

June 14, 2019 File No. 04.0190348.03

Ms. Catherine Finneran, Director Environmental Affairs Eversource 247 Station Drive, SE270 Westwood, Massachusetts 02090

Re: Report of Post-Demolition Building Surfaces Sampling and

Evaluation of Human Health Risk

Former Schiller Mercury Power Generating Units 1 and 2

Portsmouth, New Hampshire

Dear Ms. Finneran:

GZA GeoEnvironmental, Inc. (GZA) has prepared this report of the findings of the post-dismantling sampling of interior building surfaces in the vicinity of the former mercury boiler components (Unit 1 and Unit 2 including boiler, turbine and reclaim room areas) within Schiller Station (Plant). This Study was conducted subject to the limitations included in **Appendix A**.

EXECUTIVE SUMMARY

This report presents an assessment of the significance of residual mercury on the interior surfaces and in building materials in the vicinity of the dismantled mercury Unit 1 and Unit 2 boilers at the Schiller Station Site. A total of 210 wipe samples were collected from non-porous surfaces and 142 bulk samples were collected from porous surfaces. Each sample was tested for total mercury content. In addition, indoor air quality results from areas outside of the active dismantling work were used to assess past, current, and future risk to the other workers at the Plant.

Based on the testing results for the air, wipe, and bulk samples, an evaluation of risk to current and future industrial workers at the Plant was performed by calculating risks via the inhalation pathway and by comparing wipe and bulk sample results to the risk-based screening levels derived for workers with potential exposure to mercury residuals on interior surfaces and building materials. In general, GZA adopted conservative (i.e., human health protective) assumptions for the exposure parameters and toxicity factors. Overall, the assessment demonstrates that the concentrations of residual mercury detected within the plant and associated with the former mercury boiler system do not pose Significant Risks to current and future industrial workers within the plant building.

BACKGROUND AND PROJECT OBJECTIVES

BACKGROUND

The Plant is currently owned and operated by Granite Shore Power (GSP) and includes two coal/oil-fired electricity generating units and one wood-fired unit. Two former mercury vapor power units (Unit 1 and Unit 2) were operated at the Plant between 1950 and 1968. The current and former power units are/were housed within the same building with the exception that the wood-fired boiler is housed separately. In 1968, the components of the mercury vapor power systems were partially decommissioned by draining the liquid mercury from residual components; however, the components were not removed at that time.



Between approximately October 2016 and March 2019, Manafort Brothers Inc. (Manafort) of Plainville, Connecticut was contracted by Eversource to dismantle and remove the two 7,500-kilowatt (kW) mercury vapor power units (Unit 1 and Unit 2).

Preliminary concrete sampling activities performed early in the project were beneficial to the understanding of data and helped establish the approach utilized in the 2019 sampling program. On April 17, 2017, during active boiler dismantling activities, TRC Solutions Inc. (TRC), as a subcontractor to Manafort, collected 12 concrete chip samples ranging in depth from 0 to ¾" from the surface of a discrete area of the concrete floor slab located on floor Elevation (EL.) 11' within the footprint of the former mercury boiler units. The concrete chip samples were obtained by TRC for Manafort to evaluate mercury concentrations present in the concrete floor slab on EL. 11' prior to the start of work on that elevation. The concrete chip samples were submitted to Katahdin Analytical Services located in Scarborough, Maine for total mercury analysis via Method SW846-7471. Results from the samples obtained indicated concentrations of Mercury ranging from 22.3 mg/kg¹ to 220 mg/kg within the top 0 to ¾" of the concrete floor slab.

Eversource and GZA reviewed TRC's concrete chip sample results, sampling methodology, location and approach and discussed with TRC the potential of the samples being biased by mercury-impacted dust and debris on the surface of the floor slab and thus not being representative of actual impacts to the concrete floor slab. As a result of these discussions, Eversource decided to conduct cleaning and decontamination of the concrete floor slab adjacent to the area of the highest observed total mercury concentration (220 mg/kg) and to re-sample the concrete at specific depth intervals from 0 to ½" and ½" to 1".

On May 23, 2017, Moran Environmental Recovery (Moran) mobilized to the Site under contract with Eversource to conduct cleaning and decontamination of the concrete floor slab. Cleaning and decontamination activities were performed from May 23 through 30, 2017. Cleaning activities consisted of an initial high-pressure wash of the areas to remove accumulated debris from the surface of the concrete floor slab. Wash water was collected, containerized and disposed of with liquid wastes generated from the boiler dismantling project. After the initial cleaning activities, the floor slab surface was decontaminated in two separate areas using two mercury decontamination products: 1) DeconGel 1108 and 2) a solution of HgX® Decontamination Powder (HgX) and water. Waste associated with the decontamination process was collected, containerized, and disposed of with other liquid and solid wastes generated from the boiler dismantling Following completion of the decontamination, GZA collected 4 discrete concrete samples from the decontamination areas on June 1, 2017. Two samples were obtained from the DeconGel 1108 decontaminated area at depths of 0 to $\frac{1}{2}$ " and $\frac{1}{2}$ " respectively and two samples were obtained from the HgX® decontaminated area at depths of 0 to ½" and ½" to 1" respectively. The samples were submitted to ESS Laboratory in Cranston, Rhode Island for total mercury analysis via Method SW846-7471. The total mercury concentrations in samples from the areas decontaminated with DeconGel 1108 were 31.7 mg/kg from the 0 to ½" sample location and 12.1 mg/kg from the ½" to 1" sample location. The total mercury concentrations in samples from the areas decontaminated with HgX® Decontamination Powder were 14.9 mg/kg from the 0 to ½" sample location and 5.2 mg/kg from the ½" to 1" sample location. A summary of sampling results and analytical laboratory report was submitted to Eversource via email on June 19, 2017.

Based upon the results of the surface decontamination and subsequent GZA sampling, mercury concentrations were reduced from the original 220 mg/kg concentration in the 0 to ½" samples with a greater reduction in concentration observed in the sample from the HgX® decontaminated area. In addition, a lower mercury concentration (5.2 mg/kg) was observed at the ½" to 1" sample depth in comparison to the concentration observed at the floor surface (220 mg/kg) prior to cleaning and decontamination.

Given the results of the samples obtained, a risk evaluation was deemed necessary to assess the current and future risk of mercury residuals to industrial workers at the Plant. In the absence of regulatory requirements related to acceptable

¹ Milligram per kilogram.



mercury concentrations in building materials, direct sampling of residual building materials and calculation of risk-based screening values assuming the continued future use of the facility as an operating power plant were performed.

PROJECT OBJECTIVES

GZA understands that Eversource's objectives for this study were to:

- Assess post dismantling conditions within the Unit 1 and 2 boiler area (i.e., including boiler component, the turbine area, and the reclaim room area) relative to residual mercury impacts to non-porous building surfaces and porous concrete and brick surfaces through the collection of wipe and bulk samples; and
- Evaluate potential risks posed to current and future industrial workers at the Plant via exposure to residual mercury
 in the building. GZA developed human health risk-based screening values based on potential exposure to mercuryimpacted non-porous building surfaces and porous building material in the areas described above; and compared
 the sampling data to the human health risk-based screening values.

POST-DISMANTLING SAMPLING

GENERAL SAMPLING APPROACH

The following outlines the general approach to post-dismantling sampling activities utilized as part of GZA's study.

- Sample collection occurred following the mercury boiler dismantling work and removal of containments, which was completed in early March 2019.
- Sampling was limited to the Unit 1 and Unit 2 boiler and associated boiler component, turbine, and reclaim room
 areas.
- Wipe samples of primarily metal surfaces were collected from representative interior non-porous horizontal and vertical surfaces within the Unit 1 and 2 boiler sampling area.
- Bulk samples of the concrete floor slabs, brick walls, concrete walls, and concrete equipment pedestals and slabs were collected from targeted areas within the Unit 1 and 2 boiler sampling area where impacts from residual mercury are considered most likely, such as under the former mercury-containing machinery, storage areas, etc.
- Both wipe samples and bulk samples were submitted to ESS Laboratory of Cranston, Rhode Island for analysis of total mercury via METHOD 7471B.
- The results of the wipe samples and bulk samples were used to assess the extent and distribution of mercury impacts in the former Unit 1 and 2 boiler area of the Plant.
- Washing of porous concrete floor surfaces within the Unit 1 and 2 boiler areas was completed following sampling activities. Washing included an initial cleaning with an industrial degreaser to remove accumulated debris from the floor surface followed by washing with a solution of HgX® and water using the manufacturer's "wet method", which consisted of application of the HgX® in solution on the cleaned floor surface followed by rinsing of the floor surface and collection of rinsate after a minimum 24-hour contact period.

SAMPLING METHODS

Wipe Samples of Non-Porous Surfaces

To assess extent and distribution of potential mercury impact within the building, GZA collected wipe samples from representative interior building surfaces. Sampling locations and surface types were selected based on historic operations. Prior to the collection of each wipe sample, the sample surface was wet wiped with deionized water moistened towels to remove accumulated dust in order to eliminate interference from dust deposited from current Plant activities. Each



sample was then collected over a 100-square-centimeter area framed by a template utilizing deionized water wetted gauze pads provided by the laboratory in 4-ounce glass jars with Teflon lined caps. Wiping of the surface proceeded from left to right in rows from the top to the bottom of the framed sampling area. The gauze was then folded over onto itself for a fresh sampling surface and sample area was wiped again with the same uniform pressure in columns from the top to the bottom from the left side to the right side of the entire framed area. Once the area was wiped, the gauze was folded and returned to the sample jar.

Bulk Samples of Porous Material

Concrete and brick floor and wall samples were collected from targeted areas within the Unit 1 and 2 boiler area where impacts from residual mercury are considered more likely, such as under former mercury-containing machinery, storage areas, etc. Prior to collection of the concrete or brick samples, the surface in the immediate area of the sampling location was wet wiped with deionized water moistened towels to remove accumulated dust in order to eliminate interference from dust deposited from current Plant activities. Consistent with the methods utilized for the concrete floor cleaning described above, each sample location was washed including an initial cleaning with an industrial degreaser to remove accumulated debris from the floor surface followed by washing with HgX® using the manufacturer's "wet method", which consisted of application of the HgX® Decontamination Powder in solution on the cleaned floor surface followed by rinsing of the floor surface and collection of rinsate after a minimum 24-hour contact period.

The samples were collected using a drill with ½-inch or ¾-inch masonry drill bits without the use of water. At each sampling location, discrete samples were collected at 0-0.5 inch below the floor or wall surface to assess the mercury concentration within the concrete and brick. Care was taken to operate the drill slowly so as to not significantly increase the temperature of the sample by friction-generated heat. The drilling process also generated bulk samples that were fully pulverized and homogenized prior to submittal to the laboratory. Samples were placed in 4-ounce glass jars with Teflon lined caps. The bulk samples were analyzed for total mercury. The drilling bits were cleaned between sampling locations using a dilute acid solution.

REAL TIME INDOOR AIR MONITORING

GZA monitored real time indoor air mercury concentrations outside of the containment systems throughout the mercury boiler system dismantling and post-dismantling activities. GZA's real-time air monitoring activities occurred exclusively outside the containment areas where no active dismantling or floor and drain cleaning activities occurred. The Lumex analyzers were installed near the perimeter of containments and exclusion zones and outside the containment areas to collect worst-case-scenario exposures to Plant personnel who worked strictly outside the designated containment/exclusion areas and did not perform dismantling related tasks. Furthermore, the Lumex measurement stations were periodically moved throughout the Unit 1 and 2 boiler areas depending on where containment/exclusion areas were located. Thus, the real-time measurements provided instantaneous determination of personnel exposures to mercury vapor outside the containment/exclusion areas and also allowed for an evaluation of potential future exposure to industrial workers at the Plant.

GZA utilized three direct-reading, real-time Lumex RA915+ Mercury Vapor Analyzers (Lumex) to provide indoor air mercury concentration measurements. Two monitors were installed in December 2016 and an additional monitor was installed in May 2017 within the Unit 1 and Unit 2 boiler area within the Plant. These monitors have run continuously since installation and continue to operate and log data as of the date of issuance of this report.

The Lumex analyzer uses Zeeman atomic absorption and background correction technology to provide mercury vapor measurements in air. The Lumex has been used in industry for almost 20 years to measure mercury vapor in real time. The Lumex analyzers were programed to record mercury vapor concentrations every minute and to conduct a self-zeroing cycle every 5 minutes.



SAMPLE DATA MANAGEMENT

GZA developed a site-specific GIS-based data management system for the post-dismantling wipe sample and bulk sample collection activities. This system allowed field personnel to record pertinent sampling information on a mobile device concurrent to the field sampling activities. Upon receipt, the sample analytical results were uploaded and stored within the GIS database and used to track the sampling progress and perform the data evaluation.

The following sample attribute information was recorded in the GIS-based data management system:

- Sampling location
- Sample ID
- Sample type
- Sampler identification
- Sample date and time
- Surface type
- Surface description (paint, condition, color, stains)
- Sample type
- Elevation
- Sample area and surface preparation
- Laboratory analyses to be performed
- Laboratory results
- Photographs
- General comments

RISK EVALUATION AND DERIVATION OF RISK-BASED SCREENING LEVEL

GZA evaluated potential risks via exposure to indoor air to determine if risks via inhalation of indoor air would be a significant risk to current and future industrial workers. GZA then derived risk-based screening levels for worker exposure to mercury residuals on the non-porous interior building surfaces (wipe sampling) and for exposure to the porous interior building surfaces (bulk sampling). The results of our analyses are presented below.

RISKS VIA INHALATION OF MERCURY IN INDOOR AIR

As discussed above, GZA monitored real time indoor air quality for mercury vapor concentrations outside of the dismantling containment systems. The indoor air quality data are summarized in Table 1. As part of the Lumex monitor data analysis, GZA summarized the average and maximum concentrations of each Lumex monitor over a monitoring period that typically was approximately one week in duration. The data were summarized in this manner over the course of the project in order to efficiently analyze the vast quantity of data generated by each monitor on a weekly basis and compare the detected mercury concentrations to project-specific and other applicable worker exposure action levels. The data are summarized in Table 1, including average and maximum detected concentrations, and associated Lumex monitor location. The continuous raw data generated by each monitor have also been logged throughout the project and are available in electronic data files, if requested.



The Regional Screening Level (RSL)² published by the U.S. Environmental Protection Agency (USEPA) for mercury (including elemental mercury and mercuric chloride and other mercury salts) in air for industrial workers is 1.3 μ g/m³. The RSL of 1.3 μ g/m³ corresponds to a target hazard index of 1.

The daily average mercury concentration across the building from December 2016 through April 2019 was calculated to be 0.83 µg/m³ based on the data provided in Table 1. Note that average concentrations were provided for various periods with different durations. As shown in Table 1, GZA first multiplied the average concentration for each period by the number of days for the period. The multiplication for each period was then summed up and divided by total number of days for the monitoring period (i.e., 3010 days) to derive the daily average mercury concentration. This daily average concentration of 0.83 µg/m³ is less than the RSL (1.3 µg/m³) for the industrial scenario evaluated. Furthermore, the measured mercury concentration is expected to be overstated due to the fact that this daily average concentration was based on the concentrations measured during active mercury boiler dismantling, as well as floor and drain cleaning activities conducted from December 2016 through April 2019. Throughout the course of the project, the highest observed mercury vapor concentrations recorded by the Lumex monitors have been observed during periods of significant torch cutting and other hot-cutting operations of mercury impacted components inside the containment systems. As the removal of these components has been completed and the generation of mercury vapor inside containments associated with the removal of these components has lessened, the observed mercury concentrations recorded by the Lumex monitors have also lessened. Since the completion of mercury boiler dismantling activities in December 2018 through the completion of post-dismantling cleaning and restoration activities, the daily average concentration has dropped to 0.27 µg/m³. Note that other activities potentially impacting mercury such as tear down of containments, floor drain cleaning, and floor cleaning activities continued until April 24, 2019. Reduction of the indoor air mercury concentrations are expected to continue as normal indoor air exchange with ambient air is re-established.

In summary, risks via the potential indoor air inhalation pathway are not expected to contribute significantly to overall risks to future industrial workers. Therefore, the indoor air inhalation pathway was not included in deriving the risk-based screening values for the wipe or bulk samples as further discussed below.

RISK-BASED SCREENING VALUE FOR WIPE SAMPLES

GZA developed a risk-based screening value for mercury, based on the approach adopted by Karen DiBiasio and Kimiko Klein (2003)³. The exposure pathways evaluated in deriving the risk-based screening value included:

- Dermal contact of contaminated surfaces, and
- Incidental ingestion of contaminants on hands.

As discussed in the preceding section, risks via inhalation of mercury in indoor air are not expected to contribute significantly to overall risks to future industrial workers and therefore the inhalation pathway was not included in the risk-based screening value derivation.

GZA adopted the conservative exposure assumptions for workers presented in the Karen DiBiasio and Kimiko Klein (2003) report. In brief, workers were assumed to work 5 days per week and 50 weeks each year (with 2 weeks of vacation each year) for 25 years. On each work day, workers were assumed to contact contaminated surfaces 8 events during the day. During each event, workers' head, forearms, hands, and lower legs (total of 5,070 cm²) were assumed to contact contamination surfaces and 10% of the surface contamination was assumed to be transferred to the skin. Of the

² USEPA, 2019. Regional Screening Levels (RSLs) for Chemical Contaminants at Superfund Sites. On-line resources at https://www.epa.gov/risk/regional-screening-levels-rsls. Recently updated May 2019.

³ Karen DiBiasio and Kimiko Klein, 2003. Human Health Risk Evaluation of Structural Surfaces Contaminated with Metals. California Environmental Protection Agency, Sacramento, CA. On-line resources available at https://www.dtsc.ca.gov/AssessingRisk/upload/Eval-Metal-Contaminated-Surfaces.pdf.



contaminants that contacted the skin, contaminants on both hands were assumed to be incidentally ingested with the fraction transferred from dermal to oral to be 0.04. A default dermal absorption fraction factor (ABSder) of 0.001 was assumed for mercury, in accordance with the USEPA Region 3 proposal⁴. It should be noted that certain default exposure parameters such as skin surface area and body weight have been updated by USEPA since the DiBiasio et al (2003) report became available. GZA compared the values adopted in the DiBiasio et al (2003) and the USEPA (2014)⁵ updated values and concluded that the assumptions adopted by DiBiasio et al (2003) and consequently used in deriving the screening values for this project were conservative relative to the USEPA updated values and appropriate for use in the derivation due to the specific history and use conditions at the Site. For example, the body weight for adults of 70 kilogram (kg) was used in the screening value derivation for this project while USEPA proposes a default value of 80 kg in the 2014 Guidance. As another example, the skin surface areas for dermal contact (3,200 cm² and 5,070 cm²) used for this project were higher than the USEPA proposed default soil skin surface area (2,373 cm² for residential children and 3,527 cm² for workers).

Residual mercury is expected to be predominantly in elemental form. However, an oral reference dose for elemental mercury is not available. Oral and dermal absorption of elemental mercury is very limited⁶; consequently, risks via exposure to elemental mercury through oral and dermal pathways are not expected to be significant. Nonetheless, as a conservative approach, GZA adopted the oral reference dose of 3E-4 mg/kg-day proposed by the USEPA Integrated Risk Information System (IRIS; an on-line database) for mercuric chloride and other mercury salts to derive the risk-based screening values for this project.

For the dermal exposure pathway, the USEPA (2004) Risk Assessment Guidance for Superfund (RAGS)⁷ proposes to adjust the oral RfD (administered) by a Gastrointestinal tract (GI) absorption factor to be used for the dermal exposure pathway (to convert the administered referenced dose to the absorbed referenced dose), for certain compounds. Although USEPA (2004) recommended an adjustment factor for mercuric chloride and other soluble salts of 0.07, USEPA did not recommend adjustment for insoluble, metallic mercury, or methyl mercury. Mercury at the Site is expected to be in the elemental form as the boilers only utilized elemental mercury for their operation. As a result, GZA did not adjust the oral RfD for evaluating risks via dermal contact for mercury.

Karen DiBiasio and Kimiko Klein (2003) assumed a wipe removal efficiency of 50%. This assumption was adopted to derive the risk-based screening value for wipe samples.

The derivation of the risk-based screening value for wipe samples is presented in Table 2 and the result is provided below.

Risk-Based Screening Value for Mercury in Wipe Samples Industrial Use (µg/100cm²)						
Mercury 52						

⁴ USEPA Region 3 proposed range for dermal absorption of inorganics from soil was 0.1% to 1%. On-line resources available at https://www.epa.gov/risk/assessing-dermal-exposure-soil.

⁵ USEPA Human Health Evaluation Manual, Supplemental Guidance: Update of Standard Default Exposure Factors. OSWER Directive 9200.1-120. February, 2014.

⁶ As an example, the Mercury Toxicity published at the Medscape website indicated that "Only 2-10% of the ingested mercury is absorbed from the gut, and ingested elemental mercury is not absorbed at all." On-line resources available at https://emedicine.medscape.com/article/1175560-overview.

⁷ USEPA, 2004. Supplemental Guidance for Dermal Risk Assessment, Part E of Risk Assessment Guidance for Superfund Volume I: Human Health Evaluation Manual. Office of Solid Waste and Emergency and Remedial Response (OSWER) Directive 9285.7-02. August.



RISK-BASED SCREENING VALUE FOR BULK SAMPLES

In the Environmental Compliance and Area Completion Projects Regulatory Document Handbook by United States Department of Energy (USDOE)⁸, USDOE proposes to use 10 times of the USEPA Region 9 Soil Preliminary Remediation Goal (PRG) for concrete (Module 6, P.6.5, Human Health Constituents of Concern, p.432).

The USEPA Region 9 RPG, or USEPA (2019) RSL⁹, is 46 mg/kg for elemental mercury and is 350 mg/kg for mercuric chloride and other mercury salts for the industrial use scenario, corresponding to a hazard quotient of 1.0. GZA adopted a screening value of 460 mg/kg for the bulk samples for this project. Note that the RSL was derived by USEPA (2019) based on the inhalation of elemental mercury emitted from soil. As noted in Section 4.1, based on the real time indoor air monitoring, the inhalation pathway is not expected to be of concern for this project. Therefore, adopting the USEPA (2019) RSL as the basis to derive the risk-based screening value for bulk samples would result in overly stringent screening value for this project.

RISK-BASED SCREENING VALUE UNCERTAINTY AND APPLICATION

There is variability associated with the derivation of the risk-based screening values. In general, GZA adopted conservative (i.e., human health protective) assumptions for the exposure parameters and toxicity factors. The multiple conservative assumptions would result in overly stringent screening values.

It should be noted that the derivation of the risk-based screening values is based on a continuous long-time exposure period (i.e., 25 years). Due to the nature of this continuous long-time exposure, it is GZA's position that the risk-based screening values should be used to compare with the average concentrations for an appropriately identified area/space where potential receptors would be exposed continuously for a long period of time. It may not be appropriate to compare the maximum or individual sample concentrations with the screening values and make management decisions based on this point comparison.

Note that cumulative risks via exposure to non-porous surface and porous concrete were not evaluated. It is unlikely for a potential receptor to be exposed to contaminated non-porous surface via dermal contact and incidental ingestion (8 events/day) AND to be exposed to contaminated porous material via dermal contact and ingestion during the same day with the magnitude of exposure assumed above for the screening value derivation.

If a potential receptor would be exposed to BOTH non-porous surface and porous concrete, the cumulative risks for the receptor can be evaluated using the following equation:

Cumulative
$$HI = \sum_{i} f_{i}HI_{i}$$

Where:

HI_i = Hazard index for specific exposure route i (porous or non-porous), and

In the above equation, f_i is the fraction of risks from exposure route i that would be contributed to the cumulative risks. It was assumed that receptors could be exposed solely to one exposure route (which is the assumption used for the

⁸ USDOE, 2012. Environmental Compliance and Area Completion Projects Regulatory Document Handbook by ERD-AG-003. June.

⁹ The RSLs were developed with DOE's Oak Ridge National Laboratory (ORNL) under an Interagency Agreement as a merger of the EPA Region 3 Risk-Based Concentration (RBC) Table, Region 6 Human Health Medium-Specific Screening Level (HHMSSL) Table and the Region 9 PRG Table. The inhalation of volatiles and fugitive dust pathway was evaluated in deriving the RSL for elemental mercury. Workers were assumed to inhale mercury emitted from soil for 8 hours each day, 250 days each year for 25 years.

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screening value derivation for each exposure route) or they could be exposed to both exposure routes with a fraction (e.g., with 50% dose from each exposure route). The sum of f_i should be one:

$$\sum_{i} f_i = 1$$

As a result, the cumulative HI can be expressed as:

Cumulative $HI \leq Maximum(HI_1, HI_2)$

That is, as long as the screening value for each exposure route is met, the cumulative risks to a receptor from both exposure routes should not exceed the risk limit.

SAMPLING RESULTS

As presented above, the post-dismantling sampling focused on the Unit 1 and 2 boiler and associated boiler component, turbine, and reclaim room areas. The two types of sampling included:

- Wipe sampling of representative non-porous surfaces, including walls, floors, columns, beams, girts, etc., and
- Bulk sampling of porous surfaces, including brick walls and concrete floors, walls, and equipment pedestals and slabs.

As mentioned above, prior to sampling, the non-porous surfaces were wiped with deionized water moistened towels to remove accumulated dust generated from the operation of the coal/oil fired boiler units within the plant building. Porous surfaces were washed with a solution of HgX® Decontamination powder following the established concrete slab post-demolition cleaning protocol as described above.

Mercury sampling locations are shown on **Figures 2** through **7**. The mercury sampling results for the wipe and bulk samples are summarized in **Tables 4** and **5**, respectively, along with pertinent sampling information (surface type, condition, and description, etc.). The laboratory reports for the wipe and bulk samples are provided in **Appendix B**. The sampling results shown on **Figures 2** through **7** are presented in the following subsections organized by primary elevation levels¹⁰ within the Plant building.

ELEVATION 11'

Non-Porous Surfaces

At elevation 11', GZA collected a total of 32 post-dismantling assessment wipe samples at the locations shown on **Figure 2**. Mercury was detected above the risk-based screening value of 52 ug/100 cm² in only one non-porous sample collected at elevation 11', sample W-1201 at a concentration of 78.4 ug/100 cm². Sample W-1201 was collected from a vertical beam beneath the former Turbine 1 Area, north of the former Mercury Storage Tank area. The mercury concentrations in the remainder of the wipe samples collected at elevation 11' ranged from 0.079 ug/100 cm² to 17.3 ug/100 cm².

¹⁰ The elevations for individual samples were measured and used to group the samples by primary elevation levels. Spatial locations were also considered when grouping the samples by primary elevation levels. Both the primary elevation levels and individual sample elevations are included in Tables 4 and 5.



Porous Surfaces

At elevation 11', GZA collected a total of 77 post-dismantling bulk samples at the locations shown on **Figure 2**. Mercury was detected above the risk-based screening value of 460 mg/kg in four of the bulk samples collected at elevation 11' (C-1076, C-1082, C-1084, and C-1111) as detailed in the table below.

Sample ID	Mercury Concentration (mg/kg)	Location Description
C-1076	3,130	Concrete bulk sample collected from the floor at the base of the former Stack.
C-1082	2,000	Concrete bulk sample collected from the west wall of the former Reclaim Room.
C-1084	595	Concrete bulk sample collected from the floor in the middle of the former Reclaim Room.
C-1111	682	Concrete bulk sample collected from the west side of the pedestal for the former Mercury
		Storage Tank.

The remainder of the bulk samples collected at elevation 11' had mercury concentrations ranging from 0.377 mg/kg to 327 mg/kg.

ELEVATION 24'

Non-Porous Surfaces

At elevation 24′, GZA collected a total of 32 post-dismantling assessment wipe samples at the locations shown on **Figure 3**. Mercury was not detected above the risk-based screening value of 52 ug/100 cm² in any of the samples collected at elevation 24′. The mercury results at this elevation ranged from non-detect to 51.1 ug/100 cm². The sample with a mercury concentration of 51.1 ug/100 cm², W-1166, was collected from a beam adjacent to the east exterior wall of the #2 Load Center below the former Unit 2 Turbine. The remainder of the wipe samples collected at elevation 24′ had mercury concentrations below 21.9 ug/100 cm².

Porous Surfaces

At elevation 24', GZA collected a total of 24 post-dismantling bulk samples at the locations shown on **Figure 3**. Mercury was not detected above the risk-based screening value of 460 mg/kg in any of the bulk samples collected at elevation 24'. The mercury concentrations in the samples collected at this elevation ranged from 1.98 mg/kg to 174 mg/kg.

ELEVATION 36'

Non-Porous Surfaces

At elevation 36′, GZA collected a total of 32 post-dismantling assessment wipe samples at the locations shown on **Figure 4**. Mercury was detected above the risk-based screening value of 52 ug/100 cm² in only one non-porous sample collected at elevation 36′, sample W-1129 at a concentration of 95.3 ug/100 cm². Sample W-1129 was collected from a beam adjacent to the former east sidewall of the Unit 2 Boiler. The mercury concentrations in the remainder of the wipe samples collected at elevation 36′ ranged from non-detect to 48.7 ug/100 cm². The sample with a mercury concentration of 48.7 ug/100 cm², W-1126, was collected from a beam adjacent to the former east sidewall of the Unit 1 Boiler. The remaining wipe samples collected at elevation 36′ had mercury concentrations below 12.7 ug/100 cm².

Porous Surfaces

At elevation 36', GZA collected a total of 34 post-dismantling bulk samples at the locations shown on **Figure 4**. Mercury was not detected above the risk-based screening value of 460 mg/kg in any of the bulk samples collected at elevation 36'. The mercury concentrations in the samples collected at this elevation ranged from 0.167 mg/kg to 415 mg/kg.



ELEVATIONS 49' AND 56'

Non-Porous Surfaces

At elevations 49' and 56', GZA collected a total of 57 post-dismantling assessment wipe samples at the locations shown on **Figure 5**. Mercury was not detected above the risk-based screening value of 52 ug/100 cm² in any of the samples collected at elevations 49' and 56'. The mercury concentrations in the samples collected at these elevations ranged from non-detect to 20.5 ug/100 cm².

Porous Surfaces

At elevation 56', GZA collected a total of 5 post-dismantling bulk samples at the locations shown on **Figure 5**. ¹¹ Mercury was not detected above the risk-based screening value of 460 mg/kg in any of the bulk samples collected at elevation 56'. The mercury concentrations in the samples collected at this elevation ranged from 3.53 mg/kg to 50.6 mg/kg.

There are no porous surfaces on elevation 49' as elevation 49' is a mezzanine. The flooring at elevation 49' is metal grating.

ELEVATION 69'

Non-Porous Surfaces

At elevation 69', GZA collected a total of 18 post-dismantling assessment wipe samples at the locations shown on **Figure 6**. Mercury was not detected above the risk-based screening value of 52 ug/100 cm² in any of the samples collected at elevation 69'. The mercury concentrations in the samples collected at this elevation ranged from non-detect to 1.33 ug/100 cm².

Porous Surfaces

No post post-dismantling bulk samples were collected at elevation 69' due to the presence of metal floor grating throughout the elevation.

ELEVATIONS 82' AND 95'

Non-Porous Surfaces

At elevations 82' and 95', GZA collected a total of 39 post-dismantling assessment wipe samples at the locations shown on **Figure 7**. Mercury was not detected above the risk-based screening value of 52 ug/100 cm² in any of the samples collected at elevations 82' and 95'. The mercury concentrations in the samples collected at these elevations ranged from non-detect to 14 ug/100 cm².

Porous Surfaces

At elevation 82', GZA collected a total of 2 post-dismantling bulk samples at the locations shown on **Figure 7**. ¹² Mercury was not detected above the risk-based screening value of 460 mg/kg in either of the bulk samples collected at elevation 82'. The mercury concentrations in the samples collected at this elevation were 17.9 mg/kg in sample C-1001 and 43.1 mg/kg in sample C-1002.

¹¹ No post-dismantling bulk samples were collected at elevation 49' due to the presence of metal floor grating throughout the elevation.

 $^{^{12}}$ No post-dismantling bulk samples were collected at elevation 95' due to the presence of metal flooring and metal wall surfaces throughout the elevation.



DATA EVALUATION

GZA reviewed the wipe sample data collected for this project and noted that all wipe sample results had mercury concentrations below the risk-based screening value of $52 \mu g/100 cm^2$ with the following exceptions.

- W-1129 (95.3 μg/100cm², Beam Wipe Horizontal)
- W-1201 (78.4 µg/100cm², Beam Wipe Vertical)

GZA reviewed the bulk sample data collected for this project and noted that all bulk sample results had mercury concentrations below the risk-based screening value of 460 mg/kg with the following exceptions.

- C-1076 (3,130 mg/kg, Floor Bulk)
- C-1082 (2,000 mg/kg, Wall Bulk)
- C-1084 (595 mg/kg, Floor Bulk)
- C-1111 (682 mg/kg, Pedestal Bulk Vertical)

Although exceedances of the risk-based screening value were noted for two wipe samples W-1129 and W-1201, the average wipe sample concentration (3.1 μ g/100cm², including the results for W-1129 and W-1201) is an order of magnitude lower than the risk-based screening value of 52 g/100cm². GZA further calculated the 90% Upper Confidence Limit (UCL)¹³ using the USEPA ProUCL version 5.1 based on the wipe sample results. The 90% UCL recommended by the ProUCL is 2.5 μ g/100cm² based on Kaplan-Meier Land's H-statistic. The calculated 90% UCL is below the screening value (2.5 μ g/100cm² vs. 52 μ g/100cm²), indicating that residual mercury on building surface is not expected to pose significant risks to current and future industrial workers at the Site.

Although exceedances of the risk-based screening value were noted for four bulk samples (C-1076, C-1082, C-1084, and C-1111), the average bulk sample concentration (82 mg/kg, including the results for C-1076, C-1082, C-1084, and C-1111) is much lower than the risk-based screening value of 460 mg/kg. GZA further calculated the 90% UCL using the USEPA ProUCL version 5.1 based on the bulk sample results. The 90% UCL recommended by the ProUCL is 162 mg/kg based on Chebyshev's theorem¹⁴. The calculated 90% UCL is below the screening value (162 mg/kg vs. 460 mg/kg), indicating that residual mercury in building material is not expected to pose significant risks to current and future industrial workers at the Site.

It should be noted that the wipe sample and bulk sample results represent the residual mercury levels resulting from the historic operation of the plant (associated with both mercury boiler operation and coal/oil-fired electricity generating). Note that coal/oil-fired electricity generating is still on-going at the Site and the operation could potentially produce dust containing mercury at the Site. Now that the mercury power system dismantling activities has been completed at the Site, residual mercury associated with mercury boiler operation is not expected to increase. Therefore, the conclusion of

¹³ The 90% UCL is the value when calculated for a random data set equals or exceeds the true mean 90% of the time. Note that the selection of specific UCL type should be determined by multiple factors including project-/site-specific factors, model uncertainties, data distributions, and statistical method used to derive UCLs. As an example, the USEPA ProUCL Version 5.0.00 Technical Guide indicates that "The use of the Chebyshev inequality to compute UCLs tends to yield more conservative (but stable) UCLs than other methods available in ProUCL software. In such cases, when the sample size is large (and other UCL methods such as the bootstrap-t method yield unrealistically high values due to presence of outlier(s)), one may want to use a 95% Chebyshev UCL or a Chebyshev UCL with lower confidence coefficient such as 90% as an estimate of the population mean, especially when the sample size is large (e.g., >100, 150)." For this project, the 90% UCL was selected for comparison to the wipe sample screening value based on the uncertainty associated with the screening value derivation.

¹⁴ In accordance with the USEPA ProUCL Version 5.0.00 Technical Guide, 90% UCL based on the Chebyshev theorem was an appropriate estimate of the mean.



No Significant Risk associated with residual mercury from mercury boiler operation under the current use condition would also be valid for the future use condition.

6.0 SUMMARY AND CONCLUSIONS

This report presents an assessment of the significance of residual mercury on the interior surfaces and in the building material in the vicinity of the dismantled mercury Unit 1 and Unit 2 boilers at the Schiller Station Site. A total of 210 wipe samples were collected from non-porous surfaces and 142 bulk samples were collected from porous surfaces. Each sample was tested for total mercury content. In addition, indoor air quality from areas outside of the active dismantling work was used to assess past, current, and future risk to the other workers at the Plant.

The indoor air quality monitoring results indicate that measured mercury vapor concentrations do not pose a significant risk to the current or future industrial workers at the Plant. A comparison of the wipe and bulk sampling results to the risk-based screening values indicates that while 6 individual samples exceeded the risk-based screening levels, the average concentrations and the 90% UCL of the arithmetic mean values are below the risk-based screening levels. In summary, the overall sampling results demonstrate that residual mercury associated with the former mercury boiler system would not pose Significant Risks to current and future industrial workers within the plant building.

We appreciate the opportunity to assist Eversource with this project. We trust that this report meets your current needs. If you have any questions, please contact us.

John R. Paquin

John Murphy
Consultant/Reviewer

Consultant/Reviewer

Very truly yours,

GZA GEOENVIRONMENTAL, INC.

Chunhua Liu, Doctor of Science

Senior Risk Assessor

Stephen M. Raymond

Principal

Attachments:

Table 1 – Indoor Air Monitoring Summary

Table 2 – Risk-based Screening Value Derivation

Table 3 – Sampling Summary Table

Table 4 – Laboratory Analytical Results – Non-Porous Surfaces

Table 5 – Laboratory Analytical Results – Porous Surfaces

Figure 1 - Locus Plan

Figures 2-7 – Sample Location and Laboratory Testing Results (Plan per each elevation)

Appendix A - Limitations

Appendix B - Laboratory Analytical Data



Tables

TABLE 1 INDOOR AIR MONITORING SUMMARY Schiller Station 400 Gosling Road Portsmouth, New Hampshire

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			Portsmouth, Ne		1			6
Monitor	Monitoring Period	Monitor Location	Mercury Vapor Conc	entration (mg/m³)		Time Period	Number of	Concentration x Number of Days
No.	Worldoning Period	Widnitor Location	Average	Maximum	Start	Finish	Days	(mg-day/m³)
	12/7/2016		0.00159	0.00193	12/7/2016	12/7/2016	1	0.00159
	12/15/16-12/21/16		0.00053	0.00365	12/15/2016	12/21/2016	7	0.00371
<u> </u>	12/21/16 - 12/23/16	_	0.00074	0.00881	12/21/2016	12/23/2016	3	0.00222
	12/23/16 - 12/28/16	4	0.00057	0.00283	12/23/2016	12/28/2016	6	0.00340
-	12/29/16 - 1/5/17 1/6/17 - 1/13/17	┥ ⊦	0.00059 0.00062	0.00377 0.00279	12/29/2016 1/6/2017	1/5/2017 1/13/2017	8	0.00474 0.00492
 	1/14/17 - 1/27/17	╡	0.00090	0.00279	1/0/2017	1/27/2017	14	0.01258
T I	1/27/17 - 2/2/17	1	0.00088	0.00809	1/27/2017	2/2/2017	7	0.00617
	2/3/17 - 2/7/17		0.00086	0.00678	2/3/2017	02/07/17	5	0.00431
	2/7/17 - 2/14/17	East side of Turbine	0.00085	0.00603	2/7/2017	02/14/17	8	0.00681
	2/14/17 - 2/20/17	Deck at El. 36'	0.00057	0.00683	2/14/2017	02/20/17	7	0.00402
	2/21/17 - 2/24/17 2/24/17 - 2/28/17		0.00112 0.00172	0.01047 0.00863	2/21/2017 2/24/2017	02/24/17 02/28/17	5	0.00446 0.00858
F	2/28/17 - 3/3/17	-	0.00172	0.00863	2/24/2017	03/03/17	4	0.00983
F	3/3/17 - 3/9/17		0.00127	0.00870	3/3/2017	03/09/17	7	0.00889
	3/9/17 - 3/15/17		0.00134	0.01436	3/9/2017	03/15/17	7	0.00939
	3/15/17 - 4/3/17		0.00038	0.00268	3/15/2017	04/03/17	20	0.00770
L	4/3/17 - 4/7/17		0.00091	0.00402	4/3/2017	04/07/17	5	0.00454
	4/7/17 - 4/10/17	┥ ⊦	0.00076	0.00196	4/7/2017	04/10/17	4	0.00303
-	4/10/17 - 4/12/17 4/12/17 - 4/20/17		0.00063 0.00308	0.00394 0.01196	4/10/2017 4/12/2017	04/12/17 04/20/17	9	0.00188 0.02773
	4/20/17 - 4/28/17	┥ ⊦	0.00368	0.00977	4/20/2017	04/28/17	9	0.01318
F	4/28/17 - 5/1/17	1	0.00010	0.00017	4/28/2017	05/01/17	4	0.00038
	5/1/17 - 5/9/17		0.00139	0.01056	5/1/2017	05/09/17	9	0.01250
	5/10/17 - 5/15/17	_ [0.00237	0.01473	5/10/2017	05/15/17	6	0.01420
Ļ	5/16/17 - 5/18/17	┥	0.00251	0.00789	5/16/2017	05/18/17	3	0.00752
	5/18/17 - 5/20/17 5/20/17 - 5/30/17	┥ ├	0.00122 0.00143	0.00560 0.01159	5/18/2017 5/20/2017	5/20/2017 5/30/2017	3 11	0.00366 0.01576
F	5/30/17 - 6/14/17	┥ ト	0.00143	0.01139	5/20/2017	6/14/2017	16	0.01376
F	6/14/17 - 6/27/17	<u></u>	0.00077	0.00751	6/14/2017	6/27/2017	14	0.01072
	6/27/17 - 7/11/17		0.00084	0.00687	6/27/2017	7/11/2017	15	0.01263
<u> </u>	7/21/17 - 7/24/17	_	0.00122	0.01067	7/21/2017	7/24/2017	4	0.00487
	7/28/17 - 8/10/17		0.00107	0.01452	7/28/2017	8/10/2017	14	0.01503
	8/10/17 - 8/22/17 8/22/17 - 9/5/17	-	0.00093 0.00071	0.00306 0.00520	8/10/2017 8/22/2017	8/22/2017 9/5/2017	13 15	0.01205 0.01065
F	9/5/17 - 9/14/17	-	0.00071	0.00320	9/5/2017	9/14/2017	10	0.01063
T I	9/14/17 - 10/4/17		0.00073	0.00562	9/14/2017	10/4/2017	21	0.01530
	10/4/17 - 10/12/17		0.00133	0.00739	10/4/2017	10/12/2017	9	0.01198
	10/12/17 - 10/25/17		0.00148	0.00505	10/12/2017	10/25/2017	14	0.02078
-	10/25/17 - 10/31/17		0.00117	0.01295	10/25/2017	10/31/2017	7	0.00821
	11/1/17 - 11/20/17		0.00085 0.00427		11/1/2017	11/20/2017	20	0.01706
	11/21/17 - 11/28/17 11/28/17 - 12/5/17		0.00095 0.00161	0.00234 0.00907	11/21/2017 11/28/2017	11/28/2017 12/5/2017	8	0.00763 0.01285
1	12/5/17 - 12/20/17	┪	0.00092	0.00793	12/5/2017	12/20/2017	16	0.01468
	12/20/17 - 1/2/18		0.00046	0.00431	12/20/2017	1/2/2018	14	0.00643
	1/2/18 - 1/9/18	Adjacent to north	0.00208	0.00542	1/2/2018	1/9/2018	8	0.01664
<u> </u>	1/9/18 - 1/30/18	elevator at El. 24'	0.00093	0.01039	1/9/2018	1/30/2018	22	0.02047
	2/1/18 - 2/13/18	-	0.00048	0.00123	2/1/2018	2/13/2018	13	0.00618
	2/13/18 - 2/20/18 2/20/18 - 2/28/18	┥ ⊦	0.00064 0.00101	0.00330 0.00530	2/13/2018 2/20/2018	2/20/2018 2/28/2018	8 9	0.00514 0.00905
	2/28/18 - 3/6/18	1	0.00101	0.01930	2/28/2018	3/6/2018	7	0.00303
F	3/6/18 - 3/23/18		0.00101	0.01438	3/6/2018	3/23/2018	18	0.01809
	3/23/18 - 3/29/18		0.00071	0.01280	3/23/2018	3/29/2018	7	0.00495
L	3/29/18 - 4/18/18	_	0.00097	0.00307	3/29/2018	4/18/2018	21	0.02033
	4/18/18 - 4/26/18	4	0.00171	0.01034	4/18/2018	4/26/2018	9	0.01535
-	4/27/18 - 5/4/18 5/4/18 - 5/9/18	┥ ト	0.00137 0.00110	0.00526 0.00650	4/27/2018 5/4/2018	5/4/2018 5/9/2018	8	0.01096 0.00659
F	5/4/18 - 5/9/18	┥ ト	0.00110	0.00650	5/4/2018	5/9/2018	6	0.00659
F	5/14/18 - 5/22/18	┥	0.00113	0.01498	5/14/2018	5/22/2018	9	0.01175
F	5/22/18 - 5/29/18]	0.00071	0.00957	5/22/2018	5/29/2018	8	0.00565
	5/29/18 - 6/5/18	」	0.00051	0.01590	5/29/2018	6/5/2018	8	0.00412
[6/5/18 - 6/12/18	4 [0.00266	0.04764	6/5/2018	6/12/2018	8	0.02127
	6/12/18 - 6/19/18	-	0.00066	0.02070	6/12/2018	6/19/2018	8	0.00528
F	6/22/18 - 6/26/18 6/26/18 - 7/3/18	-	0.00121 0.00096	0.00417 0.00873	6/22/2018 6/26/2018	6/26/2018 7/3/2018	5 8	0.00607 0.00769
	7/3/18 - 7/10/18	┥ ├	0.00096	0.00980	7/3/2018	7/3/2018	8	0.00769
	7/10/18 - 7/17/18	1	0.00055	0.01544	7/10/2018	7/17/2018	8	0.00440
F	7/17/18 - 7/24/18] [0.00041	0.00936	7/17/2018	7/24/2018	8	0.00330
	7/24/18 - 7/31/18	[0.00034	0.00416	7/24/2018	7/31/2018	8	0.00273
	7/31/18 - 8/7/18	┥ ├	0.00026	0.00321	7/31/2018	8/7/2018	8	0.00212
	8/7/18 - 8/10/18 8/10/18 - 8/21/18		0.00068 0.00045	0.01607 0.01353	8/7/2018	8/10/2018 8/21/2018	12	0.00273 0.00534
F	8/10/18 - 8/21/18 8/21/18 - 8/22/18	┥ ト	0.00045	0.01353	8/10/2018 8/21/2018	8/21/2018 8/22/2018	2	0.00534
	8/22/18 - 8/23/18	El. 24' Between Turbines 1 and 2	0.00035	0.00333	8/22/2018	8/23/2018	2	0.00107
	8/23/18 - 8/27/18	. a. omes I and Z	0.00018	0.00235	8/23/2018	8/27/2018	5	0.00092
	8/28/18 - 9/4/18	_ [0.00123	0.00649	8/28/2018	9/4/2018	8	0.00983
ļ.	9/4/18 - 9/11/18	┥ ├	0.00083	0.05492	9/4/2018	9/11/2018	8	0.00663
 	9/11/18 - 9/18/18	 El. 24' Column east	0.00114	0.00838	9/11/2018	9/18/2018	8	0.00912
-	9/18/18 - 9/25/18 9/25/18 - 10/2/18	of the north	0.00106 0.00131	0.01388 0.00883	9/18/2018 9/25/2018	9/25/2018 10/2/2018	8	0.00847 0.01052
}	10/2/18 - 10/9/18	elevator	0.00131	0.00883	10/2/2018	10/2/2018	8	0.01032
F	10/9/18 - 10/16/18		0.00126	0.00728	10/2/2018	10/16/2018	8	0.01008
F	10/16/18 - 10/23/18	_	0.00072	0.00300	10/16/2018	10/23/2018	8	0.00578
	10/23/18 - 10/30/18	_ [0.00086	0.00407	10/23/2018	10/30/2018	8	0.00690
	10/30/18 - 11/6/18		0.00111	0.00480	10/30/2018	11/6/2018	8	0.00889

TABLE 1 INDOOR AIR MONITORING SUMMARY Schiller Station 400 Gosling Road

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Monitor				ew Hampshire centration (mg/m³)		Time Period		Concentration
Monitor No.	Monitoring Period	Monitor Location	Average	Maximum	Start	Finish	Number of	Number of Day
	11/6/18 - 11/13/18		0.00142	0.01048	11/6/2018	11/13/2018	Days 8	(mg-day/m³) 0.01137
-	11/13/18 - 11/20/18	1	0.00142	0.00642	11/0/2018	11/20/2018	8	0.001137
	11/20/18 - 11/27/18	El. 24' Southwest	0.00064	0.00240	11/20/2018	11/27/2018	8	0.00515
	11/27/18 - 12/4/18	side of Boiler	0.00086	0.01219	11/27/2018	12/4/2018	8	0.00684
-	12/4/18 - 12/11/18	Containment	0.00045	0.00504	12/4/2018	12/11/2018	8	0.00357
	12/11/18 - 12/18/18 12/18/18 - 12/26/18	+	0.00058 0.00062	0.01285 0.00516	12/11/2018 12/18/2018	12/18/2018 12/26/2018	8 9	0.00463 0.00560
	12/10/10 12/20/10	1		antling Work Complete		12/20/2010		0.00300
	12/26/18 - 1/2/19		0.00055	0.00259	12/26/2018	1/2/2019	8	0.00443
	1/2/19 - 1/8/19	4	0.00075	0.00251	1/2/2019	1/8/2019	7	0.00522
H	1/8/19 - 1/15/19 1/15/19 - 1/23/19		0.00036 0.00027	0.00162 0.00155	1/8/2019 1/15/2019	1/15/2019 1/23/2019	8 9	0.00284 0.00241
1	1/23/19 - 1/30/19	-	0.00037	0.00492	1/23/2019	1/30/2019	8	0.00297
	1/30/19 - 2/5/19		0.00066	0.00328	1/30/2019	2/5/2019	7	0.00462
L	2/5/19 - 2/12/19	El. 24' Southwest	0.00068	0.02005	2/5/2019	2/12/2019	8	0.00542
-	2/12/19 - 2/19/19 2/19/19 - 2/26/19	side of Boiler	0.00057 0.00077	0.00358 0.00839	2/12/2019 2/19/2019	2/19/2019 2/26/2019	8	0.00453 0.00619
-	2/26/19 - 3/5/19	Containment	0.00077	0.01266	2/19/2019	3/5/2019	8	0.00465
	3/5/19 - 3/12/19	<u> </u>	0.00035	0.00556	3/5/2019	3/12/2019	8	0.00281
	3/12/19 - 3/19/19		0.00095	0.01715	3/12/2019	3/19/2019	8	0.00764
-	3/19/19 - 3/28/19	_	0.00054	0.00838	3/19/2019	3/28/2019	10	0.00544
	3/28/19 - 4/4/19 4/4/19 - 4/11/19	_	0.00033 0.00043	0.00116 0.00303	3/28/2019 4/4/2019	4/4/2019 4/11/2019	8	0.00267 0.00341
	4/11/19 - 4/18/19		0.00045	0.00140	4/11/2019	4/18/2019	8	0.00357
	12/7/2016		0.00093	0.00151	12/7/2016	12/7/2016	1	0.00093
	12/8/16 - 12/12/16	4 [0.00063	0.00103	12/8/2016	12/12/2016	5	0.00315
-	12/13/16 - 12/19/16	4	0.00040	0.00213	12/13/2016	12/19/2016	7	0.00278
-	12/19/16 - 12/21/16 12/21/16 - 12/23/16	┥ ├	0.00035 0.00053	0.00182 0.00224	12/19/2016 12/21/2016	12/21/2016 12/23/2016	3	0.00106 0.00159
	12/23/16 - 12/28/16	†	0.00047	0.00207	12/23/2016	12/28/2016	6	0.00282
	12/28/16 - 1/5/17		0.00049	0.00287	12/28/2016	1/5/2017	9	0.00445
-	1/5/17 - 1/13/17		0.00058	0.00334	1/5/2017	1/13/2017	9	0.00521
-	1/13/17 - 1/27/17 1/27/17 - 1/29/17	-	0.00068 0.00074	0.00969 0.00133	1/13/2017 1/27/2017	1/27/2017 1/29/2017	15 3	0.01021 0.00222
-	1/29/17 - 2/7/17	╡ ⊦	0.00074	0.00133	1/29/2017	2/7/2017	10	0.00222
	2/7/17 - 2/21/17] [0.00067	0.00570	2/7/2017	2/21/2017	15	0.00998
	2/21/17 - 3/14/17		0.00103	0.01017	2/21/2017	3/14/2017	22	0.02266
-	3/15/17 - 3/28/17		0.00069	0.00551	3/15/2017	3/28/2017	14	0.00964
-	3/28/17 - 3/30/17 3/30/17 - 4/7/17	┥	0.00096 0.00083	0.00997 0.00798	3/28/2017 3/30/2017	3/30/2017 4/7/2017	3 9	0.00288 0.00750
-	4/7/17 - 4/20/17	1	0.00116	0.00689	4/7/2017	4/20/2017	14	0.01627
	4/20/17 - 4/27/17		0.00158	0.01174	4/20/2017	4/27/2017	8	0.01264
_	4/27/17 - 5/1/17	4	0.00245	0.01054	4/27/2017	5/1/2017	5	0.01227
-	5/1/17 - 5/24/17	4	0.00160 0.00111	0.01334 0.00124	5/1/2017	5/24/2017 5/30/2017	24 372	0.03849 0.41300
-	5/24/16 - 5/30/17 5/30/17 - 6/2/17	┪	0.00111	0.00124	5/24/2016 5/30/2017	6/2/2017	4	0.41300
	6/3/17 - 6/26/17	<u> </u>	0.00520	0.01492	6/3/2017	6/26/2017	24	0.12472
	6/26/17 - 7/5/17] [0.00267	0.01104	6/26/2017	7/5/2017	10	0.02671
L	7/5/17 - 7/11/17		0.00176	0.00462	7/5/2017	7/11/2017	7	0.01230
-	7/11/17 - 7/18/17 7/18/17 - 8/4/17	┥	0.00100 0.00036	0.00464 0.00653	7/11/2017 7/18/2017	7/18/2017 8/4/2017	8 18	0.00798 0.00648
-	8/4/17 - 9/13/17	1	0.00092	0.00466	8/4/2017	9/13/2017	41	0.03780
	9/13/17 - 10/4/17		0.00086	0.00569	9/13/2017	10/4/2017	22	0.01883
_	10/4/17 - 10/12/17	Adjacent to El. 59'	0.00128	0.00516	10/4/2017	10/12/2017	9	0.01155
2	10/12/17 - 10/25/17	and El. 82'	0.00031	0.00275	10/12/2017	10/25/2017	14 7	0.00429
<i>"</i>	10/25/17 - 10/31/17 10/31/17 - 11/7/17	containment decon	0.00112 0.00135	0.01291 0.01496	10/25/2017 10/31/2017	10/31/2017 11/7/2017	8	0.00785 0.01079
	11/7/17 - 11/15/17	area at El. 56'	0.00031	0.00275	11/7/2017	11/15/2017	9	0.00276
	11/15/17 - 11/20/17	_ [0.00027	0.00119	11/15/2017	11/20/2017	6	0.00160
-	11/21/17 - 11/28/17	┥ ト	0.00061	0.00212	11/21/2017	11/28/2017	8 7	0.00490
-	11/29/17 - 12/5/17 12/20/17 - 1/2/18	┥ ト	0.00081 0.00028	0.00710 0.00266	11/29/2017 12/20/2017	12/5/2017 1/2/2018	14	0.00568 0.00397
	1/2/18 - 1/9/18	<u></u>	0.00025	0.00146	1/2/2018	1/9/2018	8	0.00337
	1/18/18 - 1/22/18		0.00075	0.00292	1/18/2018	1/22/2018	5	0.00375
_	1/22/18 - 1/30/18	-	0.00072	0.01157	1/22/2018	1/30/2018	9	0.00649
-	1/30/18 - 2/6/18 2/6/18 - 2/13/18	-	0.00054 0.00089	0.00126 0.01582	1/30/2018 2/6/2018	2/6/2018 2/13/2018	8	0.00432 0.00709
-	2/13/18 - 2/28/18	┪ ├	0.00089	0.01382	2/13/2018	2/28/2018	16	0.01950
	2/28/18 - 3/6/18	1	0.00125	0.01759	2/28/2018	3/6/2018	7	0.00877
	3/6/18 - 3/15/18		0.00096	0.00859	3/6/2018	3/15/2018	10	0.00960
_	3/15/18 - 3/23/18	-	0.00053	0.01171	3/15/2018	3/23/2018	9	0.00477
-	3/23/18 - 3/27/18 3/27/18 - 4/4/18	┥	0.00028 0.00059	0.01479 0.01486	3/23/2018 3/27/2018	3/27/2018 4/4/2018	5 9	0.00142 0.00534
-	4/4/18 - 4/16/18	┥ ├	0.00039	0.00521	4/4/2018	4/4/2018	13	0.00504
	4/16/18 - 4/26/18] [0.00101	0.01232	4/16/2018	4/26/2018	11	0.01116
	4/27/18 - 5/4/18	4 [0.00109	0.01421	4/27/2018	5/4/2018	8	0.00870
-	5/4/18 - 5/7/18	┥ ト	0.00127	0.01299	5/4/2018 5/7/2018	5/7/2018	4	0.00509
-	5/7/18 - 5/14/18 5/14/18 - 5/22/18	┥ ├	0.00098 0.00189	0.01367 0.02818	5/7/2018	5/14/2018 5/22/2018	8 9	0.00783 0.01700
	5/22/18 - 5/29/18	<u> </u>	0.00133	0.01421	5/22/2018	5/29/2018	8	0.01700
	5/29/18 - 6/5/18] [0.00106	0.04002	5/29/2018	6/5/2018	8	0.00849
L	6/5/18 - 6/12/18	┥ ┡	0.00121	0.04106	6/5/2018	6/12/2018	8	0.00972
	6/12/18 - 6/19/18 6/20/18 - 6/26/18	┥ ├	0.00163 0.00093	0.02491 0.00874	6/12/2018 6/20/2018	6/19/2018 6/26/2018	8 7	0.01307 0.00652
-	6/26/18 - 7/3/18	┥ ├	0.00093	0.00874	6/20/2018	7/3/2018	8	0.00652
	7/3/18 - 7/10/18	<u> </u>	0.00092	0.02352	7/3/2018	7/10/2018	8	0.00715
 	7/10/18 - 7/12/18	¬	0.00104	0.03069	7/10/2018	7/12/2018	3	0.00311

TABLE 1 INDOOR AIR MONITORING SUMMARY Schiller Station 400 Gosling Road Portsmouth, New Hampshire

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		1	Portsmouth, Nev		T			T
Monitor	Monitoring Period	Monitor Location	Mercury Vapor Conce	ntration (mg/m³)		Time Period	Number of	Concentration x Number of Days
No.			Average	Maximum	Start	Finish	Days	(mg-day/m³)
	7/12/18 - 7/17/18		0.00057	0.02601	7/12/2018	7/17/2018	6	0.00343
	7/17/18 - 7/24/18		0.00099	0.01692	7/17/2018	7/24/2018	8	0.00795
	7/24/18 - 7/31/18 7/31/18 - 8/7/18	4	0.00068 0.00047	0.01736 0.02933	7/24/2018 7/31/2018	7/31/2018 8/7/2018	8	0.00542 0.00375
	8/7/18 - 8/10/18	†	0.00047	0.00277	8/7/2018	8/10/2018	4	0.00373
	8/10/18 - 8/21/18]	0.00032	0.00407	8/10/2018	8/21/2018	12	0.00386
	8/21/18 - 8/28/18	Adjacent to El. 59'	0.00038	0.00366	8/21/2018	8/28/2018	8	0.00305
	8/28/18 - 9/4/18 9/4/18 - 9/11/18	and El. 82'	0.00023 0.00015	0.00190 0.00229	8/28/2018 9/4/2018	9/4/2018 9/11/2018	8	0.00186 0.00122
	9/11/18 - 9/18/18	containment decon	0.00013	0.00229	9/11/2018	9/11/2018	8	0.00122
	9/18/18 - 9/25/18	area at El. 56'	0.00017	0.00196	9/18/2018	9/25/2018	8	0.00136
	9/25/18 - 10/2/18]	0.00009	0.00103	9/25/2018	10/2/2018	8	0.00076
	10/2/18 - 10/9/18 10/9/18 - 10/16/18	4	0.00013 0.00014	0.00307 0.00182	10/2/2018 10/9/2018	10/9/2018 10/16/2018	8	0.00101 0.00112
	10/9/18 - 10/16/18	1	0.00014	0.00182	10/9/2018	10/16/2018	8	0.00112
	10/23/18 - 10/30/18	_	0.00023	0.00460	10/23/2018	10/30/2018	8	0.00187
	10/30/18 - 11/7/18		0.00013	0.00067	10/30/2018	11/7/2018	9	0.00114
	11/7/18 - 11/13/18	4	0.00017	0.01124	11/7/2018	11/13/2018	7	0.00116
	11/13/18 - 11/20/18 11/20/18 - 11/27/18	South side of	0.00009 0.00008	0.00040 0.00021	11/13/2018 11/20/2018	11/20/2018 11/27/2018	8	0.00075 0.00060
2	11/27/18 - 12/4/18	Former Coal	0.00025	0.00371	11/27/2018	12/4/2018	8	0.00201
	12/4/18 - 12/11/18	Bunker at El. 56'	0.00011	0.00071	12/4/2018	12/11/2018	8	0.00086
	12/11/18 - 12/18/18	4	0.00014	0.00130	12/11/2018	12/18/2018	8	0.00114
	12/18/18 - 12/26/18	Boiler Dismantling W	0.00011 /ork Completed	0.00104	12/18/2018	12/26/2018	9	0.00097
	12/26/18 - 1/2/19	Doner Dismanding W	0.000082	0.00021	12/26/2018	1/2/2019	8	0.00000
	1/2/19 - 1/8/19		0.000114	0.00061	1/2/2019	1/8/2019	7	0.00057
	1/8/19 - 1/15/19		0.000086	0.00018	1/8/2019	1/15/2019	8	0.00091
	1/15/19 - 1/23/19		0.000156	0.00074	1/15/2019	1/23/2019	9	0.00077
	1/23/19 - 1/30/19 1/30/19 - 2/5/19	-	0.000061 0.000068	0.00009 0.00009	1/23/2019 1/30/2019	1/30/2019 2/5/2019	7	0.00125 0.00042
	2/5/19 - 2/12/19	Courth old a cf	0.000102	0.00009	2/5/2019	2/3/2019	8	0.00042
	2/12/19 - 2/19/19	South side of Former Coal	0.000111	0.00026	2/12/2019	2/19/2019	8	0.00081
	2/19/19 - 2/26/19	Bunker at El. 56'	0.000168	0.00184	2/19/2019	2/26/2019	8	0.00089
	2/26/19 - 3/5/19		0.000111	0.00040	2/26/2019	3/5/2019	8	0.00134 0.00089
	3/5/19 - 3/12/19 3/12/19 - 3/20/19	=	0.000079 0.000147	0.00019 0.00084	3/5/2019 3/12/2019	3/12/2019 3/20/2019	9	0.00089
	3/20/19 - 3/28/19		0.00004	0.00009	3/20/2019	3/28/2019	9	0.00132
	3/28/19 - 4/4/19		0.000063	0.00007	3/28/2019	4/4/2019	8	0.00051
	4/4/19 - 4/11/19	_	0.000067	0.00010	4/4/2019	4/11/2019	8	0.00051
	4/11/19 - 4/18/19 5/19/17 - 5/20/17		0.000003 0.00170	0.00004 0.00933	4/11/2019 5/18/2017	4/18/2019 5/30/2017	8 13	0.00054 0.00083
	5/18/17 - 5/30/17 5/30/17 - 6/5/17	╡	0.00170	0.00933	5/30/2017	6/5/2017	7	0.00044
	6/6/17 - 6/29/17	Between Turbine	0.00144	0.01454	6/6/2017	6/29/2017	24	0.00161
	6/29/17 - 7/11/17	#1 and Turbine #2	0.00139	0.00980	6/29/2017	7/11/2017	13	0.00003
	7/11/17 - 7/21/17	at El. 11'	0.00350	0.00876	7/11/2017	7/21/2017	11	0.01875
	7/21/17 - 8/10/17 8/10/17 - 8/22/17	at Li. 11	0.00039 0.00056	0.00903 0.00563	7/21/2017 8/10/2017	8/10/2017 8/22/2017	21 13	0.04837 0.01876
	8/22/17 - 8/29/17	1	0.00044	0.00534	8/22/2017	8/29/2017	8	0.01115
	8/29/17 - 9/5/17		0.00051	0.00391	8/29/2017	9/5/2017	8	0.02802
	9/5/17 - 9/14/17	_	0.00139	0.00443	9/5/2017	9/14/2017	10	0.00394
	9/14/17 - 10/4/17	4	0.00021	0.00146	9/14/2017	10/4/2017	21	0.01178
	10/4/17 - 10/12/17 10/12/17 - 10/24/17	-	0.00096 0.00064	0.00456 0.00903	10/4/2017 10/12/2017	10/12/2017 10/24/2017	9 13	0.00394 0.00657
	10/24/17 - 10/31/17	1	0.00039	0.01251	10/24/2017	10/31/2017	8	0.01110
	10/31/17 - 11/7/17]	0.00102	0.01414	10/31/2017	11/7/2017	8	0.00168
	11/7/17 - 11/21/17	4	0.00044	0.00290	11/7/2017	11/21/2017	15	0.01439
	11/21/17 - 11/28/17	-	0.00020 0.00013	0.00804 0.00144	11/21/2017	11/28/2017	8	0.00512 0.00309
	11/28/17 - 12/5/17 12/5/17 - 12/20/17	┪	0.00013	0.00144	11/28/2017 12/5/2017	12/5/2017 12/20/2017	16	0.00309
	12/20/17 - 1/2/18	Beneath northeast	0.00026	0.00457	12/20/2017	1/2/2018	14	0.00620
	1/2/18 - 1/9/18	stairway at El. 11'	0.00174	0.00765	1/2/2018	1/9/2018	8	0.00157
3	1/9/18 - 1/26/18	-	0.00015 0.00019	0.00391	1/9/2018	1/26/2018	18 5	0.00240 0.00068
Э	1/26/18 - 1/30/18 1/30/18 - 2/10/18	┪	0.00019	0.00144 0.00211	1/26/2018 1/30/2018	1/30/2018 2/10/2018	12	0.00068
	2/10/18 - 2/14/18	<u> </u>	0.00013	0.00011	2/10/2018	2/14/2018	5	0.00870
	2/14/18 -2/21/18]	0.00013	0.00167	2/14/2018	2/21/2018	8	0.00123
	2/21/18 - 2/28/18	4	0.00026	0.00146	2/21/2018	2/28/2018	8	0.00152
	2/28/18 - 3/12/18 3/12/18 - 3/23/18	-	0.00038 0.00030	0.00449 0.00104	2/28/2018 3/12/2018	3/12/2018 3/23/2018	13 12	0.00201 0.00098
	3/12/18 - 3/23/18 3/23/18 - 3/29/18	┪	0.00030	0.0104	3/12/2018	3/23/2018	7	0.00098
	3/29/18 - 4/4/18]	0.00075	0.00226	3/29/2018	4/4/2018	7	0.00180
	4/4/18 - 4/19/18		0.00048	0.00453	4/4/2018	4/19/2018	16	0.00610
	4/19/18 - 4/27/18	-	0.00141	0.01254 0.01744	4/19/2018	4/27/2018	9	0.00268
	4/27/18 - 5/4/18 5/4/18 - 5/8/18	-	0.00125 0.00124	0.01744	4/27/2018 5/4/2018	5/4/2018 5/8/2018	8 5	0.00535 0.00375
	5/8/18 - 5/14/18	1	0.00124	0.01233	5/8/2018	5/14/2018	7	0.00373
	5/14/18 - 5/22/18]	0.00170	0.01481	5/14/2018	5/22/2018	9	0.01266
	5/22/18 - 5/29/18	South east of the	0.00056	0.00826	5/22/2018	5/29/2018	8	0.01002
	5/29/18 - 6/5/18	Unit #2 Boiler at El.	0.00159	0.01226	5/29/2018	6/5/2018	8	0.00991
	6/5/18 - 6/12/18 6/12/18 - 6/19/18	11'	0.00239 0.00120	0.02335 0.01943	6/5/2018 6/12/2018	6/12/2018 6/19/2018	8	0.00916 0.01360
	6/20/18 - 6/26/18	1	0.00120	0.01943	6/20/2018	6/26/2018	7	0.00392
	6/26/18 - 7/3/18	<u> </u>	0.00162	0.01694	6/26/2018	7/3/2018	8	0.01270
	7/3/18 - 7/10/18	7	0.00127	0.00997	7/3/2018	7/10/2018 7/17/2018	8	0.01909
	1,0,00							

TABLE 1 INDOOR AIR MONITORING SUMMARY Schiller Station 400 Gosling Road

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			Mercury Vapor Con	centration (mg/m³)		Time Period		Concentration x
Monitor No.	Monitoring Period	Monitor Location	Average	Maximum	Start	Finish	Number of Days	Number of Days (mg-day/m³)
	7/17/18 - 7/24/18	South east of the	0.00171	0.01155	7/17/2018	7/24/2018	8	0.00722
	7/24/18 - 7/31/18	Unit #2 Boiler at El.	0.00171	0.04902	7/24/2018	7/31/2018	8	0.01293
	7/31/18 - 8/7/18	11'	0.00133	0.02817	7/31/2018	8/7/2018	8	0.01016
	8/7/18 - 8/10/18		0.00046	0.00469	8/7/2018	8/10/2018	4	0.00444
	8/10/18 - 8/16/18		0.00052	0.00275	8/10/2018	8/16/2018	7	0.01194
	8/16/18 - 8/21/18	Adjacent to Unit #4	0.00020	0.00150	8/16/2018	8/21/2018	6	0.01025
L	8/21/18 - 8/26/18	FD Fan at El. 11'	0.00031	0.00157	8/21/2018	8/26/2018	6	0.00796
L	8/27/18 - 8/28/18	TD rail at Li. 11	0.00028	0.00169	8/27/2018	8/28/2018	2	0.00093
	8/28/18 - 9/4/18	_	0.00013	0.00101	8/28/2018	9/4/2018	8	0.00413
	9/4/18 - 9/11/18		0.00016	0.00145	9/4/2018	9/11/2018	8	0.00157
	9/12/18 - 9/18/18	_	0.00016	0.00109	9/12/2018	9/18/2018	7	0.00215
L	9/18/18 - 9/25/18		0.00013	0.00141	9/18/2018	9/25/2018	8	0.00222
L	9/25/18 - 10/2/18	_	0.00020	0.00415	9/25/2018	10/2/2018	8	0.00108
L	10/3/18 - 10/9/18	_	0.00018	0.00546	10/3/2018	10/9/2018	7	0.00114
L	10/9/18 - 10/16/18		0.00016	0.00275	10/9/2018	10/16/2018	8	0.00124
	10/16/18 - 10/23/18		0.00017	0.00146	10/16/2018	10/23/2018	8	0.00108
F	10/23/18 - 10/30/18	East of Reclaim	0.00020	0.00371	10/23/2018	10/30/2018	8	0.00163
	10/30/18 - 11/7/18	Room at El. 11'	0.00012	0.00136	10/30/2018	11/7/2018	9	0.00159
	11/7/18 - 11/13/18	4	0.00027	0.00816	11/7/2018	11/13/2018	7	0.00110
	11/13/18 - 11/20/18	-	0.00011	0.00076	11/13/2018	11/20/2018	8	0.00137
, F	11/20/18 - 11/27/18	- ⊦	0.00010	0.00056	11/20/2018	11/27/2018	8	0.00159
3	11/27/18 - 12/4/18	-	0.00017	0.00668	11/27/2018	12/4/2018	8	0.00093
-	12/4/18 - 12/11/18	-	0.00017	0.00795	12/4/2018	12/11/2018	8	0.00219
-	12/11/18 - 12/18/18	-	0.00028	0.02489	12/11/2018	12/18/2018	8	0.00088
-	12/18/18 - 12/26/18	Boiler Dismantling W	0.00014	0.00828	12/18/2018	12/26/2018	9	0.00094
- 1	12/26/19 1/2/10	Boller Dismantling W	0.00014	0.01758	12/26/2018	1/2/2019	8	0.00139
- 1	12/26/18 - 1/2/19 1/2/19 - 1/8/19	- -	0.00014	0.01738	1/2/2019	1/8/2019	7	0.00139
-	1/8/19 - 1/15/19	-	0.00012	0.00114	1/8/2019	1/5/2019	8	0.00223
-	1/15/19 - 1/23/19	-	0.00011	0.00073	1/0/2019	1/23/2019	9	0.00223
-	1/23/19 - 1/30/19		0.00014	0.00143	1/23/2019	1/30/2019	8	0.00000
- 1	1/30/19 - 2/5/19	-	0.00015	0.00203	1/30/2019	2/5/2019	7	0.00100
- 1	2/5/19 - 2/12/19	-	0.00023	0.00457	2/5/2019	2/12/2019	8	0.00097
- 1	2/12/19 - 2/19/19		0.00019	0.00365	2/12/2019	2/19/2019	8	0.00086
	2/19/19 - 2/26/19	East of Reclaim	0.00037	0.01008	2/19/2019	2/26/2019	8	0.00113
	2/26/19 - 3/5/19	Room at El. 11'	0.00032	0.01184	2/26/2019	3/5/2019	8	0.00171
	3/5/19 - 3/12/19		0.00024	0.00459	3/5/2019	3/12/2019	8	0.00122
	3/12/19 - 3/20/19		0.00006	0.00008	3/12/2019	3/20/2019	9	0.00209
	3/20/19 - 3/28/19		0.00036	0.01307	3/20/2019	3/28/2019	9	0.00169
	3/28/19 - 4/4/19		0.00016	0.00394	3/28/2019	4/4/2019	8	0.00293
	4/4/19 - 4/11/19		0.00012	0.00222	4/4/2019	4/11/2019	8	0.00255
	4/11/19 - 4/13/19		0.00014	0.00114	4/11/2019	4/13/2019	3	0.00072
	4/15/19 - 4/18/19		0.00012	0.00109	4/15/2019	4/18/2019	4	0.00024
S	Sum (Whole Monitoring Peri	iod)					3010	2.48

Daily Average mg/m³ (Whole Monitoring Period) = sum of (Average Concentration x Number of Days)/sum of (Number of Days) **Sum (Post-Dismantling)**

0.00083 386 0.104

0.00027

Daily Average mg/m³ (Post-Dismantling) = sum of (Average Concentration x Number of Days)/sum of (Number of Days)

Notes:

- 1. Boiler dismantling and mercury removal work already commenced prior to installation of Lumex monitors.
- 2. Vapor monitoring was performed with Lumex RA915+ Mercury Vapor Analyzers.
- 3. Mercury vapor analyzers were deployed at locations outside of the contained dismantling activities, and at locations intended to monitor general plant worker exposure potential
- ${\bf 4.}~{\bf Grey-highlighted}~{\bf results}~{\bf represent}~{\bf post-dismantling}~{\bf conditions}.$

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TABLE 2

RISK-BASED SCREENING LEVEL DERIVATION FOR NON-POROUS SURFACE Schiller Station

400 Gosling Road

Portsmouth, New Hampshire

RISK CHARACTERIZATION EQUATIONS

HI=ADI/RfD

Where:

HI = Hazard Index ADI = Average Daily Dose RfD = Reference Dose

Calculation of Risk-Based Screening Value for Wipe Samples

Ingestion	Parameter	Definition $C_{wipe} = \frac{RfD \times HQ \times UCF}{2 \times CNST_{ing}}$	Unit ug/m2	Value 6064	Reference Calculated
Dermal		$C_{wipe} = \frac{RfD \times fgi \times HQ \times UCF}{2 \times ABS_{der} \times CNST_{der}}$	ug/m2	37796	Calculated
Ingestion + Derm	nal	$C_{wipe} = \frac{_{RfD x HI x UCF}}{_{2 x (ABS_{der} X CNST_{der}/f gi+ CNST_{ing})}}$	ug/m2 ug/wipe, or ug/100cm ²	5226 52	Calculated Calculated

Where:					
	HQ =	Hazard Quotient			
	HI =	Target Hazard Index		1.0	
	RfD =	Oral Reference Dose	mg/kg-day	3E-04	IRIS, 1995 for mercuric chloride
	UCF =	Unit Conversion Factor	ug/mg	1000	
	ABSder=	dermal absorption (fraction)		0.001	USEPA Region 3, https://www.epa.gov/risk/assessing-dermal-exposure-soil
	fgi	fractional GI absorption		1	
		$CNST_{der} = \frac{SA_d \times CF \times TE \times EF \times ED}{BW \times AT \times UCF2}$	m ² /kg-day	4.0E-03	Calculated
		$CNST_{ing} = \frac{SA_i \times CF \times TE \times f do \times EF \times ED}{BW \times AT \times UCF2}$	m²/kg-day	2.5E-05	Calculated

Where:	SA _d =	skin surface area	cm²/event	5070	DiBiasio et al. (2003)	
	SA _i =	skin surface area, ingestion	cm²/event	790	DiBiasio et al. (2003)	
	CF =	contact frequency	events/day	8	DiBiasio et al. (2003)	
	BW =	body weight	kg	70	DiBiasio et al. (2003)	
	AT =	averaging time - non-cancer	days	9125	DiBiasio et al. (2003)	
	EF	exposure frequency	days/yr	250	DiBiasio et al. (2003)	
	ED	exposure duration	yr	25	DiBiasio et al. (2003)	
	TE	surface-to-skin transfer efficiency		0.1	DiBiasio et al. (2003)	
	fdo	fraction transferred from dermal-to-oral		0.04	DiBiasio et al. (2003)	
	UCF2=	unit conversion factor	cm ² /m ²	1E+04		

Notes:

1. The equations and default exposure assumptions from Karen DiBiasio et al (2003) Human Health Risk Evaluation of Structural Surfaces Contaminated with Metals.

TABLE 3
SAMPLING SUMMARY TABLE
Schiller Station
400 Gosling Road
Portsmouth, New Hampshire

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		Porous	Surfaces			Non-Porous Surfaces											
Location	Floor Bulk Sample	Wall Bulk Sample	Pedestal Bulk Sample Horizontal	Pedestal Bulk Sample Vertical	Beam Wipe Horizontal	Beam Wipe Horizontal Incline	Beam Wipe Vertical	Column Wipe Vertical	Cross Beam Horizontal	Cross Beam Horizontal Incline	Cross Bracing Horizontal Incline	Floor Wipe	Girt Horizontal	Stair Stringer	Stair Stringer Vertical	Wall Wipe	Other
El. 11'	43	24	6	4	0	0	15	13	0	0	0	2	0	2	0	0	0
El. 24'	12	12	0	0	11	2	0	9	0	0	0	4	0	0	0	6	0
El. 36'	27	7	0	0	9	0	0	6	0	1	3	2	2	0	0	8	1
El. 49' and 56'	3	2	0	0	17	0	0	10	2	0	0	5	7	0	1	10	5
El. 69'	0	0	0	0	4	0	1	7	0	1	0	0	3	0	0	2	0
El. 82' and 95'	2	0	0	0	12	0	0	4	0	1	0	3	3	0	0	15	1
Totals	87	45	6	4	53	2	16	49	2	3	3	16	15	2	1	41	7

Notes:

^{1.} Refer to Table 4 for descriptions of non-porous surface samples designated as "Other".

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Floor Elevation	Sample Measured Elevation	Sample Name	Sample Date	Surface Type	Surface Description	Paint Color	Paint Condition	General notes	Mercury Concentration (ug/100cm ²⁾
11	15	W-1179	3/29/2019	Column Wipe Vertical	Steel	Gray	Damaged	Column near stack foundation	0.465
11	15	W-1180	3/29/2019	Stair Stringer	Steel	Gray	Damaged	Stair stringer south of stack foundation	0.82
11	14	W-1181	3/29/2019	Stair Stringer	Steel	Gray	Damaged	East face of stair stringer at bottom of stairwell to south of stack foundation	0.166
11	15	W-1182	3/29/2019	Column Wipe Vertical	Steel	Gray	Damaged	East face of column adjacent to boiler leak gear door	0.218
11	23	W-1183	3/29/2019	Beam Wipe Vertical	Steel			North face of beam above office just north of south elevator	1.06
11	21	W-1184	3/29/2019	Beam Wipe Vertical	Steel	Gray	Damaged	Center of south beam of boiler #2 pit	1.35
11	18	W-1185	3/29/2019	Column Wipe Vertical	Concrete	Gray	Damaged	Northwest column of boiler 2 pit	0.525
11	23	W-1186	3/29/2019	Beam Wipe Vertical	Steel	Gray	Damaged	Beam adjacent to compressed air tank to northwest of boiler #2 pit	0.438
11	15	W-1187	3/29/2019	Column Wipe Vertical	Steel	Gray	Damaged	East face of southeast column of boiler #1 pit	0.318
11	22	W-1188	3/29/2019	Beam Wipe Vertical	Steel	Gray	Damaged	Center of west face of west center beam of boiler #1 pit	0.079
11	22	W-1189	3/29/2019	Beam Wipe Vertical	Steel	Gray	Damaged	Center of south face of north beam of boiler #1 pit	0.116
11	15	W-1190	3/29/2019	Column Wipe Vertical	Steel	Gray	Intact	South face of northeast column of boiler #1 pit	0.275
11	15	W-1191	3/29/2019	Column Wipe Vertical	Steel	Gray	Slightly Damaged	East face of column on east side of north elevator	2.61
11	23.5	W-1192	3/29/2019	Beam Wipe Vertical	Steel	Gray	Damaged	Southface at west end of north beam of pit to east of boiler #2 pit	0.769
11	22	W-1193	3/29/2019	Beam Wipe Vertical	Steel	Gray	Slightly Damaged	West face of south end of east beam of boiler #2 pit	0.712
11	17	W-1194	3/29/2019	Column Wipe Vertical	Steel	Gray	Slightly Damaged	Boiler pit #2, southeast column, west face	0.404
11	11	W-1195	3/29/2019	Floor Wipe	Steel	Black	Damaged	Plate on ground adjacent to unit 4 switch board	2.56
11	16	W-1196	3/29/2019	Beam Wipe Vertical	Steel	Gray	Slightly Damaged	Beam to west of KAYDON a Turbo-Tec Turbine Oil Conditioner	17.3
11	14	W-1197	3/29/2019	Column Wipe Vertical	Steel	Gray	Slightly Damaged	North face of column to south east of north elevator	0.549
11	23	W-1198	3/29/2019	Beam Wipe Vertical	Steel	Gray	Slightly Damaged	West face of beam to east of north elevator	0.382
11	23.5	W-1199	3/29/2019	Beam Wipe Vertical	Steel	Gray	Slightly Damaged	West face of beam to east of north elevator	0.716
11	15	W-1200	3/29/2019	Column Wipe Vertical	Steel	Gray	Slightly Damaged	North face of column to northeast of north elevator	1.08
11	23	W-1200	3/29/2019	Beam Wipe Vertical	Steel		Slightly Damaged		78.4
11	20	W-1201 W-1202	3/29/2019	Beam Wipe Vertical	Steel	Gray Gray	Slightly Damaged	South face of north beam of crane bay to northeast of north elevator South face of beam in northeast corner	0.248
11	14	W-1202 W-1203	3/29/2019	Column Wipe Vertical	Steel Steel	Gray	Slightly Damaged Slightly Damaged	North face of column in northeast corner	0.248
	23								
11		W-1204	3/29/2019	Beam Wipe Vertical	Steel	Gray	Slightly Damaged	East face of beam to east of northeast stairwell	1.68
11	23	W-1205	3/29/2019	Beam Wipe Vertical	Steel	Gray	Slightly Damaged	North face of beam adjacent to northeast stairwell	1.08
11	15	W-1206	3/29/2019	Column Wipe Vertical	Steel	Gray	Slightly Damaged	East face of column to southwest of machine shop	0.172
11	11	W-1207	3/29/2019	Floor Wipe	Steel	Red	Slightly Damaged	Steel plate on floor near entrance to locker room	0.565
11	15	W-1208	3/29/2019	Beam Wipe Vertical	Steel	Gray	Slightly Damaged	Cross race to west of spare parts storage	0.386
11	16	W-1209	3/29/2019	Column Wipe Vertical	Steel	Gray	Slightly Damaged	North face of southwest column of spare parts storage	0.762
11	14	W-1210	3/29/2019	Column Wipe Vertical	Steel	Gray	Slightly Damaged	West face of steel column beneath south turbine deck	0.682
24	24	W-1144	3/15/2019	Floor Wipe	Steel				0.373
24	28.5	W-1145	3/18/2019	Column Wipe Vertical	Steel	Gray	Damaged		1.54
24	24	W-1146	3/18/2019	Beam Wipe Horizontal	Steel	Gray	Damaged		1.23
24	24	W-1147	3/18/2019	Beam Wipe Horizontal	Steel	Gray	Damaged		0.883
24	24	W-1148	3/18/2019	Beam Wipe Horizontal	Steel	Gray	Slightly Damaged		0.309
24	29.25	W-1149	3/18/2019	Column Wipe Vertical	Steel	Gray	Slightly Damaged		0.341
24	28	W-1150	3/18/2019	Beam Wipe Horizontal	Steel	Gray	Damaged		1.25
24	27.5	W-1151	3/18/2019	Beam Wipe Horizontal	Steel	Gray	Slightly Damaged		0.698
24	28	W-1152	3/18/2019	Column Wipe Vertical	Steel	Gray	Slightly Damaged		0.043
24	29.25	W-1153	3/18/2019	Column Wipe Vertical	Steel	Gray	Slightly Damaged		0.643
24	32.5	W-1154	3/18/2019	Column Wipe Vertical	Steel	Gray	Slightly Damaged		1.48
24	29	W-1155	3/18/2019	Wall Wipe	Steel	Gray	Intact		0.21
24	30	W-1156	3/18/2019	Wall Wipe	Steel	Gray	Intact		0.097
24	27.75	W-1157	3/18/2019	Beam Wipe Horizontal	Steel	Beige	Slightly Damaged		12.1
24	29.5	W-1158	3/18/2019	Column Wipe Vertical	Steel	Gray	Intact		0.086
24	27.75	W-1160	3/18/2019	Beam Wipe Horizontal	Steel	Gray	Damaged		16.3
24	27	W-1161	3/18/2019	Column Wipe Vertical	Steel	Gray	Damaged		0.173
24	24	W-1162	3/20/2019	Floor Wipe	Steel	Red	Damaged	#1 Load Center, floor, adjacent to entrance to East	0.654
24	29.25	W-1163	3/21/2019	Wall Wipe	Steel	Gray	Intact	South exterior wall of #1 Load Center 12 feet east of entrance	0.086
24	24	W-1164	3/21/2019	Beam Wipe Horizontal	Steel	Gray	Intact	East end of beam spanning south side of pit to east of Boiler 1 Pit	0.686
24	24	W-1165	3/21/2019	Beam Wipe Horizontal	Steel	Gray	Slightly Damaged	West end of beam at North side of Northeast corner below south turbine deck	1.31
24	28.5	W-1166	3/21/2019	Beam Wipe Horizontal Incline	Steel	Gray	Damaged	North 45 degree beam on east exterior wall of #2 Load Center	51.1
24	28	W-1167	3/21/2019	Column Wipe Vertical	Steel	Gray	Slightly Damaged	Column to south of southeast corner of pit to east of boiler 2 pit	5.56
24	24	W-1168	3/21/2019	Beam Wipe Horizontal	Steel	Gray	Damaged	West end of beam 4 feet North of south end of pit to east of boiler 2 pit	21.9
24	24	W-1169	3/21/2019	Floor Wipe	Other - LiNoleum flooring	,	Intact	Men's locker room floor center of bathroom between sinks	0.201
24	29	W-1170	3/21/2019	Beam Wipe Horizontal Incline	Steel	Gray	Slightly Damaged	East stairwell stringer of stairwell up to EL 36 on west side of crane bay	0.037
				· ·		Gray		Column in Northeast corner of crane bay on North wall to east of garage door adjacent	
24	29	W-1171	3/21/2019	Column Wipe Vertical	Steel	l	Intact	to vending machines	0.087
24	26.5	W-1172	3/21/2019	Wall Wipe	Steel	Gray	Intact	North end of east wall of crane bay behind ice machine	<0.020
24	30.5	W-1172 W-1173	3/21/2019	Wall Wipe	Steel	Gray	Intact	East wall of crane bay adjacent to I&C Dept entrance	0.020
24	30.3	W-11/3	3/21/2019	waii wipe	steer		IIIIdet	East wall of craffe day adjacent to fac Dept entrance	0.021
24	24	W-1174	3/21/2019	Beam Wipe Horizontal	Steel	Gray	Damaged	Beam adjacent to walkway to southeast of mechanical room behind crane bay	3.02
24	26	W-1175	3/21/2019	Wall Wipe	Steel	Gray	Slightly Damaged	North exterior wall of office at end of walkway on east wall of crane bay to south of mechanical room	0.073
24	24	W-1178	3/18/2019	Floor Wipe	Steel			Steel plate on walkway 6 feet northwest of northwest corner of stack pit. Sample ID was duplicated during sampling. ID changed from W-1144 to W-1178 during QA/QC.	1.97
36	42	W-1114	3/14/2019	Other - Staircase diamond plate angle iron	Steel		Intact	Staircase to rear building (next to old stack)	0.356
36	40	W-1115	3/14/2019	Wall Wipe	Steel	Gray	Intact	Under staircase	0.03
36	40	W-1115 W-1116	3/14/2019	Girt Horizontal	Steel	Gray	Damaged	Girt under window, paint peeling	0.03
36	42.5	W-1116 W-1117	3/14/2019	Wall Wipe				on conder window, paint peering	0.127
36	42.5	W-1117 W-1118		Wall Wipe Girt Horizontal	Other - Galbestos paneling Steel	Gray	Slightly Damaged	Girt next to staircase	0.084
36	40	W-1118 W-1119	3/14/2019	Wall Wipe	Steel Steel	Gray	Damaged Intact		0.691
30	40	W-1119	3/14/2019	waii wipe	Steel	Gray	Intact	Next to opening to rear building	0.03

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10	Floor Elevation	Sample Measured Elevation	Sample Name	Sample Date	Surface Type	Surface Description	Paint Color	Paint Condition	General notes	Mercury Concentration (ug/100cm ²⁾
6	36		W-1120	3/14/2019	Wall Wipe	Steel	Grren	Intact	Above door with Red painted doorframe	
20					Beam Wipe Horizontal				Inside beam	
36										
1.5									Beam near boiler, three feet in from column	
36								Slightly Damaged		
March Marc									Outer beam racing away from boiler	
10										
Section Sect										
2										
30 W. 1111 V. 14/2019 Count Wigh Verbried Seel Degg Intext County	36		W-1130		Wall Wipe	Other - Metal exterior office wall		Intact		0.575
15	36	40	W-1131		Column Wipe Vertical			Intact		< 0.020
35 W. 1114 V.11/2019 Base wheye induced at the control of					Cross Beam Horizontal Incline	Steel		Slightly Damaged		
36			W-1133				Gray			
36										
36 38 W. 1197 \$715/2039 Degan Wood referenced Octor Octo										
Bo									Next to control room office door	
Bit March Mily									Control construction	
38 36									Control room wall	
30 42										
36 42 W-1126 3/15/29/9 Wash Wope Seef Gry									Column by day door	
18										
3-96 448	36		W-1143			Steel		Intact		0.046
3-96 448								Slightly Damaged	Center of planning office floor	
49 \$2 W.1997 \$3(1)(2)(2)(3) Gethinstended Steel Gray Sightly Denaged Gethinstended Gethins										3.98
49 49 W-1509 31/2/2019 Seam Wige Forszental Steel Gry Damaged 1.17	49	52	W-1097	3/12/2019	Girt Horizontal	Steel		Slightly Damaged		0.108
49 49 W-1100 31/12/019 Bear Wigh Performant Steel Gry Intect Description Descrip	49		W-1098	3/12/2019	Column Wipe Vertical	Steel	Gray	Slightly Damaged		< 0.020
49	49	49	W-1099	3/12/2019	Beam Wipe Horizontal	Steel	Gray	Damaged		9.5
49 52 W-1102 3712/2019 Other-Creating beam Steel Grow Red Other Ot							Gray			
49 49 W-1105 3712/2019 Wall Wige Steel Gray Intact Damaged										
49 55.5 W-1104 31/2/2019 Beam Wijer Horizontal Seel Gray Intact On elevator outer wall On 177										
49										
1.00									On elevator outer wall	
69										
49										
49 53 W-1109 31/12/039 Column Nipe Vertical Steel Gray Damaged Column Nipe Vertical Column Nipe Vertical Steel Gray Damaged Column Nipe Vertical Steel Gray Slightly Damaged Column Nipe Vertical Steel Gray Damaged Column Nipe Vertical Column Nipe Vertical Steel Gray Damaged Column Nipe Vertical Column Nipe Vertical Column Nipe Vertical Steel Gray Damaged Column Nipe Vertical Column Nipe Vertical Steel Gray Damaged Column Nipe Vertical Column Nipe Vertical Steel Gray Damaged Column Nipe Vertical Column Nipe Vertical Steel Gray Damaged Column Nipe Vertical										
69 55 W-110 3/12/2019 Column Wipe Vertical Steel Gray Slightly Damaged Column Steel Gray Damaged Column Steel Column Steel Gray Damaged Column Steel Column Steel Gray Damaged Column Steel										
49 56 W-1111 3/12/2019 Girl Horizontal Steel Gray Slightly Damaged 1.54 49 54 W-1113 3/12/2019 Column Wijer Vertical Steel Gray Damaged Column south or cross bracing adjacent to North wall of turbine deck on roof of slanning office O.33 56 64.5 W-1058 3/11/2019 Wall Wijer Steel Gray Intact More dust than average, on top of third panel up O.263 56 6.9 W-1059 3/11/2019 Girl Horizontal Steel Gray Intact More dust than average, on top of third panel up O.263 56 6.9 W-1050 3/11/2019 Wall Wijer Steel Gray Intact More dust than average, on top of third panel up O.263 56 6.9 W-1060 3/11/2019 Wall Wijer Steel Gray Intact More dust than average, on top of third panel up O.263 56 6.9 W-1061 3/11/2019 Gross Beam Horizontal Steel Gray Intact More dust than average, on top of third panel up O.263 56 6.9 W-1061 3/11/2019 Gross Beam Horizontal Steel Gray Intact More dust than average, on top of third panel up O.263 56 6.9 W-1064 3/11/2019 Gross Beam Horizontal Steel Gray Intact More dust than average, on top of third panel up O.263 56 5.9 W-1064 3/11/2019 Gross Beam Horizontal Steel Gray Intact More dust than average, on top of third panel up O.263 56 5.9 W-1064 3/11/2019 Gross Beam Horizontal Steel Gray Intact More dust than average, on top of third panel up O.263 56 5.9 W-1064 3/11/2019 Gross Beam Horizontal Steel Gray Intact More dust than average, on top of third panel up O.263 56 6.3 W-1064 3/11/2019 Gross Beam Horizontal Steel Gray Intact										
49				3/12/2019				Dalilageu		
49								Slightly Damaged		
49 49 W-1177 3/21/2019 Column Wipe Vertical Steel Gray Damaged Column South or cross bracing adjacent to North wall of turbine deck on roof of 0.53	49	54					0.27			
Secondary Seco	49	49	W-1177	3/21/2019	Column Wipe Vertical	Steel	Gray	Damaged		0.53
See Gray Infact Cost	56	64.5	W-1058	3/11/2019	Wall Wipe	Steel	Gray	Intact		0.31
See Gray Intact Steel Gray Intact Sampled bottom of fourth panel high Co.020			W-1059		Girt Horizontal	Steel		Intact	More dust than average, on top of third panel up	0.263
Second S		62		3/11/2019	Wall Wipe	Steel	Gray	Intact		0.348
Sef Sef W-1063 3/11/2019 Floor Wipe Steel Rused Steel floor Sef Rusted Steel floor Sef Rusted Steel floor Sef Rusted Steel floor Sef Rusted Steel floor Sef Se										
See See Number Steel Rusted Steel (floor Steel Beige Slightly Damaged See Se							0.01			
See								Intact	Rusted Steel floor	
See								Damagad		
Sefe										
Second										
Second Color										
Second							-cigc and ned	Damagea		
56 59 W-1071 3/11/2019 Floor Wipe Steel Steel Gray Damaged										
See Gray Damaged D.36								l	Sampled floorplate	
See Green Intact Co.239 Steel Green Intact Co.239 Steel Green Intact Co.239 Steel Green Intact Co.239 Steel Gray Damaged Co.239 Co.2							Gray	Damaged		
See Gray	56									
See See W-1075 3/11/2019 Beam Wipe Horizontal Steel Gray Damaged Dam	56	67	W-1074	3/11/2019		Steel				0.292
56 68 W-1077 3/11/2019 Beam Wipe Horizontal Steel Gray Intact 1.95									Sampled baseplate (kick plate)	
See Gray Slightly Damaged Column Wipe Vertical Stee Gray Slightly Damaged Column Wipe Vertical Stee Gray Slightly Damaged Column Wipe Vertical Stee Gray Intact Stee Gray Intact Stee Gray Intact Column Wipe Vertical Column Wipe Vertical Stee Gray Intact Column Wipe Vertical Column Wipe Ve										
56 61 W-1079 3/11/2019 Girt Horizontal Steel Gray Intact 1.78										
56 65 W-1080 3/11/2019 Wall Wipe Other - Galbestos paneling Gray Intact 0.108 56 59 W-1081 3/11/2019 Beam Wipe Horizontal Steel Gray Intact 0.938 56 59 W-1082 3/11/2019 Beam Wipe Horizontal Steel Gray Intact 0.423 56 62 W-1083 3/11/2019 Cross Beam Horizontal Steel Gray Intact 0.289 56 63 W-1084 3/11/2019 Column Wipe Vertical Steel Gray Intact 0.289 56 59 W-1085 3/11/2019 Beam Wipe Horizontal Steel Gray Damaged Palnt severely chipping/peeling 12.4 56 59 W-1085 3/11/2019 Beam Wipe Horizontal Steel Gray Silghtly Damaged Beam adjacent to stairs 0.372 56 59 W-1086 3/11/2019 Beam Wipe Horizontal Steel Gray Intact 0.202 56 59 W-1086 3/11/2019 Beam Wipe Horizontal Steel Gray Intact 0.202 56 59 W-1086 3/11/2019 Beam Wipe Horizontal Steel Gray Intact 0.202 56 59 W-1086 3/11/2019 Beam Wipe Horizontal Steel Gray Intact 0.202 56 59 W-1086 3/11/2019 Beam Wipe Horizontal Steel Gray Intact 0.202 57 58 59 W-1086 3/11/2019 Beam Wipe Horizontal Steel Gray Intact 0.202 58 59 W-1086 3/11/2019 Beam Wipe Horizontal Steel Gray Intact 0.202 59 50 50 50 50 50 50 50					Column Wipe Vertical			Slightly Damaged		
56 59 W-1081 3/11/2019 Beam Wipe Horizontal Steel Gray Intact 0.938 56 59 W-1082 3/11/2019 Beam Wipe Horizontal Steel Gray Intact 0.423 56 62 W-1083 3/11/2019 Cross Beam Horizontal Steel Gray Intact 0.289 56 63 W-1084 3/11/2019 Column Wipe Vertical Steel Gray Damaged Paint severely chipping/peeling 12.4 56 59 W-1085 3/11/2019 Beam Wipe Horizontal Steel Gray Slighty Damaged Beam adjacent to stairs 0.372 56 59 W-1086 3/11/2019 Beam Wipe Horizontal Steel Gray Intact 0.202							Gray			
56 59 W-1082 3/11/2019 Beam Wipe Horizontal Steel Gray Intact 0.423 56 62 W-1083 3/11/2019 Cross Beam Horizontal Steel Gray Intact 0.289 56 63 W-1084 3/11/2019 Column Wipe Vertical Steel Gray Damaged Paint severely chipping/peeling 12.4 56 59 W-1085 3/11/2019 Beam Wipe Horizontal Steel Gray Slightly Damaged Beam adjacent to stairs 0.372 56 59 W-1086 3/11/2019 Beam Wipe Horizontal Steel Gray Intact 0.202										
56 62 W-1083 3/11/2019 Cross Beam Horizontal Steel Gray Intact 0.289 56 63 W-1084 3/11/2019 Column Wipe Vertical Steel Gray Damaged Paint severely chipping/peeling 12.4 56 59 W-1085 3/11/2019 Beam Wipe Horizontal Steel Gray Slightly Damaged Beam adjacent to stairs 0.372 56 59 W-1086 3/11/2019 Beam Wipe Horizontal Steel Gray Intact 0.202										
56 63 W-1084 3/11/2019 Column Wipe Vertical Steel Gray Damaged Paint severely chipping/peeling 12.4 56 59 W-1085 3/11/2019 Beam Wipe Horizontal Steel Gray Slightly Damaged Beam adjacent to stairs 0.372 56 59 W-1086 3/11/2019 Beam Wipe Horizontal Steel Gray Intact 0.202 0.202 Column Wipe Lorizontal Steel Gray Intact 0.202										
56 59 W-1085 3/11/2019 Beam Wipe Horizontal Steel Gray Slightly Damaged Beam adjacent to stairs 0.372 56 59 W-1086 3/11/2019 Beam Wipe Horizontal Steel Gray Intact 0.202									Delet en each ablanta de calles	
56 59 W-1086 3/11/2019 Beam Wipe Horizontal Steel Gray Intact 0.202										
									Deam adjacent to stall 5	
	56	61	W-1087	3/11/2019	Girt Horizontal	Steel	Gray/Red	Damaged	Paint is peeling	0.153

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Floor Elevation	Sample Measured Elevation	Sample Name	Sample Date	Surface Type	Surface Description	Paint Color	Paint Condition	General notes	Mercury Concentration (ug/100cm ²⁾
56	60	W-1088	3/12/2019	Beam Wipe Horizontal	Steel	Red/Gray	Damaged	Below window, peeling paint	0.173
56	63	W-1089	3/12/2019	Wall Wipe	Other - Galbestos paneling	Gray	Slightly Damaged		0.052
56	62	W-1090	3/12/2019	Column Wipe Vertical	Steel	Gray	Intact		0.061
56	59	W-1091	3/12/2019	Other - Foot plate on beam	Steel	Gray	Intact	Floor plate on top of beam	0.35
56 56	65 60	W-1092 W-1093	3/12/2019 3/12/2019	Wall Wipe Girt Horizontal	Other - Galbestos paneling	Gray	Damaged	Paint peeling	0.047 0.401
56	62	W-1093 W-1094	3/12/2019	Girt Horizontal	Steel Steel	Gray/Red Gray/Red	Damaged Damaged	Sampled in duct, above average amount of dust	0.401
56	57	W-1094 W-1095	3/12/2019	Stair Stringer Vertical	Steel	Gray	Intact	On vertical plate of staircase beam	0.191
56	59	W-1095	3/12/2019	Beam Wipe Horizontal	Steel	Gray	Slightly Damaged	On vertical place of stalicase beam	0.079
69	74	W-1040	3/5/2019	Beam Wipe Vertical	Steel	Beige/Red/green	Damaged	Multiple paint layers	0.094
69	70.5	W-1041	3/5/2019	Wall Wipe	Steel	Green	Intact	On wall near staircase platform	<0.020
69	75	W-1042	3/5/2019	Beam Wipe Horizontal	Steel	Green	Intact		0.02
69	69	W-1043	3/5/2019	Beam Wipe Horizontal	Steel	Beige/Red/black	Damaged	Paint is peeling away	0.198
69	74	W-1044	3/5/2019	Column Wipe Vertical	Steel	Gray/Red	Damaged	Peeling paint	0.101
69	75	W-1045	3/5/2019	Column Wipe Vertical	Steel	Gray/Red	Slightly Damaged	Inside beam facing old boiler	0.023
69	74.5	W-1046	3/5/2019	Column Wipe Vertical	Steel	Gray/Red	Slightly Damaged	Above newly installed and painted railing	0.03
69	69	W-1047	3/5/2019	Girt Horizontal	Steel	Gray/Red	Damaged		0.69
69	75	W-1048	3/5/2019	Column Wipe Vertical	Steel	Gray/Red	Damaged		0.14
69	69	W-1049	3/5/2019	Girt Horizontal	Steel	Gray/Red	Damaged		0.677
69 69	72 69	W-1050 W-1051	3/5/2019 3/5/2019	Cross Beam Horizontal Incline Beam Wipe Horizontal	Steel	Gray	Intact	Angled crossbeam	<0.020 0.188
69	73	W-1051 W-1052	3/5/2019	Column Wipe Vertical	Steel Steel	Gray Gray	Damaged Damaged	Sampled upper portion of metal More dust than average amount	1.06
69	75	W-1052 W-1053	3/6/2019	Wall Wipe	Other - Galbestos paneling	Gray	Damaged	Paint peeling	0.376
69	69	W-1053	3/5/2019	Girt Horizontal	Steel	Gray	Damaged	Moved template and cleaned/samples areas adjacent to each Other to reach 10cm^2	1.33
69	72	W-1055	3/5/2019	Column Wipe Vertical	Steel	Gray/Red	Damaged	morea template and cleaned/samples areas adjacent to each other to reach 20th 2	0.08
69	68	W-1056	3/5/2019	Beam Wipe Horizontal	Steel	Gray/Red	Damaged	Moved template and cleaned adjacent area to cover 10cm^2	0.141
69	69	W-1057	3/5/2019	Column Wipe Vertical	Steel	Gray	Slightly Damaged		0.525
82	87.5	W-1014	3/4/2019	Wall Wipe	Other - Galbestos panel	Gray	Intact	Between the window and door	< 0.020
82	89	W-1015	3/4/2019	Girt Horizontal	Steel	Gray	Damaged	Previously 1 inch of dust	0.095
82	89.5	W-1016	3/5/2019	Cross Beam Horizontal Incline	Steel	Gray	Intact		0.039
82	83.5	W-1017	3/4/2019	Girt Horizontal	Steel	Gray	Intact		0.025
82	88	W-1018	3/4/2019	Wall Wipe	Other - Galbestos paneling	Gray	Intact	Multiple layers of paint (black, white, Gray)	<0.020
82	88	W-1019	3/4/2019	Girt Horizontal	Steel	Gray	Intact	Rust circle and horizontal paint peeling present	0.072
82 82	82 87	W-1020 W-1021	3/4/2019	Beam Wipe Horizontal	Steel	Gray/Red	Intact	Multiple layers of paint (Red, Gray, black)	0.027
82	88.5	W-1021 W-1022	3/4/2019 3/4/2019	Wall Wipe Wall Wipe	Other - Galbestos paneling	Gray/black	Damaged Intact	Approximately 1 foot right of window	0.068
82	82.5	W-1022 W-1023	3/4/2019	Beam Wipe Horizontal	Steel Steel	Gray Gray	Damaged	Paint is worn	0.729
82	94	W-1023 W-1024	3/4/2019	Beam Wipe Horizontal	Steel	Gray	Slightly Damaged	On stair platform to mezzanine (to the right)	0.045
82	87	W-1025	3/4/2019	Wall Wipe	Concrete	Gray	Intact	on stan patronn to mercanine (to the right)	0.034
82	83	W-1026	3/4/2019	Wall Wipe	Steel	Gray	Slightly Damaged	Under mezzanine staircase	0.034
82	83	W-1027	3/4/2019	Wall Wipe	Steel	Gray	Slightly Damaged		0.051
82	100	W-1028	3/4/2019	Wall Wipe	Steel	Gray	Damaged	Corroded	0.04
82	87	W-1029	3/4/2019	Column Wipe Vertical	Steel	Gray, white, Red, black	Slightly Damaged	Multiple paint colors	<0.020
82	87	W-1030	3/4/2019	Column Wipe Vertical	Steel	Gray	Intact		0.055
82	82	W-1031	3/4/2019	Beam Wipe Horizontal	Steel	Gray	Intact		0.151
82	85	W-1032	3/4/2019	Column Wipe Vertical	Steel	Beige and Red	Intact	Boiler beam	0.466
82	82	W-1033	3/4/2019	Beam Wipe Horizontal	Steel	Gray	Damaged		0.388
82	82	W-1034	3/4/2019	Beam Wipe Horizontal	Steel	Beige, Red	Slightly Damaged	Boiler beam	0.104
82	88	W-1035	3/4/2019	Column Wipe Vertical	Steel		Damaged	Multiple paint colors	0.035
82	86	W-1036	3/4/2019	Wall Wipe	Steel	Gray	Intact	Elevator room wall	0.117
82 82	87 98	W-1037 W-1038	3/4/2019 3/6/2019	Wall Wipe Beam Wipe Horizontal	Steel Steel	Gray Gray	Intact Damaged	Inside elevator, on the east wall looking in behind protective covers On mezzanine beam	<0.020 14
82	98	W-1038 W-1039	3/6/2019	Beam Wipe Horizontal Beam Wipe Horizontal	Steel Steel	Gray	Damaged Damaged	On mezzanine beam On mezzanine beam	3.62
95	100	W-1001	3/4/2019	Wall Wipe	Other - Galbestos panel	No paint, off white	Daniageu	on mezzanne beam	<0.020
95	94	W-1002	3/4/2019	Floor Wipe	Steel	panel Red/black	Intact		0.027
95	100	W-1002 W-1003	3/4/2019	Wall Wipe	Other - Galbestos panel	Gray	Intact		0.027
95	98	W-1003 W-1004	3/4/2019	Wall Wipe	Steel	Gray	Intact		0.021
95	94	W-1004 W-1005	3/4/2019	Floor Wipe	Steel	Red/black	Intact		0.047
95	100.5	W-1005 W-1006	3/4/2019	Beam Wipe Horizontal	Steel	Gray	Intact		0.036
95	95	W-1007	3/4/2019	Beam Wipe Horizontal	Concrete	Red	Intact		0.407
95	100.5	W-1008	3/4/2019	Beam Wipe Horizontal	Steel	Gray	Intact		<0.020
95	97	W-1009	3/4/2019	Other - Window Wipe	Other - Glass		Intact		< 0.020
95	94	W-1010	3/4/2019	Floor Wipe	Steel	Red/black	Intact		<0.020
95	102	W-1011	3/4/2019	Wall Wipe	Steel		Intact		< 0.020
95	104	W-1012	3/4/2019	Beam Wipe Horizontal	Steel	Gray	Intact		0.026
95	104.5	W-1013	3/4/2019	Wall Wipe	Steel	Gray	Intact	Approximately 10.5 feet off ground	< 0.020

- Notes:

 1. "<" indicates the mercury result was not detected above the laboratory reporting limit to the right.

 2. Bold, shaded results were detected at a concentration above the risk-based screening value of 52 ug/100 cm².

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Floor Elevation	Sample Measured Elevation	Sample Name	Sample Date	Surface Type	Surface Description	Paint Color	Paint Condition	General notes	Mercury Concentration (mg/kg)
11	15	C-1067	3/28/2019	Wall Bulk Sample	Concrete		Intact		28.2
11	11	C-1068	3/28/2019	Floor Bulk Sample	Concrete		Intact	C-1068 HgK @ 0909 3/27 Rinsed @ 1011 3/28	3.8
11	11	C-1069	3/28/2019	Floor Bulk Sample	Concrete		Intact	C-1069 HgX @ 0915 3/27 Rinsed @ 1013 3/28	15.9
11	11	C-1070	3/28/2019	Floor Bulk Sample	Concrete			C-1070 HgX @ 0930 3/27 Rinsed @ 1017 3/28	22.3
11	11	C-1071	3/28/2019	Floor Bulk Sample	Concrete	Gray	Damaged	C-1071 HgX @ 0940 3/27 Rinsed @ 1015 3/28	0.377
11	17	C-1072	3/28/2019	Wall Bulk Sample	Concrete			Included Concrete lip	3.99
11	11	C-1073	3/28/2019	Floor Bulk Sample	Concrete			C-1073 Hgk @ 0950 3/27 Rinsed @ 1025 3/28	9.77
11	13	C-1074	3/29/2019	Pedestal Bulk Sample Horizontal	Concrete			Bottom of staircase on west wall adjacent to stack foundation to west of north elevator	5.35
11	13	C-1075	3/29/2019	Pedestal Bulk Sample Horizontal	Concrete			West wall between stack foundation and caustic acid tank	2.16
11	11	C-1076	3/29/2019	Floor Bulk Sample Pedestal Bulk Sample Horizontal	Concrete	-		South perimeter inside of stack foundation on west wall adjacent to caustic acid tank	3130
11	13	C-1077 C-1078	3/29/2019 3/28/2019	Floor Bulk Sample	Concrete			Pedestal wall just south of stack foundation on west wall (-1.078 HgX @ 0955 3/27	2.75 19.6
11	15	C-1079	3/28/2019	Wall Bulk Sample	Concrete		Intact	Rinsed @ 1030 3/28	4.91
11	11	C-1080	3/28/2019	Floor Bulk Sample	Concrete		Intact	C-1080 HgX @ 1005 3/27	84.1
11	16	C-1081	3/28/2019	Wall Bulk Sample	Concrete			Rinsed @ 1037 3/28 Just outside mercury reclaim room	9.45
11	15	C-1081	3/28/2019	Wall Bulk Sample	Concrete			In mercury reclaim room	2000
11	11	C-1083	3/28/2019	Floor Bulk Sample	Concrete			HeX © 1018 3/27 Rinsed @ 1038 3/28 Jerome: 0.012- 0.01 within former walls of the mercury reclaim room	133
11	11	C-1084	3/28/2019	Floor Bulk Sample	Concrete			C-1084 HgX @ 1025 3/27 Rinsed @ 1040 3/28 Jerome: 0.169 - 0.545	595
11	11	C-1085	3/28/2019	Floor Bulk Sample	Concrete		Intact	C-1085 HgX @ 1034 3/27 Rinsed @ 1034 3/28	32
11	11	C-1086	3/28/2019	Floor Bulk Sample	Concrete		Intact	C-1086 HgX @ 1040 3/27 Rinsed @ 1028 3/28	36.1
11	11	C-1087	3/28/2019	Floor Bulk Sample	Concrete		Intact	C-1087 HgX @ 1050 3/27 Rinsed @ 1020 3/28	9.7
11	15	C-1088	3/28/2019	Wall Bulk Sample	Brick	Gray	Intact	C 1000	11.8
11	11	C-1089	3/28/2019	Floor Bulk Sample	Concrete			C-1089 HgX @ 1100 3/27 Rinsed @ 1400 3/28	24
11	11	C-1090	3/28/2019	Floor Bulk Sample	Concrete			Near drain C-1090 HgX @ 1110 3/27 Rinsed @ 1354 3/28 Close to sulphuric acid tank	40.1
11	11	C-1091	3/28/2019	Floor Bulk Sample	Concrete			C-1091 HgX @ 1120 3/27 Rinsed @ 1352 3/28 White acid residue, possibly sulphuric acid	35.2
11	11	C-1092	3/28/2019	Floor Bulk Sample	Concrete		Intact	C-1092 HgX @ 1135 3/27 Rinsed @ 1342 3/28	69.8

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Floor Elevation	Sample Measured Elevation	Sample Name	Sample Date	Surface Type	Surface Description	Paint Color	Paint Condition	General notes	Mercury Concentration (mg/kg)
11	11	C-1093	3/28/2019	Floor Bulk Sample	Concrete		Intact	C-1093 HgX @ 1150 3/27 Rinsed @ 1340 3/28	21.9
11	11	C-1094	3/28/2019	Wall Bulk Sample	Brick				47.2
11	15	C-1095	3/28/2019	Wall Bulk Sample	Brick	Gray	Intact	Wiped existing dust	40
11	11	C-1096	3/28/2019	Floor Bulk Sample	Concrete			C-1096 HgX @ 1330 3/27	5.87
								Rinsed @ 1340 3/28 C-1097	
11	11	C-1097	3/28/2019	Floor Bulk Sample	Concrete		Intact	HgX @ 1340 3/27 Rinsed @ 1345 3/28	6.02
11	11.5	C-1098	3/29/2019	Pedestal Bulk Sample Vertical	Concrete			South of north elevator	69.8
11	11	C-1099	3/28/2019	Floor Bulk Sample	Concrete			C-1099 HgX @ 1348 3/27 Rinsed @ 1350 3/28	68.9
11	11	C-1100	3/28/2019	Floor Bulk Sample	Concrete		Intact	Sampled in cracked area C-1110 HgX @ 1355 3/27 Rinsed @ 1355 3/28 C-1101	228
11	11	C-1101	3/28/2019	Floor Bulk Sample	Concrete			HgX @ 1400 3/27 Rinsed @ 1358 3/28	10.7
11	13	C-1102	3/29/2019	Pedestal Bulk Sample Vertical	Concrete			West face of pedestal to southwest of S-3 cooling water tank	19.3
11	14	C-1103	3/29/2019	Pedestal Bulk Sample Horizontal	Concrete			Wiped with dry towel	8.69
11	11	C-1104	3/28/2019	Wall Bulk Sample	Concrete				26.3
11	11	C-1105	3/28/2019	Floor Bulk Sample	Concrete			Sample area contains black stain C-1105 HgX @ 1410 3/27 Rinsed @ 1552 3/28	109
11	15	C-1106	3/29/2019	Wall Bulk Sample	Concrete			South face of northeast column of Hg boiler filler pumps foundation	48.6
11	14	C-1107	3/29/2019	Wall Bulk Sample	Concrete			South face of east column of Hg boiler filler pump foundation	15.8
11	15	C-1108	3/29/2019	Wall Bulk Sample	Concrete			North face of west center column of Hg boiler filling pumps	26.8
11	11	C-1109	3/28/2019	Floor Bulk Sample	Concrete			C-1109 HgX @ 1430 3/27 Rinsed @ 1556 3/28	67.1
11	11	C-1110	3/28/2019	Floor Bulk Sample	Concrete			C-1110 HgX @ 1420 3/27 Rinsed @ 1555 3/28 Drilling in area where floor is chipped	130
11	11.25	C-1111	3/29/2019	Pedestal Bulk Sample Vertical	Concrete			West face of large rectangular foundation to southeast of S-3 cooling water tank	682
11	12	C-1112	3/29/2019	Pedestal Bulk Sample Horizontal	Concrete			East end of large rectangular foundation to southeast of S-3 water cooling tank	18.6
11	11	C-1113	3/29/2019	Floor Bulk Sample	Concrete			C-1113 HgX @ 1435 3/27 Rinsed @ 1603 3/28	142
11	16	C-1114	3/29/2019	Wall Bulk Sample	Concrete			Sampled in cracked area South face of large column 45' East of north elevator	11.5
11	11	C-1115	3/28/2019	Floor Bulk Sample	Concrete	İ		C-1115	0.734
11	19	C-1116	3/29/2019	Wall Bulk Sample	Concrete	l		East face of column adjacent to KAYDON a Turbo-Toc Turbine oil conditioner	6.57
11	11	C-1117	3/28/2019	Floor Bulk Sample	Concrete		Intact	C-1117 HgX @ 1450 3/27 Rinsed @ 1610 3/28	327
11	11	C-1118	3/28/2019	Floor Bulk Sample	Concrete			C-1118 HgX @ 1457 3/27 Rinsed @ 1615 3/28	13.6
11	15	C-1119	3/29/2019	Wall Bulk Sample	Concrete			East face of column east side beneath south turbine deck	10.8
11	11	C-1120	3/28/2019	Floor Bulk Sample	Concrete			C-1120 HgX @ 1503 3/27 Rinsed @ 1608 3/28	45.1
11	11	C-1121	3/28/2019	Floor Bulk Sample	Concrete			C-1121 HgX @ 1510 3/27 Rinsed @ 1605 3/28	11.1
11	11	C-1122	3/28/2019	Floor Bulk Sample	Concrete			C-1122 HgX @ 1517 3/27 Rinsed @ 1602 3/28	25.4
11	11	C-1123	3/28/2019	Floor Bulk Sample	Concrete			C-1123 HgX @ 1520 3/27 Rinsed @ 1555 3/28	26.2

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Floor Elevation	Sample Measured Elevation	Sample Name	Sample Date	Surface Type	Surface Description	Paint Color	Paint Condition	General notes	Mercury Concentration (mg/kg)
11	11	C-1124	3/29/2019	Wall Bulk Sample	Concrete		Intact	Behind air compressor	6.07
11	11	C-1125	3/28/2019	Wall Bulk Sample	Concrete			0.4405	8.35
11	11	C-1126	3/28/2019	Floor Bulk Sample	Concrete			C-1126 HgX @ 1540 3/27 Rinsed @ 1600	7.35
11	11	C-1127	3/29/2019	Floor Bulk Sample	Concrete	Red	Damaged	Center of machine shop	27.5
11	15	C-1128	3/29/2019	Wall Bulk Sample	Concrete	White	Intact	Machine shop northwest corner	47
11	11	C-1129	3/29/2019	Floor Bulk Sample	Concrete	Red	Damaged	Floor at entrance to machine shop	26.1
11	11	C-1130	3/29/2019	Floor Bulk Sample	Concrete	Red	Damaged	Machine shop office floor	8.06
11 11	14 11	C-1131 C-1132	3/29/2019 3/29/2019	Wall Bulk Sample Floor Bulk Sample	Concrete	Gray	Intact	In machine shop	15.6 12.1
11	11	C-1132 C-1133	3/29/2019	Floor Bulk Sample	Concrete Concrete	Red	Damaged	Bottom of steps to locker room	22.6
11	16	C-1133	3/29/2019	Wall Bulk Sample	Concrete	1		Spare parts storage south of machine shop	8.74
11	11	C-1134 C-1135	3/29/2019	Floor Bulk Sample	Concrete			South end of spare parts storage	22
11	14	C-1135	3/29/2019	Wall Bulk Sample	Concrete			South end of spare parts storage	9.95
11	17	C-1137	3/29/2019	Wall Bulk Sample	Brick				9.21
11	11	C-1138	3/29/2019	Floor Bulk Sample	Concrete			West of spare parts storage	35.3
11	11	C-1139	3/29/2019	Floor Bulk Sample	Concrete			Southwest of southwest corner of machine shop	35.7
11	14	C-1140	3/29/2019	Pedestal Bulk Sample Horizontal	Concrete			Top of pedestal west of machine shop adjacent to salt water inlet pipe	8.59
11	12	C-1141	3/29/2019	Pedestal Bulk Sample Vertical	Concrete			North face of pedestal west of machine shop adjacent to salt water inlet	13.8
11	1'	C-1142	4/5/2019	Wall Bulk Sample	Concrete				16.4
11	3'	C-1143	4/5/2019	Wall Bulk Sample	Concrete	Gray	slight	Former ash room	48.1
24	29.5	C-1042	3/20/2019	Wall Bulk Sample	Other - Plaster	Gray	Intact	Insulation storage room, center of North wall	1.98
24	26.5	C-1043	3/22/2019	Wall Bulk Sample	Other - Gypsum board	Green	Slightly Damaged	Men's bathroom south exterior wall adjacent to entrance to men's locker room	7.51
24	24	C-1044	3/21/2019	Floor Bulk Sample	Concrete			Concrete walkway to west of #2 Load Center and south of boiler #2 pit. HGX 1021 3/20/19, Rinsed 1044 3/21/19	5.48
24	24	C-1045	3/21/2019	Floor Bulk Sample	Concrete			West of crane bay beneath North turbine deck. HGX 0835 3/20/19, Rinsed 0925 3/21/19	161
24 24	24	C-1046 C-1047	3/21/2019 3/29/2019	Floor Bulk Sample Floor Bulk Sample	Concrete			HGX 0830 3/20/19, Rinsed 0931 3/21/19	38.6
24	24	C-1047 C-1048	3/29/2019	Wall Bulk Sample	Concrete Concrete	Gray Gray	slight Damaged	Center of west side of crane bay at bottom of stairs to EL 36' turbine deck Adjacent to stairwell on east side of crane bay south of vending machines. HGX 0946 3/20/19,	5.88
24	24	C-1049	3/21/2019	Floor Bulk Sample	Concrete			Rinsed 0950 3/21/19 Beneath North end of south turbine deck. HGX 0910 3/20/19, Rinsed 0936 3/21/19	22.1
24	24	C-1050	3/21/2019	Floor Bulk Sample	Concrete			Beneath south end of south turbine deck. HGX 0933 3/20/19, Rinsed 0941 3/21/19	27.5
24	24	C-1051	3/21/2019	Floor Bulk Sample	Concrete			Beneath center of south turbine deck. HGX 0921 3/20/19, Rinsed 0941 3/21/19	19.7
24	29.25	C-1052	3/21/2019	Wall Bulk Sample	Concrete			Northwest corner of Concrete column beneath south east corner of south turbine deck	20.3
24	30.5	C-1053	3/21/2019	Wall Bulk Sample	Concrete			South side of North center Concrete column on east side beneath south turbine deck	37.7
24	30.5	C-1054	3/22/2019	Wall Bulk Sample	Concrete			West face of North Center column beneath west side of south turbine deck	16.3
24	31.25	C-1055	3/22/2019	Wall Bulk Sample	Concrete			Beneath center of North and south turbine decks above cylinder storage	24.6
24	33.25	C-1056	3/22/2019	Wall Bulk Sample	Concrete			West face of arch between south and south center column beneath east side of North turbine deck	14.1
24	33	C-1057	3/22/2019	Wall Bulk Sample	Concrete			South face of arch adjacent to Northwest column beneath North turbine deck	158
24	24	C-1058	3/21/2019	Floor Bulk Sample	Concrete	Red	Damaged	Entrance to mechanic room south of crane bay. HGX 0958 3/20/19, Rinsed 1037 3/21/19	30.5
24	30	C-1059	3/22/2019	Wall Bulk Sample	Brick			Interior North wall of crane bay adjacent to exit door	174
24	24	C-1060	3/21/2019	Floor Bulk Sample	Concrete	Red	Slightly Damaged	East end of #1 Load Center. HGX 156 3/20/19, Rinsed 1234 3/21/19	17
24	24	C-1061	3/21/2019	Floor Bulk Sample	Concrete	Red	Slightly Damaged	West end of #1 Load Center. HGX 1202 3/20/19, Rinsed 1236 3/21/19	7.32
24	30	C-1063	3/20/2019	Wall Bulk Sample	Brick			#1 Load center, west end of North wall	2.22
24	29.5	C-1064	3/20/2019	Wall Bulk Sample	Concrete	Green	CIT LIL D	#2 Load Center, West end of south wall	37.2
24 24	24	C-1065 C-1066	3/21/2019 3/21/2019	Floor Bulk Sample Floor Bulk Sample	Concrete Concrete	Red Red	Slightly Damaged Slightly Damaged	East end of #2 Load Center. HGX 1232 3/20/19, Rinsed 1244 3/21/19 West end of #2 Load Center. HGX 1238 3/20/19, Rinsed 1242 3/21/19	16.4 9.28
36	36	C-1008	3/15/2019	Floor Bulk Sample	Concrete	Red	Intact	Under stairs between boiler pit and old stack room HGX: 1014 3/14/19 Rinse: 0950 3/15/19	10.3
36	36	C-1009	3/15/2019	Floor Bulk Sample	Concrete	Red	Damaged	Floor near entrance to old stack room HGX: 1023 3/14/19 Ringe: 1000 3/15/19	2.04
36	36	C-1010	3/15/2019	Floor Bulk Sample	Concrete	Red	Intact	Between northern stairs and electrical shop HGX: 1055 3/14/19 Rinse: 1200 3/15/19 Rinses taged parties of	5.75
36	36	C-1011	3/15/2019	Floor Bulk Sample	Concrete	Red	Intact	Northwest corner of northern pit HGX: 1045 3/14/19 Rinse: 1209 3/15/19	2.97
36	36	C-1012	3/15/2019	Floor Bulk Sample	Concrete	Red	Intact	SW corner of northern boiler pit HGX: 1036 3/14/19 Rinse: 1005 3/15/19	16.9

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Floor	Sample Measured	Sample Name	Sample Date	Surface Type	Surface Description	Paint Color	Paint Condition	General notes	Mercury Concentration
Elevation	Elevation								(mg/kg)
36	36	C-1013	3/15/2019	Floor Bulk Sample	Concrete	Red	Slightly Damaged	Corner of southern boiler pit closest to electrical shop. HGX: 1030 3/14/19 Rinse: 1005 3/15/19	4.94
36	36	C-1014	3/15/2019	Floor Bulk Sample	Concrete	Red	Intact	By transformers at southern boiler pit HGX: 1000 3/14/19 Rinse: 0945 3/15/19	1.93
36	36	C-1015	3/15/2019	Floor Bulk Sample	Concrete	Red	Intact	Between staircase and structure on eastern side of southern pit HGX: 1145 3/14/19 Rinse: 1305 3/15/19	19.7
36	36	C-1016	3/15/2019	Floor Bulk Sample	Concrete	Red	Intact	Eastern edge of southern boiler pit	23.6
36	36	C-1017	3/15/2019	Floor Bulk Sample	Concrete	Red	Intact	Next to elevator door by boiler pits HGX: 1113 3/14/19 Rinse: 1315 3/15/19	55.2
36	36	C-1018	3/15/2019	Floor Bulk Sample	Concrete	Red	Intact	Bordering elevator wall closest to turbine deck HGX: 1124 3/14/19 Rinse: 1318 3/15/19	15.5
36	36	C-1019	3/15/2019	Floor Bulk Sample	Concrete	Red	Intact	NE corner by northern pit HGX: 1140 3/14/19 Rinse: 1322 3/15/19	16.2
36	36	C-1020	3/15/2019	Floor Bulk Sample	Concrete	Red	Intact	Between stairs and northern boiler pit HGX: 1105 3/14/19 Rinse: 1213 3/15/19	5.81
36	38.5	C-1021	3/14/2019	Wall Bulk Sample	Brick			111110C. 1220 0/10/10	14.9
36	40	C-1022	3/14/2019	Wall Bulk Sample	Concrete	Gray	Slightly Damaged		15
36 36	46.5 36	C-1023 C-1024	3/14/2019	Wall Bulk Sample Floor Bulk Sample	Concrete Concrete	Gray Red	Intact Slightly Damaged	SE corner of turbine deck HGX 0847 3/18/19	25.9
36	36	C-1025	3/19/2019	Floor Bulk Sample	Concrete	Red	Slightly Damaged	Rinsed 1004 3/19/19 SW corner of turbine deck HGX 0825 3/18/19 Rinsed 1000 3/19/19	71
36	36	C-1026	3/19/2019	Floor Bulk Sample	Concrete	Red	Slightly Damaged	Just south of center of turbine deck HGX 0857 3/18/19 Rinsed 1008 3/19/19	415
36	40	C-1027	3/15/2019	Wall Bulk Sample	Brick			North wall	320
36	36	C-1028	3/15/2019	Floor Bulk Sample	Concrete	Red	Intact	Inside electrical shop HGX: 1310 3/14/19 Rinse: 1158 3/15/19	2.83
36	41	C-1029	3/15/2019	Wall Bulk Sample	Other - Wood	Gray	Intact	Eye level near opening to old stack room	0.207
36	38	C-1030	3/15/2019	Wall Bulk Sample	Other - Wood	Gray	Intact	On office wall by Northern boiler pit	0.337
36 36	36	C-1031 C-1032	3/15/2019	Wall Bulk Sample Floor Bulk Sample	Other - Wood Concrete	Gray Red	Intact Slightly Damaged	Near stairs on electrical shop wall Near offices on outside wall HGX 0935 3/18/19 Rinsed 1015 3/19/19	0.167
36	36	C-1033	3/19/2019	Floor Bulk Sample	Concrete	Red	Damaged	Sampled along cracks at top of stairs by main entrance HGX 1007 3/18/19 Rinsed 1025 3/19/19	16.6
36	36	C-1034	3/19/2019	Floor Bulk Sample	Concrete	Red	Damaged	Middle of turbine deck HGX 1000 3/18/19 Rinsed 1034 3/19/19	2.69
36	36	C-1035	3/19/2019	Floor Bulk Sample	Concrete	Red	Intact	Just North of center of turbine deck, HGX 1018 3/18/19, Rinsed 1035 3/19/19	14.9
36	36	C-1036	3/19/2019	Floor Bulk Sample	Concrete	Red	Intact	Near stairs by main entrance HGX 1034 3/18/19 Rinsed 1044 3/19/19	35.4

File No. 04.0190348.01 Page 5 of 5 5/3/2019

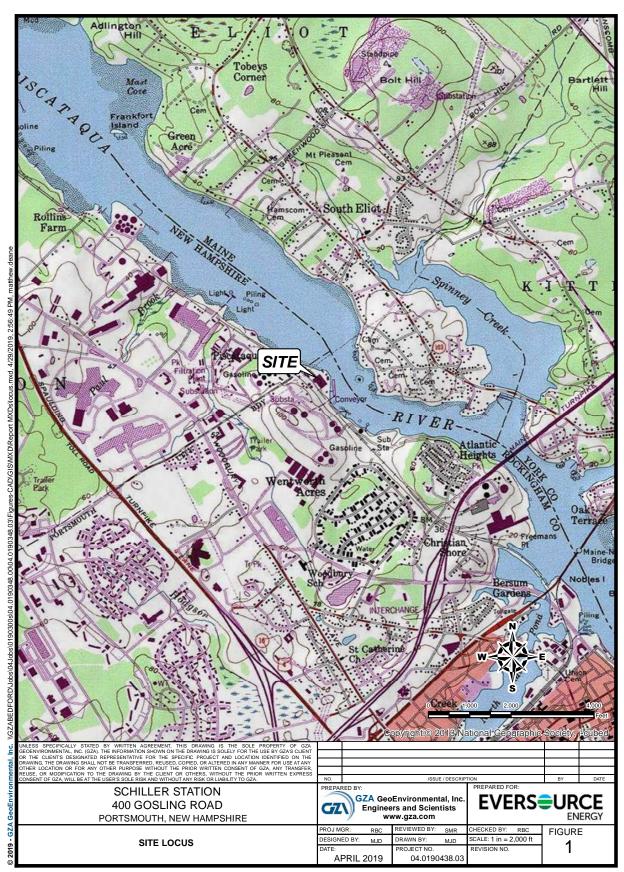
Floor Elevation	Sample Measured Elevation	Sample Name	Sample Date	Surface Type	Surface Description	Paint Color	Paint Condition	General notes	Mercury Concentration (mg/kg)
								Within curve of green structure in NW corner of turbine deck	
36	36	C-1037	3/19/2019	Floor Bulk Sample	Concrete	Red	Damaged	HGX 1059 3/18/19	208
								Rinsed 1100 3/19/19	
36	36	C-1038	3/21/2019	Floor Bulk Sample	Concrete	Red	Damaged	North of North turbine deck adjacent to planning room door and North exterior wall of crane bay.	17.5
				-				HGX 1047 3/20/19, Rinsed 1051 3/21/19 NE corner of turbine deck	
								THE COTTES OF CATOLINE GEEK	
36	36	C-1039	3/19/2019	Floor Bulk Sample	Concrete	Red	Slightly Damaged	HGX 1043 3/18/19	16.5
								Rinsed 1050 3/19/19	
								Catwalk east of main entrance	
36	36	C-1040	3/19/2019	Floor Bulk Sample	Concrete	Red	Damaged	UCV 000C 2/40/40	4.39
								HGX 0926 3/18/19 Rinsed 1040 3/19/19	
								Inside Dick Gregoire's office	
36	36	C-1041	3/19/2019	Floor Bulk Sample	Concrete	Red	Intact		47.5
30	30	C-1041	3/15/2015	Floor Bulk Sample	Concrete	Reu	ilitact	HGX 0911 3/18/19	47.3
								Rinsed 1012 3/19/19	
								Hgx applied at 12:50pm on 3/12/19	
56	59	C-1003	3/13/2019	Floor Bulk Sample	Concrete			Rinsed at 1:51pm on 3/12/19 Jerome read .002 to .008 +/003	7.87
								Drilled 6 Bulk Samples	
								Hgx applied 12:40pm on 3/11/19	
56	59	C-1004	3/13/2019	Floor Bulk Sample	Concrete			Rinsed at 2:00pm on 3/12/19	15.6
								Drilled 6 Bulk Samples	
								Hgx applied on 3/11/19 at 3:15pm	
56	59	C-1005	3/13/2019	Floor Bulk Sample	Concrete			Rinse on 3/12/19 at 2:05pm	3.53
								Jerome read .000 to .008 Vacuum dust beforehand	
56	63	C-1006	3/14/2019	Wall Bulk Sample	Brick		Intact	Threw out first sample (too deep)	50.6
56	67	C-1007	3/14/2019	Wall Bulk Sample	Brick		Intact	Threw out first sample (too deep)	26.4
			-, ,				****	Prep work complete at 2:47 pm on 3/4/2019	17.9
82	82	C-1001	3/6/2019	Floor Bulk Sample	Concrete			Rinsing complete at 2:50 pm on 3/5/2019	17.9
82	82	C-1002	3/6/2019	Floor Bulk Sample	Concrete			Prep complete at 2:49 pm on 3/4/2019	43.1
			-, -,					Rinsing complete at 2:55 pm on 3/5/2019	

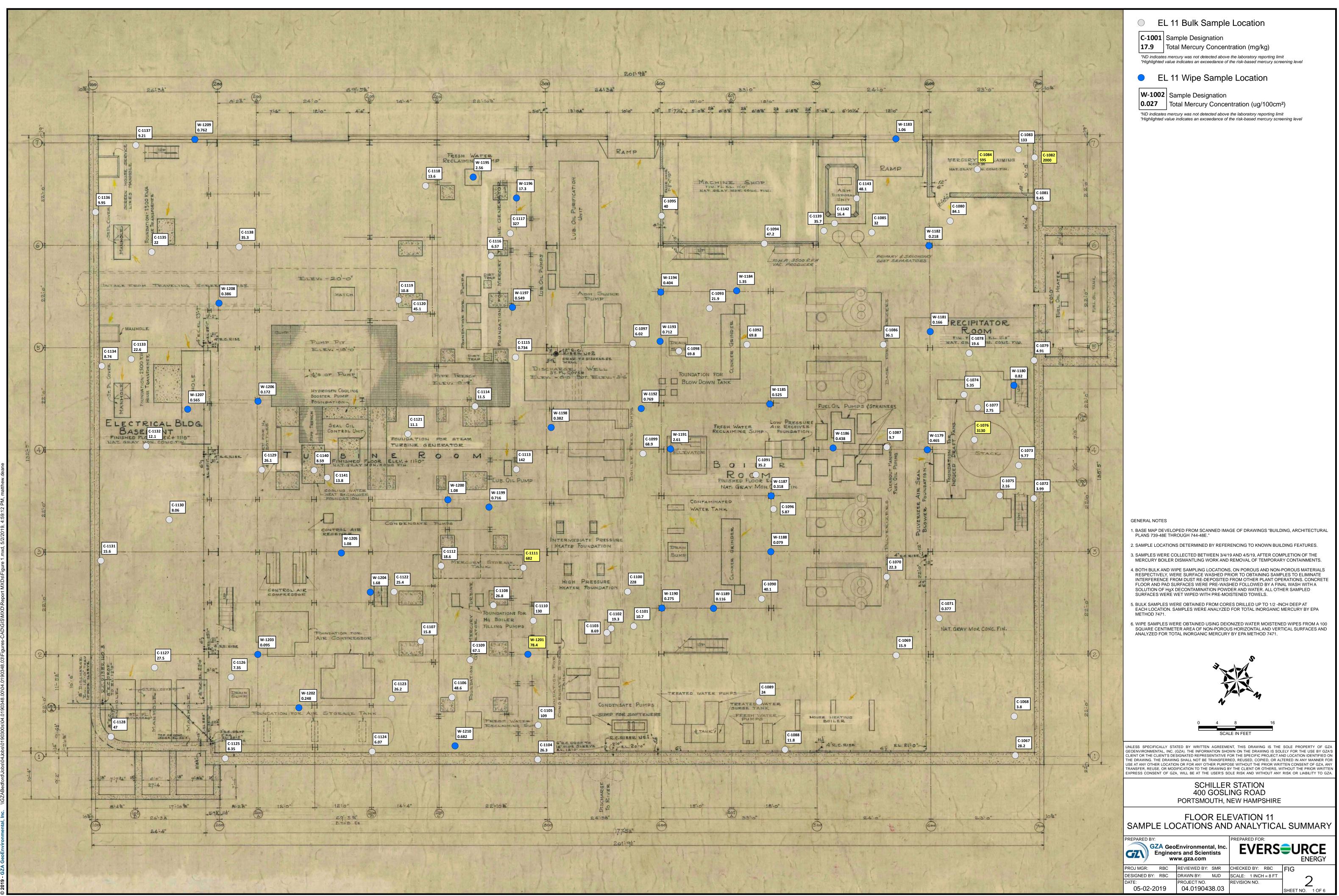
Notes:

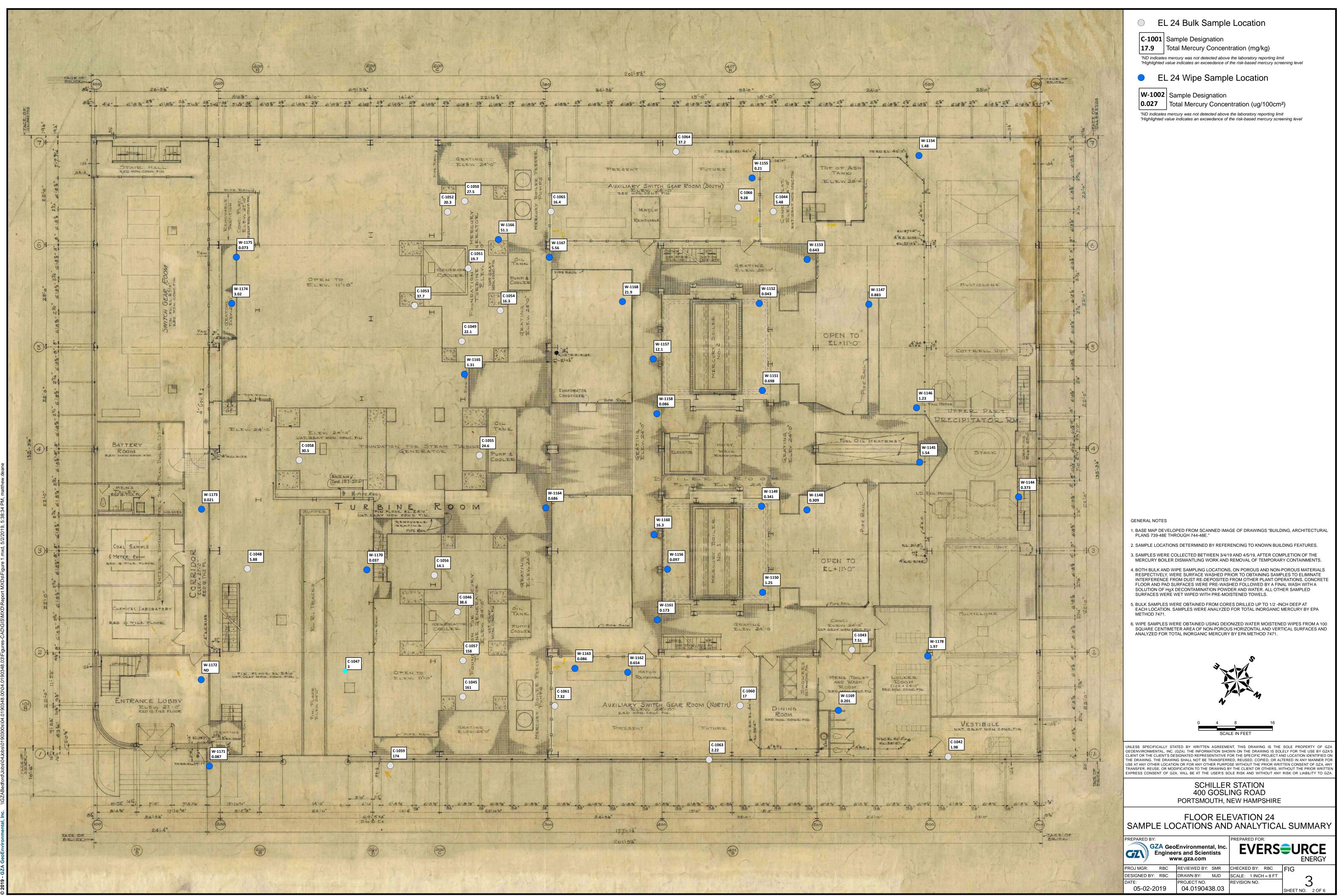
1. Bold, shaded results were detected at a concentration above the risk-based screening value of 460 mg/kg.

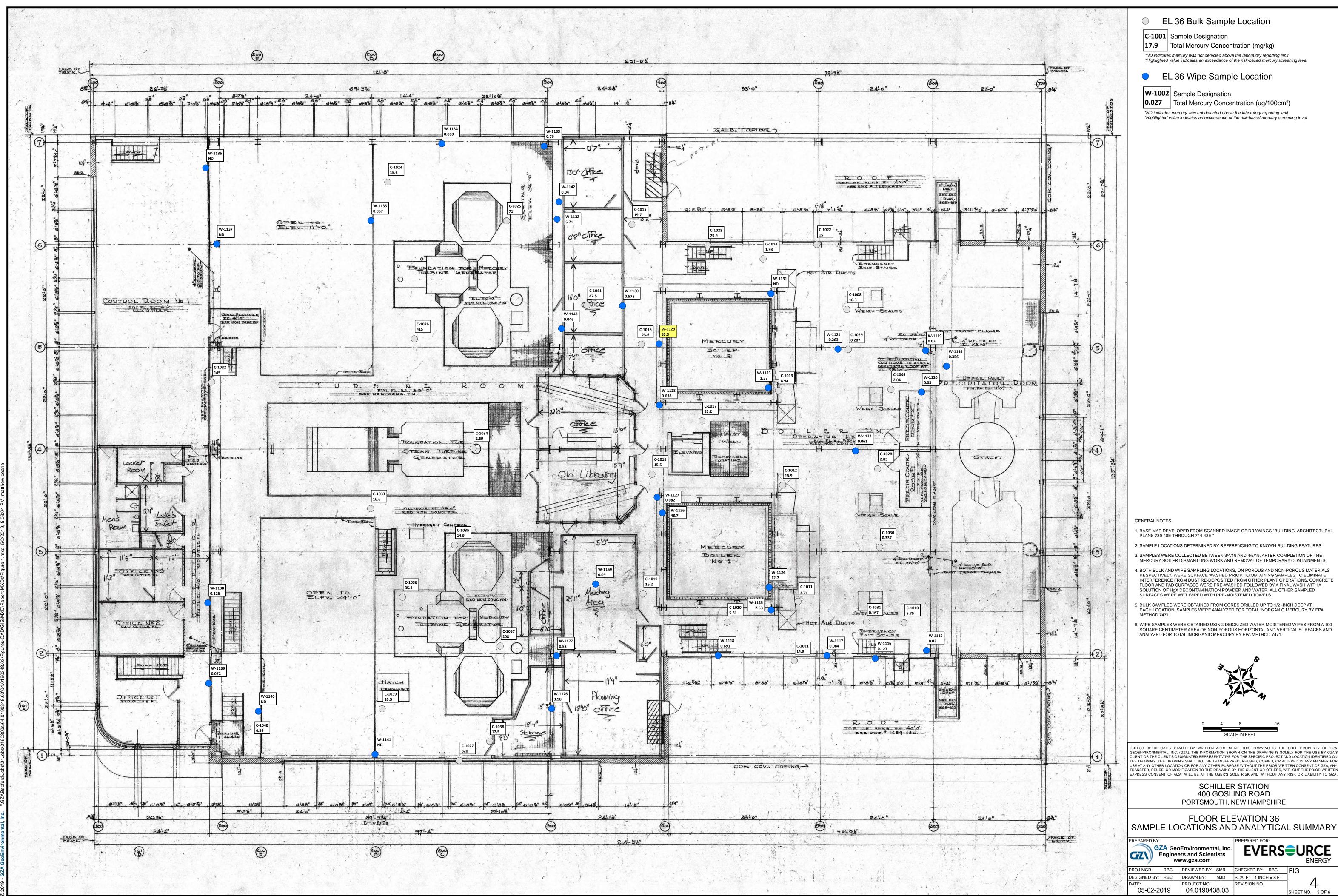


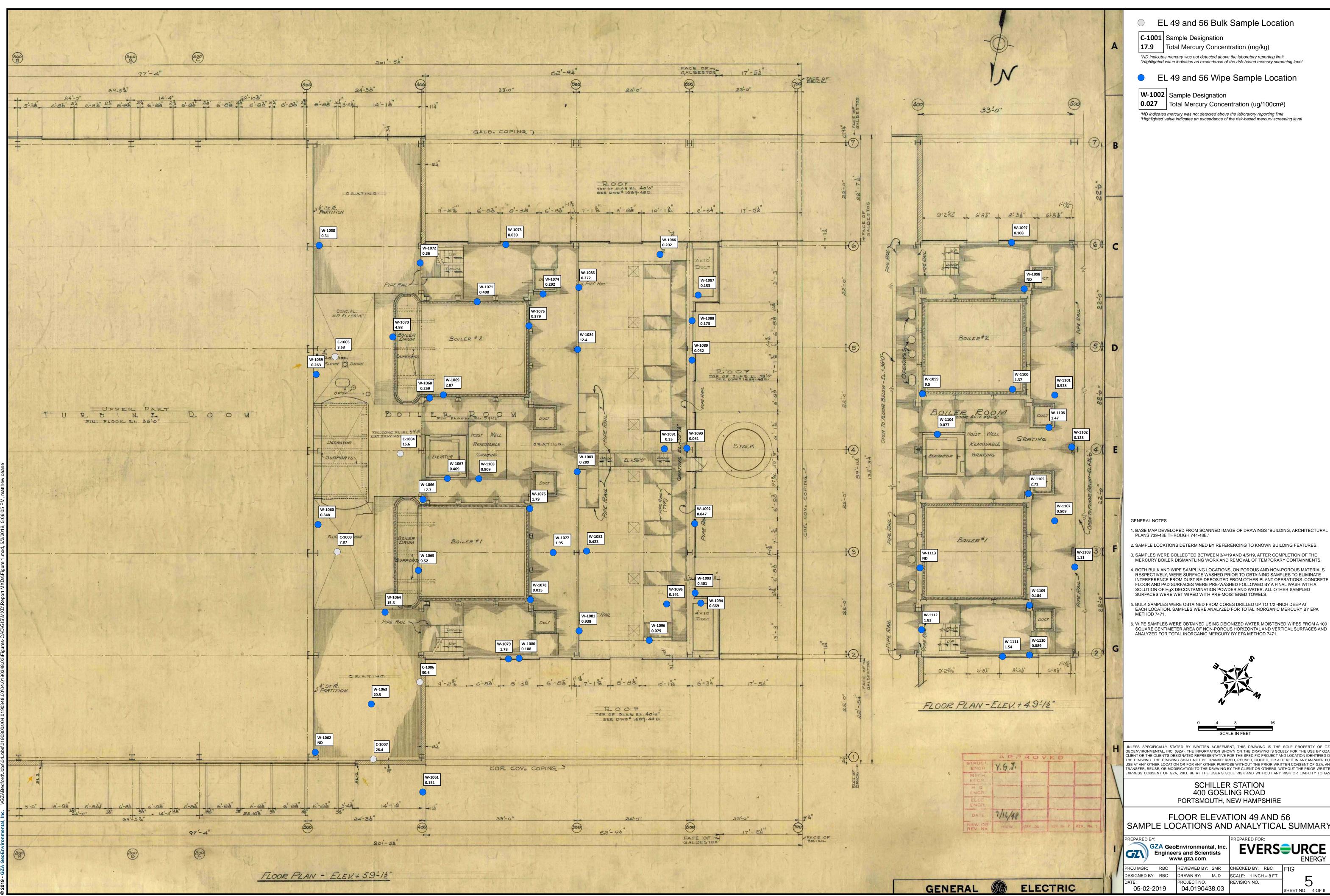
Figures

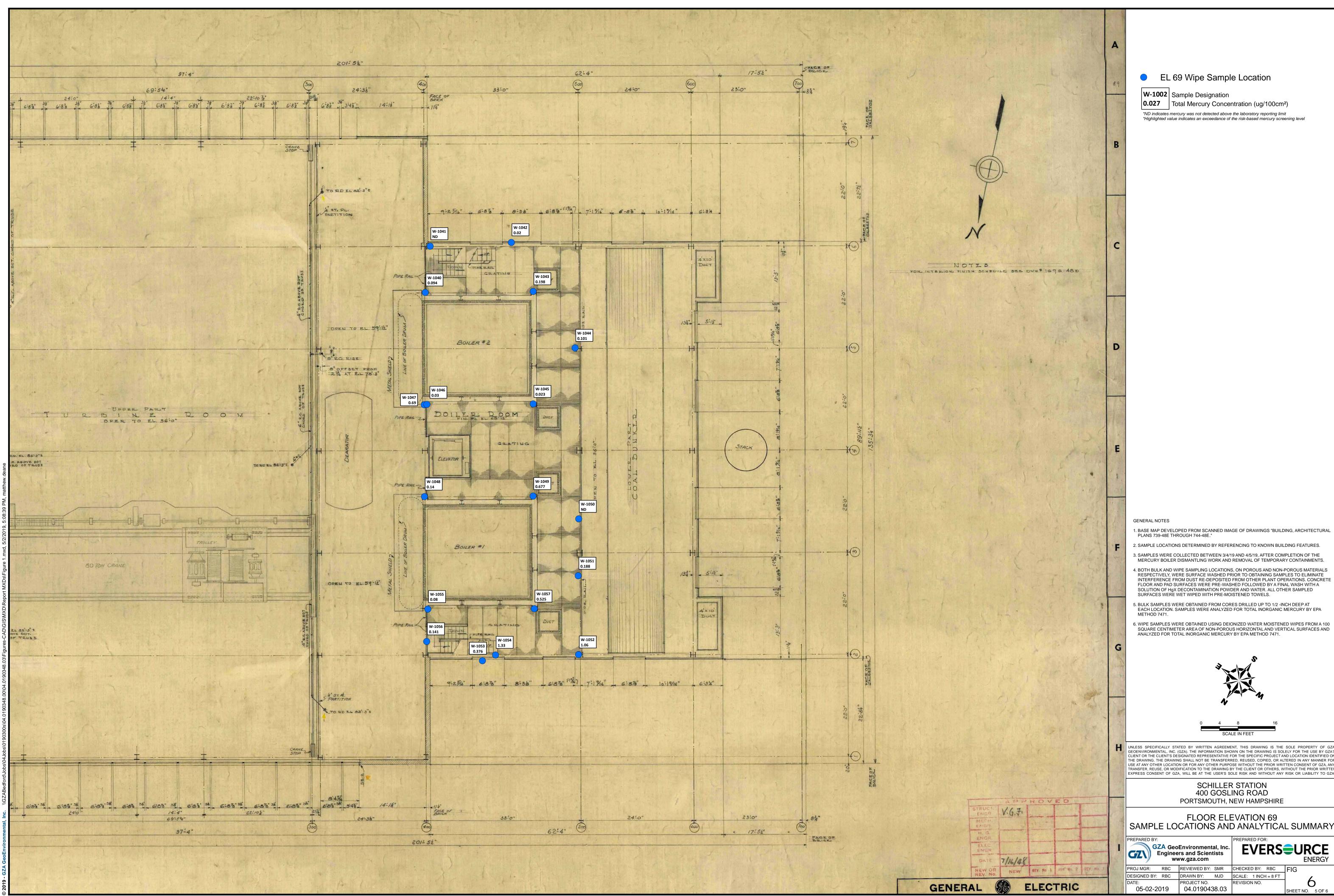


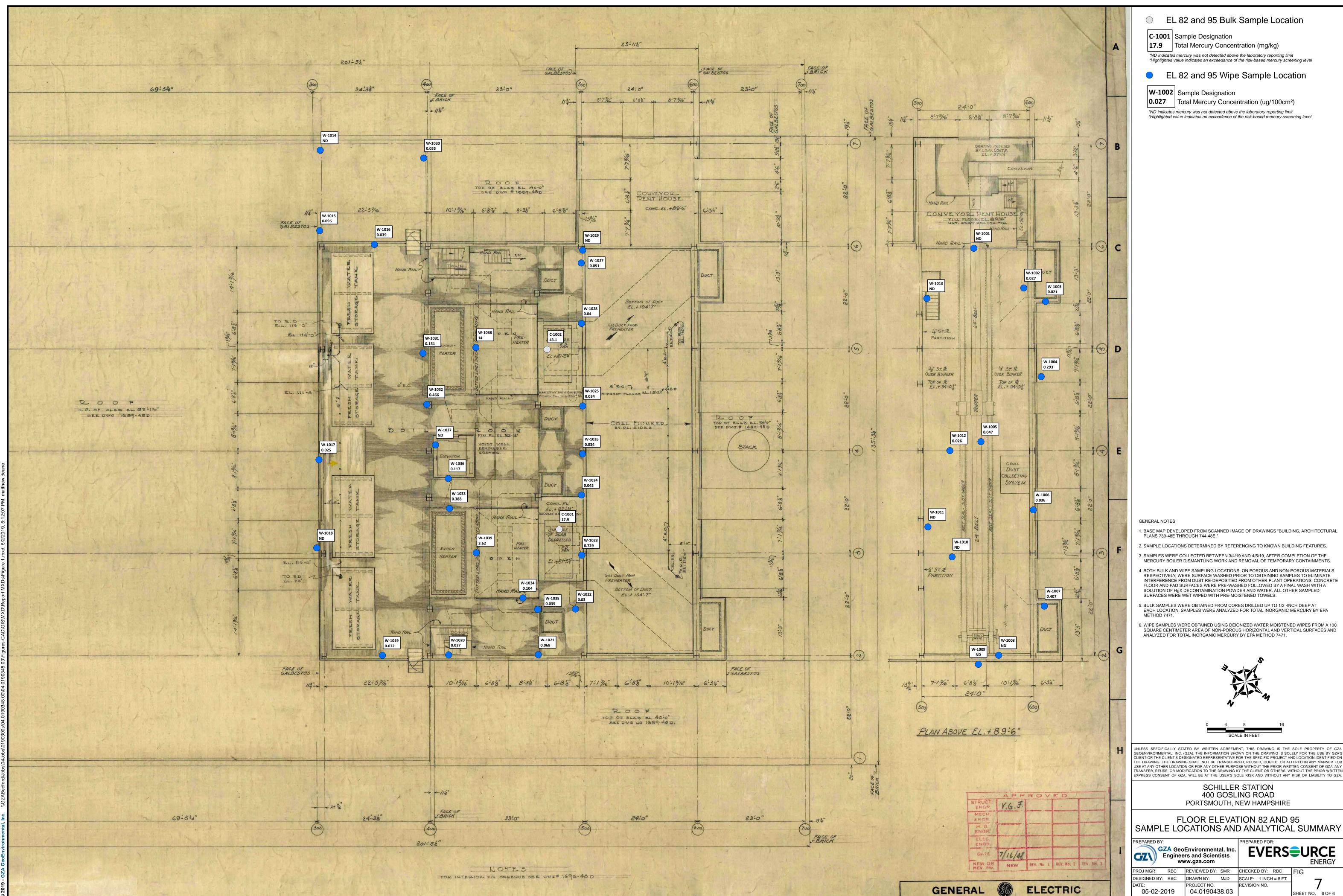














Appendix A – Limitations



USE OF REPORT

1. GeoEnvironmental, Inc. (GZA) prepared this report on behalf of, and for the exclusive use of the Client for the stated purpose(s) and location(s) identified in the Report. Use of this Report, in whole or in part, at other locations, or for other purposes, may lead to inappropriate conclusions and we do not accept any responsibility for the consequences of such use(s). Further, reliance by any party not identified in the agreement, for any use, without our prior written permission, shall be at that party's sole risk, and without any liability to GZA.

STANDARD OF CARE

- 2. Our findings and conclusions are based on the work conducted as part of the Scope of Services set forth in the Report and/or proposal, and reflect our professional judgment. These findings and conclusions must be considered not as scientific or engineering certainties, but rather as our professional opinions concerning the limited data gathered during the course of our work. Conditions other than described in this report may be found at the subject location(s).
- 3. The interpretations and conclusions presented in the Report were based solely upon the services described therein, and not on scientific tasks or procedures beyond the scope of described services. The work described in this report was carried out in accordance with the agreed upon Terms and Conditions.
- 4. GZA's risk characterization was performed in accordance with generally accepted practices of qualified professionals performing the same type of services at the same time, under similar conditions, at the same or a similar property. No warranty, expressed or implied, is made. The findings of the risk characterization are dependent on numerous assumptions and uncertainties inherent in the risk assessment process. Sources of uncertainty may include the description of site conditions, the nature and extent of chemical distribution and the reliability of toxicity information. Consequently, the findings of the risk characterization are not an absolute characterization of actual risks, but rather serve to highlight potential sources of risk at the site. Although the range of uncertainties has not been quantified, the use of conservative assumptions and parameters throughout the assessment would be expected to err on the side of protection of human health and the environment.

RELIANCE ON INFORMATION FROM OTHERS

5. In conducting our work, GZA has relied upon certain information made available by public agencies, Client and/or others. GZA did not attempt to independently verify the accuracy or completeness of that information. Any inconsistencies in this information which we have noted are discussed in the Report.

ADDITIONAL INFORMATION

6. In the event that the Client, or others authorized to use this Report, obtain information on environmental or hazardous waste issues at the site not contained in this report, such information shall be brought to GZA's attention forthwith. GZA will evaluate such information and, on the basis of this evaluation, may modify the conclusions stated in this report.

COMPLIANCE WITH CODES AND REGULATIONS

7. We used reasonable care in identifying and interpreting applicable codes and regulations necessary to execute our scope of work. These codes and regulations are subject to various, and possibly contradictory, interpretations. Interpretations with codes and regulations by other parties are beyond our control.



Appendix B – Laboratory Analytical Data



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Rebecca Cox GZA GeoEnvironmental, Inc. 5 Commerce Park North Bedford, NH 03110

RE: Schiller Boiler Demo (04.0190348.03) ESS Laboratory Work Order Number: 1903059

This signed Certificate of Analysis is our approved release of your analytical results. These results are only representative of sample aliquots received at the laboratory. ESS Laboratory expects its clients to follow all regulatory sampling guidelines. Beginning with this page, the entire report has been paginated. This report should not be copied except in full without the approval of the laboratory. Samples will be disposed of thirty days after the final report has been delivered. If you have any questions or concerns, please feel free to call our Customer Service Department.

Laurel Stoddard Laboratory Director

REVIEWED

By ESS Laboratory at 3:31 pm, Mar 13, 2019

Analytical Summary

The project as described above has been analyzed in accordance with the ESS Quality Assurance Plan. This plan utilizes the following methodologies: US EPA SW-846, US EPA Methods for Chemical Analysis of Water and Wastes per 40 CFR Part 136, APHA Standard Methods for the Examination of Water and Wastewater, American Society for Testing and Materials (ASTM), and other recognized methodologies. The analyses with these noted observations are in conformance to the Quality Assurance Plan. In chromatographic analysis, manual integration is frequently used instead of automated integration because it produces more accurate results.

The test results present in this report are in compliance with TNI and relative state standards, and/or client Quality Assurance Project Plans (QAPP). The laboratory has reviewed the following: Sample Preservations, Hold Times, Initial Calibrations, Continuing Calibrations, Method Blanks, Blank Spikes, Blank Spike Duplicates, Duplicates, Matrix Spikes, Matrix Spike Duplicates, Surrogates and Internal Standards. Any results which were found to be outside of the recommended ranges stated in our SOPs will be noted in the Project Narrative.



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

ESS Laboratory Work Order: 1903059

SAMPLE RECEIPT

The following samples were received on March 05, 2019 for the analyses specified on the enclosed Chain of Custody Record.

Revision 1 March 13, 2019: This report has been revised to change reporting units from ug/wipe to ug/100cm2.

Sample Name	<u>Matrix</u>	Analysis
W-1011	Wipe	7471B
W-1012	Wipe	7471B
W-1013	Wipe	7471B
W-1014	Wipe	7471B
W-1015	Wipe	7471B
W-1016	Wipe	7471B
W-1017	Wipe	7471B
W-1018	Wipe	7471B
W-1019	Wipe	7471B
W-1020	Wipe	7471B
W-1001	Wipe	7471B
W-1002	Wipe	7471B
W-1003	Wipe	7471B
W-1004	Wipe	7471B
W-1005	Wipe	7471B
W-1006	Wipe	7471B
W-1007	Wipe	7471B
W-1008	Wipe	7471B
W-1009	Wipe	7471B
W-1010	Wipe	7471B
	W-1011 W-1012 W-1013 W-1014 W-1015 W-1016 W-1017 W-1018 W-1019 W-1020 W-1001 W-1002 W-1003 W-1004 W-1005 W-1006 W-1007 W-1008 W-1009	W-1011 Wipe W-1012 Wipe W-1013 Wipe W-1014 Wipe W-1015 Wipe W-1016 Wipe W-1017 Wipe W-1018 Wipe W-1019 Wipe W-1020 Wipe W-1001 Wipe W-1002 Wipe W-1003 Wipe W-1004 Wipe W-1005 Wipe W-1006 Wipe W-1007 Wipe W-1008 Wipe W-1009 Wipe



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

ESS Laboratory Work Order: 1903059

PROJECT NARRATIVE

No unusual observations noted.

End of Project Narrative.

DATA USABILITY LINKS

To ensure you are viewing the most current version of the documents below, please clear your internet cookies for www.ESSLaboratory.com. Consult your IT Support personnel for information on how to clear your internet cookies.

Definitions of Quality Control Parameters

Semivolatile Organics Internal Standard Information

Semivolatile Organics Surrogate Information

Volatile Organics Internal Standard Information

Volatile Organics Surrogate Information

EPH and VPH Alkane Lists



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

ESS Laboratory Work Order: 1903059

Analytical Methods

1010A - Flashpoint 6010C - ICP 6020A - ICP MS

7010 - Graphite Furnace 7196A - Hexavalent Chromium 7470A - Aqueous Mercury 7471B - Solid Mercury 8011 - EDB/DBCP/TCP 8015C - GRO/DRO

8081B - Pesticides 8082A - PCB 8100M - TPH 8151A - Herbicides 8260B - VOA 8270D - SVOA

8270D SIM - SVOA Low Level

9014 - Cyanide 9038 - Sulfate

9040C - Aqueous pH

9045D - Solid pH (Corrosivity) 9050A - Specific Conductance

9056A - Anions (IC)

9060A - TOC

9095B - Paint Filter

MADEP 04-1.1 - EPH

MADEP 04-2.1 - VPH

Prep Methods

CURRENT SW-846 METHODOLOGY VERSIONS

3005A - Aqueous ICP Digestion

3020A - Aqueous Graphite Furnace / ICP MS Digestion 3050B - Solid ICP / Graphite Furnace / ICP MS Digestion

3060A - Solid Hexavalent Chromium Digestion

3510C - Separatory Funnel Extraction 3520C - Liquid / Liquid Extraction 3540C - Manual Soxhlet Extraction 3541 - Automated Soxhlet Extraction

3546 - Microwave Extraction 3580A - Waste Dilution

5030B - Aqueous Purge and Trap 5030C - Aqueous Purge and Trap 5035A - Solid Purge and Trap

SW846 Reactivity Methods 7.3.3.2 (Reactive Cyanide) and 7.3.4.1 (Reactive Sulfide) have been withdrawn by EPA. These methods are reported per client request and are not NELAP accredited.



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

Client Sample ID: W-1011
Date Sampled: 03/04/19 10:43

Percent Solids: N/A

Extraction Method: 7471B

ESS Laboratory Work Order: 1903059 ESS Laboratory Sample ID: 1903059-01

Sample Matrix: Wipe Units: ug/100cm²

Total Metals

 Analyte
 Results (MRL)
 MDL
 Method
 Limit
 DF
 Analyst
 Analyzed
 I/V
 F/V
 Batch

 Mercury
 ND (0.020)
 7471B
 1
 MKS
 03/06/19
 9:58
 1
 40
 CC90601



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

Client Sample ID: W-1012 Date Sampled: 03/04/19 10:54

Percent Solids: N/A

ESS Laboratory Work Order: 1903059 ESS Laboratory Sample ID: 1903059-02

Sample Matrix: Wipe Units: ug/100cm²

Extraction Method: 7471B

Total Metals

Analyst Analyzed 03/06/19 10:04 Results (MRL) **MDL** F/V Batch **Analyte** Method Limit Mercury 0.026 (0.020) 7471B 40 CC90601



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

Client Sample ID: W-1013 Date Sampled: 03/04/19 10:40

Percent Solids: N/A

Extraction Method: 7471B

ESS Laboratory Work Order: 1903059 ESS Laboratory Sample ID: 1903059-03

Sample Matrix: Wipe Units: ug/100cm²

Total Metals



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

Client Sample ID: W-1014 Date Sampled: 03/04/19 12:30

Percent Solids: N/A

Extraction Method: 7471B

ESS Laboratory Work Order: 1903059 ESS Laboratory Sample ID: 1903059-04

Sample Matrix: Wipe Units: ug/100cm²

Total Metals

 Analyte
 Results (MRL)
 MDL
 Method
 Limit
 DF
 Analyst
 Analyzed
 I/V
 F/V
 Batch

 Mercury
 ND (0.020)
 7471B
 1
 MKS
 03/06/19 10:08
 1
 40
 CC90601



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

Client Sample ID: W-1015
Date Sampled: 03/04/19 12:35

Percent Solids: N/A

Extraction Method: 7471B

ESS Laboratory Work Order: 1903059 ESS Laboratory Sample ID: 1903059-05

Sample Matrix: Wipe Units: ug/100cm²

Total Metals

 Analyte
 Results (MRL)
 MDL 0.095 (0.020)
 Method 7471B
 Limit 1
 DF 0.095 (0.020)
 Analyzed 0.095 (0.020)
 I/V 1
 F/V 0.09601
 Batch 0.09601



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

Client Sample ID: W-1016 Date Sampled: 03/04/19 12:50

Percent Solids: N/A

Extraction Method: 7471B

ESS Laboratory Work Order: 1903059 ESS Laboratory Sample ID: 1903059-06

Sample Matrix: Wipe Units: ug/100cm²

Total Metals

Analyst Analyzed 03/06/19 10:12 F/V Batch Results (MRL) **MDL** I/V **Analyte** Method Limit Mercury 0.041 (0.020) 7471B 40 CC90601



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

Client Sample ID: W-1017 Date Sampled: 03/04/19 13:00

Percent Solids: N/A

Extraction Method: 7471B

ESS Laboratory Work Order: 1903059 ESS Laboratory Sample ID: 1903059-07

Sample Matrix: Wipe Units: ug/100cm²

Total Metals

 Analyte
 Results (MRL)
 MDL 0.025 (0.020)
 Method 7471B
 Limit 1
 DF 0.05 (0.020)
 Analyzed 0.06/19 10:14
 I/V 1
 F/V 0.026/00:00
 Batch 0.026/00:00



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

Client Sample ID: W-1018

Date Sampled: 03/04/19 13:10

Percent Solids: N/A

Extraction Method: 7471B

ESS Laboratory Work Order: 1903059 ESS Laboratory Sample ID: 1903059-08

Sample Matrix: Wipe Units: ug/100cm²

Total Metals



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

Client Sample ID: W-1019 Date Sampled: 03/04/19 13:11

Percent Solids: N/A

ESS Laboratory Work Order: 1903059
ESS Laboratory Sample ID: 1903059-09

Sample Matrix: Wipe Units: ug/100cm²

Extraction Method: 7471B

Total Metals

 Analyte
 Results (MRL)
 MDL 0.072 (0.020)
 Method 7471B
 Limit 1
 DF 0.072 (0.020)
 Analyzed 0.072 (0.020)
 I/V 0.074 (0.020)
 Batch 0.074 (0.020)



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

Client Sample ID: W-1020 Date Sampled: 03/04/19 13:12

Percent Solids: N/A

ESS Laboratory Work Order: 1903059 ESS Laboratory Sample ID: 1903059-10

Sample Matrix: Wipe Units: ug/100cm²

Extraction Method: 7471B

Total Metals

 Analyte
 Results (MRL)
 MDL 0.027 (0.020)
 Method 7471B
 Limit 1
 DF 0.027 (0.020)
 Analyzed 0.027 (0.020)
 I/V 1
 F/V 0.0200
 Batch 0.027 (0.020)



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

Client Sample ID: W-1001 Date Sampled: 03/04/19 09:30

Percent Solids: N/A

ESS Laboratory Work Order: 1903059 ESS Laboratory Sample ID: 1903059-11

Sample Matrix: Wipe Units: ug/100cm²

Extraction Method: 7471B

Total Metals

Analyst Analyzed 03/06/19 10:22 F/V Batch Results (MRL) **MDL** I/V **Analyte** Method Limit Mercury ND (0.020) 7471B 40 CC90601



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

Client Sample ID: W-1002 Date Sampled: 03/04/19 09:42

Percent Solids: N/A

Extraction Method: 7471B

ESS Laboratory Work Order: 1903059 ESS Laboratory Sample ID: 1903059-12

Sample Matrix: Wipe Units: ug/100cm²

Total Metals

 Analyte Mercury
 Results (MRL)
 MDL MDL (0.020)
 Method 7471B
 Limit Limit Limit Limit (DF) (MRS)
 Analyzed (MRS)
 I/V MS
 4/N MS
 MS (0.06/19 13:57)
 I MS
 40 CC90601



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

Client Sample ID: W-1003 Date Sampled: 03/04/19 09:50

Percent Solids: N/A

Extraction Method: 7471B

ESS Laboratory Work Order: 1903059 ESS Laboratory Sample ID: 1903059-13

Sample Matrix: Wipe Units: ug/100cm²

Total Metals

Analyst Analyzed 03/06/19 10:30 F/V Batch Results (MRL) **MDL Analyte** Method Limit Mercury 0.021 (0.020) 7471B 40 CC90601



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

Client Sample ID: W-1004 Date Sampled: 03/04/19 09:56

Percent Solids: N/A

Extraction Method: 7471B

ESS Laboratory Work Order: 1903059 ESS Laboratory Sample ID: 1903059-14

Sample Matrix: Wipe Units: ug/100cm²

Total Metals



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

Client Sample ID: W-1005 Date Sampled: 03/04/19 10:01

Percent Solids: N/A

Extraction Method: 7471B

ESS Laboratory Work Order: 1903059 ESS Laboratory Sample ID: 1903059-15

Sample Matrix: Wipe Units: ug/100cm²

Total Metals

 Analyte
 Results (MRL)
 MDL
 Method
 Limit
 DF
 Analyst
 Analyzed
 I/V
 F/V
 Batch

 Mercury
 0.047 (0.020)
 7471B
 1
 MKS
 03/06/19 10:34
 1
 40
 CC90601



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

Client Sample ID: W-1006 Date Sampled: 03/04/19 10:09

Percent Solids: N/A

Extraction Method: 7471B

ESS Laboratory Work Order: 1903059 ESS Laboratory Sample ID: 1903059-16

Sample Matrix: Wipe Units: ug/100cm²

Total Metals

 Analyte
 Results (MRL)
 MDL 0.036 (0.020)
 Method 7471B
 Limit 1
 DF 0.036 (0.020)
 Analyzed 0.036 (0.020)
 I/V 0.00601
 E/V 0.00601
 Batch 0.00601



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

Client Sample ID: W-1007 Date Sampled: 03/04/19 10:24

Percent Solids: N/A

1011

ESS Laboratory Work Order: 1903059 ESS Laboratory Sample ID: 1903059-17

Sample Matrix: Wipe Units: ug/100cm²

Extraction Method: 7471B

Total Metals

 Analyte Mercury
 Results (MRL) 0.407 (0.100)
 MDL MDL MDL MDL MDL MINION
 Limit Limit Limit Limit MDL MDL MINION
 DF MKS MS 03/06/19 13:59
 Analyzed MS 03/06/19 13:59
 I/V LIMIT MS MS MS 03/06/19 13:59
 Batch MCS MS MS 03/06/19 13:59



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

Client Sample ID: W-1008 Date Sampled: 03/04/19 10:29

Percent Solids: N/A

ESS Laboratory Work Order: 1903059 ESS Laboratory Sample ID: 1903059-18

Sample Matrix: Wipe Units: ug/100cm²

Extraction Method: 7471B

Total Metals



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

Client Sample ID: W-1009 Date Sampled: 03/04/19 10:34

Percent Solids: N/A

Extraction Method: 7471B

ESS Laboratory Work Order: 1903059 ESS Laboratory Sample ID: 1903059-19

Sample Matrix: Wipe Units: ug/100cm²

Total Metals

 Analyte
 Results (MRL)
 MDL
 Method
 Limit
 DF
 Analyst
 Analyzed
 I/V
 F/V
 Batch

 Mercury
 ND (0.020)
 7471B
 1
 MKS
 03/06/19 10:42
 1
 40
 CC90601



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

Client Sample ID: W-1010 Date Sampled: 03/04/19 10:40

Percent Solids: N/A

Extraction Method: 7471B

ESS Laboratory Work Order: 1903059 ESS Laboratory Sample ID: 1903059-20

Sample Matrix: Wipe Units: ug/100cm²

Total Metals

 Analyte
 Results (MRL)
 MDL
 Method
 Limit
 DF
 Analyst
 Analyzed
 I/V
 F/V
 Batch

 Mercury
 ND (0.020)
 7471B
 1
 MKS
 03/06/19 10:44
 1
 40
 CC90601



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

ESS Laboratory Work Order: 1903059

Quality Control Data

Augusta	December	MDI	11-9-	Spike	Source	0/ DEC	%REC	DDD	RPD	0!'5
Analyte	Result	MRL	Units	Level	Result	%REC	Limits	RPD	Limit	Qualifier
			Total Meta	ıls						
Batch CC90601 - 7471B										
Blank										
Mercury	ND	0.020	ug/100cm²							
LCS										
Mercury	0.123	0.020	ug/100cm²	0.1208		102	85-115			
LCS Dup										
Mercury	0.128	0.020	ug/100cm ²	0.1208		106	85-115	4	20	



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

ESS Laboratory Work Order: 1903059

Notes and Definitions

U	Analyte included in the analysis, but not detected
D	Diluted.
ND	Analyte NOT DETECTED at or above the MRL (LOQ), LOD for DoD Reports, MDL for J-Flagged Analytes
dry	Sample results reported on a dry weight basis
RPD	Relative Percent Difference
MDL	Method Detection Limit
MRL	Method Reporting Limit
LOD	Limit of Detection
LOQ	Limit of Quantitation
DL	Detection Limit
I/V	Initial Volume
F/V	Final Volume
§	Subcontracted analysis; see attached report
1	Range result excludes concentrations of surrogates and/or internal standards eluting in that range.
2	Range result excludes concentrations of target analytes eluting in that range.
3	Range result excludes the concentration of the C9-C10 aromatic range.

Avg Results reported as a mathematical average.

NR No Recovery
[CALC] Calculated Analyte

SUB Subcontracted analysis; see attached report

RL Reporting Limit

EDL Estimated Detection Limit
MF Membrane Filtration
MPN Most Probably Number
TNTC Too numerous to Count
CFU Colony Forming Units



The Microbiology Division of Thielsch Engineering, Inc.

ESS Laboratory Work Order: 1903059



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

ENVIRONMENTAL

ESS LABORATORY CERTIFICATIONS AND ACCREDITATIONS

Rhode Island Potable and Non Potable Water: LAI00179 http://www.health.ri.gov/find/labs/analytical/ESS.pdf

Connecticut Potable and Non Potable Water, Solid and Hazardous Waste: PH-0750 http://www.ct.gov/dph/lib/dph/environmental health/environmental laboratories/pdf/OutofStateCommercialLaboratories.pdf

> Maine Potable and Non Potable Water, and Solid and Hazardous Waste: RI00002 http://www.maine.gov/dhhs/mecdc/environmental-health/dwp/partners/labCert.shtml

> > Massachusetts Potable and Non Potable Water: M-RI002 http://public.dep.state.ma.us/Labcert/Labcert.aspx

New Hampshire (NELAP accredited) Potable and Non Potable Water, Solid and Hazardous Waste: 2424 $\underline{http://des.nh.gov/organization/divisions/water/dwgb/nhelap/index.htm}$

New York (NELAP accredited) Non Potable Water, Solid and Hazardous Waste: 11313 http://www.wadsworth.org/labcert/elap/comm.html

New Jersey (NELAP accredited) Non Potable Water, Solid and Hazardous Waste: RI006 http://datamine2.state.nj.us/DEP OPRA/OpraMain/pi main?mode=pi by site&sort order=PI NAMEA&Select+a+Site:=58715

United States Department of Agriculture Soil Permit: P330-12-00139

Pennsylvania: 68-01752 http://www.dep.pa.gov/Business/OtherPrograms/Labs/Pages/Laboratory-Accreditation-Program.aspx

Tel: 401-461-7181

Fax: 401-461-4486

http://www.ESSLaboratory.com

ESS Laboratory Sample and Cooler Receipt Checklist

Client:				IDIW		SS Project ID: ate Received:	1903059 3/5/2019	
Shipped/D	elivered Via:		ESS Courie	<u>r</u>	Proj	ect Due Date:	3/11/2019	
					Da	ys for Project:	4 Day	
	nanifest pres			No .	6. Does C	COC match bottles?		No
. Were cu	ıstody seals į	present?		Yes	7. Is COC	complete and corr	ect?	Yes
s. Is radiat	ion count <1	00 CPM?		Yes	8. Were s	amples received in	act?	Yes
	oler Present? 0.5		ice	Yes	9. Were I	abs informed abo	ut short holds & rushes?	(res) No / N
5. Was CC	DC signed an	d dated by cl	ient?	Yes	10. Were	any analyses rece	ived outside of hold time?	Yes /(No)
	bcontracting Sample IDs: Analysis: TAT:			/ (Aro	a. Air bul	VOAs received? obles in aqueous Vomethanol cover soil		Yes /(No Yes / No Yes / No / N
a. If metals	e samples pro s preserved u vel VOA vials	pon receipt:	ved?	Yes / No Date: _ Date: _	Tim	e: e:	By: By:	
•	ceiving Notes							
COC =	W-1011	collecte	d 1043,	W-1012 (collected 1054,	W-1010 coll	ected 1040	
ما ما ما	- 181 404			E 181 404	a collected 405	0.18/ 4040	Handard 4000	
Labeis	= ₩-101	1 collec	tea 103	5, W-1U1.	2 collected 105	U, W-1U1U C	Dilected 1030	
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i4. Was the	nere a need to	o contact Pro	ject Manag	er?	Yes/ No Les / No			
14. Was the Who was co	nere a need to contacted?	o contact Procontact the o	ject Manag	er? Date: _	Yes/ No Les / No		By:	anide and 608.3
4. Was the Was the Was the Was c	nere a need to ere a need to contacted?	o contact Procontact the c	oject Manag client?	er? Date: _ Sufficient Volume	Yes)/ No Yes / No Tim	e:Preservat	By:	anide and 608.3
4. Was the Who was co	container ID 320815	o contact Procontact the o	Air Bubbles Present	Sufficient Volume Yes	Yes/ No Tim Container Type 4 oz. Jar - Unpres	e: Preservat Other	By:	anide and 608.3
4. Was the Was the Who was constructed Sample Number 01 02	container ID 320815 320814	Proper Container Yes	Air Bubbles Present NA	Sufficient Volume Yes Yes	Yes)/ No Yes / No Tim Container Type 4 oz. Jar - Unpres 4 oz. Jar - Unpres	e:Preservat	By:	anide and 608.3
4. Was the Who was constructed Sample Number 01 02 03	container ID 320815 320814 320813	Proper Container Yes Yes	Air Bubbles Present NA NA	Sufficient Volume Yes Yes Yes	Container Type 4 oz. Jar - Unpres 4 oz. Jar - Unpres 4 oz. Jar - Unpres	e: Preservat Other Other Other	By:	anide and 608.3
4. Was the Was the Who was constructed Sample Number 01 02 03 04	container ID 320815 320814 320813 320812	Proper Container Yes Yes Yes Yes	Air Bubbles Present NA NA NA	Sufficient Volume Yes Yes Yes Yes Yes	Container Type 4 oz. Jar - Unpres	e: Preservat Other Other Other	By:	anide and 608.3
4. Was the Was the Who was constructed with the Was the Who was constructed with the Was the W	Container ID 320815 320814 320812 320811	Proper Container Yes Yes Yes Yes	Air Bubbles Present NA NA NA NA	Sufficient Volume Yes Yes Yes Yes Yes Yes	Container Type 4 oz. Jar - Unpres	Preservat Other Other Other Other Other	By:	anide and 608.3
4. Was the Who was constructed with the Was the Who was constructed with the Was the W	Container ID 320815 320814 320813 320811 320810	Proper Container Yes Yes Yes Yes Yes Yes	Air Bubbles Present NA NA NA NA NA	Sufficient Volume Yes Yes Yes Yes Yes Yes Yes Yes Yes	Container Type 4 oz. Jar - Unpres	Preservat Other Other Other Other Other Other	By:	anide and 608.3
4. Was the Who was construction of the Number of the Numbe	Container ID 320815 320814 320813 320812 320811 320810 320809	Proper Container Yes Yes Yes Yes Yes Yes	Air Bubbles Present NA NA NA NA	Sufficient Volume Yes Yes Yes Yes Yes Yes	Container Type 4 oz. Jar - Unpres	Preservat Other Other Other Other Other	By:	anide and 608.3
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ESS Laboratory Sample and Cooler Receipt Checklist

Client:	GZA - Bedford, NH - GZA/HDM		ESS Project ID:	1903059	
	bels on correct containers? ary stickers attached?	Yes No Yes No	Date Received:	3/5/2019	
Completed By:	2/4	Date & Time:	3/5/19	1955	
Reviewed By:		Date & Time:	3/15/15	2011	
Delivered By:			3/5/15	2011	
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1 3/4/19	10:43	Wipe		Wine	W-1011			X							i		
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6 3/4/19	12:50	Wipe			W-1016			X		\top		11	\top			\top	†
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Container Volume Preservation Code		2-2.5 gal 3-250 d 2-HCI 3-H2S0	-	4-300 mL 5-500 HNO3 5-NaOH 6-M			11-Other	9								工	
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Cooler Present:		O Drop o	XIF	ł	Comments:	Please sp			serval	ive ar	d conta	iners t	ypes in	this spa	ace		
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The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Rebecca Cox GZA GeoEnvironmental, Inc. 5 Commerce Park North Bedford, NH 03110

RE: Schiller Boiler Demo (04.0190348.03) ESS Laboratory Work Order Number: 1903060

This signed Certificate of Analysis is our approved release of your analytical results. These results are only representative of sample aliquots received at the laboratory. ESS Laboratory expects its clients to follow all regulatory sampling guidelines. Beginning with this page, the entire report has been paginated. This report should not be copied except in full without the approval of the laboratory. Samples will be disposed of thirty days after the final report has been delivered. If you have any questions or concerns, please feel free to call our Customer Service Department.

Laurel Stoddard Laboratory Director

REVIEWED

By ESS Laboratory at 3:36 pm, Mar 13, 2019

Analytical Summary

The project as described above has been analyzed in accordance with the ESS Quality Assurance Plan. This plan utilizes the following methodologies: US EPA SW-846, US EPA Methods for Chemical Analysis of Water and Wastes per 40 CFR Part 136, APHA Standard Methods for the Examination of Water and Wastewater, American Society for Testing and Materials (ASTM), and other recognized methodologies. The analyses with these noted observations are in conformance to the Quality Assurance Plan. In chromatographic analysis, manual integration is frequently used instead of automated integration because it produces more accurate results.

The test results present in this report are in compliance with TNI and relative state standards, and/or client Quality Assurance Project Plans (QAPP). The laboratory has reviewed the following: Sample Preservations, Hold Times, Initial Calibrations, Continuing Calibrations, Method Blanks, Blank Spikes, Blank Spike Duplicates, Duplicates, Matrix Spikes, Matrix Spike Duplicates, Surrogates and Internal Standards. Any results which were found to be outside of the recommended ranges stated in our SOPs will be noted in the Project Narrative.



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

ESS Laboratory Work Order: 1903060

SAMPLE RECEIPT

The following samples were received on March 05, 2019 for the analyses specified on the enclosed Chain of Custody Record.

Revision 1 March 13, 2019: This report has been revised to change reporting units from ug/wipe to ug/100cm2.

Lab Number	Sample Name	<u>Matrix</u>	Analysis
1903060-01	W-1031	Wipe	7471B
1903060-02	W-1032	Wipe	7471B
1903060-03	W-1033	Wipe	7471B
1903060-04	W-1034	Wipe	7471B
1903060-05	W-1035	Wipe	7471B
1903060-06	W-1036	Wipe	7471B
1903060-07	W-1037	Wipe	7471B
1903060-08	030419-BLANK-1	Wipe	7471B
1903060-09	030419-BLANK-1	Wipe	7471B
1903060-10	W-1016	Wipe	7471B
1903060-11	W-1021	Wipe	7471B
1903060-12	W-1022	Wipe	7471B
1903060-13	W-1023	Wipe	7471B
1903060-14	W-1024	Wipe	7471B
1903060-15	W-1025	Wipe	7471B
1903060-16	W-1026	Wipe	7471B
1903060-17	W-1027	Wipe	7471B
1903060-18	W-1028	Wipe	7471B
1903060-19	W-1029	Wipe	7471B
1903060-20	W-1030	Wipe	7471B



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

ESS Laboratory Work Order: 1903060

PROJECT NARRATIVE

No unusual observations noted.

End of Project Narrative.

DATA USABILITY LINKS

To ensure you are viewing the most current version of the documents below, please clear your internet cookies for www.ESSLaboratory.com. Consult your IT Support personnel for information on how to clear your internet cookies.

Definitions of Quality Control Parameters

Semivolatile Organics Internal Standard Information

Semivolatile Organics Surrogate Information

Volatile Organics Internal Standard Information

Volatile Organics Surrogate Information

EPH and VPH Alkane Lists



The Microbiology Division of Thielsch Engineering, Inc.

ESS Laboratory Work Order: 1903060



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

Analytical Methods

1010A - Flashpoint 6010C - ICP 6020A - ICP MS

7010 - Graphite Furnace 7196A - Hexavalent Chromium 7470A - Aqueous Mercury 7471B - Solid Mercury

8011 - EDB/DBCP/TCP 8015C - GRO/DRO

8081B - Pesticides 8082A - PCB 8100M - TPH 8151A - Herbicides

8260B - VOA 8270D - SVOA

8270D SIM - SVOA Low Level

9014 - Cyanide 9038 - Sulfate

9040C - Aqueous pH

9045D - Solid pH (Corrosivity)

9050A - Specific Conductance

9056A - Anions (IC)

9060A - TOC

9095B - Paint Filter

MADEP 04-1.1 - EPH

MADEP 04-2.1 - VPH

Prep Methods

CURRENT SW-846 METHODOLOGY VERSIONS

3005A - Aqueous ICP Digestion

3020A - Aqueous Graphite Furnace / ICP MS Digestion

3050B - Solid ICP / Graphite Furnace / ICP MS Digestion

3060A - Solid Hexavalent Chromium Digestion

3510C - Separatory Funnel Extraction 3520C - Liquid / Liquid Extraction

3540C - Manual Soxhlet Extraction 3541 - Automated Soxhlet Extraction

3546 - Microwave Extraction

3580A - Waste Dilution

5030B - Aqueous Purge and Trap 5030C - Aqueous Purge and Trap 5035A - Solid Purge and Trap

SW846 Reactivity Methods 7.3.3.2 (Reactive Cyanide) and 7.3.4.1 (Reactive Sulfide) have been withdrawn by EPA. These methods are reported per client request and are not NELAP accredited.



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

Client Sample ID: W-1031 Date Sampled: 03/04/19 14:35

Percent Solids: N/A

Extraction Method: 7471B

ESS Laboratory Work Order: 1903060 ESS Laboratory Sample ID: 1903060-01

Sample Matrix: Wipe Units: ug/100cm²

Total Metals

 Analyte
 Results (MRL)
 MDL
 Method
 Limit
 DF
 Analyst
 Analyzed
 I/V
 F/V
 Batch

 Mercury
 0.151 (0.020)
 7471B
 1
 MKS
 03/06/19 12:14
 1
 40
 CC90602



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

Client Sample ID: W-1032 Date Sampled: 03/04/19 14:45

Percent Solids: N/A

Extraction Method: 7471B

ESS Laboratory Work Order: 1903060 ESS Laboratory Sample ID: 1903060-02

Sample Matrix: Wipe Units: ug/100cm²

Total Metals



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

Client Sample ID: W-1033 Date Sampled: 03/04/19 14:50

Percent Solids: N/A

Extraction Method: 7471B

ESS Laboratory Work Order: 1903060 ESS Laboratory Sample ID: 1903060-03

Sample Matrix: Wipe Units: ug/100cm²

Total Metals

Analyst Analyzed 03/06/19 12:18 F/V Batch **Analyte** Results (MRL) **MDL** Method Limit Mercury 0.388 (0.020) 7471B 40 CC90602

Service



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

Client Sample ID: W-1034 Date Sampled: 03/04/19 14:50

Percent Solids: N/A

Extraction Method: 7471B

ESS Laboratory Work Order: 1903060 ESS Laboratory Sample ID: 1903060-04

Sample Matrix: Wipe Units: ug/100cm²

Total Metals

 Analyte Mercury
 Results (MRL) (0.020)
 MDL Method 7471B
 Limit Limit Limit MKS
 DF MAILY MKS
 Analyzed MKS
 I/V MKS
 Batch MKS
 E/V MKS
 Batch MKS



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

Client Sample ID: W-1035 Date Sampled: 03/04/19 15:00

Percent Solids: N/A

Extraction Method: 7471B

ESS Laboratory Work Order: 1903060 ESS Laboratory Sample ID: 1903060-05

Sample Matrix: Wipe Units: ug/100cm²

Total Metals

 Analyte Mercury
 Results (MRL) 0.035 (0.020)
 MDL Method 7471B
 Limit Limit Limit MRS
 DF MRS
 Analyzed MRS
 I/V MRS
 Batch MRS
 E/V MRS
 Batch MRS



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

Client Sample ID: W-1036 Date Sampled: 03/04/19 13:20

Percent Solids: N/A

Extraction Method: 7471B

ESS Laboratory Work Order: 1903060 ESS Laboratory Sample ID: 1903060-06

Sample Matrix: Wipe Units: ug/100cm²

Total Metals

Analyte Mercury



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

Client Sample ID: W-1037 Date Sampled: 03/04/19 15:05

Percent Solids: N/A

Extraction Method: 7471B

ESS Laboratory Work Order: 1903060 ESS Laboratory Sample ID: 1903060-07

Sample Matrix: Wipe Units: ug/100cm²

Total Metals

Analyst Analyzed 03/06/19 12:26 F/V Batch Results (MRL) **MDL Analyte** Method Limit Mercury ND (0.020) 7471B 40 CC90602



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo Client Sample ID: 030419-BLANK-1 Date Sampled: 03/04/19 00:00

Percent Solids: N/A

ESS Laboratory Work Order: 1903060 ESS Laboratory Sample ID: 1903060-08

Sample Matrix: Wipe Units: ug/100cm²

Extraction Method: 7471B

Total Metals



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo Client Sample ID: 030419-BLANK-1 Date Sampled: 03/04/19 00:00

Percent Solids: N/A

ESS Laboratory Work Order: 1903060 ESS Laboratory Sample ID: 1903060-09

Sample Matrix: Wipe Units: ug/100cm²

Extraction Method: 7471B

Total Metals

Analyst Analyzed 03/06/19 12:34 F/V Batch Results (MRL) **MDL Analyte** Method Limit Mercury ND (0.020) 7471B 40 CC90602



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

Client Sample ID: W-1016 Date Sampled: 03/04/19 10:18

Percent Solids: N/A

Extraction Method: 7471B

ESS Laboratory Work Order: 1903060 ESS Laboratory Sample ID: 1903060-10

Sample Matrix: Wipe Units: ug/100cm²

Total Metals

Analyst Analyzed 03/06/19 12:36 F/V Batch Results (MRL) **MDL Analyte** Method Limit Mercury 0.039 (0.020) 7471B 40 CC90602



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

Client Sample ID: W-1021 Date Sampled: 03/04/19 13:25

Percent Solids: N/A

Extraction Method: 7471B

ESS Laboratory Work Order: 1903060 ESS Laboratory Sample ID: 1903060-11

Sample Matrix: Wipe Units: ug/100cm²

Total Metals

Analyst Analyzed
MKS 03/06/19 12:38 F/V Batch Results (MRL) **MDL Analyte** Method Limit Mercury 0.068 (0.020) 7471B 40 CC90602



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

Client Sample ID: W-1022 Date Sampled: 03/04/19 13:30

Percent Solids: N/A

ESS Laboratory Work Order: 1903060 ESS Laboratory Sample ID: 1903060-12

Sample Matrix: Wipe Units: ug/100cm²

Extraction Method: 7471B

Total Metals

 Analyte Mercury
 Results (MRL) 0.030 (0.020)
 MDL Method 7471B
 Limit Limit Limit MRS
 DF MRS
 Analyzed MRS
 I/V MRS
 E/V MRS
 Batch MRS



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

Client Sample ID: W-1023 Date Sampled: 03/04/19 13:40

Percent Solids: N/A

ESS Laboratory Work Order: 1903060 ESS Laboratory Sample ID: 1903060-13

Sample Matrix: Wipe Units: ug/100cm²

Extraction Method: 7471B

Total Metals

 Analyte Mercury
 Results (MRL) 0.729 (0.200)
 MDL MDL 7471B
 Limit



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CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

Client Sample ID: W-1024 Date Sampled: 03/04/19 13:45

Percent Solids: N/A

Extraction Method: 7471B

ESS Laboratory Work Order: 1903060 ESS Laboratory Sample ID: 1903060-14

Sample Matrix: Wipe Units: ug/100cm²

Total Metals

 Analyte
 Results (MRL)
 MDL
 Method
 Limit
 DF
 Analyst
 Analyzed
 I/V
 F/V
 Batch

 Mercury
 0.045 (0.020)
 7471B
 1
 MKS
 03/06/19 12:44
 1
 40
 CC90602

Service



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

Client Sample ID: W-1025 Date Sampled: 03/04/19 13:50

Percent Solids: N/A

Extraction Method: 7471B

ESS Laboratory Work Order: 1903060 ESS Laboratory Sample ID: 1903060-15

Sample Matrix: Wipe Units: ug/100cm²

Total Metals

 Analyte Mercury
 Results (MRL) 0.034 (0.020)
 MDL Method 7471B
 Limit Limit Limit MRS
 DF MRS
 Analyzed MRS
 I/V MRS
 Batch MRS
 E/V MRS
 Batch MRS

Service



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

Client Sample ID: W-1026 Date Sampled: 03/04/19 13:58

Percent Solids: N/A

Extraction Method: 7471B

ESS Laboratory Work Order: 1903060 ESS Laboratory Sample ID: 1903060-16

Sample Matrix: Wipe Units: ug/100cm²

Total Metals

 Analyte
 Results (MRL)
 MDL
 Method
 Limit
 DF
 Analyst
 Analyzed
 I/V
 F/V
 Batch

 Mercury
 0.034 (0.020)
 7471B
 1
 MKS
 03/06/19 12:48
 1
 40
 CC90602



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

Client Sample ID: W-1027 Date Sampled: 03/04/19 14:02

Percent Solids: N/A

ESS Laboratory Work Order: 1903060 ESS Laboratory Sample ID: 1903060-17

Sample Matrix: Wipe Units: ug/100cm²

Extraction Method: 7471B

Total Metals

 Analyte Mercury
 Results (MRL) 0.051 (0.020)
 MDL MDL 7471B
 Limit Limit Limit MRS
 DF MRS
 Analyzed MRS
 I/V 03/06/19 12:50
 F/V Limit MRS
 Batch CC90602



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

Client Sample ID: W-1028 Date Sampled: 03/04/19 14:15

Percent Solids: N/A

Extraction Method: 7471B

ESS Laboratory Work Order: 1903060 ESS Laboratory Sample ID: 1903060-18

Sample Matrix: Wipe Units: ug/100cm²

Total Metals

 Analyte
 Results (MRL)
 MDL
 Method
 Limit
 DF
 Analyst
 Analyzed
 I/V
 F/V
 Batch

 Mercury
 0.040 (0.020)
 7471B
 1
 MKS
 03/06/19 12:56
 1
 40
 CC90602



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

Client Sample ID: W-1029 Date Sampled: 03/04/19 14:25

Percent Solids: N/A

Extraction Method: 7471B

ESS Laboratory Work Order: 1903060 ESS Laboratory Sample ID: 1903060-19

Sample Matrix: Wipe Units: ug/100cm²

Total Metals

Analyst Analyzed
MKS 03/06/19 12:58 F/V Batch Results (MRL) **MDL Analyte** Method Limit Mercury ND (0.020) 7471B 40 CC90602



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

Client Sample ID: W-1030 Date Sampled: 03/05/19 14:30

Percent Solids: N/A

Extraction Method: 7471B

ESS Laboratory Work Order: 1903060 ESS Laboratory Sample ID: 1903060-20

Sample Matrix: Wipe Units: ug/100cm²

Total Metals

 Analyte
 Results (MRL)
 MDL
 Method
 Limit
 DF
 Analyst
 Analyzed
 I/V
 F/V
 Batch

 Mercury
 0.055 (0.020)
 7471B
 1
 MKS
 03/06/19 13:00
 1
 40
 CC90602



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

ESS Laboratory Work Order: 1903060

Quality Control Data

				Spike	Source		%REC		RPD	
Analyte	Result	MRL	Units	Level	Result	%REC	Limits	RPD	Limit	Qualifier
			Total Meta	ls						
Batch CC90602 - 7471B										
Blank										
Mercury	ND	0.020	ug/100cm²							
LCS										
Mercury	0.158	0.020	ug/100cm²	0.1208		131	65-135			
LCS Dup										
Mercury	0.158	0.020	ug/100cm ²	0.1208		131	65-135	0.1	20	



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

ESS Laboratory Work Order: 1903060

Notes and Definitions

U	Analyte included in the analysis, but not detected
D	Diluted.
ND	Analyte NOT DETECTED at or above the MRL (LOQ), LOD for DoD Reports, MDL for J-Flagged Analytes
dry	Sample results reported on a dry weight basis
RPD	Relative Percent Difference
MDL	Method Detection Limit
MRL	Method Reporting Limit
LOD	Limit of Detection
LOQ	Limit of Quantitation
DL	Detection Limit
I/V	Initial Volume
F/V	Final Volume
§	Subcontracted analysis; see attached report
1	Range result excludes concentrations of surrogates and/or internal standards eluting in that range.
2	Range result excludes concentrations of target analytes eluting in that range.
3	Range result excludes the concentration of the C9-C10 aromatic range.

Avg Results reported as a mathematical average.

No Recovery NR [CALC] Calculated Analyte

SUB Subcontracted analysis; see attached report

RLReporting Limit

EDL Estimated Detection Limit MF Membrane Filtration MPN Most Probably Number TNTC Too numerous to Count CFU Colony Forming Units



The Microbiology Division of Thielsch Engineering, Inc.

ESS Laboratory Work Order: 1903060



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

ENVIRONMENTAL

ESS LABORATORY CERTIFICATIONS AND ACCREDITATIONS

Rhode Island Potable and Non Potable Water: LAI00179 http://www.health.ri.gov/find/labs/analytical/ESS.pdf

Connecticut Potable and Non Potable Water, Solid and Hazardous Waste: PH-0750 http://www.ct.gov/dph/lib/dph/environmental health/environmental laboratories/pdf/OutofStateCommercialLaboratories.pdf

Maine Potable and Non Potable Water, and Solid and Hazardous Waste: RI00002 http://www.maine.gov/dhhs/mecdc/environmental-health/dwp/partners/labCert.shtml

Massachusetts Potable and Non Potable Water: M-RI002 http://public.dep.state.ma.us/Labcert/Labcert.aspx

New Hampshire (NELAP accredited) Potable and Non Potable Water, Solid and Hazardous Waste: 2424 http://des.nh.gov/organization/divisions/water/dwgb/nhelap/index.htm

New York (NELAP accredited) Non Potable Water, Solid and Hazardous Waste: 11313 http://www.wadsworth.org/labcert/elap/comm.html

New Jersey (NELAP accredited) Non Potable Water, Solid and Hazardous Waste: RI006 http://datamine2.state.nj.us/DEP OPRA/OpraMain/pi main?mode=pi by site&sort order=PI NAMEA&Select+a+Site:=58715

United States Department of Agriculture Soil Permit: P330-12-00139

Pennsylvania: 68-01752 http://www.dep.pa.gov/Business/OtherPrograms/Labs/Pages/Laboratory-Accreditation-Program.aspx

ESS Laboratory Sample and Cooler Receipt Checklist

Client	:GZ	A - Bedford,	NH - GZA/F	IDM		ESS	Project ID:	1903060	<u> </u>
0						Date	Received:	3/5/2019	
Shipped/L	elivered Via:		ESS Courie	<u>r</u>			Due Date:	3/11/2019 4 Day	
						Daysi	or Project:	4 Day	
	nanifest pres			No		6. Does COC	match bottles?		No
2. Were cu	ustody seals	present?		Yes		7. Is COC co	mplete and corre	: 17	Yes
3. Is radiat	tion count <1	00 CPM?		Yes		8. Were samp	oles received inta	ct?	Yes
	oler Present? :0.5		Ice	Yes		9. Were labs	Informed about	short holds & rushes?	Yes / No / NA
5. Was CC	OC signed an	d dated by cl	ient?	Yes		10. Were any	analyses receiv	ed outside of hold time?	Yes / (No.)
	bcontracting		Yes	/ (No)		12. Were VO			Yes / (No)
E99	Sample IDs: Analysis:						s in aqueous VO nanol cover soil c		Yes / No Yes / No / NA
	TAT:								
13 Are the	e samples pro	nerly preser	ved?	(Yes)/ No					
	s preserved u		vcu :			Time:		Bv:	
	el VOA vials			Date:		Time:		By:	
Sample Re	ceiving Notes	3 :						-	
COC = s	ample 8 '	'030419 -	Blank - 1	l," sample	9 "03041	9 - Blank -	1"		
						•		eled in SR fridge.	
	nere a need t				(Yes)No				
	ere a need to			Date:	Yes / No	Time:		Ву:	
						<u>-</u>		- <i>,</i> -	
		· - ·· · · · · · · · · · · · · · · · · ·							
Sample Number	Container ID	Proper Container	Air Bubbles Present	Sufficient Volume	Containe	er Type	Preservativ		anide and 608.3 cides)
01	320835	Yes	NA	Yes	4 oz. Jar	- Unpres	Other		•
02	320834	Yes	NA	Yes	4 oz. Jar	•	Other		
03	320833	Yes	NA	Yes	4 oz. Jar		Other		
04	320832	Yes	NA	Yes	4 oz. Jar	•	Other		
05	320831	Yes	NA	Yes	4 oz. Jar		Other		
06	320830	Yes	NA	Yes	4 oz. Jar		Other		
07 08	320829	Yes Yes	NA NA	Yes Yes	4 oz. Jar		Other		
09	320828 320827	Yes	NA	Yes	4 oz. Jar 4 oz. Jar	•	Other Other		
10	320826	Yes	NA	Yes	4 oz. Jar		Other		
11	320825	Yes	NA	Yes	4 oz. Jar		Other		
12	320824	Yes	NA	Yes	4 oz. Jar		Other		
13	320823	Yes	NA	Yes	4 oz. Jar		Other		
14	320822	Yes	NA	Yes	4 oz. Jar		Other		
15	320821	Yes	NA	Yes	4 oz. Jar		Other		
16	320820	Yes	NA	Yes	4 oz. Jar		Other		
17	320819	Yes	NA	Yes	4 oz. Jar		Other		
18	320818	Yes	NA	Yes	4 oz. Jar	•	Other		
19	320817	Yes	NA	Yes	4 oz. Jar		Other		
20	320816	Yes	NA	Yes	4 oz. Jar	- Unpres	Other		
2nd Review						u			
		d into stora:	nellan		Initials:	114 -			

ESS Laboratory Sample and Cooler Receipt Checklist

Client: _	GZA - Bedford, NH - GZA	VHDM	ESS Project ID:	1903060
	labels on correct containers? sary stickers attached?	Yes Yes		3/5/2019
Completed By: Reviewed By: Delivered By:	The state of the s	Date & To	2//	2015 3/5/9 2015
		1	- / 1	• 1

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	Laborator			\parallel	(CHAIN OF CUST	nnv	[F00 !		 -						
/ision	of Thielsch En nces Avenue, C	gineering, Inc.			Turn Time	1 4 8 Days		ESS L			190	3060	$^{\circ}$	į		
:L (40	1) 461-7181 F	ax (401) 461-4	910 I486	\parallel	Regulatory State	1 - 1 - 1 - 1 - 1		Repor						1		
w.es	slaboratory.com	<u>1</u>			Is th	nis project for any of the f		Electo	onic	Data Che	cker		☐ Exce	\dashv		
	700 C	mpany Name	no month 1	- -	Project #	Project	O RGP t Name	Delivera	ables	Other (Pi	ease Specify)	_	∐ bxos	1		
	Rebeil	ontact Person		╫╴	04-090348-03	1 Schiller Soiler	- Demo	_					TT	Tit	\top	
	City		'	1	5 Commerce	Park No. S	uite ZOI	Analysis	11	1.1			11.		-	
	Bedford Telephone Nu	mbor	 	11	Λ)+ 	Zip Code O3110	PO#	ag ag	2				11			11
	<u>- 215 - 201</u>	<i>±520</i>	r	11	lumber	Email A	ddress	-	12)			11			1 1
:SS Lai ID	Collection Date	Collection	Sample Typ		Sample Matrix	sebelco · cox Qg		<u> </u>	12			11	1 1 1			
1	3/4/19		 				Sample ID		13			11				.
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3	3/4/19	14:50			7	W-1033			\mathbb{N}					į.	11	
	3/4/19	14:50							丛						T	
5	3/4/19	15,00				W-/034	·—————————		メ				$\dashv \dashv$	1	†-†	+
6	3/4/19	13:20		╁┼		W~1035		1	入			 	-+-+	#-	┼╌┼	+
7	2/4/19			╁		W-1036			x	1-1-1		╂╾╂╼╂	$\dashv \dashv$		╂╼╁╴	
8	3/1/1	15:05		Ц.		W-1037				╂╌╂╌╣		┝╌┼╌┼		4	$\vdash \downarrow$	\bot
	3/4//7				_+ T	1030419 - A1			4-	++		$\vdash \downarrow \downarrow$				•
9	3/4/19				+	02040	-Blank-1	P	X^{\dagger}							
10	3 5 19	10:18		\top		Dout I Olan	<u>k- </u>		X							+-
Conta	ntainer Type: A			Blass	B-BOD Bottle C	N-1016 Cubitainer Jular 0-0		\	Χl			7	1-1-	+	-	+-1
Presen	iner Volume: 1 vation Code:	-100 mL 2-2	.5 gal 3-250	nL	4-300 mL 5-500 m		ther P-Poly S-Sterile z 9-4 oz 10-8 oz 1		Ys		111		++-	#-1		4-4
	vadon code.	1-Non Preserved	2-HCI 3-H2SO4	4-H	NO3 5-NaOH 6-Metho	anol 7-Na2S2O3 8-ZnAce, Na			1				++	# +	-+-	+-
*		Laboratory I	lles Onto				er of Containers per Sa	mple:			\bot				_	+-1
Cooler I	Present	, /	* 11		[:	Sampled by:		11							工	
Seals	Intact	iA	O Drop Ort			Comments:	Please speci	fy "Other"	Drocor	-			-— <u>—</u>	:		
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SS Laboratory //sion of Thielsch Engineering, Inc. 5 Frances Avenue, Cranston RI 02910 il. (401) 461-7181 Fax (401) 461-4486 www.esslaboratory.com Carp Company Name Carp Company Name Carp Contact Person Contac	
State Contact Person Contact Perso	
State Contact Person Contact Perso	1
I. (401) 461-7181 Fax (401) 461-4486 Is this project for any of the following?: Electonic Data Checker Deliverables Other (Please Specify)	
W. esslaboratory.com Company Name C-24 Company Name C-24 Company Name Contact Person Rebelina Coo Batter State State Refered No Suite Zo) State Refered State Refered State Refered State Refered State Refered State Refered Refered State Refered Re	
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SS Lab Collection Collection Time Sample Type Sample Matrix Sample ID	
11 3/4/19 13:25 Wipe Wipe W-1021 8	
12 3/4/19 13:30 W-1022 X	1 1
13 3/4/19 13:40 W-1023	\Box
14 3/4/19 13:45 W-1024	
15 3/4/19 13:50 W-1025 X	\Box
16 3/4/19 13:58 W-1026 X	T
17 3/4/19 14:00 W-1027 X	\prod
18 3/9/19 14.75 W-1028 X	\Box
19 3/9/9 14:25 \ W-1029	\Box
20 3/4/19 14-30 V W-1030	
Container Type: AC-Air Cassette AG-Amber Glass B-BOD Bottle C-Cubitainer J-Jar O-Other P-Poly S-Sterile V-Vial	\Box
Container Volume: 1-100 mL 2-2.5 gal 3-250 mL 4-300 mL 5-500 mL 6-1L 7-VOA 8-2 oz 9-4 oz 10-8 oz 11-Other q Preservation Code: 1-Non Preserved 2-HCI 3-H2SO4 4-HNO3 5-NeOH 6-Methanol 7-Na2S2O3 8-ZnAce, NaOH 9-NH4CI 10-DH2O 11-Other 1	
Preservation Code: 1-Non Preserved 2-HCl 3-H2SQ 4-HNO3 5-NeOH 6-Methanol 7-Na2S2O3 8-ZnAce, NaOH 9-NH4Cl 10-DI H2O 11-Other Number of Containers per Sample:	1
Laboratory Use Only Sampled by: Bran Luhrs, Er. K. Durners	
Cooler Present: O Drop Off Comments: Please specify "Other" preservative and containers types in this space	
Seals Intact MA Orickup DE Wife	
Cooler Temperature: °C Kc + CMD; U.5	
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-1-(20 3/5/1/22 R 3/5/19 1/32 Lohn 3/5/19 18:32 2/ 3/5/19 1926	
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The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Rebecca Cox GZA GeoEnvironmental, Inc. 5 Commerce Park North Bedford, NH 03110

RE: Schiller Boiler Demo (04.0190348.03) ESS Laboratory Work Order Number: 1903104

This signed Certificate of Analysis is our approved release of your analytical results. These results are only representative of sample aliquots received at the laboratory. ESS Laboratory expects its clients to follow all regulatory sampling guidelines. Beginning with this page, the entire report has been paginated. This report should not be copied except in full without the approval of the laboratory. Samples will be disposed of thirty days after the final report has been delivered. If you have any questions or concerns, please feel free to call our Customer Service Department.

Laurel Stoddard Laboratory Director **REVIEWED**

By ESS Laboratory at 3:37 pm, Mar 13, 2019

Analytical Summary

The project as described above has been analyzed in accordance with the ESS Quality Assurance Plan. This plan utilizes the following methodologies: US EPA SW-846, US EPA Methods for Chemical Analysis of Water and Wastes per 40 CFR Part 136, APHA Standard Methods for the Examination of Water and Wastewater, American Society for Testing and Materials (ASTM), and other recognized methodologies. The analyses with these noted observations are in conformance to the Quality Assurance Plan. In chromatographic analysis, manual integration is frequently used instead of automated integration because it produces more accurate results.

The test results present in this report are in compliance with TNI and relative state standards, and/or client Quality Assurance Project Plans (QAPP). The laboratory has reviewed the following: Sample Preservations, Hold Times, Initial Calibrations, Continuing Calibrations, Method Blanks, Blank Spikes, Blank Spike Duplicates, Duplicates, Matrix Spikes, Matrix Spike Duplicates, Surrogates and Internal Standards. Any results which were found to be outside of the recommended ranges stated in our SOPs will be noted in the Project Narrative.



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

ESS Laboratory Work Order: 1903104

SAMPLE RECEIPT

The following samples were received on March 06, 2019 for the analyses specified on the enclosed Chain of Custody Record.

Revision 1 March 13, 2019: This report has been revised to change reporting units from ug/wipe to ug/100cm2.

Sample Name	<u>Matrix</u>	Analysis
W-1040	Wipe	7471B
W-1041	Wipe	7471B
W-1042	Wipe	7471B
W-1043	Wipe	7471B
W-1044	Wipe	7471B
W-1045	Wipe	7471B
W-1046	Wipe	7471B
W-1047	Wipe	7471B
W-1048	Wipe	7471B
W-1049	Wipe	7471B
	W-1040 W-1041 W-1042 W-1043 W-1044 W-1045 W-1046 W-1047 W-1048	W-1040 Wipe W-1041 Wipe W-1042 Wipe W-1043 Wipe W-1044 Wipe W-1045 Wipe W-1046 Wipe W-1047 Wipe W-1048 Wipe



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

ESS Laboratory Work Order: 1903104

PROJECT NARRATIVE

No unusual observations noted.

End of Project Narrative.

DATA USABILITY LINKS

To ensure you are viewing the most current version of the documents below, please clear your internet cookies for www.ESSLaboratory.com. Consult your IT Support personnel for information on how to clear your internet cookies.

<u>Definitions of Quality Control Parameters</u>

Semivolatile Organics Internal Standard Information

Semivolatile Organics Surrogate Information

Volatile Organics Internal Standard Information

Volatile Organics Surrogate Information

EPH and VPH Alkane Lists



The Microbiology Division of Thielsch Engineering, Inc.

ESS Laboratory Work Order: 1903104



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

CURRENT SW-846 METHODOLOGY VERSIONS

Analytical Methods

1010A - Flashpoint 6010C - ICP 6020A - ICP MS

7010 - Graphite Furnace 7196A - Hexavalent Chromium

7470A - Aqueous Mercury 7471B - Solid Mercury 8011 - EDB/DBCP/TCP

8015C - GRO/DRO 8081B - Pesticides

8082A - PCB

8100M - TPH 8151A - Herbicides

8260B - VOA 8270D - SVOA

8270D SIM - SVOA Low Level

9014 - Cyanide 9038 - Sulfate

9040C - Aqueous pH

9045D - Solid pH (Corrosivity)

9050A - Specific Conductance

9056A - Anions (IC)

9060A - TOC

9095B - Paint Filter

MADEP 04-1.1 - EPH

MADEP 04-2.1 - VPH

Prep Methods

3005A - Aqueous ICP Digestion

3020A - Aqueous Graphite Furnace / ICP MS Digestion

3050B - Solid ICP / Graphite Furnace / ICP MS Digestion

3060A - Solid Hexavalent Chromium Digestion

3510C - Separatory Funnel Extraction

3520C - Liquid / Liquid Extraction

3540C - Manual Soxhlet Extraction 3541 - Automated Soxhlet Extraction

3546 - Microwave Extraction

3580A - Waste Dilution

5030B - Aqueous Purge and Trap

5030C - Aqueous Purge and Trap

5035A - Solid Purge and Trap

SW846 Reactivity Methods 7.3.3.2 (Reactive Cyanide) and 7.3.4.1 (Reactive Sulfide) have been withdrawn by EPA. These methods are reported per client request and are not NELAP accredited.



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

Client Sample ID: W-1040 Date Sampled: 03/05/19 08:08

Percent Solids: N/A

Extraction Method: 7471B

ESS Laboratory Work Order: 1903104 ESS Laboratory Sample ID: 1903104-01

Sample Matrix: Wipe Units: ug/100cm²

Total Metals

 Analyte Mercury
 Results (MRL)
 MDL 7471B
 Limit 1
 DF 1
 Analyst Analyzed MKS 03/07/19 11:57
 I/V 40
 E/V CC90701



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

Client Sample ID: W-1041 Date Sampled: 03/05/19 08:11

Percent Solids: N/A

ESS Laboratory Work Order: 1903104 ESS Laboratory Sample ID: 1903104-02

Sample Matrix: Wipe Units: ug/100cm²

Extraction Method: 7471B

Total Metals

 Analyte Mercury
 Results (MRL) ND (0.020)
 MDL Method 7471B
 Limit Limit Limit Limit Limit NHS
 DF MKS
 Analyse Analyzed MKS
 I/V MKS
 Batch MKS
 Batch MKS
 MS
 03/07/19 11:59
 1
 40
 CC90701



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

Client Sample ID: W-1042 Date Sampled: 03/05/19 13:10

Percent Solids: N/A

Extraction Method: 7471B

ESS Laboratory Work Order: 1903104 ESS Laboratory Sample ID: 1903104-03

Sample Matrix: Wipe Units: ug/100cm²

Total Metals

F/V Batch CC90701 Analyst Analyzed
MKS 03/07/19 12:01 **Analyte** Results (MRL) **MDL** Method Limit Mercury 0.020 (0.020) 7471B



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

Client Sample ID: W-1043 Date Sampled: 03/05/19 08:10

Percent Solids: N/A

Extraction Method: 7471B

ESS Laboratory Work Order: 1903104 ESS Laboratory Sample ID: 1903104-04

Sample Matrix: Wipe Units: ug/100cm²

Total Metals

F/V Batch CC90701 Analyst Analyzed 03/07/19 12:03 **Analyte** Results (MRL) **MDL** Method Limit Mercury 0.198 (0.020) 7471B



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

Client Sample ID: W-1044 Date Sampled: 03/05/19 08:25

Percent Solids: N/A

Extraction Method: 7471B

ESS Laboratory Work Order: 1903104 ESS Laboratory Sample ID: 1903104-05

Sample Matrix: Wipe Units: ug/100cm²

Total Metals

 Analyte Mercury
 Results (MRL)
 MDL 0.101 (0.020)
 Method 7471B
 Limit 1
 DF 1
 Analyst Analyzed MKS 03/07/19 12:09
 I/V 1
 F/V 40 CC90701



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

Client Sample ID: W-1045 Date Sampled: 03/05/19 08:28

Percent Solids: N/A

Solius. IN/A

ESS Laboratory Work Order: 1903104 ESS Laboratory Sample ID: 1903104-06

Sample Matrix: Wipe Units: ug/100cm²

Extraction Method: 7471B

Total Metals

 Analyte Mercury
 Results (MRL)
 MDL 7471B
 Limit 1
 DF 1
 Analyst Analyzed MKS 03/07/19 12:11
 I/V 1
 F/V 40 CC90701



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

Client Sample ID: W-1046 Date Sampled: 03/05/19 08:33

Percent Solids: N/A

Extraction Method: 7471B

ESS Laboratory Work Order: 1903104 ESS Laboratory Sample ID: 1903104-07

Sample Matrix: Wipe Units: ug/100cm²

Total Metals

F/V Batch CC90701 Analyst Analyzed 03/07/19 12:13 **Analyte** Results (MRL) **MDL** Method Limit Mercury 0.030 (0.020) 7471B



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

Client Sample ID: W-1047 Date Sampled: 03/05/19 08:41

Percent Solids: N/A

ESS Laboratory Work Order: 1903104 ESS Laboratory Sample ID: 1903104-08

Sample Matrix: Wipe Units: ug/100cm²

Extraction Method: 7471B

Total Metals

 Analyte Mercury
 Results (MRL) 0.690 (0.100)
 MDL 7471B
 Limit 5
 DF MKS 03/07/19 13:28
 Analyzed 1/V 13:28
 I/V 40 CC90701



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

Client Sample ID: W-1048 Date Sampled: 03/05/19 08:40

Percent Solids: N/A

Extraction Method: 7471B

ESS Laboratory Work Order: 1903104 ESS Laboratory Sample ID: 1903104-09

Sample Matrix: Wipe Units: ug/100cm²

Total Metals

F/V Batch CC90701 Analyst Analyzed
MKS 03/07/19 12:17 **Analyte** Results (MRL) **MDL** I/V Method Limit Mercury 0.140 (0.020) 7471B



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

Client Sample ID: W-1049
Date Sampled: 03/05/19 09:00

Percent Solids: N/A

Extraction Method: 7471B

ESS Laboratory Work Order: 1903104 ESS Laboratory Sample ID: 1903104-10

Sample Matrix: Wipe Units: ug/100cm²

Total Metals

 Analyte Mercury
 Results (MRL) 0.677 (0.100)
 MDL 7471B
 Limit 5
 DF MKS 03/07/19 13:30
 Analyzed 1/V 13:30
 I/V 40
 E/V CC90701



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

ESS Laboratory Work Order: 1903104

Quality Control Data

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
			Total Meta	.lc						
			TOTAL META	115						
Batch CC90701 - 7471B										
Blank										
Mercury	ND	0.020	ug/100cm²							
LCS										
Mercury	0.125	0.020	ug/100cm²	0.1208		103	85-115			
LCS Dup										
Mercury	0.129	0.020	ug/100cm ²	0.1208		107	85-115	4	20	



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

ESS Laboratory Work Order: 1903104

Notes and Definitions

U	Analyte included in the analysis, but not detected
D	Diluted.
ND	Analyte NOT DETECTED at or above the MRL (LOQ), LOD for DoD Reports, MDL for J-Flagged Analytes
dry	Sample results reported on a dry weight basis
RPD	Relative Percent Difference
MDL	Method Detection Limit
MRL	Method Reporting Limit
LOD	Limit of Detection
LOQ	Limit of Quantitation
DL	Detection Limit
I/V	Initial Volume
F/V	Final Volume
§	Subcontracted analysis; see attached report
1	Range result excludes concentrations of surrogates and/or internal standards eluting in that range.
2	Range result excludes concentrations of target analytes eluting in that range.
3	Range result excludes the concentration of the C9-C10 aromatic range.
Avσ	Pacults reported as a mathematical average

Avg Results reported as a mathematical average.

NR No Recovery

[CALC] Calculated Analyte

SUB Subcontracted analysis; see attached report

RL Reporting Limit

EDL Estimated Detection Limit
MF Membrane Filtration
MPN Most Probably Number
TNTC Too numerous to Count
CFU Colony Forming Units



The Microbiology Division of Thielsch Engineering, Inc.

ESS Laboratory Work Order: 1903104



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

ENVIRONMENTAL

ESS LABORATORY CERTIFICATIONS AND ACCREDITATIONS

Rhode Island Potable and Non Potable Water: LAI00179 http://www.health.ri.gov/find/labs/analytical/ESS.pdf

Connecticut Potable and Non Potable Water, Solid and Hazardous Waste: PH-0750 http://www.ct.gov/dph/lib/dph/environmental health/environmental laboratories/pdf/OutofStateCommercialLaboratories.pdf

Maine Potable and Non Potable Water, and Solid and Hazardous Waste: RI00002 http://www.maine.gov/dhhs/mecdc/environmental-health/dwp/partners/labCert.shtml

Massachusetts Potable and Non Potable Water: M-RI002 http://public.dep.state.ma.us/Labcert/Labcert.aspx

New Hampshire (NELAP accredited) Potable and Non Potable Water, Solid and Hazardous Waste: 2424 http://des.nh.gov/organization/divisions/water/dwgb/nhelap/index.htm

New York (NELAP accredited) Non Potable Water, Solid and Hazardous Waste: 11313 http://www.wadsworth.org/labcert/elap/comm.html

New Jersey (NELAP accredited) Non Potable Water, Solid and Hazardous Waste: RI006 http://datamine2.state.nj.us/DEP_OPRA/OpraMain/pi_main?mode=pi_by_site&sort_order=PI_NAMEA&Select+a+Site:=58715

United States Department of Agriculture Soil Permit: P330-12-00139

Pennsylvania: 68-01752 http://www.dep.pa.gov/Business/OtherPrograms/Labs/Pages/Laboratory-Accreditation-Program.aspx

Client	GZ	A - Bedford.	NH - GZA/D	os	ESS P	roject ID:	1903104	_
00					Date F	Received:		<u> </u>
Shipped/De	elivered Via: _		SS Courier			Due Date: r Project:	3/12/2019 4 Day	<u> </u>
	anifest prese	nt? NA	[No	6. Does COC	match bottles?		Yes
	stody seals p			Net	7. Is COC con	nplete and correct?		Yes
3. Is radiati	on count <10	0 CPM?	- [Yes	· •	les received intact?		Yes
	ler Present?		[Yes	9. Were labs	informed about she	ort holds & rushes?	Yes No / N
Temp:	8.0	Iced with: _	Ice		10. Were any	analyses received o	utside of hold time?	Yes / (vo
5. Was CO	C signed and	I dated by cli	ent?	Yes				
	bcontracting r	needed?	Yes	/ (N)	12. Were VOA a. Air bubbles	As received?		Yes / (No Yes / No
200	Analysis:					anol cover soil comp	letely?	Yes / No / N
	e samples pro		ved?	Yes)/ No	_		D.::	
	preserved up rel VOA vials			Date:	Time: Time:		By:	
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- "	ceiving Notes	•						
					4)			
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14. Was th	nere a need to	o contact Pro			Yes / No		Ву:	
14. Was the	nere a need to	o contact Pro			Yes / No		Ву:	
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14. Was the	nere a need to	o contact Pro			Yes / No	Preservative	Record pH (Cya	anide and 608.3
14. Was the Who was c	nere a need to ere a need to contacted?	o contact Procontact the contact	Air Bubbles	Date:	Yes / No Time: Container Type 4 oz. Jar - Unpres	Preservative Other	Record pH (Cya	anide and 608.3
14. Was the Who was c	container ID 321246 321245	Proper Container Yes	Air Bubbles Present NA NA	Sufficient Volume Yes Yes	Container Type 4 oz. Jar - Unpres 4 oz. Jar - Unpres	Preservative Other Other	Record pH (Cya	anide and 608.3
Sample Number 01 02 03	container ID 321246 321245 321244	Proper Container Yes Yes	Air Bubbles Present NA NA	Sufficient Volume Yes Yes Yes	Container Type 4 oz. Jar - Unpres 4 oz. Jar - Unpres 4 oz. Jar - Unpres	Preservative Other	Record pH (Cya	anide and 608.3
14. Was the Who was c	container ID 321246 321245	Proper Container Yes	Air Bubbles Present NA NA	Sufficient Volume Yes Yes	Container Type 4 oz. Jar - Unpres 4 oz. Jar - Unpres 4 oz. Jar - Unpres 4 oz. Jar - Unpres 4 oz. Jar - Unpres 4 oz. Jar - Unpres	Preservative Other Other Other Other Other Other	Record pH (Cya	anide and 608.3
Sample Number 01 02 03 04	Container ID 321246 321245 321244 321243	Proper Container Yes Yes Yes	Air Bubbles Present NA NA NA NA NA	Sufficient Volume Yes Yes Yes Yes Yes Yes Yes Yes Yes	Container Type 4 oz. Jar - Unpres 4 oz. Jar - Unpres 4 oz. Jar - Unpres 4 oz. Jar - Unpres 4 oz. Jar - Unpres 4 oz. Jar - Unpres 4 oz. Jar - Unpres	Preservative Other Other Other Other Other Other	Record pH (Cya	anide and 608.3
Sample Number 01 02 03 04 05 06 07	Container ID 321246 321244 321242 321241 321241 321241	Proper Container Yes Yes Yes Yes Yes Yes Yes Yes Yes	Air Bubbles Present NA NA NA NA NA NA	Sufficient Volume Yes Yes Yes Yes Yes Yes Yes	Container Type 4 oz. Jar - Unpres 4 oz. Jar - Unpres 4 oz. Jar - Unpres 4 oz. Jar - Unpres 4 oz. Jar - Unpres 4 oz. Jar - Unpres 4 oz. Jar - Unpres 4 oz. Jar - Unpres 4 oz. Jar - Unpres	Preservative Other Other Other Other Other Other Other Other	Record pH (Cya	anide and 608.3
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The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Rebecca Cox GZA GeoEnvironmental, Inc. 5 Commerce Park North Bedford, NH 03110

RE: Schiller Boiler Demo (04.0190348.03) ESS Laboratory Work Order Number: 1903105

This signed Certificate of Analysis is our approved release of your analytical results. These results are only representative of sample aliquots received at the laboratory. ESS Laboratory expects its clients to follow all regulatory sampling guidelines. Beginning with this page, the entire report has been paginated. This report should not be copied except in full without the approval of the laboratory. Samples will be disposed of thirty days after the final report has been delivered. If you have any questions or concerns, please feel free to call our Customer Service Department.

Laurel Stoddard Laboratory Director **REVIEWED**

By ESS Laboratory at 3:38 pm, Mar 13, 2019

Analytical Summary

The project as described above has been analyzed in accordance with the ESS Quality Assurance Plan. This plan utilizes the following methodologies: US EPA SW-846, US EPA Methods for Chemical Analysis of Water and Wastes per 40 CFR Part 136, APHA Standard Methods for the Examination of Water and Wastewater, American Society for Testing and Materials (ASTM), and other recognized methodologies. The analyses with these noted observations are in conformance to the Quality Assurance Plan. In chromatographic analysis, manual integration is frequently used instead of automated integration because it produces more accurate results.

The test results present in this report are in compliance with TNI and relative state standards, and/or client Quality Assurance Project Plans (QAPP). The laboratory has reviewed the following: Sample Preservations, Hold Times, Initial Calibrations, Continuing Calibrations, Method Blanks, Blank Spikes, Blank Spike Duplicates, Duplicates, Matrix Spikes, Matrix Spike Duplicates, Surrogates and Internal Standards. Any results which were found to be outside of the recommended ranges stated in our SOPs will be noted in the Project Narrative.



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

ESS Laboratory Work Order: 1903105

SAMPLE RECEIPT

The following samples were received on March 06, 2019 for the analyses specified on the enclosed Chain of Custody Record.

Revision 1 March 13, 2019: This report has been revised to change reporting units from ug/wipe to ug/100cm2.

Lab Number	Sample Name	<u>Matrix</u>	Analysis
1903105-01	W-1050	Wipe	7471B
1903105-02	W-1051	Wipe	7471B
1903105-03	W-1052	Wipe	7471B
1903105-04	W-1053	Wipe	7471B
1903105-05	W-1054	Wipe	7471B
1903105-06	W-1055	Wipe	7471B
1903105-07	W-1056	Wipe	7471B
1903105-08	W-1057	Wipe	7471B
1903105-09	030519-BLANK-1	Wipe	7471B
1903105-10	030519-BLANK-2	Wipe	7471B
1903105-11	W-1038	Wipe	7471B
1903105-12	W-1039	Wipe	7471B
1903105-13	C-1001	Solid	7471B
1903105-14	C-1002	Solid	7471B



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

ESS Laboratory Work Order: 1903105

PROJECT NARRATIVE

No unusual observations noted.

End of Project Narrative.

DATA USABILITY LINKS

To ensure you are viewing the most current version of the documents below, please clear your internet cookies for www.ESSLaboratory.com. Consult your IT Support personnel for information on how to clear your internet cookies.

Definitions of Quality Control Parameters

Semivolatile Organics Internal Standard Information

Semivolatile Organics Surrogate Information

Volatile Organics Internal Standard Information

Volatile Organics Surrogate Information

EPH and VPH Alkane Lists



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

ESS Laboratory Work Order: 1903105

Analytical Methods

1010A - Flashpoint 6010C - ICP 6020A - ICP MS

7010 - Graphite Furnace 7196A - Hexavalent Chromium 7470A - Aqueous Mercury 7471B - Solid Mercury 8011 - EDB/DBCP/TCP 8015C - GRO/DRO 8081B - Pesticides

8081B - Pesticides 8082A - PCB 8100M - TPH 8151A - Herbicides 8260B - VOA 8270D - SVOA

8270D SIM - SVOA Low Level

9014 - Cyanide 9038 - Sulfate

9040C - Aqueous pH

9045D - Solid pH (Corrosivity) 9050A - Specific Conductance

9056A - Anions (IC)

9060A - TOC

9095B - Paint Filter

MADEP 04-1.1 - EPH

MADEP 04-2.1 - VPH

Prep Methods

CURRENT SW-846 METHODOLOGY VERSIONS

3005A - Aqueous ICP Digestion

3020A - Aqueous Graphite Furnace / ICP MS Digestion 3050B - Solid ICP / Graphite Furnace / ICP MS Digestion

3060A - Solid Hexavalent Chromium Digestion

3510C - Separatory Funnel Extraction 3520C - Liquid / Liquid Extraction 3540C - Manual Soxhlet Extraction 3541 - Automated Soxhlet Extraction

3546 - Microwave Extraction 3580A - Waste Dilution

5030B - Aqueous Purge and Trap 5030C - Aqueous Purge and Trap 5035A - Solid Purge and Trap

SW846 Reactivity Methods 7.3.3.2 (Reactive Cyanide) and 7.3.4.1 (Reactive Sulfide) have been withdrawn by EPA. These methods are reported per client request and are not NELAP accredited.



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

Client Sample ID: W-1050 Date Sampled: 03/05/19 13:30

Percent Solids: N/A

Extraction Method: 7471B

ESS Laboratory Work Order: 1903105 ESS Laboratory Sample ID: 1903105-01

Sample Matrix: Wipe Units: ug/100cm²

Total Metals

 Analyte Mercury
 Results (MRL) ND (0.020)
 MDL Method 7471B
 Limit Limit Limit Limit Limit NC (0.020)
 DF Analyst Analyzed NKS 03/07/19 12:27
 I/V I/V A0 CC90702
 Batch CC90702

000125



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

Client Sample ID: W-1051 Date Sampled: 03/05/19 13:40

Percent Solids: N/A

ESS Laboratory Work Order: 1903105 ESS Laboratory Sample ID: 1903105-02

Sample Matrix: Wipe Units: ug/100cm²

Extraction Method: 7471B

Total Metals

F/V Batch CC90702 Analyst Analyzed 03/07/19 12:33 **Analyte** Results (MRL) **MDL** Method Limit Mercury 0.188 (0.020) 7471B



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

Client Sample ID: W-1052 Date Sampled: 03/05/19 09:20

Percent Solids: N/A

Extraction Method: 7471B

ESS Laboratory Work Order: 1903105 ESS Laboratory Sample ID: 1903105-03

Sample Matrix: Wipe Units: ug/100cm²

Total Metals

 Analyte
 Results (MRL)
 MDL
 Method
 Limit
 DF
 Analyst
 Analyzed
 I/V
 F/V
 Batch

 Mercury
 1.06 (0.200)
 7471B
 10
 MKS
 03/07/19 13:32
 1
 40
 CC90702



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

Client Sample ID: W-1053 Date Sampled: 03/05/19 08:33

Percent Solids: N/A

Extraction Method: 7471B

ESS Laboratory Work Order: 1903105 ESS Laboratory Sample ID: 1903105-04

Sample Matrix: Wipe Units: ug/100cm²

Total Metals

F/V Batch CC90702 Analyst Analyzed
MKS 03/07/19 12:37 **Analyte** Results (MRL) **MDL** Method Limit Mercury 0.376 (0.020) 7471B



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

Client Sample ID: W-1054
Date Sampled: 03/05/19 11:00

Percent Solids: N/A

ESS Laboratory Work Order: 1903105 ESS Laboratory Sample ID: 1903105-05

Sample Matrix: Wipe Units: ug/100cm²

Extraction Method: 7471B

Total Metals

 Analyte
 Results (MRL)
 MDL
 Method
 Limit
 DF
 Analyst
 Analyzed
 I/V
 F/V
 Batch

 Mercury
 1.33 (0.200)
 7471B
 10
 MKS
 03/07/19 13:35
 1
 40
 CC90702



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

Client Sample ID: W-1055 Date Sampled: 03/05/19 09:15

Percent Solids: N/A

Extraction Method: 7471B

ESS Laboratory Work Order: 1903105 ESS Laboratory Sample ID: 1903105-06

Sample Matrix: Wipe Units: ug/100cm²

Total Metals

F/V Batch CC90702 Analyst Analyzed
MKS 03/07/19 12:41 Results (MRL) **MDL Analyte** Method Limit Mercury 0.080 (0.020) 7471B



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

Client Sample ID: W-1056 Date Sampled: 03/05/19 10:40

Percent Solids: N/A

Extraction Method: 7471B

ESS Laboratory Work Order: 1903105 ESS Laboratory Sample ID: 1903105-07

Sample Matrix: Wipe Units: ug/100cm²

Total Metals

 Analyte Mercury
 Results (MRL)
 MDL 0.141 (0.020)
 Method 7471B
 Limit 1
 DF 0.141 (0.020)
 Analyst Analyzed 0.147 (0.020)
 I/V 1/V 2471B
 Batch 0.000 (0.000)



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

Client Sample ID: W-1057 Date Sampled: 03/05/19 11:15

Percent Solids: N/A

Extraction Method: 7471B

ESS Laboratory Work Order: 1903105 ESS Laboratory Sample ID: 1903105-08

Sample Matrix: Wipe Units: ug/100cm²

Total Metals

F/V Batch CC90702 Analyst Analyzed
MKS 03/07/19 13:37 **Analyte** Results (MRL) **MDL** I/V Method Limit Mercury 0.525 (0.100) 7471B



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo Client Sample ID: 030519-BLANK-1 Date Sampled: 03/05/19 00:00

Percent Solids: N/A

ESS Laboratory Work Order: 1903105 ESS Laboratory Sample ID: 1903105-09

Sample Matrix: Wipe Units: ug/100cm²

Extraction Method: 7471B

Total Metals

F/V Batch CC90702 Analyst Analyzed 03/07/19 12:47 Results (MRL) **MDL Analyte** Method Limit Mercury ND (0.020) 7471B



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo Client Sample ID: 030519-BLANK-2 Date Sampled: 03/05/19 00:00

Percent Solids: N/A

ESS Laboratory Work Order: 1903105 ESS Laboratory Sample ID: 1903105-10

Sample Matrix: Wipe Units: ug/100cm²

Extraction Method: 7471B

Total Metals



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

Client Sample ID: W-1038 Date Sampled: 03/06/19 10:20

Percent Solids: N/A

Extraction Method: 7471B

ESS Laboratory Work Order: 1903105 ESS Laboratory Sample ID: 1903105-11

Sample Matrix: Wipe Units: ug/100cm²

Total Metals

Analyst Analyzed 03/07/19 13:39 **Analyte** Results (MRL) **MDL** I/V F/V Batch Method Limit **14.0** (2.00) Mercury 7471B 40 CC90702



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

Client Sample ID: W-1039 Date Sampled: 03/06/19 10:35

Percent Solids: N/A

Extraction Method: 7471B

ESS Laboratory Work Order: 1903105 ESS Laboratory Sample ID: 1903105-12

Sample Matrix: Wipe Units: ug/100cm²

Total Metals

Analyst Analyzed 03/07/19 13:41 F/V Batch **Analyte** Results (MRL) **MDL** I/V Method Limit Mercury 3.62 (1.00) 7471B 40 CC90702



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

Client Sample ID: C-1001 Date Sampled: 03/06/19 09:10

Percent Solids: 99

Extraction Method: 7471B

ESS Laboratory Work Order: 1903105 ESS Laboratory Sample ID: 1903105-13

Sample Matrix: Solid Units: mg/kg dry

Total Metals

 Analyte Mercury
 Results (MRL)
 MDL 7471B
 Limit 100
 DF MCS
 Analyzed MKS
 I/V 3/07/19 13:05
 I/V 6/07/19 13:05
 E/V 6/07/19 13:05
 Batch 7/07/19 13:05



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

Client Sample ID: C-1002 Date Sampled: 03/06/19 08:45

Percent Solids: 99

Extraction Method: 7471B

ESS Laboratory Work Order: 1903105 ESS Laboratory Sample ID: 1903105-14

Sample Matrix: Solid Units: mg/kg dry

Total Metals

 Analyte Mercury
 Results (MRL)
 MDL 7471B
 Limit 100
 DF MCS
 Analyzed MKS
 Analyzed MKS
 I/V 03/07/19 13:07
 F/V 08/07/09/08
 Batch 07/07/09/0648



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

ESS Laboratory Work Order: 1903105

Quality Control Data

				Spike	Source		%REC		RPD	
Analyte	Result	MRL	Units	Level	Result	%REC	Limits	RPD	Limit	Qualifier
			Total Meta	ıls						
Batch CC90648 - 7471B										
Blank										
Mercury	ND	0.033	mg/kg wet							
LCS										
Mercury	3.76	0.381	mg/kg wet	3.710		101	80-120			
LCS Dup										
Mercury	3.69	0.347	mg/kg wet	3.710		99	80-120	2	20	
Reference										
Mercury	1.07	0.194	mg/kg wet	1000		0.1	0-200			
Batch CC90702 - 7471B										
Blank										
Mercury	ND	0.020	ug/100cm²							
LCS										
Mercury	0.117	0.020	ug/100cm²	0.1208		97	85-115			
LCS Dup										
Mercury	0.128	0.020	ug/100cm ²	0.1208		106	85-115	9	20	



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

ESS Laboratory Work Order: 1903105

Notes and Definitions

U	Analyte included in the analysis, but not detected
D	Diluted.
ND	Analyte NOT DETECTED at or above the MRL (LOQ), LOD for DoD Reports, MDL for J-Flagged Analytes
dry	Sample results reported on a dry weight basis
RPD	Relative Percent Difference
MDL	Method Detection Limit
MRL	Method Reporting Limit
LOD	Limit of Detection
LOQ	Limit of Quantitation
DL	Detection Limit
I/V	Initial Volume
F/V	Final Volume
§	Subcontracted analysis; see attached report
1	Range result excludes concentrations of surrogates and/or internal standards eluting in that range.
2	Range result excludes concentrations of target analytes eluting in that range.
3	Range result excludes the concentration of the C9-C10 aromatic range.

Avg Results reported as a mathematical average.

NR No Recovery
[CALC] Calculated Analyte

SUB Subcontracted analysis; see attached report

RL Reporting Limit

EDL Estimated Detection Limit
MF Membrane Filtration
MPN Most Probably Number
TNTC Too numerous to Count
CFU Colony Forming Units



The Microbiology Division of Thielsch Engineering, Inc.

ESS Laboratory Work Order: 1903105



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

ENVIRONMENTAL

ESS LABORATORY CERTIFICATIONS AND ACCREDITATIONS

Rhode Island Potable and Non Potable Water: LAI00179 http://www.health.ri.gov/find/labs/analytical/ESS.pdf

Connecticut Potable and Non Potable Water, Solid and Hazardous Waste: PH-0750 http://www.ct.gov/dph/lib/dph/environmental health/environmental laboratories/pdf/OutofStateCommercialLaboratories.pdf

> Maine Potable and Non Potable Water, and Solid and Hazardous Waste: RI00002 http://www.maine.gov/dhhs/mecdc/environmental-health/dwp/partners/labCert.shtml

> > Massachusetts Potable and Non Potable Water: M-RI002 http://public.dep.state.ma.us/Labcert/Labcert.aspx

New Hampshire (NELAP accredited) Potable and Non Potable Water, Solid and Hazardous Waste: 2424 $\underline{http://des.nh.gov/organization/divisions/water/dwgb/nhelap/index.htm}$

New York (NELAP accredited) Non Potable Water, Solid and Hazardous Waste: 11313 http://www.wadsworth.org/labcert/elap/comm.html

New Jersey (NELAP accredited) Non Potable Water, Solid and Hazardous Waste: RI006 http://datamine2.state.nj.us/DEP OPRA/OpraMain/pi main?mode=pi by site&sort order=PI NAMEA&Select+a+Site:=58715

United States Department of Agriculture Soil Permit: P330-12-00139

Pennsylvania: 68-01752

http://www.dep.pa.gov/Business/OtherPrograms/Labs/Pages/Laboratory-Accreditation-Program.aspx

000141

ESS Laboratory Sample and Cooler Receipt Checklist

Shipped/F	: <u> </u>	ZA - Bedford	i, NH - GZA	/DS	_	ESS	Project ID:	1903105	
	Delivered Via:		ESS Courie	er			Received: Due Date:	3/6/2019 3/12/2019	
• •					-		for Project:	4 Day	
	manifest pres			No]	6. Does COO	match bottles?		Yes
2. Were c	ustody seals	present?			ટુડ - ગેલેજ	7. Is COC co	omplete and correct	1?	Yes
3. Is radia	tion count <1	00 CPM?		Yes]	8. Were sam	ples received intac	t?	Yes
4. Is a Coo	oler Present?	lced with:	Ice	Yes]	9. Were lab	s informed about	short holds & rushes?	Yes No / NA
	OC signed ar			Yes] .	10. Were an	y analyses receive	d outside of hold time?	Yes (No)
	ubcontracting Sample IDs: Analysis: TAT:			/(N)		 a. Air bubble 	OAs received? es in aqueous VOA hanol cover soil co		Yes / Ñò Yes / No Yes / No / NA
	e samples pr s preserved (ved?	Yes / No Date:		Time;		Bv:	
	vel VOA vials			Date:		Time:		By:	
Sample Re	ceiving Note	s:							
						<u> </u>			
	<u>.</u>								
	here a need to ere a need to contacted?				Yes / No Yes / No	Time: _		Ву:	
Sample	Container	Proper Container	Air Bubbles	Sufficient	Containe	Туре	Preservative	Record pH (Cya	
Number	ID	Container	Bubbles Present	Volume				Record pH (Cya Pestic	
Number 01	ID 321260	Container Yes	Bubbles Present NA	Volume Yes	4 oz. Jar -	Unpres	Other		
Number	ID	Container	Bubbles Present	Volume		Unpres Unpres			
01 02 03 04	321260 321259 321258 321257	Yes Yes Yes Yes Yes	Present NA NA NA NA NA NA	Yes Yes Yes Yes Yes	4 oz. Jar - 4 oz. Jar - 4 oz. Jar - 4 oz. Jar -	Unpres Unpres Unpres Unpres	Other Other Other Other		
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ESS Laboratory Sample and Cooler Receipt Checklist

Client:	Bedford, NH - 0	SZA/DS		,ESS, Project ID:		1903105
By:		Dat	te & Time: 3/	Dale Received:	759	3/6/2019
Delivered			3/	6/6	750	
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vision of Thielsch Engineering, Inc.	.	CHAIN OF CUSTODY			
5 Frances Avenue Cranster Di caste	Turn Time	U.S. IDani	ESS Lab#	1903105	
ii. (401) 461-7181 Fax (401) 461-4486 ww.esslaboratory.com	Regulatory Sta	te	Reporting	1 103/03	
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Bartina	State	e Park No. Swite	20) #	 	
Telephone Number	FAX Number	103110	PO# Analysis		
Collection Collection	 	Febelca · Cox Q Q Za · Co			
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	e Wie				111
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6 3/5/19 0915		W-1054		- - - - - - - - - - - - - - - - - - - 	TTT
7 3/5/19 1040		W-1055			
		w-1056			
9 3/5/19 -		W-1057			 - - -
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		A30 € 10 7	X	 	
Container Type: AC-Air Cassette AG-Ami Container Volume: 1-100 mL 2-2.5 gal 3-2	Third D-SOD Bottle	030 \$ 19 - Blank - Z	X	╅╸┩╸┩╸┩	
Preservation Code: 1-Non Preserved 2-HG 3-N	50 mL 4-300 mL 5-500 n	C-Cubitainer Juar O-Other P-F ril 6-1L 7-VOA 8-2 oz 9-4 oz	oly S-Sterile V-Vial 4G	┼┼┼┼┼ ┼┼	
	4-11NO3 5-NaOH 6-Meth	9-NH40	10-DI H20 11 09		
Cooler Present		reutitiber of Conf	ainom serve	+++++++++++++++++++++++++++++++++++++++	-+
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6	elephone Nu 3 - 315 -	mber 7,520	F/	Number -	03110	PO#	Analysis ###				
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ontaine	F Volume: 1-	C-Air Cassette 100 mL 2-2.5 Non Preserved 2	AG-Amber Gla			Other P-Poly S-Sterile	V-Vial AG				+
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oler Pre	esent	aboratory Us	O Drop Off		Num:	ber of Containers per San	anlos				#
eals Int Temp	act erature:	NA	Opickup 10c tempi c		Comments:		"Other" preservati	ve and contair	ers types in thi	s space	
Relinqu	ished by: (Sig	nature, Date &	Time)	· 1	gnature, Date & Time)					# # 	
Relinqu	isted by: (Sig	3 <i>16/19</i> nature, Date & 1	lime)	X Yen	3/6/14/11/26	Relinquished By: (Sig	nature, Date & Time)	R	eceived By: (Sign	nature, Date & Tir	ne)
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The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Rebecca Cox GZA GeoEnvironmental, Inc. 5 Commerce Park North Bedford, NH 03110

RE: Schiller Boiler Demo (04.0190318.03) ESS Laboratory Work Order Number: 1903262

This signed Certificate of Analysis is our approved release of your analytical results. These results are only representative of sample aliquots received at the laboratory. ESS Laboratory expects its clients to follow all regulatory sampling guidelines. Beginning with this page, the entire report has been paginated. This report should not be copied except in full without the approval of the laboratory. Samples will be disposed of thirty days after the final report has been delivered. If you have any questions or concerns, please feel free to call our Customer Service Department.

Laurel Stoddard Laboratory Director **REVIEWED**

By ESS Laboratory at 4:14 pm, Mar 18, 2019

Analytical Summary

The project as described above has been analyzed in accordance with the ESS Quality Assurance Plan. This plan utilizes the following methodologies: US EPA SW-846, US EPA Methods for Chemical Analysis of Water and Wastes per 40 CFR Part 136, APHA Standard Methods for the Examination of Water and Wastewater, American Society for Testing and Materials (ASTM), and other recognized methodologies. The analyses with these noted observations are in conformance to the Quality Assurance Plan. In chromatographic analysis, manual integration is frequently used instead of automated integration because it produces more accurate results.

The test results present in this report are in compliance with TNI and relative state standards, and/or client Quality Assurance Project Plans (QAPP). The laboratory has reviewed the following: Sample Preservations, Hold Times, Initial Calibrations, Continuing Calibrations, Method Blanks, Blank Spikes, Blank Spike Duplicates, Duplicates, Matrix Spikes, Matrix Spike Duplicates, Surrogates and Internal Standards. Any results which were found to be outside of the recommended ranges stated in our SOPs will be noted in the Project Narrative.



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

ESS Laboratory Work Order: 1903262

SAMPLE RECEIPT

The following samples were received on March 12, 2019 for the analyses specified on the enclosed Chain of Custody Record.

Lab Number	Sample Name	Matrix	Analysis
1903262-01	W-1058	Wipe	7471B
1903262-02	W-1059	Wipe	7471B
1903262-03	W-1060	Wipe	7471B
1903262-04	W-1061	Wipe	7471B
1903262-05	W-1062	Wipe	7471B
1903262-06	W-1063	Wipe	7471B
1903262-07	W-1064	Wipe	7471B
1903262-08	W-1065	Wipe	7471B
1903262-09	W-1066	Wipe	7471B
1903262-10	W-1067	Wipe	7471B
1903262-11	W-1068	Wipe	7471B
1903262-12	W-1069	Wipe	7471B
1903262-13	W-1070	Wipe	7471B
1903262-14	W-1071	Wipe	7471B
1903262-15	W-1072	Wipe	7471B
1903262-16	W-1073	Wipe	7471B
1903262-17	W-1074	Wipe	7471B
1903262-18	W-1075	Wipe	7471B
1903262-19	W-1076	Wipe	7471B
1903262-20	W-1077	Wipe	7471B



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

ESS Laboratory Work Order: 1903262

PROJECT NARRATIVE

No unusual observations noted.

End of Project Narrative.

DATA USABILITY LINKS

To ensure you are viewing the most current version of the documents below, please clear your internet cookies for www.ESSLaboratory.com. Consult your IT Support personnel for information on how to clear your internet cookies.

Definitions of Quality Control Parameters

Semivolatile Organics Internal Standard Information

Semivolatile Organics Surrogate Information

Volatile Organics Internal Standard Information

Volatile Organics Surrogate Information

EPH and VPH Alkane Lists



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

ESS Laboratory Work Order: 1903262

Analytical Methods

1010A - Flashpoint 6010C - ICP 6020A - ICP MS

7010 - Graphite Furnace 7196A - Hexavalent Chromium

7470A - Aqueous Mercury 7471B - Solid Mercury 8011 - EDB/DBCP/TCP 8015C - GRO/DRO

8081B - Pesticides

8082A - PCB 8100M - TPH

8151A - Herbicides

8260B - VOA 8270D - SVOA

8270D SIM - SVOA Low Level

9014 - Cyanide 9038 - Sulfate

9040C - Aqueous pH

9045D - Solid pH (Corrosivity)

9050A - Specific Conductance

9056A - Anions (IC)

9060A - TOC

9095B - Paint Filter

MADEP 04-1.1 - EPH

MADEP 18-2.1 - VPH

Prep Methods

CURRENT SW-846 METHODOLOGY VERSIONS

3005A - Aqueous ICP Digestion

3020A - Aqueous Graphite Furnace / ICP MS Digestion

3050B - Solid ICP / Graphite Furnace / ICP MS Digestion

3060A - Solid Hexavalent Chromium Digestion

3510C - Separatory Funnel Extraction

3520C - Liquid / Liquid Extraction 3540C - Manual Soxhlet Extraction

3541 - Automated Soxhlet Extraction

3546 - Microwave Extraction

3580A - Waste Dilution

5030B - Aqueous Purge and Trap

5030C - Aqueous Purge and Trap 5035A - Solid Purge and Trap

SW846 Reactivity Methods 7.3.3.2 (Reactive Cyanide) and 7.3.4.1 (Reactive Sulfide) have been withdrawn by EPA. These

methods are reported per client request and are not NELAP accredited.



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

Client Sample ID: W-1058 Date Sampled: 03/11/19 09:10

Percent Solids: N/A

ESS Laboratory Work Order: 1903262 ESS Laboratory Sample ID: 1903262-01

Sample Matrix: Wipe Units: ug/100cm²

Extraction Method: 7471B

Total Metals

 Analyte Mercury
 Results (MRL)
 MDL
 Method
 Limit
 DF
 Analyst
 Analyzed
 I/V
 F/V
 Batch

 Mccoury
 0.310 (0.020)
 7471B
 1
 MKS
 03/13/19 12:21
 1
 40
 CC91301



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

Client Sample ID: W-1059 Date Sampled: 03/11/19 09:15

Percent Solids: N/A

ESS Laboratory Work Order: 1903262 ESS Laboratory Sample ID: 1903262-02

Sample Matrix: Wipe Units: ug/100cm²

Extraction Method: 7471B

Total Metals

F/V Batch CC91301 Analyst Analyzed 03/13/19 12:23 **Analyte** Results (MRL) **MDL** Method Limit Mercury 0.263 (0.020) 7471B



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

Client Sample ID: W-1060 Date Sampled: 03/11/19 09:22

Percent Solids: N/A

Extraction Method: 7471B

ESS Laboratory Work Order: 1903262 ESS Laboratory Sample ID: 1903262-03

Sample Matrix: Wipe Units: ug/100cm²

Total Metals

 Analyte Mercury
 Results (MRL)
 MDL
 Method
 Limit
 DF
 Analyst
 Analyzed
 I/V
 F/V
 Batch

 7471B
 1
 MKS
 03/13/19
 12:25
 1
 40
 CC91301



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

Client Sample ID: W-1061 Date Sampled: 03/11/19 09:26

Percent Solids: N/A

Extraction Method: 7471B

ESS Laboratory Work Order: 1903262 ESS Laboratory Sample ID: 1903262-04

Sample Matrix: Wipe Units: ug/100cm²

Total Metals

 Analyte Mercury
 Results (MRL)
 MDL 0.151 (0.020)
 Method 7471B
 Limit 1
 DF 0.151 (0.020)
 Analyst Analyzed 0.151 (0.020)
 I/V 40 CC91301

Service



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

Client Sample ID: W-1062 Date Sampled: 03/11/19 09:48

Percent Solids: N/A

Extraction Method: 7471B

ESS Laboratory Work Order: 1903262 ESS Laboratory Sample ID: 1903262-05

Sample Matrix: Wipe Units: ug/100cm²

Total Metals

F/V Batch CC91301 Analyst Analyzed 03/13/19 12:29 Results (MRL) **MDL Analyte** Method Limit Mercury ND (0.020) 7471B



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

Client Sample ID: W-1063 Date Sampled: 03/11/19 09:35

Percent Solids: N/A

Extraction Method: 7471B

ESS Laboratory Work Order: 1903262 ESS Laboratory Sample ID: 1903262-06

Sample Matrix: Wipe Units: ug/100cm²

Total Metals

<u>Analyst</u> <u>Analyzed</u> 03/13/19 15:11 F/V Batch **Analyte** Results (MRL) **MDL** I/V Method Limit 20.5 (2.00) Mercury 7471B 40 CC91301



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

Client Sample ID: W-1064 Date Sampled: 03/11/19 09:40

Percent Solids: N/A

Extraction Method: 7471B

ESS Laboratory Work Order: 1903262 ESS Laboratory Sample ID: 1903262-07

Sample Matrix: Wipe Units: ug/100cm²

Total Metals

 Analyte
 Results (MRL)
 MDL
 Method
 Limit
 DF
 Analyst
 Analyzed
 I/V
 F/V
 Batch

 Mercury
 15.3 (2.00)
 7471B
 100
 MKS
 03/13/19 15:17
 1
 40
 CC91301



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

Client Sample ID: W-1065 Date Sampled: 03/11/19 10:10

Percent Solids: N/A

Extraction Method: 7471B

ESS Laboratory Work Order: 1903262 ESS Laboratory Sample ID: 1903262-08

Sample Matrix: Wipe Units: ug/100cm²

Total Metals

Analyst Analyzed
MKS 03/13/19 15:19 F/V Batch **Analyte** Results (MRL) **MDL** I/V Method Limit Mercury 9.52 (2.00) 7471B 40 CC91301



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

Client Sample ID: W-1066 Date Sampled: 03/11/19 10:13

Percent Solids: N/A

ESS Laboratory Work Order: 1903262 ESS Laboratory Sample ID: 1903262-09

Sample Matrix: Wipe Units: ug/100cm²

Extraction Method: 7471B

Total Metals

 Analyte
 Results (MRL)
 MDL
 Method
 Limit
 DF
 Analyst
 Analyzed
 I/V
 F/V
 Batch

 Mercury
 17.7 (2.00)
 7471B
 100
 MKS
 03/13/19 15:21
 1
 40
 CC91301



The Microbiology Division of Thielsch Engineering, Inc.

ESS Laboratory Work Order: 1903262



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

Client Sample ID: W-1067 Date Sampled: 03/11/19 10:15

Percent Solids: N/A

ESS Laboratory Sample ID: 1903262-10 Sample Matrix: Wipe

Sample Matrix: Wip Units: ug/100cm²

Extraction Method: 7471B

Total Metals



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

Client Sample ID: W-1068 Date Sampled: 03/11/19 10:18

Percent Solids: N/A

ESS Laboratory Work Order: 1903262 ESS Laboratory Sample ID: 1903262-11

Sample Matrix: Wipe Units: ug/100cm²

Extraction Method: 7471B

Total Metals

 Analyte Mercury
 Results (MRL)
 MDL 7471B
 Limit 1
 DF 1
 Analyst Analyzed MKS 03/13/19 12:45
 I/V 1
 F/V 40 CC91301



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

Client Sample ID: W-1069 Date Sampled: 03/11/19 10:20

Percent Solids: N/A

Extraction Method: 7471B

ESS Laboratory Work Order: 1903262 ESS Laboratory Sample ID: 1903262-12

Sample Matrix: Wipe Units: ug/100cm²

Total Metals

F/V Batch CC91301 Analyst Analyzed 03/13/19 15:25 **Analyte** Results (MRL) **MDL** <u>I/V</u> Method Limit Mercury 2.87 (0.400) 7471B



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

Client Sample ID: W-1070 Date Sampled: 03/11/19 10:25

Percent Solids: N/A

ESS Laboratory Work Order: 1903262 ESS Laboratory Sample ID: 1903262-13

Sample Matrix: Wipe Units: ug/100cm²

Extraction Method: 7471B

Total Metals

F/V Batch 40 CC91301 Analyst Analyzed 03/13/19 15:27 **Analyte** Results (MRL) **MDL** I/V Method Limit 4.98 (1.00) Mercury 7471B



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

Client Sample ID: W-1071
Date Sampled: 03/11/19 11:12

Percent Solids: N/A

ESS Laboratory Work Order: 1903262 ESS Laboratory Sample ID: 1903262-14

Sample Matrix: Wipe Units: ug/100cm²

Extraction Method: 7471B

Total Metals



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

Client Sample ID: W-1072 Date Sampled: 03/11/19 11:16

Percent Solids: N/A

ESS Laboratory Work Order: 1903262 ESS Laboratory Sample ID: 1903262-15

Sample Matrix: Wipe Units: ug/100cm²

Extraction Method: 7471B

Total Metals

 Analyte Mercury
 Results (MRL)
 MDL
 Method
 Limit
 DF
 Analyst
 Analyzed
 I/V
 F/V
 Batch

 7471B
 1
 MKS
 03/13/19
 12:53
 1
 40
 CC91301



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

Client Sample ID: W-1073 Date Sampled: 03/11/19 11:18

Percent Solids: N/A

ESS Laboratory Work Order: 1903262 ESS Laboratory Sample ID: 1903262-16

Sample Matrix: Wipe Units: ug/100cm²

Extraction Method: 7471B

Total Metals

 Analyte Mercury
 Results (MRL)
 MDL
 Method
 Limit
 DF
 Analyst
 Analyzed
 I/V
 F/V
 Batch

 Mercury
 0.039 (0.020)
 7471B
 1
 MKS
 03/13/19 12:55
 1
 40
 CC91301

000165



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

Client Sample ID: W-1074 Date Sampled: 03/11/19 11:21

Percent Solids: N/A

ESS Laboratory Work Order: 1903262 ESS Laboratory Sample ID: 1903262-17

Sample Matrix: Wipe Units: ug/100cm²

Extraction Method: 7471B

Total Metals

 Analyte Mercury
 Results (MRL)
 MDL 0.292 (0.020)
 Method 7471B
 Limit 1
 DF 0.292 (0.020)
 Analyst Analyzed 0.293 (0.020)
 I/V 40 CC91301



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

Client Sample ID: W-1075 Date Sampled: 03/11/19 11:29

Percent Solids: N/A

Extraction Method: 7471B

ESS Laboratory Work Order: 1903262 ESS Laboratory Sample ID: 1903262-18

Sample Matrix: Wipe Units: ug/100cm²

Total Metals

F/V Batch CC91301 Analyst Analyzed 03/13/19 12:59 **Analyte** Results (MRL) **MDL** Method Limit Mercury 0.379 (0.020) 7471B



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

Client Sample ID: W-1076 Date Sampled: 03/11/19 11:31

Percent Solids: N/A

ESS Laboratory Work Order: 1903262 ESS Laboratory Sample ID: 1903262-19

Sample Matrix: Wipe Units: ug/100cm²

Extraction Method: 7471B

Total Metals

 Analyte Mercury
 Results (MRL)
 MDL 7471B
 Limit 20
 DF 20
 Analyst Analyzed MKS 03/13/19 15:31
 I/V 40
 E/V CC91301



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

Client Sample ID: W-1077 Date Sampled: 03/11/19 11:45

Percent Solids: N/A

ESS Laboratory Work Order: 1903262 ESS Laboratory Sample ID: 1903262-20

Sample Matrix: Wipe Units: ug/100cm²

Extraction Method: 7471B

Total Metals

 Analyte Mercury
 Results (MRL)
 MDL 7471B
 Limit 20
 DF 20
 Analyst Analyzed MKS 03/13/19 15:33
 I/V 40
 E/V CC91301



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

ESS Laboratory Work Order: 1903262

Quality Control Data

				Spike	Source		%REC		RPD	
Analyte	Result	MRL	Units	Level	Result	%REC	Limits	RPD	Limit	Qualifier
			Total Meta	ıls						
Batch CC91301 - 7471B										
Blank										
Mercury	ND	0.020	ug/100cm²							
LCS										
Mercury	0.121	0.020	ug/100cm ²	0.1208		100	85-115			
LCS Dup										
Mercury	0.118	0.020	ug/100cm ²	0.1208		98	85-115	2	20	



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

ESS Laboratory Work Order: 1903262

Notes and Definitions

U	Analyte included in the analysis, but not detected
D	Diluted.
ND	Analyte NOT DETECTED at or above the MRL (LOQ), LOD for DoD Reports, MDL for J-Flagged Analytes
dry	Sample results reported on a dry weight basis
RPD	Relative Percent Difference
MDL	Method Detection Limit
MRL	Method Reporting Limit
LOD	Limit of Detection
LOQ	Limit of Quantitation
DL	Detection Limit
I/V	Initial Volume
F/V	Final Volume
§	Subcontracted analysis; see attached report
1	Range result excludes concentrations of surrogates and/or internal standards eluting in that range.
2	Range result excludes concentrations of target analytes eluting in that range.
3	Range result excludes the concentration of the C9-C10 aromatic range.
Avg	Results reported as a mathematical average.
NR	No Recovery

[CALC] Calculated Analyte

SUB Subcontracted analysis; see attached report

RLReporting Limit

EDL Estimated Detection Limit Membrane Filtration MF MPN Most Probably Number TNTC Too numerous to Count CFU Colony Forming Units



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

ESS Laboratory Work Order: 1903262

ESS LABORATORY CERTIFICATIONS AND ACCREDITATIONS

ENVIRONMENTAL

Rhode Island Potable and Non Potable Water: LAI00179 http://www.health.ri.gov/find/labs/analytical/ESS.pdf

Connecticut Potable and Non Potable Water, Solid and Hazardous Waste: PH-0750 http://www.ct.gov/dph/lib/dph/environmental health/environmental laboratories/pdf/OutofStateCommercialLaboratories.pdf

Maine Potable and Non Potable Water, and Solid and Hazardous Waste: RI00002 http://www.maine.gov/dhhs/mecdc/environmental-health/dwp/partners/labCert.shtml

Massachusetts Potable and Non Potable Water: M-RI002 http://public.dep.state.ma.us/Labcert/Labcert.aspx

New Hampshire (NELAP accredited) Potable and Non Potable Water, Solid and Hazardous Waste: 2424 http://des.nh.gov/organization/divisions/water/dwgb/nhelap/index.htm

New York (NELAP accredited) Non Potable Water, Solid and Hazardous Waste: 11313 http://www.wadsworth.org/labcert/elap/comm.html

New Jersey (NELAP accredited) Non Potable Water, Solid and Hazardous Waste: RI006 http://datamine2.state.nj.us/DEP_OPRA/OpraMain/pi_main?mode=pi_by_site&sort_order=PI_NAMEA&Select+a+Site:=58715

United States Department of Agriculture Soil Permit: P330-12-00139

Pennsylvania: 68-01752

http://www.dep.pa.gov/Business/OtherPrograms/Labs/Pages/Laboratory-Accreditation-Program.aspx

ESS Laboratory Sample and Cooler Receipt Checklist

	nt:	GZA - Bedfo	10, 1111- 02	7,400	_ ESS Project	ID:	1903262	
Shipped	/Delivered Vi	ia.	ESS Cou	-1	Date Receive	ed:	3/12/2019	
O.,,ppc0	DCIIICICU VI	···	ESS Coul	ier	_ Project Due Da		X19/2019 3	8/19
					Days for Proje	ct:	5 Day 4a	<u> </u>
	l manifest pro			No	6. Does COC match	bottles?		Yes
				_	1			
	custody seal	•		Yes	7. Is COC complete a	ind correct?		Yes
3. Is radi	ation count <	100 CPM?		Yes	8. Were samples reco	eived intact?		Yes
	ooler Present p: 2.3_	t? lced with	ı: Ice	Yes	9. Were labs inform	ed about <u>short h</u>	olds & rushes?	(Yes) No / NA
		nd dated by		Yes	10. Were any analys	es received outside	e of hold time?	Yes (No
11. Any S	ubcontracting	g needed?	Ye	(No)	12 Mars 104-			
ES	S Sample IDs	3:			 Were VOAs receit Air bubbles in aque 			Yes /(No)
	Analysis				b. Does methanol cov		2	Yes / No
	TAT				E. Essa Methano, con	ci soii completely	ŗ	Yes / No / NA
13 Arafl	a complee p	roperly prese		(a)				
a. If meta	is preserved	upon receipt	rvea?	Yes / No	_			
b. Low Le	vel VOA vial	s frozen:	•	Date:	Time:	By:_		
		o mozon,		Date:	Ime:	By: _		_
Sample Re	eceiving Note	es:						
					· · · · · · · · · · · · · · · · · · ·			
14 Mac t	here a nood	to contact Pr	-14-54	_	(
a Was th	ere a need to	contact the	oject Manag	er?	Yes (No)			
Who was								
	Chatacted?		client?	0-4	Yes / No			
	contacted?		Client?	Date:		_ By: _		
	contacted?		client?	_ Date:		_ By: _		
	contacted?			_ Date:		_ By: _		
	contacted?			_ Date: _		Ву:		
	contacted?			_ Date: _		By:		
Sample	Container	Proper	Air	Date:	Time:			
Sample Number			Air Bubbles		Time:	By: _	Record pH (Cyan	iide and 608.3
Number	Container ID	Proper Container	Air Bubbles Present	Sufficient Volume	Time: Container Type Pres	servative		ide and 608.3
Number 01	Container ID 322614	Proper Container Yes	Air Bubbles Present NA	Sufficient Volume Yes	Container Type Pres 4 oz. Jar - Unpres		Record pH (Cyan	ide and 608.3
Number 01 02	Container ID 322614 322613	Proper Container Yes Yes	Air Bubbles Present NA NA	Sufficient Volume Yes Yes	Container Type Pres 4 oz. Jar - Unpres (4 oz. Jar - Unpres (servative	Record pH (Cyan	ide and 608.3
01 02 03	Container ID 322614 322613 322612	Proper Container Yes Yes Yes	Air Bubbles Present NA NA	Sufficient Volume Yes Yes Yes	Container Type Pres 4 oz. Jar - Unpres (4 oz. Jar - Unpres (4 oz. Jar - Unpres (6 oz. Jar - Unpres (servative	Record pH (Cyan	ide and 608.3
01 02 03 04	Container ID 322614 322613 322612 322611	Proper Container Yes Yes Yes Yes	Air Bubbles Present NA NA NA	Sufficient Volume Yes Yes Yes Yes	Container Type Pres 4 oz. Jar - Unpres (4 oz. Jar - Unpres (4 oz. Jar - Unpres (4 oz. Jar - Unpres (4 oz. Jar - Unpres (6 oz. Jar - Unpres (6 oz. Jar - Unpres (6 oz. Jar - Unpres (7 oz. Jar - Unpres (8 oz. Jar - Unpres (9 oz. Jar	servative Other Other Other	Record pH (Cyan	ide and 608.3
01 02 03 04 05	Container ID 322614 322613 322612 322611 322610	Proper Container Yes Yes Yes Yes Yes	Air Bubbles Present NA NA NA NA	Sufficient Volume Yes Yes Yes Yes Yes	Container Type Pres 4 oz. Jar - Unpres (4 oz. Jar - Unpres (4 oz. Jar - Unpres (4 oz. Jar - Unpres (4 oz. Jar - Unpres (4 oz. Jar - Unpres (4 oz. Jar - Unpres (4 oz. Jar - Unpres (6 oz. Jar	servative Other Other	Record pH (Cyan	ide and 608.3
01 02 03 04 05 06	Container ID 322614 322613 322612 322611 322610 322609	Proper Container Yes Yes Yes Yes Yes Yes	Air Bubbles Present NA NA NA NA NA	Sufficient Volume Yes Yes Yes Yes Yes Yes	Container Type Pres 4 oz. Jar - Unpres (4 oz. Jar	servative Other Other Other	Record pH (Cyan	ide and 608.3
01 02 03 04 05 06 07	Container ID 322614 322613 322612 322611 322610 322609 322608	Proper Container Yes Yes Yes Yes Yes Yes Yes	Air Bubbles Present NA NA NA NA NA	Sufficient Volume Yes Yes Yes Yes Yes Yes Yes	Time:	servative Other Other Other Other	Record pH (Cyan	ide and 608.3
01 02 03 04 05 06 07 08	Container ID 322614 322613 322612 322611 322610 322609 322608 322607	Proper Container Yes Yes Yes Yes Yes Yes Yes Yes	Air Bubbles Present NA NA NA NA NA	Sufficient Volume Yes Yes Yes Yes Yes Yes Yes	Container Type Pres 4 oz. Jar - Unpres (4 oz. Jar - Unpres (4 oz. Jar - Unpres (4 oz. Jar - Unpres (4 oz. Jar - Unpres (4 oz. Jar - Unpres (4 oz. Jar - Unpres (4 oz. Jar - Unpres (4 oz. Jar - Unpres (4 oz. Jar - Unpres (6 oz. Jar - Unpres (6 oz. Jar - Unpres (6 oz. Jar - Unpres (7 oz. Jar - Unpres (7 oz. Jar - Unpres (7 oz. Jar - Unpres (8 oz. Jar - Unpres (9 oz. Jar	servative Other Other Other Other Other Other	Record pH (Cyan	ide and 608.3
01 02 03 04 05 06 07 08 09	Container ID 322614 322613 322612 322611 322610 322609 322608 322607 322606	Proper Container Yes Yes Yes Yes Yes Yes Yes Yes Yes	Air Bubbles Present NA NA NA NA NA NA NA NA	Sufficient Volume Yes Yes Yes Yes Yes Yes Yes Yes Yes Y	Container Type Pres 4 oz. Jar - Unpres	servative Other Other Other Other Other Other	Record pH (Cyan	ide and 608.3
01 02 03 04 05 06 07 08 09 10	Container ID 322614 322613 322612 322610 322609 322608 322607 322606 322606 322605	Proper Container Yes Yes Yes Yes Yes Yes Yes Yes Yes Yes	Air Bubbles Present NA NA NA NA NA NA NA NA	Sufficient Volume Yes Yes Yes Yes Yes Yes Yes Yes Yes Y	Container Type Pres 4 oz. Jar - Unpres (4 oz. Jar - Unpres (4 oz. Jar - Unpres (4 oz. Jar - Unpres (4 oz. Jar - Unpres (4 oz. Jar - Unpres (4 oz. Jar - Unpres (4 oz. Jar - Unpres (4 oz. Jar - Unpres (4 oz. Jar - Unpres (4 oz. Jar - Unpres (4 oz. Jar - Unpres (4 oz. Jar - Unpres (4 oz. Jar - Unpres (4 oz. Jar - Unpres (4 oz. Jar - Unpres (4 oz. Jar - Unpres (4 oz. Jar - Unpres (4 oz. Jar - Unpres (6 oz. Jar	Deter Deter	Record pH (Cyan	ide and 608.3
01 02 03 04 05 06 07 08 09 10	Container ID 322614 322613 322612 322611 322609 322609 322608 322607 322606 322605 322605	Proper Container Yes Yes Yes Yes Yes Yes Yes Yes Yes Ye	Air Bubbles Present NA NA NA NA NA NA NA NA	Sufficient Volume Yes Yes Yes Yes Yes Yes Yes Yes Yes Y	Time:	servative Other Other Other Other Other Other Other Other Other Other Other	Record pH (Cyan	ide and 608.3
01 02 03 04 05 06 07 08 09 10 11	Container ID 322614 322613 322612 322611 322609 322608 322607 322606 322605 322604 322604	Proper Container Yes Yes Yes Yes Yes Yes Yes Yes Yes Yes	Air Bubbles Present NA NA NA NA NA NA NA NA	Sufficient Volume Yes Yes Yes Yes Yes Yes Yes Yes Yes Ye	Time:	Deter Deter	Record pH (Cyan	ide and 608.3
01 02 03 04 05 06 07 08 09 10 11 12 13	Container ID 322614 322613 322612 322611 322600 322608 322607 322606 322605 322604 322603 322603 322603	Proper Container Yes Yes Yes Yes Yes Yes Yes Yes Yes Yes	Air Bubbles Present NA NA NA NA NA NA NA NA NA NA NA	Sufficient Volume Yes Yes Yes Yes Yes Yes Yes Yes Yes Y	Container Type Pres 4 oz. Jar - Unpres	servative Other Other Other Other Other Other Other Other Other Other Other Other Other Other Other	Record pH (Cyan	ide and 608.3
01 02 03 04 05 06 07 08 09 10 11 12 13	Container ID 322614 322613 322612 322610 322609 322608 322606 322605 322604 322604 322602 322602	Proper Container Yes Yes Yes Yes Yes Yes Yes Yes Yes Yes	Air Bubbles Present NA NA NA NA NA NA NA NA NA NA	Sufficient Volume Yes Yes Yes Yes Yes Yes Yes Yes Yes Y	Time:	pervative Other Other Other Other Other Other Other Other Other Other	Record pH (Cyan	ide and 608.3
Number 01 02 03 04 05 06 07 08 09 10 11 12 13 14	Container ID 322614 322613 322612 322610 322609 322608 322607 322606 322606 322604 322603 322601 322601	Proper Container Yes Yes Yes Yes Yes Yes Yes Yes Yes Ye	Air Bubbles Present NA NA NA NA NA NA NA NA NA NA NA NA	Sufficient Volume Yes Yes Yes Yes Yes Yes Yes Yes Yes Y	Time:	servative Other Other Other Other Other Other Other Other Other Other Other Other Other Other Other	Record pH (Cyan	ide and 608.3
01 02 03 04 05 06 07 08 09 10 11 12 13 14 15 16	Container ID 322614 322613 322612 322611 322610 322609 322608 322607 322606 322604 322604 322602 322602 322601 322600 322600 322600 322600	Proper Container Yes Yes Yes Yes Yes Yes Yes Yes Yes Yes	Air Bubbles Present NA NA NA NA NA NA NA NA NA NA NA NA	Sufficient Volume Yes Yes Yes Yes Yes Yes Yes Yes Yes Y	Time:	Servative Other	Record pH (Cyan	ide and 608.3
Number 01 02 03 04 05 06 07 08 09 10 11 12 13 14 15 16 17	Container ID 322614 322613 322612 322611 322609 322608 322607 322606 322605 322604 322603 322602 322601 322600 322599 322598	Proper Container Yes Yes Yes Yes Yes Yes Yes Yes Yes Ye	Air Bubbles Present NA NA NA NA NA NA NA NA NA NA NA NA NA	Sufficient Volume Yes Yes Yes Yes Yes Yes Yes Yes Yes Y	Container Type Pres 4 oz. Jar - Unpres	servative Other	Record pH (Cyan	ide and 608.3
Number 01 02 03 04 05 06 07 08 09 10 11 12 13 14 15 16 17 18	Container ID 322614 322613 322612 322610 322609 322608 322606 322606 322605 322604 322600 322600 322600 322600 322599 322598 322598	Proper Container Yes Yes Yes Yes Yes Yes Yes Yes Yes Ye	Air Bubbles Present NA NA NA NA NA NA NA NA NA NA NA NA NA	Sufficient Volume Yes Yes Yes Yes Yes Yes Yes Yes Yes Y	Container Type Pres 4 oz. Jar - Unpres 6 oz. Jar - Unpres 6 oz. Jar - Unpres 6 oz. Jar - Unpres 7 oz. Jar - Unpres 9 oz. Jar - Unpres	Dervative Other	Record pH (Cyan	ide and 608.3
Number 01 02 03 04 05 06 07 08 09 10 11 12 13 14 15 16 17 18	Container ID 322614 322613 322612 322610 322609 322608 322607 322606 322605 322604 322602 322601 322600 322599 322599 322598 322597 322596	Proper Container Yes Yes Yes Yes Yes Yes Yes Yes Yes Ye	Air Bubbles Present NA NA NA NA NA NA NA NA NA NA NA NA NA	Sufficient Volume Yes Yes Yes Yes Yes Yes Yes Yes Yes Y	Time:	pervative Other	Record pH (Cyan	aide and 608.3
01 02 03 04 05 06 07 08 09 10 11 12 13 14 15 16 17 18	Container ID 322614 322613 322612 322610 322609 322608 322606 322606 322605 322604 322600 322600 322600 322600 322599 322598 322598	Proper Container Yes Yes Yes Yes Yes Yes Yes Yes Yes Ye	Air Bubbles Present NA NA NA NA NA NA NA NA NA NA NA NA NA	Sufficient Volume Yes Yes Yes Yes Yes Yes Yes Yes Yes Y	Container Type Pres 4 oz. Jar - Unpres 6 oz. Jar - Unpres 6 oz. Jar - Unpres 6 oz. Jar - Unpres 6 oz. Jar - Unpres 6 oz. Jar - Unpres 6 oz. Jar - Unpres 6 oz. Jar - Unpres	Deservative Other	Record pH (Cyan	iide and 608.3
Number 01 02 03 04 05 06 07 08 09 10 11 12 13 14 15 16 17 18	Container ID 322614 322613 322612 322610 322609 322608 322607 322606 322605 322604 322602 322601 322600 322599 322599 322598 322597 322596	Proper Container Yes Yes Yes Yes Yes Yes Yes Yes Yes Ye	Air Bubbles Present NA NA NA NA NA NA NA NA NA NA NA NA NA	Sufficient Volume Yes Yes Yes Yes Yes Yes Yes Yes Yes Y	Container Type Pres 4 oz. Jar - Unpres 6 oz. Jar - Unpres 6 oz. Jar - Unpres 6 oz. Jar - Unpres 6 oz. Jar - Unpres 6 oz. Jar - Unpres 6 oz. Jar - Unpres 6 oz. Jar - Unpres	servative Other O	Record pH (Cyan	iide and 608.3
01 02 03 04 05 06 07 08 09 10 11 12 13 14 15 16 17 18 19 20	Container ID 322614 322613 322612 322610 322609 322608 322607 322606 322605 322604 322600 322598 322598 322597 322596 322595	Proper Container Yes Yes Yes Yes Yes Yes Yes Yes Yes Ye	Air Bubbles Present NA NA NA NA NA NA NA NA NA NA NA NA NA	Sufficient Volume Yes Yes Yes Yes Yes Yes Yes Yes Yes Y	Container Type Pres 4 oz. Jar - Unpres 6 oz. Jar - Unpres 6 oz. Jar - Unpres 6 oz. Jar - Unpres 6 oz. Jar - Unpres 6 oz. Jar - Unpres 6 oz. Jar - Unpres 6 oz. Jar - Unpres	servative Other O	Record pH (Cyan	ide and 608.3
01 02 03 04 05 06 07 08 09 10 11 12 13 14 15 16 17 18 19 20 and Review	Container ID 322614 322613 322612 322610 322609 322608 322607 322606 322604 322603 322601 322600 322599 322599 322599 322596 322595	Proper Container Yes Yes Yes Yes Yes Yes Yes Yes Yes Ye	Air Bubbles Present NA NA NA NA NA NA NA NA NA NA NA NA NA	Sufficient Volume Yes Yes Yes Yes Yes Yes Yes Yes Yes Y	Container Type Pres 4 oz. Jar - Unpres 6 oz. Jar - Unpres 6 oz. Jar - Unpres 6 oz. Jar - Unpres 6 oz. Jar - Unpres 6 oz. Jar - Unpres 6 oz. Jar - Unpres 6 oz. Jar - Unpres	servative Other O	Record pH (Cyan	ide and 608.3

ESS Laboratory Sample and Cooler Receipt Checklist

Client: GZA - Bedford, NH - GZA/DS		ESS Project ID:	1903262	
Are barcode labels on correct containers? Are all necessary stickers attached?	Yes /No Yes No	Date Received:	3/12/2019	
Completed By: Reviewed	Date & Time:	3/2/19	1756	
By: Delivered	Date & Time:	3/12/19	1816	
Ву:		<u> 5/12119</u>	1816	

CUSTODY SEAL	
COOLODI STAF) EC
DATE -Clulia	Quality Environmental Containers
SIGNATURE PER	800-255-3950 • 304-255-3900

	19032 62		leckler Excel																				Please specify "Other" preservative and containers types in this space	72.		Received By: (Signature, Date & Time)	Received Bur (Signature Date of Tame)	Take a lille)		
	ESS Lab #	Reporting Limits	Electonic Data Checker Deliverables Other (Please	1	S/s	//		601		× ×	R	\$	×	X	X	>	A.	X	S-Sterile V-Vial 46		20 11-Other (Modica.	pecify "Other" preservative			P () () () () () () () () () (Relinquished By: (Signature, Date & Time)			
	USTODY	Days	of the following?: O RGP	Project Name	sé	le PO#	Email Address	Sample ID	8										O-Other P-Poly	mL 5-500 mL 6-1L 7-VOA 8-2 oz 9-4 oz 10-8 oz	Number of Containers per Sample:	E. Duenos + C	, en	10 x10 cm	-	1	8			
	CHAIN	me K-	is project for a	Schiller	re Perkado	1	Cobbes.		N-105	W-1059	W-1060	W-106	290)-M	≥901-M	4901-M	W-1065	W-1066	 	ubitainer	4-300 mL 5-500 mL 6-1L 7-VOA	COZOZONIA TOTOLOGIA	Sampled by :	,		Received By: (Signature Date & Time)	1/2/10/10 1	Seived By: (Signature, Date & Time)	-		
	-	Turn Time Regulatory State		Project #] 、	State /	FAK Number	Sample Type Sample Matrix	3.3										92	7-7.3 gai 3-250 ml. 4-300 ml.		lafy	O Drop Off	O Pickup	1/1 a.	7	O.R.			 -
1 af 3 5	λ	gineering, Inc. ranston Rt 02910	ax (401) 461–4486 !	ompany Name	ontact Person ☆		umber 1820	Collection	0910 Wife	51160	2260	9260	8740	0935	0240	0/0/	1013	- !	sette	1- Non Presen		Laboratory Use Only	0	MA O Pickup	רכוני לכוני א Gignature, Date & Time)	2/12/19	Refinquished by: (Signature, Date & Time)			
-48.E. S	ESS Laboratory	Division of Thielsch Engineering, Inc. 185 Frances Avenue, Cranston Rt 02910	Tel. (401) 461-7181 Fax (401) 461-4486 www.esslaboratory.com	GZA Gerennens Name	Repector Con	The good city	1607-315-7820	ESS Lab Collection ID Date	61/11/2	2 1/11/14	3 2/11/19	d 2/m/cd	5 5/14/19	G 3/11/119	7 3/11/19	8 3/m/lig	b)/n/s b	60 3/4/19	Container Type: AC-Air Cas	Preservation Code:			Cooler Present:	Cooler Temperature:	Relinquished by:	S. D. Shim			00175	

	1772506		3																				ontainers types in this space		Percinal Dr. (Classical	age C	Received By: (Signature, Date & Time)	T AFFECT O	
	ESS Lab #	i i	Beliverables Data Checker	-	sis	A/ SAJEL		Pol			9.	**	2 3	2 92		> 9		9	S-Sterile V-Viat AC	z 11-Other* 9	20 11-Other	Work Y	Please specify "Other" preservative and containers types in this space		Relinquished By: (Signature, Date & Time)	Sh:91 41/c1/8	Relinquished By: (Signature, Date & Time)	-	
	Ö	g d Days	CT RCP O MA MCP O RGP	Schiller Ison Le Denne	Address	Zip Code	Email Address	Sample ID	3 701-M	W-1069	W-1070	1001	2201-m	5201-M	W-1074	7-107-	2-1076	2/1072	J-Jar O-Other P-Poly	-500 mL 6-1L 7-VOA 8-2 oz 9-4 oz 10-8 oz	Number of Containers and Same	Sampled by: E. Dones, + C	Comments: Please s	J. Signs , Palocen		S)			
	CH	Regulatory State	OCTRO	04.0/40 318.05	5 Comme		mber	Sample Matrix	25.86	-	3	-3	3	3	3	3	3	->	B-BOD Bottle	TNO3 S-NSOH				3.3	Re	12 May 2	received by: (Signature, Date & Time)		
2 of 3 erro	ESS Laboratory Division of Thielsch Engineering, Inc.	185 Frances Avenue, Cranston RI 02910 Tel. (401) 461-7181 Fax (401) 461-4486	www.esslaboratori.com	CZA COGNOSOMOSTA	Le becea Coro	Ted Sad	CO3-3/5-7570	ESS Lab Collection Collection Sample Type	11 5/4/9 1018 Wige	12 3/4/19 1020	13 3/4/19 1025	7111 spiles 41		5/14/19			<u>,</u>	' ł	Container Lype: AC-Air Cassette AG-Ambel Glass Container Volume: 1-100 ml. 2-2 5 nat 3-250 ml	16		Laboratory Use Only	Seals Intact 2.44 Oreform	Cooler Temperature: °C // Le devro	Relinquished by: (Signature, Da	Religioushed by (Squature Date & Time)			



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Rebecca Cox GZA GeoEnvironmental, Inc. 5 Commerce Park North Bedford, NH 03110

RE: Schiller Boiler Demo (04.0190318.03) ESS Laboratory Work Order Number: 1903263

This signed Certificate of Analysis is our approved release of your analytical results. These results are only representative of sample aliquots received at the laboratory. ESS Laboratory expects its clients to follow all regulatory sampling guidelines. Beginning with this page, the entire report has been paginated. This report should not be copied except in full without the approval of the laboratory. Samples will be disposed of thirty days after the final report has been delivered. If you have any questions or concerns, please feel free to call our Customer Service Department.

Laurel Stoddard Laboratory Director **REVIEWED**

By ESS Laboratory at 4:19 pm, Mar 18, 2019

Analytical Summary

The project as described above has been analyzed in accordance with the ESS Quality Assurance Plan. This plan utilizes the following methodologies: US EPA SW-846, US EPA Methods for Chemical Analysis of Water and Wastes per 40 CFR Part 136, APHA Standard Methods for the Examination of Water and Wastewater, American Society for Testing and Materials (ASTM), and other recognized methodologies. The analyses with these noted observations are in conformance to the Quality Assurance Plan. In chromatographic analysis, manual integration is frequently used instead of automated integration because it produces more accurate results.

The test results present in this report are in compliance with TNI and relative state standards, and/or client Quality Assurance Project Plans (QAPP). The laboratory has reviewed the following: Sample Preservations, Hold Times, Initial Calibrations, Continuing Calibrations, Method Blanks, Blank Spikes, Blank Spike Duplicates, Duplicates, Matrix Spikes, Matrix Spike Duplicates, Surrogates and Internal Standards. Any results which were found to be outside of the recommended ranges stated in our SOPs will be noted in the Project Narrative.



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

ESS Laboratory Work Order: 1903263

SAMPLE RECEIPT

The following samples were received on March 12, 2019 for the analyses specified on the enclosed Chain of Custody Record.

Lab Number	Sample Name	Matrix	Analysis
1903263-01	031119-BLANK1	Wipe	7471B
1903263-02	031119-BLANK2	Wipe	7471B
1903263-03	W-1088	Wipe	7471B
1903263-04	W-1089	Wipe	7471B
1903263-05	W-1090	Wipe	7471B
1903263-06	W-1091	Wipe	7471B
1903263-07	W-1092	Wipe	7471B
1903263-08	W-1093	Wipe	7471B
1903263-09	W-1094	Wipe	7471B
1903263-10	W-1095	Wipe	7471B
1903263-11	W-1096	Wipe	7471B



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

ESS Laboratory Work Order: 1903263

PROJECT NARRATIVE

No unusual observations noted.

End of Project Narrative.

DATA USABILITY LINKS

To ensure you are viewing the most current version of the documents below, please clear your internet cookies for www.ESSLaboratory.com. Consult your IT Support personnel for information on how to clear your internet cookies.

Definitions of Quality Control Parameters

Semivolatile Organics Internal Standard Information

Semivolatile Organics Surrogate Information

Volatile Organics Internal Standard Information

Volatile Organics Surrogate Information

EPH and VPH Alkane Lists



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

ESS Laboratory Work Order: 1903263

Analytical Methods

1010A - Flashpoint 6010C - ICP

6020A - ICP MS

7010 - Graphite Furnace7196A - Hexavalent Chromium7470A - Aqueous Mercury7471B - Solid Mercury

8011 - EDB/DBCP/TCP 8015C - GRO/DRO

8081B - Pesticides 8082A - PCB

8100M - TPH

8151A - Herbicides

8260B - VOA 8270D - SVOA

8270D SIM - SVOA Low Level

9014 - Cyanide

9038 - Sulfate

9040C - Aqueous pH

9045D - Solid pH (Corrosivity)

9050A - Specific Conductance

9056A - Anions (IC)

9060A - TOC

9095B - Paint Filter

MADEP 04-1.1 - EPH

MADEP 18-2.1 - VPH

Prep Methods

CURRENT SW-846 METHODOLOGY VERSIONS

3005A - Aqueous ICP Digestion

3020A - Aqueous Graphite Furnace / ICP MS Digestion

3050B - Solid ICP / Graphite Furnace / ICP MS Digestion

3060A - Solid Hexavalent Chromium Digestion

3510C - Separatory Funnel Extraction

3520C - Liquid / Liquid Extraction

3540C - Manual Soxhlet Extraction

3541 - Automated Soxhlet Extraction

3546 - Microwave Extraction

3580A - Waste Dilution

5030B - Aqueous Purge and Trap

 $5030\mathrm{C}$ - Aqueous Purge and Trap

5035A - Solid Purge and Trap

SW846 Reactivity Methods 7.3.3.2 (Reactive Cyanide) and 7.3.4.1 (Reactive Sulfide) have been withdrawn by EPA. These methods are reported per client request and are not NELAP accredited.



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo Client Sample ID: 031119-BLANK1 Date Sampled: 03/11/19 00:00

Percent Solids: N/A

Extraction Method: 7471B

ESS Laboratory Work Order: 1903263 ESS Laboratory Sample ID: 1903263-01

Sample Matrix: Wipe Units: ug/100cm²

Total Metals

F/V Batch 40 CC91302 Analyst Analyzed 03/13/19 13:15 Results (MRL) **MDL** <u>I/V</u> **Analyte** Method Limit Mercury ND (0.020) 7471B

Service



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo Client Sample ID: 031119-BLANK2 Date Sampled: 03/11/19 00:00

Percent Solids: N/A

ESS Laboratory Work Order: 1903263 ESS Laboratory Sample ID: 1903263-02

Sample Matrix: Wipe Units: ug/100cm²

Extraction Method: 7471B

Total Metals

F/V Batch 40 CC91302 Analyst Analyzed
MKS 03/13/19 13:17 Results (MRL) **MDL** I/V **Analyte** Method Limit Mercury ND (0.020) 7471B



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

Client Sample ID: W-1088 Date Sampled: 03/11/19 08:42

Percent Solids: N/A

Extraction Method: 7471B

ESS Laboratory Work Order: 1903263 ESS Laboratory Sample ID: 1903263-03

Sample Matrix: Wipe Units: ug/100cm²

Total Metals

F/V Batch CC91302 Analyst Analyzed 03/13/19 13:19 Results (MRL) **MDL Analyte** Method Limit Mercury 0.173 (0.020) 7471B



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

Client Sample ID: W-1089 Date Sampled: 03/11/19 08:43

Percent Solids: N/A

Extraction Method: 7471B

ESS Laboratory Work Order: 1903263 ESS Laboratory Sample ID: 1903263-04

Sample Matrix: Wipe Units: ug/100cm²

Total Metals

 Analyte Mercury
 Results (MRL)
 MDL 0.052 (0.020)
 Method 7471B
 Limit 1
 DF 0.052 (0.020)
 Analyst Analyzed 0.03/13/19 13:21
 I/V 1
 F/V 1
 Batch 0.0591302



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

Client Sample ID: W-1090 Date Sampled: 03/11/19 08:45

Percent Solids: N/A

Extraction Method: 7471B

ESS Laboratory Work Order: 1903263 ESS Laboratory Sample ID: 1903263-05

Sample Matrix: Wipe Units: ug/100cm²

Total Metals

F/V Batch CC91302 Analyst Analyzed 03/13/19 13:23 **Analyte** Results (MRL) **MDL** Method Limit Mercury 0.061 (0.020) 7471B

000185



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

Client Sample ID: W-1091 Date Sampled: 03/11/19 08:46

Percent Solids: N/A

Extraction Method: 7471B

ESS Laboratory Work Order: 1903263 ESS Laboratory Sample ID: 1903263-06

Sample Matrix: Wipe Units: ug/100cm²

Total Metals

 Analyte Mercury
 Results (MRL)
 MDL
 Method
 Limit
 DF
 Analyst
 Analyzed
 I/V
 F/V
 Batch

 Mercury
 0.350 (0.020)
 7471B
 1
 MKS
 03/13/19 13:29
 1
 40
 CC91302

000186



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

Client Sample ID: W-1092 Date Sampled: 03/11/19 08:50

Percent Solids: N/A

Extraction Method: 7471B

ESS Laboratory Work Order: 1903263 ESS Laboratory Sample ID: 1903263-07

Sample Matrix: Wipe Units: ug/100cm²

Total Metals

F/V Batch CC91302 Analyst Analyzed 03/13/19 13:31 **Analyte** Results (MRL) **MDL** Method Limit Mercury 0.047 (0.020) 7471B



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

Client Sample ID: W-1093 Date Sampled: 03/11/19 08:53

Percent Solids: N/A

Extraction Method: 7471B

ESS Laboratory Work Order: 1903263 ESS Laboratory Sample ID: 1903263-08

Sample Matrix: Wipe Units: ug/100cm²

Total Metals

 Analyte Mercury
 Results (MRL)
 MDL
 Method
 Limit
 DF
 Analyst
 Analyzed
 I/V
 F/V
 Batch

 Mercury
 0.401 (0.100)
 7471B
 5
 MKS
 03/13/19 15:35
 1
 40
 CC91302



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

Client Sample ID: W-1094 Date Sampled: 03/11/19 08:55

Percent Solids: N/A

Extraction Method: 7471B

ESS Laboratory Work Order: 1903263 ESS Laboratory Sample ID: 1903263-09

Sample Matrix: Wipe Units: ug/100cm²

Total Metals

F/V Batch 40 CC91302 Analyst Analyzed 03/13/19 15:41 **Analyte** Results (MRL) **MDL** I/V Method Limit Mercury 0.669 (0.200) 7471B

Service



The Microbiology Division of Thielsch Engineering, Inc.

ESS Laboratory Work Order: 1903263



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

Client Sample ID: W-1095 Date Sampled: 03/11/19 08:56

Percent Solids: N/A

ESS Laboratory Sample ID: 1903263-10

Sample Matrix: Wipe Units: ug/100cm²

refeelt Bollas. 1471

Extraction Method: 7471B

Total Metals

 Analyte Mercury
 Results (MRL)
 MDL 0.191 (0.020)
 Method 7471B
 Limit 1
 DF 1
 Analyst Analyzed MKS 03/13/19 13:37
 I/V 1
 F/V 40 CC91302



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

Client Sample ID: W-1096 Date Sampled: 03/11/19 09:00

Percent Solids: N/A

ESS Laboratory Work Order: 1903263 ESS Laboratory Sample ID: 1903263-11

Sample Matrix: Wipe Units: ug/100cm²

Extraction Method: 7471B

Total Metals

 Analyte Mercury
 Results (MRL)
 MDL
 Method
 Limit
 DF
 Analyst
 Analyzed
 I/V
 F/V
 Batch

 Mercury
 0.079 (0.020)
 7471B
 1
 MKS
 03/13/19 13:40
 1
 40
 CC91302



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

ESS Laboratory Work Order: 1903263

Quality Control Data

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
			Total Meta	.lc						
			TOTAL META	115						
Batch CC91302 - 7471B										
Blank										
Mercury	ND	0.020	ug/100cm²							
LCS										
Mercury	0.118	0.020	ug/100cm²	0.1208		98	85-115			
LCS Dup										
Mercury	0.116	0.020	ug/100cm ²	0.1208		96	85-115	2	20	



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

ESS Laboratory Work Order: 1903263

Notes and Definitions

U	Analyte included in the analysis, but not detected
D	Diluted.
ND	Analyte NOT DETECTED at or above the MRL (LOQ), LOD for DoD Reports, MDL for J-Flagged Analytes
dry	Sample results reported on a dry weight basis
RPD	Relative Percent Difference
MDL	Method Detection Limit
MRL	Method Reporting Limit
LOD	Limit of Detection
LOQ	Limit of Quantitation
DL	Detection Limit
I/V	Initial Volume
F/V	Final Volume
§	Subcontracted analysis; see attached report
1	Range result excludes concentrations of surrogates and/or internal standards eluting in that range.
2	Range result excludes concentrations of target analytes eluting in that range.
3	Range result excludes the concentration of the C9-C10 aromatic range.
Avg NR	Results reported as a mathematical average. No Recovery

[CALC] Calculated Analyte

SUB Subcontracted analysis; see attached report

RL Reporting Limit

EDL Estimated Detection Limit MF Membrane Filtration MPN Most Probably Number TNTC Too numerous to Count CFU Colony Forming Units



The Microbiology Division of Thielsch Engineering, Inc.

ESS Laboratory Work Order: 1903263



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

ENVIRONMENTAL

ESS LABORATORY CERTIFICATIONS AND ACCREDITATIONS

Rhode Island Potable and Non Potable Water: LAI00179 http://www.health.ri.gov/find/labs/analytical/ESS.pdf

Connecticut Potable and Non Potable Water, Solid and Hazardous Waste: PH-0750 http://www.ct.gov/dph/lib/dph/environmental health/environmental laboratories/pdf/OutofStateCommercialLaboratories.pdf

> Maine Potable and Non Potable Water, and Solid and Hazardous Waste: RI00002 http://www.maine.gov/dhhs/mecdc/environmental-health/dwp/partners/labCert.shtml

> > Massachusetts Potable and Non Potable Water: M-RI002 http://public.dep.state.ma.us/Labcert/Labcert.aspx

New Hampshire (NELAP accredited) Potable and Non Potable Water, Solid and Hazardous Waste: 2424 $\underline{http://des.nh.gov/organization/divisions/water/dwgb/nhelap/index.htm}$

New York (NELAP accredited) Non Potable Water, Solid and Hazardous Waste: 11313 http://www.wadsworth.org/labcert/elap/comm.html

New Jersey (NELAP accredited) Non Potable Water, Solid and Hazardous Waste: RI006 http://datamine2.state.nj.us/DEP OPRA/OpraMain/pi main?mode=pi by site&sort order=PI NAMEA&Select+a+Site:=58715

United States Department of Agriculture Soil Permit: P330-12-00139

Pennsylvania: 68-01752 http://www.dep.pa.gov/Business/OtherPrograms/Labs/Pages/Laboratory-Accreditation-Program.aspx

ESS Laboratory Sample and Cooler Receipt Checklist

		GZA - Bedfor			-	ESS Proje Date Rec		1903263 3/12/201		_
Shipped/	Delivered Via	a:	ESS Court	ier	_	Project Due		3/12/201		-
					-	Days for P				-
1 Air 631		10			,		31	my 5 Day	· Tang	-
	manifest pre			<u>No</u>		6. Does COC mar				Yes
2. Were	custody seals	present?		Yes] 7	7. Is COC comple	te and correct?	?		Yes
3. Is radia	ation count <	100 CPM?		Yes] {	8. Were samples	received intact	?		Yes
	ooler Present o: 2.3	? iced with:	: <u>Ice</u>	Yes] 9	3. Were labs info	rmed about <u>s</u>	hort holds & r	rushes?	(Yes)/ No / N/
5. Was C	OC signed a	nd dated by o	client?	Yes] _	10. Were any ana	alyses received	outside of hold	d time?	Yes (No)
	ubcontracting Sample IDs Analysis	: :		· /(No)	а	2. Were VOAs re a. Air bubbles in a b. Does methanol	aqueous VOAs			Yes / No Yes / No Yes / No / N/
	e samples pr	roperly prese	rved?	Fest / No				. ,		
	ls preserved ovel VOA vials	upon receipt: s frozen:		Date:		Time:		By:		
Sample Re	eceiving Note	ic.						шу		
·	·									
		·		-						
14. Was ti	here a need t	to contact Pro	Diect Manag	er?	Yes (NA					
14. Was the	here a need to	to contact Pre	oject Manag	er?	Yes (No					
 Was the 	here a need to contacted?	to contact Pro	oject Manag client?		Yes / No			By:		
 Was the 	ere a need to	to contact Pro	oject Manag client?		Yes / No	Time:		Ву:		
 Was the 	ere a need to	to contact Pro	Dject Manag client?		Yes / No	Time:		Ву:		
 Was the 	ere a need to	to contact Pro	oject Manag client?		Yes / No	Time:		Ву:		
a. Was the Who was c	container	Proper	Air	Date:	Yes / No				-	and 608.3
a. Was the	ere a need to contacted?	contact the	client?	_ Date: _	Yes / No		Preservative		d pH (Cyanide Pesticides)	
a. Was the Who was c	container	Proper	Air Bubbles	Date:	Yes / No Container 1	Гуре	Preservative		d pH (Cyanide	
a. Was the Who was c	container	Proper Container	Air Bubbles Present	Date: Sufficient Volume	Yes / No Container 1 4 oz. Jar - U	Гуре	Preservative Other		d pH (Cyanide	
Sample Number 01 02 03	Container ID 322634 322632	Proper Container	Air Bubbles Present	Sufficient Volume	Container 1 4 oz. Jar - U 4 oz. Jar - U	Type npres npres	Preservative Other Other		d pH (Cyanide	
Sample Number 01 02 03 04	Container ID 322634 322633 322631	Proper Container Yes Yes Yes Yes	Air Bubbles Present NA NA	Sufficient Volume Yes Yes	Yes / No Container 1 4 oz. Jar - U	Type npres npres npres	Preservative Other Other Other		d pH (Cyanide	
Sample Number 01 02 03 04 05	Container ID 322634 322631 322631 322630	Proper Container Yes Yes	Air Bubbles Present NA NA	Sufficient Volume Yes Yes Yes	Container 1 4 oz. Jar - U 4 oz. Jar - U 4 oz. Jar - U 4 oz. Jar - U	Type npres npres npres npres	Preservative Other Other Other Other Other		d pH (Cyanide	
Sample Number 01 02 03 04 05 06	Container ID 322634 322633 322631 322630 322629	Proper Container Yes Yes Yes Yes Yes Yes Yes Yes	Air Bubbles Present NA NA NA NA	Sufficient Volume Yes Yes Yes Yes	Container 1 4 oz. Jar - U 4 oz. Jar - U 4 oz. Jar - U	Type npres npres npres npres npres	Preservative Other Other Other		d pH (Cyanide	
Sample Number 01 02 03 04 05 06 07	Container ID 322634 322631 322630 322629 322628	Proper Container Yes Yes Yes Yes Yes Yes Yes	Air Bubbles Present NA NA NA NA NA	Sufficient Volume Yes Yes Yes Yes Yes Yes Yes Yes Yes Y	Container 1 4 oz. Jar - U 4 oz. Jar - U 4 oz. Jar - U 4 oz. Jar - U 4 oz. Jar - U	Type npres npres npres npres npres npres	Preservative Other Other Other Other Other Other		d pH (Cyanide	
Sample Number 01 02 03 04 05 06 07 08	Container ID 322634 322631 322630 322639 322629 322628 322627	Proper Container Yes Yes Yes Yes Yes Yes Yes	Air Bubbles Present NA NA NA NA NA	Sufficient Volume Yes Yes Yes Yes Yes Yes Yes Yes	Container 1 4 oz. Jar - U 4 oz. Jar - U 4 oz. Jar - U 4 oz. Jar - U 4 oz. Jar - U 4 oz. Jar - U 4 oz. Jar - U 4 oz. Jar - U	rype npres npres npres npres npres npres npres npres npres npres	Preservative Other Other Other Other Other Other Other Other		d pH (Cyanide	
Sample Number 01 02 03 04 05 06 07 08 09	Container ID 322634 322632 322631 322630 322629 322628 322627 322626	Proper Container Yes Yes Yes Yes Yes Yes Yes Yes	Air Bubbles Present NA NA NA NA NA NA	Sufficient Volume Yes Yes Yes Yes Yes Yes Yes Yes Yes Y	Container 1 4 oz. Jar - U 4 oz. Jar - U 4 oz. Jar - U 4 oz. Jar - U 4 oz. Jar - U 4 oz. Jar - U 4 oz. Jar - U 4 oz. Jar - U 4 oz. Jar - U	rype npres npres npres npres npres npres npres npres npres npres	Preservative Other Other Other Other Other Other Other Other		d pH (Cyanide	
Sample Number 01 02 03 04 05 06 07 08 09 10	Container ID 322634 322633 322632 322631 322630 322629 322628 322627 322626 322625	Proper Container Yes Yes Yes Yes Yes Yes Yes Yes Yes Ye	Air Bubbles Present NA NA NA NA NA NA NA	Sufficient Volume Yes Yes Yes Yes Yes Yes Yes Yes Yes Y	Container 1 4 oz. Jar - U 4 oz. Jar - U 4 oz. Jar - U 4 oz. Jar - U 4 oz. Jar - U 4 oz. Jar - U 4 oz. Jar - U 4 oz. Jar - U 4 oz. Jar - U 4 oz. Jar - U 4 oz. Jar - U	Type npres npres npres npres npres npres npres npres npres npres npres npres npres npres	Preservative Other Other Other Other Other Other Other Other Other		d pH (Cyanide	
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The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Rebecca Cox GZA GeoEnvironmental, Inc. 5 Commerce Park North Bedford, NH 03110

RE: Schiller Boiler Demo (04.0190318.03) ESS Laboratory Work Order Number: 1903264

This signed Certificate of Analysis is our approved release of your analytical results. These results are only representative of sample aliquots received at the laboratory. ESS Laboratory expects its clients to follow all regulatory sampling guidelines. Beginning with this page, the entire report has been paginated. This report should not be copied except in full without the approval of the laboratory. Samples will be disposed of thirty days after the final report has been delivered. If you have any questions or concerns, please feel free to call our Customer Service Department.

Laurel Stoddard Laboratory Director REVIEWED

By ESS Laboratory at 4:21 pm, Mar 18, 2019

Analytical Summary

The project as described above has been analyzed in accordance with the ESS Quality Assurance Plan. This plan utilizes the following methodologies: US EPA SW-846, US EPA Methods for Chemical Analysis of Water and Wastes per 40 CFR Part 136, APHA Standard Methods for the Examination of Water and Wastewater, American Society for Testing and Materials (ASTM), and other recognized methodologies. The analyses with these noted observations are in conformance to the Quality Assurance Plan. In chromatographic analysis, manual integration is frequently used instead of automated integration because it produces more accurate results.

The test results present in this report are in compliance with TNI and relative state standards, and/or client Quality Assurance Project Plans (QAPP). The laboratory has reviewed the following: Sample Preservations, Hold Times, Initial Calibrations, Continuing Calibrations, Method Blanks, Blank Spikes, Blank Spike Duplicates, Duplicates, Matrix Spikes, Matrix Spike Duplicates, Surrogates and Internal Standards. Any results which were found to be outside of the recommended ranges stated in our SOPs will be noted in the Project Narrative.



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

ESS Laboratory Work Order: 1903264

SAMPLE RECEIPT

The following samples were received on March 12, 2019 for the analyses specified on the enclosed Chain of Custody Record.

Lab Number	Sample Name	Matrix	Analysis
1903264-01	W-1078	Wipe	7471B
1903264-02	W-1079	Wipe	7471B
1903264-03	W-1080	Wipe	7471B
1903264-04	W-1081	Wipe	7471B
1903264-05	W-1082	Wipe	7471B
1903264-06	W-1083	Wipe	7471B
1903264-07	W-1084	Wipe	7471B
1903264-08	W-1085	Wipe	7471B
1903264-09	W-1086	Wipe	7471B
1903264-10	W-1087	Wipe	7471B



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

ESS Laboratory Work Order: 1903264

PROJECT NARRATIVE

No unusual observations noted.

End of Project Narrative.

DATA USABILITY LINKS

To ensure you are viewing the most current version of the documents below, please clear your internet cookies for www.ESSLaboratory.com. Consult your IT Support personnel for information on how to clear your internet cookies.

Definitions of Quality Control Parameters

Semivolatile Organics Internal Standard Information

Semivolatile Organics Surrogate Information

Volatile Organics Internal Standard Information

Volatile Organics Surrogate Information

EPH and VPH Alkane Lists



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

ESS Laboratory Work Order: 1903264

Analytical Methods

1010A - Flashpoint 6010C - ICP 6020A - ICP MS

7010 - Graphite Furnace 7196A - Hexavalent Chromium 7470A - Aqueous Mercury

7471B - Solid Mercury 8011 - EDB/DBCP/TCP 8015C - GRO/DRO

8081B - Pesticides 8082A - PCB

8100M - TPH 8151A - Herbicides

8260B - VOA 8270D - SVOA

8270D SIM - SVOA Low Level

9014 - Cyanide 9038 - Sulfate

9040C - Aqueous pH

9045D - Solid pH (Corrosivity)

9050A - Specific Conductance

9056A - Anions (IC)

9060A - TOC

9095B - Paint Filter

MADEP 04-1.1 - EPH

MADEP 18-2.1 - VPH

Prep Methods

CURRENT SW-846 METHODOLOGY VERSIONS

3005A - Aqueous ICP Digestion

3020A - Aqueous Graphite Furnace / ICP MS Digestion

3050B - Solid ICP / Graphite Furnace / ICP MS Digestion

3060A - Solid Hexavalent Chromium Digestion

3510C - Separatory Funnel Extraction

3520C - Liquid / Liquid Extraction

3540C - Manual Soxhlet Extraction

3541 - Automated Soxhlet Extraction

3546 - Microwave Extraction 3580A - Waste Dilution

5030B - Aqueous Purge and Trap

5030C - Aqueous Purge and Trap

5035A - Solid Purge and Trap

SW846 Reactivity Methods 7.3.3.2 (Reactive Cyanide) and 7.3.4.1 (Reactive Sulfide) have been withdrawn by EPA. These methods are reported per client request and are not NELAP accredited.



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

Client Sample ID: W-1078 Date Sampled: 03/11/19 11:38

Percent Solids: N/A

Extraction Method: 7471B

ESS Laboratory Work Order: 1903264 ESS Laboratory Sample ID: 1903264-01

Sample Matrix: Wipe Units: ug/100cm²

Total Metals

 Analyte Mercury
 Results (MRL)
 MDL 0.035 (0.020)
 Method 7471B
 Limit 1
 DF 0.05
 Analyst Analyzed 0.03/13/19 13:48
 I/V 1
 F/V E/V CO91303



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

Client Sample ID: W-1079 Date Sampled: 03/11/19 12:10

Percent Solids: N/A

Extraction Method: 7471B

ESS Laboratory Work Order: 1903264 ESS Laboratory Sample ID: 1903264-02

Sample Matrix: Wipe Units: ug/100cm²

Total Metals

Analyst Analyzed 03/13/19 15:43 F/V Batch Results (MRL) **MDL** I/V **Analyte** Method Limit Mercury 1.78 (0.400) 7471B 40 CC91303



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

Client Sample ID: W-1080 Date Sampled: 03/11/19 12:22

Percent Solids: N/A

ESS Laboratory Work Order: 1903264 ESS Laboratory Sample ID: 1903264-03

Sample Matrix: Wipe Units: ug/100cm²

Extraction Method: 7471B

Total Metals

F/V Batch 40 CC91303 Analyst Analyzed 03/13/19 14:52 Results (MRL) **MDL** <u>I/V</u> **Analyte** Method Limit Mercury 0.108 (0.020) 7471B



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

Client Sample ID: W-1081 Date Sampled: 03/11/19 14:30

Percent Solids: N/A

ESS Laboratory Work Order: 1903264 ESS Laboratory Sample ID: 1903264-04

Sample Matrix: Wipe Units: ug/100cm²

Extraction Method: 7471B

Total Metals

Analyst Analyzed 03/13/19 15:45 F/V Batch **Analyte** Results (MRL) **MDL** I/V Method Limit Mercury 0.938 (0.200) 7471B 40 CC91303



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

Client Sample ID: W-1082 Date Sampled: 03/11/19 14:35

Percent Solids: N/A

Extraction Method: 7471B

ESS Laboratory Work Order: 1903264 ESS Laboratory Sample ID: 1903264-05

Sample Matrix: Wipe Units: ug/100cm²

Total Metals

 Analyte Mercury
 Results (MRL)
 MDL 0.423 (0.100)
 Method 7471B
 Limit 5
 DF MKS 03/13/19 15:47
 Analyzed 0.10/1 15:47
 I/V 1 40 CC91303



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

Client Sample ID: W-1083 Date Sampled: 03/11/19 14:39

Percent Solids: N/A

Extraction Method: 7471B

ESS Laboratory Work Order: 1903264 ESS Laboratory Sample ID: 1903264-06

Sample Matrix: Wipe Units: ug/100cm²

Total Metals

 Analyte Mercury
 Results (MRL)
 MDL
 Method
 Limit
 DF
 Analyst
 Analyzed
 I/V
 F/V
 Batch

 Mcroury
 0.289 (0.020)
 7471B
 1
 MKS
 03/13/19 14:58
 1
 40
 CC91303



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

Client Sample ID: W-1084 Date Sampled: 03/11/19 14:41

Percent Solids: N/A

ESS Laboratory Work Order: 1903264 ESS Laboratory Sample ID: 1903264-07

Sample Matrix: Wipe Units: ug/100cm²

Extraction Method: 7471B

Total Metals

 Analyte Mercury
 Results (MRL)
 MDL 7471B
 Limit 7471B
 DF 100 MKS
 Analyzed 3/13/19 15:49
 I/V 11 MKS
 E/V 12 MKS
 Batch CC91303



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

Client Sample ID: W-1085 Date Sampled: 03/11/19 14:45

Percent Solids: N/A

ESS Laboratory Work Order: 1903264 ESS Laboratory Sample ID: 1903264-08

Sample Matrix: Wipe Units: ug/100cm²

Extraction Method: 7471B

Total Metals

 Analyte Mercury
 Results (MRL)
 MDL 0.372 (0.020)
 Method 7471B
 Limit 1
 DF 0.372 (0.020)
 Analyst Analyzed 0.3719 15:02
 I/V 1
 F/V 0.02103
 Batch 0.02103



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

Client Sample ID: W-1086 Date Sampled: 03/11/19 14:50

Percent Solids: N/A

Extraction Method: 7471B

ESS Laboratory Work Order: 1903264 ESS Laboratory Sample ID: 1903264-09

Sample Matrix: Wipe Units: ug/100cm²

Total Metals

F/V Batch CC91303 Analyst Analyzed 03/13/19 15:04 **Analyte** Results (MRL) **MDL** Method Limit Mercury 0.202 (0.020) 7471B



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

Client Sample ID: W-1087 Date Sampled: 03/11/19 14:55

Percent Solids: N/A

ESS Laboratory Work Order: 1903264 ESS Laboratory Sample ID: 1903264-10

Sample Matrix: Wipe Units: ug/100cm²

Extraction Method: 7471B

Total Metals

F/V Batch CC91303 Analyst Analyzed 03/13/19 15:06 **Analyte** Results (MRL) **MDL** Method Limit Mercury 0.153 (0.020) 7471B



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

ESS Laboratory Work Order: 1903264

Quality Control Data

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
			Total Meta	als						
Batch CC91303 - 7471B										
Blank										
Mercury	ND	0.020	ug/100cm²							
LCS										
Mercury	0.120	0.020	ug/100cm²	0.1208		99	85-115			
LCS Dup										
Mercury	0.121	0.020	ug/100cm²	0.1208		100	85-115	1	20	



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

ESS Laboratory Work Order: 1903264

Notes and Definitions

U	Analyte included in the analysis, but not detected
D	Diluted.
ND	Analyte NOT DETECTED at or above the MRL (LOQ), LOD for DoD Reports, MDL for J-Flagged Analytes
dry	Sample results reported on a dry weight basis
RPD	Relative Percent Difference
MDL	Method Detection Limit
MRL	Method Reporting Limit
LOD	Limit of Detection
LOQ	Limit of Quantitation
DL	Detection Limit
I/V	Initial Volume
F/V	Final Volume
§	Subcontracted analysis; see attached report
1	Range result excludes concentrations of surrogates and/or internal standards eluting in that range.
2	Range result excludes concentrations of target analytes eluting in that range.
3	Range result excludes the concentration of the C9-C10 aromatic range.
Avg NR	Results reported as a mathematical average. No Recovery

[CALC] Calculated Analyte

SUB Subcontracted analysis; see attached report

RL Reporting Limit

EDL Estimated Detection Limit MF Membrane Filtration MPN Most Probably Number TNTC Too numerous to Count CFU Colony Forming Units



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

ESS Laboratory Work Order: 1903264

ENVIRONMENTAL

ESS LABORATORY CERTIFICATIONS AND ACCREDITATIONS

Rhode Island Potable and Non Potable Water: LAI00179 http://www.health.ri.gov/find/labs/analytical/ESS.pdf

Connecticut Potable and Non Potable Water, Solid and Hazardous Waste: PH-0750 http://www.ct.gov/dph/lib/dph/environmental_health/environmental_laboratories/pdf/OutofStateCommercialLaboratories.pdf

Maine Potable and Non Potable Water, and Solid and Hazardous Waste: RI00002 http://www.maine.gov/dhhs/mecdc/environmental-health/dwp/partners/labCert.shtml

Massachusetts Potable and Non Potable Water: M-RI002 http://public.dep.state.ma.us/Labcert/Labcert.aspx

New Hampshire (NELAP accredited) Potable and Non Potable Water, Solid and Hazardous Waste: 2424 http://des.nh.gov/organization/divisions/water/dwgb/nhelap/index.htm

New York (NELAP accredited) Non Potable Water, Solid and Hazardous Waste: 11313 http://www.wadsworth.org/labcert/elap/comm.html

New Jersey (NELAP accredited) Non Potable Water, Solid and Hazardous Waste: RI006 http://datamine2.state.nj.us/DEP OPRA/OpraMain/pi main?mode=pi by site&sort order=PI NAMEA&Select+a+Site:=58715

United States Department of Agriculture Soil Permit: P330-12-00139

Pennsylvania: 68-01752

http://www.dep.pa.gov/Business/OtherPrograms/Labs/Pages/Laboratory-Accreditation-Program.aspx

ESS Laboratory Sample and Cooler Receipt Checklist

Client:	GZA -	Bedford, Ni	-I - GZA/DS		ESS Proj Date Rec	ceived: 3/12/20	19
Shipped/Deliv	ered Via:	ES	S Courier		Project Due	Project: 3/19/20	
						White Pattles	Yes
1. Air bill man Air No.:	ifest present	? _NA	 	No	6. Does COC ma	itch bottles?	
2. Were custo	ody seals pre	sent?		Yes	7. Is COC compl	ete and correct?	Yes
3. Is radiation	count <100	CPM?		Yes		received intact?	Yes Yes / No / NA
4. Is a Cooler Temp:	r Present? 2.3	lced with:	lce	Yes		formed about short holds & nalyses received outside of h	
5. Was COC			_	Yes	vere any a	maryses received entitles at	
11. Any Subc	ample IDs: Analysis:	eeded?	Yes /		12. Were VOAs a. Air bubbles i b. Does methan	received? n aqueous VOAs? nol cover soil completely?	Yes / 🔞 Yes / No Yes / No / NA
13. Are the	preserved up	on receipt:	ed?	(a) / No Date:	Time:	 By:	
b. Low Leve	I VOA vials fi	ozen:		Date			
Sample Rec	eiving Notes:						
14. Was the a. Was the Who was co	ere a need to re a need to contacted?	contact Project the c	ject Manage lient?		Yes / No Yes / No Time:	Ву:	
				_			
							Record pH (Cyanide and 608.3
Sample Number	Container ID	Proper Container	Air Bubbles Present	Sufficient Volume	Container Type	Preservative	Pesticides)
01	322645	Yes	NA	Yes	4 oz. Jar - Unpres	Other	
02	322644	Yes	NA	Yes	4 oz. Jar - Unpres	Other	
03	322643	Yes	NA	Yes	4 oz. Jar - Unpres	Other Other	
04	322642	Yes	NA	Yes	4 oz. Jar - Unpres	Other	
05	322641	Yes	NA	Yes	4 oz. Jar - Unpres 4 oz. Jar - Unpres	Other	
06	322640	Yes	NA	Yes		Other	
07	322639	Yes	NA	Yes	4 oz. Jar - Unpres 4 oz. Jar - Unpres	Other	
08	322638	Yes	NA	Yes	4 oz. Jar - Unpres	Other	
09	322637	Yes	NA NA	Yes	4 oz. Jar - Unpres	Other	
10	322636	Yes	NA	Yes	- 02. 001 - Otipico		
2nd Revie	ow iners scanne	ad into etom	ageilah		Joitials: W		
All contai	de labels on o	orrect conta	iners?		Yes No		
Are parco	de labels of c cessary sticke	ers attached	?		Yes No		
Complete) 159	\		Date & Time:	3/2/19 1758	
By: Reviewed By:	i —				Date & Time: 3 12	19 1818	
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Delivered By:		1	(30	9 1818	

ESS Laboratory Division of Thielsch Engineering, Inc. 185 Frances Avenue, Cranston Rt 02910 181. (401) 461-7181 Fax (401) 461-4486 www.esslaboratory.com Company Name CTA Company Name CTA Company Name Autoro Confact Person	10000			•					
Division of Thielsch Engineering, Inc. 186 Frances Avenue, Cranston RI 02910 Tel. (401) 461-7181 Fax (401) 461-4486 www.esslaboratory.com Company Name CZA Conformance And Confort Person	`	O	CHAIN OF CUSTODY	. A	ESS Lab #		19032641		
Tel. (401) 461-7181 Fax (401) 461-4486 WANN-GESTALON-COM GOMBON Name GTA. Calenamman Land Holder Contact Person		Turn Time	& Y Days		Reporting Limits		<u>-</u>		
CZA Colemany Name CZA Colemany 201 Replace Contact Person		Is this	project for any of the foll	owing?:	ာ ဦး ြ ြ	Data Checker Other (Please Specify	î	D Excel	
elecco		Project #	Seh	ne					
		5 Commone	were park N.		sisyl				
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60 Felephone Number	FA	FAX Number	Email Address	26. Cen	napo				
ESS Lab Collection Collection Se	Sample Type	Sample Matrix	Sam	Sample ID	Ľ			Martin Martin Communication (Communication)	
7 8511 Byns 1	×13	Sign	8201-M		٨				
0121 1111/15 2		_	6201-A		9			s a maga	
2221 6/11/15 8			W-1080		92-			Far Ballin Ta	
05.21 6/m/s h			1801-M		4.				<u></u> .,
5 1/M/9 1435			2801-M		52				_
6 3/4/9 1439			W-1083		7				
1741 8711/5 2			1801-		9_				
8 Ilulia 1445			W-1085		9-				
9 3/ulis 1450			2501-0		æ				
	ጎ		۷		Z.				
sette		B-80D B	ubitainer J-Jar	er P-Poly					\dashv
Container Volume: 1-100 mL 2-2.5 gal	gal 3-250 mL	ml 4-300	mL 6-1L 7-VOA 8-2 oz	9-4 oz	10-8 oz 11-Other* 4				+
reservation cours. Francisco 2-		3	Number o		r Sample:			-	+
Laboratory Use Only	se Only		Sampled by: E. Dynness	A 850	C. Madison				
Cooler Present:	O Drop of		Comments: Comments:	8	pecify "Other" preser	vative and	Please specify "Other" preservative and containers types in this space $(\mathcal{O} \times I \mathcal{O}_{COD})$	space	
ture:	oc letemn	, 2,3			,			ಷಣ 'ಒತ್ತಿಕ್	
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Bull Supper 3/12/9		NK T	S/12/14 12:13	MAR	21/01/ bilei18	15	يراا واليراة لحكل	1/2/19	577
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The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Rebecca Cox GZA GeoEnvironmental, Inc. 5 Commerce Park North Bedford, NH 03110

RE: Schiller Boiler Demo (04.0190318.03) ESS Laboratory Work Order Number: 1903301

This signed Certificate of Analysis is our approved release of your analytical results. These results are only representative of sample aliquots received at the laboratory. ESS Laboratory expects its clients to follow all regulatory sampling guidelines. Beginning with this page, the entire report has been paginated. This report should not be copied except in full without the approval of the laboratory. Samples will be disposed of thirty days after the final report has been delivered. If you have any questions or concerns, please feel free to call our Customer Service Department.

Laurel Stoddard Laboratory Director **REVIEWED**

By ESS Laboratory at 12:28 pm, Mar 19, 2019

Analytical Summary

The project as described above has been analyzed in accordance with the ESS Quality Assurance Plan. This plan utilizes the following methodologies: US EPA SW-846, US EPA Methods for Chemical Analysis of Water and Wastes per 40 CFR Part 136, APHA Standard Methods for the Examination of Water and Wastewater, American Society for Testing and Materials (ASTM), and other recognized methodologies. The analyses with these noted observations are in conformance to the Quality Assurance Plan. In chromatographic analysis, manual integration is frequently used instead of automated integration because it produces more accurate results.

The test results present in this report are in compliance with TNI and relative state standards, and/or client Quality Assurance Project Plans (QAPP). The laboratory has reviewed the following: Sample Preservations, Hold Times, Initial Calibrations, Continuing Calibrations, Method Blanks, Blank Spikes, Blank Spike Duplicates, Duplicates, Matrix Spikes, Matrix Spike Duplicates, Surrogates and Internal Standards. Any results which were found to be outside of the recommended ranges stated in our SOPs will be noted in the Project Narrative.



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

ESS Laboratory Work Order: 1903301

SAMPLE RECEIPT

The following samples were received on March 13, 2019 for the analyses specified on the enclosed Chain of Custody Record.

Lab Number	Sample Name	Matrix	Analysis
1903301-03	C-1003	Solid	7471B
1903301-04	C-1004	Solid	7471B
1903301-05	C-1005	Solid	7471B



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

ESS Laboratory Work Order: 1903301

PROJECT NARRATIVE

No unusual observations noted.

End of Project Narrative.

DATA USABILITY LINKS

To ensure you are viewing the most current version of the documents below, please clear your internet cookies for www.ESSLaboratory.com. Consult your IT Support personnel for information on how to clear your internet cookies.

Definitions of Quality Control Parameters

Semivolatile Organics Internal Standard Information

Semivolatile Organics Surrogate Information

Volatile Organics Internal Standard Information

Volatile Organics Surrogate Information

EPH and VPH Alkane Lists



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

ESS Laboratory Work Order: 1903301

CURRENT SW-846 METHODOLOGY VERSIONS

Analytical Methods

1010A - Flashpoint 6010C - ICP

6020A - ICP MS

7010 - Graphite Furnace 7196A - Hexavalent Chromium

7470A - Aqueous Mercury

7471B - Solid Mercury 8011 - EDB/DBCP/TCP

8015C - GRO/DRO 8081B - Pesticides

8082A - PCB

8100M - TPH

8151A - Herbicides 8260B - VOA

8260B - VOA 8270D - SVOA

8270D SIM - SVOA Low Level

9014 - Cyanide

9038 - Sulfate

9040C - Aqueous pH

9045D - Solid pH (Corrosivity)

9050A - Specific Conductance

9056A - Anions (IC)

9060A - TOC

9095B - Paint Filter

MADEP 04-1.1 - EPH

MADEP 18-2.1 - VPH

Prep Methods

3005A - Aqueous ICP Digestion

3020A - Aqueous Graphite Furnace / ICP MS Digestion

3050B - Solid ICP / Graphite Furnace / ICP MS Digestion

3060A - Solid Hexavalent Chromium Digestion

3510C - Separatory Funnel Extraction

3520C - Liquid / Liquid Extraction

3540C - Manual Soxhlet Extraction

3541 - Automated Soxhlet Extraction

3546 - Microwave Extraction

3580A - Waste Dilution

5030B - Aqueous Purge and Trap

5030C - Aqueous Purge and Trap

5035A - Solid Purge and Trap

SW846 Reactivity Methods 7.3.3.2 (Reactive Cyanide) and 7.3.4.1 (Reactive Sulfide) have been withdrawn by EPA. These methods are reported per client request and are not NELAP accredited.



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

Client Sample ID: C-1003 Date Sampled: 03/12/19 08:38

Percent Solids: 98

Extraction Method: 7471B

ESS Laboratory Work Order: 1903301 ESS Laboratory Sample ID: 1903301-03

Sample Matrix: Solid Units: mg/kg dry

Total Metals

 Analyte Mercury
 Results (MRL)
 MDL 7471B
 Limit 50 MKS
 DF MKS 03/14/19 12:20
 Analyzed 1/V 12:20
 I/V 747 MKS 03/14/19 12:20
 Batch 747 MKS 03/14/19 12:20



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

Client Sample ID: C-1004 Date Sampled: 03/12/19 08:28

Percent Solids: 98

ESS Laboratory Work Order: 1903301 ESS Laboratory Sample ID: 1903301-04

Sample Matrix: Solid Units: mg/kg dry

Extraction Method: 7471B

Total Metals

I/V F/V Batch **Analyte** Results (MRL) **MDL** Method Limit Mercury **15.6** (1.29) 7471B 40 CC91401



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

Client Sample ID: C-1005 Date Sampled: 03/12/19 08:15

Percent Solids: 99

Extraction Method: 7471B

ESS Laboratory Work Order: 1903301 ESS Laboratory Sample ID: 1903301-05

Sample Matrix: Solid Units: mg/kg dry

Total Metals

 Analyte
 Results (MRL)
 MDL
 Method
 Limit
 DF
 Analyst
 Analyzed
 I/V
 F/V
 Batch

 Mercury
 3.53 (0.681)
 7471B
 20
 MKS
 03/14/19 13:05
 0.59
 40
 CC91401



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

ESS Laboratory Work Order: 1903301

Quality Control Data

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
			Total Meta	ls						
Batch CC91401 - 7471B										
Blank										
Mercury	ND	0.033	mg/kg wet							
LCS										
Mercury	3.09	0.325	mg/kg wet	4.850		64	80-120			
LCS Dup										
Mercury	3.13	0.314	mg/kg wet	4.850		65	80-120	1	20	



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

ESS Laboratory Work Order: 1903301

Notes and Definitions

U	Analyte included in the analysis, but not detected
D	Diluted.
ND	Analyte NOT DETECTED at or above the MRL (LOQ), LOD for DoD Reports, MDL for J-Flagged Analytes
dry	Sample results reported on a dry weight basis
RPD	Relative Percent Difference
MDL	Method Detection Limit
MRL	Method Reporting Limit
LOD	Limit of Detection
LOQ	Limit of Quantitation
DL	Detection Limit
I/V	Initial Volume
F/V	Final Volume
§	Subcontracted analysis; see attached report
1	Range result excludes concentrations of surrogates and/or internal standards eluting in that range.
2	Range result excludes concentrations of target analytes eluting in that range.
3	Range result excludes the concentration of the C9-C10 aromatic range.
Avg	Results reported as a mathematical average.
NR	No Recovery

[CALC] Calculated Analyte

SUB Subcontracted analysis; see attached report

RLReporting Limit

EDL **Estimated Detection Limit** MF Membrane Filtration MPN Most Probably Number TNTC Too numerous to Count CFU Colony Forming Units



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

ESS Laboratory Work Order: 1903301

ESS LABORATORY CERTIFICATIONS AND ACCREDITATIONS

ENVIRONMENTAL

Rhode Island Potable and Non Potable Water: LAI00179 http://www.health.ri.gov/find/labs/analytical/ESS.pdf

Connecticut Potable and Non Potable Water, Solid and Hazardous Waste: PH-0750 http://www.ct.gov/dph/lib/dph/environmental health/environmental laboratories/pdf/OutofStateCommercialLaboratories.pdf

Maine Potable and Non Potable Water, and Solid and Hazardous Waste: RI00002 http://www.maine.gov/dhhs/mecdc/environmental-health/dwp/partners/labCert.shtml

Massachusetts Potable and Non Potable Water: M-RI002 http://public.dep.state.ma.us/Labcert/Labcert.aspx

New Hampshire (NELAP accredited) Potable and Non Potable Water, Solid and Hazardous Waste: 2424 http://des.nh.gov/organization/divisions/water/dwgb/nhelap/index.htm

New York (NELAP accredited) Non Potable Water, Solid and Hazardous Waste: 11313 http://www.wadsworth.org/labcert/elap/comm.html

New Jersey (NELAP accredited) Non Potable Water, Solid and Hazardous Waste: RI006 http://datamine2.state.nj.us/DEP OPRA/OpraMain/pi main?mode=pi by site&sort order=PI NAMEA&Select+a+Site:=58715

United States Department of Agriculture Soil Permit: P330-12-00139

Pennsylvania: 68-01752

 $\underline{http://www.dep.pa.gov/Business/Other Programs/Labs/Pages/Laboratory-Accreditation-Program.aspx}$

ESS Laboratory Sample and Cooler Receipt Checklist

Client: Shipped/D	GZ elivered Via:	'A - Bedford			-	Da	S Project ID: te Received: ct Due Date:	1903301 3/13/2019 3/19/2019	_
	•				-		s for Project:	4 Day	
	nanifest prese			No]	6. Does CC	OC match bottles?	4	Yes
2. Were cu	ıstody seals p	resent?		No]	7. Is COC	complete and correc	at?	Yes
3. Is radiat	ion count <10	00 CPM?		Yes]	8. Were sa	mples received intac	ct?	Yes
	oler Present? 1.5	Iced with;	Ice	Yes]	9. Were la	bs informed about	short holds & rushes?	Yes No/NA
•	C signed and			Yes]	10. Were a	ny analyses receive	ed outside of hold time?	Yes (No)
	bcontracting of Sample IDs: Analysis:			/(No)		a. Air bubb	OAs received? les in aqueous VOA ethanol cover soil co		Yes (No Yes / No Yes / No / NA
a. If metals b. Low Lev	e samples pro s preserved u rel VOA vials ceiving Notes	pon receipt: frozen:	ved?	kes / No Date: Date:		_ Time:		By: By:	
	nere a need to ontacted?			er? Date:	Yes (No Yes / No	Time:		Ву:	_
Sample Number	Container ID	Proper Container	Air Bubbles Present	Sufficient Volume	Containe	er Type	Preservative	Record pH (Cyar Pestici	
01	322889	Yes	NA	Yes	4 oz. Jar		Other		
02 03	322888 322887	Yes Yes	NA NA	Yes Yes	4 oz. Jar 4 oz. Jar		Other Other		
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05	322885	Yes	NA	Yes	4 oz. Jar	- Unpres	Other		
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The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Rebecca Cox GZA GeoEnvironmental, Inc. 5 Commerce Park North Bedford, NH 03110

RE: Schiller Boiler Demo (04.0190318.03) ESS Laboratory Work Order Number: 1903403

This signed Certificate of Analysis is our approved release of your analytical results. These results are only representative of sample aliquots received at the laboratory. ESS Laboratory expects its clients to follow all regulatory sampling guidelines. Beginning with this page, the entire report has been paginated. This report should not be copied except in full without the approval of the laboratory. Samples will be disposed of thirty days after the final report has been delivered. If you have any questions or concerns, please feel free to call our Customer Service Department.

Laurel Stoddard Laboratory Director REVIEWED

By ESS Laboratory at 2:52 pm, Mar 21, 2019

Analytical Summary

The project as described above has been analyzed in accordance with the ESS Quality Assurance Plan. This plan utilizes the following methodologies: US EPA SW-846, US EPA Methods for Chemical Analysis of Water and Wastes per 40 CFR Part 136, APHA Standard Methods for the Examination of Water and Wastewater, American Society for Testing and Materials (ASTM), and other recognized methodologies. The analyses with these noted observations are in conformance to the Quality Assurance Plan. In chromatographic analysis, manual integration is frequently used instead of automated integration because it produces more accurate results.

The test results present in this report are in compliance with TNI and relative state standards, and/or client Quality Assurance Project Plans (QAPP). The laboratory has reviewed the following: Sample Preservations, Hold Times, Initial Calibrations, Continuing Calibrations, Method Blanks, Blank Spikes, Blank Spike Duplicates, Duplicates, Matrix Spikes, Matrix Spike Duplicates, Surrogates and Internal Standards. Any results which were found to be outside of the recommended ranges stated in our SOPs will be noted in the Project Narrative.



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

ESS Laboratory Work Order: 1903403

SAMPLE RECEIPT

The following samples were received on March 15, 2019 for the analyses specified on the enclosed Chain of Custody Record.

Lab Number	Sample Name	Matrix	Analysis
1903403-01	C-1022	Solid	7471B
1903403-02	C-1023	Solid	7471B
1903403-03	W-1114	Wipe	7471B
1903403-04	W-1115	Wipe	7471B
1903403-05	W-1116	Wipe	7471B
1903403-06	W-1117	Wipe	7471B
1903403-07	W-1118	Wipe	7471B
1903403-08	W-1119	Wipe	7471B
1903403-09	W-1120	Wipe	7471B
1903403-10	W-1121	Wipe	7471B
1903403-11	W-1122	Wipe	7471B
1903403-12	W-1123	Wipe	7471B
1903403-13	W-1124	Wipe	7471B
1903403-14	W-1125	Wipe	7471B
1903403-15	W-1126	Wipe	7471B
1903403-16	W-1127	Wipe	7471B
1903403-17	W-1128	Wipe	7471B
1903403-18	W-1129	Wipe	7471B
1903403-19	W-1130	Wipe	7471B
1903403-20	W-1131	Wipe	7471B



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

ESS Laboratory Work Order: 1903403

PROJECT NARRATIVE

No unusual observations noted.

End of Project Narrative.

DATA USABILITY LINKS

To ensure you are viewing the most current version of the documents below, please clear your internet cookies for www.ESSLaboratory.com. Consult your IT Support personnel for information on how to clear your internet cookies.

Definitions of Quality Control Parameters

Semivolatile Organics Internal Standard Information

Semivolatile Organics Surrogate Information

Volatile Organics Internal Standard Information

Volatile Organics Surrogate Information

EPH and VPH Alkane Lists



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

ESS Laboratory Work Order: 1903403

Analytical Methods

1010A - Flashpoint 6010C - ICP 6020A - ICP MS

7010 - Graphite Furnace 7196A - Hexavalent Chromium

7470A - Aqueous Mercury 7471B - Solid Mercury 8011 - EDB/DBCP/TCP 8015C - GRO/DRO

8081B - Pesticides 8082A - PCB

8100M - TPH 8151A - Herbicides

8260B - VOA 8270D - SVOA

8270D SIM - SVOA Low Level

9014 - Cyanide 9038 - Sulfate

9040C - Aqueous pH

9045D - Solid pH (Corrosivity)

9050A - Specific Conductance

9056A - Anions (IC)

9060A - TOC

9095B - Paint Filter

MADEP 04-1.1 - EPH

MADEP 18-2.1 - VPH

Prep Methods

CURRENT SW-846 METHODOLOGY VERSIONS

3005A - Aqueous ICP Digestion

3020A - Aqueous Graphite Furnace / ICP MS Digestion

3050B - Solid ICP / Graphite Furnace / ICP MS Digestion

3060A - Solid Hexavalent Chromium Digestion

3510C - Separatory Funnel Extraction 3520C - Liquid / Liquid Extraction

3540C - Manual Soxhlet Extraction

3541 - Automated Soxhlet Extraction

3546 - Microwave Extraction

3580A - Waste Dilution

5030B - Aqueous Purge and Trap 5030C - Aqueous Purge and Trap

5035A - Solid Purge and Trap

SW846 Reactivity Methods 7.3.3.2 (Reactive Cyanide) and 7.3.4.1 (Reactive Sulfide) have been withdrawn by EPA. These methods are reported per client request and are not NELAP accredited.



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

Client Sample ID: C-1022 Date Sampled: 03/14/19 13:24

Percent Solids: 100

Extraction Method: 7471B

ESS Laboratory Work Order: 1903403 ESS Laboratory Sample ID: 1903403-01

Sample Matrix: Solid Units: mg/kg dry

Total Metals

<u>Analyst</u> <u>Analyzed</u> <u>I/V</u> MKS 03/19/19 16:51 0.67 Results (MRL) **MDL** I/V F/V Batch **Analyte** Method Limit Mercury **15.0** (1.48) 7471B 40 CC91854



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

Client Sample ID: C-1023 Date Sampled: 03/14/19 13:33

Percent Solids: 100

Extraction Method: 7471B

ESS Laboratory Work Order: 1903403 ESS Laboratory Sample ID: 1903403-02

Sample Matrix: Solid Units: mg/kg dry

Total Metals

 Analyte
 Results (MRL)
 MDL
 Method
 Limit
 DF
 Analyst
 Analyzed
 I/V
 F/V
 Batch

 Mercury
 25.9 (1.46)
 7471B
 50
 MKS
 03/19/19 16:53
 0.68
 40
 CC91854



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

Client Sample ID: W-1114
Date Sampled: 03/14/19 14:15

Percent Solids: N/A

Extraction Method: 7471B

ESS Laboratory Work Order: 1903403 ESS Laboratory Sample ID: 1903403-03

Sample Matrix: Wipe Units: ug/100cm²

Total Metals

 Analyte Mercury
 Results (MRL)
 MDL
 Method
 Limit
 DF
 Analyst
 Analyzed
 I/V
 F/V
 Batch

 Mccoury
 0.356 (0.020)
 7471B
 1
 MKS
 03/19/19 12:28
 1
 40
 CC91841



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

Client Sample ID: W-1115
Date Sampled: 03/14/19 14:17

Percent Solids: N/A

Extraction Method: 7471B

ESS Laboratory Work Order: 1903403 ESS Laboratory Sample ID: 1903403-04

Sample Matrix: Wipe Units: ug/100cm²

Total Metals

 Analyte Mercury
 Results (MRL)
 MDL 0.030 (0.020)
 Method 7471B
 Limit 1
 DF 0.030 (0.020)
 Analyst Analyzed 0.030 (0.020)
 I/V 40 CC91841



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

Client Sample ID: W-1116 Date Sampled: 03/14/19 14:20

Percent Solids: N/A

Extraction Method: 7471B

ESS Laboratory Work Order: 1903403 ESS Laboratory Sample ID: 1903403-05

Sample Matrix: Wipe Units: ug/100cm²

Total Metals

F/V Batch CC91841 Analyst Analyzed
MKS 03/19/19 12:32 Results (MRL) **MDL** I/V **Analyte** Method Limit Mercury 0.127 (0.020) 7471B



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

Client Sample ID: W-1117 Date Sampled: 03/14/19 14:22

Percent Solids: N/A

Extraction Method: 7471B

ESS Laboratory Work Order: 1903403 ESS Laboratory Sample ID: 1903403-06

Sample Matrix: Wipe Units: ug/100cm²

Total Metals

 Analyte Mercury
 Results (MRL)
 MDL 0.084 (0.020)
 Method 7471B
 Limit 1
 DF 0.084 (0.020)
 Analyst Analyzed 0.024
 I/V 1
 F/V 40
 Batch 0.0291841



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

Client Sample ID: W-1118
Date Sampled: 03/14/19 14:25

Percent Solids: N/A

Extraction Method: 7471B

ESS Laboratory Work Order: 1903403 ESS Laboratory Sample ID: 1903403-07

Sample Matrix: Wipe Units: ug/100cm²

Total Metals



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

Client Sample ID: W-1119
Date Sampled: 03/14/19 14:08

Percent Solids: N/A

Extraction Method: 7471B

ESS Laboratory Work Order: 1903403 ESS Laboratory Sample ID: 1903403-08

Sample Matrix: Wipe Units: ug/100cm²

Total Metals

 Analyte Mercury
 Results (MRL)
 MDL 0.030 (0.020)
 Method 7471B
 Limit 1
 DF 0.030 (0.020)
 Analyst Analyzed 0.0319/19 12:38
 I/V 1
 F/V 40 0.03841



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

Client Sample ID: W-1120 Date Sampled: 03/14/19 14:05

Percent Solids: N/A

Extraction Method: 7471B

ESS Laboratory Work Order: 1903403 ESS Laboratory Sample ID: 1903403-09

Sample Matrix: Wipe Units: ug/100cm²

Total Metals

F/V Batch CC91841 Analyst Analyzed 03/19/19 12:40 Results (MRL) **MDL Analyte** Method Limit Mercury 0.030 (0.020) 7471B



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

Client Sample ID: W-1121 Date Sampled: 03/14/19 14:38

Percent Solids: N/A

Extraction Method: 7471B

ESS Laboratory Work Order: 1903403 ESS Laboratory Sample ID: 1903403-10

Sample Matrix: Wipe Units: ug/100cm²

Total Metals

F/V Batch CC91841 Analyst Analyzed 03/19/19 12:46 **Analyte** Results (MRL) **MDL** Method Limit Mercury 0.263 (0.020) 7471B



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

Client Sample ID: W-1122 Date Sampled: 03/14/19 14:54

Percent Solids: N/A

Extraction Method: 7471B

ESS Laboratory Work Order: 1903403 ESS Laboratory Sample ID: 1903403-11

Sample Matrix: Wipe Units: ug/100cm²

Total Metals

F/V Batch CC91841 Analyst Analyzed 03/19/19 12:48 Results (MRL) **MDL Analyte** Method Limit Mercury 0.061 (0.020) 7471B



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

Client Sample ID: W-1123 Date Sampled: 03/14/19 15:03

Percent Solids: N/A

Extraction Method: 7471B

ESS Laboratory Work Order: 1903403 ESS Laboratory Sample ID: 1903403-12

Sample Matrix: Wipe Units: ug/100cm²

Total Metals

 Analyte Mercury
 Results (MRL)
 MDL
 Method
 Limit
 DF
 Analyst
 Analyzed
 I/V
 F/V
 Batch

 7471B
 10
 MKS
 03/19/19
 16:01
 1
 40
 CC91841



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

Client Sample ID: W-1124 Date Sampled: 03/14/19 15:21

Percent Solids: N/A

ESS Laboratory Work Order: 1903403 ESS Laboratory Sample ID: 1903403-13

Sample Matrix: Wipe Units: ug/100cm²

Extraction Method: 7471B

Total Metals

Analyst Analyzed
MKS 03/19/19 16:03 F/V Batch **Analyte** Results (MRL) **MDL** <u>I/V</u> Method Limit Mercury **12.7** (2.00) 7471B 40 CC91841



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

Client Sample ID: W-1125 Date Sampled: 03/14/19 15:24

Percent Solids: N/A

Extraction Method: 7471B

ESS Laboratory Work Order: 1903403 ESS Laboratory Sample ID: 1903403-14

Sample Matrix: Wipe Units: ug/100cm²

Total Metals

F/V Batch CC91841 Analyst Analyzed 03/19/19 16:05 **Analyte** Results (MRL) **MDL** <u>I/V</u> Method Limit Mercury 2.53 (0.500) 7471B



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

Client Sample ID: W-1126 Date Sampled: 03/14/19 15:11

Percent Solids: N/A

ESS Laboratory Work Order: 1903403 ESS Laboratory Sample ID: 1903403-15

Sample Matrix: Wipe Units: ug/100cm²

Extraction Method: 7471B

Total Metals

F/V Batch CC91841 Analyst Analyzed
MKS 03/19/19 17:12 **Analyte** Results (MRL) **MDL** <u>I/V</u> Method Limit **48.7** (10.0) Mercury 7471B

000248



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

Client Sample ID: W-1127 Date Sampled: 03/14/19 15:13

Percent Solids: N/A

Extraction Method: 7471B

ESS Laboratory Work Order: 1903403 ESS Laboratory Sample ID: 1903403-16

Sample Matrix: Wipe Units: ug/100cm²

Total Metals

F/V Batch CC91841 Analyst Analyzed
MKS 03/19/19 12:58 Results (MRL) **MDL** <u>I/V</u> **Analyte** Method Limit Mercury 0.082 (0.020) 7471B



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

Client Sample ID: W-1128
Date Sampled: 03/14/19 15:16

Percent Solids: N/A

Extraction Method: 7471B

ESS Laboratory Work Order: 1903403 ESS Laboratory Sample ID: 1903403-17

Sample Matrix: Wipe Units: ug/100cm²

Total Metals

 Analyte Mercury
 Results (MRL)
 MDL 0.038 (0.020)
 Method 7471B
 Limit 1
 DF 0.038 (0.020)
 Analyst Analyzed 0.038 (0.020)
 I/V 40 CC91841



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

Client Sample ID: W-1129
Date Sampled: 03/14/19 15:27

Percent Solids: N/A

Extraction Method: 7471B

ESS Laboratory Work Order: 1903403 ESS Laboratory Sample ID: 1903403-18

Sample Matrix: Wipe Units: ug/100cm²

Total Metals

 Analyte Mercury
 Results (MRL)
 MDL 95.3 (10.0)
 Method 7471B
 Limit 500
 DF MKS 03/19/19 17:14
 Analyzed 1/V 10
 I/V 40
 E/V CC91841



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

Client Sample ID: W-1130 Date Sampled: 03/14/19 15:29

Percent Solids: N/A

Extraction Method: 7471B

ESS Laboratory Work Order: 1903403 ESS Laboratory Sample ID: 1903403-19

Sample Matrix: Wipe Units: ug/100cm²

Total Metals

F/V Batch CC91841 Analyst Analyzed 03/19/19 16:11 Results (MRL) **MDL Analyte** Method Limit Mercury 0.575 (0.100) 7471B



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

Client Sample ID: W-1131 Date Sampled: 03/14/19 15:31

Percent Solids: N/A

ESS Laboratory Work Order: 1903403 ESS Laboratory Sample ID: 1903403-20

Sample Matrix: Wipe Units: ug/100cm²

Extraction Method: 7471B

Total Metals

F/V Batch CC91841 Analyst Analyzed
MKS 03/19/19 13:10 Results (MRL) **MDL Analyte** Method Limit Mercury ND (0.020) 7471B

Service



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

ESS Laboratory Work Order: 1903403

Quality Control Data

				Spike	Source		%REC		RPD	
Analyte	Result	MRL	Units	Level	Result	%REC	Limits	RPD	Limit	Qualifier
			Total Meta	als						
Batch CC91841 - 7471B										
Blank										
Mercury	ND	0.020	ug/100cm²							
LCS										
Mercury	0.123	0.020	ug/100cm²	0.1208		102	85-115			
LCS Dup										
Mercury	0.124	0.020	ug/100cm²	0.1208		102	85-115	0.4	20	
Batch CC91854 - 7471B										
Blank										
Mercury	ND	0.033	mg/kg wet							
LCS										
Mercury	3.06	0.374	mg/kg wet	4.850		63	50-103			
LCS Dup										
Mercury	2.87	0.367	mg/kg wet	4.850		59	50-103	6	20	



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

ESS Laboratory Work Order: 1903403

Notes and Definitions

U	Analyte included in the analysis, but not detected
D	Diluted.
ND	Analyte NOT DETECTED at or above the MRL (LOQ), LOD for DoD Reports, MDL for J-Flagged Analytes
dry	Sample results reported on a dry weight basis
RPD	Relative Percent Difference
MDL	Method Detection Limit
MRL	Method Reporting Limit
LOD	Limit of Detection
LOQ	Limit of Quantitation
DL	Detection Limit
I/V	Initial Volume
F/V	Final Volume
§	Subcontracted analysis; see attached report
1	Range result excludes concentrations of surrogates and/or internal standards eluting in that range.
2	Range result excludes concentrations of target analytes eluting in that range.
3	Range result excludes the concentration of the C9-C10 aromatic range.

Avg Results reported as a mathematical average.

NR No Recovery [CALC] Calculated Analyte

SUB Subcontracted analysis; see attached report

RLReporting Limit

EDL **Estimated Detection Limit** MF Membrane Filtration MPN Most Probably Number TNTC Too numerous to Count CFU Colony Forming Units



The Microbiology Division of Thielsch Engineering, Inc.

ESS Laboratory Work Order: 1903403



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

ENVIRONMENTAL

ESS LABORATORY CERTIFICATIONS AND ACCREDITATIONS

Rhode Island Potable and Non Potable Water: LAI00179 http://www.health.ri.gov/find/labs/analytical/ESS.pdf

Connecticut Potable and Non Potable Water, Solid and Hazardous Waste: PH-0750 http://www.ct.gov/dph/lib/dph/environmental health/environmental laboratories/pdf/OutofStateCommercialLaboratories.pdf

Maine Potable and Non Potable Water, and Solid and Hazardous Waste: RI00002 http://www.maine.gov/dhhs/mecdc/environmental-health/dwp/partners/labCert.shtml

Massachusetts Potable and Non Potable Water: M-RI002 http://public.dep.state.ma.us/Labcert/Labcert.aspx

New Hampshire (NELAP accredited) Potable and Non Potable Water, Solid and Hazardous Waste: 2424 http://des.nh.gov/organization/divisions/water/dwgb/nhelap/index.htm

New York (NELAP accredited) Non Potable Water, Solid and Hazardous Waste: 11313 http://www.wadsworth.org/labcert/elap/comm.html

New Jersey (NELAP accredited) Non Potable Water, Solid and Hazardous Waste: RI006 http://datamine2.state.nj.us/DEP OPRA/OpraMain/pi main?mode=pi by site&sort order=PI NAMEA&Select+a+Site:=58715

United States Department of Agriculture Soil Permit: P330-12-00139

Pennsylvania: 68-01752

http://www.dep.pa.gov/Business/OtherPrograms/Labs/Pages/Laboratory-Accreditation-Program.aspx

ESS Laboratory Sample and Cooler Receipt Checklist

Clien	it: <u>G</u>	ZA - Bedfor	d, NH - GZA/	os		ESS	Project ID:	1903403	
	.						Received:	3/15/2019	
Shipped/	Delivered Via		ESS Courie	<u> </u>			Due Date:	3/21/2019	
						Days	for Project:	4 Day	
1. Air bill : Air No	manifest pres			No		6. Does COC	match bottles?		Yes
2. Were o	custody seals	present?		No		7. Is COC co	mplete and correct	,	Yes
3. Is radia	ation count <1	00 CPM?		Yes		8. Were sam	ples received intact	?	Yes
	oler Present?		: Ice	Yes		9. Were labs	informed about <u>s</u>	hort holds & rushes?	(Yest / No / NA
5. Was C	OC signed an	d dated by	dient?	Yes		10. Were any	analyses received	outside of hold time?	Yes / G
				(P)			As received? s in aqueous VOAs nanol cover soil cor		Yes No Yes No / NA
a. If metal	e samples pro Is preserved u vel VOA vials	pon receipt		Yes No Date: Date:	/	_ Time: _ _ Time: _		By:	<u> </u>
Sample Re	eceiving Note	s:							
a. Was the	here a need to ere a need to contacted?	contact the	oject Manage client?		Yes / No Yes / No	Time:		Ву:	
Comple	Container	D	Air Buttle	0.00					
Sample Number	Container ID	Proper Container	Air Bubbles Present	Volume	Contain	er Type	Preservative	Record pH (Cya Pestic	
01	324085	Yes	NA	Yes	4 oz. Jar	- Unpres	NP	 	
02	324084	Yes	NA	Yes	4 oz. Jar	- Unpres	NP		
03	324083	Yes	NA	Yes	4 oz. Jar		Other		
04 05	324082	Yes	NA NA	Yes	4 oz. Jar		Other		
05 06	324081 324080	Yes Yes	NA NA	Yes	4 oz. Jar		Other		
06 07	324080 324079	Yes Yes	NA NA	Yes	4 oz. Jar		Other		
08	324079	Yes	NA NA	Yes Yes	4 oz. Jar		Other		
09	324077	Yes	NA NA		4 oz. Jar	•	Other		
10	324076	Yes	NA NA	Yes Yes	4 oz. Jar 4 oz. Jar		Other Other		
11	324075	Yes	NA	Yes	4 oz. Jar		Other		
12	324074	Yes	NA	Yes	4 oz. Jar		Other		
13	324073	Yes	NA	Yes	4 oz. Jar		Other		
14	324072	Yes	NA	Yes	4 oz. Jar		Other		
15	324071	Yes	NA	Yes	4 oz. Jar		Other		
16	324070	Yes	NA	Yes	4 oz. Jar		Other		
17	324069	Yes	NA	Yes	4 oz. Jar		Other		
18	324068	Yes	NA	Yes	4 oz. Jar		Other		
19	324067	Yes	NA	Yes	4 oz. Jar		Other		
	324066	Yes	NA	Yes	4 oz. Jar		Other		

2nd Review

ESS Laboratory Sample and Cooler Receipt Checklist

Client:	GZA - Bedford, NH - GZA/DS		ESS Project ID:	1903403	
			Date Received:	3/15/2019	
All container	s scanned into storage/lab	<u>In</u> itials:			
Are barcode la	abels on correct containers?	Yes / No			
Are all necess	ary stickers attached?	Yes/No			
	//				
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The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Rebecca Cox GZA GeoEnvironmental, Inc. 5 Commerce Park North Bedford, NH 03110

RE: Schiller Boiler Demo (04.0190318.03) ESS Laboratory Work Order Number: 1903404

This signed Certificate of Analysis is our approved release of your analytical results. These results are only representative of sample aliquots received at the laboratory. ESS Laboratory expects its clients to follow all regulatory sampling guidelines. Beginning with this page, the entire report has been paginated. This report should not be copied except in full without the approval of the laboratory. Samples will be disposed of thirty days after the final report has been delivered. If you have any questions or concerns, please feel free to call our Customer Service Department.

Laurel Stoddard Laboratory Director **REVIEWED**

By ESS Laboratory at 2:54 pm, Mar 21, 2019

Analytical Summary

The project as described above has been analyzed in accordance with the ESS Quality Assurance Plan. This plan utilizes the following methodologies: US EPA SW-846, US EPA Methods for Chemical Analysis of Water and Wastes per 40 CFR Part 136, APHA Standard Methods for the Examination of Water and Wastewater, American Society for Testing and Materials (ASTM), and other recognized methodologies. The analyses with these noted observations are in conformance to the Quality Assurance Plan. In chromatographic analysis, manual integration is frequently used instead of automated integration because it produces more accurate results.

The test results present in this report are in compliance with TNI and relative state standards, and/or client Quality Assurance Project Plans (QAPP). The laboratory has reviewed the following: Sample Preservations, Hold Times, Initial Calibrations, Continuing Calibrations, Method Blanks, Blank Spikes, Blank Spike Duplicates, Duplicates, Matrix Spikes, Matrix Spike Duplicates, Surrogates and Internal Standards. Any results which were found to be outside of the recommended ranges stated in our SOPs will be noted in the Project Narrative.



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

ESS Laboratory Work Order: 1903404

SAMPLE RECEIPT

The following samples were received on March 15, 2019 for the analyses specified on the enclosed Chain of Custody Record.

Lab Number	Sample Name	Matrix	Analysis
1903404-01	W-1107	Wipe	7471B
1903404-02	W-1108	Wipe	7471B
1903404-03	W-1109	Wipe	7471B
1903404-04	W-1110	Wipe	7471B
1903404-05	W-1111	Wipe	7471B
1903404-06	W-1112	Wipe	7471B
1903404-07	W-1113	Wipe	7471B
1903404-08	C-1006	Solid	7471B
1903404-09	C-1007	Solid	7471B
1903404-10	C-1021	Solid	7471B
1903404-11	W-1097	Wipe	7471B
1903404-12	W-1098	Wipe	7471B
1903404-13	W-1099	Wipe	7471B
1903404-14	W-1100	Wipe	7471B
1903404-15	W-1101	Wipe	7471B
1903404-16	W-1102	Wipe	7471B
1903404-17	W-1103	Wipe	7471B
1903404-18	W-1104	Wipe	7471B
1903404-19	W-1105	Wipe	7471B
1903404-20	W-1106	Wipe	7471B



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

ESS Laboratory Work Order: 1903404

PROJECT NARRATIVE

No unusual observations noted.

End of Project Narrative.

DATA USABILITY LINKS

To ensure you are viewing the most current version of the documents below, please clear your internet cookies for www.ESSLaboratory.com. Consult your IT Support personnel for information on how to clear your internet cookies.

Definitions of Quality Control Parameters

Semivolatile Organics Internal Standard Information

Semivolatile Organics Surrogate Information

Volatile Organics Internal Standard Information

Volatile Organics Surrogate Information

EPH and VPH Alkane Lists



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

ESS Laboratory Work Order: 1903404

Analytical Methods

1010A - Flashpoint 6010C - ICP 6020A - ICP MS

7010 - Graphite Furnace 7196A - Hexavalent Chromium

7470A - Aqueous Mercury 7471B - Solid Mercury 8011 - EDB/DBCP/TCP 8015C - GRO/DRO

8081B - Pesticides 8082A - PCB 8100M - TPH

8151A - Herbicides

8260B - VOA 8270D - SVOA

8270D SIM - SVOA Low Level

9014 - Cyanide 9038 - Sulfate

9040C - Aqueous pH

9045D - Solid pH (Corrosivity)

9050A - Specific Conductance

9056A - Anions (IC)

9060A - TOC

9095B - Paint Filter

MADEP 04-1.1 - EPH

MADEP 18-2.1 - VPH

Prep Methods

CURRENT SW-846 METHODOLOGY VERSIONS

3005A - Aqueous ICP Digestion

3020A - Aqueous Graphite Furnace / ICP MS Digestion

3050B - Solid ICP / Graphite Furnace / ICP MS Digestion

3060A - Solid Hexavalent Chromium Digestion

3510C - Separatory Funnel Extraction 3520C - Liquid / Liquid Extraction

3540C - Manual Soxhlet Extraction

3541 - Automated Soxhlet Extraction

3546 - Microwave Extraction

3580A - Waste Dilution

5030B - Aqueous Purge and Trap

5030C - Aqueous Purge and Trap

5035A - Solid Purge and Trap

SW846 Reactivity Methods 7.3.3.2 (Reactive Cyanide) and 7.3.4.1 (Reactive Sulfide) have been withdrawn by EPA. These methods are reported per client request and are not NELAP accredited.



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

Client Sample ID: W-1107 Date Sampled: 03/12/19 11:13

Percent Solids: N/A

ESS Laboratory Work Order: 1903404 ESS Laboratory Sample ID: 1903404-01

Sample Matrix: Wipe Units: ug/100cm²

Extraction Method: 7471B

Total Metals

 Analyte Mercury
 Results (MRL)
 MDL
 Method
 Limit
 DF
 Analyst
 Analyzed
 I/V
 F/V
 Batch

 Mcroury
 0.509 (0.100)
 7471B
 5
 MKS
 03/19/19 16:13
 1
 40
 CC91850



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

Client Sample ID: W-1108 Date Sampled: 03/12/19 11:21

Percent Solids: N/A

ESS Laboratory Work Order: 1903404 ESS Laboratory Sample ID: 1903404-02

Sample Matrix: Wipe Units: ug/100cm²

Extraction Method: 7471B

Total Metals

 Analyte Mercury
 Results (MRL)
 MDL Method 7471B
 Limit Limit Limit Limit Limit MKS
 DF MKS
 Analyzed MKS
 I/V MKS
 Batch MKS
 Batch CO91850



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

Client Sample ID: W-1109 Date Sampled: 03/12/19 11:24

Percent Solids: N/A

Extraction Method: 7471B

ESS Laboratory Work Order: 1903404 ESS Laboratory Sample ID: 1903404-03

Sample Matrix: Wipe Units: ug/100cm²

Total Metals

 Analyte Mercury
 Results (MRL)
 MDL 0.184 (0.020)
 Method 7471B
 Limit 1
 DF 0.184 (0.020)
 Analyst 0.3/19/19 13:22
 Analyzed 1
 I/V 1
 F/V Eyes
 Batch 0.021



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

Client Sample ID: W-1110 Date Sampled: 03/12/19 11:30

Percent Solids: N/A

Extraction Method: 7471B

ESS Laboratory Work Order: 1903404 ESS Laboratory Sample ID: 1903404-04

Sample Matrix: Wipe Units: ug/100cm²

Total Metals

F/V Batch CC91850 Analyst Analyzed 03/19/19 13:24 Results (MRL) **MDL Analyte** Method Limit Mercury 0.089 (0.020) 7471B



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

Client Sample ID: W-1111 Date Sampled: 03/12/19 11:32

Percent Solids: N/A

Extraction Method: 7471B

ESS Laboratory Work Order: 1903404 ESS Laboratory Sample ID: 1903404-05

Sample Matrix: Wipe Units: ug/100cm²

Total Metals

F/V Batch 40 CC91850 Analyst Analyzed
MKS 03/19/19 16:17 Results (MRL) **MDL** I/V **Analyte** Method Limit Mercury 1.54 (0.400) 7471B



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

Client Sample ID: W-1112 Date Sampled: 03/12/19 11:35

Percent Solids: N/A

ESS Laboratory Work Order: 1903404 ESS Laboratory Sample ID: 1903404-06

Sample Matrix: Wipe Units: ug/100cm²

Extraction Method: 7471B

Total Metals

F/V Batch CC91850 Analyst Analyzed 03/19/19 16:23 **Analyte** Results (MRL) **MDL** I/V Method Limit Mercury 1.83 (0.400) 7471B



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

Client Sample ID: W-1113 Date Sampled: 03/12/19 11:38

Percent Solids: N/A

ESS Laboratory Work Order: 1903404 ESS Laboratory Sample ID: 1903404-07

Sample Matrix: Wipe Units: ug/100cm²

Extraction Method: 7471B

Total Metals

F/V Batch CC91850 Analyst Analyzed 03/19/19 13:34 Results (MRL) **MDL Analyte** Method Limit Mercury ND (0.020) 7471B



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

Client Sample ID: C-1006 Date Sampled: 03/14/19 08:40

Percent Solids: 95

ereem bonds. yo

ESS Laboratory Work Order: 1903404 ESS Laboratory Sample ID: 1903404-08

Sample Matrix: Solid Units: mg/kg dry

Extraction Method: 7471B

Total Metals

 Analyte Mercury
 Results (MRL)
 MDL 7471B
 Limit 100
 DF MKS
 Analyzed MKS
 I/V 03/19/19 16:55
 E/V 0.66
 Batch 0.791854



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

Client Sample ID: C-1007 Date Sampled: 03/14/19 08:50

Percent Solids: 99

ESS Laboratory Work Order: 1903404 ESS Laboratory Sample ID: 1903404-09

Sample Matrix: Solid Units: mg/kg dry

Extraction Method: 7471B

Total Metals

 Analyte
 Results (MRL)
 MDL
 Method
 Limit
 DF
 Analyst
 Analyzed
 I/V
 F/V
 Batch

 Mercury
 26.4 (1.49)
 7471B
 50
 MKS
 03/19/19 16:58
 0.67
 40
 CC91854



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

Client Sample ID: C-1021 Date Sampled: 03/14/19 13:20

Percent Solids: 99

ESS Laboratory Work Order: 1903404 ESS Laboratory Sample ID: 1903404-10

Sample Matrix: Solid Units: mg/kg dry

Extraction Method: 7471B

Total Metals

 Analyte Mercury
 Results (MRL)
 MDL 7471B
 Limit 50
 MS 03/19/19 17:00
 Analyzed 0.78
 I/V 0.78
 Batch 0.791854



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

Client Sample ID: W-1097 Date Sampled: 03/12/19 10:40

Percent Solids: N/A

Extraction Method: 7471B

ESS Laboratory Work Order: 1903404 ESS Laboratory Sample ID: 1903404-11

Sample Matrix: Wipe Units: ug/100cm²

Total Metals

 Analyte Mercury
 Results (MRL)
 MDL 0.108 (0.020)
 Method 7471B
 Limit 1
 DF 0.108 (0.020)
 Analyst 0.020 (0.020)
 Analyst 0.020 (0.020)
 Analyst 0.020 (0.020)
 I/V 0.020 (0.020)
 Batch 0.020 (0.020)



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

Client Sample ID: W-1098 Date Sampled: 03/12/19 10:43

Percent Solids: N/A

Extraction Method: 7471B

ESS Laboratory Work Order: 1903404 ESS Laboratory Sample ID: 1903404-12

Sample Matrix: Wipe Units: ug/100cm²

Total Metals

F/V Batch CC91850 Analyst Analyzed
MKS 03/19/19 13:38 Results (MRL) **MDL Analyte** Method Limit Mercury ND (0.020) 7471B



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

Client Sample ID: W-1099 Date Sampled: 03/12/19 10:45

Percent Solids: N/A

Extraction Method: 7471B

ESS Laboratory Work Order: 1903404 ESS Laboratory Sample ID: 1903404-13

Sample Matrix: Wipe Units: ug/100cm²

Total Metals

000277



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

Client Sample ID: W-1100 Date Sampled: 03/12/19 10:46

Percent Solids: N/A

Extraction Method: 7471B

ESS Laboratory Work Order: 1903404 ESS Laboratory Sample ID: 1903404-14

Sample Matrix: Wipe Units: ug/100cm²

Total Metals

F/V Batch CC91850 Analyst Analyzed
MKS 03/19/19 16:27 **Analyte** Results (MRL) **MDL** I/V Method Limit Mercury 1.37 (0.400) 7471B



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

Client Sample ID: W-1101 Date Sampled: 03/12/19 10:52

Percent Solids: N/A

Extraction Method: 7471B

ESS Laboratory Work Order: 1903404 ESS Laboratory Sample ID: 1903404-15

Sample Matrix: Wipe Units: ug/100cm²

Total Metals

 Analyte Mercury
 Results (MRL)
 MDL
 Method
 Limit
 DF
 Analyst
 Analyzed
 I/V
 F/V
 Batch

 Mercury
 0.528 (0.100)
 7471B
 5
 MKS
 03/19/19 16:29
 1
 40
 CC91850



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

Client Sample ID: W-1102 Date Sampled: 03/12/19 10:54

Percent Solids: N/A

Extraction Method: 7471B

ESS Laboratory Work Order: 1903404 ESS Laboratory Sample ID: 1903404-16

Sample Matrix: Wipe Units: ug/100cm²

Total Metals

F/V Batch CC91850 Analyst Analyzed 03/19/19 13:46 Results (MRL) **MDL Analyte** Method Limit Mercury 0.123 (0.020) 7471B

Service



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

Client Sample ID: W-1103 Date Sampled: 03/12/19 10:56

Percent Solids: N/A

Extraction Method: 7471B

ESS Laboratory Work Order: 1903404 ESS Laboratory Sample ID: 1903404-17

Sample Matrix: Wipe Units: ug/100cm²

Total Metals

Analyst Analyzed 03/19/19 16:31 F/V Batch **Analyte** Results (MRL) **MDL** I/V Method Limit Mercury 0.809 (0.200) 7471B 40 CC91850



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

Client Sample ID: W-1104 Date Sampled: 03/12/19 11:02

Percent Solids: N/A

Extraction Method: 7471B

ESS Laboratory Work Order: 1903404 ESS Laboratory Sample ID: 1903404-18

Sample Matrix: Wipe Units: ug/100cm²

Total Metals

F/V Batch CC91850 Analyst Analyzed 03/19/19 13:50 Results (MRL) **MDL** <u>I/V</u> **Analyte** Method Limit Mercury 0.077 (0.020) 7471B



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

Client Sample ID: W-1105 Date Sampled: 03/12/19 10:58

Percent Solids: N/A

ESS Laboratory Work Order: 1903404 ESS Laboratory Sample ID: 1903404-19

Sample Matrix: Wipe Units: ug/100cm²

Extraction Method: 7471B

Total Metals

Analyst Analyzed 03/19/19 16:33 F/V Batch **Analyte** Results (MRL) **MDL** I/V Method Limit Mercury 2.71 (0.400) 7471B 40 CC91850



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

Client Sample ID: W-1106 Date Sampled: 03/12/19 11:05

Percent Solids: N/A

ESS Laboratory Work Order: 1903404 ESS Laboratory Sample ID: 1903404-20

Sample Matrix: Wipe Units: ug/100cm²

Extraction Method: 7471B

Total Metals

 Analyte Mercury
 Results (MRL)
 MDL 747 (0.200)
 Method 7471B
 Limit Limit Limit Microscopics
 DF Microscopics
 Analyzed Microscopics
 I/V Microscopics
 E/V E/V CC91850
 Batch CC91850



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

ESS Laboratory Work Order: 1903404

Quality Control Data

				Spike	Source		%REC		RPD	
Analyte	Result	MRL	Units	Level	Result	%REC	Limits	RPD	Limit	Qualifier
			Total Meta	ıls						
Batch CC91850 - 7471B										
Blank										
Mercury	ND	0.020	ug/100cm²						•	
LCS										
Mercury	0.119	0.020	ug/100cm²	0.1208		99	85-115			
LCS Dup										
Mercury	0.124	0.020	ug/100cm²	0.1208		103	85-115	4	20	
Batch CC91854 - 7471B										
Blank		·	·	•				•	·	·
Mercury	ND	0.033	mg/kg wet							
LCS										
Mercury	3.06	0.374	mg/kg wet	4.850		63	50-103			
LCS Dup										
Mercury	2.87	0.367	mg/kg wet	4.850		59	50-103	6	20	



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

ESS Laboratory Work Order: 1903404

Notes and Definitions

U	Analyte included in the analysis, but not detected
D	Diluted.
ND	Analyte NOT DETECTED at or above the MRL (LOQ), LOD for DoD Reports, MDL for J-Flagged Analytes
dry	Sample results reported on a dry weight basis
RPD	Relative Percent Difference
MDL	Method Detection Limit
MRL	Method Reporting Limit
LOD	Limit of Detection
LOQ	Limit of Quantitation
DL	Detection Limit
I/V	Initial Volume
F/V	Final Volume
§	Subcontracted analysis; see attached report
1	Range result excludes concentrations of surrogates and/or internal standards eluting in that range.
2	Range result excludes concentrations of target analytes eluting in that range.
3	Range result excludes the concentration of the C9-C10 aromatic range.

Avg Results reported as a mathematical average.

NR No Recovery [CALC] Calculated Analyte

SUB Subcontracted analysis; see attached report

RLReporting Limit

EDL **Estimated Detection Limit** MF Membrane Filtration MPN Most Probably Number TNTC Too numerous to Count CFU Colony Forming Units



The Microbiology Division of Thielsch Engineering, Inc.

ESS Laboratory Work Order: 1903404



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

ENVIRONMENTAL

ESS LABORATORY CERTIFICATIONS AND ACCREDITATIONS

Rhode Island Potable and Non Potable Water: LAI00179 http://www.health.ri.gov/find/labs/analytical/ESS.pdf

Connecticut Potable and Non Potable Water, Solid and Hazardous Waste: PH-0750 http://www.ct.gov/dph/lib/dph/environmental health/environmental laboratories/pdf/OutofStateCommercialLaboratories.pdf

Maine Potable and Non Potable Water, and Solid and Hazardous Waste: RI00002 http://www.maine.gov/dhhs/mecdc/environmental-health/dwp/partners/labCert.shtml

Massachusetts Potable and Non Potable Water: M-RI002 http://public.dep.state.ma.us/Labcert/Labcert.aspx

New Hampshire (NELAP accredited) Potable and Non Potable Water, Solid and Hazardous Waste: 2424 http://des.nh.gov/organization/divisions/water/dwgb/nhelap/index.htm

New York (NELAP accredited) Non Potable Water, Solid and Hazardous Waste: 11313 http://www.wadsworth.org/labcert/elap/comm.html

New Jersey (NELAP accredited) Non Potable Water, Solid and Hazardous Waste: RI006 http://datamine2.state.nj.us/DEP OPRA/OpraMain/pi main?mode=pi by site&sort order=PI NAMEA&Select+a+Site:=58715

United States Department of Agriculture Soil Permit: P330-12-00139

Pennsylvania: 68-01752

http://www.dep.pa.gov/Business/OtherPrograms/Labs/Pages/Laboratory-Accreditation-Program.aspx

000287

ESS Laboratory Sample and Cooler Receipt Checklist

Client	:: <u>G</u> :	ZA - Bedford	d, NH - GZA/	os	ESS	Project ID:	1903404	
						Received:	3/15/2019	
Shipped/L	Delivered Via:		ESS Courier	·		Due Date:	3/21/2019	
					Days 16	or Project:	4 Day	
	manifest prese			No	6. Does COC	match bottles?		Yes
2. Were c	ustody seals p	oresent?		No	7. Is COC con	nplete and correct?		Yes
3. Is radia	tion count <10	00 CPM?		Yes	8. Were samp	les received intact?		Yes
	oler Present? : 5.2	Iced with:	: Ice	Yes	9. Were labs	informed about <u>short l</u>	noids & rushes?	Yes / No / NA
5. Was Co	OC signed and	d dated by c	lient?	Yes	10. Were any	analyses received outs	ide of hold time?	Yes /(No)
	bcontracting Sample IDs: Analysis: TAT:		((No)		As received? s in aqueous VOAs? anol cover soil complete	ely?	Yes / No Yes / No Yes / No / NA
a. If metals	e samples pro s preserved u	pon receipt:		Yes No Date:	Time:	By	r:	
D. Low Lev	vel VOA vials	trozen:		Date:	Time:	By	r:	
Sample Re	eceiving Notes	s :						
	nere a need to ere a need to contacted?			r? Date:	Yes / Nol Yes / No	Ву	:	
Sample Number	Container ID	Proper Container	Air Bubbles Present	Sufficient Volume	Container Type	Preservative	Record pH (Cya Pestic	
01	324105	Yes	NA	Yes	4 oz. Jar - Unpres	Other		
02	324104	Yes	NA	Yes	4 oz. Jar - Unpres	Other		
03 04	324103 324102	Yes	NA	Yes	4 oz. Jar - Unpres	Other		
05	324102	Yes Yes	NA NA	Yes Yes	4 oz. Jar - Unpres 4 oz. Jar - Unpres	Other Other		
06	324100	Yes	NA NA	Yes	4 oz. Jar - Unpres	Other		
07	324099	Yes	NA	Yes	4 oz. Jar - Unpres	Other		
08	324098	Yes	NA	Yes	4 oz. Jar - Unpres	NP		
09	324097	Yes	NA	Yes	4 oz. Jar - Unpres	NP		
10	324096	Yes	NA	Yes	4 oz. Jar - Unpres	NP		
11	324095	Yes		Yes	4 oz. Jar - Unpres	Other		
12			NA		4 1			
43	324094	Yes	NA	Yes	4 oz. Jar - Unpres	Other		
13 14	324093	Yes Yes	NA NA	Yes Yes	4 oz. Jar - Unpres	Other Other		
14	324093 324092	Yes Yes Yes	NA NA NA	Yes Yes Yes	4 oz. Jar - Unpres 4 oz. Jar - Unpres	Other Other Other		
14 15	324093 324092 324091	Yes Yes Yes Yes	NA NA NA NA	Yes Yes Yes Yes	4 oz. Jar - Unpres 4 oz. Jar - Unpres 4 oz. Jar - Unpres	Other Other Other Other		
14 15 16	324093 324092 324091 324090	Yes Yes Yes Yes Yes	NA NA NA NA	Yes Yes Yes Yes Yes	4 oz. Jar - Unpres 4 oz. Jar - Unpres 4 oz. Jar - Unpres 4 oz. Jar - Unpres	Other Other Other Other Other		
14 15 16 17	324093 324092 324091 324090 324089	Yes Yes Yes Yes Yes Yes	NA NA NA NA NA	Yes Yes Yes Yes Yes Yes	4 oz. Jar - Unpres 4 oz. Jar - Unpres 4 oz. Jar - Unpres 4 oz. Jar - Unpres 4 oz. Jar - Unpres	Other Other Other Other Other Other		
14 15 16	324093 324092 324091 324090	Yes Yes Yes Yes Yes	NA NA NA NA	Yes Yes Yes Yes Yes	4 oz. Jar - Unpres 4 oz. Jar - Unpres 4 oz. Jar - Unpres 4 oz. Jar - Unpres	Other Other Other Other Other		

2nd Review

ESS Laboratory Sample and Cooler Receipt Checklist

Client: _	GZA - Bedford, NH - GZA/DS		ESS Project ID:	1903404
All container	s scanned into storage/lab abels on confect containers?	Initials:	Date Received:	3/15/2019
Are all necess	eary stickers/attached?	Yes / No Yes / No		
Completed By:		Data 0.75	7/10/16	11111
Reviewed (Ama a se	Date & Time: Date & Time:	3/18/19	1/3/0
Delivered By:		Date & Time	2/16/16	():
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GZA	Geotnuir	npany Name nmensol				OH.OP	oject# 0318,03	Schiller Tsoiler	, ,			ΙŤ	1	30			П		\dashv		17	_
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13	3/12/19	1045						W-1099	·		N			-	-	++	-	╀┈┼	#	+		_
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	ner Volume:			3-Amber - 3-250			OD Bottle mL 5-500	C-Cubitainer J-Jar O-Ot			AG					† †	+	-	†	++	-+	-
	ation Code:							mL 6-1L 7-VOA 8-2 02 ethanol 7-Na2S2O3 8-ZnAce, Nac	2 9-4 oz 10-8 oz	11-Other*	9		4						111			
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ESS Lab	-315 - 75 Collection	Collection		 -		rebecca, cox @	gre. com	<u> </u>	10								i			
ID	Date	Time	Sample Typ		Sample Matrix	Sar	mple ID		11		1			- 1						
	3/12/19	1113	wige		wipe	W-1107			У	\Box	+	1	\vdash	_	+-		\dashv	+	+	++
2	3/12/19	1121			Ì	W-1108			p			-		+	+				+	\dashv
3	3/12/19	1124				W-1109			K		_			\dashv	╁┤	+	+	-	╁┼┤	
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		AC-Air Cassett			iss B-BOD Bottle	C-Cubitainer J-Jar O-Ot	her P-Poly S-Ste	rile V-Vial	N AG			1						\sqcup	\vdash	
		1-100 mL 2-		-			9-4 oz 10-8 oz	11-Other*	9		+	\parallel	\dashv	+	╁┼┼			+	┝╌┼╴	\dashv
		7 (10) 7 (23) (10)	2-1101 3-11230	-	4-HNO3 5-NaOH 6-Me	ethanol 7-Na2S2O3 8-ZnAce, NaC	OH 9-NH4CI 10-DI H2C er of Containers per		1		工									
		Laboratory	Use Only			Sampled by : E. Dyn				مر لمر								Ш	\perp	
Cooler	Present:		O Drop o	f		Comments:	Please spi	ecify "Othe	r" on	Serve	rive s	nd co	ntaine	re tra	os in (bio o				
	Intact		O Pickup			DI Wipes, 10	3x10 cm		•					cyp		ano op	Jaco	ı		
Cooler Te	mperature:	Tresiz	°C	L				•									!			:
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The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Rebecca Cox GZA GeoEnvironmental, Inc. 5 Commerce Park North Bedford, NH 03110

RE: Schiller Boiler Demo (04.0190318.03) ESS Laboratory Work Order Number: 1903405

This signed Certificate of Analysis is our approved release of your analytical results. These results are only representative of sample aliquots received at the laboratory. ESS Laboratory expects its clients to follow all regulatory sampling guidelines. Beginning with this page, the entire report has been paginated. This report should not be copied except in full without the approval of the laboratory. Samples will be disposed of thirty days after the final report has been delivered. If you have any questions or concerns, please feel free to call our Customer Service Department.

Laurel Stoddard Laboratory Director **REVIEWED**

By ESS Laboratory at 2:55 pm, Mar 21, 2019

Analytical Summary

The project as described above has been analyzed in accordance with the ESS Quality Assurance Plan. This plan utilizes the following methodologies: US EPA SW-846, US EPA Methods for Chemical Analysis of Water and Wastes per 40 CFR Part 136, APHA Standard Methods for the Examination of Water and Wastewater, American Society for Testing and Materials (ASTM), and other recognized methodologies. The analyses with these noted observations are in conformance to the Quality Assurance Plan. In chromatographic analysis, manual integration is frequently used instead of automated integration because it produces more accurate results.

The test results present in this report are in compliance with TNI and relative state standards, and/or client Quality Assurance Project Plans (QAPP). The laboratory has reviewed the following: Sample Preservations, Hold Times, Initial Calibrations, Continuing Calibrations, Method Blanks, Blank Spikes, Blank Spike Duplicates, Duplicates, Matrix Spikes, Matrix Spike Duplicates, Surrogates and Internal Standards. Any results which were found to be outside of the recommended ranges stated in our SOPs will be noted in the Project Narrative.



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

ESS Laboratory Work Order: 1903405

SAMPLE RECEIPT

The following samples were received on March 15, 2019 for the analyses specified on the enclosed Chain of Custody Record.

Lab Number	Sample Name	Matrix	Analysis
1903405-01	031419-BLANK1	Wipe	7471B
1903405-02	031419-BLANK2	Wipe	7471B
1903405-03	031519-BLANK3	Wipe	7471B
1903405-04	W-1132	Wipe	7471B
1903405-05	W-1133	Wipe	7471B
1903405-06	W-1134	Wipe	7471B
1903405-07	W-1135	Wipe	7471B
1903405-08	W-1136	Wipe	7471B
1903405-09	W-1137	Wipe	7471B
1903405-10	W-1138	Wipe	7471B
1903405-11	W-1139	Wipe	7471B
1903405-12	W-1140	Wipe	7471B
1903405-13	W-1141	Wipe	7471B
1903405-14	W-1142	Wipe	7471B
1903405-15	W-1143	Wipe	7471B
1903405-16	W-1144	Wipe	7471B
1903405-17	C-1027	Solid	7471B
1903405-18	C-1029	Solid	7471B
1903405-19	C-1030	Solid	7471B
1903405-20	C-1031	Solid	7471B



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

ESS Laboratory Work Order: 1903405

PROJECT NARRATIVE

No unusual observations noted.

End of Project Narrative.

DATA USABILITY LINKS

To ensure you are viewing the most current version of the documents below, please clear your internet cookies for www.ESSLaboratory.com. Consult your IT Support personnel for information on how to clear your internet cookies.

Definitions of Quality Control Parameters

Semivolatile Organics Internal Standard Information

Semivolatile Organics Surrogate Information

Volatile Organics Internal Standard Information

Volatile Organics Surrogate Information

EPH and VPH Alkane Lists



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

ESS Laboratory Work Order: 1903405

Analytical Methods

1010A - Flashpoint 6010C - ICP

6020A - ICP MS 7010 - Graphite Furnace

7010 - Graphite Furnace 7196A - Hexavalent Chromium 7470A - Aqueous Mercury

7471B - Solid Mercury 8011 - EDB/DBCP/TCP 8015C - GRO/DRO

8081B - Pesticides

8082A - PCB

8100M - TPH 8151A - Herbicides

8260B - VOA

8270D - SVOA

8270D SIM - SVOA Low Level

9014 - Cyanide

9038 - Sulfate

9040C - Aqueous pH

9045D - Solid pH (Corrosivity)

9050A - Specific Conductance

9056A - Anions (IC)

9060A - TOC

9095B - Paint Filter

MADEP 04-1.1 - EPH

MADEP 18-2.1 - VPH

Prep Methods

CURRENT SW-846 METHODOLOGY VERSIONS

3005A - Aqueous ICP Digestion

3020A - Aqueous Graphite Furnace / ICP MS Digestion

3050B - Solid ICP / Graphite Furnace / ICP MS Digestion

3060A - Solid Hexavalent Chromium Digestion

3510C - Separatory Funnel Extraction

3520C - Liquid / Liquid Extraction

3540C - Manual Soxhlet Extraction 3541 - Automated Soxhlet Extraction

3546 - Microwave Extraction

3580A - Waste Dilution

5030B - Aqueous Purge and Trap

5030C - Aqueous Purge and Trap

5035A - Solid Purge and Trap

SW846 Reactivity Methods 7.3.3.2 (Reactive Cyanide) and 7.3.4.1 (Reactive Sulfide) have been withdrawn by EPA. These methods are reported per client request and are not NELAP accredited.



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo Client Sample ID: 031419-BLANK1 Date Sampled: 03/14/19 00:00

Percent Solids: N/A

Extraction Method: 7471B

ESS Laboratory Work Order: 1903405 ESS Laboratory Sample ID: 1903405-01

Sample Matrix: Wipe Units: ug/100cm²

Total Metals

 Analyte Mercury
 Results (MRL) ND (0.020)
 MDL Method 7471B
 Limit Limit Limit Limit Limit NC (0.020)
 DF MC (0.020)
 Analyst Analyzed NKS (0.021)
 I/V (0.021)
 Batch NKS (0.021)



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo Client Sample ID: 031419-BLANK2 Date Sampled: 03/14/19 00:00

Percent Solids: N/A

ESS Laboratory Work Order: 1903405 ESS Laboratory Sample ID: 1903405-02

Sample Matrix: Wipe Units: ug/100cm²

Extraction Method: 7471B

Total Metals

F/V Batch 40 CC91855 Analyst Analyzed 03/19/19 14:08 Results (MRL) **MDL Analyte** Method Limit Mercury ND (0.020) 7471B



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo Client Sample ID: 031519-BLANK3 Date Sampled: 03/15/19 00:00

Percent Solids: N/A

ESS Laboratory Work Order: 1903405 ESS Laboratory Sample ID: 1903405-03

Sample Matrix: Wipe Units: ug/100cm²

Extraction Method: 7471B

Total Metals

F/V Batch 40 CC91855 Analyst Analyzed
MKS 03/19/19 14:10 Results (MRL) **MDL Analyte** Method Limit Mercury ND (0.020) 7471B



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

Client Sample ID: W-1132 Date Sampled: 03/15/19 08:03

Percent Solids: N/A

Extraction Method: 7471B

ESS Laboratory Work Order: 1903405 ESS Laboratory Sample ID: 1903405-04

Sample Matrix: Wipe Units: ug/100cm²

Total Metals

F/V Batch 40 CC91855 Analyst Analyzed 03/19/19 16:41 Results (MRL) **MDL** I/V **Analyte** Method Limit Mercury 5.71 (1.00) 7471B



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

Client Sample ID: W-1133 Date Sampled: 03/15/19 08:05

Percent Solids: N/A

ESS Laboratory Work Order: 1903405 ESS Laboratory Sample ID: 1903405-05

Sample Matrix: Wipe Units: ug/100cm²

Extraction Method: 7471B

Total Metals

F/V Batch 40 CC91855 Analyst Analyzed 03/19/19 16:47 **Analyte** Results (MRL) **MDL** I/V Method Limit Mercury 0.790 (0.200) 7471B



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

Client Sample ID: W-1134 Date Sampled: 03/15/19 08:10

Percent Solids: N/A

Extraction Method: 7471B

ESS Laboratory Work Order: 1903405 ESS Laboratory Sample ID: 1903405-06

Sample Matrix: Wipe Units: ug/100cm²

Total Metals

 Analyte Mercury
 Results (MRL)
 MDL 0.069 (0.020)
 Method 7471B
 Limit 1
 DF 0.069 (0.020)
 Analyst Analyzed 0.019 14:16
 I/V 1
 F/V PV C91855



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

Client Sample ID: W-1135 Date Sampled: 03/15/19 08:15

Percent Solids: N/A

ESS Laboratory Work Order: 1903405 ESS Laboratory Sample ID: 1903405-07

Sample Matrix: Wipe Units: ug/100cm²

Extraction Method: 7471B

Total Metals

F/V Batch 40 CC91855 Analyst Analyzed 03/19/19 14:22 Results (MRL) **MDL** <u>I/V</u> **Analyte** Method Limit Mercury 0.057 (0.020) 7471B



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

Client Sample ID: W-1136 Date Sampled: 03/15/19 08:20

Percent Solids: N/A

Extraction Method: 7471B

ESS Laboratory Work Order: 1903405 ESS Laboratory Sample ID: 1903405-08

Sample Matrix: Wipe Units: ug/100cm²

Total Metals

 Analyte Mercury
 Results (MRL) ND (0.020)
 MDL Method 7471B
 Limit Limit Limit Limit Limit NC (0.020)
 DF MCD (0.020)
 Analyst Analyzed NC (0.021)
 I/V MKS (0.021)
 E/V MKS (0.021)
 Batch NC (0.021)



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

Client Sample ID: W-1137 Date Sampled: 03/15/19 08:17

Percent Solids: N/A

Extraction Method: 7471B

ESS Laboratory Work Order: 1903405 ESS Laboratory Sample ID: 1903405-09

Sample Matrix: Wipe Units: ug/100cm²

Total Metals

 Analyte Mercury
 Results (MRL) ND (0.020)
 MDL Method 7471B
 Limit Limit Limit Limit Limit NC (0.020)
 DF MCD (0.020)
 Analyst Analyzed NC (0.021)
 I/V MKS (0.021)
 E/V MKS (0.021)
 Batch NC (0.021)



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

Client Sample ID: W-1138 Date Sampled: 03/15/19 08:23

Percent Solids: N/A

ESS Laboratory Work Order: 1903405 ESS Laboratory Sample ID: 1903405-10

Sample Matrix: Wipe Units: ug/100cm²

Extraction Method: 7471B

Total Metals

F/V Batch 40 CC91855 Analyst Analyzed 03/19/19 14:28 Results (MRL) **MDL Analyte** Method Limit Mercury 0.126 (0.020) 7471B



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

Client Sample ID: W-1139 Date Sampled: 03/15/19 08:26

Percent Solids: N/A

Extraction Method: 7471B

ESS Laboratory Work Order: 1903405 ESS Laboratory Sample ID: 1903405-11

Sample Matrix: Wipe Units: ug/100cm²

Total Metals

 Analyte Mercury
 Results (MRL)
 MDL 0.072 (0.020)
 Method 7471B
 Limit 1
 DF 0.072 (0.020)
 Analyst Analyzed 0.074 (0.020)
 I/V 1
 F/V 0.074 (0.020)
 Batch 0.072 (0.020)



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

Client Sample ID: W-1140 Date Sampled: 03/15/19 08:30

Percent Solids: N/A

Extraction Method: 7471B

ESS Laboratory Work Order: 1903405 ESS Laboratory Sample ID: 1903405-12

Sample Matrix: Wipe Units: ug/100cm²

Total Metals

 Analyte Mercury
 Results (MRL) ND (0.020)
 MDL Method 7471B
 Limit Limit Limit Limit Limit NC (0.020)
 DF MC (0.020)
 Analyst Analyzed NKS (0.021)
 I/V (0.021)
 Batch NKS (0.021)



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

Client Sample ID: W-1141 Date Sampled: 03/15/19 08:35

Percent Solids: N/A

Extraction Method: 7471B

ESS Laboratory Work Order: 1903405 ESS Laboratory Sample ID: 1903405-13

Sample Matrix: Wipe Units: ug/100cm²

Total Metals

 Analyte Mercury
 Results (MRL) ND (0.020)
 MDL Method 7471B
 Limit Limit Limit Limit Limit NC (0.020)
 DF MCD (0.020)
 Analyst Analyzed NC (0.021)
 I/V MKS (0.021)
 E/V MKS (0.021)
 Batch NC (0.021)



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

Client Sample ID: W-1142 Date Sampled: 03/15/19 08:40

Percent Solids: N/A

Extraction Method: 7471B

ESS Laboratory Work Order: 1903405 ESS Laboratory Sample ID: 1903405-14

Sample Matrix: Wipe Units: ug/100cm²

Total Metals

 Analyte Mercury
 Results (MRL)
 MDL 0.040 (0.020)
 Method 7471B
 Limit 1
 DF MKS
 Analyst Analyzed 0.01/9/19 14:36
 I/V 40
 E/V C91855

Service



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

Client Sample ID: W-1143 Date Sampled: 03/15/19 08:47

Percent Solids: N/A

Extraction Method: 7471B

ESS Laboratory Work Order: 1903405 ESS Laboratory Sample ID: 1903405-15

Sample Matrix: Wipe Units: ug/100cm²

Total Metals

F/V Batch 40 CC91855 Analyst Analyzed
MKS 03/19/19 14:38 Results (MRL) **MDL Analyte** Method Limit Mercury 0.046 (0.020) 7471B



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

Client Sample ID: W-1144 Date Sampled: 03/15/19 10:20

Percent Solids: N/A

Extraction Method: 7471B

ESS Laboratory Work Order: 1903405 ESS Laboratory Sample ID: 1903405-16

Sample Matrix: Wipe Units: ug/100cm²

Total Metals

 Analyte Mercury
 Results (MRL)
 MDL
 Method
 Limit
 DF
 Analyst
 Analyzed
 I/V
 F/V
 Batch

 Mercury
 0.373 (0.020)
 7471B
 1
 MKS
 03/19/19 14:40
 1
 40
 CC91855



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

Client Sample ID: C-1027 Date Sampled: 03/15/19 10:28

Percent Solids: 99

ciccii solius.

ESS Laboratory Work Order: 1903405 ESS Laboratory Sample ID: 1903405-17

Sample Matrix: Solid Units: mg/kg dry

Extraction Method: 7471B

Total Metals

 Analyte
 Results (MRL)
 MDL
 Method
 Limit
 DF
 Analyst
 Analyzed
 I/V
 F/V
 Batch

 Mercury
 320 (16.4)
 7471B
 500
 MKS
 03/19/19 17:16
 0.61
 40
 CC91854

000312



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

Client Sample ID: C-1029 Date Sampled: 03/15/19 09:18

Percent Solids: 99

ESS Laboratory Work Order: 1903405 ESS Laboratory Sample ID: 1903405-18

Sample Matrix: Solid Units: mg/kg dry

Extraction Method: 7471B

Total Metals

 Analyte Mercury
 Results (MRL) 0.207 (0.048)
 MDL 7471B
 Limit 5 MCs
 DF MCS
 Analyzed MRS
 Analyzed 0.3/19/19 17:04
 LIV 2.07
 E/V CC91854
 Batch CC91854



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

Client Sample ID: C-1030 Date Sampled: 03/15/19 08:30

Percent Solids: 98

Extraction Method: 7471B

ESS Laboratory Work Order: 1903405 ESS Laboratory Sample ID: 1903405-19

Sample Matrix: Solid Units: mg/kg dry

Total Metals



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

Client Sample ID: C-1031 Date Sampled: 03/15/19 09:40

Percent Solids: 97

ESS Laboratory Work Order: 1903405 ESS Laboratory Sample ID: 1903405-20

Sample Matrix: Solid Units: mg/kg dry

Extraction Method: 7471B

Total Metals

 Analyte
 Results (MRL)
 MDL
 Method
 Limit
 DF
 Analyst
 Analyzed
 I/V
 F/V
 Batch

 Mercury
 0.167 (0.010)
 7471B
 1
 MKS
 03/19/19 15:41
 2.09
 40
 CC91854



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

ESS Laboratory Work Order: 1903405

Quality Control Data

				Spike	Source		%REC		RPD	
Analyte	Result	MRL	Units	Level	Result	%REC	Limits	RPD	Limit	Qualifier
			Total Meta	ıls						
Batch CC91854 - 7471B										
Blank										
Mercury	ND	0.033	mg/kg wet							
LCS										
Mercury	3.06	0.374	mg/kg wet	4.850		63	50-103			
LCS Dup										
Mercury	2.87	0.367	mg/kg wet	4.850		59	50-103	6	20	
Batch CC91855 - 7471B										
Blank										
Mercury	ND	0.020	ug/100cm²							
LCS										
Mercury	0.125	0.020	ug/100cm²	0.1208		104	85-115			
LCS Dup										
Mercury	0.128	0.020	ug/100cm ²	0.1208		106	85-115	2	20	



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

ESS Laboratory Work Order: 1903405

Notes and Definitions

U	Analyte included in the analysis, but not detected
D	Diluted.
ND	Analyte NOT DETECTED at or above the MRL (LOQ), LOD for DoD Reports, MDL for J-Flagged Analytes
dry	Sample results reported on a dry weight basis
RPD	Relative Percent Difference
MDL	Method Detection Limit
MRL	Method Reporting Limit
LOD	Limit of Detection
LOQ	Limit of Quantitation
DL	Detection Limit
I/V	Initial Volume
F/V	Final Volume
§	Subcontracted analysis; see attached report
1	Range result excludes concentrations of surrogates and/or internal standards eluting in that range.
2	Range result excludes concentrations of target analytes eluting in that range.
3	Range result excludes the concentration of the C9-C10 aromatic range.
Avg	Results reported as a mathematical average.

NR No Recovery [CALC] Calculated Analyte

SUB Subcontracted analysis; see attached report

RLReporting Limit

EDL **Estimated Detection Limit** Membrane Filtration MF MPN Most Probably Number TNTC Too numerous to Count CFU Colony Forming Units



The Microbiology Division of Thielsch Engineering, Inc.

ESS Laboratory Work Order: 1903405



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

ENVIRONMENTAL

ESS LABORATORY CERTIFICATIONS AND ACCREDITATIONS

Rhode Island Potable and Non Potable Water: LAI00179 http://www.health.ri.gov/find/labs/analytical/ESS.pdf

Connecticut Potable and Non Potable Water, Solid and Hazardous Waste: PH-0750 http://www.ct.gov/dph/lib/dph/environmental health/environmental laboratories/pdf/OutofStateCommercialLaboratories.pdf

Maine Potable and Non Potable Water, and Solid and Hazardous Waste: RI00002 http://www.maine.gov/dhhs/mecdc/environmental-health/dwp/partners/labCert.shtml

Massachusetts Potable and Non Potable Water: M-RI002 http://public.dep.state.ma.us/Labcert/Labcert.aspx

New Hampshire (NELAP accredited) Potable and Non Potable Water, Solid and Hazardous Waste: 2424 http://des.nh.gov/organization/divisions/water/dwgb/nhelap/index.htm

New York (NELAP accredited) Non Potable Water, Solid and Hazardous Waste: 11313 http://www.wadsworth.org/labcert/elap/comm.html

New Jersey (NELAP accredited) Non Potable Water, Solid and Hazardous Waste: RI006 http://datamine2.state.nj.us/DEP OPRA/OpraMain/pi main?mode=pi by site&sort order=PI NAMEA&Select+a+Site:=58715

United States Department of Agriculture Soil Permit: P330-12-00139

Pennsylvania: 68-01752

http://www.dep.pa.gov/Business/OtherPrograms/Labs/Pages/Laboratory-Accreditation-Program.aspx

ESS Laboratory Sample and Cooler Receipt Checklist

Client	:G	ZA - Bedford	d, NH - GZA/[os		ESS	Project ID:	1903405	
011 1/0							Received:	3/15/2019	
Shipped/D	Delivered Via:		ESS Courier				Due Date: for Project:	3/21/2019 4 Day	
	nanifest prese			No		-	match bottles?	4 Day	Yes
2. Were cu	ustody seals į	present?	I	No		7. Is COC cor	mplete and correc	t?	Yes
3. Is radiat	tion count <10	00 CPM?	1	Yes		8. Were samp	ples received inta-	ot?	Yes
	oler Present? :5.2		lce	Yes		9. Were labs	informed about	short holds & rushes?	Yes / No / NA
	OC signed an	-		Yes		10. Were any	analyses receive	ed outside of hold time?	Yes / No
	bcontracting Sample IDs; Analysis: TAT;			/No)			As received? s in aqueous VOA nanol cover soil co		Yes / No Yes / No Yes / No / NA
a. If metals	e samples pro s preserved u vel VOA vials	pon receipt:		Yes / No Date: Date:		Time: Time: _		By:	
Sample Re	ceiving Note:	s:							
	ere a need to		oject Manage client?	r ? Date: _	Yes /No Yes No	/ Time:		Ву:	
Sample Number	Container ID	Proper Container	Air Bubbles Present	Sufficient Volume	Containe	er Type	Preservative		anide and 608.3 cides)
01	324344	Yes	NA	Yes	4 oz. Jar -	Unpres	Other		
02	324345	Yes	NA	Yes	4 oz. Jar -	- 1	Other		
03 04	324346 324347	Yes Yes	NA NA	Yes Yes	4 oz. Jar - 4 oz. Jar -		Other Other		
05	324348	Yes	NA	Yes	4 oz. Jar -		Other		
06	324349	Yes	NA	Yes	4 oz. Jar -	•	Other		
07	324350	Yes	NA	Yes	4 oz. Jar -	•	Other		
08	324351	Yes	NA	Yes	4 oz. Jar -		Other		
09	324352	Yes	NA	Yes	4 oz. Jar -		Other		
10	324353	Yes	NA	Yes	4 oz. Jar -	Unpres	Other		
11	324354	Yes	NA	Yes	4 oz. Jar -		Other		
12	324355	Yes	NA	Yes	4 oz. Jar -		Other		•
13	324356	Yes	NA	Yes	4 oz. Jar -		Other		
14	324358	Yes	NA	Yes	4 oz. Jar -		Other		
15	324357	Yes	NA	Yes	4 oz. Jar -		Other		
16	324359	Yes	NA	Yes	4 oz. Jar -		Other		
17	324360	Yes	NA	Yes	4 oz. Jar -		Other		
18	324343	Yes	NA	Yes	4 oz. Jar -		NP		
19	324342	Yes	NA	Yes	4 oz. Jar -	•	NP		
20	324341	Yes	NA	Yes	4 oz. Jar -	Unpres	NP		

2nd Review

ESS Laboratory	/ Sample and	d Cooler Receipt Che	ecklist	
Client: GZA - Bedford, NH - GZA/DS		ESS Project ID:	1903405	
		Date Received:	3/15/2019	
All containers scanned into storage/lab	Initials: _			
Are barcode labels on correct containers?	Yes / No			
Are all necessary stickers attached?	Yes/No			
// · ^	\smile			
Completed / / /	Data 9 Times	7/18/14	11:11	
Ву:	Date & Time: _		1105	
Reviewed By:	Date & Time:	3118/19	1190	
Delivered		21/5/12	1232	_
By:		5/18/19	11-50	
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Preser	ner volume;	1-100 mL 2-	2.5 gal 3-250 2-HCl 3-H2SO4		0 000	mL 6-1L 7-VOA 8-2 o	z 9-4 oz 10-8 oz	11-Other*	<u> </u>		+			\vdash	44	_	4_	\Box		
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		Laboratory	Use Only			Numb	er of Containers per S	ample:									-	 		-
Cooler	Present:		O Drop Off	r	ŀ	Sampled by: E. Dyme	ess, C. Moolisen	<u>B.</u> Z	uhr	5							,			1
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7	3/15/19	0815	wipe		wipe	W-1135			<u> </u>									
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Contai	ner Volume:	1-100 mL 2-;	2.5 gal 3-250	mL	4-300 mL 5-500	C-Cubitainer J-Jar O-Oti mL 6-1L 7-VOA 8-2 oz		le V-Vial	1,7-1	\Box							-	
Presen	ation Code:	1-Non Preserved	2-HCI 3-H2SO4			thanoi 7-Na2S2O3 8-ZnAce, NaC	0H 9-NH4CI 10-DI H2O		171		╁╢	\dashv						
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The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Rebecca Cox GZA GeoEnvironmental, Inc. 5 Commerce Park North Bedford, NH 03110

RE: Schiller Boiler Demo (04.0190318.03) ESS Laboratory Work Order Number: 1903433

This signed Certificate of Analysis is our approved release of your analytical results. These results are only representative of sample aliquots received at the laboratory. ESS Laboratory expects its clients to follow all regulatory sampling guidelines. Beginning with this page, the entire report has been paginated. This report should not be copied except in full without the approval of the laboratory. Samples will be disposed of thirty days after the final report has been delivered. If you have any questions or concerns, please feel free to call our Customer Service Department.

Laurel Stoddard Laboratory Director **REVIEWED**

By ESS Laboratory at 12:33 pm, Mar 22, 2019

Analytical Summary

The project as described above has been analyzed in accordance with the ESS Quality Assurance Plan. This plan utilizes the following methodologies: US EPA SW-846, US EPA Methods for Chemical Analysis of Water and Wastes per 40 CFR Part 136, APHA Standard Methods for the Examination of Water and Wastewater, American Society for Testing and Materials (ASTM), and other recognized methodologies. The analyses with these noted observations are in conformance to the Quality Assurance Plan. In chromatographic analysis, manual integration is frequently used instead of automated integration because it produces more accurate results.

The test results present in this report are in compliance with TNI and relative state standards, and/or client Quality Assurance Project Plans (QAPP). The laboratory has reviewed the following: Sample Preservations, Hold Times, Initial Calibrations, Continuing Calibrations, Method Blanks, Blank Spikes, Blank Spike Duplicates, Duplicates, Matrix Spikes, Matrix Spike Duplicates, Surrogates and Internal Standards. Any results which were found to be outside of the recommended ranges stated in our SOPs will be noted in the Project Narrative.



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

ESS Laboratory Work Order: 1903433

SAMPLE RECEIPT

The following samples were received on March 18, 2019 for the analyses specified on the enclosed Chain of Custody Record.

Lab Number	Sample Name	Matrix	Analysis
1903433-01	C-1008	Solid	7471B
1903433-02	C-1009	Solid	7471B
1903433-03	C-1010	Solid	7471B
1903433-04	C-1011	Solid	7471B
1903433-05	C-1012	Solid	7471B
1903433-06	C-1013	Solid	7471B
1903433-07	C-1014	Solid	7471B
1903433-08	C-1015	Solid	7471B
1903433-09	C-1016	Solid	7471B
1903433-10	C-1017	Solid	7471B
1903433-11	C-1018	Solid	7471B
1903433-12	C-1019	Solid	7471B
1903433-13	C-1020	Solid	7471B
1903433-14	C-1028	Solid	7471B



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

ESS Laboratory Work Order: 1903433

PROJECT NARRATIVE

No unusual observations noted.

End of Project Narrative.

DATA USABILITY LINKS

To ensure you are viewing the most current version of the documents below, please clear your internet cookies for www.ESSLaboratory.com. Consult your IT Support personnel for information on how to clear your internet cookies.

Definitions of Quality Control Parameters

Semivolatile Organics Internal Standard Information

Semivolatile Organics Surrogate Information

Volatile Organics Internal Standard Information

Volatile Organics Surrogate Information

EPH and VPH Alkane Lists



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

ESS Laboratory Work Order: 1903433

Analytical Methods

1010A - Flashpoint 6010C - ICP

6020A - ICP MS 7010 - Graphite Furnace

7196A - Hexavalent Chromium 7470A - Aqueous Mercury

7471B - Solid Mercury 8011 - EDB/DBCP/TCP

8015C - GRO/DRO

8081B - Pesticides 8082A - PCB

8100M - TPH

8151A - Herbicides 8260B - VOA

8270D - SVOA

8270D SIM - SVOA Low Level

9014 - Cyanide

9038 - Sulfate

9040C - Aqueous pH

9045D - Solid pH (Corrosivity)

9050A - Specific Conductance

9056A - Anions (IC)

9060A - TOC

9095B - Paint Filter

MADEP 04-1.1 - EPH

MADEP 18-2.1 - VPH

Prep Methods

CURRENT SW-846 METHODOLOGY VERSIONS

3005A - Aqueous ICP Digestion

3020A - Aqueous Graphite Furnace / ICP MS Digestion

3050B - Solid ICP / Graphite Furnace / ICP MS Digestion

3060A - Solid Hexavalent Chromium Digestion

3510C - Separatory Funnel Extraction

3520C - Liquid / Liquid Extraction

3540C - Manual Soxhlet Extraction

3541 - Automated Soxhlet Extraction

3546 - Microwave Extraction

3580A - Waste Dilution

5030B - Aqueous Purge and Trap

5030C - Aqueous Purge and Trap

5035A - Solid Purge and Trap

SW846 Reactivity Methods 7.3.3.2 (Reactive Cyanide) and 7.3.4.1 (Reactive Sulfide) have been withdrawn by EPA. These methods are reported per client request and are not NELAP accredited.



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

Client Sample ID: C-1008 Date Sampled: 03/15/19 11:29

Percent Solids: 99

ESS Laboratory Work Order: 1903433 ESS Laboratory Sample ID: 1903433-01

Sample Matrix: Solid Units: mg/kg dry

Extraction Method: 7471B

Total Metals

Analyte Results (MRL) **MDL** I/V F/V Batch Method Limit 10.3 (1.59) Mercury 7471B 40 CC91941



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

Client Sample ID: C-1009 Date Sampled: 03/15/19 11:38

Percent Solids: 98

Extraction Method: 7471B

ESS Laboratory Work Order: 1903433 ESS Laboratory Sample ID: 1903433-02

Sample Matrix: Solid Units: mg/kg dry

Total Metals

Analyst Analyzed 03/20/19 13:17 **Analyte** Results (MRL) **MDL** <u>I/V</u> F/V Batch Method Limit Mercury 2.04 (0.336) 7471B 0.6 40 CC91941



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

Client Sample ID: C-1010 Date Sampled: 03/15/19 13:30

Percent Solids: 98

Extraction Method: 7471B

ESS Laboratory Work Order: 1903433 ESS Laboratory Sample ID: 1903433-03

Sample Matrix: Solid Units: mg/kg dry

Total Metals

<u>Analyst</u> <u>Analyzed</u> <u>I/V</u> 03/20/19 13:19 0.81 **Analyte** Results (MRL) **MDL** I/V F/V Batch Method Limit Mercury 5.75 (1.25) 7471B 40 CC91941

Service



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

Client Sample ID: C-1011 Date Sampled: 03/15/19 13:40

Percent Solids: 97

ESS Laboratory Work Order: 1903433 ESS Laboratory Sample ID: 1903433-04

Sample Matrix: Solid Units: mg/kg dry

Extraction Method: 7471B

Total Metals

F/V Batch Results (MRL) **MDL** I/V **Analyte** Method Limit Mercury **2.97** (0.628) 7471B 40 CC91941



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

Client Sample ID: C-1012 Date Sampled: 03/15/19 12:00

Percent Solids: 98

Extraction Method: 7471B

ESS Laboratory Work Order: 1903433 ESS Laboratory Sample ID: 1903433-05

Sample Matrix: Solid Units: mg/kg dry

Total Metals

Analyst Analyzed
MKS 03/20/19 13:23 **Analyte** Results (MRL) **MDL** <u>I/V</u> F/V Batch Method Limit **16.9** (1.68) Mercury 7471B 0.6 40 CC91941



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

Client Sample ID: C-1013
Date Sampled: 03/15/19 11:50

Percent Solids: 98

ESS Laboratory Work Order: 1903433 ESS Laboratory Sample ID: 1903433-06

Sample Matrix: Solid Units: mg/kg dry

Extraction Method: 7471B

Total Metals

 Analyte
 Results (MRL)
 MDL
 Method
 Limit
 DF
 Analyst
 Analyzed
 I/V
 F/V
 Batch

 Mercury
 4.94 (0.824)
 7471B
 25
 MKS
 03/20/19 13:25
 0.61
 40
 CC91941



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

Client Sample ID: C-1014 Date Sampled: 03/15/19 11:20

Percent Solids: 98

ESS Laboratory Work Order: 1903433 ESS Laboratory Sample ID: 1903433-07

Sample Matrix: Solid Units: mg/kg dry

Extraction Method: 7471B

Total Metals

 Analyte
 Results (MRL)
 MDL
 Method
 Limit
 DF
 Analyst
 Analyzed
 I/V
 F/V
 Batch

 Mercury
 1.93 (0.552)
 7471B
 20
 MKS
 03/20/19 13:27
 0.73
 40
 CC91941



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

Client Sample ID: C-1015 Date Sampled: 03/15/19 14:08

Percent Solids: 98

ESS Laboratory Work Order: 1903433 ESS Laboratory Sample ID: 1903433-08

Sample Matrix: Solid Units: mg/kg dry

Extraction Method: 7471B

Total Metals

Analyst Analyzed
MKS 03/20/19 13:29 **Analyte** Results (MRL) **MDL** <u>I/V</u> F/V Batch Method Limit Mercury **19.7** (1.69) 7471B 0.6 40 CC91941



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

Client Sample ID: C-1016 Date Sampled: 03/15/19 14:15

Percent Solids: 98

ESS Laboratory Work Order: 1903433 ESS Laboratory Sample ID: 1903433-09

Sample Matrix: Solid Units: mg/kg dry

Total Metals

Extraction Method: 7471B

F/V Batch CC91941 <u>Analyst</u> <u>Analyzed</u> <u>I/V</u> MKS 03/20/19 13:31 0.77 **Analyte** Results (MRL) **MDL** I/V Method Limit Mercury **23.6** (1.31) 7471B



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

Client Sample ID: C-1017 Date Sampled: 03/15/19 13:58

Percent Solids: 99

Extraction Method: 7471B

ESS Laboratory Work Order: 1903433 ESS Laboratory Sample ID: 1903433-10

Sample Matrix: Solid Units: mg/kg dry

Total Metals

 Analyte
 Results (MRL)
 MDL
 Method
 Limit
 DF
 Analyst
 Analyzed
 I/V
 F/V
 Batch

 Mercury
 55.2 (3.27)
 7471B
 100
 MKS
 03/20/19 13:47
 0.61
 40
 CC91941



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

Client Sample ID: C-1018 Date Sampled: 03/15/19 14:22

Percent Solids: 99

Extraction Method: 7471B

ESS Laboratory Work Order: 1903433 ESS Laboratory Sample ID: 1903433-11

Sample Matrix: Solid Units: mg/kg dry

Total Metals

Analyst Analyzed
MKS 03/20/19 13:39 **Analyte** Results (MRL) **MDL** I/V F/V Batch Method Limit Mercury **15.5** (1.45) 7471B 0.69 40 CC91941



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

Client Sample ID: C-1019 Date Sampled: 03/15/19 14:27

Percent Solids: 98

Extraction Method: 7471B

ESS Laboratory Work Order: 1903433 ESS Laboratory Sample ID: 1903433-12

Sample Matrix: Solid Units: mg/kg dry

Total Metals

Analyte Results (MRL) **MDL** I/V F/V Batch Method Limit Mercury **16.2** (1.47) 7471B 40 CC91941



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

Client Sample ID: C-1020 Date Sampled: 03/15/19 13:45

Percent Solids: 98

ESS Laboratory Work Order: 1903433 ESS Laboratory Sample ID: 1903433-13

Sample Matrix: Solid Units: mg/kg dry

Extraction Method: 7471B

Total Metals

 Analyte Mercury
 Results (MRL)
 MDL MDL
 Method 7471B
 Limit Li



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

Client Sample ID: C-1028 Date Sampled: 03/15/19 13:53

Percent Solids: 98

Extraction Method: 7471B

ESS Laboratory Work Order: 1903433 ESS Laboratory Sample ID: 1903433-14

Sample Matrix: Solid Units: mg/kg dry

Total Metals

Analyst Analyzed MKS 03/20/19 13:45 0.65 **Analyte** Results (MRL) **MDL** I/V F/V Batch Method Limit Mercury **2.83** (0.622) 7471B 40 CC91941



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

ESS Laboratory Work Order: 1903433

Quality Control Data

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
			Total Meta	ıls						
Batch CC91941 - 7471B										
Blank										
Mercury	ND	0.033	mg/kg wet							
LCS										
Mercury	3.05	0.325	mg/kg wet	4.850		63	50-103			
LCS Dup										
Mercury	3.05	0.291	mg/kg wet	4.850		63	50-103	0.04	20	



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

ESS Laboratory Work Order: 1903433

Notes and Definitions

U	Analyte included in the analysis, but not detected
D	Diluted.
ND	Analyte NOT DETECTED at or above the MRL (LOQ), LOD for DoD Reports, MDL for J-Flagged Analytes
dry	Sample results reported on a dry weight basis
RPD	Relative Percent Difference
MDL	Method Detection Limit
MRL	Method Reporting Limit
LOD	Limit of Detection
LOQ	Limit of Quantitation
DL	Detection Limit
I/V	Initial Volume
F/V	Final Volume
§	Subcontracted analysis; see attached report
1	Range result excludes concentrations of surrogates and/or internal standards eluting in that range.
2	Range result excludes concentrations of target analytes eluting in that range.
3	Range result excludes the concentration of the C9-C10 aromatic range.

Avg Results reported as a mathematical average.

NR No Recovery [CALC] Calculated Analyte

SUB Subcontracted analysis; see attached report

RLReporting Limit

EDL **Estimated Detection Limit** MF Membrane Filtration MPN Most Probably Number TNTC Too numerous to Count CFU Colony Forming Units



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

ESS Laboratory Work Order: 1903433

ENVIRONMENTAL

ESS LABORATORY CERTIFICATIONS AND ACCREDITATIONS

Rhode Island Potable and Non Potable Water: LAI00179 http://www.health.ri.gov/find/labs/analytical/ESS.pdf

Connecticut Potable and Non Potable Water, Solid and Hazardous Waste: PH-0750 http://www.ct.gov/dph/lib/dph/environmental health/environmental laboratories/pdf/OutofStateCommercialLaboratories.pdf

Maine Potable and Non Potable Water, and Solid and Hazardous Waste: RI00002 http://www.maine.gov/dhhs/mecdc/environmental-health/dwp/partners/labCert.shtml

Massachusetts Potable and Non Potable Water: M-RI002 http://public.dep.state.ma.us/Labcert/Labcert.aspx

New Hampshire (NELAP accredited) Potable and Non Potable Water, Solid and Hazardous Waste: 2424 http://des.nh.gov/organization/divisions/water/dwgb/nhelap/index.htm

New York (NELAP accredited) Non Potable Water, Solid and Hazardous Waste: 11313 http://www.wadsworth.org/labcert/elap/comm.html

New Jersey (NELAP accredited) Non Potable Water, Solid and Hazardous Waste: RI006 http://datamine2.state.nj.us/DEP OPRA/OpraMain/pi main?mode=pi by site&sort order=PI NAMEA&Select+a+Site:=58715

United States Department of Agriculture Soil Permit: P330-12-00139

Pennsylvania: 68-01752

http://www.dep.pa.gov/Business/OtherPrograms/Labs/Pages/Laboratory-Accreditation-Program.aspx

ESS Laboratory Sample and Cooler Receipt Checklist

Shipped/D	elivered Via:		ESS Courier	<u> </u>		Project D	eceived: ue Date: r Project:	3/18/2019 3/25/2019 5 Day	<u></u>
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3. Is radiat	ion count <10	00 CPM?		Yes		8. Were sample	es received intact?		Yes
	oler Present?		: Ice	Yes		9. Were labs in	nformed about <u>short</u>	holds & rushes?	Yes / No / N
. Was CC	OC signed and	d dated by o	lient?	Yes		10. Were any a	analyses received out	side of hold time?	Yes / No
	bcontracting Sample IDs: Analysis: TAT:		Yes	No			s received? in aqueous VOAs? nol cover soil complet	tely?	Yes / No Yes / No / N
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ESS Laboratory Sample and Cooler Receipt Checklist

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The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Rebecca Cox GZA GeoEnvironmental. Inc. 5 Commerce Park North Bedford, NH 03110

RE: Schiller Boiler Demo (04.0190318.03) ESS Laboratory Work Order Number: 1903461

This signed Certificate of Analysis is our approved release of your analytical results. These results are only representative of sample aliquots received at the laboratory. ESS Laboratory expects its clients to follow all regulatory sampling guidelines. Beginning with this page, the entire report has been paginated. This report should not be copied except in full without the approval of the laboratory. Samples will be disposed of thirty days after the final report has been delivered. If you have any questions or concerns, please feel free to call our Customer Service Department.

Laurel Stoddard Laboratory Director **REVIEWED**

By ESS Laboratory at 1:41 pm, Mar 25, 2019

Analytical Summary

The project as described above has been analyzed in accordance with the ESS Quality Assurance Plan. This plan utilizes the following methodologies: US EPA SW-846, US EPA Methods for Chemical Analysis of Water and Wastes per 40 CFR Part 136, APHA Standard Methods for the Examination of Water and Wastewater, American Society for Testing and Materials (ASTM), and other recognized methodologies. The analyses with these noted observations are in conformance to the Quality Assurance Plan. In chromatographic analysis, manual integration is frequently used instead of automated integration because it produces more accurate results.

The test results present in this report are in compliance with TNI and relative state standards, and/or client Quality Assurance Project Plans (QAPP). The laboratory has reviewed the following: Sample Preservations, Hold Times, Initial Calibrations, Continuing Calibrations, Method Blanks, Blank Spikes, Blank Spike Duplicates, Duplicates, Matrix Spikes, Matrix Spike Duplicates, Surrogates and Internal Standards. Any results which were found to be outside of the recommended ranges stated in our SOPs will be noted in the Project Narrative.



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

ESS Laboratory Work Order: 1903461

SAMPLE RECEIPT

The following samples were received on March 19, 2019 for the analyses specified on the enclosed Chain of Custody Record.

Lab Number	Sample Name	Matrix	Analysis
1903461-01	W-1178	Wipe	7471B
1903461-02	W-1145	Wipe	7471B
1903461-03	W-1146	Wipe	7471B
1903461-04	W-1147	Wipe	7471B
1903461-05	W-1148	Wipe	7471B
1903461-06	W-1149	Wipe	7471B
1903461-07	W-1150	Wipe	7471B
1903461-08	W-1151	Wipe	7471B
1903461-09	W-1152	Wipe	7471B
1903461-10	W-1153	Wipe	7471B
1903461-11	W-1154	Wipe	7471B
1903461-12	W-1155	Wipe	7471B
1903461-13	W-1156	Wipe	7471B
1903461-14	W-1157	Wipe	7471B
1903461-15	W-1158	Wipe	7471B
1903461-16	W-1160	Wipe	7471B
1903461-17	W-1161	Wipe	7471B



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

ESS Laboratory Work Order: 1903461

PROJECT NARRATIVE

No unusual observations noted.

End of Project Narrative.

DATA USABILITY LINKS

To ensure you are viewing the most current version of the documents below, please clear your internet cookies for www.ESSLaboratory.com. Consult your IT Support personnel for information on how to clear your internet cookies.

Definitions of Quality Control Parameters

Semivolatile Organics Internal Standard Information

Semivolatile Organics Surrogate Information

Volatile Organics Internal Standard Information

Volatile Organics Surrogate Information

EPH and VPH Alkane Lists



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

ESS Laboratory Work Order: 1903461

Analytical Methods

1010A - Flashpoint 6010C - ICP 6020A - ICP MS

7010 - Graphite Furnace 7196A - Hexavalent Chromium 7470A - Aqueous Mercury 7471B - Solid Mercury 8011 - EDB/DBCP/TCP

8011 - EDB/DBCP/TCP 8015C - GRO/DRO 8081B - Pesticides 8082A - PCB

8100M - TPH 8151A - Herbicides 8260B - VOA 8270D - SVOA

8270D SIM - SVOA Low Level

9014 - Cyanide 9038 - Sulfate

9040C - Aqueous pH

9045D - Solid pH (Corrosivity) 9050A - Specific Conductance

9056A - Anions (IC)

9060A - TOC

9095B - Paint Filter

MADEP 04-1.1 - EPH

MADEP 18-2.1 - VPH

Prep Methods

CURRENT SW-846 METHODOLOGY VERSIONS

3005A - Aqueous ICP Digestion

3020A - Aqueous Graphite Furnace / ICP MS Digestion 3050B - Solid ICP / Graphite Furnace / ICP MS Digestion

3060A - Solid Hexavalent Chromium Digestion

3510C - Separatory Funnel Extraction 3520C - Liquid / Liquid Extraction 3540C - Manual Soxhlet Extraction 3541 - Automated Soxhlet Extraction

3546 - Microwave Extraction 3580A - Waste Dilution

5030B - Aqueous Purge and Trap

5030C - Aqueous Purge and Trap

5035A - Solid Purge and Trap

SW846 Reactivity Methods 7.3.3.2 (Reactive Cyanide) and 7.3.4.1 (Reactive Sulfide) have been withdrawn by EPA. These methods are reported per client request and are not NELAP accredited.



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

Client Sample ID: W-1178 Date Sampled: 03/18/19 15:22

Percent Solids: N/A

Extraction Method: 7471B

ESS Laboratory Work Order: 1903461 ESS Laboratory Sample ID: 1903461-01

Sample Matrix: Wipe Units: ug/100cm²

Total Metals

F/V Batch 40 CC92043 Analyst Analyzed
KJK 03/21/19 19:27 **Analyte** Results (MRL) **MDL** I/V Method Limit Mercury 1.97 (0.200) 7471B

Service



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

Client Sample ID: W-1145 Date Sampled: 03/18/19 14:10

Percent Solids: N/A

Extraction Method: 7471B

ESS Laboratory Work Order: 1903461 ESS Laboratory Sample ID: 1903461-02

Sample Matrix: Wipe Units: ug/100cm²

Total Metals

F/V Batch 40 CC92043 Analyst Analyzed 03/21/19 19:29 **Analyte** Results (MRL) **MDL** I/V Method Limit Mercury 1.54 (0.200) 7471B



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

Client Sample ID: W-1146 Date Sampled: 03/18/19 14:46

Percent Solids: N/A

Extraction Method: 7471B

ESS Laboratory Work Order: 1903461 ESS Laboratory Sample ID: 1903461-03

Sample Matrix: Wipe Units: ug/100cm²

Total Metals

 Analyte Mercury
 Results (MRL)
 MDL Method 7471B
 Limit



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

Client Sample ID: W-1147 Date Sampled: 03/18/19 14:51

Percent Solids: N/A

ESS Laboratory Work Order: 1903461 ESS Laboratory Sample ID: 1903461-04

Sample Matrix: Wipe Units: ug/100cm²

Extraction Method: 7471B

Total Metals

 Analyte Mercury
 Results (MRL)
 MDL 0.883 (0.200)
 Method 7471B
 Limit 10
 DF Limit NJK
 Analyst Analyzed 0.3/21/19 19:33
 I/V 10
 E/V C92043



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

Client Sample ID: W-1148 Date Sampled: 03/18/19 14:03

Percent Solids: N/A

Extraction Method: 7471B

ESS Laboratory Work Order: 1903461 ESS Laboratory Sample ID: 1903461-05

Sample Matrix: Wipe Units: ug/100cm²

Total Metals

F/V Batch 40 CC92043 Analyst Analyzed
KJK 03/21/19 17:35 Results (MRL) **MDL** I/V **Analyte** Method Limit Mercury 0.309 (0.020) 7471B



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

Client Sample ID: W-1149 Date Sampled: 03/18/19 13:57

Percent Solids: N/A

Extraction Method: 7471B

ESS Laboratory Work Order: 1903461 ESS Laboratory Sample ID: 1903461-06

Sample Matrix: Wipe Units: ug/100cm²

Total Metals

F/V Batch 40 CC92043 Analyst Analyzed
KJK 03/21/19 17:37 **Analyte** Results (MRL) **MDL** I/V Method Limit Mercury 0.341 (0.020) 7471B



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

Client Sample ID: W-1150 Date Sampled: 03/18/19 14:15

Percent Solids: N/A

Extraction Method: 7471B

ESS Laboratory Work Order: 1903461 ESS Laboratory Sample ID: 1903461-07

Sample Matrix: Wipe Units: ug/100cm²

Total Metals

F/V Batch 40 CC92043 Analyst Analyzed
KJK 03/21/19 19:35 **Analyte** Results (MRL) **MDL** I/V Method Limit Mercury 1.25 (0.200) 7471B



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

Client Sample ID: W-1151 Date Sampled: 03/18/19 15:00

Percent Solids: N/A

Extraction Method: 7471B

ESS Laboratory Work Order: 1903461 ESS Laboratory Sample ID: 1903461-08

Sample Matrix: Wipe Units: ug/100cm²

Total Metals

F/V Batch 40 CC92043 Analyst Analyzed
KJK 03/21/19 19:37 **Analyte** Results (MRL) **MDL** I/V Method Limit Mercury 0.698 (0.200) 7471B

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The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

Client Sample ID: W-1152 Date Sampled: 03/18/19 13:33

Percent Solids: N/A

Extraction Method: 7471B

ESS Laboratory Work Order: 1903461 ESS Laboratory Sample ID: 1903461-09

Sample Matrix: Wipe Units: ug/100cm²

Total Metals

F/V Batch 40 CC92043 Analyst Analyzed 03/21/19 17:47 **Analyte** Results (MRL) **MDL** Method Limit Mercury 0.043 (0.020) 7471B



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

Client Sample ID: W-1153 Date Sampled: 03/18/19 13:51

Percent Solids: N/A

ESS Laboratory Work Order: 1903461 ESS Laboratory Sample ID: 1903461-10

Sample Matrix: Wipe Units: ug/100cm²

Extraction Method: 7471B

Total Metals

F/V Batch 40 CC92043 Analyst Analyzed 03/21/19 19:39 **Analyte** Results (MRL) **MDL** I/V Method Limit Mercury 0.643 (0.200) 7471B



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

Client Sample ID: W-1154 Date Sampled: 03/18/19 13:43

Percent Solids: N/A

Extraction Method: 7471B

ESS Laboratory Work Order: 1903461 ESS Laboratory Sample ID: 1903461-11

Sample Matrix: Wipe Units: ug/100cm²

Total Metals

F/V Batch 40 CC92043 Analyst Analyzed 03/21/19 19:41 **Analyte** Results (MRL) **MDL** I/V Method Limit Mercury 1.48 (0.200) 7471B

Service



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

Client Sample ID: W-1155 Date Sampled: 03/18/19 13:37

Percent Solids: N/A

Extraction Method: 7471B

ESS Laboratory Work Order: 1903461 ESS Laboratory Sample ID: 1903461-12

Sample Matrix: Wipe Units: ug/100cm²

Total Metals

F/V Batch 40 CC92043 <u>Analyst</u> <u>Analyzed</u> KJK 03/21/19 17:54 Results (MRL) **MDL** <u>I/V</u> **Analyte** Method Limit Mercury 0.210 (0.020) 7471B

Service



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

Client Sample ID: W-1156 Date Sampled: 03/18/19 13:20

Percent Solids: N/A

Extraction Method: 7471B

ESS Laboratory Work Order: 1903461 ESS Laboratory Sample ID: 1903461-13

Sample Matrix: Wipe Units: ug/100cm²

Total Metals

F/V Batch 40 CC92043 Analyst Analyzed
KJK 03/21/19 17:56 Results (MRL) **MDL Analyte** Method Limit Mercury 0.097 (0.020) 7471B



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

Client Sample ID: W-1157 Date Sampled: 03/18/19 12:51

Percent Solids: N/A

ESS Laboratory Work Order: 1903461 ESS Laboratory Sample ID: 1903461-14

Sample Matrix: Wipe Units: ug/100cm²

Extraction Method: 7471B

Total Metals

 Analyte
 Results (MRL)
 MDL
 Method
 Limit
 DF
 Analyst
 Analyzed
 I/V
 F/V
 Batch

 Mercury
 12.1 (2.00)
 7471B
 100
 KJK
 03/21/19 20:07
 1
 40
 CC92043



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

Client Sample ID: W-1158 Date Sampled: 03/18/19 12:31

Percent Solids: N/A

ESS Laboratory Work Order: 1903461 ESS Laboratory Sample ID: 1903461-15

Sample Matrix: Wipe Units: ug/100cm²

Extraction Method: 7471B

Total Metals

F/V Batch 40 CC92043 Analyst Analyzed 03/21/19 18:00 Results (MRL) **MDL Analyte** Method Limit Mercury 0.086 (0.020) 7471B



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

Client Sample ID: W-1160 Date Sampled: 03/18/19 14:35

Percent Solids: N/A

Extraction Method: 7471B

ESS Laboratory Work Order: 1903461 ESS Laboratory Sample ID: 1903461-16

Sample Matrix: Wipe Units: ug/100cm²

Total Metals

 Analyte
 Results (MRL)
 MDL
 Method
 Limit
 DF
 Analyst
 Analyzed
 I/V
 F/V
 Batch

 Mercury
 16.3 (2.00)
 7471B
 100
 KJK
 03/21/19 20:09
 1
 40
 CC92043



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

Client Sample ID: W-1161 Date Sampled: 03/18/19 14:20

Percent Solids: N/A

Extraction Method: 7471B

ESS Laboratory Work Order: 1903461 ESS Laboratory Sample ID: 1903461-17

Sample Matrix: Wipe Units: ug/100cm²

Total Metals

F/V Batch 40 CC92043 Analyst Analyzed 03/21/19 18:04 Results (MRL) **MDL Analyte** Method Limit Mercury 0.173 (0.020) 7471B



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

ESS Laboratory Work Order: 1903461

Quality Control Data

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
			Total Meta	.lc						
			TOTAL META	115						
Batch CC92043 - 7471B										
Blank										
Mercury	ND	0.020	ug/100cm ²							
LCS										
Mercury	0.130	0.020	ug/100cm²	0.1208		108	85-115			
LCS Dup										
Mercury	0.127	0.020	ug/100cm ²	0.1208		105	85-115	3	20	



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

ESS Laboratory Work Order: 1903461

Notes and Definitions

U	Analyte included in the analysis, but not detected
D	Diluted.
ND	Analyte NOT DETECTED at or above the MRL (LOQ), LOD for DoD Reports, MDL for J-Flagged Analytes
dry	Sample results reported on a dry weight basis
RPD	Relative Percent Difference
MDL	Method Detection Limit
MRL	Method Reporting Limit
LOD LOQ	Limit of Detection Limit of Quantitation
DL	Detection Limit
I/V	Initial Volume
F/V	Final Volume
§	Subcontracted analysis; see attached report
ï	Range result excludes concentrations of surrogates and/or internal standards eluting in that range.
2	Range result excludes concentrations of target analytes eluting in that range.
3	Range result excludes the concentration of the C9-C10 aromatic range.

No Recovery NR [CALC] Calculated Analyte

SUBSubcontracted analysis; see attached report

RLReporting Limit

EDL Estimated Detection Limit Membrane Filtration MF MPN Most Probably Number TNTC Too numerous to Count CFU Colony Forming Units



The Microbiology Division of Thielsch Engineering, Inc.

ESS Laboratory Work Order: 1903461



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

ENVIRONMENTAL

ESS LABORATORY CERTIFICATIONS AND ACCREDITATIONS

Rhode Island Potable and Non Potable Water: LAI00179 http://www.health.ri.gov/find/labs/analytical/ESS.pdf

Connecticut Potable and Non Potable Water, Solid and Hazardous Waste: PH-0750 http://www.ct.gov/dph/lib/dph/environmental health/environmental laboratories/pdf/OutofStateCommercialLaboratories.pdf

Maine Potable and Non Potable Water, and Solid and Hazardous Waste: R100002 http://www.maine.gov/dhhs/mecdc/environmental-health/dwp/partners/labCert.shtml

Massachusetts Potable and Non Potable Water: M-RI002 http://public.dep.state.ma.us/Labcert/Labcert.aspx

New Hampshire (NELAP accredited) Potable and Non Potable Water, Solid and Hazardous Waste: 2424 http://des.nh.gov/organization/divisions/water/dwgb/nhelap/index.htm

New York (NELAP accredited) Non Potable Water, Solid and Hazardous Waste: 11313 http://www.wadsworth.org/labcert/elap/comm.html

New Jersey (NELAP accredited) Non Potable Water, Solid and Hazardous Waste: RI006 http://datamine2.state.nj.us/DEP OPRA/OpraMain/pi main?mode=pi by site&sort order=PI NAMEA&Select+a+Site:=58715

United States Department of Agriculture Soil Permit: P330-12-00139

Pennsylvania: 68-01752 http://www.dep.pa.gov/Business/OtherPrograms/Labs/Pages/Laboratory-Accreditation-Program.aspx

ESS Laboratory Sample and Cooler Receipt Checklist

Client:	_G2	ZA - Bedford,	NH - GZA/D	s			Project ID:	1903461		-
Shipped/De	elivered Via:	ı	ESS Courier				Received: Due Date:	3/19/2019 - 3/26/201		-
						Days fo	or Project:	3 Đay	14 Oling	_
	anifest prese			No		6. Does COC	match bottles?	L	1 ^N	Yes
2. Were cus	stody seals p	resent?		No		7. Is COC con	mplete and correct?	>		Yes
3. Is radiation	on count <10	0 CPM?		Yes		8. Were samp	oles received intact	?		Yes
4. Is a Cool Temp:	er Present? 1.3	Iced with:	lce	Yes			informed about <u>sl</u>			Yes No / NA
5. Was CO	C signed and	d dated by cli	ent?	Yes		10. Were any	analyses received	outside of hold	time?	Yes (No
		needed?		No No			As received? s in aqueous VOAs nanol cover soil cor			Yes No Yes / No Yes / No / NA
a. If metals	samples pro preserved u el VOA vials		ved?	Yes)/ No Date: Date:	-	_ Time: _ _ Time: _		By: By:		<u>-</u>
Sample Rec	eiving Notes	s:								
		contact Pro	ject Manager	?	Yes (No) Yes (No)					
Who was co				Date:		_ Time: _		Ву:		-
Sample Number	Container ID	Proper Container	Air Bubbles Present	Sufficient Volume	Contain	er Type	Preservative	Reco	ord pH (Cyanid Pesticide	
01	325067	Yeş	NA	Yes		- Unpres	Other			
02 03	325066 325065	Yes Yes	NA NA	Yes Yes		- Unpres - Unpres	Other Other			
03 04	325065	Yes	NA NA	Yes		- Unpres	Other			
05	325063	Yes	NA	Yes		- Unpres	Other			
06	325062	Yes	NA	Yes		- Unpres	Other			
07	325061	Yes	NA	Yes		- Unpres	Other			
08	325060	Yes	NA	Yes		- Unpres	Other			
09	325059	Yes	NA	Yes		- Unpres	Other			
10	325058	Yes	NA NA	Yes		- Unpres	Other			
11	325057	Yes	NA NA	Yes		- Unpres - Unpres	Other			
12	325056	Yes	NA NA	Yes		•	Other Other			
13	325055	Yes	NA NA	Yes		- Unpres - Unpres	Other			
14	325054	Yes	NA NA	Yes		- Unpres - Unpres	Other			
15 16	325053 325052	Yes Yes	NA NA	Yes Yes		- Unpres	Other			
17	325051	Yes	NA	Yes		- Unpres	Other			
2nd Review		l into etorac	ne/lah		elei اندا لہ	A				

All containers scanned into storage/lab Are barcode labels on correct containers? Are all necessary stickers attached?



ESS Laboratory Sample and Cooler Receipt Checklist

Client:	GZA - Bedford, NH - GZA/DS	ESS Project ID:	1903461
_	<u> </u>	Date Received:	3/19/2019
Completed By:	All	Date & Time: 3/9/19	1830
Reviewed By:	1211	Date & Time: 7/9/9	J 035
Delivered By:	<u> </u>	3,910) 203K

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	aborator	•			CHAIN OF CUSTODY		Lab#	190	3461					
	Charles de la .	ineering, Inc. ranston RI 0291	10	Turn Time Regulatory State	Days		orting mits							
		ix (401) 461-44			is project for any of the following?:		ctonic Data	Checker	☐ E	vcel				
ww.esslal	ooratory.com			O CT R	P O MA MOP O RGP		erables 🔲 Other		- نیا	ACC!				
2A	Can	mpany Name	1 /20	Project # 04.0190 348.0	Schiller Project Name									
	Co	ntact Person		1	Aguress	· 5								
Rebecco Cox			S	tate	Zip Code	# OP	(27)							
<u> 309</u> 1	01		NH		03110	¥	121				1 1 1			
03 -	elephone Nu	SZO	FAXI	Number	Email Address	000								
SS Lab	Collection	Collection	Sample Type	Sample Matrix	Sample ID		7				1 1 1			
ID	Date	Time	outliple type	Campic matrix		RISC)	le F				$\perp \perp$			
1/3	3/18/19	1279	wipe	WIDE	W-1144W-1178	mange south	\times							
2		1410	1,	1	W-1145		X							
3		1446	7		4-1146						\Box			
u		1451			W-1147				+++	-				
5	_			 			$-\Theta$			-	+++			
2		1403			W-1148						$\sqcup \sqcup$			
9		1357			w - 1149									
1		1415			w - 1150		\times							
8		1500			w-1151		X							
9		1333			w-1152		X							
0	*	1351	Y.	X.	W-1152									
Con	tainer Type:	AC-Air Casset	te AG-Amber Gla	ss B-BOD Bottle	C-Cubitainer J-Jar O-Other P-F	oly S-Sterile V-	Vial AG							
		1-100 mL 2-				10-8 oz 11-Oti								
Preserv	ation Code:	1-Non Preserved	2-HC1 3-H2SO4	4-HN03 5-NaOH 6-N	ethanol 7-Na2S2O3 8-ZnAce, NaOH 9-NH4	1000								
*****						tainers per Sample	: []							
		Laboratory	TEACHER PROPERTY OF THE		Sampled by: B. Lahrs									
	Present:		O Drop Off		Comments:	Please specify "C	ther" preservation	e and container	types in this s	pace				
	Intact:	NA	@ Pickup		0 % ms/cs 2.65 10.	- CM-								
	mperature:		·c le tempi		77.70									
Reli	inquished by:	(Signature, Da	te & Time)	Received By:		quished By: (Signa	ture, Date & Time	Rece	eived By: (Signat	ure, Date &				
Acres	6 3		0240	Custodo Se	2/19/19			2	ihn-	3)14/19	12:50			
Reli	inquished by:	(Signature, Da	te & Time)			quished By: (Signa	ture, Date & Time)	Rece	eived By: (Signat	ure, Date &	Time)			
15	Re	3/19/19	16:17	CALL	3/9/9/800									
				7,	-7-1						1,000			



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Rebecca Cox GZA GeoEnvironmental, Inc. 5 Commerce Park North Bedford, NH 03110

RE: Schiller Boiler Demo (04.0190318.03) ESS Laboratory Work Order Number: 1903499

This signed Certificate of Analysis is our approved release of your analytical results. These results are only representative of sample aliquots received at the laboratory. ESS Laboratory expects its clients to follow all regulatory sampling guidelines. Beginning with this page, the entire report has been paginated. This report should not be copied except in full without the approval of the laboratory. Samples will be disposed of thirty days after the final report has been delivered. If you have any questions or concerns, please feel free to call our Customer Service Department.

Laurel Stoddard Laboratory Director REVIEWED

By ESS Laboratory at 1:02 pm, Mar 26, 2019

Analytical Summary

The project as described above has been analyzed in accordance with the ESS Quality Assurance Plan. This plan utilizes the following methodologies: US EPA SW-846, US EPA Methods for Chemical Analysis of Water and Wastes per 40 CFR Part 136, APHA Standard Methods for the Examination of Water and Wastewater, American Society for Testing and Materials (ASTM), and other recognized methodologies. The analyses with these noted observations are in conformance to the Quality Assurance Plan. In chromatographic analysis, manual integration is frequently used instead of automated integration because it produces more accurate results.

The test results present in this report are in compliance with TNI and relative state standards, and/or client Quality Assurance Project Plans (QAPP). The laboratory has reviewed the following: Sample Preservations, Hold Times, Initial Calibrations, Continuing Calibrations, Method Blanks, Blank Spikes, Blank Spike Duplicates, Duplicates, Matrix Spikes, Matrix Spike Duplicates, Surrogates and Internal Standards. Any results which were found to be outside of the recommended ranges stated in our SOPs will be noted in the Project Narrative.



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

ESS Laboratory Work Order: 1903499

SAMPLE RECEIPT

The following samples were received on March 20, 2019 for the analyses specified on the enclosed Chain of Custody Record.

Lab Number	Sample Name	Matrix	Analysis
1903499-01	C-1024	Solid	7471B
1903499-02	C-1025	Solid	7471B
1903499-03	C-1026	Solid	7471B
1903499-04	C-1032	Solid	7471B
1903499-05	C-1033	Solid	7471B
1903499-06	C-1034	Solid	7471B
1903499-07	C-1035	Solid	7471B
1903499-08	C-1036	Solid	7471B
1903499-09	C-1037	Solid	7471B
1903499-10	C-1039	Solid	7471B
1903499-11	C-1040	Solid	7471B
1903499-12	C-1041	Solid	7471B



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

ESS Laboratory Work Order: 1903499

PROJECT NARRATIVE

No unusual observations noted.

End of Project Narrative.

DATA USABILITY LINKS

To ensure you are viewing the most current version of the documents below, please clear your internet cookies for www.ESSLaboratory.com. Consult your IT Support personnel for information on how to clear your internet cookies.

Definitions of Quality Control Parameters

Semivolatile Organics Internal Standard Information

Semivolatile Organics Surrogate Information

Volatile Organics Internal Standard Information

Volatile Organics Surrogate Information

EPH and VPH Alkane Lists



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

ESS Laboratory Work Order: 1903499

Analytical Methods

1010A - Flashpoint 6010C - ICP 6020A - ICP MS

7010 - Graphite Furnace 7196A - Hexavalent Chromium 7470A - Aqueous Mercury 7471B - Solid Mercury 8011 - EDB/DBCP/TCP 8015C - GRO/DRO

8081B - Pesticides 8082A - PCB 8100M - TPH 8151A - Herbicides

8260B - VOA 8270D - SVOA

8270D SIM - SVOA Low Level

9014 - Cyanide 9038 - Sulfate

9040C - Aqueous pH

9045D - Solid pH (Corrosivity) 9050A - Specific Conductance

9056A - Anions (IC)

9060A - TOC

9095B - Paint Filter

MADEP 04-1.1 - EPH

MADEP 18-2.1 - VPH

Prep Methods

CURRENT SW-846 METHODOLOGY VERSIONS

3005A - Aqueous ICP Digestion

3020A - Aqueous Graphite Furnace / ICP MS Digestion 3050B - Solid ICP / Graphite Furnace / ICP MS Digestion

3060A - Solid Hexavalent Chromium Digestion

3510C - Separatory Funnel Extraction 3520C - Liquid / Liquid Extraction 3540C - Manual Soxhlet Extraction 3541 - Automated Soxhlet Extraction

3546 - Microwave Extraction

3580A - Waste Dilution

5030B - Aqueous Purge and Trap 5030C - Aqueous Purge and Trap 5035A - Solid Purge and Trap

SW846 Reactivity Methods 7.3.3.2 (Reactive Cyanide) and 7.3.4.1 (Reactive Sulfide) have been withdrawn by EPA. These methods are reported per client request and are not NELAP accredited.



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

Client Sample ID: C-1024 Date Sampled: 03/19/19 13:24

Percent Solids: 99

ESS Laboratory Work Order: 1903499 ESS Laboratory Sample ID: 1903499-01

Sample Matrix: Solid Units: mg/kg dry

Extraction Method: 7471B

Total Metals

 Analyte
 Results (MRL)
 MDL
 Method
 Limit
 DF
 Analyst
 Analyzed
 I/V
 F/V
 Batch

 Mercury
 15.6 (2.78)
 7471B
 100
 MKS
 03/25/19 13:40
 0.72
 40
 CC92202



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

Client Sample ID: C-1025 Date Sampled: 03/19/19 13:01

Percent Solids: 99

ESS Laboratory Work Order: 1903499 ESS Laboratory Sample ID: 1903499-02

Sample Matrix: Solid Units: mg/kg dry

Extraction Method: 7471B

Total Metals

Analyst Analyzed I/V MKS 03/25/19 14:45 0.75 **Analyte** Results (MRL) **MDL** I/V F/V Batch Method Limit Mercury **71.0** (13.4) 7471B 40 CC92202



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

Client Sample ID: C-1026 Date Sampled: 03/19/19 13:37

Percent Solids: 98

ESS Laboratory Work Order: 1903499 ESS Laboratory Sample ID: 1903499-03

Sample Matrix: Solid Units: mg/kg dry

Extraction Method: 7471B

Total Metals

 Analyte
 Results (MRL)
 MDL
 Method
 Limit
 DF
 Analyst
 Analyzed
 I/V
 F/V
 Batch

 Mercury
 415 (28.3)
 7471B
 1000
 MKS
 03/25/19 14:51
 0.71
 40
 CC92202



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

Client Sample ID: C-1032 Date Sampled: 03/19/19 14:13

Percent Solids: 99

ESS Laboratory Work Order: 1903499 ESS Laboratory Sample ID: 1903499-04

Sample Matrix: Solid Units: mg/kg dry

Extraction Method: 7471B

Total Metals

Analyst Analyzed MKS 03/25/19 13:46 13:46 0.65 **Analyte** Results (MRL) **MDL** I/V F/V Batch Method Limit 145 (15.5) Mercury 7471B 40 CC92202



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

Client Sample ID: C-1033 Date Sampled: 03/19/19 14:55

Percent Solids: 99

ESS Laboratory Work Order: 1903499 ESS Laboratory Sample ID: 1903499-05

Sample Matrix: Solid Units: mg/kg dry

Extraction Method: 7471B

Total Metals

 Analyte Mercury
 Results (MRL)
 MDL 7471B
 Limit 100
 DF MCS
 Analyzed MKS
 I/V 03/25/19 13:48
 I/V 0.63
 Batch CC92202

000383



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

Client Sample ID: C-1034 Date Sampled: 03/19/19 15:06

Percent Solids: 99

ESS Laboratory Work Order: 1903499 ESS Laboratory Sample ID: 1903499-06

Sample Matrix: Solid Units: mg/kg dry

Extraction Method: 7471B

Total Metals

Results (MRL) **MDL** I/V F/V Batch **Analyte** Method Limit Mercury **2.69** (0.760) 7471B 40 CC92202



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

Client Sample ID: C-1035 Date Sampled: 03/19/19 15:52

Percent Solids: 99

ESS Laboratory Work Order: 1903499 ESS Laboratory Sample ID: 1903499-07

Sample Matrix: Solid Units: mg/kg dry

Extraction Method: 7471B

Total Metals

<u>Analyst Analyzed I/V</u> MKS 03/25/19 13:52 0.83 **Analyte** Results (MRL) **MDL** I/V F/V Batch Method Limit **14.9** (2.41) Mercury 7471B 40 CC92202



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

Client Sample ID: C-1036 Date Sampled: 03/19/19 15:18

Percent Solids: 99

ESS Laboratory Work Order: 1903499 ESS Laboratory Sample ID: 1903499-08

Sample Matrix: Solid Units: mg/kg dry

Extraction Method: 7471B

Total Metals

 Analyte
 Results (MRL)
 MDL
 Method
 Limit
 DF
 Analyst
 Analyzed
 I/V
 F/V
 Batch

 Mercury
 35.4 (2.67)
 7471B
 100
 MKS
 03/25/19 13:54
 0.75
 40
 CC92202



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

Client Sample ID: C-1037 Date Sampled: 03/19/19 16:21

Percent Solids: 98

Extraction Method: 7471B

ESS Laboratory Work Order: 1903499 ESS Laboratory Sample ID: 1903499-09

Sample Matrix: Solid Units: mg/kg dry

Total Metals

<u>Analyst</u> <u>Analyzed</u> <u>I/V</u> MKS 03/25/19 13:56 0.71 **Analyte** Results (MRL) **MDL** I/V F/V Batch Method Limit 208 (14.2) Mercury 7471B 40 CC92202



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

Client Sample ID: C-1039 Date Sampled: 03/19/19 16:04

Percent Solids: 99

ESS Laboratory Work Order: 1903499 ESS Laboratory Sample ID: 1903499-10

Sample Matrix: Solid Units: mg/kg dry

Extraction Method: 7471B

Total Metals

 Analyte
 Results (MRL)
 MDL
 Method
 Limit
 DF
 Analyst
 Analyzed
 I/V
 F/V
 Batch

 Mercury
 16.5 (3.23)
 7471B
 100
 MKS
 03/25/19 14:02
 0.62
 40
 CC92202



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

Client Sample ID: C-1040 Date Sampled: 03/19/19 14:41

Percent Solids: 99

ESS Laboratory Work Order: 1903499 ESS Laboratory Sample ID: 1903499-11

Sample Matrix: Solid Units: mg/kg dry

Extraction Method: 7471B

Total Metals

 Analyte
 Results (MRL)
 MDL
 Method
 Limit
 DF
 Analyst
 Analyzed
 I/V
 F/V
 Batch

 Mercury
 4.39 (3.19)
 7471B
 100
 MKS
 03/25/19 14:04
 0.63
 40
 CC92202



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

Client Sample ID: C-1041 Date Sampled: 03/19/19 13:55

Percent Solids: 99

ESS Laboratory Work Order: 1903499 ESS Laboratory Sample ID: 1903499-12

Sample Matrix: Solid Units: mg/kg dry

Extraction Method: 7471B

Total Metals

 Analyte Mercury
 Results (MRL)
 MDL 7471B
 Limit 100
 DF MCS
 Analyze Analyzed MKS
 I/V 03/25/19 14:06
 E/V 06/10
 Batch 07/20202



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

ESS Laboratory Work Order: 1903499

Quality Control Data

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
			Total Meta	ıls						
Batch CC92202 - 7471B										
Batcii CC92202 - 7471B										
Blank										
Mercury	ND	0.033	mg/kg wet							
ıcs										
Mercury	3.54	0.325	mg/kg wet	4.850		73	50-103			
LCS Dup										
Mercury	3.61	0.309	mg/kg wet	4.850		75	50-103	2	20	



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

ESS Laboratory Work Order: 1903499

Notes and Definitions

U	Analyte included in the analysis, but not detected
D	Diluted.
ND	Analyte NOT DETECTED at or above the MRL (LOQ), LOD for DoD Reports, MDL for J-Flagged Analytes
dry	Sample results reported on a dry weight basis
RPD	Relative Percent Difference
MDL	Method Detection Limit
MRL	Method Reporting Limit
LOD	Limit of Detection
LOQ	Limit of Quantitation
DL	Detection Limit
I/V	Initial Volume
F/V	Final Volume
§	Subcontracted analysis; see attached report
1	Range result excludes concentrations of surrogates and/or internal standards eluting in that range.
2	Range result excludes concentrations of target analytes eluting in that range.
3	Range result excludes the concentration of the C9-C10 aromatic range.

Avg Results reported as a mathematical average.

NR No Recovery
[CALC] Calculated Analyte

SUB Subcontracted analysis; see attached report

RL Reporting Limit

EDL Estimated Detection Limit
MF Membrane Filtration
MPN Most Probably Number
TNTC Too numerous to Count
CFU Colony Forming Units



The Microbiology Division of Thielsch Engineering, Inc.

ESS Laboratory Work Order: 1903499



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

ENVIRONMENTAL

ESS LABORATORY CERTIFICATIONS AND ACCREDITATIONS

Rhode Island Potable and Non Potable Water: LAI00179 http://www.health.ri.gov/find/labs/analytical/ESS.pdf

Connecticut Potable and Non Potable Water, Solid and Hazardous Waste: PH-0750 http://www.ct.gov/dph/lib/dph/environmental health/environmental laboratories/pdf/OutofStateCommercialLaboratories.pdf

Maine Potable and Non Potable Water, and Solid and Hazardous Waste: R100002 http://www.maine.gov/dhhs/mecdc/environmental-health/dwp/partners/labCert.shtml

Massachusetts Potable and Non Potable Water: M-RI002 http://public.dep.state.ma.us/Labcert/Labcert.aspx

New Hampshire (NELAP accredited) Potable and Non Potable Water, Solid and Hazardous Waste: 2424 http://des.nh.gov/organization/divisions/water/dwgb/nhelap/index.htm

New York (NELAP accredited) Non Potable Water, Solid and Hazardous Waste: 11313 http://www.wadsworth.org/labcert/elap/comm.html

New Jersey (NELAP accredited) Non Potable Water, Solid and Hazardous Waste: RI006 http://datamine2.state.nj.us/DEP OPRA/OpraMain/pi main?mode=pi by site&sort order=PI NAMEA&Select+a+Site:=58715

United States Department of Agriculture Soil Permit: P330-12-00139

Pennsylvania: 68-01752

http://www.dep.pa.gov/Business/OtherPrograms/Labs/Pages/Laboratory-Accreditation-Program.aspx

ESS Laboratory Sample and Cooler Receipt Checklist

Client:	GZ	A - Bedford	NH - GZA/DS	s		ESS P	roject ID:	1903499	
						Date R	Received:	3/20/2019	
Shipped/De	livered Via: _		ESS Courier			Days for	r Project:	3/26/2019 4 Day	
	anifest presei			No		6. Does COC n	natch bottles?		Yes
2. Were cus	stody seals p	resent?		10 Y	Pak.	7. Is COC com	plete and correc	ot?	Yes
3. Is radiation	on count <10	0 CPM?		Yes	Na	8. Were sample	es received inta	ct?	Yes
4. Is a Cool Temp:	er Present?	Iced with:	lce	Yes				short holds & rush	\mathcal{A}
5. Was CO	C signed and	dated by cl	ient?	Yes _		10. Were any	analyses receiv	ed outside of hold tir	THE? THE THO
	ocontracting r Sample IDs: Analysis: TAT:	needed?	Yes /	No No			s received? in aqueous VO anol cover soil c		Yes / No Yes / No / NA
a. If metals	samples pro preserved u el VOA vials	oon receipt:	ved?	Yes / No Date: Date:		Time: Time:		By: By:	
Sample Red	ceiving Notes	:							
a. Was the	re a need to ontacted?		client?	Date:	Yes 7 No	Time:		Ву:	
Sample Number	Container ID	Proper Container	Air Bubbles Present	Sufficient Volume	Contain	er Type	Preservati	ve Record	pH (Cyanide and 608.3 Pesticides)
01	325303	Yes	NA	Yes	4 oz. Jar	- Unpres	NP		\$ 2
02	325302	Yes	NA	Yes	4 oz. Jar	- Unpres	NP		
03	325301	Yes	NA	Yes Yes	4 oz. Jar 4 oz. Jar		NP NP		<u>୍ର</u> ଅଧିକ
04 05	325300 325299	Yes Yes	NA NA	Yes	4 oz. Jar		NP		# # # # # # # # # # # # # # # # # # #
06	325298	Yes	NA	Yes	4 oz. Jar		NP		Environmental
07	325297	Yes	NA	Yes	4 oz. Jar		NP		
80	325296	Yes	NA	Yes	4 oz. Jar		NP NP		\
09 10	325295 325294	Yes Yes	NA NA	Yes Yes	4 oz. Jar 4 oz. Jar		NP		ng Sa
11	325294	Yes	NA	Yes	4 oz. Jar		NP		
12	325292	Yes	NA	Yes	4 oz. Jar	- Unpres	NP		() 9
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Are barcod	e labels on c	orrect conta	iners?		Yes No Yes / No Date & Time: Date & Time:	3/20/1	9 16	57	GUSTODY SEA

ESS Laboratory Sample and Cooler Receipt Checklist

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The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Rebecca Cox GZA GeoEnvironmental, Inc. 5 Commerce Park North Bedford, NH 03110

RE: Schiller Boiler Demo (04.0190318.03) ESS Laboratory Work Order Number: 1903563

This signed Certificate of Analysis is our approved release of your analytical results. These results are only representative of sample aliquots received at the laboratory. ESS Laboratory expects its clients to follow all regulatory sampling guidelines. Beginning with this page, the entire report has been paginated. This report should not be copied except in full without the approval of the laboratory. Samples will be disposed of thirty days after the final report has been delivered. If you have any questions or concerns, please feel free to call our Customer Service Department.

Laurel Stoddard Laboratory Director **REVIEWED**

By ESS Laboratory at 2:32 pm, Mar 27, 2019

Analytical Summary

The project as described above has been analyzed in accordance with the ESS Quality Assurance Plan. This plan utilizes the following methodologies: US EPA SW-846, US EPA Methods for Chemical Analysis of Water and Wastes per 40 CFR Part 136, APHA Standard Methods for the Examination of Water and Wastewater, American Society for Testing and Materials (ASTM), and other recognized methodologies. The analyses with these noted observations are in conformance to the Quality Assurance Plan. In chromatographic analysis, manual integration is frequently used instead of automated integration because it produces more accurate results.

The test results present in this report are in compliance with TNI and relative state standards, and/or client Quality Assurance Project Plans (QAPP). The laboratory has reviewed the following: Sample Preservations, Hold Times, Initial Calibrations, Continuing Calibrations, Method Blanks, Blank Spikes, Blank Spike Duplicates, Duplicates, Matrix Spikes, Matrix Spike Duplicates, Surrogates and Internal Standards. Any results which were found to be outside of the recommended ranges stated in our SOPs will be noted in the Project Narrative.



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

ESS Laboratory Work Order: 1903563

SAMPLE RECEIPT

The following samples were received on March 21, 2019 for the analyses specified on the enclosed Chain of Custody Record.

Lab Number	Sample Name	Matrix	Analysis
1903563-01	W-1179	Wipe	7471B
1903563-02	W-1162	Wipe	7471B
1903563-03	C-1042	Solid	7471B
1903563-04	C-1063	Solid	7471B
1903563-05	C-1064	Solid	7471B
1903563-06	BLANK	Wipe	7471B
1903563-07	W-1163	Wipe	7471B
1903563-08	W-1164	Wipe	7471B
1903563-09	W-1165	Wipe	7471B
1903563-10	W-1166	Wipe	7471B
1903563-11	W-1167	Wipe	7471B
1903563-12	W-1168	Wipe	7471B
1903563-13	W-1170	Wipe	7471B
1903563-14	W-1171	Wipe	7471B
1903563-15	W-1172	Wipe	7471B
1903563-16	W-1173	Wipe	7471B
1903563-17	W-1174	Wipe	7471B
1903563-18	W-1175	Wipe	7471B
1903563-19	BLANK	Wipe	7471B
1903563-20	W-1169	Wipe	7471B



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

ESS Laboratory Work Order: 1903563

PROJECT NARRATIVE

No unusual observations noted.

End of Project Narrative.

DATA USABILITY LINKS

To ensure you are viewing the most current version of the documents below, please clear your internet cookies for www.ESSLaboratory.com. Consult your IT Support personnel for information on how to clear your internet cookies.

Definitions of Quality Control Parameters

Semivolatile Organics Internal Standard Information

Semivolatile Organics Surrogate Information

Volatile Organics Internal Standard Information

Volatile Organics Surrogate Information

EPH and VPH Alkane Lists



The Microbiology Division of Thielsch Engineering, Inc.

ESS Laboratory Work Order: 1903563



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

Analytical Methods

1010A - Flashpoint 6010C - ICP 6020A - ICP MS

7010 - Graphite Furnace 7196A - Hexavalent Chromium 7470A - Aqueous Mercury

7471B - Solid Mercury 8011 - EDB/DBCP/TCP 8015C - GRO/DRO 8081B - Pesticides

8082A - PCB 8100M - TPH 8151A - Herbicides

8260B - VOA 8270D - SVOA

8270D SIM - SVOA Low Level

9014 - Cyanide 9038 - Sulfate

9040C - Aqueous pH

9045D - Solid pH (Corrosivity)

9050A - Specific Conductance

9056A - Anions (IC)

9060A - TOC

9095B - Paint Filter

MADEP 04-1.1 - EPH

MADEP 18-2.1 - VPH

Prep Methods

CURRENT SW-846 METHODOLOGY VERSIONS

3005A - Aqueous ICP Digestion

3020A - Aqueous Graphite Furnace / ICP MS Digestion

3050B - Solid ICP / Graphite Furnace / ICP MS Digestion

3060A - Solid Hexavalent Chromium Digestion 3510C - Separatory Funnel Extraction

3520C - Liquid / Liquid Extraction 3540C - Manual Soxhlet Extraction

3541 - Automated Soxhlet Extraction

3546 - Microwave Extraction

3580A - Waste Dilution

5030B - Aqueous Purge and Trap 5030C - Aqueous Purge and Trap

5035A - Solid Purge and Trap

SW846 Reactivity Methods 7.3.3.2 (Reactive Cyanide) and 7.3.4.1 (Reactive Sulfide) have been withdrawn by EPA. These methods are reported per client request and are not NELAP accredited.



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

Client Sample ID: W-1179
Date Sampled: 03/20/19 12:29

Percent Solids: N/A

Extraction Method: 7471B

ESS Laboratory Work Order: 1903563 ESS Laboratory Sample ID: 1903563-01

Sample Matrix: Wipe Units: ug/100cm²

Total Metals

 Analyte Mercury
 Results (MRL)
 MDL 2.29 (0.500)
 Method 7471B
 Limit 25
 DF 25
 Analyst Analyzed MKS 03/25/19 14:15
 I/V 1
 F/V 40 CC92203



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

Client Sample ID: W-1162 Date Sampled: 03/20/19 11:50

Percent Solids: N/A

Extraction Method: 7471B

ESS Laboratory Work Order: 1903563 ESS Laboratory Sample ID: 1903563-02

Sample Matrix: Wipe Units: ug/100cm²

Total Metals

 Analyte Mercury
 Results (MRL)
 MDL 0.654 (0.200)
 Method 7471B
 Limit 10
 DF 0.654 (0.200)
 Analyst Analyzed 0.25719 14:17
 I/V 1
 F/V 40 CC92203



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

Client Sample ID: C-1042 Date Sampled: 03/20/19 08:45

Percent Solids: 99

Extraction Method: 7471B

ESS Laboratory Work Order: 1903563 ESS Laboratory Sample ID: 1903563-03

Sample Matrix: Solid Units: mg/kg dry

Total Metals

Analyst Analyzed 03/25/19 14:08 F/V Batch **Analyte** Results (MRL) **MDL** <u>I/V</u> Method Limit Mercury 1.98 (0.553) 7471B 0.9 40 CC92202



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

Client Sample ID: C-1063 Date Sampled: 03/20/19 11:37

Percent Solids: 100

Extraction Method: 7471B

ESS Laboratory Work Order: 1903563 ESS Laboratory Sample ID: 1903563-04

Sample Matrix: Solid Units: mg/kg dry

Total Metals

 Analyte
 Results (MRL)
 MDL
 Method
 Limit
 DF
 Analyst
 Analyzed
 I/V
 F/V
 Batch

 Mercury
 2.22 (0.729)
 7471B
 25
 MKS
 03/25/19 14:10
 0.68
 40
 CC92202

000405



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

Client Sample ID: C-1064 Date Sampled: 03/20/19 12:25

Percent Solids: 100

Extraction Method: 7471B

ESS Laboratory Work Order: 1903563 ESS Laboratory Sample ID: 1903563-05

Sample Matrix: Solid Units: mg/kg dry

Total Metals

 Analyte
 Results (MRL)
 MDL
 Method
 Limit
 DF
 Analyst
 Analyzed
 I/V
 F/V
 Batch

 Mercury
 37.2 (3.20)
 7471B
 100
 MKS
 03/25/19 14:53
 0.62
 40
 CC92202



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

Client Sample ID: BLANK Date Sampled: 03/20/19 13:47

Percent Solids: N/A

Extraction Method: 7471B

ESS Laboratory Work Order: 1903563 ESS Laboratory Sample ID: 1903563-06

Sample Matrix: Wipe Units: ug/100cm²

Total Metals

 Analyte Mercury
 Results (MRL) ND (0.020)
 MDL Method 7471B
 Limit Limit Limit Limit ND (0.020)
 DF MKS 03/25/19 10:55
 Analyzed NMS 03/25/19 10:55
 I/V 40 CC92203



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

Client Sample ID: W-1163 Date Sampled: 03/21/19 07:45

Percent Solids: N/A

Extraction Method: 7471B

ESS Laboratory Work Order: 1903563 ESS Laboratory Sample ID: 1903563-07

Sample Matrix: Wipe Units: ug/100cm²

Total Metals

F/V Batch CC92203 Analyst Analyzed 03/25/19 10:57 Results (MRL) **MDL Analyte** Method Limit Mercury 0.086 (0.020) 7471B



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

Client Sample ID: W-1164 Date Sampled: 03/21/19 07:51

Percent Solids: N/A

ESS Laboratory Work Order: 1903563 ESS Laboratory Sample ID: 1903563-08

Sample Matrix: Wipe Units: ug/100cm²

Extraction Method: 7471B

Total Metals

Analyst Analyzed 03/25/19 14:19 F/V Batch **Analyte** Results (MRL) **MDL** I/V Method Limit Mercury 0.686 (0.200) 7471B 40 CC92203

Service



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

Client Sample ID: W-1165 Date Sampled: 03/21/19 08:06

Percent Solids: N/A

Extraction Method: 7471B

ESS Laboratory Work Order: 1903563 ESS Laboratory Sample ID: 1903563-09

Sample Matrix: Wipe Units: ug/100cm²

Total Metals

F/V Batch CC92203 Analyst Analyzed
MKS 03/25/19 14:21 **Analyte** Results (MRL) **MDL** <u>I/V</u> Method Limit Mercury 1.31 (0.200) 7471B



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

Client Sample ID: W-1166 Date Sampled: 03/21/19 08:10

Percent Solids: N/A

Extraction Method: 7471B

ESS Laboratory Work Order: 1903563 ESS Laboratory Sample ID: 1903563-10

Sample Matrix: Wipe Units: ug/100cm²

Total Metals

 Analyte
 Results (MRL)
 MDL
 Method
 Limit
 DF
 Analyst
 Analyzed
 I/V
 F/V
 Batch

 Mercury
 51.1 (10.0)
 7471B
 500
 MKS
 03/25/19 14:55
 1
 40
 CC92203



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

Client Sample ID: W-1167 Date Sampled: 03/21/19 07:57

Percent Solids: N/A

ESS Laboratory Work Order: 1903563 ESS Laboratory Sample ID: 1903563-11

Sample Matrix: Wipe Units: ug/100cm²

Extraction Method: 7471B

Total Metals

F/V Batch CC92203 Analyst Analyzed 03/25/19 14:29 **Analyte** Results (MRL) **MDL** I/V Method Limit Mercury 5.56 (1.00) 7471B



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

Client Sample ID: W-1168 Date Sampled: 03/21/19 08:01

Percent Solids: N/A

ESS Laboratory Work Order: 1903563 ESS Laboratory Sample ID: 1903563-12

Sample Matrix: Wipe Units: ug/100cm²

Extraction Method: 7471B

Total Metals

 Analyte
 Results (MRL)
 MDL
 Method
 Limit
 DF
 Analyst
 Analyzed
 I/V
 F/V
 Batch

 Mercury
 21.9 (2.00)
 7471B
 100
 MKS
 03/25/19 14:31
 1
 40
 CC92203



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

Client Sample ID: W-1170 Date Sampled: 03/21/19 08:25

Percent Solids: N/A

Extraction Method: 7471B

ESS Laboratory Work Order: 1903563 ESS Laboratory Sample ID: 1903563-13

Sample Matrix: Wipe Units: ug/100cm²

Total Metals

 Analyte Mercury
 Results (MRL)
 MDL 0.037 (0.020)
 Method 7471B
 Limit 1
 DF 0.037 (0.020)
 Analyst Analyzed 0.025 (0.020)
 I/V 1
 F/V 1
 Batch 0.0200



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

Client Sample ID: W-1171 Date Sampled: 03/21/19 08:31

Percent Solids: N/A

ESS Laboratory Work Order: 1903563 ESS Laboratory Sample ID: 1903563-14

Sample Matrix: Wipe Units: ug/100cm²

Extraction Method: 7471B

Total Metals

F/V Batch CC92203 Analyst Analyzed 03/25/19 11:15 **Analyte** Results (MRL) **MDL** Method Limit Mercury 0.087 (0.020) 7471B

Service



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

Client Sample ID: W-1172 Date Sampled: 03/21/19 08:37

Percent Solids: N/A

Extraction Method: 7471B

ESS Laboratory Work Order: 1903563 ESS Laboratory Sample ID: 1903563-15

Sample Matrix: Wipe Units: ug/100cm²

Total Metals

F/V Batch CC92203 Analyst Analyzed
MKS 03/25/19 11:17 Results (MRL) **MDL Analyte** Method Limit Mercury ND (0.020) 7471B



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

Client Sample ID: W-1173 Date Sampled: 03/21/19 08:42

Percent Solids: N/A

Extraction Method: 7471B

ESS Laboratory Work Order: 1903563 ESS Laboratory Sample ID: 1903563-16

Sample Matrix: Wipe Units: ug/100cm²

Total Metals

 Analyte Mercury
 Results (MRL)
 MDL
 Method
 Limit
 DF
 Analyst
 Analyzed
 I/V
 F/V
 Batch

 Mercury
 0.021 (0.020)
 7471B
 1
 MKS
 03/25/19 11:19
 1
 40
 CC92203



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

Client Sample ID: W-1174 Date Sampled: 03/21/19 08:49

Percent Solids: N/A

Extraction Method: 7471B

ESS Laboratory Work Order: 1903563 ESS Laboratory Sample ID: 1903563-17

Sample Matrix: Wipe Units: ug/100cm²

Total Metals

 Analyte Mercury
 Results (MRL)
 MDL 7471B
 Limit 25
 DF 25
 Analyst Analyzed MKS 03/25/19 14:33
 I/V 140
 E/V CC92203

Service



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

Client Sample ID: W-1175 Date Sampled: 03/21/19 08:52

Percent Solids: N/A

Extraction Method: 7471B

ESS Laboratory Work Order: 1903563 ESS Laboratory Sample ID: 1903563-18

Sample Matrix: Wipe Units: ug/100cm²

Total Metals

F/V Batch CC92203 <u>Analyst</u> <u>Analyzed</u> 03/25/19 11:23 **Analyte** Results (MRL) **MDL** Method Limit Mercury 0.073 (0.020) 7471B



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

Client Sample ID: BLANK Date Sampled: 03/20/19 09:08

Percent Solids: N/A

Extraction Method: 7471B

ESS Laboratory Work Order: 1903563 ESS Laboratory Sample ID: 1903563-19

Sample Matrix: Wipe Units: ug/100cm²

Total Metals

 Analyte Mercury
 Results (MRL) ND (0.020)
 MDL Method 7471B
 Limit Limit Limit Limit ND (0.020)
 DF MKS 03/25/19 11:27
 Analyst Analyzed NKS 03/25/19 11:27
 I/V 40 CC92203



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

Client Sample ID: W-1169 Date Sampled: 03/21/19 10:28

Percent Solids: N/A

Extraction Method: 7471B

ESS Laboratory Work Order: 1903563 ESS Laboratory Sample ID: 1903563-20

Sample Matrix: Wipe Units: ug/100cm²

Total Metals

 Analyte Mercury
 Results (MRL)
 MDL
 Method
 Limit
 DF
 Analyst
 Analyzed
 I/V
 F/V
 Batch

 Mercury
 0.201 (0.020)
 7471B
 1
 MKS
 03/25/19 11:25
 1
 40
 CC92203



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

ESS Laboratory Work Order: 1903563

Quality Control Data

				Spike	Source		%REC		RPD	
Analyte	Result	MRL	Units	Level	Result	%REC	Limits	RPD	Limit	Qualifier
			Total Meta	ıls						
Batch CC92202 - 7471B										
Blank										
Mercury	ND	0.033	mg/kg wet							
LCS										
Mercury	3.54	0.325	mg/kg wet	4.850		73	50-103			
LCS Dup										
Mercury	3.61	0.309	mg/kg wet	4.850		75	50-103	2	20	
Batch CC92203 - 7471B										
Blank										
Mercury	ND	0.020	ug/100cm²							
LCS										
Mercury	0.115	0.020	ug/100cm²	0.1208		95	85-115			
LCS Dup										
Mercury	0.120	0.020	ug/100cm ²	0.1208		100	85-115	5	20	



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

ESS Laboratory Work Order: 1903563

Notes and Definitions

U	Analyte included in the analysis, but not detected
D	Diluted.
ND	Analyte NOT DETECTED at or above the MRL (LOQ), LOD for DoD Reports, MDL for J-Flagged Analytes
dry	Sample results reported on a dry weight basis
RPD	Relative Percent Difference
MDL	Method Detection Limit
MRL	Method Reporting Limit
LOD	Limit of Detection
LOQ	Limit of Quantitation
DL	Detection Limit
I/V	Initial Volume
F/V	Final Volume
§	Subcontracted analysis; see attached report
1	Range result excludes concentrations of surrogates and/or internal standards eluting in that range.
2	Range result excludes concentrations of target analytes eluting in that range.
3	Range result excludes the concentration of the C9-C10 aromatic range.

Avg Results reported as a mathematical average.

NR No Recovery [CALC] Calculated Analyte

SUB Subcontracted analysis; see attached report

RLReporting Limit

EDL **Estimated Detection Limit** MF Membrane Filtration MPN Most Probably Number TNTC Too numerous to Count CFU Colony Forming Units



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

ESS Laboratory Work Order: 1903563

ESS LABORATORY CERTIFICATIONS AND ACCREDITATIONS

ENVIRONMENTAL

Rhode Island Potable and Non Potable Water: LAI00179 http://www.health.ri.gov/find/labs/analytical/ESS.pdf

Connecticut Potable and Non Potable Water, Solid and Hazardous Waste: PH-0750 http://www.ct.gov/dph/lib/dph/environmental health/environmental laboratories/pdf/OutofStateCommercialLaboratories.pdf

Maine Potable and Non Potable Water, and Solid and Hazardous Waste: RI00002 http://www.maine.gov/dhhs/mecdc/environmental-health/dwp/partners/labCert.shtml

Massachusetts Potable and Non Potable Water: M-RI002 http://public.dep.state.ma.us/Labcert/Labcert.aspx

New Hampshire (NELAP accredited) Potable and Non Potable Water, Solid and Hazardous Waste: 2424 http://des.nh.gov/organization/divisions/water/dwgb/nhelap/index.htm

New York (NELAP accredited) Non Potable Water, Solid and Hazardous Waste: 11313 http://www.wadsworth.org/labcert/elap/comm.html

New Jersey (NELAP accredited) Non Potable Water, Solid and Hazardous Waste: RI006 http://datamine2.state.nj.us/DEP OPRA/OpraMain/pi main?mode=pi by site&sort order=PI NAMEA&Select+a+Site:=58715

United States Department of Agriculture Soil Permit: P330-12-00139

Pennsylvania: 68-01752

http://www.dep.pa.gov/Business/OtherPrograms/Labs/Pages/Laboratory-Accreditation-Program.aspx

ESS Laboratory Sample and Cooler Receipt Checklist

Client: GZA - Bedford, NH - GZA/DS	ESS Project ID:	
Chimned (Dellis, 12.6)	Date Received: 3/21/2019	
Shipped/Delivered Via:ESS Courier	Project Due Date: 3/27/2019	
	Days for Project: 4 Day	
1. Air bill manifest present? Air No.: NA	6. Does COC match bottles?	Yes
2. Were custody seals present?	7. Is COC complete and correct?	Yes
3. Is radiation count <100 CPM? Yes	8. Were samples received intact?	Yes
4. Is a Cooler Present? Temp: 2.3 Iced with: Ice	9. Were labs informed about short holds & rushes?	Yes No / NA
5. Was COC signed and dated by client? Yes	10. Were any analyses received outside of hold time?	Yes (No)
11. Any Subcontracting needed? ESS Sample IDs: Analysis: TAT:	12. Were VOAs received? a. Air bubbles in aqueous VOAs? b. Does methanol cover soil completely?	Yes No Yes No / NA
13. Are the samples properly preserved? a. If metals preserved upon receipt: b. Low Level VOA vials frozen: Output Date: Date:	Time: By: Time: By:	_
Sample Receiving Notes:	by	_
C 1	with no sample in jar	
14. Was there a need to contact Project Manager? a. Was there a need to contact the client? Who was contacted? Date:	Julijala Time:By:	
		-

Sample Number	Container ID	Proper Container	Air Bubbles Present	Sufficient Volume	Container Type	Preservative	Record pH (Cyanide and 608.3 Pesticides)
01	326559	Yes	NA	Yes	4 oz. Jar - Unpres	Other	
02	326558	Yes	NA	Yes	4 oz. Jar - Unpres		
03	326557	Ye s	NA	Yes	4 oz. Jar - Unpres	Other	
04	326556	Yes	NA	Yes	4 oz. Jar - Unpres	NP NP	
05	326555	Yes	NA	Yes	4 oz. Jar - Unpres	NP NP	
06	326554	Yes	NA	Yes	4 oz. Jar - Unpres		
07	326553	Yes	NA	Yes	4 oz. Jar - Unpres	Other	•
08	326552	Yes	NA	Yes	4 oz. Jar - Unpres	Other	
09	326551	Yes	NA	Yes	4 oz. Jar - Unpres	Other	
10	326550	Yes	NA	Yes	4 oz. Jar - Unpres	Other	
11	326549	Yes	NA	Yes	4 oz. Jar - Unpres	Other	
12	326548	Yes	NA	Yes	4 oz. Jar - Unpres	Other	
13	326547	Yes	NA	Yes	4 oz. Jar - Unpres	Other	
14	326546	Yes	NA	Yes	4 oz. Jar - Unpres	Other	
15	326545	Yes	NA	Yes		Other	
16	326544	Yes	NA	Yes	4 oz. Jar - Unpres	Other	
17	326543	Yes	NA	Yes	4 oz. Jar - Unpres	Other	
18	326542	Yes	NA	Yes	4 oz. Jar - Unpres	Other	
19	326541	Yes	NA	Yes	4 oz. Jar - Unpres	Other	
20	326540	Yes	NA	Yes	4 oz. Jar - Unpres 4 oz. Jar - Unpres	Other Other	

2nd Review All containers scanned into storage/lab



ESS Laboratory Sample and Cooler Receipt Checklist

Client:	GZA - Bedford, NH - GZA/DS		ESS Project ID:	1903563
	e labels on correct containers? ssary stickers attached?	Yes No Yes No	Date Received:	3/21/2019
Completed By:	Chil	Date & Time: _	3/2/19 19	48
Reviewed By: Delivered		Date & Time: _	3/21/19	9099
By:			3/21/19	3097

CUSTODY SEAL QEC (1)
PATE 3/30/19 1356 Quality Environmental Containers 800-255-3950 - 304-255-3900
'GNATURE WWW. Sold

■ 2				
V 1 A 7	11		A SAME AND MARKET A CONTRACTOR	Time to the same of the same o
	,	•	1	4
ESS Laboratory				
Division of Thielsch Engineering Inc.	CHAIN OF CUSTODY	ESS Lab #	Dag 22	
185 Frances Avenue Cranetan Di cooks	Turn Time #4 Days	Reporting	1903563	
101. (401) 461-7181 Fay (401) 464 4400	Regulatory State NH	Limits		
www.esslaboratory.com Company Name	Is this project for any of the following?: OCTRCP MA MCP RGP	Electonic Data Che	cker	
OSA GEOTAVICONOSTA		Deliverables Other (Ple	Excel	
Resecte Cox Person	Bailer Demo			th the
C/C/city	Store Commerce Park 11	1 1 1 1		
KedTord Number NH	Zip Code PO#	Analysis Analysis		
103-315-7520	Finally	-	11 1 1 1 1 1 1	
ESS Lab Collection Collection ID Date Time Sample Type	rebecca.cox@gza.com			
	Sample ID	10	1 1 1 1 1 1 1 1	
1 3/26/9) 20 mine	(A)C	2 1		
2 1150 wine				#+++
2	mige W-1162 San	iple to	\dagger	
11	50/19 C-1042			
1137 Grab	zolig C-1083			
5 1225 Grab				#+++
6 4 1347 1=	Solid C-1064	X	┝╫┸╫╫	
7	wipe BLANK	- ()		
7 7100	21/ce N-1163			
8 0751		X		H + + + + + + + + + + + + + + + + + + +
9 0806	M-11PH	X		
	W-1165			
70 10010	-X. \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\			
Container Volumes 4 400	ass B-BOD Bottle C-Cubitainer Lies Con	X		H + + + + + + + + + + + + + + + + + + +
Preservation Code.	4-300 mL 5-500 ml 6-11 7 VOA 200		+++++	
2-HCI 3-H2SQ4	4-HNO3 5-NaOH 6-Methanol 7-Na2S2O3 8-ZnAce, NaOH 9-NH4Cl 10-DI H2C	11-Other* 9		++++
Laboratory Use Only	Number of Containers per	Sample:		├ ┼ ╌ ┼╌┤ ┃
Cooler Present: O Prop Off	Sampled by: JLK, BRI	Timple:		
Seals Intact:		cify "Other" preserves		
Cooler Temperature: °C Ice Jewn 10	of moter wipe 100 cmg	other preservative and	containers types in this space	
Relinquished by (Signature, Date & Time)		1		
19115 1 MAKE	Received By: (Signature, Date & Time) Relinquished By:	(Signature, Date & Time)		
VY114 - XXIVA-1111 - 11 - 11	John 3/21/19 12:10 4 c/	,)	Received By: (Signature, Da	te & Time)
Relinquished by: (Signature, Date & Time)	Received Duritor	13/21/19 17/28	All state	1600
	Reinquished By:	(Signature, Date & Time)	Received By (Signature, Dat	740
			, Carone, Car	o a time)
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ESS Laboratory	ALLAROA AND AND AND AND AND AND AND AND AND AN	
Division of Thielsch Engineering Inc.	CHAIN OF CUSTODY ESS Lab# ICM < 7.2	
185 Frances Avenue Crangton Bl 02040	Turn Time 94 Days Reporting	
Tel. (401) 461-7181 Fax (401) 461-4486	The same of the sa	
www.esslaboratory.com	is trins project for any of the following?: Electonic Data Checker	
GZA Createry Name	Deliverables Class Control Deliverables Control Deliverables Control Deliverables Control Deliverables Control Deliverables Contr	
Contact Person	04.01003.48.03 Schiller Bailer Dans	
Resecte Cox		- }
Bed tord	State Commerce Pork N State Commerce Pork N	- 1
Telephone Number	FAX Number Email Add	
7000		
ESS Lab Collection Collection ID Date Time Sample Typ	Pre Sample Matrix	'
	yps Sample Matrix Sample ID	1.
2 1 100	Wige W-1155	\perp
d 1150 min		+
a lipe	mige W-1162	4_
10012 Cup	50/1/2 C-1042	
4 1137 Grab	zo///d C-1063	
1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1		+4
1311 /1/20	Suipe BLANK	
7 3/21/19 07115		+-
8 0751	H when 1163	4
	W-1164	1:1
9 0806		
10 4 0810	W-1165	
70 1 10010	<u>-4. ~-1166</u>	
Container Volumes 4 400	Glass B-BOD Bottle C-Cubitainer J-Jar O-Other P-Poly S-Chorile VI 5-18	,
Processories in in	OML 4-300 ML 5-500 ML 6-1L 7-VOA 8-2 0Z 9-4 0Z 10-8 0Z 11-0ther* S	-
1-Non Preserved 2-HCl 3-H2SQ4	4-HNO3 5-NaOH 6-Methanol 7-Na2S2O3 8-ZnAce, NaOH 9-NH4CI 10-DI H2O 11-Other* 9	<u>,</u> —
Laboratory Use Only	Number of Containers per Sample:	,
Conjer Present	Sampled by: TI > PDI	. —
O Drop Off	Comments	\dashv
Seals Intact: NA Pickup	DI water wice Company Other preservative and containers types in this space	\dashv
Cooler Temperature: °C icc femp	12.3	
Relinquished by (Signature, Date & Time)	People	
9/16/8 1 1/4 M		
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ESS Laboratory Division of Thielsch Engineering, Inc. 185 Frances Avenue, Cranston RI 02910 Tel. (401) 461-7181 Fax (401) 461-4486 Www.esslaboratory.com Company Name Company Name CHAIN OF CUSTODY ESS Lab # Days Reporting Limits Is this project for any of the following?: CTRCP OMAMCP ORGP Deliverables Other (Please Specify)	
Division of Thielsch Engineering, Inc. 185 Frances Avenue, Cranston RI 02910 Tel. (401) 461-7181 Fax (401) 461-4486 WWW.esslatory.com Company Name Company Name Ess Lab # Turn Time Regulatory State NW Is this project for any of the following?: CTRCP O MA MCP O RGP Deliverables O Other Company Name	
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Division of Thielsch Engineering, Inc. 185 Frances Avenue, Cranston RI 02910 Tel. (401) 461-7181 Fax (401) 461-4486 WWW.esslatory.com Company Name Company Name Ess Lab # Turn Time Regulatory State NW Is this project for any of the following?: CTRCP O MA MCP O RGP Deliverables O Other Company Name	
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The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Rebecca Cox GZA GeoEnvironmental, Inc. 5 Commerce Park North Bedford, NH 03110

RE: Schiller Boiler Demo (04.0190318.03) ESS Laboratory Work Order Number: 1903597

This signed Certificate of Analysis is our approved release of your analytical results. These results are only representative of sample aliquots received at the laboratory. ESS Laboratory expects its clients to follow all regulatory sampling guidelines. Beginning with this page, the entire report has been paginated. This report should not be copied except in full without the approval of the laboratory. Samples will be disposed of thirty days after the final report has been delivered. If you have any questions or concerns, please feel free to call our Customer Service Department.

Laurel Stoddard Laboratory Director **REVIEWED**

By ESS Laboratory at 4:50 pm, Mar 28, 2019

Analytical Summary

The project as described above has been analyzed in accordance with the ESS Quality Assurance Plan. This plan utilizes the following methodologies: US EPA SW-846, US EPA Methods for Chemical Analysis of Water and Wastes per 40 CFR Part 136, APHA Standard Methods for the Examination of Water and Wastewater, American Society for Testing and Materials (ASTM), and other recognized methodologies. The analyses with these noted observations are in conformance to the Quality Assurance Plan. In chromatographic analysis, manual integration is frequently used instead of automated integration because it produces more accurate results.

The test results present in this report are in compliance with TNI and relative state standards, and/or client Quality Assurance Project Plans (QAPP). The laboratory has reviewed the following: Sample Preservations, Hold Times, Initial Calibrations, Continuing Calibrations, Method Blanks, Blank Spikes, Blank Spike Duplicates, Duplicates, Matrix Spikes, Matrix Spike Duplicates, Surrogates and Internal Standards. Any results which were found to be outside of the recommended ranges stated in our SOPs will be noted in the Project Narrative.



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

ESS Laboratory Work Order: 1903597

SAMPLE RECEIPT

The following samples were received on March 22, 2019 for the analyses specified on the enclosed Chain of Custody Record.

		Analysi
C-1038	Solid	7471B
C-1044	Solid	7471B
C-1045	Solid	7471B
C-1046	Solid	7471B
C-1048	Solid	7471B
C-1049	Solid	7471B
C-1050	Solid	7471B
C-1051	Solid	7471B
C-1052	Solid	7471B
C-1053	Solid	7471B
C-1058	Solid	7471B
C-1060	Solid	7471B
C-1061	Solid	7471B
C-1065	Solid	7471B
C-1066	Solid	7471B
W-1159	Wipe	7471B
W-1176	Wipe	7471B
W-1177	Wipe	7471B
	C-1044 C-1045 C-1046 C-1048 C-1049 C-1050 C-1051 C-1052 C-1053 C-1058 C-1060 C-1061 C-1065 C-1066 W-1159 W-1176	C-1044 Solid C-1045 Solid C-1046 Solid C-1048 Solid C-1049 Solid C-1050 Solid C-1051 Solid C-1052 Solid C-1053 Solid C-1058 Solid C-1060 Solid C-1060 Solid C-1061 Solid C-1065 Solid C-1066 Solid W-1159 Wipe W-1176 Wipe



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

ESS Laboratory Work Order: 1903597

PROJECT NARRATIVE

Total Metals

CC92655-BSD1 Blank Spike recovery is above upper control limit (B+).

Mercury (119% @ 85-115%)

No other observations noted.

End of Project Narrative.

DATA USABILITY LINKS

To ensure you are viewing the most current version of the documents below, please clear your internet cookies for www.ESSLaboratory.com. Consult your IT Support personnel for information on how to clear your internet cookies.

<u>Definitions of Quality Control Parameters</u>

Semivolatile Organics Internal Standard Information

Semivolatile Organics Surrogate Information

Volatile Organics Internal Standard Information

Volatile Organics Surrogate Information

EPH and VPH Alkane Lists



The Microbiology Division of Thielsch Engineering, Inc.

ESS Laboratory Work Order: 1903597



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

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Analytical Methods

1010A - Flashpoint 6010C - ICP

6020A - ICP MS 7010 - Graphite Furnace

7196A - Hexavalent Chromium 7470A - Aqueous Mercury

7471B - Solid Mercury

8011 - EDB/DBCP/TCP 8015C - GRO/DRO

8081B - Pesticides 8082A - PCB

8100M - TPH

8151A - Herbicides

8260B - VOA

8270D - SVOA

8270D SIM - SVOA Low Level

9014 - Cyanide

9038 - Sulfate

9040C - Aqueous pH

9045D - Solid pH (Corrosivity)

9050A - Specific Conductance

9056A - Anions (IC)

9060A - TOC

9095B - Paint Filter

MADEP 04-1.1 - EPH

MADEP 18-2.1 - VPH

Prep Methods

CURRENT SW-846 METHODOLOGY VERSIONS

3005A - Aqueous ICP Digestion

 $3020\mbox{A}$ - Aqueous Graphite Furnace / ICP MS Digestion

3050B - Solid ICP / Graphite Furnace / ICP MS Digestion

3060A - Solid Hexavalent Chromium Digestion

3510C - Separatory Funnel Extraction

3520C - Liquid / Liquid Extraction

3540C - Manual Soxhlet Extraction 3541 - Automated Soxhlet Extraction

3546 - Microwave Extraction

3580A - Waste Dilution

5030B - Aqueous Purge and Trap

5030C - Aqueous Purge and Trap

5035A - Solid Purge and Trap

SW846 Reactivity Methods 7.3.3.2 (Reactive Cyanide) and 7.3.4.1 (Reactive Sulfide) have been withdrawn by EPA. These methods are reported per client request and are not NELAP accredited.



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

Client Sample ID: C-1038 Date Sampled: 03/21/19 15:12

Percent Solids: 98

Extraction Method: 7471B

ESS Laboratory Work Order: 1903597 ESS Laboratory Sample ID: 1903597-01

Sample Matrix: Solid Units: mg/kg dry

Total Metals

Analyst Analyzed I/V MKS 03/27/19 15:07 0.74 **Analyte** Results (MRL) **MDL** I/V F/V Batch Method Limit Mercury 17.5 (2.72) 7471B 40 CC92649



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

Client Sample ID: C-1044 Date Sampled: 03/21/19 16:11

Percent Solids: 98

Extraction Method: 7471B

ESS Laboratory Work Order: 1903597 ESS Laboratory Sample ID: 1903597-02

Sample Matrix: Solid Units: mg/kg dry

Total Metals

 Analyte
 Results (MRL)
 MDL
 Method
 Limit
 DF
 Analyst
 Analyzed
 I/V
 F/V
 Batch

 Mercury
 5.48 (0.868)
 7471B
 25
 MKS
 03/27/19 15:09
 0.58
 40
 CC92649



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

Client Sample ID: C-1045
Date Sampled: 03/21/19 12:50

Percent Solids: 99

ESS Laboratory Work Order: 1903597 ESS Laboratory Sample ID: 1903597-03

Sample Matrix: Solid Units: mg/kg dry

Total Metals

Extraction Method: 7471B

 Analyte
 Results (MRL)
 MDL
 Method
 Limit
 DF
 Analyst
 Analyzed
 I/V
 F/V
 Batch

 Mercury
 161 (17.0)
 7471B
 500
 MKS
 03/27/19 15:11
 0.59
 40
 CC92649



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

Client Sample ID: C-1046 Date Sampled: 03/21/19 13:30

Percent Solids: 98

ESS Laboratory Work Order: 1903597 ESS Laboratory Sample ID: 1903597-04

Sample Matrix: Solid Units: mg/kg dry

Extraction Method: 7471B

Total Metals

 Analyte
 Results (MRL)
 MDL
 Method
 Limit
 DF
 Analyst
 Analyzed
 I/V
 F/V
 Batch

 Mercury
 38.6 (3.20)
 7471B
 100
 MKS
 03/27/19 15:13
 0.63
 40
 CC92649



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

Client Sample ID: C-1048 Date Sampled: 03/21/19 15:36

Percent Solids: 97

Extraction Method: 7471B

ESS Laboratory Work Order: 1903597 ESS Laboratory Sample ID: 1903597-05

Sample Matrix: Solid Units: mg/kg dry

Total Metals

Analyte Results (MRL) **MDL** I/V F/V Batch Method Limit Mercury 5.88 (0.794) 7471B 40 CC92649



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

Client Sample ID: C-1049
Date Sampled: 03/21/19 13:36

Percent Solids: 99

ESS Laboratory Work Order: 1903597 ESS Laboratory Sample ID: 1903597-06

Sample Matrix: Solid Units: mg/kg dry

Extraction Method: 7471B

Total Metals

 Analyte
 Results (MRL)
 MDL
 Method
 Limit
 DF
 Analyst
 Analyzed
 I/V
 F/V
 Batch

 Mercury
 22.1 (3.44)
 7471B
 100
 MKS
 03/27/19 15:21
 0.58
 40
 CC92649



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

Client Sample ID: C-1050 Date Sampled: 03/21/19 13:52

Percent Solids: 99

ESS Laboratory Work Order: 1903597 ESS Laboratory Sample ID: 1903597-07

Sample Matrix: Solid Units: mg/kg dry

Total Metals

Extraction Method: 7471B

 Analyte
 Results (MRL)
 MDL
 Method
 Limit
 DF
 Analyst
 Analyzed
 I/V
 F/V
 Batch

 Mercury
 27.5 (3.07)
 7471B
 100
 MKS
 03/27/19 15:23
 0.65
 40
 CC92649



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

Client Sample ID: C-1051 Date Sampled: 03/21/19 13:44

Percent Solids: 98

ESS Laboratory Work Order: 1903597 ESS Laboratory Sample ID: 1903597-08

Sample Matrix: Solid Units: mg/kg dry

Extraction Method: 7471B

Total Metals

Analyst Analyzed I/V MKS 03/27/19 15:25 0.69 **Analyte** Results (MRL) **MDL** I/V F/V Batch Method Limit **19.7** (2.92) Mercury 7471B 40 CC92649



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

Client Sample ID: C-1052 Date Sampled: 03/21/19 14:04

Percent Solids: 99

ESS Laboratory Work Order: 1903597 ESS Laboratory Sample ID: 1903597-09

Sample Matrix: Solid Units: mg/kg dry

Extraction Method: 7471B

Total Metals

 Analyte
 Results (MRL)
 MDL
 Method
 Limit
 DF
 Analyst
 Analyzed
 I/V
 F/V
 Batch

 Mercury
 20.3 (3.03)
 7471B
 100
 MKS
 03/27/19 15:27
 0.66
 40
 CC92649



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

Client Sample ID: C-1053 Date Sampled: 03/21/19 14:10

Percent Solids: 99

Extraction Method: 7471B

ESS Laboratory Work Order: 1903597 ESS Laboratory Sample ID: 1903597-10

Sample Matrix: Solid Units: mg/kg dry

Total Metals

Analyst Analyzed
MKS 03/27/19 15:29 **Analyte** Results (MRL) **MDL** I/V F/V Batch Method Limit Mercury **37.7** (2.81) 7471B 0.71 40 CC92649



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

Client Sample ID: C-1058 Date Sampled: 03/21/19 15:32

Percent Solids: 99

Extraction Method: 7471B

ESS Laboratory Work Order: 1903597 ESS Laboratory Sample ID: 1903597-11

Sample Matrix: Solid Units: mg/kg dry

Total Metals

Analyst Analyzed I/V MKS 03/27/19 15:31 0.65 **Analyte** Results (MRL) **MDL** I/V F/V Batch Method Limit **30.5** (3.08) Mercury 7471B 40 CC92649



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

Client Sample ID: C-1060 Date Sampled: 03/21/19 14:24

Percent Solids: 99

cicciii solius.

ESS Laboratory Work Order: 1903597 ESS Laboratory Sample ID: 1903597-12

Sample Matrix: Solid Units: mg/kg dry

Extraction Method: 7471B

Total Metals

 Analyte
 Results (MRL)
 MDL
 Method
 Limit
 DF
 Analyst
 Analyzed
 I/V
 F/V
 Batch

 Mercury
 17.0 (2.86)
 7471B
 100
 MKS
 03/27/19 15:34
 0.7
 40
 CC92649



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

Client Sample ID: C-1061 Date Sampled: 03/21/19 14:33

Percent Solids: 99

Extraction Method: 7471B

ESS Laboratory Work Order: 1903597 ESS Laboratory Sample ID: 1903597-13

Sample Matrix: Solid Units: mg/kg dry

Total Metals

Analyst Analyzed MKS 03/27/19 15:36 15:26 0.62 **Analyte** Results (MRL) **MDL** I/V F/V Batch Method Limit Mercury 7.32 (1.62) 7471B 40 CC92649



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

Client Sample ID: C-1065 Date Sampled: 03/21/19 15:00

Percent Solids: 99

cicciii solius.

ESS Laboratory Work Order: 1903597 ESS Laboratory Sample ID: 1903597-14

Sample Matrix: Solid Units: mg/kg dry

Extraction Method: 7471B

Total Metals

 Analyte
 Results (MRL)
 MDL
 Method
 Limit
 DF
 Analyst
 Analyzed
 I/V
 F/V
 Batch

 Mercury
 16.4 (3.14)
 7471B
 100
 MKS
 03/27/19 15:38
 0.64
 40
 CC92649



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

Client Sample ID: C-1066 Date Sampled: 03/21/19 14:45

Percent Solids: 99

ESS Laboratory Work Order: 1903597 ESS Laboratory Sample ID: 1903597-15

Sample Matrix: Solid Units: mg/kg dry

Total Metals

Extraction Method: 7471B

 Analyte Mercury
 Results (MRL)
 MDL 9.28 (1.52)
 Method 7471B
 Limit 50
 DF MKS
 Analyzed 03/27/19 16:29
 I/V 0.66
 F/V 0.66
 Batch 0.0292649



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

Client Sample ID: W-1159 Date Sampled: 03/21/19 17:00

Percent Solids: N/A

Extraction Method: 7471B

ESS Laboratory Work Order: 1903597 ESS Laboratory Sample ID: 1903597-16

Sample Matrix: Wipe Units: ug/100cm²

Total Metals

F/V Batch CC92655 Analyst Analyzed
MKS 03/27/19 12:54 Results (MRL) **MDL Analyte** Method Limit Mercury 0.090 (0.020) 7471B



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

Client Sample ID: W-1176 Date Sampled: 03/21/19 15:52

Percent Solids: N/A

ESS Laboratory Work Order: 1903597 ESS Laboratory Sample ID: 1903597-17

Sample Matrix: Wipe Units: ug/100cm²

Extraction Method: 7471B

Total Metals

Analyst Analyzed 03/27/19 16:31 F/V Batch **Analyte** Results (MRL) **MDL** I/V Method Limit Mercury 3.98 (1.00) 7471B 40 CC92655

000450



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

Client Sample ID: W-1177
Date Sampled: 03/21/19 16:55

Percent Solids: N/A

Extraction Method: 7471B

ESS Laboratory Work Order: 1903597 ESS Laboratory Sample ID: 1903597-18

Sample Matrix: Wipe Units: ug/100cm²

Total Metals

 Analyte Mercury
 Results (MRL)
 MDL
 Method
 Limit
 DF
 Analyst
 Analyzed
 I/V
 F/V
 Batch

 Mcroury
 0.530 (0.100)
 7471B
 5
 MKS
 03/27/19 16:33
 1
 40
 CC92655



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

ESS Laboratory Work Order: 1903597

Quality Control Data

				Spike	Source		%REC		RPD	
Analyte	Result	MRL	Units	Level	Result	%REC	Limits	RPD	Limit	Qualifier
			Total Meta	ıls						
Batch CC92649 - 7471B										
Blank										
Mercury	ND	0.033	mg/kg wet							
LCS										
Mercury	4.09	0.360	mg/kg wet	4.850		84	50-103			
LCS Dup										
Mercury	4.36	0.367	mg/kg wet	4.850		90	50-103	7	20	
Batch CC92655 - 7471B										
Blank										
Mercury	ND	0.020	ug/100cm²							
LCS										
Mercury	0.118	0.020	ug/100cm²	0.1208		98	85-115			
LCS Dup										
Mercury	0.144	0.020	ug/100cm ²	0.1208		119	85-115	20	20	B+



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

ESS Laboratory Work Order: 1903597

Notes and Definitions

U	Analyte included in the analysis, but not detected
D	Diluted.
B+	Blank Spike recovery is above upper control limit (B+).
ND	Analyte NOT DETECTED at or above the MRL (LOQ), LOD for DoD Reports, MDL for J-Flagged Analytes
dry	Sample results reported on a dry weight basis
RPD	Relative Percent Difference
MDL	Method Detection Limit
MRL	Method Reporting Limit
LOD	Limit of Detection
LOQ	Limit of Quantitation
DL	Detection Limit
I/V	Initial Volume
F/V	Final Volume
§	Subcontracted analysis; see attached report
ï	Range result excludes concentrations of surrogates and/or internal standards eluting in that range.
2	Range result excludes concentrations of target analytes eluting in that range.
3	Range result excludes the concentration of the C9-C10 aromatic range.
Avg	Results reported as a mathematical average.
NR	No Recovery
FO AT OIL	

[CALC] Calculated Analyte

SUB Subcontracted analysis; see attached report

RL Reporting Limit

EDL Estimated Detection Limit MF Membrane Filtration MPN Most Probably Number TNTC Too numerous to Count CFU Colony Forming Units



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

ESS Laboratory Work Order: 1903597

ENVIRONMENTAL

ESS LABORATORY CERTIFICATIONS AND ACCREDITATIONS

Rhode Island Potable and Non Potable Water: LAI00179 http://www.health.ri.gov/find/labs/analytical/ESS.pdf

Connecticut Potable and Non Potable Water, Solid and Hazardous Waste: PH-0750 http://www.ct.gov/dph/lib/dph/environmental health/environmental laboratories/pdf/OutofStateCommercialLaboratories.pdf

Maine Potable and Non Potable Water, and Solid and Hazardous Waste: RI00002 http://www.maine.gov/dhhs/mecdc/environmental-health/dwp/partners/labCert.shtml

Massachusetts Potable and Non Potable Water: M-RI002 http://public.dep.state.ma.us/Labcert/Labcert.aspx

New Hampshire (NELAP accredited) Potable and Non Potable Water, Solid and Hazardous Waste: 2424 http://des.nh.gov/organization/divisions/water/dwgb/nhelap/index.htm

New York (NELAP accredited) Non Potable Water, Solid and Hazardous Waste: 11313 http://www.wadsworth.org/labcert/elap/comm.html

New Jersey (NELAP accredited) Non Potable Water, Solid and Hazardous Waste: RI006 http://datamine2.state.nj.us/DEP OPRA/OpraMain/pi main?mode=pi by site&sort order=PI NAMEA&Select+a+Site:=58715

United States Department of Agriculture Soil Permit: P330-12-00139

Pennsylvania: 68-01752

http://www.dep.pa.gov/Business/OtherPrograms/Labs/Pages/Laboratory-Accreditation-Program.aspx

		E	ESS Labo	oratory S	ample a	nd Cooler	Receipt Checkli	ist	
Client:	GZ	A - Bedford	NH - GZA/HI	OM		ESS I	Project ID:	1903597	
Olloni.			02					3/22/2019	_
Shipped/De	elivered Via:		ESS Courier			Project		3/28/2019	
••	•					Days f	or Project:	4 Day	
	anifest prese		[No		6. Does COC	match bottles?		No
2. Were cus	stody seals p	resent?	[Yes		7. Is COC cor	mplete and correct?		Yes
3. Is radiation	on count <10	0 CPM?	[Yes		8. Were samp	oles received intact?		Yes
	ler Present? 2.5	Iced with:	lce [Yes		9. Were labs	informed about short h	olds & rushes?	Yes)/ No / NA
	C signed and			Yes		10. Were any	analyses received outsi	de of hold time?	Yes (AN)
	ocontracting r Sample IDs: Analysis: TAT:		Yes	(No)			As received? s in aqueous VOAs? nanol cover soil complete	ly?	Yes / No Yes / No Yes / No / NA
a. If metals	samples pro preserved u el VOA vials	pon receipt:		Yes) / No Date: Date:		Time: Time:	By:		
Sample Rec	ceiving Notes	:							
COC = s	sample 1	6 is a w	/ipe ; san	nple 16 i	s a solid				
a. Was the Who was co	re a need to ontacted?	contact the	oject Manage client?	Date:	Yes) No Yes / No -3 / 2.5 /		Ву	— PR	
Sample Number	Container ID	Proper Container	Air Bubbles Present	Sufficient Volume	Contain	er Type	Preservative		anide and 608.3 cides)
01	326639	Yes	NA	Yes	4 oz. Jar	- Unpres	NP		
02	326638	Yes	NA	Yes	4 oz. Jar		NP		
03	326637	Yes	NA	Yes	4 oz. Jar		NP		
04	326636 326635	Yes	NA NA	Yes Yes	4 oz. Jar 4 oz. Jar	•	NP NP		
05 06	326634	Yes Yes	NA NA	Yes	4 oz. Jar	•	NP		
07	326633	Yes	NA	Yes	4 oz. Jar		NP		
08	326632	Yes	NA	Yes	4 oz. Jar		NP		
09	326631	Yes	NA	Yes	4 oz. Jar	- Unpres	NP		
10	326630	Yes	NA	Yes	4 oz. Jar	•	NP		
11	326629	Yes	NA	Yes	4 oz. Jar	•	NP		
12	326628	Yes	NA	Yes	4 oz. Jar		NP		
13	326627	Yes	NA	Yes	4 oz. Jar		NP		
14	326626	Yes	NA	Yes	4 oz. Jar		NP		
15	326625	Yes	NA	Yes	4 oz. Jar		NP		
16	326642	Yes	NA	Yes	4 oz. Jar		NP		
17 18	326641 326640	Yes Yes	NA NA	Yes Yes	4 oz. Jar 4 oz. Jar		Hexane Hexane		
10	323010	. 00	,	. 30	. 32. 34				
2nd Review	v ers scanned	Linto etere	ne/lah		Initials:	w			
	e labels on co				Yes / No				

ESS Laboratory Sample and Cooler Receipt Checklist

Client:	GZA - Bedford, NH - GZA/HDM		ESS Project ID:	1903597
Are all necessary sti	ickers attached?	(Yes/No	Date Received:	3/22/2019
Completed By:	DL	Date & Time:	3/22/19	17.00
Reviewed By:	try -	Date & Time:	3/22/19	17:33
Delivered By:	ha -		3/22/19	17:133
	/		·	

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DAIL SO ON / 13	1717		
		Quality Envi	ironmental Containers
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	MAN IN	000-200-35	50 · 304-255-3900
63633 663.4			

		E	ESS Labo	oratory S	ample a	nd Cooler	Receipt Checkl	ist	
Client:	GZ/	A - Bedford,	NH - GZA/HI	OM			Project ID:	1903597	
Shinned/Dr	alivered Via:		ESS Courier				Received: Due Date:	3/22/2019 3/28/2019	
Shipped/Di	ciivereu via.		LGO Courier			•	for Project:		
	anifest prese		[No		6. Does COC	match bottles?		No
2. Were cu	stody seals p	resent?		Yes		7. Is COC cor	mplete and correct?		Yes
3. Is radiati	on count <10	0 CPM?		Yes		8. Were samp	ples received intact?		Yes
	ler Present? 2.5	Iced with:	[lce	Yes		9. Were labs	informed about short h	olds & rushes?	Yes)/ No / NA
	C signed and			Yes		10. Were any	analyses received outs	ide of hold time?	Yes 🕪
			Yes				As received? Is in aqueous VOAs? Thanol cover soil complete	ely?	Yes / No Yes / No Yes / No / NA
a. If metals	samples pro preserved u el VOA vials	pon receipt:	1	Yes / No Date: Date:		_ Time: _ Time: _	By	:	
14. Was th	ere a need to	contact Procontact the	ripe ; san		Yes No Yes / No		Ву		
Sample Number	Container ID	Proper Container	Air Bubbles Present	Sufficient Volume	Contain	er Type	Preservative		ranide and 608.3
01	326639	Yes	NA	Yes	4 oz. Jar	- Unpres	NP		
02	326638	Yes	NA NA	Yes	4 oz. Jar		NP NP		
03 04	326637 326636	Yes Yes	NA NA	Yes Yes	4 oz. Jar 4 oz. Jar		NP		
05	326635	Yes	NA	Yes	4 oz. Jar		NP		
06	326634	Yes	NA	Yes	4 oz. Jar		NP		
07	326633	Yes	NA NA	Yes	4 oz. Jar 4 oz. Jar		NP NP		
08 09	326632 326631	Yes Yes	NA NA	Yes Yes	4 oz. Jar 4 oz. Jar	•	NP		
10	326630	Yes	NA	Yes	4 oz. Jar	•	NP		
11	326629	Yes	NA	Yes	4 oz. Jar		NP		
12	326628	Yes	NA	Yes	4 oz. Jar		NP		
13	326627	Yes	NA	Yes		- Unpres	NP		
14	326626	Yes	NA NA	Yes	4 oz. Jar		NP NP		
15 16	326625 326642	Yes Yes	NA NA	Yes Yes	4 oz. Jar	- Unpres - Unpres	NP NP		
16 17	326641	Yes	NA NA	Yes	4 oz. Jar		Hexane		
18	326640	Yes	NA	Yes		- Hexane	Hexane		
	ers scanned				Initials:	<u> </u>			
Are barcod	e labels on co	orrect contai	iners?		Yes / No				

ESS Laboratory Sample and Cooler Receipt Checklist

Client: GZA - Bedford, NH - GZA/HDM		ESS Project ID:	1903597
Are all necessary stickers attached?	(Yes/No	Date Received:	3/22/2019
Completed By:	Date & Time:	3/22/19	17.00
Reviewed By:	Date & Time:	3/22/19	17:33
By:		3/22/19	17.133
/		•	

CUSTODY SEAL			
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DATE OF THE PROPERTY OF THE PR			
SIGNATURE MANA		Quality Env	rironmental Containers
SIGNATURE THE	THE STATE OF THE S	800-255-39	950 · 304-255-3900
6863 - 6634		600 630	

1/2								
ESS Laboratory								
Division of Thielsch Engineering, Inc.		CHAIN OF CUST	ODY	ESS Lab#	19035	597		
185 Frances Avenue, Cranston RI 02910	Turn Time Regulatory State	4 days Rus	h	Reporting		- 		
Tel. (401) 461-7181 Fax (401) 461-4486		nis project for any of the fo	llowing?	Limits				
www.esslaboratory.com	OCT RC	P OMA MCP	ORGP		mit Checker ther (Please Specify		tandard Excel	
GZA Ces Environmental Contact Person	Project # 0.848.00 10.40	Project			I I I	"		
Reborca Contact Person	_	Address	oiler Demo	ا ه ا				
L' CITY	State State	Zip Code	: PO#	Analysis				1 1 1 1
	14	63110		Ang A]
602-212-1280	X Number	Email Ac	idress]] [1
ESS Lab Collection Collection Sample Type	Sample Matrix		ample ID	1				
- I I I I I I I I I I I I I I I I I I I			ampie ID	[-]				
1 3/21/19 1512 Grab	Solid	C-1038						1
2 1611	1	C-1044			- - - -	+++	 	╅┥┪┩
3 1250		C-1045		- ()		+		+
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5 1536		C-1048						
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8 1344		C-1050		-				
 		C-1051		X]		
		C-1027						
10 1410 2	N N	C-1053			- - - -	† 	+	
Container Type: AC-Air Cassette AG-Amber GI	ass B-BOD Bottle C		Other P-Poly S-Ster	ile V-Vial A.C.		+++	_	
Container Volume: 1-100 mL 2-2.5 gal 3-250 n					++-	+++		
Preservation Code: 1-Non Preserved 2-HCl 3-H28O4 4-H	NO3 5-NaOH 6-Methanol	7-Na2S2O3 8-ZnAce, NaOH 9-NH4	CI 10-DI H2O 11-Ascorbic Ac				+	┝╼┾╌┼╌
Laboratory Use Only			er of Containers per S	Sample: \				
Cooler Present:		Sampled by : BRL						
		Comments:	Please spe	cify "Other" preserv	ative and conta	iners types in t	his space	
Seals Intact: <u>AA</u> Cooler Temperature: °C	10							
			24.5		•			
Relinquished by: (Signature, Date & Time)		Signature, Date & Time)	Relinquished By:	(Signature, Date & Ti	me)	Received By: (S	ignature, Dat	te & Time)
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Division of Thielsch Engineering, Inc.	Turn Time	4 Javs Rush		Reporting	J.	1 10	<u> </u>					
185 Frances Avenue, Cranston RI 02910 Tel. (401) 461-7181 Fax (401) 461-4486	Regulatory State			Limits								
www.esslaboratory.com	OCT RCP	s project for any of the following OMA MCP ORGP		Electonic Deliverable		Checker r (Please Spe	:ifv →)	∟¦Star	dard Exce	l		1
COAC Company Name	Project #	Project Name					ÍΊ		T			\top
Reserva Cox	5 Commo	Address	Dowo	Analysis								
B-17-City 111-8	tate	Zip Code	PO#	*na			1					
Telephone Number FAX	Number	Email Address		` ,	1							
ESS Lab Collection Collection	Τ	rebecco.cox@0		——/ _/	6		1 1 1					
ID Date Time Sample Type	Sample Matrix	Sample	TD									1 1
11 3(21/19 153% Grab	Solid	C-1058										\Box
12 1424		C-1060			1					\top		\top
13 1433		C-1061										11
14 1500		C-1065			Ž T							\top
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17 1552	1	w-1176										\Box
18 - 1655 -	N.	W - 1/37		5	1							\top
	<u> </u>											
Container Type: AC-Air Cassette AG-Amber Glas Container Volume: 1-100 mL 2-2.5 gal 3-250 mL		C-Cubitainer G - Glass O-Other mL 6-1L 7-VOA 8-2 oz 9	 	V-Viai		+-	+++					+
Preservation Code: 1-Non Preserved 2-HCI 3-H2SO4 4-HNC			DI H2O 11-Ascorbic Acid		7	+			\dashv			+
		Number of	Containers per Sa	ımple:				<u> </u>				
Laboratory Use Only		Sampled by : RR										
Cooler Present: Seals Intact: M.A.		Comments:	Please spec		preserva	tive and c	ontainers	ypes in t	his spa	e		
Cooler Temperature: °C //c+cnp	1.1.2		` '									
Relinquished by: (Signature, Date & Time)	Receiyed By;		Relinquished By: (Signature, [Date & Tin	ne)	Receiv	ed By: (S	ignature	, Date &	Time)	
Mun Jahr 3/21/19	3/21/1	9 Custody Seal 6	2A fridge	3/22	/19 10	:36 5	1/	h	3/2	2/19	10:	36
Relinquished by: (Signature, Date & Time)	Received By: (Signature, Date & Time)	Relinquished By: (S	Signature, [Date & Tin	ne)	Receiv	ed By: (S	gnature	, Date &	Time)	
LAR 3/22/19 16:35	1°21+	3/22/19 1647										



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Rebecca Cox GZA GeoEnvironmental, Inc. 5 Commerce Park North Bedford, NH 03110

RE: Schiller Boiler Demo (04.0190318.03) ESS Laboratory Work Order Number: 1903664

This signed Certificate of Analysis is our approved release of your analytical results. These results are only representative of sample aliquots received at the laboratory. ESS Laboratory expects its clients to follow all regulatory sampling guidelines. Beginning with this page, the entire report has been paginated. This report should not be copied except in full without the approval of the laboratory. Samples will be disposed of thirty days after the final report has been delivered. If you have any questions or concerns, please feel free to call our Customer Service Department.

Laurel Stoddard Laboratory Director REVIEWED

By ESS Laboratory at 3:30 pm, Mar 29, 2019

Analytical Summary

The project as described above has been analyzed in accordance with the ESS Quality Assurance Plan. This plan utilizes the following methodologies: US EPA SW-846, US EPA Methods for Chemical Analysis of Water and Wastes per 40 CFR Part 136, APHA Standard Methods for the Examination of Water and Wastewater, American Society for Testing and Materials (ASTM), and other recognized methodologies. The analyses with these noted observations are in conformance to the Quality Assurance Plan. In chromatographic analysis, manual integration is frequently used instead of automated integration because it produces more accurate results.

The test results present in this report are in compliance with TNI and relative state standards, and/or client Quality Assurance Project Plans (QAPP). The laboratory has reviewed the following: Sample Preservations, Hold Times, Initial Calibrations, Continuing Calibrations, Method Blanks, Blank Spikes, Blank Spike Duplicates, Duplicates, Matrix Spikes, Matrix Spike Duplicates, Surrogates and Internal Standards. Any results which were found to be outside of the recommended ranges stated in our SOPs will be noted in the Project Narrative.



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

ESS Laboratory Work Order: 1903664

SAMPLE RECEIPT

The following samples were received on March 25, 2019 for the analyses specified on the enclosed Chain of Custody Record.

Lab Number	Sample Name	Matrix	Analysis
1903664-01	C-1043	Solid	7471B
1903664-02	C-1054	Solid	7471B
1903664-03	C-1055	Solid	7471B
1903664-04	C-1056	Solid	7471B
1903664-05	C-1057	Solid	7471B
1903664-06	C-1059	Solid	7471B



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

ESS Laboratory Work Order: 1903664

PROJECT NARRATIVE

No unusual observations noted.

End of Project Narrative.

DATA USABILITY LINKS

To ensure you are viewing the most current version of the documents below, please clear your internet cookies for www.ESSLaboratory.com. Consult your IT Support personnel for information on how to clear your internet cookies.

Definitions of Quality Control Parameters

Semivolatile Organics Internal Standard Information

Semivolatile Organics Surrogate Information

Volatile Organics Internal Standard Information

Volatile Organics Surrogate Information

EPH and VPH Alkane Lists



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

ESS Laboratory Work Order: 1903664

Analytical Methods

1010A - Flashpoint 6010C - ICP

6020A - ICP MS

7010 - Graphite Furnace 7196A - Hexavalent Chromium 7470A - Aqueous Mercury 7471B - Solid Mercury 8011 - EDB/DBCP/TCP

8015C - GRO/DRO 8081B - Pesticides

8082A - PCB 8100M - TPH 8151A - Herbicides

8260B - VOA 8270D - SVOA

8270D SIM - SVOA Low Level

9014 - Cyanide 9038 - Sulfate

9040C - Aqueous pH

9045D - Solid pH (Corrosivity)

9050A - Specific Conductance

9056A - Anions (IC)

9060A - TOC

9095B - Paint Filter

MADEP 04-1.1 - EPH

MADEP 18-2.1 - VPH

Prep Methods

CURRENT SW-846 METHODOLOGY VERSIONS

3005A - Aqueous ICP Digestion

3020A - Aqueous Graphite Furnace / ICP MS Digestion

3050B - Solid ICP / Graphite Furnace / ICP MS Digestion

3060A - Solid Hexavalent Chromium Digestion 3510C - Separatory Funnel Extraction

3520C - Liquid / Liquid Extraction

3540C - Manual Soxhlet Extraction

3541 - Automated Soxhlet Extraction

3546 - Microwave Extraction

3580A - Waste Dilution

5030B - Aqueous Purge and Trap 5030C - Aqueous Purge and Trap

5035A - Solid Purge and Trap

SW846 Reactivity Methods 7.3.3.2 (Reactive Cyanide) and 7.3.4.1 (Reactive Sulfide) have been withdrawn by EPA. These methods are reported per client request and are not NELAP accredited.



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

Client Sample ID: C-1043 Date Sampled: 03/22/19 08:27

Percent Solids: 99

Extraction Method: 7471B

ESS Laboratory Work Order: 1903664 ESS Laboratory Sample ID: 1903664-01

Sample Matrix: Solid Units: mg/kg dry

Total Metals

 Analyte Mercury
 Results (MRL)
 MDL 7471B
 Limit 50
 DF MCS
 Analyzed MCS
 I/V 0.66
 F/V 0.66
 Batch 0.0792848



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

Client Sample ID: C-1054 Date Sampled: 03/22/19 08:47

Percent Solids: 99

ESS Laboratory Work Order: 1903664 ESS Laboratory Sample ID: 1903664-02

Sample Matrix: Solid Units: mg/kg dry

Extraction Method: 7471B

Total Metals

 Analyte
 Results (MRL)
 MDL
 Method
 Limit
 DF
 Analyst
 Analyzed
 I/V
 F/V
 Batch

 Mercury
 16.3 (2.60)
 7471B
 100
 MKS
 03/29/19 11:42
 0.77
 40
 CC92848



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

Client Sample ID: C-1055 Date Sampled: 03/22/19 08:57

Percent Solids: 99

ESS Laboratory Work Order: 1903664 ESS Laboratory Sample ID: 1903664-03

Sample Matrix: Solid Units: mg/kg dry

Extraction Method: 7471B

Total Metals

 Analyte
 Results (MRL)
 MDL
 Method
 Limit
 DF
 Analyst
 Analyzed
 I/V
 F/V
 Batch

 Mercury
 24.6 (2.47)
 7471B
 100
 MKS
 03/29/19 11:44
 0.81
 40
 CC92848



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

Client Sample ID: C-1056 Date Sampled: 03/22/19 09:09

Percent Solids: 100

Extraction Method: 7471B

ESS Laboratory Work Order: 1903664 ESS Laboratory Sample ID: 1903664-04

Sample Matrix: Solid Units: mg/kg dry

Total Metals

Analyst Analyzed I/V MKS 03/29/19 11:46 0.74 **Analyte** Results (MRL) **MDL** I/V F/V Batch Method Limit Mercury 14.1 (2.69) 7471B 40 CC92848



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

Client Sample ID: C-1057 Date Sampled: 03/22/19 09:20

Percent Solids: 99

Extraction Method: 7471B

ESS Laboratory Work Order: 1903664 ESS Laboratory Sample ID: 1903664-05

Sample Matrix: Solid Units: mg/kg dry

Total Metals

<u>Analyst</u> <u>Analyzed</u> <u>I/V</u> MKS 03/29/19 13:10 0.65 **Analyte** Results (MRL) **MDL** I/V F/V Batch Method Limit Mercury **158** (15.3) 7471B 40 CC92848



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

Client Sample ID: C-1059
Date Sampled: 03/22/19 09:31

Percent Solids: 99

Extraction Method: 7471B

ESS Laboratory Work Order: 1903664 ESS Laboratory Sample ID: 1903664-06

Sample Matrix: Solid Units: mg/kg dry

Total Metals

 Analyte Mercury
 Results (MRL)
 MDL 7471B
 Limit 500
 DF MCS
 Analyzed MKS
 Analyzed 03/29/19 13:12
 I/V 13/2
 E/V CP2848



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

ESS Laboratory Work Order: 1903664

Quality Control Data

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
			Total Meta	ls						
Batch CC92848 - 7471B										
Blank										
Mercury	ND	0.033	mg/kg wet							
ıcs										
Mercury	3.55	0.360	mg/kg wet	4.850		73	50-103			
LCS Dup										
Mercury	3.76	0.336	mg/kg wet	4.850		78	50-103	6	20	



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

ESS Laboratory Work Order: 1903664

Notes and Definitions

U	Analyte included in the analysis, but not detected
D	Diluted.
ND	Analyte NOT DETECTED at or above the MRL (LOQ), LOD for DoD Reports, MDL for J-Flagged Analytes
dry	Sample results reported on a dry weight basis
RPD	Relative Percent Difference
MDL	Method Detection Limit
MRL	Method Reporting Limit
LOD	Limit of Detection
LOQ	Limit of Quantitation
DL	Detection Limit
I/V	Initial Volume
F/V	Final Volume
§	Subcontracted analysis; see attached report
1	Range result excludes concentrations of surrogates and/or internal standards eluting in that range.
2	Range result excludes concentrations of target analytes eluting in that range.
3	Range result excludes the concentration of the C9-C10 aromatic range.

Avg Results reported as a mathematical average.

NR No Recovery
[CALC] Calculated Analyte

SUB Subcontracted analysis; see attached report

RL Reporting Limit

EDL Estimated Detection Limit
MF Membrane Filtration
MPN Most Probably Number
TNTC Too numerous to Count
CFU Colony Forming Units



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

ESS Laboratory Work Order: 1903664

ENVIRONMENTAL

ESS LABORATORY CERTIFICATIONS AND ACCREDITATIONS

Rhode Island Potable and Non Potable Water: LAI00179 http://www.health.ri.gov/find/labs/analytical/ESS.pdf

Connecticut Potable and Non Potable Water, Solid and Hazardous Waste: PH-0750 http://www.ct.gov/dph/lib/dph/environmental health/environmental laboratories/pdf/OutofStateCommercialLaboratories.pdf

Maine Potable and Non Potable Water, and Solid and Hazardous Waste: RI00002 http://www.maine.gov/dhhs/mecdc/environmental-health/dwp/partners/labCert.shtml

Massachusetts Potable and Non Potable Water: M-RI002 http://public.dep.state.ma.us/Labcert/Labcert.aspx

New Hampshire (NELAP accredited) Potable and Non Potable Water, Solid and Hazardous Waste: 2424 http://des.nh.gov/organization/divisions/water/dwgb/nhelap/index.htm

New York (NELAP accredited) Non Potable Water, Solid and Hazardous Waste: 11313 http://www.wadsworth.org/labcert/elap/comm.html

New Jersey (NELAP accredited) Non Potable Water, Solid and Hazardous Waste: RI006 http://datamine2.state.nj.us/DEP OPRA/OpraMain/pi main?mode=pi by site&sort order=PI NAMEA&Select+a+Site:=58715

United States Department of Agriculture Soil Permit: P330-12-00139

Pennsylvania: 68-01752 http://www.dep.pa.gov/Business/OtherPrograms/Labs/Pages/Laboratory-Accreditation-Program.aspx

ESS Laboratory Sample and Cooler Receipt Checklist

a. Air bubbles in aqueous VO b. Does methanol cover soil of TAT: 13. Are the samples properly preserved? a. If metals preserved upon receipt: b. Low Level VOA vials frozen: Time: Time: Time: Time:	S Day Yes Act? Yes Act? Yes Yes Yes Yes No Yes No Yes Yes No Yes Yes Yes No Yes Yes Yes Yes No Yes Yes Yes Yes Yes Yes Yes Ye
Days for Project: 1. Air bill manifest present?	Yes Yes Act? Yes Yes Yes Yes Yes You Yes Yes No Yes No Yes No Yes No Yes No Yes No Yes No Yes No Yes No Yes No Yes No Yes No Yes No Yes No Yes No No Yes No Yes No Yes No No Yes No No No No No No No No No N
Air No.: NA 2. Were custody seals present? Yes 7. Is COC complete and corre 3. Is radiation count <100 CPM? Yes 8. Were samples received into Yes 9. Were labs informed about 10. Were any analyses received? 5. Was COC signed and dated by client? Yes 10. Were any analyses received? ESS Sample IDs: Analysis: 12. Were VOAs received? 13. Air bubbles in aqueous VO 15. Does methanol cover soil of TAT: 15. No 16. Low Level VOA vials frozen: Time	yes act? Yes Ast short holds & rushes? Yes Yes Yes No Yes No Yes No Yes No Yes No Yes No Yes No Yes No Yes No Yes No Yes No Yes No Yes No Yes No Yes No Yes No Yes No Yes No Yes No No Yes No No No No No No No No No N
3. Is radiation count <100 CPM? 4. Is a Cooler Present? Temp: 1.1 Iced with: Ice 5. Was COC signed and dated by client? 11. Any Subcontracting needed? Yes Analysis: TAT: 13. Are the samples properly preserved? A. If metals preserved upon receipt: 14. Is a Cooler Present? Yes 15. Were labs informed about 16. Were any analyses received? 17. Were VOAs received? 18. Were samples informed about 19. Were any analyses received? 11. Any Subcontracting needed? Yes 12. Were VOAs received? 23. Air bubbles in aqueous VO 24. B. Does methanol cover soil of the cover of	yes ved outside of hold time? Yes ved outside of hold time? Yes ved ved outside of hold time? Yes ved ved outside of hold time? Yes ved ved ved ved ved ved ved ved ved ved
4. Is a Cooler Present? Temp: 1.1 loed with: loe 5. Was COC signed and dated by client? 11. Any Subcontracting needed? Yes No ESS Sample IDs: Analysis: TAT: 13. Are the samples property preserved? a. If metals preserved upon receipt: b. Low Level VOA vials frozen: Yes 9. Were labs informed about 10. Were any analyses received? a. Air bubbles in aqueous VO b. Does methanol cover soil of the control of	ved outside of hold time? Yes No Yes No Yes No Yes No Yes No Yes No Yes No Yes No / NA
Temp:	Yes No Yes / No / NA Yes / No / NA
10. Were any analyses received? 11. Any Subcontracting needed? ESS Sample IDs: Analysis: TAT: 13. Are the samples properly preserved? a. If metals preserved upon receipt: b. Low Level VOA vials frozen: 14. Were VOAs received? a. Air bubbles in aqueous VO b. Does methanol cover soil of the contraction of the co	Yes No Yes / No Yes / No / NA Yes / No / NA
ESS Sample IDs: Analysis: TAT: 13. Are the samples properly preserved? a. If metals preserved upon receipt: b. Low Level VOA vials frozen: a. Air bubbles in aqueous VO b. Does methanol cover soil of Yes \(\) No Date: Date: Time: Time: Time:	As? Yes / No completely? Yes / No / NA
ESS Sample IDs: Analysis: TAT: 13. Are the samples properly preserved? TAT: TAT: A. Air bubbles in aqueous VO b. Does methanol cover soil of Yes \(\) No	As? Yes / No completely? Yes / No / NA
a. If metals preserved upon receipt: b. Low Level VOA vials frozen: Date: Time: Time:	By:
Sample Receiving Notes:	
14. Was there a need to contact Project Manager? a. Was there a need to contact the client? Who was contacted? Date:	Ву:
Sample Container Proper Air Sufficient Container Type Preservation Number ID Container Preservation Present	ve Record pH (Cyanide and 608.3 Pesticides)
01 327242 Yes NA Yes 4 oz. Jar - Unpres NP 02 327241 Yes NA Yes 4 oz. Jar - Unpres NP	SE C
03 327240 Yes NA Yes 4 oz. Jar - Unpres NP	
04 327239 Yes NA Yes 4 oz. Jar - Unpres NP 05 327238 Yes NA Yes 4 oz. Jar - Unpres NP	USTOD) ATE GNATURE
06 327237 Yes NA Yes 4 oz. Jar - Unpres NP	
2nd Review All containers scanned into storage/lab Are barcode labels on correct containers? Are all necessary stocks attached? Completed By: Date & Time: Date & Time: Date & Time: 375 &	169 30.25-350 304-25-350 1657 1657 1657

			4
ESS Laboratory	CHAIN OF CUSTOD	Y ESS Lab#	G03664
Division of Thielsch Engineering, Inc.	Turn Time 54 Days	Reporting Limits	
185 Frances Avenue, Cranston RI 02910 Tel. (401) 461-7181 Fax (401) 461-4486	Regulatory State Is this project for any of the follow		er Booel
www.esslaboratory.com		RGP Deliverables Other (Plea	
GTA Geotheron mental, Inc	Project # Project Name of Option 1981	ne l	
Confact Person	5 Commerce Per N		
Bedford City	State OSVO	Analysis # Od	
	K Number Email Addre	ess	
ESS Lab Collection Collection	resecus con es		
ID Date Time Sample Typ		ple ID	
1 3/22/19 0827 6	Sold (-1043	X	1100
2 3/22/19 08+7 G	Solid C-1054	XIII	
3 3/22/19 0857 G	304d C-1088	X	
9 3/22/19/09/09 G	Solid (-1056	X	
5 3/22/11 0920 G	Solid C - 1057	X	
6 3/22/19 0931 G	Solrd C- 1009	X	
Container Type: AC-Air Cassette AG-Amber	Glass B-BOD Bottle C-Cubitainer J-Jar O-Othe	er P-Poly S-Sterile V-Vial	
Container Volume: 1-100 mL 2-2.5 gat 3-250		9-4 oz 10-8 oz 11-Other* 9	
Preservation Code: 1-Non Preserved 2-HCl 3-H2SC	4-HNO3 5-NaOH 6-Methanol 7-Na2S2O3 8-ZnAce, NaOH	1 9-NH4Cl 10-Dl H2O 11-Other*	
	Number	of Containers per Sample:	
Laboratory Use Only	Sampled by :).		
Cooler Present: O Drop C		Please specify "Other" preservative a	nd containers types in this space
Seals Intact Cooler Temperature: Cooler Temperature: Cooler Temperature: Cooler Temperature:	11 (1 ())		:
Relinquished by: (Signature, Date & Time)	Received By: (Signature, Date & Time)	Relinquished By: (Signature, Date & Time)	Received By: (Signature, Date & Time)
fell 3/20/19 1241	GEA. FILAGE 3/22/19 1241	GZA fridge 3/25/14 11:09	22/13-3/25/14 11/09
Relinquished by: (Signature, Date & Time)	Reteived By: (Signature, Date & Time)	Relinquished By: (Signature, Date & Time)	Received By: (Signature, Date & Time)
1 3/25/19 16:00	265/19 100V		
	10711		
1	V		



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Rebecca Cox GZA GeoEnvironmental, Inc. 5 Commerce Park North Bedford, NH 03110

RE: Schiller Boiler Demo (04.0190318.03) ESS Laboratory Work Order Number: 1903825

This signed Certificate of Analysis is our approved release of your analytical results. These results are only representative of sample aliquots received at the laboratory. ESS Laboratory expects its clients to follow all regulatory sampling guidelines. Beginning with this page, the entire report has been paginated. This report should not be copied except in full without the approval of the laboratory. Samples will be disposed of thirty days after the final report has been delivered. If you have any questions or concerns, please feel free to call our Customer Service Department.

Laurel Stoddard Laboratory Director **REVIEWED**

By ESS Laboratory at 3:20 pm, Apr 04, 2019

Analytical Summary

The project as described above has been analyzed in accordance with the ESS Quality Assurance Plan. This plan utilizes the following methodologies: US EPA SW-846, US EPA Methods for Chemical Analysis of Water and Wastes per 40 CFR Part 136, APHA Standard Methods for the Examination of Water and Wastewater, American Society for Testing and Materials (ASTM), and other recognized methodologies. The analyses with these noted observations are in conformance to the Quality Assurance Plan. In chromatographic analysis, manual integration is frequently used instead of automated integration because it produces more accurate results.

The test results present in this report are in compliance with TNI and relative state standards, and/or client Quality Assurance Project Plans (QAPP). The laboratory has reviewed the following: Sample Preservations, Hold Times, Initial Calibrations, Continuing Calibrations, Method Blanks, Blank Spikes, Blank Spike Duplicates, Duplicates, Matrix Spikes, Matrix Spike Duplicates, Surrogates and Internal Standards. Any results which were found to be outside of the recommended ranges stated in our SOPs will be noted in the Project Narrative.



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

ESS Laboratory Work Order: 1903825

SAMPLE RECEIPT

The following samples were received on March 29, 2019 for the analyses specified on the enclosed Chain of Custody Record.

Lab Number	Sample Name	Matrix	Analysis
1903825-01	C-1067	Solid	7471B
1903825-02	C-1068	Solid	7471B
1903825-03	C-1070	Solid	7471B
1903825-04	C-1072	Solid	7471B
1903825-05	C-1078	Solid	7471B
1903825-06	C-1080	Solid	7471B
1903825-07	C-1082	Solid	7471B
1903825-08	C-1084	Solid	7471B
1903825-09	C-1086	Solid	7471B
1903825-10	C-1088	Solid	7471B
1903825-11	C-1069	Solid	7471B
1903825-12	C-1071	Solid	7471B
1903825-13	C-1073	Solid	7471B
1903825-14	C-1079	Solid	7471B
1903825-15	C-1081	Solid	7471B
1903825-16	C-1083	Solid	7471B
1903825-17	C-1085	Solid	7471B
1903825-18	C-1087	Solid	7471B
1903825-19	C-1089	Solid	7471B
1903825-20	C-1090	Solid	7471B



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

ESS Laboratory Work Order: 1903825

PROJECT NARRATIVE

No unusual observations noted.

End of Project Narrative.

DATA USABILITY LINKS

To ensure you are viewing the most current version of the documents below, please clear your internet cookies for www.ESSLaboratory.com. Consult your IT Support personnel for information on how to clear your internet cookies.

<u>Definitions of Quality Control Parameters</u>

Semivolatile Organics Internal Standard Information

Semivolatile Organics Surrogate Information

Volatile Organics Internal Standard Information

Volatile Organics Surrogate Information

EPH and VPH Alkane Lists



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

ESS Laboratory Work Order: 1903825

Analytical Methods

1010A - Flashpoint 6010C - ICP

6020A - ICP MS 7010 - Graphite Furnace

7196A - Hexavalent Chromium

7470A - Aqueous Mercury 7471B - Solid Mercury

8011 - EDB/DBCP/TCP

8015C - GRO/DRO

8081B - Pesticides

8082A - PCB 8100M - TPH

8151A - Herbicides

8260B - VOA

8270D - SVOA

8270D SIM - SVOA Low Level

9014 - Cyanide

9038 - Sulfate

9040C - Aqueous pH

9045D - Solid pH (Corrosivity)

9050A - Specific Conductance

9056A - Anions (IC)

9060A - TOC

9095B - Paint Filter

MADEP 04-1.1 - EPH

MADEP 18-2.1 - VPH

Prep Methods

CURRENT SW-846 METHODOLOGY VERSIONS

3005A - Aqueous ICP Digestion

3020A - Aqueous Graphite Furnace / ICP MS Digestion

3050B - Solid ICP / Graphite Furnace / ICP MS Digestion

3060A - Solid Hexavalent Chromium Digestion

3510C - Separatory Funnel Extraction

3520C - Liquid / Liquid Extraction

3540C - Manual Soxhlet Extraction

3541 - Automated Soxhlet Extraction

3546 - Microwave Extraction

3580A - Waste Dilution

5030B - Aqueous Purge and Trap

5030C - Aqueous Purge and Trap

5035A - Solid Purge and Trap

SW846 Reactivity Methods 7.3.3.2 (Reactive Cyanide) and 7.3.4.1 (Reactive Sulfide) have been withdrawn by EPA. These methods are reported per client request and are not NELAP accredited.



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

Client Sample ID: C-1067 Date Sampled: 03/28/19 09:12

Percent Solids: 99

Extraction Method: 7471B

ESS Laboratory Work Order: 1903825 ESS Laboratory Sample ID: 1903825-01

Sample Matrix: Solid Units: mg/kg dry

Total Metals

F/V Batch 40 CD90125 Analyst Analyzed 04/02/19 13:59 **Analyte** Results (MRL) **MDL** I/V Method Limit Mercury **28.2** (3.07) 7471B 0.65



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

Client Sample ID: C-1068 Date Sampled: 03/28/19 10:47

Percent Solids: 98

ESS Laboratory Work Order: 1903825 ESS Laboratory Sample ID: 1903825-02

Sample Matrix: Solid Units: mg/kg dry

Extraction Method: 7471B

Total Metals

 Analyte Mercury
 Results (MRL)
 MDL 7471B
 Limit 25
 DF 25
 Analyst Analyzed MKS 04/02/19 14:01
 I/V 0.64
 F/V 40 CD90125

000481



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

Client Sample ID: C-1070 Date Sampled: 03/28/19 12:24

Percent Solids: 99

Extraction Method: 7471B

ESS Laboratory Work Order: 1903825 ESS Laboratory Sample ID: 1903825-03

Sample Matrix: Solid Units: mg/kg dry

Total Metals

 Analyte Mercury
 Results (MRL)
 MDL 22.3 (3.29)
 Method 7471B
 Limit 100
 DF MKS
 Analyst Analyzed 04/02/19 14:07
 I/V 0.61
 F/V 40 CD90125



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

Client Sample ID: C-1072 Date Sampled: 03/28/19 09:23

Percent Solids: 99

Extraction Method: 7471B

ESS Laboratory Work Order: 1903825 ESS Laboratory Sample ID: 1903825-04

Sample Matrix: Solid Units: mg/kg dry

Total Metals

F/V Batch 40 CD90125 Analyst Analyzed 04/02/19 14:09 **Analyte** Results (MRL) **MDL** I/V Method Limit Mercury 3.99 (0.745) 7471B 0.67



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

Client Sample ID: C-1078 Date Sampled: 03/28/19 12:48

Percent Solids: 99

ESS Laboratory Work Order: 1903825 ESS Laboratory Sample ID: 1903825-05

Sample Matrix: Solid Units: mg/kg dry

Extraction Method: 7471B

Total Metals

 Analyte Mercury
 Results (MRL)
 MDL 96 (3.13)
 Method 7471B
 Limit 100
 DF MKS
 Analyst Analyzed 94/02/19 14:11
 I/V 0.64
 F/V 40 CD90125



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

Client Sample ID: C-1080 Date Sampled: 03/28/19 13:07

Percent Solids: 98

Extraction Method: 7471B

ESS Laboratory Work Order: 1903825 ESS Laboratory Sample ID: 1903825-06

Sample Matrix: Solid Units: mg/kg dry

Total Metals

F/V Batch 40 CD90125 Analyst Analyzed 04/02/19 16:08 **Analyte** Results (MRL) **MDL** I/V Method Limit Mercury 84.1 (14.3) 7471B 0.71



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

Client Sample ID: C-1082 Date Sampled: 03/28/19 09:58

Percent Solids: 99

Extraction Method: 7471B

ESS Laboratory Work Order: 1903825 ESS Laboratory Sample ID: 1903825-07

Sample Matrix: Solid Units: mg/kg dry

Total Metals

 Analyte Mercury
 Results (MRL)
 MDL 2000 (137)
 Method 7471B
 Limit 5000
 DF MKS
 Analyst Analyzed 04/02/19 16:10
 I/V 0.73
 F/V 40 CD90125



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

Client Sample ID: C-1084 Date Sampled: 03/28/19 16:33

Percent Solids: 98

Extraction Method: 7471B

ESS Laboratory Work Order: 1903825 ESS Laboratory Sample ID: 1903825-08

Sample Matrix: Solid Units: mg/kg dry

Total Metals

 Analyte Mercury
 Results (MRL)
 MDL 7471B
 Limit 2000
 DF 2000
 Analyst Analyzed MKS 04/02/19 16:25
 I/V 16:25
 F/V 0000
 Batch CD90125



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

Client Sample ID: C-1086 Date Sampled: 03/28/19 12:55

Percent Solids: 99

Extraction Method: 7471B

ESS Laboratory Work Order: 1903825 ESS Laboratory Sample ID: 1903825-09

Sample Matrix: Solid Units: mg/kg dry

Total Metals

F/V Batch 40 CD90125 Analyst Analyzed 04/02/19 14:19 **Analyte** Results (MRL) **MDL** <u>I/V</u> Method Limit Mercury **36.1** (2.87) 7471B 0.7



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

Client Sample ID: C-1088 Date Sampled: 03/28/19 15:34

Percent Solids: 99

Extraction Method: 7471B

ESS Laboratory Work Order: 1903825 ESS Laboratory Sample ID: 1903825-10

Sample Matrix: Solid Units: mg/kg dry

Total Metals

 Analyte Mercury
 Results (MRL)
 MDL Method 7471B
 Limit Limit Limit Limit Limit MKS
 DF MKS
 Analyzed MKS
 LiV MKS
 E/V MKS
 Batch CD90125



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

Client Sample ID: C-1069 Date Sampled: 03/28/19 10:55

Percent Solids: 96

Extraction Method: 7471B

ESS Laboratory Work Order: 1903825 ESS Laboratory Sample ID: 1903825-11

Sample Matrix: Solid Units: mg/kg dry

Total Metals

F/V Batch 40 CD90125 <u>Analyst</u> <u>Analyzed</u> <u>I/V</u> MKS 04/02/19 14:35 0.68 **Analyte** Results (MRL) **MDL** I/V Method Limit Mercury **15.9** (3.05) 7471B



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

Client Sample ID: C-1071 Date Sampled: 03/28/19 11:04

Percent Solids: 98

Extraction Method: 7471B

ESS Laboratory Work Order: 1903825 ESS Laboratory Sample ID: 1903825-12

Sample Matrix: Solid Units: mg/kg dry

Total Metals

 Analyte Mercury
 Results (MRL)
 MDL
 Method
 Limit
 DF
 Analyst
 Analyzed
 I/V
 F/V
 Batch

 Mercury
 0.377 (0.029)
 7471B
 1
 MKS
 04/02/19 11:33
 0.69
 40
 CD90125



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

Client Sample ID: C-1073 Date Sampled: 03/28/19 12:40

Percent Solids: 99

,,

ESS Laboratory Work Order: 1903825 ESS Laboratory Sample ID: 1903825-13

Sample Matrix: Solid Units: mg/kg dry

Extraction Method: 7471B

Total Metals

 Analyte Mercury
 Results (MRL)
 MDL 9.77 (1.69)
 Method 7471B
 Limit 50
 DF MKS 04/02/19 14:37
 Analyzed 0.59
 I/V 40 ED90125



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

Client Sample ID: C-1079 Date Sampled: 03/28/19 09:35

Percent Solids: 99

Extraction Method: 7471B

ESS Laboratory Work Order: 1903825 ESS Laboratory Sample ID: 1903825-14

Sample Matrix: Solid Units: mg/kg dry

Total Metals

F/V Batch 40 CD90125 Analyst Analyzed 04/02/19 14:39 Results (MRL) **MDL** I/V **Analyte** Method Limit Mercury **4.91** (0.810) 7471B 0.62



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

Client Sample ID: C-1081 Date Sampled: 03/28/19 09:49

Percent Solids: 99

ESS Laboratory Work Order: 1903825 ESS Laboratory Sample ID: 1903825-15

Sample Matrix: Solid Units: mg/kg dry

Extraction Method: 7471B

Total Metals

 Analyte Mercury
 Results (MRL)
 MDL 9.45 (1.51)
 Method 7471B
 Limit 50
 DF MKS
 Analyst Analyzed 0.402/19 14:41
 I/V 0.66
 F/V Depoil 25



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

Client Sample ID: C-1083 Date Sampled: 03/28/19 16:41

Percent Solids: 98

Extraction Method: 7471B

ESS Laboratory Work Order: 1903825 ESS Laboratory Sample ID: 1903825-16

Sample Matrix: Solid Units: mg/kg dry

Total Metals

 Analyte Mercury
 Results (MRL)
 MDL Method 7471B
 Limit 500
 DF MKS
 Analyzed 04/02/19 14:43
 I/V 0.66
 F/V DBatch 0CD90125



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

Client Sample ID: C-1085 Date Sampled: 03/28/19 13:02

Percent Solids: 99

Extraction Method: 7471B

ESS Laboratory Work Order: 1903825 ESS Laboratory Sample ID: 1903825-17

Sample Matrix: Solid Units: mg/kg dry

Total Metals

F/V Batch 40 CD90125 <u>Analyst</u> <u>Analyzed</u> <u>I/V</u> 04/02/19 14:45 0.87 **Analyte** Results (MRL) **MDL** I/V Method Limit Mercury **32.0** (2.31) 7471B



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

Client Sample ID: C-1087 Date Sampled: 03/28/19 12:31

Percent Solids: 99

Extraction Method: 7471B

ESS Laboratory Work Order: 1903825 ESS Laboratory Sample ID: 1903825-18

Sample Matrix: Solid Units: mg/kg dry

Total Metals

 Analyte Mercury
 Results (MRL)
 MDL 9.70 (1.52)
 Method 7471B
 Limit 50
 MES 04/02/19 14:47
 Analyzed 0.66
 I/V 40 CD90125



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

Client Sample ID: C-1089 Date Sampled: 03/28/19 15:29

Percent Solids: 94

ESS Laboratory Work Order: 1903825 ESS Laboratory Sample ID: 1903825-19

Sample Matrix: Solid Units: mg/kg dry

Extraction Method: 7471B

Total Metals

 Analyte Mercury
 Results (MRL)
 MDL 24.0 (3.26)
 Method 7471B
 Limit 100
 DF MKS
 Analyst Analyzed 04/02/19 14:49
 I/V 0.65
 E/V D90125



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

Client Sample ID: C-1090 Date Sampled: 03/28/19 15:22

Percent Solids: 98

ESS Laboratory Work Order: 1903825 ESS Laboratory Sample ID: 1903825-20

Sample Matrix: Solid Units: mg/kg dry

Extraction Method: 7471B

Total Metals

 Analyte Mercury
 Results (MRL)
 MDL 40.1 (2.40)
 Method 7471B
 Limit 100
 DF MKS
 Analyst Analyzed 04/02/19 14:55
 I/V 140
 E/V D90125



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

ESS Laboratory Work Order: 1903825

Quality Control Data

Amalita	Dogudt	MDI	l laika	Spike	Source	0/ DEC	%REC	DDD	RPD	Ovelifien
Analyte	Result	MRL	Units	Level	Result	%REC	Limits	RPD	Limit	Qualifier
			Total Meta	ıls						
Batch CD90125 - 7471B										
Blank										
Mercury	ND	0.033	mg/kg wet							
LCS										
Mercury	3.58	0.341	mg/kg wet	4.850		74	50-103			
LCS Dup										
Mercury	3.49	0.325	mg/kg wet	4.850		72	50-103	3	20	



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

ESS Laboratory Work Order: 1903825

Notes and Definitions

U	Analyte included in the analysis, but not detected
D	Diluted.
ND	Analyte NOT DETECTED at or above the MRL (LOQ), LOD for DoD Reports, MDL for J-Flagged Analytes
dry	Sample results reported on a dry weight basis
RPD	Relative Percent Difference
MDL	Method Detection Limit
MRL	Method Reporting Limit
LOD	Limit of Detection
LOQ	Limit of Quantitation
DL	Detection Limit
I/V	Initial Volume
F/V	Final Volume
§	Subcontracted analysis; see attached report
1	Range result excludes concentrations of surrogates and/or internal standards eluting in that range.
2	Range result excludes concentrations of target analytes eluting in that range.
3	Range result excludes the concentration of the C9-C10 aromatic range.
Avg NR	Results reported as a mathematical average. No Recovery

Subcontracted analysis; see attached report

[CALC] Calculated Analyte

SUB

MPN Most Probably Number TNTC Too numerous to Count CFU Colony Forming Units



The Microbiology Division of Thielsch Engineering, Inc.

ESS Laboratory Work Order: 1903825



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

ENVIRONMENTAL

ESS LABORATORY CERTIFICATIONS AND ACCREDITATIONS

Rhode Island Potable and Non Potable Water: LAI00179 http://www.health.ri.gov/find/labs/analytical/ESS.pdf

Connecticut Potable and Non Potable Water, Solid and Hazardous Waste: PH-0750 http://www.ct.gov/dph/lib/dph/environmental health/environmental laboratories/pdf/OutofStateCommercialLaboratories.pdf

Maine Potable and Non Potable Water, and Solid and Hazardous Waste: RI00002 http://www.maine.gov/dhhs/mecdc/environmental-health/dwp/partners/labCert.shtml

Massachusetts Potable and Non Potable Water: M-RI002 http://public.dep.state.ma.us/Labcert/Labcert.aspx

New Hampshire (NELAP accredited) Potable and Non Potable Water, Solid and Hazardous Waste: 2424 http://des.nh.gov/organization/divisions/water/dwgb/nhelap/index.htm

New York (NELAP accredited) Non Potable Water, Solid and Hazardous Waste: 11313 http://www.wadsworth.org/labcert/elap/comm.html

New Jersey (NELAP accredited) Non Potable Water, Solid and Hazardous Waste: RI006 http://datamine2.state.nj.us/DEP OPRA/OpraMain/pi main?mode=pi by site&sort order=PI NAMEA&Select+a+Site:=58715

United States Department of Agriculture Soil Permit: P330-12-00139

Pennsylvania: 68-01752

http://www.dep.pa.gov/Business/OtherPrograms/Labs/Pages/Laboratory-Accreditation-Program.aspx

ESS Laboratory Sample and Cooler Receipt Checklist

Client	:GZ	A - Bedford,	NH - GZA/	HDM		ESS	Project ID:	1903825	
Shinned/D	elivered \/ia	:	ESS Courie	ar.			e Received:	3/29/2019	<u> </u>
Omppour D	CHITCHES THE		LOO COUIN	<u></u>			t Due Date: for Project:	4/4/2019 4 Day	
	nanifest pres			No		6. Does CO	C match bottles?		Yes
2. Were cu	ustody seals	present?		Yes		7. Is COC co	omplete and correc	at?	Yes
3. Is radiat	tion count <1	00 CPM?		Yes		8. Were sam	nples received inta	ot?	Yes
	oler Present?			Yes		9. Were lab	s informed about	short holds & rushes?	Yes / No / NA
Temp:		_ lced with:		- [10. Were an	y analyses receive	ed outside of hold time?	Yes (No)
J. Was CC	oc signed at	id dated by c	nerit?	Yes			·		
				No		a. Air bubble	DAs received? es in aqueous VOA thanol cover soil co		Yes No Yes No/NA
a. If metals	preserved ι	operly preser upon receipt:	ved?	Yes / No Date: _		Time:		By:	
b. Low Lev	el VOA vials	frozen:		Date: _		Time:		By:	<u> </u>
Sample Red	ceiving Note	s;							
	re a need to	o contact Pro	lient?	Date:	Yes (No) Yes (No	_ Time: _		Ву:	
Sample Number	Container ID	Proper Container	Air Bubbles Present	Sufficient Volume	Containe	er Type	Preservative	Record pH (Cyar Pestici	
01	329016	Yes	NA	Yes	4 oz. Jar	- Unpres	NP		
02	329015	Yes	NA	Yes	4 oz. Jar		NP		
03 04	329014 329013	Yes Yes	NA NA	Yes Yes	4 oz. Jar 4 oz. Jar		NP NP		
05	329012	Yes	NA	Yes	4 oz. Jar		NP		
06 07	329011	Yes	NA	Yes	4 oz. Jar		NP		
07	329010 329009	Yes Yes	NA NA	Yes Yes	4 oz. Jar - 4 oz. Jar -		NP		
09	329008	Yes	NA	Yes	4 oz. Jar -		NP NP		
10	329007	Yes	NA	Yes	4 oz. Jar -		NP		
11	329006	Yes	NA	Yes	4 oz. Jar -		NP		
12	329005	Yes	NA	Yes	4 oz. Jar -		NP		
13	329004	Yes	NA	Yes	4 oz. Jar -		NP		
14	329003	Yes	NA	Yes	4 oz. Jar -		NP		
15 16	329002	Yes	NA	Yes	4 oz. Jar -		NP		
16 17	329001	Yes	NA	Yes	4 oz. Jar -		NP		
17 18	329000 328999	Yes	NA NA	Yes	4 oz. Jar -		NP		
19	328999	Yes Yes	NA NA	Yes	4 oz. Jar -		NP		
20	328997	Yes	NA	Yes Yes	4 oz. Jar - 4 oz. Jar -		NP NP		
2nd Review All contains		l into storag	je/lab		Initials:	A			

ESS Laboratory Sample and Cooler Receipt Checklist

Client:	GZA - Bedford, NH - GZA/HDM		ESS Project ID:	1903825	
	els on correct containers? y stickers attached?	Yes / No	Date Received:	3/29/2019	
Completed By:	alm	Date & Time:	3/29/19 175	7_	
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CUSTODY SEAL	OEC O O
DATE 3/18/19	Quality Environmental Containers 800-255-3950 • 304-255-3900
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The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Rebecca Cox GZA GeoEnvironmental, Inc. 5 Commerce Park North Bedford, NH 03110

RE: Schiller Boiler Demo (04.0190318.03) ESS Laboratory Work Order Number: 1903826

This signed Certificate of Analysis is our approved release of your analytical results. These results are only representative of sample aliquots received at the laboratory. ESS Laboratory expects its clients to follow all regulatory sampling guidelines. Beginning with this page, the entire report has been paginated. This report should not be copied except in full without the approval of the laboratory. Samples will be disposed of thirty days after the final report has been delivered. If you have any questions or concerns, please feel free to call our Customer Service Department.

Laurel Stoddard Laboratory Director **REVIEWED**

By ESS Laboratory at 3:23 pm, Apr 04, 2019

Analytical Summary

The project as described above has been analyzed in accordance with the ESS Quality Assurance Plan. This plan utilizes the following methodologies: US EPA SW-846, US EPA Methods for Chemical Analysis of Water and Wastes per 40 CFR Part 136, APHA Standard Methods for the Examination of Water and Wastewater, American Society for Testing and Materials (ASTM), and other recognized methodologies. The analyses with these noted observations are in conformance to the Quality Assurance Plan. In chromatographic analysis, manual integration is frequently used instead of automated integration because it produces more accurate results.

The test results present in this report are in compliance with TNI and relative state standards, and/or client Quality Assurance Project Plans (QAPP). The laboratory has reviewed the following: Sample Preservations, Hold Times, Initial Calibrations, Continuing Calibrations, Method Blanks, Blank Spikes, Blank Spike Duplicates, Duplicates, Matrix Spikes, Matrix Spike Duplicates, Surrogates and Internal Standards. Any results which were found to be outside of the recommended ranges stated in our SOPs will be noted in the Project Narrative.



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

ESS Laboratory Work Order: 1903826

SAMPLE RECEIPT

The following samples were received on March 29, 2019 for the analyses specified on the enclosed Chain of Custody Record.

Lab Number	Sample Name	Matrix	Analysis
1903826-01	C-1091	Solid	7471B
1903826-02	C-1093	Solid	7471B
1903826-03	C-1095	Solid	7471B
1903826-04	C-1100	Solid	7471B
1903826-05	C-1104	Solid	7471B
1903826-06	C-1109	Solid	7471B
1903826-07	C-1115	Solid	7471B
1903826-08	C-1118	Solid	7471B
1903826-09	C-1120	Solid	7471B
1903826-10	C-1121	Solid	7471B
1903826-11	C-1092	Solid	7471B
1903826-12	C-1094	Solid	7471B
1903826-13	C-1096	Solid	7471B
1903826-14	C-1097	Solid	7471B
1903826-15	C-1099	Solid	7471B
1903826-16	C-1101	Solid	7471B
1903826-17	C-1105	Solid	7471B
1903826-18	C-1110	Solid	7471B
1903826-19	C-1113	Solid	7471B
1903826-20	C-1117	Solid	7471B



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

ESS Laboratory Work Order: 1903826

PROJECT NARRATIVE

No unusual observations noted.

End of Project Narrative.

DATA USABILITY LINKS

To ensure you are viewing the most current version of the documents below, please clear your internet cookies for www.ESSLaboratory.com. Consult your IT Support personnel for information on how to clear your internet cookies.

Definitions of Quality Control Parameters

Semivolatile Organics Internal Standard Information

Semivolatile Organics Surrogate Information

Volatile Organics Internal Standard Information

Volatile Organics Surrogate Information

EPH and VPH Alkane Lists



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

ESS Laboratory Work Order: 1903826

Analytical Methods

1010A - Flashpoint 6010C - ICP 6020A - ICP MS

7010 - Graphite Furnace 7196A - Hexavalent Chromium 7470A - Aqueous Mercury

7470A - Aqueous Mercury 7471B - Solid Mercury 8011 - EDB/DBCP/TCP 8015C - GRO/DRO

8081B - Pesticides 8082A - PCB

8100M - TPH 8151A - Herbicides

8260B - VOA 8270D - SVOA

8270D SIM - SVOA Low Level

9014 - Cyanide 9038 - Sulfate

9040C - Aqueous pH

9045D - Solid pH (Corrosivity)

9050A - Specific Conductance

9056A - Anions (IC)

9060A - TOC

9095B - Paint Filter

MADEP 04-1.1 - EPH

MADEP 18-2.1 - VPH

Prep Methods

CURRENT SW-846 METHODOLOGY VERSIONS

3005A - Aqueous ICP Digestion

3020A - Aqueous Graphite Furnace / ICP MS Digestion

3050B - Solid ICP / Graphite Furnace / ICP MS Digestion

3060A - Solid Hexavalent Chromium Digestion

3510C - Separatory Funnel Extraction 3520C - Liquid / Liquid Extraction

3540C - Manual Soxhlet Extraction

3541 - Automated Soxhlet Extraction

3546 - Microwave Extraction

3580A - Waste Dilution

5030B - Aqueous Purge and Trap

 $5030\mathrm{C}$ - Aqueous Purge and Trap

5035A - Solid Purge and Trap

SW846 Reactivity Methods 7.3.3.2 (Reactive Cyanide) and 7.3.4.1 (Reactive Sulfide) have been withdrawn by EPA. These methods are reported per client request and are not NELAP accredited.



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

Client Sample ID: C-1091 Date Sampled: 03/28/19 14:44

Percent Solids: 98

Extraction Method: 7471B

ESS Laboratory Work Order: 1903826 ESS Laboratory Sample ID: 1903826-01

Sample Matrix: Solid Units: mg/kg dry

Total Metals

 Analyte Mercury
 Results (MRL)
 MDL 7471B
 Limit DF 100
 Analyst Analyzed MKS 04/02/19 14:57
 I/V 0.74
 F/V 40 CD90129

000511



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

Client Sample ID: C-1093 Date Sampled: 03/28/19 14:33

Percent Solids: 98

Extraction Method: 7471B

ESS Laboratory Work Order: 1903826 ESS Laboratory Sample ID: 1903826-02

Sample Matrix: Solid Units: mg/kg dry

Total Metals

 Analyte Mercury
 Results (MRL)
 MDL 21.9 (2.85)
 Method 7471B
 Limit



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

Client Sample ID: C-1095 Date Sampled: 03/28/19 14:07

Percent Solids: 100

Extraction Method: 7471B

ESS Laboratory Work Order: 1903826 ESS Laboratory Sample ID: 1903826-03

Sample Matrix: Solid Units: mg/kg dry

Total Metals

 Analyte Mercury
 Results (MRL)
 MDL 40.0 (3.48)
 Method 7471B
 Limit



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

Client Sample ID: C-1100 Date Sampled: 03/28/19 15:09

Percent Solids: 99

ESS Laboratory Work Order: 1903826 ESS Laboratory Sample ID: 1903826-04

Sample Matrix: Solid Units: mg/kg dry

Extraction Method: 7471B

Total Metals

 Analyte Mercury
 Results (MRL)
 MDL 228 (16.5)
 Method 7471B
 Limit 500
 DF MKS
 Analyzed 04/02/19 15:03
 I/V 0.61
 F/V 40 CD90129



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

Client Sample ID: C-1104 Date Sampled: 03/28/19 16:52

Percent Solids: 99

Extraction Method: 7471B

ESS Laboratory Work Order: 1903826 ESS Laboratory Sample ID: 1903826-05

Sample Matrix: Solid Units: mg/kg dry

Total Metals

F/V Batch 40 CD90129 Analyst Analyzed 04/02/19 15:05 **Analyte** Results (MRL) **MDL** I/V Method Limit Mercury **26.3** (3.14) 7471B 0.64

Service

000515



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

Client Sample ID: C-1109 Date Sampled: 03/28/19 17:17

Percent Solids: 98

Extraction Method: 7471B

ESS Laboratory Work Order: 1903826 ESS Laboratory Sample ID: 1903826-06

Sample Matrix: Solid Units: mg/kg dry

Total Metals

 Analyte Mercury
 Results (MRL)
 MDL 7471B
 Limit 500
 DF MKS
 Analyzed 04/02/19 16:14
 I/V 0.85
 E/V 40 CD90129



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

Client Sample ID: C-1115 Date Sampled: 03/28/19 17:50

Percent Solids: 98

Extraction Method: 7471B

ESS Laboratory Work Order: 1903826 ESS Laboratory Sample ID: 1903826-07

Sample Matrix: Solid Units: mg/kg dry

Total Metals

F/V Batch CD90129 Analyst Analyzed 04/02/19 15:09 **Analyte** Results (MRL) **MDL** I/V Method Limit Mercury 0.734 (0.141) 7471B 0.72



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

Client Sample ID: C-1118 Date Sampled: 03/28/19 18:08

Percent Solids: 99

Extraction Method: 7471B

ESS Laboratory Work Order: 1903826 ESS Laboratory Sample ID: 1903826-08

Sample Matrix: Solid Units: mg/kg dry

Total Metals

 Analyte Mercury
 Results (MRL)
 MDL Method 7471B
 Limit Limit Limit Limit Limit MKS
 DF MKS
 Analyzed MKS
 LiV MKS
 F/V MARK
 Batch CD90129



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

Client Sample ID: C-1120 Date Sampled: 03/28/19 18:02

Percent Solids: 99

Extraction Method: 7471B

ESS Laboratory Work Order: 1903826 ESS Laboratory Sample ID: 1903826-09

Sample Matrix: Solid Units: mg/kg dry

Total Metals

 Analyte Mercury
 Results (MRL)
 MDL 45.1 (2.74)
 Method 7471B
 Limit 100
 DF MKS
 Analyst Analyzed 04/02/19 15:23
 I/V 15:23
 E/V 07.090129



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

Client Sample ID: C-1121 Date Sampled: 03/28/19 17:48

Percent Solids: 97

Extraction Method: 7471B

ESS Laboratory Work Order: 1903826 ESS Laboratory Sample ID: 1903826-10

Sample Matrix: Solid Units: mg/kg dry

Total Metals

F/V Batch 40 CD90129 Analyst Analyzed 04/02/19 15:25 **Analyte** Results (MRL) **MDL** I/V Method Limit Mercury **11.1** (3.03) 7471B 0.67



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

Client Sample ID: C-1092 Date Sampled: 03/28/19 14:37

Percent Solids: 99

ESS Laboratory Work Order: 1903826 ESS Laboratory Sample ID: 1903826-11

Sample Matrix: Solid Units: mg/kg dry

Extraction Method: 7471B

Total Metals

 Analyte Mercury
 Results (MRL)
 MDL 94.0
 Method 7471B
 Limit 50.0
 DF MKS 04/02/19 16:16
 Analyzed 0.9
 I/V 10.0
 E/V 10.0
 Batch 0.0
 CD90129



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

Client Sample ID: C-1094 Date Sampled: 03/28/19 14:19

Percent Solids: 99

ESS Laboratory Work Order: 1903826 ESS Laboratory Sample ID: 1903826-12

Sample Matrix: Solid Units: mg/kg dry

Extraction Method: 7471B

Total Metals

 Analyte Mercury
 Results (MRL)
 MDL 47.2 (3.50)
 Method 7471B
 Limit 100
 DF MKS
 Analyst Analyzed 04/02/19 15:30
 I/V 15:30
 E/V CD90129

000522



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

Client Sample ID: C-1096 Date Sampled: 03/28/19 14:13

Percent Solids: 97

Extraction Method: 7471B

ESS Laboratory Work Order: 1903826 ESS Laboratory Sample ID: 1903826-13

Sample Matrix: Solid Units: mg/kg dry

Total Metals

 Analyte Mercury
 Results (MRL)
 MDL 7471B
 Limit 50
 DF MKS
 Analyzed MKS
 I/V 04/02/19 15:32
 I/V 0.8
 E/V D90129



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

Client Sample ID: C-1097 Date Sampled: 03/28/19 14:56

Percent Solids: 97

ESS Laboratory Work Order: 1903826 ESS Laboratory Sample ID: 1903826-14

Sample Matrix: Solid Units: mg/kg dry

Extraction Method: 7471B

Total Metals

 Analyte Mercury
 Results (MRL)
 MDL of Method (7471B)
 Limit of Method (7471B)
 DF of MKS



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

Client Sample ID: C-1099 Date Sampled: 03/28/19 15:02

Percent Solids: 98

ESS Laboratory Work Order: 1903826 ESS Laboratory Sample ID: 1903826-15

Sample Matrix: Solid Units: mg/kg dry

Extraction Method: 7471B

Total Metals

 Analyte Mercury
 Results (MRL)
 MDL 68.9 (13.0)
 Method 7471B
 Limit 500
 DF MKS
 Analyst Analyzed 04/02/19 16:18
 I/V 16.18
 E/V CD90129



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

Client Sample ID: C-1101 Date Sampled: 03/28/19 15:16

Percent Solids: 94

Extraction Method: 7471B

ESS Laboratory Work Order: 1903826 ESS Laboratory Sample ID: 1903826-16

Sample Matrix: Solid Units: mg/kg dry

Total Metals

Analyte Mercury

Results (MRL) **10.7** (1.70)

MDL

Method 7471B

Limit

Analyst Analyzed I/V 04/02/19 15:38 0.62

I/V

F/V Batch CD90129



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

Client Sample ID: C-1105 Date Sampled: 03/28/19 17:00

Percent Solids: 97

ESS Laboratory Work Order: 1903826 ESS Laboratory Sample ID: 1903826-17

Sample Matrix: Solid Units: mg/kg dry

Total Metals

Extraction Method: 7471B

 Analyte Mercury
 Results (MRL) 109 (14.8)
 MDL 7471B
 Limit 500
 DF MCS 04/02/19 16:20
 Analyzed 0.69
 I/V 16:20
 E/V 0.69
 Batch 0.090129



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

Client Sample ID: C-1110 Date Sampled: 03/28/19 17:09

Percent Solids: 88

ESS Laboratory Work Order: 1903826 ESS Laboratory Sample ID: 1903826-18

Sample Matrix: Solid Units: mg/kg dry

Extraction Method: 7471B

Total Metals

 Analyte Mercury
 Results (MRL)
 MDL Method 7471B
 Limit 500
 DF MKS
 Analyzed 04/02/19 15:46
 I/V 0.95
 F/V Datch 0.090129



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

Client Sample ID: C-1113 Date Sampled: 03/28/19 17:44

Percent Solids: 97

ESS Laboratory Work Order: 1903826 ESS Laboratory Sample ID: 1903826-19

Sample Matrix: Solid Units: mg/kg dry

Extraction Method: 7471B

Total Metals

F/V Batch 40 CD90129 Analyst Analyzed
MKS 04/02/19 15:48 **Analyte** Results (MRL) **MDL** I/V Method Limit Mercury 142 (15.8) 7471B 0.65



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

Client Sample ID: C-1117 Date Sampled: 03/28/19 17:57

Percent Solids: 98

Extraction Method: 7471B

ESS Laboratory Work Order: 1903826 ESS Laboratory Sample ID: 1903826-20

Sample Matrix: Solid Units: mg/kg dry

Total Metals



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

ESS Laboratory Work Order: 1903826

Quality Control Data

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
			Total Meta	ls						
Batch CD90129 - 7471B										
Blank										
Mercury	ND	0.033	mg/kg wet							
LCS										
Mercury	3.38	0.305	mg/kg wet	4.850		70	50-103			
LCS Dup										
Mercury	3.78	0.354	mg/kg wet	4.850		78	50-103	11	20	



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

ESS Laboratory Work Order: 1903826

Notes and Definitions

U	Analyte included in the analysis, but not detected
D	Diluted.
ND	Analyte NOT DETECTED at or above the MRL (LOQ), LOD for DoD Reports, MDL for J-Flagged Analytes
dry	Sample results reported on a dry weight basis
RPD	Relative Percent Difference
MDL	Method Detection Limit
MRL	Method Reporting Limit
LOD	Limit of Detection
LOQ	Limit of Quantitation
DL	Detection Limit
I/V	Initial Volume
F/V	Final Volume
§	Subcontracted analysis; see attached report
1	Range result excludes concentrations of surrogates and/or internal standards eluting in that range.
2	Range result excludes concentrations of target analytes eluting in that range.
3	Range result excludes the concentration of the C9-C10 aromatic range.

Avg Results reported as a mathematical average.

No Recovery NR [CALC] Calculated Analyte

SUB Subcontracted analysis; see attached report

RLReporting Limit

EDL **Estimated Detection Limit** MF Membrane Filtration MPN Most Probably Number TNTC Too numerous to Count CFU Colony Forming Units



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

ESS Laboratory Work Order: 1903826

ENVIRONMENTAL

ESS LABORATORY CERTIFICATIONS AND ACCREDITATIONS

Rhode Island Potable and Non Potable Water: LAI00179 http://www.health.ri.gov/find/labs/analytical/ESS.pdf

Connecticut Potable and Non Potable Water, Solid and Hazardous Waste: PH-0750 http://www.ct.gov/dph/lib/dph/environmental health/environmental laboratories/pdf/OutofStateCommercialLaboratories.pdf

Maine Potable and Non Potable Water, and Solid and Hazardous Waste: RI00002 http://www.maine.gov/dhhs/mecdc/environmental-health/dwp/partners/labCert.shtml

Massachusetts Potable and Non Potable Water: M-RI002 http://public.dep.state.ma.us/Labcert/Labcert.aspx

New Hampshire (NELAP accredited) Potable and Non Potable Water, Solid and Hazardous Waste: 2424 http://des.nh.gov/organization/divisions/water/dwgb/nhelap/index.htm

New York (NELAP accredited) Non Potable Water, Solid and Hazardous Waste: 11313 http://www.wadsworth.org/labcert/elap/comm.html

New Jersey (NELAP accredited) Non Potable Water, Solid and Hazardous Waste: RI006 http://datamine2.state.nj.us/DEP OPRA/OpraMain/pi main?mode=pi by site&sort order=PI NAMEA&Select+a+Site:=58715

United States Department of Agriculture Soil Permit: P330-12-00139

Pennsylvania: 68-01752

 $\underline{http://www.dep.pa.gov/Business/Other Programs/Labs/Pages/Laboratory-Accreditation-Program.aspx}$

ESS Laboratory Sample and Cooler Receipt Checklist

Client	t:G	ZA - Bedford	d, NH - GZA/	os	ESS	Project ID:	1903826	
Ob: 4/5	2-15		E00.0: 1		Date	Received:	3/29/2019	
Snipped/L	Delivered Via:		ESS Courier		Project	Due Date: for Project:	4/4/2019	
					Days	ioi Projeci.	4 Day	
	nanifest prese			No	6. Does COC	match bottles?		Yes
2. Were o	ustody seals į	oresent?	!	Yes	7. Is COC cor	mplete and correct?		Yes
3. Is radia	tion count <10	00 CPM?	1	Yes	8. Were sam	ples received intact?		Yes
	oler Present?		:lce	Yes	9. Were labs	informed about <u>short l</u>	nolds & rushes?	Yes No / NA
5. Was Co	OC signed an	d dated by c	dient?	Yes	10. Were any	analyses received outs	ide of hold time?	Yes (No
	obcontracting Sample IDs: Analysis: TAT:			/(No)		As received? s in aqueous VOAs? nanol cover soil complete	ely?	Yes / No Yes / No Yes / No / NA
a. If metals	e samples pro s preserved u vel VOA vials	pon receipt:		Yes / No Date: Date:	Time: Time:	By		
Sample Re	ceiving Notes	S :		•		•		
	ere a need to		oject Manage client?	r? Date:	Yes / No Yes / No Time:	Ву	:	
Sample Number	Container ID	Proper Container	Air Bubbles Present	Sufficient Volume	Container Type	Preservative		anide and 608.3
01	329036	Yes	NA	Yes	4 oz. Jar - Unpres	NP		
02 03	329035 329034	Yes Yes	NA NA	Yes Yes	4 oz. Jar - Unpres 4 oz. Jar - Unpres	NP NB		
03	329034	Yes	NA NA	Yes	4 oz. Jar - Unpres 4 oz. Jar - Unpres	NP NP		
05	329032	Yes	NA	Yes	4 oz. Jar - Unpres	NP		
06					4 1			
	329031	Yes	NA	Yes	4 oz. Jar - Unpres	NP		
07	329030	Yes	NA	Yes	4 oz. Jar - Unpres	NP		
07 08	329030 329029	Yes Yes	NA NA	Yes Yes	4 oz. Jar - Unpres 4 oz. Jar - Unpres	NP NP		
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2nd Review

ESS Laboratory Sample and Cooler Receipt Checklist

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			AC-Air Cassett		Amber	Glass	B-BOD Bottle	C-Cubitainer J-Jar O-6	Other P-Poly S-St	erile V-Vial	A a	-	 	++			-	4-			
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The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Rebecca Cox GZA GeoEnvironmental, Inc. 5 Commerce Park North Bedford, NH 03110

RE: Schiller Boiler Demo (04.0190318.03) ESS Laboratory Work Order Number: 1903834

This signed Certificate of Analysis is our approved release of your analytical results. These results are only representative of sample aliquots received at the laboratory. ESS Laboratory expects its clients to follow all regulatory sampling guidelines. Beginning with this page, the entire report has been paginated. This report should not be copied except in full without the approval of the laboratory. Samples will be disposed of thirty days after the final report has been delivered. If you have any questions or concerns, please feel free to call our Customer Service Department.

Laurel Stoddard Laboratory Director **REVIEWED**

By ESS Laboratory at 3:35 pm, Apr 04, 2019

Analytical Summary

The project as described above has been analyzed in accordance with the ESS Quality Assurance Plan. This plan utilizes the following methodologies: US EPA SW-846, US EPA Methods for Chemical Analysis of Water and Wastes per 40 CFR Part 136, APHA Standard Methods for the Examination of Water and Wastewater, American Society for Testing and Materials (ASTM), and other recognized methodologies. The analyses with these noted observations are in conformance to the Quality Assurance Plan. In chromatographic analysis, manual integration is frequently used instead of automated integration because it produces more accurate results.

The test results present in this report are in compliance with TNI and relative state standards, and/or client Quality Assurance Project Plans (QAPP). The laboratory has reviewed the following: Sample Preservations, Hold Times, Initial Calibrations, Continuing Calibrations, Method Blanks, Blank Spikes, Blank Spike Duplicates, Duplicates, Matrix Spikes, Matrix Spike Duplicates, Surrogates and Internal Standards. Any results which were found to be outside of the recommended ranges stated in our SOPs will be noted in the Project Narrative.



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

ESS Laboratory Work Order: 1903834

SAMPLE RECEIPT

The following samples were received on March 29, 2019 for the analyses specified on the enclosed Chain of Custody Record.

Sample Name	Matrix	Analysis
C-1122	Solid	7471B
C-1123	Solid	7471B
C-1125	Solid	7471B
C-1126	Solid	7471B
C-1134	Solid	7471B
C-1136	Solid	7471B
C-1137	Solid	7471B
C-1133	Solid	7471B
C-1139	Solid	7471B
C-1138	Solid	7471B
C-1135	Solid	7471B
C-1074	Solid	7471B
C-1075	Solid	7471B
C-1076	Solid	7471B
C-1077	Solid	7471B
C-1098	Solid	7471B
C-1102	Solid	7471B
C-1103	Solid	7471B
C-1106	Solid	7471B
C-1107	Solid	7471B
	C-1122 C-1123 C-1125 C-1126 C-1134 C-1136 C-1137 C-1138 C-1139 C-1138 C-1135 C-1074 C-1075 C-1076 C-1077 C-1098 C-1102 C-1103 C-1106	C-1122 Solid C-1123 Solid C-1125 Solid C-1126 Solid C-1126 Solid C-1134 Solid C-1136 Solid C-1137 Solid C-1133 Solid C-1139 Solid C-1138 Solid C-1135 Solid C-1074 Solid C-1075 Solid C-1076 Solid C-1077 Solid C-1098 Solid C-1102 Solid C-1103 Solid C-1103 Solid C-1103 Solid C-1106 Solid



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

ESS Laboratory Work Order: 1903834

PROJECT NARRATIVE

No unusual observations noted.

End of Project Narrative.

DATA USABILITY LINKS

To ensure you are viewing the most current version of the documents below, please clear your internet cookies for www.ESSLaboratory.com. Consult your IT Support personnel for information on how to clear your internet cookies.

Definitions of Quality Control Parameters

Semivolatile Organics Internal Standard Information

Semivolatile Organics Surrogate Information

Volatile Organics Internal Standard Information

Volatile Organics Surrogate Information

EPH and VPH Alkane Lists



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

ESS Laboratory Work Order: 1903834

Analytical Methods

1010A - Flashpoint 6010C - ICP 6020A - ICP MS

7010 - Graphite Furnace

7196A - Hexavalent Chromium 7470A - Aqueous Mercury 7471B - Solid Mercury

8011 - EDB/DBCP/TCP 8015C - GRO/DRO

8081B - Pesticides 8082A - PCB

8100M - TPH 8151A - Herbicides

8260B - VOA 8270D - SVOA

8270D SIM - SVOA Low Level

9014 - Cyanide 9038 - Sulfate

9040C - Aqueous pH

9045D - Solid pH (Corrosivity)

9050A - Specific Conductance

9056A - Anions (IC)

9060A - TOC

9095B - Paint Filter

MADEP 04-1.1 - EPH

MADEP 18-2.1 - VPH

Prep Methods

CURRENT SW-846 METHODOLOGY VERSIONS

3005A - Aqueous ICP Digestion

3020A - Aqueous Graphite Furnace / ICP MS Digestion

3050B - Solid ICP / Graphite Furnace / ICP MS Digestion

3060A - Solid Hexavalent Chromium Digestion

3510C - Separatory Funnel Extraction

3520C - Liquid / Liquid Extraction

3540C - Manual Soxhlet Extraction 3541 - Automated Soxhlet Extraction

3546 - Microwave Extraction

3580A - Waste Dilution

5030B - Aqueous Purge and Trap

5030C - Aqueous Purge and Trap

5035A - Solid Purge and Trap

SW846 Reactivity Methods 7.3.3.2 (Reactive Cyanide) and 7.3.4.1 (Reactive Sulfide) have been withdrawn by EPA. These methods are reported per client request and are not NELAP accredited.



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

Client Sample ID: C-1122 Date Sampled: 03/28/19 17:38

Percent Solids: 98

Extraction Method: 7471B

ESS Laboratory Work Order: 1903834 ESS Laboratory Sample ID: 1903834-01

Sample Matrix: Solid Units: mg/kg dry

Total Metals

F/V Batch 40 CD90241 <u>Analyst Analyzed MKS 04/03/19 18:52 18:52 0.64</u> **Analyte** Results (MRL) **MDL** I/V Method Limit Mercury **25.4** (3.17) 7471B



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

Client Sample ID: C-1123 Date Sampled: 03/28/19 17:22

Percent Solids: 98

Extraction Method: 7471B

ESS Laboratory Work Order: 1903834 ESS Laboratory Sample ID: 1903834-02

Sample Matrix: Solid Units: mg/kg dry

Total Metals

F/V Batch 40 CD90241 Analyst Analyzed 04/03/19 18:54 **Analyte** Results (MRL) **MDL** <u>I/V</u> Method Limit Mercury **26.2** (3.37) 7471B 0.6



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

Client Sample ID: C-1125 Date Sampled: 03/28/19 17:29

Percent Solids: 98

Extraction Method: 7471B

ESS Laboratory Work Order: 1903834 ESS Laboratory Sample ID: 1903834-03

Sample Matrix: Solid Units: mg/kg dry

Total Metals

F/V Batch 40 CD90241 <u>Analyst</u> <u>Analyzed</u> <u>I/V</u> 04/03/19 18:56 0.59 **Analyte** Results (MRL) **MDL** I/V Method Limit Mercury 8.35 (1.71) 7471B



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

Client Sample ID: C-1126 Date Sampled: 03/28/19 17:31

Percent Solids: 97

Extraction Method: 7471B

ESS Laboratory Work Order: 1903834 ESS Laboratory Sample ID: 1903834-04

Sample Matrix: Solid Units: mg/kg dry

Total Metals

F/V Batch 40 CD90241 <u>Analyst</u> <u>Analyzed</u> <u>I/V</u> MKS 04/03/19 19:06 0.63 **Analyte** Results (MRL) **MDL** I/V Method Limit Mercury 7.35 (1.61) 7471B



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

Client Sample ID: C-1134 Date Sampled: 03/28/19 18:20

Percent Solids: 99

ESS Laboratory Work Order: 1903834 ESS Laboratory Sample ID: 1903834-05

Sample Matrix: Solid Units: mg/kg dry

Extraction Method: 7471B

Total Metals

 Analyte Mercury
 Results (MRL)
 MDL 7471B
 Limit 50
 DF MKS
 Analyst Analyzed 4/03/19 19:08 0.66
 I/V F/V E/V CD90241
 Batch CD90241



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

Client Sample ID: C-1136 Date Sampled: 03/28/19 18:17

Percent Solids: 99

Extraction Method: 7471B

ESS Laboratory Work Order: 1903834 ESS Laboratory Sample ID: 1903834-06

Sample Matrix: Solid Units: mg/kg dry

Total Metals

 Analyte Mercury
 Results (MRL)
 MDL 9.95 (2.73)
 Method 7471B
 Limit Limit Limit Limit Limit MKS
 DF 0.00
 Analyst Analyzed MKS 04/03/19 19:23
 I/V 0.73
 F/V Depote 10 Depote



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

Client Sample ID: C-1137 Date Sampled: 03/28/19 18:12

Percent Solids: 99

ESS Laboratory Work Order: 1903834 ESS Laboratory Sample ID: 1903834-07

Sample Matrix: Solid Units: mg/kg dry

Extraction Method: 7471B

Total Metals

F/V Batch CD90241 <u>Analyst</u> <u>Analyzed</u> <u>I/V</u> MKS 04/03/19 19:25 0.71 **Analyte** Results (MRL) **MDL** I/V Method Limit Mercury 9.21 (1.41) 7471B



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

Client Sample ID: C-1133 Date Sampled: 03/29/19 10:13

Percent Solids: 98

Extraction Method: 7471B

ESS Laboratory Work Order: 1903834 ESS Laboratory Sample ID: 1903834-08

Sample Matrix: Solid Units: mg/kg dry

Total Metals

Analyte Mercury

Results (MRL) **22.6** (2.88)

MDL

Method 7471B

Limit

Analyst Analyzed 04/03/19 19:27

<u>I/V</u> 0.7

F/V Batch 40 CD90241



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

Client Sample ID: C-1139 Date Sampled: 03/29/19 10:21

Percent Solids: 99

ESS Laboratory Work Order: 1903834 ESS Laboratory Sample ID: 1903834-09

Sample Matrix: Solid Units: mg/kg dry

Extraction Method: 7471B

Total Metals

F/V Batch 40 CD90241 Analyst Analyzed 04/03/19 19:29 **Analyte** Results (MRL) **MDL** I/V Method Limit Mercury **35.7** (3.04) 7471B 0.66



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

Client Sample ID: C-1138 Date Sampled: 03/29/19 10:24

Percent Solids: 98

Extraction Method: 7471B

ESS Laboratory Work Order: 1903834 ESS Laboratory Sample ID: 1903834-10

Sample Matrix: Solid Units: mg/kg dry

Total Metals

 Analyte Mercury
 Results (MRL)
 MDL 7471B
 Limit Limit Limit Limit Program (MRS)
 DF MKS
 Analyzed MKS
 LiV F/V Analyzed MKS
 E/V Analyzed MKS
 MKS
 MKS
 04/03/19 19:31
 0.66
 40
 CD90241

000551



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

Client Sample ID: C-1135 Date Sampled: 03/29/19 10:29

Percent Solids: 98

ESS Laboratory Work Order: 1903834 ESS Laboratory Sample ID: 1903834-11

Sample Matrix: Solid Units: mg/kg dry

Extraction Method: 7471B

Total Metals

F/V Batch 40 CD90241 <u>Analyst</u> <u>Analyzed</u> <u>I/V</u> MKS 04/03/19 19:33 0.64 **Analyte** Results (MRL) **MDL** I/V Method Limit Mercury **22.0** (3.16) 7471B



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

Client Sample ID: C-1074 Date Sampled: 03/29/19 07:53

Percent Solids: 98

ESS Laboratory Work Order: 1903834 ESS Laboratory Sample ID: 1903834-12

Sample Matrix: Solid Units: mg/kg dry

Extraction Method: 7471B

Total Metals

 Analyte Mercury
 Results (MRL)
 MDL 7471B
 Limit 50
 DF MKS
 Analyst Analyzed Analyzed MKS
 I/V 1/03/19 19:39
 F/V 1/03/19 19:39
 Batch CD90241



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

Client Sample ID: C-1075 Date Sampled: 03/29/19 07:58

Percent Solids: 98

Extraction Method: 7471B

ESS Laboratory Work Order: 1903834 ESS Laboratory Sample ID: 1903834-13

Sample Matrix: Solid Units: mg/kg dry

Total Metals

F/V Batch 40 CD90241 <u>Analyst</u> <u>Analyzed</u> <u>I/V</u> 04/03/19 19:41 0.63 Results (MRL) **MDL** I/V **Analyte** Method Limit Mercury **2.16** (0.803) 7471B



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

Client Sample ID: C-1076 Date Sampled: 03/29/19 08:03

Percent Solids: 97

ESS Laboratory Work Order: 1903834 ESS Laboratory Sample ID: 1903834-14

Sample Matrix: Solid Units: mg/kg dry

Extraction Method: 7471B

Total Metals

F/V Batch 40 CD90241 Analyst Analyzed I/V MKS 04/03/19 21:11 0.73 **Analyte** Results (MRL) **MDL** I/V Method Limit Mercury 3130 (278) 7471B



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

Client Sample ID: C-1077 Date Sampled: 03/29/19 08:07

Percent Solids: 98

Extraction Method: 7471B

ESS Laboratory Work Order: 1903834 ESS Laboratory Sample ID: 1903834-15

Sample Matrix: Solid Units: mg/kg dry

Total Metals

 Analyte Mercury
 Results (MRL)
 MDL 7471B
 Limit 25
 DF Analyst Analyzed MKS 04/03/19 19:45
 I/V 0.64
 F/V 40 CD90241



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

Client Sample ID: C-1098 Date Sampled: 03/29/19 08:18

Percent Solids: 98

Extraction Method: 7471B

ESS Laboratory Work Order: 1903834 ESS Laboratory Sample ID: 1903834-16

Sample Matrix: Solid Units: mg/kg dry

Total Metals

Total Met

 Analyte Mercury
 Results (MRL)
 MDL 940
 Method 7471B
 Limit 200
 DF 200
 Analyst Analyzed MKS 04/03/19 21:17
 I/V 0.65
 F/V 40 CD90241



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

Client Sample ID: C-1102 Date Sampled: 03/29/19 08:24

Percent Solids: 99

ESS Laboratory Work Order: 1903834 ESS Laboratory Sample ID: 1903834-17

Sample Matrix: Solid Units: mg/kg dry

Extraction Method: 7471B

Total Metals

 Analyte Mercury
 Results (MRL)
 MDL 93 (3.27)
 Method 7471B
 Limit Limit Limit Limit Picture
 DF 04 (0.000) MKS (0.000) MKS (0.000) (0.



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

Client Sample ID: C-1103 Date Sampled: 03/29/19 08:28

Percent Solids: 98

Extraction Method: 7471B

ESS Laboratory Work Order: 1903834 ESS Laboratory Sample ID: 1903834-18

Sample Matrix: Solid Units: mg/kg dry

Total Metals

 Analyte Mercury
 Results (MRL)
 MDL 7471B
 Limit 50
 DF MCS 04/03/19 19:51
 Analyzed 04/03/19 19:51
 I/V 0.61
 F/V 40 000/000/41
 Batch 000/000/000/41



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

Client Sample ID: C-1106 Date Sampled: 03/29/19 08:46

Percent Solids: 99

Extraction Method: 7471B

ESS Laboratory Work Order: 1903834 ESS Laboratory Sample ID: 1903834-19

Sample Matrix: Solid Units: mg/kg dry

Total Metals

 Analyte Mercury
 Results (MRL)
 MDL 48.6 (3.12)
 Method 7471B
 Limit



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

Client Sample ID: C-1107 Date Sampled: 03/29/19 08:51

Percent Solids: 99

refeelit solids.

ESS Laboratory Work Order: 1903834 ESS Laboratory Sample ID: 1903834-20

Sample Matrix: Solid Units: mg/kg dry

Extraction Method: 7471B

Total Metals

 Analyte Mercury
 Results (MRL)
 MDL Method 7471B
 Limit Limit Limit Limit Limit MKS
 DF MKS
 Analyzed Analyzed MKS
 I/V MKS
 F/V MASS
 Batch CD90241



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

ESS Laboratory Work Order: 1903834

Quality Control Data

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
			Total Meta	ıls						
Batch CD90241 - 7471B										
Blank										
Mercury	ND	0.033	mg/kg wet							
LCS										
Mercury	4.05	0.314	mg/kg wet	4.850		84	50-103			
LCS Dup										
Mercury	4.25	0.336	mg/kg wet	4.850		88	50-103	5	20	



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

ESS Laboratory Work Order: 1903834

Notes and Definitions

U	Analyte included in the analysis, but not detected
D	Diluted.
ND	Analyte NOT DETECTED at or above the MRL (LOQ), LOD for DoD Reports, MDL for J-Flagged Analytes
dry	Sample results reported on a dry weight basis
RPD	Relative Percent Difference
MDL	Method Detection Limit
MRL	Method Reporting Limit
LOD	Limit of Detection
LOQ	Limit of Quantitation
DL	Detection Limit
I/V	Initial Volume
F/V	Final Volume
§	Subcontracted analysis; see attached report
1	Range result excludes concentrations of surrogates and/or internal standards eluting in that range.
2	Range result excludes concentrations of target analytes eluting in that range.
3	Range result excludes the concentration of the C9-C10 aromatic range.
Avg	Results reported as a mathematical average.

NR No Recovery [CALC] Calculated Analyte

SUB Subcontracted analysis; see attached report

RLReporting Limit

EDL Estimated Detection Limit Membrane Filtration MF MPN Most Probably Number TNTC Too numerous to Count CFU Colony Forming Units



The Microbiology Division of Thielsch Engineering, Inc.

ESS Laboratory Work Order: 1903834



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

ENVIRONMENTAL

ESS LABORATORY CERTIFICATIONS AND ACCREDITATIONS

Rhode Island Potable and Non Potable Water: LAI00179 http://www.health.ri.gov/find/labs/analytical/ESS.pdf

Connecticut Potable and Non Potable Water, Solid and Hazardous Waste: PH-0750 http://www.ct.gov/dph/lib/dph/environmental health/environmental laboratories/pdf/OutofStateCommercialLaboratories.pdf

Maine Potable and Non Potable Water, and Solid and Hazardous Waste: RI00002 http://www.maine.gov/dhhs/mecdc/environmental-health/dwp/partners/labCert.shtml

Massachusetts Potable and Non Potable Water: M-RI002 http://public.dep.state.ma.us/Labcert/Labcert.aspx

New Hampshire (NELAP accredited) Potable and Non Potable Water, Solid and Hazardous Waste: 2424 http://des.nh.gov/organization/divisions/water/dwgb/nhelap/index.htm

New York (NELAP accredited) Non Potable Water, Solid and Hazardous Waste: 11313 http://www.wadsworth.org/labcert/elap/comm.html

New Jersey (NELAP accredited) Non Potable Water, Solid and Hazardous Waste: RI006 http://datamine2.state.nj.us/DEP OPRA/OpraMain/pi main?mode=pi by site&sort order=PI NAMEA&Select+a+Site:=58715

United States Department of Agriculture Soil Permit: P330-12-00139

Pennsylvania: 68-01752

http://www.dep.pa.gov/Business/OtherPrograms/Labs/Pages/Laboratory-Accreditation-Program.aspx

ESS Laboratory Sample and Cooler Receipt Checklist

Client: GZA - Bedford, NH - GZA/DS	ESS Project ID: 1903834 Date Received: 3/29/2019	
Shipped/Delivered Via: ESS Courier	Project Due Date: 4/4/2019	
Chippedibelivered via	Days for Project: 4 Day	
Air bill manifest present? No NA No.:	6. Does COC match bottles?	
2. Were custody seals present? Yes	7. Is COC complete and correct?	Yes
3. Is radiation count <100 CPM? Yes	8. Were samples received intact?	Yes
4. Is a Cooler Present? Yes Temp: 0.8 Iced with: Ice	9. Were labs informed about short holds & rushes?	Yes No NA
5. Was COC signed and dated by client? Yes	10. Were any analyses received outside of hold time?	Yes (No
5. YVas GGG signed and dated by Gient:		
11. Any Subcontracting needed? ESS Sample IDs: Analysis: TAT:	12. Were VOAs received? a. Air bubbles in aqueous VOAs? b. Does methanol cover soil completely?	Yes No Yes / No Yes / No / NA
13. Are the samples properly preserved? a. If metals preserved upon receipt: b. Low Level VOA vials frozen: Ves / No Date: Date:	Time: By:	
Sample Receiving Notes: COC = C-1121 Collected 1021	Lec'd = C-1139 collected @ 1021 7	sba
	1.	
14. Was there a need to contact Project Manager? a. Was there a need to contact the client? Who was contacted? Date:	Time: By:	_

Sample Number	Container ID	Proper Container	Air Bubbles Present	Sufficient Volume	Container Type	Preservative	Record pH (Cyanide and 608.3 Pesticides)
01	329096	Yes	NA	Yes	4 oz. Jar - Unpres	NP	 "
02	329095	Yes	NA	Yes	4 oz. Jar - Unpres	NP	
03	329094	Yes	NA	Yes	4 oz. Jar - Unpres	NP	
04	329093	Yes	NA	Yes	4 oz. Jar - Unpres	NP	
05	329092	Yes	NA	Yes	4 oz. Jar - Unpres	NP	
06	329091	Yes	NA	Yes	4 oz. Jar - Unpres	NP	
07	329090	Yes	NA	Yes	4 oz. Jar - Unpres	NP	
80	329089	Yes	NA	Yes	4 oz. Jar - Unpres	NP	
09	329088	Yes	NA	Yes	4 oz. Jar - Unpres	NP	
10	329087	Yes	NA	Yes	4 oz. Jar - Unpres	NP	
11	329086	Yes	NA	Yes	4 oz. Jar - Unpres	NP	
12	329085	Yes	NA	Yes	4 oz. Jar - Unpres	NP	
13	329084	Yes	NA	Yes	4 oz. Jar - Unpres	NP	
14	329083	Yes	NA	Yes	4 oz. Jar - Unpres	NP	
15	329082	Yes	NA	Yes	4 oz. Jar - Unpres	NP	
16	329081	Yes	NA	Yes	4 oz. Jar - Unpres	NP	
17	329080	Yes	NA	Yes	4 oz. Jar - Unpres	NP	
18	329079	Yes	NA	Yes	4 oz. Jar - Unpres	NP	
19	329078	Yes	NA	Yes	4 oz. Jar - Unpres	NP	
20	329077	Yes	NA	Yes	4 oz. Jar - Unpres	NP	

2nd Review

ESS Laboratory Sample and Cooler Receipt Checklist

Client:	GZA - Bedford, NH - GZA/DS	_	ESS Project ID:	1903834
Are barcode	ers scanned into storage/lab e labels on correct containers? essary stickers attached?	Thitials: Yes / No Yes / No	Date Received:	3/29/2019
Completed By:		_ Date & Time:	360/19 17	141
Reviewed By:	1211	_ Date & Time:	3/29/19	(8-29
Delivered By:	22		3/29/19	1829

CUSTODY SEAL	EC (4. 50
03 57 19	Quality Environmental Containers 800-255-3950 • 304-255-3900
SIGNATURE MANY	tree ?

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	1														<u> </u>		
ESS La	aboratory	7 -			C	HAIN OF CUSTOD	Y	ESS La	b#			1902	3831	4			
	Thielsch Engi				Turn Time	8.4 Days		Report						1	1		İ
		anston Ri 0291	10	R	egulatory State			Limit		-							
		x (401) 461-44	86			is project for any of the follov		Elector		Data		ander .		[] E	xoei		
www.essla	boratory.com			 	○ CT RC	P OMAMOP O Project Nai	RGP	Delivera	Dies	Other	(Please :	pecity →	'		-1		\top
GZA	Geo envi	npany Name	Inc.	04	Project # 1.0190348,03	Schiller Station	De ler Dena					1 1				İ	
	Co	ntact Person		17	-50	Comperce Park Worth Suit	. 201	Analysis	1 1	.	11]
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ESS Lab	Collection Date	Collection Time	Sample Typ	:	Sample Matrix	Sam	ple ID		To								
	3/28/19	1738	G		Solid	C-1122			X						-		
12		1722			1	6-1123			X							\perp	
3		1729				(-1125			X							L	
9		1731				6-1116			X						in direction		
3		1870				C-1134			X								
6		1817				6-1136			K			\perp					
7	Y	1815				6-1137			1							·	
જ	3/29/1	1013				C-1133			X								
9	131	1021				C-1121 C-			X								
W	* \(\frac{1}{2}\)	1024	\\		V	C-1138			X								
Co	ntainer Type	AC-Air Casse	ette AG-Ambei	Glass		C-Cubitainer J-Jar O-Ot			-1174	$oxed{oxed}$	11						4-4-1
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The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Rebecca Cox GZA GeoEnvironmental, Inc. 5 Commerce Park North Bedford, NH 03110

RE: Schiller Boiler Demo (04.0190318.03) ESS Laboratory Work Order Number: 1903835

This signed Certificate of Analysis is our approved release of your analytical results. These results are only representative of sample aliquots received at the laboratory. ESS Laboratory expects its clients to follow all regulatory sampling guidelines. Beginning with this page, the entire report has been paginated. This report should not be copied except in full without the approval of the laboratory. Samples will be disposed of thirty days after the final report has been delivered. If you have any questions or concerns, please feel free to call our Customer Service Department.

Laurel Stoddard Laboratory Director REVIEWED

By ESS Laboratory at 3:24 pm, Apr 04, 2019

Analytical Summary

The project as described above has been analyzed in accordance with the ESS Quality Assurance Plan. This plan utilizes the following methodologies: US EPA SW-846, US EPA Methods for Chemical Analysis of Water and Wastes per 40 CFR Part 136, APHA Standard Methods for the Examination of Water and Wastewater, American Society for Testing and Materials (ASTM), and other recognized methodologies. The analyses with these noted observations are in conformance to the Quality Assurance Plan. In chromatographic analysis, manual integration is frequently used instead of automated integration because it produces more accurate results.

The test results present in this report are in compliance with TNI and relative state standards, and/or client Quality Assurance Project Plans (QAPP). The laboratory has reviewed the following: Sample Preservations, Hold Times, Initial Calibrations, Continuing Calibrations, Method Blanks, Blank Spikes, Blank Spike Duplicates, Duplicates, Matrix Spikes, Matrix Spike Duplicates, Surrogates and Internal Standards. Any results which were found to be outside of the recommended ranges stated in our SOPs will be noted in the Project Narrative.



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

ESS Laboratory Work Order: 1903835

SAMPLE RECEIPT

The following samples were received on March 29, 2019 for the analyses specified on the enclosed Chain of Custody Record.

Lab Number	Sample Name	Matrix	Analysis
1903835-01	C-1108	Solid	7471B
1903835-02	C-1111	Solid	7471B
1903835-03	C-1112	Solid	7471B
1903835-04	C-1114	Solid	7471B
1903835-05	C-1116	Solid	7471B
1903835-06	C-1119	Solid	7471B
1903835-07	C-1124	Solid	7471B
1903835-08	C-1127	Solid	7471B
1903835-09	C-1128	Solid	7471B
1903835-10	C-1129	Solid	7471B
1903835-11	C-1130	Solid	7471B
1903835-12	C-1131	Solid	7471B
1903835-13	C-1141	Solid	7471B
1903835-14	C-1140	Solid	7471B
1903835-15	C-1132	Solid	7471B



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

ESS Laboratory Work Order: 1903835

PROJECT NARRATIVE

No unusual observations noted.

End of Project Narrative.

DATA USABILITY LINKS

To ensure you are viewing the most current version of the documents below, please clear your internet cookies for www.ESSLaboratory.com. Consult your IT Support personnel for information on how to clear your internet cookies.

Definitions of Quality Control Parameters

Semivolatile Organics Internal Standard Information

Semivolatile Organics Surrogate Information

Volatile Organics Internal Standard Information

Volatile Organics Surrogate Information

EPH and VPH Alkane Lists



The Microbiology Division of Thielsch Engineering, Inc.

ESS Laboratory Work Order: 1903835



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

Analytical Methods

1010A - Flashpoint 6010C - ICP

6020A - ICP MS 7010 - Graphite Furnace

7010 - Graphite Furnace 7196A - Hexavalent Chromium 7470A - Aqueous Mercury 7471B - Solid Mercury

8011 - EDB/DBCP/TCP 8015C - GRO/DRO

8081B - Pesticides 8082A - PCB

8100M - TPH

8151A - Herbicides

8260B - VOA 8270D - SVOA

8270D SIM - SVOA Low Level

9014 - Cyanide

9038 - Sulfate

9040C - Aqueous pH

9045D - Solid pH (Corrosivity)

9050A - Specific Conductance

9056A - Anions (IC)

9060A - TOC

9095B - Paint Filter

MADEP 04-1.1 - EPH

MADEP 18-2.1 - VPH

Prep Methods

CURRENT SW-846 METHODOLOGY VERSIONS

3005A - Aqueous ICP Digestion

3020A - Aqueous Graphite Furnace / ICP MS Digestion

3050B - Solid ICP / Graphite Furnace / ICP MS Digestion

3060A - Solid Hexavalent Chromium Digestion

3510C - Separatory Funnel Extraction

3520C - Liquid / Liquid Extraction

3540C - Manual Soxhlet Extraction 3541 - Automated Soxhlet Extraction

3546 - Microwave Extraction

3580A - Waste Dilution

5030B - Aqueous Purge and Trap

5030C - Aqueous Purge and Trap

5035A - Solid Purge and Trap

SW846 Reactivity Methods 7.3.3.2 (Reactive Cyanide) and 7.3.4.1 (Reactive Sulfide) have been withdrawn by EPA. These methods are reported per client request and are not NELAP accredited.



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

Client Sample ID: C-1108 Date Sampled: 03/29/19 08:40

Percent Solids: 100

Extraction Method: 7471B

ESS Laboratory Work Order: 1903835 ESS Laboratory Sample ID: 1903835-01

Sample Matrix: Solid Units: mg/kg dry

Total Metals

 Analyte Mercury
 Results (MRL)
 MDL 26.8 (3.05)
 Method 7471B
 Limit 100
 DF MKS
 Analyst Analyzed 04/03/19 20:14
 I/V 0.65
 E/V D90305
 Batch CD90305



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

Client Sample ID: C-1111 Date Sampled: 03/29/19 08:32

Percent Solids: 99

Extraction Method: 7471B

ESS Laboratory Work Order: 1903835 ESS Laboratory Sample ID: 1903835-02

Sample Matrix: Solid Units: mg/kg dry

Total Metals

 Analyte Mercury
 Results (MRL)
 MDL 682 (43.1)
 Method 7471B
 Limit 1500
 DF MKS
 Analyst Analyzed 04/03/19 21:19
 I/V 170 MKS
 E/V 170 MKS
 Batch 070 MKS



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

Client Sample ID: C-1112 Date Sampled: 03/29/19 08:55

Percent Solids: 99

ESS Laboratory Work Order: 1903835 ESS Laboratory Sample ID: 1903835-03

Sample Matrix: Solid Units: mg/kg dry

Total Metals

Extraction Method: 7471B

F/V Batch 40 CD90305 <u>Analyst Analyzed MKS 04/03/19 20:18 1/V</u> 0.72 **Analyte** Results (MRL) **MDL** I/V Method Limit Mercury **18.6** (2.79) 7471B



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

Client Sample ID: C-1114

Date Sampled: 03/29/19 09:01

Percent Solids: 99

Extraction Method: 7471B

ESS Laboratory Work Order: 1903835 ESS Laboratory Sample ID: 1903835-04

Sample Matrix: Solid Units: mg/kg dry

Total Metals

 Analyte Mercury
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 MDL Method 7471B
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 DF MKS
 Analyzed MKS
 I/V MKS
 E/V MASS
 Batch MCD90305



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

Client Sample ID: C-1116 Date Sampled: 03/29/19 09:10

Percent Solids: 99

Extraction Method: 7471B

ESS Laboratory Work Order: 1903835 ESS Laboratory Sample ID: 1903835-05

Sample Matrix: Solid Units: mg/kg dry

Total Metals

F/V Batch 40 CD90305 Analyst Analyzed MKS 04/03/19 20:22 0.59 **Analyte** Results (MRL) **MDL** I/V Method Limit Mercury **6.57** (1.69) 7471B

Service



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

Client Sample ID: C-1119 Date Sampled: 03/29/19 09:15

Percent Solids: 100

Extraction Method: 7471B

ESS Laboratory Work Order: 1903835 ESS Laboratory Sample ID: 1903835-06

Sample Matrix: Solid Units: mg/kg dry

Total Metals

F/V Batch 40 CD90305 Analyst Analyzed
MKS 04/03/19 20:29 **Analyte** Results (MRL) **MDL** I/V Method Limit 10.8 (2.80) Mercury 7471B 0.71



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

Client Sample ID: C-1124 Date Sampled: 03/29/19 07:21

Percent Solids: 99

Extraction Method: 7471B

ESS Laboratory Work Order: 1903835 ESS Laboratory Sample ID: 1903835-07

Sample Matrix: Solid Units: mg/kg dry

Total Metals

 Analyte Mercury
 Results (MRL)
 MDL (MRL)
 Method 7471B
 Limit 50
 DF (MKS)
 Analyzed (MAC)
 I/V (MAC)
 E/V (MAC)
 Batch (D90305)



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

Client Sample ID: C-1127 Date Sampled: 03/29/19 09:57

Percent Solids: 99

Extraction Method: 7471B

ESS Laboratory Work Order: 1903835 ESS Laboratory Sample ID: 1903835-08

Sample Matrix: Solid Units: mg/kg dry

Total Metals

F/V Batch 40 CD90305 Analyst Analyzed MKS 04/03/19 20:33 I/V 0.64 **Analyte** Results (MRL) **MDL** I/V Method Limit Mercury **27.5** (3.13) 7471B



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

Client Sample ID: C-1128 Date Sampled: 03/29/19 07:42

Percent Solids: 99

ESS Laboratory Work Order: 1903835 ESS Laboratory Sample ID: 1903835-09

Sample Matrix: Solid Units: mg/kg dry

Extraction Method: 7471B

Total Metals

 Analyte Mercury
 Results (MRL)
 MDL 47.0 (3.08)
 Method 7471B
 Limit



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

Client Sample ID: C-1129 Date Sampled: 03/29/19 10:06

Percent Solids: 98

ESS Laboratory Work Order: 1903835 ESS Laboratory Sample ID: 1903835-10

Sample Matrix: Solid Units: mg/kg dry

Extraction Method: 7471B

Total Metals

 Analyte Mercury
 Results (MRL)
 MDL 7471B
 Limit 100
 DF MKS
 Analyzed 04/03/19 20:37
 I/V 100
 E/V CD90305
 Batch CD90305



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

Client Sample ID: C-1130 Date Sampled: 03/29/19 10:01

Percent Solids: 97

Extraction Method: 7471B

ESS Laboratory Work Order: 1903835 ESS Laboratory Sample ID: 1903835-11

Sample Matrix: Solid Units: mg/kg dry

Total Metals

 Analyte Mercury
 Results (MRL)
 MDL Method 7471B
 Limit 50
 DF MKS
 Analyzed 04/03/19 20:47
 I/V 0.63
 F/V DBatch CD90305



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

Client Sample ID: C-1131 Date Sampled: 03/29/19 07:31

Percent Solids: 99

Extraction Method: 7471B

ESS Laboratory Work Order: 1903835 ESS Laboratory Sample ID: 1903835-12

Sample Matrix: Solid Units: mg/kg dry

Total Metals



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

Client Sample ID: C-1141 Date Sampled: 03/29/19 09:26

Percent Solids: 99

ESS Laboratory Work Order: 1903835 ESS Laboratory Sample ID: 1903835-13

Sample Matrix: Solid Units: mg/kg dry

Extraction Method: 7471B

Total Metals



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

Client Sample ID: C-1140 Date Sampled: 03/29/19 09:21

Percent Solids: 99

Extraction Method: 7471B

ESS Laboratory Work Order: 1903835 ESS Laboratory Sample ID: 1903835-14

Sample Matrix: Solid Units: mg/kg dry

Total Metals

 Analyte Mercury
 Results (MRL)
 MDL 97471B
 Limit 50
 DF MKS 04/03/19 21:05
 Analyzed 0.62
 I/V 1/V 21:05
 E/V CD90305



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

Client Sample ID: C-1132 Date Sampled: 03/29/19 10:10

Percent Solids: 99

ESS Laboratory Work Order: 1903835 ESS Laboratory Sample ID: 1903835-15

Sample Matrix: Solid Units: mg/kg dry

Extraction Method: 7471B

Total Metals

F/V Batch 40 CD90305 Analyst Analyzed 04/03/19 21:07 **Analyte** Results (MRL) **MDL** I/V Method Limit Mercury **12.1** (3.09) 7471B 0.65



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

ESS Laboratory Work Order: 1903835

Quality Control Data

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
			Total Meta	ıls						
Batch CD90305 - 7471B										
Blank										
Mercury	ND	0.033	mg/kg wet							
LCS										
Mercury	4.22	0.314	mg/kg wet	4.850		87	50-103			
LCS Dup										
Mercury	3.74	0.305	mg/kg wet	4.850		77	50-103	12	20	



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

ESS Laboratory Work Order: 1903835

Notes and Definitions

U	Analyte included in the analysis, but not detected
D	Diluted.
ND	Analyte NOT DETECTED at or above the MRL (LOQ), LOD for DoD Reports, MDL for J-Flagged Analytes
dry	Sample results reported on a dry weight basis
RPD	Relative Percent Difference
MDL	Method Detection Limit
MRL	Method Reporting Limit
LOD	Limit of Detection
LOQ	Limit of Quantitation
DL	Detection Limit
I/V	Initial Volume
F/V	Final Volume
§	Subcontracted analysis; see attached report
1	Range result excludes concentrations of surrogates and/or internal standards eluting in that range.
2	Range result excludes concentrations of target analytes eluting in that range.
3	Range result excludes the concentration of the C9-C10 aromatic range.
Avg NR	Results reported as a mathematical average. No Recovery

NR No Recovery [CALC] Calculated Analyte

SUB Subcontracted analysis; see attached report

RLReporting Limit

EDL **Estimated Detection Limit** MF Membrane Filtration MPN Most Probably Number TNTC Too numerous to Count CFU Colony Forming Units



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

ESS Laboratory Work Order: 1903835

ENVIRONMENTAL

ESS LABORATORY CERTIFICATIONS AND ACCREDITATIONS

Rhode Island Potable and Non Potable Water: LAI00179 http://www.health.ri.gov/find/labs/analytical/ESS.pdf

Connecticut Potable and Non Potable Water, Solid and Hazardous Waste: PH-0750 http://www.ct.gov/dph/lib/dph/environmental health/environmental laboratories/pdf/OutofStateCommercialLaboratories.pdf

Maine Potable and Non Potable Water, and Solid and Hazardous Waste: RI00002 http://www.maine.gov/dhhs/mecdc/environmental-health/dwp/partners/labCert.shtml

Massachusetts Potable and Non Potable Water: M-RI002 http://public.dep.state.ma.us/Labcert/Labcert.aspx

New Hampshire (NELAP accredited) Potable and Non Potable Water, Solid and Hazardous Waste: 2424 http://des.nh.gov/organization/divisions/water/dwgb/nhelap/index.htm

New York (NELAP accredited) Non Potable Water, Solid and Hazardous Waste: 11313 http://www.wadsworth.org/labcert/elap/comm.html

New Jersey (NELAP accredited) Non Potable Water, Solid and Hazardous Waste: RI006 http://datamine2.state.nj.us/DEP OPRA/OpraMain/pi main?mode=pi by site&sort order=PI NAMEA&Select+a+Site:=58715

United States Department of Agriculture Soil Permit: P330-12-00139

Pennsylvania: 68-01752

http://www.dep.pa.gov/Business/OtherPrograms/Labs/Pages/Laboratory-Accreditation-Program.aspx

ESS Laboratory Sample and Cooler Receipt Checklist

Client	t:	SZA - Bedfor	d, NH - GZA/	DS		ESS P	Project ID:	1903835	
					_	Date F	Received:	3/29/2019	
Shipped/E	Delivered Via	:	ESS Courie	<u>- </u>	_	Project D	Due Date:	4/4/2019	
						Days fo	r Project:	4 Day	
	nanifest pres			No]	6. Does COC r	match bottles?		Yes
2. Were c	ustody seals	present?		Yes]	7. Is COC com	plete and correct	?	Yes
3. Is radia	tion count <1	00 CPM?		Yes]	8. Were sampl	es received intac	t?	Yes
	oler Present? : 0.8		: Ice	Yes]	9. Were labs i	nformed about <u>s</u>	short holds & rushes?	Yes No / NA
5. Was Co	DC signed ar	d dated by d	client?	Yes]	10. Were any	analyses receive	d outside of hold time?	Yes (No
	beontracting Sample IDs Analysis TAT:			/No	-		s received? in aqueous VOA anol cover soil co		Yes (No Yes / No Yes / No / NA
a. If metals	e samples pro s preserved u vel VOA vials	pon receipt:		Yes No Date: Date:		_ Time: _ Time:		By:	
Sample Re	ceiving Note	s: 				·			
	ere a need to		oject Manage client?		Yes No Yes / No	Time:		Ву:	
Sample Number	Container ID	Proper Container	Air Bubbles Present	Sufficient Volume	Contain	er Type	Preservative	Record pH (Cya	
01	329116	Yes	NA	Yes	4 oz. Jar	- Unnres	NP		
02	329115	Yes	NA	Yes	4 oz. Jar	•	NP		
03	329114	Yes	NA	Yes	4 oz. Jar		NP		
04	329113	Yes	NA	Yes	4 oz. Jar		NP		
05	329112	Yes	NA	Yes	4 oz. Jar		NP		
06 07	329111	Yes	NA	Yes	4 oz. Jar		NP		
07 08	329110	Yes	NA NA	Yes	4 oz. Jar	•	NP		
	329109	Yes	NA NA	Yes	4 oz. Jar		NP		
09 10	329108 329107	Yes Yes	NA NA	Yes	4 oz. Jar	•	NP		
11	329107	Yes	NA NA	Yes	4 oz. Jar		NP		
12	329105	Yes	NA NA	Yes Yes	4 oz. Jar -		NP NB		
13	329103	Yes	NA NA	Yes	4 oz. Jar		NP ND		
14	329104	Yes	NA NA	Yes	4 oz. Jar 4 oz. Jar		NP ND		
15	329102	Yes	NA	Yes	4 oz. Jar -		NP NP		
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Completed

ESS Laboratory Sample and Cooler Receipt Checklist

Client:	Bedford, NH - GZA/DS	_	ESS Project ID:	1903835
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The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Rebecca Cox GZA GeoEnvironmental, Inc. 5 Commerce Park North Bedford, NH 03110

RE: Schiller Boiler Demo (04.0190348.03) ESS Laboratory Work Order Number: 1904020

This signed Certificate of Analysis is our approved release of your analytical results. These results are only representative of sample aliquots received at the laboratory. ESS Laboratory expects its clients to follow all regulatory sampling guidelines. Beginning with this page, the entire report has been paginated. This report should not be copied except in full without the approval of the laboratory. Samples will be disposed of thirty days after the final report has been delivered. If you have any questions or concerns, please feel free to call our Customer Service Department.

Laurel Stoddard Laboratory Director **REVIEWED**

By ESS Laboratory at 2:42 pm, Apr 08, 2019

Analytical Summary

The project as described above has been analyzed in accordance with the ESS Quality Assurance Plan. This plan utilizes the following methodologies: US EPA SW-846, US EPA Methods for Chemical Analysis of Water and Wastes per 40 CFR Part 136, APHA Standard Methods for the Examination of Water and Wastewater, American Society for Testing and Materials (ASTM), and other recognized methodologies. The analyses with these noted observations are in conformance to the Quality Assurance Plan. In chromatographic analysis, manual integration is frequently used instead of automated integration because it produces more accurate results.

The test results present in this report are in compliance with TNI and relative state standards, and/or client Quality Assurance Project Plans (QAPP). The laboratory has reviewed the following: Sample Preservations, Hold Times, Initial Calibrations, Continuing Calibrations, Method Blanks, Blank Spikes, Blank Spike Duplicates, Duplicates, Matrix Spikes, Matrix Spike Duplicates, Surrogates and Internal Standards. Any results which were found to be outside of the recommended ranges stated in our SOPs will be noted in the Project Narrative.



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

ESS Laboratory Work Order: 1904020

SAMPLE RECEIPT

The following samples were received on April 01, 2019 for the analyses specified on the enclosed Chain of Custody Record.

Lab Number	Sample Name	Matrix	Analysis
1904020-01	W-1198	Wipe	7471B
1904020-02	W-1199	Wipe	7471B
1904020-03	W-1200	Wipe	7471B
1904020-04	W-1201	Wipe	7471B
1904020-05	W-1202	Wipe	7471B
1904020-06	W-1203	Wipe	7471B
1904020-07	W-1204	Wipe	7471B
1904020-08	W-1205	Wipe	7471B
1904020-09	W-1206	Wipe	7471B
1904020-10	W-1207	Wipe	7471B
1904020-11	W-1208	Wipe	7471B
1904020-12	W-1209	Wipe	7471B
1904020-13	W-1210	Wipe	7471B
1904020-14	Blank 01-03-29-19	Wipe	7471B
1904020-15	Blank 02-03-29-19	Wipe	7471B
1904020-16	C-1047	Solid	7471B



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

ESS Laboratory Work Order: 1904020

PROJECT NARRATIVE

No unusual observations noted.

End of Project Narrative.

DATA USABILITY LINKS

To ensure you are viewing the most current version of the documents below, please clear your internet cookies for www.ESSLaboratory.com. Consult your IT Support personnel for information on how to clear your internet cookies.

Definitions of Quality Control Parameters

Semivolatile Organics Internal Standard Information

Semivolatile Organics Surrogate Information

Volatile Organics Internal Standard Information

Volatile Organics Surrogate Information

EPH and VPH Alkane Lists



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

ESS Laboratory Work Order: 1904020

Analytical Methods

1010A - Flashpoint 6010C - ICP

6020A - ICP MS

7010 - Graphite Furnace 7196A - Hexavalent Chromium 7470A - Aqueous Mercury 7471B - Solid Mercury 8011 - EDB/DBCP/TCP

8015C - GRO/DRO 8081B - Pesticides

8082A - PCB 8100M - TPH

8151A - Herbicides

8260B - VOA 8270D - SVOA

8270D SIM - SVOA Low Level

9014 - Cyanide 9038 - Sulfate

9040C - Aqueous pH

9045D - Solid pH (Corrosivity)

9050A - Specific Conductance

9056A - Anions (IC)

9060A - TOC

9095B - Paint Filter

MADEP 04-1.1 - EPH

MADEP 18-2.1 - VPH

Prep Methods

CURRENT SW-846 METHODOLOGY VERSIONS

3005A - Aqueous ICP Digestion

3020A - Aqueous Graphite Furnace / ICP MS Digestion

3050B - Solid ICP / Graphite Furnace / ICP MS Digestion

3060A - Solid Hexavalent Chromium Digestion

3510C - Separatory Funnel Extraction

3520C - Liquid / Liquid Extraction 3540C - Manual Soxhlet Extraction

3541 - Automated Soxhlet Extraction

3546 - Microwave Extraction

3580A - Waste Dilution

5030B - Aqueous Purge and Trap

5030C - Aqueous Purge and Trap

5035A - Solid Purge and Trap

SW846 Reactivity Methods 7.3.3.2 (Reactive Cyanide) and 7.3.4.1 (Reactive Sulfide) have been withdrawn by EPA. These methods are reported per client request and are not NELAP accredited.



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

Client Sample ID: W-1198 Date Sampled: 03/29/19 13:10

Percent Solids: N/A

Extraction Method: 7471B

ESS Laboratory Work Order: 1904020 ESS Laboratory Sample ID: 1904020-01

Sample Matrix: Wipe Units: ug/100cm²

Total Metals

 Analyte Mercury
 Results (MRL)
 MDL
 Method
 Limit
 DF
 Analyst
 Analyzed
 I/V
 F/V
 Batch

 Mcroury
 0.382 (0.020)
 7471B
 1
 MKS
 04/04/19 10:41
 1
 40
 CD90343



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

Client Sample ID: W-1199 Date Sampled: 03/29/19 13:14

Percent Solids: N/A

ESS Laboratory Work Order: 1904020 ESS Laboratory Sample ID: 1904020-02 Sample Matrix: Wipe

Sample Matrix: Wipe Units: ug/100cm²

Extraction Method: 7471B

Total Metals

 Analyte Mercury
 Results (MRL)
 MDL 0.716 (0.200)
 Method 7471B
 Limit 10
 DF 0.716 (0.200)
 Analyst Analyzed 0.7471B
 I/V 0.7471B
 Analyst 0.7471B
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 Analyst 0.7471



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

Client Sample ID: W-1200 Date Sampled: 03/29/19 13:16

Percent Solids: N/A

Extraction Method: 7471B

ESS Laboratory Work Order: 1904020 ESS Laboratory Sample ID: 1904020-03

Sample Matrix: Wipe Units: ug/100cm²

Total Metals

 Analyte Mercury
 Results (MRL)
 MDL 7471B
 Limit DF 108 (0.200)
 Analyst Analyzed MKS 04/04/19 12:17
 I/V 12:17
 F/V 40 CD90343



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

Client Sample ID: W-1201 Date Sampled: 03/29/19 13:21

Percent Solids: N/A

ESS Laboratory Work Order: 1904020 ESS Laboratory Sample ID: 1904020-04

Sample Matrix: Wipe Units: ug/100cm²

Extraction Method: 7471B

Total Metals

 Analyte Mercury
 Results (MRL)
 MDL 7471B
 Limit 500
 DF MKS
 Analyst Analyzed 04/04/19 12:19
 I/V 10
 E/V D90343



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

Client Sample ID: W-1202 Date Sampled: 03/29/19 13:24

Percent Solids: N/A

ESS Laboratory Work Order: 1904020 ESS Laboratory Sample ID: 1904020-05

Sample Matrix: Wipe Units: ug/100cm²

Extraction Method: 7471B

Total Metals

 Analyte Mercury
 Results (MRL)
 MDL
 Method
 Limit
 DF
 Analyst
 Analyzed
 I/V
 F/V
 Batch

 Mercury
 0.248 (0.020)
 7471B
 1
 MKS
 04/04/19 10:53
 1
 40
 CD90343



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

Client Sample ID: W-1203 Date Sampled: 03/29/19 13:30

Percent Solids: N/A

Extraction Method: 7471B

ESS Laboratory Work Order: 1904020 ESS Laboratory Sample ID: 1904020-06

Sample Matrix: Wipe Units: ug/100cm²

Total Metals

 Analyte Mercury
 Results (MRL)
 MDL 0.095 (0.020)
 Method 7471B
 Limit 1
 DF 0.095 (0.020)
 Analyst Analyzed 0.04/04/19 10:55
 I/V 1
 F/V 2
 Batch 0.090343



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

Client Sample ID: W-1204 Date Sampled: 03/29/19 13:33

Percent Solids: N/A

Extraction Method: 7471B

ESS Laboratory Work Order: 1904020 ESS Laboratory Sample ID: 1904020-07

Sample Matrix: Wipe Units: ug/100cm²

Total Metals

 Analyte Mercury
 Results (MRL)
 MDL Method 7471B
 Limit



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

Client Sample ID: W-1205 Date Sampled: 03/29/19 13:38

Percent Solids: N/A

Extraction Method: 7471B

ESS Laboratory Work Order: 1904020 ESS Laboratory Sample ID: 1904020-08

Sample Matrix: Wipe Units: ug/100cm²

Total Metals

F/V Batch 40 CD90343 Analyst Analyzed 04/04/19 12:27 **Analyte** Results (MRL) **MDL** I/V Method Limit Mercury 1.08 (0.200) 7471B

Service



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

Client Sample ID: W-1206 Date Sampled: 03/29/19 13:41

Percent Solids: N/A

ESS Laboratory Work Order: 1904020 ESS Laboratory Sample ID: 1904020-09

Sample Matrix: Wipe Units: ug/100cm²

Extraction Method: 7471B

Total Metals

 Analyte Mercury
 Results (MRL)
 MDL
 Method
 Limit
 DF
 Analyst
 Analyzed
 I/V
 F/V
 Batch

 Mercury
 0.172 (0.020)
 7471B
 1
 MKS
 04/04/19 11:01
 1
 40
 CD90343



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

Client Sample ID: W-1207 Date Sampled: 03/29/19 13:43

Percent Solids: N/A

Extraction Method: 7471B

ESS Laboratory Work Order: 1904020 ESS Laboratory Sample ID: 1904020-10

Sample Matrix: Wipe Units: ug/100cm²

Total Metals

 Analyte Mercury
 Results (MRL)
 MDL
 Method
 Limit
 DF
 Analyst
 Analyzed
 I/V
 F/V
 Batch

 Mercury
 0.565 (0.200)
 7471B
 10
 MKS
 04/04/19 12:29
 1
 40
 CD90343



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

Client Sample ID: W-1208 Date Sampled: 03/29/19 13:35

Percent Solids: N/A

Extraction Method: 7471B

ESS Laboratory Work Order: 1904020 ESS Laboratory Sample ID: 1904020-11

Sample Matrix: Wipe Units: ug/100cm²

Total Metals

F/V Batch CD90343 Analyst Analyzed 04/04/19 11:05 **Analyte** Results (MRL) **MDL** <u>I/V</u> Method Limit Mercury 0.386 (0.020) 7471B



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

Client Sample ID: W-1209 Date Sampled: 03/29/19 13:47

Percent Solids: N/A

Extraction Method: 7471B

ESS Laboratory Work Order: 1904020 ESS Laboratory Sample ID: 1904020-12

Sample Matrix: Wipe Units: ug/100cm²

Total Metals

 Analyte Mercury
 Results (MRL)
 MDL
 Method
 Limit
 DF
 Analyst
 Analyzed
 I/V
 F/V
 Batch

 Mercury
 0.762 (0.200)
 7471B
 10
 MKS
 04/04/19 12:31
 1
 40
 CD90343



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

Client Sample ID: W-1210 Date Sampled: 03/29/19 13:49

Percent Solids: N/A

ESS Laboratory Work Order: 1904020 ESS Laboratory Sample ID: 1904020-13

Sample Matrix: Wipe Units: ug/100cm²

Extraction Method: 7471B

Total Metals

 Analyte Mercury
 Results (MRL)
 MDL 0.682 (0.200)
 Method 7471B
 Limit 10
 DF 0.000
 Analyst Analyzed 0.4/04/19 12:33
 I/V 12:33
 F/V 12
 Batch 0.000



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo Client Sample ID: Blank 01-03-29-19 Date Sampled: 03/29/19 00:00

Percent Solids: N/A

ESS Laboratory Work Order: 1904020 ESS Laboratory Sample ID: 1904020-14

Sample Matrix: Wipe Units: ug/100cm²

Extraction Method: 7471B

Total Metals

 Analyte Mercury
 Results (MRL) ND (0.020)
 MDL Method 7471B
 Limit Limit Limit Limit NG (0.020)
 DF MKS (0.020)
 Analyst Analyzed NKS (0.04/04/19 11:15)
 I/V 40 CD90343



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo Client Sample ID: Blank 02-03-29-19 Date Sampled: 03/29/19 00:00

Percent Solids: N/A

ESS Laboratory Work Order: 1904020 ESS Laboratory Sample ID: 1904020-15

Sample Matrix: Wipe Units: ug/100cm²

Extraction Method: 7471B

Total Metals

F/V Batch CD90343 Analyst Analyzed 04/04/19 11:17 Results (MRL) **MDL** I/V **Analyte** Method Limit Mercury ND (0.020) 7471B



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

Client Sample ID: C-1047 Date Sampled: 03/29/19 14:36

Percent Solids: 97

Extraction Method: 7471B

ESS Laboratory Work Order: 1904020 ESS Laboratory Sample ID: 1904020-16

Sample Matrix: Solid Units: mg/kg dry

Total Metals



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

ESS Laboratory Work Order: 1904020

Quality Control Data

				Spike	Source		%REC		RPD	
Analyte	Result	MRL	Units	Level	Result	%REC	Limits	RPD	Limit	Qualifier
			Total Meta	als						
Batch CD90305 - 7471B										
Blank										
Mercury	ND	0.033	mg/kg wet							
LCS										
Mercury	4.22	0.314	mg/kg wet	4.850		87	50-103			
LCS Dup										
Mercury	3.74	0.305	mg/kg wet	4.850		77	50-103	12	20	
Batch CD90343 - 7471B										
Blank										
Mercury	ND	0.020	ug/100cm²							
LCS										
Mercury	0.125	0.020	ug/100cm²	0.1208		104	85-115			
LCS Dup										
Mercury	0.127	0.020	ug/100cm ²	0.1208		105	85-115	1	20	



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

ESS Laboratory Work Order: 1904020

Notes and Definitions

U	Analyte included in the analysis, but not detected
D	Diluted.
ND	Analyte NOT DETECTED at or above the MRL (LOQ), LOD for DoD Reports, MDL for J-Flagged Analytes
dry	Sample results reported on a dry weight basis
RPD	Relative Percent Difference
MDL	Method Detection Limit
MRL	Method Reporting Limit
LOD	Limit of Detection
LOQ	Limit of Quantitation
DL	Detection Limit
I/V	Initial Volume
F/V	Final Volume
§	Subcontracted analysis; see attached report
1	Range result excludes concentrations of surrogates and/or internal standards eluting in that range.
2	Range result excludes concentrations of target analytes eluting in that range.
3	Range result excludes the concentration of the C9-C10 aromatic range.
Avg	Results reported as a mathematical average.

NR No Recovery [CALC] Calculated Analyte

SUB Subcontracted analysis; see attached report

RLReporting Limit

EDL **Estimated Detection Limit** MF Membrane Filtration MPN Most Probably Number TNTC Too numerous to Count CFU Colony Forming Units



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

ESS Laboratory Work Order: 1904020

ESS LABORATORY CERTIFICATIONS AND ACCREDITATIONS

ENVIRONMENTAL

Rhode Island Potable and Non Potable Water: LAI00179 http://www.health.ri.gov/find/labs/analytical/ESS.pdf

Connecticut Potable and Non Potable Water, Solid and Hazardous Waste: PH-0750 http://www.ct.gov/dph/lib/dph/environmental health/environmental laboratories/pdf/OutofStateCommercialLaboratories.pdf

Maine Potable and Non Potable Water, and Solid and Hazardous Waste: RI00002 http://www.maine.gov/dhhs/mecdc/environmental-health/dwp/partners/labCert.shtml

Massachusetts Potable and Non Potable Water: M-RI002 http://public.dep.state.ma.us/Labcert/Labcert.aspx

New Hampshire (NELAP accredited) Potable and Non Potable Water, Solid and Hazardous Waste: 2424 http://des.nh.gov/organization/divisions/water/dwgb/nhelap/index.htm

New York (NELAP accredited) Non Potable Water, Solid and Hazardous Waste: 11313 http://www.wadsworth.org/labcert/elap/comm.html

New Jersey (NELAP accredited) Non Potable Water, Solid and Hazardous Waste: RI006 http://datamine2.state.nj.us/DEP_OPRA/OpraMain/pi_main?mode=pi_by_site&sort_order=PI_NAMEA&Select+a+Site:=58715

United States Department of Agriculture Soil Permit: P330-12-00139

Pennsylvania: 68-01752

 $\underline{http://www.dep.pa.gov/Business/Other Programs/Labs/Pages/Laboratory-Accreditation-Program.aspx}$

ESS Laboratory Sample and Cooler Receipt Checklist

Client	t: <u> </u>	ZA - Bedford	, NH - GZA	/DS	_	ESS	Project ID:	1904020	
O						Date	e Received:	4/1/2019	
Snipped/L	Jelivered Via	:	ESS Couri	er			t Due Date:	4/8/2019	
						Days	for Project:	5 Day	<u> </u>
	manifest pre			No		6. Does CO	C match bottles?		Yes
2. Were c	ustody seals	present?		No	}	7. Is COC co	omplete and corre	ct?	Yes
3. Is radia	tion count <	100 CPM?		Yes		8. Were sam	ples received inta	ct?	Yes
	oler Present'		Ice	Yes		9. Were lab	s informed abou	t short holds & rushes?	Yes / No / NA
5. Was Co	OC signed a	nd dated by c	lient?	Yes		10. Were an	y analyses receiv	ed outside of hold time?	Yes (No
	sbcontracting Sample IDs Analysis: TAT:		Yes	No		a. Air bubble	DAs received? es in aqueous VO, hanol cover soll c		Yes /No Yes /No / NA
a. If metals	e samples pr s preserved (/el VOA vials	operly presei upon receipt: i frozen;	ved?	Yes No Date:		_ Time: _ Time:		By:	
Sample Re	ceiving Note	s:		•			·	-,. <u></u>	_
	ere a need to	o contact Pro		er? Date:	Yes No Yes No	Time: _		Ву:	_
Sample Number	Container ID	Proper Container	Air Bubbles	Sufficient	Containe	er Type	Preservative	Record pH (Cyan	
		Container	Present	Volume				Pesticio	ies)
01	329799	Yes	NA	Yes	2 oz. Jar		Other		-
02 03	329798 329797	Yes Yes	NA NA	Yes Yes	2 oz. Jar		Other		
04	329796	Yes	NA NA	Yes	2 oz. Jar - 2 oz. Jar -		Other Other		
05	329795	Yes	NA	Yes	2 oz. Jar		Other		
06	329794	Yes	NA	Yes	2 oz. Jar -	Unpres	Other		
07	329793	Yes	NA	Yes	2 oz. Jar -		Other		
08 09	329792	Yes	NA	Yes	2 oz. Jar -	•	Other		
10	329791 329790	Yes Yes	NA	Yes	2 oz. Jar -		Other		
11	329789	Yes	NA NA	Yes Yes	2 oz. Jar - 2 oz. Jar -		Other		
12	329788	Yes	NA	Yes	2 oz. Jar -		Other Other		
13	329787	Yes	NA	Yes	2 oz. Jar -	•	Other		
14	329786	Yes	NA	Yes	2 oz. Jar -		Other		
15 10	329785	Yes	NA	Yes	2 oz. Jar -	Unpres	Other		
16	329784	Yes	NA	Yes	4 oz. Jar -	Unpres	Other		
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Are barcode		d into storaç rrect contain s attached?		(Yes / No Yes / No Yes / No	+			
Completed									

ESS Laboratory Sample and Cooler Receipt Checklist

Client:GZA - Bedford, NH - GZA/DS	ESS Project ID: 1904020
By:	
Reviewed	& Time: 41115 1615
By: Date	e & Time: 4/1/9 (623
Delivered By:	4 J. J. G
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ID	Date	Time	Sample Typ		Sample Matrix	Sa	mple ID		10					11	1			
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8		1338				W-1205			X			11	† †			_		
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		1-Non Preserved		-	4-300 mL 5-500 HNO3 5-NaOH 6-M	mL 6-1L 7-VOA 8-2 o ethanol 7-Na2S2O3 8-ZnAce, Na			9									
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		Laboratory	Use Only			Sampled by : C. Mad	<u>-</u>		110		-				اتك			
Cooler	Present:		O Drop 0	f		Comments:	Please spe	cify "Other	r" pre	servati	ve and	containe	rs types i	n shie en	ece .			-
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7	3-29-19		Wibe		Wipe	Blank 02-0	3-29-19		X											
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The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Rebecca Cox GZA GeoEnvironmental, Inc. 5 Commerce Park North Bedford, NH 03110

RE: Schiller Boiler Demo (04.0190318.03) ESS Laboratory Work Order Number: 1904021

This signed Certificate of Analysis is our approved release of your analytical results. These results are only representative of sample aliquots received at the laboratory. ESS Laboratory expects its clients to follow all regulatory sampling guidelines. Beginning with this page, the entire report has been paginated. This report should not be copied except in full without the approval of the laboratory. Samples will be disposed of thirty days after the final report has been delivered. If you have any questions or concerns, please feel free to call our Customer Service Department.

Laurel Stoddard Laboratory Director **REVIEWED**

By ESS Laboratory at 1:06 pm, Apr 05, 2019

Analytical Summary

The project as described above has been analyzed in accordance with the ESS Quality Assurance Plan. This plan utilizes the following methodologies: US EPA SW-846, US EPA Methods for Chemical Analysis of Water and Wastes per 40 CFR Part 136, APHA Standard Methods for the Examination of Water and Wastewater, American Society for Testing and Materials (ASTM), and other recognized methodologies. The analyses with these noted observations are in conformance to the Quality Assurance Plan. In chromatographic analysis, manual integration is frequently used instead of automated integration because it produces more accurate results.

The test results present in this report are in compliance with TNI and relative state standards, and/or client Quality Assurance Project Plans (QAPP). The laboratory has reviewed the following: Sample Preservations, Hold Times, Initial Calibrations, Continuing Calibrations, Method Blanks, Blank Spikes, Blank Spike Duplicates, Duplicates, Matrix Spikes, Matrix Spike Duplicates, Surrogates and Internal Standards. Any results which were found to be outside of the recommended ranges stated in our SOPs will be noted in the Project Narrative.



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

ESS Laboratory Work Order: 1904021

SAMPLE RECEIPT

The following samples were received on April 01, 2019 for the analyses specified on the enclosed Chain of Custody Record.

Lab Number	Sample Name	Matrix	Analysis
1904021-01	W-1188	Wipe	7471B
1904021-02	W-1189	Wipe	7471B
1904021-03	W-1190	Wipe	7471B
1904021-04	W-1191	Wipe	7471B
1904021-05	W-1192	Wipe	7471B
1904021-06	W-1193	Wipe	7471B
1904021-07	W-1194	Wipe	7471B
1904021-08	W-1195	Wipe	7471B
1904021-09	W-1196	Wipe	7471B
1904021-10	W-1197	Wipe	7471B
1904021-11	W-1178	Wipe	7471B
1904021-12	W-1179	Wipe	7471B
1904021-13	W-1180	Wipe	7471B
1904021-14	W-1181	Wipe	7471B
1904021-15	W-1182	Wipe	7471B
1904021-16	W-1183	Wipe	7471B
1904021-17	W-1184	Wipe	7471B
1904021-18	W-1185	Wipe	7471B
1904021-19	W-1186	Wipe	7471B
1904021-20	W-1187	Wipe	7471B



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

ESS Laboratory Work Order: 1904021

PROJECT NARRATIVE

No unusual observations noted.

End of Project Narrative.

DATA USABILITY LINKS

To ensure you are viewing the most current version of the documents below, please clear your internet cookies for www.ESSLaboratory.com. Consult your IT Support personnel for information on how to clear your internet cookies.

Definitions of Quality Control Parameters

Semivolatile Organics Internal Standard Information

Semivolatile Organics Surrogate Information

Volatile Organics Internal Standard Information

Volatile Organics Surrogate Information

EPH and VPH Alkane Lists



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

ESS Laboratory Work Order: 1904021

CURRENT SW-846 METHODOLOGY VERSIONS

Analytical Methods

1010A - Flashpoint 6010C - ICP

6020A - ICP MS

7010 - Graphite Furnace

7196A - Hexavalent Chromium

7470A - Aqueous Mercury

7471B - Solid Mercury

8011 - EDB/DBCP/TCP

8015C - GRO/DRO

8081B - Pesticides

8082A - PCB

8100M - TPH

8151A - Herbicides

8260B - VOA

8270D - SVOA

8270D SIM - SVOA Low Level

9014 - Cyanide

9038 - Sulfate

9040C - Aqueous pH

9045D - Solid pH (Corrosivity)

9050A - Specific Conductance

9056A - Anions (IC)

9060A - TOC

9095B - Paint Filter

MADEP 04-1.1 - EPH

MADEP 18-2.1 - VPH

Prep Methods

3005A - Aqueous ICP Digestion

 $3020\mbox{A}$ - Aqueous Graphite Furnace / ICP MS Digestion

3050B - Solid ICP / Graphite Furnace / ICP MS Digestion

3060A - Solid Hexavalent Chromium Digestion

3510C - Separatory Funnel Extraction

3520C - Liquid / Liquid Extraction

3540C - Manual Soxhlet Extraction

3541 - Automated Soxhlet Extraction

3546 - Microwave Extraction

3580A - Waste Dilution

5030B - Aqueous Purge and Trap

 $5030\mathrm{C}$ - Aqueous Purge and Trap

5035A - Solid Purge and Trap

SW846 Reactivity Methods 7.3.3.2 (Reactive Cyanide) and 7.3.4.1 (Reactive Sulfide) have been withdrawn by EPA. These methods are reported per client request and are not NELAP accredited.



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

Client Sample ID: W-1188 Date Sampled: 03/29/19 12:46

Percent Solids: N/A

Extraction Method: 7471B

ESS Laboratory Work Order: 1904021 ESS Laboratory Sample ID: 1904021-01

Sample Matrix: Wipe Units: ug/100cm²

Total Metals

 Analyte Mercury
 Results (MRL)
 MDL 0.079 (0.020)
 Method 7471B
 Limit 1
 DF 0.079 (0.020)
 Analyst Analyzed 0.04/04/19 11:25
 I/V 1
 F/V 2
 Batch 0.079 (0.020)



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

Client Sample ID: W-1189 Date Sampled: 03/29/19 12:48

Percent Solids: N/A

Extraction Method: 7471B

ESS Laboratory Work Order: 1904021 ESS Laboratory Sample ID: 1904021-02

Sample Matrix: Wipe Units: ug/100cm²

Total Metals

Analyte Mercury

Results (MRL) 0.116 (0.020)

MDL

Method 7471B

Limit

Analyst Analyzed 04/04/19 11:27

I/V

F/V Batch 40 CD90345



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

Client Sample ID: W-1190 Date Sampled: 03/29/19 12:49

Percent Solids: N/A

Extraction Method: 7471B

ESS Laboratory Work Order: 1904021 ESS Laboratory Sample ID: 1904021-03

Sample Matrix: Wipe Units: ug/100cm²

Total Metals

F/V Batch 40 CD90345 Analyst Analyzed 04/04/19 11:29 **Analyte** Results (MRL) **MDL** I/V Method Limit Mercury 0.275 (0.020) 7471B

Service



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

Client Sample ID: W-1191 Date Sampled: 03/29/19 12:51

Percent Solids: N/A

ESS Laboratory Work Order: 1904021 ESS Laboratory Sample ID: 1904021-04

Sample Matrix: Wipe Units: ug/100cm²

Extraction Method: 7471B

Total Metals

F/V Batch 40 CD90345 Analyst Analyzed 04/04/19 12:35 <u>I/V</u> **Analyte** Results (MRL) **MDL** Method Limit Mercury 2.61 (0.500) 7471B



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

Client Sample ID: W-1192 Date Sampled: 03/29/19 12:54

Percent Solids: N/A

ESS Laboratory Work Order: 1904021 ESS Laboratory Sample ID: 1904021-05

Sample Matrix: Wipe Units: ug/100cm²

Extraction Method: 7471B

Total Metals

F/V Batch 40 CD90345 Analyst Analyzed 04/04/19 12:37 **Analyte** Results (MRL) **MDL** I/V Method Limit Mercury 0.769 (0.200) 7471B



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

Client Sample ID: W-1193 Date Sampled: 03/29/19 12:58

Percent Solids: N/A

Extraction Method: 7471B

ESS Laboratory Work Order: 1904021 ESS Laboratory Sample ID: 1904021-06

Sample Matrix: Wipe Units: ug/100cm²

Total Metals

F/V Batch 40 CD90345 Analyst Analyzed 04/04/19 12:39 **Analyte** Results (MRL) **MDL** I/V Method Limit Mercury 0.712 (0.200) 7471B



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

Client Sample ID: W-1194 Date Sampled: 03/29/19 13:02

Percent Solids: N/A

Extraction Method: 7471B

ESS Laboratory Work Order: 1904021 ESS Laboratory Sample ID: 1904021-07

Sample Matrix: Wipe Units: ug/100cm²

Total Metals

F/V Batch 40 CD90345 Analyst Analyzed 04/04/19 12:41 Results (MRL) **MDL** I/V **Analyte** Method Limit Mercury 0.404 (0.100) 7471B



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

Client Sample ID: W-1195 Date Sampled: 03/29/19 13:04

Percent Solids: N/A

Extraction Method: 7471B

ESS Laboratory Work Order: 1904021 ESS Laboratory Sample ID: 1904021-08

Sample Matrix: Wipe Units: ug/100cm²

Total Metals

 Analyte Mercury
 Results (MRL)
 MDL 2.56 (0.500)
 Method 7471B
 Limit 25
 DF 25
 Analyst Analyzed MKS 04/04/19 12:43
 I/V 40 CD90345
 E/V CD90345



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

Client Sample ID: W-1196 Date Sampled: 03/29/19 13:06

Percent Solids: N/A

Extraction Method: 7471B

ESS Laboratory Work Order: 1904021 ESS Laboratory Sample ID: 1904021-09

Sample Matrix: Wipe Units: ug/100cm²

Total Metals

 Analyte Mercury
 Results (MRL)
 MDL 7471B
 Limit Limit Limit Limit Program (MRS)
 DF MKS
 Analyse Analyzed Analyzed MKS
 I/V 12:49
 F/V 1
 Batch CD90345



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

Client Sample ID: W-1197 Date Sampled: 03/29/19 13:07

Percent Solids: N/A

ESS Laboratory Work Order: 1904021 ESS Laboratory Sample ID: 1904021-10

Sample Matrix: Wipe Units: ug/100cm²

Extraction Method: 7471B

Total Metals

F/V Batch 40 CD90345 Analyst Analyzed 04/04/19 12:51 **Analyte** Results (MRL) **MDL** I/V Method Limit Mercury 0.549 (0.200) 7471B

000637



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

Client Sample ID: W-1178 Date Sampled: 03/29/19 11:27

Percent Solids: N/A

ESS Laboratory Work Order: 1904021 ESS Laboratory Sample ID: 1904021-11

Sample Matrix: Wipe Units: ug/100cm²

Extraction Method: 7471B

Total Metals

F/V Batch 40 CD90345 Analyst Analyzed 04/04/19 12:53 **Analyte** Results (MRL) **MDL** I/V Method Limit Mercury **6.04** (1.00) 7471B



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

Client Sample ID: W-1179 Date Sampled: 03/29/19 11:36

Percent Solids: N/A

Extraction Method: 7471B

ESS Laboratory Work Order: 1904021 ESS Laboratory Sample ID: 1904021-12

Sample Matrix: Wipe Units: ug/100cm²

Total Metals

 Analyte Mercury
 Results (MRL)
 MDL
 Method
 Limit
 DF
 Analyst
 Analyzed
 I/V
 F/V
 Batch

 Mercury
 0.465 (0.100)
 7471B
 5
 MKS
 04/04/19 12:55
 1
 40
 CD90345

Service



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

Client Sample ID: W-1180 Date Sampled: 03/29/19 11:38

Percent Solids: N/A

ereent Bonds. 1771

ESS Laboratory Work Order: 1904021 ESS Laboratory Sample ID: 1904021-13

Sample Matrix: Wipe Units: ug/100cm²

Extraction Method: 7471B

Total Metals

 Analyte Mercury
 Results (MRL)
 MDL
 Method
 Limit
 DF
 Analyst
 Analyzed
 I/V
 F/V
 Batch

 Mercury
 0.820 (0.200)
 7471B
 10
 MKS
 04/04/19 12:57
 1
 40
 CD90345



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

Client Sample ID: W-1181 Date Sampled: 03/29/19 12:27

Percent Solids: N/A

Extraction Method: 7471B

ESS Laboratory Work Order: 1904021 ESS Laboratory Sample ID: 1904021-14

Sample Matrix: Wipe Units: ug/100cm²

Total Metals

F/V Batch 40 CD90345 Analyst Analyzed 04/04/19 11:55 **Analyte** Results (MRL) **MDL** I/V Method Limit Mercury 0.166 (0.020) 7471B



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

Client Sample ID: W-1182
Date Sampled: 03/29/19 12:31

Percent Solids: N/A

Extraction Method: 7471B

ESS Laboratory Work Order: 1904021 ESS Laboratory Sample ID: 1904021-15

Sample Matrix: Wipe Units: ug/100cm²

Total Metals

 Analyte Mercury
 Results (MRL)
 MDL
 Method
 Limit
 DF
 Analyst
 Analyzed
 I/V
 F/V
 Batch

 Mcroury
 0.218 (0.020)
 7471B
 1
 MKS
 04/04/19 12:01
 1
 40
 CD90345



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

Client Sample ID: W-1183 Date Sampled: 03/29/19 12:34

Percent Solids: N/A

reent Bonds. 17/11

ESS Laboratory Work Order: 1904021 ESS Laboratory Sample ID: 1904021-16

Sample Matrix: Wipe Units: ug/100cm²

Extraction Method: 7471B

Total Metals

 Analyte Mercury
 Results (MRL)
 MDL Method 7471B
 Limit



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

Client Sample ID: W-1184 Date Sampled: 03/29/19 12:36

Percent Solids: N/A

Extraction Method: 7471B

ESS Laboratory Work Order: 1904021 ESS Laboratory Sample ID: 1904021-17

Sample Matrix: Wipe Units: ug/100cm²

Total Metals

 Analyte Mercury
 Results (MRL)
 MDL 7471B
 Limit 20
 DF 20
 Analyst Analyzed MKS 04/04/19 13:01
 I/V 13:01
 F/V 13:01
 Batch CD90345



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

Client Sample ID: W-1185 Date Sampled: 03/29/19 12:39

Percent Solids: N/A

Extraction Method: 7471B

ESS Laboratory Work Order: 1904021 ESS Laboratory Sample ID: 1904021-18

Sample Matrix: Wipe Units: ug/100cm²

Total Metals

 Analyte Mercury
 Results (MRL)
 MDL
 Method
 Limit
 DF
 Analyst
 Analyzed
 I/V
 F/V
 Batch

 Mcroury
 0.525 (0.100)
 7471B
 5
 MKS
 04/04/19 13:03
 1
 40
 CD90345



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

Client Sample ID: W-1186 Date Sampled: 03/29/19 12:41

Percent Solids: N/A

ESS Laboratory Work Order: 1904021 ESS Laboratory Sample ID: 1904021-19

Sample Matrix: Wipe Units: ug/100cm²

Extraction Method: 7471B

Total Metals

F/V Batch 40 CD90345 Analyst Analyzed 04/04/19 13:05 **Analyte** Results (MRL) **MDL** <u>I/V</u> Method Limit Mercury 0.438 (0.100) 7471B



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

Client Sample ID: W-1187 Date Sampled: 03/29/19 12:44

Percent Solids: N/A

Extraction Method: 7471B

ESS Laboratory Work Order: 1904021 ESS Laboratory Sample ID: 1904021-20

Sample Matrix: Wipe Units: ug/100cm²

Total Metals

F/V Batch 40 CD90345 Analyst Analyzed 04/04/19 12:11 **Analyte** Results (MRL) **MDL** <u>I/V</u> Method Limit Mercury 0.318 (0.020) 7471B

Service



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

ESS Laboratory Work Order: 1904021

Quality Control Data

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier		
Total Metals												
Batch CD90345 - 7471B												
Blank												
Mercury	ND	0.020	ug/100cm²									
LCS												
Mercury	0.127	0.020	ug/100cm²	0.1208		105	85-115					
LCS Dup												
Mercury	0.133	0.020	ug/100cm ²	0.1208		110	85-115	4	20			



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

ESS Laboratory Work Order: 1904021

Notes and Definitions

U	Analyte included in the analysis, but not detected
D	Diluted.
ND	Analyte NOT DETECTED at or above the MRL (LOQ), LOD for DoD Reports, MDL for J-Flagged Analytes
dry	Sample results reported on a dry weight basis
RPD	Relative Percent Difference
MDL	Method Detection Limit
MRL	Method Reporting Limit
LOD	Limit of Detection
LOQ	Limit of Quantitation
DL	Detection Limit
I/V	Initial Volume
F/V	Final Volume
§	Subcontracted analysis; see attached report
1	Range result excludes concentrations of surrogates and/or internal standards eluting in that range.
2	Range result excludes concentrations of target analytes eluting in that range.
3	Range result excludes the concentration of the C9-C10 aromatic range.
Avg	Results reported as a mathematical average.
NR	No Recovery

[CALC] Calculated Analyte

SUB Subcontracted analysis; see attached report

RLReporting Limit

EDL **Estimated Detection Limit** Membrane Filtration MF MPN Most Probably Number TNTC Too numerous to Count CFU Colony Forming Units



The Microbiology Division of Thielsch Engineering, Inc.

ESS Laboratory Work Order: 1904021



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

ENVIRONMENTAL

ESS LABORATORY CERTIFICATIONS AND ACCREDITATIONS

Rhode Island Potable and Non Potable Water: LAI00179 http://www.health.ri.gov/find/labs/analytical/ESS.pdf

Connecticut Potable and Non Potable Water, Solid and Hazardous Waste: PH-0750 http://www.ct.gov/dph/lib/dph/environmental health/environmental laboratories/pdf/OutofStateCommercialLaboratories.pdf

Maine Potable and Non Potable Water, and Solid and Hazardous Waste: RI00002 http://www.maine.gov/dhhs/mecdc/environmental-health/dwp/partners/labCert.shtml

Massachusetts Potable and Non Potable Water: M-RI002 http://public.dep.state.ma.us/Labcert/Labcert.aspx

New Hampshire (NELAP accredited) Potable and Non Potable Water, Solid and Hazardous Waste: 2424 http://des.nh.gov/organization/divisions/water/dwgb/nhelap/index.htm

New York (NELAP accredited) Non Potable Water, Solid and Hazardous Waste: 11313 http://www.wadsworth.org/labcert/elap/comm.html

New Jersey (NELAP accredited) Non Potable Water, Solid and Hazardous Waste: RI006 http://datamine2.state.nj.us/DEP OPRA/OpraMain/pi main?mode=pi by site&sort order=PI NAMEA&Select+a+Site:=58715

United States Department of Agriculture Soil Permit: P330-12-00139

Pennsylvania: 68-01752 http://www.dep.pa.gov/Business/OtherPrograms/Labs/Pages/Laboratory-Accreditation-Program.aspx

ESS Laboratory Sample and Cooler Receipt Checklist

Client:	GZA -	- Bedford, NI	H - GZA/HD	М		SS Project ID:		04021	
One						Date Received:		/2019	
Shipped/Del	ivered Via: _	ES	SS Courier			oject Due Date:		/2019	
,,,					D	ays for Project: _	4	Day	
. Air bill ma Air No.: _	ınifest presen	t? NA		No	6. Does	COC match bottle	es?		Yes
. Were cus	tody seals pr	esent?	[Yes	7, Is CO	C complete and c	orrect?		Yes
. Is radiatio	n count <100	CPM?		Yes	8. Were	samples received	I intact?		Yes
. Is a Coole			. [Yes	9. Were	labs informed a	bout <u>short hol</u>	ds & rushes?	Yes/No/NA
•	0.4		-	Yes	10. Wer	e any analyses r	eceived outside	of hold time?	Yes No
i. Was CO	C signed and	dated by clie	ent? L	168					
	contracting n Sample IDs: Analysis: _ TAT: _		Yes (No)	a. Air b	re VOAs received ubbles in aqueou s methanol cover	s VOAs?		Yes / No Yes / No Yes / No / NA
a. If metals	samples pro preserved up el VOA vials t	oon receipt:	ed? (Yes)/ No Date: Date:	Ti	me:	By: By:		
Sample Red	eiving Notes	:							
14. Was the	nere a need to	contact Pro	ject Manage lient?	er?	Yes No Yes No	īme:	Ву: _		
Sample Number	Container ID	Proper Container	Air Bubbles Present	Sufficient Volume	Container Type	Pres	ervative		yanide and 608.3 ticides)
01	329783	Yes	NA	Yes	4 oz. Jar - Unpre	-	ther		
02	329782	Yes	NA	Yes	4 oz. Jar - Unpre	-	Other		
03	329781	Yes	NA	Yes	4 oz. Jar - Unpre	-)ther		
04	329780	Yes	NA	Yes	4 oz. Jar - Unpre	•	Other Other		
05	329779	Yes	NA	Yes	4 oz. Jar - Unpre	-			
06	329778	Yes	NA	Yes	4 oz. Jar - Unpre	-	Other Other		
07	329777	Yes	NΑ	Yes	4 oz. Jar - Unpre		other		
80	329776	Yes	NA	Yes	4 oz. Jar - Unpre		Other Other		
09	329775	Yes	NA	Yes	4 oz. Jar - Unpre		Other Other		
10	329774	Yes	NA	Yes	2 oz. Jar - Unpre		Other		
11	329773	Yes	NA	Yes	4 oz. Jar - Unpre		Other		
12	329772	Yes	NA	Yes	2 oz. Jar - Unpre		Other		
13	329771	Yes	NA	Yes	2 oz. Jar - Unpre		Other		
14	329770	Yes	NA	Yes	2 oz. Jar - Unpre		Other		
15	329769	Yes	NA	Yes	2 oz. Jar - Unpre				
16	329768	Yes	NA	Yes	2 oz. Jar - Unpre		Other		
17	329767	Yes	NA	Yes	4 oz. Jar - Unpre		Other		
18	329766	Yes	NA	Yes	2 oz. Jar - Unpre		Other		
19	329765	Yes	NA	Yes	2 oz. Jar - Unpr		Other		
20	329764	Yes	NA	Yes	2 oz. Jar - Unpr	es	Other		
2nd Revi	aw.				(d)				
All conta	ew liners scann	ed into stor	age/lab		Initials:				

ESS Laboratory Sample and Cooler Receipt Checklist

0!!	GZA - Bedford, NH - GZA/HDM_		ESS Project ID:	1904021	
Client:	GZA - Bediord, NTT - GZ-VTIDIN	_	Date Received:	4/1/2019	
	els on correct containers? y stickets attached?	Yes No Yes / No			
Completed By:	All -	Date & Time:	4/1/19 1613		
Reviewed By:	K C	Date & Time:	4/1/19	161	
Delivered	- 214		4119	1621	

CUSTODY SEAL Q	EC 00
DATE 03-39-19	Quality Environmental Containers 800-255-3950 • 304-255-3900
SIGNATURE Mente	

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Division of Thielson Engineering, Inc.				Turr	Time	84 Days		Report			10902						4	
185 Franc	es Avenue, C	ranston Rt 0291				ory State			Limit									
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Cooler	Present:		O Drop C	nff			Sampled by : (, / had ,	Flease spec				- 1 4						-
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Tel. (401) 461-7181 Fax (401) 461-4486	Regulatory State Is this project for any of the following?:	Limits Electonic Data Check	er 🔲 Excel						
www.esslaboratory.com	O CT RCP O MA MCP O RGP	Deliverables Other (Please							
GZA Geo Environmental Inc.	Project # Project Name 04.0190348.03 Schiller Station Doiler Veno								
Contact Person	Address								
City	State Zip Code PO#	Analysis Ho							
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16 1234	W-1183	X							
1) 1236	W-1184	X							
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Container Type: AC-Air Cassette AG-Amber		ile V-Vial AG		} 					
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Laboratory Use Only	Number of Containers per S								
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The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Rebecca Cox GZA GeoEnvironmental. Inc. 5 Commerce Park North Bedford, NH 03110

RE: Schiller Boiler Demo (04.0190318.03) ESS Laboratory Work Order Number: 1904201

This signed Certificate of Analysis is our approved release of your analytical results. These results are only representative of sample aliquots received at the laboratory. ESS Laboratory expects its clients to follow all regulatory sampling guidelines. Beginning with this page, the entire report has been paginated. This report should not be copied except in full without the approval of the laboratory. Samples will be disposed of thirty days after the final report has been delivered. If you have any questions or concerns, please feel free to call our Customer Service Department.

Laurel Stoddard Laboratory Director **REVIEWED**

By ESS Laboratory at 11:24 am, Apr 11, 2019

Analytical Summary

The project as described above has been analyzed in accordance with the ESS Quality Assurance Plan. This plan utilizes the following methodologies: US EPA SW-846, US EPA Methods for Chemical Analysis of Water and Wastes per 40 CFR Part 136, APHA Standard Methods for the Examination of Water and Wastewater, American Society for Testing and Materials (ASTM), and other recognized methodologies. The analyses with these noted observations are in conformance to the Quality Assurance Plan. In chromatographic analysis, manual integration is frequently used instead of automated integration because it produces more accurate results.

The test results present in this report are in compliance with TNI and relative state standards, and/or client Quality Assurance Project Plans (QAPP). The laboratory has reviewed the following: Sample Preservations, Hold Times, Initial Calibrations, Continuing Calibrations, Method Blanks, Blank Spikes, Blank Spike Duplicates, Duplicates, Matrix Spikes, Matrix Spike Duplicates, Surrogates and Internal Standards. Any results which were found to be outside of the recommended ranges stated in our SOPs will be noted in the Project Narrative.



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

ESS Laboratory Work Order: 1904201

SAMPLE RECEIPT

The following samples were received on April 05, 2019 for the analyses specified on the enclosed Chain of Custody Record.

Lab Number	Sample Name	Matrix	Analysis
1904201-01	C-1142	Solid	7471B
1904201-02	C-1143	Solid	7471B



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

ESS Laboratory Work Order: 1904201

PROJECT NARRATIVE

No unusual observations noted.

End of Project Narrative.

DATA USABILITY LINKS

To ensure you are viewing the most current version of the documents below, please clear your internet cookies for www.ESSLaboratory.com. Consult your IT Support personnel for information on how to clear your internet cookies.

Definitions of Quality Control Parameters

Semivolatile Organics Internal Standard Information

Semivolatile Organics Surrogate Information

Volatile Organics Internal Standard Information

Volatile Organics Surrogate Information

EPH and VPH Alkane Lists



The Microbiology Division of Thielsch Engineering, Inc.

ESS Laboratory Work Order: 1904201



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

Analytical Methods

1010A - Flashpoint 6010C - ICP 6020A - ICP MS

7010 - Graphite Furnace 7196A - Hexavalent Chromium 7470A - Aqueous Mercury

7470A - Aqueous Mercury 7471B - Solid Mercury 8011 - EDB/DBCP/TCP 8015C - GRO/DRO

8081B - Pesticides 8082A - PCB 8100M - TPH

8151A - Herbicides

8260B - VOA 8270D - SVOA

8270D SIM - SVOA Low Level

9014 - Cyanide 9038 - Sulfate

9040C - Aqueous pH

9045D - Solid pH (Corrosivity)

9050A - Specific Conductance

9056A - Anions (IC)

9060A - TOC

9095B - Paint Filter

MADEP 04-1.1 - EPH

MADEP 18-2.1 - VPH

Prep Methods

CURRENT SW-846 METHODOLOGY VERSIONS

3005A - Aqueous ICP Digestion

 $3020\mbox{A}$ - Aqueous Graphite Furnace / ICP MS Digestion

3050B - Solid ICP / Graphite Furnace / ICP MS Digestion

3060A - Solid Hexavalent Chromium Digestion

3510C - Separatory Funnel Extraction

3520C - Liquid / Liquid Extraction

3540C - Manual Soxhlet Extraction

3541 - Automated Soxhlet Extraction

3546 - Microwave Extraction

3580A - Waste Dilution

5030B - Aqueous Purge and Trap

 $5030\mbox{C}$ - Aqueous Purge and Trap

5035A - Solid Purge and Trap

SW846 Reactivity Methods 7.3.3.2 (Reactive Cyanide) and 7.3.4.1 (Reactive Sulfide) have been withdrawn by EPA. These methods are reported per client request and are not NELAP accredited.



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

Client Sample ID: C-1142 Date Sampled: 04/05/19 07:30

Percent Solids: 99

Extraction Method: 7471B

ESS Laboratory Work Order: 1904201 ESS Laboratory Sample ID: 1904201-01

Sample Matrix: Solid Units: mg/kg dry

Total Metals

 Analyte Mercury
 Results (MRL)
 MDL Method 7471B
 Limit Limit Limit Limit Limit MKS
 DF MKS
 Analyzed MKS
 L/V MKS
 E/V MKS
 Batch MCD90557



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

Client Sample ID: C-1143 Date Sampled: 04/05/19 08:14

Percent Solids: 99

Extraction Method: 7471B

ESS Laboratory Work Order: 1904201 ESS Laboratory Sample ID: 1904201-02

Sample Matrix: Solid Units: mg/kg dry

Total Metals

F/V Batch 40 CD90557 Analyst Analyzed
MKS 04/08/19 16:25 **Analyte** Results (MRL) **MDL** I/V Method Limit **48.1** (3.19) Mercury 7471B 0.63

Service

000660



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

ESS Laboratory Work Order: 1904201

Quality Control Data

				Spike	Source		%REC		RPD					
Analyte	Result	MRL	Units	Level	Result	%REC	Limits	RPD	Limit	Qualifier				
Total Metals														
Batch CD90557 - 7471B														
Blank														
Mercury	ND	0.033	mg/kg wet											
LCS														
Mercury	3.74	0.341	mg/kg wet	4.850		77	50-103							
LCS Dup														
Mercury	4.03	0.341	mg/kg wet	4.850		83	50-103	7	20					



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

ESS Laboratory Work Order: 1904201

Notes and Definitions

U	Analyte included in the analysis, but not detected
D	Diluted.
ND	Analyte NOT DETECTED at or above the MRL (LOQ), LOD for DoD Reports, MDL for J-Flagged Analytes
dry	Sample results reported on a dry weight basis
RPD	Relative Percent Difference
MDL	Method Detection Limit
MRL	Method Reporting Limit
LOD	Limit of Detection
LOQ	Limit of Quantitation
DL	Detection Limit
I/V	Initial Volume
F/V	Final Volume
§	Subcontracted analysis; see attached report
1	Range result excludes concentrations of surrogates and/or internal standards eluting in that range.
2	Range result excludes concentrations of target analytes eluting in that range.
3	Range result excludes the concentration of the C9-C10 aromatic range.

Avg Results reported as a mathematical average.

NR No Recovery

[CALC] Calculated Analyte

SUB Subcontracted analysis; see attached report

RL Reporting Limit

EDL Estimated Detection Limit
MF Membrane Filtration
MPN Most Probably Number
TNTC Too numerous to Count
CFU Colony Forming Units



The Microbiology Division of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc. Client Project ID: Schiller Boiler Demo

ESS Laboratory Work Order: 1904201

ESS LABORATORY CERTIFICATIONS AND ACCREDITATIONS

ENVIRONMENTAL

Rhode Island Potable and Non Potable Water: LAI00179 http://www.health.ri.gov/find/labs/analytical/ESS.pdf

Connecticut Potable and Non Potable Water, Solid and Hazardous Waste: PH-0750 http://www.ct.gov/dph/lib/dph/environmental health/environmental laboratories/pdf/OutofStateCommercialLaboratories.pdf

Maine Potable and Non Potable Water, and Solid and Hazardous Waste: R100002 http://www.maine.gov/dhhs/mecdc/environmental-health/dwp/partners/labCert.shtml

Massachusetts Potable and Non Potable Water: M-RI002 http://public.dep.state.ma.us/Labcert/Labcert.aspx

New Hampshire (NELAP accredited) Potable and Non Potable Water, Solid and Hazardous Waste: 2424 http://des.nh.gov/organization/divisions/water/dwgb/nhelap/index.htm

New York (NELAP accredited) Non Potable Water, Solid and Hazardous Waste: 11313 http://www.wadsworth.org/labcert/elap/comm.html

New Jersey (NELAP accredited) Non Potable Water, Solid and Hazardous Waste: RI006 http://datamine2.state.nj.us/DEP OPRA/OpraMain/pi main?mode=pi by site&sort order=PI NAMEA&Select+a+Site:=58715

United States Department of Agriculture Soil Permit: P330-12-00139

Pennsylvania: 68-01752

http://www.dep.pa.gov/Business/OtherPrograms/Labs/Pages/Laboratory-Accreditation-Program.aspx

ESS Laboratory S	Sample and Cooler Receipt Checklist	
Client: GZA - Bedford, NH - GZA/HDM	ESS Project ID: 1904201	
FOO Overland	Date Received: 4/5/2019	
Shipped/Delivered Via: ESS Courier	Project Due Date: <u>4/11/2019</u> Days for Project: 4 Day	
Air bill manifest present? No Air No.: NA	6. Does COC match bottles?	Yes
Were custody seals present? Yes	7. Is COC complete and correct?	Yes
3. Is radiation count <100 CPM? Yes	8. Were samples received intact?	Yes
4. Is a Cooler Present? Yes Temp: 0.1 Iced with: Ice	9. Were labs informed about short holds & rushes?	Yes/No/NA
5. Was COC signed and dated by client? Yes	10. Were any analyses received outside of hold time?	Yes /(No)
11. Any Subcontracting needed? Yes /(No) ESS Sample IDs: Analysis: TAT:	12. Were VOAs received? a. Air bubbles in aqueous VOAs? b. Does methanol cover soil completely?	Yes / (No Yes / No Yes / No / NA
13. Are the samples properly preserved? a. If metals preserved upon receipt: b. Low Level VOA vials frozen: Yes // No Date: Date:	Time: By:	
Sample Receiving Notes:		
14. Was there a need to contact Project Manager? a. Was there a need to contact the client? Who was contacted? Date:	Yes (No Yes / No Time: By:	
		*** * **
Sample Container Proper Air Bubbles Sufficient Number ID Container Present Volume	Container Type Preservative Record pH (Cya Pestic	
01 331521 Yes NA Yes 02 331520 Yes NA Yes	4 oz. Jar - Unpres NP 4 oz. Jar - Unpres NP	
2nd Review All containers scanned into storage/lab Are barcode labels on correct containers? Are all necessary stickers attached?	Initials: (1) Yes No Yes No	
Completed By:	Date & Time: 4/5/19 1734	
Reviewed By:	Date & Time: 4519 1500	
Delivered By:	4518 1800	

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	Thielsch Eng			Turn Time 8 4 Days				Report				1904201							\dashv
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ESS Lab ID	Collection Date	Collection Time	Sample Typ		Sample Matrix	rebecks. Cox @ gza. Co	mple ID		100							4			
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Cooler	Present	_1/_	O Drop Of	•		Comments:) Please spe	ecify "Othe	r" pre	serva	ative a	nd cont	ainers t	vpes in	this sr	ace			-
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