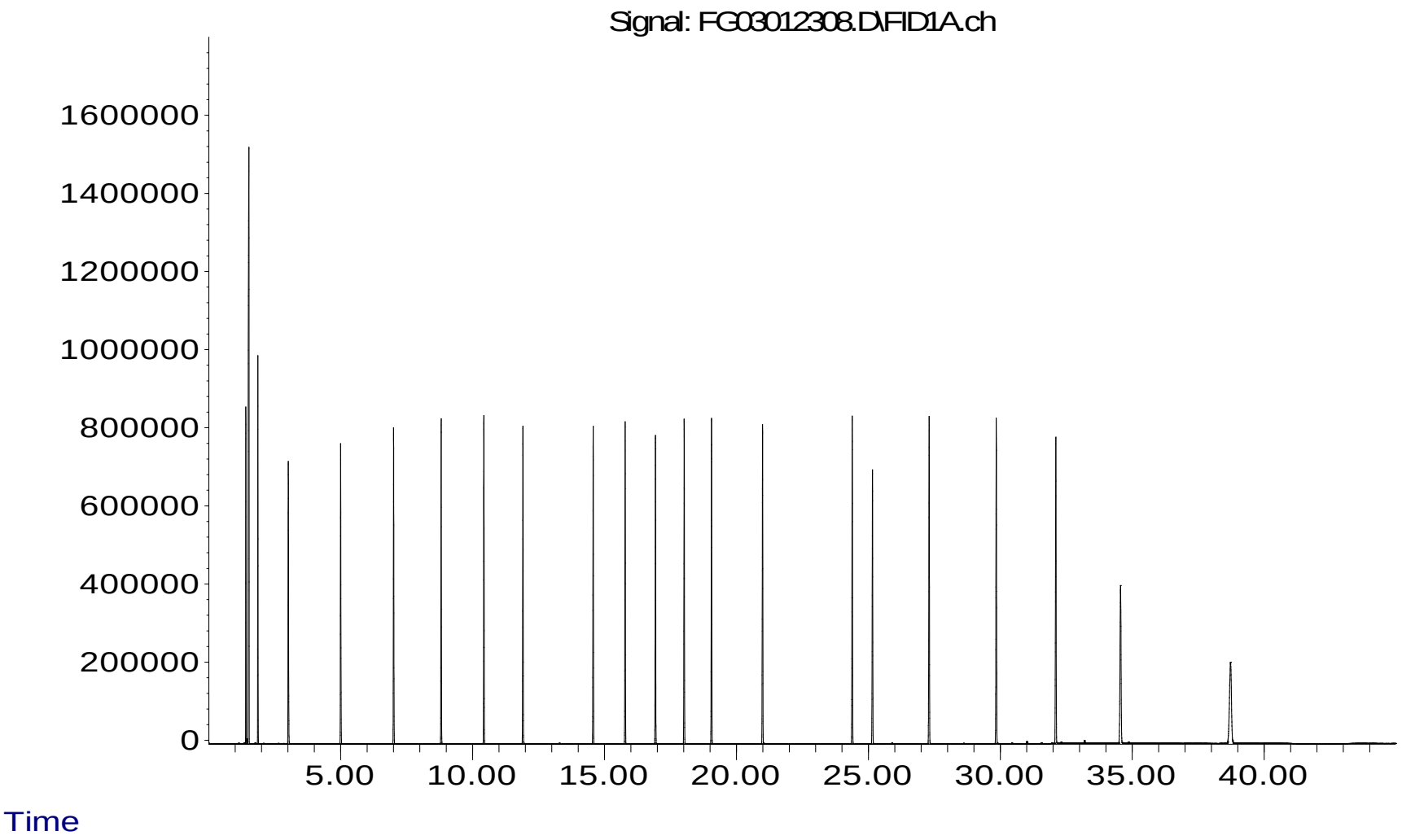
QC Sample: Method Blank
Landau Associates - Boeing Portland 85-105 Investigation
Sequence Date: March 1, 2023



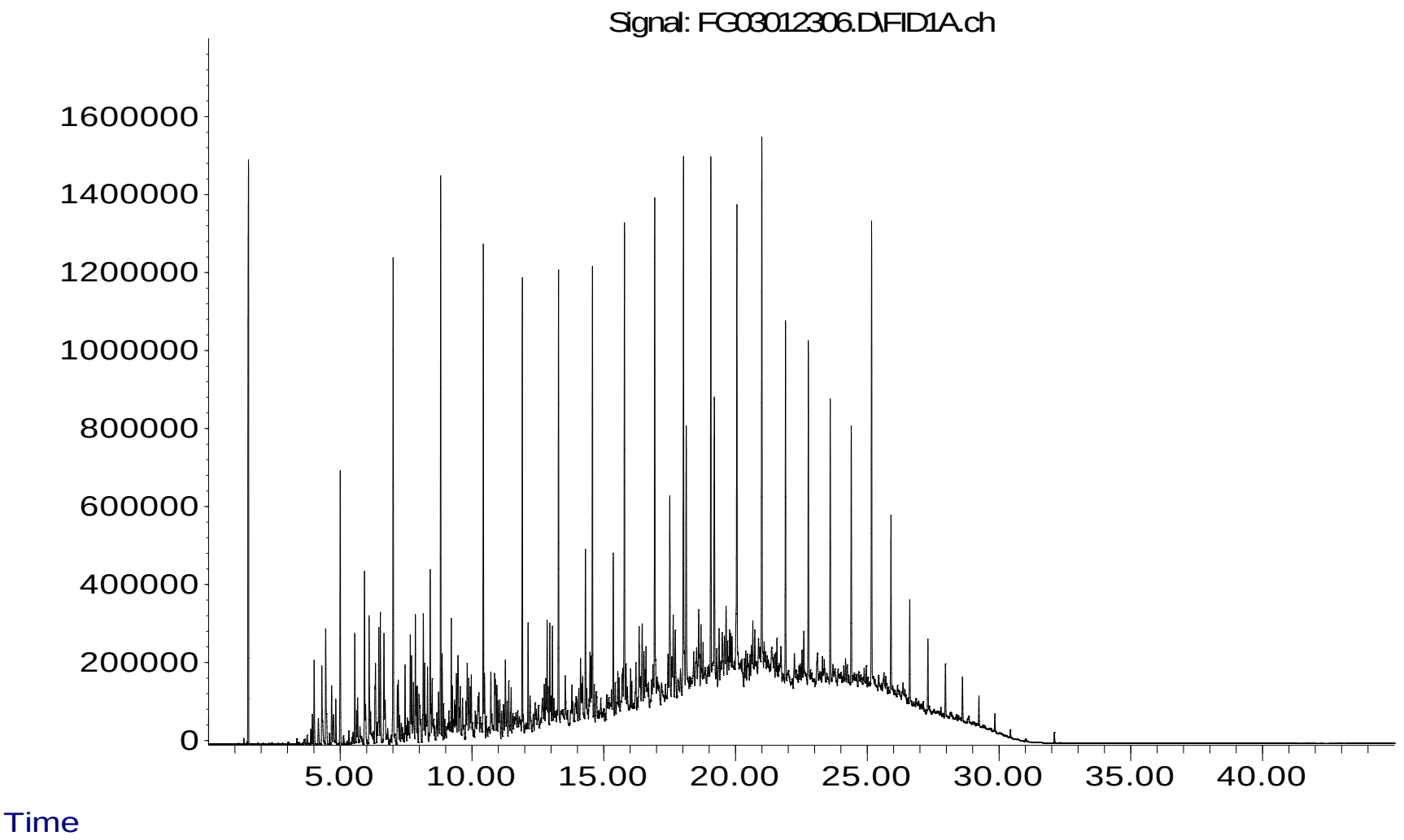
QC Sample: Method Blank DETAIL
Landau Associates - Boeing Portland 85-105 Investigation
Sequence Date: March 1, 2023



ASTM Reference Sample: 2887 Alk A
Sequence Date: March 1, 2023



ASTM Reference Sample: 2887 Gas/Oil A
Sequence Date: March 1, 2023



ATTACHMENT 2

Triton Analytics Certificate of Analysis

Triton Analytics Corp
16840 Barker Springs Rd. #302
Houston, TX 77084

(281) 578-2289

Certificate of Analysis

Job ID: TAC 12033

Submitted By: Erin Waibel / Landau Associates

Date Received: 14-Feb-23

Date Reported: 2-Mar-23

Sample Name		LAI-8-PROD-0223 (Oil)	LAI-8-0223-SP (Water)
Density @ 13 C, (g/cm3)	ASTM D4052	0.9489	1.0002
Density @ 60 F, (g/cm3)		0.9473	0.9986
API Gravity @ 60 F	ASTM D4052	17.7	10.1
Specific Gravity @ 60 F		0.9482	0.9996
Dynamic Visc @ 13 C, (mPa-s)		273	
Kinematic Visc @ 13 C, (mm2/s)	ASTM D7042	288	
Density @ 13 C, (g/cm3)		0.9480	

Oil to Water Measurement	Trial No.	1	2	3
Interfacial Tension, (mN/m)		1.53	1.53	1.52
Average, (mN/m)			**1.53**	
Standard Deviation, (mN/m)			0.01	
Volume, (µL)	ASTM D971	8.10	8.18	8.11
Average, (µL)			8.13	
Standard Deviation, (µL)			0.04	
Volume, (µL)			**8.13±0.04**	

Oil to Air Measurement	Trial No.	1	2	3
Surface Tension, (mN/m)		8.67	8.65	8.68
Average, (mN/m)			**8.67**	
Standard Deviation, (mN/m)			0.02	
Volume, (µL)	ASTM D971	1.17	1.17	1.19
Average, (µL)			1.18	
Standard Deviation, (µL)			0.01	
Volume, (µL)			**1.18±0.01**	

Water to Air Measurement		Trial No.	1	2	3
Surface Tension, (mN/m)			14.26	14.30	14.21
Average, (mN/m)				**14.26**	
Standard Deviation, (mN/m)				0.05	
Volume, (µL)	ASTM D971		1.21	1.22	1.22
Average, (µL)				1.22	
Standard Deviation, (µL)				0.01	
Volume, (µL)				**1.22±0.01**	

The drop picture was taken 30 seconds after the drop was formed for stabilization. The density of the sample at 13°C (0.9489 g/cm3) was used and the density of the water at 13°C (1.0002 g/cm3) was used.

Dan Villalanti, President