

GZA
GeoEnvironmental, Inc.

Engineers and
Scientists

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File No. 32795.02



Ms. Cynthia Gianfrancesco
Principal Environmental Scientist
Rhode Island Department of Environmental Management
Office of Waste Management
235 Promenade Street
Providence, Rhode Island 02908-5767

Re: Stockpiled Soils Reuse Plan
Charbert, Division of N.F.A. Corporation
Alton, Rhode Island

Dear Ms. Gianfrancesco:

GZA GeoEnvironmental, Inc. (GZA) is please to provide this plan describing the proposed on-site reuse of soil stockpiles currently located at the Charbert facility property in Alton, Rhode Island. The plan also provides supporting sampling and analytical results for your use in evaluating this plan. This report is subject to the Limitations presented in Appendix A.

To facilitate the Departments review, GZA has included the following documents:

- GZA's February 14, 2005 "New Stockpiles" analytical results;
- GZA's January 12, 2005 re-sampling results for the "Old Stockpiles";
- The Clayton Group Service's (Clayton's) 2001 initial sampling of the "Old Stockpiles"; and
- Clayton's 2001 analytical results for the bottom of the "Holding Pond".

The "New Stockpiles" consist of approximately 3,800 cubic yards (yds³) of soil located in the central portion of the facility as shown on Figure E-1 and labeled "Stockpiled Soils (2001 - 2004)". This material is categorized as a tan to gray, fine to coarse gravely Sand with trace Silt, and was created by scraping the bottoms of Lagoons 1 to 3 in 2001 and 2004. The "Old Stockpiles" also are approximately 3,800 yds³ of soil located in the south-southeastern portion of the facility yard as shown on Figure E-1 and labeled "Stockpiled Soils (1998)". This material is also categorized as a tan, fine to coarse gravely Sand, with trace Silt, and was created by scraping the bottoms of Lagoons 1 to 3 in 1998.

PREVIOUS SOIL TESTING

Clayton Group Testing - 2001

The stockpiled soils generated in 1998 were extensively characterized by Clayton in the summer of 2001. The results are documented in a series of letter reports provided to the RIDEM on July 18, 2001 (*Findings of Soil Reuse Investigation*) and September 12, 2001 (*Findings of the Characterization of the "Unknown Hydrocarbon"*). Clayton's sampling included testing for the 13 Priority Pollutant Metals (total basis), TCLP Metals, Total Petroleum Hydrocarbons (TPH), Volatile Organic Compounds (VOCs) and Semi-volatile Organic Compounds (SVOC) plus tentatively identified compounds (TICs).

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A summary of the Clayton analytical testing results on the 13 prior samples (designated SP-1 to SP-13) is provided on Table 1, attached. Copies of their certificates of analysis are contained in Appendix B. As shown on Table 1, low levels of four metals and four VOCs were detected in the soil samples; all at concentrations below RIDEM's Method 1 Residential Direct Exposure Criteria (RDEC) and the GA Leachability Criteria. Unknown hydrocarbons ranged in concentration from 62 milligrams/kilogram (mg/kg) to 2,600 mg/kg. Clayton's reports indicated that these unknowns were non-petroleum, silicon-based oils. One SVOC was tentatively identified in one of the 13 samples as para-tert-butyl phenol at an estimated concentration of 100 mg/kg. The laboratory (Alpha Analytical) indicated that the confidence on the qualitative identification of this SVOC was poor (i.e., Q value of 72% compared to a typical reporting threshold of 85%).

GZA Testing – January 2005

To further evaluate the "petroleum versus silicone" issue in the older stockpiled materials, GZA collected two sample sets on January 12, 2005. GZA returned to the approximate locations where Clayton had collected samples SP-12 from the northern stockpile and SP-13 from the southern stockpile (refer to Figures 9 and E-1, attached). These locations were selected because they represented the highest reported Total Petroleum Hydrocarbon (TPH) levels from each Old Stockpile. GZA Samples were designated SP-12/GZA05 and SP-13/GZA05, and were comprised of a series of 5 to 10 individual aliquots each, collected from a depth of approximately 12 inches below ground surface in the general vicinity of Clayton's original samples. This method of composite sampling was selected to most accurately represent Clayton's original work, as actual survey data was not available for the sample locations.

GZA analyzed each soil sample for a suite of parameters consisting of: VOCs, SVOCs plus tentatively identified compounds (TICs), TPH with Fingerprint, Volatile Petroleum Hydrocarbons (VPH), and Extractable Petroleum Hydrocarbons (EPH). These analytical results are summarized on Table 2, and the analytical certificates are attached in Appendix C.

Review of this data indicates that both samples were non-detected for VOCs, target SVOCs and VPH. TPH levels, as reported by Modified Method 8100 ranged from 170 mg/kg in the sample from SP-13/GZA 05 to 220 mg/kg in the sample from SP-12/GZA 05. More than 15 SVOC TICs were observed in each sample and were characterized by the laboratory as organo-siloxanes. This information, in conjunction with the Fingerprint analyses, indicates that more than 90% of the material identified by Modified Method 8100 as TPH is actually non-petroleum based silicone compounds.

GZA's recent testing substantiates Clayton's earlier findings that the majority of TPH observed in the soil stockpiles is not petroleum-based. This work also validates the applicability of the proposed SVOC TIC/TPH Fingerprint testing for quantification of the non-petroleum fraction of the Modified Method 8100 TPH results. These findings were applied to our proposal for characterization of the "New Stockpiles", as discussed below.

Holding Pond Sampling - 2001

In response to RIDEM's request of November 2, 2000 to characterize soils in the Holding Pond prior to final closure, Clayton collected and analyzed three soil samples from the base of the excavation for TCLP Metals, TPH and VOCs in the summer of 2001. The results were submitted to RIDEM in an August 3, 2001 letter report. A summary of the results of this testing are also

included on Table 1, and reveal that only 120 mg/kg of an unknown, non-petroleum based hydrocarbon was present in one of the three samples. A copy of the August 3, 2001 letter is attached for your reference in Appendix D.

FINAL SOIL STOCKPILE CHARACTERIZATION

Task 1 – Sample Collection

On February 14, 2005 GZA personnel collected a series of 10 samples from the approximately 3,800 yd³ of soil in the “New Stockpiles” area. Sampling and analysis was conducted in accordance with the RIDEM approved, February 16, 2005 *Revised Soil Reuse Characterization Work Plan*. Five samples, consisting of four individual aliquots and one composite, were collected from each of the 2001 and 2004 soil stockpiles. Samples were collected using a rough grid pattern laid over the stockpile area to provide representative aerial coverage of the materials (see Appendix E for photographs 1-3 and Figure F-1).

A clean shovel was used to excavate to a depth of approximately 18-inches at each location. A soil sample was then collected from the 12-inch to 18-inch interval of the excavation sidewall (see Appendix E for photograph 4) to ensure that any volatile fraction present was not lost. The collected samples were placed in clean jars and methanol preserved vials provided by the laboratory, stored in an ice-filled cooler and transported to GZA's Environmental Chemistry Laboratory in Hopkinton, Massachusetts (a Rhode Island Department of Health licensed facility) under chain-of-custody for analysis.

The two composite samples, designated COMP 2001 and COMP 2004, were produced in the laboratory (exclusive of VOC samples as described below) from equal portions by weight of the four individual samples from each stockpile. Individual samples were designated SS-1/01 through SS-4/01 and SS-1/04 through SS-4/04. The approximate collection locations of all new samples are shown on Figure E-1. The composite VOC samples were prepared in the field by collecting roughly equal volumetric aliquots from each test hole sidewall directly into the methanol preserved vials to avoid the potential loss of volatiles.

Task 2 – Sample Analysis

The two composite soil samples (one from the 2001 soils and one from the 2004 soils) were tested for the full suite of analytes that were evaluated during the 2001 sampling/analytical program, which consist of: 13 Priority Pollutant Metals, SPLP Metals (substituted for TCLP metals), VOCs, SVOCs plus TICs, and TPH. Additionally, GZA included Extractable Petroleum Hydrocarbons (Massachusetts EPH Method) and Petroleum Hydrocarbon Fingerprint (PHF) using EPA Method 8100M to differentiate between petroleum and non-petroleum fractions as reported by the TPH test. These analytical results are summarized on Table 2, and the analytical certificates are attached in Appendix C.

Both samples were non-detected for VOC and the target SVOCs. TPH levels, as reported by Modified Method 8100, ranged from 280 mg/kg in sample COMP 2001 to 350 mg/kg in sample COMP 2004, below RIDEM's 500-1,000 mg/kg Method 1 Residential Direct Exposure and GA Leachability criteria. Up to 15 SVOC TICs were reported in each sample and were characterized primarily as organo-siloxanes that contributed to the hydrocarbon content as reported by the TPH tests. This information in conjunction with the Fingerprint analyses indicates that more than 90%



of the material identified by Modified Method 8100 as TPH is actually non-petroleum based silicone compounds. No total or SPLP metals were reported at concentrations at or above RIDEM's Method 1 Residential Direct Exposure Criteria or the GA Leachability Criteria.

Analysis of each of the eight individual samples focused on those parameters that were previously identified or suspected to be present, in lagoon scrapings. This testing consisted of SVOCs plus TICs using EPA Method 8270 and TPH/EPH/Fingerprint. All eight samples were non-detected for VOCs and the target SVOCs. TPH levels as reported by Modified Method 8100 ranged from 100 mg/kg in the sample from SS-2/01 to 430 mg/kg in the sample from SS-3/01 and were all below the applicable soils quality limits. Again, more than 15 SVOC TICs were observed in each sample and were characterized as organo-siloxanes. This information in conjunction with the Fingerprint analyses indicates that 90% of the material identified by Modified Method 8100 as TPH is actually non-petroleum based silicone compounds.

As a contingency, GZA retained each individual sample for further testing in the event that either of the composite samples yielded an elevated concentration of a target constituent. "Elevated" was defined as the Method 1 Residential Direct Exposure or GA Leachability Criteria divided by the total number of aliquots in the composite (in this case four). In fact, one composite (SS-04/COMP) did yield an SPLP concentration for lead greater than $\frac{1}{4}$ of the GA Leachability criteria of 0.04 mg/l. In accordance with the work plan, each SS-04 series sample was then tested for SPLP lead. As shown in the analytical certificates attached in Appendix C, none of the individual samples contained lead in excess of the GA Leachability criterion; three were non-detected and the fourth (SS-3/04) was reported as 0.016 mg/L.

PROPOSED ON-SITE SOIL REUSE

Charbert proposes to reuse the approximately 7,600 yds³ of stockpiled soils, all of which meet the RIDEM's Residential Direct Exposure Criteria and GA Leachability Criteria, as backfill in the "Holding Pond" and Lagoons from which they were removed. As you know, an evaluation of waste water treatment and disposal options is currently being conducted. This filling will take place once Charbert has completed the permitting and construction of a new on-site waste water treatment plant.

At the time of Holding Pond closure, the stockpiled soils will be excavated from the various facility yard areas and trucked to the Holding Pond for placement. They will be spread and compacted as needed based on Charbert's anticipated future use of the area. At a minimum the soils will be placed using a bulldozer in two foot thick lifts and compacted by tracking with dozer. The Holding Pond area outside of the 200-foot river bank wetland buffer, estimated to be approximately 2,000 yd³, will be filled first. Filling will then proceed to the Lagoons, each of which is estimated to have a capacity of approximately 17,000 yd³, until the soil stockpiles are exhausted based on visual observation of the storage areas.

Note that portions of the 1998 stockpiles are within the 200-foot river bank wetland buffer of the Pawcatuck River. Charbert will prepare a wetland restoration plan for RIDEM review and approval prior to removing stockpiled soils from the river bank buffer areas. These areas will then be restored as necessary using virgin soils either from on-site or off-site sources, and in accordance with all applicable wetland regulations. A report that documents the final disposition of the stockpile soils will be prepared and submitted to RIDEM following completion of the wetland restoration project.



We look forward to your approval of this soils reuse plan. If you have any questions, please feel free to contact us at (401) 421-4140.

Very Truly Yours,

GZA GEOENVIRONMENTAL, INC.




Edward A. Summerly, P.G.
Associate Principal


John P. Hartley
Project Reviewer

EAS/JPH:mac

cc: Jill Eastman, RIDEM (2 copies)
David Chopy, RIDEM

Attachments: Table 1 & 2
Figures 9 & E1
Appendix A – Limitations
Appendix B – Clayton Analytical Results
Appendix C – GZA Analytical Results
Appendix D – Holding Pond Sampling Results
Appendix E – Photographs

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