OU3 Investigation at the Former Carborundum Company - Electric Products Division, Hyde Park Facility
Town of Niagara, Niagara, County, New York
Site No. 932036

FINAL REPORT

Prepared for:
BP
4850 East 49th Street, MBC3-149
Cuyahoga Heights, Ohio 44125

Prepared by:

INTERA Inc.

Project No.: 01-220-3
February 2002

EXECUTIVE SUMMARY

The former Carborundum Company's Hyde Park facility ("site" or "facility") in Niagara Falls is listed on the New York State Department of Environmental Conservation's (NYSDEC's) list of Inactive Hazardous Waste Disposal Sites. The facility is listed as a Class 2 site, No. 932036. A Class 2 site is defined as a site that poses a significant threat to the public health or the environment and one that requires mitigative action.

NYSDEC has prepared a Record of Decision (ROD) for the site. The ROD divides the site into three operable units (OU1, OU2, and OU3). OU3 is off-site soil east of the site that was to be subjected to further study of the nature and extent of contamination in OU3. A work plan for investigating OU3 was prepared by INTERA in March 2001, and was approved by NYSDEC in May 2001.

The purpose of the OU3 investigation was to study contaminated soils off-site along the east property boundary. The specific objectives of the investigation include the following:

- Identify the extent of soil contamination identified within the proposed investigation area along the east property boundary during the IRM.
- Identify the source of potential off-site soil contamination, if possible.
- Recommend appropriate actions to manage potential off-site soil contamination

All work carried out during the OU3 investigation was conducted in accordance with the OU3 investigation work plan. This report documents the work program and results of the OU3 investigation that was carried out at the end of August 2001. The OU3 investigation work program included locating utilities in the work area, conducting surface soil sampling, excavating test pits and completing soil sampling, decontaminating equipment, and conducting air monitoring. A total of 20 test pits were excavated in the OU3 investigation area to depths ranging from 15 to 20ft BGS to define the lateral and vertical extent of soils containing COCs at concentrations that exceed NYSDEC Soil Cleanup Objectives. Validation of the data was completed for both field and laboratory aspects of the sampling program.

The results of the OU3 investigation indicated the following:

- Soil contamination is present in OU3 in TP-5, TP-6 and TP-10 at depths ranging from approximately 10 to 16.5ft BGS. Trichloroethene and 1,2-dichloroethene are present at concentrations that exceed NYSDEC Soil Cleanup Objectives but below Action Levels. There is no evidence of soil contamination present at depths above approximately 10ft BGS.
- Assuming that soil contamination extends approximately half-way between contaminated and adjacent non-contaminated test pits, the estimated area of soil contamination in OU3 is

approximately 550ft^2.

- Assuming that soil contamination extends approximately 1ft above and below the known depth of contamination, the estimated volume of soil contamination in OU3 is approximately 175yd^3 or approximately 315 tons, assuming a soil density of 1.8 tons/yd^3.

- The soil contamination in OU3 appears to be a continuation of the existing soil containing concentrations of COCs exceeding NYSDEC Soil Cleanup Objectives that was identified at depths greater than 10ft BGS during the IRM in the vicinity of TP-5 and TP-6.

- The estimated total volume of contaminated soil remaining along the eastern property boundary of the Kanthal-Globar site and in OU3 is approximately 685yd^3 or approximately 1240 tons, assuming a soil density of 1.8 tons/yd^3. This total volume is comprised of approximately 1170 tons of soil exceeding NYSDEC Soil Cleanup Objectives at depths from 0 to 16ft BGS and approximately 70 tons of soil exceeding NYSDEC Action Levels at depths from 10 to 16ft BGS.

In order to address the soil contamination identified during the OU3 investigation, it is recommended that the IRM process be continued to allow for removal and off-site disposal of contaminated soil from OU3 as well as the remaining contaminated soil that was identified during the IRM along the east property boundary.

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

LIST OF APPENDICES

1. INTRODUCTION

The former Carborundum Company's Hyde Park facility ("site" or "facility") in Niagara Falls is listed on the New York State Department of Environmental Conservation's (NYSDEC's) list of Inactive Hazardous Waste Disposal Sites. The facility is listed as a Class 2 site, No. 932036. A Class 2 site is defined as a site that poses a significant threat to the public health or the environment and one that requires mitigative action.

1.1 Background

A Remedial Investigation (RI), Phase II RI, Feasibility Study (FS) and Interim Remedial Measure (IRM) have been completed at the site by Intera Inc. (INTERA, formerly Duke Engineering & Services) for BP. Results of the RI and Phase II RI indicated that soils existed on the property that contained volatile organic compounds (VOCs) and/or polycyclic aromatic hydrocarbons (PAHs) at concentrations that exceeded NYSDEC Soil Cleanup Objectives. An IRM was executed at the site in 1999 to delineate the extent of soil contamination and to remove contaminated soil. A total of 35,606 tons of contaminated soil were removed from the site. Excavation during the IRM was conducted up to but not beyond property boundaries. Some soils containing VOCs above NYSDEC Soil Cleanup Objectives were identified along the eastern property boundary, but were not removed during the IRM.

NYSDEC has prepared a Record of Decision (ROD) for the site. The ROD divides the site into three operable units (OU1, OU2, and OU3). OU1 is on-site soil, that was addressed through execution of the IRM. Over 90% of contaminated soil was removed from within the site boundaries. Remaining contaminated soil in OU1 is located at depths of greater than 10 feet below ground surface and does not pose a threat to the health of site employees or nearby residents. Therefore, the NYSDEC has proposed no further action for OU1. OU2 is groundwater beneath the site that is being addressed through an on-going long-term groundwater monitoring program. OU3 is off-site soil east of the site that was to be subjected to further study of the nature and extent of contamination in OU3. A work plan for investigating OU3 was prepared by INTERA in March 2001 (DE&S 2001), and approved by NYSDEC in May 2001.

1.2 Purpose of OU3 Investigation

The purpose of the OU3 investigation was to study contaminated soils off-site along the east property boundary. The specific objectives of the investigation include the following:

- Identify the extent of soil contamination identified within the proposed investigation area along the east property boundary during the IRM.
- Identify the source of potential off-site soil contamination, if possible.

- Recommend appropriate actions to manage potential off-site soil contamination

1.3 Scope of Work

All work carried out during the OU3 investigation was conducted in accordance with the OU3 investigation work plan. The scope of work carried out during the OU3 investigation in order to satisfy the project objectives included the following:

- Collecting surface soil samples (0 to 2" depth interval) from each test pit location and selecting ten samples for laboratory analysis of volatile organic compounds (VOCs) and semi-volatile organic compounds (SVOCs).
- Excavating test pits in OU3 to a depth of approximately 20 feet below ground surface (ft BGS).
- Collecting soil samples from each test pit and selecting two soil samples from each test pit for laboratory analysis of VOCs.
- Collecting two composite soil samples for waste characterization purposes.
- Preparation of a report documenting the work program and results of the OU3 investigation.

This report documents the work program and results of the OU3 investigation that was carried out at the end of August 2001 in accordance with the OU3 investigation work plan.

2. WORK PROGRAM

The OU3 investigation work program included locating utilities in the work area, conducting surface soil sampling, excavating test pits and completing soil sampling, decontaminating equipment, and conducting air monitoring. All on-site activities were conducted according to health and safety protocols outlined in the Health and Safety Plan (DE&S 1999) and the Quality Assurance Project Plan (QAPP) used for the IRM (Intera 1995) that were deemed acceptable for use during the OU3 investigation as described in the OU3 investigation work plan.

2.1 Utilities

Utility locations in the work area were confirmed and marked prior to test pit excavations. The only utility of concern in the OU3 work area was overhead power lines located approximately 25ft east of the east property boundary of the Kanthal-Globar facility. The height of the power lines was great enough that work could be carried out underneath the power lines with minimal risk to on-site workers and equipment.

2.2 Sample Analyses

The analytical parameter list for the OU3 Investigation was developed from the list of contaminants of concern (COCs) developed during the IRM. The COCs for the OU3 investigation include the following specific VOCs:

1,2-dichloroethene (DCE)	trichloroethene (TCE)	toluene
vinyl chloride (VC)	xylenes	acetone

All soil samples were analyzed for VOCs. In addition, surface soil samples were analyzed for semi-volatile organic compounds (SVOCs) as requested by NYSDEC. Analyses were conducted by Severn Trent Laboratories (STL) of Amherst, New York, a New York State certified analytical laboratory. Samples were analyzed according to SW-846 protocol Method 8260 for VOCs and SW-846 protocol Method 8270 for SVOCs. All laboratory deliverables were reported in accordance with ASP Category B deliverables.

Blind field replicate samples were collected and analyzed at the rate of one replicate for every ten field samples. Field replicates provide an indication of laboratory precision, as discussed in the QAPP. Travel blanks were also collected to ensure that soil samples collected from the field were not contaminated with COCs during sample handling or shipment. One travel blank was shipped in each cooler containing samples for VOCs analysis.

2.3 Surface Soil Sampling

Surface soil samples (0 to 2" depth interval) were collected from each test pit location on August 27, 2001, prior to excavating the test pits. Test pit locations are indicated on Figure 1. Surface soil samples could not be collected from TP-1 and TP-2 as the sample interval consisted entirely of crushed stone and no soil was available for sampling. Soil samples at each location were collected in duplicate into two new self sealing plastic bags. One bag was allowed to reach ambient temperature and used for headspace analysis, the other was placed on ice for possible selection for laboratory analysis.

The headspace for each soil sample collected was scanned with a Photovac 2020 model photoionization detector (PID) for the presence of organic vapors. Surface soil samples were selected for laboratory analysis based on PID concentrations and to define the vertical extent of surface soil contamination. Surface soil samples were collected from TP-3, TP-7, TP-9, TP-10, TP-11, TP-12, TP-15, TP-17, TP-19, TP-21. A replicate soil sample was collected from TP-21. These samples were numbered *OU3TP-001* to *OU3TP-011*.

Soil samples were transferred to laboratory prepared sample containers, placed on ice in insulated coolers, and delivered to STL within 48 hours of sampling under chain-of-custody procedures. Surface soil samples were submitted for laboratory analysis of VOCs and SVOCs. One trip blank for VOCs analysis was included with this shipment.

2.4 Test Pit Excavation and Soil Sampling

Test pit excavation and soil sampling were conducted between August 28 and 30, 2001. A total of 20 test pits were completed in the OU3 work area as indicated on Figure 1. Note that TP-18 was not completed as it was not deemed necessary based on field observations of surrounding test pits.

The test pits were completed in a grid pattern to provide coverage of the entire OU3 work area in order to define the extent of VOC concentrations that exceed NYSDEC Soil Cleanup Objectives. Test pits were completed to depths greater than the known depth of soil contamination along the eastern property boundary of the former Carborundum site (approximately 16ft). Test pit depths ranged from 15ft BGS to 21ft BGS as indicated in the test pit stratigraphic logs included in Appendix A. Material excavated from the test pits was temporarily placed in two stockpiles on plastic sheeting next to each test pit to minimize surface contamination. The stockpiles consisted of soil from the surface to approximately 10ft BGS and from 10ft and deeper such that soils could be replaced to their approximate original depth during backfilling. Test pits were backfilled immediately upon completion and the plastic sheeting collected for later disposal. The excavator bucket was decontaminated between test pits following the procedure described below in Section 2.5.

Soil samples were collected directly from the excavator bucket in approximately 2.5ft intervals. Soil samples at each interval were collected in duplicate into two new self sealing plastic bags. One bag was allowed to reach ambient temperature and used for headspace analysis, the other was placed on ice for possible selection for laboratory analysis. The headspace for each soil sample collected was scanned with a PID for the presence of organic vapors. At the request of NYSDEC, PID readings were also taken directly from the excavator bucket in TP-1, TP-2, TP-3, TP-4, TP-5, TP-9, TP-10 and TP-14.

2.4.1 Samples for VOC Analysis

Soil samples were selected to define the lateral and vertical extent of contamination and included shallow, mid-level and deeper soils. Two discrete samples from each test pit were selected for laboratory analysis of COCs according to the following rationale:

- From the sample interval registering the highest PID reading.
- If no indication of contamination was found in a sample during the PID scan, but suspected contamination was visually observed, then discrete samples were selected for laboratory analysis from the area judged to represent the area of maximum contamination.
- If no indication of contamination was found in a specific horizon with the PID or by visual inspection, then samples were selected from the test pit at regular intervals, or based on evidence of contamination in adjacent test pits.

A total of 44 samples were submitted for analysis of VOCs including 40 test pit soil samples and four replicates. Soil samples were collected from each test pit and replicate samples were collected from TP-4, TP-8, TP-10 and TP-17. The soil samples were numbered *OU3TP-012* to *OU3TP-055*.

Soil samples were transferred to laboratory prepared sample containers, placed on ice in insulated coolers, and delivered to STL within 48 hours of sampling under chain-of-custody procedures. Soil samples were submitted for laboratory analysis of VOCs. A total of two trip blanks for VOC analysis accompanied the shipments to the lab.

2.4.2 Samples for Waste Characterization Parameters

Two composite samples were submitted for analysis of Toxic Characteristic Leachate Procedure (TCLP) toxicity characteristic list NYCRR Part 371, Section 371.3(e) (VOCs, SVOCs and Metals); ignitability; corrosivity; and reactivity. These samples were collected as follows: one sample from ground surface to 10ft BGS in all test pits along the western boundary of OU3 (TP-1 to TP-7); and one sample from greater than10 feet in all test pits along the western boundary of OU3. The samples were collected along the west boundary

due to the known presence of contamination in that area as confirmed during the IRM (DE&S 1999).

The characterization samples were transferred to laboratory prepared sample containers, placed on ice in insulated coolers, and delivered to STL within 48 hours of sampling under chain-of-custody procedures.

2.5 Decontamination Procedures

Decontamination of the excavator bucket took place on a portable decontamination pad located adjacent to the OU3 work area constructed of polyethylene sheeting. The excavator bucket was decontaminated between each test pit to minimize cross contamination of test pit soils and soil samples. Decontamination of the excavator bucket consisted of removing accumulated solids by scraping, followed by high pressure washing. Plastic sheeting and accumulated solids were collected and disposed of by the test pit contractor. Decontamination effluent water was temporarily containerized in drums and was discharged at the end of the test pit program to city sewers under an INTERA discharge permit from the City of Niagara Falls.

2.6 Air Monitoring

Work area and community air monitoring were conducted and overseen by INTERA personnel during test pit excavation activities in accordance with the health and safety plan. This health and safety plan was in compliance with the New York State Department of Health (NYSDOH) Community Air Monitoring Plan and the NYSDEC TAGM 4031 Dust Control.

Work area air monitoring was performed by continuously monitoring the breathing zone of work zone personnel with a PID. PID readings noted in the breathing zone during test pit excavation did not reach action levels and personnel were not required to upgrade the level of health and safety equipment at any time.

Community air monitoring was conducted by continuously monitoring VOC vapor and dust concentrations in ambient air upwind and downwind of the work area during all intrusive activity. PID readings and dust concentrations noted during test pit excavation did not reach action levels and vapor and/or dust control measures were not required at any time.

3. RESULTS OF WORK PROGRAM

The OU3 investigation field program included collecting surface soil samples, excavating test pits and collecting soil samples to define the lateral and vertical extent of soils containing COCs at concentrations that exceed NYSDEC Soil Cleanup Objectives. These are the same objectives that were used during the IRM. NYSDEC Soil Cleanup Objectives were determined for the site based on the procedure described in NYSDEC TAGM HWR-94-4046, January 24, 1994 (NYSDEC 1994).

3.1 Surface Soil Sampling

Surface soil consisted of fill material composed of crushed stone mixed with medium grain sand. Headspace analysis conducted on all samples indicated PID readings ranging from a 0 to 6.8ppm. These readings are not indicative of significant concentrations of organic vapor. Visual and/or olfactory evidence of contamination was not observed in any of the samples.

Ten surface soil samples were selected for laboratory analysis of VOCs and SVOCs. Laboratory analytical results did not indicate the presence of VOCs or SVOCs that exceeded NYSDEC Soil Cleanup Objectives. Laboratory analytical results for COCs and selected SVOCs are presented in Table 1. Laboratory analytical reports are included in Appendix B.

3.2 Test Pit Excavation and Soil Sampling

3.2.1 Results of Field Investigation

Soil conditions encountered during test pit excavation were reasonably consistent across the OU3 work area. Fill material consisting of sand and gravel was encountered from the surface to a depth of approximately 1.5ft BGS. Reddish brown, mottled silty clay was encountered from approximately 1.5 to 14ft BGS. Saturated conditions were encountered at approximately 9ft BGS. Gray, wet, plastic clay was encountered below 14ft BGS. Visual and/or olfactory evidence of contamination was not observed in any of the test pits except for a mild solvent odor noted at a depth of approximately 4ft BGS in TP-4. Further details are provided on the test pit stratigraphic logs included in Appendix A.

PID readings were taken directly from the excavator bucket in TP-1, TP-2, TP-3, TP-4, TP-5, TP-9, TP-10 and TP-14. These PID bucket readings ranged from 0 to 150ppm. PID readings greater than 0ppm were only detected in bucket readings from TP-4, TP-5 and TP-10. Headspace analysis conducted on all samples indicated PID readings ranging from 0 to 40ppm. Note that PID readings greater than 0ppm were only detected in sample headspace from TP-5, TP-6 and TP-10.

TP-18 was not excavated as there was no field evidence of contamination in surrounding test pits.

3.2.2 Results of Laboratory Analysis for COCs

Based on field observations, two soil samples were selected from each test pit using the methodology described in Section 2.4.1 for laboratory analysis of VOCs. Laboratory analytical results indicated concentrations of COCs that exceeded NYSDEC Soil Cleanup Objectives in samples from TP-5, TP-6 and TP-10. Concentrations of COCs did not exceed NYSDEC Soil Cleanup Objectives in remaining samples. Concentrations of COCs did not exceed Action Levels in any samples. Laboratory analytical results for COCs are presented in Table 2. Concentrations of non-COC VOCs were not detected above analytical detection limits in any of the samples. Laboratory analytical reports are included in Appendix B.

Trichloroethene was detected at a concentration of 21µg/g in TP-6 (14.5 to 16.5ft sample interval) and at a concentration of 2.4µg/g in TP-10 (10.5 to 13.5ft sample interval). These concentrations exceed the NYSDEC Soil Cleanup Objective of 0.88µg/g but do not exceed the Action Level of 64µg/g. The concentration of trichloroethene in TP-5 does not exceed the NYSDEC Soil Cleanup Objective.

1,2-Dichloroethene was detected at a concentration of 0.58µg/g in TP-5 (10 to 12.5ft sample interval) and at a concentration of 0.79µg/g in TP-6 (14.5 to 16.5ft sample interval). These concentrations exceed the NYSDEC Soil Cleanup Objective of 0.41µg/g but do not exceed the Action Level of 2,800µg/g. The concentration of 1,2-dichloroethene in TP-10 was not detected above the analytical detection limit; however, the analytical detection limit for this parameter exceeds the NYSDEC Soil Cleanup Objective due to laboratory sample dilution.

Concentrations of other COCs were not detected above NYSDEC Soil Cleanup Objectives in the samples from TP-5, TP-6 and TP-10. Note that concentrations of acetone, vinyl chloride and methylene chloride were not detected above analytical detection limits in TP-6 and TP-10; however, the analytical detection limits for these parameters exceeds NYSDEC Soil Cleanup Objectives due to laboratory sample dilution.

3.2.3 Results of Laboratory Analysis for Waste Characterization

Two composite soil samples were submitted for laboratory analysis of waste characterization parameters. One sample was a composite of material from the surface to 10ft BGS in TP-1 to TP-7 and the other was a composite of material from greater than 10ft BGS in TP-1 to TP-7. Laboratory analytical results indicated that the material can be considered non-hazardous according to 6 NYCRR Part 371 - Identification and Listing of Hazardous Wastes (NYSDEC 1995). Laboratory analytical results for the waste characterization analysis are presented in Table 3. Laboratory analytical reports are included in Appendix B.

During the IRM, it was determined that environmental media containing hazardous constituents from listed hazardous waste can be managed as non-hazardous waste if the media contain hazardous constituent concentrations that are at or below Soil Action Level concentrations. This is known as the "contained-in"

policy and was used to manage excavated soils during the IRM. COC concentrations noted during the OU3 investigation did not exceed Soil Action Levels; therefore, the soil in OU3 can be considered non-hazardous according to the "contained-in" policy.

4. DATA VALIDATION

Validation of the data was completed for both field and laboratory aspects of the sampling program. Data validation consisted of:

- Assessment of the field sampling protocols and Quality Assurance/Quality Control (QA/QC) procedures.
- Assessment of the laboratory analytical methodology and QA/QC procedures.

4.1 Field Sampling QA/QC

To ensure that representative samples were collected in the field and were delivered to the laboratory without degradation or contamination of the sample, the following field QA/QC measures were taken:

- Field staff used new latex gloves for each sampling location.
- Samples collected directly from the excavator bucket were collected from soil that had not come in contact with the bucket itself in an effort to prevent cross-contamination.
- The excavator bucket was decontaminated between test pits.
- Samples were delivered to the laboratory in sealed, iced coolers under chain-of-custody within 48 hours of sampling.

During sampling, replicate samples and travel blanks were collected to assess analytical precision and to identify potential sample contamination during sampling or transportation. The additional samples collected included the following:

- Replicate surface soil sample collected from TP-21 (sample # *OU3TP-010 & OU3TP-011*), analyzed for VOCs and SVOCs.
- Replicate soil sample collected from TP-4, 12-14.5ft interval (sample # *OU3TP-030 & OU3TP-037*), analyzed for VOCs.
- Replicate soil sample collected from TP-8, 12.5-15ft interval (sample # *OU3TP-043 & OU3TP-047*), analyzed for VOCs.
- Replicate soil sample collected from TP-10, 10.5-13.5ft interval (sample # *OU3TP-039 & OU3TP-*

046), analyzed for VOCs.

- Replicate soil sample collected from TP-17, 3-6ft interval (sample # *OU3TP-018 & OU3TP-019*), analyzed for VOCs.

- Travel blanks shipped to the laboratory on August 28, 2001 (sample # *TRIPBLANK-1*), and on August 30, 2001 (sample # *TRIPBLANK-2* and *TRIPBLANK-3*), analyzed for VOCs.

Relative percent differences (RPDs) between original and replicate samples were calculated as follows:

$$RPD = \frac{X_1 - X_2}{\overline{X}}$$

Where: X_1 = Concentration of original sample

X_2 = Concentration of replicate sample

$\overline{X}$ = Mean concentration of original and replicate samples

Replicate surface soil samples showed good correlation with RPDs ranging from 10 to 20% between analytes except for acetone. The concentration of this parameter was detected at low concentrations in one sample and below the analytical detection limit in the other. This situation produces higher RPD values for slight differences in concentration.

Replicate soil samples showed good correlation with RPDs less than approximately 50% between analytes except for trichloroethene in the replicate from TP-10. The RPD for this parameter is 128%; however, given the heterogenous nature of the soil, this is not considered to be indicative of unacceptable analytical precision. The overall sample quality is considered to be acceptable. RPDs of all field replicate samples are provided in Table 4.

All travel blank samples were analyzed for VOCs. VOCs were not detected in any of the blank samples.

4.2 Laboratory QA/QC

STL provided Category B deliverables for all of the samples analyzed. Soil samples were analyzed for VOCs using EPA SW-846 Method 8260B and for SVOCs using EPA SW-846 Method 8270C.

Analytical data was validated by Intera Inc. of Austin, Texas. QA/QC was generally acceptable; however, some data was qualified due to contaminants detected in the method blanks and due to response factors and percent relative standard deviations being outside method parameters during calibration verifications. The

internal laboratory QA/QC procedures were sufficient to meet the criteria outlined in the method. The data validation report is included in Appendix C.

Elevated concentrations found in several soil samples from TP-5, TP-6 and TP-10 necessitated sample dilution. This resulted in high detection limits for COCs in these samples.

5. EXTENT AND SOURCE OF SOIL CONTAMINATION

5.1 Extent of Soil Contamination in OU3

Results of the test pit excavation and soil sampling program indicated that soil contamination is present in OU3 in TP-5, TP-6 and TP-10 at depths ranging from approximately 10 to 16.5ft BGS. Concentrations of trichloroethene and 1,2-dichloroethene are present at concentrations that exceed NYSDEC Soil Cleanup Objectives but below Action Levels. Soil samples collected from less than 10ft BGS in these test pits did not contain concentrations of COCs that exceeded NYSDEC Soil Cleanup Objectives.

TP-5, TP-6 and TP-10 are located in the southwestern portion of the OU3 investigation area, with TP-5 and TP-6 located along the perimeter fence that forms the eastern property boundary of the former Carborundum site. Soil samples collected from surrounding test pits (TP-4, TP-7, TP-9, TP-13 and TP-14), did not indicate concentrations of COCs that exceeded NYSDEC Soil Cleanup Objectives. Based on this information and assuming that soil contamination extends approximately half-way between contaminated and adjacent non-contaminated test pits, the estimated area of soil contamination in OU3 is approximately 550ft^2. Note that this estimated area uses the perimeter fence as the western boundary. The estimated area of soil contamination is indicated on Figure 2. The approximate area of soil contamination remaining at the Kanthal-Globar site that was identified during the IRM is also indicated on Figure 2.

Based on the sample intervals and assuming that soil contamination extends approximately 1ft above and below the known depth of contamination (i.e. from 9 to 17.5ft BGS), the estimated volume of soil contamination in OU3 is approximately 175yd^3. A cross-section indicating soil sample locations and the estimated vertical extent of contamination is shown in Figure 3. The approximate vertical extent of soil contamination remaining at the Kanthal-Globar site that was identified during the IRM is also indicated on Figure 3.

Assuming a soil density of 1.8 tons/yd^3, the estimated volume of soil contamination in OU3 is approximately 315 tons. Note that soil samples were not collected below a depth of 16.5ft BGS in any of the test pits; therefore, no information is available that describes the full depth of soil contamination in OU3.

5.2 Source of Soil Contamination in OU3

The soil contamination present in OU3 is located in the southwestern portion of the OU3 investigation area, with soil samples from TP-5 and TP-6 and TP-10 containing concentrations of COCs that exceed NYSDEC Soil Cleanup Objectives. The most elevated concentrations of COCs that exceed NYSDEC Soil Cleanup Objectives are present in TP-6 that is located along the perimeter fenceline. Soil samples collected during the IRM from the wall of the excavation in the vicinity of TP-5 and TP-6 identified concentrations of COCs that exceeded NYSDEC Soil Cleanup Objectives. Based on the results of the OU3 investigation, it is

apparent that soils containing concentrations of COCs above NYSDEC Soil Cleanup Objectives identified during the IRM extend into OU3.

6. SUMMARY AND CONCLUSIONS

The purpose of the OU3 investigation was to study contaminated soils off-site along the east property boundary. The OU3 investigation field program included collecting surface soil samples, excavating test pits and collecting soil samples to define the lateral and vertical extent of soils containing COCs at concentrations that exceed NYSDEC Soil Cleanup Objectives. A total of 20 test pits were excavated in the OU3 investigation area to depths ranging from 15 to 20ft BGS. The results of the OU3 investigation indicated the following:

- Surface soil samples did not contain concentrations of VOCs or SVOCs that exceeded NYSDEC Soil Cleanup Objectives.

- Soil conditions encountered during test pit excavation consisted of silty clay to a depth of approximately 14ft BGS underlain by wet, plastic clay. Visual and/or olfactory evidence of contamination was not observed in any of the test pits except for a mild odor in TP-4.

- PID readings taken directly from the excavator bucket indicated concentrations ranging from 0 to 150ppm. Headspace analysis for organic vapors indicated concentrations ranging from 0 to 40ppm. Organic vapor concentrations greater than zero were only detected in TP-4, TP-5, TP-6 and TP-10.

- Soil samples from TP-5, TP-6 and TP-10 contained concentrations of trichloroethene and 1,2-dichloroethene that exceeded NYSDEC Soil Cleanup Objectives but did not exceed Action Levels. These samples were collected between 10 and 16.5ft BGS.

- Soil samples from remaining test pits did not contain concentrations of COCs that exceeded NYSDEC Soil Cleanup Objectives or Action Levels.

- Waste characterization samples composited from TP-1 to TP-7 indicated that the material can be considered non-hazardous according to 6 NYCRR Part 371 - Identification and Listing of Hazardous Wastes. COC concentrations noted during the OU3 investigation did not exceed Soil Action Levels; therefore, the soil in OU3 can be considered non-hazardous according to the "contained-in" policy that was utilized during the IRM.

- Validation of the data for both field and laboratory aspects of the sampling program indicated that the QA/QC procedures were acceptable and that the analytical data was acceptable.

The following conclusions are based on the results of the OU3 investigation:

- Soil contamination is present in OU3 in TP-5, TP-6 and TP-10 at depths ranging from approximately 10 to 16.5ft BGS. Trichloroethene and 1,2-dichloroethene are present at concentrations that exceed NYSDEC Soil Cleanup Objectives but below Action Levels. There is no evidence of soil contamination present at depths above approximately 10ft BGS.

- Assuming that soil contamination extends approximately half-way between contaminated and adjacent non-contaminated test pits, the estimated area of soil contamination in OU3 is approximately 550ft^2

- Assuming that soil contamination extends approximately 1ft above and below the known depth of contamination, the estimated volume of soil contamination in OU3 is approximately 175yd^3 or approximately 315 tons, assuming a soil density of 1.8 tons/yd^3.

- The soil contamination in OU3 appears to be a continuation of the existing soil containing concentrations of COCs exceeding NYSDEC Soil Cleanup Objectives that was identified at depths greater than 10ft BGS during the IRM in the vicinity of TP-5 and TP-6.

- The estimated total volume of contaminated soil remaining along the eastern property boundary of the Kanthal-Globar site and in OU3 is approximately 685yd^3 or approximately 1240 tons, assuming a soil density of 1.8 tons/yd^3. This total volume is comprised of approximately 1170 tons of soil exceeding NYSDEC Soil Cleanup Objectives at depths from 0 to 16ft BGS and approximately 70 tons of soil exceeding NYSDEC Action Levels at depths from 10 to 16ft BGS.

7. RECOMMENDATIONS FOR FUTURE ACTION

In order to address the soil contamination identified during the OU3 investigation, it is recommended that the IRM process be continued. Continuing the IRM process would allow for the removal and off-site disposal of the soil contamination identified in OU3 as well as the remaining contamination identified during the IRM along the east property boundary (identified during the IRM as the east side of Area 2A).

It is anticipated that NYSDEC will allow the soil removal work to be completed as an addendum to the 1999 IRM that was executed at the site. As such, addendum to the IRM work plan, HSP and QAPP will be completed to include OU3. It is estimated that it will take approximately four months to produce addenda to the IRM work plan documents and have them approved and accepted by NYSDEC. Once a final work plan is in place, contractors can be selected and the soil removal action undertaken in the early fall of 2002. A report documenting the soil removal could then be produced for the end of 2002.

8. CLOSURE

This report has been prepared for the exclusive use of BP using a methodology that is acceptable within the profession for environmental site assessments. Data obtained from test pit excavation and soil sampling represent the conditions about a limited area surrounding the sample location and as such can be expected to be variable with respect to location and time. It should be noted that results of an investigation of this type should in no way be construed as a warranty that the site is free from any and all contamination from past or current practices.

Intera, Inc. (INTERA) has exercised professional judgement in collecting and analysing the information and in formulating recommendations based on the results of the study. The mandate at INTERA is to perform the given tasks within the guidelines prescribed by the client and with the quality and due diligence expected within the profession. No other warranty or representation, expressed or implied, as to the accuracy of the information or recommendations is included or intended in this report. Intera Inc. hereby disclaims any liability or responsibility to any person or party, other than the party to whom this report is addressed, for any loss, damage, expense, fines or penalties which may arise or result from the use of any information or recommendations contained in this report by any other party. Any use of this report constitutes acceptance of the limits of INTERA liability. INTERA liability extends only to its client and only for the total amount of fees received from the client for this specific project and not to other parties who may obtain this report.

Respectfully submitted

INTERA INC.

Eric Wilson, P.Eng.
Environmental Engineer

Kenneth G. Raven, M. Sc., P.Eng.
Project Manager

9. REFERENCES

DE&S (2001) Final OU3 Investigation Work Plan for the Former Carborundum Company - Electric Products Division, Hyde Park Facility, Town of Niagara, Niagara County, New York, Site No. 932036, March 2001.

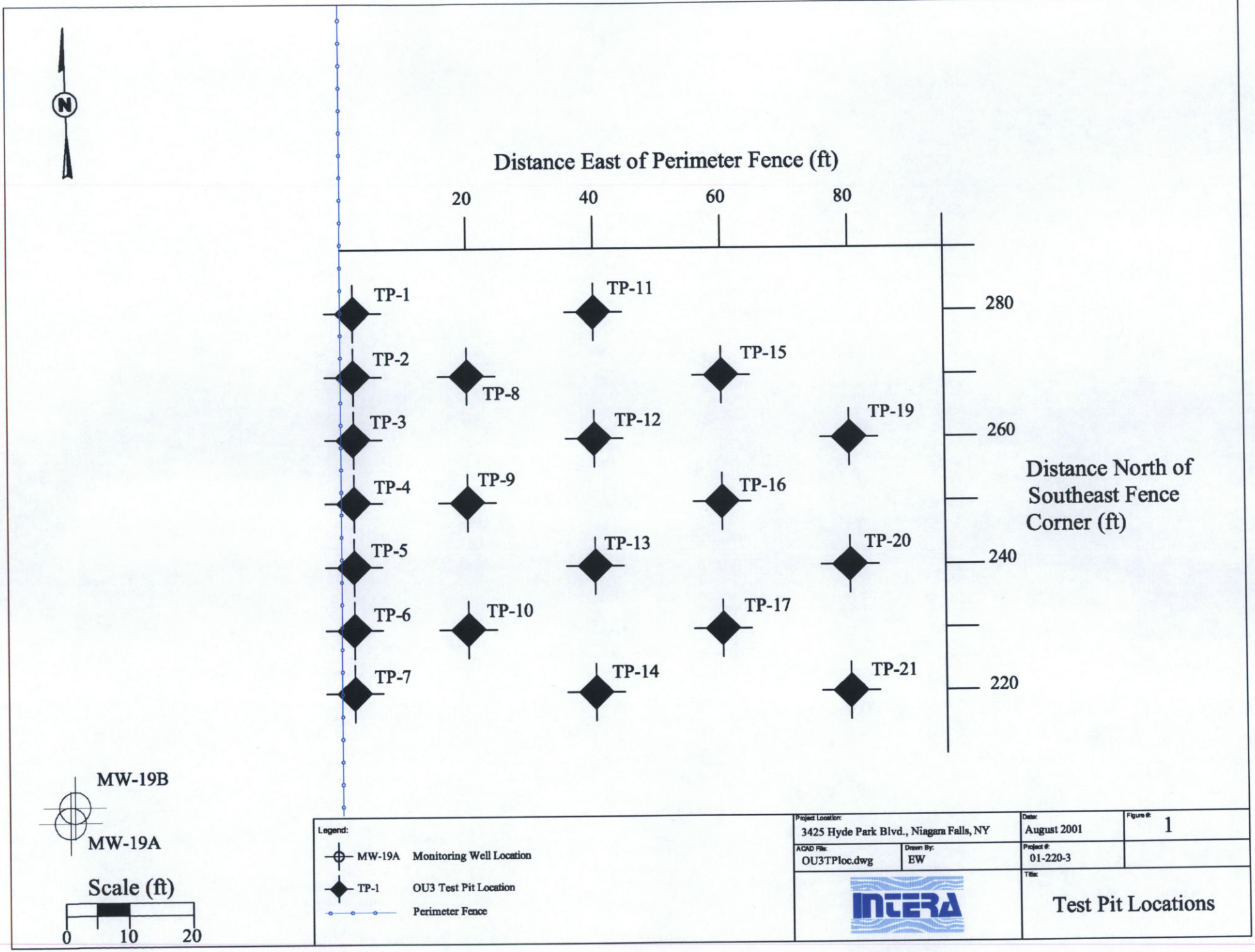
DE&S (1999) Execution of the Interim Remedial Measure for the Former Carborundum Company - Electric Products Division, Hyde Park Facility, Town of Niagara, Niagara County, New York, Site No. 932036, December 1999.

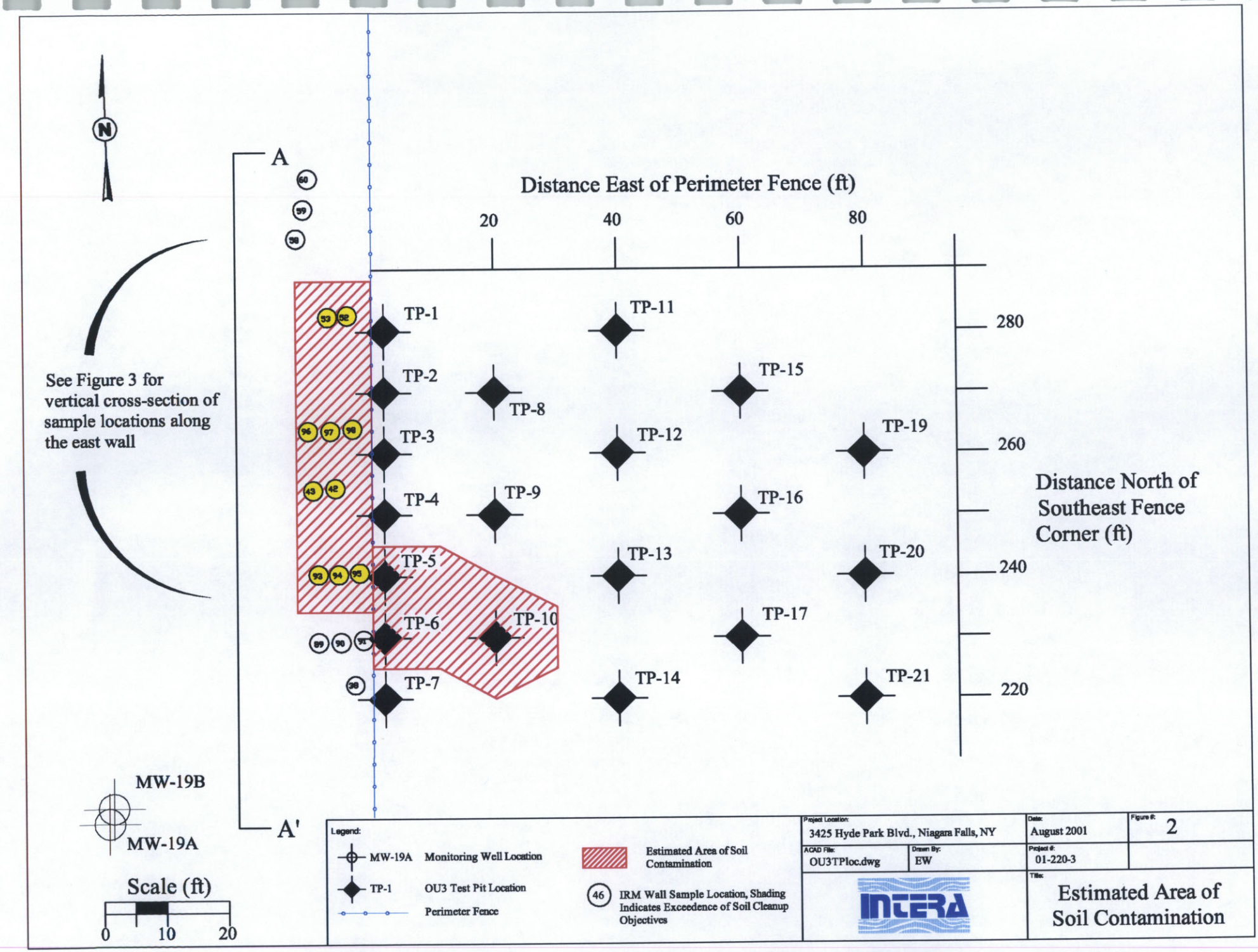
Intera Inc. (1995) Quality Assurance Project Plan for Remedial Investigation/Feasibility Study of the Former Carborundum Company - Electric Products Division, Hyde Park Facility, Town of Niagara, Niagara County, New York, Site No. 932036, August 1995.

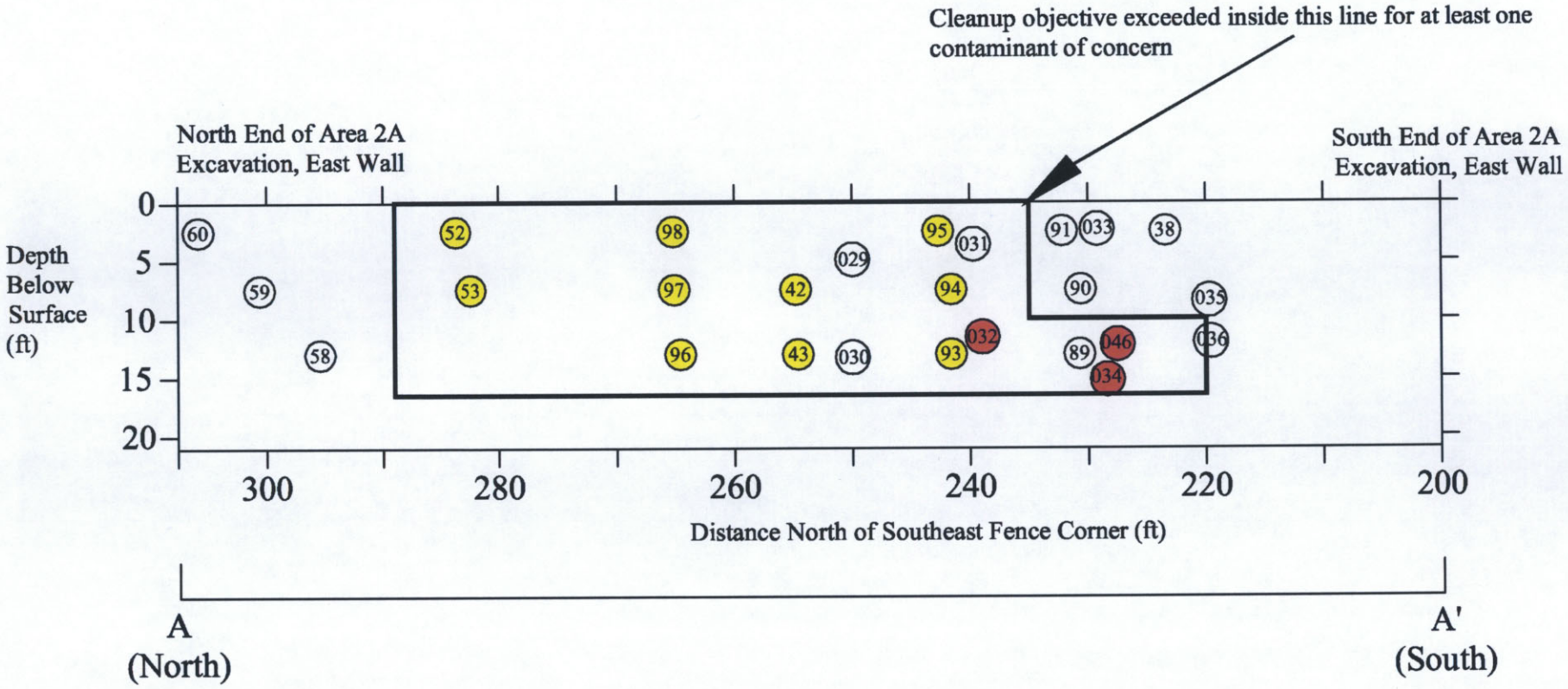
NYSDEC (1995) 6 NYCRR Part 371, Identification and Listing of Hazardous Wastes, January 14, 1995.

NYSDEC (1994) Determination of Soil Cleanup Objectives and Cleanup Levels NYSDEC TAGM HWR-94-4046, January 24, 1994

FIGURES


N
Distance East of Perimeter Fence (ft)
20
40
60
80
TP-1
TP-2
TP-3
TP-4
TP-5
TP-6
TP-7
TP-8
TP-9
TP-10
TP-11
TP-12
TP-13
TP-14
TP-15
TP-16
TP-17
TP-19
TP-20
TP-21
280
260
240
220
Distance North of Southeast Fence Corner (ft)
MW-19B
MW-19A
Scale (ft)
0
10
20
Legend:
MW-19A Monitoring Well Location
TP-1 OU3 Test Pit Location
Perimeter Fence
Project Location:
3425 Hyde Park Blvd., Niagara Falls, NY
Date:
August 2001
Figure #:
1
ACAD File:
OU3TPloc.dwg
Drawn By:
EW
Project #:
01-220-3
INTERA
Title:
Test Pit Locations


N
A
A'
Distance East of Perimeter Fence (ft)
20
40
60
80
Distance North of Southeast Fence Corner (ft)
280
260
240
220
TP-1
TP-2
TP-3
TP-4
TP-5
TP-6
TP-7
TP-8
TP-9
TP-10
TP-11
TP-12
TP-13
TP-14
TP-15
TP-16
TP-17
TP-19
TP-20
TP-21
See Figure 3 for vertical cross-section of sample locations along the east wall
MW-19B
MW-19A
Scale (ft)
0
10
20
Legend:
MW-19A Monitoring Well Location
TP-1 OU3 Test Pit Location
Perimeter Fence
Estimated Area of Soil Contamination
46 IRM Wall Sample Location, Shading Indicates Exceedence of Soil Cleanup Objectives
Project Location: 3425 Hyde Park Blvd., Niagara Falls, NY
Date: August 2001
Figure #: 2
ACAD File: OU3TPloc.dwg
Drawn By: EW
Project #: 01-220-3
INTERA
Title: Estimated Area of Soil Contamination



Legend:

Estimated Extent of Contamination Along East Property Boundary

(46) IRM Wall Sample, Shading Indicates Exceedence of Soil Cleanup Objectives

(046) OU3 Test Pit Sample, Shading Indicates Exceedence of Soil Cleanup Objectives

Project Location: 3425 Hyde Park Blvd., Niagara Falls, NY	Date: January 2002	Figure #: 3	
ACAD File: OU3Vertical Cross Section.dwg	Project #: 01-220-3	Drawn by: GDB	
INTERA	Title: Cross Section of Contaminated Soil Along East Property Boundary		

TABLES

Table 1: Surface Soil Analytical Results for COCs and Selected Semi-VOCs (ug/g)

Contaminants of Conern and Selected Semi-VOC Parameters	Test Pit Number >>	TP-3	TP-7	TP-9	TP-10	TP-11	TP-12	TP-15	TP-17
	Sample Number >>	OU3TP-001	OU3TP-002	OU3TP-003	OU3TP-004	OU3TP-005	OU3TP-006	OU3TP-007	OU3TP-008
	Clean up Objective	27-Aug-01	27-Aug-01	27-Aug-01	27-Aug-01	27-Aug-01	27-Aug-01	27-Aug-01	27-Aug-01
Trichloroethene	0.88	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	2.0 J	<0.005
1,2-Dichloroethene	0.41	<0.005	<0.005	<0.005	<0.005 UJ	<0.005 UJ	<0.005 UJ	<0.005 UJ	<0.005
Acetone	0.2	0.011 BU	0.012 BU	0.012 BU	0.013 BUJ	0.015 BUJ	0.019 BUJ	0.010 BUJ	0.014 BU
Vinyl Chloride	0.2	<0.010	<0.010	<0.010	<0.010 UJ	<0.010 UJ	<0.010 UJ	<0.010 UJ	<0.010
Xylenes (total)	1.68	0.003 J	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Ethylbenzene	7.7	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Toluene	2.1	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	0.001 J	<0.005
Methylene Chloride	0.15	0.006 BU	0.006 BU	0.008 BU	0.009 BUJ	0.007 J	0.008 J	0.017 J	0.011 BU
Pyrene	50	0.14 J	0.31 J	0.13 J	0.17 J	0.30 J	0.18 J	0.11 J	0.059 J
Benzo(ghi)perylene	50	<0.33	0.17 J	0.056 J	<0.33	0.12 J	0.10 J	0.06 J	0.025 J
Indeno(1,2,3-cd)pyrene	4.48	<0.33	0.15 J	0.05 J	<0.33	0.094 J	0.086 J	0.051 J	0.023 J
Benzo(b)fluoranthene	1.5	0.092 J	0.26 J	0.12 J	0.16 J	0.23 J	0.27 J	0.11 J	0.054 J
Fluoranthene	50	0.15 J	0.38	0.16 J	0.20 J	0.31 J	0.22 J	0.14 J	0.073 J
Benzo(k)fluoranthene	1.5	0.10 J	0.34	0.12 J	<0.33	0.26 J	0.14 J	0.092 J	0.045 J
Chrysene	0.56	0.12 J	0.30 J	0.14 J	0.18 J	0.27 J	0.17 J	0.12 J	0.06 J
Benzo(a)pyrene	15.4	0.11 J	0.33	0.13 J	0.17 J	0.26 J	0.17 J	0.11 J	0.054 J
Benzo(a)anthracene	3.86	0.087 J	0.23 J	0.098 J	0.13 J	0.19 J	0.12 J	0.08 J	0.039 J
Phenanthrene	50	<0.33	0.19 J	0.068 J	<0.33	<0.33	0.096 J	0.059 J	<0.33

NOTES

All units ug/g

Dupl. - indicates a duplicate sample

UJ - Indicates the analyte was not detected above the reported sample quantitation limit and the quantitation limit is approximate.

J - Indicates an estimated value. Compound meets identification criteria and is less than the specific detection limit but greater than zero.

B - Indicates that the analyte was found in both the sample and its associated laboratory blank. Possible/probable blank contamination.

U - Indicates the analyte was not detected above the reported sample quantitation limit.

<330 - Indicates not detected above laboratory detection limit.

Concentrations of all other semi-volatile oraganic compound parameters were not detected above analytical detection limits

Table 1 cont.

Contaminants of Conern and Selected Semi-VOC Parameters	Test Pit Number >>	TP-19	TP-21	TP-21 (Dupl.)
	Sample Number >>	OU3TP-009	OU3TP-010	OU3TP-011
	Clean up Objective	27-Aug-01	27-Aug-01	27-Aug-01
Trichloroethene	0.88	<0.005	<0.005	0.004 J
1,2-Dichloroethene	0.41	<0.005	<0.005 UJ	<0.005
Acetone	0.2	0.016 BU	0.011 BUJ	<0.010
Vinyl Chloride	0.2	<0.010 UJ	<0.010 UJ	<0.010
Xylenes (total)	1.68	0.002 J	<0.005	0.002 J
Ethylbenzene	7.7	<0.005	<0.005	<0.005
Toluene	2.1	<0.005	<0.005	0.003 J
Methylene Chloride	0.15	0.009 BU	0.011 J	0.014 J
Pyrene	50	0.14 J	0.092 J	0.081 J
Benzo(ghi)perylene	50	0.055 J	0.038 J	0.031 J
Indeno(1,2,3-cd)pyrene	4.48	0.048 J	0.032 J	0.027 J
Benzo(b)fluoranthene	1.5	0.11 J	0.084 J	0.079 J
Fluoranthene	50	0.16 J	0.11 J	0.098 J
Benzo(k)fluoranthene	1.5	0.099 J	0.08 J	0.072 J
Chrysene	0.56	0.10 J	0.098 J	0.088 J
Benzo(a)pyrene	15.4	0.12 J	0.088 J	0.076 J
Benzo(a)anthracene	3.86	0.088 J	0.066 J	0.056 J
Phenanthrene	50	0.074 J	0.051 J	0.046 J

NOTES

All units ug/g

Dupl. - indicates a duplicate sample

UJ - Indicates the analyte was not detected above the reported sample quantitation limit and the quantitation limit is approximate.

J - Indicates an estimated value. Compound meets identification criteria and is less than the specific detection limit but greater than zero.

B - Indicates that the analyte was found in both the sample and its associated laboratory blank. Possible/probable blank contamination.

U - Indicates the analyte was not detected above the reported sample quantitation limit.

<330 - Indicates not detected above laboratory detection limit.

Concentrations of all other semi-volatile oraganic compound parameters were not detected above analytical detection limits

Table 2: Soil Sample Laboraotory Analytical Results for Contaminants of Concern (ug/g)

Contaminants of Concern	Test Pit Number >		TP-1		TP-2		TP-3	
	Sample Interval >		3-6.5 ft	9.5-13 ft	3-6 ft	8.5-11 ft	6-9.75 ft	12.5-15.5 ft
	Sample Number >		OU3TP-023	OU3TP-024	OU3TP-025	OU3TP-026	OU3TP-027	OU3TP-028
	Clean up Objective	**Action Level**	29-Aug-01	29-Aug-01	29-Aug-01	29-Aug-01	29-Aug-01	29-Aug-01
Trichloroethene	0.88	64	0.008	<0.005	0.004 J	0.078	0.01	<0.005
1,2-Dichloroethene	0.41	2,800	<0.005 UJ	<0.005 UJ	<0.005 UJ	0.002 J	0.001 J	<0.005 UJ
Acetone	0.2	8,000	0.016 BUJ	0.013 BUJ	0.013 BUJ	0.013 BUJ	0.011 BUJ	0.045 BUJ
Vinyl Chloride	0.2	0.36	<0.010 UJ	<0.010 UJ	<0.010 UJ	<0.010 UJ	<0.010 UJ	<0.010 UJ
Xylenes (total)	1.68	200,000	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Ethylbenzene	7.7	8,000	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Toluene	2.1	20,000	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Methylene Chloride	0.15	93	0.027 BUJ	0.020 BUJ	0.014 BUJ	0.012 BUJ	0.013 BUJ	0.009 BUJ

NOTES

All units ug/g

Dupl. - indicates a duplicate sample

UJ - Indicates the analyte was not detected above the reported sample quantitation limit and the quantitation limit is approximate.

J - Indicates an estimated value. Compound meets identification criteria and is less than the specific detection limit but greater than zero.

B - Indicates that the analyte was found in both the sample and its associated laboratory blank. Possible/probable blank contamination.

D - Indicates compound identified in an analysis at a secondary dilution factor.

U - Indicates the analyte was not detected above the reported sample quantitation limit.

<5 - Indicates not detected above laboratory detection limit.

580D Indicates that parameter exceeds Clean-up Objective

Table 2 cont.

Contaminants of Concern	Test Pit Number >		TP-4			TP-5		TP-6	
	Sample Interval >		3.5-6.5 ft	12-14.5 ft	12-14.5 ft (Dup)	3-5 ft	10-12.5 ft	1.5-3 ft	14.5-16.5 ft
	Sample Number >		OU3TP-029	OU3TP-030	OU3TP-037	OU3TP-031	OU3TP-032	OU3TP-033	OU3TP-034
	Clean up Objective	**Action Level**	29-Aug-01	29-Aug-01	29-Aug-01	29-Aug-01	29-Aug-01	29-Aug-01	29-Aug-01
Trichloroethene	0.88	64	0.016	<0.005	0.004 J	0.022 D	0.50 D	0.004 J	**21 D**
1,2-Dichloroethene	0.41	2,800	0.14	0.004 J	0.004 J	0.160 DJ	**0.58 D**	0.001 J	**0.79 D**
Acetone	0.2	8,000	0.053 BJ	0.038 BUJ	0.064 BJ	0.042 BDUJ	<0.020	0.007 BUJ	<1.25
Vinyl Chloride	0.2	0.36	0.002 J	<0.010 UJ	<0.010	<0.010 UJ	<0.010	<0.010 UJ	<1.25
Xylenes (total)	1.68	200,000	<0.005	<0.005	<0.005	<0.005	0.16 D	<0.005	0.46 DJ
Ethylbenzene	7.7	8,000	0.02 J	<0.005	<0.005	<0.005	0.15 D	<0.005	0.36 DJ
Toluene	2.1	20,000	<0.005	<0.005	<0.005	<0.005	0.011 D	<0.005	1.4 D
Methylene Chloride	0.15	93	0.006 B	0.011 BUJ	0.007 J	0.049 BDUJ	0.04 BDU	0.010 BUJ	<0.625

NOTES

All units ug/g

Dupl. - indicates a duplicate sample

UJ - Indicates the analyte was not detected above the reported sample quantitation limit and the quantitation limit is approximate.

J - Indicates an estimated value. Compound meets identification criteria and is less than the specific detection limit but greater than zero.

B - Indicates that the analyte was found in both the sample and its associated laboratory blank. Possible/probable blank contamination.

D - Indicates compound identified in an analysis at a secondary dilution factor.

U - Indicates the analyte was not detected above the reported sample quantitation limit.

<5 - Indicates not detected above laboratory detection limit.

580D Indicates that parameter exceeds Clean-up Objective

Table 2 cont.

Contaminants of Concern	Test Pit Number >		TP-7		TP-8			TP-9	
	Sample Interval >		6.5-10 ft	10-12 ft	1.5-3.5 ft	12.5-15 ft	12.5-15 ft (Dup)	6-8.5 ft	14-16 ft
	Sample Number >		OU3TP-035	OU3TP-036	OU3TP-042	OU3TP-043	OU3TP-047	OU3TP-040	OU3TP-041
	Clean up Objective	**Action Level**	29-Aug-01	29-Aug-01	30-Aug-01	30-Aug-01	30-Aug-01	30-Aug-01	30-Aug-01
Trichloroethene	0.88	64	0.041	0.096	<0.005	<0.005 UJ	0.004 J	<0.005 UJ	<0.005
1,2-Dichloroethene	0.41	2,800	0.003 J	0.006	<0.005	<0.005 UJ	<0.005 UJ	<0.005 UJ	<0.005
Acetone	0.2	8,000	0.016 BUJ	0.014 BJ	0.008 J	0.017 BU	0.014 J	0.011 J	0.028 J
Vinyl Chloride	0.2	0.36	<0.010 UJ	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Xylenes (total)	1.68	200,000	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Ethylbenzene	7.7	8,000	<0.005	<0.005	<0.005	<0.005 UJ	<0.005 UJ	<0.005 UJ	<0.005
Toluene	2.1	20,000	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Methylene Chloride	0.15	93	0.012 BUJ	0.009 J	0.013 BJ	0.009 BU	0.009 BJ	0.017 BJ	0.010 BJ

NOTES

All units ug/g

Dupl. - indicates a duplicate sample

UJ - Indicates the analyte was not detected above the reported sample quantitation limit and the quantitation limit is approximate.

J - Indicates an estimated value. Compound meets identification criteria and is less than the specific detection limit but greater than zero.

B - Indicates that the analyte was found in both the sample and its associated laboratory blank. Possible/probable blank contamination.

D - Indicates compound identified in an analysis at a secondary dilution factor.

U - Indicates the analyte was not detected above the reported sample quantitation limit.

<5 - Indicates not detected above laboratory detection limit.

580D Indicates that parameter exceeds Clean-up Objective

Table 2 cont.

Contaminants of Concern	Test Pit Number >		TP-10			TP-11		TP-12	
	Sample Interval >		3-5 ft	10.5-13.5 ft	10.5-13.5 ft (Dup)	7-10.5 ft	13.5-16 ft	2.5-6 ft	8.5-11 ft
	Sample Number >		OU3TP-038	OU3TP-039	OU3TP-046	OU3TP-052	OU3TP-053	OU3TP-050	OU3TP-051
	Clean up Objective	**Action Level**	30-Aug-01	30-Aug-01	30-Aug-01	30-Aug-01	30-Aug-01	30-Aug-01	30-Aug-01
Trichloroethene	0.88	64	<0.005	0.53 DJ	**2.40 DJ**	<0.005 UJ	<0.005	<0.005 UJ	<0.005 UJ
1,2-Dichloroethene	0.41	2,800	<0.005 UJ	<0.625 UJ	<0.625 UJ	<0.005 UJ	<0.005	<0.005 UJ	<0.005 UJ
Acetone	0.2	8,000	0.020 BU	<1.25	<1.25	0.008 J	0.04 J	0.015 J	0.015 J
Vinyl Chloride	0.2	0.36	<0.010	<1.25	<1.25	<0.010	<0.010	<0.010	<0.010
Xylenes (total)	1.68	200,000	<0.005	<0.625	<0.625	<0.005	<0.005	<0.005	<0.005
Ethylbenzene	7.7	8,000	<0.005 UJ	<0.625 UJ	<0.625 UJ	<0.005 UJ	<0.005	<0.005 UJ	<0.005 UJ
Toluene	2.1	20,000	<0.005	<0.625	<0.625	<0.005	<0.005	<0.005	<0.005
Methylene Chloride	0.15	93	0.008 BU	<0.625	<0.625	0.009 BJ	0.015 BJ	0.010 BJ	0.010 BJ

NOTES

All units ug/g

Dupl. - indicates a duplicate sample

UJ - Indicates the analyte was not detected above the reported sample quantitation limit and the quantitation limit is approximate.

J - Indicates an estimated value. Compound meets identification criteria and is less than the specific detection limit but greater than zero.

B - Indicates that the analyte was found in both the sample and its associated laboratory blank. Possible/probable blank contamination.

D - Indicates compound identified in an analysis at a secondary dilution factor.

U - Indicates the analyte was not detected above the reported sample quantitation limit.

<5 - Indicates not detected above laboratory detection limit.

580D Indicates that parameter exceeds Clean-up Objective

Table 2 cont.

Contaminants of Concern	Test Pit Number >		TP-13		TP-14		TP-15	
	Sample Interval >		6-9 ft	9-12 ft	3-5.5 ft	14-16 ft	0-4 ft	10-13.5 ft
	Sample Number >		OU3TP-048	OU3TP-049	OU3TP-044	OU3TP-045	OU3TP-054	OU3TP-055
	Clean up Objective	**Action Level**	30-Aug-01	30-Aug-01	30-Aug-01	30-Aug-01	30-Aug-01	30-Aug-01
Trichloroethene	0.88	64	<0.005 UJ	<0.005 UJ	<0.005 UJ	<0.005	<0.005	<0.005 UJ
1,2-Dichloroethene	0.41	2,800	<0.005 UJ	<0.005 UJ	<0.005 UJ	<0.005	<0.005	<0.005 UJ
Acetone	0.2	8,000	0.015 J	0.019 J	0.014 BU	0.024 J	0.007 J	0.017 J
Vinyl Chloride	0.2	0.36	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Xylenes (total)	1.68	200,000	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Ethylbenzene	7.7	8,000	<0.005 UJ	<0.005 UJ	<0.005 UJ	<0.005	<0.005	<0.005 UJ
Toluene	2.1	20,000	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Methylene Chloride	0.15	93	0.011 BJ	0.012 BJ	0.008 BU	0.009 BJ	0.008 BJ	0.006 BJ

NOTES

All units ug/g

Dupl. - indicates a duplicate sample

UJ - Indicates the analyte was not detected above the reported sample quantitation limit and the quantitation limit is approximate.

J - Indicates an estimated value. Compound meets identification criteria and is less than the specific detection limit but greater than zero.

B - Indicates that the analyte was found in both the sample and its associated laboratory blank. Possible/probable blank contamination.

D - Indicates compound identified in an analysis at a secondary dilution factor.

U - Indicates the analyte was not detected above the reported sample quantitation limit.

<5 - Indicates not detected above laboratory detection limit.

580D Indicates that parameter exceeds Clean-up Objective

Table 2 cont.

Contaminants of Concern	Test Pit Number >		TP-16		TP-17			TP-19	
	Sample Interval >		6-9.5 ft	13-15 ft	3-6 ft	3-6 ft (Dup)	16-17 ft	7-8.5 ft	14.5-16 ft
	Sample Number >		OU3TP-021	OU3TP-022	OU3TP-018	OU3TP-019	OU3TP-020	OU3TP-016	OU3TP-017
	Clean up Objective	**Action Level**	28-Aug-01	28-Aug-01	28-Aug-01	28-Aug-01	28-Aug-01	28-Aug-01	28-Aug-01
Trichloroethene	0.88	64	<0.005	<0.005 UJ	<0.005	<0.005	<0.005 UJ	<0.005	<0.005
1,2-Dichloroethene	0.41	2,800	<0.005 UJ	<0.005 UJ	<0.005	<0.005	<0.005 UJ	<0.005	<0.005 UJ
Acetone	0.2	8,000	0.022 BUJ	0.038 BUJ	0.014 BJ	0.012 BU	0.025 BUJ	0.015 BJ	0.046 BJ
Vinyl Chloride	0.2	0.36	<0.010 UJ	<0.010 UJ	<0.010	<0.010	<0.010 UJ	<0.010	<0.010 UJ
Xylenes (total)	1.68	200,000	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Ethylbenzene	7.7	8,000	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Toluene	2.1	20,000	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Methylene Chloride	0.15	93	0.010 BUJ	0.023 BUJ	0.010 J	0.009 BUJ	0.008 BUJ	0.010 J	0.013 J

NOTES

All units ug/g

Dupl. - indicates a duplicate sample

UJ - Indicates the analyte was not detected above the reported sample quantitation limit and the quantitation limit is approximate.

J - Indicates an estimated value. Compound meets identification criteria and is less than the specific detection limit but greater than zero.

B - Indicates that the analyte was found in both the sample and its associated laboratory blank. Possible/probable blank contamination.

D - Indicates compound identified in an analysis at a secondary dilution factor.

U - Indicates the analyte was not detected above the reported sample quantitation limit.

<5 - Indicates not detected above laboratory detection limit.

580D Indicates that parameter exceeds Clean-up Objective

Table 2 cont.

Contaminants of Concern	Test Pit Number >		TP-20		TP-21	
	Sample Interval >		2-4 ft	10.5-12 ft	5.5-7.5 ft	12-15.5 ft
	Sample Number >		OU3TP-014	OU3TP-015	OU3TP-012	OU3TP-013
	Clean up Objective	**Action Level**	28-Aug-01	28-Aug-01	28-Aug-01	28-Aug-01
Trichloroethene	0.88	64	<0.005	<0.005	<0.005	<0.005
1,2-Dichloroethene	0.41	2,800	<0.005	<0.005 UJ	<0.005	<0.005 UJ
Acetone	0.2	8,000	0.013 BJ	0.029 BJ	0.030 BJ	0.037 BJ
Vinyl Chloride	0.2	0.36	<0.010	<0.010 UJ	<0.010	<0.010 UJ
Xylenes (total)	1.68	200,000	<0.005	<0.005	<0.005	<0.005
Ethylbenzene	7.7	8,000	<0.005	<0.005	<0.005	<0.005
Toluene	2.1	20,000	<0.005	<0.005	<0.005	<0.005
Methylene Chloride	0.15	93	0.009 J	0.010 J	0.012 J	0.013 J

NOTES

All units ug/g

Dupl. - indicates a duplicate sample

UJ - Indicates the analyte was not detected above the reported sample quantitation limit and the quantitation limit is approximate.

J - Indicates an estimated value. Compound meets identification criteria and is less than the specific detection limit but greater than zero.

B - Indicates that the analyte was found in both the sample and its associated laboratory blank. Possible/probable blank contamination.

D - Indicates compound identified in an analysis at a secondary dilution factor.

U - Indicates the analyte was not detected above the reported sample quantitation limit.

<5 - Indicates not detected above laboratory detection limit.

580D Indicates that parameter exceeds Clean-up Objective

Table 3: Waste Characterization Analytical Results

Waste Characterization Parameters	Units	OU3WC-001 TP-1 to 7 0-10ft BGS	OU3WC-002 TP-1 to 7 >10ft BGS	NYCRR 371 Regulatory Level
1,1-Dichloroethene	MG/L	<0.008	<0.008	0.7
1,2-Dichloroethane	MG/L	<0.008	<0.008	0.5
1,4-Dichlorobenzene	MG/L	<0.01	<0.01	7.5
2,4,5-Trichlorophenol	MG/L	<0.01	<0.01	400.0
2,4,6-Trichlorophenol	MG/L	<0.01	<0.01	2.0
2,4-Dinitrotoluene	MG/L	<0.01	<0.01	0.13
2-Butanone	MG/L	<0.02 UJ	<0.02 UJ	NV
2-Methylphenol	MG/L	<0.01	<0.01	NV
3-Methylphenol	MG/L	<0.01	<0.01	NV
4-Methylphenol	MG/L	<0.01	<0.01	NV
Arsenic - Total	MG/L	<0.007 UJ	<0.007 UJ	5.0
Barium - Total	MG/L	1.83	3.16	100.0
Benzene	MG/L	<0.006	<0.006	0.5
Cadmium - Total	MG/L	<0.001	<0.001	1.0
Carbon Tetrachloride	MG/L	<0.008	<0.008	0.5
Chlorobenzene	MG/L	<0.008	<0.008	100.0
Chloroform	MG/L	<0.005	<0.005	6.0
Chromium - Total	MG/L	0.0024 J	0.0211 J	5.0
Flashpoint	°F	>200	>200	<140
H2S Released From Waste	MG/KG	<10.0	<10.0	NV
HCN Released From Waste	MG/KG	<10.0	<10.0	NV
Hexachlorobenzene	MG/L	<0.01	<0.01	0.13
Hexachlorobutadiene	MG/L	<0.01	<0.01	0.5
Hexachloroethane	MG/L	<0.01	<0.01	3.0
Leachable pH	S.U.	8.59	8.43	NV
Lead - Total	MG/L	<0.010 UJ	0.030 UJ	5.0
Mercury - Total	MG/L	<0.0002 UJ	<0.0002 UJ	0.2
Nitrobenzene	MG/L	<0.01	<0.01	2.0
Pentachlorophenol	MG/L	<0.05	<0.05	100.0
Pyridine	MG/L	<0.025 UJ	<0.025 UJ	5.0
Selenium - Total	MG/L	<0.010 UJ	<0.010 UJ	1.0
Silver - Total	MG/L	<0.003	<0.003	5.0
Tetrachloroethene	MG/L	<0.008	<0.008	0.7
Trichloroethene	MG/L	<0.005	<0.005	0.5
Vinyl chloride	MG/L	<0.005	<0.005	0.2

Notes

NYCRR 371 - 6 NYCRR Part 371, Identification and Listing of Hazardous Wastes, January 14, 1995

UJ - Indicates the analyte was not detected above the reported sample quantitation limit and the quantitation limit is approximate.

J - Indicates an estimated value. Compound meets identification criteria and is less than the specific detection limit but greater than zero.

NV - Indicates No Value applicable for parameter

Table 4: Relative Percent Differences for Field Replicated Samples

Location	Sample Interval	Sample ID	Concentration of Contaminant of Concern (ug/g)									
			Pyrene	Benzo(ghi) perylene	Indeno(1,2,3-cd)pyrene	Benzo(b) fluoranthene	Fluoroanthene	Benzo(k) fluoranthene	Acenaphthylene	Chrysene	Benzo(a) pyrene	Phenanthrene
TP-21	Surface	OU3TP-010	0.092	0.038	0.032	0.084	0.110	0.080	0.098	0.088	0.066	0.051
		OU3TP-011	0.081	0.031	0.027	0.079	0.098	0.072	0.088	0.076	0.056	0.046
		RPD	**13%**	**20%**	**17%**	**6%**	**12%**	**11%**	**11%**	**15%**	**16%**	**10%**

Location	Sample Interval	Sample ID	Concentration of Contaminant of Concern (ug/g)							
			Trichloroethene	1,1-Dichloroethane	Acetone	Vinyl Chloride	Xylenes (total)	Ethylbenzene	Toluene	Methylene Chloride
TP-21	Surface	OU3TP-010	<0.005*	<0.005	0.011	<0.010	<0.005*	<0.005	<0.005*	0.011
		OU3TP-011	0.004	<0.005	<0.010*	<0.010	0.002	<0.005	0.003	0.014
		RPD	**46%**	**0%**	**75%**	**0%**	**22%**	**0%**	**18%**	**24%**
TP-4	12-14.5 ft	OU3TP-030	<5*	0.004	0.038	<0.010	<0.005	<0.005	<0.005	0.011
		OU3TP-037	0.004	0.004	0.064	<0.010	<0.005	<0.005	<0.005	0.007
		RPD	**46%**	**0%**	**51%**	**0%**	**0%**	**0%**	**0%**	**44%**
TP-8	12.5-15 ft	OU3TP-043	<0.005*	<0.005	0.017	<0.010	<0.005	<0.005	<0.005	0.009
		OU3TP-047	0.004	<0.005	0.014	<0.010	<0.005	<0.005	<0.005	0.009
		RPD	**46%**	**0%**	**19%**	**0%**	**0%**	**0%**	**0%**	**0%**
TP-10	10.5-13.5 ft	OU3TP-039	0.53	<0.625	<1.250	<1.250	<0.625	<0.625	<0.625	<0.625
		OU3TP-046	2.4	<0.625	<1.250	<1.250	<0.625	<0.625	<0.625	<0.625
		RPD	**128%**	**0%**	**0%**	**0%**	**0%**	**0%**	**0%**	**0%**
TP-17	3-6 ft	OU3TP-018	<0.005	<0.005	0.014	<0.010	<0.005	<0.005	<0.005	0.01
		OU3TP-019	<0.005	<0.005	0.012	<0.010	<0.005	<0.005	<0.005	0.009
		RPD	**0%**	**0%**	**15%**	**0%**	**0%**	**0%**	**0%**	**11%**

* A value one half of the analytical detection limit was used to calculate the RPD

APPENDIX A: TEST PIT STRATIGRAPHIC LOGS

TEST PIT STRATIGRAPHIC AND INSTRUMENTATION LOG

Project Number: 01-220-3

Client: BP

Site Location: OU3

Ground Surface Elevation: Not surveyed

Test Pit: TP-1

Date Completed: August 29, 2001

Excavation Method: Case 9040B Back-hoe

Supervisor: EDW

DEPTH (BGS) ft / m	SAMPLES	LAB SAMPLE	CGI (ppm)	PID (ppm)	LOG	STRATIGRAPHIC DESCRIPTION
0 / 0						Ground Surface
0 – 2 / 0 – 1						**FILL** Coarse gravel and medium grained sand fill.
2 – 3 / 1			--	0		**SILTY CLAY** Brown/red, mottled, hard silty clay.
3 – 5 / 1 – 2		X	--	0		Silty clay with minor oxidation staining.
5 – 9 / 2 – 3			--	0		Wet at 9 ftBGS.
9 – 11 / 3		X	--	0		
11 – 14 / 3 – 4						**CLAY** Wet grey, plastic clay.
14 – 17 / 4 – 5			--	0		Test pit terminated at 17 ftBGS
17 – 20 / 5 – 6						TEST PIT TERMINATED

TEST PIT STRATIGRAPHIC AND INSTRUMENTATION LOG

Project Number: 01-220-3

Client: BP

Site Location: OU3

Ground Surface Elevation: Not surveyed

Test Pit: TP-2

Date Completed: August 29, 2001

Excavation Method: Case 9040B Back-hoe

Supervisor: EDW

DEPTH (BGS) ft / m	SAMPLES	LAB SAMPLE	CGI (ppm)	PID (ppm)	LOG	STRATIGRAPHIC DESCRIPTION
0 / 0						Ground Surface
1						**FILL** Coarse gravel and medium grained sand fill.
2			--	0		**SILTY CLAY** Brown/red, mottled, hard silty clay.
3 / 1						
4		X	--	0		
5						
6 / 2						
7			--	0		
8						
9						Wet at 9 ftBGS.
10 / 3		X	--	0		
11						
12						
13 / 4			--	0		
14						**CLAY** Wet grey/red, plastic clay.
15						Test pit terminated at 16 ftBGS
16						TEST PIT TERMINATED
17 / 5						
18						
19						
20 / 6						

TEST PIT STRATIGRAPHIC AND INSTRUMENTATION LOG

Project Number: 01-220-3

Client: BP

Site Location: OU3

Ground Surface Elevation: Not surveyed

Test Pit: TP-3

Date Completed: August 29, 2001

Excavation Method: Case 9040B Back-hoe

Supervisor: EDW

DEPTH (BGS) ft / m	SAMPLES	LAB SAMPLE	CGI (ppm)	PID (ppm)	LOG	STRATIGRAPHIC DESCRIPTION
0 / 0						Ground Surface
1						**FILL** Coarse gravel and medium grained sand fill.
2			--	0		**SILTY CLAY** Brown/red, mottled, hard silty clay with roots.
3 / 1						
4			--	0		
5						
6 / 2						
7						
8		X	--	0		
9						Moist to wet at 9 ftBGS.
10 / 3						
11			--	0		
12						
13 / 4						
14		X	--	0		**CLAY** Wet grey/red, plastic clay.
15						
16						
17 / 5			--	0		
18						
19			--	0		Reddish, very wet, plastic clay. Test pit terminated at 20 ftBGS
20 / 6						
21						TEST PIT TERMINATED
22						

INTERA

TEST PIT STRATIGRAPHIC AND INSTRUMENTATION LOG

Project Number: 01-220-3

Client: BP

Site Location: OU3

Ground Surface Elevation: Not surveyed

Test Pit: TP-4

Date Completed: August 29, 2001

Excavation Method: Case 9040B Back-hoe

Supervisor: EDW

DEPTH (BGS) ft / m	SAMPLES	LAB SAMPLE	CGI (ppm)	PID (ppm)	LOG	STRATIGRAPHIC DESCRIPTION
0 / 0						Ground Surface
1						**FILL** Coarse gravel and medium grained sand fill.
2			--	0		**SILTY CLAY** Brown/red, mottled, hard silty clay.
3 / 1						
4						Minor orange/yellow oxidation staining, mild odour at 4 ftBGS.
5		X	--	0		
6 / 2						No odour at 6 ftBGS.
7						
8			--	0		
9						Moist to wet at 9 ftBGS. No stain, no odour.
10 / 3						
11			--	0		
12						
13 / 4		X	--	0		
14						
15						**CLAY** Wet grey, plastic clay.
16			--	0		
17 / 5						
18						
19			--	0		Test pit terminated at 20 ftBGS
20 / 6						
21						TEST PIT TERMINATED
22						

INTERA

TEST PIT STRATIGRAPHIC AND INSTRUMENTATION LOG

Project Number: 01-220-3

Client: BP

Site Location: OU3

Ground Surface Elevation: Not surveyed

Test Pit: TP-5

Date Completed: August 29, 2001

Excavation Method: Case 9040B Back-hoe

Supervisor: EDW

DEPTH (BGS) ft	DEPTH (BGS) m	SAMPLES	LAB SAMPLE	CGI (ppm)	PID (ppm)	LOG	STRATIGRAPHIC DESCRIPTION
0	0						Ground Surface
1							**FILL** Coarse gravel and medium grained sand fill.
2				--	0		**SILTY CLAY** Brown/red, mottled, hard silty clay with minor roots.
3	1						
4			X	--	9.5		
5							
6							
7	2			--	6.8		
8							
9				--	9.0		Moist to wet at 8 ftBGS.
10	3						
11			X	--	27.8		
12							
13	4						
14				--	0		**CLAY** Wet grey, plastic clay.
15							Test pit terminated at 16.1 ftBGS
16				--	1.2		
17	5						TEST PIT TERMINATED
18							
19							
20	6						

INTERA

TEST PIT STRATIGRAPHIC AND INSTRUMENTATION LOG

Project Number: 01-220-3

Client: BP

Site Location: OU3

Ground Surface Elevation: Not surveyed

Test Pit: TP-6

Date Completed: August 29, 2001

Excavation Method: Case 9040B Back-hoe

Supervisor: EDW

DEPTH (BGS) ft / m	SAMPLES	LAB SAMPLE	CGI (ppm)	PID (ppm)	LOG	STRATIGRAPHIC DESCRIPTION
0 / 0						Ground Surface
1						**FILL** Coarse gravel and medium grained sand fill.
2		X	--	0		**SILTY CLAY** Brown, mottled, hard silty clay.
3 / 1						
4			--	0		
5						
6			--	0		
7 / 2						
8						
9			--	0		Moist to wet at 9 ftBGS.
10 / 3						
11			--	0		
12						
13 / 4			--	0		
14						**CLAY** Wet grey, plastic clay.
15		X	--	40		Test pit terminated at 16.5 ftBGS
16 / 5						
17						TEST PIT TERMINATED
18						
19						
20 / 6						

INTERA

TEST PIT STRATIGRAPHIC AND INSTRUMENTATION LOG

Project Number: 01-220-3

Client: BP

Site Location: OU3

Ground Surface Elevation: Not surveyed

Test Pit: TP-7

Date Completed: August 29, 2001

Excavation Method: Case 9040B Back-hoe

Supervisor: EDW

DEPTH (BGS) ft	DEPTH (BGS) m	SAMPLES	LAB SAMPLE	CGI (ppm)	PID (ppm)	LOG	STRATIGRAPHIC DESCRIPTION
							Ground Surface
0–2	0						**FILL** Coarse gravel and medium grained sand fill.
2–9	0–1			--	0		**SILTY CLAY** Brown, mottled, hard silty clay.
4–7	1–2			--	0		
7–9	2		X	--	0		
9							Moist to wet at 9 ftBGS.
9–13	3–4		X	--	0		
13–16	4–5			--	0		**CLAY** Wet grey, plastic clay.
15–17	5			--	0		
16							Very wet/saturated material at 16 ftBGS.
17							Test pit teminated at 17.5 ftBGS
							TEST PIT TERMINATED

TEST PIT STRATIGRAPHIC AND INSTRUMENTATION LOG

Project Number: 01-220-3

Client: BP

Site Location: OU3

Ground Surface Elevation: Not surveyed

Test Pit: TP-8

Date Completed: August 30, 2001

Excavation Method: Case 9040B Back-hoe

Supervisor: EDW

DEPTH (BGS) ft	DEPTH (BGS) m	SAMPLES	LAB SAMPLE	CGI (ppm)	PID (ppm)	LOG	STRATIGRAPHIC DESCRIPTION
0	0						Ground Surface
1							FILL Coarse gravel and medium grained sand fill.
2			X	--	0		SILTY CLAY Brown/red, mottled, hard silty clay.
3	1						
4							
5				--	0		
6							
7	2						Clay not as hard at 7 ftBGS.
8				--	0		
9							
10	3						Slightly moist at 9.5 ftBGS.
11				--	0		
12							
13	4						
14			X	--	0		
15							CLAY Moist grey clay.
16				--	0		
17	5						Test pit terminated at 16.5 ftBGS
18							TEST PIT TERMINATED
19							
20	6						

INTERA

TEST PIT STRATIGRAPHIC AND INSTRUMENTATION LOG

Project Number: 01-220-3

Client: BP

Site Location: OU3

Ground Surface Elevation: Not surveyed

Test Pit: TP-9

Date Completed: August 30, 2001

Excavation Method: Case 9040B Back-hoe

Supervisor: EDW

DEPTH (BGS) ft / m	SAMPLES	LAB SAMPLE	CGI (ppm)	PID (ppm)	LOG	STRATIGRAPHIC DESCRIPTION
0 / 0						Ground Surface
1						**FILL** Coarse gravel and medium grained sand fill.
2			--	0		**SILTY CLAY** Brown to brown/red, mottled, hard silty clay.
3 / 1						
4			--	0		
5						
6						
7 / 2		X	--	0		
8						
9						Wet at 8.5 ftBGS.
10 / 3			--	0		
11						
12			--	0		
13 / 4						
14						**CLAY** Wet grey, plastic clay.
15		X	--	0		Test pit terminated at 16 ftBGS
16 / 5						TEST PIT TERMINATED
17						
18						
19						
20 / 6						

INTERA

TEST PIT STRATIGRAPHIC AND INSTRUMENTATION LOG

Project Number: 01-220-3

Client: BP

Site Location: OU3

Ground Surface Elevation: Not surveyed

Test Pit: TP-10

Date Completed: August 30, 2001

Excavation Method: Case 9040B Back-hoe

Supervisor: EDW

DEPTH (BGS) ft / m	SAMPLES	LAB SAMPLE	CGI (ppm)	PID (ppm)	LOG	STRATIGRAPHIC DESCRIPTION
0 / 0						Ground Surface
1						**FILL** Coarse gravel and medium grained sand fill.
2			--	0		**SILTY CLAY** Brown/red, mottled, hard silty clay.
3 / 1						
4		X	--	0		
5						
6						
7 / 2			--	0		
8						Moist to wet at 8 ftBGS.
9						
10 / 3			--	0		
11						
12		X	--	1.6		
13 / 4						
14						**CLAY** Wet grey, plastic clay.
15			--	0		
16						Test pit terminated at 16.5 ftBGS
17 / 5						TEST PIT TERMINATED
18						
19						
20 / 6						

INTERA

TEST PIT STRATIGRAPHIC AND INSTRUMENTATION LOG

Project Number: 01-220-3

Client: BP

Site Location: OU3

Ground Surface Elevation: Not surveyed

Test Pit: TP-11

Date Completed: August 30, 2001

Excavation Method: Case 9040B Back-hoe

Supervisor: EDW

DEPTH (BGS) ft / m	SAMPLES	LAB SAMPLE	CGI (ppm)	PID (ppm)	LOG	STRATIGRAPHIC DESCRIPTION
0 / 0						Ground Surface
0–1						**FILL** Coarse gravel and medium grained sand fill.
2–3 / 1			--	0		**SILTY CLAY** Brown to brown/red, mottled, hard silty clay with roots.
4–5 / 2			--	0		
6–7 / 2		X	--	0		
8–9 / 3						
10–11 / 3						Wet at 10.5 ftBGS.
12–13 / 4			--	0		
14–15 / 4		X	--	0		**CLAY** Wet grey, plastic clay. Test pit terminated at 16 ftBGS
16 / 5						TEST PIT TERMINATED
17–20 / 5–6						

TEST PIT STRATIGRAPHIC AND INSTRUMENTATION LOG

Project Number: 01-220-3

Client: BP

Site Location: OU3

Ground Surface Elevation: Not surveyed

Test Pit: TP-12

Date Completed: August 30, 2001

Excavation Method: Case 9040B Back-hoe

Supervisor: EDW

DEPTH (BGS) ft / m	SAMPLES	LAB SAMPLE	CGI (ppm)	PID (ppm)	LOG	STRATIGRAPHIC DESCRIPTION
0 / 0						Ground Surface
1						**FILL** Coarse gravel and medium grained sand fill.
2			--	0		**SILTY CLAY** Brown to brown/red, mottled, hard silty clay. Roots from 1.5 ftBGS to 2.5 ftBGS.
3 / 1						
4		X				
5			--	0		
6						
7 / 2						
8			--	0		
9						Wet at 8.5 ftBGS.
10 / 3		X	--	0		
11						
12						
13 / 4			--	0		
14						**CLAY** Wet grey, plastic clay.
15						Test pit terminated at 15 ftBGS
16 / 5						TEST PIT TERMINATED
17						
18						
19						
20 / 6						

INTERA

TEST PIT STRATIGRAPHIC AND INSTRUMENTATION LOG

Project Number: 01-220-3

Client: BP

Site Location: OU3

Ground Surface Elevation: Not surveyed

Test Pit: TP-13

Date Completed: August 30, 2001

Excavation Method: Case 9040B Back-hoe

Supervisor: EDW

DEPTH (BGS) ft / m	SAMPLES	LAB SAMPLE	CGI (ppm)	PID (ppm)	LOG	STRATIGRAPHIC DESCRIPTION
0 / 0						Ground Surface
1						**FILL** Coarse gravel and medium grained sand fill.
2			--	0		**SILTY CLAY** Brown to brown/red, mottled, hard silty clay. Roots from 1.5 ftBGS to 3 ftBGS.
3 / 1						
4			--	0		
5						
6 / 2						
7		X	--	0		
8						
9						Wet at 9 ftBGS.
10 / 3						
11		X	--	0		
12						
13 / 4						
14			--	0		**CLAY** Wet grey, plastic clay.
15						Test pit terminated at 15.5 ftBGS
16						TEST PIT TERMINATED
17 / 5						
18						
19						
20 / 6						

TEST PIT STRATIGRAPHIC AND INSTRUMENTATION LOG

Project Number: 01-220-3

Client: BP

Site Location: OU3

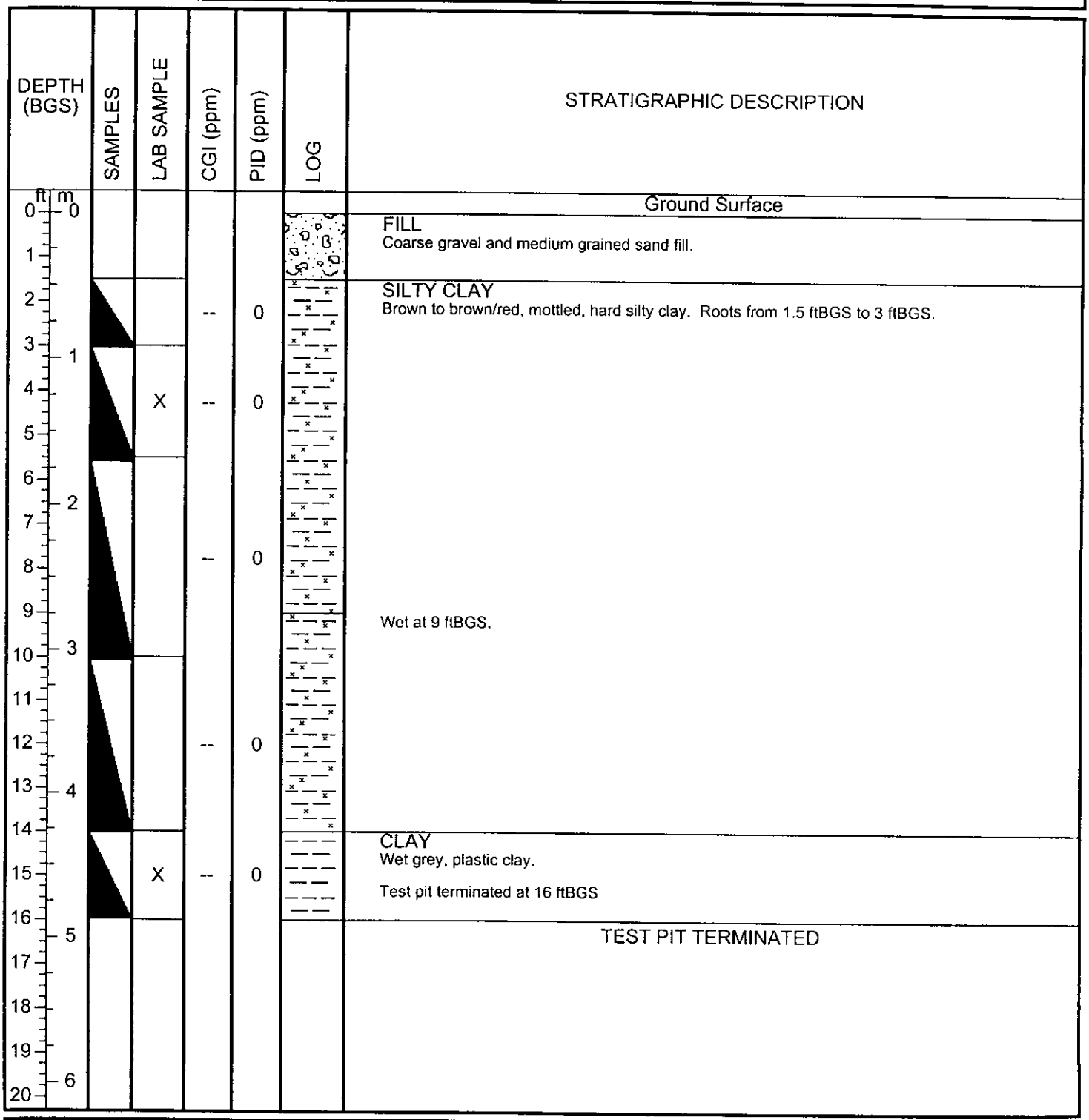
Ground Surface Elevation: Not surveyed

Test Pit: TP-14

Date Completed: August 30, 2001

Excavation Method: Case 9040B Back-hoe

Supervisor: EDW



TEST PIT STRATIGRAPHIC AND INSTRUMENTATION LOG

Project Number: 01-220-3

Client: BP

Site Location: OU3

Ground Surface Elevation: Not surveyed

Test Pit: TP-15

Date Completed: August 30, 2001

Excavation Method: Case 9040B Back-hoe

Supervisor: EDW

DEPTH (BGS) ft	DEPTH (BGS) m	SAMPLES	LAB SAMPLE	CGI (ppm)	PID (ppm)	LOG	STRATIGRAPHIC DESCRIPTION
							Ground Surface
0	0						**SILTY CLAY** Red/brown, hard silty clay.
1							
2			X	--	0		
3	1						
4							Mottled silty clay at 4 ftBGS, not as hard.
5				--	0		
6	2						
7							
8				--	0		
9							
10	3						Wet at 10 ftBGS.
11							
12			X	--	0		
13	4						
14							**CLAY** Wet grey, plastic clay.
15				--	0		Test pit terminated at 16 ftBGS
16							TEST PIT TERMINATED
17	5						
18							
19							
20	6						

INTERA

TEST PIT STRATIGRAPHIC AND INSTRUMENTATION LOG

Project Number: 01-220-3

Client: BP

Site Location: OU3

Ground Surface Elevation: Not surveyed

Test Pit: TP-16

Date Completed: August 28, 2001

Excavation Method: Case 9040B Back-hoe

Supervisor: EDW

DEPTH (BGS) ft	DEPTH (BGS) m	SAMPLES	LAB SAMPLE	CGI (ppm)	PID (ppm)	LOG	STRATIGRAPHIC DESCRIPTION
							Ground Surface
0–2	0						**FILL** Coarse gravel and medium grained sand fill.
2–3				--	0		**SILTY CLAY** Brown/red hard silty clay.
3–6	1			--	0		
6–9	2		X	--	0		
9–10							Moist to wet at 9 ftBGS.
10–13	3			--	0		
13–15	4		X	--	0		
15–17	5			--	0		**CLAY** Wet grey, plastic clay. Test pit terminated at 17.5 ftBGS
18–20	6						TEST PIT TERMINATED

TEST PIT STRATIGRAPHIC AND INSTRUMENTATION LOG

Project Number: 01-220-3

Client: BP

Site Location: OU3

Ground Surface Elevation: Not surveyed

Test Pit: TP-17

Date Completed: August 28, 2001

Excavation Method: Case 9040B Back-hoe

Supervisor: EDW

DEPTH (BGS) ft / m	SAMPLES	LAB SAMPLE	CGI (ppm)	PID (ppm)	LOG	STRATIGRAPHIC DESCRIPTION
0 / 0						Ground Surface
0–2						**FILL** Coarse gravel and medium grained sand fill.
2–3			--	0		**SILTY CLAY** Brown/red hard silty clay.
3–6		X	--	0		
6–9			--	0		
9						Wet at 9 ftBGS.
9–14			--	0		
14						**CLAY** Wet grey, plastic clay.
14–16			--	0		
16–17		X	--	0		Test pit terminated at 17 ftBGS
17 / 5						TEST PIT TERMINATED
18–20 / 6						

TEST PIT STRATIGRAPHIC AND INSTRUMENTATION LOG

Project Number: 01-220-3

Client: BP

Site Location: OU3

Ground Surface Elevation: Not surveyed

Test Pit: TP-19

Date Completed: August 28, 2001

Excavation Method: Case 9040B Back-hoe

Supervisor: EDW

DEPTH (BGS) ft / m	SAMPLES	LAB SAMPLE	CGI (ppm)	PID (ppm)	LOG	STRATIGRAPHIC DESCRIPTION
0 / 0						Ground Surface
1						**FILL** Coarse gravel and medium grained sand fill.
2						
3 / 1			--	0		**SILTY CLAY** Brown/red silty clay.
4						
5			--	0		
6 / 2						
7		X	--	0		
8						
9						Moist to wet at 9 ftBGS.
10 / 3			--	0		
11						
12						
13 / 4			--	0		
14						
15		X	--	0		**CLAY** Wet grey, plastic clay.
16						Test pit terminated at 17 ftBGS
17 / 5			--	0		
18						TEST PIT TERMINATED
19						
20 / 6						

INTERA

TEST PIT STRATIGRAPHIC AND INSTRUMENTATION LOG

Project Number: 01-220-3

Client: BP

Site Location: OU3

Ground Surface Elevation: Not surveyed

Test Pit: TP-20

Date Completed: August 28, 2001

Excavation Method: Case 9040B Back-hoe

Supervisor: EDW

DEPTH (BGS) ft / m	SAMPLES	LAB SAMPLE	CGI (ppm)	PID (ppm)	LOG	STRATIGRAPHIC DESCRIPTION
0 / 0						Ground Surface
0–2						**FILL** Coarse gravel and brown/grey sand fill.
2–10						**SILTY CLAY** Brown/red silty clay.
3 / 1		X	--	0		
6 / 2			--	0		
9 / 3			--	0		
10						Moist to wet at 10 ftBGS.
11 / 3		X	--	0		
13 / 4			--	0		
16–19						**CLAY** Wet grey clay.
18 / 5			--	0		
19						Clay with reddish colouring at 19 ftBGS.
20 / 6			--	0		Test pit terminated at 20.5 ftBGS
21						TEST PIT TERMINATED

TEST PIT STRATIGRAPHIC AND INSTRUMENTATION LOG

Project Number: 01-220-3

Client: BP

Site Location: OU3

Ground Surface Elevation: Not surveyed

Test Pit: TP-21

Date Completed: August 28, 2001

Excavation Method: Case 9040B Back-hoe

Supervisor: EDW

DEPTH (BGS) ft	DEPTH (BGS) m	SAMPLES	LAB SAMPLE	CGI (ppm)	PID (ppm)	LOG	STRATIGRAPHIC DESCRIPTION
0	0						Ground Surface
0–2							**FILL** Coarse gravel and brown/grey sand fill.
3–5	1			--	0		**SILTY CLAY** Brown/red silty clay.
6–7	2		X	--	0		
8–9				--	0		
10–11	3			--	0		Moist to wet at 11 ftBGS.
12–15	4		X	--	0		
16–18	5			--	0		**CLAY** Saturated, grey, plastic clay.
19–20	6			--	0		
20–21				--	0		Test pit terminated at 21 ftBGS
21							TEST PIT TERMINATED
22							

APPENDIX B: LABORATORY ANALYTICAL REPORTS

APPENDIX C: DATA VALIDATION REPORT

Data Review/Validation Report

Site Name:	BP Amoco Former Carborundum-Niagara Falls	**Matrix:**	Soil
Laboratory:	Severn Trent Services (STL) 10 Hazelwood Drive Suite 106 Amherst, NY 14228	**Number of Job Numbers:**	3
Reviewer:	Duke Engineering & Services (DE&S)	**Completion Date:**	October 10, 2001
STL Job #s:	A01-8309 A01-8428 A01-8423		

Part I. History of Data Review and Validation

August 30, 2001	DE&S completed field sampling.
September 27, 2001	DE&S received data to perform data review and validation.
October 10, 2001	DE&S completed the Data Review/Validation Report for BP Carborundum project.

Part II. Data Review

Fifty-five soil samples, two waste characterization samples, and three trip blanks were collected for the August 2001 BP Carborundum sampling event (STL Job #s A01-8309, A01-8428, and A01-8423). BP Carborundum samples were analyzed using the following SW-846 methods:

- Target Compound List Volatile Organic Compounds by Method 8260 (55 soil samples and 3 trip blanks)
- Semi-Volatile Organic Compounds by Method 8270 (11 soil samples)
- Toxicity Characteristic Leaching Procedure for Volatiles and Semi-Volatiles by Methods 8260 and 8270 (2 waste samples)
- Total Metals by Method 6010 (2 waste samples)
- Mercury by Method 7470 (2 waste samples)
- Waste Characterization Analyses for Flashpoint, H_2S Released from Waste, HCN Released from Waste, and Leachable pH (2 waste samples)

Each data package was reviewed for the following items, as applicable: laboratory case narrative, chain-of-custody documentation, sample holding times, Contract Required Quantitation Limits, method/equipment/trip blank data, field duplicates, surrogate recovery data, laboratory control sample, and matrix/matrix spike duplicates. Each of these items were compared to review criteria presented in the National Functional Guidelines for Organic Data Review (USEPA 1999) and the National Functional Guidelines for Inorganic Data Review (USEPA 1994), hereafter referred to as the NFG. A checklist of the review criteria was created for each method in the data package. By completing the checklist, the data reviewer identified whether or not the laboratory or sampler met, or failed to meet, the review criteria stipulated in the NFG. A summary of the comments generated during the data review process is presented in Table 1.

Part III. Data Validation

Complete data validation was performed on all of the project data with the exception of the waste characterization analyses for flashpoint, H_2S released from waste, HCN released from waste, and leachable pH. Data validation typically consists of review and confirmation of laboratory QC procedures and data qualification done in accordance to the NFG followed by a data usability assessment. Specifically, the data were validated for the following items, as applicable: all items mentioned in the data review section (Part II of this report), initial and continuing calibrations, GC/MS tunings, internal standard areas, and sample duplicate recovery. The validation criteria were taken directly from the NFG. DE&S modified the qualifiers on the data sheets in strict accordance with the guidelines given in the NFG. Qualifiers amended to the lab data packages were also added to the project data tables in Attachment 2. Data qualifiers applied by the laboratory were not altered on either the lab data packages or on the project data tables.

Each of the review and validation criteria has been summarized below. Each review parameter has been assessed to determine the overall quality of the laboratory or sampler's performance. An indication of the quality of the data has been provided by using one of the following three terms: acceptable, provisional, or unusable. These terms are defined below:

Acceptable = No results were qualified for any problem associated with this QC parameter.

Provisional = Some results were qualified because of problems associated with this QC parameter.

Unusable = All results are unusable because of major problems associated with this QC parameter.

Laboratory Case Narrative and Sample Log-In:

- All Analyses: Acceptable. No problems were noted upon receipt of samples and the case narratives covered all issues associated with analysis.

Chain-of-Custody Documentation:

- All Analyses: Acceptable. No problems were noted with the chain of custodies.

Sample Storage:

- All Analyses: Acceptable. No problems noted with sample storage.

Sample Preservation:

- All Analyses: Acceptable. No problems were noted with sample preservation.

Sample Holding Times:

- VOC by 8260: Provisional. Samples A018309-07RI and 11RI were reanalyzed one day outside of holding times. Professional judgement was used to determine that qualification is not necessary.

- All Other Analyses: Acceptable. No problems noted with holding times.

Contract Required Quantitation Limits:

Laboratory reporting limits were compared to the Contract Required Quantitation Limits (CRQLs).

- VOC by 8260: Acceptable. No problems noted.

- SVOC by 8270: Provisional. Reporting limits are above CRQLs for eight compounds (3,3-Dichlorobenzidine, 4,6-Dinitro-2-methylphenol, 2,4-Dinitrophenol, 2-Nitroaniline, 4-Nitroaniline, 4-Nitrophenol, and Pentachlorophenol). Associated data were not qualified based on CRQLs. However, the end user of the data should be aware that the reporting limits might exceed action levels.

- TCLP VOC by 8260: Acceptable. No problems noted.

- TCLP SVOC by 8270: Acceptable. No problems noted.

- Metals by 6010: Provisional. Reporting limits for Lead and Selenium are above CRQLS. Associated data were not qualified based on CRQLs. However, the end user of the data should be aware that the reporting limits might exceed action levels.

- Mercury by 7470: Acceptable. No problems noted.

- Waste Characterization Analyses: Acceptable. No problems noted.

Method Blank Data:

- VOC by 8260: Provisional. Acetone, Methylene Chloride, and Toluene were detected in method blanks for all batches. Associated data were qualified as non-detect (U) if the sample concentration was not ten times greater than the concentration in the blank. Refer to Table 2 for a list of qualified data.

- All Other Analyses: Acceptable. No problems noted.

Equipment Blank Data:

- All Analyses: Acceptable. Equipment blanks were not required for this project since dedicated or disposable equipment was used for sampling activities.

Trip Blank Data:

- VOC by 8260: Acceptable. Three trip blanks were collected and all were non-detect for volatile compounds.

Field Duplicates:

Five field duplicate pairs were collected for the soil samples. For Job Number A01-8423, soil sample OU3-TP19 is a duplicate of OU3-TP18 and OU3-TP37 is a duplicate of OU3-TP30. For Job Number A018428, soil sample OU3-TP046 is a duplicate of OU3-TP34 and OU3-TP047 is a duplicate of OU3-TP43. For Job Number A01-8309, soil sample OU3-TP011 is a duplicate of OU3TP-010.

- VOC by 8260: Provisional. For batch number A01-8128, the relative percent difference for the duplicate results is outside control limits for 1,2-Dichloroethene, Ethylbezene, and Trichloroethene. Associated analytes in all samples within batch A01-8128 were qualified as estimates (J/UJ). All other duplicate pairs were within control limits.

- All Other Analyses: Acceptable. No problems noted.

Surrogate Recovery Data:

- All Analyses: Acceptable. No problems noted with surrogate recoveries.

Laboratory Control Sample Results:

- All Analyses: Acceptable. No problems noted with data packages.

Matrix Spike/Matrix Spike Duplicate Recovery Data:

- VOC by 8260: Acceptable. Matrix spike samples were analyzed on laboratory blank samples instead of project samples. For batches A01-8428 and A01-8423, matrix spike recovery for toluene is just above the upper control limit. Since the corresponding matrix spike duplicate and relative percent difference were within control limits, qualification is not deemed necessary.

- SVOC by 8270: Acceptable. Matrix spike samples were analyzed on laboratory blank samples instead of project samples.

- TCLP VOC by 8260: Acceptable. For batch A01-8423, the matrix spike recoveries for 2-Butanone and 1,2-Dichloroethane were above upper control limit. Since associated samples were non-detect for these analytes, qualification is not necessary.

- TCLP SVOC by 8270: Acceptable. For batch A01-8423, the relative percent difference for Hexachlorobutadiene is outside control limits. The associated matrix spike and matrix spike duplicate were within control limits and qualification is not necessary.

Initial Calibrations:

- VOC by 8260: Provisional. Relative standard deviations were outside control limits for several analytes in all batches. Per the NFG, for those analytes that had relative standard deviations (%RSD) outside method parameters, data were flagged as estimates (J for detects, UJ for non-detects). See Table 2 for effected analytes and a list of qualified data.

- SVOC by 8270: Acceptable. No problems noted.

- TCLP VOC by 8260: Acceptable. No problems noted.

- TCLP SVOC by 8270: Acceptable. No problems noted.

- Metals by 6010: Provisional. In batch A01-8423, the high calibration standard was outside control limits for Lead, Selenium, and Arsenic. Associated data were qualified as estimates (J/UJ).

- Mercury by 7470: Provisional. In batch A01-8423, the calibration standard was outside of control limits. Associated data were qualified as estimates (J/UJ). See Table 2 for a list of qualified data.

Continuing Calibration Verifications:

- VOC by 8260: Provisional. Percent differences for continued calibration verification (CCV) samples in each VOC batch were outside control limits for multiple analytes. Per the NFG, for those analytes that had percent differences greater than 25%, associated data were flagged as estimates (J for detects, UJ for non-detects). See Table 2 for analytes and a list of qualified data.

- SVOC by 8270: Acceptable. No problems noted.

- TCLP VOC by 8260: Provisional. CCV percent difference is outside control limits for 2-Butanone. This analyte was qualified as estimated (J/UJ) in all associated samples. Table 2 for a list of qualified data.

- TCLP SVOC by 8270:Provisional. CCV percent difference is outside control limits for Pyridine. This analyte was qualified as estimated (J/UJ) in all associated samples. Table 2 for a list of qualified data.

- Metals by 6010: Acceptable. Arsenic was detected in the continuing calibration blank at a concentration above reporting limits. Per the NFG, if the concentration in the associated sample is less than five times the concentration in the blank, the sample is qualified as non-detect (U). The associated samples for this blank were non-detect and qualification was not necessary.

- Mercury by 7470: Acceptable. No problems noted with data package.

Dilution Test/Post-Digestion Spike

- Metals by 6010: Provisional. For batch A01-8423, the dilution test results for Chromium and Lead are outside control limits. Per NFG, associated data were qualified as estimates (J/UJ). See Table 2 for a list of qualified data. Additionally, the post-digestion spike was outside control limits for Barium. Per the NFG, if the spiked sample concentration is greater than four times the spike concentration, then qualification is not necessary.

GC/MS tunings:

- All Analyses: Acceptable. No problems noted with data packages.

Internal Standard Areas:

- VOC by 8260: Provisional. For batches A01-8309, A01-8428, and A01-8423, various internal standards were outside of control limits. Per the NFG, for each sample that has an internal standard outside control limits, the associated fraction of analytes are qualified as estimates (J/UJ). Refer to Table 2 for a list of qualified data.

- All Other Analyses: Acceptable. No problems noted.

Part V. Suggestions for Next Sampling Event and Laboratory Analysis

A list of suggestions for the laboratory is presented below. These suggestions should be implemented to reduce future problems with the data quality.

Recommendations for Laboratory are as follows:

1. Perform a matrix spike/matrix spike duplicate sample on at least one *project* sample per analytical batch.

2. Use reporting limits that are equal to or below the Contract Required Quantitation Limits.

Part VI. References

Environmental Protection Agency (EPA) 1994. USEPA Contract Laboratory Program, National Functional Guidelines for Inorganic Data Review. EPA540/R-94/013. February.

Environmental Protection Agency (EPA) 1999. USEPA Contract Laboratory Program, National Functional Guidelines for Organic Data Review. EPA540/R-99/008. October.

TABLES

Table 1. Comments Generated During Review/Validation of BP Carborundum Data Packages

Chain-of-Custody Number	Severn Trent Job #	Lab Sample Numbers	Analysis	Item	Comments
112459, 112460	A01-8309	All samples	VOC 8260	1	Acetone, Methylene Chloride, and Toluene were detected in method blanks. See Table 2 for samples effected.
		All samples		2	Matrix spike was run on a laboratory blank sample rather than a project sample.
		All samples		3	RSD outside control limits for initial calibrations for some analytes. See Table 2 for samples and analytes effected.
		A18309-001 to 012		4	CCV outside control limits for Bromomethane.
		A18309-04, 04RI, 05, 05RI, 06, 06RI, 07, 07RI, 10, 10RI, 11		5	Internal standard (Dichlorobenzene) outside control limits for multiple samples.
		A18309-12, 18309-11RI		6	Trip blank and sample OU3TP-11RI reanalyzed one day outside of holding times.
112459, 112460	A01-8309	All samples	SVOC 8270	1	Reporting limits are above CRQLs for 8 compounds: 3,3-Dichlorobenzidine, 4,6-Dinitro-2-methylphenol, 2,4-Dinitrophenol, 2-Nitroaniline, 3-Nitroaniline, 4-Nitroaniline, 4-Nitrophenol, and Pentachlorophenol.
		All samples		2	Matrix spike was run on a laboratory blank sample rather than a project sample.
		A18309-06 to 11		3	RSD outside control limits for initial calibrations for some analytes. See Table 2 for samples and analytes affected.
112463, 112464	A01-8428	A18428-01 to 18	VOC 8260	1	Matrix spike was run on a laboratory blank sample rather than a project sample.
		Various samples		2	Acetone and Methylene Chloride detected in method blanks. See Table 2 for a list of samples effected.
		A18428-01 to 18		3	RPD for field duplicates outside control limits for 1,2-Dichloroethene, Ethylbenzene, and Trichloroethene.
		A18428-01 to 18		4	Matrix spike percent recovery just above upper control limit for toluene in soil.

Table 1. Comments Generated During Review/Validation of BP Carborundum Data Packages

Chain-of-Custody Number	Severn Trent Job #	Lab Sample Numbers	Analysis	Item	Comments
112463, 112464	A01-8428	Various samples	VOC 8260 (cont.)	5	RSD outside control limits for initial calibrations for some analytes. See Table 2 for samples and analytes effected.
		Various samples		6	CCV outside control limits for Bromomethane, Acetone, Carbon Disulfide, 1,2-Dichloroethane, 2-Butanone, 4-Methyl-2-Pentanone, 2-Hexanone. See Table 2 for samples and analytes effected.
		A18428-04, 04RI, 05, 05RI, 08, 08RI, 16, 16RI, 17, 17RI		7	Internal standard (Dichlorobenzene) outside control limits for multiple samples.
112461, 112462, 112480, 112481	A01-8423	All samples	VOC 8260	1	Matrix spike was run on a laboratory blank sample rather than a project sample.
		All samples		2	Matrix spike percent recovery just above upper control limit for toluene in soil.
		Various samples		3	RSD outside control limits for initial calibrations for some analytes. See Table 2 for samples and analytes effected.
		Various samples		4	CCV outside control limits for Acetone, Carbon Disulfide, 2-Butanone, 4-Methyl-2-Pentanone, 2-Hexanone, Methylene Chloride, and Bromomethane. See Table 2 for samples and analytes effected.
		A18423-13, 13RI, 15, 15RI, 17, 17RI, 19 to 28, 20RI to 28RI, 30, 30RI, 30DLRI, 31DL, 33, 33RI, 35, 35RI		5	Internal standards (Chlorobenzene, 1,4-Dichlorobenzene, and 1,4-Difluorobenzene) outside control limits for multiple samples. See Table 2 for samples and analytes effected.
		A18423-20RI to 23RI, 25RI		6	Acetone and Methylene Chloride detected in method blanks.

Table 1. Comments Generated During Review/Validation of BP Carborundum Data Packages

Chain-of-Custody Number	Severn Trent Job #	Lab Sample Numbers	Analysis	Item	Comments
112462	A01-8423	A18423-28 and 29	TCLP VOC	1	MS percent recovery for 2-Butanone and 1,2-Dichloroethane is above upper control limit.
		A18423-28 and 29		2	CCV for 2-Butanone is outside control limits.
112462	A01-8423	A18423-28 and 29	TCLP SVOC	1	MS RPD for Hexachlorobutadiene is outside control limits. Associated MS/MSD within control limits.
		A18423-28 and 29		2	CCV for Pyridine is outside control limits.
112462	A01-8423	AD1167-22 and 23	Metals 6010	1	Reporting limits for Lead and Selenium are above CRQLs.
				2	Barium detected in preparation blank at concentration less than reporting limit.
				3	High Calibration Standard outside control limits for Lead, Selenium, and Arsenic.
				4	Arsenic detected in continuing calibration blank at concentration above reporting limit.
				5	Percent recovery of post digestion spike for Barium is outside control limits.
				6	Dilution test results for Chromium and Lead are outside control limits.
112462	A01-8423	AD1167-22 and 23	Mercury	1	Calibration standard not within control limits
112462	A01-8423	A18423-28 and 29	Waste Characterization[1]	1	No problems noted.

[1]Waste Characterization Analyses include Flashpoint, H_2S Released from Waste, HCN Released from Waste, and Leachable pH.

CCV: Continuing Calibration Verification

CRQL: Contract Required Quantitation Limit

MS: Matrix Spike

MSD: Matrix Spike Duplicate

NFG: National Functional Guidelines

RF: Response Factor

RPD: Relative Percent Difference

RSD: Relative Standard Deviation

Table 2. Qualified Data for BP Carborundum Based on Data Validation per National Functional Guidelines

Chain-of-Custody Number	Severn Trent Job #	Analysis	Samples	Analyte	NFG Qualifier	Reason Data was Qualified by NFG Criteria
112459, 112460	A01-8309	VOC	A18309-01 to 06, 08 to 10	Acetone Methylene Chloride	U	Analyte detected in method blank. Sample concentration qualified as non-detect (U) if concentration was not 10 times greater than blank.
			A18309-12	Toluene	Not Qualified	Toluene detected in method blank at concentration below CRQL. Qualification is not necessary.
			A18309-04RI, 05RI, 06RI, 07, 10RI, 11	Acetone	U	Analyte detected in method blank. Sample concentration qualified as non-detect (U) if concentration was not 10 times greater than blank.
			A18309-07RI and 11RI	Acetone	U	Analyte detected in method blank. Sample concentration qualified as non-detect (U) if concentration was not 10 times greater than blank.
			A18309-01 to 12	Methylene Chloride Acetone	J for detects	Percent RSD for initial calibration is >30%. Associated detect data was qualified as estimated (J).
			A18309-01 to 12	Bromomethane	J for detects UJ for non-detects	Continuing calibration verification %D outside NFG control limits (+-25%).
			A18309-04, 04RI, 05, 05RI, 06, 06RI, 07, 07RI, 10, 10RI, 11	Associated fraction	J for detects UJ for non-detects	Internal standard (1,4-Dichlorobenzene) outside control limits. Associated fraction of analytes qualified as estimates (J/UJ).
			A18309-07RI and 11RI	All analytes	Not Qualified	Samples reanalyzed one day outside of holding times. Qualification not deemed necessary.
112459, 112460	A01-8309	SVOC	A18309-06 to 11	3-Nitroaniline 4-Nitroaniline	Not Qualified	Percent RSD for initial calibration is >30%. Associated detect data was qualified as estimated (J). All data was non-detect, so data were not qualified.
112463, 112464	A01-8428	VOC	A18428-01 to 18	1,2-Dichloroethene Ethylbenzene Trichloroethene	J for detects UJ for non-detects	RPD for field duplicates outside control limits. Associated data qualified as estimates (J/UJ).
			A18428-01 to 18	Toluene	Not Qualified	MS recovery for toluene just above upper control limit. Qualification not deemed necessary.

Table 2. Qualified Data for BP Carborundum Based on Data Validation per National Functional Guidelines

Chain-of-Custody Number	Severn Trent Job #	Analysis	Samples	Analyte	NFG Qualifier	Reason Data was Qualified by NFG Criteria
112463, 112464	A01-8428	VOC (cont.)	A18428-19	Methylene Chloride	Not Qualified	Analyte detected in method blank. Sample concentration qualified as non-detect (U) if concentration was not 10 times greater than blank.
			A18428-01 to 08	Acetone Methylene Chloride	U	Analyte detected in method blank. Sample concentration qualified as non-detect (U) if concentration was not 10 times greater than blank.
			A18428-03, 09 to 18, 04RI, 05RI, 08RI	Acetone Methylene Chloride	J for detects	Initial calibration RSD is outside NFG control limits (>30%).
			A18428-09 to 18, 04RI, 05RI, 08RI, 16RI, 17RI	Bromomethane Acetone Carbon Disulfide 1,2-Dichloroethane 2-Butanone 4-Methyl-2-Pentanone 2-Hexanone	J for detects UJ for non-detects	Initial calibration RSD is outside NFG control limits (>30%).
			A18428-04, 05, 08, 04RI, 05RI, 16, 16RI, 17, 17RI	Associated fraction	J for detects UJ for non-detects	Internal standard (1,4-Dichlorobenzene) outside control limits. Associated fraction of analytes qualified as estimates (J/UJ).
112461, 112462, 112480, 112481	A01-8423	VOC	A18423-08RI to 14RI, 21DL, 22DL, 23, 25	Acetone	U	Analyte detected in method blank. Sample concentration qualified as non-detect (U) if concentration was not 10 times greater than blank.
			A18423-15RI to 18RI, 20RI, 21DLRI, 23RI, 25RI	Acetone Methylene Chloride	U	Analyte detected in method blank. Sample concentration qualified as non-detect (U) if concentration was not 10 times greater than blank.
			A18423-01 to 27	Toluene	Not Qualified	MS recovery for toluene just above upper control limit. Qualification not deemed necessary.
			A18423-12 to 27	Methylene Chloride Acetone	J for detects UJ for non-detects	Initial calibration RSD is outside NFG control limits (>30%).
			A18423-01 to 20	Methylene Chloride	J for detects UJ for non-detects	Continuing calibration verification %D outside NFG control limits (+-25%).

Table 2. Qualified Data for BP Carborundum Based on Data Validation per National Functional Guidelines

Chain-of-Custody Number	Severn Trent Job #	Analysis	Samples	Analyte	NFG Qualifier	Reason Data was Qualified by NFG Criteria
112461, 112462, 112480, 112481	A01-8423	VOC (cont.)	A18423-21 to 27	Acetone Carbon Disulfide 2-Butanone 4-Methyl-2-Pentanone 2-Hexanone	J for detects UJ for non-detects	Continuing calibration verification %D outside NFG control limits (+-25%).
			A18423-08RI to 11RI, 23, 25, 15RI, 17RI, 20RI, 21RI, 25RI, 23RI	Bromomethane	J for detects UJ for non-detects	Continuing calibration verification %D outside NFG control limits (+-25%).
			A18423-13, 13RI, 15, 15RI, 17, 17RI, 19 to 28, 20RI to 28RI, 30, 30RI, 30DLRI, 31DL, 33, 33RI, 35, 35RI	Associated fraction	J for detects UJ for non-detects	Internal standards outside control limits. Associated fraction of analytes qualified as estimates (J/UJ).
			A18423-20RI to 23RI, 25RI	Methylene Chloride Acetone	U	Analyte detected in method blank. Sample concentration qualified as non-detect (U) if concentration was not 10 times greater than blank.
112462	A01-8423	TCLP VOC	A18423-28 and 29	2-Butanone 1,2-Dichloroethane	Not Qualified	MS recovery for these analytes are above upper control limit. Associated sample results were non-detect and qualification was not necessary.
			A18423-28 and 29	2-Butanone	J for detects UJ for non-detects	Continuing calibration verification %D outside NFG control limits (+-25%).
112462	A01-8423	TCLP SVOC	A18423-28 and 29	Hexachlorobutadiene	Not Qualified	RPD outside control limits. Associated MS/MSD were within control limits and qualification is not deemed necessary.
			A18423-28 and 29	Pyridine	J for detects UJ for non-detects	Continuing calibration verification %D outside NFG control limits (+-25%).

Table 2. Qualified Data for BP Carborundum Based on Data Validation per National Functional Guidelines

Chain-of-Custody Number	Severn Trent Job #	Analysis	Samples	Analyte	NFG Qualifier	Reason Data was Qualified by NFG Criteria
112462	A01-8423	Metals 6010	AD1167-22 and 23	Arsenic Lead Selenium	J for detects UJ for non-detects	High Calibration Standards for these analytes were outside of control limits.
			AD1167-22 and 23	Arsenic	Not Qualified	Analyte detected in continuing calibration blank. If concentration in associated sample is less than 5 times the concentration in the blank, the sample is qualified as non-detect (U). Both samples were non-detect and qualification was not necessary.
			AD1167-22 and 23	Barium	Not Qualified	Post digestion percent recovery is elevated for barium. Since concentration in spiked sample is greater than 4 times the spike concentration, qualification is not necessary.
			AD1167-22 and 23	Chromium Lead	J for detects UJ for non-detects	Dilution test outside of control limits. Associated data qualified as estimates (J/UJ).
112462	A01-8423	Mercury 7471	AD1167-22 and 23	Mercury	J for detects UJ for non-detects	Calibration standard not within limits. Associated data qualified as estimates (J/UJ).

%D: Percent Difference
CRQL: Contract Required Quantitation Limit
MS: Matrix Spike
MSD: Matrix Spike Difference
NFG: National Functional Guidelines
RF: Response Factor
RPD: Relative Percent Difference
RSD: Relative Standard Deviation

ATTACHMENT 1
PROJECT CORRESPONDENCE

Eric D Wilson
10/05/01 09:40 AM

To: Lisa A Rottinghaus/Pwr/DukeEngineering@DukePower
cc:
bcc:
Subject: Re: Carborundum Data Tables

Lisa,

Done. See attached. Let me know if you need anything else.

Regards,
Eric

[redacted] [redacted]
Test Pit Data Sent for Validation.x Sampling Key.xls

Eric Wilson, P. Eng.
Environmental Engineer
Duke Engineering & Services (Canada), Inc.
Tel: 613-232-2525
Fax: 613-232-7149
Lisa A Rottinghaus

Lisa A Rottinghaus
10/05/2001 10:20 AM

To: Eric D Wilson/Pwr/DukeEngineering@DukePower
cc:
Subject: Carborundum Data Tables

Eric,

It looks like I will be ready to place the qualifiers on the data tables by next Tuesday, October 9. Please forward the data tables to me when you are ready.

Thank you.
Lisa
DE&S Austin

Sample Description	Sample Location	Interval Sampled (ft.)
OU3TP-001	TP-3	surface
OU3TP-002	TP-7	surface
OU3TP-003	TP-9	surface
OU3TP-004	TP-10	surface
OU3TP-005	TP-11	surface
OU3TP-006	TP-12	surface
OU3TP-007	TP-15	surface
OU3TP-008	TP-17	surface
OU3TP-009	TP-19	surface
OU3TP-010	TP-21	surface
OU3TP-011	DUP TP-21	surface
OU3TP-012	TP-21	5.5-7.5
OU3TP-013	TP-21	12.0-15.5
OU3TP-014	TP-20	2.0-4.0
OU3TP-015	TP-20	10.5-12.0
OU3TP-016	TP-19	7.0-8.5
OU3TP-017	TP-19	14.5-16.0
OU3TP-018	TP-17	3.0-6.0
OU3TP-019	TP-17	DUP 3.0-6.0
OU3TP-020	TP-17	16.0-17.0
OU3TP-021	TP-16	6.0-9.5
OU3TP-022	TP-16	13.0-15.0
OU3TP-023	TP-1	3.0-6.5
OU3TP-024	TP-1	9.5-13.0
OU3TP-025	TP-2	3.0-6.0
OU3TP-026	TP-2	8.5-11.0
OU3TP-027	TP-3	6.0-9.75
OU3TP-028	TP-3	12.5-15.5
OU3TP-029	TP-4	3.5-6.5
OU3TP-030	TP-4	12.0-14.5
OU3TP-031	TP-5	3.0-5.0
OU3TP-032	TP-5	10.0-12.5
OU3TP-033	TP-6	1.5-3.0
OU3TP-034	TP-6	14.5-16.5
OU3TP-035	TP-7	6.5-10.0
OU3TP-036	TP-7	10.0-12.0
OU3TP-037	TP-4	DUP 12.0-14.5
OU3TP-038	TP-10	3.0-5.0
OU3TP-039	TP-10	10.5-13.5
OU3TP-040	TP-9	6.0-8.5
OU3TP-041	TP-9	14.0-16.0
OU3TP-042	TP-8	1.5-3.5
OU3TP-043	TP-8	12.5-15.0
OU3TP-044	TP-14	3.0-5.5
OU3TP-045	TP-14	14.0-16.0
OU3TP-046	TP-10	DUP 10.5-13.5
OU3TP-047	TP-8	DUP 12.5-15.0
OU3TP-048	TP-13	6.0-9.0
OU3TP-049	TP-13	9.0-12.0
OU3TP-050	TP-12	2.5-6.0
OU3TP-051	TP-12	8.5-11.0
OU3TP-052	TP-11	7.0-10.5
OU3TP-053	TP-11	13.5-16
OU3TP-054	TP-15	0.0-4.0
OU3TP-055	TP-15	10-13.5
OU3WC-001	TP-1 to 7	0-10
OU3WC-002	TP-1 to 7	>10

ATTACHMENT 2
DATA TABLES WITH QUALIFIERS

Waste Characterization Parameters	Units	OU3WC-001 TP-1 to 7,0-10 ft. August 29, 2001 (ug/kg)	OU3WC-002 TP-1 to 7, 10-20 ft. August 29, 2001 (ug/kg)
1,1-Dichloroethene	UG/L	<8.0	<8.0
1,2-Dichloroethane	UG/L	<8.0	<8.0
1,4-Dichlorobenzene	MG/L	<0.01	<0.01
2,4,5-Trichlorophenol	MG/L	<0.01	<0.01
2,4,6-Trichlorophenol	MG/L	<0.01	<0.01
2,4-Dinitrotoluene	MG/L	<0.01	<0.01
2-Butanone	UG/L	<20.0 UJ	<20.0 UJ
2-Methylphenol	MG/L	<0.01	<0.01
3-Methylphenol	MG/L	<0.01	<0.01
4-Methylphenol	MG/L	<0.01	<0.01
Arsenic - Total	UG/L	<7.0 UJ	<7.0 UJ
Barium - Total	UG/L	1830.0	3160.0
Benzene	UG/L	<6.0	<6.0
Cadmium - Total	UG/L	<1.0	<1.0
Carbon Tetrachloride	UG/L	<8.0	<8.0
Chlorobenzene	UG/L	<8.0	<8.0
Chloroform	UG/L	<5.0	<5.0
Chromium - Total	UG/L	2.4 J	21.1 J
Flashpoint	°F	0.0	0.0
H2S Released From Waste	MG/KG	<10.0	<10.0
HCN Released From Waste	MG/KG	<10.0	<10.0
Hexachlorobenzene	MG/L	<0.01	<0.01
Hexachlorobutadiene	MG/L	<0.01	<0.01
Hexachloroethane	MG/L	<0.01	<0.01
Leachable pH	S.U.	8.59	8.43
Lead - Total	UG/L	<10.0 UJ	30 UJ
Mercury - Total	UG/L	<0.2 UJ	<0.2 UJ
Nitrobenzene	MG/L	<0.01	<0.01
Pentachlorophenol	MG/L	<0.05	<0.05
Pyridine	MG/L	<0.025 UJ	<0.025 UJ
Selenium - Total	UG/L	<10.0 UJ	<10.0 UJ
Silver - Total	UG/L	<3.0	<3.0
Tetrachloroethene	UG/L	<8.0	<8.0
Toxicity Characteristic Leaching Procedure	INVALID	0.0	0.0
Trichloroethene	UG/L	<5.0	<5.0
Vinyl chloride	UG/L	<5.0	<5.0

UJ - Indicates the analyte was not detected above the reported sample quantitation limit and the quantitation limit is approximate.

J - Indicates an estimated value. Compound meets identification criteria and is less than the specific detection limit but greater than zero.

Semi-Volatile Parameters	Clean up Objective (ug/kg)	OU3TP-001 TP-3,Surface August 27, 2001 (ug/kg)	OU3TP-002 TP-7,Surface August 27, 2001 (ug/kg)	OU3TP-003 TP-9,Surface August 27, 2001 (ug/kg)	OU3TP-004 TP-10,Surface August 27, 2001 (ug/kg)	OU3TP-005 TP-11,Surface August 27, 2001 (ug/kg)	OU3TP-006 TP-12,Surface August 27, 2001 (ug/kg)	OU3TP-007 TP-15,Surface August 27, 2001 (ug/kg)	OU3TP-008 TP-17,Surface August 27, 2001 (ug/kg)	OU3TP-009 TP-19,Surface August 27, 2001 (ug/kg)	OU3TP-010 TP-21,Surface August 27, 2001 (ug/kg)
4-Nitroaniline		<1600	<1600	<1600	<1600	<1600	<1600	<1600	<1600	<1600	<1600
4-Nitrophenol		<1600	<1600	<1600	<1600	<1600	<1600	<1600	<1600	<1600	<1600
Benzyl alcohol		<330	<330	<330	<330	<330	<330	<330	<330	<330	<330
4-Bromophenyl phenyl ether		<330	<330	<330	<330	<330	<330	<330	<330	<330	<330
2,4-Dimethylphenol		<330	<330	<330	<330	<330	<330	<330	<330	<330	<330
4-Methylphenol		<330	<330	<330	<330	<330	<330	<330	<330	<330	<330
1,4-Dichlorobenzene		<330	<330	<330	<330	<330	<330	<330	<330	<330	<330
4-Chloroaniline		<330	<330	<330	<330	<330	<330	<330	<330	<330	<330
2,2'-Oxybis(1-Chloropropane)		<330	<330	<330	<330	<330	<330	<330	<330	<330	<330
Phenol		<330	<330	<330	<330	<330	<330	<330	<330	<330	<330
Bis(2-chloroethyl) ether		<330	<330	<330	<330	<330	<330	<330	<330	<330	<330
Bis(2-chloroethoxy) methane		<330	<330	<330	<330	<330	<330	<330	<330	<330	<330
Bis(2-ethylhexyl) phthalate		<330	<330	<330	<330	<330	<330	<330	<330	<330	<330
Di-n-octyl phthalate		<330	<330	<330	<330	<330	<330	<330	<330	<330	<330
Hexachlorobenzene		<330	<330	<330	<330	<330	<330	<330	<330	<330	<330
Anthracene		<330	<330	<330	<330	<330	<330	<330	<330	<330	<330
1,2,4-Trichlorobenzene		<330	<330	<330	<330	<330	<330	<330	<330	<330	<330
2,4-Dichlorophenol		<330	<330	<330	<330	<330	<330	<330	<330	<330	<330
2,4-Dinitrotoluene		<330	<330	<330	<330	<330	<330	<330	<330	<330	<330
Pyrene	50,000	140 J	310 J	130 J	170 J	300J	180 J	110 J	59 J	140 J	92 J
Dimethyl phthalate	50,000	<330	<330	<330	<330	<330	<330	<330	<330	<330	<330
Dibenzofuran	50,000	<330	<330	<330	<330	<330	<330	<330	<330	<330	<330
Benzo(ghi)perylene	50,000	<330	170 J	56 J	<330	120J	100 J	60 J	25 J	55 J	38 J
Indeno(1,2,3-cd)pyrene	4,480	<330	150 J	50 J	<330	94 J	86 J	51 J	23 J	48 J	32 J
Benzo(b)fluoranthene	1,500	92 J	260 J	120 J	160 J	230 J	270 J	110 J	54 J	110 J	84 J
Fluoranthene	50,000	150 J	380.0	160 J	200 J	310 J	220 J	140 J	73 J	160 J	110 J
Benzo(k)fluoranthene	1,500	100 J	340.0	120 J	<330	260 J	140 J	92 J	45 J	99 J	80 J
Chrysene	560	120 J	300 J	140 J	180 J	270 J	170 J	120 J	60 J	100 J	98 J
Benzo(a)pyrene	15,400	110 J	330.0	130 J	170 J	260 J	170 J	110 J	54 J	120 J	88 J
Benzo(a)anthracene	3,860	87 J	230 J	98 J	130 J	190 J	120 J	80 J	39 J	88 J	66 J
Phenanthrene	50,000	<330	190 J	68 J	<330	<330	96 J	59 J	<330	74 J	51 J

UJ - Indicates the analyte was not detected above the reported sample quantitation limit and the quantitation limit is approximate.

J - Indicates an estimated value. Compound meets identification criteria and is less than the specific detection limit but greater than zero.

B - Indicates that the analyte was found in both the sample and its associated laboratory blank. Possible/probable blank contamination.

D - Indicates compound identified in an analysis at a secondary dilution factor.

<5 - Indicates not detected above laboratory detection limit.

5800 Bolded/shaded concentrations indicate an exceedence of the clean-up criteria objective.

Semi-Volatile Parameters	Clean up Objective (ug/kg)	OU3TP-011 dupTP-21,Surface August 27, 2001 (ug/kg)
4-Nitroaniline		<1600
4-Nitrophenol		<1600
Benzyl alcohol		<330
4-Bromophenyl phenyl ether		<330
2,4-Dimethylphenol		<330
4-Methylphenol		<330
1,4-Dichlorobenzene		<330
4-Chloroaniline		<330
2,2'-Oxybis(1-Chloropropane)		<330
Phenol		<330
Bis(2-chloroethyl) ether		<330
Bis(2-chloroethoxy) methane		<330
Bis(2-ethylhexyl) phthalate		<330
Di-n-octyl phthalate		<330
Hexachlorobenzene		<330
Anthracene		<330
1,2,4-Trichlorobenzene		<330
2,4-Dichlorophenol		<330
2,4-Dinitrotoluene		<330
Pyrene	50,000	81 J
Dimethyl phthalate	50,000	<330
Dibenzofuran	50,000	<330
Benzo(ghi)perylene	50,000	31 J
Indeno(1,2,3-cd)pyrene	4,480	27 J
Benzo(b)fluoranthene	1,500	79 J
Fluoranthene	50,000	98 J
Benzo(k)fluoranthene	1,500	72 J
Chrysene	560	88 J
Benzo(a)pyrene	15,400	76 J
Benzo(a)anthracene	3,860	56 J
Phenanthrene	50,000	46 J

Contaminants of Concern	**Clean-up Objective** (ug/kg)	**Action Level** (ug/kg)	OU3TP-001 TP-3,Surface August 27, 2001 (ug/kg)	OU3TP-002 TP-7,Surface August 27, 2001 (ug/kg)	OU3TP-003 TP-9,Surface August 27, 2001 (ug/kg)	OU3TP-004 TP-10,Surface August 27, 2001 (ug/kg)	OU3TP-005 TP-11,Surface August 27, 2001 (ug/kg)	OU3TP-006 TP-12,Surface August 27, 2001 (ug/kg)	OU3TP-007 TP-15,Surface August 27, 2001 (ug/kg)
Trichloroethene	880	64,000	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	2.0 J
1,2-Dichloroethene	410	$2.8x10^6$	<5.0	<5.0	<5.0	<5.0 UJ	<5.0UJ	<5.0 UJ	<5.0 UJ
Acetone	200	$8x10^6$	11 BU	12 BU	12 BU	13 BUJ	15 BUJ	19 BUJ	10 BUJ
Vinyl Chloride	200	360	<10	<10	<10	<10 UJ	<10 UJ	<10 UJ	<10 UJ
Xylenes (total)	1,680	$2x10^8$	3.0 J	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
Ethylbenzene	7,700	$8x10^6$	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
Toluene	2,100	$20x10^6$	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	1.0 J
Methylene Chloride	150	93,000	6.0 BU	6.0 BU	8.0 BU	9.0 BUJ	7.0 J	8.0 J	17.0 J

UJ - Indicates the analyte was not detected above the reported sample quantitation limit and the quantitation limit is approximate.

J - Indicates an estimated value. Compound meets identification criteria and is less than the specific detection limit but greater than zero.

B - Indicates that the analyte was found in both the sample and its associated laboratory blank. Possible/probable blank contamination.

D - Indicates compound identified in an analysis at a secondary dilution factor.

<5 - Indicates not detected above laboratory detection limit.

580D Bolded/shaded concentrations indicate an exceedence of the clean-up criteria objective.

Contaminants of Concern	**Clean-up Objective** (ug/kg)	**Action Level** (ug/kg)	OU3TP-008 TP-17,Surface August 27, 2001 (ug/kg)	OU3TP-009 TP-19,Surface August 27, 2001 (ug/kg)	OU3TP-010 TP-21,Surface August 27, 2001 (ug/kg)	OU3TP-011 21,Surface August 27, 2001 (ug/kg)	OU3TP-012 TP-21,5.5-7.5 ft August 28, 2001 (ug/kg)	OU3TP-013 TP-21,12-15.5 ft August 28, 2001 (ug/kg)	OU3TP-014 TP-20,2-4 ft August 28, 2001 (ug/kg)
Trichloroethene	880	64,000	<5.0	<5.0	<5.0	4.0 J	<5.0	<5.0	<5.0
1,2-Dichloroethene	410	$2.8x10^6$	<5.0	<5.0	<5.0 UJ	<5.0	<5.0	<5.0 UJ	<5.0
Acetone	200	$8x10^6$	14 BU	16 BU	11 BUJ	<10	30 BJ	37 BJ	13 BJ
Vinyl Chloride	200	360	<10	<10	<10 UJ	<10	<10	<10 UJ	<10
Xylenes (total)	1,680	$2x10^8$	<5.0	2.0 J	<5.0	2.0 J	<5.0	<5.0	<5.0
Ethylbenzene	7,700	$8x10^6$	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
Toluene	2,100	$20x10^6$	<5.0	<5.0	<5.0	3.0 J	<5.0	<5.0	<5.0
Methylene Chloride	150	93,000	11.0 BU	9.0 BU	11.0 J	14.0 J	12.0 J	13 J	9.0 J

Contaminants of Concern	**Clean-up Objective** (ug/kg)	**Action Level** (ug/kg)	OU3TP-015 TP-20,10.5-12 ft August 28, 2001 (ug/kg)	OU3TP-016 TP-19,7-8.5 ft August 28, 2001 (ug/kg)	OU3TP-017 TP-19,14.5-16 ft August 28, 2001 (ug/kg)	OU3TP-018 TP-17,3-6 ft August 28, 2001 (ug/kg)	OU3TP-019 dupTP-17,3-6 ft August 28, 2001 (ug/kg)	OU3TP-020 TP-17,16-17 ft August 28, 2001 (ug/kg)	OU3TP-021 TP-16,6-9.5 ft August 28, 2001 (ug/kg)
Trichloroethene	880	64,000	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0 UJ	<5.0
1,2-Dichloroethene	410	$2.8x10^6$	<5.0 UJ	<5.0	<5.0 UJ	<5.0	<5.0	<5.0 UJ	<5.0 UJ
Acetone	200	$8x10^6$	29 BJ	15 BJ	46 BJ	14 BJ	12 BU	25 BUJ	22 BUJ
Vinyl Chloride	200	360	<10 UJ	<10	<10 UJ	<10	<10	<10 UJ	<10 UJ
Xylenes (total)	1,680	$2x10^8$	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
Ethylbenzene	7,700	$8x10^6$	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
Toluene	2,100	$20x10^6$	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
Methylene Chloride	150	93,000	10.0 J	10.0 J	13.0 J	10.0 J	9.0 BUJ	8.0 BUJ	10.0 BUJ

Contaminants of Concern	**Clean-up Objective** (ug/kg)	**Action Level** (ug/kg)	OU3TP-022 TP-16,13-15 ft August 28, 2001 (ug/kg)	OU3TP-023 TP-1,3-6.5 ft August 29, 2001 (ug/kg)	OU3TP-024 TP-1,9.5-13 ft August 29, 2001 (ug/kg)	OU3TP-025 TP-2,3-6 ft August 29, 2001 (ug/kg)	OU3TP-026 TP-2,8.5-11 ft August 29, 2001 (ug/kg)	OU3TP-027 TP-3,6-9.75 ft August 29, 2001 (ug/kg)	OU3TP-028 TP-3,12.5-15.5 ft August 29, 2001 (ug/kg)
Trichloroethene	880	64,000	<5.0 UJ	8.0	<5.0	4.0 J	78	10	<5.0
1,2-Dichloroethene	410	$2.8x10^6$	<5.0 UJ	<5.0 UJ	<5.0 UJ	<5.0 UJ	2.0 J	1.0 J	<5.0 UJ
Acetone	200	$8x10^6$	38 BUJ	16 BUJ	13 BUJ	13 BUJ	13 BUJ	11 BUJ	45 BUJ
Vinyl Chloride	200	360	<10 UJ	<10 UJ	<10 UJ	<10 UJ	<10 UJ	<10 UJ	<10 UJ
Xylenes (total)	1,680	$2x10^8$	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
Ethylbenzene	7,700	$8x10^6$	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
Toluene	2,100	$20x10^6$	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
Methylene Chloride	150	93,000	23.0 BUJ	27.0 BUJ	20.0 BUJ	14.0 BUJ	12.0 BUJ	13.0 BUJ	9.0 BUJ

Contaminants of Concern	**Clean-up Objective** (ug/kg)	**Action Level** (ug/kg)	OU3TP-029 TP-4,3.5-6.5 ft August 29, 2001 (ug/kg)	OU3TP-030 TP-4,12-14.5 ft August 29, 2001 (ug/kg)	OU3TP-031 TP-5,3-5 ft August 29, 2001 (ug/kg)	OU3TP-032 TP-5,10-12.5 ft August 29, 2001 (ug/kg)	OU3TP-033 TP-6,1.5-3 ft August 29, 2001 (ug/kg)	OU3TP-034 TP-6,14.5-16.5 ft August 29, 2001 (ug/kg)	OU3TP-035 TP-7,6.5-10 ft August 29, 2001 (ug/kg)
Trichloroethene	880	64,000	16	<5.0	22 D	500 D	4.0 J	**21000 D**	41
1,2-Dichloroethene	410	$2.8x10^6$	140	4.0 J	160 DJ	**580 D**	1.0 J	**790 D**	3.0 J
Acetone	200	$8x10^6$	53 BJ	38 BUJ	42 BDUJ	<20	7 BUJ	**<1250**	16 BUJ
Vinyl Chloride	200	360	2.0 J	<10 UJ	<10 UJ	<10	<10 UJ	<1250	<10 UJ
Xylenes (total)	1,680	$2x10^8$	<5.0	<5.0	<5.0	160 D	<5.0	460 DJ	<5.0
Ethylbenzene	7,700	$8x10^6$	20 J	<5.0	<5.0	150 D	<5.0	360 DJ	<5.0
Toluene	2,100	$20x10^6$	<5.0	<5.0	<5.0	11.0 D	<5.0	1400 D	<5.0
Methylene Chloride	150	93,000	6.0 B	11.0 BUJ	49 BDUJ	40 BDU	10.0 BUJ	**<625**	12.0 BUJ

Contaminants of Concern	**Clean-up Objective** (ug/kg)	**Action Level** (ug/kg)	OU3TP-036 TP-7,10-12 ft August 29, 2001 (ug/kg)	OU3TP-037 dupTP-4,12-14.5 ft August 29, 2001 (ug/kg)	OU3TP-038 TP-10,3-5 ft August 30, 2001 (ug/kg)	OU3TP-039 TP-10,10.5-13.5 ft August 30, 2001 (ug/kg)	OU3TP-040 TP-9,6-8.5 ft August 30, 2001 (ug/kg)	OU3TP-041 TP-9,14-16 ft August 30, 2001 (ug/kg)	OU3TP-042 TP-8,1.5-3.5 ft August 30, 2001 (ug/kg)
Trichloroethene	880	64,000	96	4.0 J	<5.0	530 DJ	<5.0 UJ	<5.0	<5.0
1,2-Dichloroethene	410	$2.8x10^6$	6.0	4.0 J	<5.0 UJ	<625 UJ	<5.0 UJ	<5.0	<5.0
Acetone	200	$8x10^6$	14 BJ	64 BJ	20 BU	<1250	11 J	28 J	8 J
Vinyl Chloride	200	360	<10	<10	<10	<1250	<10	<10	<10
Xylenes (total)	1,680	$2x10^8$	<5.0	<5.0	<5.0	<625	<5.0	<5.0	<5.0
Ethylbenzene	7,700	$8x10^6$	<5.0	<5.0	<5.0 UJ	<625 UJ	<5.0 UJ	<5.0	<5.0
Toluene	2,100	$20x10^6$	<5.0	<5.0	<5.0	<625	<5.0	<5.0	<5.0
Methylene Chloride	150	93,000	9.0 J	7.0J	8.0 BU	<625	17.0 BJ	10.0 BJ	13.0 BJ

Contaminants of Concern	**Clean-up Objective** (ug/kg)	**Action Level** (ug/kg)	OU3TP-043 TP-8,12.5-15 ft August 30, 2001 (ug/kg)	OU3TP-044 TP-14,3-5.5 ft August 30, 2001 (ug/kg)	OU3TP-045 TP-14,14-16 ft August 30, 2001 (ug/kg)	OU3TP-046 dup TP-10,10.5-13.5 ft August 30, 2001 (ug/kg)	OU3TP-047 dup TP-8,12.5-15 ft August 30, 2001 (ug/kg)	OU3TP-048 TP-13, 6-9 ft August 30, 2001 (ug/kg)	OU3TP-049 TP-13, 9-12 ft August 30, 2001 (ug/kg)
Trichloroethene	880	64,000	<5.0 UJ	<5.0 UJ	<5.0	**2400 DJ**	4.0 J	<5.0 UJ	<5.0 UJ
1,2-Dichloroethene	410	$2.8x10^6$	<5.0 UJ	<5.0 UJ	<5.0	**<625 UJ**	<5.0 UJ	<5.0 UJ	<5.0 UJ
Acetone	200	$8x10^6$	17 BU	14 BU	24 J	**<1250**	14 J	15 J	19 J
Vinyl Chloride	200	360	<10	<10	<10	**<1250**	<10	<10	<10
Xylenes (total)	1,680	$2x10^8$	<5.0	<5.0	<5.0	<625	<5.0	<5.0	<5.0
Ethylbenzene	7,700	$8x10^6$	<5.0 UJ	<5.0 UJ	<5.0	<625 UJ	<5.0 UJ	<5.0 UJ	<5.0 UJ
Toluene	2,100	$20x10^6$	<5.0	<5.0	<5.0	<625	<5.0	<5.0	<5.0
Methylene Chloride	150	93,000	9.0 BU	8.0 BU	9.0 BJ	**<625**	9.0 BJ	11.0 BJ	12.0 BJ

Contaminants of Concern	**Clean-up Objective** (ug/kg)	**Action Level** (ug/kg)	OU3TP-050 TP-12, 2.5-6 ft August 30, 2001 (ug/kg)	OU3TP-051 TP-12, 8.5-11 ft August 30, 2001 (ug/kg)	OU3TP-052 TP-11, 7-10.5 ft August 30, 2001 (ug/kg)	OU3TP-053 TP-11,13.5-16 ft August 30, 2001 (ug/kg)	OU3TP-054 TP-15, 0-4 ft August 30, 2001 (ug/kg)	OU3TP-055 TP-15,10-13.5 ft August 30, 2001 (ug/kg)
Trichloroethene	880	64,000	<5.0 UJ	<5.0 UJ	<5.0 UJ	<5.0	<5.0	<5.0 UJ
1,2-Dichloroethene	410	$2.8x10^6$	<5.0 UJ	<5.0 UJ	<5.0 UJ	<5.0	<5.0	<5.0 UJ
Acetone	200	$8x10^6$	15 J	15 J	8 J	40 J	7 J	17 J
Vinyl Chloride	200	360	<10	<10	<10	<10	<10	<10
Xylenes (total)	1,680	$2x10^8$	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
Ethylbenzene	7,700	$8x10^6$	<5.0 UJ	<5.0 UJ	<5.0 UJ	<5.0	<5.0	<5.0 UJ
Toluene	2,100	$20x10^6$	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
Methylene Chloride	150	93,000	10.0 BJ	10.0 BJ	9.0 BJ	15.0 BJ	8.0 BJ	6.0 BJ