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This report has been revised (rev. 5) to clarify that the tin-126 issue noted in the correspondence numbered WAI-2019-051 does not apply to this project. This correspondence has been replaced with a client notification letter regarding the applicable issue, dated 2/5/2020. No other changes to this report or the attachments have been made.				
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Revision 5

FINAL ANALYTICAL REPORT FOR TANK 241-SY-101 TBI GRAB SAMPLING 2018

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**222-S LABORATORY
FINAL REPORT FOR TANK 241-SY-101 TBI GRAB SAMPLING 2018****1.0 INTRODUCTION**

This report has been revised (rev. 5) to clarify that the tin-126 issue noted in the correspondence numbered WAI-2019-051 does not apply to this project. This correspondence has been replaced with a client notification letter regarding the applicable issue, dated 2/5/2020. No other changes to this report or the attachments have been made.

Previous revisions included:

- Revision 4 was to correct the tin-117 calibration factor and update tin-126 results.
- Revision 3 was to clarify the cesium results reported in the previous versions by Inductive Coupled Plasma Mass Spectrometry (ICP/MS). The cesium concentration reported by the ICP/MS data was for the cesium-133 isotope.
- Revision 2 was to edit the sample breakdown diagram to include a revised sample number for OH and the two archived samples.
- Revision 1 was to include additional ICPMS sample numbers on the sample breakdown diagram, a qualifier flag change for benzene on sample S18T036478, a qualifier flag change for isobutanol on sample S18T036510 and a qualifier flag change on toluene for sample S18T036513.

This data package presents the results for the liquid grab samples taken from double-shell Tank 241-SY-101 on November 14, 2018 and November 15, 2018. The samples were received on November 15, 2018; and were analyzed in accordance with RPP-PLAN-627746, *Tank 241-SY-101 Grab Sampling and Analysis Plan in Support of Test Bed Initiative- Phase 2*, Rev. 0, Fiscal Year 2018; WHL-MP-1011, *Quality Assurance Project Plan for 222-S Laboratory (QAPP)*; SW-846, *Test Methods for Evaluating Solid Waste: Physical/Chemical Methods*, and the additional guidance given in verbal and electronic communications.

Due to the hazardous and complex nature of Hanford tank waste samples, most SW-846 test methods performed at the 222-S Laboratory contain deviations that are listed in an appendix in the analytical procedures. All other known deviations or variances from SW-846 are documented in this narrative.

The following attachments are included in this report:

- | | |
|---------------|---|
| Attachment 1 | Data Summary Report – Requested Analytes |
| Attachment 2 | Data Summary Report – Opportunistic Analytes |
| Attachment 3 | Sample Breakdown Diagrams |
| Attachment 4 | Sample Receipt Documentation |
| Attachment 5 | Sample Photographs |
| Attachment 6 | Analysis Date and Holding Time Report |
| Attachment 7 | Matrix Spike (MS) and Matrix Spike Duplicate (MSD) Recoveries |
| Attachment 8 | Surrogate Recoveries |
| Attachment 9 | Blank Report |
| Attachment 10 | Correspondence |
| Attachment 11 | TIC for SVOC and VOC analyses |

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2.0 SAMPLE RECEIPT AND APPEARANCE INFORMATION

Table 1 provides the sampling and receipt dates, and a description of the samples for the Tank 241-SY-101 TBI grab samples.

Table 1. Sample Receipt and Appearance Information

Sample Identification	Date Sampled And Time	Date Received And Time	Sample Weight (g)	Sample Description
1SY-18-01TB	11/14/18 09:08	11/15/18 10:08	261.3	250mL narrow-neck amber glass bottle of clear, colorless liquid. No solids or organic layers visible.
1SY-18-01FB	11/15/18 09:02	11/15/18 10:21	255.9	250mL narrow-neck amber glass bottle of clear, colorless liquid. No solids or organic layers visible.
1SY-18-01	11/15/18 09:08	11/15/18 13:11	294.3	250mL narrow-neck amber glass bottle of clear, yellow liquid. No solids or organic layers visible.
1SY-18-01DUP	11/15/18 09:12	11/15/18 13:40	293.5	250mL narrow-neck amber glass bottle of clear, yellow liquid. No solids or organic layers visible.
1SY-18-02	11/15/18 09:14	11/15/18 12:57	293.1	250mL narrow-neck amber glass bottle of clear, yellow liquid. No solids or organic layers visible.
1SY-18-03	11/15/18 09:22	11/15/18 14:00	293.4	250mL narrow-neck amber glass bottle of clear, yellow liquid. No solids or organic layers visible.

As stated in the Tank Sampling and Analysis Plan (TSAP), refrigeration and preservation are not appropriate for Hanford waste tank samples. Therefore, the subsamples were not refrigerated prior to analysis and no preservatives were added to the samples. Since the exact nature of the samples cannot be determined until they are sampled and the dose rate is measured, the sampling team must be prepared to ship the samples as high-level tank waste in Type A containers. This makes shipping these samples per SW-846 requirements impractical.

The descriptions in Table 1 were recorded after the samples were received at a hood in the 11A Hot Cell facility. Sample 1SY-18-01TB, the trip blank, was received in room 2B. Pictures of the samples were taken upon receipt and are included in Attachment 5.

One primary sample, one field duplicate sample, two samples with additional volume for 1SY-18-02 and 1SY-18-03, one field blank sample, and one field trip blank were collected from double-shell Tank 241-SY-101. The samples with additional volume were held in reserve. The 222-S Laboratory received the samples on November 15, 2018. The data on the chain of custody (COC) forms were verified at sample receipt, and all samples were observed for appearance, a visible organic layer, and volume percent settled solids. Directions for sample handling were followed as indicated in section 4.1 of the Tank Sampling and Analysis Plan. Attachment 3 provides the sample breakdown diagrams for all the samples.

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3.0 ANALYTICAL RESULTS SUMMARY

Attachment 1 and 2 provide the final analytical results for all analytes identified in the TSAP. Results for non-requested analytes were appropriately flagged for quality control failures, but the flagged results of non-requested analytes are not discussed in this narrative.

The “Det Limit” column in Attachment 1 contains the method detection limit (MDL).

In Attachment 1, the column labeled “A#” indicates the aliquot class or the method used for sample preparation before analysis. The aliquot classes are defined as follows:

- “Hg” indicates samples were prepared by SW-846 Method 7471B acid digest.
- “O” indicates samples were extracted for organic analysis.

Samples without a letter identifier in the “A#” column were analyzed directly, with no separate preparation procedure, or with sample preparation performed as part of the analytical procedure.

The “Qual Flags” column in Attachment 1 contains data qualifier flags that are defined as follows:

- “B” is used to indicate that the analyte was detected in the method or preparation blank and in the sample, and that the result for the blank is greater than 5% of the reported sample result.
- “b” indicates the recovery for the matrix spike (MS) is outside of the laboratory required limits.
- “T” indicates the calibration for the reported result used an indirect method (isotope substitution).
- “J” indicates the reported result should be considered an estimate because of increased uncertainty near the detection limit. The “J” flag is applied to sample concentrations that are greater than the MDL but less than the estimated quantitation limit (EQL).
- “U” indicates the reported result is less than the calculated detection limit.
- “Q” indicates the result is qualitative only.
- “a” indicates a percent recovery outside control limits in the laboratory control sample (LCS).
- “c” indicates an analyte result (both detected and non-detected) where the relative percent difference (RPD) between duplicate samples, laboratory control sample duplicates (LCSDs) or MSDs was greater than the customer or analytical method defined range.
- “e” indicates an analyte for which the sample result and the serial dilution result (normally a factor of 5) for that sample have a percent difference of greater than 10 percent.
- “E” indicates the analyte result exceeded the calibration range of the instrument.

Manual calculations using rounded results from the Data Summary Report or result calculation forms may differ slightly from the actual results derived from the raw data.

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3.1 HOLDING TIMES

The TSAP indicates that the laboratory is expected to meet the hold times specified in SW-846 methods. Because highly radioactive samples may require additional time to ship and break down in the hot cells, the TSAP recognizes that the shorter holding times may not be met. The lab performed all analyses as soon as possible during normal working hours after the samples were broken down and subsampled for analysis. The following holding times were not met:

- Total suspended solids analysis exceeded the recommended holding time by four days.
- Cyanide distillation and analysis exceeded the holding time by seven days.
- pH was performed outside of the recommended holding time of 48 hrs.

Attachment 6 provides the analysis dates and holding times for all samples.

3.2 INORGANIC ANALYSES

3.2.1 Carbon Analyses

Total Inorganic Carbon/Total Organic Carbon (TIC/TOC)

The TIC/TOC analysis was performed by catalyzed oxidation and coulometric titration (reference Standard Method 5310C, *Persulfate-UV or Heated-Persulfate Oxidation Method*) on the primary field sample, the field duplicate sample, and the field blank as directed by the TSAP. There was no required detection limit for TIC/TOC and all quality control (QC) acceptance criteria met the requirements listed in the TSAP and the QAPP.

3.2.2 Total Carbon/Total Organic Carbon

The carbon analysis was performed by furnace oxidation for total carbon and total organic carbon on the field blank, the primary field sample, and the field duplicate. There was not a required detection limit for TOC and all other QC acceptance criteria met the requirements listed in the TSAP and the QAPP.

3.2.3 Metals – Inductively Coupled Plasma-Atomic Emission Spectroscopy (ICP/AES)

The ICP/AES analysis was performed on the primary field sample, field duplicate sample, and on the field blank as directed by the TSAP. Per the TSAP, required analytes were silver, aluminum, arsenic, barium, beryllium, cadmium, chromium, lead, potassium, sodium, nickel, selenium, thallium, uranium and vanadium. In addition to the required analytes, the TSAP also specifically requested a report for all additional analytes by ICP/AES analysis. In order to meet the requested detection limits, arsenic, lead, selenium, silver and thallium were analyzed by ICP/MS. Copper, nickel, silicon, and strontium were detected in the initial calibration blank (ICB) at greater than the MDL and less than the lower limit of quantitation (LLOQ). Associated samples where the blank result was greater than five percent of the reported result have been qualified with the “B” flag. All additional QC acceptance criteria met the requirements listed in the TSAP and the QAPP.

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3.2.4 Anions – Ion Chromatography (IC)

Ion chromatography for anions analysis was conducted on the primary field sample, field duplicate sample, and on the field blank as directed by the TSAP. The results for non-detected analytes met all required detection limits listed in the TSAP. All additional QC acceptance criteria met the acceptance requirements listed in the TSAP and the QAPP.

3.2.5 Mercury – Cold Vapor/Atomic Absorption

The analysis for mercury was performed on acid-digested aliquots from the primary sample, field duplicate sample, and the field blank as directed by the TSAP. A low level standard, a pre-digest spike/spike duplicate and a sample duplicate were analyzed. Mercury met the required detection limit listed in the TSAP, and all QC acceptance criteria met the requirements listed in the TSAP and the QAPP.

3.2.6 Cyanide

Cyanide analysis was performed using micro-distillation accompanied by spectrophotometric determination. Cyanide was measured on the primary field sample, the field duplicate sample, and on the field blank as directed by the TSAP. The ICB/prep blank concentration was above the MDL and less than the estimated quantitation limit (EQL). The associated samples were qualified with the “B” flag when the blank concentration was greater than five percent of the sample concentration. A low level standard (LLS) was analyzed in conjunction with the calibration. The percent recovery was 132 percent, which exceeded the upper acceptance control limit of 125 percent. The field sample results were less than the EQL and above the MDL; therefore, the sample results were qualified with the “J” flag. The field sample results exceeded the requested detection limit. The field blank met the requested detection limit. All other QC acceptance criteria met the requirements listed in the TSAP and the QAPP.

3.2.7 Density

The density analysis was performed on the primary sample and field duplicate sample as directed by the TSAP. Per the Characterization Engineer and Chemistry Control Technical Point of Contact request, the lab reported the results of data collected by density analysis on parent samples in the hot cell. The data met all QC acceptance requirements listed in the TSAP and the QAPP.

3.2.8 Hydroxide

The hydroxide analysis was performed on the primary sample and field duplicate sample as directed by the TSAP. The TSAP also requested a hydroxide analysis on the field blank, which did not have a pH greater than 10, to perform the analysis. For hydroxide, all non-detect samples met the TSAP’s required detection limit of 17 µg/mL. All QC acceptance criteria met the requirements listed in the TSAP and the QAPP.

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3.2.9 pH

The pH analysis was performed on the primary field sample, the field duplicate sample and the field blank sample as directed by the TSAP. The pH samples were analyzed outside the recommended holding time. All other QC acceptance criteria met the requirements listed in the TSAP and the QAPP.

3.2.10 Percent Water-Thermogravimetric Analysis (TGA)

Using TGA, the percent water analysis was performed on the field blank sample, and the primary field sample. The results are reported in Attachment 1 as percent water with the assumption that all weight loss below 250 °C was due to water loss. This assumption might be incorrect because there could be other gaseous reaction products that contribute to weight loss below 250 °C that are not easily differentiated using this method. However, based on the type of sample (high pH liquid tank waste) and the fact that the majority of the weight loss occurred below 120 °C, the laboratory believes the results of this analysis can be interpreted to be percent water. There were no notable issues, and all QC acceptance criteria met the requirements listed in the TSAP and the QAPP.

3.2.11 Inductively Coupled Plasma-Mass Spectroscopy (ICP/MS)

The ICP/MS analysis was performed on the primary field sample, the field duplicate sample, and on the field blank sample. Attachment 6 lists the dates of analysis for these methods. Results for cesium are reported as the cesium-133 isotope. Unless noted below, all QC acceptance criteria met the requirements listed in the QAPP.

Due to the request for lower detection limits, arsenic, lead, selenium, silver and thallium were also analyzed by ICP/MS.

Direct calibration is the most accurate type of calibration. However, standard material is not commercially available for all isotopes of interest. Concentrations of those isotopes without available standards are estimated based on the instrument's response to another isotope of the same element, which is known as "isotopic substitution" and is an indirect method of calibration. All isotope concentrations determined using isotopic substitution are flagged with an "I". All QC acceptance criteria met the requirements listed in TSAP and QAPP except for the following:

Arsenic, Lead, Selenium, Silver and Thallium

Batch 87562: The matrix spike recovery for silver was below the lower acceptance criteria at 79 %. Therefore, the analytical result for silver has been qualified with the "b" flag.

The serial dilution for lead exceeded the acceptance criteria (10%) at 23.8%. Therefore, the result for lead has been qualified with the "e" flag.

The readback for the low calibration point for arsenic and selenium was outside of method requirements. Arsenic and selenium were calibrated to 100 ppt using an additional standard, whereas the EQL is 500 ppb. The sample raw results were 2000 ppt; the readback of the bracketing calibration points was within specification. Data did not require qualification based on this deviation.

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Actinides Uranium/Thorium

Batch 87288: Thorium-232 and uranium-238 results in the ICB were above the MDL and below the EQL. Thorium-232 was qualified in the associated samples with the “B” flag. The level of uranium-238 in the field samples was greater than twenty times the blank result; therefore, no qualification of the samples was necessary. The field blank result was less than five times the blank result; therefore, the field blank was qualified with the “B” flag. All other CCBs were below the MDL. The duplicate RPD for U-234 exceeded the acceptance criteria (20%), therefore, the results for uranium-234 was qualified with the “c” flag. The percent difference for the serial dilution for uranium-234 was greater than 10%; the results were less than a hundred times the MDL. No qualification of the data was necessary based on this finding.

All required detection limits and all other QC acceptance criteria met the requirements listed in the TSAP and the QAPP.

3.2.12 Total Suspended Solids

The total suspended solids (TSS) analysis was performed on the primary field sample and the field duplicate sample as directed by the TSAP. A 10 mL sample volume was used in each of the samples analyzed. All samples were non-detect for total suspended solids. There were no acceptance criteria listed in the TSAP; the QC acceptance criteria met the requirements listed in the QAPP.

3.3 RADIOCHEMICAL ANALYSES

3.3.1 Total Alpha/Beta

The analysis for total Alpha/Beta by gas proportional counting was performed on the primary field sample, the field duplicate sample, and on the field blank as directed by the TSAP. All QC acceptance criteria met the requirements listed in the TSAP and the QAPP.

3.3.2 Americium-241, Curium-242, Curium-243/244

The analysis for americium-241, curium-242, and curium-243/244 by alpha energy analysis (AEA) was performed on the primary field sample, the field duplicate sample, and on the field blank as directed by the TSAP. There were no required detection limits in the TSAP for curium-242 or curium-243/244. The required detection limit for americium-241 was 0.13 μ Ci/mL. All samples met the detection limit. All other QC acceptance criteria met the requirements listed in the TSAP and the QAPP.

3.3.3 Carbon-14

The carbon-14 analysis was performed by liquid scintillation counting (LSC) on the primary field sample, field duplicate sample and on the field blank. The prep blank had detected activity above the MDL and below the EQL. The prep blank was below the five percent criteria for the field samples with the exception of the field blank. The field blank was qualified with a “B” flag. There was no required detection limit in the TSAP for carbon-14. All QC acceptance criteria met the requirements listed in the TSAP and the QAPP.

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3.3.4 Gamma Energy Analysis (GEA)

Gamma energy analysis was performed on the primary field sample, the field duplicate sample, and on the field blank as directed by the TSAP. Analysis was completed for all requested analytes and the GEA analyte cesium-137 met the required detection limit at 150 $\mu\text{Ci/mL}$. All QC acceptance criteria met the requirements listed in the TSAP and the QAPP.

3.3.5 Plutonium-239/240, Plutonium-238

The plutonium-239/240 and plutonium-238 isotopic analysis by AEA was performed on the primary sample, field duplicate sample, and on the field blank as directed by the TSAP. The required detection limit for plutonium-238 was 22.27 $\mu\text{Ci/mL}$ and 0.000016 Ci/L for plutonium 239/240 in the TSAP. The detection limits were met for both samples where the analytes were not detected.. The duplicate RPD for plutonium-242 was above the acceptance limit. The relative counting uncertainty for plutonium-242 was above the 15 percent criteria; therefore, no qualification of the data was needed. All remaining QC acceptance criteria met the requirements listed in the TSAP and the QAPP.

3.3.6 Plutonium-241

The plutonium-241 analysis was performed by LSC on the primary and field duplicate samples, and on the field blank as listed in the TSAP. The required detection limit in the TSAP for plutonium-241 was 0.0015 Ci/L, which was met. All QC acceptance criteria met the requirements listed in the TSAP and the QAPP.

3.3.7 Nickel-63

The nickel-63 analysis was performed by LSC on the primary field sample, the field duplicate sample and on the field blank as directed by the TSAP. There were no required detection limits in the TSAP for nickel-63. All additional QC acceptance criteria met the requirements listed in the TSAP and the QAPP.

3.3.8 Technetium-99

The technetium-99 analysis was performed by LSC on the primary sample, the field duplicate sample, and on the field blank. There was no a required detection limit in the TSAP for technetium-99 analysis by LSC. All QC acceptance criteria met the requirements listed in the TSAP and the QAPP.

3.3.9 Tritium

Tritium analysis was performed by LSC on the primary field sample, the field duplicate sample, and on the field blank. There was no required detection limit in the TSAP for tritium. All additional QC acceptance criteria met the requirements listed in the TSAP and the QAPP.

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3.3.10 Iodine-129

The iodine-129 analysis by LEPD was performed on the primary sample, the field duplicate sample, and on the field blank as directed by the TSAP. There is no required detection limit for iodine-129 in the TSAP, and all QC acceptance criteria met the requirements listed in the TSAP and the QAPP.

3.3.11 Strontium-89/90

The strontium-89/90 analysis was performed on the primary field sample, the field duplicate sample, and on the field blank as directed by the TSAP. The TSAP requests that strontium-90, not strontium-89/90, be reported. The 222-S Laboratory only performs the latter analysis. Since the half-life for strontium-89 is approximately 51 days and strontium-89 has not been produced at Hanford for years, strontium-89/90 is essentially strontium-90. Strontium-89/90 met the TSAP's required detection limit of 22 $\mu\text{Ci/mL}$. The prep blank detected activity that was above the detection limit and below the EQL. The blank activity was less than the five percent for all samples except the field blank. Therefore, only the field blank was qualified with a "B" flag. All remaining QC acceptance criteria met the requirements listed in the TSAP and the QAPP.

3.4 ORGANIC ANALYSES

3.4.1 Polychlorinated Biphenyl (PCB) Analysis

The PCB analysis was performed on hexane extractions on the primary sample, the field duplicate sample, and on the field blank as directed in the TSAP. Due to dose rate concerns associated with the samples, a 4 ml sample size was used in order to meet Radiological Work Permit requirements and method detection limits as listed in the TSAP (100 $\mu\text{g/mL}$). As a result, the MDL for the PCB aroclors ranged from 6.5 $\mu\text{g/L}$ to 94.5 $\mu\text{g/L}$. There were no aroclors detected in the samples for this project. The samples were extracted on December 10, 2018 and December 11, 2018. The LCS and matrix spikes were spiked with Aroclor 1254 and all percent recoveries met both the TSAP and laboratory QAPP acceptance criteria. The matrix spike/matrix spike duplicate (MS/MSD) RPD was also within acceptance criteria. All QC acceptance criteria met the requirements listed in the TSAP and the QAPP.

Attachment 7 provides the MS/MSD recoveries and the corresponding RPD. Attachment 8 provides the surrogate recoveries.

3.4.2 Volatile Organic Compounds

Volatile organic compounds (VOC) analysis by gas chromatography/mass spectrometry (GC/MS) was performed on November 15, 2018. The field blank and trip blank were analyzed using a 9 mL sample aliquot and the remaining samples used a 0.50 ml sample aliquot. The duplicate, MS and MSD were purged using a 0.50 mL aliquot. All samples analyzed met the holding time.

Data originally report in the Format II report contained a transposed number in the calculations. The error resulted in raised detection limits. This error has been corrected, and for this project, all data met the detection limits specified in the TSAP.

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The initial calibration was completed on November 9, 2018. All calibrated compounds passed linearity requirement of 20% RSD or minimum $r^2 \leq 0.99$. All calibrated compounds passed the initial calibration verification (ICV) criteria of 70% to 130%. All target compounds passed the daily calibration verification check of + 20% difference (%D).

The prep blank contained styrene below the EQL and greater than the MDL. Sample 1SY-18-01 was impacted and results for styrene in sample 1SY-18-01 were qualified with the "B" flag.

The laboratory control sample (LCS) passed the required acceptance criteria of 70% to 130% for all target analytes as specified in the TSAP. All surrogate recoveries met the required acceptance criteria for all samples.

The MS and MSD was analyzed using sample S18T036489 (1SY-18-01). The percent recoveries and RPDs were within the TSAP designated control limits with the exception of trichloroethene. The analyte was non-detect in both the sample and duplicate analysis. The high recovery in both the MS (166%) and the MSD (160%) indicates a potential matrix effect (interference) is occurring. The affected sample was qualified with the "b" flag to indicate the MS/MSD recoveries were outside criteria for this analyte. Four non-target analytes exceeded acceptance criteria in the MS. These compounds were not detected in any of the associated samples.

There were no TICs associated with the samples in this project. All other QC acceptance criteria met the requirements listed in the TSAP and the QAPP.

3.4.3 Semivolatile Organic Compounds

Semivolatile organic analysis (SVOA) was performed on methylene chloride extractions on the primary field sample, the field duplicate, and the field blank as directed in the TSAP. Semivolatile organic analysis liquid/liquid extraction for Tank 241-SY-101 TBI Grab samples comprised of two field samples. The sample extractions were initiated on November 26, 2018 and November 28, 2018. The extractions were completed on November 28, 2018 and November 30, 2018. The sample extract analysis was performed on December 5, 2018 and December 6, 2018.

The initial calibration was completed on November 28, 2018. The calibration passed at <20% RSD for all compounds which used average response factor and passed at minimum $r^2 \geq 0.99$ for all compounds which used a linear regression fit. There were no compounds that used a linear regression fit. All calibrated compounds passed the ICV criteria. The DFTPP tune verification and the CCV % drift met the criteria.

Batch 87926: Acid surrogates (2-Fluorophenol, Phenol-D6 and 2,4,6-Tribromophenol) had low recoveries in the sample containing tank matrix due to conversion of phenols to corresponding nitrophenols by the highly nitrated sample matrix. This is a known artifact of SVOA acid surrogates with Hanford tank samples. Base/Neutral (B/N) surrogate p-Terphenyl-D14 recovery was also below the acceptance criteria (58%) in the matrix spike at 56.89%.

Batch 87941: The samples and the associated MS samples showed the same pattern. This pattern in the samples and associated MS failure of the acid surrogate recoveries indicate a matrix effect. Acid surrogates (2-Fluorophenol, Phenol-D6 and 2,4,6-Tribromophenol) had low recoveries in

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the sample containing tank matrix due to conversion of phenols to corresponding nitrophenols by the highly nitrated sample matrix. This is a known artifact of SVOA acid surrogates with Hanford tank samples. Base/Neutral surrogate p-Terphenyl-D14 recovery was also below the acceptance criteria (58%) in the LCS at 48.73%.

Both prep blanks contained butylbenzylphthalate and bis(2-ethylhexyl)phthalate above the MDL and below the reporting limit. The analytes have been qualified with a “B” flag in the associated samples.

The LCS and MS/MSD uses the SW-846 extraction procedure 3520C, which calls for spiking a minimum of “representative” compounds. These compounds have been included in the 222-S SVOA spiking protocol for many years and the laboratory has established statistical control limits for them. In order to accumulate sufficient data to generate statistical control limits for all target compounds, the laboratory began spiking 100% of all target compounds into the laboratory control standard and matrix spike samples. Administrative recovery limits of 70% to 130% recovery have been established for these compounds until sufficient data can be acquired to determine statistical limits. Failure to meet administrative limits should not be considered as a failure of the process, but should serve as an indicator of the extraction efficiency one might expect in the sample. The following statistical analytes recoveries exceeded the LCS control limits:

Batch 87926: Pentaclorophenol (46.75 %R), 1,2,4-Trichlorobenzene (16.37%R), pyrene (51.54%R) and 1,4-Dichlorobenzene (19.41%R).

Batch 87941: Pentaclorophenol (42.39 %R), 1,2,4-Trichlorobenzene (7.23%R), Pyrene (45.01%R) and 1,4-Dichlorobenzene (9.41%R).

Any analytes that exceeded the LCS acceptance criteria of 70% to 130% as identified in the TSAP have been qualified with the “a” flag in the associated samples.

The matrix spike recoveries outside the TSAP specified control limits have been qualified with the “b” flag. Relative percent differences outside of the TSAP specified acceptance criteria have been qualified with the “c” flag. Data for the matrix spikes are in Attachment 7.

The prep blanks met the TSAP required detection limits with the exception of pyridine and butylbenzylphthalate. The samples due to the reduced sample size used for extraction; did not meet the required detection limits as identified in the TSAP. Sample sizes used for extraction are based on the hood capacity for dose. There were no target analytes detected above the reporting limit. The following analytes were detected above the MDL in samples S18T036498, S18T036510 and S18T036486:

- Butylbenzylphthalate
- Tributylphosphate
- Bis(2-ethylhexyl)phthalate

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4.0 PROCEDURES

Table 2 lists the procedures used for analysis of Tank 241-SY-101 TBI Grab Samples taken November 14, 2018 and November 15, 2018.

Table 2.0 Analytical Procedures

Analysis	Preparation Method	Analysis Procedure
Inorganic Analyses		
Sample Physical Descriptions	Direct	LA-519-151, Rev. 11-4
Density – Hot Cell	Direct	LA-510-112, Rev. 10-4
Cyanide	Distillation	LA-695-102, Rev.14-2
OH ⁻	Direct	LA-211-102, Rev. 10-4
TGA (% Water)	Direct	LA-514-115, Rev. 7-3
pH	Direct	LA-212-106, Rev. 9-4
Total Suspended Solids	Direct	LA-512-106, Rev. 6-3
Mercury – Cold Vapor Atomic Absorption	LA-325-110, Rev. 1-4	LA-325-110, Rev. 1-4 (SW-846 7470A)
IC - Anions and Small Organic Acids	Direct	LA-533-166, Rev. 2-4 (SW-846 9056A)
ICP/AES – Metals	Direct	LA-505-174, Rev. 2.0 (SW-846 6010D)
ICP/MS – ²⁴² Pu, ²³⁷ Np, ²²⁹ Th, ²³³ U, ²³⁴ U, ²³⁵ U, ²³⁸ U, ²⁴³ Am, Sb, Cs, As, Se, Pb, Ag, Tl	Direct	LA-506-103, Rev. 4-0 (SW-846 6020B)
ICP/MS – ¹²⁶ Sn	Direct	LA-506-103, Rev. 4-0 (SW-846 6020B)
TIC/TOC – Persulfate Oxidation	Direct	LA-342-100, Rev. 12-3 (SM5310C)
TOC - Furnace	Direct	LA-344-105, Rev 11-2
Radiochemical Analyses		
GEA	LA-548-121, Rev. 10-3	LA-508-167, Rev. 2-1
Total Alpha/Beta	LA-508-101, Rev 15-3	LA-508-124, Rev. 3-1
¹²⁹ I – Separation/GEA	LA-378-103, Rev. 14-4	LA-508-167, Rev. 2-1
^{89/90} Sr – Separation/Alpha/Beta Gas Proportional Counter	LA-220-107, Rev. 0-1	LA-508-124, Rev. 3-1
¹⁴ C – Separation/LSC	LA-348-104, Rev. 10-5	LA-508-122, Rev. 0-3
²⁴¹ Am, ²⁴² Cm, ^{243/244} Cm, – Separation/AEA	LA-543-102, Rev. 0-3	LA-508-168, Rev. 1-4
²⁴¹ Pu – Separation/LSC	LA-543-102, Rev. 0-3	LA-508-122, Rev. 0-3
^{239/240} Pu, ²³⁸ Pu – Separation/AEA	LA-543-102, Rev. 0-3	LA-508-168, Rev. 1-4
³ H – Separation/LSC	LA-218-114, Rev. 8-4	LA-508-122, Rev. 0-3
⁹⁹ Tc – Separation/LSC	LA-438-101, Rev. 13-0	LA-508-122, Rev. 0-3

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Analysis	Preparation Method	Analysis Procedure
⁶³ Ni –Separation/LSC	LA-285-102, Rev. 7-5	LA-508-122, Rev. 0-3
Organic Analyses		
PCB–Gas Chromatograph/Electron Capture Detector	LA-523-115, Rev. 9-3	LA-523-140, Rev. 9-1 (SW-846 8082A)
Volatile Organic Compounds by GC/MS	Direct	LA-523-118, Rev. 8-2 (SW-846 8260C)
Semivolatile Organic Compounds by GCMS	LA-523-115, Rev. 9-3	LA-523-135, Rev 4-2 (SW-846 8270)

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5.0 REFERENCES

RPP-PLAN-62774, 2018, *Tank 241-SY-101 Grab Sampling and Analysis Plan in Support of Test Bed Initiative – Phase 2* Revision 0, Washington River Protection Solutions, LLC, Richland, Washington.

Standard Methods, *For the Examination of Water and Wastewater*, American Public Health Association, American Water Works Association, Water Environment Federation

- Method 5310C, *Persulfate-UV or Heated-Persulfate Oxidation Method*

SW-846, 1986, *Test Methods for Evaluating Solid Waste: Physical/Chemical Methods*, Third Edition, as amended, U.S. Environmental Protection Agency, Washington, D.C.

WHL-MP-1011, 2017, *Quality Assurance Project Plan for 222-S Laboratory*, Revision 13-2, Wastren Advantage Inc. Hanford Laboratory, Richland, Washington.

Attachment 1

DATA SUMMARY REPORT
REQUESTED ANALYTES

**SY-101 TBI Grab 2018-11
Data Summary Report**

Sample Group: 20183183

Riser: 14

Segment Number: 1SY-18-01

Segment Portion: Grab Sample (Total)

Sample#	R	A#	CAS #	Analyte	Unit	STD %	Blank	Result	Duplicate	Average	RPD %	Spk Rec %	Det Limit	Cnt Err %	Qual Flags
% Water by TGA															
S18T036493			%WATER	Percent water	%	99.3	n/a	83.6	85.4	84.5	2.19	n/a	n/a	n/a	
Alpha and Beta															
S18T036495			ALPHA	Gross alpha	uCi/mL	95.6	<8.39E-06	<8.67E-04	<7.24E-04	n/a	n/a	99.4	8.67E-04	n/a	U
S18T036495			12587-47-2	Gross beta	uCi/mL	104	<1.84E-05	20.0	19.9	19.9	0.592	104	1.42E-03	0.445	
Am241,Cm243															
S18T036495			CM-243/244	Curium-243/244	uCi/mL	n/a	<6.61E-08	<7.92E-08	n/a	n/a	n/a	n/a	7.92E-08	n/a	U
S18T036495			14596-10-2	Americium-241	uCi/mL	97.7	<6.63E-08	4.81E-07	n/a	n/a	n/a	n/a	7.89E-08	14.00	
S18T036495			15510-73-3	Curium-242	uCi/mL	n/a	<2.32E-08	<4.48E-08	n/a	n/a	n/a	n/a	4.48E-08	n/a	U
Anions and Small Organic Acids															
S18T036491			16984-48-8	Fluoride	ug/mL	100	<1.00E-03	441	442	442	0.102	101	1.00	n/a	
S18T036491			666-14-8	Glycolate	ug/mL	100	<5.00E-03	96.8	97.8	97.3	1.04	101	5.00	n/a	J
S18T036491			71-50-1	Acetate	ug/mL	100	<0.0100	112	116	114	3.02	104	10.0	n/a	J
S18T036491			12311-97-6	Formate	ug/mL	99.8	<7.00E-03	234	239	237	1.84	100	7.00	n/a	
S18T036491			16887-00-6	Chloride	ug/mL	98.9	<4.00E-03	849	851	850	0.182	103	4.00	n/a	
S18T036491			14797-65-0	Nitrite	ug/mL	102	<9.00E-03	1.04E+04	1.04E+04	1.04E+04	0.346	102	9.00	n/a	
S18T036491			14808-79-8	Sulfate	ug/mL	100	<9.00E-03	2.01E+03	2.01E+03	2.01E+03	0.194	101	9.00	n/a	
S18T036491			338-70-5	Oxalate	ug/mL	101	<9.00E-03	2.29E+03	2.25E+03	2.27E+03	1.73	99.9	9.00	n/a	
S18T036491			14797-55-8	Nitrate	ug/mL	99.5	<0.0210	6.11E+04	6.07E+04	6.09E+04	0.645	99.9	210	n/a	
S18T036491			14265-44-2	Phosphate	ug/mL	98.9	<0.0140	8.52E+03	8.55E+03	8.53E+03	0.370	94.7	14.0	n/a	
S18T036491			7772-98-7	Thiosulfate	ug/mL	99.0	<6.00E-03	<6.00	<6.00	n/a	n/a	97.8	6.00	n/a	U
Carbon 14 by LSC															
S18T036495			14762-75-5	Carbon-14	uCi/mL	98.8	4.52E-06	5.15E-04	n/a	n/a	n/a	n/a	8.57E-07	0.933	
Cyanide Water Distillation															
S18T036493			57-12-5	Cyanide	ug/mL	100	8.60E-03	2.96	2.52	2.74	16.2	96.7	0.400	n/a	BJ
Density in Hotcells															
S18T036488			Density	Density	g/mL	99.66	n/a	1.132	1.129	1.130	0.2654	n/a	n/a	n/a	
GEA															
S18T036495			10198-40-0	Cobalt-60	uCi/mL	106	<2.23E-04	<3.06E-03	n/a	n/a	n/a	n/a	3.06E-03	n/a	U

NA = Not Analyzed, ND = Not Detected

J - Estimated

E - Outside Calibration Range

c - RPD Outside Range

a - LCS Outside Range

U - Less Than Detection Limit

I - Indirect Calibration

B - Blank Contamination

b - MS/MSD Outside Range

e - SERDIL Outside Range

**SY-101 TBI Grab 2018-11
 Data Summary Report**

Sample Group: 20183183

Riser: 14

Segment Number: 1SY-18-01

Segment Portion: Grab Sample (Total)

Sample#	R	A#	CAS #	Analyte	Unit	STD %	Blank	Result	Duplicate	Average	RPD %	Spk Rec %	Det Limit	Cnt Err %	Qual Flags
GEA															
S18T036495			14681-63-1	Niobium-94	uCi/mL	n/a	<2.20E-04	<2.59E-03	n/a	n/a	n/a	n/a	2.59E-03	n/a	U
S18T036495			10045-97-3	Cesium-137	uCi/mL	105	<2.52E-04	19.2	n/a	n/a	n/a	n/a	9.73E-03	0.13	
S18T036495			13982-63-3	Radium-226	uCi/mL	n/a	<3.19E-03	<0.281	n/a	n/a	n/a	n/a	0.281	n/a	U
ICP-AES															
S18T036491			7429-90-5	Aluminum	ug/mL	100	<0.0140	3.24E+03	3.24E+03	3.24E+03	0.210	105	7.00	n/a	
S18T036491			7440-39-3	Barium	ug/mL	102	<1.00E-03	<0.500	<0.500	n/a	n/a	95.1	0.500	n/a	U
S18T036491			7440-41-7	Beryllium	ug/mL	99.4	<1.00E-03	<0.500	<0.500	n/a	n/a	96.5	0.500	n/a	U
S18T036491			7440-43-9	Cadmium	ug/mL	101	<1.00E-03	<0.500	<0.500	n/a	n/a	95.1	0.500	n/a	U
S18T036491			7440-47-3	Chromium	ug/mL	100	<2.00E-03	95.8	95.7	95.7	0.144	95.9	1.00	n/a	J
S18T036491			7440-09-7	Potassium	ug/mL	100	<0.0220	267	274	271	2.55	96.7	11.0	n/a	
S18T036491			7440-23-5	Sodium	ug/mL	101	<0.0920	5.97E+04	5.98E+04	5.97E+04	0.0452	93.1	46.0	n/a	
S18T036491			7440-02-0	Nickel	ug/mL	102	2.41E-03	<1.00	1.19	n/a	n/a	95.3	1.00	n/a	U
S18T036491			7440-36-0	Antimony	ug/mL	100	<0.0180	<9.00	<9.00	n/a	n/a	113	9.00	n/a	U
S18T036491			7440-61-1	Uranium	ug/mL	104	<0.0290	<14.5	<14.5	n/a	n/a	98.7	14.5	n/a	U
S18T036491			7440-62-2	Vanadium	ug/mL	99.5	<1.00E-03	<0.500	<0.500	n/a	n/a	96.5	0.500	n/a	U
ICP/MS															
S18T036490			7440-36-0	Antimony	ug/mL	99.2	<6.00E-06	<6.00E-03	<6.00E-03	n/a	n/a	101	6.00E-03	n/a	U
S18T036490			15832-50-5	Tin-126	ug/mL	n/a	<1.77E-07	4.86E-03	5.14E-03	5.00E-03	5.60	n/a	1.77E-04	n/a	I
S18T036490			7440-46-2	Cesium	ug/mL	101	<3.00E-06	0.968	0.934	0.951	3.62	101	6.00E-03	n/a	
S18T037451			7440-38-2	Arsenic	ug/mL	97.8	<4.20E-05	0.648	0.671	0.660	3.49	100	0.0210	n/a	
S18T037451			7439-92-1	Lead	ug/mL	100	<3.10E-05	1.54	1.53	1.54	0.423	89.6	0.0155	n/a	e
S18T037451			7782-49-2	Selenium	ug/mL	99.8	<6.10E-05	1.04	1.02	1.03	1.70	101	0.0305	n/a	
S18T037451			7440-22-4	Silver	ug/mL	98.9	<8.00E-06	0.0152	0.0153	0.0153	0.328	79.3	4.00E-03	n/a	Jb
S18T037451			7440-28-0	Thallium	ug/mL	101	<4.00E-06	<2.00E-03	<2.00E-03	n/a	n/a	93.2	2.00E-03	n/a	U
Iodine-129															
S18T036495			15046-84-1	Iodine-129	uCi/mL	108	<1.30E-05	<1.90E-05	<1.53E-05	n/a	n/a	n/a	1.90E-05	n/a	U
MS ACTINIDES for Plutonium															
S18T036490			13982-10-0	Plutonium-242	ug/mL	98.8	<1.30E-06	<6.50E-04	<6.50E-04	n/a	n/a	103	6.50E-04	n/a	U

NA = Not Analyzed, ND = Not Detected

J - Estimated
 U - Less Than Detection Limit
 e - SERDIL Outside Range

E - Outside Calibration Range
 I - Indirect Calibration

c - RPD Outside Range
 B - Blank Contamination

a - LCS Outside Range
 b - MS/MSD Outside Range

**SY-101 TBI Grab 2018-11
Data Summary Report**

Sample Group: 20183183

Riser: 14

Segment Number: 1SY-18-01

Segment Portion: Grab Sample (Total)

Sample#	R	A#	CAS #	Analyte	Unit	STD %	Blank	Result	Duplicate	Average	RPD %	Spk Rec %	Det Limit	Cnt Err %	Qual Flags
MS ACTINIDES for Uranium & Thorium															
S18T036490			15594-54-4	Thorium-229	ug/mL	n/a	<1.12E-07	<5.60E-05	<5.60E-05	n/a	n/a	n/a	5.60E-05	n/a	IU
S18T036490			13966-29-5	Uranium-234	ug/mL	n/a	<5.40E-08	3.22E-04	1.84E-04	2.53E-04	54.4	n/a	2.70E-05	n/a	Ic
S18T036490			15117-96-1	Uranium-235	ug/mL	100	<5.40E-08	0.0269	0.0281	0.0275	4.44	109	1.08E-04	n/a	
S18T036490			U-238	Uranium-238	ug/mL	100	4.79E-06	3.93	4.21	4.07	7.08	109	8.36E-04	n/a	
MS ACTINIDES with Uranium & Neptunium															
S18T036490			13968-55-3	Uranium-233	ug/mL	98.4	<5.00E-07	3.47E-04	3.66E-04	3.56E-04	5.08	101	2.50E-04	n/a	J
S18T036490			13994-20-2	Neptunium-237	ug/mL	98.5	<1.12E-07	1.30E-03	1.34E-03	1.32E-03	3.37	102	5.60E-05	n/a	J
MS Actinides for Americium															
S18T036490			14993-75-0	Americium-243	ug/mL	n/a	<1.00E-06	<5.00E-04	<5.00E-04	n/a	n/a	n/a	5.00E-04	n/a	IU
Mercury by CVAA															
S18T036492		HG	7439-97-6	Mercury	ug/mL	103	<0.0110	<8.80E-04	<8.80E-04	n/a	n/a	107	8.80E-04	n/a	U
Nickel-63															
S18T036495			13981-37-8	Nickel-63	uCi/mL	94.2	<5.30E-06	5.57E-04	5.45E-04	5.51E-04	2.18	n/a	2.69E-06	2.41	
OH- by Pot. Titration															
S18T037778			HYDROXIDE	Hydroxide	ug/mL	n/a	n/a	7.86E+03	n/a	n/a	n/a	n/a	553	n/a	
PCB (EPA 8082) from Extraction															
S18T036499		O	12674-11-2	Aroclor 1016	ug/L	n/a	<5.40	<94.5	n/a	n/a	n/a	n/a	94.5	n/a	U
S18T036499		O	11104-28-2	Aroclor 1221	ug/L	n/a	<1.01	<17.8	n/a	n/a	n/a	n/a	17.8	n/a	U
S18T036499		O	11141-16-5	Aroclor 1232	ug/L	n/a	<1.17	<20.5	n/a	n/a	n/a	n/a	20.5	n/a	U
S18T036499		O	53469-21-9	Aroclor 1242	ug/L	n/a	<1.80	<31.5	n/a	n/a	n/a	n/a	31.5	n/a	U
S18T036499		O	12672-29-6	Aroclor 1248	ug/L	n/a	<1.01	<17.8	n/a	n/a	n/a	n/a	17.8	n/a	U
S18T036499		O	11097-69-1	Aroclor 1254	ug/L	74.0	<0.371	<6.50	n/a	n/a	n/a	n/a	6.50	n/a	U
S18T036499		O	11096-82-5	Aroclor 1260	ug/L	n/a	<4.09	<71.5	n/a	n/a	n/a	n/a	71.5	n/a	U
Plutonium-241 by LSC															
S18T036495			14119-32-5	Plutonium-241	uCi/mL	105	<6.29E-06	7.44E-05	n/a	n/a	n/a	n/a	5.40E-06	11.461	
Pu238,239															
S18T036495			PU-239/240	Plutonium-239/240	uCi/mL	116	<1.55E-07	5.75E-05	n/a	n/a	n/a	n/a	1.12E-07	1.17	
S18T036495			13981-16-3	Plutonium-238	uCi/mL	n/a	<1.16E-07	5.64E-06	n/a	n/a	n/a	n/a	1.02E-07	3.79	

NA = Not Analyzed, ND = Not Detected

J - Estimated
U - Less Than Detection Limit
e - SERDIL Outside Range

E - Outside Calibration Range
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c - RPD Outside Range
B - Blank Contamination

a - LCS Outside Range
b - MS/MSD Outside Range

**SY-101 TBI Grab 2018-11
Data Summary Report**

Sample Group: 20183183

Riser: 14

Segment Number: 1SY-18-01

Segment Portion: Grab Sample (Total)

Sample#	R	A#	CAS #	Analyte	Unit	STD %	Blank	Result	Duplicate	Average	RPD %	Spk Rec %	Det Limit	Cnt Err %	Qual Flags
Pu238,239															
S18T036495			13982-10-0	Plutonium-242	uCi/mL	n/a	<8.30E-08	3.53E-07	n/a	n/a	n/a	n/a	6.32E-08	15.33	
SVOA 222S LIQUID															
S18T036498	O		106-46-7	1,4-Dichlorobenzene	ug/L	0.0	<38.9	<680	<680	n/a	n/a	29.9	680	n/a	Uabc
S18T036498	O		71-36-3	1-Butanol	ug/L	54.1	<159	<2.78E+03	<2.78E+03	n/a	n/a	53.6	2.78E+03	n/a	Uab
S18T036498	O		95-95-4	2,4,5-Trichlorophenol	ug/L	64.1	<39.1	<685	<685	n/a	n/a	0.0	685	n/a	Uab
S18T036498	O		88-06-2	2,4,6-Trichlorophenol	ug/L	64.4	<38.0	<665	<665	n/a	n/a	0.0	665	n/a	Uab
S18T036498	O		121-14-2	2,4-Dinitrotoluene	ug/L	62.4	<20.9	<365	<365	n/a	n/a	102	365	n/a	U
S18T036498	O		95-48-7	2-Methylphenol	ug/L	85.1	<36.0	<630	<630	n/a	n/a	65.3	630	n/a	Ub
S18T036498	O		108-39-4M	Cresol (m & p)	ug/L	85.7	<32.0	<560	<560	n/a	n/a	0.0	560	n/a	Ub
S18T036498	O		534-52-1	4,6-Dinitro-o-cresol	ug/L	67.2	<8.57	<150	<150	n/a	n/a	224	150	n/a	Uab
S18T036498	O		85-68-7	Butylbenzylphthalate	ug/L	45.8	32.0	570	560	565	1.77	92.3	230	n/a	BJa
S18T036498	O		108-94-1	Cyclohexanone	ug/L	89.2	<37.1	<650	<650	n/a	n/a	99.5	650	n/a	U
S18T036498	O		84-74-2	Di-n-butylphthalate	ug/L	48.9	<10.9	<190	<190	n/a	n/a	103	190	n/a	Ua
S18T036498	O		118-74-1	Hexachlorobenzene	ug/L	41.3	<30.9	<540	<540	n/a	n/a	88.1	540	n/a	Ua
S18T036498	O		87-68-3	Hexachlorobutadiene	ug/L	11.2	<42.9	<750	<750	n/a	n/a	27.5	750	n/a	Uabc
S18T036498	O		67-72-1	Hexachloroethane	ug/L	10.5	<40.0	<700	<700	n/a	n/a	20.4	700	n/a	Uabc
S18T036498	O		1319-77-3	Total Methylphenols	ug/L	n/a	<68.0	<1.19E+03	<1.19E+03	n/a	n/a	n/a	1.19E+03	n/a	U
S18T036498	O		98-95-3	Nitrobenzene	ug/L	64.8	<34.9	<610	<610	n/a	n/a	167	610	n/a	Uab
S18T036498	O		87-86-5	Pentachlorophenol	ug/L	42.4	<16.3	<285	<285	n/a	n/a	77.0	285	n/a	Uac
S18T036498	O		110-86-1	Pyridine	ug/L	88.4	<41.7	<730	<730	n/a	n/a	76.1	730	n/a	U
Sr-89/90 by Gas Proportional Counter															
S18T036495			SR-89/90	Strontium-89/90	uCi/mL	108	2.84E-06	7.23E-03	n/a	n/a	n/a	n/a	1.98E-06	0.875	
Suspended Solids															
S18T036493			SUSPSLD	Suspended Solids in Liquid	mg/L	n/a	<1000	<1.00E+03	<1.00E+03	n/a	n/a	n/a	1000	n/a	U
TIC/TOC by Acid Persulfate															
S18T036493			TIC	Total inorganic carbon	ug/mL	95.9	<7.00	2.70E+03	2.72E+03	2.71E+03	0.738	96.4	70.0	n/a	
S18T036493			TOC	Total organic carbon	ug/mL	92.0	<20.0	963	885	924	8.44	88.7	200	n/a	
Technetium - Liq. Scint.															

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**SY-101 TBI Grab 2018-11
 Data Summary Report**

Sample Group: 20183183

Riser: 14

Segment Number: 1SY-18-01

Segment Portion: Grab Sample (Total)

Sample#	R	A#	CAS #	Analyte	Unit	STD %	Blank	Result	Duplicate	Average	RPD %	Spk Rec %	Det Limit	Cnt Err %	Qual Flags
Technetium - Liq. Scint.															
S18T036495			14133-76-7	Technetium-99	uCi/mL	100	<3.10E-05	0.0260	n/a	n/a	n/a	n/a	3.27E-05	1.02	
Total Carbon by Furnace															
S18T036493			TC	Total carbon	ug/mL	86.3	1.12	3.74E+03	3.81E+03	3.77E+03	1.98	104	11.0	n/a	
Total Organic Carbon by Furnace															
S18T036493			TOC	Total organic carbon	ug/mL	89.9	<1.00	864	891	877	3.12	102	11.0	n/a	
Tritium (H3) by LSC															
S18T036495			10028-17-8	Tritium	uCi/mL	99.1	<2.19E-06	2.94E-06	n/a	n/a	n/a	n/a	1.66E-06	70.348	J
VOA Liquid Samples from Tanks															
S18T036489	O		71-55-6	1,1,1-Trichloroethane	ug/L	97.7	<0.160	<3.21	<3.21	n/a	n/a	105	3.21	n/a	U
S18T036489	O		75-35-4	1,1-Dichloroethene	ug/L	89.7	<0.134	<2.68	<2.68	n/a	n/a	99.3	2.68	n/a	U
S18T036489	O		107-06-2	1,2-Dichloroethane	ug/L	102	<0.214	<4.27	<4.27	n/a	n/a	112	4.27	n/a	U
S18T036489	O		78-93-3	2-Butanone	ug/L	100	<0.371	<7.42	<7.42	n/a	n/a	109	7.42	n/a	U
S18T036489	O		67-64-1	Acetone	ug/L	109	<6.20	<124	<124	n/a	n/a	121	124	n/a	U
S18T036489	O		71-43-2	Benzene	ug/L	94.6	<0.221	<4.42	<4.42	n/a	n/a	98.0	4.42	n/a	U
S18T036489	O		56-23-5	Carbon tetrachloride	ug/L	97.2	<0.157	<3.14	<3.14	n/a	n/a	102	3.14	n/a	U
S18T036489	O		108-90-7	Chlorobenzene	ug/L	95.3	<0.162	<3.23	<3.23	n/a	n/a	97.7	3.23	n/a	U
S18T036489	O		67-66-3	Chloroform	ug/L	98.1	<0.188	<3.76	<3.76	n/a	n/a	105	3.76	n/a	U
S18T036489	O		108-10-1	4-Methyl-2-Pentanone	ug/L	96.7	<0.269	<5.38	<5.38	n/a	n/a	114	5.38	n/a	U
S18T036489	O		75-09-2	Methylene Chloride	ug/L	96.3	<0.196	<3.93	<3.93	n/a	n/a	102	3.93	n/a	U
S18T036489	O		127-18-4	Tetrachloroethene	ug/L	90.6	<0.172	<3.45	<3.45	n/a	n/a	90.3	3.45	n/a	U
S18T036489	O		79-01-6	Trichloroethene	ug/L	93.3	<0.168	<3.37	<3.37	n/a	n/a	166	3.37	n/a	Ub
S18T036489	O		75-01-4	Vinyl chloride	ug/L	92.0	<0.386	<7.72	<7.72	n/a	n/a	88.6	7.72	n/a	U
pH of Liquids															
S18T036493			PH	pH	unitless	n/a	n/a	13.0	13.0	n/a	n/a	n/a	n/a	n/a	E

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**SY-101 TBI Grab 2018-11
 Data Summary Report**

Sample Group: 20183183

Riser: 14

Segment Number: 1SY-18-01DUP

Segment Portion: Grab Sample (Total)

Sample#	R	A#	CAS #	Analyte	Unit	STD %	Blank	Result	Duplicate	Average	RPD %	Spk Rec %	Det Limit	Cnt Err %	Qual Flags
% Water by TGA															
S18T036505			%WATER	Percent water	%	98.9	n/a	83.8	83.6	83.7	0.251	n/a	n/a	n/a	
Alpha and Beta															
S18T036507			ALPHA	Gross alpha	uCi/mL	95.6	<8.39E-06	<7.24E-04	n/a	n/a	n/a	n/a	7.24E-04	n/a	U
S18T036507			12587-47-2	Gross beta	uCi/mL	104	<1.84E-05	19.0	n/a	n/a	n/a	n/a	1.42E-03	0.457	
Am241,Cm243															
S18T036507			CM-243/244	Curium-243/244	uCi/mL	n/a	<6.61E-08	<6.89E-08	<7.95E-08	n/a	n/a	n/a	6.89E-08	n/a	U
S18T036507			14596-10-2	Americium-241	uCi/mL	97.7	<6.63E-08	3.81E-07	3.64E-07	3.72E-07	4.67	n/a	8.23E-08	15.69	
S18T036507			15510-73-3	Curium-242	uCi/mL	n/a	<2.32E-08	<2.38E-08	<2.44E-08	n/a	n/a	n/a	2.38E-08	n/a	U
Anions and Small Organic Acids															
S18T036503			16984-48-8	Fluoride	ug/mL	100	<1.00E-03	475	n/a	n/a	n/a	n/a	1.00	n/a	
S18T036503			666-14-8	Glycolate	ug/mL	100	<5.00E-03	103	n/a	n/a	n/a	n/a	5.00	n/a	J
S18T036503			71-50-1	Acetate	ug/mL	100	<0.0100	120	n/a	n/a	n/a	n/a	10.0	n/a	J
S18T036503			12311-97-6	Formate	ug/mL	99.8	<7.00E-03	252	n/a	n/a	n/a	n/a	7.00	n/a	
S18T036503			16887-00-6	Chloride	ug/mL	98.9	<4.00E-03	916	n/a	n/a	n/a	n/a	4.00	n/a	
S18T036503			14797-65-0	Nitrite	ug/mL	102	<9.00E-03	1.12E+04	n/a	n/a	n/a	n/a	9.00	n/a	
S18T036503			14808-79-8	Sulfate	ug/mL	100	<9.00E-03	2.17E+03	n/a	n/a	n/a	n/a	9.00	n/a	
S18T036503			338-70-5	Oxalate	ug/mL	101	<9.00E-03	2.45E+03	n/a	n/a	n/a	n/a	9.00	n/a	
S18T036503			14797-55-8	Nitrate	ug/mL	99.5	<0.0210	6.50E+04	n/a	n/a	n/a	n/a	210	n/a	
S18T036503			14265-44-2	Phosphate	ug/mL	98.9	<0.0140	9.18E+03	n/a	n/a	n/a	n/a	14.0	n/a	
S18T036503			7772-98-7	Thiosulfate	ug/mL	99.0	<6.00E-03	<6.00	n/a	n/a	n/a	n/a	6.00	n/a	U
Carbon 14 by LSC															
S18T036507			14762-75-5	Carbon-14	uCi/mL	98.8	4.52E-06	5.17E-04	5.08E-04	5.12E-04	1.76	98.5	8.57E-07	0.926	
Cyanide Water Distillation															
S18T036505			57-12-5	Cyanide	ug/mL	100	8.60E-03	2.46	n/a	n/a	n/a	n/a	0.400	n/a	BJ
Density in Hotcells															
S18T036500			Density	Density	g/mL	99.66	n/a	1.132	n/a	n/a	n/a	n/a	n/a	n/a	
GEA															
S18T036507			10198-40-0	Cobalt-60	uCi/mL	106	<2.23E-04	<2.50E-03	<2.84E-03	n/a	n/a	n/a	2.50E-03	n/a	U

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**SY-101 TBI Grab 2018-11
 Data Summary Report**

Sample Group: 20183183

Riser: 14

Segment Number: 1SY-18-01DUP

Segment Portion: Grab Sample (Total)

Sample#	R	A#	CAS #	Analyte	Unit	STD %	Blank	Result	Duplicate	Average	RPD %	Spk Rec %	Det Limit	Cnt Err %	Qual Flags
GEA															
S18T036507			14681-63-1	Niobium-94	uCi/mL	n/a	<2.20E-04	<2.62E-03	<2.26E-03	n/a	n/a	n/a	2.62E-03	n/a	U
S18T036507			10045-97-3	Cesium-137	uCi/mL	105	<2.52E-04	19.5	19.8	19.6	1.93	n/a	0.0135	0.17	
S18T036507			13982-63-3	Radium-226	uCi/mL	n/a	<3.19E-03	<0.422	<0.257	n/a	n/a	n/a	0.422	n/a	U
ICP-AES															
S18T036503			7429-90-5	Aluminum	ug/mL	100	<0.0140	3.39E+03	n/a	n/a	n/a	n/a	7.00	n/a	
S18T036503			7440-39-3	Barium	ug/mL	102	<1.00E-03	<0.500	n/a	n/a	n/a	n/a	0.500	n/a	U
S18T036503			7440-41-7	Beryllium	ug/mL	99.4	<1.00E-03	<0.500	n/a	n/a	n/a	n/a	0.500	n/a	U
S18T036503			7440-43-9	Cadmium	ug/mL	101	<1.00E-03	<0.500	n/a	n/a	n/a	n/a	0.500	n/a	U
S18T036503			7440-47-3	Chromium	ug/mL	100	<2.00E-03	99.6	n/a	n/a	n/a	n/a	1.00	n/a	J
S18T036503			7440-09-7	Potassium	ug/mL	100	<0.0220	282	n/a	n/a	n/a	n/a	11.0	n/a	
S18T036503			7440-23-5	Sodium	ug/mL	101	<0.0920	6.18E+04	n/a	n/a	n/a	n/a	46.0	n/a	
S18T036503			7440-02-0	Nickel	ug/mL	102	2.41E-03	1.50	n/a	n/a	n/a	n/a	1.00	n/a	BJ
S18T036503			7440-36-0	Antimony	ug/mL	100	<0.0180	<9.00	n/a	n/a	n/a	n/a	9.00	n/a	U
S18T036503			7440-61-1	Uranium	ug/mL	104	<0.0290	<14.5	n/a	n/a	n/a	n/a	14.5	n/a	U
S18T036503			7440-62-2	Vanadium	ug/mL	99.5	<1.00E-03	<0.500	n/a	n/a	n/a	n/a	0.500	n/a	U
ICP/MS															
S18T036502			7440-36-0	Antimony	ug/mL	99.2	<6.00E-06	<6.00E-03	n/a	n/a	n/a	n/a	6.00E-03	n/a	U
S18T036502			15832-50-5	Tin-126	ug/mL	n/a	<1.77E-07	4.85E-03	n/a	n/a	n/a	n/a	1.77E-04	n/a	I
S18T036502			7440-46-2	Cesium	ug/mL	101	<3.00E-06	0.919	n/a	n/a	n/a	n/a	6.00E-03	n/a	
S18T037452			7440-38-2	Arsenic	ug/mL	97.8	<4.20E-05	0.658	n/a	n/a	n/a	n/a	0.0210	n/a	
S18T037452			7439-92-1	Lead	ug/mL	100	<3.10E-05	1.58	n/a	n/a	n/a	n/a	0.0155	n/a	
S18T037452			7782-49-2	Selenium	ug/mL	99.8	<6.10E-05	1.05	n/a	n/a	n/a	n/a	0.0305	n/a	
S18T037452			7440-22-4	Silver	ug/mL	98.9	<8.00E-06	0.0159	n/a	n/a	n/a	n/a	4.00E-03	n/a	J
S18T037452			7440-28-0	Thallium	ug/mL	101	<4.00E-06	<2.00E-03	n/a	n/a	n/a	n/a	2.00E-03	n/a	U
Iodine-129															
S18T036507			15046-84-1	Iodine-129	uCi/mL	108	<1.30E-05	2.02E-05	n/a	n/a	n/a	n/a	1.80E-05	34.6	J
MS ACTINIDES for Plutonium															
S18T036502			13982-10-0	Plutonium-242	ug/mL	98.8	<1.30E-06	<6.50E-04	n/a	n/a	n/a	n/a	6.50E-04	n/a	U

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**SY-101 TBI Grab 2018-11
 Data Summary Report**

Sample Group: 20183183

Riser: 14

Segment Number: 1SY-18-01DUP

Segment Portion: Grab Sample (Total)

Sample#	R	A#	CAS #	Analyte	Unit	STD %	Blank	Result	Duplicate	Average	RPD %	Spk Rec %	Det Limit	Cnt Err %	Qual Flags
MS ACTINIDES for Uranium & Thorium															
S18T036502			15594-54-4	Thorium-229	ug/mL	n/a	<1.12E-07	<5.60E-05	n/a	n/a	n/a	n/a	5.60E-05	n/a	IU
S18T036502			13966-29-5	Uranium-234	ug/mL	n/a	<5.40E-08	2.84E-04	n/a	n/a	n/a	n/a	2.70E-05	n/a	I
S18T036502			15117-96-1	Uranium-235	ug/mL	100	<5.40E-08	0.0252	n/a	n/a	n/a	n/a	1.08E-04	n/a	
S18T036502			U-238	Uranium-238	ug/mL	100	4.79E-06	3.80	n/a	n/a	n/a	n/a	8.36E-04	n/a	
MS ACTINIDES with Uranium & Neptunium															
S18T036502			13968-55-3	Uranium-233	ug/mL	98.4	<5.00E-07	3.66E-04	n/a	n/a	n/a	n/a	2.50E-04	n/a	J
S18T036502			13994-20-2	Neptunium-237	ug/mL	98.5	<1.12E-07	1.30E-03	n/a	n/a	n/a	n/a	5.60E-05	n/a	J
MS Actinides for Americium															
S18T036502			14993-75-0	Americium-243	ug/mL	n/a	<1.00E-06	<5.00E-04	n/a	n/a	n/a	n/a	5.00E-04	n/a	IU
Mercury by CVAA															
S18T036504		HG	7439-97-6	Mercury	ug/mL	103	<0.0110	<8.80E-04	n/a	n/a	n/a	n/a	8.80E-04	n/a	U
Nickel-63															
S18T036507			13981-37-8	Nickel-63	uCi/mL	94.2	<5.30E-06	5.57E-04	n/a	n/a	n/a	n/a	2.75E-06	2.442	
OH- by Pot. Titration															
S18T037779			HYDROXIDE	Hydroxide	ug/mL	n/a	n/a	8.01E+03	n/a	n/a	n/a	n/a	553	n/a	
PCB (EPA 8082) from Extraction															
S18T036511		O	12674-11-2	Aroclor 1016	ug/L	n/a	<5.40	<94.5	<94.5	n/a	n/a	n/a	94.5	n/a	U
S18T036511		O	11104-28-2	Aroclor 1221	ug/L	n/a	<1.01	<17.8	<17.8	n/a	n/a	n/a	17.8	n/a	U
S18T036511		O	11141-16-5	Aroclor 1232	ug/L	n/a	<1.17	<20.5	<20.5	n/a	n/a	n/a	20.5	n/a	U
S18T036511		O	53469-21-9	Aroclor 1242	ug/L	n/a	<1.80	<31.5	<31.5	n/a	n/a	n/a	31.5	n/a	U
S18T036511		O	12672-29-6	Aroclor 1248	ug/L	n/a	<1.01	<17.8	<17.8	n/a	n/a	n/a	17.8	n/a	U
S18T036511		O	11097-69-1	Aroclor 1254	ug/L	74.0	<0.371	<6.50	<6.50	n/a	n/a	64.0	6.50	n/a	U
S18T036511		O	11096-82-5	Aroclor 1260	ug/L	n/a	<4.09	<71.5	<71.5	n/a	n/a	n/a	71.5	n/a	U
Plutonium-241 by LSC															
S18T036507			14119-32-5	Plutonium-241	uCi/mL	105	<6.29E-06	7.27E-05	7.41E-05	7.34E-05	1.91	n/a	5.42E-06	11.694	
Pu238,239															
S18T036507			PU-239/240	Plutonium-239/240	uCi/mL	116	<1.55E-07	5.83E-05	6.08E-05	5.95E-05	4.25	n/a	7.90E-08	1.19	
S18T036507			13981-16-3	Plutonium-238	uCi/mL	n/a	<1.16E-07	5.70E-06	5.73E-06	5.71E-06	0.595	n/a	1.04E-07	3.85	

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**SY-101 TBI Grab 2018-11
Data Summary Report**

Sample Group: 20183183

Riser: 14

Segment Number: 1SY-18-01DUP

Segment Portion: Grab Sample (Total)

Sample#	R	A#	CAS #	Analyte	Unit	STD %	Blank	Result	Duplicate	Average	RPD %	Spk Rec %	Det Limit	Cnt Err %	Qual Flags
Pu238,239															
S18T036507			13982-10-0	Plutonium-242	uCi/mL	n/a	<8.30E-08	5.78E-07	2.24E-07	4.01E-07	88.2	n/a	4.76E-08	11.98	
SVOA 222S LIQUID															
S18T036510	O		106-46-7	1,4-Dichlorobenzene	ug/L	19.4	<38.9	<680	<680	n/a	n/a	16.0	680	n/a	Uabc
S18T036510	O		71-36-3	1-Butanol	ug/L	56.4	<159	<2.78E+03	<2.78E+03	n/a	n/a	57.0	2.78E+03	n/a	Uab
S18T036510	O		95-95-4	2,4,5-Trichlorophenol	ug/L	69.2	<39.1	<685	<685	n/a	n/a	0.0	685	n/a	Uabc
S18T036510	O		88-06-2	2,4,6-Trichlorophenol	ug/L	71.0	<38.0	<665	<665	n/a	n/a	30.9	665	n/a	Ubc
S18T036510	O		121-14-2	2,4-Dinitrotoluene	ug/L	68.3	<20.9	<365	<365	n/a	n/a	77.0	365	n/a	Ua
S18T036510	O		95-48-7	2-Methylphenol	ug/L	86.9	<36.0	<630	<630	n/a	n/a	0.0	630	n/a	Ub
S18T036510	O		108-39-4M	Cresol (m & p)	ug/L	88.2	<32.0	<560	<560	n/a	n/a	0.0	560	n/a	Ub
S18T036510	O		534-52-1	4,6-Dinitro-o-cresol	ug/L	70.7	<8.57	<150	<150	n/a	n/a	184	150	n/a	Ub
S18T036510	O		85-68-7	Butylbenzylphthalate	ug/L	52.2	32.0	590	570	580	3.45	56.3	230	n/a	BJabc
S18T036510	O		108-94-1	Cyclohexanone	ug/L	92.6	<37.1	<650	<650	n/a	n/a	97.8	650	n/a	U
S18T036510	O		84-74-2	Di-n-butylphthalate	ug/L	55.9	<10.9	<190	<190	n/a	n/a	66.3	190	n/a	Uab
S18T036510	O		118-74-1	Hexachlorobenzene	ug/L	47.8	<30.9	<540	<540	n/a	n/a	54.0	540	n/a	Uabc
S18T036510	O		87-68-3	Hexachlorobutadiene	ug/L	12.4	<42.9	<750	<750	n/a	n/a	0.0	750	n/a	Uabc
S18T036510	O		67-72-1	Hexachloroethane	ug/L	13.6	<40.0	<700	<700	n/a	n/a	0.0	700	n/a	Uabc
S18T036510	O		1319-77-3	Total Methylphenols	ug/L	n/a	<68.0	<1.19E+03	<1.19E+03	n/a	n/a	n/a	1.19E+03	n/a	U
S18T036510	O		98-95-3	Nitrobenzene	ug/L	75.4	<34.9	<610	<610	n/a	n/a	131	610	n/a	Ub
S18T036510	O		87-86-5	Pentachlorophenol	ug/L	46.7	<16.3	<285	<285	n/a	n/a	57.8	285	n/a	Uab
S18T036510	O		110-86-1	Pyridine	ug/L	78.1	<41.7	<730	<730	n/a	n/a	78.7	730	n/a	U
Sr-89/90 by Gas Proportional Counter															
S18T036507			SR-89/90	Strontium-89/90	uCi/mL	108	2.84E-06	7.27E-03	7.00E-03	7.13E-03	3.74	n/a	2.02E-06	0.882	
Suspended Solids															
S18T036505			SUSPSLD	Suspended Solids in Liquid	mg/L	n/a	<1000	<1.00E+03	n/a	n/a	n/a	n/a	1000	n/a	U
TIC/TOC by Acid Persulfate															
S18T036505			TIC	Total inorganic carbon	ug/mL	95.9	<7.00	2.66E+03	n/a	n/a	n/a	n/a	70.0	n/a	
S18T036505			TOC	Total organic carbon	ug/mL	92.0	<20.0	861	n/a	n/a	n/a	n/a	200	n/a	
Technetium - Liq. Scint.															

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**SY-101 TBI Grab 2018-11
 Data Summary Report**

Sample Group: 20183183

Riser: 14

Segment Number: 1SY-18-01DUP

Segment Portion: Grab Sample (Total)

Sample#	R	A#	CAS #	Analyte	Unit	STD %	Blank	Result	Duplicate	Average	RPD %	Spk Rec %	Det Limit	Cnt Err %	Qual Flags
Technetium - Liq. Scint.															
S18T036507			14133-76-7	Technetium-99	uCi/mL	100	<3.10E-05	0.0238	0.0229	0.0233	3.69	n/a	2.98E-05	1.01	
Total Carbon by Furnace															
S18T036505			TC	Total carbon	ug/mL	86.3	1.12	3.71E+03	n/a	n/a	n/a	n/a	11.0	n/a	
Total Organic Carbon by Furnace															
S18T036505			TOC	Total organic carbon	ug/mL	89.9	<1.00	942	n/a	n/a	n/a	n/a	11.0	n/a	
Tritium (H3) by LSC															
S18T036507			10028-17-8	Tritium	uCi/mL	99.1	<2.19E-06	5.62E-06	6.20E-06	5.91E-06	9.81	102	1.66E-06	38.499	J
VOA Liquid Samples from Tanks															
S18T036501	O		71-55-6	1,1,1-Trichloroethane	ug/L	97.7	<0.160	<3.21	n/a	n/a	n/a	n/a	3.21	n/a	U
S18T036501	O		75-35-4	1,1-Dichloroethene	ug/L	89.7	<0.134	<2.68	n/a	n/a	n/a	n/a	2.68	n/a	U
S18T036501	O		107-06-2	1,2-Dichloroethane	ug/L	102	<0.214	<4.27	n/a	n/a	n/a	n/a	4.27	n/a	U
S18T036501	O		78-93-3	2-Butanone	ug/L	100	<0.371	<7.42	n/a	n/a	n/a	n/a	7.42	n/a	U
S18T036501	O		67-64-1	Acetone	ug/L	109	<6.20	<124	n/a	n/a	n/a	n/a	124	n/a	U
S18T036501	O		71-43-2	Benzene	ug/L	94.6	<0.221	<4.42	n/a	n/a	n/a	n/a	4.42	n/a	U
S18T036501	O		56-23-5	Carbon tetrachloride	ug/L	97.2	<0.157	<3.14	n/a	n/a	n/a	n/a	3.14	n/a	U
S18T036501	O		108-90-7	Chlorobenzene	ug/L	95.3	<0.162	<3.23	n/a	n/a	n/a	n/a	3.23	n/a	U
S18T036501	O		67-66-3	Chloroform	ug/L	98.1	<0.188	<3.76	n/a	n/a	n/a	n/a	3.76	n/a	U
S18T036501	O		108-10-1	4-Methyl-2-Pentanone	ug/L	96.7	<0.269	<5.38	n/a	n/a	n/a	n/a	5.38	n/a	U
S18T036501	O		75-09-2	Methylene Chloride	ug/L	96.3	<0.196	<3.93	n/a	n/a	n/a	n/a	3.93	n/a	U
S18T036501	O		127-18-4	Tetrachloroethene	ug/L	90.6	<0.172	<3.45	n/a	n/a	n/a	n/a	3.45	n/a	U
S18T036501	O		79-01-6	Trichloroethene	ug/L	93.3	<0.168	<3.37	n/a	n/a	n/a	n/a	3.37	n/a	U
S18T036501	O		75-01-4	Vinyl chloride	ug/L	92.0	<0.386	<7.72	n/a	n/a	n/a	n/a	7.72	n/a	U
pH of Liquids															
S18T036505			PH	pH	unitless	n/a	n/a	13.0	n/a	n/a	n/a	n/a	n/a	n/a	E

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**SY-101 TBI Grab 2018-11
Data Summary Report**

Sample Group: 20183183

Riser: 14

Segment Number: 1SY-18-01FB

Segment Portion: Field Blank

Sample#	R	A#	CAS #	Analyte	Unit	STD %	Blank	Result	Duplicate	Average	RPD %	Spk Rec %	Det Limit	Cnt Err %	Qual Flags
Alpha and Beta															
S18T036483			ALPHA	Gross alpha	uCi/mL	95.6	<8.39E-06	<6.52E-06	n/a	n/a	n/a	n/a	6.52E-06	n/a	U
S18T036483			12587-47-2	Gross beta	uCi/mL	104	<1.84E-05	<1.93E-03	n/a	n/a	n/a	n/a	1.93E-03	n/a	U
Am241,Cm243															
S18T036483			CM-243/244	Curium-243/244	uCi/mL	n/a	<6.61E-08	<6.59E-08	n/a	n/a	n/a	n/a	6.59E-08	n/a	U
S18T036483			14596-10-2	Americium-241	uCi/mL	97.7	<6.63E-08	<8.94E-08	n/a	n/a	n/a	n/a	8.94E-08	n/a	U
S18T036483			15510-73-3	Curium-242	uCi/mL	n/a	<2.32E-08	<3.27E-08	n/a	n/a	n/a	n/a	3.27E-08	n/a	U
Anions and Small Organic Acids															
S18T036480			16984-48-8	Fluoride	ug/mL	100	<1.00E-03	0.0150	n/a	n/a	n/a	n/a	1.00E-03	n/a	J
S18T036480			666-14-8	Glycolate	ug/mL	100	<5.00E-03	<5.00E-03	n/a	n/a	n/a	n/a	5.00E-03	n/a	U
S18T036480			71-50-1	Acetate	ug/mL	100	<0.0100	0.377	n/a	n/a	n/a	n/a	0.0100	n/a	
S18T036480			12311-97-6	Formate	ug/mL	99.8	<7.00E-03	<7.00E-03	n/a	n/a	n/a	n/a	7.00E-03	n/a	U
S18T036480			16887-00-6	Chloride	ug/mL	98.9	<4.00E-03	0.0200	n/a	n/a	n/a	n/a	4.00E-03	n/a	J
S18T036480			14797-65-0	Nitrite	ug/mL	102	<9.00E-03	<9.00E-03	n/a	n/a	n/a	n/a	9.00E-03	n/a	U
S18T036480			14808-79-8	Sulfate	ug/mL	100	<9.00E-03	0.0770	n/a	n/a	n/a	n/a	9.00E-03	n/a	J
S18T036480			338-70-5	Oxalate	ug/mL	101	<9.00E-03	<9.00E-03	n/a	n/a	n/a	n/a	9.00E-03	n/a	U
S18T036480			14797-55-8	Nitrate	ug/mL	99.5	<0.0210	<0.0210	n/a	n/a	n/a	n/a	0.0210	n/a	U
S18T036480			14265-44-2	Phosphate	ug/mL	98.9	<0.0140	<0.0140	n/a	n/a	n/a	n/a	0.0140	n/a	U
S18T036480			7772-98-7	Thiosulfate	ug/mL	99.0	<6.00E-03	<6.00E-03	n/a	n/a	n/a	n/a	6.00E-03	n/a	U
Carbon 14 by LSC															
S18T036483			14762-75-5	Carbon-14	uCi/mL	98.8	4.52E-06	<1.05E-06	n/a	n/a	n/a	n/a	1.05E-06	n/a	BU
Cyanide Water Distillation															
S18T036482			57-12-5	Cyanide	ug/mL	100	8.60E-03	<0.400	n/a	n/a	n/a	n/a	0.400	n/a	U
GEA															
S18T036483			10198-40-0	Cobalt-60	uCi/mL	106	<2.23E-04	<1.54E-04	n/a	n/a	n/a	n/a	1.54E-04	n/a	U
S18T036483			14681-63-1	Niobium-94	uCi/mL	n/a	<2.20E-04	<1.35E-04	n/a	n/a	n/a	n/a	1.35E-04	n/a	U
S18T036483			10045-97-3	Cesium-137	uCi/mL	105	<2.52E-04	<1.35E-04	n/a	n/a	n/a	n/a	1.35E-04	n/a	U
S18T036483			13982-63-3	Radium-226	uCi/mL	n/a	<3.19E-03	<3.34E-03	n/a	n/a	n/a	n/a	3.34E-03	n/a	U
ICP-AES															

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**SY-101 TBI Grab 2018-11
 Data Summary Report**

Sample Group: 20183183

Riser: 14

Segment Number: 1SY-18-01FB

Segment Portion: Field Blank

Sample#	R	A#	CAS #	Analyte	Unit	STD %	Blank	Result	Duplicate	Average	RPD %	Spk Rec %	Det Limit	Cnt Err %	Qual Flags
ICP-AES															
S18T036479			7429-90-5	Aluminum	ug/mL	100	<0.0140	0.0280	n/a	n/a	n/a	n/a	0.0140	n/a	J
S18T036479			7440-39-3	Barium	ug/mL	102	<1.00E-03	0.0618	n/a	n/a	n/a	n/a	1.00E-03	n/a	J
S18T036479			7440-41-7	Beryllium	ug/mL	99.4	<1.00E-03	<1.00E-03	n/a	n/a	n/a	n/a	1.00E-03	n/a	U
S18T036479			7440-43-9	Cadmium	ug/mL	101	<1.00E-03	<1.00E-03	n/a	n/a	n/a	n/a	1.00E-03	n/a	U
S18T036479			7440-47-3	Chromium	ug/mL	100	<2.00E-03	<2.00E-03	n/a	n/a	n/a	n/a	2.00E-03	n/a	U
S18T036479			7440-09-7	Potassium	ug/mL	100	<0.0220	0.0665	n/a	n/a	n/a	n/a	0.0220	n/a	J
S18T036479			7440-23-5	Sodium	ug/mL	101	<0.0920	2.09	n/a	n/a	n/a	n/a	0.0920	n/a	
S18T036479			7440-02-0	Nickel	ug/mL	102	2.41E-03	2.39E-03	n/a	n/a	n/a	n/a	2.00E-03	n/a	BJ
S18T036479			7440-36-0	Antimony	ug/mL	100	<0.0180	<0.0180	n/a	n/a	n/a	n/a	0.0180	n/a	U
S18T036479			7440-61-1	Uranium	ug/mL	104	<0.0290	<0.0290	n/a	n/a	n/a	n/a	0.0290	n/a	U
S18T036479			7440-62-2	Vanadium	ug/mL	99.5	<1.00E-03	<1.00E-03	n/a	n/a	n/a	n/a	1.00E-03	n/a	U
ICP/MS															
S18T036479			7440-36-0	Antimony	ug/mL	99.2	<6.00E-06	1.08E-04	n/a	n/a	n/a	n/a	6.00E-05	n/a	J
S18T036479			15832-50-5	Tin-126	ug/mL	n/a	<1.77E-07	<1.77E-06	n/a	n/a	n/a	n/a	1.77E-06	n/a	IU
S18T036479			7440-46-2	Cesium	ug/mL	101	<3.00E-06	8.77E-05	n/a	n/a	n/a	n/a	3.00E-05	n/a	J
S18T037322			7440-38-2	Arsenic	ug/mL	97.8	<4.20E-05	1.53E-03	n/a	n/a	n/a	n/a	4.20E-04	n/a	J
S18T037322			7439-92-1	Lead	ug/mL	100	<3.10E-05	<3.10E-04	n/a	n/a	n/a	n/a	3.10E-04	n/a	U
S18T037322			7782-49-2	Selenium	ug/mL	99.8	<6.10E-05	<6.10E-04	n/a	n/a	n/a	n/a	6.10E-04	n/a	U
S18T037322			7440-22-4	Silver	ug/mL	98.9	<8.00E-06	<8.00E-05	n/a	n/a	n/a	n/a	8.00E-05	n/a	U
S18T037322			7440-28-0	Thallium	ug/mL	101	<4.00E-06	<4.00E-05	n/a	n/a	n/a	n/a	4.00E-05	n/a	U
Iodine-129															
S18T036483			15046-84-1	Iodine-129	uCi/mL	108	<1.30E-05	<9.94E-06	n/a	n/a	n/a	n/a	9.94E-06	n/a	U
MS ACTINIDES for Plutonium															
S18T036479			13982-10-0	Plutonium-242	ug/mL	98.8	<1.30E-06	<1.30E-05	n/a	n/a	n/a	n/a	1.30E-05	n/a	U
MS ACTINIDES for Uranium & Thorium															
S18T036479			15594-54-4	Thorium-229	ug/mL	n/a	<1.12E-07	<1.12E-06	n/a	n/a	n/a	n/a	1.12E-06	n/a	IU
S18T036479			13966-29-5	Uranium-234	ug/mL	n/a	<5.40E-08	<5.40E-07	n/a	n/a	n/a	n/a	5.40E-07	n/a	IU
S18T036479			15117-96-1	Uranium-235	ug/mL	100	<5.40E-08	5.96E-07	n/a	n/a	n/a	n/a	5.40E-07	n/a	J

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**SY-101 TBI Grab 2018-11
 Data Summary Report**

Sample Group: 20183183

Riser: 14

Segment Number: 1SY-18-01FB

Segment Portion: Field Blank

Sample#	R	A#	CAS #	Analyte	Unit	STD %	Blank	Result	Duplicate	Average	RPD %	Spk Rec %	Det Limit	Cnt Err %	Qual Flags
MS ACTINIDES for Uranium & Thorium															
S18T036479			U-238	Uranium-238	ug/mL	100	4.79E-06	1.60E-04	n/a	n/a	n/a	n/a	4.18E-06	n/a	B
MS ACTINIDES with Uranium & Neptunium															
S18T036479			13968-55-3	Uranium-233	ug/mL	98.4	<5.00E-07	<5.00E-06	n/a	n/a	n/a	n/a	5.00E-06	n/a	U
S18T036479			13994-20-2	Neptunium-237	ug/mL	98.5	<1.12E-07	<1.12E-06	n/a	n/a	n/a	n/a	1.12E-06	n/a	U
MS Actinides for Americium															
S18T036479			14993-75-0	Americium-243	ug/mL	n/a	<1.00E-06	<1.00E-05	n/a	n/a	n/a	n/a	1.00E-05	n/a	IU
Mercury by CVAA															
S18T036481		HG	7439-97-6	Mercury	ug/mL	103	<0.0110	<8.80E-04	n/a	n/a	n/a	n/a	8.80E-04	n/a	U
Nickel-63															
S18T036483			13981-37-8	Nickel-63	uCi/mL	94.2	<5.30E-06	<4.97E-06	n/a	n/a	n/a	n/a	4.97E-06	n/a	U
PCB (EPA 8082) from Extraction															
S18T036487		O	12674-11-2	Aroclor 1016	ug/L	n/a	<5.40	<94.5	n/a	n/a	n/a	n/a	94.5	n/a	U
S18T036487		O	11104-28-2	Aroclor 1221	ug/L	n/a	<1.01	<17.8	n/a	n/a	n/a	n/a	17.8	n/a	U
S18T036487		O	11141-16-5	Aroclor 1232	ug/L	n/a	<1.17	<20.5	n/a	n/a	n/a	n/a	20.5	n/a	U
S18T036487		O	53469-21-9	Aroclor 1242	ug/L	n/a	<1.80	<31.5	n/a	n/a	n/a	n/a	31.5	n/a	U
S18T036487		O	12672-29-6	Aroclor 1248	ug/L	n/a	<1.01	<17.8	n/a	n/a	n/a	n/a	17.8	n/a	U
S18T036487		O	11097-69-1	Aroclor 1254	ug/L	74.0	<0.371	<6.50	n/a	n/a	n/a	n/a	6.50	n/a	U
S18T036487		O	11096-82-5	Aroclor 1260	ug/L	n/a	<4.09	<71.5	n/a	n/a	n/a	n/a	71.5	n/a	U
Plutonium-241 by LSC															
S18T036483			14119-32-5	Plutonium-241	uCi/mL	105	<6.29E-06	<5.33E-06	n/a	n/a	n/a	n/a	5.33E-06	n/a	U
Pu238,239															
S18T036483			PU-239/240	Plutonium-239/240	uCi/mL	116	<1.55E-07	<1.38E-07	n/a	n/a	n/a	n/a	1.38E-07	n/a	U
S18T036483			13981-16-3	Plutonium-238	uCi/mL	n/a	<1.16E-07	<1.27E-07	n/a	n/a	n/a	n/a	1.27E-07	n/a	U
S18T036483			13982-10-0	Plutonium-242	uCi/mL	n/a	<8.30E-08	<5.92E-08	n/a	n/a	n/a	n/a	5.92E-08	n/a	U
SVOA 222S LIQUID															
S18T036486		O	106-46-7	1,4-Dichlorobenzene	ug/L	0.0	<38.9	<680	n/a	n/a	n/a	n/a	680	n/a	Ua
S18T036486		O	71-36-3	1-Butanol	ug/L	54.1	<159	<2.78E+03	n/a	n/a	n/a	n/a	2.78E+03	n/a	Ua
S18T036486		O	95-95-4	2,4,5-Trichlorophenol	ug/L	64.1	<39.1	<685	n/a	n/a	n/a	n/a	685	n/a	Ua

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SY-101 TBI Grab 2018-11
Data Summary Report

Sample Group: 20183183

Riser: 14

Segment Number: 1SY-18-01FB

Segment Portion: Field Blank

Sample#	R	A#	CAS #	Analyte	Unit	STD %	Blank	Result	Duplicate	Average	RPD %	Spk Rec %	Det Limit	Cnt Err %	Qual Flags
SVOA 222S LIQUID															
S18T036486		O	88-06-2	2,4,6-Trichlorophenol	ug/L	64.4	<38.0	<665	n/a	n/a	n/a	n/a	665	n/a	Ua
S18T036486		O	121-14-2	2,4-Dinitrotoluene	ug/L	62.4	<20.9	<365	n/a	n/a	n/a	n/a	365	n/a	Ua
S18T036486		O	95-48-7	2-Methylphenol	ug/L	85.1	<36.0	<630	n/a	n/a	n/a	n/a	630	n/a	U
S18T036486		O	108-39-4M	Cresol (m & p)	ug/L	85.7	<32.0	<560	n/a	n/a	n/a	n/a	560	n/a	U
S18T036486		O	534-52-1	4,6-Dinitro-o-cresol	ug/L	67.2	<8.57	<150	n/a	n/a	n/a	n/a	150	n/a	Ua
S18T036486		O	85-68-7	Butylbenzylphthalate	ug/L	45.8	32.0	560	n/a	n/a	n/a	n/a	230	n/a	BJa
S18T036486		O	108-94-1	Cyclohexanone	ug/L	89.2	<37.1	<650	n/a	n/a	n/a	n/a	650	n/a	U
S18T036486		O	84-74-2	Di-n-butylphthalate	ug/L	48.9	<10.9	<190	n/a	n/a	n/a	n/a	190	n/a	Ua
S18T036486		O	118-74-1	Hexachlorobenzene	ug/L	41.3	<30.9	<540	n/a	n/a	n/a	n/a	540	n/a	Ua
S18T036486		O	87-68-3	Hexachlorobutadiene	ug/L	11.2	<42.9	<750	n/a	n/a	n/a	n/a	750	n/a	Ua
S18T036486		O	67-72-1	Hexachloroethane	ug/L	10.5	<40.0	<700	n/a	n/a	n/a	n/a	700	n/a	Ua
S18T036486		O	1319-77-3	Total Methylphenols	ug/L	n/a	<68.0	<1.19E+03	n/a	n/a	n/a	n/a	1.19E+03	n/a	U
S18T036486		O	98-95-3	Nitrobenzene	ug/L	64.8	<34.9	<610	n/a	n/a	n/a	n/a	610	n/a	Ua
S18T036486		O	87-86-5	Pentachlorophenol	ug/L	42.4	<16.3	<285	n/a	n/a	n/a	n/a	285	n/a	Ua
S18T036486		O	110-86-1	Pyridine	ug/L	88.4	<41.7	<730	n/a	n/a	n/a	n/a	730	n/a	U
Sr-89/90 by Gas Proportional Counter															
S18T036483			SR-89/90	Strontium-89/90	uCi/mL	108	2.84E-06	6.86E-06	n/a	n/a	n/a	n/a	1.34E-06	94.971	BJ
TIC/TOC by Acid Persulfate															
S18T036482			TIC	Total inorganic carbon	ug/mL	95.9	<7.00	<7.00	n/a	n/a	n/a	n/a	7.00	n/a	U
S18T036482			TOC	Total organic carbon	ug/mL	92.0	<20.0	<20.0	n/a	n/a	n/a	n/a	20.0	n/a	U
Technetium - Liq. Scint.															
S18T036483			14133-76-7	Technetium-99	uCi/mL	100	<3.10E-05	<3.04E-05	n/a	n/a	n/a	n/a	3.04E-05	n/a	U
Total Carbon by Furnace															
S18T036482			TC	Total carbon	ug/mL	86.3	1.12	<11.0	n/a	n/a	n/a	n/a	11.0	n/a	U
Total Organic Carbon by Furnace															
S18T036482			TOC	Total organic carbon	ug/mL	89.9	<1.00	<11.0	n/a	n/a	n/a	n/a	11.0	n/a	U
Tritium (H3) by LSC															
S18T036483			10028-17-8	Tritium	uCi/mL	99.1	<2.19E-06	<1.66E-06	n/a	n/a	n/a	n/a	1.66E-06	n/a	U

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**SY-101 TBI Grab 2018-11
 Data Summary Report**

Sample Group: 20183183

Riser: 14

Segment Number: 1SY-18-01FB

Segment Portion: Field Blank

Sample#	R	A#	CAS #	Analyte	Unit	STD %	Blank	Result	Duplicate	Average	RPD %	Spk Rec %	Det Limit	Cnt Err %	Qual Flags
VOA Liquid Samples from Tanks															
S18T036478	O		71-55-6	1,1,1-Trichloroethane	ug/L	97.7	<0.160	<0.178	n/a	n/a	n/a	n/a	0.178	n/a	U
S18T036478	O		75-35-4	1,1-Dichloroethene	ug/L	89.7	<0.134	<0.149	n/a	n/a	n/a	n/a	0.149	n/a	U
S18T036478	O		107-06-2	1,2-Dichloroethane	ug/L	102	<0.214	<0.237	n/a	n/a	n/a	n/a	0.237	n/a	U
S18T036478	O		78-93-3	2-Butanone	ug/L	100	<0.371	<0.412	n/a	n/a	n/a	n/a	0.412	n/a	U
S18T036478	O		67-64-1	Acetone	ug/L	109	<6.20	<6.88	n/a	n/a	n/a	n/a	6.88	n/a	U
S18T036478	O		71-43-2	Benzene	ug/L	94.6	<0.221	<0.245	n/a	n/a	n/a	n/a	0.245	n/a	U
S18T036478	O		56-23-5	Carbon tetrachloride	ug/L	97.2	<0.157	<0.174	n/a	n/a	n/a	n/a	0.174	n/a	U
S18T036478	O		108-90-7	Chlorobenzene	ug/L	95.3	<0.162	<0.180	n/a	n/a	n/a	n/a	0.180	n/a	U
S18T036478	O		67-66-3	Chloroform	ug/L	98.1	<0.188	<0.209	n/a	n/a	n/a	n/a	0.209	n/a	U
S18T036478	O		108-10-1	4-Methyl-2-Pentanone	ug/L	96.7	<0.269	<0.299	n/a	n/a	n/a	n/a	0.299	n/a	U
S18T036478	O		75-09-2	Methylene Chloride	ug/L	96.3	<0.196	<0.218	n/a	n/a	n/a	n/a	0.218	n/a	U
S18T036478	O		127-18-4	Tetrachloroethene	ug/L	90.6	<0.172	<0.192	n/a	n/a	n/a	n/a	0.192	n/a	U
S18T036478	O		79-01-6	Trichloroethene	ug/L	93.3	<0.168	<0.187	n/a	n/a	n/a	n/a	0.187	n/a	U
S18T036478	O		75-01-4	Vinyl chloride	ug/L	92.0	<0.386	<0.429	n/a	n/a	n/a	n/a	0.429	n/a	U
pH of Liquids															
S18T036482			PH	pH	unitless	n/a	n/a	7.39	7.31	7.35	1.09	n/a	n/a	n/a	

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**SY-101 TBI Grab 2018-11
 Data Summary Report**

Sample Group: 20183183

Riser: 14

Segment Number: 1SY-18-01TB

Segment Portion: Trip Blank

Sample#	R	A#	CAS #	Analyte	Unit	STD %	Blank	Result	Duplicate	Average	RPD %	Spk Rec %	Det Limit	Cnt Err %	Qual Flags
VOA Liquid Samples from Tanks															
S18T036513	O		71-55-6	1,1,1-Trichloroethane	ug/L	97.7	<0.160	<0.178	n/a	n/a	n/a	n/a	0.178	n/a	U
S18T036513	O		75-35-4	1,1-Dichloroethene	ug/L	89.7	<0.134	<0.149	n/a	n/a	n/a	n/a	0.149	n/a	U
S18T036513	O		107-06-2	1,2-Dichloroethane	ug/L	102	<0.214	<0.237	n/a	n/a	n/a	n/a	0.237	n/a	U
S18T036513	O		78-93-3	2-Butanone	ug/L	100	<0.371	0.541	n/a	n/a	n/a	n/a	0.412	n/a	J
S18T036513	O		67-64-1	Acetone	ug/L	109	<6.20	<6.88	n/a	n/a	n/a	n/a	6.88	n/a	U
S18T036513	O		71-43-2	Benzene	ug/L	94.6	<0.221	<0.245	n/a	n/a	n/a	n/a	0.245	n/a	U
S18T036513	O		56-23-5	Carbon tetrachloride	ug/L	97.2	<0.157	<0.174	n/a	n/a	n/a	n/a	0.174	n/a	U
S18T036513	O		108-90-7	Chlorobenzene	ug/L	95.3	<0.162	<0.180	n/a	n/a	n/a	n/a	0.180	n/a	U
S18T036513	O		67-66-3	Chloroform	ug/L	98.1	<0.188	<0.209	n/a	n/a	n/a	n/a	0.209	n/a	U
S18T036513	O		108-10-1	4-Methyl-2-Pentanone	ug/L	96.7	<0.269	<0.299	n/a	n/a	n/a	n/a	0.299	n/a	U
S18T036513	O		75-09-2	Methylene Chloride	ug/L	96.3	<0.196	<0.218	n/a	n/a	n/a	n/a	0.218	n/a	U
S18T036513	O		127-18-4	Tetrachloroethene	ug/L	90.6	<0.172	<0.192	n/a	n/a	n/a	n/a	0.192	n/a	U
S18T036513	O		79-01-6	Trichloroethene	ug/L	93.3	<0.168	<0.187	n/a	n/a	n/a	n/a	0.187	n/a	U
S18T036513	O		75-01-4	Vinyl chloride	ug/L	92.0	<0.386	<0.429	n/a	n/a	n/a	n/a	0.429	n/a	U

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Attachment 2

DATA SUMMARY REPORT
OPPORTUNISTIC ANALYTES

SY-101 TBI Grab 2018-11
Opportunistic Analyte Results

Sample Group: 20183183

Riser: 14

Segment Number: 1SY-18-01

Segment Portion: Grab Sample (Total)

Sample#	R	A#	CAS #	Analyte	Unit	STD %	Blank	Result	Duplicate	Average	RPD %	Spk Rec %	Det Limit	Cnt Err %	Qual Flags
Anions and Small Organic Acids															
S18T036491			24959-67-9	Bromide	ug/mL	99.4	<6.00E-03	<6.00	<6.00	n/a	n/a	96.8	6.00	n/a	U
ICP-AES															
S18T036491			7440-42-8	Boron	ug/mL	101	<2.00E-03	4.30	4.17	4.23	3.08	97.4	1.00	n/a	J
S18T036491			7440-69-9	Bismuth	ug/mL	101	<0.0190	<9.50	<9.50	n/a	n/a	93.5	9.50	n/a	U
S18T036491			7440-70-2	Calcium	ug/mL	100	<0.120	<60.0	<60.0	n/a	n/a	95.4	60.0	n/a	U
S18T036491			7440-45-1	Cerium	ug/mL	104	<0.0250	<12.5	<12.5	n/a	n/a	95.1	12.5	n/a	U
S18T036491			7440-48-4	Cobalt	ug/mL	101	<1.00E-03	<0.500	<0.500	n/a	n/a	95.6	0.500	n/a	U
S18T036491			7440-50-8	Copper	ug/mL	101	3.47E-03	<1.00	<1.00	n/a	n/a	104	1.00	n/a	U
S18T036491			7440-53-1	Europium	ug/mL	102	<1.00E-03	<0.500	<0.500	n/a	n/a	96.0	0.500	n/a	U
S18T036491			7439-89-6	Iron	ug/mL	101	<0.0200	<10.0	<10.0	n/a	n/a	95.9	10.0	n/a	U
S18T036491			7439-91-0	Lanthanum	ug/mL	99.5	<1.00E-03	<0.500	<0.500	n/a	n/a	97.8	0.500	n/a	U
S18T036491			7439-93-2	Lithium	ug/mL	101	<1.00E-03	<0.500	<0.500	n/a	n/a	97.3	0.500	n/a	U
S18T036491			7439-95-4	Magnesium	ug/mL	99.5	<9.00E-03	<4.50	<4.50	n/a	n/a	96.2	4.50	n/a	U
S18T036491			7439-96-5	Manganese	ug/mL	101	<1.00E-03	<0.500	<0.500	n/a	n/a	95.9	0.500	n/a	U
S18T036491			7439-98-7	Molybdenum	ug/mL	103	<2.00E-03	8.98	9.09	9.04	1.16	97.0	1.00	n/a	J
S18T036491			7440-00-8	Neodymium	ug/mL	102	<0.0150	<7.50	<7.50	n/a	n/a	98.5	7.50	n/a	U
S18T036491			7440-03-1	Niobium	ug/mL	101	<6.00E-03	<3.00	<3.00	n/a	n/a	96.5	3.00	n/a	U
S18T036491			7723-14-0	Phosphorus	ug/mL	103	<0.0130	2.64E+03	2.65E+03	2.65E+03	0.450	95.2	6.50	n/a	
S18T036491			7440-05-3	Palladium	ug/mL	99.7	<0.0120	<6.00	<6.00	n/a	n/a	93.7	6.00	n/a	U
S18T036491			7440-10-0	Praseodymium	ug/mL	99.9	<0.0260	<13.0	<13.0	n/a	n/a	94.7	13.0	n/a	U
S18T036491			7440-17-7	Rubidium	ug/mL	105	<0.0570	<28.5	<28.5	n/a	n/a	95.3	28.5	n/a	U
S18T036491			7440-16-6	Rhodium	ug/mL	98.3	<0.0120	<6.00	<6.00	n/a	n/a	95.1	6.00	n/a	U
S18T036491			7440-18-8	Ruthenium	ug/mL	98.6	<5.00E-03	<2.50	2.89	n/a	n/a	93.3	2.50	n/a	U
S18T036491			7704-34-9	Sulfur	ug/mL	101	<0.0280	691	690	691	0.0579	96.9	14.0	n/a	
S18T036491			7440-21-3	Silicon	ug/mL	103	0.0468	8.01	7.36	7.68	8.44	104	6.00	n/a	BJ
S18T036491			7440-19-9	Samarium	ug/mL	102	<0.0170	<8.50	<8.50	n/a	n/a	96.7	8.50	n/a	U
S18T036491			7440-31-5	Tin	ug/mL	101	<8.00E-03	<4.00	<4.00	n/a	n/a	93.5	4.00	n/a	U
S18T036491			7440-24-6	Strontium	ug/mL	101	2.37E-03	<1.00	<1.00	n/a	n/a	94.3	1.00	n/a	U

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SY-101 TBI Grab 2018-11
Opportunistic Analyte Results

Sample Group: 20183183

Riser: 14

Segment Number: 1SY-18-01

Segment Portion: Grab Sample (Total)

Sample#	R	A#	CAS #	Analyte	Unit	STD %	Blank	Result	Duplicate	Average	RPD %	Spk Rec %	Det Limit	Cnt Err %	Qual Flags
ICP-AES															
S18T036491			7440-25-7	Tantalum	ug/mL	100	<5.00E-03	<2.50	3.02	n/a	n/a	98.6	2.50	n/a	U
S18T036491			13494-80-9	Tellurium	ug/mL	101	<9.00E-03	<4.50	<4.50	n/a	n/a	96.4	4.50	n/a	U
S18T036491			7440-29-1	Thorium	ug/mL	106	<0.0130	<6.50	<6.50	n/a	n/a	98.2	6.50	n/a	U
S18T036491			7440-32-6	Titanium	ug/mL	104	<2.00E-03	<1.00	<1.00	n/a	n/a	97.2	1.00	n/a	U
S18T036491			7440-33-7	Tungsten	ug/mL	101	<0.0160	13.6	14.4	14.0	5.53	96.8	8.00	n/a	J
S18T036491			7440-65-5	Yttrium	ug/mL	104	<2.00E-03	<1.00	<1.00	n/a	n/a	96.0	1.00	n/a	U
S18T036491			7440-66-6	Zinc	ug/mL	101	<0.0320	<16.0	<16.0	n/a	n/a	95.7	16.0	n/a	U
S18T036491			7440-67-7	Zirconium	ug/mL	101	<1.00E-03	<0.500	<0.500	n/a	n/a	96.7	0.500	n/a	U
ICP/MS															
S18T036490			SN-117	Tin-117	ug/mL	100	<2.30E-06	2.42	2.45	2.44	1.15	100	2.30E-03	n/a	
MS ACTINIDES for Uranium & Thorium															
S18T036490			TH-232	Thorium-232	ug/mL	100	6.48E-06	5.43E-04	5.82E-04	5.63E-04	7.02	104	1.60E-04	n/a	BJ
MS Actinides for Americium															
S18T036490			14596-10-2	Americium-241	ug/mL	98.0	<1.00E-06	<5.00E-04	<5.00E-04	n/a	n/a	101	5.00E-04	n/a	U
SVOA 222S LIQUID															
S18T036498	O		120-82-1	1,2,4-Trichlorobenzene	ug/L	0.0	<39.4	<690	<690	n/a	n/a	42.9	690	n/a	Uabc
S18T036498	O		95-50-1	1,2-Dichlorobenzene	ug/L	10.4	<38.6	<675	<675	n/a	n/a	35.3	675	n/a	Uabc
S18T036498	O		108-60-1	2,2-oxybis(1-Chloropropane)	ug/L	51.8	<40.0	<700	<700	n/a	n/a	89.3	700	n/a	Uac
S18T036498	O		120-83-2	2,4-Dichlorophenol	ug/L	76.6	<37.7	<660	<660	n/a	n/a	0.0	660	n/a	Ub
S18T036498	O		105-67-9	2,4-Dimethylphenol	ug/L	81.2	<19.7	<345	<345	n/a	n/a	0.0	345	n/a	Ub
S18T036498	O		51-28-5	2,4-Dinitrophenol	ug/L	75.5	<37.1	<650	<650	n/a	n/a	167	650	n/a	Ub
S18T036498	O		128-37-0	BHT	ug/L	21.0	<17.7	<310	<310	n/a	n/a	0.0	310	n/a	Uab
S18T036498	O		606-20-2	2,6-Dinitrotoluene	ug/L	68.4	<26.3	<460	<460	n/a	n/a	93.2	460	n/a	Ua
S18T036498	O		111-76-2	2-Butoxyethanol	ug/L	88.5	<80.3	<1.40E+03	<1.40E+03	n/a	n/a	96.0	1.40E+03	n/a	U
S18T036498	O		91-58-7	2-Chloronaphthalene	ug/L	25.2	<40.0	<700	<700	n/a	n/a	75.9	700	n/a	Uac
S18T036498	O		95-57-8	2-Chlorophenol	ug/L	78.7	<33.7	<590	<590	n/a	n/a	0.0	590	n/a	Ub
S18T036498	O		110-80-5	2-Ethoxyethanol	ug/L	75.8	<53.1	<930	<930	n/a	n/a	81.8	930	n/a	U
S18T036498	O		91-57-6	2-Methylnaphthalene	ug/L	18.1	<40.3	<705	<705	n/a	n/a	68.0	705	n/a	Uabc
S18T036498	O		88-74-4	2-Nitroaniline	ug/L	93.2	<28.6	<500	<500	n/a	n/a	10.4	500	n/a	Ub

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SY-101 TBI Grab 2018-11
Opportunistic Analyte Results

Sample Group: 20183183

Riser: 14

Segment Number: 1SY-18-01

Segment Portion: Grab Sample (Total)

Sample#	R	A#	CAS #	Analyte	Unit	STD %	Blank	Result	Duplicate	Average	RPD %	Spk Rec %	Det Limit	Cnt Err %	Qual Flags
SVOA 222S LIQUID															
S18T036498		O	88-75-5	2-Nitrophenol	ug/L	70.0	<36.0	<630	<630	n/a	n/a	185	630	n/a	Uab
S18T036498		O	99-09-2	3-Nitroaniline	ug/L	89.6	<34.6	<605	<605	n/a	n/a	0.0	605	n/a	Ub
S18T036498		O	101-55-3	4-Bromophenylphenyl ether	ug/L	41.5	<23.7	<415	<415	n/a	n/a	92.5	415	n/a	Ua
S18T036498		O	59-50-7	4-Chloro-3-methylphenol	ug/L	87.5	<36.3	<635	<635	n/a	n/a	0.0	635	n/a	Ub
S18T036498		O	106-47-8	4-Chloroaniline	ug/L	82.3	<39.4	<690	<690	n/a	n/a	19.1	690	n/a	Ubc
S18T036498		O	7005-72-3	4-Chlorophenylphenyl ether	ug/L	38.0	<32.9	<575	<575	n/a	n/a	85.6	575	n/a	Ua
S18T036498		O	100-01-6	4-Nitroaniline	ug/L	95.6	<36.3	<635	<635	n/a	n/a	0.0	635	n/a	Ub
S18T036498		O	100-02-7	4-Nitrophenol	ug/L	95.6	<20.9	<365	<365	n/a	n/a	280	365	n/a	Ub
S18T036498		O	83-32-9	Acenaphthene	ug/L	34.7	<12.9	<225	<225	n/a	n/a	73.4	225	n/a	U
S18T036498		O	208-96-8	Acenaphthylene	ug/L	34.4	<42.9	<750	<750	n/a	n/a	0.0	750	n/a	Uab
S18T036498		O	120-12-7	Anthracene	ug/L	42.8	<17.7	<310	<310	n/a	n/a	52.8	310	n/a	Uab
S18T036498		O	56-55-3	Benzo(a)anthracene	ug/L	45.3	<16.0	<280	<280	n/a	n/a	90.1	280	n/a	Ua
S18T036498		O	50-32-8	Benzo(a)pyrene	ug/L	44.2	<15.4	<270	<270	n/a	n/a	17.6	270	n/a	Uabc
S18T036498		O	205-99-2	Benzo(b)fluoranthene	ug/L	47.0	<17.7	<310	<310	n/a	n/a	119	310	n/a	Ua
S18T036498		O	191-24-2	Benzo(ghi)perylene	ug/L	44.1	<15.1	<265	<265	n/a	n/a	98.8	265	n/a	Uac
S18T036498		O	207-08-9	Benzo(k)fluoranthene	ug/L	44.0	<17.1	<300	<300	n/a	n/a	112	300	n/a	Ua
S18T036498		O	218-01-9	Chrysene	ug/L	44.0	<18.6	<325	<325	n/a	n/a	113	325	n/a	Ua
S18T036498		O	117-84-0	Di-n-octylphthalate	ug/L	45.2	<13.4	<235	<235	n/a	n/a	123	235	n/a	Ua
S18T036498		O	53-70-3	Dibenz[a,h]anthracene	ug/L	43.4	<12.9	<225	<225	n/a	n/a	112	225	n/a	Ua
S18T036498		O	132-64-9	Dibenzofuran	ug/L	36.9	<34.0	<595	<595	n/a	n/a	84.4	595	n/a	Ua
S18T036498		O	84-66-2	Diethylphthalate	ug/L	73.0	<20.6	<360	<360	n/a	n/a	98.4	360	n/a	U
S18T036498		O	131-11-3	Dimethyl phthalate	ug/L	89.6	<24.3	<425	<425	n/a	n/a	78.0	425	n/a	U
S18T036498		O	122-39-4	Diphenylamine	ug/L	50.0	<22.0	<385	<385	n/a	n/a	0.0	385	n/a	Uabc
S18T036498		O	206-44-0	Fluoranthene	ug/L	46.5	<11.7	<205	<205	n/a	n/a	97.3	205	n/a	Ua
S18T036498		O	86-73-7	Fluorene	ug/L	39.5	<30.9	<540	<540	n/a	n/a	87.2	540	n/a	Ua
S18T036498		O	77-47-4	Hexachlorocyclopentadiene	ug/L	0.0	<7.43	<130	<130	n/a	n/a	46.4	130	n/a	Uabc
S18T036498		O	193-39-5	Indeno(1,2,3-cd)pyrene	ug/L	44.0	<7.43	<130	<130	n/a	n/a	109	130	n/a	Ua
S18T036498		O	78-83-1	Isobutanol	ug/L	48.0	<61.7	<1.08E+03	<1.08E+03	n/a	n/a	102	1.08E+03	n/a	Uac

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SY-101 TBI Grab 2018-11
Opportunistic Analyte Results

Sample Group: 20183183

Riser: 14

Segment Number: 1SY-18-01

Segment Portion: Grab Sample (Total)

Sample#	R	A#	CAS #	Analyte	Unit	STD %	Blank	Result	Duplicate	Average	RPD %	Spk Rec %	Det Limit	Cnt Err %	Qual Flags
SVOA 222S LIQUID															
S18T036498		O	78-59-1	Isophorone	ug/L	82.1	<38.6	<675	<675	n/a	n/a	96.9	675	n/a	U
S18T036498		O	62-75-9	N-Nitrosodimethylamine	ug/L	83.4	<35.4	<620	<620	n/a	n/a	101	620	n/a	U
S18T036498		O	621-64-7	N-Nitroso-di-n-propylamine	ug/L	79.4	<38.9	<680	<680	n/a	n/a	98.9	680	n/a	U
S18T036498		O	59-89-2	N-Nitrosomorpholine	ug/L	82.0	<31.1	<545	<545	n/a	n/a	101	545	n/a	U
S18T036498		O	91-20-3	Naphthalene	ug/L	14.8	<35.1	<615	<615	n/a	n/a	59.5	615	n/a	Uabc
S18T036498		O	85-01-8	Phenanthrene	ug/L	43.7	<16.9	<295	<295	n/a	n/a	91.9	295	n/a	Ua
S18T036498		O	108-95-2	Phenol	ug/L	80.8	<34.6	<605	<605	n/a	n/a	0.0	605	n/a	Ub
S18T036498		O	129-00-0	Pyrene	ug/L	45.0	<10.9	<190	<190	n/a	n/a	93.7	190	n/a	Ua
S18T036498		O	126-73-8	Tributyl phosphate	ug/L	56.9	<14.6	8.79E+02	1.24E+03	1.06E+03	33.7	99.7	255	n/a	Ja
S18T036498		O	111-91-1	Bis(2-Chloroethoxy)methane	ug/L	80.3	<38.3	<670	<670	n/a	n/a	92.6	670	n/a	U
S18T036498		O	117-81-7	Bis(2-ethylhexyl) phthalate	ug/L	50.2	38.6	681	680	680	0.147	96.1	220	n/a	BJa
S18T036498		O	111-44-4	Bis(2-chloroethyl) ether	ug/L	78.5	<37.1	<650	<650	n/a	n/a	94.3	650	n/a	U
VOA Liquid Samples from Tanks															
S18T036489		O	79-34-5	1,1,2,2-Tetrachloroethane	ug/L	95.0	<0.135	<2.71	<2.71	n/a	n/a	0.0	2.71	n/a	Ub
S18T036489		O	79-00-5	1,1,2-Trichloroethane	ug/L	94.5	<0.119	<2.38	<2.38	n/a	n/a	102	2.38	n/a	U
S18T036489		O	75-34-3	1,1-Dichloroethane	ug/L	97.2	<0.195	<3.90	<3.90	n/a	n/a	105	3.90	n/a	U
S18T036489		O	120-82-1	1,2,4-Trichlorobenzene	ug/L	94.1	<0.204	<4.07	<4.07	n/a	n/a	90.3	4.07	n/a	U
S18T036489		O	96-12-8	1,2-Dibromo-3-Chloropropane	ug/L	97.4	<0.192	<3.84	<3.84	n/a	n/a	105	3.84	n/a	U
S18T036489		O	106-93-4	Ethylene Dibromide	ug/L	96.3	<0.124	<2.48	<2.48	n/a	n/a	107	2.48	n/a	U
S18T036489		O	95-50-1	1,2-Dichlorobenzene	ug/L	94.5	<0.192	<3.84	<3.84	n/a	n/a	97.1	3.84	n/a	U
S18T036489		O	78-87-5	1,2-Dichloropropane	ug/L	98.5	<0.214	<4.29	<4.29	n/a	n/a	103	4.29	n/a	U
S18T036489		O	541-73-1	1,3-Dichlorobenzene	ug/L	94.8	<0.190	<3.81	<3.81	n/a	n/a	94.8	3.81	n/a	U
S18T036489		O	106-46-7	1,4-Dichlorobenzene	ug/L	96.0	<0.180	<3.60	<3.60	n/a	n/a	96.6	3.60	n/a	U
S18T036489		O	591-78-6	2-Hexanone	ug/L	98.2	<0.837	<16.7	<16.7	n/a	n/a	115	16.7	n/a	U
S18T036489		O	79-46-9	2-Nitropropane	ug/L	93.4	<0.157	<3.13	<3.13	n/a	n/a	106	3.13	n/a	U
S18T036489		O	107-87-9	2-Pentanone	ug/L	95.5	<0.420	<8.39	<8.39	n/a	n/a	100	8.39	n/a	U
S18T036489		O	75-27-4	Bromodichloromethane	ug/L	101	<0.169	<3.37	<3.37	n/a	n/a	103	3.37	n/a	U
S18T036489		O	75-25-2	Bromoform	ug/L	95.2	<0.106	<2.11	<2.11	n/a	n/a	109	2.11	n/a	U

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B - Blank Contamination

SY-101 TBI Grab 2018-11
Opportunistic Analyte Results

Sample Group: 20183183

Riser: 14

Segment Number: 1SY-18-01

Segment Portion: Grab Sample (Total)

Sample#	R	A#	CAS #	Analyte	Unit	STD %	Blank	Result	Duplicate	Average	RPD %	Spk Rec %	Det Limit	Cnt Err %	Qual Flags
VOA Liquid Samples from Tanks															
S18T036489	O		74-83-9	Bromomethane	ug/L	98.5	<0.215	<4.30	<4.30	n/a	n/a	110	4.30	n/a	Uc
S18T036489	O		75-15-0	Carbon disulfide	ug/L	86.3	<0.153	<3.06	<3.06	n/a	n/a	86.7	3.06	n/a	U
S18T036489	O		75-00-3	Chloroethane	ug/L	101	<0.138	<2.76	<2.76	n/a	n/a	111	2.76	n/a	U
S18T036489	O		74-87-3	Chloromethane	ug/L	101	<0.171	<3.41	<3.41	n/a	n/a	108	3.41	n/a	U
S18T036489	O		156-59-2	cis-Dichloroethylene	ug/L	95.8	<0.199	<3.98	<3.98	n/a	n/a	99.9	3.98	n/a	U
S18T036489	O		10061-01-5	cis-1,3-Dichloropropene	ug/L	94.5	<0.182	<3.64	<3.64	n/a	n/a	105	3.64	n/a	U
S18T036489	O		110-82-7	Cyclohexane	ug/L	91.9	<0.167	<3.35	<3.35	n/a	n/a	97.5	3.35	n/a	U
S18T036489	O		124-48-1	Dibromochloromethane	ug/L	97.3	<0.129	<2.44	<2.58	n/a	n/a	105	2.44	n/a	U
S18T036489	O		75-71-8	Dichlorodifluoromethane	ug/L	88.2	<0.146	<2.91	<2.91	n/a	n/a	94.1	2.91	n/a	U
S18T036489	O		60-29-7	Diethyl ether	ug/L	96.3	<0.216	<4.33	<4.33	n/a	n/a	103	4.33	n/a	U
S18T036489	O		141-78-6	Ethyl acetate	ug/L	96.3	<0.314	<6.29	<6.29	n/a	n/a	15.1	6.29	n/a	Ubc
S18T036489	O		100-41-4	Ethylbenzene	ug/L	95.4	<0.112	<2.24	<2.24	n/a	n/a	94.8	2.24	n/a	U
S18T036489	O		76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	ug/L	90.9	<0.181	<3.62	<3.62	n/a	n/a	98.1	3.62	n/a	U
S18T036489	O		67-72-1	Hexachloroethane	ug/L	88.4	<0.132	<2.64	<2.64	n/a	n/a	87.0	2.64	n/a	U
S18T036489	O		110-54-3	Hexane	ug/L	86.5	<0.168	<3.35	<3.35	n/a	n/a	89.2	3.35	n/a	U
S18T036489	O		98-82-8	Isopropyl Benzene	ug/L	94.8	<0.132	<2.64	<2.64	n/a	n/a	92.9	2.64	n/a	U
S18T036489	O		106-42-3	Xylene (m & p)	ug/L	93.9	<0.330	<6.61	<6.61	n/a	n/a	92.9	6.61	n/a	U
S18T036489	O		79-20-9	Methyl Acetate	ug/L	97.5	<0.176	<3.51	<3.51	n/a	n/a	7.64	3.51	n/a	Ubc
S18T036489	O		108-87-2	Methylcyclohexane	ug/L	91.1	<0.127	<2.53	<2.53	n/a	n/a	93.8	2.53	n/a	U
S18T036489	O		71-36-3	1-Butanol	ug/L	87.6	<2.79	<55.8	<55.8	n/a	n/a	107	55.8	n/a	U
S18T036489	O		104-51-8	n-Butylbenzene	ug/L	95.8	<0.168	<3.36	<3.36	n/a	n/a	88.5	3.36	n/a	U
S18T036489	O		95-47-6	o-Xylene	ug/L	95.3	<0.139	<2.79	<2.79	n/a	n/a	96.8	2.79	n/a	U
S18T036489	O		100-42-5	Styrene	ug/L	94.7	0.180	2.74	2.50	2.62	9.09	92.8	2.21	n/a	BJ
S18T036489	O		1634-04-4	tert-butyl methyl ether	ug/L	99.4	<0.208	<4.16	<4.16	n/a	n/a	108	4.16	n/a	U
S18T036489	O		109-99-9	Tetrahydrofuran	ug/L	96.7	<0.138	<2.75	<2.75	n/a	n/a	109	2.75	n/a	U
S18T036489	O		108-88-3	Toluene	ug/L	91.5	<0.159	<3.18	<3.18	n/a	n/a	95.5	3.18	n/a	U
S18T036489	O		1330-20-7	Xylenes (total)	ug/L	n/a	<0.470	<9.38	<9.40	n/a	n/a	n/a	9.38	n/a	U
S18T036489	O		156-60-5	trans-Dichloroethylene	ug/L	93.6	<0.174	<3.48	<3.48	n/a	n/a	95.9	3.48	n/a	U

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SY-101 TBI Grab 2018-11
Opportunistic Analyte Results

Sample Group: 20183183

Riser: 14

Segment Number: 1SY-18-01

Segment Portion: Grab Sample (Total)

Sample#	R	A#	CAS #	Analyte	Unit	STD %	Blank	Result	Duplicate	Average	RPD %	Spk Rec %	Det Limit	Cnt Err %	Qual Flags
VOA Liquid Samples from Tanks															
S18T036489		O	10061-02-6	trans-1,3-Dichloropropene	ug/L	99.7	<0.141	<2.82	<2.82	n/a	n/a	108	2.82	n/a	U
S18T036489		O	75-69-4	Trichlorofluoromethane	ug/L	100	<0.165	<3.29	<3.29	n/a	n/a	111	3.29	n/a	U

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B - Blank Contamination

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J - Estimated

SY-101 TBI Grab 2018-11
Opportunistic Analyte Results

Sample Group: 20183183

Riser: 14

Segment Number: 1SY-18-01DUP

Segment Portion: Grab Sample (Total)

Sample#	R	A#	CAS #	Analyte	Unit	STD %	Blank	Result	Duplicate	Average	RPD %	Spk Rec %	Det Limit	Cnt Err %	Qual Flags
Anions and Small Organic Acids															
S18T036503			24959-67-9	Bromide	ug/mL	99.4	<6.00E-03	<6.00	n/a	n/a	n/a	n/a	6.00	n/a	U
ICP-AES															
S18T036503			7440-42-8	Boron	ug/mL	101	<2.00E-03	6.90	n/a	n/a	n/a	n/a	1.00	n/a	J
S18T036503			7440-69-9	Bismuth	ug/mL	101	<0.0190	<9.50	n/a	n/a	n/a	n/a	9.50	n/a	U
S18T036503			7440-70-2	Calcium	ug/mL	100	<0.120	<60.0	n/a	n/a	n/a	n/a	60.0	n/a	U
S18T036503			7440-45-1	Cerium	ug/mL	104	<0.0250	<12.5	n/a	n/a	n/a	n/a	12.5	n/a	U
S18T036503			7440-48-4	Cobalt	ug/mL	101	<1.00E-03	<0.500	n/a	n/a	n/a	n/a	0.500	n/a	U
S18T036503			7440-50-8	Copper	ug/mL	101	3.47E-03	1.55	n/a	n/a	n/a	n/a	1.00	n/a	BJ
S18T036503			7440-53-1	Europium	ug/mL	102	<1.00E-03	<0.500	n/a	n/a	n/a	n/a	0.500	n/a	U
S18T036503			7439-89-6	Iron	ug/mL	101	<0.0200	<10.0	n/a	n/a	n/a	n/a	10.0	n/a	U
S18T036503			7439-91-0	Lanthanum	ug/mL	99.5	<1.00E-03	<0.500	n/a	n/a	n/a	n/a	0.500	n/a	U
S18T036503			7439-93-2	Lithium	ug/mL	101	<1.00E-03	<0.500	n/a	n/a	n/a	n/a	0.500	n/a	U
S18T036503			7439-95-4	Magnesium	ug/mL	99.5	<9.00E-03	<4.50	n/a	n/a	n/a	n/a	4.50	n/a	U
S18T036503			7439-96-5	Manganese	ug/mL	101	<1.00E-03	<0.500	n/a	n/a	n/a	n/a	0.500	n/a	U
S18T036503			7439-98-7	Molybdenum	ug/mL	103	<2.00E-03	8.97	n/a	n/a	n/a	n/a	1.00	n/a	J
S18T036503			7440-00-8	Neodymium	ug/mL	102	<0.0150	<7.50	n/a	n/a	n/a	n/a	7.50	n/a	U
S18T036503			7440-03-1	Niobium	ug/mL	101	<6.00E-03	<3.00	n/a	n/a	n/a	n/a	3.00	n/a	U
S18T036503			7723-14-0	Phosphorus	ug/mL	103	<0.0130	2.75E+03	n/a	n/a	n/a	n/a	6.50	n/a	
S18T036503			7440-05-3	Palladium	ug/mL	99.7	<0.0120	<6.00	n/a	n/a	n/a	n/a	6.00	n/a	U
S18T036503			7440-10-0	Praseodymium	ug/mL	99.9	<0.0260	<13.0	n/a	n/a	n/a	n/a	13.0	n/a	U
S18T036503			7440-17-7	Rubidium	ug/mL	105	<0.0570	<28.5	n/a	n/a	n/a	n/a	28.5	n/a	U
S18T036503			7440-16-6	Rhodium	ug/mL	98.3	<0.0120	<6.00	n/a	n/a	n/a	n/a	6.00	n/a	U
S18T036503			7440-18-8	Ruthenium	ug/mL	98.6	<5.00E-03	4.25	n/a	n/a	n/a	n/a	2.50	n/a	J
S18T036503			7704-34-9	Sulfur	ug/mL	101	<0.0280	728	n/a	n/a	n/a	n/a	14.0	n/a	
S18T036503			7440-21-3	Silicon	ug/mL	103	0.0468	7.59	n/a	n/a	n/a	n/a	6.00	n/a	BJ
S18T036503			7440-19-9	Samarium	ug/mL	102	<0.0170	<8.50	n/a	n/a	n/a	n/a	8.50	n/a	U
S18T036503			7440-31-5	Tin	ug/mL	101	<8.00E-03	<4.00	n/a	n/a	n/a	n/a	4.00	n/a	U
S18T036503			7440-24-6	Strontium	ug/mL	101	2.37E-03	<1.00	n/a	n/a	n/a	n/a	1.00	n/a	U

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SY-101 TBI Grab 2018-11
Opportunistic Analyte Results

Sample Group: 20183183

Riser: 14

Segment Number: 1SY-18-01DUP

Segment Portion: Grab Sample (Total)

Sample#	R	A#	CAS #	Analyte	Unit	STD %	Blank	Result	Duplicate	Average	RPD %	Spk Rec %	Det Limit	Cnt Err %	Qual Flags
ICP-AES															
S18T036503			7440-25-7	Tantalum	ug/mL	100	<5.00E-03	<2.50	n/a	n/a	n/a	n/a	2.50	n/a	U
S18T036503			13494-80-9	Tellurium	ug/mL	101	<9.00E-03	<4.50	n/a	n/a	n/a	n/a	4.50	n/a	U
S18T036503			7440-29-1	Thorium	ug/mL	106	<0.0130	<6.50	n/a	n/a	n/a	n/a	6.50	n/a	U
S18T036503			7440-32-6	Titanium	ug/mL	104	<2.00E-03	<1.00	n/a	n/a	n/a	n/a	1.00	n/a	U
S18T036503			7440-33-7	Tungsten	ug/mL	101	<0.0160	12.2	n/a	n/a	n/a	n/a	8.00	n/a	J
S18T036503			7440-65-5	Yttrium	ug/mL	104	<2.00E-03	<1.00	n/a	n/a	n/a	n/a	1.00	n/a	U
S18T036503			7440-66-6	Zinc	ug/mL	101	<0.0320	<16.0	n/a	n/a	n/a	n/a	16.0	n/a	U
S18T036503			7440-67-7	Zirconium	ug/mL	101	<1.00E-03	<0.500	n/a	n/a	n/a	n/a	0.500	n/a	U
MS ACTINIDES for Uranium & Thorium															
S18T036502			TH-232	Thorium-232	ug/mL	100	6.48E-06	9.31E-04	n/a	n/a	n/a	n/a	1.60E-04	n/a	B
SVOA 222S LIQUID															
S18T036510	O		120-82-1	1,2,4-Trichlorobenzene	ug/L	16.4	<39.4	<690	<690	n/a	n/a	13.6	690	n/a	Uabc
S18T036510	O		95-50-1	1,2-Dichlorobenzene	ug/L	21.0	<38.6	<675	<675	n/a	n/a	18.0	675	n/a	Uabc
S18T036510	O		108-60-1	2,2-oxybis(1-Chloropropane)	ug/L	64.1	<40.0	<700	<700	n/a	n/a	73.4	700	n/a	Ua
S18T036510	O		120-83-2	2,4-Dichlorophenol	ug/L	83.6	<37.7	<660	<660	n/a	n/a	0.0	660	n/a	Ub
S18T036510	O		105-67-9	2,4-Dimethylphenol	ug/L	85.3	<19.7	<345	<345	n/a	n/a	0.0	345	n/a	Ub
S18T036510	O		51-28-5	2,4-Dinitrophenol	ug/L	72.8	<37.1	<650	<650	n/a	n/a	155	650	n/a	Ub
S18T036510	O		128-37-0	BHT	ug/L	25.1	<17.7	<310	<310	n/a	n/a	0.0	310	n/a	Uab
S18T036510	O		606-20-2	2,6-Dinitrotoluene	ug/L	72.8	<26.3	<460	<460	n/a	n/a	80.0	460	n/a	U
S18T036510	O		111-76-2	2-Butoxyethanol	ug/L	89.9	<80.3	<1.40E+03	<1.40E+03	n/a	n/a	97.8	1.40E+03	n/a	U
S18T036510	O		91-58-7	2-Chloronaphthalene	ug/L	30.6	<40.0	<700	<700	n/a	n/a	39.3	700	n/a	Uabc
S18T036510	O		95-57-8	2-Chlorophenol	ug/L	83.4	<33.7	<590	<590	n/a	n/a	0.0	590	n/a	Ubc
S18T036510	O		110-80-5	2-Ethoxyethanol	ug/L	77.7	<53.1	<930	<930	n/a	n/a	83.9	930	n/a	U
S18T036510	O		91-57-6	2-Methylnaphthalene	ug/L	25.0	<40.3	<705	<705	n/a	n/a	31.4	705	n/a	Uabc
S18T036510	O		88-74-4	2-Nitroaniline	ug/L	93.5	<28.6	<500	<500	n/a	n/a	10.5	500	n/a	Ubc
S18T036510	O		88-75-5	2-Nitrophenol	ug/L	81.5	<36.0	<630	<630	n/a	n/a	185	630	n/a	Ub
S18T036510	O		99-09-2	3-Nitroaniline	ug/L	88.2	<34.6	<605	<605	n/a	n/a	0.0	605	n/a	Ub
S18T036510	O		101-55-3	4-Bromophenylphenyl ether	ug/L	46.9	<23.7	<415	<415	n/a	n/a	54.9	415	n/a	Uabc

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SY-101 TBI Grab 2018-11
Opportunistic Analyte Results

Sample Group: 20183183

Riser: 14

Segment Number: 1SY-18-01DUP

Segment Portion: Grab Sample (Total)

Sample#	R	A#	CAS #	Analyte	Unit	STD %	Blank	Result	Duplicate	Average	RPD %	Spk Rec %	Det Limit	Cnt Err %	Qual Flags
SVOA 222S LIQUID															
S18T036510		O	59-50-7	4-Chloro-3-methylphenol	ug/L	90.6	<36.3	<635	<635	n/a	n/a	0.0	635	n/a	Ub
S18T036510		O	106-47-8	4-Chloroaniline	ug/L	85.0	<39.4	<690	<690	n/a	n/a	0.0	690	n/a	Ub
S18T036510		O	7005-72-3	4-Chlorophenylphenyl ether	ug/L	43.1	<32.9	<575	<575	n/a	n/a	52.1	575	n/a	Uabc
S18T036510		O	100-01-6	4-Nitroaniline	ug/L	95.1	<36.3	<635	<635	n/a	n/a	0.0	635	n/a	Ub
S18T036510		O	100-02-7	4-Nitrophenol	ug/L	94.7	<20.9	<365	<365	n/a	n/a	273	365	n/a	Ub
S18T036510		O	83-32-9	Acenaphthene	ug/L	40.2	<12.9	<225	<225	n/a	n/a	44.8	225	n/a	Uabc
S18T036510		O	208-96-8	Acenaphthylene	ug/L	39.9	<42.9	<750	<750	n/a	n/a	0.0	750	n/a	Uab
S18T036510		O	120-12-7	Anthracene	ug/L	50.6	<17.7	<310	<310	n/a	n/a	45.4	310	n/a	Uabc
S18T036510		O	56-55-3	Benzo(a)anthracene	ug/L	51.7	<16.0	<280	<280	n/a	n/a	56.6	280	n/a	Uabc
S18T036510		O	50-32-8	Benzo(a)pyrene	ug/L	52.6	<15.4	<270	<270	n/a	n/a	29.0	270	n/a	Uabc
S18T036510		O	205-99-2	Benzo(b)fluoranthene	ug/L	53.8	<17.7	<310	<310	n/a	n/a	67.6	310	n/a	Uabc
S18T036510		O	191-24-2	Benzo(ghi)perylene	ug/L	46.7	<15.1	<265	<265	n/a	n/a	59.6	265	n/a	Uabc
S18T036510		O	207-08-9	Benzo(k)fluoranthene	ug/L	54.3	<17.1	<300	<300	n/a	n/a	64.7	300	n/a	Uabc
S18T036510		O	218-01-9	Chrysene	ug/L	54.6	<18.6	<325	<325	n/a	n/a	63.3	325	n/a	Uabc
S18T036510		O	117-84-0	Di-n-octylphthalate	ug/L	54.2	<13.4	<235	<235	n/a	n/a	74.1	235	n/a	Uac
S18T036510		O	53-70-3	Dibenz[a,h]anthracene	ug/L	49.1	<12.9	<225	<225	n/a	n/a	62.4	225	n/a	Uabc
S18T036510		O	132-64-9	Dibenzofuran	ug/L	42.5	<34.0	<595	<595	n/a	n/a	50.3	595	n/a	Uabc
S18T036510		O	84-66-2	Diethylphthalate	ug/L	76.7	<20.6	<360	<360	n/a	n/a	78.8	360	n/a	U
S18T036510		O	131-11-3	Dimethyl phthalate	ug/L	88.7	<24.3	<425	<425	n/a	n/a	66.9	425	n/a	Ub
S18T036510		O	122-39-4	Diphenylamine	ug/L	56.0	<22.0	<385	<385	n/a	n/a	8.03	385	n/a	Uab
S18T036510		O	206-44-0	Fluoranthene	ug/L	53.0	<11.7	<205	<205	n/a	n/a	61.2	205	n/a	Uabc
S18T036510		O	86-73-7	Fluorene	ug/L	45.3	<30.9	<540	<540	n/a	n/a	53.9	540	n/a	Uabc
S18T036510		O	77-47-4	Hexachlorocyclopentadiene	ug/L	0.0	<7.43	<130	<130	n/a	n/a	16.9	130	n/a	Uabc
S18T036510		O	193-39-5	Indeno(1,2,3-cd)pyrene	ug/L	48.9	<7.43	<130	<130	n/a	n/a	62.1	130	n/a	Uabc
S18T036510		O	78-83-1	Isobutanol	ug/L	50.8	<61.7	<1.08E+03	<1.08E+03	n/a	n/a	104	1.08E+03	n/a	Ua
S18T036510		O	78-59-1	Isophorone	ug/L	85.7	<38.6	<675	<675	n/a	n/a	93.5	675	n/a	U
S18T036510		O	62-75-9	N-Nitrosodimethylamine	ug/L	86.4	<35.4	<620	<620	n/a	n/a	101	620	n/a	U
S18T036510		O	621-64-7	N-Nitroso-di-n-propylamine	ug/L	84.0	<38.9	<680	<680	n/a	n/a	96.2	680	n/a	U

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SY-101 TBI Grab 2018-11
Opportunistic Analyte Results

Sample Group: 20183183

Riser: 14

Segment Number: 1SY-18-01DUP

Segment Portion: Grab Sample (Total)

Sample#	R	A#	CAS #	Analyte	Unit	STD %	Blank	Result	Duplicate	Average	RPD %	Spk Rec %	Det Limit	Cnt Err %	Qual Flags
SVOA 222S LIQUID															
S18T036510		O	59-89-2	N-Nitrosomorpholine	ug/L	87.2	<31.1	<545	<545	n/a	n/a	102	545	n/a	U
S18T036510		O	91-20-3	Naphthalene	ug/L	26.9	<35.1	<615	<615	n/a	n/a	27.5	615	n/a	Uabc
S18T036510		O	85-01-8	Phenanthrene	ug/L	49.6	<16.9	<295	<295	n/a	n/a	57.1	295	n/a	Uabc
S18T036510		O	108-95-2	Phenol	ug/L	83.6	<34.6	<605	<605	n/a	n/a	0.0	605	n/a	Ub
S18T036510		O	129-00-0	Pyrene	ug/L	51.5	<10.9	<190	<190	n/a	n/a	57.8	190	n/a	Uabc
S18T036510		O	126-73-8	Tributyl phosphate	ug/L	66.1	<14.6	9.20E+02	1.11E+03	1.02E+03	18.7	75.0	255	n/a	Ja
S18T036510		O	111-91-1	Bis(2-Chloroethoxy)methane	ug/L	84.9	<38.3	<670	<670	n/a	n/a	89.7	670	n/a	U
S18T036510		O	117-81-7	Bis(2-ethylhexyl) phthalate	ug/L	53.7	35.8	625	605	615	3.25	56.9	220	n/a	BJabc
S18T036510		O	111-44-4	Bis(2-chloroethyl) ether	ug/L	82.4	<37.1	<650	<650	n/a	n/a	89.8	650	n/a	BU
VOA Liquid Samples from Tanks															
S18T036501		O	79-34-5	1,1,2,2-Tetrachloroethane	ug/L	95.0	<0.135	<2.71	n/a	n/a	n/a	n/a	2.71	n/a	U
S18T036501		O	79-00-5	1,1,2-Trichloroethane	ug/L	94.5	<0.119	<2.38	n/a	n/a	n/a	n/a	2.38	n/a	U
S18T036501		O	75-34-3	1,1-Dichloroethane	ug/L	97.2	<0.195	<3.90	n/a	n/a	n/a	n/a	3.90	n/a	U
S18T036501		O	120-82-1	1,2,4-Trichlorobenzene	ug/L	94.1	<0.204	<4.07	n/a	n/a	n/a	n/a	4.07	n/a	U
S18T036501		O	96-12-8	1,2-Dibromo-3-Chloropropane	ug/L	97.4	<0.192	<3.84	n/a	n/a	n/a	n/a	3.84	n/a	U
S18T036501		O	106-93-4	Ethylene Dibromide	ug/L	96.3	<0.124	<2.48	n/a	n/a	n/a	n/a	2.48	n/a	U
S18T036501		O	95-50-1	1,2-Dichlorobenzene	ug/L	94.5	<0.192	<3.84	n/a	n/a	n/a	n/a	3.84	n/a	U
S18T036501		O	78-87-5	1,2-Dichloropropane	ug/L	98.5	<0.214	<4.29	n/a	n/a	n/a	n/a	4.29	n/a	U
S18T036501		O	541-73-1	1,3-Dichlorobenzene	ug/L	94.8	<0.190	<3.81	n/a	n/a	n/a	n/a	3.81	n/a	U
S18T036501		O	106-46-7	1,4-Dichlorobenzene	ug/L	96.0	<0.180	<3.60	n/a	n/a	n/a	n/a	3.60	n/a	U
S18T036501		O	591-78-6	2-Hexanone	ug/L	98.2	<0.837	<16.7	n/a	n/a	n/a	n/a	16.7	n/a	U
S18T036501		O	79-46-9	2-Nitropropane	ug/L	93.4	<0.157	<3.13	n/a	n/a	n/a	n/a	3.13	n/a	U
S18T036501		O	107-87-9	2-Pentanone	ug/L	95.5	<0.420	<8.39	n/a	n/a	n/a	n/a	8.39	n/a	U
S18T036501		O	75-27-4	Bromodichloromethane	ug/L	101	<0.169	<3.37	n/a	n/a	n/a	n/a	3.37	n/a	U
S18T036501		O	75-25-2	Bromoform	ug/L	95.2	<0.106	<2.11	n/a	n/a	n/a	n/a	2.11	n/a	U
S18T036501		O	74-83-9	Bromomethane	ug/L	98.5	<0.215	<4.30	n/a	n/a	n/a	n/a	4.30	n/a	U
S18T036501		O	75-15-0	Carbon disulfide	ug/L	86.3	<0.153	<3.06	n/a	n/a	n/a	n/a	3.06	n/a	U
S18T036501		O	75-00-3	Chloroethane	ug/L	101	<0.138	<2.76	n/a	n/a	n/a	n/a	2.76	n/a	U

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SY-101 TBI Grab 2018-11
Opportunistic Analyte Results

Sample Group: 20183183

Riser: 14

Segment Number: 1SY-18-01DUP

Segment Portion: Grab Sample (Total)

Sample#	R	A#	CAS #	Analyte	Unit	STD %	Blank	Result	Duplicate	Average	RPD %	Spk Rec %	Det Limit	Cnt Err %	Qual Flags
VOA Liquid Samples from Tanks															
S18T036501	O		74-87-3	Chloromethane	ug/L	101	<0.171	<3.41	n/a	n/a	n/a	n/a	3.41	n/a	U
S18T036501	O		156-59-2	cis-Dichloroethylene	ug/L	95.8	<0.199	<3.98	n/a	n/a	n/a	n/a	3.98	n/a	U
S18T036501	O		10061-01-5	cis-1,3-Dichloropropene	ug/L	94.5	<0.182	<3.64	n/a	n/a	n/a	n/a	3.64	n/a	U
S18T036501	O		110-82-7	Cyclohexane	ug/L	91.9	<0.167	<3.35	n/a	n/a	n/a	n/a	3.35	n/a	U
S18T036501	O		124-48-1	Dibromochloromethane	ug/L	97.3	<0.129	<2.58	n/a	n/a	n/a	n/a	2.58	n/a	U
S18T036501	O		75-71-8	Dichlorodifluoromethane	ug/L	88.2	<0.146	<2.91	n/a	n/a	n/a	n/a	2.91	n/a	U
S18T036501	O		60-29-7	Diethyl ether	ug/L	96.3	<0.216	<4.33	n/a	n/a	n/a	n/a	4.33	n/a	U
S18T036501	O		141-78-6	Ethyl acetate	ug/L	96.3	<0.314	<6.29	n/a	n/a	n/a	n/a	6.29	n/a	U
S18T036501	O		100-41-4	Ethylbenzene	ug/L	95.4	<0.112	<2.24	n/a	n/a	n/a	n/a	2.24	n/a	U
S18T036501	O		76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	ug/L	90.9	<0.181	<3.62	n/a	n/a	n/a	n/a	3.62	n/a	U
S18T036501	O		67-72-1	Hexachloroethane	ug/L	88.4	<0.132	<2.64	n/a	n/a	n/a	n/a	2.64	n/a	U
S18T036501	O		110-54-3	Hexane	ug/L	86.5	<0.168	<3.35	n/a	n/a	n/a	n/a	3.35	n/a	U
S18T036501	O		98-82-8	Isopropyl Benzene	ug/L	94.8	<0.132	<2.64	n/a	n/a	n/a	n/a	2.64	n/a	U
S18T036501	O		106-42-3	Xylene (m & p)	ug/L	93.9	<0.330	<6.61	n/a	n/a	n/a	n/a	6.61	n/a	U
S18T036501	O		79-20-9	Methyl Acetate	ug/L	97.5	<0.176	<3.51	n/a	n/a	n/a	n/a	3.51	n/a	U
S18T036501	O		108-87-2	Methylcyclohexane	ug/L	91.1	<0.127	<2.53	n/a	n/a	n/a	n/a	2.53	n/a	U
S18T036501	O		71-36-3	1-Butanol	ug/L	87.6	<2.79	<55.8	n/a	n/a	n/a	n/a	55.8	n/a	U
S18T036501	O		104-51-8	n-Butylbenzene	ug/L	95.8	<0.168	<3.36	n/a	n/a	n/a	n/a	3.36	n/a	U
S18T036501	O		95-47-6	o-Xylene	ug/L	95.3	<0.139	<2.79	n/a	n/a	n/a	n/a	2.79	n/a	U
S18T036501	O		100-42-5	Styrene	ug/L	94.7	0.180	<2.21	n/a	n/a	n/a	n/a	2.21	n/a	U
S18T036501	O		1634-04-4	tert-butyl methyl ether	ug/L	99.4	<0.208	<4.16	n/a	n/a	n/a	n/a	4.16	n/a	U
S18T036501	O		109-99-9	Tetrahydrofuran	ug/L	96.7	<0.138	<2.75	n/a	n/a	n/a	n/a	2.75	n/a	U
S18T036501	O		108-88-3	Toluene	ug/L	91.5	<0.159	<3.18	n/a	n/a	n/a	n/a	3.18	n/a	U
S18T036501	O		1330-20-7	Xylenes (total)	ug/L	n/a	<0.470	<9.40	n/a	n/a	n/a	n/a	9.40	n/a	U
S18T036501	O		156-60-5	trans-Dichloroethylene	ug/L	93.6	<0.174	<3.48	n/a	n/a	n/a	n/a	3.48	n/a	U
S18T036501	O		10061-02-6	trans-1,3-Dichloropropene	ug/L	99.7	<0.141	<2.82	n/a	n/a	n/a	n/a	2.82	n/a	U
S18T036501	O		75-69-4	Trichlorofluoromethane	ug/L	100	<0.165	<3.29	n/a	n/a	n/a	n/a	3.29	n/a	U

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J - Estimated

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B - Blank Contamination

SY-101 TBI Grab 2018-11
Opportunistic Analyte Results

Sample Group: 20183183

Riser: 14

Segment Number: 1SY-18-01FB

Segment Portion: Field Blank

Sample#	R	A#	CAS #	Analyte	Unit	STD %	Blank	Result	Duplicate	Average	RPD %	Spk Rec %	Det Limit	Cnt Err %	Qual Flags
Anions and Small Organic Acids															
S18T036480			24959-67-9	Bromide	ug/mL	99.4	<6.00E-03	<6.00E-03	n/a	n/a	n/a	n/a	6.00E-03	n/a	U
ICP-AES															
S18T036479			7440-42-8	Boron	ug/mL	101	<2.00E-03	0.301	n/a	n/a	n/a	n/a	2.00E-03	n/a	
S18T036479			7440-69-9	Bismuth	ug/mL	101	<0.0190	<0.0190	n/a	n/a	n/a	n/a	0.0190	n/a	U
S18T036479			7440-70-2	Calcium	ug/mL	100	<0.120	0.423	n/a	n/a	n/a	n/a	0.120	n/a	
S18T036479			7440-45-1	Cerium	ug/mL	104	<0.0250	<0.0250	n/a	n/a	n/a	n/a	0.0250	n/a	U
S18T036479			7440-48-4	Cobalt	ug/mL	101	<1.00E-03	<1.00E-03	n/a	n/a	n/a	n/a	1.00E-03	n/a	U
S18T036479			7440-50-8	Copper	ug/mL	101	3.47E-03	<2.00E-03	n/a	n/a	n/a	n/a	2.00E-03	n/a	U
S18T036479			7440-53-1	Europium	ug/mL	102	<1.00E-03	<1.00E-03	n/a	n/a	n/a	n/a	1.00E-03	n/a	U
S18T036479			7439-89-6	Iron	ug/mL	101	<0.0200	<0.0200	n/a	n/a	n/a	n/a	0.0200	n/a	U
S18T036479			7439-91-0	Lanthanum	ug/mL	99.5	<1.00E-03	<1.00E-03	n/a	n/a	n/a	n/a	1.00E-03	n/a	U
S18T036479			7439-93-2	Lithium	ug/mL	101	<1.00E-03	4.21E-03	n/a	n/a	n/a	n/a	1.00E-03	n/a	J
S18T036479			7439-95-4	Magnesium	ug/mL	99.5	<9.00E-03	0.0674	n/a	n/a	n/a	n/a	9.00E-03	n/a	J
S18T036479			7439-96-5	Manganese	ug/mL	101	<1.00E-03	<1.00E-03	n/a	n/a	n/a	n/a	1.00E-03	n/a	U
S18T036479			7439-98-7	Molybdenum	ug/mL	103	<2.00E-03	<2.00E-03	n/a	n/a	n/a	n/a	2.00E-03	n/a	U
S18T036479			7440-00-8	Neodymium	ug/mL	102	<0.0150	<0.0150	n/a	n/a	n/a	n/a	0.0150	n/a	U
S18T036479			7440-03-1	Niobium	ug/mL	101	<6.00E-03	<6.00E-03	n/a	n/a	n/a	n/a	6.00E-03	n/a	U
S18T036479			7723-14-0	Phosphorus	ug/mL	103	<0.0130	<0.0130	n/a	n/a	n/a	n/a	0.0130	n/a	U
S18T036479			7440-05-3	Palladium	ug/mL	99.7	<0.0120	<0.0120	n/a	n/a	n/a	n/a	0.0120	n/a	U
S18T036479			7440-10-0	Praseodymium	ug/mL	99.9	<0.0260	<0.0260	n/a	n/a	n/a	n/a	0.0260	n/a	U
S18T036479			7440-17-7	Rubidium	ug/mL	105	<0.0570	<0.0570	n/a	n/a	n/a	n/a	0.0570	n/a	U
S18T036479			7440-16-6	Rhodium	ug/mL	98.3	<0.0120	<0.0120	n/a	n/a	n/a	n/a	0.0120	n/a	U
S18T036479			7440-18-8	Ruthenium	ug/mL	98.6	<5.00E-03	<5.00E-03	n/a	n/a	n/a	n/a	5.00E-03	n/a	U
S18T036479			7704-34-9	Sulfur	ug/mL	101	<0.0280	<0.0280	n/a	n/a	n/a	n/a	0.0280	n/a	U
S18T036479			7440-21-3	Silicon	ug/mL	103	0.0468	2.06	n/a	n/a	n/a	n/a	0.0120	n/a	
S18T036479			7440-19-9	Samarium	ug/mL	102	<0.0170	<0.0170	n/a	n/a	n/a	n/a	0.0170	n/a	U
S18T036479			7440-31-5	Tin	ug/mL	101	<8.00E-03	<8.00E-03	n/a	n/a	n/a	n/a	8.00E-03	n/a	U
S18T036479			7440-24-6	Strontium	ug/mL	101	2.37E-03	2.61E-03	n/a	n/a	n/a	n/a	2.00E-03	n/a	BJ

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SY-101 TBI Grab 2018-11
Opportunistic Analyte Results

Sample Group: 20183183

Riser: 14

Segment Number: 1SY-18-01FB

Segment Portion: Field Blank

Sample#	R	A#	CAS #	Analyte	Unit	STD %	Blank	Result	Duplicate	Average	RPD %	Spk Rec %	Det Limit	Cnt Err %	Qual Flags
ICP-AES															
S18T036479			7440-25-7	Tantalum	ug/mL	100	<5.00E-03	<5.00E-03	n/a	n/a	n/a	n/a	5.00E-03	n/a	U
S18T036479			13494-80-9	Tellurium	ug/mL	101	<9.00E-03	<9.00E-03	n/a	n/a	n/a	n/a	9.00E-03	n/a	U
S18T036479			7440-29-1	Thorium	ug/mL	106	<0.0130	<0.0130	n/a	n/a	n/a	n/a	0.0130	n/a	U
S18T036479			7440-32-6	Titanium	ug/mL	104	<2.00E-03	<2.00E-03	n/a	n/a	n/a	n/a	2.00E-03	n/a	U
S18T036479			7440-33-7	Tungsten	ug/mL	101	<0.0160	<0.0160	n/a	n/a	n/a	n/a	0.0160	n/a	U
S18T036479			7440-65-5	Yttrium	ug/mL	104	<2.00E-03	<2.00E-03	n/a	n/a	n/a	n/a	2.00E-03	n/a	U
S18T036479			7440-66-6	Zinc	ug/mL	101	<0.0320	<0.0320	n/a	n/a	n/a	n/a	0.0320	n/a	U
S18T036479			7440-67-7	Zirconium	ug/mL	101	<1.00E-03	<1.00E-03	n/a	n/a	n/a	n/a	1.00E-03	n/a	U
MS ACTINIDES for Uranium & Thorium															
S18T036479			TH-232	Thorium-232	ug/mL	100	6.48E-06	<3.21E-06	n/a	n/a	n/a	n/a	3.21E-06	n/a	U
SVOA 222S LIQUID															
S18T036486	O		120-82-1	1,2,4-Trichlorobenzene	ug/L	0.0	<39.4	<690	n/a	n/a	n/a	n/a	690	n/a	Ua
S18T036486	O		95-50-1	1,2-Dichlorobenzene	ug/L	10.4	<38.6	<675	n/a	n/a	n/a	n/a	675	n/a	Ua
S18T036486	O		108-60-1	2,2-oxybis(1-Chloropropane)	ug/L	51.8	<40.0	<700	n/a	n/a	n/a	n/a	700	n/a	Ua
S18T036486	O		120-83-2	2,4-Dichlorophenol	ug/L	76.6	<37.7	<660	n/a	n/a	n/a	n/a	660	n/a	U
S18T036486	O		105-67-9	2,4-Dimethylphenol	ug/L	81.2	<19.7	<345	n/a	n/a	n/a	n/a	345	n/a	U
S18T036486	O		51-28-5	2,4-Dinitrophenol	ug/L	75.5	<37.1	<650	n/a	n/a	n/a	n/a	650	n/a	U
S18T036486	O		128-37-0	BHT	ug/L	21.0	<17.7	<310	n/a	n/a	n/a	n/a	310	n/a	Ua
S18T036486	O		606-20-2	2,6-Dinitrotoluene	ug/L	68.4	<26.3	<460	n/a	n/a	n/a	n/a	460	n/a	Ua
S18T036486	O		111-76-2	2-Butoxyethanol	ug/L	88.5	<80.3	<1.40E+03	n/a	n/a	n/a	n/a	1.40E+03	n/a	U
S18T036486	O		91-58-7	2-Chloronaphthalene	ug/L	25.2	<40.0	<700	n/a	n/a	n/a	n/a	700	n/a	Ua
S18T036486	O		95-57-8	2-Chlorophenol	ug/L	78.7	<33.7	<590	n/a	n/a	n/a	n/a	590	n/a	U
S18T036486	O		110-80-5	2-Ethoxyethanol	ug/L	75.8	<53.1	<930	n/a	n/a	n/a	n/a	930	n/a	U
S18T036486	O		91-57-6	2-Methylnaphthalene	ug/L	18.1	<40.3	<705	n/a	n/a	n/a	n/a	705	n/a	Ua
S18T036486	O		88-74-4	2-Nitroaniline	ug/L	93.2	<28.6	<500	n/a	n/a	n/a	n/a	500	n/a	U
S18T036486	O		88-75-5	2-Nitrophenol	ug/L	70.0	<36.0	<630	n/a	n/a	n/a	n/a	630	n/a	Ua
S18T036486	O		99-09-2	3-Nitroaniline	ug/L	89.6	<34.6	<605	n/a	n/a	n/a	n/a	605	n/a	U
S18T036486	O		101-55-3	4-Bromophenylphenyl ether	ug/L	41.5	<23.7	<415	n/a	n/a	n/a	n/a	415	n/a	Ua

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SY-101 TBI Grab 2018-11
Opportunistic Analyte Results

Sample Group: 20183183

Riser: 14

Segment Number: 1SY-18-01FB

Segment Portion: Field Blank

Sample#	R	A#	CAS #	Analyte	Unit	STD %	Blank	Result	Duplicate	Average	RPD %	Spk Rec %	Det Limit	Cnt Err %	Qual Flags
SVOA 222S LIQUID															
S18T036486		O	59-50-7	4-Chloro-3-methylphenol	ug/L	87.5	<36.3	<635	n/a	n/a	n/a	n/a	635	n/a	U
S18T036486		O	106-47-8	4-Chloroaniline	ug/L	82.3	<39.4	<690	n/a	n/a	n/a	n/a	690	n/a	U
S18T036486		O	7005-72-3	4-Chlorophenylphenyl ether	ug/L	38.0	<32.9	<575	n/a	n/a	n/a	n/a	575	n/a	Ua
S18T036486		O	100-01-6	4-Nitroaniline	ug/L	95.6	<36.3	<635	n/a	n/a	n/a	n/a	635	n/a	U
S18T036486		O	100-02-7	4-Nitrophenol	ug/L	95.6	<20.9	<365	n/a	n/a	n/a	n/a	365	n/a	U
S18T036486		O	83-32-9	Acenaphthene	ug/L	34.7	<12.9	<225	n/a	n/a	n/a	n/a	225	n/a	Ua
S18T036486		O	208-96-8	Acenaphthylene	ug/L	34.4	<42.9	<750	n/a	n/a	n/a	n/a	750	n/a	Ua
S18T036486		O	120-12-7	Anthracene	ug/L	42.8	<17.7	<310	n/a	n/a	n/a	n/a	310	n/a	Ua
S18T036486		O	56-55-3	Benzo(a)anthracene	ug/L	45.3	<16.0	<280	n/a	n/a	n/a	n/a	280	n/a	Ua
S18T036486		O	50-32-8	Benzo(a)pyrene	ug/L	44.2	<15.4	<270	n/a	n/a	n/a	n/a	270	n/a	Ua
S18T036486		O	205-99-2	Benzo(b)fluoranthene	ug/L	47.0	<17.7	<310	n/a	n/a	n/a	n/a	310	n/a	Ua
S18T036486		O	191-24-2	Benzo(ghi)perylene	ug/L	44.1	<15.1	<265	n/a	n/a	n/a	n/a	265	n/a	Ua
S18T036486		O	207-08-9	Benzo(k)fluoranthene	ug/L	44.0	<17.1	<300	n/a	n/a	n/a	n/a	300	n/a	Ua
S18T036486		O	218-01-9	Chrysene	ug/L	44.0	<18.6	<325	n/a	n/a	n/a	n/a	325	n/a	Ua
S18T036486		O	117-84-0	Di-n-octylphthalate	ug/L	45.2	<13.4	<235	n/a	n/a	n/a	n/a	235	n/a	Ua
S18T036486		O	53-70-3	Dibenz[a,h]anthracene	ug/L	43.4	<12.9	<225	n/a	n/a	n/a	n/a	225	n/a	Ua
S18T036486		O	132-64-9	Dibenzofuran	ug/L	36.9	<34.0	<595	n/a	n/a	n/a	n/a	595	n/a	Ua
S18T036486		O	84-66-2	Diethylphthalate	ug/L	73.0	<20.6	<360	n/a	n/a	n/a	n/a	360	n/a	U
S18T036486		O	131-11-3	Dimethyl phthalate	ug/L	89.6	<24.3	<425	n/a	n/a	n/a	n/a	425	n/a	U
S18T036486		O	122-39-4	Diphenylamine	ug/L	50.0	<22.0	<385	n/a	n/a	n/a	n/a	385	n/a	Ua
S18T036486		O	206-44-0	Fluoranthene	ug/L	46.5	<11.7	<205	n/a	n/a	n/a	n/a	205	n/a	Ua
S18T036486		O	86-73-7	Fluorene	ug/L	39.5	<30.9	<540	n/a	n/a	n/a	n/a	540	n/a	Ua
S18T036486		O	77-47-4	Hexachlorocyclopentadiene	ug/L	0.0	<7.43	<130	n/a	n/a	n/a	n/a	130	n/a	Ua
S18T036486		O	193-39-5	Indeno(1,2,3-cd)pyrene	ug/L	44.0	<7.43	<130	n/a	n/a	n/a	n/a	130	n/a	Ua
S18T036486		O	78-83-1	Isobutanol	ug/L	48.0	<61.7	<1.08E+03	n/a	n/a	n/a	n/a	1.08E+03	n/a	Ua
S18T036486		O	78-59-1	Isophorone	ug/L	82.1	<38.6	<675	n/a	n/a	n/a	n/a	675	n/a	U
S18T036486		O	62-75-9	N-Nitrosodimethylamine	ug/L	83.4	<35.4	<620	n/a	n/a	n/a	n/a	620	n/a	U
S18T036486		O	621-64-7	N-Nitroso-di-n-propylamine	ug/L	79.4	<38.9	<680	n/a	n/a	n/a	n/a	680	n/a	U

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SY-101 TBI Grab 2018-11
Opportunistic Analyte Results

Sample Group: 20183183

Riser: 14

Segment Number: 1SY-18-01FB

Segment Portion: Field Blank

Sample#	R	A#	CAS #	Analyte	Unit	STD %	Blank	Result	Duplicate	Average	RPD %	Spk Rec %	Det Limit	Cnt Err %	Qual Flags
SVOA 222S LIQUID															
S18T036486		O	59-89-2	N-Nitrosomorpholine	ug/L	82.0	<31.1	<545	n/a	n/a	n/a	n/a	545	n/a	U
S18T036486		O	91-20-3	Naphthalene	ug/L	14.8	<35.1	<615	n/a	n/a	n/a	n/a	615	n/a	Ua
S18T036486		O	85-01-8	Phenanthrene	ug/L	43.7	<16.9	<295	n/a	n/a	n/a	n/a	295	n/a	Ua
S18T036486		O	108-95-2	Phenol	ug/L	80.8	<34.6	<605	n/a	n/a	n/a	n/a	605	n/a	U
S18T036486		O	129-00-0	Pyrene	ug/L	45.0	<10.9	<190	n/a	n/a	n/a	n/a	190	n/a	Ua
S18T036486		O	126-73-8	Tributyl phosphate	ug/L	56.9	<14.6	374	n/a	n/a	n/a	n/a	255	n/a	Ua
S18T036486		O	111-91-1	Bis(2-Chloroethoxy)methane	ug/L	80.3	<38.3	<670	n/a	n/a	n/a	n/a	670	n/a	U
S18T036486		O	117-81-7	Bis(2-ethylhexyl) phthalate	ug/L	50.2	38.6	645	n/a	n/a	n/a	n/a	220	n/a	BJa
S18T036486		O	111-44-4	Bis(2-chloroethyl) ether	ug/L	78.5	<37.1	<650	n/a	n/a	n/a	n/a	650	n/a	U
VOA Liquid Samples from Tanks															
S18T036478		O	79-34-5	1,1,2,2-Tetrachloroethane	ug/L	95.0	<0.135	<0.150	n/a	n/a	n/a	n/a	0.150	n/a	U
S18T036478		O	79-00-5	1,1,2-Trichloroethane	ug/L	94.5	<0.119	<0.132	n/a	n/a	n/a	n/a	0.132	n/a	U
S18T036478		O	75-34-3	1,1-Dichloroethane	ug/L	97.2	<0.195	<0.216	n/a	n/a	n/a	n/a	0.216	n/a	U
S18T036478		O	120-82-1	1,2,4-Trichlorobenzene	ug/L	94.1	<0.204	<0.226	n/a	n/a	n/a	n/a	0.226	n/a	U
S18T036478		O	96-12-8	1,2-Dibromo-3-Chloropropane	ug/L	97.4	<0.192	<0.214	n/a	n/a	n/a	n/a	0.214	n/a	U
S18T036478		O	106-93-4	Ethylene Dibromide	ug/L	96.3	<0.124	<0.138	n/a	n/a	n/a	n/a	0.138	n/a	U
S18T036478		O	95-50-1	1,2-Dichlorobenzene	ug/L	94.5	<0.192	<0.214	n/a	n/a	n/a	n/a	0.214	n/a	U
S18T036478		O	78-87-5	1,2-Dichloropropane	ug/L	98.5	<0.214	<0.238	n/a	n/a	n/a	n/a	0.238	n/a	U
S18T036478		O	541-73-1	1,3-Dichlorobenzene	ug/L	94.8	<0.190	<0.212	n/a	n/a	n/a	n/a	0.212	n/a	U
S18T036478		O	106-46-7	1,4-Dichlorobenzene	ug/L	96.0	<0.180	<0.200	n/a	n/a	n/a	n/a	0.200	n/a	U
S18T036478		O	591-78-6	2-Hexanone	ug/L	98.2	<0.837	<0.930	n/a	n/a	n/a	n/a	0.930	n/a	U
S18T036478		O	79-46-9	2-Nitropropane	ug/L	93.4	<0.157	<0.174	n/a	n/a	n/a	n/a	0.174	n/a	U
S18T036478		O	107-87-9	2-Pentanone	ug/L	95.5	<0.420	<0.466	n/a	n/a	n/a	n/a	0.466	n/a	U
S18T036478		O	75-27-4	Bromodichloromethane	ug/L	101	<0.169	<0.187	n/a	n/a	n/a	n/a	0.187	n/a	U
S18T036478		O	75-25-2	Bromoform	ug/L	95.2	<0.106	<0.117	n/a	n/a	n/a	n/a	0.117	n/a	U
S18T036478		O	74-83-9	Bromomethane	ug/L	98.5	<0.215	<0.239	n/a	n/a	n/a	n/a	0.239	n/a	U
S18T036478		O	75-15-0	Carbon disulfide	ug/L	86.3	<0.153	<0.170	n/a	n/a	n/a	n/a	0.170	n/a	U
S18T036478		O	75-00-3	Chloroethane	ug/L	101	<0.138	<0.153	n/a	n/a	n/a	n/a	0.153	n/a	U

NA = Not Analyzed, ND = Not Detected

b - MS/MSD Outside Range

c - RPD Outside Range

U - Less Than Detection Limit

B - Blank Contamination

a - LCS Outside Range

J - Estimated

SY-101 TBI Grab 2018-11
Opportunistic Analyte Results

Sample Group: 20183183

Riser: 14

Segment Number: 1SY-18-01FB

Segment Portion: Field Blank

Sample#	R	A#	CAS #	Analyte	Unit	STD %	Blank	Result	Duplicate	Average	RPD %	Spk Rec %	Det Limit	Cnt Err %	Qual Flags
VOA Liquid Samples from Tanks															
S18T036478	O		74-87-3	Chloromethane	ug/L	101	<0.171	<0.190	n/a	n/a	n/a	n/a	0.190	n/a	U
S18T036478	O		156-59-2	cis-Dichloroethylene	ug/L	95.8	<0.199	<0.221	n/a	n/a	n/a	n/a	0.221	n/a	U
S18T036478	O		10061-01-5	cis-1,3-Dichloropropene	ug/L	94.5	<0.182	<0.202	n/a	n/a	n/a	n/a	0.202	n/a	U
S18T036478	O		110-82-7	Cyclohexane	ug/L	91.9	<0.167	<0.186	n/a	n/a	n/a	n/a	0.186	n/a	U
S18T036478	O		124-48-1	Dibromochloromethane	ug/L	97.3	<0.129	<0.143	n/a	n/a	n/a	n/a	0.143	n/a	U
S18T036478	O		75-71-8	Dichlorodifluoromethane	ug/L	88.2	<0.146	<0.162	n/a	n/a	n/a	n/a	0.162	n/a	U
S18T036478	O		60-29-7	Diethyl ether	ug/L	96.3	<0.216	<0.240	n/a	n/a	n/a	n/a	0.240	n/a	U
S18T036478	O		141-78-6	Ethyl acetate	ug/L	96.3	<0.314	<0.349	n/a	n/a	n/a	n/a	0.349	n/a	U
S18T036478	O		100-41-4	Ethylbenzene	ug/L	95.4	<0.112	<0.125	n/a	n/a	n/a	n/a	0.125	n/a	U
S18T036478	O		76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	ug/L	90.9	<0.181	<0.201	n/a	n/a	n/a	n/a	0.201	n/a	U
S18T036478	O		67-72-1	Hexachloroethane	ug/L	88.4	<0.132	<0.147	n/a	n/a	n/a	n/a	0.147	n/a	U
S18T036478	O		110-54-3	Hexane	ug/L	86.5	<0.168	<0.186	n/a	n/a	n/a	n/a	0.186	n/a	U
S18T036478	O		98-82-8	Isopropyl Benzene	ug/L	94.8	<0.132	<0.146	n/a	n/a	n/a	n/a	0.146	n/a	U
S18T036478	O		106-42-3	Xylene (m & p)	ug/L	93.9	<0.330	<0.367	n/a	n/a	n/a	n/a	0.367	n/a	U
S18T036478	O		79-20-9	Methyl Acetate	ug/L	97.5	<0.176	<0.195	n/a	n/a	n/a	n/a	0.195	n/a	U
S18T036478	O		108-87-2	Methylcyclohexane	ug/L	91.1	<0.127	<0.141	n/a	n/a	n/a	n/a	0.141	n/a	U
S18T036478	O		71-36-3	1-Butanol	ug/L	87.6	<2.79	<3.10	n/a	n/a	n/a	n/a	3.10	n/a	U
S18T036478	O		104-51-8	n-Butylbenzene	ug/L	95.8	<0.168	<0.187	n/a	n/a	n/a	n/a	0.187	n/a	U
S18T036478	O		95-47-6	o-Xylene	ug/L	95.3	<0.139	<0.155	n/a	n/a	n/a	n/a	0.155	n/a	U
S18T036478	O		100-42-5	Styrene	ug/L	94.7	0.180	<0.123	n/a	n/a	n/a	n/a	0.123	n/a	U
S18T036478	O		1634-04-4	tert-butyl methyl ether	ug/L	99.4	<0.208	<0.231	n/a	n/a	n/a	n/a	0.231	n/a	U
S18T036478	O		109-99-9	Tetrahydrofuran	ug/L	96.7	<0.138	<0.153	n/a	n/a	n/a	n/a	0.153	n/a	U
S18T036478	O		108-88-3	Toluene	ug/L	91.5	<0.159	<0.177	n/a	n/a	n/a	n/a	0.177	n/a	U
S18T036478	O		1330-20-7	Xylenes (total)	ug/L	n/a	<0.470	<0.522	n/a	n/a	n/a	n/a	0.522	n/a	U
S18T036478	O		156-60-5	trans-Dichloroethylene	ug/L	93.6	<0.174	<0.193	n/a	n/a	n/a	n/a	0.193	n/a	U
S18T036478	O		10061-02-6	trans-1,3-Dichloropropene	ug/L	99.7	<0.141	<0.157	n/a	n/a	n/a	n/a	0.157	n/a	U
S18T036478	O		75-69-4	Trichlorofluoromethane	ug/L	100	<0.165	<0.183	n/a	n/a	n/a	n/a	0.183	n/a	U

NA = Not Analyzed, ND = Not Detected

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c - RPD Outside Range

U - Less Than Detection Limit

B - Blank Contamination

a - LCS Outside Range

J - Estimated

SY-101 TBI Grab 2018-11
Opportunistic Analyte Results

Sample Group: 20183183

Riser: 14

Segment Number: 1SY-18-01TB

Segment Portion: Trip Blank

Sample#	R	A#	CAS #	Analyte	Unit	STD %	Blank	Result	Duplicate	Average	RPD %	Spk Rec %	Det Limit	Cnt Err %	Qual Flags
VOA Liquid Samples from Tanks															
S18T036513	O		79-34-5	1,1,2,2-Tetrachloroethane	ug/L	95.0	<0.135	<0.150	n/a	n/a	n/a	n/a	0.150	n/a	U
S18T036513	O		79-00-5	1,1,2-Trichloroethane	ug/L	94.5	<0.119	<0.132	n/a	n/a	n/a	n/a	0.132	n/a	U
S18T036513	O		75-34-3	1,1-Dichloroethane	ug/L	97.2	<0.195	<0.216	n/a	n/a	n/a	n/a	0.216	n/a	U
S18T036513	O		120-82-1	1,2,4-Trichlorobenzene	ug/L	94.1	<0.204	<0.226	n/a	n/a	n/a	n/a	0.226	n/a	U
S18T036513	O		96-12-8	1,2-Dibromo-3-Chloropropane	ug/L	97.4	<0.192	<0.214	n/a	n/a	n/a	n/a	0.214	n/a	U
S18T036513	O		106-93-4	Ethylene Dibromide	ug/L	96.3	<0.124	<0.138	n/a	n/a	n/a	n/a	0.138	n/a	U
S18T036513	O		95-50-1	1,2-Dichlorobenzene	ug/L	94.5	<0.192	<0.214	n/a	n/a	n/a	n/a	0.214	n/a	U
S18T036513	O		78-87-5	1,2-Dichloropropane	ug/L	98.5	<0.214	<0.238	n/a	n/a	n/a	n/a	0.238	n/a	U
S18T036513	O		541-73-1	1,3-Dichlorobenzene	ug/L	94.8	<0.190	<0.212	n/a	n/a	n/a	n/a	0.212	n/a	U
S18T036513	O		106-46-7	1,4-Dichlorobenzene	ug/L	96.0	<0.180	<0.200	n/a	n/a	n/a	n/a	0.200	n/a	U
S18T036513	O		591-78-6	2-Hexanone	ug/L	98.2	<0.837	<0.930	n/a	n/a	n/a	n/a	0.930	n/a	U
S18T036513	O		79-46-9	2-Nitropropane	ug/L	93.4	<0.157	<0.174	n/a	n/a	n/a	n/a	0.174	n/a	U
S18T036513	O		107-87-9	2-Pentanone	ug/L	95.5	<0.420	<0.466	n/a	n/a	n/a	n/a	0.466	n/a	U
S18T036513	O		75-27-4	Bromodichloromethane	ug/L	101	<0.169	<0.187	n/a	n/a	n/a	n/a	0.187	n/a	U
S18T036513	O		75-25-2	Bromoform	ug/L	95.2	<0.106	<0.117	n/a	n/a	n/a	n/a	0.117	n/a	U
S18T036513	O		74-83-9	Bromomethane	ug/L	98.5	<0.215	<0.239	n/a	n/a	n/a	n/a	0.239	n/a	U
S18T036513	O		75-15-0	Carbon disulfide	ug/L	86.3	<0.153	<0.170	n/a	n/a	n/a	n/a	0.170	n/a	U
S18T036513	O		75-00-3	Chloroethane	ug/L	101	<0.138	<0.153	n/a	n/a	n/a	n/a	0.153	n/a	U
S18T036513	O		74-87-3	Chloromethane	ug/L	101	<0.171	<0.190	n/a	n/a	n/a	n/a	0.190	n/a	U
S18T036513	O		156-59-2	cis-Dichloroethylene	ug/L	95.8	<0.199	<0.221	n/a	n/a	n/a	n/a	0.221	n/a	U
S18T036513	O		10061-01-5	cis-1,3-Dichloropropene	ug/L	94.5	<0.182	<0.202	n/a	n/a	n/a	n/a	0.202	n/a	U
S18T036513	O		110-82-7	Cyclohexane	ug/L	91.9	<0.167	<0.186	n/a	n/a	n/a	n/a	0.186	n/a	U
S18T036513	O		124-48-1	Dibromochloromethane	ug/L	97.3	<0.129	<0.143	n/a	n/a	n/a	n/a	0.143	n/a	U
S18T036513	O		75-71-8	Dichlorodifluoromethane	ug/L	88.2	<0.146	<0.162	n/a	n/a	n/a	n/a	0.162	n/a	U
S18T036513	O		60-29-7	Diethyl ether	ug/L	96.3	<0.216	<0.240	n/a	n/a	n/a	n/a	0.240	n/a	U
S18T036513	O		141-78-6	Ethyl acetate	ug/L	96.3	<0.314	<0.349	n/a	n/a	n/a	n/a	0.349	n/a	U
S18T036513	O		100-41-4	Ethylbenzene	ug/L	95.4	<0.112	<0.125	n/a	n/a	n/a	n/a	0.125	n/a	U
S18T036513	O		76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	ug/L	90.9	<0.181	<0.201	n/a	n/a	n/a	n/a	0.201	n/a	U

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b - MS/MSD Outside Range

c - RPD Outside Range

U - Less Than Detection Limit

B - Blank Contamination

a - LCS Outside Range

J - Estimated

SY-101 TBI Grab 2018-11
Opportunistic Analyte Results

Sample Group: 20183183

Riser: 14

Segment Number: 1SY-18-01TB

Segment Portion: Trip Blank

Sample#	R	A#	CAS #	Analyte	Unit	STD %	Blank	Result	Duplicate	Average	RPD %	Spk Rec %	Det Limit	Cnt Err %	Qual Flags
VOA Liquid Samples from Tanks															
S18T036513	O		67-72-1	Hexachloroethane	ug/L	88.4	<0.132	<0.147	n/a	n/a	n/a	n/a	0.147	n/a	U
S18T036513	O		110-54-3	Hexane	ug/L	86.5	<0.168	<0.186	n/a	n/a	n/a	n/a	0.186	n/a	U
S18T036513	O		98-82-8	Isopropyl Benzene	ug/L	94.8	<0.132	<0.146	n/a	n/a	n/a	n/a	0.146	n/a	U
S18T036513	O		106-42-3	Xylene (m & p)	ug/L	93.9	<0.330	<0.367	n/a	n/a	n/a	n/a	0.367	n/a	U
S18T036513	O		79-20-9	Methyl Acetate	ug/L	97.5	<0.176	<0.195	n/a	n/a	n/a	n/a	0.195	n/a	U
S18T036513	O		108-87-2	Methylcyclohexane	ug/L	91.1	<0.127	<0.141	n/a	n/a	n/a	n/a	0.141	n/a	U
S18T036513	O		71-36-3	1-Butanol	ug/L	87.6	<2.79	<3.10	n/a	n/a	n/a	n/a	3.10	n/a	U
S18T036513	O		104-51-8	n-Butylbenzene	ug/L	95.8	<0.168	<0.187	n/a	n/a	n/a	n/a	0.187	n/a	U
S18T036513	O		95-47-6	o-Xylene	ug/L	95.3	<0.139	<0.155	n/a	n/a	n/a	n/a	0.155	n/a	U
S18T036513	O		100-42-5	Styrene	ug/L	94.7	0.180	<0.123	n/a	n/a	n/a	n/a	0.123	n/a	U
S18T036513	O		1634-04-4	tert-butyl methyl ether	ug/L	99.4	<0.208	<0.231	n/a	n/a	n/a	n/a	0.231	n/a	U
S18T036513	O		109-99-9	Tetrahydrofuran	ug/L	96.7	<0.138	1.03	n/a	n/a	n/a	n/a	0.153	n/a	J
S18T036513	O		108-88-3	Toluene	ug/L	91.5	<0.159	<0.177	n/a	n/a	n/a	n/a	0.177	n/a	U
S18T036513	O		1330-20-7	Xylenes (total)	ug/L	n/a	<0.470	<0.522	n/a	n/a	n/a	n/a	0.522	n/a	U
S18T036513	O		156-60-5	trans-Dichloroethylene	ug/L	93.6	<0.174	<0.193	n/a	n/a	n/a	n/a	0.193	n/a	U
S18T036513	O		10061-02-6	trans-1,3-Dichloropropene	ug/L	99.7	<0.141	<0.157	n/a	n/a	n/a	n/a	0.157	n/a	U
S18T036513	O		75-69-4	Trichlorofluoromethane	ug/L	100	<0.165	<0.183	n/a	n/a	n/a	n/a	0.183	n/a	U

NA = Not Analyzed, ND = Not Detected

b - MS/MSD Outside Range

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SY-101 TBI Grab 2018-11
Opportunistic Analyte Results

Sample Group: 20183183

Riser: 14

Segment Number: 1SY-18-01TB

Segment Portion: Trip Blank

Sample#	R	A#	CAS #	Analyte	Unit	STD %	Blank	Result	Duplicate	Average	RPD %	Spk Rec %	Det Limit	Cnt Err %	Qual Flags
VOA Liquid Samples from Tanks															
S18T036513	O	79-34-5		1,1,2,2-Tetrachloroethane	ug/L	95.0	<0.135	<0.150	n/a	n/a	n/a	n/a	0.150	n/a	U
S18T036513	O	79-00-5		1,1,2-Trichloroethane	ug/L	94.5	<0.119	<0.132	n/a	n/a	n/a	n/a	0.132	n/a	U
S18T036513	O	75-34-3		1,1-Dichloroethane	ug/L	97.2	<0.195	<0.216	n/a	n/a	n/a	n/a	0.216	n/a	U
S18T036513	O	120-82-1		1,2,4-Trichlorobenzene	ug/L	94.1	<0.204	<0.226	n/a	n/a	n/a	n/a	0.226	n/a	U
S18T036513	O	96-12-8		1,2-Dibromo-3-Chloropropane	ug/L	97.4	<0.192	<0.214	n/a	n/a	n/a	n/a	0.214	n/a	U
S18T036513	O	106-93-4		Ethylene Dibromide	ug/L	96.3	<0.124	<0.138	n/a	n/a	n/a	n/a	0.138	n/a	U
S18T036513	O	95-50-1		1,2-Dichlorobenzene	ug/L	94.5	<0.192	<0.214	n/a	n/a	n/a	n/a	0.214	n/a	U
S18T036513	O	78-87-5		1,2-Dichloropropane	ug/L	98.5	<0.214	<0.238	n/a	n/a	n/a	n/a	0.238	n/a	U
S18T036513	O	541-73-1		1,3-Dichlorobenzene	ug/L	94.8	<0.190	<0.212	n/a	n/a	n/a	n/a	0.212	n/a	U
S18T036513	O	106-46-7		1,4-Dichlorobenzene	ug/L	96.0	<0.180	<0.200	n/a	n/a	n/a	n/a	0.200	n/a	U
S18T036513	O	591-78-6		2-Hexanone	ug/L	98.2	<0.837	<0.930	n/a	n/a	n/a	n/a	0.930	n/a	U
S18T036513	O	79-46-9		2-Nitropropane	ug/L	93.4	<0.157	<0.174	n/a	n/a	n/a	n/a	0.174	n/a	U
S18T036513	O	107-87-9		2-Pentanone	ug/L	95.5	<0.420	<0.466	n/a	n/a	n/a	n/a	0.466	n/a	U
S18T036513	O	75-27-4		Bromodichloromethane	ug/L	101	<0.169	<0.187	n/a	n/a	n/a	n/a	0.187	n/a	U
S18T036513	O	75-25-2		Bromoform	ug/L	95.2	<0.106	<0.117	n/a	n/a	n/a	n/a	0.117	n/a	U
S18T036513	O	74-83-9		Bromomethane	ug/L	98.5	<0.215	<0.239	n/a	n/a	n/a	n/a	0.239	n/a	U
S18T036513	O	75-15-0		Carbon disulfide	ug/L	86.3	<0.153	<0.170	n/a	n/a	n/a	n/a	0.170	n/a	U
S18T036513	O	75-00-3		Chloroethane	ug/L	101	<0.138	<0.153	n/a	n/a	n/a	n/a	0.153	n/a	U
S18T036513	O	74-87-3		Chloromethane	ug/L	101	<0.171	<0.190	n/a	n/a	n/a	n/a	0.190	n/a	U
S18T036513	O	156-59-2		cis-Dichloroethylene	ug/L	95.8	<0.199	<0.221	n/a	n/a	n/a	n/a	0.221	n/a	U
S18T036513	O	10061-01-5		cis-1,3-Dichloropropene	ug/L	94.5	<0.182	<0.202	n/a	n/a	n/a	n/a	0.202	n/a	U
S18T036513	O	110-82-7		Cyclohexane	ug/L	91.9	<0.167	<0.186	n/a	n/a	n/a	n/a	0.186	n/a	U
S18T036513	O	124-48-1		Dibromochloromethane	ug/L	97.3	<0.129	<0.143	n/a	n/a	n/a	n/a	0.143	n/a	U
S18T036513	O	75-71-8		Dichlorodifluoromethane	ug/L	88.2	<0.146	<0.162	n/a	n/a	n/a	n/a	0.162	n/a	U
S18T036513	O	60-29-7		Diethyl ether	ug/L	96.3	<0.216	<0.240	n/a	n/a	n/a	n/a	0.240	n/a	U
S18T036513	O	141-78-6		Ethyl acetate	ug/L	96.3	<0.314	<0.349	n/a	n/a	n/a	n/a	0.349	n/a	U
S18T036513	O	100-41-4		Ethylbenzene	ug/L	95.4	<0.112	<0.125	n/a	n/a	n/a	n/a	0.125	n/a	U

NA = Not Analyzed, ND = Not Detected

b - MS/MSD Outside Range
 U - Less Than Detection Limit

J - Estimated
 c - RPD Outside Range

B - Blank Contamination

a - LCS Outside Range

23 - Jan - 2019 9:41:27
 DSRHardcopyWOLimits 3.0.13a
 DSR.Jar v. 3.1.1

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SY-101 TBI Grab 2018-11
Opportunistic Analyte Results

Sample Group: 20183183

Riser: 14

Segment Number: 1SY-18-01TB

Segment Portion: Trip Blank

Sample#	R	A#	CAS #	Analyte	Unit	STD %	Blank	Result	Duplicate	Average	RPD %	Spk Rec %	Det Limit	Cnt Err %	Qual Flags
VOA Liquid Samples from Tanks															
S18T036513	O	76-13-1		1,1,2-Trichloro-1,2,2-trifluoroethane	ug/L	90.9	<0.181	<0.201	n/a	n/a	n/a	n/a	0.201	n/a	U
S18T036513	O	67-72-1		Hexachloroethane	ug/L	88.4	<0.132	<0.147	n/a	n/a	n/a	n/a	0.147	n/a	U
S18T036513	O	110-54-3		Hexane	ug/L	86.5	<0.168	<0.186	n/a	n/a	n/a	n/a	0.186	n/a	U
S18T036513	O	98-82-8		Isopropyl Benzene	ug/L	94.8	<0.132	<0.146	n/a	n/a	n/a	n/a	0.146	n/a	U
S18T036513	O	106-42-3		Xylene (m & p)	ug/L	93.9	<0.330	<0.367	n/a	n/a	n/a	n/a	0.367	n/a	U
S18T036513	O	79-20-9		Methyl Acetate	ug/L	97.5	<0.176	<0.195	n/a	n/a	n/a	n/a	0.195	n/a	U
S18T036513	O	108-87-2		Methylcyclohexane	ug/L	91.1	<0.127	<0.141	n/a	n/a	n/a	n/a	0.141	n/a	U
S18T036513	O	71-36-3		1-Butanol	ug/L	87.6	<2.79	<3.10	n/a	n/a	n/a	n/a	3.10	n/a	U
S18T036513	O	104-51-8		n-Butylbenzene	ug/L	95.8	<0.168	<0.187	n/a	n/a	n/a	n/a	0.187	n/a	U
S18T036513	O	95-47-6		o-Xylene	ug/L	95.3	<0.139	<0.155	n/a	n/a	n/a	n/a	0.155	n/a	U
S18T036513	O	100-42-5		Styrene	ug/L	94.7	0.180	<0.123	n/a	n/a	n/a	n/a	0.123	n/a	U
S18T036513	O	1634-04-4		tert-butyl methyl ether	ug/L	99.4	<0.208	<0.231	n/a	n/a	n/a	n/a	0.231	n/a	U
S18T036513	O	109-99-9		Tetrahydrofuran	ug/L	96.7	<0.138	1.03	n/a	n/a	n/a	n/a	0.153	n/a	J
S18T036513	O	108-88-3		Toluene	ug/L	91.5	<0.159	<0.177	n/a	n/a	n/a	n/a	0.177	n/a	U
S18T036513	O	1330-20-7		Xylenes (total)	ug/L	n/a	<0.470	<0.522	n/a	n/a	n/a	n/a	0.522	n/a	U
S18T036513	O	156-60-5		trans-Dichloroethylene	ug/L	93.6	<0.174	<0.193	n/a	n/a	n/a	n/a	0.193	n/a	U
S18T036513	O	10061-02-6		trans-1,3-Dichloropropene	ug/L	99.7	<0.141	<0.157	n/a	n/a	n/a	n/a	0.157	n/a	U
S18T036513	O	75-69-4		Trichlorofluoromethane	ug/L	100	<0.165	<0.183	n/a	n/a	n/a	n/a	0.183	n/a	U

NA = Not Analyzed, ND = Not Detected

b - MS/MSD Outside Range
 U - Less Than Detection Limit

J - Estimated
 c - RPD Outside Range

B - Blank Contamination

a - LCS Outside Range

Attachment 3

SAMPLE BREAKDOWN DIAGRAMS

SY-101 TBI Grab 2018-11

Riser: 14

Group: 20183183

ICP/MS & RadChem on 22 day TAT

All others 37 day TAT

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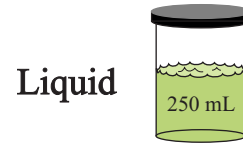
NO DUP or SPK on this sample

**TSCA Regulated
for PCB**

Liquids: <2.61E-03µg/mL

1SY-18-01FB

Field Blank

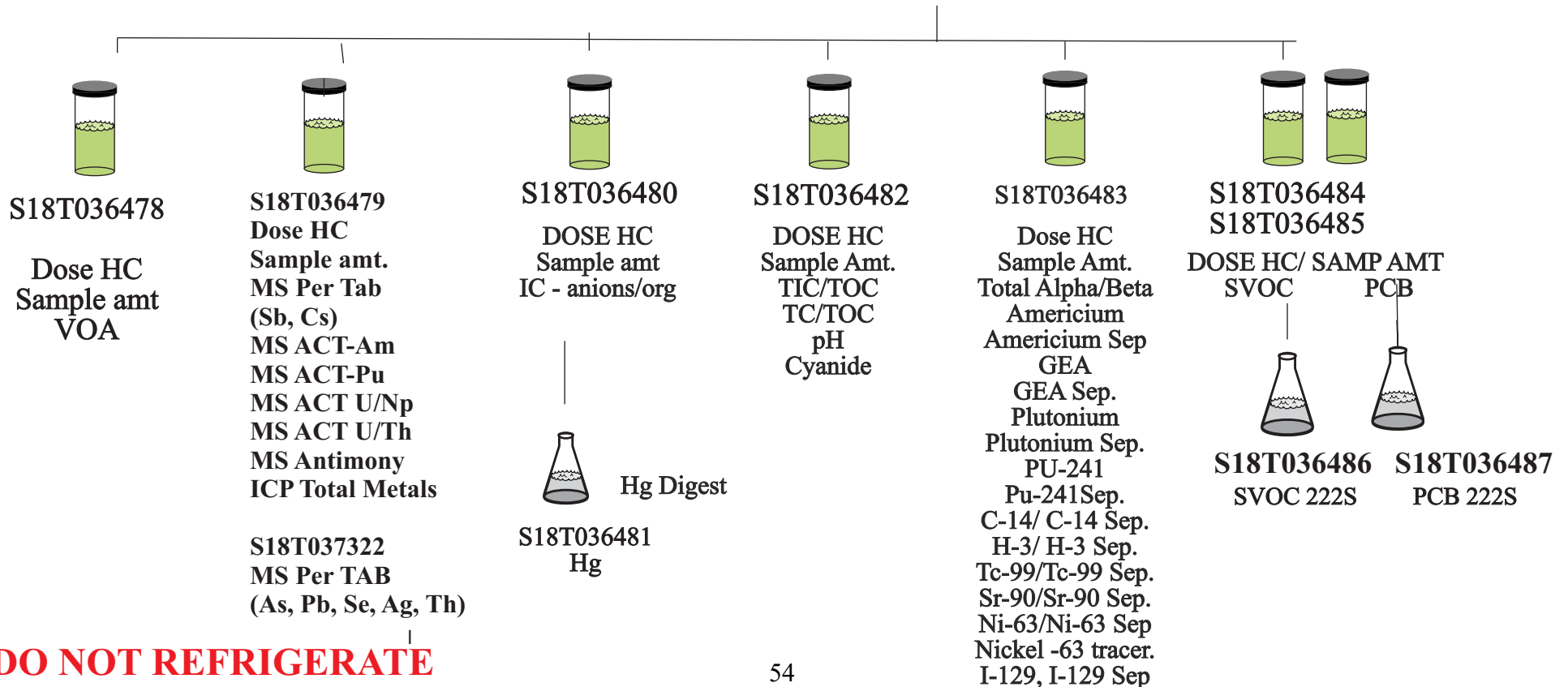


S18T036477

Archive-HC
BRKDWN PIG HC

Analytical Notes:

Use the largest sample size (least dilution) possible to obtain lowest practical detection limit.



SY-101 TBI Grab 2018-11

Riser: 14

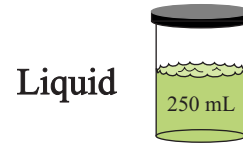
Group: 20183183

ICP/MS & Rad chem on 22 calendar day TAT

All Others due 37 day TAT

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**1SY-18-01
Sub Surface Sample**



Analytical Notes:

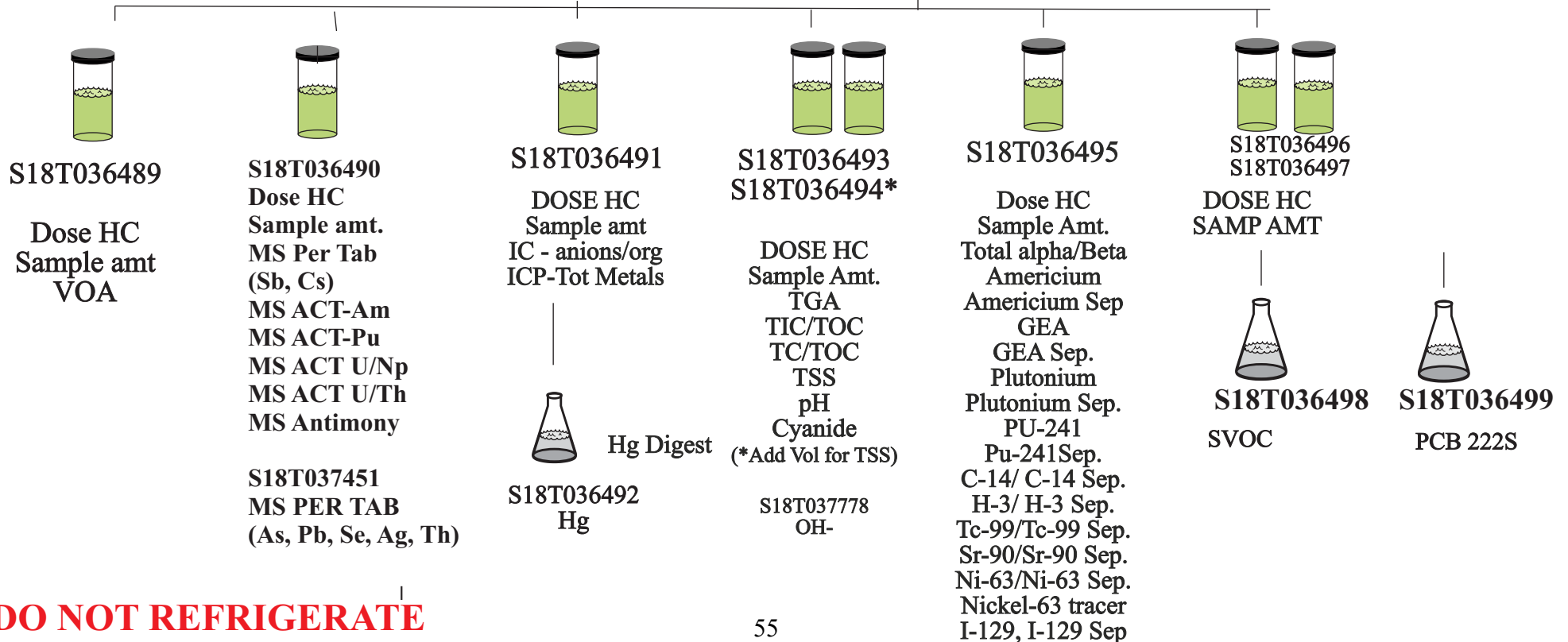
Use the largest sample size (least dilution) possible to obtain lowest practical detection limit.

**TSCA Regulated
for PCB**

Liquids: <2.61E-03 µg/mL

S18T036488

**Archive-HC
BRKDWN PIG HC
Density-HC**



DO NOT REFRIGERATE

SY-101 TBI Grab 2018-11

Riser: 14

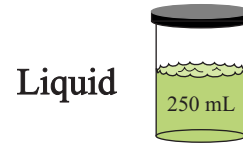
Group: 20183183

ICP/MS & Rad chem on 22 calendar day TAT

All Others due 37 day TAT

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**1SY-18-01 DUP
Sub Surface Sample**



Analytical Notes:

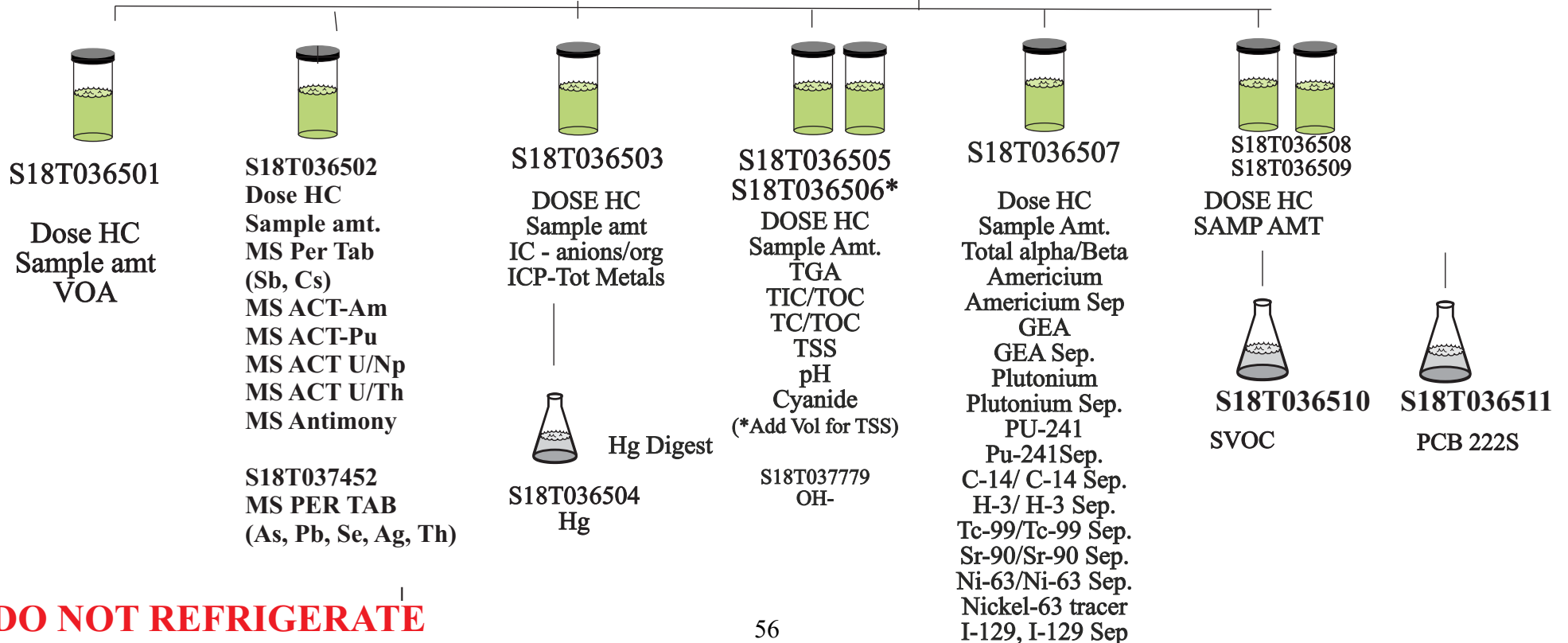
Use the largest sample size (least dilution) possible to obtain lowest practical detection limit.

**TSCA Regulated
for PCB**

Liquids: <2.61E-03 µg/mL

S18T036500

**Archive-HC
BRKDNW PIG HC
Density-HC**



DO NOT REFRIGERATE

SY-101TBI Grab 2018-07

Riser: 14

Group: 20183183

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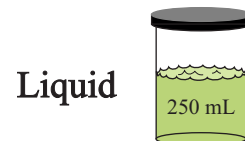
NO DUP or SPK on this sample

**TSCA Regulated
for PCB**

Liquids: <2.61E-03µg/mL

1SY-18-01TB

Trip Blank



S18T036512

BRKDWN PIG HC



S18T036513

Dose HC
Sample amt
VOA

DO NOT REFRIGERATE

SY-101TBI Grab 2018-07

Riser: 14

Group: 20183183

**TSCA Regulated
for PCB**

Liquids: <2.61E-03µg/mL

1SY-18-02



**S18T036594
BRKDWN PIG HC
Archive**

1SY-18-03



**S18T036595
BRKDWN PIG HC
Archive**

DO NOT REFRIGERATE

Attachment 4

SAMPLE RECEIPT PAPERWORK

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**SAMPLE RECEIPT AND CHAIN OF CUSTODY
VERIFICATION CHECKLIST - 222-S**

ATS-LO-090-101 REV.: DH-3

Date Samples Received: 11-15-18 Total Number of Samples: 6 Group No.: _____

Sample Custodian: Don Spenson IH Technician: N/A

Sample Custodian to Complete

Action	Yes	No	N/A	Comments
RSR provided?	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	
Verify GKI is complete	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="checkbox"/> In Project File
Received from an alpha facility?	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="checkbox"/> Contact PC for approval to release
Check that outer custody seal is intact, if present	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	
Record cooler temperature in centigrade, as appropriate	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="checkbox"/> Check if no cooler and/or no ice
Samples are intact and in good condition	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	If No, provide comments below.
RSA/COC provided and complete containing the following information?				
• Client name and client sample number	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	
• Date and time of sampling	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	
• Sampling location or origin	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	
• Container type, size, and number	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	
• Preservatives (if used) noted on the COC/RSA and sample bottles	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	
• Analysis request is clear	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	
• Signature of persons relinquishing and receiving samples	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	
• Date and/or time of sample custody exchange	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	
Verify that sample numbers on containers match the COC and/or RSA	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	
Samples stored properly (e.g., refrigeration)	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	

Notify the PC immediately if any problems are noted. Any "No" checked boxes require PC resolution. For WRPS samples, the initials block below is completed by the responsible WRPS PC.

Samples acceptable for release? Yes No PC/SC Initials: DS Date: 11-15-18

If No, comment on communication and resolution:






54101 Samples 6

Number of IH Samples Received:

Acetonitrile: _____	Asbestos: _____	Formaldehyde: _____	Nitrous Oxide: _____
Aldehyde Screen: _____	Be-Bulk: _____	Furans: _____	Other-IH: _____
Amines: _____	Be-Filter: _____	Lead: _____	Pyridines: _____
Ammonia: _____	Be-Wipe: _____	Methanol: _____	SEM-EDS: _____
Anions: _____	Beryllium: _____	Mercury: _____	SVOA: _____
Aromatic HC: _____	1, 3-Butadiene: _____	Nitrosamines: _____	VOA: _____

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CHAIN OF CUSTODY RECORD FOR WTS

(1) Sample Number <u>1SY-18-01PB</u>		(2) Supervisor/Sampler <i>Print First and Last Name/Signature</i> <u>G. Emms / </u>		(9) Seal Intact Upon Release <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No			
(3) Tank <u>SY-101</u>	(4) Riser <u>21</u>	(5) Cask/Pig Serial No. <u>004</u>		(10) Seal Intact Upon Release <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No			
(6) Shipment Description: A. Work Package Number: <u>498540</u> B. Cask/Pig Seal Number: <u>3064</u> C. Date Sample Collected: <u>11/15/18</u> D. Time Sample Collected: <u>9:02</u>			(7) Sampling Data: - Lithium Bromide <input type="checkbox"/> Yes <input type="checkbox"/> No Amount: <u>N/A</u> Concentration: <u>A</u> - X-Ray <input type="checkbox"/> Yes <input type="checkbox"/> No - Partial Sample <input type="checkbox"/> Yes <input type="checkbox"/> No - Retrieved Partial Sample Stroke Length: _____			(11) Seal Number AND Cask/Pig SERIAL Number consistent with this record? (Block 5 & 6b) <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	
(12) Laboratory Comments: <p style="text-align: center; font-size: 1.2em;">OMNI 20183183 518T036477 MARS ✓</p>							
(8) Field Comments: <p style="text-align: center; font-size: 1.2em;">Dose Rate < 0.5 mR/hr or uncorrected</p>							
(13) Relinquished by: <u>G. Emms</u>  <i>Print First and Last Name</i> <i>Signature</i>		(14) Received by: <u>RTJ VEKILLEN</u>  <i>Print First and Last Name</i> <i>Signature</i>		(15) Date/Time: <u>11-15-18</u> <u>0940</u>	(16) Receiver Comments:		
(17) Relinquished by: <u>RTJ VEKILLEN</u>  <i>Print First and Last Name</i> <i>Signature</i>		(18) Received by: <u>Don Spenser</u>  <i>Print First and Last Name</i> <i>Signature</i>		(19) Date/Time: <u>11-15-18</u> <u>1021</u>	(20) Receiver Comments:		
(21) Relinquished by: _____ <i>Print First and Last Name</i> <i>Signature</i>		(22) Received by: _____ <i>Print First and Last Name</i> <i>Signature</i>		(23) Date/Time:	(24) Receiver Comments:		
(25) Relinquished by: _____ <i>Print First and Last Name</i> <i>Signature</i>		(26) Received by: _____ <i>Print First and Last Name</i> <i>Signature</i>		(27) Date/Time:	(28) Receiver Comments:		

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CHAIN OF CUSTODY RECORD FOR WTS

(1) Sample Number <u>154-18-01</u>		(2) Supervisor/Sampler <i>Print First and Last Name/Signature</i> <u>G. Simons / [Signature]</u>		(9) Seal Intact Upon Release <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No		
(3) Tank <u>54-101</u>	(4) Riser <u>21</u>	(5) Cask/Pig Serial No. <u>30</u>		(10) Seal Intact Upon Release <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No		
(6) Shipment Description: A. Work Package Number: <u>498540</u> B. Cask/Pig Seal Number: <u>3065</u> C. Date Sample Collected: <u>11/18/18</u> D. Time Sample Collected: <u>0908</u>			(7) Sampling Data: - Lithium Bromide <input type="checkbox"/> Yes <input type="checkbox"/> No Amount: <u>N</u> Concentration: <u>A</u> - X-Ray <input type="checkbox"/> Yes <input type="checkbox"/> No - Partial Sample <input type="checkbox"/> Yes <input type="checkbox"/> No - Retrieved Partial Sample Stroke Length: _____		(11) Seal Number AND Cask/Pig SERIAL Number consistent with this record? (Block 5 & 6b) <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	
					(12) Laboratory Comments: <u>OMN 1</u> <u>20183183</u> <u>518T036488</u> <u>MARJ ✓</u>	
(8) Field Comments: <u>Dose Rate 220 mcr/hr ow/uncorrected</u>						
(13) Relinquished by: <u>G. Simons</u> <u>[Signature]</u> <i>Print First and Last Name</i> <i>Signature</i>		(14) Received by: <u>Scott Harder</u> <u>[Signature]</u> <i>Print First and Last Name</i> <i>Signature</i>		(15) Date/Time: <u>11-15-18/0910</u>	(16) Receiver Comments:	
(17) Relinquished by: <u>Scott Harder</u> <u>[Signature]</u> <i>Print First and Last Name</i> <i>Signature</i>		(18) Received by: <u>Don Severson</u> <u>[Signature]</u> <i>Print First and Last Name</i> <i>Signature</i>		(19) Date/Time: <u>11-18-18/1311</u>	(20) Receiver Comments:	
(21) Relinquished by: _____ <i>Print First and Last Name</i> <i>Signature</i>		(22) Received by: _____ <i>Print First and Last Name</i> <i>Signature</i>		(23) Date/Time:	(24) Receiver Comments:	
(25) Relinquished by: _____ <i>Print First and Last Name</i> <i>Signature</i>		(26) Received by: _____ <i>Print First and Last Name</i> <i>Signature</i>		(27) Date/Time:	(28) Receiver Comments:	

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CHAIN OF CUSTODY RECORD FOR WTS

(1) Sample Number <u>154-18-01 DUP</u>		(2) Supervisor/Sampler <i>Print First and Last Name/Signature</i> <u>B. Simons / [Signature]</u>		(9) Seal Intact Upon Release <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No			
(3) Tank <u>ST-101</u>	(4) Riser <u>21</u>	(5) Cask/Pig Serial No. <u>001</u>		(10) Seal Intact Upon Release <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No			
(6) Shipment Description: A. Work Package Number: <u>498540</u> B. Cask/Pig Seal Number: <u>3066</u> C. Date Sample Collected: <u>11/15/18</u> D. Time Sample Collected: <u>0912</u>			(7) Sampling Data: - Lithium Bromide <input type="checkbox"/> Yes <input type="checkbox"/> No Amount: _____ Concentration: <u>W</u> - X-Ray <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No - Partial Sample <input type="checkbox"/> Yes <input type="checkbox"/> No - Retrieved Partial Sample Stroke Length: _____			(11) Seal Number AND Cask/Pig SERIAL Number consistent with this record? (Block 5 & 6b) <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	
			<div style="font-size: 2em; font-weight: bold; transform: rotate(-45deg); opacity: 0.5;">/</div>			(12) Laboratory Comments: <u>OMNI</u> <u>20183183</u> <u>S18T036500</u> <u>MARS ✓</u>	
(8) Field Comments: <u>Dose Rate</u> <u>1320 m/hr</u> <u>ow/uncorrected</u>							
(13) Relinquished by: <u>[Signature]</u> <i>Print First and Last Name</i> <u>B. Simons</u>		(14) Received by: <u>Bob Parks</u> <u>[Signature]</u> <i>Print First and Last Name</i> <u>Bob Parks</u>		(15) Date/Time: <u>11-15-18</u> <u>1300</u>	(16) Receiver Comments:		
(17) Relinquished by: <u>Bob Parks</u> <u>[Signature]</u> <i>Print First and Last Name</i> <u>Bob Parks</u>		(18) Received by: <u>Don Sorenson</u> <u>[Signature]</u> <i>Print First and Last Name</i> <u>Don Sorenson</u>		(19) Date/Time: <u>11-15-18</u> <u>1340</u>	(20) Receiver Comments:		
(21) Relinquished by: <i>Print First and Last Name</i> _____ <i>Signature</i> _____		(22) Received by: <i>Print First and Last Name</i> _____ <i>Signature</i> _____		(23) Date/Time:	(24) Receiver Comments:		
(25) Relinquished by: <i>Print First and Last Name</i> _____ <i>Signature</i> _____		(26) Received by: <i>Print First and Last Name</i> _____ <i>Signature</i> _____		(27) Date/Time:	(28) Receiver Comments:		

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CHAIN OF CUSTODY RECORD FOR WTS

(1) Sample Number <u>15Y-18-01TB</u>		(2) Supervisor/Sampler <i>Print First and Last Name/Signature</i> <u>Beau Perry</u>		(9) Seal Intact Upon Release <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No			
(3) Tank <u>SY-101</u>	(4) Riser <u>21</u>	(5) Cask/Pig Serial No. <u>035</u>		(10) Seal Intact Upon Release <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No			
(6) Shipment Description: A. Work Package Number: <u>498540</u> B. Cask/Pig Seal Number: <u>3063</u> C. Date Sample Collected: <u>11/14/18</u> D. Time Sample Collected: <u>09:08</u>			(7) Sampling Data: - Lithium Broimide <input type="checkbox"/> Yes <input type="checkbox"/> No Amount: _____ Concentration: _____ - X-Ray <input type="checkbox"/> Yes <input type="checkbox"/> No - Partial Sample <input type="checkbox"/> Yes <input type="checkbox"/> No - Retrieved Partial Sample Stroke Length: _____			(11) Seal Number AND Cask/Pig SERIAL Number consistent with this record? (Block 5 & 6b) <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	
			 A 			(12) Laboratory Comments: <div style="font-size: 1.5em; text-align: center;"> OMNI 20183183 S18T036S1Z MARKS ✓ </div>	
(8) Field Comments: <div style="font-size: 1.2em;"> Dose Rate <u> </u> <u>our</u> <u>uncorrected</u> </div>							
(13) Relinquished by: <u>Beau R. Perry</u> <i>Print First and Last Name</i>		(14) Received by: <u>Chris Lamm</u> <i>Print First and Last Name</i>		(15) Date/Time: <u>11/14/18</u> <u>0910</u>	(16) Receiver Comments:		
(17) Relinquished by: <u>Chris Lamm</u> <i>Print First and Last Name</i>		(18) Received by: <u>BOB PARKS</u> <i>Print First and Last Name</i>		(19) Date/Time: <u>11-15-18</u> <u>0930</u>	(20) Receiver Comments:		
(21) Relinquished by: <u>BOB PARKS</u> <i>Print First and Last Name</i>		(22) Received by: <u>Don Spenser</u> <i>Print First and Last Name</i>		(23) Date/Time: <u>11-15-18</u> <u>1008</u>	(24) Receiver Comments:		
(25) Relinquished by: _____ <i>Print First and Last Name</i> _____ <i>Signature</i>		(26) Received by: _____ <i>Print First and Last Name</i> _____ <i>Signature</i>		(27) Date/Time:	(28) Receiver Comments:		

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CHAIN OF CUSTODY RECORD FOR WTS

(1) Sample Number <u>154-18-02</u>		(2) Supervisor/Sampler <i>Print First and Last Name/Signature</i> <u>G. Simone</u>		(9) Seal Intact Upon Release <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	
(3) Tank <u>54-101</u>	(4) Riser <u>21</u>	(5) Cask/Pig Serial No. <u>002</u>		(10) Seal Intact Upon Release <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	
(6) Shipment Description: A. Work Package Number: <u>498540</u> B. Cask/Pig Seal Number: <u>3067</u> C. Date Sample Collected: <u>11/15/18</u> D. Time Sample Collected: <u>0914</u>		(7) Sampling Data: - Lithium Bromide <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No Amount: _____ Concentration: <u>N/A</u> - X-Ray <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No - Partial Sample <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No - Retrieved Partial Sample Stroke Length: _____		(11) Seal Number AND Cask/Pig SERIAL Number consistent with this record? (Block 5 & 6b) <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	
				(12) Laboratory Comments: <u>OMN 1</u> <u>20183183</u> <u>518T036594</u> <u>MARS</u> ✓	
(8) Field Comments: <u>Dose Rate 270 mR/hr low / uncorrected</u>					
(13) Relinquished by: <u>G. Simone</u> <i>Print First and Last Name Signature</i>		(14) Received by: <u>BOB PARKS B</u> <i>Print First and Last Name Signature</i>		(15) Date/Time: <u>11-15-18</u> <u>1230</u>	(16) Receiver Comments:
(17) Relinquished by: <u>BOB PARKS</u> <i>Print First and Last Name Signature</i>		(18) Received by: <u>Don Jensen</u> <i>Print First and Last Name Signature</i>		(19) Date/Time: <u>11-15-18</u> <u>1257</u>	(20) Receiver Comments:
(21) Relinquished by: _____ <i>Print First and Last Name Signature</i>		(22) Received by: _____ <i>Print First and Last Name Signature</i>		(23) Date/Time:	(24) Receiver Comments:
(25) Relinquished by: _____ <i>Print First and Last Name Signature</i>		(26) Received by: _____ <i>Print First and Last Name Signature</i>		(27) Date/Time:	(28) Receiver Comments:

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CHAIN OF CUSTODY RECORD FOR WTS

(1) Sample Number 1SY-18-03		(2) Supervisor/Sampler <i>Print First and Last Name/Signature</i> G. Simons		(9) Seal Intact Upon Release <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No				
(3) Tank SY-101	(4) Riser 21	(5) Cask/Pig Serial No. 008		(10) Seal Intact Upon Release <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No				
(6) Shipment Description: A. Work Package Number: 498540 B. Cask/Pig Seal Number: 3068 C. Date Sample Collected: 11/15/18 D. Time Sample Collected: 0922			(7) Sampling Data: - Lithium Bromide <input type="checkbox"/> Yes <input type="checkbox"/> No Amount: _____ Concentration: N - X-Ray <input type="checkbox"/> Yes <input type="checkbox"/> No - Partial Sample <input type="checkbox"/> Yes <input type="checkbox"/> No - Retrieved Partial Sample Stroke Length: _____			(11) Seal Number AND Cask/Pig SERIAL Number consistent with this record? (Block 5 & 6b) <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No		
						(12) Laboratory Comments: <div style="font-size: 2em; text-align: center;"> OMNI 20183183 S18T036595 MARS ✓ </div>		
(8) Field Comments: <div style="font-size: 1.5em;"> Dose Rate <u>290 nS/hr</u> <i>or uncorrected</i> </div>								
(13) Relinquished by: G. Simons <i>Print First and Last Name</i> <i>Signature</i>		(14) Received by: Scott Harder <i>Print First and Last Name</i> <i>Signature</i>		(15) Date/Time: 11-15-18/1342	(16) Receiver Comments:			
(17) Relinquished by: Scott Harder <i>Print First and Last Name</i> <i>Signature</i>		(18) Received by: Don Brunsen <i>Print First and Last Name</i> <i>Signature</i>		(19) Date/Time: 11-15-18/1400	(20) Receiver Comments:			
(21) Relinquished by: <i>Print First and Last Name</i> <i>Signature</i>		(22) Received by: <i>Print First and Last Name</i> <i>Signature</i>		(23) Date/Time:	(24) Receiver Comments:			
(25) Relinquished by: <i>Print First and Last Name</i> <i>Signature</i>		(26) Received by: <i>Print First and Last Name</i> <i>Signature</i>		(27) Date/Time:	(28) Receiver Comments:			

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SY-101 Riser 21		Top Hat 53"		Date 11/15/18		Work Package WO# 498540					
Sample #	Sample Depth + Top Hat	Time	Dose (WO, RO-7 Uncorrected)	Liquid Color	Pig#	Organic Layer %	Color	Solids %	Setting Characteristics		
Zip cord (no oil/water meter used)						L= 24' 10 1/2" includes tophat					
1SY-18-01TB	N/A	N/A	N/A	N/A	1035	%Full N/A	Organic Layer N/A	Color N/A	Solids % N/A	Setting Characteristics N/A	Expected Depth N/A"
1SY-18-01FB	22' 10 1/2"	0902	< 0.5 ml/hr	N/A	1004	%Full 100	Organic Layer N/A	Color N/A	Solids % N/A	Setting Characteristics N/A	Expected Depth L-24"
1SY-18-01	28' 2 1/2"	0908	220 ml/hr	Amber Bottle	30	%Full 100	Organic Layer NO	Color N/A	Solids % 0	Setting Characteristics N/A	Expected Depth L+40" (3'4")
1SY-18-01DUP	28' 2 1/2"	0912	320 ml/hr	Amber Bottle	1001	%Full 100	Organic Layer NO	Color N/A	Solids % 0	Setting Characteristics N/A	Expected Depth L+40" (3'4")
1SY-18-02	28' 2 1/2"	0914	270 ml/hr	Amber Bottle	1002	%Full 100	Organic Layer NO	Color N/A	Solids % 0	Setting Characteristics N/A	Expected Depth L+40" (3'4")
1SY-18-03	28' 2 1/2"	0922	290 ml/hr	Amber Bottle	1008	%Full 100	Organic Layer NO	Color N/A	Solids % 0	Setting Characteristics N/A	Expected Depth L+40" (3'4")
Zipcord	Liquid 24' 10 1/2"										
	Solid N/A										FLM Info Print/Sign <i>B. Simon/Car</i> Date 11/15/18

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Attachment 5

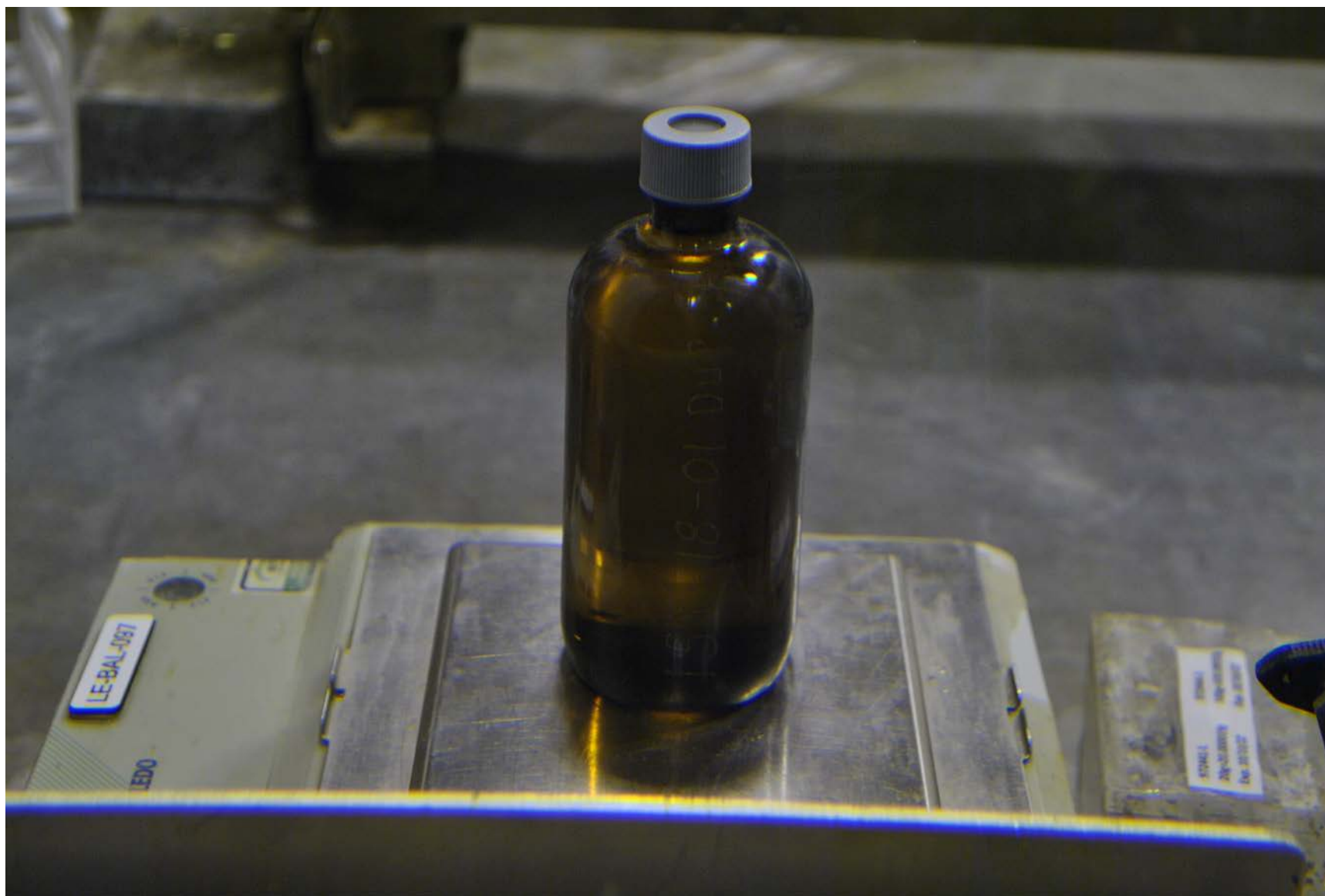
SAMPLE PHOTOGRAPHS

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1SY-18-01

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1SY-18-01DUP

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1SY-18-02 (additional Volume)

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1SY-18-03

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1SY-18-01FB

Attachment 6

HOLDING TIME AND ANALYSIS DATE REPORT

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Sample	Customer	Method	Prep Met	Sample Date Time	Preparation Date	Analysis Date	Hold Time Met
S18T036483	1SY-18-01FB	ALPHA/BETA		11/15/2018 09:02		11/20/2018 13:30	Yes
S18T036495	1SY-18-01	ALPHA/BETA		11/15/2018 09:08		11/20/2018 13:30	Yes
S18T036507	1SY-18-01DUP	ALPHA/BETA		11/15/2018 09:12		11/20/2018 13:30	Yes
S18T036483	1SY-18-01FB	AMERICIUM		11/15/2018 09:02		11/27/2018 12:19	Yes
S18T036495	1SY-18-01	AMERICIUM		11/15/2018 09:08		11/27/2018 12:19	Yes
S18T036507	1SY-18-01DUP	AMERICIUM		11/15/2018 09:12		11/27/2018 12:19	Yes
S18T036483	1SY-18-01FB	CARBON-14		11/15/2018 09:02		11/26/2018 14:15	Yes
S18T036495	1SY-18-01	CARBON-14		11/15/2018 09:08		11/26/2018 14:15	Yes
S18T036507	1SY-18-01DUP	CARBON-14		11/15/2018 09:12		11/26/2018 14:15	Yes
S18T036482	1SY-18-01FB	CN - WATER DISTILLATION		11/15/2018 09:02		12/06/2018 08:00	No
S18T036493	1SY-18-01	CN - WATER DISTILLATION		11/15/2018 09:08		12/06/2018 08:00	No
S18T036505	1SY-18-01DUP	CN - WATER DISTILLATION		11/15/2018 09:12		12/06/2018 08:00	No
S18T036488	1SY-18-01	DENSITY-HC		11/15/2018 09:08		12/19/2018 10:25	Yes
S18T036500	1SY-18-01DUP	DENSITY-HC		11/15/2018 09:12		12/19/2018 10:25	Yes
S18T036483	1SY-18-01FB	GEA		11/15/2018 09:02		11/20/2018 10:19	Yes
S18T036495	1SY-18-01	GEA		11/15/2018 09:08		11/20/2018 10:20	Yes
S18T036507	1SY-18-01DUP	GEA		11/15/2018 09:12		11/20/2018 13:32	Yes
S18T036481	1SY-18-01FB	HG	HG PREP	11/15/2018 09:02	12/10/2018 08:00	12/10/2018 14:33	Yes
S18T036492	1SY-18-01	HG	HG PREP	11/15/2018 09:08	12/10/2018 08:00	12/10/2018 14:25	Yes
S18T036504	1SY-18-01DUP	HG	HG PREP	11/15/2018 09:12	12/10/2018 08:00	12/10/2018 14:35	Yes
S18T036480	1SY-18-01FB	IC - ANIONS/SMALL ORG. ACIDS		11/15/2018 09:02		11/16/2018 12:00	Yes
S18T036491	1SY-18-01	IC - ANIONS/SMALL ORG. ACIDS		11/15/2018 09:08		11/16/2018 12:33	Yes
S18T036491	1SY-18-01	IC - ANIONS/SMALL ORG. ACIDS		11/15/2018 09:08		11/16/2018 14:44	Yes
S18T036503	1SY-18-01DUP	IC - ANIONS/SMALL ORG. ACIDS		11/15/2018 09:12		11/16/2018 14:11	Yes
S18T036503	1SY-18-01DUP	IC - ANIONS/SMALL ORG. ACIDS		11/15/2018 09:12		11/16/2018 16:23	Yes
S18T036479	1SY-18-01FB	ICP-TOTAL METALS		11/15/2018 09:02		11/28/2018 11:28	Yes
S18T036491	1SY-18-01	ICP-TOTAL METALS		11/15/2018 09:08		11/28/2018 11:40	Yes
S18T036503	1SY-18-01DUP	ICP-TOTAL METALS		11/15/2018 09:12		11/28/2018 12:04	Yes
S18T036483	1SY-18-01FB	IODINE-129		11/15/2018 09:02		11/25/2018 16:00	Yes
S18T036495	1SY-18-01	IODINE-129		11/15/2018 09:08		11/25/2018 16:00	Yes
S18T036507	1SY-18-01DUP	IODINE-129		11/15/2018 09:12		11/25/2018 16:00	Yes
S18T036479	1SY-18-01FB	MS ACTINIDES-AM		11/15/2018 09:02		11/27/2018 10:49	Yes
S18T036490	1SY-18-01	MS ACTINIDES-AM		11/15/2018 09:08		11/27/2018 10:53	Yes
S18T036502	1SY-18-01DUP	MS ACTINIDES-AM		11/15/2018 09:12		11/27/2018 11:17	Yes
S18T036479	1SY-18-01FB	MS ACTINIDES-PU		11/15/2018 09:02		11/27/2018 10:49	Yes
S18T036490	1SY-18-01	MS ACTINIDES-PU		11/15/2018 09:08		11/27/2018 10:53	Yes
S18T036502	1SY-18-01DUP	MS ACTINIDES-PU		11/15/2018 09:12		11/27/2018 11:17	Yes

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S18T036479	1SY-18-01FB	MS ACTINIDES-U/NP	11/15/2018 09:02		11/27/2018 10:49	Yes
S18T036490	1SY-18-01	MS ACTINIDES-U/NP	11/15/2018 09:08		11/27/2018 10:53	Yes
S18T036502	1SY-18-01DUP	MS ACTINIDES-U/NP	11/15/2018 09:12		11/27/2018 11:17	Yes
S18T036479	1SY-18-01FB	MS ACTINIDES-U/TH	11/15/2018 09:02		11/20/2018 11:03	Yes
S18T036490	1SY-18-01	MS ACTINIDES-U/TH	11/15/2018 09:08		11/20/2018 11:07	Yes
S18T036490	1SY-18-01	MS ACTINIDES-U/TH	11/15/2018 09:08		11/20/2018 13:07	Yes
S18T036502	1SY-18-01DUP	MS ACTINIDES-U/TH	11/15/2018 09:12		11/20/2018 11:25	Yes
S18T036502	1SY-18-01DUP	MS ACTINIDES-U/TH	11/15/2018 09:12		11/20/2018 12:04	Yes
S18T036479	1SY-18-01FB	MS ANTIMONY	11/15/2018 09:02		11/26/2018 11:17	Yes
S18T036490	1SY-18-01	MS ANTIMONY	11/15/2018 09:08		11/26/2018 11:22	Yes
S18T036502	1SY-18-01DUP	MS ANTIMONY	11/15/2018 09:12		11/26/2018 11:40	Yes
S18T036479	1SY-18-01FB	MS PERIODIC TABLE	11/15/2018 09:02		11/26/2018 11:17	Yes
S18T036490	1SY-18-01	MS PERIODIC TABLE	11/15/2018 09:08		11/26/2018 11:57	Yes
S18T036502	1SY-18-01DUP	MS PERIODIC TABLE	11/15/2018 09:12		11/26/2018 12:15	Yes
S18T037322	1SY-18-01FB	MS PERIODIC TABLE	11/15/2018 09:02		12/04/2018 14:10	Yes
S18T037451	1SY-18-01	MS PERIODIC TABLE	11/15/2018 09:08		12/04/2018 14:15	Yes
S18T037452	1SY-18-01DUP	MS PERIODIC TABLE	11/15/2018 09:12		12/04/2018 14:43	Yes
S18T036483	1SY-18-01FB	NICKEL-63	11/15/2018 09:02		11/26/2018 14:45	Yes
S18T036495	1SY-18-01	NICKEL-63	11/15/2018 09:08		11/26/2018 14:45	Yes
S18T036507	1SY-18-01DUP	NICKEL-63	11/15/2018 09:12		11/26/2018 14:45	Yes
S18T036493	1SY-18-01	OH	11/15/2018 09:08		11/20/2018 09:12	Yes
S18T036505	1SY-18-01DUP	OH	11/15/2018 09:12		11/20/2018 09:12	Yes
S18T037778	1SY-18-01	OH	11/15/2018 09:08		12/12/2018 16:17	Yes
S18T037779	1SY-18-01DUP	OH	11/15/2018 09:12		12/12/2018 16:17	Yes
S18T036487	1SY-18-01FB	PCB 222S	ORGANIC EXT. 11/15/2018 09:02	12/10/2018 10:40	12/12/2018 19:47	Yes
S18T036499	1SY-18-01	PCB 222S	ORGANIC EXT. 11/15/2018 09:08	12/10/2018 10:40	12/12/2018 19:00	Yes
S18T036511	1SY-18-01DUP	PCB 222S	ORGANIC EXT. 11/15/2018 09:12	12/10/2018 10:40	12/12/2018 15:50	Yes
S18T036482	1SY-18-01FB	PH LIQUID	11/15/2018 09:02		11/27/2018 09:15	Yes
S18T036493	1SY-18-01	PH LIQUID	11/15/2018 09:08		01/07/2019 15:30	No
S18T036505	1SY-18-01DUP	PH LIQUID	11/15/2018 09:12		01/07/2019 15:30	No
S18T036483	1SY-18-01FB	PLUTONIUM	11/15/2018 09:02		11/27/2018 13:24	Yes
S18T036495	1SY-18-01	PLUTONIUM	11/15/2018 09:08		11/27/2018 13:24	Yes
S18T036507	1SY-18-01DUP	PLUTONIUM	11/15/2018 09:12		11/27/2018 13:24	Yes
S18T036483	1SY-18-01FB	PLUTONIUM-241	11/15/2018 09:02		11/27/2018 10:55	Yes
S18T036495	1SY-18-01	PLUTONIUM-241	11/15/2018 09:08		11/27/2018 10:55	Yes
S18T036507	1SY-18-01DUP	PLUTONIUM-241	11/15/2018 09:12		11/27/2018 10:55	Yes
S18T036483	1SY-18-01FB	STRONTIUM-90	11/15/2018 09:02		11/28/2018 15:00	Yes
S18T036495	1SY-18-01	STRONTIUM-90	11/15/2018 09:08		11/28/2018 15:00	Yes

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S18T036507	1SY-18-01DUP	STRONTIUM-90		11/15/2018 09:12		11/28/2018 15:00	Yes
S18T036493	1SY-18-01	SUSPENDED SOLIDS		11/15/2018 09:08		11/26/2018 08:55	No
S18T036505	1SY-18-01DUP	SUSPENDED SOLIDS		11/15/2018 09:12		11/26/2018 08:55	No
S18T036486	1SY-18-01FB	SVOA 222S LIQUID	ORGANIC EXT.	11/15/2018 09:02	11/26/2018 11:22	12/05/2018 19:54	Yes
S18T036498	1SY-18-01	SVOA 222S LIQUID	ORGANIC EXT.	11/15/2018 09:08	11/26/2018 11:22	12/05/2018 17:18	Yes
S18T036510	1SY-18-01DUP	SVOA 222S LIQUID	ORGANIC EXT.	11/15/2018 09:12	11/28/2018 14:40	12/06/2018 15:40	Yes
S18T036483	1SY-18-01FB	TC-99		11/15/2018 09:02		11/27/2018 16:00	Yes
S18T036495	1SY-18-01	TC-99		11/15/2018 09:08		11/27/2018 16:00	Yes
S18T036507	1SY-18-01DUP	TC-99		11/15/2018 09:12		11/27/2018 16:00	Yes
S18T036493	1SY-18-01	TGA-TA		11/15/2018 09:08		11/29/2018 08:08	Yes
S18T036505	1SY-18-01DUP	TGA-TA		11/15/2018 09:12		12/04/2018 16:05	Yes
S18T036482	1SY-18-01FB	TICTOC		11/15/2018 09:02		11/20/2018 08:00	Yes
S18T036493	1SY-18-01	TICTOC		11/15/2018 09:08		11/20/2018 08:00	Yes
S18T036505	1SY-18-01DUP	TICTOC		11/15/2018 09:12		11/20/2018 08:00	Yes
S18T036482	1SY-18-01FB	TOT. CARBON by FURNACE		11/15/2018 09:02		11/28/2018 13:10	Yes
S18T036493	1SY-18-01	TOT. CARBON by FURNACE		11/15/2018 09:08		11/28/2018 13:10	Yes
S18T036494	1SY-18-01	TOT. CARBON by FURNACE		11/15/2018 09:08		11/28/2018 13:10	Yes
S18T036505	1SY-18-01DUP	TOT. CARBON by FURNACE		11/15/2018 09:12		11/28/2018 13:10	Yes
S18T036506	1SY-18-01DUP	TOT. CARBON by FURNACE		11/15/2018 09:12		11/28/2018 13:10	Yes
S18T036482	1SY-18-01FB	TOT. ORGANIC CARBON by FURNACE		11/15/2018 09:02		11/28/2018 09:40	Yes
S18T036493	1SY-18-01	TOT. ORGANIC CARBON by FURNACE		11/15/2018 09:08		11/28/2018 09:40	Yes
S18T036494	1SY-18-01	TOT. ORGANIC CARBON by FURNACE		11/15/2018 09:08		11/28/2018 09:40	Yes
S18T036505	1SY-18-01DUP	TOT. ORGANIC CARBON by FURNACE		11/15/2018 09:12		11/28/2018 09:40	Yes
S18T036506	1SY-18-01DUP	TOT. ORGANIC CARBON by FURNACE		11/15/2018 09:12		11/28/2018 09:40	Yes
S18T036483	1SY-18-01FB	TRITIUM		11/15/2018 09:02		11/27/2018 14:35	Yes
S18T036495	1SY-18-01	TRITIUM		11/15/2018 09:08		11/27/2018 14:35	Yes
S18T036507	1SY-18-01DUP	TRITIUM		11/15/2018 09:12		11/27/2018 14:35	Yes
S18T036478	1SY-18-01FB	VOA-LIQ-TANK	VOA PURGE 14	11/15/2018 09:02	11/15/2018 17:00	11/15/2018 17:12	Yes
S18T036489	1SY-18-01	VOA-LIQ-TANK	VOA PURGE 14	11/15/2018 09:08	11/15/2018 18:00	11/15/2018 18:06	Yes
S18T036501	1SY-18-01DUP	VOA-LIQ-TANK	VOA PURGE 14	11/15/2018 09:12	11/15/2018 17:30	11/15/2018 17:39	Yes
S18T036513	1SY-18-01TB	VOA-LIQ-TANK	VOA PURGE 14	11/15/2018 09:08	11/15/2018 16:30	11/15/2018 16:44	Yes

Attachment 7

MATRIX SPIKE SAMPLE RESULTS

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ALPHA/BETA Analysis Matrix Spike/Matrix Spike Duplicate Summary for SY-101 TBI Grab 2018-11

Client Sample Id	Sample Id	Analyte	MS Recovery %	MSD Recovery %	Lower Limit	Upper Limit	RPD %	RPD Limit
1SY-18-01	S18T036495	Alpha Total	99.4		75	125		
		Beta Total	104		75	125		

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CARBON-14 Analysis Matrix Spike/Matrix Spike Duplicate Summary for SY-101 TBI Grab 2018-11

Client Sample Id	Sample Id	Analyte	MS Recovery %	MSD Recovery %	Lower Limit	Upper Limit	RPD %	RPD Limit
1SY-18-01DUP	S18T036507	Carbon-14	98.5		75	125		

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Cyanide Analysis Matrix Spike/Matrix Spike Duplicate Summary for SY-101 TBI Grab 2018-11

Client Sample Id	Sample Id	Analyte	MS Recovery %	MSD Recovery %	Lower Limit	Upper Limit	RPD %	RPD Limit
1SY-18-01	S18T036493	Cyanide	96.7	99.2	75	125	2.52	20

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HG Analysis Matrix Spike/Matrix Spike Duplicate Summary for SY-101 TBI Grab 2018-11

Client Sample Id	Sample Id	Analyte	MS Recovery %	MSD Recovery %	Lower Limit	Upper Limit	RPD %	RPD Limit
1SY-18-01	S18T036492	Mercury	107	107	75	125	0.401	20

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IC - ANIONS/SMALL ORG. ACIDS Analysis Matrix Spike/Matrix Spike Duplicate Summary for SY-101 TBI Grab 2018-11

Client Sample Id	Sample Id	Analyte	MS Recovery %	MSD Recovery %	Lower Limit	Upper Limit	RPD %	RPD Limit
1SY-18-01	S18T036491	Acetate	104		75	125		
		Bromide	96.8		75	125		
		Chloride	103		75	125		
		Fluoride	101		75	125		
		Formate	100		75	125		
		Glycolate	101		75	125		
		Nitrate	99.9		75	125		
		Nitrite	102		75	125		
		Oxalate	99.9		75	125		
		Phosphate	94.7		75	125		
		Sulfate	101		75	125		
		Thiosulfate	97.8		75	125		

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ICP-TOTAL METALS Analysis Matrix Spike/Matrix Spike Duplicate Summary for SY-101 TBI Grab 2018-11

Client Sample Id	Sample Id	Analyte	MS Recovery %	MSD Recovery %	Lower Limit	Upper Limit	RPD %	RPD Limit
1SY-18-01	S18T036491	Aluminum	105		75	125		
		Antimony	113		75	125		
		Arsenic	97.7		75	125		
		Barium	95.1		75	125		
		Beryllium	96.5		75	125		
		Bismuth	93.5		75	125		
		Boron	97.4		75	125		
		Cadmium	95.1		75	125		
		Calcium	95.4		75	125		
		Cerium	95.1		75	125		
		Chromium	95.9		75	125		
		Cobalt	95.6		75	125		
		Copper	104		75	125		
		Europium	96.0		75	125		
		Iron	95.9		75	125		
		Lanthanum	97.8		75	125		
		Lead	102		75	125		
		Lithium	97.3		75	125		
		Magnesium	96.2		75	125		
		Manganese	95.9		75	125		
		Molybdenum	97.0		75	125		
		Neodymium	98.5		75	125		
		Nickel	95.3		75	125		
		Niobium	96.5		75	125		
		Palladium	93.7		75	125		
		Phosphorus	95.2		75	125		
		Potassium	96.7		75	125		
		Praseodymium	94.7		75	125		
		Rhodium	95.1		75	125		
		Rubidium	95.3		75	125		
		Ruthenium	93.3		75	125		
		Samarium	96.7		75	125		
		Selenium	98.1		75	125		
		Silicon	104		75	125		
		Silver	86.8		75	125		
		Sodium	93.1		75	125		
		Strontium	94.3		75	125		
		Sulfur	96.9		75	125		
		Tantalum	98.6		75	125		
		Tellurium	96.4		75	125		
		Thallium	91.8		75	125		
Thorium	98.2		75	125				
Tin	93.5		75	125				

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 ICP-TOTAL METALS Analysis Matrix Spike/Matrix Spike Duplicate Summary for SY-101 TBI Grab 2018-11

Client Sample Id	Sample Id	Analyte	MS Recovery %	MSD Recovery %	Lower Limit	Upper Limit	RPD %	RPD Limit
1SY-18-01	S18T036491	Titanium	97.2		75	125		
		Tungsten	96.8		75	125		
		Uranium	98.7		75	125		
		Vanadium	96.5		75	125		
		Yttrium	96.0		75	125		
		Zinc	95.7		75	125		
		Zirconium	96.7		75	125		

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MS ACTINIDES-AM Analysis Matrix Spike/Matrix Spike Duplicate Summary for SY-101 TBI Grab 2018-11

Client Sample Id	Sample Id	Analyte	MS Recovery %	MSD Recovery %	Lower Limit	Upper Limit	RPD %	RPD Limit
1SY-18-01	S18T036490	Americium-241	101		75	125		

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MS ACTINIDES-PU Analysis Matrix Spike/Matrix Spike Duplicate Summary for SY-101 TBI Grab 2018-11

Client Sample Id	Sample Id	Analyte	MS Recovery %	MSD Recovery %	Lower Limit	Upper Limit	RPD %	RPD Limit
1SY-18-01	S18T036490	Plutonium-242	103		75	125		

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MS ACTINIDES-U/NP Analysis Matrix Spike/Matrix Spike Duplicate Summary for SY-101 TBI Grab 2018-11

Client Sample Id	Sample Id	Analyte	MS Recovery %	MSD Recovery %	Lower Limit	Upper Limit	RPD %	RPD Limit
1SY-18-01	S18T036490	Neptunium-237	102		75	125		
		Uranium-233	101		75	125		

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MS ACTINIDES-U/TH Analysis Matrix Spike/Matrix Spike Duplicate Summary for SY-101 TBI Grab 2018-11

Client Sample Id	Sample Id	Analyte	MS Recovery %	MSD Recovery %	Lower Limit	Upper Limit	RPD %	RPD Limit
1SY-18-01	S18T036490	Thorium-232	104		75	125		
		Uranium-235	109		75	125		
		Uranium-238	109		75	125		

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MS ANTIMONY Analysis Matrix Spike/Matrix Spike Duplicate Summary for SY-101 TBI Grab 2018-11

Client Sample Id	Sample Id	Analyte	MS Recovery %	MSD Recovery %	Lower Limit	Upper Limit	RPD %	RPD Limit
1SY-18-01	S18T036490	Antimony	101		75	125		
		Tin-117	100		75	125		

RPP-RPT-61303, Rev. 5
MS PERIODIC TABLE Analysis Matrix Spike/Matrix Spike Duplicate Summary for SY-101 TBI Grab 2018-11

Client Sample Id	Sample Id	Analyte	MS Recovery %	MSD Recovery %	Lower Limit	Upper Limit	RPD %	RPD Limit
1SY-18-01	S18T036490	Cesium	101					
	S18T037451	Arsenic	100					
		Lead	89.6					
		Selenium	101					
		Silver	79.3					
		Thallium	93.2					

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OH Analysis Matrix Spike/Matrix Spike Duplicate Summary for SY-101 TBI Grab 2018-11

Client Sample Id	Sample Id	Analyte	MS Recovery %	MSD Recovery %	Lower Limit	Upper Limit	RPD %	RPD Limit
1SY-18-01	S18T036493	Hydroxide	121		75	125		

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PCB 222S Analysis Matrix Spike/Matrix Spike Duplicate Summary for SY-101 TBI Grab 2018-11

Client Sample Id	Sample Id	Analyte	MS Recovery %	MSD Recovery %	Lower Limit	Upper Limit	RPD %	RPD Limit
1SY-18-01DUP	S18T036511	Aroclor-1254	64.0	78.0	36	120.1	19.7	30

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SVOA 222S LIQUID Analysis Matrix Spike/Matrix Spike Duplicate Summary for SY-101 TBI Grab 2018-11

Client Sample Id	Sample Id	Analyte	MS Recovery %	MSD Recovery %	Lower Limit	Upper Limit	RPD %	RPD Limit
1SY-18-01	S18T036498	1,2,4-Trichlorobenzene	42.9	18.5	20	111	79.4	30
		1,2-Dichlorobenzene	35.3	19.1	70	130	59.3	30
		1,4-Dichlorobenzene	29.9	17.0	20	107	54.7	30
		1-Butanol	53.6	49.4	70	130	8.19	30
		2,2-oxybis(1-Chloropropane)	89.3	71.6	70	130	22.1	30
		2,4,5-Trichlorophenol	0.0	0.0	70	130	0.0	30
		2,4,6-Trichlorophenol	0.0	0.0	70	130	0.0	30
		2,4-Dichlorophenol	0.0	0.0	70	130	0.0	30
		2,4-Dimethylphenol	0.0	0.0	70	130	0.0	30
		2,4-Dinitrophenol	167	171	70	130	2.27	30
		2,4-Dinitrotoluene	102	99.9	55	105	1.64	30
		2,6 bis-4Methylphenol	0.0	0.0	70	130	0.0	30
		2,6-Dinitrotoluene	93.2	90.8	70	130	2.53	30
		2-Butoxyethanol	96.0	88.8	70	130	7.75	30
		2-Chloronaphthalene	75.9	60.5	70	130	22.7	30
		2-Chlorophenol	0.0	0.0	40	106	0.0	30
		2-Ethoxyethanol	81.8	74.6	70	130	9.30	30
		2-Methylnaphthalene	68.0	44.3	70	130	42.2	30
		2-Methylphenol	65.3	58.9	70	130	10.4	30
		2-Nitroaniline	10.4	9.75	70	130	5.97	30
		2-Nitrophenol	185	171	70	130	7.71	30
		3 & 4 Methylphenol Total	0.0	0.0	70	130	0.0	30
		3-Nitroaniline	0.0	0.0	70	130	0.0	30
		4,6-Dinitro-2-methylphenol	224	221	70	130	1.35	30
		4-Bromophenyl-phenylether	92.5	92.0	70	130	0.569	30
		4-Chloro-3-methylphenol	0.0	0.0	45	112	0.0	30
		4-Chloroaniline	19.1	0.0	70	130	200	30
		4-Chlorophenyl-phenylether	85.6	84.7	70	130	1.06	30
		4-Nitroaniline	0.0	0.0	70	130	0.0	30
		4-Nitrophenol	280	255	45	115	9.22	30
		Acenaphthene	73.4	66.2	34	106	10.4	30
		Acenaphthylene	0.0	0.0	70	130	0.0	30
		Anthracene	52.8	52.1	70	130	1.29	30
		Benzo(a)anthracene	90.1	93.2	70	130	3.36	30
		Benzo(a)pyrene	17.6	0.0	70	130	200	30
		Benzo(b)fluoranthene	119	126	70	130	6.00	30
		Benzo(g,h,i)perylene	98.8	78.6	70	130	22.7	30
		Benzo(k)fluoranthene	112	117	70	130	4.38	30
		Butylbenzylphthalate	92.3	96.2	70	130	4.22	30
		Chrysene	113	119	70	130	5.19	30
		Cyclohexanone	99.5	87.9	70	130	12.3	30
		Di-n-butylphthalate	103	105	70	130	2.09	30
		Di-n-octylphthalate	123	131	70	130	6.37	30

RPP-RPT-61303, Rev. 5
SVOA 222S LIQUID Analysis Matrix Spike/Matrix Spike Duplicate Summary for SY-101 TBI Grab 2018-11

Client Sample Id	Sample Id	Analyte	MS Recovery %	MSD Recovery %	Lower Limit	Upper Limit	RPD %	RPD Limit		
1SY-18-01	S18T036498	Dibenz(a,h)anthracene	112	115	70	130	3.04	30		
		Dibenzofuran	84.4	79.9	70	130	5.48	30		
		Diethylphthalate	98.4	96.1	70	130	2.39	30		
		Dimethylphthalate	78.0	78.0	70	130	0.0	30		
		Diphenylamine	0.0	12.4	70	130	200	30		
		Fluoranthene	97.3	99.2	70	130	1.91	30		
		Fluorene	87.2	86.9	70	130	0.345	30		
		Hexachlorobenzene	88.1	90.8	70	130	3.02	30		
		Hexachlorobutadiene	27.5	12.2	70	130	77.0	30		
		Hexachlorocyclopentadiene	46.4	24.2	70	130	63.0	30		
		Hexachloroethane	20.4	13.0	70	130	44.5	30		
		Indeno(1,2,3-cd)pyrene	109	113	70	130	3.32	30		
		Isobutanol	102	60.6	70	130	50.8	30		
		Isophorone	96.9	88.5	70	130	9.06	30		
		N-Nitrosodimethylamine	101	91.6	44	99	10.3	30		
		N-Nitrosodipropylamine	98.9	88.7	70	130	10.8	30		
		N-Nitrosomorpholine	101	91.6	70	130	9.96	30		
		Naphthalene	59.5	31.7	70	130	61.1	30		
		Nitrobenzene	167	144	70	130	14.7	30		
		Pentachlorophenol	77.0	58.0	47	110	28.1	30		
		Phenanthrene	91.9	93.4	70	130	1.62	30		
		Phenol	0.0	0.0	41	107	0.0	30		
		Pyrene	93.7	97.1	65	111	3.62	30		
		Pyridine	76.1	73.2	70	130	3.82	30		
		Tri-n-butylphosphate	99.7	100	70	130	0.528	30		
		bis(2-Chloroethoxy)methane	92.6	84.0	70	130	9.69	30		
		bis(2-Ethylhexyl)phthalate	96.1	98.6	70	130	2.62	30		
		bis-(2-Chloroethyl) ether	94.3	82.7	70	130	13.1	30		
		1SY-18-01DUP	S18T036510	1,2,4-Trichlorobenzene	13.6	25.4	20	111	60.8	30
				1,2-Dichlorobenzene	18.0	31.1	70	130	53.4	30
				1,4-Dichlorobenzene	16.0	29.0	20	107	57.6	30
				1-Butanol	57.0	61.0	70	130	6.79	30
				2,2-oxybis(1-Chloropropane)	73.4	78.8	70	130	7.00	30
2,4,5-Trichlorophenol	0.0			14.8	70	130	200	30		
2,4,6-Trichlorophenol	30.9			47.6	70	130	42.4	30		
2,4-Dichlorophenol	0.0			0.0	70	130	0.0	30		
2,4-Dimethylphenol	0.0			0.0	70	130	0.0	30		
2,4-Dinitrophenol	155			164	70	130	5.22	30		
2,4-Dinitrotoluene	77.0			87.8	55	105	13.2	30		
2,6 bis-4Methylphenol	0.0			0.0	70	130	0.0	30		
2,6-Dinitrotoluene	80.0			89.7	70	130	11.4	30		
2-Butoxyethanol	97.8			97.6	70	130	0.192	30		
2-Chloronaphthalene	39.3			51.8	70	130	27.3	30		

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SVOA 222S LIQUID Analysis Matrix Spike/Matrix Spike Duplicate Summary for SY-101 TBI Grab 2018-11

Client Sample Id	Sample Id	Analyte	MS Recovery %	MSD Recovery %	Lower Limit	Upper Limit	RPD %	RPD Limit
1SY-18-01DUP	S18T036510	2-Chlorophenol	0.0	12.8	40	106	200	30
		2-Ethoxyethanol	83.9	88.4	70	130	5.22	30
		2-Methylnaphthalene	31.4	43.5	70	130	32.2	30
		2-Methylphenol	0.0	0.0	70	130	0.0	30
		2-Nitroaniline	10.5	13.5	70	130	25.0	30
		2-Nitrophenol	185	187	70	130	0.887	30
		3 & 4 Methylphenol Total	0.0	0.0	70	130	0.0	30
		3-Nitroaniline	0.0	0.0	70	130	0.0	30
		4,6-Dinitro-2-methylphenol	184	177	70	130	3.82	30
		4-Bromophenyl-phenylether	54.9	69.2	70	130	23.1	30
		4-Chloro-3-methylphenol	0.0	0.0	45	112	0.0	30
		4-Chloroaniline	0.0	0.0	70	130	0.0	30
		4-Chlorophenyl-phenylether	52.1	65.0	70	130	22.0	30
		4-Nitroaniline	0.0	0.0	70	130	0.0	30
		4-Nitrophenol	273	271	45	115	0.744	30
		Acenaphthene	44.8	57.6	34	106	25.1	30
		Acenaphthylene	0.0	0.0	70	130	0.0	30
		Anthracene	45.4	58.9	70	130	25.9	30
		Benzo(a)anthracene	56.6	69.9	70	130	21.1	30
		Benzo(a)pyrene	29.0	39.1	70	130	29.8	30
		Benzo(b)fluoranthene	67.6	83.3	70	130	20.8	30
		Benzo(g,h,i)perylene	59.6	74.7	70	130	22.4	30
		Benzo(k)fluoranthene	64.7	82.1	70	130	23.8	30
		Butylbenzylphthalate	56.3	70.4	70	130	22.2	30
		Chrysene	63.3	79.6	70	130	22.8	30
		Cyclohexanone	97.8	98.3	70	130	0.535	30
		Di-n-butylphthalate	66.3	79.7	70	130	18.3	30
		Di-n-octylphthalate	74.1	91.7	70	130	21.2	30
		Dibenz(a,h)anthracene	62.4	78.3	70	130	22.6	30
		Dibenzofuran	50.3	63.8	70	130	23.8	30
		Diethylphthalate	78.8	87.8	70	130	10.7	30
		Dimethylphthalate	66.9	78.4	70	130	15.8	30
		Diphenylamine	8.03	8.03	70	130	0.0	30
		Fluoranthene	61.2	74.9	70	130	20.2	30
		Fluorene	53.9	67.7	70	130	22.8	30
		Hexachlorobenzene	54.0	68.1	70	130	23.1	30
		Hexachlorobutadiene	0.0	19.0	70	130	200	30
		Hexachlorocyclopentadiene	16.9	29.6	70	130	54.6	30
		Hexachloroethane	0.0	22.4	70	130	200	30
		Indeno(1,2,3-cd)pyrene	62.1	77.9	70	130	22.6	30
		Isobutanol	104	101	70	130	2.27	30
		Isophorone	93.5	94.1	70	130	0.560	30
		N-Nitrosodimethylamine	101	101	44	99	0.525	30

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SVOA 222S LIQUID Analysis Matrix Spike/Matrix Spike Duplicate Summary for SY-101 TBI Grab 2018-11

Client Sample Id	Sample Id	Analyte	MS Recovery %	MSD Recovery %	Lower Limit	Upper Limit	RPD %	RPD Limit
1SY-18-01DUP	S18T036510	N-Nitrosodipropylamine	96.2	96.5	70	130	0.389	30
		N-Nitrosomorpholine	102	103	70	130	0.516	30
		Naphthalene	27.5	38.5	70	130	33.2	30
		Nitrobenzene	131	143	70	130	8.32	30
		Pentachlorophenol	57.8	68.0	47	110	16.1	30
		Phenanthrene	57.1	70.5	70	130	21.0	30
		Phenol	0.0	0.0	41	107	0.0	30
		Pyrene	57.8	71.9	65	111	21.8	30
		Pyridine	78.7	73.3	70	130	7.11	30
		Tri-n-butylphosphate	75.0	85.6	70	130	13.2	30
		bis(2-Chloroethoxy)methane	89.7	90.3	70	130	0.667	30
		bis(2-Ethylhexyl)phthalate	56.9	72.8	70	130	24.6	30
		bis-(2-Chloroethyl) ether	89.8	91.5	70	130	1.90	30

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TICTOC Analysis Matrix Spike/Matrix Spike Duplicate Summary for SY-101 TBI Grab 2018-11

Client Sample Id	Sample Id	Analyte	MS Recovery %	MSD Recovery %	Lower Limit	Upper Limit	RPD %	RPD Limit
1SY-18-01	S18T036493	Inorganic Carbon Total	96.4		75	125		
		Organic Carbon Total	88.7		75	125		

RPP-RPT-61303, Rev. 5
TOT. CARBON by FURNACE Analysis Matrix Spike/Matrix Spike Duplicate Summary for SY-101 TBI Grab 2018-11

Client Sample Id	Sample Id	Analyte	MS Recovery %	MSD Recovery %	Lower Limit	Upper Limit	RPD %	RPD Limit
1SY-18-01	S18T036493	Carbon Total	104		75	125		

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TOT. ORGANIC CARBON by FURNACE Analysis Matrix Spike/Matrix Spike Duplicate Summary for SY-101 TBI Grab 2018-11

Client Sample Id	Sample Id	Analyte	MS Recovery %	MSD Recovery %	Lower Limit	Upper Limit	RPD %	RPD Limit
1SY-18-01	S18T036493	Organic Carbon Total	102		75	125		

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TRITIUM Analysis Matrix Spike/Matrix Spike Duplicate Summary for SY-101 TBI Grab 2018-11

Client Sample Id	Sample Id	Analyte	MS Recovery %	MSD Recovery %	Lower Limit	Upper Limit	RPD %	RPD Limit
1SY-18-01DUP	S18T036507	Tritium	102		75	125		

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VOA-LIQ-TANK Analysis Matrix Spike/Matrix Spike Duplicate Summary for SY-101 TBI Grab 2018-11

Client Sample Id	Sample Id	Analyte	MS Recovery %	MSD Recovery %	Lower Limit	Upper Limit	RPD %	RPD Limit
1SY-18-01	S18T036489	1,1,1-Trichloroethane	105	99.3	70	130	5.54	30
		1,1,2,2-Tetrachloroethane	0.0	0.0	70	130	0.0	30
		1,1,2-Trichloroethane	102	98.9	70	130	3.53	30
		1,1-Dichloroethane	105	101	70	130	3.26	30
		1,1-Dichloroethene	99.3	100	72	147	0.956	30
		1,2,4-Trichlorobenzene	90.3	97.9	70	130	8.12	30
		1,2-Dibromo-3-Chloropropane	105	113	70	130	7.34	30
		1,2-Dibromoethane	107	112	70	130	4.45	30
		1,2-Dichlorobenzene	97.1	98.7	70	130	1.59	30
		1,2-Dichloroethane	112	111	70	130	0.967	30
		1,2-Dichloropropane	103	100	70	130	2.50	30
		1,3-Dichlorobenzene	94.8	94.1	70	130	0.745	30
		1,4-Dichlorobenzene	96.6	95.6	70	130	1.00	30
		1-Butanol	107	111	63	142	3.64	30
		112Trichloro-122Trifluoroethan	98.1	91.0	70	130	7.44	30
		2-Butanone	109	113	71	135	3.78	30
		2-Hexanone	115	126	67	158	9.53	30
		2-Nitropropane	106	115	70	130	8.15	30
		2-Pentanone	100	108	70	130	6.95	30
		4-Methyl-2-pentanone	114	122	72	150	6.63	30
		Acetone	121	125	56	155	3.06	30
		Benzene	98.0	96.3	84	120	1.77	30
		Bromodichloromethane	103	100	70	130	3.11	30
		Bromoform	109	106	70	130	2.88	30
		Bromomethane	110	72.3	70	130	41.0	30
		Carbon Disulfide	86.7	81.1	70	130	6.61	30
		Carbon Tetrachloride	102	96.9	70	130	5.04	30
		Chlorobenzene	97.7	96.3	88	113	1.36	30
		Chloroethane	111	104	70	130	7.03	30
		Chloroform	105	102	70	130	2.28	30
		Chloromethane	108	98.8	70	130	8.60	30
		Cyclohexane	97.5	91.5	70	130	6.27	30
		Dibromochloromethane	105	107	70	130	1.34	30
		Dichlorodifluoromethane	94.1	88.6	70	130	6.00	30
		Diethyl ether	103	102	70	130	0.789	30
		Ethyl acetate	15.1	2.87	70	130	136	30
		Ethylbenzene	94.8	92.4	70	130	2.56	30
		Hexachloroethane	87.0	84.4	70	130	2.96	30
		Hexane	89.2	88.1	70	130	1.22	30
		Isopropyl Benzene	92.9	88.4	70	130	4.88	30
		Methyl Acetate	7.64	3.35	70	130	78.0	30
		Methylcyclohexane	93.8	88.9	70	130	5.32	30
		Methylene Chloride	102	99.5	70	130	2.68	30

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VOA-LIQ-TANK Analysis Matrix Spike/Matrix Spike Duplicate Summary for SY-101 TBI Grab 2018-11

Client Sample Id	Sample Id	Analyte	MS Recovery %	MSD Recovery %	Lower Limit	Upper Limit	RPD %	RPD Limit
1SY-18-01	S18T036489	Styrene	92.8	91.4	70	130	1.55	30
		Tetrachloroethene	90.3	92.6	70	130	2.46	30
		Tetrahydrofuran	109	112	70	130	2.80	30
		Toluene	95.5	96.1	87	114	0.705	30
		Trichloroethene	166	160	75	127	3.54	30
		Trichlorofluoromethane	111	106	70	130	4.75	30
		Vinyl Chloride	88.6	76.0	70	130	15.3	30
		cis-1,3-Dichloropropene	105	107	70	130	2.10	30
		cis-Dichloroethylene	99.9	98.8	70	130	1.16	30
		m,p-Xylene	92.9	89.5	70	130	3.67	30
		n-Butylbenzene	88.5	81.8	70	130	7.80	30
		o-Xylene	96.8	93.7	70	130	3.27	30
		tert-butyl methyl ether	108	110	70	130	2.09	30
		trans-1,3-Dichloropropene	108	111	70	130	2.43	30
		trans-Dichloroethylene	95.9	94.2	70	130	1.75	30

RPP-RPT-61303, Rev. 5

Attachment 8

SURROGATE RECOVERIES

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**PCB SY101 TBI Grab 2018-11
Liquid-Liquid Extraction****PCB Surrogate Recoveries for Liquid-Liquid Extraction**

The limits for surrogate recoveries and recoveries obtained for samples in this batch are as follows:

Sample	TCX (%)	DCB (%)
Prep Blank	30.07	84.92
LCS	54.86	113.35
S18T036511	32.80	70.37
Dup	36.31	65.51
MS	48.03	75.00
MSD	51.47	82.86
S18T036499	53.95	59.34
S18T036487	39.84	120.84

Liquid-Liquid SPC Limits:

TCX Limits: 10% - 70%

DCB Limits: 22% - 126%

The Liquid-Liquid extraction method has established surrogate QC limits as listed. The sheets that have ng/ μ L show recoveries based on raw ng on-column. Recovery results reported on the Custom Reports may be slightly different due to the number of significant digits used for calculations. Results listed here are based on the custom reports and values that are uploaded into LIMs.

TCX and DCB were within acceptance criteria for all samples. Surrogates are used to assist in demonstrating the presence or absence of matrix effects.

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**SURROGATE STANDARD RECOVERY SUMMARY
SVOA SY101 TBI**

Sample	2-Fluorophenol			Phenol-D6			Nitrobenzene-D5		
	Limits:	Lower	Upper	Limits:	Lower	Upper	Limits:	Lower	Upper
		38	109		39	115		43	108
	Conc Added	Conc Recov	% Recov	Conc Added	Conc Recov	% Recov	Conc Added	Conc Recov	% Recov
BLK	40.000	32.797	81.99	40.000	33.911	84.78	20.000	18.521	92.61
LCS	40.000	28.759	71.90	40.000	31.424	78.56	20.000	16.088	80.44
S18T036510	40.000	7.302	18.26	40.000	3.735	9.34	20.000	17.484	87.42
S18T036510 DUP	40.000	0.104	0.26	40.000	0.075	0.19	20.000	16.38	81.90
S18T036510 MS	40.000	0.025	0.06	40.000	N/A	0.00	20.000	17.574	87.87
S18T036510 MSD	40.000	0.661	1.65	40.000	0.168	0.42	20.000	17.984	89.92

SURROGATE STANDARD RECOVERY SUMMARY

Sample	2-Fluorobiphenyl			2,4,6-Tribromophenol			p-Terphenyl-D14		
	Limits:	Lower	Upper	Limits:	Lower	Upper	Limits:	Lower	Upper
		20	91		48	112		58	119
	Conc Added	Conc Recov	% Recov	Conc Added	Conc Recov	% Recov	Conc Added	Conc Recov	% Recov
BLK	20.000	14.549	72.75	40.000	35.687	89.22	20.000	19.627	98.14
LCS	20.000	9.126	45.63	40.000	33.491	83.73	20.000	12.559	62.80
S18T036510	20.000	9.178	45.89	40.000	26.914	67.29	20.000	17.898	89.49
S18T036510 DUP	20.000	7.996	39.98	40.000	11.783	29.46	20.000	16.436	82.18
S18T036510 MS	20.000	8.119	40.60	40.000	0.072	0.18	20.000	11.377	56.89
S18T036510 MSD	20.000	11.605	58.03	40.000	2.152	5.38	20.000	15.304	76.52

There were several surrogate recoveries that were outside the acceptable recovery limits on the low side. These samples and the associated MS samples showed the same pattern and the blank and LCS were within specification; therefore, reanalysis was not required. This pattern of the samples and associated MS failure of the surrogate recoveries indicate a matrix effect. The recoveries are almost completely eliminated due to "nitration" by the matrix.

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SURROGATE STANDARD RECOVERY SUMMARY
SVOA SY101 TBI

Sample	2-Fluorophenol			Phenol-D6			Nitrobenzene-D5		
	Limits:	Lower	Upper	Limits:	Lower	Upper	Limits:	Lower	Upper
		38	109		39	115		43	108
	Conc Added	Conc Recov	% Recov	Conc Added	Conc Recov	% Recov	Conc Added	Conc Recov	% Recov
BLK	40.000	32.882	82.21	40.000	34.572	86.43	20.000	19.411	97.06
LCS	40.000	28.57	71.43	40.000	30.141	75.35	20.000	16.415	82.08
S18T036498	40.000	3.533	8.83	40.000	1.337	3.34	20.000	16.634	83.17
S18T036498 DUP	40.000	3.106	7.77	40.000	0.511	1.28	20.000	18.196	90.98
S18T036498 MS	40.000	0.004	0.01	40.000	N/A	0.00	20.000	18.64	93.20
S18T036498 MSD	40.000	0.016	0.04	40.000	0.007	0.02	20.000	15.649	78.25
S18T036486	40.000	31.895	79.74	40.000	33.630	84.08	20.000	18.369	91.85

SURROGATE STANDARD RECOVERY SUMMARY

Sample	2-Fluorobiphenyl			2,4,6-Tribromophenol			p-Terphenyl-D14		
	Limits:	Lower	Upper	Limits:	Lower	Upper	Limits:	Lower	Upper
		20	91		48	112		58	119
	Conc Added	Conc Recov	% Recov	Conc Added	Conc Recov	% Recov	Conc Added	Conc Recov	% Recov
BLK	20.000	14.813	74.07	40.000	38.336	95.84	20.000	20.665	103.33
LCS	20.000	6.873	34.37	40.000	33.591	83.98	20.000	9.746	48.73
S18T036498	20.000	10.102	50.51	40.000	22.851	57.13	20.000	17.612	88.06
S18T036498 DUP	20.000	9.525	47.63	40.000	23.164	57.91	20.000	20.493	102.47
S18T036498 MS	20.000	14.376	71.88	40.000	0.044	0.11	20.000	18.81	94.05
S18T036498 MSD	20.000	14.043	70.22	40.000	0.014	0.04	20.000	21.223	106.12
S18T036486	20.000	9.717	48.59	40.000	36.617	91.54	20.000	19.826	99.13

There were several surrogate recoveries that were outside the acceptable recovery limits on the low side. These samples and the associated MS samples showed the same pattern. This pattern of the samples and associated MS failure of the surrogate recoveries indicate a matrix effect. The recoveries are almost completely eliminated due to "nitration" by the matrix.

RPP-RPT-61303, Rev. 5

SURROGATE STANDARD RECOVERY SUMMARY
SY-101 TBI Grab 2018-11

Sample	1,2-Dichloroethane-d4			Toluene-D8			Bromofluorobenzene		
	Conc Added	Conc Recov	% Recov	Conc Added	Conc Recov	% Recov	Conc Added	Conc Recov	% Recov
CCV	100.000	107.305	107	100.000	97.260	97	100.000	101.153	101
CCB	100.000	104.311	104	100.000	100.678	101	100.000	102.363	102
LCS	100.000	101.354	101	100.000	96.848	97	100.000	102.587	103
S18T036513	100.000	104.638	105	100.000	100.697	101	100.000	102.347	102
S18T036478	100.000	105.723	106	100.000	100.924	101	100.000	104.783	105
S18T036501	100.000	104.573	105	100.000	103.671	104	100.000	102.647	103
S18T036489	100.000	107.414	107	100.000	103.021	103	100.000	106.691	107
S18T036489DUP	100.000	103.986	104	100.000	103.921	104	100.000	105.535	106
S18T036489MS	100.000	109.007	109	100.000	102.087	102	100.000	108.433	108
S18T036489MSD	100.000	106.666	107	100.000	104.109	104	100.000	108.149	108

Attachment 9

BLANK REPORT

Sample ID	Client ID	Analyte	Blank Result	Blank Unit	Sample Result	Sample Unit	Blank/ Sample %	Blank MDL/MDA	Sample MDL/MDA	%Count. Error Blank	Blank Type	Dilution Factor	Digest Factor
Method = CARBON-14													
Batch 00087402													
S18T036495	1SY-18-01	Carbon-14	4.52E-06	UCML	5.15E-04	UCML	.8777	8.57E-07	8.57E-07	24.367	BLNK	1.00	1.000
S18T036483	1SY-18-01FB	Carbon-14	4.52E-06	UCML	<1.05E-06	UCML		8.57E-07	1.05E-06	24.367	BLNK	1.00	1.000
S18T036507	1SY-18-01DUP	Carbon-14	4.52E-06	UCML	5.17E-04	UCML	.8743	8.57E-07	8.57E-07	24.367	BLNK	1.00	1.000
Method = CN - WATER DISTILLATION													
Batch 00087674													
S18T036493	1SY-18-01	Cyanide	8.60E-03	UGML	2.96	UGML	29.02	4.00E-03	0.400	N/A	ICB	1.00	1.000
S18T036482	1SY-18-01FB	Cyanide	8.60E-03	UGML	<0.400	UGML		4.00E-03	0.400	N/A	ICB	1.00	1.000
S18T036505	1SY-18-01DUP	Cyanide	8.60E-03	UGML	2.46	UGML	34.92	4.00E-03	0.400	N/A	ICB	1.00	1.000
Method = ICP-TOTAL METALS													
Batch 00087521													
S18T036479	1SY-18-01FB	Silicon	0.0468	UGML	2.06	UGML	2.275	0.0120	0.0120	N/A	ICB	1.00	1.000
S18T036479	1SY-18-01FB	Strontium	2.37E-03	UGML	2.61E-03	UGML	90.78	2.00E-03	2.00E-03	N/A	ICB	1.00	1.000
S18T036479	1SY-18-01FB	Strontium	2.09E-03	UGML	2.61E-03	UGML	80.18	2.00E-03	2.00E-03	N/A	CCB	1.00	1.000
S18T036503	1SY-18-01DUP	Copper	3.47E-03	UGML	1.55	UGML	112.2	2.00E-03	1.00	N/A	ICB	500.00	1.000
S18T036503	1SY-18-01DUP	Nickel	2.41E-03	UGML	1.50	UGML	80.1	2.00E-03	1.00	N/A	ICB	500.00	1.000
S18T036503	1SY-18-01DUP	Strontium	2.09E-03	UGML	<1.00	UGML		2.00E-03	1.00	N/A	CCB	500.00	1.000
S18T036503	1SY-18-01DUP	Strontium	2.37E-03	UGML	<1.00	UGML		2.00E-03	1.00	N/A	ICB	500.00	1.000
S18T036479	1SY-18-01FB	Copper	3.47E-03	UGML	<2.00E-03	UGML		2.00E-03	2.00E-03	N/A	ICB	1.00	1.000
S18T036491	1SY-18-01	Copper	3.47E-03	UGML	<1.00	UGML		2.00E-03	1.00	N/A	ICB	500.00	1.000
S18T036491	1SY-18-01	Nickel	2.41E-03	UGML	<1.00	UGML		2.00E-03	1.00	N/A	ICB	500.00	1.000
S18T036491	1SY-18-01	Silicon	0.0468	UGML	8.01	UGML	292.3	0.0120	6.00	N/A	ICB	500.00	1.000
S18T036491	1SY-18-01	Strontium	2.37E-03	UGML	<1.00	UGML		2.00E-03	1.00	N/A	ICB	500.00	1.000
S18T036479	1SY-18-01FB	Nickel	2.41E-03	UGML	2.39E-03	UGML	100.9	2.00E-03	2.00E-03	N/A	ICB	1.00	1.000
S18T036503	1SY-18-01DUP	Silicon	0.0468	UGML	7.59	UGML	308.3	0.0120	6.00	N/A	ICB	500.00	1.000
S18T036491	1SY-18-01	Strontium	2.09E-03	UGML	<1.00	UGML		2.00E-03	1.00	N/A	CCB	500.00	1.000
Method = MS ACTINIDES-U/TH													
Batch 00087288													
S18T036490	1SY-18-01	Uranium-238	4.79E-06	UGML	3.93	UGML	.2442	4.18E-07	8.36E-04	N/A	ICB	2,000.00	1.000
S18T036490	1SY-18-01	Thorium-232	1.47E-06	UGML	5.43E-04	UGML	135.6	3.21E-07	1.60E-04	N/A	CCB	500.00	1.000
S18T036490	1SY-18-01	Thorium-232	6.48E-06	UGML	5.43E-04	UGML	596.7	3.21E-07	1.60E-04	N/A	ICB	500.00	1.000
S18T036479	1SY-18-01FB	Uranium-238	4.79E-06	UGML	1.69E-04	UGML	29.91	4.18E-07	4.18E-06	N/A	ICB	10.00	1.000
S18T036479	1SY-18-01FB	Thorium-232	1.47E-06	UGML	<3.21E-06	UGML		3.21E-07	3.21E-06	N/A	CCB	10.00	1.000
S18T036502	1SY-18-01DUP	Thorium-232	6.48E-06	UGML	9.31E-04	UGML	348	3.21E-07	1.60E-04	N/A	ICB	500.00	1.000

Sample ID	Client ID	Analyte	Blank Result	Blank Unit	Sample Result	Sample Unit	Blank/ Sample %	Blank MDL/MDA	Sample MDL/MDA	%Count. Error Blank	Blank Type	Dilution Factor	Digest Factor
S18T036479	1SY-18-01FB	Thorium-232	6.48E-06	UGML	<3.21E-06	UGML		3.21E-07	3.21E-06	N/A	ICB	10.00	1.000
S18T036502	1SY-18-01DUP	Thorium-232	1.47E-06	UGML	9.31E-04	UGML	79.11	3.21E-07	1.60E-04	N/A	CCB	500.00	1.000
S18T036502	1SY-18-01DUP	Uranium-238	4.79E-06	UGML	3.80	UGML	.2521	4.18E-07	8.36E-04	N/A	ICB	2,000.00	1.000
Method = NICKEL TRACER													
Batch 00087495													
S18T036495	1SY-18-01	Nickel	206	UGML	206	UGML	100.1	0.0200	0.0200	N/A	BLNK-PREP	10.00	1.000
S18T036507	1SY-18-01DUP	Nickel	206	UGML	201	UGML	102.3	0.0200	0.0200	N/A	BLNK-PREP	10.00	1.000
S18T036483	1SY-18-01FB	Nickel	206	UGML	204	UGML	101.2	0.0200	0.0200	N/A	BLNK-PREP	10.00	1.000
Method = STRONTIUM-90													
Batch 00087497													
S18T036495	1SY-18-01	Strontium-89/90	2.84E-06	UCML	7.23E-03	UCML	.05752	1.35E-06	1.98E-06	39.646	BLNK	1.00	1.000
S18T036507	1SY-18-01DUP	Strontium-89/90	2.84E-06	UCML	7.27E-03	UCML	.05838	1.35E-06	2.02E-06	39.646	BLNK	1.00	1.000
S18T036483	1SY-18-01FB	Strontium-89/90	2.84E-06	UCML	6.86E-06	UCML	40.93	1.35E-06	1.34E-06	39.646	BLNK	1.00	1.000
Method = SVOA 222S LIQUID													
Batch 00087926													
S18T036510	1SY-18-01DUP	bis(2-Ethylhexyl)phthalate	35.8	UGL	625	UGL	100.3	12.6	220	N/A	BLNK	1.00	0.002000
S18T036510	1SY-18-01DUP	Butylbenzylphthalate	32.0	UGL	590	UGL	94.91	13.1	230	N/A	BLNK	1.00	0.002000
Batch 00087941													
S18T036498	1SY-18-01	Butylbenzylphthalate	32.0	UGL	570	UGL	98.24	13.1	230	N/A	BLNK	1.00	0.002000
S18T036498	1SY-18-01	bis(2-Ethylhexyl)phthalate	38.6	UGL	681	UGL	99.12	12.6	220	N/A	BLNK	1.00	0.002000
S18T036486	1SY-18-01FB	bis(2-Ethylhexyl)phthalate	38.6	UGL	645	UGL	104.7	12.6	220	N/A	BLNK	1.00	0.002000
S18T036486	1SY-18-01FB	Butylbenzylphthalate	32.0	UGL	560	UGL	100	13.1	230	N/A	BLNK	1.00	0.002000
Method = TOT. CARBON by FURNACE													
Batch 00087493													
S18T036505	1SY-18-01DUP	Carbon Total	2.55	UGML	3.71E+03	UGML	.7553	1.00	11.0	N/A	CCB	11.00	1.000
S18T036505	1SY-18-01DUP	Carbon Total	1.12	UGML	3.71E+03	UGML	.3317	1.00	11.0	N/A	BLNK	11.00	1.000
S18T036493	1SY-18-01	Carbon Total	1.12	UGML	3.74E+03	UGML	.3297	1.00	11.0	N/A	BLNK	11.00	1.000
S18T036493	1SY-18-01	Carbon Total	2.55	UGML	3.74E+03	UGML	.7506	1.00	11.0	N/A	CCB	11.00	1.000
S18T036494	1SY-18-01	Carbon Total	1.12	UGML	3.93E+03	UGML	.3133	1.00	11.0	N/A	BLNK	11.00	1.000
S18T036494	1SY-18-01	Carbon Total	2.55	UGML	3.93E+03	UGML	.7132	1.00	11.0	N/A	CCB	11.00	1.000
S18T036482	1SY-18-01FB	Carbon Total	1.12	UGML	<11.0	UGML		1.00	11.0	N/A	BLNK	11.00	1.000
S18T036482	1SY-18-01FB	Carbon Total	2.55	UGML	<11.0	UGML		1.00	11.0	N/A	CCB	11.00	1.000
S18T036506	1SY-18-01DUP	Carbon Total	2.55	UGML	3.78E+03	UGML	.7427	1.00	11.0	N/A	CCB	11.00	1.000
S18T036506	1SY-18-01DUP	Carbon Total	1.12	UGML	3.78E+03	UGML	.3262	1.00	11.0	N/A	BLNK	11.00	1.000
Method = VOA-LIQ-TANK													

Sample ID	Client ID	Analyte	Blank Result	Blank Unit	Sample Result	Sample Unit	Blank/ Sample %	Blank MDL/MDA	Sample MDL/MDA	%Count. Error Blank	Blank Type	Dilution Factor	Digest Factor
Batch 00087589													
S18T036513	1SY-18-01TB	Styrene	0.180	UGL	<0.123	UGL		0.110	0.123	N/A	BLNK	1.00	9.000
S18T036478	1SY-18-01FB	Styrene	0.180	UGL	<0.123	UGL		0.110	0.123	N/A	BLNK	1.00	9.000
S18T036501	1SY-18-01DUP	Styrene	0.180	UGL	<2.21	UGL		0.110	2.21	N/A	BLNK	1.00	0.5000
S18T036489	1SY-18-01	Styrene	0.180	UGL	2.74	UGL	131.5	0.110	2.21	N/A	BLNK	1.00	0.5000

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Attachment 10

CORRESPONDENCE

RPP-RPT-61303, Rev. 5



February 5, 2020

Ms. Heather Baune
 Washington River Protection Services
 Tank Waste Inventory and Characterization

Dear Ms. Baune:

Wastren Hanford Laboratory's mission is to provide quality, defensible data to our clients. Our quality and corrective action processes involve taking a broad and critical look at our systems whenever an issue arises.

The laboratory has identified an issue affecting tin-126 results reported in 2017 through 2019.

During the review of data related to a previously identified concern with tin-126 results, it was discovered that standards were being prepared using 40ppt of total tin instead of 40ppt of tin-117. Tin-117 is only 7.68% of environmental tin standards, so therefore the calibration factor generated was incorrect.

Quality Assurance created a corrective action report and a deeper investigation was initiated. The extent of condition analysis evaluated every tin-126 batch since contract assumption to identify any other samples that may be affected by the same error. The extent of condition also included all other indirect calibration methods that use total-metal standards for an isotopic calibration.

In total, the error affects nine (9) batches and eleven (11) sample groups. Tin-126 was a non-detect in four (4) of the groups. In all cases, the originally-reported result and detection limit were reported at a higher concentration than actual.

The following projects are affected:

Project	Sample Group	Tin-126 detected?
AP-107 Grab 2017-07B, AP-107 Grab 2017-07	20172477	No
AP-107 Grab 2017-07B, AP-107 Grab 2017-07	20172528	No
AW-102 Test Bed Grab 2018-07	20182084	Yes
AW-105 Grab 2018-09	20181041	Yes
AW-106 EVAP 2018-03	20180600	No
AY-101 Grab Post Recirculation 2018-04	20181158	Yes
AZ-102 Grab 2018-06 Post Recirculation	20181575	Yes
AZ-301 Liquid Grab 2018-08	20182487	No
C-105 Post Retrieval Residual Grab 2018-04	20181040	Yes
C-105 Post Retrieval Residual Grab 2018-04	20181103	Yes
SY-101 TBI Grab 2018-11	20183183	Yes

RPP-RPT-61303, Rev. 5

CAMPATS condition report CR-2019-0118 was created to resolve this issue.

WHL will issue revised reports as soon as possible. Please contact the laboratory with questions or concerns. I apologize for the inconvenience.

Regards,



Tricia Wood
Director ESH&Q
Veolia Nuclear Solutions Federal Services
Wastren Hanford Laboratory
(509) 372-1256

RPP-RPT-61303, Rev. 5

From: [Menjivar, Carolina E](#)
To: [Snyder, Susan M](#)
Cc: [McKinney, Jo](#)
Subject: RE: SY-101 TBI Hydroxide
Date: Wednesday, December 12, 2018 10:27:01 AM
Attachments: [image002.gif](#)
[image003.png](#)

Susan,

The OH is one of the most important parameters for tank waste chemistry. I do not want these results to be questionable.

Please re-analyze the samples for OH with calibration verification (CCV) every 10 samples, if possible.

Thanks,

Carolina Menjivar

Chemical Engineer
Tank Waste Inventory & Characterization
2620 Fermi/C221
(509) 376-1977



Contractor to the United States Department of Energy

From: Snyder, Susan M <susan_m_snyder@rl.gov>
Sent: Wednesday, December 12, 2018 10:09 AM
To: Menjivar, Carolina E <carolina_e_menjivar@rl.gov>
Cc: McKinney, Jo <jo_m_mckinney@rl.gov>
Subject: SY-101 TBI Hydroxide

Carolina,

I just got the batch results for the hydroxide analysis. It looks like the had two extra samples in the analytical batch. The batch had 12 samples rather than ten between the CCV's. Do you want the batch reanalyzed?

Let me know...

Thanks,

Susan M. Snyder
Sr. Project Coordinator

RPP-RPT-61303, Rev. 5

VNSFS Hanford Laboratory

Veolia Nuclear Solutions-Federal Services, LLC

Contractor to the Office of River Protection

U.S. Department of Energy

509-372-2525



Attachment 11

TENTATIVELY IDENTIFIED COMPOUNDS DATA

SY-101 TBI Grab 2018-11
Data Summary of All Results

Sample Group: 20183183

Riser: 14

Segment Number: 1SY-18-01

Segment Portion: Grab Sample (Total)

Sample#	R	A#	QC Type	Analyte	CAS No.	Retention Time (Minutes)	Unit	Result	Qual Flags
SVOA 222S LIQUID									
S18T036498		O		Oxirane, trimethyl-	5076-19-7	3.07	ug/L	3.2E+03	JNT
S18T036498		O		Amylene Hydrate	75-85-4	3.22	ug/L	1.2E+03	JNT
S18T036498		O		Unknown1		3.38	ug/L	3.8E+03	JT
S18T036498		O		Butane, 2-chloro-2-methyl-	594-36-5	3.46	ug/L	1.8E+03	JNT
S18T036498		O		Unknown2		3.72	ug/L	1000	JT
S18T036498		O		Unknown3		4.13	ug/L	1.5E+04	JT
S18T036498		O		Methane, dichloronitro-	7119-89-3	4.36	ug/L	1.3E+03	JNT
S18T036498		O		Unknown4		4.48	ug/L	1.2E+03	JT
S18T036498		O		1,1-Dimethyl-3-chloropropanol	1985-88-2	5.00	ug/L	960	JNT
S18T036498		O		Unknown5		5.65	ug/L	2.3E+03	JT
S18T036498		O		Unknown6		6.04	ug/L	1.2E+03	JT
S18T036498		O		Unknown7		6.36	ug/L	1.2E+03	JT
S18T036498		O		Unknown8		6.54	ug/L	1.2E+04	JT
S18T036498		O		Unknown9		8.84	ug/L	2.0E+03	JT
S18T036498		O		Unknown10		8.87	ug/L	3.4E+03	JT
S18T036498		O		Unknown11		12.48	ug/L	2.7E+03	JT
S18T036498		O	BLNK	Amylene Hydrate	75-85-4	3.22	ug/L	85	
S18T036498		O	BLNK	Unknown1		3.38	ug/L	270	
S18T036498		O	BLNK	Butane, 2-chloro-2-methyl-	594-36-5	3.46	ug/L	110	
S18T036498		O	BLNK	Unknown2		6.07	ug/L	63	
S18T036498		O	BLNK	Unknown3		6.36	ug/L	160	

NA = Not Analyzed, ND = Not Detected

SY-101 TBI Grab 2018-11
Data Summary of All Results

Sample Group: 20183183

Riser: 14

Segment Number: 1SY-18-01DUP

Segment Portion: Grab Sample (Total)

Sample#	R	A#	QC Type	Analyte	CAS No.	Retention Time (Minutes)	Unit	Result	Qual Flags
SVOA 222S LIQUID									
S18T036510		O		Amylene Hydrate	75-85-4	3.22	ug/L	1.5E+03	JNT
S18T036510		O		Unknown1		3.38	ug/L	4.8E+03	JT
S18T036510		O		Butane, 2-chloro-2-methyl-	594-36-5	3.46	ug/L	2.3E+03	JNT
S18T036510		O		Unknown2		4.12	ug/L	1.2E+04	JT
S18T036510		O		Unknown3		4.48	ug/L	1.3E+03	JT
S18T036510		O		Unknown4		5.64	ug/L	1.8E+03	JT
S18T036510		O		Unknown5		6.36	ug/L	2.9E+03	JT
S18T036510		O		Unknown6		6.53	ug/L	9.5E+03	JT
S18T036510		O		Unknown7		8.87	ug/L	3.4E+03	JT
S18T036510		O		Unknown8		12.48	ug/L	2.4E+03	JT
S18T036510		O	BLNK	Amylene Hydrate	75-85-4	3.22	ug/L	92	
S18T036510		O	BLNK	Unknown1		3.37	ug/L	270	
S18T036510		O	BLNK	Butane, 2-chloro-2-methyl-	594-36-5	3.45	ug/L	120	
S18T036510		O	BLNK	Unknown2		6.07	ug/L	61	
S18T036510		O	BLNK	Unknown3		6.35	ug/L	160	

NA = Not Analyzed, ND = Not Detected

SY-101 TBI Grab 2018-11
Data Summary of All Results**Sample Group: 20183183****Riser: 14****Segment Number: 1SY-18-01FB****Segment Portion: Field Blank**

Sample#	R	A#	QC Type	Analyte	CAS No.	Retention Time (Minutes)	Unit	Result	Qual Flags
SVOA 222S LIQUID									
S18T036486		O		Amylene Hydrate	75-85-4	3.22	ug/L	1.5E+03	JNT
S18T036486		O		Unknown1		3.38	ug/L	3.6E+03	JNT
S18T036486		O		Butane, 2-chloro-2-methyl-	594-36-5	3.46	ug/L	2.2E+03	JNT
S18T036486		O		Unknown2		6.36	ug/L	2.0E+03	JNT
S18T036486		O	BLNK	Amylene Hydrate	75-85-4	3.22	ug/L	85	
S18T036486		O	BLNK	Unknown1		3.38	ug/L	270	
S18T036486		O	BLNK	Butane, 2-chloro-2-methyl-	594-36-5	3.46	ug/L	110	
S18T036486		O	BLNK	Unknown2		6.07	ug/L	63	
S18T036486		O	BLNK	Unknown3		6.36	ug/L	160	

NA = Not Analyzed, ND = Not Detected

INFORMATION CLEARANCE REVIEW AND RELEASE APPROVAL

Part I: Background Information

Title: Final Analytical Report for Tank 241-SY-101 BI Grab Sampling 2018	Information Category: <input type="checkbox"/> Abstract <input type="checkbox"/> Journal Article <input type="checkbox"/> Summary <input type="checkbox"/> Internet <input type="checkbox"/> Visual Aid <input type="checkbox"/> Software <input type="checkbox"/> Full Paper <input checked="" type="checkbox"/> Report <input type="checkbox"/> Other _____
Publish to OSTI? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	Yes NA <input type="checkbox"/> <input checked="" type="checkbox"/>
Trademark/Copyright "Right to Use" Information or Permission Documentation	
Document Number: RPP-RPT-61303 Revision 5	Date: October 2020
Author: Prindiville, Kerry A	

Part II: External/Public Presentation Information

Conference Name:	
Sponsoring Organization(s): DOE-ORP	
Date of Conference:	Conference Location:
Will Material be Handed Out? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	Will Information be Published? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <i>(If Yes, attach copy of Conference format instructions/guidance.)</i>

Part III: WRPS Document Originator Checklist

Description	Yes	N/A	Print/Sign/Date
Information Product meets requirements in TFC-BSM-AD-C-01?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
Document Release Criteria in TFC-ENG-DESIGN-C-25 completed? (Attach checklist)	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
If product contains pictures, safety review completed?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	

Part IV: WRPS Internal Review

Function	Organization	Date	Print Name/Signature/Date
Subject Matter Expert	WRPS	03/22/2021	Prindiville, Kerry A IDMS data attached
Responsible Manager	WRPS	02/11/2021	Cunningham, Buddy M IDMS data attached
Other:			

Part V: IRM Clearance Services Review

Description	Yes	No	Print Name/Signature
Document Contains Classified Information?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	If Answer is "Yes," ADC Approval Required _____ Print Name/Signature/Date
Document Contains Information Restricted by DOE Operational Security Guidelines?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Reviewer Signature: _____ Print Name/Signature/Date
Document is Subject to Release Restrictions? <i>If the answer is "Yes," please mark category at right and describe limitation or responsible organization below:</i>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Document contains: <input type="checkbox"/> Applied Technology <input type="checkbox"/> Protected CRADA <input type="checkbox"/> Personal/Private <input type="checkbox"/> Export Controlled <input type="checkbox"/> Proprietary <input type="checkbox"/> Procurement – Sensitive <input type="checkbox"/> Patentable Info. <input type="checkbox"/> OUO <input type="checkbox"/> Predecisional Info. <input type="checkbox"/> UCNi <input type="checkbox"/> Restricted by Operational Security Guidelines <input type="checkbox"/> Other (Specify) _____
Additional Comments from Information Clearance Specialist Review?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Information Clearance Specialist Approval <div style="border: 1px solid green; padding: 2px; display: inline-block; text-align: center;"> APPROVED <small>By Lynn M Ayers at 11:37 am, Mar 22, 2021</small> </div> _____ Print Name/Signature/Date

When IRM Clearance Review is Complete – Return to WRPS Originator for Final Signature Routing (Part VI)

INFORMATION CLEARANCE REVIEW AND RELEASE APPROVAL

Part VI: Final Review and Approvals

Description	Approved for Release		Print Name/Signature
	Yes	N/A	
WRPS External Affairs	<input checked="" type="checkbox"/>	<input type="checkbox"/>	McCune, Hal C - IDMS approval attached
WRPS Office of Chief Counsel	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Peters, Amber D - IDMS approval attached
DOE – ORP Public Affairs/Communications	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Tyree, Geoff T - IDMS approval attached
Other: DOE OCC	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Hellstrom, George W - IDMS approval attached
Other: DOE ORP SME	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Mauss, Billie M - IDMS approval attached

Comments Required for WRPS-Indicate Purpose of Document:

To support NRC review of the Test Bed Initiative Draft Waste Incidental to Reprocessing Evaluation.

APPROVED

By Lynn M Ayers at 11:37 am, Mar 22, 2021

**Approved for Public Release;
Further Dissemination Unlimited**

Information Release Station

Was/Is Information Product Approved for Release? Yes No

If Yes, what is the Level of Releaser? Public/Unrestricted Other (Specify) _____

Date Information Product Stamped/Marked for Release: 03/22/2021

Was/Is Information Product Transferred to OSTI? Yes No

Forward Copies of Completed Form to WRPS Originator


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  Sampling 2018, requested by Kerry Prindiville for the NRC review of the
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  Thank you, Lynn Ayers Information Clearance</comments>
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