Phase II "Limited" Environmental Site Assessment

Location:
Morgan Materials
373 Hertel Avenue
Buffalo, New York

Prepared For:
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Prepared:

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Contents

1.0 EXECUTIVE SUMMARY

Morgan Materials, Inc. engaged AFI Environmental (AFI) to conduct a 'Limited' Phase II Environmental Site Assessment (ESA) of the property known as Morgan Materials which is located at 373 Hertel Avenue, Buffalo, Erie County, New York, subsequently known as "the property". The Purpose of the Ad hoc interim investigation was to assess the existing environmental conditions, the current presence and magnitude of contamination at the Morgan Materials Site as identified in the Malcolm Pirnie study dated January, 1999, and to evaluate the needs and concerns necessary for AFI to provide sufficient information to DEC to defend AFI's future suggested Work Plan which will be required to address NYSDEC Consent Ordered future activities at the Site. This collected information will assist AFI to assess changes, if present regarding the nature and extent of contamination that may have attenuated or worsened since 2001. This information will inform and assist the owners and principals of Morgan Materials in making informed business decisions about the property; and where applicable, providing the level of knowledge necessary to justify the recommendation to be proposed by AFI on the future investigations and remediation alternatives. The recognized on-site environmental concerns assessed as part of this Ad hoc Investigation were the presence of Volatile Organic Compounds (VOCs) and Metals impacts to groundwater as identified in a previous study (Malcolm Pirnie January 1999) during Monitoring Well sampling.

This Ad hoc investigation included the following activities:

- The identification of the location of five (5) previously installed (by others) Monitoring Wells,
- Evaluation of the integrity and confirmation of the location and design criteria of each well,
- Evaluation of the well's location in respect to assessing:
- Groundwater flow direction and gradient
- Proximity of the wells to previous on-site source materials
- Proximity of wells to potential off-site resources,
- Proximity of wells to potential off-site sources of fugitive releases capable of trespass to this property,
- Evaluation of the potential attenuation factors of the soils and natural degradation,
- Estimating future attenuation potential,
- Collecting data in support of AFI's potential to revise the consent ordered Onsite activities dating back to 2001.

AFI's work included:

- The Development and recording of field parameters and well conditions of all 5 previously installed and documented monitoring wells,
- Confirmation of well integrity and design
- Sampling of three (3) of the productive wells.
- Chemical analysis of ground water from the three (3) worse case monitoring wells (MW3, MW4 and MW5).

Water samples collected were analyzed for VOCs and Total Metals. The results of these assessments reported all of the groundwater samples with the exception of MW5 exceeded NYSDEC TOG 1.1.1 guidelines for VOCs.

Samples collected from MW-3 and MW-4 exceeded NYSDEC guidelines for VOCs and levels in MW3 for Cis-1,2-Dichloroethene, Tetrachloroethene, trichloroethene and vinyl chloride* were highly elevated. VOCs in MW-5 were well below the NYSDEC TOGS 1.1.1 Tables 1& 5. Total Metals were above detection limits in all ground water samples and above guidance values for Aluminum, Antimony, Beryllium, Iron and sodium in all three (3) wells sampled during this study (See Table 1).

NOTE - * The laboratory could not report lower on the other VOA compounds due to the high Chlorinated compounds that were found. The sample was diluted due to high levels of chlorinated compounds, and because of the high levels of chlorinated compounds, the laboratory was unable to run the sample at a lesser dilution, as contamination of the instrument would result.

The following were not evaluated or assessed as part of this 'limited' Phase II ESA: ground sonar survey for USTS and drums, Soil Vapor Encroachment Screening (SVEs), the possible presence of asbestos containing materials, lead based paint and radon gas. The findings and conclusions presented in this report apply to the recognized environmental conditions assessed.

Based on the results of this assessment, most of the ground water tested at the site was above applicable or relevant and appropriate requirements ("ARARs) (NYSDEC Ground Water TOGS 1.1.1 (Table 1, Table 5)). The levels encountered were extremely high in some cases for the areas tested and samples analyzed; AFI will recommend that A Site Management Plan (SMP) for Soil (excavation, transport and disposal limitations) and for Ground water (use) be prepared and put into place for the Site.

Table 1
373 Hertel Avenue
Groundwater Analytical Comparison
1994 NYSDEC Water Quality Regulations and Current TOGS 1.1.1 (Table 1 Table 5)
August 2012
A12B Hertel-ENV

Contaminant	CAS Number	1994 NYSDEC Objectives (1)	TOGS 1.1.1 Maximum Allowable Concentration	MW-1 7-Nov-98	MW-2 7-Nov-98	MW-3 7-Nov-98	MW-4 7-Nov-98	MW-3 29-Aug-12	MW-4 29-Aug-12	MW-5 29-Aug-12
Volitile Organic Compounds (VOCs)-ug/L										
1,1,2,2 Tetrachloroethane	79-34-5	5	5	U	U	U	U	<200*	<2.00	<2.00
1,1,2 Trichloroethane	79-00-5)	0.6	1	U	U	U	U	<200*	<2.00	<2.00
1,1 Dichloroethene	75-34-3	5	5	U	U	2.1	U	<200*	<2.00	<2.00
Acetone	67-64-1	50	50	U	U	U	U	<1,000*	<10.0	<10.0
Benzene	71-43-8	0.7	1	U	U	U	U	<70.0*	<0.700	<0.700
Bromodichloromethane	74-27-4	100	50	U	U	U	U	<200*	<2.00	<2.00
Carbon Disulfide	75-15-0	50	na	U	U	U	U	<200*	<2.00	<2.00
Carbon tetrachloride	56-23-5	5	5	U	U	U	U	<200*	<2.00	<2.00
cis-1,2-Dichloroethene	156-59-2	70	5	U	U	540	23	22,200	14.6	<2.00
Ethylbenzene	100-41-4	5	5	U	U	U	U	<200*	<2.00	<2.00
m&p-Xylene	108-38-3	5	5	U	U	U	U	<200*	<2.00	<2.00
Methyl t-butyl ether (MTBE)	1634-04-4	na	10	U	U	U	6.2	<200*	NA	NA
o-Xylene	95-47-6	5	5	U	U	U	U	<200*	<2.00	<2.00
Naphthalene	91-20-3	na	10	U	U	U	U	<200*	NA	NA
p-Isopropyltoulene	**	na	na	U	U	U	U	<200*	NA	NA
Toluene	108-88-3	5	5	U	U	U	U	<200*	<2.00	<2.00
trans-1,2-Dichloroethene	156-60-5	5(2)	5	U	U	4	U	<200*	<2.00	<2.00
Tetrachloroethene	127-18-4	na	5	U	U	390	U	1,520	<2.00	<2.00
Trichloroethene	79-01-6	5	5	U	U	500	6.7	1,220	<2.00	<2.00
Trichlorofluoromethane	75-69-4	na	5	U	U	U	U	<200*	<2.00	<2.00
Vinyl chloride	75-01-4	2	2	U	U	62	5.6	4,450	6.10	<2.00
Total Metals-ug/L										
Arsenic	**	25	25	U	U	2.5	U	10	10	31
Aluminum	**	na	2000	760	64	1200	130	2,130	200	15,000
Antimony	**	6	6	U	U	U	U	60	60	60
Barium	**	1,000	1,000	58	22	140	16	126	100	159
Beryllium	7440-41-7	4	3	U	U	U	U	5	5	5
Cadmium	**	10	5	U	U	U	U	5	5	5
Calcium	**	na	na	140,000	130,000	92,000	55,000	80,500	74,600	330,200
Chromium	16065-831	50	50	U	U	U	U	10	10	35
Copper	7440-508	200	200	U	U	U	U	25	25	25
Iron	**	300	300	1400	120	15,000	260	16100.0	3000	17,000
Lead	7439-92-1	25	25	U	U	3.8	U	19	10	19
Magnesium	**	na	35,000	250,000	280,000	15,000	5100	16,000	29,600	448,000
Manganese	**	300	300	190	84	570	22	554	702	270
Mercury	**	2	0.7	0.2	U	U	U	0.2	0.2	0.2
Nickel	**	100	100	U	U	U	U	40	40	40
Potassium	**	na	na	7,700	7,700	5,800	11,00	11,600	10,300	9,650
Selenium	**	10	10	U	U	U	U	10	10	10
Silver	**	50	50	U	U	U	U	10	10	10
Sodium	**	20,000	20,000	110,000	150,000	270,000	45,000	130,000	24,200	234,000
Thallium	**	2(2)	0.5	U	U	U	U	25	25	25
Vanadium	**	na	na	U	U	U	U	25	25	31
Zinc	**	300	2,000	22	U	21	U	60	60	60

=Exceeds TOGS 1.1.1 Table 1 and Table 5

Notes:

Definitions:
ND=Parameter not detected above laboratory detection limit.
NA=Sample not analyzed for parameter.
na - No objective available.
** - CAS not applicable
(1) - New York State Department of Environmental Conservation (NYSDEC) water quality regulations (NYSDEC 1994b).
(2) -NYSDEC water quality regulation unavailable; U.S. Environmental Protection Agency (USEPA) maximum contaminant level (MCL) indicated (USEPA 1992)
U - The analyte was not detected at the sample quantitation limit.

*The laboratory could not report lower on the other VOA compounds due to the high Chlorinated compounds that were found. The sample was diluted due to high levels of chlorinated compounds, and because of the high levels of chlorinated compounds, the laboratory was unable to run the sample at a lesser dilution, as contamination of the instrument would result.

2.0 INTRODUCTION

2.1 Purpose

The purpose of this Phase II Environmental Report is to document the presence, or absence of, petroleum products or hazardous chemicals in the subsurface of the site.

This 'Limited' Phase II Environmental Site Assessment Investigation Report presents and summarizes the field activities, observations, and laboratory analysis for the 'Limited' Phase II Site activities conducted by AFI Environmental (AFI) at 373 Hertel Avenue, Buffalo, New York 14206 (See Figure 1) on August 24, 28 and 29, 2012.

This Report was prepared to assess the existing environmental conditions and the current presence and magnitude of contamination at the Morgan Materials Site as identified in the Malcolm Pirnie previous study dated January, 1999. Based on the historical past use of the site; it was likely that the historic activities at and adjacent to the site had resulted in a potential release of hazardous substances or petroleum products to the subsurface soils or groundwater of the subject property. In order to address this potential and the concerns of AFI's client related to the development ability of the site; AFI conducted the 'Limited Phase II Investigation.

This Report summarizes and documents the sample locations and results used to profile the present conditions and/or the levels of chemical impacts to soils and groundwater. The purpose of this study is to observe the current, and compare the marked contaminants of the previous study and determine the current composition of the groundwater and it's volatility through time.

2.2 Scope of Services

AFI's scope of service included an on-site, visual inspection of the site to identify the locations of previously installed (by others) Monitoring Wells. Also included was the development of the wells that are accessible and that harbor water, collection of samples and the analysis of the developed groundwater for comparison to previous sampling (by others) was also provided.

2.3 Special Terms and Conditions

The work was completed in strict accordance with AFI's agreement with the client dated August 24, 2012. The Assessment was characterized as 'Limited' and did not include the full range of investigation as per ASTM standard E1903-97 (2002).

2.4 Limitations and Exceptions

AFI's Phase II Environmental Investigation was conducted according to the ASTM E1903 - 97(2002) Standard Guide for Environmental Site Assessments: Phase II Environmental Site Assessment Process standard and to meet our client's specific needs. This report was completed in accordance with the contract terms and the scope of service agreed to by AFI's client. It is

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Site Map
Morgan Materials

373 Hertel Avenue
Buffalo, New York 14207

FIGURE 1

also subject to the limitations inherent in these methodologies of ASTM E1903 - 97(2002). No other warranties, expressed or implied, are made as to the professional services provided under the terms of our contract and included in this report.

This Phase II Environmental Investigation Report is characterized as 'Limited' based on the above ASTM Standard and is limited by the terms of the contract.

2.5 Limiting Conditions and Methodologies

It should be noted, that this report is only valid for the precise areas sampled, the chemicals analyzed and a 'limited zone of influence' around each sample location.

No ESA can eliminate all uncertainty. Furthermore, any sample, either surface or subsurface, taken for chemical analysis may or may not be representative of a larger population. Professional judgment and interpretation are inherent in the process and some level of uncertainty is inevitable. Additional testing and sampling may be able to reduce the uncertainty. This ESA was limited in scope.

Even when Phase II ESA work is executed with an appropriate site-specific standard of care, certain conditions present especially difficult detection problems. Such conditions may include, but are not limited to, complex geological settings, the fate and transport characteristics of certain hazardous substances and petroleum products, the distribution of existing contamination, physical limitations imposed by the location of the utilities and other man-made objects, and the limitations of the assessment technologies.

Phase II ESAs do not generally require an exhaustive assessment of environmental conditions on a property. There is a point at which the cost of information obtained and the time required to obtain it out weigh the usefulness of the information and, in fact, may be a material detriment to the orderly completion of transactions. If hazardous substance or petroleum releases are confirmed on a parcel of property, the extent of further assessment is related to the degree of uncertainty that is acceptable to the user or future user, with respect to the real estate transaction.

Measurements and sampling date only represent the site conditions at the time of data collection. Therefore the usability of data collected and presented as part of this Phase II ESA may have a definite finite lifetime depending on the application and use being made of the data. An environmental professional should evaluate whether the generated data are appropriate for any subsequent use beyond the original purpose for which it was collected.

The results within this report are only indicative of the areas sampled; and the conclusion drawn from the data are based on the available analytical results. Since sampling was 'Limited', AFI could potentially underestimate the actual levels of contamination at the Site. BACKGROUND

2.6 Site Description and Features

The Morgan Materials site is located at 373 Hertel Avenue, a mixed residential and industrial area of Buffalo in Erie County, New York. The site sits on approximately 3.5 acres and consisted of six interconnected warehouses, some of which are no longer present. Population within a 2-mile radius of the site is approximately 30,000. There is a residential neighborhood of 30 homes immediately across the street from the site; the nearest residential property is 100 feet (ft.) north in the same neighborhood. A middle school is located about 400ft west of the site; three schools are located within a 0.75-mile radius

2.7 Physical Setting

The Morgan Materials site is located in the Erie-Ontario lowlands physiographic province where the bedrock is predominantly limestone, dolomite, and shale. This area has been repeatedly covered by continental glacial ice sheets which have deposited un-stratified till. Thick veneers of stratified till have been deposited by glacial melt water channels. The area has also been eroded and covered by the Niagara River multiple times. Melt water also formed lake at the ice margins, where silts and clays accumulated. Erie County is covered by such lake sediments.

Stratified glacial tills consisting of sand and gravel may act as aquifers in the area of the site, with the clay and silt behaving as aquitards. No wells are known to obtain groundwater from bedrock [approximately 60ft to 80ft below ground surface (bgs)] in the vicinity of the site. Drilling activities at the site have shown the upper 30 ft. of overburden to consist mainly of red-brown silty clay, overlain by fill material at some areas of the site.

The Niagara River is the closest body of water to the site, approximately o.75 miles to the west. The Niagara receives surface water and groundwater from the direction of the site (Environmental Science, Inc. 1992). There is a localized gentle topographical dip extending from the southeast towards the northwest that encompasses the whole site.

2.8 Site History and Land Use

Morgan Materials, Inc. is a broker of off-specification and discontinued chemicals that were purchased for the purpose of resale. On 14 March 1997, the New York State Department of Environmental Conservation (NYSEDEC) requested that the U.S. EPA evaluate the site for a removal action. On 27 and 28 March 1997, U.S. EPA's Removal Action Branch and Superfund Technical Assessment and Response Team (START) performed a site evaluation and found numerous environmental concerns. During the evaluation, U.S. EPA observed between 8,000 and 10,000 drums possibly containing hazardous substances including flammable liquids, corrosive liquids and solids, and poisonous liquids. Many drums were found to be leaking, corroding, crushed, and/or deteriorating. Drums were stacked on pallets up to four high, with some appearing ready to topple. There was evidence of material spills inside the warehouse facility; spilled materials from previous cleanups were being stored in drums as well. Small portions of the warehouse floor consisted of soil and broken concrete, and there were areas of accumulated water. Information subsequently obtained increased the total number of drums to more than 20,000.

2.9 Adjacent Property Use

The outer perimeter of the site on the east side, contained an old automobile scrap yard that is now void of most vegetation with mostly gravel, concrete, asphalt, and general debris covering the surface. To the south and the west is a berm that harbors the railway. This berm contains soils and soil piles that contain glass slag, pumice slag, and contaminated wood, broken rail-road ties, and general construction debris. To the North of the property is a sidewalk and Hertel Avenue.

2.10 Summary of Previous Studies

According to the Malcolm Pirnie previous study of January 1999, "two water-bearing zones exist beneath the site: one confined by stiff silty clay; the second is perched above the clay within the fill, as found at MW-3 and MW-4. It is unclear if the confined water-bearing zone is continuous beneath the entire site, or whether the perched zone is continuous between Monitor Wells MW-3 and MW-4. However, both situations seem likely.

The dry, stiff clay supporting the perched aquifer seems to provide a barrier to downward vertical movement of groundwater from this water-bearing zone. The extent and continuity of the clay in relation to the perched aquifer are unknown. However, samples obtained from the confined zone do not show evidence of the contamination detected in soil samples, or in samples obtained from the perched aquifer, except for mercury detected at MW-1. Unfortunately, local groundwater flow directions of either water-bearing zone are not currently known.

Groundwater analytical results suggest that groundwater quality in the perched aquifer (MW-3 and MW-4) is generally worse than in the clay water-bearing zone (MW-1 and MW-2), particularly for VOCs. Monitor well MW-3 had the highest VOC concentrations with high levels of cis-1,2-DCE, and TCE. Monitor Well MW-3 also had concentrations of aluminum, arsenic, iron, manganese, and sodium that were either not found at other wells, or not at the elevated concentrations detected in MW-3. Most of these metals could have been derived from the clay, however, that leads to the question of why concentrations of these metals have been derived from the clay, however, that leads to the question of why concentrations of these metals are elevated in MW-3. Mercury was detected at Monitor Well-1 at 0.20 µg/L; it was not detected at other monitor wells. Most of the elements or compounds that exceeded NYSDEC water quality limits are volatile organic compounds. They include: vinyl chloride, cis-1,2-dichloroethene, TCE, and PCE at MW-3; vinyl chloride and TCE at MW-4. Three metals exceeded NYSDEC water quality objectives: sodium at all wells; iron at MW-1 and MW-3; manganese at MW-3.

BNAs were generally not detected in groundwater samples except for bis (2-ethylhexyl) phthalate detected at low concentrations in samples from Monitor Wells MW-1, MW-2, and MW-3, as well as the field blank. Because this constituent was found in the field blank at similar levels as the groundwater samples, these results should be considered invalid.

Based on soil boring, and the soil and groundwater analytical results, the following conclusions can be made regarding the Morgan Materials site:

-The site overlies a stiff, red-brown, dry, silty clay which acts as a confining layer for an underlying water-bearing zone within a plastic clay, and a supporting layer for a water-bearing zone composed of a red-brown to gray-black, sandy, gravel fill. The thickness of the gravel fill increases from west to east across the site.

-Groundwater within the fill displays worse quality than groundwater within the clay. Groundwater samples obtained from wells screened in the clay showed no concentrations above NYSDEC water quality regulatory levels. This suggests that the stiff clay may provide an effective barrier to vertical groundwater movement.

There are several sample locations where one or more contaminants were detected (Figure 3), but four areas stand out: 1) the western portion of building 1, where a high number of different compounds were detected at GP-6; 2) the eastern section of Building 1, where TCE and PCE were detected at relatively high concentrations in soil samples from GP-7 and GP-10, in addition to a high concentration of zinc detected at GP-10; 3) the area surrounding the loading dock where high concentrations of VOCs, metals, PAHs, and phenol were detected in soil samples, in addition to VOCs and metals detected in the groundwater sample obtained from MW-3; and 4) GP-15 where several metals were detected at concentrations exceeding NYSDEC cleanup objectives".

3.0 PHASE II ACTIVITIES

3.1 Scope of Investigation or Assessment

To determine of refute the current existence and magnitude of contamination from historic on-site or off-site operations or migration from adjacent properties, AFI's Scientist's located the five (5) previously installed Monitoring Wells (MW-1, MW-2, MW-3, MW-4 and MW-5) and developed three (3) of the existing five (5) wells (MW-3, MW-4 and MW-5) and collected a water sample from each (see Figure 2).

MW-2 had no water and was filled with soil while MW-1's handle and lock broke off leaving the well currently inaccessible.

3.2 Field Exploration and Methods

3.2.1 Field Observations and Measurements

Well depth and depth to water were measured and well volumes were calculated. Wells were developed by removing at least three (3) well volumes with the use of dedicated poly well bailers and/or a peristaltic pump with dedicated tubing. Field measurement s for pH, turbidity and conductivity were recorded in the field log. A sample from each well was screened using the handheld PID.

3.3 Sampling and Chemical Analysis

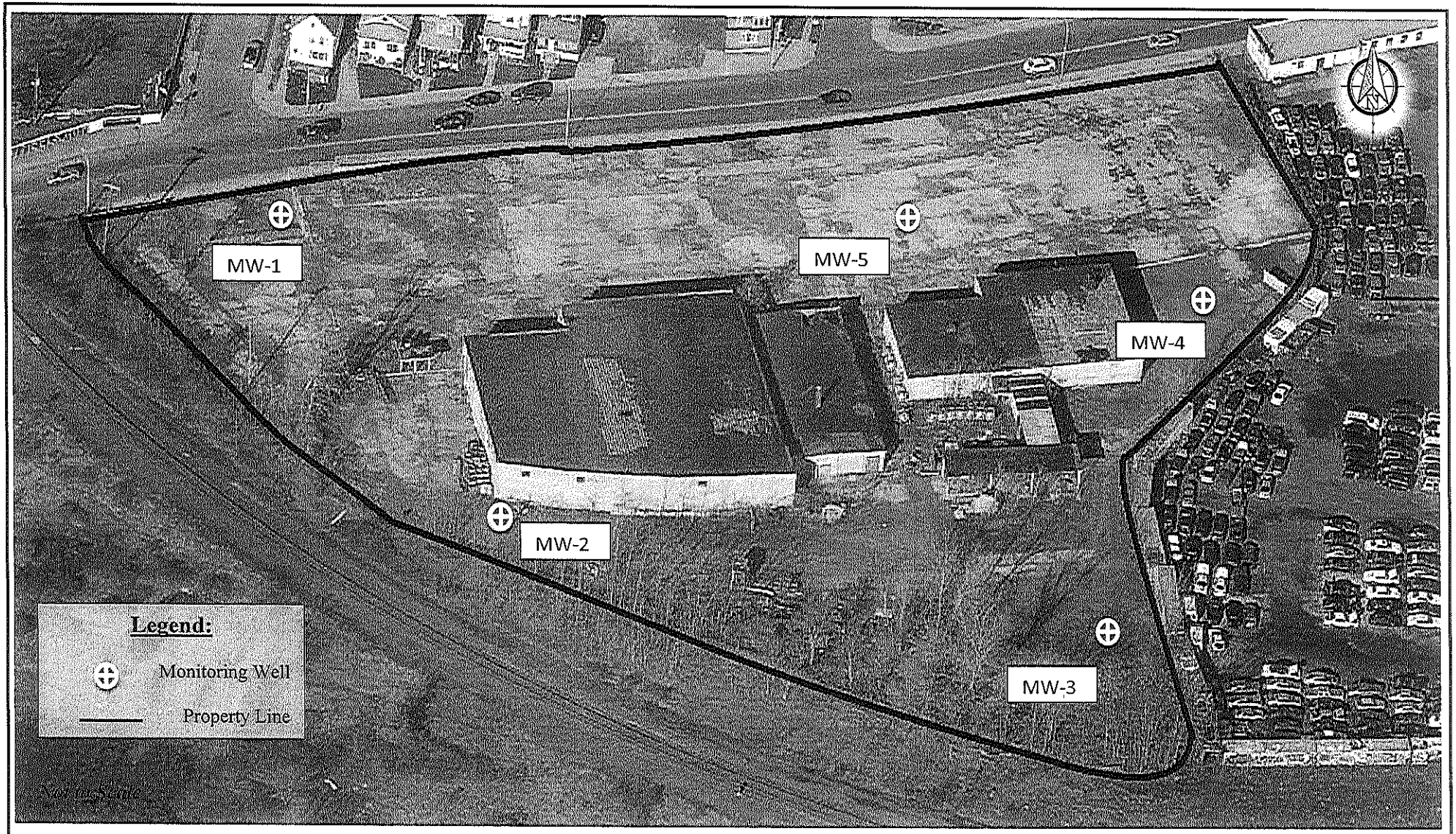
3.3.1 Ground Water Results

Groundwater samples were analyzed by Paradigm Environmental Services, Inc., Rochester, New York. Analysis (see Appendix II) was performed in accordance with the appropriate EPA Method for that specific analysis (8260B and 6010B/7471A).

Groundwater sample results were compared to the NYSDEC Division of Water Technical and Operational Guidance Series (1.1.1) (TOGS 1.1.1) Groundwater Effluent Limitations guidelines to confirm the presence or absence of contamination exceeding regulatory standards (See Table 1) and were as follows:

VOCSs

The sample from MW3 has high levels of chlorinated volatiles. Cis-1,2-Dichloroethene, Tetrachloroethene, trichloroethene and vinyl chloride all exceed the current NYSDEC TOGS 1.1.1 guidelines and also exceed the levels measured during the previous study when this well was sampled on November 7, 1998. The levels of Cis-1,2-Dichloroethene



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Monitoring Well Locations
Morgan Materials

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FIGURE 2

and vinyl chloride in MW4 are less or only slightly higher than when the well was sampled in 1998. AFI sampled MW5 (this well was not sampled in 1998) with the VOC results all being below current NYSDEC guidelines for Volatiles.

Total Metals

Analytical Metals results were compared to NYSDEC TOGS 1.1.1 guidelines as follows: All wells sampled during this study had metals exceeding the current NYSDEC guidelines (see Table 1) although the only RECR metal of concern was beryllium. Beryllium was not present in any of the four (4) wells sampled in 1998 however all wells exceeded current values for some metals.

3.3.2 Other Information

Due to the high levels of chlorinated volatiles in the sample collected from MW3, the laboratory could not report lower on the other VOA compounds. The sample was diluted and due to high levels of chlorinated compounds, the laboratory was unable to run the sample at a lesser dilution, as contamination of the instrument would result.

4.0 EVALUATION AND PRENTATION OF RESULTS

4.1 Subsurface Conditions

Subsurface conditions for the site (limited to only for areas sampled) are presented in Appendix A and indicated on the Soil Boring Logs attached to the previous study of January 1999.

4.2 Analytical Data

4.2.1 Ground Water

AFI Environmental (AFI) delivered one groundwater sample collected from each of the three (3) wells sampled, to Paradigm Environmental Services, Inc., a New York State Department of Environmental Conservation (NYSDEC) approved laboratory, under proper chain of custody. One (1) groundwater sample from each of the three (3) monitoring wells was submitted and analyzed for VOCs and Total Metals. Groundwater analytical data as received from the laboratory is presented in Appendix B. The results have also been tabulated and compared to NYSDEC TOGS 1.1.1 c Groundwater Effluent Limitations Guidelines (TOGs) on Table 1. The yellow highlighted results indicate constituents above TOGs.

4.2.2 Other information

When conducting the development of Monitoring Well MW3, gray suspended particles were observed and PID readings as high as 165 ppm were recorded.

The subsequent laboratory analysis of the sample; reported extremely elevated VOC's and some elevation of Metals.

Water elevations were not sufficiently stabilized to identify the flow direction at the time of the Investigation and ground water flow direction is assumed to be generally from east to west.

5.0 DISCUSSION OF FINDINGS AND CONCLUSIONS

This assessment has been prepared in accordance with generally accepted environmental methodologies referred to in ASTM 1903-97 (re-approved 2002), and contains all of the limitations inherent in these methodologies. No other warranties, expressed or implied, are made as to the professional services provided under the terms of our contract and included in this report.

There were no major deviations from the approved Work Plan (WP).

5.1 Recognized Environmental Conditions

Due to the railroad tracks which exist to the south of the site and AFI previous knowledge of a scrap yard/Recycling Center immediately to the east of the site it is possible that the site contamination is a result of off-site migration.

5.2 Affected Media

Based on the results of this assessment, Metals were detected above detection limits in the three (3) ground water wells sampled. The elevated metals indicated that groundwater entering and leaving the site had concentrations which were above Guidance values.

5.3 Evaluation of Media Quality

The data gathered during the assessment is sufficient to determine whether petroleum products were released or disposed of on the site. The data indicates that the groundwater on the site contains elevated levels of VOCs and Metals. With respect to Total Metals, these were elevated in the soils across the site in wells sampled during this study.

6.0 RECOMMENDATIONS

Based on the results of this assessment, all of the ground water tested at the site was above applicable or relevant and appropriate requirements ("ARARs) (NYSDEC Ground Water TOGS 1.1.1 (Table 1, Table 5)). In some cases (MW3) the levels encountered were extremely high in the areas tested, which indicates that there may be pockets or areas on, or near the site, that contain significantly higher levels of the chemicals indicated. This potential is supported by the levels of metals recorded in ground water samples across the site.

AFI recommends that:

A Site Soil Management Plan (SMP) be prepared and put into use for the Site. It should address Soil (excavation, transport and disposal limitations) and Ground water (use). This SMP once developed should be used during excavation for any expansion, landscaping, parking lot improvements or drainage alteration or construction.

REFERENCES AND SOURCES OF INFORMATION

- ASTM E1903 - 97(2002) Standard Guide for Environmental Site Assessments: Phase II Environmental Site Assessment Process

- "Malcolm Pirnie Study" 373 Hertel Avenue, Buffalo, New York – January 1999

- NYSDEC TOGS 1.1.1 Groundwater Effluent Limitations www.dec.ny.gov/regulations/2652.html

TABLES

FIGURES

APPENDIX I: SUBSURFACE BORING LOGS AND WELL DIAGRAMS

APPENDIX II: LABORATORY ANALYTICAL REPORTS

APPENDIX III: PREVIOUS STUDY

Tables

Table 1
373 Hertel Avenue
Groundwater Analytical Comparison
1994 NYSDEC Water Quality Regulations and Current TOGS 1.1.1 (Table 1 Table 5)
August 2012
A12B Hertel-ENV

Contaminant	CAS Number	1994 NYSDEC Objectives (1)	TOGS 1.1.1 Maximum Allowable Concentration	MW-1 7-Nov-98	MW-2 7-Nov-98	MW-3 7-Nov-98	MW-4 7-Nov-98	MW-3 29-Aug-12	MW-4 29-Aug-12	MW-5 29-Aug-12
Volitile Organic Compounds (VOCs)-ug/L										
1,1,2,2 Tetrachloroethane	79-34-5	5	5	U	U	U	U	<200*	<2.00	<2.00
1,1,2 Trichloroethane	79-00-5)	0.6	1	U	U	U	U	<200*	<2.00	<2.00
1,1 Dichloroethene	75-34-3	5	5	U	U	2.1	U	<200*	<2.00	<2.00
Acetone	67-64-1	50	50	U	U	U	U	<1,000*	<10.0	<10.0
Benzene	71-43-8	0.7	1	U	U	U	U	<70.0*	<0.700	<0.700
Bromodichloromethane	74-27-4	100	50	U	U	U	U	<200*	<2.00	<2.00
Carbon Disulfide	75-15-0	50	na	U	U	U	U	<200*	<2.00	<2.00
Carbon tetrachloride	56-23-5	5	5	U	U	U	U	<200*	<2.00	<2.00
cis-1,2-Dichloroethene	156-59-2	70	5	U	U	540	23	22,200	14.6	<2.00
Ethylbenzene	100-41-4	5	5	U	U	U	U	<200*	<2.00	<2.00
m&p-Xylene	108-38-3	5	5	U	U	U	U	<200*	<2.00	<2.00
Methyl t-butyl ether (MTBE)	1634-04-4	na	10	U	U	U	6.2	<200*	NA	NA
o-Xylene	95-47-6	5	5	U	U	U	U	<200*	<2.00	<2.00
Naphthalene	91-20-3	na	10	U	U	U	U	<200*	NA	NA
p-Isopropyltoulene	**	na	na	U	U	U	U	<200*	NA	NA
Toluene	108-88-3	5	5	U	U	U	U	<200*	<2.00	<2.00
trans-1,2-Dichloroethene	156-60-5	100	5	U	U	4	U	<200*	<2.00	<2.00
Tetrachloroethene	127-18-4	na	5	U	U	390	U	1,520	<2.00	<2.00
Trichloroethene	79-01-6	5	5	U	U	500	6.7	1,220	<2.00	<2.00
Trichlorofluoromethane	75-69-4	na	5	U	U	U	U	<200*	<2.00	<2.00
Vinyl chloride	75-01-4	2	2	U	U	62	5.6	4,450	6.10	<2.00
Total Metals-ug/L										
Arsenic	**	25	25	U	U	2.5	U	10	10	31
Aluminum	**	na	2000	760	64	1200	130	2,130	200	15,000
Antimony	**	6	6	U	U	U	U	60	60	60
Barium	**	1,000	1,000	58	22	140	16	126	100	159
Beryllium	7440-41-7	4	3	U	U	U	U	5	5	5
Cadmium	**	10	5	U	U	U	U	5	5	5
Calcium	**	na	na	140,000	130,000	92,000	55,000	80,500	74,600	330,200
Chromium	16065-831	50	50	U	U	U	U	10	10	35
Copper	7440-508	200	200	U	U	U	U	25	25	25
Iron	**	300	300	1400	120	15,000	260	16100.0	3000	17,000
Lead	7439-92-1	25	25	U	U	3.8	U	19	10	19
Magnesium	**	na	35,000	250,000	280,000	15,000	5100	16,000	29,600	448,000
Manganese	**	300	300	190	84	570	22	554	702	270
Mercury	**	2	0.7	0.2	U	U	U	0.2	0.2	0.2
Nickel	**	100	100	U	U	U	U	40	40	40
Potassium	**	na	na	7,700	7,700	5,800	11,00	11,600	10,300	9,650
Selenium	**	10	10	U	U	U	U	10	10	10
Silver	**	50	50	U	U	U	U	10	10	10
Sodium	**	20,000	20,000	110,000	150,000	270,000	45,000	130,000	24,200	234,000
Thallium	**	2(2)	0.5	U	U	U	U	25	25	25
Vanadium	**	na	na	U	U	U	U	25	25	31
Zinc	**	300	2,000	22	U	21	U	60	60	60

=Exceeds TOGS 1.1.1 Table 1 and Table 5

Notes:

Definitions:
ND=Parameter not detected above laboratory detection limit.
NA=Sample not analyzed for parameter.
na - No objective available.
** - CAS not applicable
(1) - New York State Department of Environmental Conservation (NYSDEC) water quality regulations (NYSDEC 1994b).
(2) -NYSDEC water quality regulation unavailable; U.S. Environmental Protection Agency (USEPA) maximum contaminant level (MCL) indicated (USEPA 1992)
U - The analyte was not detected at the sample quantitation limit.

*The laboratory could not report lower on the other VOA compounds due to the high Chlorinated compounds that were found. The sample was diluted due to high levels of chlorinated compounds, and because of the high levels of chlorinated compounds, the laboratory was unable to run the sample at a lesser dilution, as contamination of the instrument would result.

Figures

AFI ENVIRONMENTAL
7815 BUFFALO AVE
P.O. BOX 4049
NIAGARA FALLS, NY 14304
(716) 283-7645

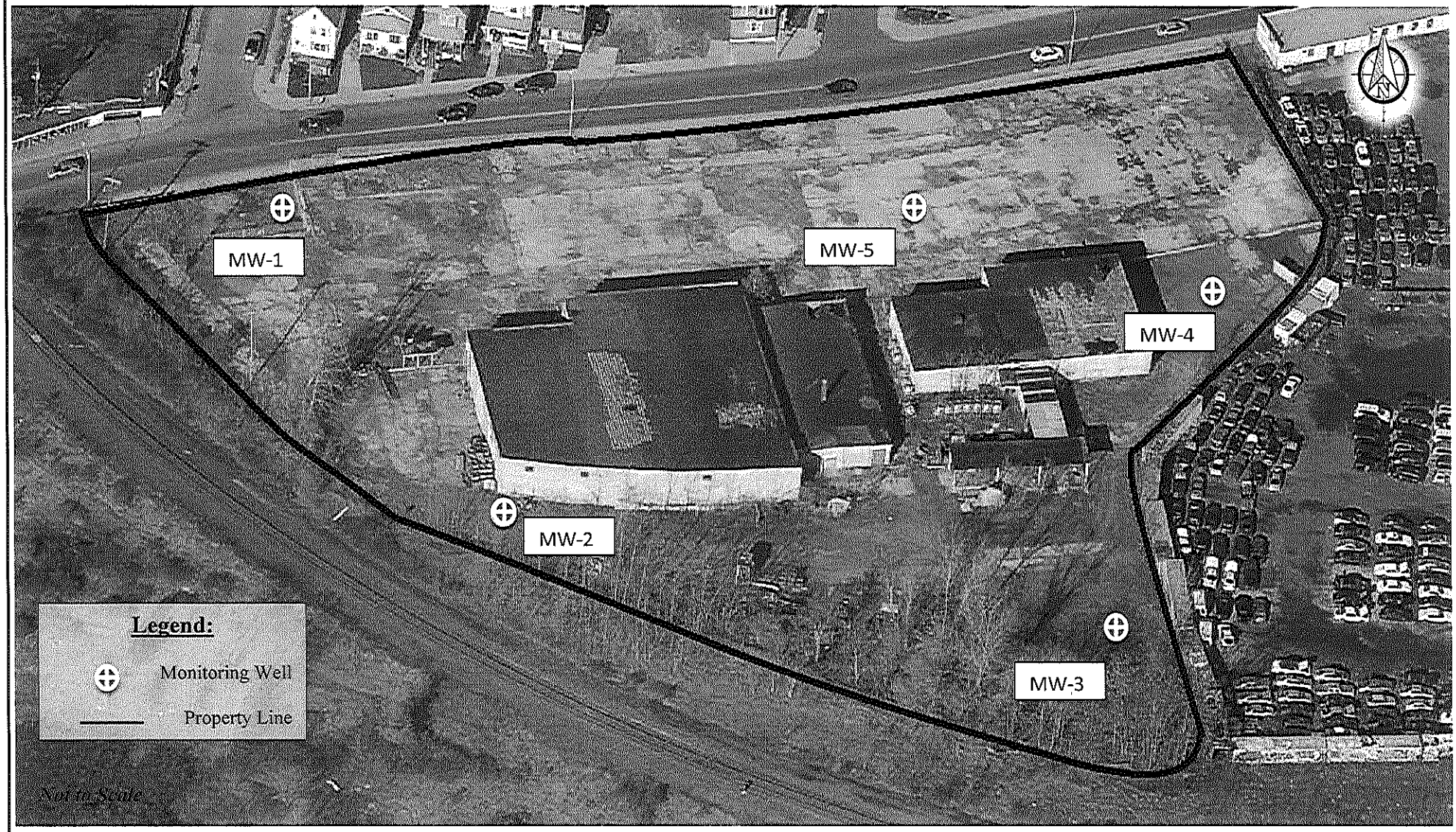
PROJECT NO.: A12B Hertel-ENV

DRAFTED BY: JRH

Site Map
Morgan Materials

373 Hertel Avenue
Buffalo, New York 14207

FIGURE 1



AFI ENVIRONMENTAL
7815 BUFFALO AVE
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NIAGARA FALLS, NY 14304
(716) 283-7645

PROJECT NO.: A12B Hertel-ENV

DRAFTED BY: JRH

Monitoring Well Locations
Morgan Materials

373 Hertel Avenue
Buffalo, NY 14207

FIGURE 2

Appendix I

U.S EPA Environmental Response Team Center

Response Engineering and Analytical Contract

68-C4-0024

W.O. # 03347-143-001-3399-01

BOREHOLE LOG AND WELL CONSTRUCTION DIAGRAM

Site Name: Morgan Materials Site
Site Location: Buffalo, New York
Boring ID: MW-1

Total Depth: 35.0 ft
Logger: W. Avery
Date Started: 11/3/98
Date Completed: 11/3/98

All depths are in feet (ft) below ground surface.
Well completed with flush-mount casing and cement pad.

Depth	Material	USCS Classification	Comments	Depth to Water	Well Construction Summary	Well Completion Diagram
0		SW	0-2 (core): Dark gray gravelly sand, rounded, loose, dry, non-cemented.			
		MH	2-4 (core): Red-brown clayey silt, minor fine-grained sub-rounded gravel, moderate sorting, dry, low plasticity, soft, moderately calcareous.		Grout from 0 to 20.5 ft around inner casing.	
		CL	4.5-6 (core): Same as above.			
-5		CL	7.4-8 (core): Red-brown silty clay, minor fine-grained sub-rounded gravel, moderate sorting, dry, low plasticity, soft, moderately calcareous.			
		CL	8-10 (core): Same as above.			
-10		CL	11.6-12 (core): Red-brown clay, minor angular gravel, moderate sorting, dry, firm, low plasticity, moderately calcareous.		Inner casing is 2-inch schedule 40 PVC.	
		CL	12-14 (core): Same as above with minor silt.			
-15		CL	14-16 (core): Red-brown clay with minor fine-grained sub-rounded gravel, moderate sorting, dry, firm, moderate plasticity, moderately calcareous.			
		CL	16-18 (core): Red-brown silty clay with minor fine-grained sub-rounded gravel, well sorted, dry, firm, low plasticity, moderately calcareous.			
		CL	18-20 (core): Same as above with moderate plasticity.			
-20		CL	20-22 (core): Red-brown silty clay with minor fine-grained sub-rounded gravel, well sorted, dry, firm, gray clay vertical tracers, moderate plasticity, moderately calcareous.		Bentonite seal from 20.5 to 23 ft.	
		CL	22.2-24 (core): Same as above.			
-25		CH	24-26 (core): Red-brown silty clay with minor sub-rounded to angular gravel, moderate sorting, high plasticity, dry, soft, higher silt content, coarse gravel at bottom of spoon.		Sand pack from 23 to 35 ft.	
		CL	26-28 (core): Red-brown silty clay with sandy gravel pockets. Well sorted, dry, sft, moderate plasticity, moderately calcareous.	▽		
		CL	28-29.5 (core): Red-brown silty clay with minor sub-rounded fine-grained gravel, well sorted, dry, moderate plasticity, firm.			
-30		CH	29.5-30 (core): Gray-brown clay. Moist, well-sorted, highly plastic.		2-inch PVC, No. 10 slot screen from 25 to 35 ft.	
		CH	30-32 (core): Same as above with gray clay tracers.			
-35			32-34 (core): Same as above.			

U.S EPA Environmental Response Team Center

Response Engineering and Analytical Contract

68-C4-0024

W.O. # 03347-143-001-3399-01

BOREHOLE LOG AND WELL CONSTRUCTION DIAGRAM

Site Name: Morgan Materials Site
Site Location: Buffalo, New York
Boring ID: MW-2

Total Depth: 38.0 ft
Logger: W. Avery
Date Started: 11/3/98
Date Completed: 11/3/98

All depths are in feet (ft) below ground surface.
Well completed with flush-mount casing and cement pad.

Depth	Material	USCS Classification	Comments	Depth to Water	Well Construction Summary	Well Completion Diagram
0		SW	0-2 (core): Mottled gray, tan, brown sand, angular, loose, dry, non-cemented.			
		SP	2-4 (core): Dark brown gravelly sand, minor fine-grained sub-angular gravel, poorly sorted, dry, low plasticity.		Grout from 0 to 23.2 ft around inner casing.	
-5		GP-GM	4-5 (core): Gray-black sub-angular gravel and sand, poorly sorted, dry, non-cemented.	▽		
		CL	7.5-8 (core): Red-brown silty clay, minor fine-grained sub-rounded gravel, well sorted, dry, low plasticity, soft, moderately calcareous.			
		CL	8-10 (core): Red-brown silty clay, minor rounded gravel, well sorted, dry, low plasticity, moderately calcareous.			
-10		CL	10-12 (core): Red-brown clay, minor angular gravel, well sorted, dry, firm, moderate plasticity, moderately calcareous, dolomite present.		Inner casing is 2-inch schedule 40 PVC.	
		CL	12-14 (core): Red-brown silty clay, minor fine-grained sub-angular gravel, well sorted, dry, very stiff, moderately calcareous.			
		CL	14-16 (core): Same as above.			
-15		CL	16-18 (core): Red-brown silty clay with minor fine-grained sub-angular gravel, well sorted, dry, very stiff, moderate plasticity, moderately calcareous.			
		CL	18-20 (core): Same as above with larger gravel fragments.			
-20		CL	20-22 (core): Red-brown silty clay with minor fine-grained sub-rounded gravel, well sorted, dry, very stiff, gray clay sub-vertical striations, moderate plasticity, moderately calcareous.			
		CL	22-24 (core): Same as above.			
-25		CL	24-26 (core): Red-brown silty clay with minor sub-rounded gravel, well sorted, moderate plasticity, dry, very stiff, moderately calcareous.		Bentonite seal from 23.2 to 26 ft.	
		CL	26-28 (core): Same as above with limestone fragments.		Sand pack from 26 to 38 ft.	
		CL	28-30 (core): Same as above.			
-30		CL	30-32 (core): Same as above.		2-inch PVC, No. 10 slot screen from 28 to 38 ft.	
		CH	32-34 (core): Red-grey clay, well sorted, moist, soft, high plasticity, slightly calcareous.			
-35						

U.S EPA Environmental Response Team Center

Response Engineering and Analytical Contract

68-C4-0024

W.O. # 03347-143-001-3399-01

BOREHOLE LOG AND WELL CONSTRUCTION DIAGRAM

Site Name: Morgan Materials Site
Site Location: Buffalo, New York
Boring ID: MW-3

Total Depth: 20.0 ft
Logger: W. Avery
Date Started: 11/4/98
Date Completed: 11/4/98

All depths are in feet (ft) below ground surface.
Well completed with above ground, locking protective casing.

Depth	Material	USCS Classification	Comments	Depth to Water	Well Construction Summary	Well Completion Diagram
0					Grout from 0 to 4 ft around inner casing.	
					Inner casing is 2-inch schedule 40 PVC.	
-5		SP	4-6 (core): Black-gray sand, minor fine-grained sub-angular gravel, poorly sorted, moist, non-cemented.		Bentonite seal from 4 to 6 ft.	
				▽	Sand pack from 6 to 21 ft.	
-10		SP / CL	10-11 (core): Red-brown clay, minor sub-angular gravel, moderate sorting, dry, firm, low plasticity, moderately calcareous.		2-inch PVC. No. 10 slot screen from 8 to 13 ft.	
-15		CL	14-16 (core): Same as above.			
-20		CL	19-21 (core): Red-brown clay, minor sub-angular gravel, well sorted, dry, firm, non-cemented, moderate plasticity, moderately calcareous.			

U.S EPA Environmental Response Team Center

Response Engineering and Analytical Contract

68-C4-0024

W.O. # 03347-143-001-3399-01

BOREHOLE LOG AND WELL CONSTRUCTION DIAGRAM

Site Name: Morgan Materials Site
Site Location: Buffalo, New York
Boring ID: MW-4

Total Depth: 28.0 ft
Logger: W. Avery
Date Started: 11/4/98
Date Completed: 11/4/98

All depths are in feet (ft) below ground surface.
Well completed with above ground, locking protective casing.

Depth	Material	USCS Classification	Comments	Depth to Water	Well Construction Summary	Well Completion Diagram
0		SP	0-2 (core): Dark brown-red-tan medium-fine grained sand, minor fine-grained angular gravel, moderately sorted, dry, non-cemented.			
		SP	2-4 (core): Dark brown-tan angular sand, minor medium-fine grained sub-angular gravel, poorly sorted, dry, non-cemented.		Grout from 0 to 14 ft around inner casing.	
-5		SP	4-6 (core): Red-brown-gray medium sand with medium-fine grained sub-angular gravel, moderately sorted, dry, non-cemented.			
		SP	6-8 (core): Black-gray-tan fine-grained sub-angular sand, medium-fine grained angular gravel, moderately sorted, dry, non-cemented.			
		SP	8-10 (core): Red-black coarse angular fractured gravel, medium-fine grained sub-angular sand, poorly sorted, dry, red mudstone rock fragments in sand.			
-10		SP	10-12 (core): Red-black coarse angular sand, medium-fine grained angular fractured gravel, poorly sorted, moist with last foot wet.		Inner casing is 2-inch schedule 40 PVC.	
		GP	12-14 (core): Red-black medium-fine grained angular gravel, minor fine sub-angular sand, poorly sorted, wet-saturated, non-cemented.	▽		
		GP	14-16 (core): Dark gray-black medium-fine grained angular fractured gravel, minor coarse grained angular sand, poorly sorted, wet-saturated.		Bentonite seal from 14 to 16 ft.	
-15		GP	16-18 (core): Same as above.			
		SP	18-20 (core): Dark gray medium-fine grained angular sand, fine grained angular fractured gravel, poorly sorted, saturated.			
-20		GP	20-22 (core): Dark gray-tan fine grained sub-angular gravel, medium grained angular sand, poorly sorted, saturated.		Sand pack from 16 to 28 ft.	
		SP-SM	22-24 (core): Dark gray sandy gravel with tan gravel layer at 23.6-23.8, saturated, non-cemented.			
		CL	24-26 (core): Gray-Red-brown silty clay possibly stained by water, moderate plasticity, moist, moderately calcareous.		2-inch PVC, No. 10 slot screen from 18 to 28 ft.	
-25		CL	26-28 (core): Red-brown silty clay, vertical gray striations, moderate plasticity, dry, moderately calcareous.			

U.S EPA Environmental Response Team Center

Response Engineering and Analytical Contract

68-C4-0024

W.O. # 03347-143-001-3399-01

BOREHOLE LOG AND WELL CONSTRUCTION DIAGRAM

Site Name: Morgan Materials Site
Site Location: Buffalo, New York
Boring ID: MW-5

Total Depth: 37.0 ft
Logger: W. Avery
Date Started: 11/5/98
Date Completed: 11/5/98

All depths are in feet (ft) below ground surface.
Well completed with flush-mount casing and cement pad.

Depth	Material	USCS Classification	Comments	Depth to Water	Well Construction Summary	Well Completion Diagram
0		CL	0-2 (core): Top 1 inch is black to brown, dry, gravel fill. Rest of core is red-brown silty caly, low plasticity.			
		CL	2-4 (core): Red-brown silty clay.		Grout from 0 to 22.5 ft around inner casing.	
-5		CL	4-6 (core): Red-brown silty clay, minor fine-grained gravel, well sorted, dry, low plasticity, moderately calcareous.			
-10		CL	9-11 (core): Red-brown silty clay, minor fine-grained gravel, well sorted, dry, low plasticity, firm, non-cemented.		Inner casing is 2-inch schedule 40 PVC.	
-15		CL	14-16 (core): Same as above.			
-20		CL	19-21 (core): Same as above.		Bentonite seal from 22.5 to 25 ft.	
-25		CL	24-26 (core): Same as above becoming softer downward.		Sand pack from 25 to 37 ft.	
					2-inch PVC, No. 10 slot screen from 27 to 37 ft.	
-30		CL	29-31 (core): Red-brown silty clay, minor fine-grained gravel, well sorted, dry, soft, moderate plasticity.			
		CH	32-34 (core): Gray-brown clay, high plasticity, soft, moist.	▽		
-35						

Appendix II

PARADIGM
ENVIRONMENTAL SERVICES, INC.

Analytical Report Cover Page

AFI Environmental

For Lab Project # 12:3605
Issued September 7, 2012
This report contains a total of 9 pages

The reported results relate only to the samples as they have been received by the laboratory.

Any noncompliant QC parameters having impact on the data are flagged or documented on the final report or are noted below.

All soil/sludge samples have been reported on a dry weight basis, unless qualified "reported as received". Other solids are reported as received.

The Chain of Custody provides additional information, including compliance with sample condition requirements upon receipt. Sample condition requirements are defined under the 2003 NELAC Standard, sections 5.5.8.3.1 and 5.5.8.3.2. Aliquots separated for certain tests, such as TCLP, are indicated on the Chain of Custody and final reports with an "A" suffix.

NYSDOH ELAP does not certify for all parameters. Paradigm Environmental Services or the indicated subcontracted laboratory does hold certification for all analytes where certification is offered by ELAP unless otherwise specified.

Data qualifiers are used, when necessary, to provide additional information about the data. This information may be communicated as a flag or as text at the bottom of the report. Please refer to the following list of frequently used data flags and their meaning:

"<" = analyzed for but not detected at or above the reporting limit.
"E" = Result has been estimated, calibration limit exceeded.
"Z" = See case narrative.
"D" = Duplicate results outside QC limits. May indicate a non-homogenous matrix.
"M" = Matrix spike recoveries outside QC limits. Matrix bias indicated.
"B" = Method blank contained trace levels of analyte. Refer to included method blank report.

PARADIGM
ENVIRONMENTAL SERVICES, INC.
179 Lake Avenue, Rochester, NY 14608 Office: (585) 647-2530 Fax: (585) 647-3311

LAB REPORT FOR TAL METALS ANALYSIS IN WATERS

Client: AFI Environmental

Client Job Site: 373 Hertel

Client Job No.: A12B Hertel - ENV

Field Location: MW582912
Field ID No.: N/A

Lab Project No.: 12:3605
Lab Sample No.: 12:3605-01

Sample Type: Water

Date Sampled: 08/29/2012
Date Received: 08/30/2012

Parameter	Date Analyzed	Analytical Method	Result (mg/L)
Aluminum	09/05/2012	SW846 3005/6010	15.0
Antimony	09/05/2012	SW846 3005/6010	< 0.060
Arsenic	09/05/2012	SW846 3005/6010	0.031
Barium	09/05/2012	SW846 3005/6010	0.159
Beryllium	09/05/2012	SW846 3005/6010	< 0.005
Cadmium	09/05/2012	SW846 3005/6010	< 0.005
Calcium	09/05/2012	SW846 3005/6010	332
Chromium	09/05/2012	SW846 3005/6010	0.035
Cobalt	09/05/2012	SW846 3005/6010	< 0.050
Copper	09/05/2012	SW846 3005/6010	< 0.025
Iron	09/05/2012	SW846 3005/6010	17.0
Lead	09/05/2012	SW846 3005/6010	0.019
Magnesium	09/05/2012	SW846 3005/6010	448
Manganese	09/05/2012	SW846 3005/6010	0.270
Mercury	09/04/2012	SW846 7470	< 0.0002
Nickel	09/05/2012	SW846 3005/6010	< 0.040
Potassium	09/05/2012	SW846 3005/6010	9.65
Selenium	09/05/2012	SW846 3005/6010	< 0.010
Silver	09/05/2012	SW846 3005/6010	< 0.010
Sodium	09/06/2012	SW846 3005/6010	234
Thallium	09/05/2012	SW846 3005/6010	< 0.025
Vanadium	09/05/2012	SW846 3005/6010	0.031
Zinc	09/05/2012	SW846 3005/6010	< 0.060

ELAP ID No.:10958

Comments:

Approved By: _____
Bruce Hoogesteger, Technical Director

PARADIGM
ENVIRONMENTAL SERVICES, INC.
179 Lake Avenue, Rochester, NY 14608 Office: (585) 647-2530 Fax: (585) 647-3311

LAB REPORT FOR TAL METALS ANALYSIS IN WATERS

Client: AFI Environmental

Client Job Site: 373 Hertel

Client Job No.: A12B Hertel - ENV

Field Location: MW382912
Field ID No.: N/A

Lab Project No.: 12:3605
Lab Sample No.: 12:3605-02

Sample Type: Water

Date Sampled: 08/29/2012
Date Received: 08/30/2012

Parameter	Date Analyzed	Analytical Method	Result (mg/L)
Aluminum	09/05/2012	SW846 3005/6010	2.13
Antimony	09/05/2012	SW846 3005/6010	< 0.060
Arsenic	09/05/2012	SW846 3005/6010	< 0.010
Barium	09/05/2012	SW846 3005/6010	0.126
Beryllium	09/05/2012	SW846 3005/6010	< 0.005
Cadmium	09/05/2012	SW846 3005/6010	< 0.005
Calcium	09/05/2012	SW846 3005/6010	80.5
Chromium	09/05/2012	SW846 3005/6010	< 0.010
Cobalt	09/05/2012	SW846 3005/6010	< 0.050
Copper	09/05/2012	SW846 3005/6010	< 0.025
Iron	09/05/2012	SW846 3005/6010	16.1
Lead	09/05/2012	SW846 3005/6010	0.019
Magnesium	09/05/2012	SW846 3005/6010	16.0
Manganese	09/05/2012	SW846 3005/6010	0.554
Mercury	09/04/2012	SW846 7470	< 0.0002
Nickel	09/05/2012	SW846 3005/6010	< 0.040
Potassium	09/05/2012	SW846 3005/6010	11.6
Selenium	09/05/2012	SW846 3005/6010	< 0.010
Silver	09/05/2012	SW846 3005/6010	< 0.010
Sodium	09/06/2012	SW846 3005/6010	130
Thallium	09/05/2012	SW846 3005/6010	< 0.025
Vanadium	09/05/2012	SW846 3005/6010	< 0.025
Zinc	09/05/2012	SW846 3005/6010	< 0.060

ELAP ID No.:10958

Comments:

Approved By: _____
Bruce Hoogesteger, Technical Director

This report is part of a multipage document and should only be evaluated in its entirety. Chain of Custody provides additional information, including compliance with sample condition requirements upon receipt.

File ID:12-3605.xls

PARADIGM ENVIRONMENTAL SERVICES, INC. 179 Lake Avenue, Rochester, NY 14608 Office: (585) 647-2530 Fax: (585) 647-3311

LAB REPORT FOR TAL METALS ANALYSIS IN WATERS

Client: AFI Environmental

Client Job Site: 373 Hertel

Client Job No.: A12B Hertel - ENV

Field Location: MW482912
Field ID No.: N/A

Lab Project No.: 12:3605
Lab Sample No.: 12:3605-03

Sample Type: Water

Date Sampled: 08/29/2012
Date Received: 08/30/2012

Parameter	Date Analyzed	Analytical Method	Result (mg/L)
Aluminum	09/05/2012	SW846 3005/6010	< 0.200
Antimony	09/05/2012	SW846 3005/6010	< 0.060
Arsenic	09/05/2012	SW846 3005/6010	< 0.010
Barium	09/05/2012	SW846 3005/6010	< 0.100
Beryllium	09/05/2012	SW846 3005/6010	< 0.005
Cadmium	09/05/2012	SW846 3005/6010	< 0.005
Calcium	09/05/2012	SW846 3005/6010	74.6
Chromium	09/05/2012	SW846 3005/6010	< 0.010
Cobalt	09/05/2012	SW846 3005/6010	< 0.050
Copper	09/05/2012	SW846 3005/6010	< 0.025
Iron	09/05/2012	SW846 3005/6010	3.00
Lead	09/05/2012	SW846 3005/6010	< 0.010
Magnesium	09/05/2012	SW846 3005/6010	29.6
Manganese	09/05/2012	SW846 3005/6010	0.702
Mercury	09/04/2012	SW846 7470	< 0.0002
Nickel	09/05/2012	SW846 3005/6010	< 0.040
Potassium	09/05/2012	SW846 3005/6010	10.3
Selenium	09/05/2012	SW846 3005/6010	< 0.010
Silver	09/05/2012	SW846 3005/6010	< 0.010
Sodium	09/06/2012	SW846 3005/6010	24.2
Thallium	09/05/2012	SW846 3005/6010	< 0.025
Vanadium	09/05/2012	SW846 3005/6010	< 0.025
Zinc	09/05/2012	SW846 3005/6010	< 0.060

ELAP ID No.:10958

Comments:

Approved By: _____

Bruce Hoogesteger, Technical Director

File ID:12-3605.xls

PARADIGM
179 Lake Avenue Rochester, New York 14608 (585) 647 - 2530 FAX (585) 647 - 3311

Volatile Analysis Report for Non-potable Water

Client: AFI Environmental

Client Job Site: 373 Hertel
Client Job Number: A12BHERTEL-ENV
Field Location: MW582912
Field ID Number: N/A
Sample Type: Water

Lab Project Number: 12:3605
Lab Sample Number: 12:3605-01

Date Sampled: 08/29/2012
Date Received: 08/30/2012
Date Analyzed: 09/05/2012

Halocarbons	Results in ug / L
Bromodichloromethane	< 2.00
Bromomethane	< 2.00
Bromoform	< 5.00
Carbon Tetrachloride	< 2.00
Chloroethane	< 2.00
Chloromethane	< 2.00
2-Chloroethyl vinyl Ether	< 10.0
Chloroform	< 2.00
Dibromochloromethane	< 2.00
1,1-Dichloroethane	< 2.00
1,2-Dichloroethane	< 2.00
1,1-Dichloroethene	< 2.00
cis-1,2-Dichloroethene	< 2.00
trans-1,2-Dichloroethene	< 2.00
1,2-Dichloropropane	< 2.00
cis-1,3-Dichloropropene	< 2.00
trans-1,3-Dichloropropene	< 2.00
Methylene chloride	< 5.00
1,1,2,2-Tetrachloroethane	< 2.00
Tetrachloroethene	< 2.00
1,1,1-Trichloroethane	< 2.00
1,1,2-Trichloroethane	< 2.00
Trichloroethene	< 2.00
Trichlorofluoromethane	< 2.00
Vinyl chloride	< 2.00

Aromatics	Results in ug / L
Benzene	< 0.700
Chlorobenzene	< 2.00
Ethylbenzene	< 2.00
Toluene	< 2.00
m,p-Xylene	< 2.00
o-Xylene	< 2.00
Styrene	< 5.00
1,2-Dichlorobenzene	< 2.00
1,3-Dichlorobenzene	< 2.00
1,4-Dichlorobenzene	< 2.00

Ketones	Results in ug / L
Acetone	< 10.0
2-Butanone	< 10.0
2-Hexanone	< 5.00
4-Methyl-2-pentanone	< 5.00

Miscellaneous	Results in ug / L
Carbon disulfide	< 2.00
Vinyl acetate	< 5.00

ELAP Number 10958

Analytical Method: EPA 8260B
Prep Method: EPA 5030

Data File: X00137.D

Comments: ug / L = microgram per Liter

Signature:

Bruce Hoogesteger: Technical Director

PARADIGM
179 Lake Avenue Rochester, New York 14608 (585) 647 - 2530 FAX (585) 647 - 3311

Volatile Analysis Report for Non-potable Water

Client: AFI Environmental

Client Job Site: 373 Hertel
Client Job Number: A12BHERTEL-ENV
Field Location: MW382912
Field ID Number: N/A
Sample Type: Water

Lab Project Number: 12:3605
Lab Sample Number: 12:3605-02

Date Sampled: 08/29/2012
Date Received: 08/30/2012
Date Analyzed: 09/05/2012

Halocarbons	Results in ug / L
Bromodichloromethane	< 200
Bromomethane	< 200
Bromoform	< 500
Carbon Tetrachloride	< 200
Chloroethane	< 200
Chloromethane	< 200
2-Chloroethyl vinyl Ether	< 1,000
Chloroform	< 200
Dibromochloromethane	< 200
1,1-Dichloroethane	< 200
1,2-Dichloroethane	< 200
1,1-Dichloroethene	< 200
cis-1,2-Dichloroethene	22,200
trans-1,2-Dichloroethene	< 200
1,2-Dichloropropane	< 200
cis-1,3-Dichloropropene	< 200
trans-1,3-Dichloropropene	< 200
Methylene chloride	< 500
1,1,2,2-Tetrachloroethane	< 200
Tetrachloroethene	1,520
1,1,1-Trichloroethane	< 200
1,1,2-Trichloroethane	< 200
Trichloroethene	1,220
Trichlorofluoromethane	< 200
Vinyl chloride	4,450

Aromatics	Results in ug / L
Benzene	< 70.0
Chlorobenzene	< 200
Ethylbenzene	< 200
Toluene	< 200
m,p-Xylene	< 200
o-Xylene	< 200
Styrene	< 500
1,2-Dichlorobenzene	< 200
1,3-Dichlorobenzene	< 200
1,4-Dichlorobenzene	< 200

Ketones	Results in ug / L
Acetone	< 1,000
2-Butanone	< 1,000
2-Hexanone	< 500
4-Methyl-2-pentanone	< 500

Miscellaneous	Results in ug / L
Carbon disulfide	< 200
Vinyl acetate	< 500

ELAP Number 10958
Analytical Method: EPA 8260B
Prep Method: EPA 5030
Data File: X00134.D

Comments: ug / L = microgram per Liter

Signature:
Bruce Hoogesteger: Technical Director

PARADIGM
179 Lake Avenue Rochester, New York 14608 (585) 647 - 2530 FAX (585) 647 - 3311

Volatile Analysis Report for Non-potable Water

Client: AFI Environmental

Client Job Site: 373 Hertel
Client Job Number: A12BHERTEL-ENV
Field Location: MW482912
Field ID Number: N/A
Sample Type: Water

Lab Project Number: 12:3605
Lab Sample Number: 12:3605-03

Date Sampled: 08/29/2012
Date Received: 08/30/2012
Date Analyzed: 09/05/2012

Halocarbons	Results in ug / L
Bromodichloromethane	< 2.00
Bromomethane	< 2.00
Bromoform	< 5.00
Carbon Tetrachloride	< 2.00
Chloroethane	< 2.00
Chloromethane	< 2.00
2-Chloroethyl vinyl Ether	< 10.0
Chloroform	< 2.00
Dibromochloromethane	< 2.00
1,1-Dichloroethane	< 2.00
1,2-Dichloroethane	< 2.00
1,1-Dichloroethene	< 2.00
cis-1,2-Dichloroethene	14.6
trans-1,2-Dichloroethene	< 2.00
1,2-Dichloropropane	< 2.00
cis-1,3-Dichloropropene	< 2.00
trans-1,3-Dichloropropene	< 2.00
Methylene chloride	< 5.00
1,1,2,2-Tetrachloroethane	< 2.00
Tetrachloroethene	< 2.00
1,1,1-Trichloroethane	< 2.00
1,1,2-Trichloroethane	< 2.00
Trichloroethene	< 2.00
Trichlorofluoromethane	< 2.00
Vinyl chloride	6.10

Aromatics	Results in ug / L
Benzene	< 0.700
Chlorobenzene	< 2.00
Ethylbenzene	< 2.00
Toluene	< 2.00
m,p-Xylene	< 2.00
o-Xylene	< 2.00
Styrene	< 5.00
1,2-Dichlorobenzene	< 2.00
1,3-Dichlorobenzene	< 2.00
1,4-Dichlorobenzene	< 2.00

Ketones	Results in ug / L
Acetone	< 10.0
2-Butanone	< 10.0
2-Hexanone	< 5.00
4-Methyl-2-pentanone	< 5.00

Miscellaneous	Results in ug / L
Carbon disulfide	< 2.00
Vinyl acetate	< 5.00

ELAP Number 10958
Analytical Method: EPA 8260B
Prep Method: EPA 5030
Data File: X00138.D

Comments: ug / L = microgram per Liter

Signature:
Bruce Hoogesteger: Technical Director

Appendix III

TABLE OF CONTENTS

HERTEL SITE
373 HERTEL
(359 HERTEL ON TAX RECORDS)

THIS STUDY DONE DURING & AFTER THE
CERCLA SUPERFUND CLEANUP)

1.0 INTRODUCTION

1.1 Objective of Study

The objective of this study was for the Response Engineering and Analytical Contract (REAC) to provide technical support to the United States Environmental Protection Agency/Environmental Response Team Center (U.S. EPA/ERTC) during soil collection, and install and sample groundwater from five monitor wells. The purpose of these sampling activities was to determine the presence and magnitude of contamination at the Morgan Materials site.

1.2 Site Background (U.S. EPA 1998)

The Morgan Materials site is located at 373 Hertel Road, a mixed residential and industrial area of Buffalo in Erie County, New York (Figure 1). The site sits on approximately 3.5 acres and consists of six interconnected warehouses. Population within a 2-mile radius of the site is approximately 30,000. There is a residential neighborhood of 30 homes immediately across the street from the site; the nearest residential property is 100 feet (ft) north in the same neighborhood. A middle school is located about 400 ft west of the site; three schools are located within a 0.75-mile radius.

Morgan Materials, Inc. is a broker of off-specification and discontinued chemicals that were purchased for the purpose of resale. On 14 March 1997, the New York State Department of Environmental Conservation (NYSDEC) requested that the U.S. EPA evaluate the site for a removal action. On 27 and 28 March 1997, U.S. EPA's Removal Action Branch and Superfund Technical Assessment and Response Team (START) performed a site evaluation and found numerous environmental concerns. During the evaluation, U.S. EPA observed between 8,000 and 10,000 drums possibly containing hazardous substances including flammable liquids, corrosive liquids and solids, and poisonous liquids. Many drums were found to be leaking, corroding, crushed, and/or deteriorating. Drums were stacked on pallets up to four high, with some appearing ready to topple. There was evidence of material spills inside the warehouse facility; spilled materials from previous cleanups were being stored in drums as well. Small portions of the warehouse floor consisted of soil and broken concrete, and there were areas of accumulated water. Information subsequently obtained increased the total number of drums to more than 20,000.

1.3 Geology and Hydrogeology (Engineering-Science, Inc. 1992)

The Morgan Materials site is located in the Erie-Ontario lowlands physiographic province where the bedrock is predominantly limestone, dolomite, and shale. This area has been repeatedly covered by continental glacial ice sheets which have deposited unstratified till. Thick veneers of stratified till have been deposited by glacial meltwater channels. Meltwater also formed lakes at the ice margins, where silts and clays accumulated. Erie county is covered by such lake sediments.

Stratified glacial tills consisting of sand and gravel may act as aquifers in the area of the site, with the clay and silt behaving as aquitards. No wells are known to obtain groundwater from bedrock [approximately 60 ft to 80 ft below ground surface (bgs)] in the vicinity of the site. Drilling activities at the site have shown the upper 30 ft of overburden to consist mainly of red-brown silty clay, overlain by fill material at some areas of the site.

The Niagara River is the closest body of water to the site, approximately 0.75 miles to the west. The Niagara receives surface water and groundwater from the direction of the site (Environmental-Science, Inc. 1992).

2.2.3 Groundwater Sampling

Monitor wells were sampled using new disposable teflon™ bailers, approximately 18 to 20 hours after development was completed. This time interval allowed the slow-recharging wells to recharge sufficiently for sampling. REAC personnel were not able to obtain a groundwater sample from Monitor Well MW-5 due to slow recharge in the well.

Wells were sampled by lowering and raising bailers very slowly to avoid agitating water within the wells. VOC samples were always collected first, followed by random ordered sampling for BNAs, TAL metals, pesticides, and PCBs. Samples for TAL metals analysis were preserved in the field immediately after collection by adjusting the pH to less than 2 standard units; the pH was lowered by adding to the sample a 10 percent solution of ultra pure nitric acid and laboratory distilled/deionized water. The nitric acid solution was prepared at REAC laboratories by a chemist. All samples were labeled, logged, placed in an ice-packed cooler, and shipped to REAC. Samples were collected per REAC/ERT SOP #2007, *Groundwater Well Sampling*.

3.0 RESULTS

A table showing analytical results is associated with each following subsections unless less than two compounds were detected. For the most part, the analyte list for each table is limited to detected compounds (please refer to Appendix C for a full list of analytes, detection limits, and results). For VOCs, all analytes detected in either groundwater or soil are listed in both tables. All TAL metals are listed in the tables for soils and groundwater. Also, if available, each analytical-results table displays the NYSDEC cleanup objectives for each analyte for soil, and groundwater quality standards for water. If NYSDEC standards were unavailable, U.S. EPA maximum contaminant levels (MCLs) were substituted, if available.

3.1 Monitor Well Installation and Development

Five groundwater monitor wells were installed into the first water-bearing zone below grade at each location (Figure 2). Table 1 shows well construction details. Borehole logs and well construction diagrams can be found in Appendix B. At monitor well locations MW-1, MW-2, and MW-5, boreholes were advanced through a red-brown, dry, firm, silty clay with low plasticity, into a gray-brown, highly plastic, soft, moist, clay considered the first water-bearing zone. At each of these locations, the moist clay was encountered between 30 and 32 ft bgs.

At monitor well location MW-3, the borehole was advanced through approximately 10 ft of moist to wet, gray-black, gravel fill. The borehole was further advanced through 10 ft of dry red-brown, silty clay. Upon examination of wet cuttings around the borehole, it was determined that a perched aquifer existed over the clay, which was acting as a low-conductivity hydraulic barrier (aquitard) at this location. The well was installed to monitor the perched aquifer so as not to disrupt the integrity of the aquitard.

The borehole at MW-4 was advanced through approximately 24 ft of black-brown-red, poorly sorted gravel and sand similar to that of MW-3, although this material was saturated starting at approximately 11 ft bgs. Dry, red-brown, silty clay was encountered at 26 ft bgs; the well was set to a total depth of 28 ft bgs.

3.2.3 Base Neutral Acid Extractable Compounds

Table 6 shows soil sample analytical results for detected BNA compounds. A majority of the soil samples contained polynuclear aromatic hydrocarbons (PAHs) ranging from 78 μg/kg to 14,000 μg/kg at location GP-12. Diethylphthalate was also detected in concentrations ranging from 200 μg/kg to 11,000 μg/kg at sample location GP-6. The soil sample from location GP-17 also contained a high level of phenol at 280,000 μg/kg. Sample locations GP-8 and GP-9 showed no detected BNAs.

Concentrations of bis(2-ethylhexyl)phthalate were detected in groundwater samples from MW-1, MW-2, MW-3, and the Field Blank. At MW-1, the detected concentration of bis(2-ethylhexyl)phthalate was 14 μg/L; 2.5 μg/L at MW-2; 2.6 μg/L at MW-3; and 10 μg/L in the Field Blank. No other BNAs were detected in groundwater samples.

3.2.4 Pesticides and Polychlorinated Biphenyls

Soil sample analytical results for detected pesticides and PCBs are shown in Table 7. No target compounds were found in any of the groundwater samples. Low concentrations of heptachlor epoxide, endosulfan (I), p,p'-dichlorodiphenyldichloroethylene (DDE), p,p'-dichlorodiphenyldichloroethane (DDD), endrin aldehyde, and methoxychlor where detected in soil samples. Of these compounds, the highest concentration was 43 μg/kg heptachlor epoxide detected at sample location GP-6, in the northwest corner of Building 1 (Figure 2). Sample location GP-6 also had the highest detected concentrations of p,p'-DDD (13 μg/kg) and methoxychlor (23 μg/kg). p,p'-dichlorodiphenyltrichloroethane (DDT) was detected at three locations: GP-15 (10 μg/kg), GP-12 (7.4 μg/kg), and GP-13 (6.0μg/kg). All other detections in soil samples were at low (<5 μg/kg) concentrations. In six soil samples, one or a combination of aroclor 1248, aroclor 1254, and aroclor 1260 were detected with the highest concentrations being 310 μg/kg aroclor 1254 and 290 μg/kg aroclor 1260, both at GP-14.

4.0 DISCUSSION OF RESULTS

Two water-bearing zones exist beneath the site: one confined by a stiff silty clay; the second is perched above the clay within the fill, as found at MW-3 and MW-4. It is unclear if the confined water-bearing zone is continuous beneath the entire site, or whether the perched zone is continuous between Monitor Wells MW-3 and MW-4. However, both situations seem likely.

The dry, stiff clay supporting the perched aquifer seems to provide a barrier to downward vertical movement of groundwater from this water-bearing zone. The extent and continuity of the clay in relation to the perched aquifer are unknown. However, samples obtained from the confined zone do not show evidence of the contamination detected in soil samples, or in samples obtained from the perched aquifer, except for mercury detected at MW-1. Unfortunately, local groundwater flow directions of either water-bearing zone are not currently known.

Figure 3 shows selected analytical results that "stand out" at certain sample locations, due either to high concentrations of individual contaminants, a wide variety of contaminants, or a unique detection of an element or compound. Selected data are presented next to the appropriate sample point and color coded by analyte group. At several sample locations, "Total PAH" indicates the summed concentrations of PAHs as defined by National Institute for Occupational Safety and Health (NIOSH) method number 5515 (see Appendix D). Units in this figure are expressed in parts per billion (ppb) or parts per million (ppm).

5.0 CONCLUSIONS

Based on soil borings, and the soil and groundwater analytical results, the following conclusions can be made regarding the Morgan Materials site:

- The site overlies a stiff, red-brown, dry, silty clay which acts as a confining layer for an underlying water-bearing zone within a plastic clay, and a supporting layer for a water-bearing zone composed of a red-brown to gray-black, sandy, gravel fill. The thickness of the gravel fill increases from west to east across the site.

- Groundwater within the fill displays worse quality than groundwater within the clay. Groundwater samples obtained from wells screened in the clay showed no concentrations above NYSDEC water quality regulatory levels. This suggests that the stiff clay may provide an effective barrier to vertical groundwater movement.

- There are several sample locations where one or more contaminants were detected (Figure 3), but four areas stand out: 1) the western portion of Building 1, where a high number of different compounds were detected at GP-6; 2) the eastern section of Building 1, where TCE and PCE were detected at relatively high concentrations in soil samples from GP-7 and GP-10, in addition to a high concentration of zinc detected at GP-10; 3) the area surrounding the loading dock where high concentrations of VOCs, metals, PAHs, and phenol were detected in soil samples, in addition to VOCs and metals detected in the groundwater sample obtained from MW-3; and 4) GP-15 where several metals were detected at concentrations exceeding NYSDEC cleanup objectives.

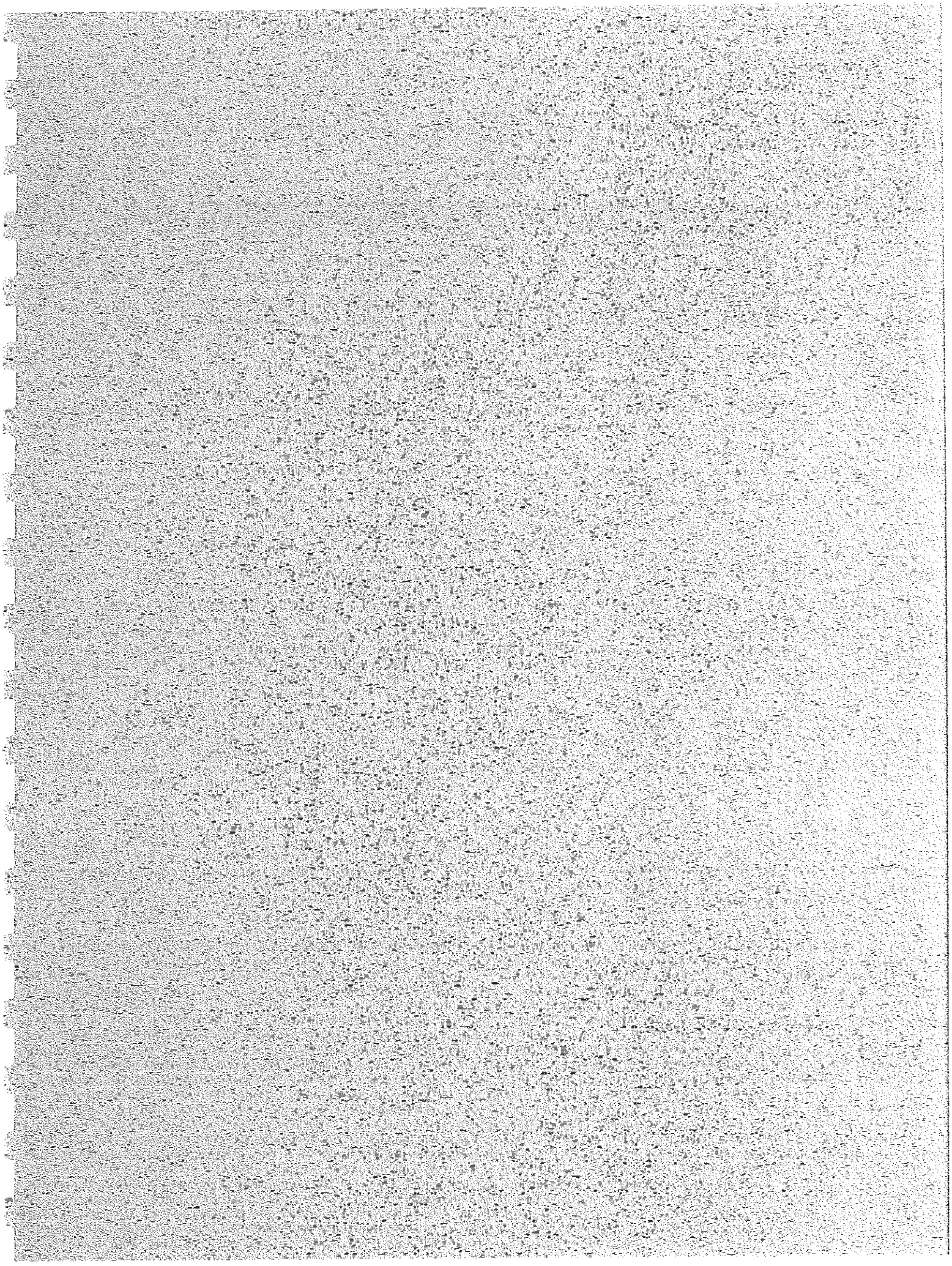

TABLE 2
Volatile Organic Compounds in Soil
Morgan Materials Site
January 1999

Location	NYSDEC Objectives[1]	GP-1	GP-2	GP-3	GP-4	GP-5	GP-6	GP-7	GP-8	GP-9
Analyte	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg
Vinyl Chloride	120	U	U	U	U	U	U	U	U	U
Tricholorofluoromethane	na	U	U	1.3	0.7 J	U	U	U	U	U
Acetone	110	U	U	27	34	23	U	U	U	U
1,1-Dichloroethene	400	U	U	U	U	U	U	U	U	U
Carbon Disulfide	2,700	U	U	7.9	U	U	72	U	U	U
Methyl-tertiary-butylether	na	U	U	U	U	U	U	U	U	U
trans-1,2-Dicholoroethene	na	U	U	U	U	U	58	2.1	U	U
cis-1,2-Dichloroethene	na	U	U	U	U	U	U	18	U	U
Carbon Tetrachloride	600	U	U	U	U	U	U	U	U	U
Benzene	60	U	U	1.6	U	U	U	U	U	U
Trichloroethene	700	U	U	U	U	U	350	2,700	U	U
1,1,2-Trichloroethane	na	U	U	U	U	U	150	6.3	U	U
Toluene	1,500	U	U	5.6	U	U	8.6	U	1.3	U
Tetrachloroethene	1,400	U	U	U	U	U	U	66	U	U
Ethylbenzene	5,500	U	U	1.2	U	U	11	U	U	U
p & m-Xylene	1,200	U	U	2.1	U	U	62	U	U	U
o-Xylene	1,200	U	U	0.9 J	U	U	41	U	U	U
1,1,2,2-Tetrachloroethane	600	U	U	U	U	U	520	1,300	U	U
p-Isopropyltoluene	na	U	U	U	U	U	U	U	U	U
Naphthalene	13,000	U	U	U	U	U	73	U	U	U

Samples collected 3-4 November 1998.
(1) - New York State Department of Environmental Conservation (NYSDEC) soil cleanup objectives to protect groundwater quality (NYSDEC 1994a).
µg/kg - micrograms per kilogram.
Concentrations exceeding NYSDEC objectives in bold.
J - denotes below method dectection limit.
U - denotes compound not detected.
na - not available.

TABLE 3
Volatile Organic Compounds in Groundwater
Morgan Materials Site
January 1999

Location	NYSDEC Objectives[1]	MW-1	MW-2	MW-3	MW-4
Compound	µg/L	µg/L	µg/L	µg/L	µg/L
Vinyl Chloride	2	U	U	**62**	**5.6**
Tricholorofluoromethane	na	U	U	U	U
Acetone	50	U	U	U	U
1,1-Dichloroethene	5	U	U	2.1	U
Carbon Disulfide	50	U	U	U	U
Methyl-tertiary-butylether	na	U	U	U	6.2
trans-1,2-Dicholoroethene	100[2]	U	U	4	U
cis-1,2-Dichloroethene	70[2]	U	U	**540**	23
Carbon Tetrachloride	5	U	U	U	U
Benzene	0.7	U	U	U	U
Trichloroethene	5	U	U	**500**	**6.7**
Bromodichloromethane	100[2]	U	U	U	U
1,1,2-Trichloroethane	0.6	U	U	U	U
Toluene	5	U	U	U	U
Tetrachloroethene	5	U	U	**390**	U
Ethylbenzene	5	U	U	U	U
p & m-Xylene	5	U	U	U	U
o-Xylene	5	U	U	U	U
1,1,2,2-Tetrachloroethane	5	U	U	U	U
p-Isopropyltoluene	na	U	U	U	U
Naphthalene	10	U	U	U	U

Samples collected 7 November 1998.
µg/L - micrograms per liter.
(1) - New York State Department of Environmental Conservation (NYSDEC) water quality regulations (NYSDEC 1994b).
(2) - NYSDEC water quality regulation unavailable; U.S. Environmental Protection Agency (USEPA) maximum contaminant level (MCL) indicated (USEPA 1992).
Concentrations exceeding specified limits in **bold**.
J - denotes below Method Detection limit.
U - denotes compound Not Detected.
na - not available

TABLE 4 (Cont'd)
Tareget Analyte List Metals in Soil
Morgan Materials Site
January 1999

Location	NYSDEC Objectives[1]	GP-11	GP-12	GP-13	GP-14	GP-15	GP-16	GP-17	Field Blank-O	Field Blank-I
Parameter	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
Aluminum	SB (33,000)	4,900	6,500	4,100	4,300	19,000	12,000	11,000	59	28
Antimony	SB	U	U	U	U	U	U	U	U	U
Arsenic	7.5 or SB (3-12)	5	8.7	5.1	9.9	10	5.0	7.0	U	U
Barium	300 or SB	47	610	47	81	200	120	140	1.1	U
Beryllium	.16 or SB (0-1.75)	U	U	U	U	2.6	1.2	0.69	U	U
Cadmium	1	0.6	1.4	1.9	0.81	U	U	0.84	U	U
Calcium	SB (130-35,000)	7,700	7,800	24,000	25,000	83,000	86,000	21,000	80	U
Chromium	10 or SB	19	21	13	29	65	13	59	U	U
Cobalt	30 or SB	4.9	9.1	4.5	5.7	7.3	6.3	6.4	U	U
Copper	25 or SB	51	78	72	230	120	42	260	U	U
Iron	2,000 or SB	47,000	77,000	43,000	83,000	89,000	16,000	54,000	290	89
Lead	SB	66	83	99	140	45	21	110	U	U
Magnesium	SB (100-5,000)	1900	2000	12000	2200	14000	15000	1400	U	U
Manganese	SB (50-5,000)	710	1,000	600	2,300	2,400	980	4,300	15	2.8
Mercury	0.1	0.04	0.10	0.12	1.0	0.07	U	0.51	U	U
Nickel	13 or SB (0.5-25)	13	27	11	23	170	18	1,000	2.8	U
Potassium	SB (8,500-43,000)	660	790	440	460	1,200	1,600	1,000	U	U
Selenium	2 or SB	U	U	U	U	0.74	U	U	U	U
Silver	SB	U	U	U	U	U	U	U	U	U
Sodium	SB (6,000-8,000)	99	140	230	210	450	370	780	U	U
Thallium	SB	U	U	U	U	U	U	U	U	U
Vanadium	150 or SB	18	23	11	22	28	17	28	U	U
Zinc	20 or SB (9-50)	120	330	610	190	1,200	110	350	2	U

Samples collected 3-4 November 1998.

(1) - New York State Department of Environmental Conservation (NYSDEC) soil cleanup objectives to protect groundwater quality (NYSDEC 1994a).

mg/kg - milligrams per kilogram.

SB - site background (numbers in parentheses are eastern US background).

Concentrations exceeding specified limits in **bold**.

U - denotes not detected.

TABLE 6
Base Neutral Acid Extractables in Soil
Morgan Materials Site
January 1999

Location	NYSDEC Objectives[1]	GP-1	GP-2	GP-3	GP-4	GP-5	GP-6	GP-7	GP-8	GP-9
Analyte	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg
Phenol	30	U	U	U	U	U	U	U	U	U
Naphthalene	13,000	1,700 J	U	U	U	U	U	U	U	U
4-Chloro-3-methylphenol	240	U	U	U	U	U	U	U	U	U
2-Methylnaphthalene	36,400	920 J	110 J	U	120 J	U	6,800 J	U	U	U
Acenaphthene	50,000	U	U	U	U	U	U	U	U	U
Dibenzofuran	6,200	970 J	U	U	U	U	4,800 J	U	U	U
Diethylphthalate	7,100	U	390	2,500 J	440	490	11,000	450	U	U
Fluorene	50,000	1,100 J	U	U	U	U	5,500 J	U	U	U
Phenanthrene	50,000	7,200	U	U	U	U	19,000	U	U	U
Anthracene	50,000	1,800 J	U	U	U	U	18,000	U	U	U
Carbazole	na	830 J	U	U	U	U	U	U	U	U
Fluoranthene	50,000	7,200	81 J	780 J	88 J	U	U	U	U	U
Pyrene	50,000	5,400	U	800 J	78 J	U	2,400 J	U	U	U
Benzo(a)anthracene	224	2,900 J	U	U	U	U	U	U	U	U
Chrysene	400	3,000 J	U	U	U	U	U	U	U	U
Bis(2-Ethylhexyl)phthalate	50,000	U	100 J	U	U	U	U	97 J	U	U
Benzo(b)fluoranthene	1,100	2,200 J	U	U	U	U	U	U	U	U
Benzo(k)fluoranthene	1,100	2,500 J	U	U	U	U	U	U	U	U
Benzo(a)pyrene	61	2,500 J	U	U	U	U	U	U	U	U
Indeno(1,2,3-cd)pyrene	3,200	1,400 J	U	U	U	U	U	U	U	U
Dibenzo(a,h)anthracene	14	U	U	U	U	U	U	U	U	U
Benzo(g,h,i)perylene	50,000	1,400 J	U	810 J	U	U	U	U	U	U

Samples collected 3-4 November 1998.

(1) - New York State Department of Environmental Conservation (NYSDEC) soil cleanup objectives to protect groundwater quality (NYSDEC 1994a).

µg/kg - micrograms per kilogram.

U - denotes not detected.

J - denotes below method detection limit.

na - not available.

TABLE 7
Pesticides and Polychlorinated Biphenyls in Soil
Morgan Materials Site
January 1999

Location	NYSDEC Objectives[1]	GP-1	GP-2	GP-3	GP-4	GP-5	GP-6	GP-7	GP-8	GP-9	GP-10	GP-11	GP-12	GP-13	GP-14	GP-15	GP-16	GP-17
Analyte	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg
Heptachlor Epoxide	20	U	U	U	U	U	43	U	U	U	U	U	U	U	3.3 J	U	U	U
Endosulfan (I)	900	U	U	U	U	U	U	U	U	U	U	U	1.7 J	U	U	U	U	U
p,p'-D D E	2,100	2.2 J	U	U	U	U	U	U	U	U	U	U	U	2.4 J	3.7	U	U	U
Endrin	100	U	U	U	U	U	U	U	U	U	U	U	2.1 J	U	U	U	U	U
p,p'-D D D	2,900	U	U	2.8 J	U	U	13	U	U	U	U	U	U	U	U	U	U	U
p,p'-D D T	2,100	3.6 J	U	U	U	U	U	U	U	U	U	U	7.4	6.0	U	10	U	U
Endrin Aldehyde	na	U	U	U	U	U	U	U	U	U	U	U	U	U	3.2 J	U	U	U
Methoxychlor	9,000	U	U	U	U	U	23	U	U	U	U	U	U	U	U	U	U	U
Aroclor 1248	1,000	260	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U
Aroclor 1254	1,000	U	U	15 W	U	U	U	U	U	U	U	U	U	U	310	U	U	U
Aroclor 1260	1,000	49	U	U	U	U	U	U	U	U	U	U	20 W	30 W	290	130	U	U

Samples collected 3-4 November 1998.
(1) - New York State Department of Environmental Conservation (NYSDEC) soil cleanup objectives to protect groundwater quality (NYSDEC 1994a).
µg/kg - micrograms per kilogram.
Concentrations exceeding specified limits in bold.
U - denotes not detected.
J - denotes below method detection limit.
W - denotes weathered analyte; the results should be regarded as estimated.
na - not available.

U.S. EPA ENVIRONMENTAL RESPONSE TEAM CENTER
RESPONSE ENGINEERING AND ANALYTICAL CONTRACT
68-C4-0022
W.O.# 03347-143-001-3399-01

FIGURE 1
SITE LOCATION MAP
MORGAN MATERIALS SITE
BUFFALO, NY
JANUARY 1999

APPENDIX A
Field Well Development Forms
Morgan Materials Site
Buffalo, New York
January 1999

GEOLIS Well Development Form

COMPANY: Weston / REAC
CLIENT: USEPA
PROJECT: Morgan Material
SITE/AREA:

LOCATION ID: MW-3
DATE: 11/16/98
MEASURED BY: William Akers
SIGNATURE: WA

ONE WELL VOLUME: 1.1 gallons WELL TD: 14.94 ft TOC

Well Volume (gallons/foot): 2-Inch = 0.16, 3-Inch = 1.47, 4-Inch = 0.65, 6-Inch = 2.61

TIME	ACTIVITY CODE	DEPTH TO WATER (ft)	PURGE RATE (gpm)	PURGE VOLUME (gal)	FIELD MEASUREMENTS pH	MSC	DO	Temp	TURBIDITY	COMMENTS
1008	DBB	7.976		1 gal	7.28	2.13	2.44 6.	12.6	999*	
1030		8.08		7 gal	7.33	2.16	6.50	13.0	999	DK Grey/Br.
1040		8.06		13	7.31	2.11	9.53	12.7	999	
1100		8.1		18	7.34	2.11	1.57	12.6	99	Medium
1130		8.11		24	7.33	2.10	0.20	12.7	999	↓
1137	DBE			27						
1430	DBB	8.14		32	7.34	2.12	1.90	12.5	999	Medium
1443		8.16		37	7.35	2.12	1.88	12.7	999	
1458	DBE	8.18		42	7.39	2.11	2.04	12.7	999	↓
										* Turbidity probe probably not working.
			WA							
	FINAL									

FINAL WELL YIELD: _____ GPM PUMP RATE - ESTIMATED CORRESPONDING DRAWDOWN: _____ FT

DEVELOPMENT ACTIVITY CODES

DBB - Begin Bailing
DOB - Begin Overpumping
DRB - Begin Rawhiding
DCB - Begin Recirculation
DHB - Begin Hydraulic Jetting
DAB - Begin Air Surging
DSB - Begin Surge Blocking
DXB - Begin Other
Specify other method: _____
FMT - Field Measurements (select from codes at right)

DBE - End Bailing
DOE - End Overpumping
DRE - End Rawhiding
DCE - End Recirculation
DHE - End Hydraulic Jetting
DAE - End Air Surging
DSE - End Surge Blocking
DXE - End Other

FIELD MEASUREMENT CODES

MTP - Temperature
MSC - Specific Conductance
MPD - Photolonizer (e.g., HNu)
MFD - Flame Ionizer (e.g., OVA)
MDO - Dissolved Oxygen
MPH - pH
MEH - Eh
MMC - Imhoff Cone
MO1 - Other: _____
MO2 - Other: _____

TURBIDITY

Enter Turbidity Meter Reading (Final should be < 5 NTU)
OR
Enter Qualitative Observations
H - High: Opaque/Muddy/Silty
M - Medium: Translucent/Cloudy
L - Low: Transparent/Some Silt
N - None: Clear/No Visible Silt

APPENDIX B
Borehole and Well Construction Logs
Morgan Materials Site
Buffalo, New York
January 1999

U.S EPA Environmental Response Team Center

Response Engineering and Analytical Contract

68-C4-0024

W.O. # 03347-143-001-3399-01

BOREHOLE LOG AND WELL CONSTRUCTION DIAGRAM

Site Name: Morgan Materials Site
Site Location: Buffalo, New York
Boring ID: MW-1

Total Depth: 35.0 ft
Logger: W. Avery
Date Started: 11/3/98
Date Completed: 11/3/98

All depths are in feet (ft) below ground surface.
Well completed with flush-mount casing and cement pad.

Depth	Material	USCS Classification	Comments	Depth to Water	Well Construction Summary	Well Completion Diagram
0		SW	0-2 (core): Dark gray gravelly sand, rounded, loose, dry, non-cemented.			
		MH	2-4 (core): Red-brown clayey silt, minor fine-grained sub-rounded gravel, moderate sorting, dry, low plasticity, soft, moderately calcareous.		Grout from 0 to 20.5 ft around inner casing.	
		CL	4.5-6 (core): Same as above.			
-5		CL	7.4-8 (core): Red-brown silty clay, minor fine-grained sub-rounded gravel, moderate sorting, dry, low plasticity, soft, moderately calcareous.			
		CL	8-10 (core): Same as above.			
-10		CL	11.6-12 (core): Red-brown clay, minor angular gravel, moderate sorting, dry, firm, low plasticity, moderately calcareous.		Inner casing is 2-inch schedule 40 PVC.	
		CL	12-14 (core): Same as above with minor silt.			
		CL	14-16 (core): Red-brown clay with minor fine-grained sub-rounded gravel, moderate sorting, dry, firm, moderate plasticity, moderately calcareous.			
-15		CL	16-18 (core): Red-brown silty clay with minor fine-grained sub-rounded gravel, well sorted, dry, firm, low plasticity, moderately calcareous.			
		CL	18-20 (core): Same as above with moderate plasticity.			
-20		CL	20-22 (core): Red-brown silty clay with minor fine-grained sub-rounded gravel, well sorted, dry, firm, gray clay vertical tracers, moderate plasticity, moderately calcareous.		Bentonite seal from 20.5 to 23 ft.	
		CL	22.2-24 (core): Same as above.			
		CH	24-26 (core): Red-brown silty clay with minor sub-rounded to angular gravel, moderate sorting, high plasticity, dry, soft, higher silt content, coarse gravel at bottom of spoon.		Sand pack from 23 to 35 ft.	
-25		CL	26-28 (core): Red-brown silty clay with sandy gravel pockets. Well sorted, dry, sft, moderate plasticity, moderately calcareous.	▽		
		CL	28-29.5 (core): Red-brown silty clay with minor sub-rounded fine-grained gravel, well sorted, dry, moderate plasticity, firm.			
-30		CH	29.5-30 (core): Gray-brown clay. Moist, well-sorted, highly plastic.		2-inch PVC, No. 10 slot screen from 25 to 35 ft.	
		CH	30-32 (core): Same as above with gray clay tracers.			
		CH	32-34 (core): Same as above.			

U.S EPA Environmental Response Team Center

Response Engineering and Analytical Contract

68-C4-0024

W.O. # 03347-143-001-3399-01

BOREHOLE LOG AND WELL CONSTRUCTION DIAGRAM

Site Name: Morgan Materials Site
Site Location: Buffalo, New York
Boring ID: MW-4

Total Depth: 28.0 ft
Logger: W. Avery
Date Started: 11/4/98
Date Completed: 11/4/98

All depths are in feet (ft) below ground surface.
Well completed with above ground, locking protective casing.

Depth	Material	USCS Classification	Comments	Depth to Water	Well Construction Summary	Well Completion Diagram
0		SP	0-2 (core): Dark brown-red-tan medium-fine grained sand, minor fine-grained angular gravel, moderately sorted, dry, non-cemented.			
		SP	2-4 (core): Dark brown-tan angular sand, minor medium-fine grained sub-angular gravel, poorly sorted, dry, non-cemented.		Grout from 0 to 14 ft around inner casing.	
-5		SP	4-6 (core): Red-brown-gray medium sand with medium-fine grained sub-angular gravel, moderately sorted, dry, non-cemented.			
		SP	6-8 (core): Black-gray-tan fine-grained sub-angular sand, medium-fine grained angular gravel, moderately sorted, dry, non-cemented.			
		SP	8-10 (core): Red-black coarse angular fractured gravel, medium-fine grained sub-angular sand, poorly sorted, dry, red mudstone rock fragments in sand.			
-10		SP	10-12 (core): Red-black coarse angular sand, medium-fine grained angular fractured gravel, poorly sorted, moist with last foot wet.		Inner casing is 2-inch schedule 40 PVC.	
		GP	12-14 (core): Red-black medium-fine grained angular gravel, minor fine sub-angular sand, poorly sorted, wet-saturated, non-cemented.	▽		
		GP	14-16 (core): Dark gray-black medium-fine grained angular fractured gravel, minor coarse grained angular sand, poorly sorted, wet-saturated.		Bentonite seal from 14 to 16 ft.	
-15		GP	16-18 (core): Same as above.			
		SP	18-20 (core): Dark gray medium-fine grained angular sand, fine grained angular fractured gravel, poorly sorted, saturated.			
-20		GP	20-22 (core): Dark gray-tan fine grained sub-angular gravel, medium grained angular sand, poorly sorted, saturated.		Sand pack from 16 to 28 ft.	
		SP-SM	22-24 (core): Dark gray sandy gravel with tan gravel layer at 23.6-23.8, saturated, non-cemented.			
		CL	24-26 (core): Gray-Red-brown silty clay possibly stained by water, moderate plasticity, moist, moderately calcareous.		2-inch PVC, No. 10 slot screen from 18 to 28 ft.	
-25		CL	26-28 (core): Red-brown silty clay, vertical gray striations, moderate plasticity, dry, moderately calcareous.			

APPENDIX C
Analytical Report for Samples Taken in November 1998
Morgan Materials Site
Buffalo, New York
January 1999

Roy F. Weston, Inc.
GSA Raritan Depot
Bldg. 209 Annex (Bay F)
2890 Woodbridge Avenue
Edison, New Jersey 08837-3679
732-321-4200 • Fax 732-494-4021

DATE: 24 December 1998

TO: R. Singhvi EPA/ERTC

FROM: V. Kansal Analytical Section Leader Vinod Kansal

SUBJECT: DOCUMENT TRANSMITTAL UNDER WORK ASSIGNMENT # 3-399

Attached please find the following document prepared under this work assignment:

Morgan Materials Site - Analytical Report

Central File WA # 3-399
P. Campagna
W. Avery
M. Barkley

(w/attachment)
Work Assignment Manager (w/attachment)
Task Leader (w/attachment)
Data Validation and Report Writing
Group Leader (w/o attachment)

ANALYTICAL REPORT

Prepared by
Roy F. Weston, Inc.

Morgan Materials Site
Buffalo, New York

December 1998

EPA Work Assignment No. 3-399
WESTON Work Order No. 03347-143-001-3399-01
EPA Contract No. 68-C4-0022

Submitted to
P. Campagna
EPA-ERTC

W. Avery 12/23/98
W. Avery Date
Task Leader

Analysis by:
REAC

V. Kansal 12/23/98
V. Kansal Date
Analytical Section Leader

Prepared by:
M. Bernick

V. Kansal 12/24/98
E Gilardi Date
Program Manager

Reviewed by:
M. Barkley

Appendices will be furnished on request.

Data Package H517 - BNA

Field blank B17918 contained 200 µg/kg diethylphthalate. Associated sample B17916 contained less than ten times the blank concentration of this analyte; the diethylphthalate result is considered not detected.

Field blank B17919 contained 200 µg/kg diethylphthalate. Associated samples B17912, B17913, B17914, and B17909 contained less than ten times the blank concentration of this analyte; the diethylphthalate results are considered not detected.

Field blank B17925 contained 10 µg/L diethylphthalate. Associated samples B17921, B17922 and B17923 contained less than ten times the blank concentration of this analyte; the diethylphthalate results are considered not detected.

Data Package H540 - Metals - Water

The percent recoveries for A17924MS for selenium (Se) (73%) and silver (Ag) (11%), for A17924MSD for Se (74%) and Ag (12%) exceeded the QC limits. The Se results for samples A17921, A17922, A17923, A17924, and A17925 are considered estimated. The Ag results for samples A17921, A17922, A17923, A17924, and A17925 are considered unusable.

Data Package H539 - Metals - Soil

The percent recoveries for E17910MS for arsenic (As) (0%), antimony (Sb) (54%), mercury (Hg) (55%), and Se (24%) for E17910MSD for As (29%), Sb (63%), copper (Cu) (329%), lead (Pb) (368%), Se (30%), and zinc (Zn) (133%) exceeded the QC limits. The percent recoveries for E17908MS for Sb (44%), thallium (Tl) (53%), and Se (46%) for E17908MSD for Sb (31%) and Se (44%) exceeded the QC limits. The As results for samples E17901, E17902, E17903, E17904, E17905, E17906, E17907, E17908, E17909, E17910, E17911, E17912, E17913, E179014, E17915, E17916 and E17917 are considered estimated and for samples E17918 and E17919 are considered unusable. The Sb results for samples E17901, E17902, E17903, E17904, E17905, E17906, E17907, E17908, E17909, E17910, E17911, E17912, E17913, E179014, E17915, E17916, E17917, E17918 and E17919 are considered estimated. The Cu results for samples E17901, E17902, E17903, E17904, E17905, E17906, E17907, E17908, E17909, E17910, E17911, E17912, E17913, E179014, E17915, E17916 and E17917 are considered estimated. The Pb results for samples E17901, E17902, E17903, E17904, E17905, E17906, E17907, E17908, E17909, E17910, E17911, E17912, E17913, E179014, E17915, E17916 and E17917 are considered estimated. The Hg results for samples E17901, E17902, E17903, E17904, E17905, E17906, E17907, E17908, E17909, E17910, E17911, E17912, E17913, E179014, E17915, E17916, E17917, E17918 and E17919 are considered estimated. The Se results for sample E17902 is considered estimated and for samples E17901, E17903, E17904, E17905, E17906, E17907, E17908, E17909, E17910, E17911, E17912, E17913, E179014, E17915, E17916, E17917, E17918 and E17919 are considered unusable. The Tl results for samples E17901, E17902, E17903, E17904, E17905, E17906, E17907, E17908, E17909, E17910, E17911, E17912, E17913, E179014, E17915, E17916, E17917, E17918 and E17919 are considered estimated. The Zn results for samples E17901, E17902, E17903, E17904, E17905, E17906, E17907, E17908, E17909, E17910, E17911, E17912, E17913, E179014, E17915, E17916, E17917 and E17918 are considered estimated.

The Hg MS percent recovery for sample E17910 was 0% for the original analysis on 11/24/98. The sample and the MS/MSD samples were prepared and reanalyzed on 12/2/98. The E17910 Hg results are reported from the 12/2/98 analysis exceeding the sample holding time by one day; the results are considered estimated.

Sample E17918 field blank-O contained aluminum (Al) (59 mg/kg), barium (Ba) (1.1 mg/kg), Calcium (Ca) (80 mg/kg), iron (Fe) (290 mg/kg), manganese (Mn) (15 mg/kg), nickel (Ni) (2.8 mg/kg) and Zn (2.0 mg/kg). Sample E17919 field blank-I contained Al (28 mg/kg), Fe (89 mg/kg), and Mn (2.8 mg/kg).

Data Package H536 - Pest/PCB

In the end of sequence calibration check on 11/16/98 the percent difference for b-BHC (29), p,p'-DDE (27), p,p'-DDD (32), endosulfan (II) (39), p,p'-DDT (49), endrin aldehyde (65), endosulfan sulfate (37), methoxychlor (42), endrin ketone (50), and DCBP (75) exceeded the QC limits. No compounds were quatitated with this standard; the data are not affected.

In the end of sequence calibration check on 12/2/98 the percent difference for archlor 1254 (55) and 1260 (50) exceeded the QC limits. No compounds were quatitated with this standard; the data are not affected.

One surrogate exceeded the QC limits for water samples G17923, G17924, G17925 and soil samples A17906, A17911 and A17915; the data are not affected.

Analytical Procedure for VOC in Water

A modified 524.2 method was used for the analysis of Volatile Organic Compounds in water. Samples were purged, trapped, and desorbed to a GC/MS system. Prior to purging, the samples were spiked with a three component surrogate mixture consisting of toluene-d_8 , 4-bromofluorobenzene and 1,2-dichloroethane-d_4 and a three component internal standard mixture consisting of bromochloromethane, 1,4-difluorobenzene, and chlorobenzene-d_5 . The following conditions and parameters were utilized:

The purge and trap unit consisted of: A Tekmar concentrator (3000 series) equipped with an autosampler (Dynatech) and a trap consisting of a VOCARB 4000 (Supelco), which itself contained of four adsorbent beds: Carbopack B (graphitized carbon 60/80 mesh), Carbopack C (graphitized carbon 60/80 mesh), Carboxen-1000 (60/80 mesh), and Carboxen-1001 (60/80 mesh).

The purge and trap instrument conditions were:

Purge	10 min at 25° C
Dry Purge	2 min at 25° C
Desorb Preheat	230° C
Desorb	4 min at 230° C
Purge Flow Rate	40 mL/min
Bake	8 min at 250° C

A Hewlett Packard 5970 GC/MSD equipped with an RTE-A data system was used to analyze the data.

The instrument conditions were:

Column:	30 meter x 0.53mm ID, RTx-Volatiles (Restek Corp.) column with 3.0µm thickness.
Temperature:	5 min at 10° C 6° C/min to 140° C 0.1 min at 140° C 12° C/min to 160° C 5 min at 160° C
Flow Rate	Helium at 10 mL/min
GC/MS Interface	Glass jet separator with 30 mL/min helium make-up gas at 250° C.

GC/MS Interface:	Glass jet separator with 30 mL make-up gas at 250° C.
Mass Spectrometer:	Electron Impact Ionization at a nominal electron energy of 70 electron volts, scanning from 35-300 amu at one scan/sec.

Computer: Preprogrammed to plot Extracted Ion Current Profile (EICP); capable of integrating ions and plotting abundances vs time or scan number. A library search (NBS-Wiley) for tentatively identified compounds was performed on samples.

The GC/MS system was calibrated using 6 VOC standards at 5, 20, 50, 100, 150, and 200 µg/L. Before analysis each day, the system was tuned with 50 ng BFB and passed a continuing calibration check when analyzing a 50 µg/L standard mixture in which the responses were evaluated by comparison to the average response of the calibration curve.

Analytical Procedure for VOC in Soil

A modified 524.2 method was used for the analysis of Volatile Organic Compounds in soil. Samples were purged, trapped, and desorbed to a GC/MS system. Prior to purging, the samples were spiked with a three component surrogate mixture consisting of toluene-d_8, 4-bromofluorobenzene and 1,2-dichloroethane-d_4 and a three component internal standard mixture consisting of bromochloromethane, 1,4-difluorobenzene, and chlorobenzene-d_5. The following conditions and parameters were utilized:

The purge and trap unit consisted of: A Tekmar concentrator (3000 series) equipped with an autosampler (Dynatech) and a trap consisting of a VOCARB 4000 (Supelco), which itself contained of four adsorbent beds: Carbopack B (graphitized carbon 60/80 mesh), Carbopack C (graphitized carbon 60/80 mesh), Carboxen-1000 (60/80 mesh), and Carboxen-1001 (60/80 mesh).

The purge and trap instrument conditions were:

Purge	10 min at 25° C
Dry Purge	2 min at 25° C
Desorb Preheat	230° C
Desorb	4 min at 230° C
Purge Flow Rate	40 mL/min
Bake	8 min at 250° C

A Hewlett Packard 5970 GC/MSD equipped with an RTE-A data system was used to analyze the data.

The instrument conditions were:

Column:	30 meter x 0.53mm ID, RTx-Volatiles (Restek Corp.) column with 3.0µm thickness.
Temperature:	5 min at 10° C 6° C/min to 140° C 0.1 min at 140° C 12° C/min to 160° C 5 min at 160° C
Flow Rate	Helium at 10 mL/min
GC/MS Interface	Glass jet separator with 30 mL/min helium make-up gas at 250° C.

GC/MS Interface:	Glass jet separator with 30 mL make-up gas at 250° C.
Mass Spectrometer:	Electron Impact Ionization at a nominal electron energy of 70 electron volts, scanning from 35-300 amu at one scan/sec.

Computer: Preprogrammed to plot Extracted Ion Current Profile (EICP); capable of integrating ions and plotting abundances vs time or scan number. A library search (NBS-Wiley) for tentatively identified compounds was performed on samples.

The GC/MS system was calibrated using 6 VOC standards at 5, 20, 50, 100, 150, and 200 µg/L. Before analysis each day, the system was tuned with 50 ng BFB and passed a continuing calibration check when analyzing a 50 µg/L standard mixture in which the responses were evaluated by comparison to the average response of the calibration curve.

Extraction Procedure

Prior to extraction, each sample was spiked with a six component surrogate mixture consisting of nitrobenzene-d_5, 2-fluorobiphenyl, terphenyl-d_{14}, phenol-d_5, 2-fluorophenol, and 2,4,6-tribromophenol. One liter of sample was extracted according to Method 625, Section 10, as outlined in the Federal Register Vol. 49, #209, Friday, Oct. 26, 1984. After the extracts were combined and concentrated to 1.0 mL, they were spiked with an internal standards mixture consisting of 1,4-dichlorobenzene-d_4, naphthalene-d_8, acenaphthene-d_{10}, phenanthrene-d_{10}, chrysene-d_{12}, and perylene-d_{12}. Following this preparation, the extracts were analyzed.

Analytical Procedure

An HP 6890/5972 Gas Chromatograph/Mass Spectrometer (GC/MS), equipped with a 6890 autosampler and controlled by a PC computer equipped with Enviroquant software was used to analyze the samples.

The instrument conditions were:

Column	Restek Rtx-5 (crossbonded SE-54) 30 meter x 0.25mm ID, 0.50 µm film thickness
Injection Temperature	280° C
Transfer Temperature	280° C
Source Temperature & Analyzer Temperature	Controlled by thermal transfer of heat from transfer line
Temperature Program	50°C for 0.5 min 20° C/min to 295° C, hold for 8.5 min 25° C/min to 310° C, hold for 15 min
Pulsed Split Injection	Split time = 2.00 min @ 8:1 split ratio Pressure pulse = 16 psi for 0.5 min, then normal
Injection Volume	1µL Must use 4 mm ID single gooseneck liners packed with 10 mm pulg of silanized & conditioned glass wool.

The GC/MS system was calibrated using 5 BNA standards at 20, 50, 80, 120, and 160 µg/mL. Before analysis each day, the system was tuned with 50 ng decafluorotriphenylphosphine (DFTPP) and passed a continuing calibration check when analysing a 50 µg/mL standard mixture in which the responses were evaluated by comparison to the average response of the calibration curve.

Analytical Procedure for Metals in Water

Sample Preparation

A representative 45 mL aliquot of each sample was mixed with 5.0 mL concentrated nitric acid, placed in an acid rinsed Teflon container, capped with a Teflon lined cap, and digested according to SW-846, Method 3015 in a CEM MDS-2100 microwave oven, which was programmed to bring the samples to 160 +/- 4°C in 10 minutes (first stage) and slowly rise to 165-170°C in the second 10 minutes (second stage). After digestion, samples were allowed to cool to room temperature and were transfered to polyethylene bottles. Samples were analyzed for all metals, except mercury, by US EPA SW-846, Method 7000 Atomic Absorption (AA) or Method 6010 Inductively Coupled Argon Plasma (ICAP) procedures.

A 100 mL aliquot of each sample was transfered to a 300-mL BOD bottle and prepared according to SW-846, Method 7470. The samples were heated for 2 hours on a hot plate at 95 °C, cooled to room temperature, and reduced with Hydroxylamine hydrochloride (NH_2OH:HCl). Mercury was then analyzed separately on a Varian SpectrAA-300 Atomic Absorption Spectrophotometer equipped with a Varian VGA-76 vapor gas analyzer by SW-846, Method 7470.

A reagent blank and a blank spike sample were carried through the sample preparation procedure for each analytical batch of samples processed. One matrix spike (MS) and one matrix spike duplicate (MSD) sample were also processed for each analytical batch or every 10 samples.

Analysis and Calculations

The AA and ICAP instruments were calibrated and operated according to SW-846, Method 7000/7470/6010 and the manufacturer's operating instructions. After calibration, initial calibration verification (ICV), initial calibration blank (ICB), and QC check standards were run to verify proper calibration. The continuing calibration verification (CCV) and continuing calibration blank (CCB) standards were run after every 10 samples to verify proper operation during sample analysis.

The metal concentrations in solution, in micrograms per liter (µg/L) were read directly from the read-out systems of the instruments. ICAP and Mercury results were taken directly from instrument read-outs. The ICAP results were corrected for digestion volume (45 mL sample + 5 mL nitric acid) prior to instrument read-out; AA read-outs (excluding Mercury) were externally corrected for digestion volume (1.1111 * AA read-out).

For samples that required dilution to fall within the instrument calibration range:

$$\mu g/L \text{ metal in sample} = A\ [\ (C+B) / C\ ]$$

where:

A = direct read-out (ICAP and Mercury)
A = corrected read-out (AA)
B = acid blank matrix used for dilution, mL
C = sample aliquot, mL

Results of the analyses are listed in Table 1.11.

Table 1.1 Results of the Analysis for VOC in Water
WA # 3-399 Morgan Materials Site

SAMPLE # :	Lab Blank		17926 Trip Blank		17925 Field Blank		17924 MW-4		17923 MW-3	
LOCATION :										
COLLECTED			11/07/98		11/07/98		11/07/98		11/07/98	
ANALYZED :	11/10/98		11/10/98		11/10/98		11/10/98		11/11/98	
FILE # :	A5290		A5291		A5292		A5293		A5294	
DIL. FACT.:	1		1		1		1		1	
UNIT :	µg/L		µg/L		µg/L		µg/L		µg/L	
COMPOUND	CONC.	MDL	CONC.	MDL	CONC.	MDL	CONC.	MDL	CONC.	MDL
Dichlorodifluoromethane	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0
Chloromethane	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0
Vinyl Chloride	U	1.0	U	1.0	U	1.0	5.6	1.0	62	1.0
Bromomethane	U	2.0	U	2.0	U	2.0	U	2.0	U	2.0
Chloroethane	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0
Trichlorofluoromethane	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0
Acetone	U	2.0	U	2.0	U	2.0	U	2.0	U	2.0
1,1-Dichloroethene	U	1.0	U	1.0	U	1.0	U	1.0	2.1	1.0
Carbon Disulfide	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0
Methylene Chloride	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0
Methyl-tertiary-butylether	U	1.0	U	1.0	U	1.0	6.2	1.0	U	1.0
trans-1,2-Dichloroethene	U	1.0	U	1.0	U	1.0	U	1.0	4.0	1.0
1,1-Dichloroethane	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0
2-Butanone	U	4.0	U	4.0	U	4.0	U	4.0	U	4.0
2,2-Dichloropropane	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0
cis-1,2-Dichloroethene	U	1.0	U	1.0	U	1.0	23	1.0	540	1.0
Chloroform	U	1.0	1.9	1.0	2.0	1.0	U	1.0	U	1.0
1,1-Dichloropropene	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0
1,2-Dichloroethane	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0
1,1,1-Trichloroethane	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0
Carbon Tetrachloride	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0
Benzene	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0
Trichloroethene	U	1.0	U	1.0	U	1.0	6.7	1.0	500	1.0
1,2-Dichloropropane	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0
Dibromomethane	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0
Bromodichloromethane	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0
cis-1,3-Dichloropropene	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0
trans-1,3-Dichloropropene	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0
1,1,2-Trichloroethane	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0
1,3-Dichloropropane	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0
Dibromochloromethane	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0
1,2-Dibromoethane	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0
Bromoform	U	2.0	U	2.0	U	2.0	U	2.0	U	2.0
4-Methyl-2-Pentanone	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0
Toluene	U	2.0	U	2.0	U	2.0	U	2.0	U	2.0
2-Hexanone	U	1.0	U	1.0	U	1.0	U	1.0	390	1.0
Tetrachloroethene	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0
Chlorobenzene	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0
1,1,1,2-Tetrachloroethane	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0
Ethylbenzene	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0
p & m-Xylene	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0
o-Xylene	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0
Styrene	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0
Isopropylbenzene	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0
1,1,2,2-Tetrachloroethane	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0
1,2,3-Trichloropropane	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0
Bromobenzene	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0
n-Propylbenzene	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0
2-Chlorotoluene	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0
4-Chlorotoluene	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0
1,3,5-Trimethylbenzene	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0
tert-Butylbenzene	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0
1,2,4-Trimethylbenzene	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0
sec-Butylbenzene	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0
1,3-Dichlorobenzene	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0
p-Isopropyltoluene	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0
1,4-Dichlorobenzene	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0
1,2-Dichlorobenzene	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0
n-Butylbenzene	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0
1,2-Dibromo-3-Chloroprop	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0
1,2,4-Trichlorobenzene	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0
Naphthalene	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0
Hexachlorobutadiene	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0
1,2,3-Trichlorobenzene	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0

Table 1.2 Results of TIC for VOC in Water
Morgan Material Site WA# 3399

Sample # LAB BLANK
LabFile# A5290

Unit µg/L
Con. Factor 1

	CAS#	Compound	Q	RT	Conc
1		NO PEAKS FOUND			0
2					0
3					0
4					0
5					0
6					0
7					0
8					0
9					0
10					0
11					0
12					0
13					0
14					0
15					0
16					0
17					0
18					0
19					0
20					0

*Estimated Concentration (Response Factor = 1.0)

Table 1.2 (cont.) Results of TIC for VOC in Water
Morgan Material Site WA# 3399

Sample # 17925 Unit µg/L

LabFile# A5292 Con. Factor 1

	CAS#	Compound	Q	RT	Conc
1		NO PEAKS FOUND			0
2					0
3					0
4					0
5					0
6					0
7					0
8					0
9					0
10					0
11					0
12					0
13					0
14					0
15					0
16					0
17					0
18					0
19					0
20					0

*Estimated Concentration (Response Factor = 1.0)

Table 1.2 (cont.) Results of TIC for VOC in Water
Morgan Material Site WA# 3399

Sample # 17923 Unit µg/L

LabFile# A5294 Con. Factor 1

	CAS#	Compound	Q	RT	Conc
1		NO PEAKS FOUND			0
2					0
3					0
4					0
5					0
6					0
7					0
8					0
9					0
10					0
11					0
12					0
13					0
14					0
15					0
16					0
17					0
18					0
19					0
20					0

*Estimated Concentration (Response Factor = 1.0)

Table 1.2 (cont.) Results of TIC for VOC in Water
Morgan Material Site WA# 3399

Sample # 17921 Unit µg/L

LabFile# A5296 Con. Factor 1

	CAS#	Compound	Q	RT	Conc
1		Unknown		24.20	21
2					0
3					0
4					0
5					0
6					0
7					0
8					0
9					0
10					0
11					0
12					0
13					0
14					0
15					0
16					0
17					0
18					0
19					0
20					0

*Estimated Concentration (Response Factor = 1.0)

Table 1.3 (cont.) Results of the Analysis for VOC in Soil
WA # 3-399 Morgan Materials Site
Based on Dry Weight

SAMPLE # :	Sand Blank		17908		17909		17911	
LOCATION :			GP-10		GP-7		GP-6	
COLLECTED			11/03/98		11/03/98		11/04/98	
ANALYZED :	11/06/98		11/06/98		11/06/98		11/06/98	
FILE # :	A5217		A5225		A5226		A5228	
DIL. FACT.:	1		1		1		5	
% Solid :	100		94		85		83	
UNIT :	µg/kg		µg/kg		µg/kg		µg/kg	
COMPOUND	CONC.	MDL	CONC.	MDL	CONC.	MDL	CONC.	MDL
Dichlorodifluoromethane	U	1.0	U	1.1	U	1.2	U	6.0
Chloromethane	U	1.0	U	1.1	U	1.2	U	6.0
Vinyl Chloride	U	1.0	U	1.1	U	1.2	U	6.0
Bromomethane	U	2.0	U	2.1	U	2.4	U	12
Chloroethane	U	1.0	U	1.1	U	1.2	U	6.0
Trichlorofluoromethane	U	1.0	U	1.1	U	1.2	U	6.0
Acetone	U	2.0	U	2.1	U	2.4	U	12
1,1-Dichloroethene	U	1.0	U	1.1	U	1.2	U	6.0
Carbon Disulfide	U	1.0	U	1.1	U	1.2	72	6.0
Methylene Chloride	U	1.0	U	1.1	U	1.2	U	6.0
Methyl-tertiary-butylether	U	1.0	U	1.1	U	1.2	U	6.0
trans-1,2-Dichloroethene	U	1.0	U	1.1	2.1	1.2	58	6.0
1,1-Dichloroethane	U	1.0	U	1.1	U	1.2	U	6.0
2-Butanone	U	4.0	U	4.3	U	4.7	U	24
2,2-Dichloropropane	U	1.0	U	1.1	U	1.2	U	6.0
cis-1,2-Dichloroethene	U	1.0	U	1.1	18	1.2	U	6.0
Chloroform	U	1.0	U	1.1	U	1.2	U	6.0
1,1-Dichloropropene	U	1.0	U	1.1	U	1.2	U	6.0
1,2-Dichloroethane	U	1.0	U	1.1	U	1.2	U	6.0
1,1,1-Trichloroethane	U	1.0	U	1.1	U	1.2	U	6.0
Carbon Tetrachloride	U	1.0	U	1.1	U	1.2	U	6.0
Benzene	U	1.0	U	1.1	U	1.2	U	6.0
Trichloroethene	U	1.0	1400	1.1	2700	1.2	350	6.0
1,2-Dichloropropane	U	1.0	U	1.1	U	1.2	U	6.0
Dibromomethane	U	1.0	U	1.1	U	1.2	U	6.0
Bromodichloromethane	U	1.0	U	1.1	U	1.2	U	6.0
cis-1,3-Dichloropropene	U	1.0	U	1.1	U	1.2	U	6.0
trans-1,3-Dichloropropene	U	1.0	U	1.1	U	1.2	U	6.0
1,1,2-Trichloroethane	U	1.0	U	1.1	6.3	1.2	150	6.0
1,3-Dichloropropane	U	1.0	U	1.1	U	1.2	U	6.0
Dibromochloromethane	U	1.0	U	1.1	U	1.2	U	6.0
1,2-Dibromoethane	U	1.0	U	1.1	U	1.2	U	6.0
Bromoform	U	1.0	U	1.1	U	1.2	U	6.0
4-Methyl-2-Pentanone	U	2.0	U	2.1	U	2.4	U	12
Toluene	U	1.0	U	1.1	U	1.2	8.6	6.0
2-Hexanone	U	2.0	U	2.1	U	2.4	U	12
Tetrachloroethene	U	1.0	4800	1.1	66	1.2	U	6.0
Chlorobenzene	U	1.0	U	1.1	U	1.2	U	6.0
1,1,1,2-Tetrachloroethane	U	1.0	U	1.1	U	1.2	U	6.0
Ethylbenzene	U	1.0	U	1.1	U	1.2	11	6.0
p & m-Xylene	U	1.0	U	1.1	U	1.2	62	6.0
o-Xylene	U	1.0	U	1.1	U	1.2	41	6.0
Styrene	U	1.0	U	1.1	U	1.2	U	6.0
Isopropylbenzene	U	1.0	U	1.1	U	1.2	U	6.0
1,1,2,2-Tetrachloroethane	U	1.0	33	1.1	1300	1.2	520	6.0
1,2,3-Trichloropropane	U	1.0	U	1.1	U	1.2	U	6.0
Bromobenzene	U	1.0	U	1.1	U	1.2	U	6.0
n-Propylbenzene	U	1.0	U	1.1	U	1.2	U	6.0
2-Chlorotoluene	U	1.0	U	1.1	U	1.2	U	6.0
4-Chlorotoluene	U	1.0	U	1.1	U	1.2	U	6.0
1,3,5-Trimethylbenzene	U	1.0	U	1.1	U	1.2	U	6.0
tert-Butylbenzene	U	1.0	U	1.1	U	1.2	U	6.0
1,2,4-Trimethylbenzene	U	1.0	U	1.1	U	1.2	U	6.0
sec-Butylbenzene	U	1.0	U	1.1	U	1.2	U	6.0
1,3-Dichlorobenzene	U	1.0	U	1.1	U	1.2	U	6.0
p-Isopropyltoluene	U	1.0	U	1.1	U	1.2	U	6.0
1,4-Dichlorobenzene	U	1.0	U	1.1	U	1.2	U	6.0
1,2-Dichlorobenzene	U	1.0	U	1.1	U	1.2	U	6.0
n-Butylbenzene	U	1.0	U	1.1	U	1.2	U	6.0
1,2-Dibromo-3-Chloroprop	U	1.0	U	1.1	U	1.2	U	6.0
1,2,4-Trichlorobenzene	U	1.0	U	1.1	U	1.2	U	6.0
Naphthalene	U	1.0	U	1.1	U	1.2	73	6.0
Hexachlorobutadiene	U	1.0	U	1.1	U	1.2	U	6.0
1,2,3-Trichlorobenzene	U	1.0	U	1.1	U	1.2	U	6.0

Table 1.3 (cont.) Results of the Analysis for VOC in Soil
WA # 3-399 Morgan Materials Site
Based on Dry Weight

SAMPLE # :	Sand Blank		17916		17914	
LOCATION :			GP-16		GP-2	
COLLECTED			11/04/98		11/04/98	
ANALYZED :	11/06/98		11/07/98		11/07/98	
FILE # :	A5234		A5245		A5247	
DIL. FACT.:	1		1		1	
% Solid :	100		79		85	
UNIT :	µg/kg		µg/kg		µg/kg	
COMPOUND	CONC.	MDL	CONC.	MDL	CONC.	MDL
Dichlorodifluoromethane	U	1.0	U	1.3	U	1.2
Chloromethane	U	1.0	U	1.3	U	1.2
Vinyl Chloride	U	1.0	U	1.3	U	1.2
Bromomethane	U	2.0	U	2.5	U	2.4
Chloroethane	U	1.0	U	1.3	U	1.2
Trichlorofluoromethane	U	1.0	U	1.3	U	1.2
Acetone	U	2.0	U	2.5	U	2.4
1,1-Dichloroethene	U	1.0	U	1.3	U	1.2
Carbon Disulfide	U	1.0	U	1.3	U	1.2
Methylene Chloride	U	1.0	U	1.3	U	1.2
Methyl-tertiary-butylether	U	1.0	U	1.3	U	1.2
trans-1,2-Dichloroethene	U	1.0	U	1.3	U	1.2
1,1-Dichloroethane	U	1.0	U	1.3	U	1.2
2-Butanone	U	4.0	U	5.1	U	4.7
2,2-Dichloropropane	U	1.0	U	1.3	U	1.2
cis-1,2-Dichloroethene	U	1.0	U	1.3	U	1.2
Chloroform	U	1.0	U	1.3	U	1.2
1,1-Dichloropropene	U	1.0	U	1.3	U	1.2
1,2-Dichloroethane	U	1.0	U	1.3	U	1.2
1,1,1-Trichloroethane	U	1.0	U	1.3	U	1.2
Carbon Tetrachloride	U	1.0	U	1.3	U	1.2
Benzene	U	1.0	U	1.3	U	1.2
Trichloroethene	U	1.0	1.9	1.3	U	1.2
1,2-Dichloropropane	U	1.0	U	1.3	U	1.2
Dibromomethane	U	1.0	U	1.3	U	1.2
Bromodichloromethane	U	1.0	U	1.3	U	1.2
cis-1,3-Dichloropropene	U	1.0	U	1.3	U	1.2
trans-1,3-Dichloropropene	U	1.0	U	1.3	U	1.2
1,1,2-Trichloroethane	U	1.0	U	1.3	U	1.2
1,3-Dichloropropane	U	1.0	U	1.3	U	1.2
Dibromochloromethane	U	1.0	U	1.3	U	1.2
1,2-Dibromoethane	U	1.0	U	1.3	U	1.2
Bromoform	U	1.0	U	1.3	U	1.2
4-Methyl-2-Pentanone	U	2.0	U	2.5	U	2.4
Toluene	U	1.0	U	1.3	U	1.2
2-Hexanone	U	2.0	U	2.5	U	2.4
Tetrachloroethene	U	1.0	U	1.3	U	1.2
Chlorobenzene	U	1.0	U	1.3	U	1.2
1,1,1,2-Tetrachloroethane	U	1.0	U	1.3	U	1.2
Ethylbenzene	U	1.0	U	1.3	U	1.2
p & m-Xylene	U	1.0	U	1.3	U	1.2
o-Xylene	U	1.0	U	1.3	U	1.2
Styrene	U	1.0	U	1.3	U	1.2
Isopropylbenzene	U	1.0	U	1.3	U	1.2
1,1,2,2-Tetrachloroethane	U	1.0	U	1.3	U	1.2
1,2,3-Trichloropropane	U	1.0	U	1.3	U	1.2
Bromobenzene	U	1.0	U	1.3	U	1.2
n-Propylbenzene	U	1.0	U	1.3	U	1.2
2-Chlorotoluene	U	1.0	U	1.3	U	1.2
4-Chlorotoluene	U	1.0	U	1.3	U	1.2
1,3,5-Trimethylbenzene	U	1.0	U	1.3	U	1.2
tert-Butylbenzene	U	1.0	U	1.3	U	1.2
1,2,4-Trimethylbenzene	U	1.0	U	1.3	U	1.2
sec-Butylbenzene	U	1.0	U	1.3	U	1.2
1,3-Dichlorobenzene	U	1.0	U	1.3	U	1.2
p-Isopropyltoluene	U	1.0	U	1.3	U	1.2
1,4-Dichlorobenzene	U	1.0	U	1.3	U	1.2
1,2-Dichlorobenzene	U	1.0	U	1.3	U	1.2
n-Butylbenzene	U	1.0	U	1.3	U	1.2
1,2-Dibromo-3-Chloroprop	U	1.0	U	1.3	U	1.2
1,2,4-Trichlorobenzene	U	1.0	U	1.3	U	1.2
Naphthalene	U	1.0	U	1.3	U	1.2
Hexachlorobutadiene	U	1.0	U	1.3	U	1.2
1,2,3-Trichlorobenzene	U	1.0	U	1.3	U	1.2

Table 1.3 (cont.) Results of the Analysis for VOC in Soil
WA # 3-399 Morgan Materials Site
Based on Dry Weight

SAMPLE # :	Sand Blank		17912		17915	
LOCATION :			GP-5		GP-3	
COLLECTED			11/04/98		11/04/98	
ANALYZED :	11/10/98		11/10/98		11/10/98	
FILE # :	A5267		A5268		A5276	
DIL. FACT.:	1		1		1	
% Solid :	100		85		86	
UNIT :	µg/kg		µg/kg		µg/kg	
COMPOUND	CONC.	MDL	CONC.	MDL	CONC.	MDL
Dichlorodifluoromethane	U	1.0	U	1.2	U	1.2
Chloromethane	U	1.0	U	1.2	U	1.2
Vinyl Chloride	U	1.0	U	1.2	U	1.2
Bromomethane	U	2.0	U	2.4	U	2.3
Chloroethane	U	1.0	U	1.2	U	1.2
Trichlorofluoromethane	U	1.0	U	1.2	1.3	1.2
Acetone	U	2.0	23	2.4	27	2.3
1,1-Dichloroethene	U	1.0	U	1.2	U	1.2
Carbon Disulfide	U	1.0	U	1.2	7.9	1.2
Methylene Chloride	U	1.0	U	1.2	U	1.2
Methyl-tertiary-butylether	U	1.0	U	1.2	U	1.2
trans-1,2-Dichloroethene	U	1.0	U	1.2	U	1.2
1,1-Dichloroethane	U	1.0	U	1.2	U	1.2
2-Butanone	U	4.0	U	4.7	U	4.7
2,2-Dichloropropane	U	1.0	U	1.2	U	1.2
cis-1,2-Dichloroethene	U	1.0	U	1.2	U	1.2
Chloroform	U	1.0	U	1.2	U	1.2
1,1-Dichloropropene	U	1.0	U	1.2	U	1.2
1,2-Dichloroethane	U	1.0	U	1.2	U	1.2
1,1,1-Trichloroethane	U	1.0	U	1.2	U	1.2
Carbon Tetrachloride	U	1.0	U	1.2	U	1.2
Benzene	U	1.0	U	1.2	1.6	1.2
Trichloroethene	U	1.0	U	1.2	U	1.2
1,2-Dichloropropane	U	1.0	U	1.2	U	1.2
Dibromomethane	U	1.0	U	1.2	U	1.2
Bromodichloromethane	U	1.0	U	1.2	U	1.2
cis-1,3-Dichloropropene	U	1.0	U	1.2	U	1.2
trans-1,3-Dichloropropene	U	1.0	U	1.2	U	1.2
1,1,2-Trichloroethane	U	1.0	U	1.2	U	1.2
1,3-Dichloropropane	U	1.0	U	1.2	U	1.2
Dibromochloromethane	U	1.0	U	1.2	U	1.2
1,2-Dibromoethane	U	1.0	U	1.2	U	1.2
Bromoform	U	1.0	U	1.2	U	1.2
4-Methyl-2-Pentanone	U	2.0	U	2.4	U	2.3
Toluene	U	1.0	U	1.2	5.6	1.2
2-Hexanone	U	2.0	U	2.4	U	2.3
Tetrachloroethene	U	1.0	U	1.2	U	1.2
Chlorobenzene	U	1.0	U	1.2	U	1.2
1,1,1,2-Tetrachloroethane	U	1.0	U	1.2	U	1.2
Ethylbenzene	U	1.0	U	1.2	1.2	1.2
p & m-Xylene	U	1.0	U	1.2	2.1	1.2
o-Xylene	U	1.0	U	1.2	0.9 J	1.2
Styrene	U	1.0	U	1.2	U	1.2
Isopropylbenzene	U	1.0	U	1.2	U	1.2
1,1,2,2-Tetrachloroethane	U	1.0	U	1.2	U	1.2
1,2,3-Trichloropropane	U	1.0	U	1.2	U	1.2
Bromobenzene	U	1.0	U	1.2	U	1.2
n-Propylbenzene	U	1.0	U	1.2	U	1.2
2-Chlorotoluene	U	1.0	U	1.2	U	1.2
4-Chlorotoluene	U	1.0	U	1.2	U	1.2
1,3,5-Trimethylbenzene	U	1.0	U	1.2	U	1.2
tert-Butylbenzene	U	1.0	U	1.2	U	1.2
1,2,4-Trimethylbenzene	U	1.0	U	1.2	U	1.2
sec-Butylbenzene	U	1.0	U	1.2	U	1.2
1,3-Dichlorobenzene	U	1.0	U	1.2	U	1.2
p-Isopropyltoluene	U	1.0	U	1.2	U	1.2
1,4-Dichlorobenzene	U	1.0	U	1.2	U	1.2
1,2-Dichlorobenzene	U	1.0	U	1.2	U	1.2
n-Butylbenzene	U	1.0	U	1.2	U	1.2
1,2-Dibromo-3-Chloroprop	U	1.0	U	1.2	U	1.2
1,2,4-Trichlorobenzene	U	1.0	U	1.2	U	1.2
Naphthalene	U	1.0	U	1.2	U	1.2
Hexachlorobutadiene	U	1.0	U	1.2	U	1.2
1,2,3-Trichlorobenzene	U	1.0	U	1.2	U	1.2

Table 1.4 Results of TIC for VOC in Soil
Morgan Material Site WA# 3399

Sample # SAND BLANK Unit µg/kg

LabFile# A5217 Con. Factor 1

	CAS#	Compound	Q	RT	Conc
1		NO PEAKS FOUND			0
2					0
3					0
4					0
5					0
6					0
7					0
8					0
9					0
10					0
11					0
12					0
13					0
14					0
15					0
16					0
17					0
18					0
19					0
20					0

*Estimated Concentration (Response Factor = 1.0)

Table 1.4 (cont.) Results of TIC for VOC in Soil
Morgan Material Site WA# 3399

Sample # 17902
LabFile# A5219

Unit µg/kg
Con. Factor 1.1494

	CAS#	Compound	Q	RT	Conc
1		NO PEAKS FOUND			0
2					0
3					0
4					0
5					0
6					0
7					0
8					0
9					0
10					0
11					0
12					0
13					0
14					0
15					0
16					0
17					0
18					0
19					0
20					0

*Estimated Concentration (Response Factor = 1.0)

Table 1.4 (cont.) Results of TIC for VOC in Soil
Morgan Material Site WA# 3399

Sample # 17904
LabFile# A5221

Unit µg/kg
Con. Factor 1.1236

	CAS#	Compound	Q	RT	Conc
1		NO PEAKS FOUND			0
2					0
3					0
4					0
5					0
6					0
7					0
8					0
9					0
10					0
11					0
12					0
13					0
14					0
15					0
16					0
17					0
18					0
19					0
20					0

*Estimated Concentration (Response Factor = 1.0)

Table 1.4 (cont.) Results of TIC for VOC in Soil
Morgan Material Site WA# 3399

Sample # 17909 Unit µg/kg

LabFile# A5226 Con. Factor 1.1765

	CAS#	Compound	Q	RT	Conc
1		NO PEAKS FOUND			0
2					0
3					0
4					0
5					0
6					0
7					0
8					0
9					0
10					0
11					0
12					0
13					0
14					0
15					0
16					0
17					0
18					0
19					0
20					0

*Estimated Concentration (Response Factor = 1.0)

Table 1.4 (cont.) Results of TIC for VOC in Soil
Morgan Material Site WA# 3399

Sample # SAND BLANK
LabFile# A5234

Unit µg/kg
Con. Factor 1

	CAS#	Compound	Q	RT	Conc
1		NO PEAKS FOUND			0
2					0
3					0
4					0
5					0
6					0
7					0
8					0
9					0
10					0
11					0
12					0
13					0
14					0
15					0
16					0
17					0
18					0
19					0
20					0

*Estimated Concentration (Response Factor = 1.0)

Table 1.4 (cont.) Results of TIC for VOC in Soil
Morgan Material Site WA# 3399

Sample # 17919
LabFile# A5236

Unit µg/kg
Con. Factor 1

	CAS#	Compound	Q	RT	Conc
1		NO PEAKS FOUND			0
2					0
3					0
4					0
5					0
6					0
7					0
8					0
9					0
10					0
11					0
12					0
13					0
14					0
15					0
16					0
17					0
18					0
19					0
20					0

*Estimated Concentration (Response Factor = 1.0)

Table 1.4 (cont.) Results of TIC for VOC in Soil
Morgan Material Site WA# 3399

Sample # 17917 Unit µg/kg

LabFile# A5244 Con. Factor 1.2048

	CAS#	Compound	Q	RT	Conc
1		Unknown		6.72	8
2		Unknown		10.21	47
3					0
4					0
5					0
6					0
7					0
8					0
9					0
10					0
11					0
12					0
13					0
14					0
15					0
16					0
17					0
18					0
19					0
20					0

*Estimated Concentration (Response Factor = 1.0)

Table 1.4 (cont.) Results of TIC for VOC in Soil
Morgan Material Site WA# 3399

Sample # 17914
LabFile# A5247

Unit µg/kg
Con. Factor 1.1765

	CAS#	Compound	Q	RT	Conc
1		NO PEAKS FOUND			0
2					0
3					0
4					0
5					0
6					0
7					0
8					0
9					0
10					0
11					0
12					0
13					0
14					0
15					0
16					0
17					0
18					0
19					0
20					0

*Estimated Concentration (Response Factor = 1.0)

Table 1.4 (cont.) Results of TIC for VOC in Soil
Morgan Material Site WA# 3399

Sample # 17906
LabFile# A5253

Unit µg/kg
Con. Factor 1.1628

	CAS#	Compound	Q	RT	Conc
1		Trimethylsilanol C3H10OSi		7.93	198
2		Siloxane		11.53	20
3					0
4					0
5					0
6					0
7					0
8					0
9					0
10					0
11					0
12					0
13					0
14					0
15					0
16					0
17					0
18					0
19					0
20					0

*Estimated Concentration (Response Factor = 1.0)

Table 1.4 (cont.) Results of TIC for VOC in Soil
Morgan Material Site WA# 3399

Sample # 17910 Unit µg/kg

LabFile# A5255 Con. Factor 1.0638

	CAS#	Compound	Q	RT	Conc
1		NO PEAKS FOUND			0
2					0
3					0
4					0
5					0
6					0
7					0
8					0
9					0
10					0
11					0
12					0
13					0
14					0
15					0
16					0
17					0
18					0
19					0
20					0

*Estimated Concentration (Response Factor = 1.0)

Table 1.4 (cont.) Results of TIC for VOC in Soil
Morgan Material Site WA# 3399

Sample # SAND BLANK Unit µg/kg
LabFile# A5267 Con. Factor 1

	CAS#	Compound	Q	RT	Conc
1		NO PEAKS FOUND			0
2					0
3					0
4					0
5					0
6					0
7					0
8					0
9					0
10					0
11					0
12					0
13					0
14					0
15					0
16					0
17					0
18					0
19					0
20					0

*Estimated Concentration (Response Factor = 1.0)

Table 1.4 (cont.) Results of TIC for VOC in Soil
Morgan Material Site WA# 3399

Sample # 17915 Unit µg/kg

LabFile# A5276 Con. Factor 1.1628

	CAS#	Compound	Q	RT	Conc
1		Unknown		2.66	8
2		Unknown		4.51	7
3					0
4					0
5					0
6					0
7					0
8					0
9					0
10					0
11					0
12					0
13					0
14					0
15					0
16					0
17					0
18					0
19					0
20					0

*Estimated Concentration (Response Factor = 1.0)

Table 1.4 (cont.) Results of TIC for VOC in Soil
Morgan Material Site WA# 3399

Sample # 17913 Unit µg/kg

LabFile# A5284 Con. Factor 1.2821

	CAS#	Compound	Q	RT	Conc
1		NO PEAKS FOUND			0
2					0
3					0
4					0
5					0
6					0
7					0
8					0
9					0
10					0
11					0
12					0
13					0
14					0
15					0
16					0
17					0
18					0
19					0
20					0

*Estimated Concentration (Response Factor = 1.0)

Table 1.5 (Cont.) Results of the Analysis for BNA in Water
WA # 3-399 Morgan Materials Site

Sample No.	F17925
Sample Location	Field Blank
GC/MS File Name	MM051
Dilution Factor	1

Compound Name	Conc. µg/L	MDL µg/L
Phenol	U	10
bis(-2-Chloroethyl)Ether	U	10
2-Chlorophenol	U	10
1,3-Dichlorobenzene	U	10
1,4-Dichlorobenzene	U	10
Benzyl alcohol	U	10
1,2-Dichlorobenzene	U	10
2-Methylphenol	U	10
bis(2-Chloroisopropyl)ether	U	10
4-Methylphenol	U	10
N-Nitroso-Di-n-propylamine	U	10
Hexachloroethane	U	10
Nitrobenzene	U	10
Isophorone	U	10
2-Nitrophenol	U	10
2,4-Dimethylphenol	U	10
bis(2-Chloroethoxy)methane	U	10
2,4-Dichlorophenol	U	10
1,2,4-Trichlorobenzene	U	10
Naphthalene	U	10
4-Chloroaniline	U	10
Hexachlorobutadiene	U	10
4-Chloro-3-methylphenol	U	10
2-Methylnaphthalene	U	10
Hexachlorocyclopentadiene	U	10
2,4,6-Trichlorophenol	U	10
2,4,5-Trichlorophenol	U	10
2-Chloronaphthalene	U	10
2-Nitroaniline	U	10
Dimethylphthalate	U	10
Acenaphthylene	U	10
2,6-Dinitrotoluene	U	10
3-Nitroaniline	U	10
Acenaphthene	U	10
2,4-Dinitrophenol	U	10
4-Nitrophenol	U	10
Dibenzofuran	U	10
2,4-Dinitrotoluene	U	10
Diethylphthalate	U	10
4-Chlorophenyl-phenylether	U	10
Fluorene	U	10
4-Nitroaniline	U	10
4,6-Dinitro-2-methylphenol	U	10
N-Nitrosodiphenylamine	U	10
4-Bromophenyl-phenylether	U	10
Hexachlorobenzene	U	10
Pentachlorophenol	U	10
Phenanthrene	U	10
Anthracene	U	10
Carbazole	U	10
Di-n-butylphthalate	U	10
Fluoranthene	U	10
Pyrene	U	10
Butylbenzylphthalate	U	10
Benzo(a)anthracene	U	10
3,3'-Dichlorobenzidine	U	10
Chrysene	U	10
Bis(2-Ethylhexyl)phthalate	10	10
Di-n-octylphthalate	U	10
Benzo(b)fluoranthene	U	10
Benzo(k)fluoranthene	U	10
Benzo(a)pyrene	U	10
Indeno(1,2,3-cd)pyrene	U	10
Dibenzo(a,h)anthracene	U	10
Benzo(g,h,i)perylene	U	10

Table 1.6 (Cont.) Results of the TIC for BNA in Water
WA # 3-399 Morgan Materials Site

Sample # F17921 MW-1

LabFile # MM047

Con. Factor 1.0

	CAS#	Compound	Q	RT	Conc * µg/L
1		Possible 2-butoxy-ethanol		4.44	12
2		Possible eucalyptol + diene/cycloalkene		5.65	52
3		Possible camphor + diene/cycloalkene		6.66	6.6
4		Unknown alcohol		6.81	40
5		Possible caprolactum		7.51	370
6		Unknown diene/cycloalkene		7.82	8.4
7		Unknown amine		8.41	4.9
8		Unknown PAH isomer		12.61	5.2
9		Unknown organic acid		13.55	6.7
10					
11					
12					
13					
14					
15					
16					
17					
18					
19					
20					

*Estimated Concentration (Response Factor = 1.0)

Table 1.6 (Cont.) Results of the TIC for BNA in Water
WA # 3-399 Morgan Materials Site

Sample # F17923 MW-3

LabFile # MM049

Con. Factor 1.0

	CAS#	Compound	Q	RT	Conc * µg/L
1	127-18-4	Tetrachloroethylene	98	3.69	140
2		Unknown alkene		3.73	38
3		Unknown alcohol		4.45	12
4		Possible eucalyptol + diene/cycloalkene		5.65	19
5		Unknown alcohol		6.81	25
6		Possible caprolactam		7.43	6.9
7		Unknown		7.94	6.3
8		Possible tri(2-chloroethyl)phosphate		10.63	13
9		Unknown organic acid		13.55	7.5
10		Unknown amine isomer + alkane		22.33	58
11		Unknown alkane + diene/cycloalkene + unknown		26.8	19
12					
13					
14					
15					
16					
17					
18					
19					
20					

*Estimated Concentration (Response Factor = 1.0)

Table 1.6 (Cont.) Results of the TIC for BNA in Water
WA # 3-399 Morgan Materials Site

Sample # F17925 Field Blank

LabFile # MM051 Con. Factor 1.0

	CAS#	Compound	Q	RT	Conc * µg/L
1	119-61-9	Benzophenone	96	10.03	15
2		Unknown organic acid		13.55	5.7
3		Unknown alkane + unknown		16.61	4.1
4					
5					
6					
7					
8					
9					
10					
11					
12					
13					
14					
15					
16					
17					
18					
19					
20					

*Estimated Concentration (Response Factor = 1.0)

Table 1.7 (cont.) Results of the Analysis for BNA in Soil
WA # 3-399 Morgan Materials Site
(Results are Based on Dry Weight)

Sample No.	B17905		B17910		B17906		B17907		B17908	
Sample Location	GP-11		GP-14		GP-9		GP-8		GP-10	
GC/MS File Name	MM018		MM019		MM020		MM021		MM022	
Dilution Factor	10		1		1		1		1	
% Solid	90		92		84		85		92	
Compound Name	Conc. µg/kg	MDL µg/kg	Conc. µg/kg	MDL µg/kg	Conc. µg/kg	MDL µg/kg	Conc. µg/kg	MDL µg/kg	Conc. µg/kg	MDL µg/kg
Phenol	U	3700	U	360	U	400	U	390	U	360
bis(-2-Chloroethyl)Ether	U	3700	U	360	U	400	U	390	U	360
2-Chlorophenol	U	3700	U	360	U	400	U	390	U	360
1,3-Dichlorobenzene	U	3700	U	360	U	400	U	390	U	360
1,4-Dichlorobenzene	U	3700	U	360	U	400	U	390	U	360
Benzyl alcohol	U	3700	U	360	U	400	U	390	U	360
1,2-Dichlorobenzene	U	3700	U	360	U	400	U	390	U	360
2-Methylphenol	U	3700	U	360	U	400	U	390	U	360
bis(2-Chloroisopropyl)ether	U	3700	U	360	U	400	U	390	U	360
4-Methylphenol	U	3700	U	360	U	400	U	390	U	360
N-Nitroso-Di-n-propylamine	U	3700	U	360	U	400	U	390	U	360
Hexachloroethane	U	3700	U	360	U	400	U	390	U	360
Nitrobenzene	U	3700	U	360	U	400	U	390	U	360
Isophorone	U	3700	U	360	U	400	U	390	U	360
2-Nitrophenol	U	3700	U	360	U	400	U	390	U	360
2,4-Dimethylphenol	U	3700	U	360	U	400	U	390	U	360
bis(2-Chloroethoxy)methane	U	3700	U	360	U	400	U	390	U	360
2,4-Dichlorophenol	U	3700	U	360	U	400	U	390	U	360
1,2,4-Trichlorobenzene	U	3700	U	360	U	400	U	390	160 J	360
Naphthalene	U	3700	1500	360	U	400	U	390	U	360
4-Chloroaniline	U	3700	U	360	U	400	U	390	U	360
Hexachlorobutadiene	U	3700	U	360	U	400	U	390	U	360
4-Chloro-3-methylphenol	U	3700	U	360	U	400	U	390	290 J	360
2-Methylnaphthalene	U	3700	2600	360	U	400	U	390	U	360
Hexachlorocyclopentadiene	U	3700	U	360	U	400	U	390	U	360
2,4,6-Trichlorophenol	U	3700	U	360	U	400	U	390	U	360
2,4,5-Trichlorophenol	U	3700	U	360	U	400	U	390	U	360
2-Chloronaphthalene	U	3700	U	360	U	400	U	390	U	360
2-Nitroaniline	U	3700	U	360	U	400	U	390	U	360
Dimethylphthalate	U	3700	U	360	U	400	U	390	U	360
Acenaphthylene	U	3700	U	360	U	400	U	390	U	360
2,6-Dinitrotoluene	U	3700	U	360	U	400	U	390	U	360
3-Nitroaniline	U	3700	U	360	U	400	U	390	U	360
Acenaphthene	U	3700	U	360	U	400	U	390	U	360
2,4-Dinitrophenol	U	3700	U	360	U	400	U	390	U	360
4-Nitrophenol	U	3700	570	360	U	400	U	390	90 J	360
Dibenzofuran	U	3700	U	360	U	400	U	390	U	360
2,4-Dinitrotoluene	U	3700	U	360	U	400	U	390	U	360
Diethylphthalate	U	3700	U	360	U	400	U	390	U	360
4-Chlorophenyl-phenylether	U	3700	U	360	U	400	U	390	U	360
Fluorene	U	3700	U	360	U	400	U	390	U	360
4-Nitroaniline	U	3700	U	360	U	400	U	390	U	360
4,6-Dinitro-2-methylphenol	U	3700	U	360	U	400	U	390	U	360
N-Nitrosodiphenylamine	U	3700	U	360	U	400	U	390	U	360
4-Bromophenyl-phenylether	U	3700	U	360	U	400	U	390	U	360
Hexachlorobenzene	U	3700	U	360	U	400	U	390	U	360
Pentachlorophenol	U	3700	U	360	U	400	U	390	U	360
Phenanthrene	U	3700	980	360	U	400	U	390	250 J	360
Anthracene	U	3700	95 J	360	U	400	U	390	U	360
Carbazole	U	3700	97 J	360	U	400	U	390	U	360
Di-n-butylphthalate	U	3700	U	360	U	400	U	390	730	360
Fluoranthene	3200 J	3700	810	360	U	400	U	390	710	360
Pyrene	3400 J	3700	750	360	U	400	U	390	U	360
Butylbenzylphthalate	U	3700	U	360	U	400	U	390	1000	360
Benzo(a)anthracene	2500 J	3700	530	360	U	400	U	390	U	360
3,3'-Dichlorobenzidine	U	3700	U	360	U	400	U	390	1700	360
Chrysene	3500 J	3700	730	360	U	400	U	390	U	360
Bis(2-Ethylhexyl)phthalate	U	3700	140 J	360	U	400	U	390	U	360
Di-n-octylphthalate	U	3700	U	360	U	400	U	390	2600	360
Benzo(b)fluoranthene	4500	3700	760	360	U	400	U	390	1700	360
Benzo(k)fluoranthene	3600 J	3700	610	360	U	400	U	390	1500	360
Benzo(a)pyrene	4300	3700	730	360	U	400	U	390	1500	360
Indeno(1,2,3-cd)pyrene	3500 J	3700	500	360	U	400	U	390	700	360
Dibenzo(a,h)anthracene	1300 J	3700	220 J	360	U	400	U	390	1800	360
Benzo(g,h,i)perylene	4500	3700	620	360	U	400	U	390		

Table 1.7 (cont.) Results of the Analysis for BNA in Soil
WA # 3-399 Morgan Materials Site
(Results are Based on Dry Weight)

Sample No.	B17915		B17916		B17917		B17918		B17919	
Sample Location	GP-3		GP-16		GP-17		Field Blank-0		Field Blank-I	
GC/MS File Name	MM032		MM034		MM035		MM036		MM037	
Dilution Factor	10		1		10		1		1	
% Solid	87		84		81		100		100	

Compound Name	Conc. µg/kg		MDL µg/kg	Conc. µg/kg		MDL µg/kg	Conc. µg/kg		MDL µg/kg	Conc. µg/kg		MDL µg/kg	Conc. µg/kg		MDL µg/kg
Phenol	U		3800	U		400	280000		4100	U		330	U		330
bis(-2-Chloroethyl)Ether	U		3800	U		400	U		4100	U		330	U		330
2-Chlorophenol	U		3800	U		400	U		4100	U		330	U		330
1,3-Dichlorobenzene	U		3800	U		400	U		4100	U		330	U		330
1,4-Dichlorobenzene	U		3800	U		400	U		4100	U		330	U		330
Benzyl alcohol	U		3800	U		400	U		4100	U		330	U		330
1,2-Dichlorobenzene	U		3800	U		400	U		4100	U		330	U		330
2-Methylphenol	U		3800	U		400	U		4100	U		330	U		330
bis(2-Chloroisopropyl)ether	U		3800	U		400	U		4100	U		330	U		330
4-Methylphenol	U		3800	U		400	U		4100	U		330	U		330
N-Nitroso-Di-n-propylamine	U		3800	U		400	U		4100	U		330	U		330
Hexachloroethane	U		3800	U		400	U		4100	U		330	U		330
Nitrobenzene	U		3800	U		400	U		4100	U		330	U		330
Isophorone	U		3800	U		400	U		4100	U		330	U		330
2-Nitrophenol	U		3800	U		400	U		4100	U		330	U		330
2,4-Dimethylphenol	U		3800	U		400	U		4100	U		330	U		330
bis(2-Chloroethoxy)methane	U		3800	U		400	U		4100	U		330	U		330
2,4-Dichlorophenol	U		3800	U		400	U		4100	U		330	U		330
1,2,4-Trichlorobenzene	U		3800	U		400	U		4100	U		330	U		330
Naphthalene	U		3800	460		400	860	J	4100	U		330	U		330
4-Chloroaniline	U		3800	U		400	U		4100	U		330	U		330
Hexachlorobutadiene	U		3800	U		400	U		4100	U		330	U		330
4-Chloro-3-methylphenol	U		3800	U		400	U		4100	U		330	U		330
2-Methylnaphthalene	U		3800	130	J	400	840	J	4100	U		330	U		330
Hexachlorocyclopentadiene	U		3800	U		400	U		4100	U		330	U		330
2,4,6-Trichlorophenol	U		3800	U		400	U		4100	U		330	U		330
2,4,5-Trichlorophenol	U		3800	U		400	U		4100	U		330	U		330
2-Chloronaphthalene	U		3800	U		400	U		4100	U		330	U		330
2-Nitroaniline	U		3800	U		400	U		4100	U		330	U		330
Dimethylphthalate	U		3800	U		400	U		4100	U		330	U		330
Acenaphthylene	U		3800	U		400	U		4100	U		330	U		330
2,6-Dinitrotoluene	U		3800	U		400	U		4100	U		330	U		330
3-Nitroaniline	U		3800	U		400	U		4100	U		330	U		330
Acenaphthene	U		3800	160	J	400	U		4100	U		330	U		330
2,4-Dinitrophenol	U		3800	U		400	U		4100	U		330	U		330
4-Nitrophenol	U		3800	U		400	U		4100	U		330	U		330
Dibenzofuran	U		3800	210	J	400	970	J	4100	U		330	U		330
2,4-Dinitrotoluene	U		3800	U		400	U		4100	U		330	U		330
Diethylphthalate	2500	J	3800	320	J	400	2400	J	4100	200	J	330	200	J	330
4-Chlorophenyl-phenylether	U		3800	U		400	U		4100	U		330	U		330
Fluorene	U		3800	250	J	400	U		4100	U		330	U		330
4-Nitroaniline	U		3800	U		400	U		4100	U		330	U		330
4,6-Dinitro-2-methylphenol	U		3800	U		400	U		4100	U		330	U		330
N-Nitrosodiphenylamine	U		3800	U		400	U		4100	U		330	U		330
4-Bromophenyl-phenylether	U		3800	U		400	U		4100	U		330	U		330
Hexachlorobenzene	U		3800	U		400	U		4100	U		330	U		330
Pentachlorophenol	U		3800	U		400	U		4100	U		330	U		330
Phenanthrene	U		3800	1700		400	U		4100	U		330	U		330
Anthracene	U		3800	390	J	400	U		4100	U		330	U		330
Carbazole	U		3800	240	J	400	U		4100	U		330	U		330
Di-n-butylphthalate	U		3800	U		400	U		4100	U		330	U		330
Fluoranthene	780	J	3800	1900		400	1300	J	4100	U		330	U		330
Pyrene	800	J	3800	1500		400	1100	J	4100	U		330	U		330
Butylbenzylphthalate	U		3800	U		400	U		4100	U		330	U		330
Benzo(a)anthracene	U		3800	810		400	U		4100	U		330	U		330
3,3'-Dichlorobenzidine	U		3800	U		400	U		4100	U		330	U		330
Chrysene	U		3800	810		400	1100	J	4100	U		330	U		330
Bis(2-Ethylhexyl)phthalate	U		3800	88	J	400	U		4100	U		330	U		330
Di-n-octylphthalate	U		3800	U		400	U		4100	U		330	U		330
Benzo(b)fluoranthene	U		3800	810		400	1300	J	4100	U		330	U		330
Benzo(k)fluoranthene	U		3800	860		400	1100	J	4100	U		330	U		330
Benzo(a)pyrene	U		3800	880		400	1300	J	4100	U		330	U		330
Indeno(1,2,3-cd)pyrene	U		3800	570		400	980	J	4100	U		330	U		330
Dibenzo(a,h)anthracene	U		3800	140	J	400	U		4100	U		330	U		330
Benzo(g,h,i)perylene	810	J	3800	580		400	1200	J	4100	U		330	U		330

Table 1.8 (cont.) Results of the TIC for BNA in Soil
WA # 3-399 Morgan Materials Site

Sample # B17901 GP-1

LabFile # MM012

Con. Factor 380

	CAS#	Compound	Q	RT	Conc * µg/kg
1		PAH isomer		11.81	1700
2		Benzo - pyrene isomer		18.45	1900
3					
4					
5					
6					
7					
8					
9					
10					
11					
12					
13					
14					
15					
16					
17					
18					
19					
20					

*Estimated Concentration (Response Factor = 1.0)

Table 1.8 (cont.) Results of the TIC for BNA in Soil
WA # 3-399 Morgan Materials Site

Sample # B17903 GP-12

LabFile # MM014

Con. Factor 371.6

	CAS#	Compound	Q	RT	Conc * µg/kg
1	127-18-4	Tetrachloroethylene	98	3.71	140000
2		Benzo-napptho-thiophene isomer		14.28	1800
3		Benzo - pyrene isomer		17.84	1700
4		Benzo - pyrene isomer		18.45	15000
5		Benzo - pyrene isomer		18.94	2600
6		Dibenz - anthracene isomer		22.76	2400
7		Dibenz - anthracene isomer		23.68	2400
8		Dibenz - anthracene isomer		23.84	4000
9		Dibenzpyrene isomer		30.03	2500
10					
11					
12					
13					
14					
15					
16					
17					
18					
19					
20					

*Estimated Concentration (Response Factor = 1.0)

Table 1.8 (cont.) Results of the TIC for BNA in Soil
WA # 3-399 Morgan Materials Site

Sample # B17905 GP-11

LabFile # MM018

Con. Factor 369.1

	CAS#	Compound	Q	RT	Conc * µg/kg
1		Benzo - pyrene isomer		18.45	5100
2					
3					
4					
5					
6					
7					
8					
9					
10					
11					
12					
13					
14					
15					
16					
17					
18					
19					
20					

*Estimated Concentration (Response Factor = 1.0)

Table 1.8 (cont.) Results of the TIC for BNA in Soil
WA # 3-399 Morgan Materials Site

Sample # B17906 GP-9

LabFile # MM020

Con. Factor 39.68

	CAS#	Compound	Q	RT	Conc * µg/kg
1		Unknown alcohol		7.33	540
2		Unknown		8.6	420
3		Unknown amine		8.98	780
4		Chloro-alkane isomer		10.06	430
5		Possible chlorinated alkane isomer		11.18	3400
6		Unknown - possible amine		11.26	4300
7		Unknown - possible amine		11.31	5400
8		Unknown - possible amine		11.63	520
9		Unknown - possible amine		11.68	440
10		Unknown - possible amine		11.76	600
11		Possible chlorinated alkane isomer		12.1	6100
12		Unknown - possible amine		12.16	24000
13		Unknown - possible amine		12.2	21000
14		Unknown - possible amine		12.24	20000
15		Unknown - possible amine		12.29	15000
16		Unknown		12.47	800
17		Unknown		13.06	870
18		Unknown - possible amine		13.15	470
19		Unknown - possible amine		14.23	910
20		Unknown - possible amine		14.35	490

*Estimated Concentration (Response Factor = 1.0)

Table 1.8 (cont.) Results of the TIC for BNA in Soil
WA # 3-399 Morgan Materials Site

Sample # B17908 GP-10

LabFile # MM022

Con. Factor 36.27

	CAS#	Compound	Q	RT	Conc * µg/kg
1		Unknown alcohol		3.67	230
2	127-18-4	Tetrachloroethylene	98	3.71	15000
3	79-34-5	1,1,2,2-Tetrachloroethane	81	4.58	440
4		Methyl-aniline isomer		6.01	270
5		Methyl-naphthalene isomer		7.99	240
6		Trimethyl-naphthalene isomer		9.84	220
7		Unknown		10.68	230
8		Methyl-pyrene isomer		13.58	230
9		Methyl-pyrene isomer		14.08	220
10		Benzo(x)naptho(x)thiophene isomer		14.28	270
11		Benzo(x)carbazole isomer		15.23	230
12		Methyl-chrysene isomer		15.61	370
13		PAH Isomer		15.74	220
14		PAH Isomer		18.13	280
15		Benzo - pyrene isomer		18.46	2800
16		PAH Isomer		22.76	540
17		PAH Isomer		22.87	380
18		PAH Isomer		23.69	550
19		PAH Isomer		23.85	800
20		PAH Isomer		30.06	1200

*Estimated Concentration (Response Factor = 1.0)

Table 1.8 (cont.) Results of the TIC for BNA in Soil
WA # 3-399 Morgan Materials Site.

Sample # B17911 GP-6

LabFile # MM028 Con. Factor 835.4

	CAS#	Compound	Q	RT	Conc * µg/kg
1		Unknown alcohol		5.01	49000
2		Unknown alkane		7.38	28000
3		Unknown alkane		8.12	34000
4		Dimethyl-naphthalene isomer		8.59	25000
5		Unknown alkane		8.68	91000
6		Dimethyl-naphthalene isomer		8.73	30000
7		Unknown alcohol		8.92	28000
8		Unknown alkene + unknown		8.96	26000
9		Unknown amine		8.99	22000
10		Unknown alkane		9.26	25000
11		Trimethyl-naphthalene isomer		9.53	80000
12		Unknown alkane		10.15	220000
13		Unknown alkene + unknown		10.19	22000
14		Unknown alkane		10.73	180000
15		Unknown alkane		11.16	49000
16		Unknown alkane		11.19	24000
17		Methyl-anthracene isomer + unknown alkane		11.61	28000
18		Unknown alkane		11.69	28000
19		Unknown PAH isomer + unknown alkane		11.77	23000
20		Dimethyl-phenanthrene isomer + unknown alkane		12.32	39000

*Estimated Concentration (Response Factor = 1.0)

Table 1.8 (cont.) Results of the TIC for BNA in Soil
WA # 3-399 Morgan Materials Site

Sample # B17913 GP-4

LabFile # MM030

Con. Factor 39.03

	CAS#	Compound	Q	RT	Conc * µg/kg
1		Unknown alcohol		3.73	1500
2		Unknown		3.95	220
3		Unknown alcohol		14.10	330
4		Unknown alcohol		15.44	300
5		Unknown - possible aldehyde		16.70	240
6		Unknown		29.69	510
7					
8					
9					
10					
11					
12					
13					
14					
15					
16					
17					
18					
19					
20					

*Estimated Concentration (Response Factor = 1.0)

Table 1.8 (cont.) Results of the TIC for BNA in Soil
WA # 3-399 Morgan Materials Site

Sample # B17915 GP-3

LabFile # MM032

Con. Factor 384

	CAS#	Compound	Q	RT	Conc * µg/kg
1		Methyl-benzenamine isomer		6.00	4900
2					
3					
4					
5					
6					
7					
8					
9					
10					
11					
12					
13					
14					
15					
16					
17					
18					
19					
20					

*Estimated Concentration (Response Factor = 1.0)

Table 1.8 (cont.) Results of the TIC for BNA in Soil
WA # 3-399 Morgan Materials Site

Sample # B17917 GP-17

LabFile # MM035

Con. Factor 411.5

	CAS#	Compound	Q	RT	Conc * µg/kg
1		Unknown		10.35	41000
2		Unknown		10.42	95000
3		Unknown		11.78	26000
4		Unknown phenol		11.81	27000
5		Unknown phenol		11.99	110000
6		Unknown phenol		12.29	140000
7		Unknown		13.23	15000
8		Unknown carboxylic acid		13.67	16000
9		Unknown		14.12	23000
10		Unknown carboxylic acid		14.29	32000
11		Unknown		15.29	43000
12		Unknown		15.37	15000
13		Unknown		15.51	35000
14		Unknown		15.62	16000
15		Unknown		15.71	14000
16		Unknown phenol		17.95	41000
17		Unknown PAH isomer		18.42	18000
18		Unknown		20.27	24000
19		Unknown		20.63	17000
20		Unknown		21.62	40000

*Estimated Concentration (Response Factor = 1.0)

Table 1.8 (cont.) Results of the TIC for BNA in Soil
WA # 3-399 Morgan Materials Site

Sample # B17919 Field Blank-I

LabFile # MM037 Con. Factor 33.33

	CAS#	Compound	Q	RT	Conc * µg/kg
1		No TICs Detected			
2					
3					
4					
5					
6					
7					
8					
9					
10					
11					
12					
13					
14					
15					
16					
17					
18					
19					
20					

*Estimated Concentration (Response Factor = 1.0)

Table 1.9 (cont.) Results of the Analysis for Pesticide/PCB in Water
WA# 3-399 Morgan Materials Site

Client ID	G 17925	
Location	Field Blank	
	Conc.	MDL
Analyte	µg/L	µg/L
a-BHC	U	0.02
g-BHC	U	0.02
b-BHC	U	0.02
Heptachlor	U	0.02
d-BHC	U	0.02
Aldrin	U	0.02
Heptachlor Epoxide	U	0.02
g-Chlordane	U	0.02
a-Chlordane	U	0.02
Endosulfan (I)	U	0.02
p,p'-D D E	U	0.02
Dieldrin	U	0.02
Endrin	U	0.02
p,p'-D D D	U	0.02
Endosulfan (II)	U	0.02
p,p'-D D T	U	0.02
Endrin Aldehyde	U	0.02
Endosulfan Sulfate	U	0.02
Methoxychlor	U	0.02
Endrin Ketone	U	0.02
Toxaphene	U	0.5
Aroclor 1016	U	0.3
Aroclor 1221	U	0.5
Aroclor 1232	U	0.3
Aroclor 1242	U	0.3
Aroclor 1248	U	0.3
Aroclor 1254	U	0.3
Aroclor 1260	U	0.3
Aroclor 1268	U	0.3

Table 1.10 (cont.) Results of the Analysis for Pesticide/PCBs in Soil
WA# 3-399 Morgan Materials Site
Based on dry weight

Client ID	A17905		A17910		A17906		A17907		A17908	
Location	GP-11		GP-14		GP-9		GP-8		GP-10	
Percent Solid	90.3		92.2		84		85.3		91.9	
Analyte	Conc. µg/kg	MDL µg/kg	Conc. µg/kg	MDL µg/kg	Conc. µg/kg	MDL µg/kg	Conc. µg/kg	MDL µg/kg	Conc. µg/kg	MDL µg/kg
a-BHC	U	3.7	U	3.6	U	4.0	U	3.9	U	3.6
g-BHC	U	3.7	U	3.6	U	4.0	U	3.9	U	3.6
b-BHC	U	3.7	U	3.6	U	4.0	U	3.9	U	3.6
Heptachlor	U	3.7	U	3.6	U	4.0	U	3.9	U	3.6
d-BHC	U	3.7	U	3.6	U	4.0	U	3.9	U	3.6
Aldrin	U	3.7	U	3.6	U	4.0	U	3.9	U	3.6
Heptachlor Epoxide	U	3.7	3.3 J	3.6	U	4.0	U	3.9	U	3.6
g-Chlordane	U	3.7	U	3.6	U	4.0	U	3.9	U	3.6
a-Chlordane	U	3.7	U	3.6	U	4.0	U	3.9	U	3.6
Endosulfan (I)	U	3.7	U	3.6	U	4.0	U	3.9	U	3.6
p,p'-D D E	U	3.7	3.7	3.6	U	4.0	U	3.9	U	3.6
Dieldrin	U	3.7	U	3.6	U	4.0	U	3.9	U	3.6
Endrin	U	3.7	U	3.6	U	4.0	U	3.9	U	3.6
p,p'-D D D	U	3.7	U	3.6	U	4.0	U	3.9	U	3.6
Endosulfan (II)	U	3.7	U	3.6	U	4.0	U	3.9	U	3.6
p,p'-D D T	U	3.7	U	3.6	U	4.0	U	3.9	U	3.6
Endrin Aldehyde	U	3.7	3.2 J	3.6	U	4.0	U	3.9	U	3.6
Endosulfan Sulfate	U	3.7	U	3.6	U	4.0	U	3.9	U	3.6
Methoxychlor	U	3.7	U	3.6	U	4.0	U	3.9	U	3.6
Endrin Ketone	U	3.7	U	3.6	U	4.0	U	3.9	U	3.6
Toxaphene	U	92	U	90	U	99	U	98	U	91
Aroclor 1016	U	46	U	45	U	50	U	49	U	45
Aroclor 1221	U	92	U	90	U	99	U	98	U	91
Aroclor 1232	U	46	U	45	U	50	U	49	U	45
Aroclor 1242	U	46	U	45	U	50	U	49	U	45
Aroclor 1248	U	46	U	45	U	50	U	49	U	45
Aroclor 1254	U	46	310	45	U	50	U	49	U	45
Aroclor 1260	U	46	290	45	U	50	U	49	U	45
Aroclor 1268	U	46	U	45	U	50	U	49	U	45

Table 1.10 (cont.) Results of the Analysis for Pesticide/PCBs in Soil
WA# 3-399 Morgan Materials Site
Based on dry weight

Client ID	A17915		A17916		A17917		A17918		A17919	
Location	GP-3		GP-16		GP-17		Field Blank-0		Field Blank-I	
Percent Solid	86.8		84.1		81		100		100	
Analyte	Conc. µg/kg	MDL µg/kg	Conc. µg/kg	MDL µg/kg	Conc. µg/kg	MDL µg/kg	Conc. µg/kg	MDL µg/kg	Conc. µg/kg	MDL µg/kg
a-BHC	U	3.8	U	4.0	U	4.1	U	3.3	U	3.3
g-BHC	U	3.8	U	4.0	U	4.1	U	3.3	U	3.3
b-BHC	U	3.8	U	4.0	U	4.1	U	3.3	U	3.3
Heptachlor	U	3.8	U	4.0	U	4.1	U	3.3	U	3.3
d-BHC	U	3.8	U	4.0	U	4.1	U	3.3	U	3.3
Aldrin	U	3.8	U	4.0	U	4.1	U	3.3	U	3.3
Heptachlor Epoxide	U	3.8	U	4.0	U	4.1	U	3.3	U	3.3
g-Chlordane	U	3.8	U	4.0	U	4.1	U	3.3	U	3.3
a-Chlordane	U	3.8	U	4.0	U	4.1	U	3.3	U	3.3
Endosulfan (I)	U	3.8	U	4.0	U	4.1	U	3.3	U	3.3
p,p'-D D E	U	3.8	U	4.0	U	4.1	U	3.3	U	3.3
Dieldrin	U	3.8	U	4.0	U	4.1	U	3.3	U	3.3
Endrin	U	3.8	U	4.0	U	4.1	U	3.3	U	3.3
p,p'-D D D	2.8 J	3.8	U	4.0	U	4.1	U	3.3	U	3.3
Endosulfan (II)	U	3.8	U	4.0	U	4.1	U	3.3	U	3.3
p,p'-D D T	U	3.8	U	4.0	U	4.1	U	3.3	U	3.3
Endrin Aldehyde	U	3.8	U	4.0	U	4.1	U	3.3	U	3.3
Endosulfan Sulfate	U	3.8	U	4.0	U	4.1	U	3.3	U	3.3
Methoxychlor	U	3.8	U	4.0	U	4.1	U	3.3	U	3.3
Endrin Ketone	U	3.8	U	4.0	U	4.1	U	3.3	U	3.3
Toxaphene	U	96	U	99	U	100	U	83	U	83
Aroclor 1016	U	48	U	50	U	51	U	42	U	42
Aroclor 1221	U	96	U	99	U	100	U	83	U	83
Aroclor 1232	U	48	U	50	U	51	U	42	U	42
Aroclor 1242	U	48	U	50	U	51	U	42	U	42
Aroclor 1248	U	48	U	50	U	51	U	42	U	42
Aroclor 1254	15 W	48	U	50	U	51	U	42	U	42
Aroclor 1260	U	48	U	50	U	51	U	42	U	42
Aroclor 1268	U	48	U	50	U	51	U	42	U	42

Table 1.12 Results of the Analysis for Metals in Soil
WA # 3-399 Morgan Materials Site
Results Based on Dry Weight

Client ID		Method Blank		E17901		E17902		E17903		E17904		E17905	
Location		Lab		GP-1		GP-15		GP-12		GP-13		GP-11	
% Solids		NA		87.06		92.26		68.87		89.71		90.85	
Parameter	Analysis Method	Conc mg/kg	MDL mg/kg	Conc mg/kg	MDL mg/kg	Conc mg/kg	MDL mg/kg	Conc mg/kg	MDL mg/kg	Conc mg/kg	MDL mg/kg	Conc mg/kg	MDL mg/kg
Aluminum	ICAP	U	18	10000	21	19000	19	6500	26	4100	19	4900	19
Antimony	ICAP	U	6.0	U	6.9	U	6.3	U	8.6	U	6.5	U	6.2
Arsenic	AA-Fur	U	0.50	4.2	1.1	10	0.54	8.7	0.62	5.1	0.52	5	0.52
Barium	ICAP	U	1.0	95	1.1	200	1.0	610	1.4	47	1.1	47	1.0
Beryllium	ICAP	U	0.50	0.80	0.57	2.6	0.52	U	0.72	U	0.54	U	0.52
Cadmium	ICAP	U	0.50	U	0.57	U	0.52	1.4	0.72	1.9	0.54	0.6	0.52
Calcium	ICAP	U	50	51000	57	83000	52	7800	72	24000	54	7700	52
Chromium	ICAP	U	0.50	19	0.57	65	0.52	21	0.72	13	0.54	19	0.52
Cobalt	ICAP	U	1.0	7.0	1.1	7.3	1.0	9.1	1.4	4.5	1.1	4.9	1.0
Copper	ICAP	U	1.0	81	1.1	120	1.0	78	1.4	72	1.1	51	1.0
Iron	ICAP	U	10	40000	11	89000	10	77000	14	43000	11	47000	10
Lead	ICAP	U	4.0	95	4.6	45	4.2	83	5.8	99	4.3	66	4.2
Magnesium	ICAP	U	50	6900	57	14000	52	2000	72	12000	54	1900	52
Manganese	ICAP	U	1.0	1100	1.1	2400	1.0	1000	1.4	600	1.1	710	1.0
Mercury	Cold Vapor	U	0.04	0.09	0.03	0.07	0.05	0.10	0.05	0.12	0.04	0.04	0.04
Nickel	ICAP	U	1.0	24	1.1	170	1.0	27	1.4	11	1.1	13	1.0
Potassium	ICAP	U	200	1100	230	1200	210	790	290	440	220	660	210
Selenium	AA-Fur	U	0.50	U	0.55	0.74	0.54	U	0.62	U	0.52	U	0.52
Silver	ICAP	U	0.50	U	0.57	U	0.52	U	0.72	U	0.54	U	0.52
Sodium	ICAP	U	50	220	57	450	52	140	72	230	54	99	52
Thallium	AA-Fur	U	0.50	U	0.55	U	0.54	U	0.62	U	0.52	U	0.52
Vanadium	ICAP	U	2.0	20	2.3	28	2.1	23	2.9	11	2.2	18	2.1
Zinc	ICAP	U	2.0	140	2.3	1200	2.1	330	2.9	610	2.2	120	2.1

Table 1.12 (cont.) Results of the Analysis for Metals in Soil
WA # 3-399 Morgan Materials Site
Results Based on Dry Weight

Client ID		E17912		E17913		E17914		E17915		E17916 GP-6		E17917	
Location		GP-5		GP-4		GP-2		GP-3				GP-17	
% Solids		80.42		78.66		85.88		89.04		81.57		79.12	
Parameter	Analysis Method	Conc mg/kg	MDL mg/kg	Conc mg/kg	MDL mg/kg	Conc mg/kg	MDL mg/kg	Conc mg/kg	MDL mg/kg	Conc mg/kg	MDL mg/kg	Conc mg/kg	MDL mg/kg
Aluminum	ICAP	13000	21	16000	22	6700	19	3500	19	12000	21	11000	22
Antimony	ICAP	U	7.0	U	7.3	U	6.2	U	6.5	U	7.1	U	7.4
Arsenic	AA-Fur	2.9	1.1	3.6	1.2	2.6	0.53	2.5	0.48	5.0	1.1	7.0	0.58
Barium	ICAP	62	1.2	130	1.2	80	1.0	41	1.1	120	1.2	140	1.2
Beryllium	ICAP	U	0.58	0.64	0.61	U	0.52	U	0.54	1.2	0.6	0.69	0.61
Cadmium	ICAP	U	0.58	U	0.61	U	0.52	U	0.54	U	0.6	0.64	0.61
Calcium	ICAP	3000	58	18000	61	24000	52	120000	54	86000	60	21000	61
Chromium	ICAP	15	0.58	23	0.61	17	0.52	17	0.54	13	0.6	59	0.61
Cobalt	ICAP	16	1.2	13	1.2	4.0	1.0	2.2	1.1	6.3	1.2	6.4	1.2
Copper	ICAP	11	1.2	25	1.2	30	1.0	27	1.1	42	1.2	260	1.2
Iron	ICAP	21000	12	30000	12	17000	10	13000	11	16000	12	54000	12
Lead	ICAP	14	4.6	36	4.9	45	4.2	76	4.3	21	4.8	110	4.9
Magnesium	ICAP	4300	58	5700	61	3100	52	15000	54	15000	60	1400	61
Manganese	ICAP	440	1.2	450	1.2	140	1.0	760	1.1	980	1.2	4300	1.2
Mercury	Cold Vapor	U	0.05	U	0.05	0.37	0.03	0.05	0.03	U	0.05	0.51	0.05
Nickel	ICAP	15	1.2	30	1.2	29	1.0	13	1.1	18	1.2	1000	1.2
Potassium	ICAP	980	230	1300	240	1200	210	360	220	1600	240	1000	250
Selenium	AA-Fur	U	0.56	U	0.6	U	0.53	U	0.48	U	0.52	U	0.58
Silver	ICAP	U	0.58	U	0.61	U	0.52	U	0.54	U	0.6	U	0.61
Sodium	ICAP	250	58	420	61	370	52	1600	54	370	60	780	61
Thallium	AA-Fur	U	0.56	U	0.6	U	0.53	U	0.48	U	0.52	U	0.58
Vanadium	ICAP	26	2.3	30	2.4	14	2.1	17	2.2	17	2.4	28	2.5
Zinc	ICAP	65	2.3	82	2.4	52	2.1	64	2.2	110	2.4	350	2.5

Analytical Procedure for BNA in Soil

Extraction Procedure

Prior to extraction each sample was spiked with a six component surrogate mixture consisting of nitrobenzene-d_5, 2-fluorobiphenyl, terphenyl-d_{14}, phenol-d_5, 2-fluorophenol, and 2,4,6-tribromophenol. Thirty grams of sample was mixed with 30 g anhydrous sodium sulfate, and Soxhlet extracted for 16 hours with 300 mL of 1:1 acetone:methylene chloride. The extract was concentrated to 1.0 mL., an internal standard mixture consisting of 1,4-dichlorobenzene-d_4, naphthalene-d_8, acenaphthene-d_{10}, phenanthrene-d_{10}, chrysene-d_{12}, and perylene-d_{12} was added, and analyzed.

Analysis Procedure

An HP 6890/5972 Gas Chromatograph/Mass Spectrometer (GC/MS), equipped with a 6890 autosampler and controlled by a PC computer equipped with Enviroquant software was used to analyze the samples.

The instrument conditions were:

Column	Restek Rtx-5 (crossbonded SE-54) 30 meter x 0.25mm ID, 0.50 µm film thickness
Injection Temperature	280° C
Transfer Temperature	280° C
Source Temperature & Analyzer Temperature	Controlled by thermal transfer of heat from transfer line
Temperature Program	50°C for 0.5 min 20° C/min to 295° C, hold for 8.5 min 25° C/min to 310° C, hold for 15 min
Pulsed Split Injection	Split time = 2.00 min @ 8:1 split ratio Pressure pulse = 16 psi for 0.5 min, then normal
Injection Volume	1µL Must use 4 mm ID single gooseneck liners packed with 10 mm pulg of silanized & conditioned glass wool.

The GC/MS system was calibrated using 5 BNA standards at 20, 50, 80, 120, and 160 µg/mL. Before analysis each day, the system was tuned with 50 ng decafluorotriphenylphosphine (DFTPP) and passed a continuing calibration check when analysing a 50 µg/mL standard mixture in which the responses were evaluated by comparison to the average response of the calibration curve.

Extraction Procedure

One liter of sample was spiked with a surrogate solution consisting of tetrachloro-m-xylene and decachlorobiphenyl, and was extracted three times with 60 mL portions of methylene chloride. The combined extracts were filtered, concentrated to 10 mL, solvent exchanged with 60 mL hexane, and the hexane concentrated to 1.0 mL.

Gas Chromatographic Analysis-PCB Quantitation

The samples were analyzed for PCBs using simultaneous dual column injections. The analysis was done on an HP 5890 GC/ECD system, equipped with an HP 7673A automatic sampler, and controlled with an HP-CHEM STATION. The following conditions were employed:

First Column	DB-608, 30 meter, 0.32mm fused silica capillary, 0.50 µm film thickness
Second Column	RTX-CLPesticides, 30 meter, 0.32mm fused silica capillary, 0.50 µm film thickness
Injector Temperature	200° C
Detector Temperature	325° C
Temperature Program	70°C for 1 minute 30°C/min to 150°C, 0.5min at 150°C 8°C/min to 275°C, 10min at 275°C
Injection Volume	2µL

Gas Chromatographic Analysis-Pesticides and PCBs(screening)

The diluted samples were analyzed for pesticides and PCBs (screening) using simultaneous dual column injections. The analysis was done on an HP 6890 GC/ECD system, equipped with an HP 6890 automatic injector, and controlled with HP-CHEM STATION software. The following conditions were employed:

First Column	DB-608, 30 meter, 0.32mm fused silica capillary, 0.50 µm film thickness
Second Column	RTX-CLPesticides, 30 meter, 0.32mm fused silica capillary, 0.50 µm film thickness
Injector Temperature	200° C
Detector Temperature	325° C
Temperature Program	120°C for 1 minute 9°C/min to 285°C, 10 min at 285°C
Injection Volume	1µL

The gas chromatographs were calibrated using 5 pesticide standards at 20, 50, 100, 200, and 500 µg/L. The results from each mixture were used to calculate the response factor (RF) of each analyte and the average Response Factor was used to calculate the concentration of pesticide in the sample. Quantification was based on the DB-608 column (signal 1) and the identity of the analyte was confirmed using the RTX-CLPesticides column (signal 2). A fingerprint chromatogram was run using each of the eight Aroclor mixtures and toxaphene; calibration curves were run only if a particular Aroclor or toxaphene was found in the sample.

Analytical Procedure for Pesticides and PCBs in Soil

Extraction Procedure

The soil samples were extracted by the Soxhlet method. Thirty grams of sample was spiked with a surrogate solution consisting of tetrachloro-m-xylene and decachlorobiphenyl, 30 g anhydrous sodium sulfate and Soxhlet extracted for 16 hours with 300 mL hexane. The extract was concentrated to 5.0 mL.

Gas Chromatographic Analysis-PCB Quantitation

The samples were analyzed for PCBs using simultaneous dual column injections. The analysis was done on an HP 5890 GC/ECD system, equipped with an HP 7673A automatic sampler, and controlled with an HP-CHEM STATION. The following conditions were employed:

First Column	DB-608, 30 meter, 0.32mm fused silica capillary, 0.50 µm film thickness
Second Column	RTX-CLPesticides, 30 meter, 0.32mm fused silica capillary, 0.50 µm film thickness
Injector Temperature	200° C
Detector Temperature	325° C
Temperature Program	70°C for 1 minute 30°C/min to 150°C, 0.5min at 150°C 8°C/min to 275°C, 10min at 275°C
Injection Volume	2µL

Gas Chromatographic Analysis-Pesticides and PCBs(screening)

The diluted samples were analyzed for pesticides and PCBs (screening) using simultaneous dual column injections. The analysis was done on an HP 6890 GC/ECD system, equipped with an HP 6890 automatic injector, and controlled with HP-CHEM STATION software. The following conditions were employed:

First Column	DB-608, 30 meter, 0.32mm fused silica capillary, 0.50 µm film thickness
Second Column	RTX-CLPesticides, 30 meter, 0.32mm fused silica capillary, 0.50 µm film thickness
Injector Temperature	200° C
Detector Temperature	325° C
Temperature Program	120°C for 1 minute 9°C/min to 285°C, 10 min at 285°C
Injection Volume	1µL

The gas chromatographs were calibrated using 5 pesticide standards at 20, 50, 100, 200, and 500 µg/L. The results from each mixture were used to calculate the response factor (RF) of each analyte and the average Response Factor was used to calculate the concentration of pesticide in the sample. Quantification was based on the DB-608 column (signal 1) and the identity of the analyte was confirmed using the Rtx-1701 column (signal 2). A fingerprint chromatogram was run using each of the eight Aroclor mixtures and toxaphene; calibration curves were run only if a particular Aroclor or toxaphene was found in the sample.

Results of the Internal Standard Areas and Surrogate Recoveries for VOC in Water

Prior to purging, the samples were spiked with a three component surrogate mixture consisting of toluene-d_8, 4-bromofluorobenzene and 1,2-dichloroethane-d_4 and a three component internal standard mixture consisting of bromochloromethane, 1,4-difluorobenzene, and chlorobenzene-d_5.

The internal standard areas are listed in Table 2.1. All 33 internal standard areas were within QC criteria. The surrogate percent recoveries, also listed in Table 2.1, ranged from 96 to 104. All 33 recoveries were within QC limits.

Results of the MS/MSD Analysis for VOC in Water

Sample 17921 was chosen for the matrix spike/matrix spike duplicate (MS/MSD) analysis. The percent recoveries, listed in Table 2.2, ranged from 90 to 99. All 10 recoveries were within QC limits. The relative percent differences (RPDs), also listed in Table 2.2, ranged from 1 to 2. All 5 RPD values were within QC limits.

Results of the Internal Standard Areas and Surrogate Recoveries for VOC in Soil

Prior to purging, the samples were spiked with a three component surrogate mixture consisting of toluene-d_8, 4-bromofluorobenzene and 1,2-dichloroethane-d_4 and a three component internal standard mixture consisting of bromochloromethane, 1,4-difluorobenzene, and chlorobenzene-d_5.

The internal standard areas are listed in Table 2.3. All 111 internal standard areas were within QC criteria. The surrogate percent recoveries, also listed in Table 2.3, ranged from 76 to 114. All 111 recoveries were within QC limits.

Results of the MS/MSD Analysis for VOC in Soil

Samples 17903, 17912, and 17906 were chosen for the matrix spike/matrix spike duplicate (MS/MSD) analysis. The percent recoveries, listed in Table 2.4, ranged from 62 to 101. All 30 recoveries were within QC limits. The relative percent differences (RPDs), also listed in Table 2.4, ranged from zero (0) to 15. All 15 RPD values were within QC limits.

Table 2.2 Results of the MS/MSD Analysis for VOC in Water
WA#3-399 Morgan Material Site

Sample ID: 17921

Compound Name	Sample Conc. (µg/L)	MS Spike Added (µg/L)	MSD Spike Added (µg/L)	MS Conc. (µg/L)	MSD Conc. (µg/L)	MS % Rec.	MSD % Rec.	RPD	QC Limits RPD	QC Limits % Rec.
1,1-Dichloroethene	U	50	50	45.70	45.10	91	90	1	14	61 - 145
Trichloroethene	U	50	50	47.10	46.50	94	93	1	14	71 - 120
Benzene	U	50	50	49.40	49.00	99	98	1	11	76 - 127
Toluene	U	50	50	49.40	48.40	99	97	2	13	76 - 125
Chlorobenzene	U	50	50	49.50	49.20	99	98	1	13	75 - 130

Table 2.3 (cont.) Results of the Internal Standard Areas and Surrogate Recoveries for VOC in Soil
HA # 3-399 Morgan Materials Site

	Sample #	Data File	Internal Standards 1 area	2 area	3 area	Surrogates DIC %	TOL %	BRO %	Flags	Chrom. Acceptable Y or N	Preliminary Data Acceptable Y or ReRun
CAL CHECK	50 PPB VOC	>A5266	34704	192442	166815	NA	NA	NA			
SAND BLANK		>A5267	33282	190936	162579	96	102	100			
_____	17912	>A5268	29467	176076	143162	94	104	92			
_____	17912MS	>A5269	31292	183790	148494	94	104	94			
_____	17912MSD	>A5270	32304	190575	162522	96	101	96			
_____	17906MS	>A5272	33367	192591	159884	94	102	94			
_____	17906MSD	>A5273	29266	162636	133221	98	103	93			
_____	17915	>A5276	31926	178143	127804	93	108	86			
CAL CHECK	50 PPB VOC	>A5278	32805	185029	157583	NA	NA	NA			
MEOH BLANK		>A5279	41557	231755	190515	92	103	102			
_____	17908 50X	>A5280	36391	219043	177369	96	104	102			
_____	17909 50X	>A5281	35055	213945	172960	95	105	103			
_____	17917 100X	>A5282	34792	206932	170215	95	102	102			
SAND BLANK		>A5283	34489	201599	170041	99	101	104			
_____	17913	>A5284	31164	180580	138058	97	109	91			

SURROGATE LIMITS	WATER	SOIL
S1 (DIC) = 1,2-Dichloroethane-d4	(76-114)	(70-121)
S2 (TOL) = Toluene-d8	(88-110)	(81-117)
S3 (BRO) = Bromofluorobenzene	(86-115)	(74-121)

Table 2.4 (cont.) Results of the MS/MSD Analysis for VOC In Soil
WA#3-399 Morgan Material Site
Based on Dry Weight

Sample ID:17912

Compound Name	Sample Conc. (µg/kg)	MS Spike Added (µg/kg)	MSD Spike Added (µg/kg)	MS Conc. (µg/kg)	MSD Conc. (µg/kg)	MS % Rec.	MSD % Rec.	RPD	QC Limits RPD	QC Limits % Rec.
1,1-Dichloroethene	U	58.8	58.8	54.0	51.2	92	87	5	22	59 - 172
Trichloroethene	U	58.8	58.8	43.7	43.6	74	74	0	24	62 - 137
Benzene	U	58.8	58.8	49.8	48.8	85	83	2	21	66 - 142
Toluene	U	58.8	58.8	46.0	44.2	78	75	4	21	59 - 139
Chlorobenzene	U	58.8	58.8	37.3	36.6	63	62	2	21	60 - 133

Results of the Internal Standard Areas and Surrogate Recoveries for BNA in Water

Prior to extraction, each sample was spiked with a six component surrogate mixture consisting of nitrobenzene-d_5, 2-fluorobiphenyl, terphenyl-d_{14}, phenol-d_5, 2-fluorophenol, and 2,4,6-tribromophenol. After the extracts were combined and concentrated, they were spiked with an internal standards mixture consisting of 1,4-dichlorobenzene-d_4, naphthalene-d_8, acenaphthene-d_{10}, phenanthrene-d_{10}, chrysene-d_{12}, and perylene-d_{12}.

The internal standard areas are listed in Table 2.5. All 48 internal standard areas were within QC criteria. The surrogate percent recoveries, also listed in Table 2.5, ranged from 44 to 107. All 48 recoveries were within QC limits.

Results of the BS/BSD Analysis for BNA in Water

The blank spike/blank spike duplicate (BS/BSD) percent recoveries, listed in Table 2.6, ranged from 45 to 94. All 22 recoveries were within QC limits. The relative percent differences (RPDs), also listed in Table 2.6, ranged from zero (0) to 9. All 11 RPD values were within QC limits.

Results of the Internal Standard Areas and Surrogate Recoveries for BNA in Soil

Prior to extraction, each sample was spiked with a six component surrogate mixture consisting of nitrobenzene-d_5, 2-fluorobiphenyl, terphenyl-d_{14}, phenol-d_5, 2-fluorophenol, and 2,4,6-tribromophenol. After the extracts were combined and concentrated, they were spiked with an internal standards mixture consisting of 1,4-dichlorobenzene-d_4, naphthalene-d_8, acenaphthene-d_{10}, phenanthrene-d_{10}, chrysene-d_{12}, and perylene-d_{12}.

The internal standard areas are listed in Table 2.7. All 150 internal standard areas were within QC criteria. The reported surrogate percent recoveries, also listed in Table 2.7, ranged from 44 to 105. All 144 reported recoveries were within QC limits. Six recoveries were diluted out.

Results of the MS/MSD Analysis for BNA in Soil

Samples B17904 and B17919 were chosen for the matrix spike/matrix spike duplicate (MS/MSD) analysis. The percent recoveries, listed in Table 2.8, ranged from 67 to 543. Thirty-eight out of 44 recoveries were within QC limits. The relative percent differences (RPDs), also listed in Table 2.8, ranged from zero (0) to 35. Twenty-one out of 22 RPD values were within QC limits.

Table 2.5 (Cont.) Results of the Internal Standard Areas and Surrogate Recoveries for BNA in Water
WA # 3-399 Morgan Materials Site

Analysis Date 11/16/98
Matrix Water

Sample No.	File ID	IS 1	IS 2	IS 3	IS 4	IS 5	IS 6
WBLK111098	MM052.D	47298	163065	89586	168223	171331	144133.
WBLK111098 MS	MM045.D	45875	166940	90330	172125	176677	149398
WBLK111098 MSD	MM046.D	45747	166674	91332	172621	175407	148229
F17921	MM047.D	46783	167669	91173	173052	181805	154769
F17922	MM048.D	46457	173520	92575	176793	179944	158091
F17923	MM049.D	48265	180244	95707	184728	187957	163629
F17924	MM050.D	49020	175624	95596	180072	182396	157560
F17925	MM051.D	47724	174221	93833	178530	176729	153128
Cal Check Area	MM043.D	58081	213896	115700	195922	195131	208296

IS 1 d4-Dichlorobenzene
IS 2 d8-Naphthalene
IS 3 d10-Acenaphthene
IS 4 d10-Phenanthrene
IS 5 d12-Chrysene
IS 6 d12-Perylene

Table 2.7 Results of the Internal Standard Areas and Surrogate Recoveries for BNA in Soil WA # 3-399 Morgan Materials Site

Analysis Date 11/10/98
Matrix Soil

Sample No.	File ID	IS 1	IS 2	IS 3	IS 4	IS 5	IS 6
B17901	MM012.D	34989	130372	73605	144348	145109	126946.
B17902	MM013.D	39442	143995	82689	159312	161939	140647
B17903	MM014.D	38838	137243	80011	152046	151578	132343
B17904	MM015.D	41456	152868	86865	163900	162371	140574
B17904 MS	MM016.D	39293	141326	81449	157267	153939	130624
B17904 MSD	MM017.D	36363	135096	78527	148763	148346	125152
B17905	MM018.D	39250	138521	79127	151802	145318	122821
B17910	MM019.D	33288	119557	71355	134167	133654	117990
B17906	MM020.D	34993	129821	74946	141429	138051	117983
B17907	MM021.D	36247	130512	73217	140185	137333	113819
B17908	MM022.D	36849	129664	73571	143445	141051	121624
SBLK1106	MM024.D	34670	124173	70907	134908	129318	104252
Cal Check Area	MM010.D	44128	162222	90093	158511	154248	146825

IS 1 = d4-Dichlorobenzene
IS 2 = d8-Naphthalene
IS 3 = d10-Acenaphthene
IS 4 = d10-Phenanthrene
IS 5 = d12-Chrysene
IS 6 = d12-Perylene

Table 2.12 Results of the MS/MSD Analysis for Pesticide/PCB in Soil
WA# 3-399 Morgan Materials Site
Results Based on Dry Weight

Sample ID: A 17904

Compound	Sample Conc µg/kg	MS Spike Added µg/kg	MS Conc µg/kg	MS % Rec	MSD Spike Added µg/kg	MSD Conc µg/kg	MSD % Rec	RPD	Advisory QC Limits % Rec	Advisory QC Limits RPD
g-BHC	U	23.148	23.851	103	23.148	27.822	120	15	46-127	50
Heptachlor	U	23.148	21.543	93	23.148	23.905	103	10	35-130	31
Aldrin	U	23.148	20.634	89	23.148	22.195	96	8	34-132	43
Dieldrin	U	46.296	45.612	99	46.296	52.670	114	14	31-134	38
Endrin	U	46.296	46.263	100	46.296	48.489	105	5	42-139	45
p,p'-DDT	6.0	46.296	29.746	51	46.296	30.582	53	4	23-134	50

Results of the QC Standard Analysis for Metals in Water

The QC standards ERA-434, QC-7x100, QC-21x100, TMWS, TMAA#1 and TMAA#2 were used to check the accuracy of the calibration curves. The percent recoveries for the metals found in the QC standards listed in Table 2.13, ranged from 87 to 113. There are 95% confidence interval limits available for 19 of the 36 concentration recoveries. All 19 concentration recoveries are within the limits. There are no 95% confidence interval limits available for the remaining 17 recoveries.

Results of the MS/MSD Analysis for Metals in Water

Sample A17924 was chosen for matrix spike/matrix spike duplicate (MS/MSD) analysis. The reported percent recoveries, listed in Table 2.14, ranged from 11 to 116. Thirty-six out of 40 recoveries were within QC limits. The relative percent differences (RPDs), also listed in Table 2.14, ranged from 0 to 20. All 20 RPDs were with in QC limits.

Results of the Blank Spike Analysis for Metals in Water

The percent recoveries for the blank spike metals, listed in Table 2.15, ranged from 73 to 96. Twenty-two out of 23 recoveries were within QC limits.

Results of the QC Standard Analysis for Metals (Soil)

The QC standards ERA-434, QC-7x100, QC-21x100, TMWS, TMAA#1 and TMAA#2 were used to check the accuracy of the calibration curves. The percent recoveries for the metals found in the QC standards listed in Table 2.16, ranged from 85 to 111. There are 95% confidence interval limits available for 19 of the 38 concentration recoveries. All 19 concentration recoveries are within the limits. There are no 95% confidence interval limits available for the remaining 19 recoveries.

Results of the MS/MSD Analysis for Metals in Soil

Samples E17910 and E17908 were chosen for matrix spike/matrix spike duplicate (MS/MSD) analysis. The reported percent recoveries, listed in Table 2.17, ranged from zero (0) to 368. Fourty-seven out of 62 reported recoveries were within QC limits. The reported relative percent differences (RPDs), also listed in Table 2.17, ranged from zero (0) to 118. Twenty-three out of 30 reported RPDs were with in QC limits. Six percent recoveries and three RPDs were not calculated because the sample concentration of the analyte was greater than four times the spike concentration. One RPD was not calculated because the MS recovery was zero (0).

Results of the Blank Spike Analysis for Metals in Soil

The percent recoveries for the blank spike metals, listed in Table 2.18, ranged from 91 to 105. All 24 recoveries were within QC limits.

Table 2.14 Results of the MS/MSD Analysis for Metals in Water
WA # 3-399 Morgan Materials Site

Sample ID: A17924

Metal	Sample Conc µg/L	MS Spike Added µg/L	MS Conc µg/L	MS % Rec	MSD Spike Added µg/L	MSD Conc µg/L	MSD % Rec	RPD	Recommended QC Limits % Rec	RPD
Aluminum	134	4444	4393	96	4444	4420	96	1	75-125	20
Antimony	U	55.6	50.9	92	55.6	49.6	89	3	75-125	20
Arsenic	U	55.6	58.7	106	55.6	56.8	102	3	75-125	20
Barium	15.5	556	539	94	556	542	95	1	75-125	20
Beryllium	U	222	218	98	222	219	99	0	75-125	20
Cadmium	U	222	214	96	222	214	96	0	75-125	20
Chromium	U	222	216	97	222	216	97	0	75-125	20
Cobalt	U	222	220	99	222	219	99	0	75-125	20
Copper	U	222	217	98	222	218	98	0	75-125	20
Iron	256	4444	4563	97	4444	4590	98	1	75-125	20
Lead	U	55.6	48	86	55.6	47.3	85	1	75-125	20
Manganese	21.9	222	236	96	222	237	97	0	75-125	20
Mercury	U	2.00	1.90	95	2.00	2.00	100	5	75-125	20
Nickel	U	222	219	99	222	222	100	1	75-125	20
Potassium	10660	4444	15610	116	4444	15010	98	17	75-125	20
Selenium	U	55.6	40.6	73 *	55.6	40.9	74 *	1	75-125	20
Silver	U	222	24.5	11 *	222	25.6	12 *	9	75-125	20
Thallium	U	55.6	52.3	94	55.6	42.9	77	20	75-125	20
Vanadium	U	556	537	97	556	539	97	0	75-125	20
Zinc	U	222	219	99	222	219	99	0	75-125	20

Table 2.16 Results of the QC Standard Analysis for Metals (Soil)
WA # 3-399 Morgan Materials Site

Metal	Date Analyzed	Quality Control Standard	Conc. Recovered µg/L	Certified Value µg/L	95 % Confidence Interval µg/L	% Recovery
Aluminum	11/25/98	QC-7 x100	1022	1000	NA	102
	11/25/98	ERA-434	709	647	531-763	110
Antimony	11/25/98	QC-21 x100	970	1000	NA	97
Arsenic	12/01/98	TMAA #1	49.6	50	41.9-55.9	99
Barium	11/25/98	QC-7 x100	992	1000	NA	99
	11/25/98	ERA-434	743	735	603 - 867	101
Beryllium	11/25/98	QC-21 x100	1025	1000	NA	102
	11/25/98	ERA-434	87	82	68 - 97	106
Cadmium	11/25/98	QC-21 x100	1031	1000	NA	103
	11/25/98	ERA-434	82.1	77	63 - 90	107
Calcium	11/25/98	QC-21 x100	1048	1000	NA	105
Chromium	11/25/98	QC-21 x100	1034	1000	NA	103
	11/25/98	ERA-434	112	106	87 - 125	106
Cobalt	11/25/98	QC-21 x100	1050	1000	NA	105
	11/25/98	ERA-434	97.6	88	72 - 104	111
Copper	11/25/98	QC-21 x100	1020	1000	NA	102
	11/25/98	ERA-434	156	147	121 - 173	106
Iron	11/25/98	QC-21 x100	1069	1000	NA	107
	11/25/98	ERA-434	227	206	169 - 243	110
Lead	11/25/98	QC-21 x100	1033	1000	NA	103
	11/25/98	ERA-434	96.1	94	77 - 111	102
Magnesium	11/25/98	QC-21 x100	987	1000	NA	99
Manganese	11/25/98	QC-21 x100	1034	1000	NA	103
	11/25/98	ERA-434	248	235	193 - 277	106
Mercury	11/24/98	TMWS	2.7	2.9	2.13 - 3.53	93
Mercury	12/02/98	TMWS	2.6	2.9	2.13 - 3.53	90
Nickel	11/25/98	QC-21 x100	1073	1000	NA	107
	11/25/98	ERA-434	120	112	92 - 132	107
Potassium	11/25/98	QC-7 x100	8515	10000	NA	85
Selenium	11/30/98	TMAA #1	50.41	50	39.4-57.4	101
Silver	11/25/98	QC-7 x100	1013	1000	NA	101
	11/25/98	ERA-434	91.4	88	72 - 104	104
Sodium	11/25/98	QC-7 x100	995	1000	NA	100
Thallium	11/30/98	TMAA #2	48.6	50	39.9-57.97	97
Vanadium	11/25/98	QC-21 x100	1027	1000	NA	103
	11/25/98	ERA-434	121	118	97 - 139	103
Zinc	11/25/98	QC-21 x100	1065	1000	NA	107
	11/25/98	ERA-434	290	265	217 - 313	109

Table 2.17 (cont.) Results of the MS/MSD Analysis for Metals in Soil
WA # 3-399 Morgan Materials Site
Results Based on Dry Weight

Sample ID: E17908

Metal	Sample Conc mg/kg	MS Spike Added mg/kg	MS Conc mg/kg	MS % Rec	MSD Spike Added mg/kg	MSD Conc mg/kg	MSD % Rec	RPD	Recommended QC Limits %Rec	RPD
Antimony	U	52.8	23.4	44 *	52.8	16.3	31 *	36 *	75-125	20
Arsenic	5.81	5.33	9.94	77	5.13	9.79	78	0	75-125	20
Barium	39.3	106	139	94	106	139	94	0	75-125	20
Beryllium	U	52.8	52.9	100	52.8	53.3	101	1	75-125	20
Cadmium	0.543	52.8	51.7	97	52.8	52.4	98	1	75-125	20
Chromium	19	52.8	71.9	100	52.8	68.9	95	6	75-125	20
Cobalt	4.88	52.8	56.6	98	52.8	57.6	100	2	75-125	20
Copper	32	52.8	84.7	100	52.8	81.3	93	7	75-125	20
Lead	13.3	52.8	64.1	96	52.8	65.5	99	3	75-125	20
Manganese	1410	52.8	1406	NC	52.8	1215	NC	NC	75-125	20
Mercury	0.03	0.395	0.454	107	0.333	0.367	101	6	75-125	20
Nickel	7.91	52.8	60.6	100	52.8	61.5	102	2	75-125	20
Selenium	U	5.33	2.45	46 *	5.13	2.26	44 *	4	75-125	20
Silver	U	52.8	50	95	52.8	50.5	96	1	75-125	20
Thallium	U	5.33	2.83	53 *	5.13	3.93	77	36 *	75-125	20
Vanadium	28.2	106	132	98	106	128	95	4	75-125	20
Zinc	3998	52.8	4013	NC	52.8	4038	NC	NC	75-125	20

REAC, Edison, NJ
(908) 321-4200
EPA Contract 68-C4-0022

CHAIN OF CUSTODY RECORD

Project Name: MORGAN MATERIALS
Project Number: 03847-143-001-3399-01
RFW Contact: Will Avery Phone: 732-321-4200

No: 01401

SHEET NO. 1 OF 2

110698 -

Sample Identification

Analyses Requested

REAC #	Sample No.	Sampling Location	Matrix	Date Collected	# of Bottles	Container/Preservative	Pest/PCB	BNA	TAL	
802	A17901	GP-1	S	11/3/98	1	8oz glass/4°C	X			
803	B17901	↓				↓		X		
804	E17901	↓				4oz glass/4°C			X	
805	A17902	GP-15				8oz glass/4°C	X			
806	B17902	↓				↓		X		
807	E17902	↓				4oz glass/4°C			X	
808	A17903	GP-12				8oz glass/4°C	X			
809	B17903	↓				↓		X		
810	E17903	↓				4oz glass/4°C			X	
811	A17904	GP-13				8oz glass/4°C	X			
812	B17904	↓				↓		X		
813	E17904	↓				4oz glass/4°C			X	
814	A17905	GP-11				8oz glass/4°C	X			
815	B17905	↓				↓		X		
816	E17905	↓				4oz glass/4°C			X	
817	A17910	GP-14				8oz glass/4°C	X			
818	B17910	↓				↓		X		
819	E17910	↓				4oz glass/4°C			X	
820	A17906	GP-9				8oz glass/4°C	X			
821	B17906	↓	↓	↓	↓	↓		X		

Matrix:

SD -	Sediment	PW -	Potable Water	S -	Soil
DS -	Drum Solids	GW -	Groundwater	W -	Water
DL -	Drum Liquids	SW -	Surface Water	O -	Oil
X -	Other	SL -	Sludge	A -	Air

Special Instructions:

QA'd [illegible] 11/16/98

Lab to perf MS/MSD

FOR SUBCONTRACTING USE ONLY
FROM CHAIN OF CUSTODY #

Items/Reason	Relinquished By	Date	Received By	Date	Time
All Analytes	[signature]	11/5/98	C Grasso	11/6/98	9:40

Items/Reason	Relinquished By	Date	Received By	Date	Time
7/ Pest/PCB	C Grasso	11/6/98	[signature]	11/6/98	11:35am
7/ BNA	C Grasso	11/6/98	[signature]	11/6/98	11:35am
6/ TAL	C Grasso	11/6/98	[signature]	11/6/98	11 am

FORM #4 8/94

REAC, Edison, NJ
(908) 321-4200
EPA Contract 68-C4-0022

CHAIN OF CUSTODY RECORD

Project Name: Morgan Materials
Project Number: 03347-143-001-3399-01
RFW Contact: Will Avery Phone: 732-321-4200

No: 01403

SHEET NO. 2 OF 2

110698-

Sample Identification / Analyses Requested

REAC #	Sample No.	Sampling Location	Matrix	Date Collected	# of Bottles	Container/Preservative	Pest/PCB	BNA	TAL
822	E17906	GP-9	S	11/3/98	1	4oz Glass/4°C			X
823	A17907	GP-8			1	8oz Glass/4°C	X		
824	B17907	↓				↓		X	
825	E17907	↓				4oz Glass/4°C			X
826	A17908	GP-10				8oz Glass/4°C	X		
827	B17908	↓				↓		X	
828	E17908	↓				4oz glass/4°C			X
829	A17909	GP-7				8oz glass/4°C	X		
830	B17909	↓				↓		X	
831	E17909	↓	↓	↓	↓	4oz glass/4°C			X

Matrix:

SD -	Sediment	PW -	Potable Water	S -	Soil
DS -	Drum Solids	GW -	Groundwater	W -	Water
DL -	Drum Liquids	SW -	Surface Water	O -	Oil
X -	Other	SL -	Sludge	A -	Air

Special Instructions:

GA'd 99 11/4/98

Lab to P.C.B. MS/MSD

FOR SUBCONTRACTING USE ONLY

FROM CHAIN OF CUSTODY #

Items/Reason	Relinquished By	Date	Received By	Date	Time
All Analyses	Will Avery	11/5/98	C. Hassen	11/6/98	9:40

Items/Reason	Relinquished By	Date	Received By	Date	Time
B/Pest/PCB	C. Hassen	11/6/98	Matthew J. Hauser	11/6/98	11:35am
3/ BNA	C. Hassen	11/6/98	Matthew J. Hauser	11/6/98	11:35am
4/TAL	C. Hassen	11/6/98	[illegible]	11/6/98	11:40

FORM #4

8/94

REAC, Edison, NJ
(908) 321-4200
EPA Contract 68-C4-0022

CHAIN OF CUSTODY RECORD

Project Name: Morgan Materials
Project Number: 03347-143-001-3399-01
RFW Contact: Will Avery Phone: 732-321-4200

No: 01405
SHEET NO. 2 OF 2

110698-

Sample Identification

Analyses Requested

REAC #	Sample No.	Sampling Location	Matrix	Date Collected	# of Bottles	Container/Preservative	Pest/PCB	BNA	TAL	
852	E17917	GP-17	S	11/4/98	1	4oz Glass/4°C			X	
853	A17918	Field Blank-D	S	11/5/98	1	8oz Glass/4°C	X			
854	B17918	↓				↓		X		
855	E17918	↓				40z Glass/4°C			X	
856	A17919	Field Blank-I				8oz Glass/4°C	X			
857	B17919	↓				↓		X		
858	E17919	↓	↓	↓	↓	40z Glass/4°C			X	

11/4/98 11/5/98 11/6/98

Matrix:

SD -	Sediment	PW -	Potable Water	S -	Soil
DS -	Drum Solids	GW -	Groundwater	W -	Water
DL -	Drum Liquids	SW -	Surface Water	O -	Oil
X -	Other	SL -	Sludge	A -	Air

Special Instructions:

Lab to perf MS/MSD

QA'd (Sig) 11/4/98

FOR SUBCONTRACTING USE ONLY

FROM CHAIN OF CUSTODY #

Items/Reason	Relinquished By	Date	Received By	Date	Time
All Analyses	Will Avery	11/5/98	C Gasser	11/6/98	7:40

Items/Reason	Relinquished By	Date	Received By	Date	Time
2/Pest/PCB	C Gasser	11/6/98	[illegible]	11/6/98	11 35am
2/BNA	C Gasser	11/6/98	[illegible]	11/6/98	11 35am
3/TAL	C Gasser	11/6/98	[illegible]	[illegible]	11 45am

FORM #4 8/94

REAC, Edison, NJ
(908) 321-4200
EPA Contract 68-C4-0022

CHAIN OF CUSTODY RECORD

Project Name: Morgan Materials
Project Number: ~~5599~~ 05347-142-001-3399-01
RFW Contact: W. Avery Phone: 732-321-4200

No: 01407

110998-

SHEET NO. 1 OF 1

Sample Identification							Analyses Requested			
REAC #	Sample No.	Sampling Location	Matrix	Date Collected	# of Bottles	Container/Preservative	1/0A			
859	BCD17921	MW-1	W	11/7/98	3	40ml / ~~4°C~~ 4°C	X			
860	BCD17922	MW-2	↓	↓	↓	↓	X			
861	BCD17923	MW-3	↓	↓	↓	↓	X			
862	BCD17924	MW-4	↓	↓	↓	↓	X			
863	BCD17925	Field Blank	↓	↓	↓	↓	X			
864	AB17926	Trip Blank	W	11/7/98	2	40ml / ~~4°C~~ 4°C	X			

MW 11/7/98

MW 11/7/98

MW 11/7/98

Matrix:

SD -	Sediment	PW -	Potable Water	S -	Soil
DS -	Drum Solids	GW -	Groundwater	W -	Water
DL -	Drum Liquids	SW -	Surface Water	O -	Oil
X -	Other	SL -	Sludge	A -	Air

Special Instructions:

Add: Wash 1. Comp

FOR SUBCONTRACTING USE ONLY

FROM CHAIN OF CUSTODY #

Items/Reason	Relinquished By	Date	Received By	Date	Time	Items/Reason	Relinquished By	Date	Received By	Date	Time
Add/Analysis	[illegible]	11/7/98	C. Hassin	11/9/98	10:00	All/Analysis	C. Hassin	11/9/98	Ling Wang	11/9/98	1010

FORM #4

8/94