Beazer

BEAZER EAST, INC. C/O THREE RIVERS MANAGEMENT, INC.
ONE OXFORD CENTRE, SUITE 3000, PITTSBURGH, PA 15219-6401

June 25, 2009

John T. Spellman, P.E.
Environmental Engineer
Bureau of Construction Services
Division of Hazardous Waste Remediation
New York State Dept. of Environmental Conservation
Bur. of Western Rem. Action
625 Broadway, Room 352
Albany, NY 12233-7017

Re: **New York Tar Emulsion Products Site**
Utica, New York

Subject: **Submittal of the Site Management Plan**
Final Revised Version

Dear Mr. Spellman:

Beazer East, Inc. (Beazer) hereby provides the New York State Department of Environmental Conservation (Department) with one hardcopy and one electronic copy of the revised *Site Management Plan* (SMP) for the New York Tar Emulsion Products (NYTEP) Site in Utica, New York. The final SMP references and includes the following project documents:

- Groundwater Monitoring Plan; and,
- Field Sampling Plan, including the Quality Assurance Project Plan, Standard Operating Procedures, and the Health and Safety plan.

As you are aware, the Department provided separate comments on each of the documents. Beazer provided responses to the comments and subsequently the Department approved[1,2,3] of the documents with the agreed modifications. The documents have been edited in accordance with the respective Department approval.

---

[1] NYSDEC, February 12, 2009, Approval of Groundwater Monitoring Plan upon incorporating responses.
[2] NYSDEC, March 16, 2009, Approval of Site Management Plan upon incorporating responses.
[3] NYSDEC, May 15, 2009, Approval of Field Sampling Plan upon incorporating responses.

If you have any questions or need additional information regarding this transmittal, please do not hesitate to contact me at 412-208-8867.

Sincerely,

Michael Slenska \ MRL for

Michael Slenska, P.E.
Environmental Manager

Enclosures.

cc: Mr. Greg Rys - NYSDOH (via PDF)
Mr. Paul Kline – Beazer (via PDF)
Mr. Eric T. Dadd, Esq. – Dadd & Nelson
Mr. Richard Schutz – Suit-Kote Corporation
Mr. Mark Lahr, P.E. – Key Environmental, Inc. (via PDF)

SITE MANAGEMENT PLAN

NEW YORK TAR EMULSION PRODUCTS SITE

UTICA, NEW YORK

Prepared for:

Beazer East, Inc.

Prepared by:

Key Environmental, Inc.
200 Third Avenue
Carnegie, Pennsylvania 15106

June 2009

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF APPENDICES

1.0 INTRODUCTION

Key Environmental, Inc. (KEY) has prepared this S*ite Management Plan* (SMP) on behalf of Beazer East, Inc. (Beazer) and Suit-Kote Corporation (Suit-Kote) for the New York Tar Emulsion Products (NYTEP) site in Utica, New York (Site). Figure 1 presents the Site location map. This section of the report provides the background information, summary of objectives, and identifies the report contents.

1.1 BACKGROUND

The Site remedial activities are being conducted pursuant to and in accordance with the Record of Decision[1] (ROD) that was issued to Beazer and Suit-Kote by the New York State Department of Environmental Conservation (Department). The ROD specifically identified institutional controls (ICs), soil remediation, passive non-aqueous phase liquid (NAPL) recovery, and groundwater monitoring for the Site. The institutional controls, soil remediation, and NAPL recovery have been implemented at the Site. The remedial actions for the Site are summarized below:

- ICs have been implemented to control future use and access to the Site. A deed restriction has been completed to restrict future land and groundwater use. A copy of the recorded deed restrictions is included in Appendix A. Future use of the site is restricted such that there is to be no disturbance or excavation of the soil cover, that there can be no development other than restricted commercial use, and the use of groundwater is prohibited. Fencing has been installed around the Site to control unauthorized access;

- Soil remediation has been completed to address tar / NAPL contamination in soil to a depth of 6 feet below ground surface over the entire ~3 acre Site. Soil remediation consisted of the excavation and off-Site disposal of all Site soils to a depth of ~6 feet, placement of a geotextile as a demarcation layer, placement of clean imported fill, and establishing a grass cover. During implementation of the soil remediation, the majority of the shallow perched water bearing zone within the entire Site property boundary was dewatered, the groundwater was treated, and the treated groundwater was discharged off-Site;

- Passive NAPL monitoring, and removal as necessary, within the intermediate aquifer has been implemented at nine wells installed over the southern portion of the Site. In addition, NAPL monitoring has been implemented at three northeastern sumps within the shallow water bearing zone; and,

---

[1] NYSDEC, March 30, 2002, Record of Decision NIMO – Harbor Point Property Operable Unit No. 1 – Peninsula-Site No. 6-33-021, New York Tar Emulsion Products Site-Site No. 6-33-031 Mohawk Valley Oil Site-Site No. 6-33-032.

- Groundwater monitoring will be conducted at the Site in accordance with the Groundwater Monitoring Plan[2] (GMP), which is provided in Appendix B. Groundwater from six monitoring wells (three within the intermediate aquifer and three within the shallow zone) will be sampled. In addition, the GMP identifies the NAPL recovery and monitoring requirements.

1.2 SMP OBJECTIVES

The majority of the activities required by the Order[3] (Order) and the ROD have been completed. However, some remaining items are necessary in order to move the Site into an operations and maintenance mode. The Order requires the submittal of a Post-Remedial Operation and Maintenance Plan (O&MP) for the remedial actions. The ROD specifies that an annual review and certification is to be completed to ensure that the remedial actions remain effective. The Department has indicated that a Site Management Plan (SMP) could address all of the project requirements comprehensively, including: the O&MP; Institutional and Engineering Control Plan; Site Monitoring Plan; required certifications; and, reporting. Therefore, the *SMP* has been prepared specifically to address the following objectives:

- Identify the responsibilities and process for ensuring that the remedial actions remain effective at the Site;

- Define the operation, monitoring, maintenance, and termination requirements for the remedial actions;

- Review the soil and groundwater management requirements associated with potential future intrusive activities or redevelopment at the Site; and,

- Define the reporting and certification requirements.

1.3 REPORT CONTENTS

This *SMP* is organized into the following five sections:

- **Section 1.0: Introduction** – presents background information and identifies the report contents.

- **Section 2.0: Site Management Process** – provides a review of the Site team, responsibilities, and approach to ensure that the remedial actions remain effective.

- **Section 3.0: Remedial Action Monitoring –** defines the monitoring required to verify operation and maintenance of the corrective measures components. In addition, the

---

[2] KEY, July 7, 2008, Groundwater Monitoring Plan submitted to the Department.
[3] NYSDEC, July 10, 1998, Order, Index Number D6-0001-97-11.

termination criteria for the institutional controls, soil cover, NAPL recovery / monitoring, and groundwater monitoring are reviewed.

- **Section 4.0: Site Work Requirements –** establishes the minimum requirements for conducting any maintenance or redevelopment activities at the Site.

- **Section 5.0: Reporting –** presents the reporting requirements.

The SMP is supported by one figure and eight Appendices.

2.0 SITE MANAGEMENT PROCESS

This section identifies the project team, responsibilities, and the approach to monitor, maintain, and verify proper operation of the remedial actions.

2.1 PROJECT TEAM AND RESPONSIBILITIES

The project team and responsibilities are summarized below:

- **Respondents –** Suit-Kote and Beazer: responsible for implementing and maintaining the remedial actions.

- **Regulatory Agency –** Department: responsible for reviewing project documents, Site conditions, and ensuring that the Public Health and Safety is maintained.

- **Engineer –** NY Professional Engineer: responsible for completing activities to ensure continued effectiveness of the remedial actions and providing applicable certifications.

- **Operator –** responsible for the normal operation and maintenance of the remedial actions in accordance with the Department-approved plans.

2.2 SITE MANAGEMENT SYSTEM

The Site Management System consists of implementing certain plans and actions to address any issues that could compromise the remedial actions in-place at the Site. The actions should entail on-going operation and maintenance, with periodic inspections, and resolution of any issues identified by those activities. The inspections provide feedback on the effectiveness of maintenance activities and performance of the remedial actions. The Site Management System can be organized into the following items:

- Communications (emails, calls, Monthly Reports);
- Operations and Maintenance;
- Periodic Inspection and Review; and,
- Reporting and Certification.

Each of these elements are described in the following paragraphs.

Communications

Communications between the Respondents and the Department are important for maintaining the on-going activities at the Site. These communications can be email, phone call, letters or other periodic reports, such as, the monthly progress reports. The communications will identify any on-going issues to facilitate their timely resolution.

Operations and Maintenance

Operations and maintenance activities are conducted by a qualified operations contractor that reports directly to Beazer East, Inc. The operator is required to conduct activities at the Site in accordance with the approved plans. The operator follows a Site-specific Health and Safety Plan developed to support their work activities. The operator is responsible for documentation of any operations and maintenance activities, Site security issues, or any problems or concerns.

Periodic Inspection and Review

Periodic inspections will be conducted to ensure that the remedial actions remain effective. The inspections will also provide an opportunity to review the on-going maintenance activities, any changes to Site conditions, and activities on adjacent properties. The periodic review will evaluate the routine operations and maintenance data, corrective measure activities, any Site issues, and the inspection information.

Reporting and Certification

The information collected from the operation and maintenance activities and the periodic inspections will be assembled into an annual evaluation report (Annual Report). Submittal of the Annual Report will provide the Department with the detailed information used to verify that the on-going remedial actions remain effective. The ROD requires that the Respondents provide an annual certification to ensure the effectiveness of the institutional and engineering controls. The Annual Report will provide the required certification and recommendations for improvements, as necessary.

Details regarding the requirements and language of the annual certification were obtained from the Department's SMP checklist. As required by the checklist, the certification will be provided by a professional engineer or other qualified environmental professional, and the following specific certification statement will be provided with the Annual Report:

"*The institutional controls and engineering controls employed at the Site are:*

- *Unchanged from the previous certification, unless otherwise approved by the Department, consistent with the SMP;*
- *In place and effective;*
- *Performing as designed;*
- *That nothing has occurred that would;*

  1. *impair the ability of the controls to protect the public health and environment; or,*
  2. *constitute a violation or failure to comply with any operation and maintenance plan for such controls.*"

3.0 REMEDIAL ACTION MONITORING

This section of the SMP identifies the remedial action components, identifies the operation and maintenance requirements, defines the monitoring required to verify the corrective measures are performing as designed. In addition, the termination criteria for the institutional controls, soil cover, NAPL monitoring / recovery, and groundwater monitoring will be reviewed.

3.1 INSTITUTIONAL CONTROLS

ICs consist of the Deed Notice and the site fencing. The Deed Notice provided in Appendix A is a legal mechanism that has been properly filed with the Deed and will run in perpetuity. The site fencing is a physical structure that requires semi-annual inspection and maintenance, as necessary. The fence / Site inspections are conducted as part of the soil cover inspection activity described in Section 3.2. Repairs to maintain the fence, replace locks, reset or replace posts, and maintain the Site signage will be conducted. If the Site was redeveloped and additional fill was placed or hard surfaces (roads, building foundations, etc.) were constructed over the entire Site, then the fence would no longer be required.

3.2 SOIL COVER

A vegetated soil cover ~6 feet thick exists at the Site. In accordance with the Operation and Maintenance Requirements of the *Soil Remedy Certification Report*[4] (SRC Report), semi-annual inspections are conducted to verify that the soil cover is functioning properly. Appendix C provides the *Soil Remedy Semi-Annual Inspection Reporting Form*, which was approved by the Department as part of the SRC Report. The inspection activities will include:

- <u>Soil Cover</u>: Perform visual inspection of the soil cover for signs of erosion and settlement.

- <u>Vegetative Layer</u>: Perform visual inspection of the vegetation established on the soil cover for signs of disease and/or distress.

- <u>Gate/Fence</u>: Perform visual inspection of the perimeter fence and gate for signs of deterioration and/or damage.

If semi-annual monitoring identifies major problems in any of the areas identified, maintenance activities will be performed to remedy the deficiencies. The inspection results and any maintenance activities will be documented as part of the next Annual Report.

---

[4] KEY, June 2005, Soil Remedy Certification Report, New York Tar Emulsion Products Site, submitted to the NYSDEC.

If the Site was redeveloped and hard surfaces (roads, building foundations, etc.) were constructed, then inspection/maintenance of the soil cover may no longer be necessary. The Annual Report would provide the Department with recommendations to change the inspection form or to eliminate inspection requirements, if warranted.

3.3 GROUNDWATER MONITORING

Groundwater Monitoring will be conducted in accordance with the GMP (Appendix B). An annual inspection of the wells will be completed to identify any required maintenance. Appendix C provides a copy of the *Annual Well Inspection Form*. Typical maintenance activities would include; well redevelopment, repaint stickup, repair protective casings, lock replacement, repair well pads, and well relabeling.

As required by the ROD, a well search will be conducted on an annual basis to identify any new water supply wells installed within 1/2 mile of the Site. The well search evaluation is necessary to ensure that Site groundwater is not used for drinking purposes. The results of the well search will be provided in the Annual Report.

The Annual Report will also provide a review of the groundwater monitoring program. Recommendations to modify the groundwater monitoring program may be provided in the Annual Report based on the stability of the groundwater plume at the Site, redevelopment activities both on-Site or off-Site, or technological advances. Modifications will only be implemented following Department approval.

3.4 NAPL MONITORING AND RECOVERY

The NAPL monitoring and recovery remedial action consists of shallow sumps and intermediate wells. The NAPL remedial action requirements have been incorporated into the GMP (Appendix B), where further details are provided. The sumps and well components of the NAPL remedial action will be discussed separately below.

Shallow Sumps

The three shallow sumps were installed to monitor a small (~10 feet square) area where tar-like material had migrated to the surface of the soil cover. No NAPL has been observed in the sumps. A *Recovery Well Gauging Form* (Appendix C) is used to document the NAPL monitoring efforts, which are conducted monthly, and report any problems observed with the sumps. In addition to the monthly monitoring, the condition of the sumps will be inspected and documented annually, in accordance with the *Annual Well Inspection Form* (Appendix C), and maintained as necessary. If no NAPL is observed at the end of the two year period, the sumps will be abandoned by filling with cement bentonite grout and cutting and removing the stick-up pipe ~2 feet below ground surface.

Intermediate Wells

Nine NAPL monitoring / recovery wells have been installed at the Site. A *Recovery Well Gauging Form* (Appendix C) is used to document the NAPL monitoring efforts, which are conducted monthly, and report any problems observed with the wells. The wells will be inspected annually and maintenance conducted, as necessary. The recovery wells were constructed with a 2 foot sump. NAPL recovery activities will be conducted in accordance with the GMP schedule. NAPL will be recovered from each well when the NAPL thickness in the sump exceeds half of the sump height, i.e., 1 foot thick. The recovery well will be redeveloped when silt/sand has accumulated to a thickness of 1 foot in the sump. The termination criteria for NAPL recovery will be developed in accordance with the GMP schedule.

The recovered NAPL will be containerized and stored on-Site in accordance with applicable requirements. The NAPL and used PPE storage drum(s) will be located within the fenced area, placed on secondary containment, and inspected periodically. Maintenance will be conducted for the NAPL storage area.

4.0 SITE WORK REQUIREMENTS

All Contractors at the Site are required to conduct their work activities in accordance with their own *Site and Job Specific Health and Safety Plan*. In addition, any Site activities conducted by the Respondents have been and will continue to be conducted in accordance with Department-approved plans and OSHA regulation 29 CFR 1910.120. The following activities, representative of potential intrusive work, are reviewed to describe the material management approach to ensure that the on-going remedial actions remain effective:

- Augering / Excavation up to 6 feet (replacement of fence posts, intrusive cover inspections) would not require extensive monitoring unless indicated by visual or other means. The soils originate from clean fill and are not expected to be impacted. Visual inspection of soils will be conducted. If tar-like material is observed, then soils containing tar-like material must be containerized, tested, and properly managed off-site. Clean off-site borrow materials shall be used to restore the original elevations / grades of the soil cover. Imported backfill will be required to satisfy 6 NYCRR 375-6.7(d)(1)(ii)(b), and meet the soil cleanup objectives of the lower of either protection of public health/commercial use or the protection of groundwater. If soils do not contain tar-like material, they will be placed back in the excavation or on-Site, these soils shall not be removed from the Site.

- Excavation work below the soil cover (below the demarcation layer) requires containment, testing, and off-Site disposal of the subsoils, repair to the geotextile (demarcation layer), decontamination of the excavation tools / equipment, and repair / reseeding of the disturbed areas. The shallow soils (<6 feet) shall be managed as indicated above. Such excavation will also require real-time air monitoring at the downwind perimeter of the work zone. This work will be conducted in accordance with the New York State Department of Health Generic Community Air Monitoring Plan presented in Appendix D.

- Drilling activities will be conducted in accordance with the GMP (once approved) or other Department-approved plans that may be needed to support future activities. All soils, drilling fluids, groundwater, decontamination materials, and used disposable personnel protective equipment (PPE) will be containerized and properly managed off-Site. All equipment will be properly decontaminated before leaving the Site.

- NAPL recovery activities will be conducted in accordance with the existing Health and Safety Plan. The recovered NAPL will be containerized and properly stored and recycled or disposed off off-Site along with any used PPE.

- Any groundwater pumped at the Site must be containerized, tested, and properly managed.

- Well Development and Sampling will be conducted in accordance with the approved-GMP. Purge water will be containerized, tested, and managed appropriately off-Site.

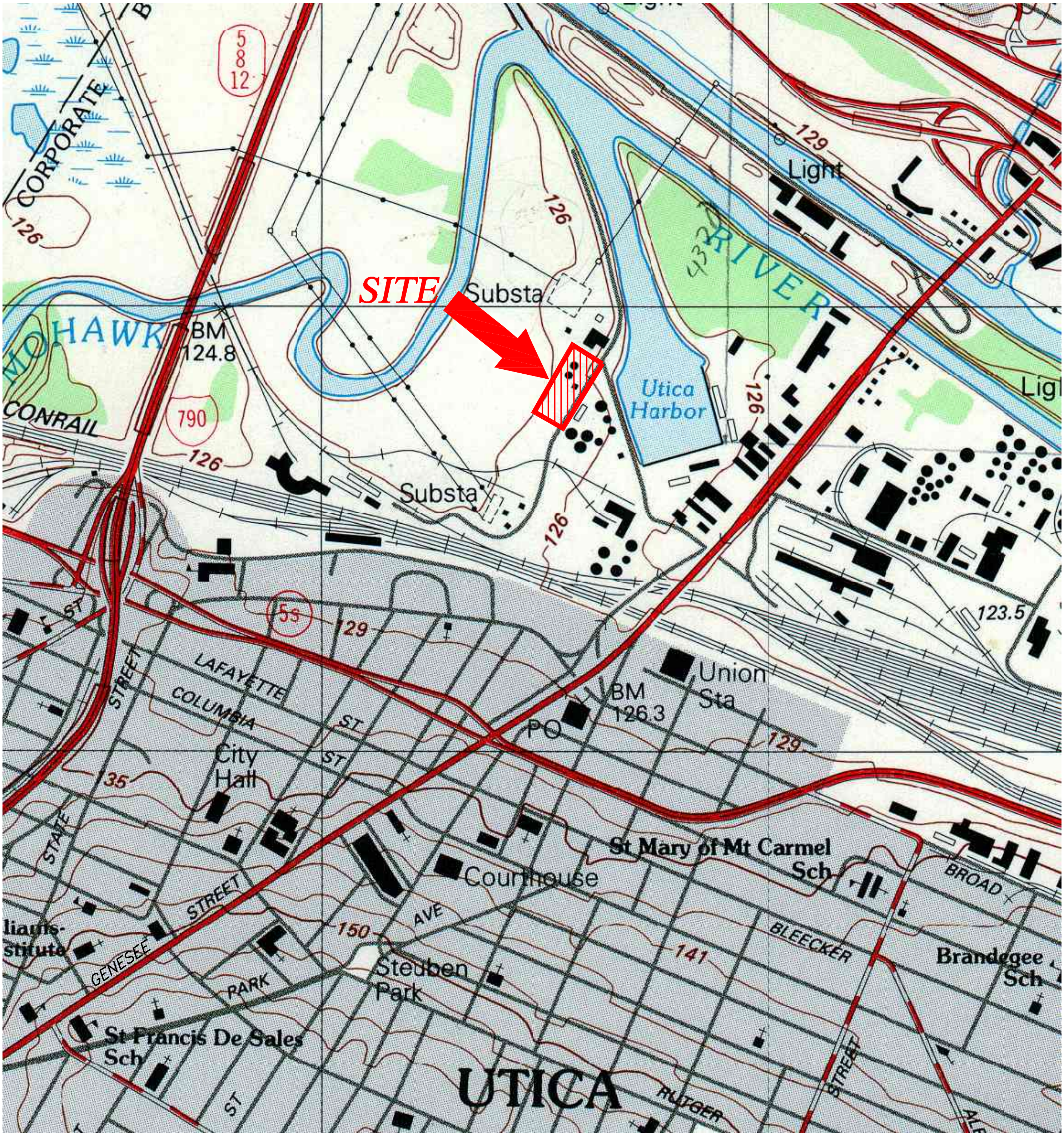
5.0 REPORTING

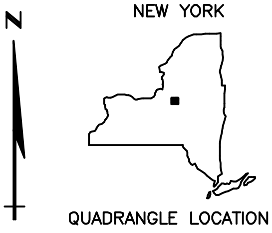
The Annual Report will be prepared documenting the inspection, maintenance and any corrective measures conducted through the reporting period. The report will provide the Department's required certification specified in Section 2.2 of this report. The Annual Report will include recommendations for changes to the maintenance, operations, inspections, or reporting activities. No changes will be implemented without the approval of the Department.

Any field activities that will involve excavation or drilling below the demarcation layer will require at least five working days' advance notice to the Department.

FIGURE 1

SITE LOCATION MAP





REFERENCE: USGS 7.5 MINUTE TOPOGRAPHIC QUADRANGLE
OF UTICA EAST, NEW YORK 1983

ISSUE DATE:

KEY ENVIRONMENTAL, INC.
200 THIRD AVENUE
CARNEGIE, PA 15106

BEAZER EAST, INC.
PITTSBURGH, PENNSYLVANIA

DRWN:	SCC	DATE: 05/12/08
CHKD:	MRL	DATE: 05/12/08
APPD:	MRL	DATE: 05/12/08
SCALE:	1" = 1000'	

KEY ENVIRONMENTAL INCORPORATED

SITE MANAGEMENT PLAN
NEW YORK TAR
EMULSION PRODUCTS SITE
UTICA, NEW YORK

SITE LOCATION MAP

PROJECT NO: 09-888

FIGURE 1

Y:\NYTEP\09-888\SITE MANAGEMENT PLAN\FIGURE 1.DWG

APPENDIX A

DEED NOTICE

*** DO NOT DETACH ***

COPY

Oneida County Clerk's Office

Recording Page

Receipt #:	233371	--------FEES--------	
Instrument #:	2005-012599	Recording and Filing:	60.00
Date:	06/21/2005	Transfer Tax:	0.00
Time:	10:05A	Basic Tax:	0.00
Doc Type:	DECLARATION	Additional Tax:	0.00
1st OR:	SUITE KOTE	Special Tax:	0.00
1st EE:	-	Withheld:	0.00
Town:	-	Total:	60.00
Pages:	11		
Serial #:	-	--------MORTGAGE TAX-----	
Employee ID:	JAB	Amount Taxed:	0.00
Transfer Tax #:		--------TRANSFER TAX-------	
		Consideration Amount:	0.00

Return Address:
SUIT KOE
PO BOX 5160
CORTLAND NY 13045

State of New York
County of Oneida

***** WARNING -** **I hereby certify that the within and foregoing was recorded in the Oneida County Clerk's Office, State of New York.**

This sheet constitutes the Clerks endorsement required by Section 316 of the Real Property Law of the State of New York.

Richard D. Allen
County Clerk

****

* *** DO NOT DETACH *** *

****

2005-012599
06/21/2005 10:05AM
Page: 1 of 11
Richard D. Allen, Oneida County Clerk DEC

10

DECLARATION of COVENANTS and RESTRICTIONS

THIS COVENANT, made the 15th day of JUNE 2005, by Suit-Kote Corporation, a corporation organized and existing under the laws of the State of New York and having an office at 1911 Lorings Crossing Road, Cortland, New York 13045 (hereinafter "Suit-Kote").

WHEREAS, property known as the former New York Tar Emulsion Products Site is the subject of an Order on Consent (the Order) executed by the New York State Department of Environmental Conservation (the Department), Suit-Kote and Beazer-East, Inc., namely that parcel of real property located at Washington Street in the City of Utica, Oneida County, State of New York, which is part of lands owned by Suit-Kote, and recorded in the Oneida County Clerk's Office on March 21, 1977 in Book 2040 of Deeds at Page 695 and being more particularly described in Appendix "A," attached to this declaration and made a part hereof, and hereinafter referred to as "the Property"; and

WHEREAS, the Department selected a remedy to address contamination at the Property and such remedy requires that the Property be subject to restrictive covenants.

NOW, THEREFORE, Suit-Kote, for itself and its successors and/or assigns, covenants that:

First, the Property subject to this Declaration of Covenants and Restrictions, is as shown on a map attached to this declaration as Appendix "B" and made a part hereof, and consists of:

Beginning at a point marked by an iron pipe in the northeasterly boundary line of a proposed new street, said proposed new street line being the continuation northwesterly of the division line between the lands of the Texas Company on the northeast and the lands of the Utica Gas and Electric Company on the southwest, said point being distant N. 58° 10' W. eighty (80) feet along said proposed street line from the extreme westerly corner of the lands of the Texas Company; thence N. 58° 10' W. eighty (80) feet along said proposed street line from the extreme westerly corner of the lands of the Texas Company; thence N. 58° 10' W. along said proposed new street line two hundred twenty-five (225) feet to a point marked by an iron pipe; thence N. 29° 26' E. five hundred forty and nine hundredths (540.09) feet to a point marked by an iron pipe; thence S. 60° 34' E. two hundred forty-seven and eighty-three hundredths (247.83) feet to a point marked by an iron pipe in a line parallel to and distant eighty (80) feet northwesterly at right angles form the northwesterly line of the heretofore mentioned lands of the Texas Company; thence S. 31° 50' W. along said last mentioned parallel line five hundred fifty (550) feet to the point of beginning.

Second, unless prior written approval by the Department or, if the Department shall no longer exist, any New York State agency or agencies subsequently created to protect the environment of the State and the health of the State's citizens, hereinafter referred to as "the Relevant Agency," is first obtained, there shall be no construction, use

Suit-Kote
1911 LoringsCrossing
PO Box 5160
Cortland NY 13045

or occupancy of the Property that results in the disturbance or excavation of the Property, which threatens the integrity of the soil cover, or which results in unacceptable human exposure to contaminated soils.

Third, the owner of the Property shall maintain the soil cover covering the Property by maintaining its grass cover or, after obtaining the written approval of the Relevant Agency, by covering the Property with another material.

Fourth, the owner of the Property shall prohibit the Property from being used for purposes other than for restricted commercial use, excluding day care, child care and medical care uses, without the express written waiver of such prohibition by the Relevant Agency.

Fifth, the owner of the Property shall prohibit the use of the groundwater underlying the Property without treatment rendering it safe for drinking or for industrial purposes, as appropriate, unless the user first obtains permission to do so from the Relevant Agency.

Sixth, the owner of the Property shall continue in full force and effect any institutional and engineering controls required under the Order, and shall maintain such controls unless the owner first obtains permission to discontinue such controls from the Relevant Agency.

Seventh, this Declaration is and shall be deemed a covenant that shall run with the land and shall be binding upon all future owners of the Property, and shall provide that the owner of the property, and its successors and assigns, consents to enforcement by the Relevant Agency of the prohibitions and restrictions that Paragraph X of the Order requires to be recorded, and hereby covenants not to contest the authority of the Relevant Agency to seek enforcement.

Eighth, any deed of conveyance of the Property, or any portion thereof, shall recite, unless the Relevant Agency has consented to the termination of such covenants and restrictions, that said conveyance is subject to this Declaration of Covenants and Restrictions.

IN WITNESS WHEREOF, the undersigned has executed this instrument the day written below.

In Presence of

In Witness Whereof, the party of the first part has signed by its duly authorized officer this   day of June, Two Thousand Five.

By Frank H. Suits Jr.

State of New York *)*
) ss
County of (CORTLAND) *)*

On 15th DAY OF JUNE 2005, before me, the undersigned, personally appeared **FRANK H. SUITS, JR.,** personally known to me or proved to me on the basis of satisfactory evidence to be the individual whose name is subscribed to the within instrument and acknowledged to me that he executed the same in his capacity, and that by his signature on the instrument, the individual, or the person upon behalf of which the individual acted, executed the instrument.

Notary Public

BRIAN P. RENNA
Notary Public, State of New York
Qualified in Onon. Co. No. 01RE6007609
Commission Expires May 26, 2006

Appendix A

142.90

#690

FILED
Utica, N. Y.
MAR 21 1977
Dept. of Assessment
& Taxation

THIS INDENTURE, made the 16th day of March Nineteen Hundred and Seventy-seven between KOPPERS COMPANY, INC., a corporation organized under the laws of Delaware, having its general offices in the Koppers Building, Pittsburgh, Pennsylvania, party of the first part, and NEW YORK EMULSIONS, INC., a New York corporation, having its official address at 700 Midtown Tower, Rochester, New York 14604,

party of the second part;

WITNESSETH, that the party of the first part, in consideration of ten dollars and other valuable consideration paid by the party of the second part, does hereby grant and release unto the party of the second part, the heirs or successors and assigns of the party of the second part forever,

ALL that certain plot, piece or parcel of land, with the buildings and improvements thereon erected, situate, lying and being in the City of Utica, County of Oneida and State of New York:

Beginning at a point marked by an iron pipe in the northeasterly boundary line of a proposed new street, said proposed new street line being the continuation northwesterly of the division line between the lands of the Texas Company on the northeast and the lands of the Utica Gas and Electric Company on the southwest, said point being distant N. 58° 10', W. eighty (80) feet along said proposed street line from the extreme westerly corner of the lands of the Texas Company; thence N. 58° 10' W. along said proposed new street line two hundred twenty-five (225) feet to a point marked by an iron pipe; thence N. 29° 26' E. five hundred forty and nine hundredths (540.09) feet to a point marked by an iron pipe; thence S. 60° 34' E. two hundred forty-seven and eighty-three hundredths (247.83) feet to a point marked by an iron pipe in a line parallel to and distant eighty (80) feet northwesterly at right angles from the northwesterly line of the heretofore mentioned lands of the Texas Company; thence S. 31° 50' W. along said last mentioned parallel line five hundred fifty (550) feet to the point of beginning. Containing two and nine hundred fifty-seven thousandths (2.957) acres, more or less, (as shown on Utica Gas and Electric Company's drawing C-5121-2, reference to which is hereby made). Being a part of parcel "N" conveyed to Utica Gas and Electric Company by Charles Davies individually and as Executor by Deed dated December 20, 1923, and recorded in the Office of the County Clerk of Oneida County, New York, in Deed Book 830 at page 152.

Being the same premises conveyed to the party of the first part by Deed dated November 9, 1944 and recorded in the Oneida County Clerk's Office in Liber 1063 of Deeds at page 211.

Together with the right to cross that strip of land thirty (30) feet wide lying between the property above described and the west line of Washington Street extended, as shown on the drawing referred to above, by persons, teams and vehicles at not more than three places to be selected by the party of the second part, together with the right to pass over Washington Street extended to the proposed new street and through the proposed new street to the nearest public highway.

Also the right of complete and unobstructed access across the southwesterly line of the property above described to the proposed new street as and when said proposed new street is made a public thoroughfare.

Also the right to connect the plant located upon the property above described with the potable water and sewer pipes of Utica Gas and Electric Company now laid in Washington Street opposite to said property, together with the right to use the same for water supply and sewage purposes.

Also the right to lay and maintain, either above or underground, conduits for telephone and electric wires and pipelines for gas, together with the right to connect same with sources of supply in Washington Street.

Also the right to connect the plant located on the property above described with the tar loading pipeline and water service pipeline of the Utica Gas and Electric Company located northerly of said property, together with the right to use the same for tar handling and water supply purposes.

SUBJECT, however, to easements, restrictions and reservations of record and to such state of facts that an accurate survey and an inspection of the premises would disclose, and also subject to the provisions in the Deed dated September 1, 1926 from Utica Gas and Electric Company recorded in the Oneida County Clerk's Office in Liber 879 of Deeds at page 24.

RECEIVED
$ 42.90
REAL ESTATE
MAR 21 1977
TRANSFER TAX
ONEIDA
COUNTY

RECORDED
LIBER ___ OF ___ PAGE
'77 MAR 21 AM 10:24
Mary
BY ONEIDA COUNTY CLERK

TOGETHER with the appurtenances and all the estate and rights of the party of the first part in and to said premises,

TO HAVE AND TO HOLD the premises herein granted unto the party of the second part, its heirs or successors and assigns forever.

AND the party of the first part covenants as follows:

FIRST. That the party of the first part covenants that it has not done or suffered anything whereby the said premises have been incumbered in any way whatever.

SECOND. That the party of the first part, in compliance with Section 13 of the Lien Law, covenants that the party of the first part will receive the consideration for this conveyance and will hold the right to receive such consideration as a trust fund to be applied first for the purpose of paying the cost of the improvement and will apply the same first to the payment of the cost of the improvement before using any part of the total of the same for any other purpose.

IN PRESENCE OF

IN WITNESS WHEREOF, The party of the first part has caused its corporate seal to be hereunto affixed, and these presents to be signed by its duly authorized officer the day and year first above written.

KOPPERS COMPANY, INC.

ATTEST:

John

Assistant Secretary

By

Vice President

1943

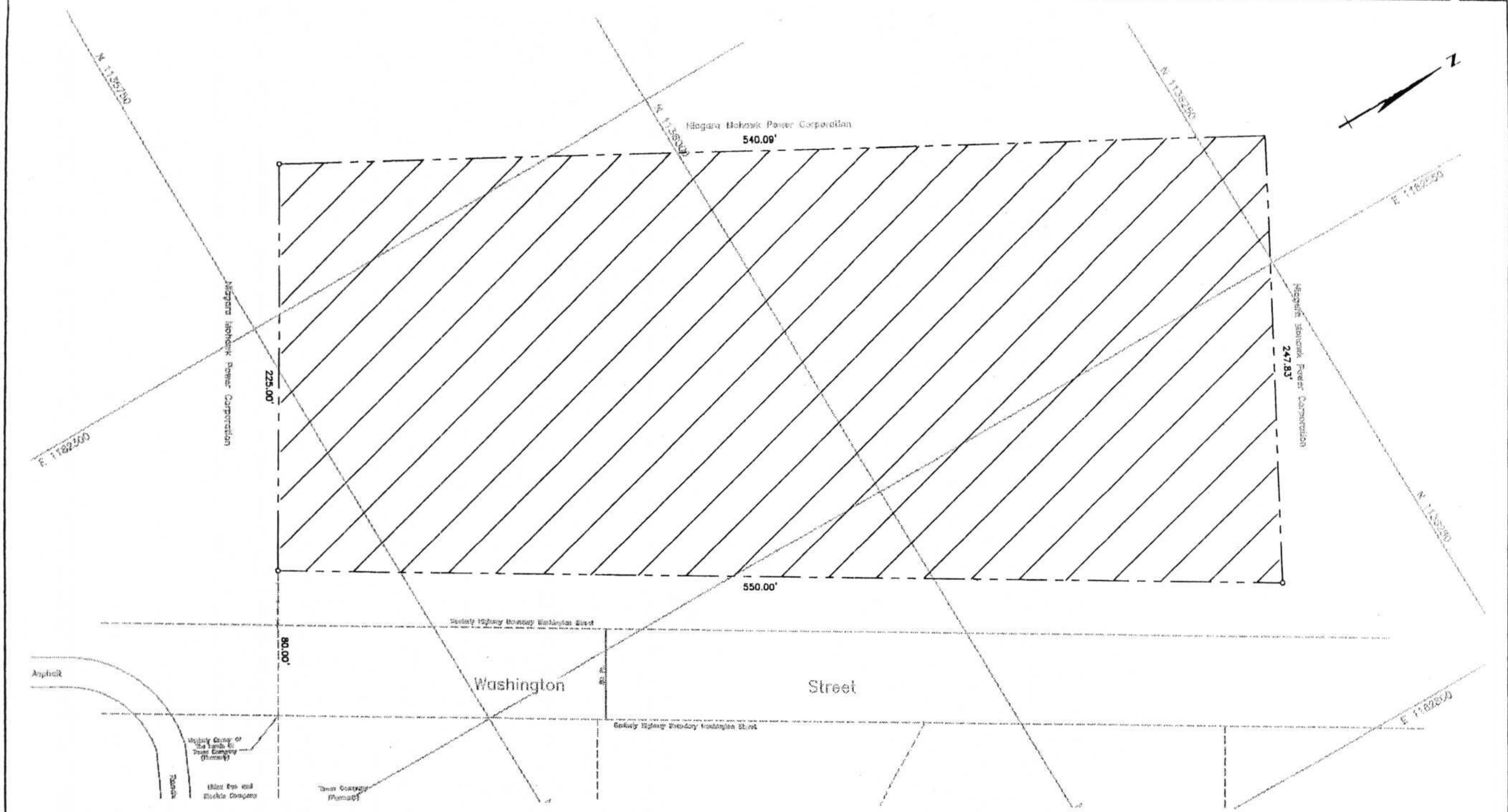
STATE OF PENNSYLVANIA)
) ss:
COUNTY OF ALLEGHENY)

On this 16th day of March, Nineteen Hundred and Seventy-seven before me personally came C. R. Puccini to me personally known, who, being by me duly sworn, did depose and say that he resides in Pittsburgh, Pennsylvania that he is a Vice President of KOPPERS COMPANY, INC., the corporation described in, and which executed, the above Instrument; that he knows the seal of said corporation; that the seal affixed to said Instrument is such corporate seal; that it was so affixed by order of the Board of Directors of said corporation; and that he signed his name thereto by like order.

Anne M. Horne

Anne M. Horne, Notary Public
Pittsburgh, Allegheny County, Pa.
My Commission Expires
July 8, 1980

Appendix B



LEGEND

—··—··— NYTEP SITE PROPERTY BOUNDARY

- - - - - OTHER PROPERTY BOUNDARY

○ IRON PIN SET AT PROPERTY CORNER

▨ LIMITS OF DEED RESTRICTION

NEW YORK STATE PLANE GRID

0 40 80 160
FEET

REFERENCE: TOPOGRAPHY AND PLANIMETRICS PROVIDED BY MYERS & ASSOCIATES, P.C., SURVEY DRAWING, 8/12/2002.
HORIZONTAL DATUM: NAD 1983

ISSUE DATE:

ROSSLYN FARMS
INDUSTRIAL PARK
1200 ARCH ST., SUITE 200
CARNEGIE, PA 15106

BEAZER EAST, INC.
PITTSBURGH, PENNSYLVANIA

DRWN: DAE	DATE: 05/20/05	
CHKD: RFD	DATE: 05/20/05	
APPD: NJM	DATE: 05/20/05	
SCALE:	AS SHOWN	

KEY ENVIRONMENTAL INCORPORATED

NEW YORK TAR EMULSION PRODUCTS SITE
UTICA, NEW YORK

LIMITS OF
DEED RESTRICTION

DRAWING NUMBER
APPENDIX B

CDS: Y:\NYTEP\04-846\G001A.DWG

APPENDIX B

GROUNDWATER MONITORING PLAN

GROUNDWATER MONITORING PLAN

NEW YORK TAR EMULSION PRODUCTS SITE

UTICA, NEW YORK

Prepared for:

Beazer East, Inc.

Prepared by:

Key Environmental, Inc.
200 Third Avenue
Carnegie, Pennsylvania 15106

June 2009

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

1.0 INTRODUCTION

Key Environmental, Inc. (KEY) has prepared this *Groundwater Monitoring Plan* (GMP) on behalf of Beazer East, Inc. (Beazer) and Suit-Kote Corporation (Suit-Kote) for the New York Tar Emulsion Products (NYTEP) site in Utica, New York (Site). Figure 1 presents the Site location map. The GMP has been prepared pursuant to and in accordance with the Record of Decision[1] (ROD) that was issued to Beazer and Suit-Kote by the New York State Department of Environmental Conservation (NYSDEC) in March 30, 2002. The ROD identified that groundwater monitoring be conducted to support the Site remedy. This section of the report provides the background information, summary of objectives, and identifies the report contents.

1.1 BACKGROUND

The Site remedial activities are being conducted pursuant to and in accordance with the ROD that was issued to Beazer and Suit-Kote by the NYSDEC. The ROD specifically identified soil remediation, passive NAPL recovery for subsurface NAPL in the southern portion of the Site, groundwater monitoring, and institutional controls. This GMP addresses the groundwater monitoring portion of the selected remedial actions. The soil and passive NAPL recovery remedial actions are summarized in the following paragraphs.

The soil corrective measures consisted of the excavation and off-Site disposal of soils with tar/NAPL up to a depth of about six feet across the entire ~3 acre property, as documented in the *Soil Remedy Certification Report*[2]. Following implementation of the soil remediation, NAPL was observed at the soil surface in a small area. Subsequently, the small area was re-excavated, subsurface NAPL stained materials were removed, and a shallow NAPL recovery sump system was installed in accordance with the approved[3]-*Surface Tar/NAPL Removal Letter Plan*[4]. The shallow NAPL recovery sump system consists of subsurface piping/gravel trenches connected to three NAPL recovery sumps operated as passive NAPL collectors. NAPL has not been observed in the shallow recovery sumps. Site inspections are conducted at the Site as required by the soil corrective measures. Surface Tar/NAPL has not been observed at the soil surface since re-excavation and installation of the shallow NAPL recovery sumps.

A series of borings were completed in the southern portion of the Site to determine the extent and presence of NAPL within the intermediate aquifer as depicted on Figure 2. Nine NAPL recovery wells were installed and subsequently monitored. NAPL was recovered from four of the nine locations, as indicated on Figure 2. NAPL recovery activities have been conducted for

---

[1] NYSDEC, March 30, 2002, Record of Decision NIMO – Harbor Point Property Operable Unit No. 1 – Peninsula-Site No. 6-33-021, New York Tar Emulsion Products Site-Site No. 6-33-031 Mohawk Valley Oil Site-Site No. 6-33-032.

[2] KEY, June 24, 2005, Soil Remedy Certification Report, New York Tar Emulsion Products Site, Utica, New York.

[3] NYSDEC, September 7, 2006, approval letter for the KEY Surface Tar/NAPL Removal Letter Plan.

[4] KEY, July 21, 2006, Surface Tar/NAPL Removal Letter Plan, New York Tar Emulsion Products Site, Utica, New York.

approximately two years, with approximately 18 gallons of NAPL removed. The majority of NAPL has been recovered from three locations: EW-103; EW-107; and, EW-101. The ROD indicated that passive NAPL recovery would be conducted and that criteria for termination of the NAPL recovery effort would be developed.

1.2 GMP OBJECTIVES

The *GMP* has been prepared specifically to address the following objectives:

- Evaluate the continuity of the shallow, unconfined zone at the Site;
- Monitor for NAPL movement within the shallow zone at the Site;
- Monitor the extent of NAPL in the intermediate aquifer in the southern portion of the Site to verify stability of the NAPL;
- Conduct periodic sampling to monitor the groundwater quality and trends in both the shallow and intermediate zones outside of the NAPL area;
- Verify groundwater flow direction and assess whether changes have occurred since the previous reporting period; and,
- Define the process to establish the termination criteria for the NAPL and groundwater remedial alternatives.

The *GMP* was developed and implemented to address these objectives.

1.3 REPORT CONTENTS

This *GMP* is organized into the following four sections:

- **Section 1.0: Introduction** – presents background information and identifies the report contents.
- **Section 2.0: Site Conditions Review –** provides a review of the relevant Site conditions.
- **Section 3.0: Groundwater Monitoring Plan Details** – provides a detailed overview of the groundwater monitoring program.
- **Section 4.0: Implementation Schedule and Reporting** – presents the implementation schedule and reporting schedule for the groundwater monitoring program.

This report is supported by seven figures and one table.

2.0 SITE CONDITIONS REVIEW

This section presents a review of the geologic strata, hydrogeology, NAPL distribution, and groundwater quality.

2.1 GEOLOGIC DESCRIPTION

The generalized geologic description of the near surface stratigraphy at this Site would be as follows, as presented from surface to depth:

- Placed Material;
- Basal remnant of the historic fill material;
- Fluvial Deposits;
- Lacustrine deposits; and,
- Glacial Till and Shale Bedrock.

Figure 3 presents a geologic cross section. A detailed description of each unit is provided in the following subsections.

2.1.1 Placed Material

The Placed Material consists of six to twelve-inch thick silt and clay topsoil unit overlying a brown silt, sand, and gravel fill material. Near surface native soils from the entire Site were excavated 6 feet below ground surface[5]. The excavation was then in-filled with the Placed Material as part of the 100% soil remedy.

2.1.2 Basal Remnant of the Historic Fill Material

A thin layer (averaging 1.3 ft thick) of stained soils consisting of silt, sand, and gravel was observed beneath the placed material and above the underlying lacustrine deposits in the vicinity of the NAPL extraction wells. This layer was interpreted as the basal section of the pre-excavation Site fill material, composed of fill, silt, sand, and gravel.

2.1.3 Fluvial Deposits

Site investigations indicate that the subsurface soil (silts and clays) underlying the placed/historic fill material was most likely deposited in a fluvial environment. The shallow fluvial confining unit has an average thickness of 16.8 feet and contain thin horizontal alternating rhythmic layers of silt and clay that occasionally exhibit vertically oriented desiccation partings.

---

[5] Key Environmental, Inc., April 28, 2004, 100% Soil Remedial Design Report.

The intermediate fluvial deposits (intermediate aquifer) consist of a sandy deposit and a silt deposit (with clay). The grain size of the intermediate fluvial deposits was generally observed to gradually decrease with depth. The gradational change in grain size makes it difficult to identify the unit's basal boundary with the underlying silt and clay layer. Therefore, the boundary between these layers was selected based on the depth in which clay content became visually and texturally apparent.

Prior investigations indicate that the sandy deposit portion of the intermediate fluvial deposit is discontinuous. This layer appears to have been deposited into an erosion channel that was incised into the underlying silty flood plain deposits. These deposits consist of poorly sorted silty sand. The sandy fluvial deposits vary in thickness from 0 ft to 18 ft and have previously been referred to as the intermediate sand layer.

2.1.4 Lacustrine Deposits

Silt deposits are present beneath and adjacent to the intermediate sand layer and appear to represent over-bank or flood plain deposits. The silt deposit was not fully penetrated as part of the recent drilling effort, however, the silty deposit layer thickness ranged from >2 feet to >14 feet. These deposits act as a confining unit.

2.1.5 Glacial Till and Shale Bedrock

A glacial till soil and the middle Ordovician Utica Shale bedrock are believed to be present beneath the intermediate fluvial deposits.

2.2 HYDROGEOLOGIC CONDITIONS

The hydrogeology of the Site consists of a shallow perched and potentially discontinuous water-bearing zone within the placed material and historic fill on top of the fluvial deposits and the presence of a confined transmissive water-bearing zone within the intermediate fluvial deposits. Previous investigations indicated that the shallow water-bearing zone was discontinuous and potentially perched, therefore, this zone can not be reasonably termed as a shallow aquifer. It is intended that the continuity of this zone will be evaluated as part of the GMP via newly installed well pairs and groundwater sampling and elevation measurement.

Groundwater flow within the confined intermediate aquifer is generally northeastward towards the Utica Harbor, as depicted on Figure 4. The presence of the sandy fluvial channel deposit (depicted on Figure 3), the isopach map (Figure 5) and the aquitard contour map (Figure 6), associated with the intermediate aquifer, indicates little influence on the groundwater flow directions but the channel deposit may influence horizontal groundwater gradients. Horizontal groundwater flow gradients vary from 0.004 to 0.011 ft/ft at the passive NAPL recovery well locations. Groundwater gradients are anticipated to be related to the thickness of the sandy fluvial channel deposits within the confined intermediate aquifer, because thick zones are more transmissive than thin zones.

2.3 NAPL DISTRIBUTION

Previous subsurface investigations indicated that the shallow aquitard contains horizontal silt seams and vertical desiccation partings, some of which contain tar or NAPL staining. It appears that an interconnected network of vertical desiccation partings and horizontal silt seams is a possible pathway for the migration of NAPL from the historic fill layer to the intermediate confined aquifer.

Tar, NAPL staining, or NAPL was observed during drilling in the upper portions of the intermediate confined aquifer layer at every location except SB-104. Figure 2 depicts the current extent of mobile NAPL based on the observations at the passive recovery wells.

2.4 GROUNDWATER QUALITY

As indicated in the ROD, the NYTEP Site is a small portion (~3 acres) of the ~100 acre Harbor Point Peninsula. Groundwater within an approximate area of 60 acres, including the entire NYTEP Site, exceeds the standards for compounds of concern (COCs). According to the ROD, the COCs for groundwater consist of a few volatile organic compounds (VOCs) and semi-volatile organic compounds (SVOCs). Specific VOCs of concern are: benzene; toluene; ethylbenzene; and, xylenes, collectively known as BTEX. Specific SVOCs are mainly polycyclic aromatic hydrocarbons (PAHs). The PAHs of interest are: acenaphthene; acenaphthylene; anthracene; benzo(a)anthracene; benzo(a)pyrene; benzo(b)fluoranthene; benzo(g,h,i)perylene; benzo(k)fluoranthene; dibenzo(a,h)anthracene; chrysene; fluoranthene; fluorene; indeno(1,2,3-cd)pyrene; 2-methylnaphthalene; naphthalene; phenanthrene; and, pyrene.

3.0 GROUNDWATER MONITORING PLAN DETAILS

This section of the GMP provides a description of the monitoring well network, details of the proposed monitoring, and the sampling / testing requirements.

3.1 MONITORING WELL NETWORK

Figure 7 depicts the proposed monitoring well network. The network consists of the three existing shallow sumps, nine existing intermediate zone NAPL monitoring / recovery wells, and three proposed shallow/intermediate zones groundwater monitoring well pairs.

3.2 MONITORING PLAN

Table 1 identifies the proposed monitoring for the monitoring well network. The monitoring plan details and rationale to address the GMP objectives are reviewed below.

Shallow Zone NAPL Monitoring

The continuity of the shallow zone is not known. During the earlier field activities it was encountered as a perched discontinuous water bearing unit consisting primarily of man-placed fill, which had become impacted with NAPL / tar-like materials. During implementation of the soil corrective measures, as discussed in Section 1.1, the shallow zone was dewatered to facilitate the excavation of the tar / NAPL containing soils above the clay confining unit. The excavated materials were disposed of off-Site. Clean imported fill was placed within the dewatered excavation (which encompassed the entire Site), regraded to minimize ponding of water at the Site, and re-vegetated.

As a result of the soils corrective measures, the shallow zone was dramatically altered. Hence it is recommended that three monitoring wells be installed in the shallow zone to determine the hydrogeologic conditions within the Placed Material. Periodic surface inspections are conducted to identify the recurrence of tar/NAPL expression at the ground surface. Shortly after completion of the soil corrective measures, the Site inspection identified one area (approx. 10 feet by 10 feet) with surface tar/NAPL. The area was subsequently excavated, the NAPL source material removed, and three shallow sumps were installed to monitor and collect any mobile NAPL. No NAPL has been observed in the sumps, which have been monitored for approximately 1.5 years.

The inspection approach is appropriate for monitoring the effectiveness of the soil corrective measures for the shallow zone. The existing three sumps will be gauged monthly to determine the presence of NAPL. Site inspections required by the soil corrective measures will continue. Any tar/NAPL areas observed at the ground surface will be investigated, remediated, and monitored for mobile NAPL, as necessary.

The shallow zone wells will be sampled in a baseline event and then annually for two years for the COCs identified in Section 2.4, i.e., BTEX and selected PAHs. Sampling and analysis details are provided in Table 1.

Intermediate Confined Aquifer NAPL Monitoring

Based on the discussion in Section 2.0, the intermediate confined aquifer is the primary unit of interest from a constituent transport and monitoring perspective. As required by the ROD, passive NAPL recovery has been implemented for the southern portion of the Site. A series of NAPL recovery wells, as discussed in Section 1.1, were installed and continue to be gauged monthly. Accumulated NAPL is recovered as necessary. The same approach is proposed for monitoring the extent of NAPL at the Site in this area.

Intermediate Confined Aquifer Groundwater Constituent Monitoring

As indicated in the ROD, groundwater use restrictions and user surveys are being implemented to ensure that the groundwater is not used. The NYTEP site groundwater monitoring will focus on the northern portion of the Site, where mobile NAPL is not expected. The northern areas of the Site exhibit thicker (more transmissive) sandy deposits comprising the intermediate confined aquifer thus making them candidate locations for a monitoring well. Three monitoring wells will be installed at locations taking into account the presence of NAPL, the groundwater flow direction in the intermediate confined aquifer, and the thickness of the intermediate confined aquifer. These wells will be paired with three shallow zone wells discussed earlier in this section. Tentative monitoring well locations are shown on Figure 7. The monitoring wells will be periodically sampled. The groundwater samples will be analyzed for the COCs identified in Section 2.4; BTEX and selected PAHs. A baseline sampling event will be conducted, followed by two annual sampling events.

4.0 IMPLEMENTATION SCHEDULE AND REPORTING

The monitoring wells will be installed within 4 months from approval of this GMP. The wells will be developed in accordance with the applicable TAGM. The baseline sampling will then be conducted at least two weeks after completion of the well development. At least six months will lapse between sampling events. An annual groundwater monitoring report will be provided to the NYSDEC no later than the end of the following January.

Following completion of the two year program defined in this GMP, the annual report will include an evaluation of the NAPL monitoring data, NAPL recovery data, Site monitoring results, and groundwater monitoring data. The purpose of the evaluation is to develop the long-term strategy and monitoring requirements associated with the NAPL and groundwater remedial action. Termination criteria for NAPL recovery efforts will be developed as part of this report in accordance with the March 10, 2008 NYSDEC letter modifying the ROD.

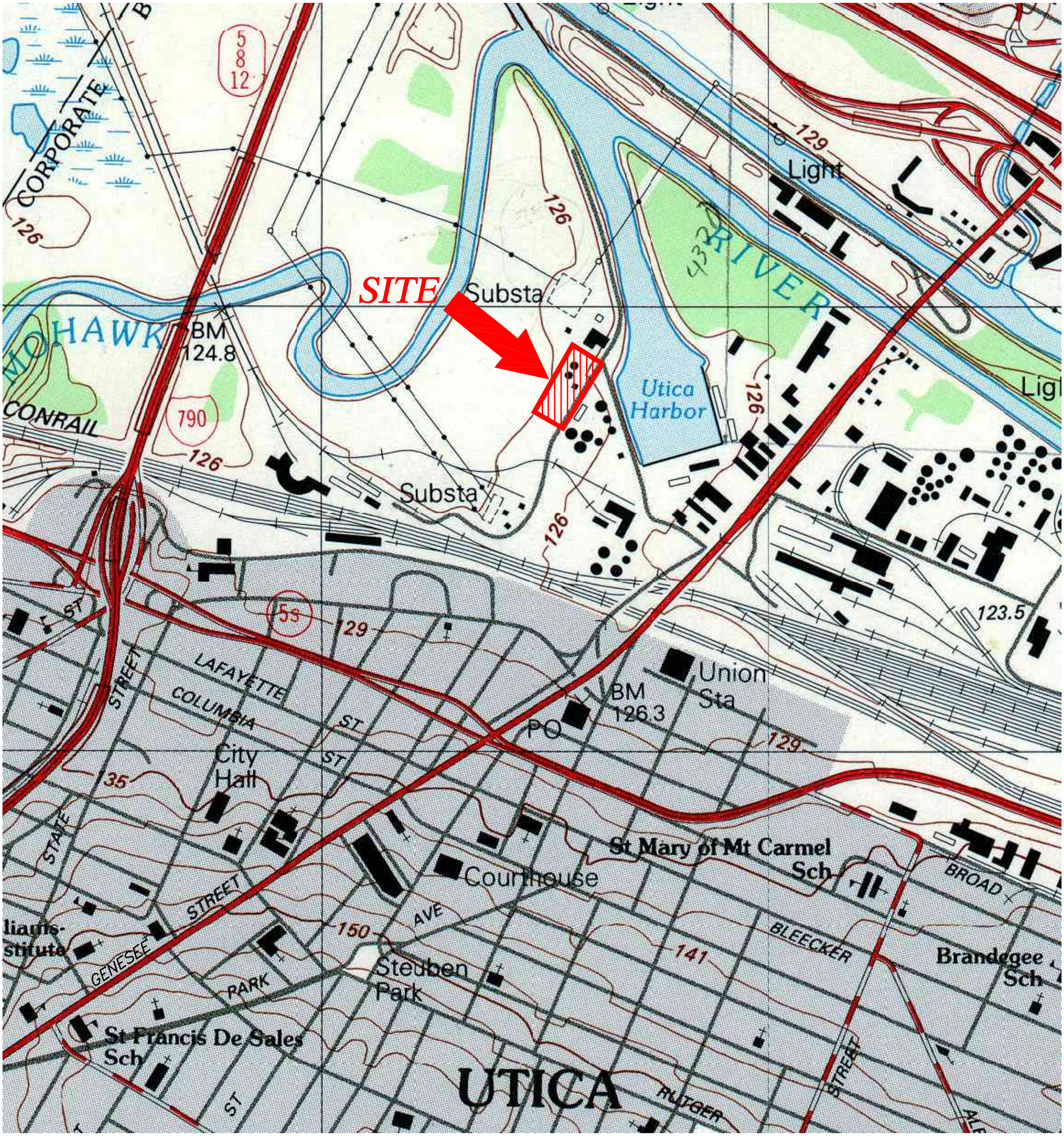
TABLE

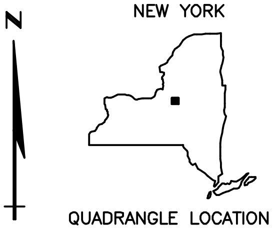
TABLE 1
GROUNDWATER MONITORING PLAN SCHEDULE

NEW YORK TAR EMULSION PRODUCTS SITE
UTICA, NY

UNIT / LOCATION	LOCATIONS	FREQUENCY AND DURATION	TESTING
Shallow Zone			
DNAPL Monitoring	Sump 1, 2, and 3	Monthly for Two Years	Gauge sump for indication of DNAPL only. Gauge water level.
Groundwater Constituent Monitoring	MW-01S, MW-02S, and MW-03S	Baseline and Two Annual	Gauge water level. Water sample tested for BTEX and PAHs
Intermediate Zone			
DNAPL Monitoring	EW-100, EW-101, EW-102, EW-103, EW-105, EW-106, EW-107, EW-108, and EW-109	Monthly for Two Years	Gauge well for indication of DNAPL, remove accumulated DNAPL. Gauge water level.
Groundwater Constituent Monitoring	MW-01I, MW-02I, and MW-03I	Baseline and Two Annual	Gauge water level. Water sample tested for BTEX and PAHs

FIGURES





REFERENCE: USGS 7.5 MINUTE TOPOGRAPHIC QUADRANGLE
OF UTICA EAST, NEW YORK 1983

ISSUE DATE:

KEY ENVIRONMENTAL, INC.
200 THIRD AVENUE
CARNEGIE, PA 15106

BEAZER EAST, INC.
PITTSBURGH, PENNSYLVANIA

DRWN:	SCC	DATE: 05/12/08
CHKD:	MRL	DATE: 05/12/08
APPD:	MRL	DATE: 05/12/08
SCALE:	1" = 1000'	

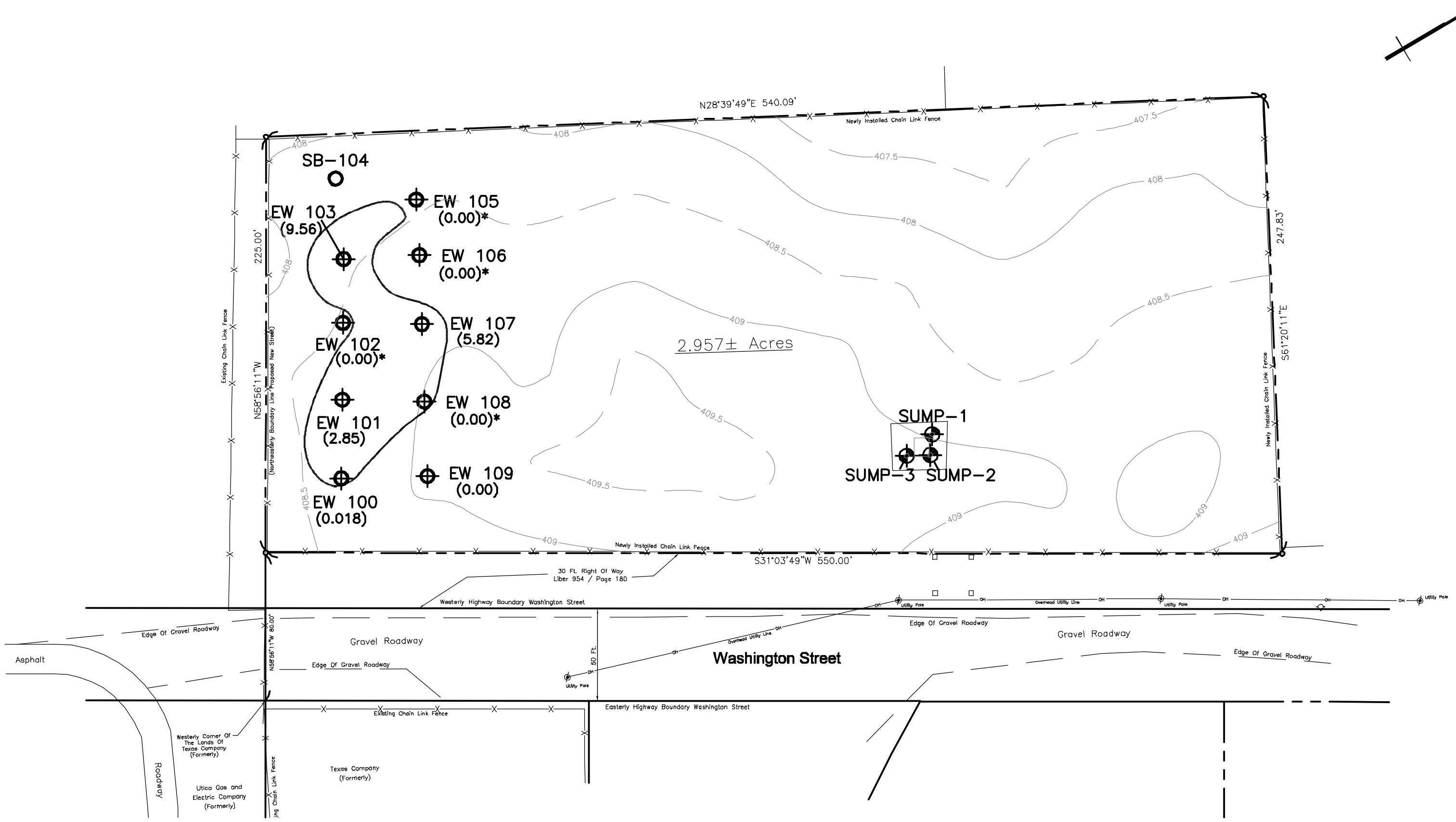
KEY ENVIRONMENTAL INCORPORATED

GROUNDWATER MONITORING PLAN
NEW YORK TAR
EMULSION PRODUCTS SITE
UTICA, NEW YORK

SITE LOCATION MAP

PROJECT NO: 09-888

FIGURE 1



LEGEND

— — - - — — - - — —	SITE PROPERTY BOUNDARY AND CHAIN LINK FENCE
————————	EDGE OF ROAD
— — — — —	EDGE OF GRAVEL ROAD
——x——x——x——x—	CHAIN LINK FENCE
——— 409 ———	GROUND SURFACE ELEVATION CONTOUR INTERVAL
————————	INFERRED EXTENT OF FREE NAPL – APRIL 2008
(0.18)	TOTAL GALLONS OF NAPL REMOVED – APRIL 2008
EW 100 ⊕	NAPL EXTRACTION WELL
SB–104 ○	SOIL BORING
SUMP–1 ⊕	SHALLOW NAPL RECOVERY SUMP

0 100 200
FEET

BEAZER EAST, INC.
PITTSBURGH, PENNSYLVANIA

DRWN:	SCC	DATE: 06/17/08
CHKD:	MRL	DATE: 06/17/08
APPD:	MRL	DATE: 06/17/08
SCALE:	AS SHOWN	

KEY ENVIRONMENTAL INCORPORATED

GROUNDWATER MONITORING PLAN
NEW YORK TAR EMULSION PRODUCTS SITE
UTICA, NEW YORK

REFERENCE:

* SHEEN NOTED FOR 2 OR MORE EVENTS

ISSUE DATE:

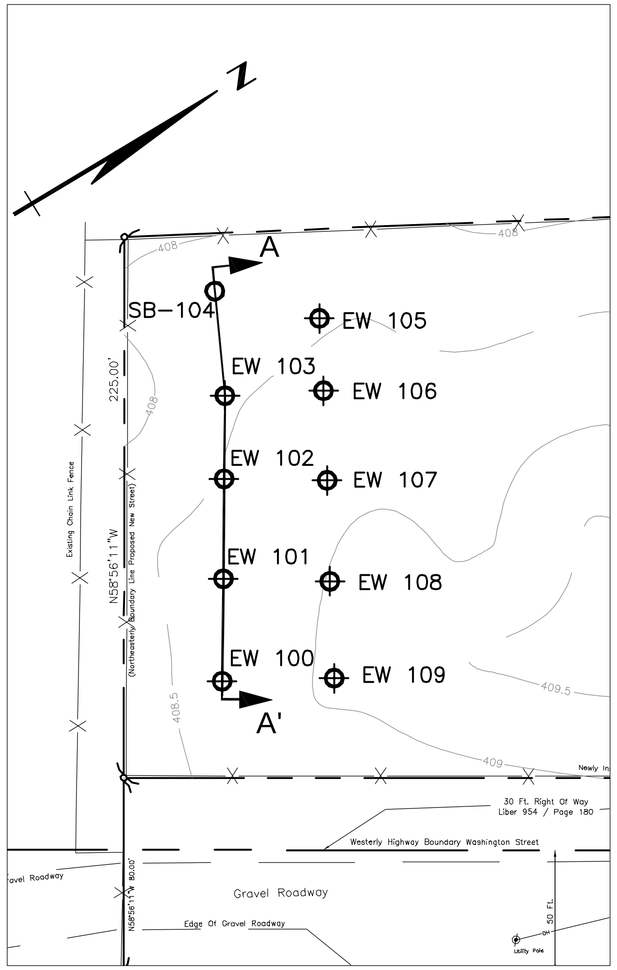
KEY ENVIRONMENTAL, INC.
200 THIRD AVENUE
CARNEGIE, PA 15106

BORING, WELL, AND SUMP
LOCATION MAP

PROJECT NO: 09–888

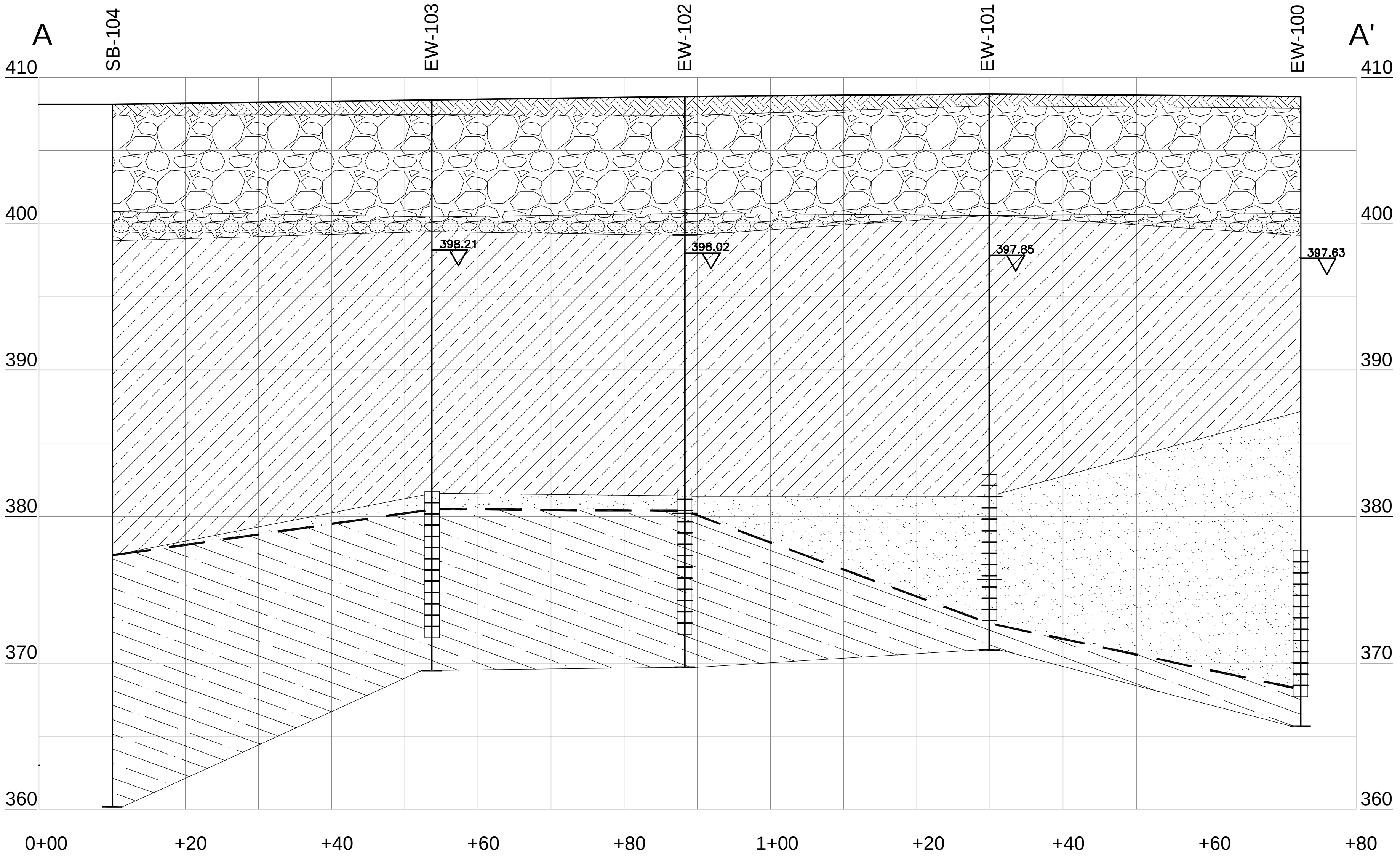
FIGURE 2

Y:\NYTEP\09–888\GROUNDWATER MANAGEMNET PLAN\FIGURE 2.DWG



PLAN VIEW

SCALE 0 80 160 FEET



LEGEND

▨	TOP SOIL
▨	PLACED MATERIAL (FILL)
▨	BASAL REMNANT FOR THE HISTORIC FILL MATERIAL (GRAVEL & SILT LAYER)
▨	CLAY LAYER
▨	INTERMEDIATE DEPOSITS (SAND LAYER)
▨	INTERMEDIATE DEPOSITS (SILT LAYER)
— ○ —	ELEVATION OF BASE OF INTERMEDIATE SAND LAYER
397.70 ▽	WATER LEVEL AUGUST 21, 2007
EW 106 ⊕	NAPL EXTRACTION WELL
SB-104 ○	SOIL BORING
☰	SCREEN LOCATION

CROSS SECTION A-A'

V 0 10 20 FEET

H 0 20 40 FEET

BEAZER EAST, INC.
PITTSBURGH, PENNSYLVANIA

DRWN: SCC	DATE: 06/06/08
CHKD: TEJ	DATE: 06/06/08
APPD: MRL	DATE: 06/06/08
SCALE: AS SHOWN	

KEY ENVIRONMENTAL INCORPORATED

GROUNDWATER MONITORING PLAN
NEW YORK TAR EMULSION PRODUCTS SITE
UTICA, NEW YORK

GEOLOGICAL CROSS SECTION A–A'

PROJECT NO: 09-888
FIGURE 3

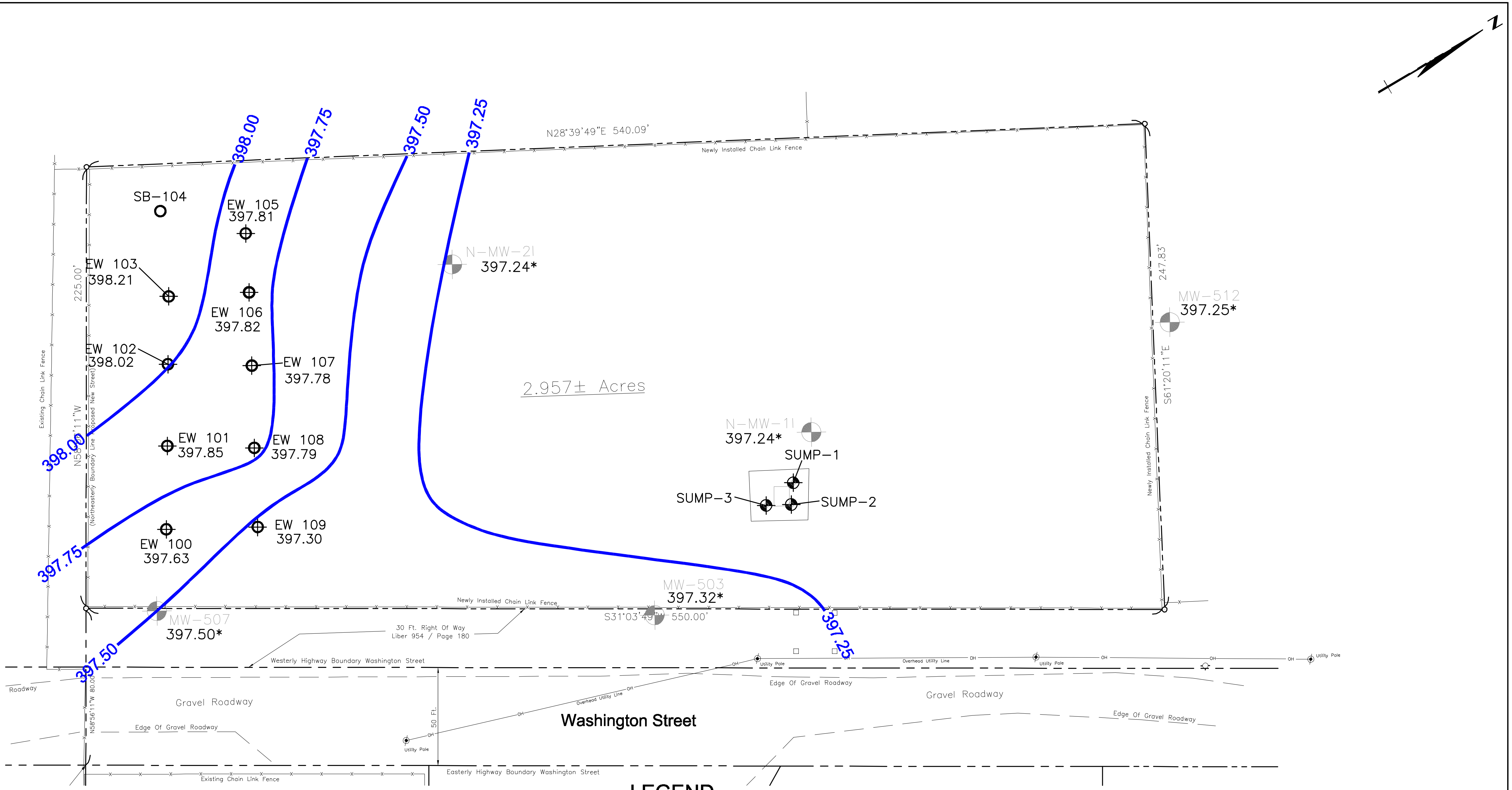
REV #	DATE	DESCRIPTION	APPD
△			
△			
△1			

REFERENCE:

ISSUE DATE:

KEY ENVIRONMENTAL, INC.
200 THIRD AVENUE
CARNEGIE, PA 15106

y:\nytep\09-888\groundwater managemnet plan\figure 3.dwg Last Saved By: Scomer 6/23/2009 11:22 AM Plotted By: Shelly Comer 6/25/2009 12:35 PM Scale: 1:1



LEGEND

— - — - —	SITE PROPERTY BOUNDARY AND CHAIN LINK FENCE
———	EDGE OF ROAD
— — —	EDGE OF GRAVEL ROAD
—x—x—	CHAIN LINK FENCE
397.75———	POTIOMETRIC SURFACE OF THE INTERMEDIATE FLUVIAL LAYER CONTOUR INTERVAL 0.25'
397.30	POTENTIOMETRICL ELEVATION
EW 109 ⊕	NAPL EXTRACTION WELL
SB-104 ○	SOIL BORING
SUMP-1 ⊕	SHALLOW NAPL RECOVERY SUMP

0 50 100
FEET

BEAZER EAST, INC.
PITTSBURGH, PENNSYLVANIA

DRWN: CRJ	DATE: 06/13/08	KEY ENVIRONMENTAL INCORPORATED
CHKD: TEJ	DATE: 06/13/08	
APPD: MRL	DATE: 06/13/08	
SCALE:	AS SHOWN	

GROUNDWATER MONITORING PLAN
NEW YORK TAR EMULSION PRODUCTS SITE
UTICA, NEW YORK

POTENTIOMETRIC SURFACE
OF THE INTERMEDIATE
CONFINED AQUIFER–8/21/07

PROJECT NO: 09-888
FIGURE 4

REV #	DATE	DESCRIPTION	APPD
△			
△			
△1			

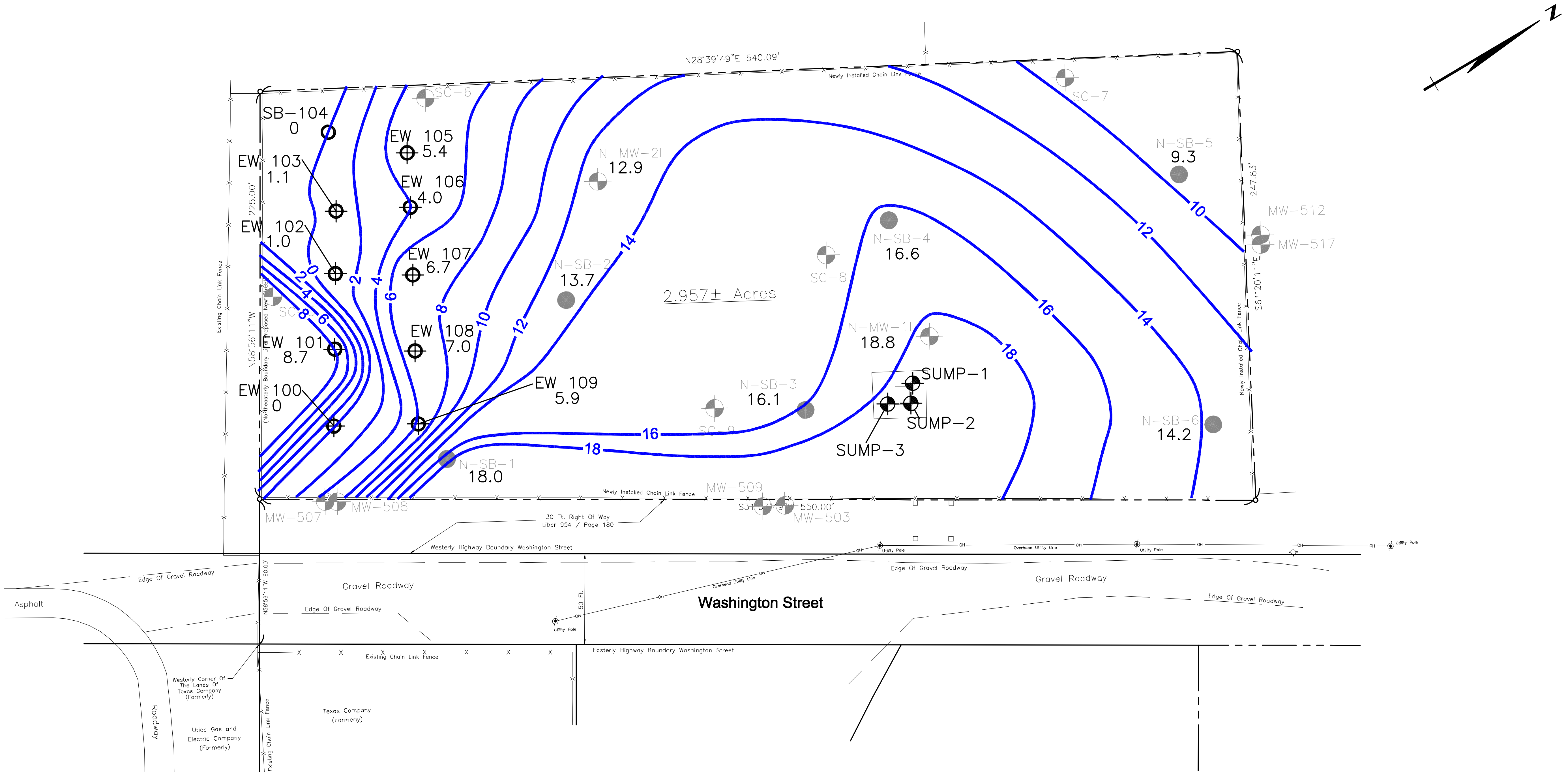
REFERENCE:

* 1998 WATER LEVEL DATA NORMALIZED TO AUGUST 21, 2007 DATA

ISSUE DATE:

KEY ENVIRONMENTAL, INC.
200 THIRD AVENUE
CARNEGIE, PA 15106

y:\nytep\09-888\groundwater managemnet plan\figure 4.dwg Last Saved By: Scomer 5/28/2009 10:43 AM Plotted By: Shelly Comer 5/28/2009 11:32 AM Scale: 1:1



LEGEND

— — —— — —	SITE PROPERTY BOUNDARY AND CHAIN LINK FENCE
———	EDGE OF ROAD
— — —	EDGE OF GRAVEL ROAD
—x—x—	CHAIN LINK FENCE
EW 100 ⌖	NAPL EXTRACTION WELL
SB-104 ○	SOIL BORING
SUMP-1 ⌖	SHALLOW NAPL RECOVERY SUMP
⊕	ABANDONED MONITORING WELL
●	ABANDONED TEST BORING
—370—	ISOPACH CONTOURS CONTOUR INTERVAL 2.0'

0 60 120
FEET

BEAZER EAST, INC.
PITTSBURGH, PENNSYLVANIA

DRWN: CRJ	DATE: 06/11/08
CHKD: TEJ	DATE: 06/11/08
APPD: MRL	DATE: 06/11/08
SCALE: AS SHOWN	

KEY ENVIRONMENTAL INCORPORATED

GROUNDWATER MONITORING PLAN
NEW YORK TAR EMULSION PRODUCTS SITE
UTICA, NEW YORK

ISSUE DATE:

KEY ENVIRONMENTAL, INC.
200 THIRD AVENUE
CARNEGIE, PA 15106

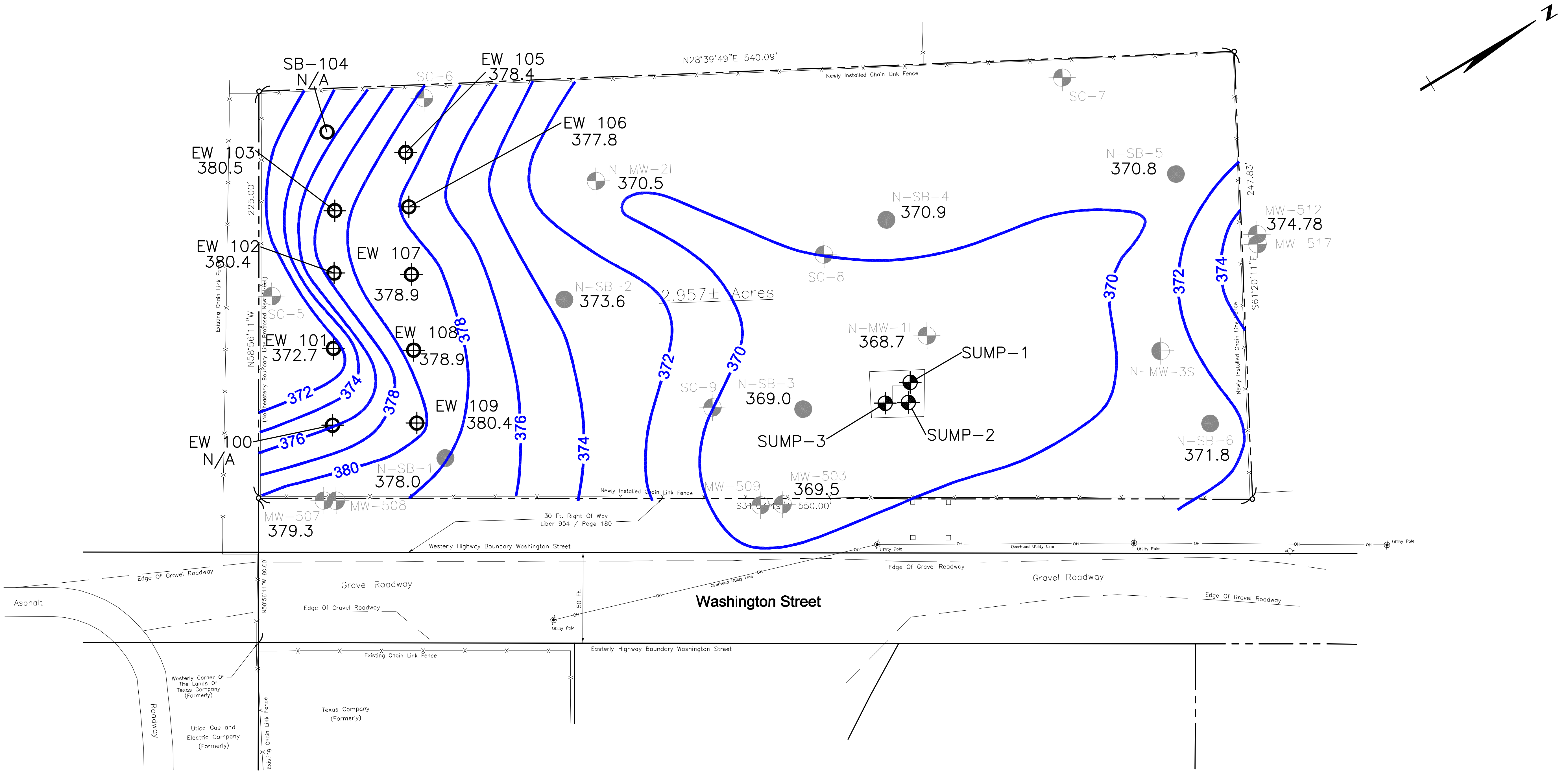
ISOPACH MAP OF THE
INTERMEDIATE CONFINED AQUIFER

PROJECT NO: 09-888
FIGURE 5

REFERENCE:

REV #	DATE	DESCRIPTION	APPD
△			
△			
1			

y:\nytep\09-888\groundwater managemnet plan\figure 5.dwg Last Saved By: Scomer 5/28/2009 10:42 AM Plotted By: Shelly Comer 5/28/2009 11:32 AM Scale: 1:1



LEGEND

SITE PROPERTY BOUNDARY AND CHAIN LINK FENCE

EDGE OF ROAD

EDGE OF GRAVEL ROAD

CHAIN LINK FENCE

EW 100 NAPL EXTRACTION WELL

SB-104 SOIL BORING

SUMP-1 SHALLOW NAPL RECOVERY SUMP

ABANDONED MONITORING WELL

● ABANDONED TEST BORING

370 AQUITARD SURFACE CONTOURS CONTOUR INTERVAL 2.0'

0 60 120
FEET

BEAZER EAST, INC.
PITTSBURGH, PENNSYLVANIA

DRWN: CRJ	DATE: 06/11/08	KEY ENVIRONMENTAL INCORPORATED
CHKD: TEJ	DATE: 06/11/08	
APPD: MRL	DATE: 06/11/08	
SCALE:	AS SHOWN	

GROUNDWATER MONITORING PLAN
NEW YORK TAR EMULSION PRODUCTS SITE
UTICA, NEW YORK

TOP OF INTERMEDIATE
AQUITARD

PROJECT NO: 09-888

FIGURE 6

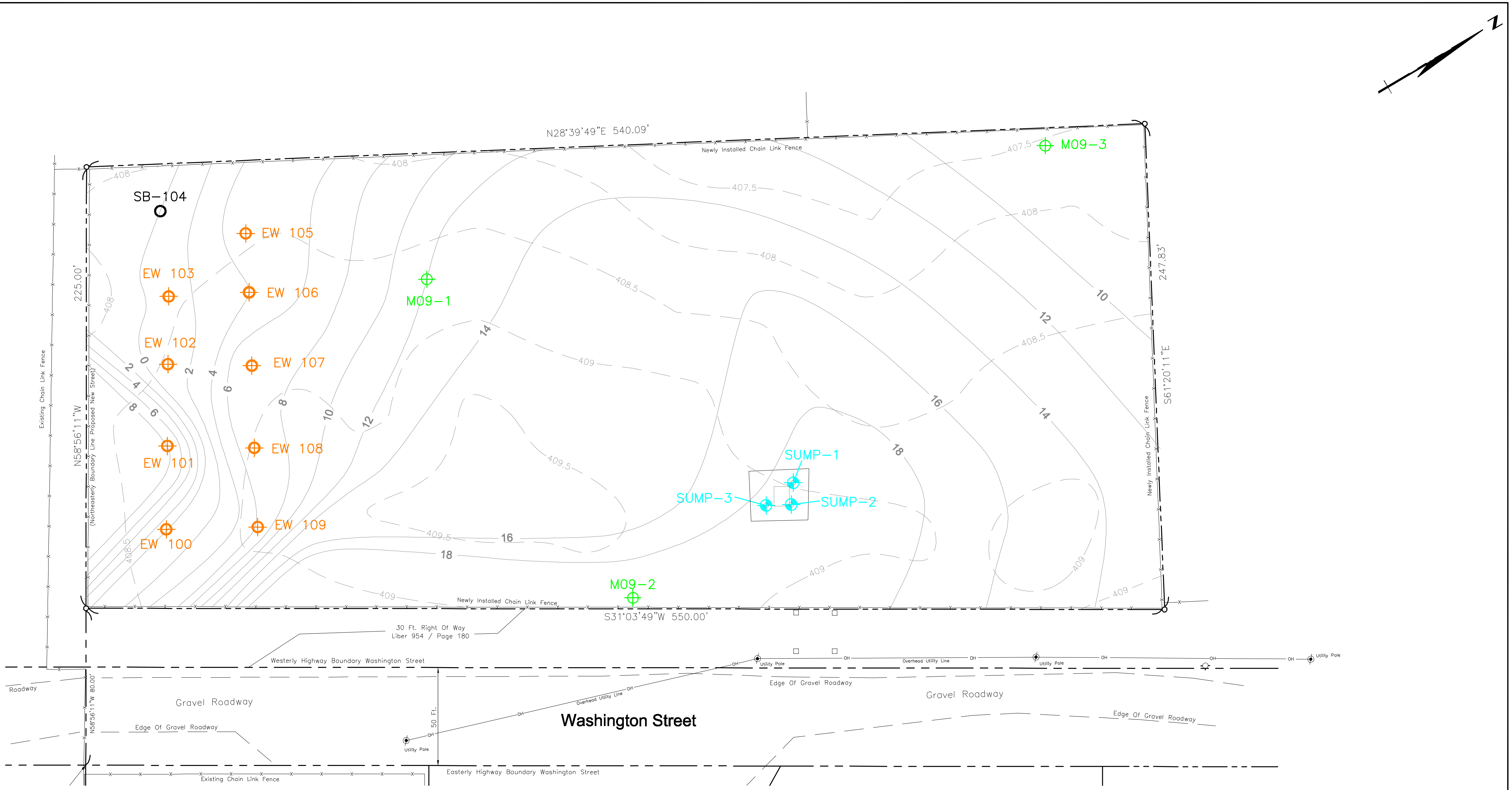
ISSUE DATE:

KEY ENVIRONMENTAL, INC.
200 THIRD AVENUE
CARNEGIE, PA 15106

REFERENCE:

REV #	DATE	DESCRIPTION	APPD
△			
△			
1			

y:\nytep\09-888\groundwater managemnet plan\figure 6.dwg Last Saved By: Scomer 5/28/2009 10:42 AM Plotted By: Shelly Comer 5/28/2009 11:32 AM Scale: 1:1



LEGEND

SITE PROPERTY BOUNDARY

EDGE OF ROAD

EDGE OF GRAVEL ROAD

CHAIN LINK FENCE

409 GROUND SURFACE ELEVATION CONTOUR INTERVAL

370 ISOPACH CONTOURS OF INTERMEDIATE CONFINED AQUIFER

SB–104 ○ SOIL BORING

SUMP–1 ⊕ SHALLOW ZONE DNAPL MONITORING LOCATION

EW 109 ⊕ INTERMEDIATE ZONE DNAPL MONITORING LOCATION

M09–1 ⊕ SHALLOW AND INTERMEDIATE ZONE MONITORING WELL PAIR GROUNDWATER SAMPLING LOCATION

0 50 100 FEET

REV #	DATE	DESCRIPTION	APPD
△			
△			
△1			

REFERENCE:

* SHEEN NOTED FOR TWO OR MORE EVENTS.

ISSUE DATE:

KEY ENVIRONMENTAL, INC.
200 THIRD AVENUE
CARNEGIE, PA 15106

BEAZER EAST, INC.
PITTSBURGH, PENNSYLVANIA

DRWN: SCC	DATE: 11/11/08
CHKD: MRL	DATE: 11/11/08
APPD: MRL	DATE: 11/11/08
SCALE:	AS SHOWN

KEY ENVIRONMENTAL INCORPORATED

GROUNDWATER MONITORING PLAN
NEW YORK TAR EMULSION PRODUCTS SITE
UTICA, NEW YORK

PROPOSED MONITORING PROGRAM

PROJECT NO: 09–888

FIGURE 7

y:\nytep\09–888\groundwater managemnet plan\figure 7.dwg Last Saved By: Scomer 5/28/2009 10:42 AM Plotted By: Shelly Comer 5/28/2009 11:31 AM Scale: 1:1

APPENDIX C

INSPECTION FORMS

SOIL REMEDY SEMI-ANNUAL INSPECTION FORM

NEW YORK TAR EMULSION PRODUCTS SITE
UTICA, NEW YORK

The following inspection is to be performed on a semi-annual basis to monitor site conditions in relation to the 100% Soil Remedial Design.

ITEM NUMBER	**YES/NO**
1) Is the site gate locked? IF NOT, EXPLAIN	_______
2) Is the site fence in acceptable condition? If NOT, EXPLAIN	_______
3) Does the site fence have any new wear or damage? IF SO, EXPLAIN	_______
4) Does the soil cover show any new signs of erosion or settlement? IF SO, EXPLAIN	_______
5) Does site vegetation show any signs of disease or distress? IF SO, EXPLAIN	_______

NOTES:

____

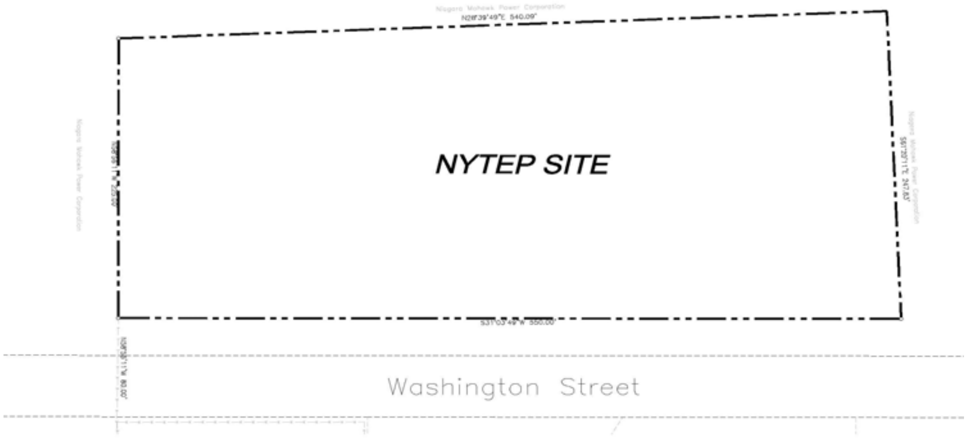
____

____

____

____

____



Inspected By: ______________________ **Date:** ___________

Signature

____

Print

Recovery Well Gauging Form

Utica FORM 1, Revision 0 (1/2/07)

Date: __________ **Operator:** ____________________

Weather/Site Conditions: ____

DNAPL COLLECTION

Well ID	Volume/ft (gal)	Time	Depth to Bottom (ft)	Depth to Water (ft)	Depth to DNAPL (ft)	DNAPL thickness (ft)	Calculated DNAPL Volume (gal)	DNAPL Recovered (gal)	Depth to Water after Pumping (ft)	Depth to DNAPL after Pumping (ft)	Comments
Sump 01			13.83								
Sump 02			13.88								
Sump 03			13.77								
EW-100			43.67								
EW-101			40.56								
EW-102			41.05								
EW-103			41.51								
EW-105			40.19								
EW-106			38.01								
EW-107			40.75								
EW-108			40.20								
EW-109			39.45								

STORAGE DRUMS					WASTE MANAGEMENT	
DRUM	Time*	Total Fluid Volume (gal)			Previous Disposal Event (Date, Gallons Disposed)	
Onsite Drum						

*MEASURE AFTER DNAPL RECOVERY TASKS ARE COMPLETED

ADDITIONAL COMMENTS / ACTIVITIES COMPLETED:

____

____

____

____

ND = Not Detected
NA = Not Applicable

Annual Well / Sump Inspection Form

Utica FORM 1, Revision 0 (8/11/08)

Date:

Weather/Site Conditions:

Well ID	Proper Label?	Protective Casing painted?	Well Pad Condition	Condition of Lock	Inner Casing Cap?	Inner Casing Material	Total Depth / Silt	Other	Comments
Sump 01									
Sump 02									
Sump 03									
MW-01									
MW-02									
MW-03									
EW-100									
EW-101									
EW-102									
EW-103									
EW-105									
EW-106									
EW-107									
EW-108									
EW-109									
MO9-1S									
MO9-1I									
MO9-2S									
MO9-2I									
MO9-3S									
MO9-3I									

ADDITIONAL COMMENTS / ACTIVITIES COMPLETED:

APPENDIX D

GENERIC COMMUNITY AIR MONITORING PLAN

New York State Department of Health
Generic Community Air Monitoring Plan

A Community Air Monitoring Plan (CAMP) requires real-time monitoring for volatile organic compounds (VOCs) and particulates (i.e., dust) at the downwind perimeter of each designated work area when certain activities are in progress at contaminated sites. The CAMP is not intended for use in establishing action levels for worker respiratory protection. Rather, its intent is to provide a measure of protection for the downwind community (i.e., off-site receptors including residences and businesses and on-site workers not directly involved with the subject work activities) from potential airborne contaminant releases as a direct result of investigative and remedial work activities. The action levels specified herein require increased monitoring, corrective actions to abate emissions, and/or work shutdown. Additionally, the CAMP helps to confirm that work activities did not spread contamination off-site through the air.

The generic CAMP presented below will be sufficient to cover many, if not most, sites. Specific requirements should be reviewed for each situation in consultation with NYSDOH to ensure proper applicability. In some cases, a separate site-specific CAMP or supplement may be required. Depending upon the nature of contamination, chemical- specific monitoring with appropriately-sensitive methods may be required. Depending upon the proximity of potentially exposed individuals, more stringent monitoring or response levels than those presented below may be required. Special requirements will be necessary for work within 20 feet of potentially exposed individuals or structures and for indoor work with co-located residences or facilities. These requirements should be determined in consultation with NYSDOH.

Reliance on the CAMP should not preclude simple, common-sense measures to keep VOCs, dust, and odors at a minimum around the work areas.

Community Air Monitoring Plan

Depending upon the nature of known or potential contaminants at each site, real-time air monitoring for volatile organic compounds (VOCs) and/or particulate levels at the perimeter of the exclusion zone or work area will be necessary. Most sites will involve VOC and particulate monitoring; sites known to be contaminated with heavy metals alone may only require particulate monitoring. If radiological contamination is a concern, additional monitoring requirements may be necessary per consultation with appropriate NYSDEC/NYSDOH staff.

Continuous monitoring will be required for all ground intrusive activities and during the demolition of contaminated or potentially contaminated structures. Ground intrusive activities include, but are not limited to, soil/waste excavation and handling, test pitting or trenching, and the installation of soil borings or monitoring wells.

Periodic monitoring for VOCs will be required during non-intrusive activities such as the collection of soil and sediment samples or the collection of groundwater samples from existing monitoring wells. "Periodic" monitoring during sample collection might reasonably consist of taking a reading upon arrival at a sample location, monitoring while opening a well cap or overturning soil, monitoring during well baling/purging, and taking a reading prior to leaving a sample location. In some instances, depending upon the proximity of potentially exposed individuals, continuous monitoring may be required during sampling activities. Examples of such situations include groundwater sampling at wells on the curb of a busy urban street, in the midst of a public park, or adjacent to a school or residence.

VOC Monitoring, Response Levels, and Actions

Volatile organic compounds (VOCs) must be monitored at the downwind perimeter of the immediate work area (i.e., the exclusion zone) on a continuous basis or as otherwise specified. Upwind concentrations should be measured at the start of each workday and periodically thereafter to establish background conditions. The monitoring work should be performed using equipment appropriate to measure the types of contaminants known or suspected to be present. The equipment should be calibrated at least daily for the contaminant(s) of concern or for an appropriate surrogate. The equipment should be capable of calculating 15-minute running average concentrations, which will be compared to the levels specified below.

- If the ambient air concentration of total organic vapors at the downwind perimeter of the work area or exclusion zone exceeds 5 parts per million (ppm) above background for the 15-minute average, work activities must be temporarily halted and monitoring continued. If the total organic vapor level readily decreases (per instantaneous readings) below 5 ppm over background, work activities can resume with continued monitoring.

- If total organic vapor levels at the downwind perimeter of the work area or exclusion zone persist at levels in excess of 5 ppm over background but less than 25 ppm, work activities must be halted, the source of vapors identified, corrective actions taken to abate emissions, and monitoring continued. After these steps, work activities can resume provided that the total organic vapor level 200 feet downwind of the exclusion zone or half the distance to the nearest potential receptor or residential/commercial structure, whichever is less - but in no case less than 20 feet, is below 5 ppm over background for the 15-minute average.

- If the organic vapor level is above 25 ppm at the perimeter of the work area, activities must be shutdown.

All 15-minute readings must be recorded and be available for State (DEC and DOH) personnel to review. Instantaneous readings, if any, used for decision purposes should also be recorded.

Particulate Monitoring, Response Levels, and Actions

Particulate concentrations should be monitored continuously at the upwind and downwind perimeters of the exclusion zone at temporary particulate monitoring stations. The particulate monitoring should be performed using real-time monitoring equipment capable of measuring particulate matter less than 10 micrometers in size (PM-10) and capable of integrating over a period of 15 minutes (or less) for comparison to the airborne particulate action level. The equipment must be equipped with an audible alarm to indicate exceedance of the action level. In addition, fugitive dust migration should be visually assessed during all work activities.

- If the downwind PM-10 particulate level is 100 micrograms per cubic meter (mcg/m^3) greater than background (upwind perimeter) for the 15-minute period or if airborne dust is observed leaving the work area, then dust suppression techniques must be employed. Work may continue with dust suppression techniques provided that downwind PM-10 particulate levels do not exceed 150 mcg/m^3 above the upwind level and provided that no visible dust is migrating from the work area.

- If, after implementation of dust suppression techniques, downwind PM-10 particulate levels are greater than 150 mcg/m^3 above the upwind level, work must be stopped and a re-evaluation of activities initiated. Work can resume provided that dust suppression measures and other controls are successful in reducing the downwind PM-10 particulate concentration to within 150 mcg/m^3 of the upwind level and in preventing visible dust migration.

All readings must be recorded and be available for State (DEC and DOH) personnel to review.

June 20, 2000

APPENDIX E

FIELD SAMPLING PLAN

FIELD SAMPLING PLAN

NEW YORK TAR EMULSION PRODUCTS SITE

UTICA, NEW YORK

Prepared for:

Beazer East, Inc.

Prepared by:

Key Environmental, Inc.
200 Third Avenue
Carnegie, Pennsylvania 15106

June 2009

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

1.0 INTRODUCTION

On behalf of Beazer East, Inc. (Beazer) and Suit-Kote Corporation (Suit-Kote), Key Environmental, Inc. (KEY) has prepared this Field Sampling Plan (FSP) to monitor the groundwater within the shallow and intermediate water bearing zones at the New York Tar Emulsion Products (NYTEP) Site in Utica, New York (Site). The Site location is shown in Figure 1. This section of the report includes relevant background information and a summary of the objectives of the FSP. Specific methodologies to be followed are discussed in Section 2.0. This FSP is supported by three figures and one table.

1.1 BACKGROUND INFORMATION

Passive non-aqueous phase liquid (NAPL) recovery is presently being implemented at nine wells and a sump pursuant to and in accordance with the Record of Decision[1] (ROD) that was issued to Beazer and Suit-Kote by the NYSDEC. These nine passive NAPL recovery wells were installed and developed from June 26 through July 6th, 2006. Test boring and well installation methodology and results from the passive NAPL recovery is presented in the June 13, 2008 Report[2].

Beazer provided NYSDEC with the GMP on July 7, 2008. The GMP scope includes the installation and monitoring of six groundwater monitoring wells at the Site. The monitoring will be conducted annually for a period of two years following which recommendations will be made for subsequent monitoring, if determined necessary. The FSP methodologies described herein are consistent with methods used for the installation of the nine passive NAPL recovery wells and in accordance with the NYSDEC-approved[3] NAPL Recovery Pre-Design Investigation Work Plan (Work Plan).

1.2 PURPOSE, OBJECTIVE, AND SCOPE OF WORK

The objectives of this project, as provided within the GMP, are as follows:

- Determine if there is a continuous shallow unconfined aquifer present within the placed material.

---

[1] NYSDEC, March 30, 2002, Record of Decision NIMO – Harbor Point Property Operable Unit No. 1 – Peninsula-Site No. 6-33-021, New York Tar Emulsion Products Site-Site No. 6-33-031 Mohawk Valley Oil Site-Site No. 6-33-032.

[2] Key Environmental, Inc., June 13, 2008, NAPL Recovery Pre-Design Investigation Report, New York Tar Emulsion Products Site, Utica, New York.

[3] NYSDEC, February 16, 2006, approval letter for the NAPL Recovery Pre-Design Investigation Work Plan dated January 27, 2006.

- Determine if there have been any changes in groundwater flow direction since the remedial activities and the last investigative report.

- Quantify dissolved phase constituents of concern in the shallow and intermediate aquifers for purposes of identifying trends and demonstrate stability/improvement of the constituent concentrations in groundwater.

The following is a summary of the scope of work for this FSP to meet the above-stated objectives. They are as follows:

- Drill and install three groundwater monitoring well-clusters that each include a shallow and intermediate water bearing zone monitoring well (Figure 2).

- Survey each monitoring well for location and elevation and reference to the New York State Plane Coordinate System.

- Develop, obtain groundwater elevation data, and use low flow methods to collect samples from these three groundwater monitoring well clusters.

- Collect and analyze baseline groundwater data and two subsequent annual events to determine trends in dissolved phase constituents using linear regression methods.

- Issue NYSDEC three groundwater reports at annual intervals that will contain results from the initial baseline sampling event and the two subsequent annual sampling events.

2.0 METHODOLOGIES

This site FSP will be consistent with the May 11, 1998 Remedial Investigation/Feasibility Study (RI/FS) Work Plan[4] with exceptions and method updates listed below. In addition, two figures showing the location and construction details of the proposed groundwater monitoring wells are attached (Figures 2 and 3).

- 4-inch diameter Rotosonic drilling methods will be used and will be consistent with the NAPL recovery investigation.

- Well installation and construction will be similar to the NAPL recovery well methods with the exception that the monitoring wells will consist of two inch diameter schedule 40 PVC riser pipe and screen. Figure 3 presents the proposed well construction details. Table 1 lists the anticipated well construction details for each monitoring well based on stratigraphic information from abandoned groundwater monitoring wells from the RI/FS and other previous investigations.

- Well development will be consistent with previous methods used at the Site and the NYSDEC Technical Administrative Guidance Manual (TAGM) No. 4007 and the Division of Environmental Remediation (DER) program policy #10 (DER-10).

- Groundwater sampling will be conducted following methodology presented in the attached updated QAPP (Appendix F). This QAPP is a modified version of the approved QAPP that was attached to the 1998 RI/FS Work Plan document (Appendix F – QAPP). This QAPP has been modified to include low flow purging and sampling procedures, updated field data forms, and revised Standard Operating Procedure (SOP) briefs. In addition, text pertaining to sediment and soil sampling has been deleted.

- Quality assurance and quality control QA/QC samples including matrix spike and matrix spike duplicates (MS/MSD), trip blanks, equipment blanks, and duplicate samples will be collected at intervals specified in the QAPP.

- Drilling equipment will be decontaminated between each borehole using a steam cleaner. Decontamination fluids will be collected and temporarily staged on-site in drums or portable tanks.

- Most equipment used for the groundwater sampling component of this field effort will be dedicated or disposable. Exceptions may include water level meters and water quality instrumentation. These devices will be decontaminated between sampling locations as specified in the QAPP.

---

[4] Key Environmental, Inc., May 11, 1998, Final Remedial Investigation /Feasibility Study Work Plan, New York Tar Emulsion Products Site, Utica, New York.

- Management of investigation derived waste (IDW) will be conducted in accordance with the attached SOP #122 (Appendix G) and NYSDEC TAGM – 4032 and 4061. Solids (soil cuttings) will be segregated from liquids (purge liquids). Personal protection equipment (PPE) will be containerized separately in 55-gallon drums. Other non-IDW items will be collected, placed in plastic bags, and disposed of as municipal waste.

3.0 QAPP, SOPs and HASP

An updated QAPP is attached to the SMP as Appendix F. The primary update to the QAPP is the inclusion of low flow groundwater purge and sampling methodology and the deletion of text referring to analytical sediment and soil sampling. Attached to the QAPP are updated field data forms. The QAPP is based on collecting and analyzing groundwater samples for constituents of interest (COIs) listed in the ROD. These COIs consist of a focused set of volatile organic compounds (VOCs) and semi-volatile organic compounds (SVOCs). Specific VOCs of interest are benzene, toluene, ethylbenzene, and xylene, collectively known as BTEX. Specific SVOCs are mainly polycyclic aromatic hydrocarbons (PAHs). The PAHs of interest are: acenaphthene; acenaphthylene; anthracene; benzo(a)anthracene; benzo(a)pyrene; benzo(b)fluoranthene; benzo(g,h,i)perylene; benzo(k)fluoranthene; dibenzo(a,h)anthracene; chrysene; fluoranthene; fluorene; indeno(1,2,3-cd)pyrene; 2-methylnaphthalene; naphthalene; phenanthrene; and pyrene.

Appendix G of the SMP includes SOPs related to this field effort. Appendix H presents the updated Site- and project-specific HASP. This HASP was developed from the July 2006 recovery well installation HASP which was updated for the current scope of work.

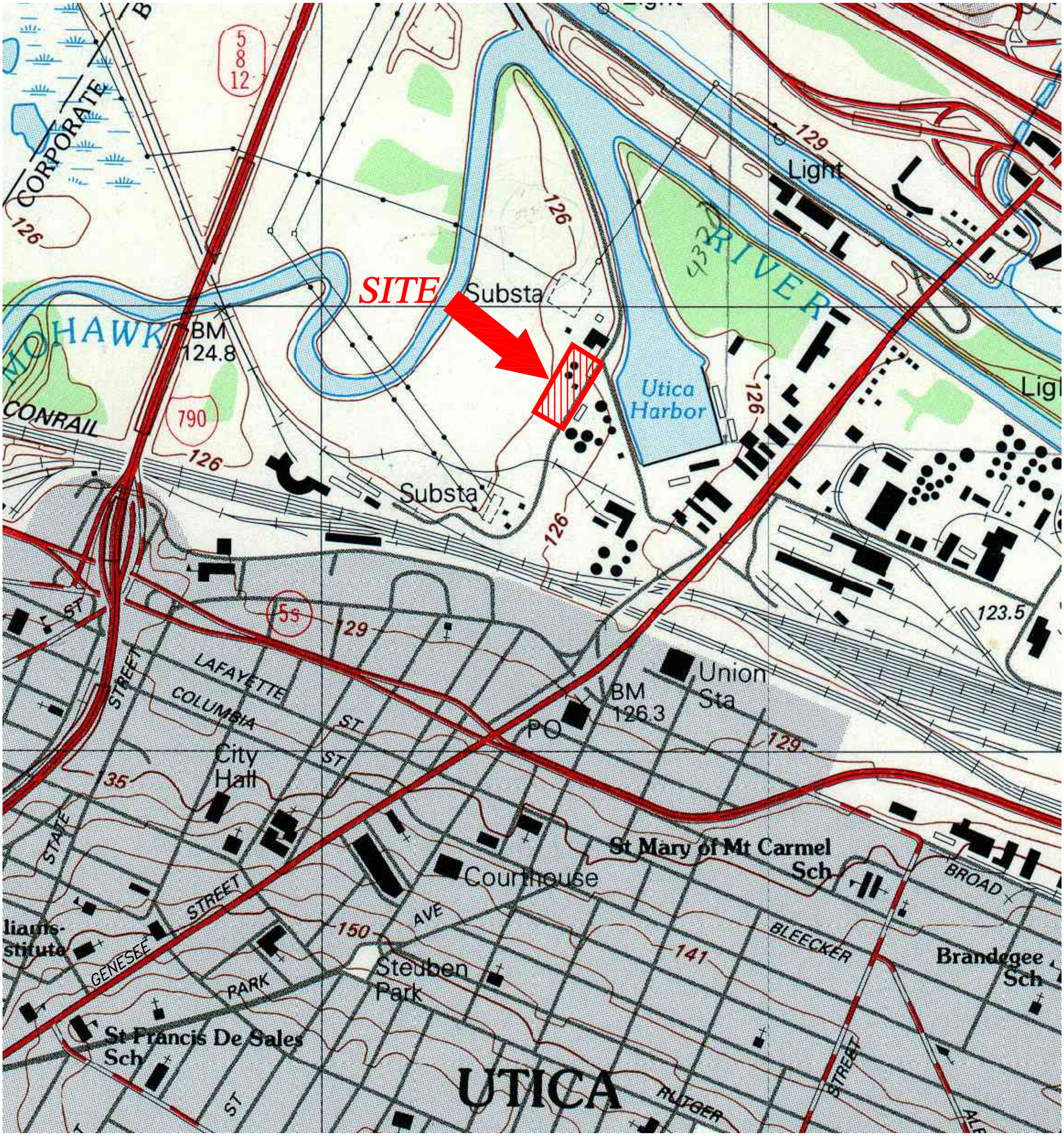
TABLES

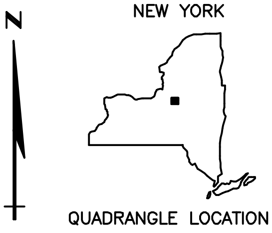
Table 1
Anticipated Well Construction Details
New York Tar Emulsion Products Site
Utica, New York

Well	Zone Monitored	Estimated Depth to Aquifer Base (ft-bgs)	Estimated Depth to Aquifer Top (ft-bgs)	Estimated Aquifer Saturated Thickness (ft)	Proposed Well Construction Details (ft-bgs)							
					Total Well Depth	Screened Interval	Sand Filter Interval	Bentonite Seal Interval	Choke Sand Interval	Neat Portland Cement Interval	Concrete Interval	Comment
M09-1S	Shallow	7.0	0.0	< 1.0	7.5	7.5 - 4.5	4.5 - 4.0	4.0 - 2.0	n/a	n/a	2 - 0	To be completed in the vicinity of abandoned monitoring well pair N-MW-2S/2I
M09-1I	Intermediate	38.0	25.0	13.0	38.0	38 - 28	38 - 26	26 - 24	24 - 23	23 - 2	2 - 0	
M09-2S	Shallow	8.0	0.0	< 1.0	8.0	8 - 5	8 - 4.5	4.5 - 2.0	n/a	n/a	2 - 0	To be completed in the vicinity of test boring N-SB-6
M09-2I	Intermediate	39.0	21.0	18.0	39.0	39 - 29	39 - 27	27 - 20	20 - 19	19 - 2	2 - 0	
M09-3S	Shallow	8.5	0.0	< 1.0	8.5	8.5 - 5.5	5.5 - 5.0	5.0 - 2.0	n/a	n/a	2 - 0	To be completed in the vicinity of test boring N-SB-3
M09-3I	Intermediate	37.0	23.0	14.0	37.0	37 - 27	37 - 25	25 - 22	22 - 21	21 - 2	2 - 0	

ft-bgs - feet below ground surface
n/a - not applicable due to shallow installation

FIGURES





REFERENCE: USGS 7.5 MINUTE TOPOGRAPHIC QUADRANGLE
OF UTICA EAST, NEW YORK 1983

ISSUE DATE:

KEY ENVIRONMENTAL, INC.
200 THIRD AVENUE
CARNEGIE, PA 15106

BEAZER EAST, INC.
PITTSBURGH, PENNSYLVANIA

DRWN: SCC	DATE: 11/11/08	KEY ENVIRONMENTAL INCORPORATED
CHKD: MRL	DATE: 11/11/08	
APPD: MRL	DATE: 11/11/08	
SCALE: 1" = 1000'		

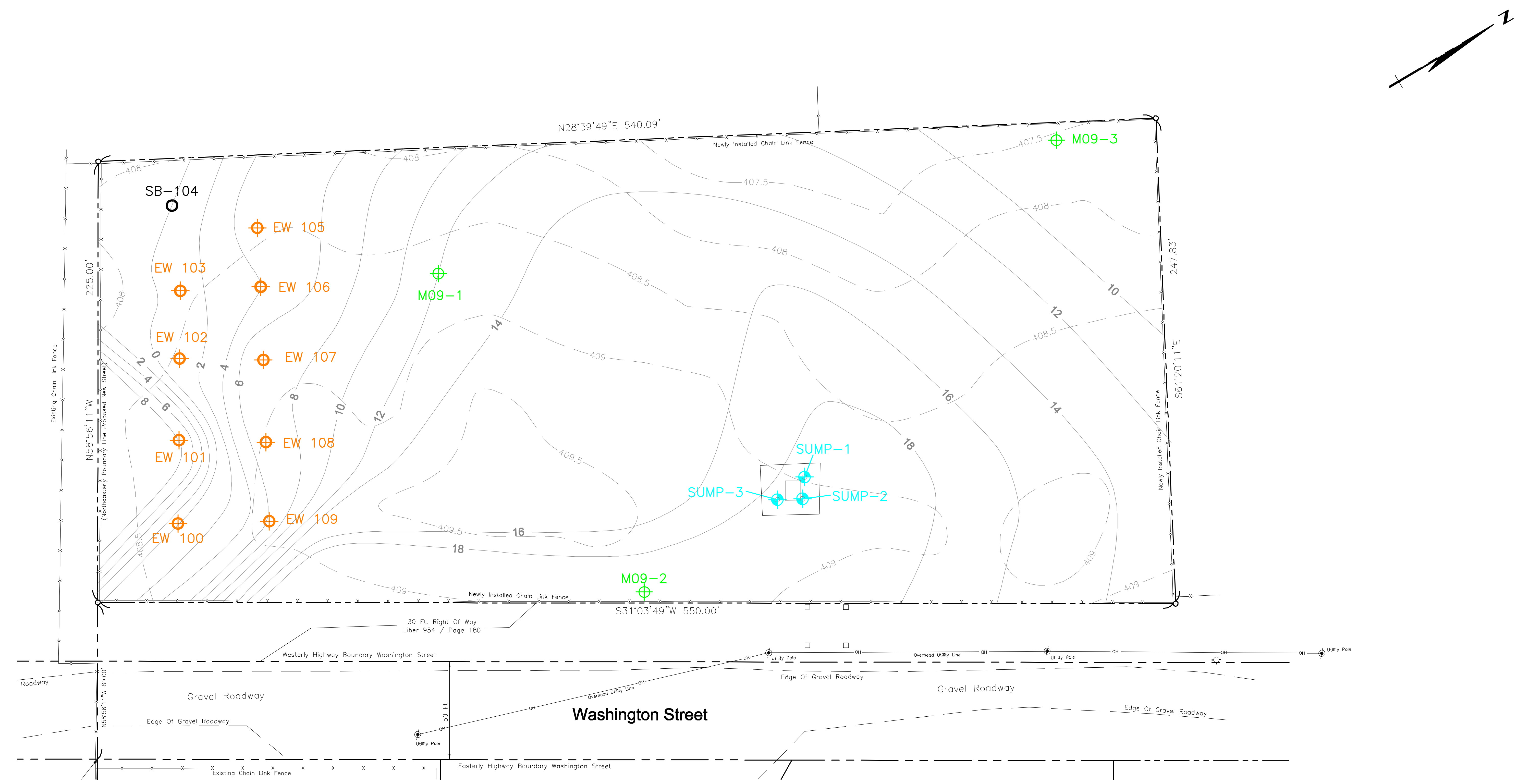
FIELD SAMPLING PLAN
NEW YORK TAR
EMULSION PRODUCTS SITE
UTICA, NEW YORK

SITE LOCATION MAP

PROJECT NO: 09-888

FIGURE 1

Y:\NYTEP\09-888\FIELD SAMPLING PLAN\FIGURE 1.DWG



LEGEND

- SITE PROPERTY BOUNDARY
- EDGE OF ROAD
- EDGE OF GRAVEL ROAD
- CHAIN LINK FENCE
- 409 GROUND SURFACE ELEVATION CONTOUR INTERVAL
- 370 ISOPACH CONTOURS OF INTERMEDIATE CONFINED AQUIFER
- SB-104 ○ SOIL BORING
- SUMP-1 ⊕ SHALLOW ZONE DNAPL MONITORING LOCATION
- EW 109 ⊕ INTERMEDIATE ZONE DNAPL MONITORING LOCATION
- M09-1 ⊕ SHALLOW AND INTERMEDIATE ZONE GROUNDWATER MONITORING WELL PAIR

0 50 100
FEET

BEAZER EAST, INC.
PITTSBURGH, PENNSYLVANIA

DRWN:	SCC	DATE:	11/11/08
CHKD:	MRL	DATE:	11/11/08
APPD:	MRL	DATE:	11/11/08
SCALE:		AS SHOWN	

KEY ENVIRONMENTAL INCORPORATED

FIELD SAMPLING PLAN
NEW YORK TAR EMULSION PRODUCTS SITE
UTICA, NEW YORK

PROPOSED MONITORING PROGRAM

PROJECT NO: 09-888
FIGURE 2

REV #	DATE	DESCRIPTION	APPD
△			
△			
1			

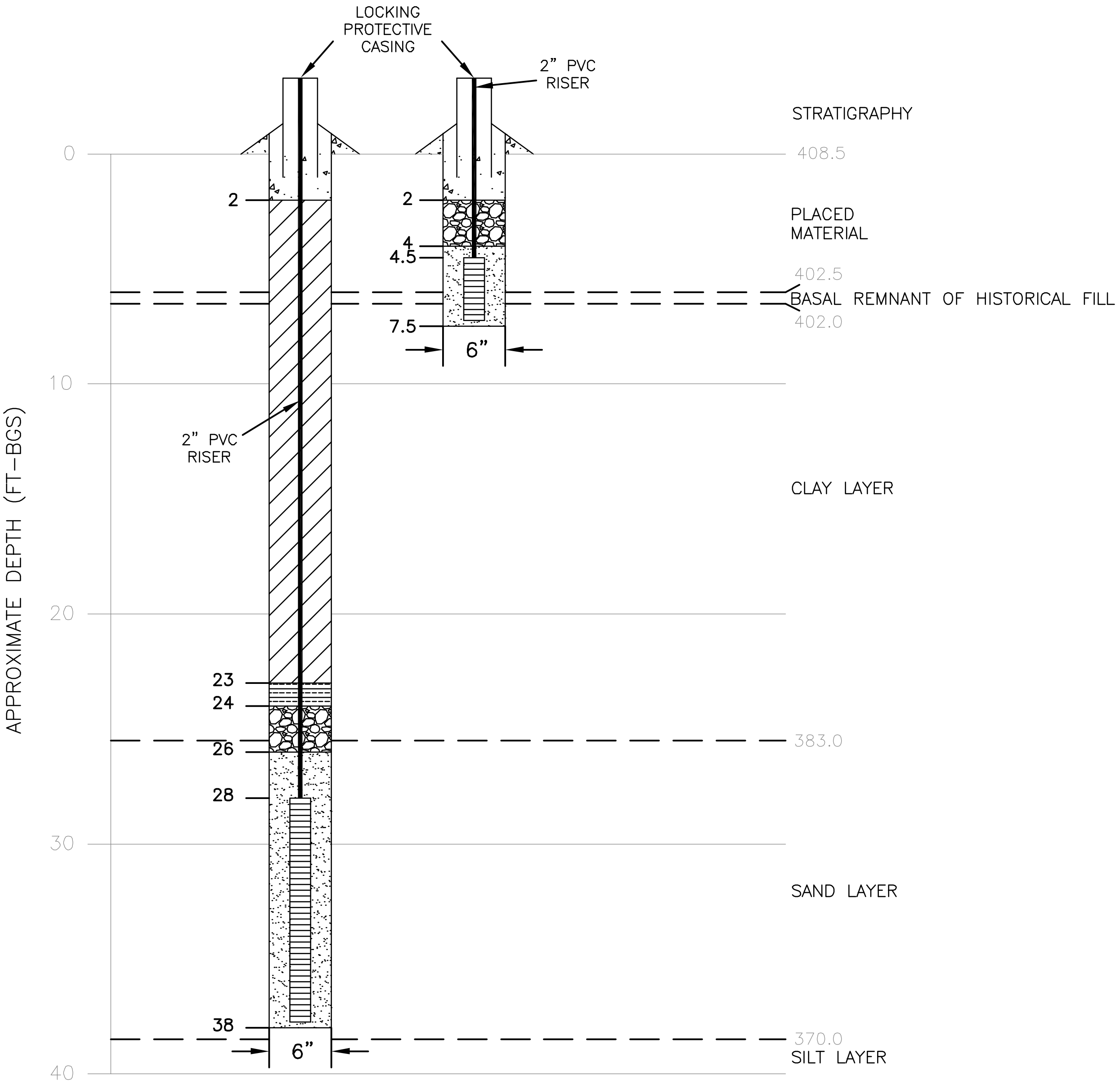
REFERENCE:

* SHEEN NOTED FOR TWO OR MORE EVENTS.

ISSUE DATE:

KEY ENVIRONMENTAL, INC.
200 THIRD AVENUE
CARNEGIE, PA 15106

y:\nytep\09-888\field sampling plan\figure 2.dwg Last Saved By: Scomer 5/28/2009 10:44 AM Plotted By: Shelly Comer 5/28/2009 11:29 AM Scale: 1:1



LEGEND

- ░ CONCRETE
- ▨ GROUT – TYPE I/II PORTLAND CEMENT
- ▤ GLOBAL #3 CHOKE SAND
- ▩ 3/8" BENTONITE CHIPS
- ░ GLOBAL #5 SAND FILTER
- ▤ 0.020" SLOTTED SCHEDULE 40 PVC SCREENED INTERVAL

BEAZER EAST, INC.
PITTSBURGH, PENNSYLVANIA

DRWN: DJB	DATE: 01/30/09	KEY ENVIRONMENTAL INCORPORATED
CHKD: TEJ	DATE: 01/30/09	
APPD: MRL	DATE: 01/30/09	
SCALE:		

FIELD SAMPLING PLAN
NEW YORK TAR
EMULSION PRODUCTS SITE
UTICA, NEW YORK

REFERENCE:

ISSUE DATE:

KEY ENVIRONMENTAL, INC.
200 THIRD AVENUE
CARNEGIE, PA 15106

GENERALIZED WELL
CONSTRUCTION DETAILS

PROJECT NO: 09-888

FIGURE 3

Y:\NYTEP\09-888\FIELD SAMPLING PLAN\FIGURE 3.DWG

APPENDIX F

QUALITY ASSURANCE PROJECT PLAN

QUALITY ASSURANCE PROJECT PLAN
NEW YORK TAR EMULSION PRODUCTS SITE

UTICA, NEW YORK

Prepared for:

Beazer East, Inc.

Prepared by:

Key Environmental, Inc.
200 Third Avenue
Carnegie, Pennsylvania 15106

June 2009

TABLE OF CONTENTS

LIST OF TABLES

1.0 INTRODUCTION

This Quality Assurance Project Plan (QAPP) provides data quality objectives, sample collection procedures, data analysis processes, and other procedures to ensure confidence in and document the usability of the results of the investigation activities for the implementation of the Field Sampling Plan (FSP) at the New York Tar Emulsion Products (NYTEP) Site, located in Utica, New York.

1.1 PROJECT DESCRIPTION

The FSP will be implemented to supplement existing Site information, provide data to characterize current Site conditions, and provide a basis for a risk assessment, focused feasibility study, and subsequent selection of a remedial alternative. Data may also be used as the basis for design of the selected remedial alternative.

Technical objectives of the investigative activities to be conducted pursuant to the FSP include:

- Determine if there is a continuous shallow unconfined aquifer present within the placed material.
- Determine if there have been any changes in groundwater flow direction since the remedial activities and the last investigative report.
- Quantify dissolved phase constituents of concern in the shallow and intermediate aquifers for purposes of identifying trends and demonstrate stability/improvement of the constituent concentrations in groundwater.

These objectives will be met through implementation of the proposed work scope and the following main tasks:

- Monitoring well drilling and installation; and,
- Groundwater monitoring program.

A detailed task description is presented in FSP which specifies the test locations, media to be sampled and quantities, and laboratory analyses required. Thus, the objective of this QAPP is to define the quality assurance / quality control (QA/QC) measures and data evaluation procedures to be conducted to ensure that the resultant data is of sufficient quality for its specified uses.

1.2 ORGANIZATION AND RESPONSIBILITIES

A description of the project organization and personnel responsibilities is provided in this section.

1.2.1 Project Coordinator

Mr. Michael Slenska is the Project Coordinator for this project for Beazer and will be the main contact for NYSDEC. He will monitor project progress and performance.

1.2.2 Project Manager

Mr. Mark Lahr, P.E., is the Project Manager for this project. The responsibilities of the Project Manager include:

- Interaction with the respective technical leads, the QA/QC Officer and the Health and Safety Coordinator to ensure that these respective tasks and programs are functioning effectively;
- Approval of project-specific procedures and internally prepared plans, drawings, and reports; and,
- Serving as the collection point for information concerning project staff and changes in the project scope, and for documents.

1.2.3 Site Investigation Manager

Mr. Tom Jordan, Ph.D., P.G., is the Site Investigation Manager. The responsibilities of the Site Investigation Manager include:

- Organize and schedule field and laboratory subcontractor activities;
- Establish and maintain project records;
- Supervise subcontractor activities;
- Provide on-Site hydrogeological and geological evaluation;
- Provide health and safety support;
- Participate in project meetings;
- Prepare appropriate sections of report; and,
- Review all project reports.

1.2.4 Quality Assurance Officer

The Quality Assurance Officer (QAO) will be responsible for the following:

- Coordinating the development and review of the QAPP;
- Providing final approval of the QAPP; and,

- Periodic monitoring and reporting associated with maintaining overall quality assurance for the project.

The QAO will be proficient in analytical methodology, data interpretation and validation, the development of sampling plans, quality control procedures and auditing techniques. The QAO, or his designee, will conduct periodic field and sampling audits, interface with the analytical laboratory to make requests and resolve problems, interface with the data validator, and develop a project- specific data usability report. Because some on-site work may be necessary, the QAO will have completed the 40-hour OSHA safety training course and will be current with the 8-hour refresher.

1.2.5 Health and Safety Coordinator

The Health and Safety Coordinator will be responsible for implementation of the project- and Site-specific HASP that is included as Appendix H to the FSP.

2.0 QUALITY ASSURANCE OBJECTIVES AND PROCEDURES USED

The overall quality assurance objective for this investigation is to ensure that the field and laboratory procedures used during the project will generate data of sufficient and adequate quality for its intended use. Data from this investigation will be used to characterize the Site, develop risk-based remedial goals, and support the remedial design.

2.1 OBJECTIVES

The quality of the measurement data is characterized in terms of precision, accuracy, representativeness, completeness, and comparability of the data collected. The objectives may be defined in these terms as follows:

- Precision - The measurement of agreement of a set of replicate results among themselves without assumption of any prior information as to the true result. Precision is assessed by means of duplicate/replicate sample analysis.
- Accuracy - The nearness of a result or the mean of a set of results to the true value. Accuracy is assessed by means of reference samples and percent recoveries.
- Representativeness - The degree to which data accurately and precisely represent a characteristic of a population, parameter variations at a sampling point, a process condition, or an environmental condition.
- Completeness - A measure of the amount of valid data obtained from a measurement system compared with the amount that was expected to be obtained under correct normal conditions.
- Comparability - An expression of the confidence with which one data set can be compared to a related set of data.

QA/QC objectives have been established according to specific Work Plan requirements and for the analysis of water samples according to the NYSDEC-ASP and USEPA SW-846 protocols. The NYSDEC-ASP analytical protocols referenced are equivalent to level IV data quality objectives as described in "Data Quality Objectives for Remedial Response Activities" (EPA, March 1987) for off-Site laboratories. This level is characterized by rigorous QA/QC protocols and documentation.

The groundwater samples will be analyzed for volatile organic compounds and semi-volatile organic compounds. The accuracy, precision, and representativeness of the data will be functions of the origin of the samples, the procedures used to analyze the samples, and the specific sample matrices involved in the project. QA/QC practices used in the evaluation of these data quality objectives (DQOs) include blanks, replicates, spikes, standards, check samples, calibrations, and recoveries.

2.1.1 Precision

Precision is a measure of mutual agreement among individual measurements of the same property. The precision of the chemical analytical results will be evaluated by the analysis of replicate samples. Precision can be expressed as range, relative percent difference (RPD), or relative standard deviation (RSD):

$$\text{Range} = \text{RH} - \text{R}_L$$

where:
R_H = the highest result
R_L = the lowest result

$$RDP = \frac{\text{R}_1 - \text{R}_2}{\frac{1}{2}(\text{R}_1 + \text{R}_2)} x\ 100\%$$

where:
R_1 and R_2 are the two results being compared

$$RSD = \frac{S}{\overline{X}} x\ 100\%$$

where:
S = the standard deviation of the data
$\overline{X}$= the arithmetic mean of the data.

Analytical laboratory precision will be evaluated using field replicates and matrix spike laboratory control samples.

2.1.2 Accuracy

Accuracy indicates the nearness of a result to the true value. Throughout the analytical process, several measurements for accuracy are made. Accuracy is measured as the percent recovery (% R) of standards or matrix spikes:

- For standards:

$$\%R = \frac{\text{Result}}{\text{TrueValue}} x\ 100\%$$

- For matrix spikes:

$$\%R = \frac{\text{SSR} - \text{USR}}{\text{SA}} x\ 100\%$$

where:
SSR = spiked sample result
USR = unspiked sample result
SA = spike added.

Blanks provide a measure of accuracy in that they test for systematic bias for trace contamination in reagents and other random sources of contamination. The accuracy of instrumental measurements is measured by the analysis of initial and continuing calibration or calibration verification standards.

The accuracy of sample preparation and analysis is measured by the analysis of a preparation blank and a laboratory control standard with each batch of samples or surrogate standards spiked into each sample.

The accuracy of the measurement system within randomly selected sample matrices is measured by the analysis of matrix spikes.

2.1.3 Evaluation of Precision and Accuracy

If precision and accuracy goals, as defined by the selected laboratory's Quality Assurance Plan (QAP), are exceeded, the affected samples will be reanalyzed. However, if precision and accuracy goals are exceeded due to matrix interferences, this fact will be noted in the analytical report and those samples will not be reanalyzed.

2.1.4 Representativeness

Representativeness is a measure of the degree to which data accurately represent the sample source or an environmental condition. These elements will be controlled throughout sampling and analysis. Laboratory blanks and field blanks will be collected and analyzed for control purposes. Other factors that can affect sample representativeness include sample preservation and amount of time that elapses between sample collection and analysis.

2.1.5 Comparability

Comparability is the degree of confidence with which one set of data can be compared to another set of data. To ensure that measurements are comparable, sample collection and analysis will follow standard USEPA methods and standard reporting units will be used for all data. To determine the degree of comparability of data, the selected laboratory will provide the results of performance evaluation results that have been obtained through a laboratory audit.

2.1.6 Completeness

Completeness is a measure of the amount of valid data generated, or data generated according to appropriate methodology that meets the laboratory's defined QA/QC requirements and holding times.

Laboratory documentation, including QA/QC sample results, and acceptance limits associated with the analysis of a sample batch will be used to assess the completeness of the analysis of the sample batch. The objective for a data set for the QA/QC parameters will be 80 percent, where completeness is the percent of valid data of the total tests conducted.

3.0 SAMPLING PROCEDURES

The FSP sampling and analysis program will be designed to meet the specific objectives described in Section 2.1.

3.1 SAMPLE COLLECTION

Investigative sampling activities will consist of the collection of groundwater samples. Methodologies detailing well installation and groundwater sampling are provided in the FSP.

3.1.1 Groundwater Samples

Six monitoring wells will be installed at the Site. The primary consideration for sampling monitoring wells will be to obtain a representative sample of the groundwater in the vicinity of the well. To safeguard against collecting non-representative stagnant water from a well, the following guidelines and techniques will be followed for purging all monitoring wells prior to sample withdrawal:

- Water levels will be measured with an accuracy of ±0.01 foot following procedures outlined in SOP #116 (Appendix G). The reference point for measurements will be the top of the well riser pipe, and this will be indicated on the sample field collection report.

- The submerged casing volume (standing water column) in the well will be determined from the following formula:

$$V = (3.14\ x\ r^2\ x\ L) x\ 7.48$$

where:
V = volume (gallons);
r = monitoring well casing radius (feet); and,
L = height of water column in well (feet).

- Prior to each day's sampling event, field staff will calibrate a YSI 556 meter, a LaMotte 2020 turbidity meter and a Horiba U22 meter to monitor field parameters. The calibrations will be documented on an Equipment Calibration Form. The YSI and Horiba will be used to monitor groundwater quality parameters including pH, temperature, specific conductivity, oxidation reduction potential, and dissolved oxygen. The LaMotte will be used to monitor turbidity. Decontamination of this non-dedicated sampling equipment will be performed between sampling locations in accordance with KEY SOP #104 using and Alconox™ solution and DI water rinse

- The Low Flow sampling procedure will be utilized for well purging in accordance with SOP #157 (Appendix G). Purging of the monitoring wells will be performed using stainless steel Monsoon submersible pumps and/or peristaltic pumps and disposable polyethylene tubing. The volume purged will be measured using graduated 5-gallon buckets. Water quality parameters (temperature, pH, specific conductivity, oxidation reduction potential, turbidity, and dissolved oxygen) will be monitored every 5 minutes using appropriate measuring instruments. Stabilization of parameters will be considered complete when all parameters are stabilized for three successive readings or the well goes dry. The three successive readings must be within the following guidelines to assume stabilization:

  ± 10% for temperature
  ± 0.2 S.U. for pH
  ± 3% for conductivity
  ± 10 mv for ORP
  ± 10% for turbidity
  ± 10% for dissolved oxygen

  These water quality field parameters will be recorded onto the Groundwater Sample Collection Records.

- Groundwater samples will then be collected directly from the polyethylene tubing for VOCs-8260B analysis. Wells will be sampled within 24 hours of purging. Volatile organics sample vials will be filled first, followed by the semi-volatile organic sample containers. The water level, temperature, pH, specific conductance, and turbidity will be recorded when samples are taken.

3.1.2 Quality Control Samples

Replicate samples will be collected at a frequency of one replicate per twenty samples, as designated in Table 1. The replicate sample will be collected at the same location and, if possible, from the same sample aliquot as the original sample. Replicates of water samples will be obtained by alternately filling sample containers from the same sampling device. Replicates will be sent to the laboratory as blind samples, and will be analyzed for the same parameters as the environmental samples.

Matrix spike and matrix spike duplicate samples will also be collected at a frequency of one per 20 samples. Sample collection will be as described above for the field replicates.

Trip blanks for all matrices will consist of a set of sample bottles filled at the laboratory with demonstrated analyte-free water. Trip blanks will be handled and transported in the same manner as the samples acquired that day, except that the sample containers are not opened in the field. Trip blanks will be analyzed for volatile organics only and will accompany all sample shipments (one trip blank per cooler) that contain aqueous samples to be analyzed for volatile organics.

Rinsate blanks will be collected at a rate of one per day per type of sampling equipment. Distilled, analyte-free water will be passed through decontaminated sampling equipment and collected into the appropriate sample bottles. Rinsate blanks are analyzed for the same parameters as the investigative samples. All rinsate blanks will be packaged and shipped to the laboratory with the environmental samples.

3.2 SAMPLE PRESERVATION

Sample preservation, containers, and holding times for possible analytical parameters are specified in Table 2. Holding times will be calculated from the verified time of sample receipt (VTSR) at the laboratory. Samples will be received by the laboratory within 24 hours of collection. All VOC sample containers will be pre-preserved by the laboratory. Aqueous samples and blanks to be analyzed for volatiles will be acidified with 1:1 hydrochloric acid (HCl) to pH <2. Any deviations from the preservation methods as described will be noted in the field notebook and on the chain-of-custody form.

After collection, samples will be cooled to approximately 4 degrees Celsius (°C) and will be maintained at a reduced temperature during shipment to the laboratory. All samples will be shipped to the laboratory within 24 hours of collection *via* hand delivery to an overnight carrier or laboratory courier service.

3.3 FIELD DOCUMENTATION

Bound field notebooks will provide the means of recording any field events including data collection and sampling activities. Notebooks will be maintained by the members of the field investigation team to provide daily records of significant events, observations, and measurements during any field activities. All entries are to be signed and dated.

Field notebooks are intended to provide sufficient data and observations to enable participants to reconstruct events that occurred during field investigations and to refresh the memory of the field personnel if called upon to give testimony during legal proceedings, if any. The field notebook entries should be factual, detailed, and objective. All original data recorded in field notebooks and on sample identification labels, chain-of-custody records, and receipt-for-samples forms are to be written in waterproof ink.

If an error is made on an accountable document, the correction will be made by simply crossing out the error and entering the correct information. The erroneous information should not be obliterated. All corrections must be initialed and dated. Whenever a sample is collected or a measurement is made, a detailed description of the event will be recorded. The sampler, sample time, sample location, sample description, sample measurement, and any field observations will be included in the field notebook. All equipment used to make measurements will be identified, and all relevant calibration information will be recorded on the equipment calibration log sheets. Sample custody will be documented in the field notebook. Field data sheets, including boring logs and air monitoring data sheets, may also be used to record field data, as appropriate.

Notebooks will be assigned to field personnel, but will be stored in the project file when not in use. Field data sheets (i.e., Groundwater Sample Collection records, Equipment Calibration forms, Chain-of-Custody forms) will also be maintained in the project file.

4.0 SAMPLE CUSTODY

Chain-of-custody procedures provide an accurate written record which can be used to trace the possession of samples from the time of collection through sample analysis and data reporting by the laboratory. Both the field team and the laboratory are responsible for documenting sample custody. A sample is considered to be in an individual's custody if any of the following criteria are met: 1) the sample is in your possession; 2) it was in your possession and then locked-up or sealed to prevent tampering; or 3) it is in a secured area.

4.1 FIELD SAMPLE CUSTODY

Custody documentation will be maintained for each sample collected in the field. The field team member performing the sampling is responsible for the care and custody of the sample until it is properly dispatched. Chain-of-custody forms will be used to document sample custody. The following information will be specified for each sample on the field chain-of-custody form:

- Client/Site Name;
- Sample number;
- Sample matrix;
- Date and time of sample collection;
- Analysis requested;
- Number of containers per sample;
- Sample preservation; and,
- Method of shipment.

One chain-of-custody form will be used for each sample cooler shipped for analysis. All other pertinent sample information including sample location will be recorded in the field notebook.

The chain-of-custody form will be signed by sampling personnel. The forms will be placed in a water-tight plastic bag and taped to the underside of the lid of the cooler containing the samples designated on the form. A copy of the form is retained by the sampler for the project file.

4.2 SAMPLE PACKAGING AND SHIPMENT

The laboratory will provide the field personnel with all the sample containers necessary for completing the field sampling. Sample containers will be obtained directly from the laboratory to ensure that the containers are free of contamination and are the appropriate volume for the requested analysis. Preservatives used in field sampling will be reagent-grade and will be supplied by either the laboratory or purchased directly.

Following sampling, the sealed sample container will be rinsed with tap water, dried, and labeled. The bottles will be labeled with the following information:

- Site name;
- Sample number;
- Initials of collector;
- Date and time of collection;
- Type of sample;
- Analysis required; and,
- Preservative.

Sample labels will be completed in waterproof ink. Labels will be taped onto the sample bottles. Following labeling, sample containers will be placed in sealed clear plastic zip-lock type bags, and placed in a cooler for storage and shipment. Ice, sealed in double plastic bags, or "blue ice" will be placed in each cooler to maintain all samples at approximately 4°C. The samples will be cushioned using vermiculite, foam rubber, or other similar packaging material. Chain-of-custody forms will be enclosed in each cooler. Coolers will be sealed with custody seals in such a manner that the custody seal would be broken if the cooler were opened. The lid of the cooler will be securely taped shut. Sample coolers will be shipped to the analytical laboratory on the same day as sampling *via* overnight delivery or laboratory courier service.

4.3 LABORATORY SAMPLE CUSTODY

Samples will be received at the laboratory by the sample custodians who examine each sample to ensure that it is the expected sample, inspect the sample containers for possible damage, and ensure that the documentation is complete and adequate. In the event of any discrepancy or problems with the sample shipment, the sample custodian will immediately notify the KEY Project Manager or Site Investigation Manager. The sample custodians will ensure that each sample has been preserved in the manner required by the particular test to be conducted and stored according to the correct procedure. Samples will be maintained at 4°C until analysis begins. Details of the laboratory's procedure for sample receipt, storage, and tracking will be included in the selected laboratory's Quality Assurance Plan.

5.0 CALIBRATION PROCEDURES

5.1 FIELD INSTRUMENTS

The Site Investigation Manager, or his designee, is responsible for ensuring that the field instruments used in the investigation are calibrated and maintained according to manufacturers' specifications. Field instrument manuals describing calibration, maintenance, and field operating procedures for these instruments will be available for easy reference by field and project personnel.

The field instruments are maintained and calibrated in accordance with identified maintenance and calibration procedures. Records will be prepared and maintained for each piece of calibrated field equipment to indicate that established calibration procedures have been followed (e.g., results of calibration, problems, corrective action). Records for field equipment used for this project will be kept in the project files.

Instrument response will be checked prior to bringing the instruments to the Site and prior to operation at the Site. Instrument response will also be checked at the end of the day to determine if the instrument has drifted from its initial calibration. Equipment that fails calibration or becomes inoperable during use will be removed from service and tagged to prevent inadvertent use.

Groundwater temperature, pH, conductivity, and turbidity will be measured in the field. The pH meter and conductivity meters will be calibrated daily by a trained team member using standard calibration solutions. Standard buffer solutions at pHs of 4, 7, and 10 will be used to calibrate the pH meter. Standard buffer solutions certified traceable to the National Bureau of Standards (NBS) will be used. The conductivity standard will be a potassium chloride solution obtained as a 720 umho solution, traceable to the NBS.

Periodic preventive maintenance is required for sensitive equipment. The field instruments are maintained through periodic calibration and adjustment by the instrument manufacturer as needed.

Routine maintenance is performed whenever an instrument is acquired for field use, and when returned from field use. Instrument manuals are kept on file for reference purposes should equipment need repair. Troubleshooting sections of manuals are often useful in assisting personnel performing maintenance tasks. Preventive maintenance, other than routine maintenance and calibration, is performed as needed.

5.2 LABORATORY INSTRUMENTS

All laboratory equipment will be maintained in accordance with manufacturers' specifications. Quality assurance, tuning, and calibration procedures will be conducted according to the current USEPA CLP protocols or other method specific protocols where CLP methodology is not applicable.

Specific calibration and preventative maintenance of the laboratory equipment will be discussed in the selected laboratory's Quality Assurance Manual. The following calibration/maintenance procedures will apply.

5.2.1 Organic Parameters

GC/MS procedures will be used for the analysis of volatile and semi-volatile compounds. The GC/MS will be tuned a minimum of once every 12 hours to determine if the instrument is operating properly. The tuning specifications for extractables and volatiles are provided in the reference methods for the parameters to be analyzed. The tuning criteria must be met before standards and samples are analyzed.

The initial GC/MS calibration will be performed with a blank and five levels of laboratory standards, as described in the reference methods for the parameters to be analyzed. Frequency of calibration will be as described in the reference method. From each calibration standard, the area corresponding to the primary characteristic ion will be tabulated against concentration for each compound. The relative response factor (RRF) will be calculated for each compound at each concentration using equations provided in the reference methods. Based on the RRF from the initial calibration, the percent relative standard deviation for the calibration check compounds (CCC) will then be calculated.

After initial calibration, a system performance check will be carried out to ensure that minimum average relative response factors are met before the calibration curve is used. A system performance check will be made each 12 hours. The system performance check will enable the identification of problems with the analytical system, including fast purge rate, degradation caused by contaminated lines or active Sites in the system, or standard mixture degradation. If the average response factor for any system performance calibration compound (SPCC) is below the minimum value specified in the reference method for the parameter being analyzed, the system will be considered to be not operating properly. No samples will be analyzed until the system is once again operating properly and the SPCC average response factors are acceptable.

If the SPCC criteria are met, calibration check compounds will be used to check the validity of the external calibration. A CCC standard will be analyzed every 12 hours after the SPCC criteria are met. If the percent difference for each CCC is less than or equal to 25%, the initial calibration is valid. If the criteria are not met (>25% difference) for any one CCC, corrective action will be taken. If no source of the problem can be determined after corrective action has been taken, the initial five point calibration will be repeated.

6.0 ANALYTICAL PROCEDURES

6.1 ANALYTICAL LABORATORY PROCEDURES

NYSDEC-ASP approved procedures will be used for all analyses. Several samples of groundwater will be analyzed for volatile and semi-volatile organic compounds on the USEPA Target Compound List using procedures consistent with USEPA-approved Contract Laboratory Program (CLP) procedures. In particular, the laboratory will analyze the samples using SW-846 methods with Category B deliverables.. Documentation will be provided for those Category B analyses performed according to NYSDEC-ASP requirements for water samples so that Level IV data quality objectives are met. This information is detailed in Table 3.

6.2 FIELD AND GEOTECHNICAL PROCEDURES

Several parameters will be measured in the field, following KEY standard operating procedures, which are consistent with USEPA-approved methods. These parameters are pH, specific conductivity, temperature, and turbidity.

7.0 DATA REDUCTION, VALIDATION, AND REPORTING

7.1 DATA REDUCTION

Data reduction techniques and all equations used to calculate concentrations are specified by the NYSDEC-ASP analytical methodology. Data from these analyses will be converted by the laboratory to concentration units to enable comparison to regulatory standards. The laboratory will provide all backup information in their sample delivery packages.

7.2 DATA VALIDATION

The analytical laboratory will review appropriate quality control data to assure the validity of the analytical results provided to KEY. This review process ensures that:

- Sample preparation is correct and complete;
- Analysis information is correct and complete;
- The appropriate SOPs have been followed;
- Analytical results are correct and complete;
- QC samples are within established control limits;
- Blank contamination does not exist;
- Special sample preparation and analytical requirements have been met; and,
- Documentation is complete (all anomalies in the preparation and analysis have been documented; Out-of-Control forms, if required, are complete; holding times are documented).

The laboratory will perform the in-house analytical data reduction and QA review under the direction of the Laboratory QA Director. The Laboratory QA Director and Laboratory Project Manager are responsible for advising the KEY Project Manager of any data which were rated "preliminary" or "unacceptable" or other notations which would caution the data user of possible unreliability. Data reduction, QA review, and reporting by the laboratory will be conducted as follows:

- Raw data produced by the analyst are turned over to an independent reviewer;
- The data are ready for incorporation into the final report; and,
- The data package is complete and ready to be archived.

The data validation review by the analytical laboratory, an independent party, or both, will be structured so that all calibration data and QC supporting data are reviewed and all of the analytical results from 10 percent of the samples are checked to the benchsheets. If no problems are found with the data package, the review is complete. If any problems are found with the data package, an additional 10 percent of the samples will be checked to the benchsheet. The process continues until no errors are found, or the data package has been reviewed, in its entirety.

The reviewer will identify any out-of-control data points and data omissions and interact with the laboratory to correct data deficiencies. Decisions to repeat sample collection and analyses may be made by the Project Manager based on the extent of the deficiencies and their importance in the overall context of the project.

This data review will also be documented and the signature of the reviewer and the date of the review recorded. The reviewed data will then be released along with a narrative statement that the data are either acceptable, acceptable with limitation, or not acceptable with the supporting rationale.

An independent reviewer will then conduct a data validation review. The data validator will conduct a systematic review of the data for compliance with the established QA/QC criteria based on the calibration, spike, duplicate and blank results provided by the laboratory. All data produced according to CLP protocols will be evaluated, according to the following USEPA guidance:

- USEPA Region II SOP No. HW-6, CLP Organics Data Review Revision 11, (6/96).

This validation review will verify that:

- Holding times have been met;
- Calibration checks are adequate;
- Qualitative and quantitative results are correct;
- Documentation is complete; and,
- QA/QC results are complete and accurate.

The data validator will identify any out-of-control data points and data omissions and interact with the laboratory to correct data deficiencies. Decisions to repeat sample collection and analyses may be made by the appropriate project team members based on the extent of the deficiencies and their importance in the overall context of the project. Decisions to re-sample or re-analyze, if possible, will be communicated to Beazer.

Following data validation, any data qualifiers will be entered into the sample results summary tables. The computerized data set will include the data qualifiers provided by the laboratory in accordance with the documents referenced above, as well as additional comments of the data reviewer.

Those results which are usable as quantitative concentrations will be reported without qualifiers. As part of the data validation process, the following validation qualifiers and their meanings will be used:

"U" -	Non-Detect - the analyte was analyzed for, but was not detected above the reported sample quantitation limit.
"J" -	Estimated Value - The analyte was positively identified; but the associated numerical value is the approximate concentration of the analyte in the sample.
"NJ" -	The analysis indicates the presence of an analyte that has been "tentatively identified" and the associated numerical value represents its approximate concentration.
"UJ" -	Estimated Non-Detect - The analyte was not detected above the reported sample quantitation limit. However, the reported quantitation limit is approximate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte in the sample.
"R" -	The sample results are rejected. Due to significant QA/QC problems the analysis is invalid and provides no information as to whether the analyte is present or not. Once the data are flagged with "R", any further review or consideration is unnecessary.

Non-sampling data acquisition processes will be reviewed along with compliance of the data acquisition with operating procedures contained in the QAP, before non-sampling data are verified. Data which are not verified for further use will be summarized in a technical memo and maintained in the project files.

7.3 DATA REPORTING

The analytical laboratory will prepare and retain full analytical and QC documentation as required by the NYSDEC-ASP protocols or other referenced methods. The analytical laboratory will supply complete data packages consisting of all results, the raw data, and all relevant QA/QC documentation. All original data files will be stored in a manner which precludes manipulation of the original data. All data editing, qualification and presentation will be performed on data copied from the original data files. The analytical laboratory will provide the following information in each analytical data package submitted:

- Analytical results with detection limits and appropriate data quality notations.

- Narrative including statement of samples received, description of any deviation from the QAP, explanation of qualifications regarding data quality, and other significant items encountered during analysis.

- For analyses conducted by the NYSDEC-ASP using SW-846 protocols, the deliverable format is Category B, as defined by NYSDEC. .

8.0 INTERNAL QUALITY CONTROL CHECKS

A quality control program will be implemented so that consistent results of known and documented quality can be obtained. Both field and laboratory QC measures will be followed to measure laboratory and total system variability. Field QC consists of collection of replicate samples, field (rinsate) blanks, and trip blanks. Laboratory QC includes internal procedures such as blanks, spikes and surrogates described in the reference methods for the parameters analyzed. The laboratory will implement stringent QC requirements that meet applicable NYSDEC and SW-846 requirements.

8.1 FIELD QC CHECKS

For field quality control, samples (*i.e.*, replicates and field blanks) will be obtained. Trip blanks will be used in conjunction with all samples to be analyzed for volatile organic compounds. Field replicate samples serve as a check on the overall precision of the sampling and analytical method.

Replicate samples will be collected from each matrix at the frequency of one replicate per 20 samples. The replicate sample will be collected at the same location and, if possible, from the same sample aliquot as the original sample. Replicates of water samples will be obtained by alternately filling sample containers from the same sampling device. The laboratory will not be made aware that a sample is a duplicate sample.

Matrix spike and matrix spike duplicate samples check on laboratory analytical precision and may be used to assess matrix effects. Matrix spike and matrix spike duplicate samples will be collected at a frequency of one per 20 samples in water matrices. Sample collection will be as described above for the field replicates.

Trip blanks will only be sent with a shipment of aqueous samples to be analyzed for VOCs. Trip blanks will consist of a set of sample bottles filled at the laboratory with demonstrated analyte-free water. Trip blanks will be handled and transported in the same manner as the samples acquired that day, except that the sample containers are not opened in the field. Trip blanks will be analyzed for volatile organics only and will accompany all sample shipments which contain aqueous samples to be analyzed for volatile organics.

Rinsate blanks will be collected on a daily basis for each type of sample collection instrument, by each sample collecting team and for each matrix sampled that day. Distilled, analyte-free water will be passed through decontaminated sampling equipment and collected directly into the appropriate sample bottles. Rinsate blanks are analyzed for the same parameters as the investigative samples. All rinsate blanks will be packaged and shipped to the laboratory.

Rinsate blanks measure incidental or accidental sample contamination occurring during the entire sample handling process of sampling, transport, sample preparation and analysis. Trip blanks measure cross-contamination which can occur during sample transport, storage or field handling. Trip blanks can also check on the laboratory water quality.

8.2 LABORATORY QC CHECKS

Laboratory-specific QC procedures will be available from the selected analytical laboratory. In general, these requirements specify the qualifications of personnel, available instrumentation, analysis of performance evaluation samples, and adherence to and documentation of standard operating procedures and quality assurance plans.

8.2.1 Organics Quality Control

Surrogates, method blanks, matrix spike/matrix spike duplicates, and trip blanks will be used as quality control procedures for organic compounds.

Surrogates are organic compounds similar to the analytes of interest but which are not normally found in environmental samples. These compounds will be spiked into all blanks, standards, samples, and spiked samples prior to analysis. Percent recoveries will be calculated for each surrogate. Surrogate compounds are listed in the reference methods.

A **method blank** is a volume of deionized, distilled laboratory water carried through the entire analytical scheme. For volatiles analyses, a method blank will be performed once for each 12-hour time period. For semi-volatile analyses, method blanks will be performed at the frequency described in the reference method for the parameter being analyzed.

For **Matrix spike/matrix spike duplicate (MS/MSD) analysis**, predetermined quantities of stock solutions of certain analytes will be added to a digestion and analysis. Samples will be split into duplicates, spiked, and analyzed. Percent recoveries will be calculated for each of the analytes detected. The relative percent difference between duplicate samples will be calculated and used to assess analytical precision. Project-specific MS/MSD analysis will be performed at the frequency of 5 percent (1/20 samples). Additional sample volume (3X) will be collected for MS/MSD analysis.

Trip blanks consist of analyte-free water prepared by the laboratory and placed in volatile organic analysis (VOA) vials, preserved with 1:1 HCl until a pH <2 is achieved: sealed and transported with the empty sample containers to the Site. At the Site, the vials remain sealed and then accompany the sample containers back to the laboratory. The trip blank is analyzed for volatile organic compounds to determine if contamination problems have been introduced during sample shipment and handling. A trip blank will be prepared and analyzed with each sampling shipment that will be subject to volatile organic analysis.

9.0 PERFORMANCE AND SYSTEM AUDITS

The analytical laboratory will conduct internal quality control checks and audits in accordance with specific methods and criteria required under their internal operating procedures and under the NYSDEC and SW-846 guidance. The frequency and procedures for laboratory performance and system audits are outlined in the selected laboratory's Quality Assurance Manual. The Laboratory QA Officer will be primarily responsible for conducting these audits. The systems audit consists of evaluation of all components of the measurement systems to determine their proper selection and use. Systems audits are normally conducted prior to or shortly after systems are operational, and are then performed on a regularly-scheduled basis. Performance audits are conducted periodically, and include the analysis of performance evaluation samples.

10.0 PREVENTIVE MAINTENANCE

The analytical laboratory will keep instrument log books which document maintenance schedules, dates, and maintenance performed, and details of each maintenance action. Routine maintenance will be performed by laboratory personnel in accordance with manufacturer recommendations. Service agreements and preventive maintenance contracts are routinely secured by the laboratory for all critical instruments and equipment. These agreements provide for regular checks by qualified service personnel. Critical spare parts are maintained in accordance with manufacturer recommendations. Additional detail about preventive procedures will be included in the selected laboratory's Quality Assurance Plan.

For preventive maintenance procedures in the field, see Section 5.1.

11.0 CORRECTIVE ACTION

Corrective action on a day-to-day basis for field activities will be handled by consultation between team members and the Site Investigation Manager. The Site Investigation Manager will make immediate decisions with the team members on new protocols to be followed. All changes in field procedures will be documented in the field notebook, reported to the Site Investigation Manager and Project Manager, and reported in the final report.

The Health and Safety Coordinator will have the ultimate authority to make decisions regarding modifications to health and safety practices, and regarding safety emergencies. The KEY Project Manager will be notified of any such field decisions or corrective actions that result in modification of protocols as outlined in any of the project plans.

Corrective action in the laboratory will be handled by consultation between the Laboratory QA Officer and project Quality Assurance Officer. Corrective actions are implemented when accuracy, precision, calibration, or other internal method-specific quality assurance criteria cannot be met. All changes in laboratory procedures will be documented and reported.

All modifications to procedures during the course of the project will be documented, and these exceptions will be permanently incorporated into the project file.

12.0 QUALITY ASSURANCE REPORTS TO MANAGEMENT

The Laboratory QA Officer will regularly report to the Project Manager and Site Investigation Manager on the status of the investigation. This report will include, as appropriate, a summary of the sampling results with appropriate data qualifications, audit findings, and any necessary corrective action procedures. A data quality assessment, which summarizes the measurement data accuracy, precision, and completeness will be prepared using all information for the available data.

At the completion of the project, the results of all previous reports will be summarized in a final report.

TABLES

TABLE 1

QUALITY CONTROL SAMPLE SUMMARY
QUALITY ASSURANCE PROJECT PLAN

MATRIX	PARAMETERS	FIELD REPLICATES	MS/MSD	RINSATE BLANKS	TRIP BLANKS
Groundwater	· VOCs · SVOCs	1 per 20	1 per 20	1 per day per type of sampling equipment used	1 per shipment of aqueous VOC samples

TABLE 2

SAMPLE COLLECTION REQUIREMENTS
QUALITY ASSURANCE PROJECT PLAN

PARAMETER	MATRIX	SAMPLE PRESERVATION	HOLDING TIME	CONTAINER
VOCs	Water	HCl to ph<2; Cool to 4°C	14 days from sample collection; 10 days after VTSR	(2) 40-ml glass vials; Teflon-lined septum
SVOCs	Water	Cool to 4°C	14 days after sample collection; 10 days after VTSR until extraction; 40 days after extraction	(4) 1-L amber glass bottles; Teflon-lined cap

.

TABLE 3

ANALYTICAL PARAMETERS
QUALITY ASSURANCE PROJECT PLAN

PARAMETER	MATRIX	METHOD REFERENCES
VOCs	Water	SW-846 8260 Category B deliverable
SVOCs	Water	SW-846 8270 Category B deliverable

APPENDIX G

STANDARD OPERATING PROCEDURES

Contents:

116 - DEPTH TO GROUNDWATER AND NAPL MEASUREMENTS

1.0 SCOPE AND PURPOSE

This Standard Operating Procedure (SOP) describes procedures to be followed for determining groundwater level measurements as well as a description of the procedures to be followed for determining the depth to any non-aqueous phase liquid (NAPL) in monitoring wells, and the apparent thickness of the NAPL layers in monitoring wells.

Generally, water level measurements from boreholes, piezometers, or monitoring wells are used to construct potentiometric surface maps and product elevation maps. Product levels and thickness and water levels should generally be taken in a 24-hour period unless certain situations necessitate measurements be taken in shorter time intervals.

2.0 REQUIRED MATERIALS

The following list identifies the preferred types of materials to be used when measuring depth to water, depth to light NAPL (LNAPL), or depth to dense NAPL (DNAPL):

- Electronic water level meter for water level measurements only;
- Interface probe (suitable for groundwater, LNAPL and DNAPL measurements);
- Field Note Book and/or site specific gauging forms;
- Appropriate PPE (i.e. Nitrile gloves, safety glasses, hard hat, steel toed boots);
- Plastic bucket with sealable lid for containerizing decon fluids;
- Second plastic bucket outfitted with a liner for solid consumables;
- Decontamination solutions in dedicated squirt bottles; and,
- Paper towels.

3.0 METHODOLOGY

Depth to Groundwater Measurements

- Open the well and monitor the headspace with the appropriate monitoring instrument to determine the presence of volatile organic compounds if there is information to suggest that volatiles may be present at levels to warrant an upgrade in the level of PPE. This activity will be conducted at least once per year unless specified otherwise in specific site control documents. Head space screening data will be recorded on the appropriate site specific gauging data sheets.

- Locate the surveyed measuring point of the well. The surveyed measuring point location is typically the top of the inner well riser, and should be clearly marked in permanent ink on the well riser or identified in previous sample collection records. The measuring point location should be described in the Field Notes and should be the same point used for all subsequent measurements.

- To obtain a water level measurement, lower a decontaminated water level meter into the monitoring well. Care must be taken to assure that the water level measuring device hangs freely in the monitoring well and is not adhering to the wall of the casing. The water level measuring tape will be lowered into the well until the audible sound of the unit is detected or the light on an electronic sounder illuminates. At this time, the precise measurement should be determined (to the nearest 0.01') by repeatedly raising and lowering the tape to converge on the exact measurement. The water level measurement will then be entered in the Field Notes.

- The water level measuring device shall be decontaminated in accordance with SOP #115 immediately after use. Generally, only that portion of the measuring tape which penetrates the water table will require decontamination. If NAPL is encountered, use of a solvent (*e.g.*, acetone) will be required to clean the probe.

NAPL Measurements

NAPL measurements should be made using an interface probe. Interface probes are commonly used to detect the presence of any floating (LNAPL) or sinking (DNAPL) immiscible layers. These probes can also be used to measure the water levels inside wells.

- Using the grounding cable attached to the interface probe, ground the probe to a metal object (*i.e.*, protective steel locking well cover) to prevent electric shock.

- The probe should be lowered slowly inside each well. When LNAPL is detected, the probe will make a solid tone. Record the measurement from the surveyed point on the top of the well casing to the top of the LNAPL. Continue lowering the probe (observing the calibrated drop line) until the steady tone stops. When water is detected, the probe will emit an intermittent audible sound to signify the beginning of the water column. When the intermittent tone is heard, observe the calibrated drop line to determine the water level. Record this measurement. The measurement on the drop line between when the steady tone began (*i.e.*, LNAPL was encountered) and when it stopped (*i.e.*, groundwater was encountered) will determine the apparent thickness of the LNAPL layer.

- The depth to DNAPL can also be determined using the interface probe. Lower the probe through the water column to the bottom of the well. The probe will make a solid tone if a DNAPL is encountered. Record the depth to the top of the DNAPL layer, and the depth to the bottom of the well to determine the apparent thickness of the DNAPL layer.

- The NAPL measuring device should be thoroughly cleaned after each use in accordance with SOP #115. If NAPL is encountered, use of a solvent (*e.g.*, acetone) will be required to clean the probe.

4.0 QA/QC PROCEDURES

Quality control measures include repetitive measurements of the depth to water or NAPL to ensure that accurate and precise results are obtained. Once the measuring device indicates that the water level or NAPL layer has been encountered, the probe should be raised slightly and lowered several times to check and confirm the measurement. A single final reading should be recorded in the field notes or on the project specific form. Site specific gauging sheets contain the previous round of groundwater, NAPL and total depth measurements. Field crew members are to compare readings to assure structural integrity of the monitoring point as well as confirm the well identification. If readings are grossly (> 5%) different from the previous round of measurements, a second reading will be taken and recorded as such on the appropriate field data sheets and/or field log book.

Water levels in piezometers and monitoring wells should be allowed to stabilize for a minimum of 24 hours after well construction and development, prior to measurement. Note that various states have different requirements for the stabilization time required following well installation and development. Consult the Project Manager or Site Supervisor when newly installed wells are being gauged and/or sampled to confirm enough time has elapsed between installation/development and gauging activities. Also, measurements should always be taken from the least to the most contaminated wells while decontaminating the equipment between each well. Assure that you have been provided a current gauging and sample collection order during the Pre-job meeting prior to mobilization to the work site.

If water level data are to be used for groundwater flow direction determination, all measurements should be taken within the shortest time frame feasible.

5.0 DATA RECORDING OR MANAGEMENT

Proper field data collection and management is important. Data may either be entered into a bound field notebook or other form specified in a site-specific work plan. All erroneous data entries are to be single line striken, initialed and dated by the party making the correction in the field.

6.0 REFERENCES

United States Environmental Protection Agency, January 1991. *Compendium of ERT Groundwater Sampling Procedures.* EPA/540/P-91/007. Washington D.C.

United States Environmental Protection Agency, September 1986. *RCRA Groundwater Monitoring Technical Enforcement Guidance Document.* EPA/OSWER/9950.1. Washington D.C.

#122 - MANAGEMENT OF INVESTIGATION DERIVED WASTES

PURPOSE

This standard operating procedure (SOP) presents general guidelines for the management of investigation derived wastes (IDWs), such as, but not limited to the following:

- Drill cuttings generated during soil boring investigations or well installations;
- Drilling fluids generated during soil boring investigations or well installations;
- Groundwater generated during well development, monitoring well purging, aquifer testing (i.e., pumping tests), or remedial activities;
- Water and sediment generated during equipment decontamination;
- Used personal protective equipment; and,
- Miscellaneous debris (e.g., well construction materials generated through abandonment of monitoring wells).

Due to the wide range of materials which may be generated and the variety of situations which may arise, it is likely that these SOPs will need to be supplemented with project-specific procedures. Where project-specific procedures are necessary, they should be developed to be consistent with the general guidelines presented below. Determination of the need for and scope of the development of project-specific procedures, will be determined as part of the initial project planning.

CONTAINERIZATION

Project-specific requirements for containerization of waste materials will be developed during initial project planning. If applicable, this information may be presented in a project-specific waste management plan. Project-specific containerization requirements should be developed to be consistent with the general guidelines provided below.

1. All potentially impacted materials generated during any investigation or remedial activity must be containerized unless one of the exceptions described below under Item 10 apply. Unless directed otherwise by the client, containers (drums, frac tanks, roll-off boxes, etc.) are to be provided by the consultant or contractor.
2. All potentially impacted materials shall be placed in new or reconditioned 55-gallon (DOT-UN1A2) drums. All drums brought onsite must be clean and in sound condition, free of any rust, dents, holes, or other types of damage.
3. Various types of waste materials (e.g., soils, groundwater, PPE, etc.) must be containerized separately without exception. Additionally, dry and wet soils should be containerized separately, if feasible.
4. Materials generated from various plant process areas, which may require potentially different waste classifications, should be containerized separately. As an example, soils generated in the vicinity of a surface impoundment which managed sludge from the treatment of wastewater from wood treating operations that use creosote and/or

pentachlorophenol (EPA Hazardous Waste K001) should be containerized separately from soils generated in a creosote drip track area (EPA Hazardous Waste F034). Likewise, materials generated at off-site locations should be managed separately from those generated on-site.

5. If possible, drums should be filled to approximately 90% capacity. As necessary, drums containing liquids should have enough freeboard to prevent rupture in the event of freezing.
6. Containers inside of containers are not permitted by waste management regulations. As a result, PPE must be placed directly into the drum. **Do not place PPE in a plastic bag and in turn place the plastic bag into a drum.** This constitutes a violation of waste management regulations. Similarly, all soil samples must be removed from jars or plastic bags and the jars crushed or plastic bags torn prior to being placed in a drum.
7. All lids and gaskets must be securely fastened prior to moving from one location to another. The consultant or subcontractor is responsible for transporting containers to an on-site temporary staging area as directed by the Facility Waste Management Director. Containers must be loaded, transported and unloaded in a safe manner.
8. The exterior of all containers must be thoroughly cleaned prior to staging. All mud, dirt or debris must be removed, with no exception. Waste management facilities will not accept containers which are visibly dirty on the outside.
9. Under no circumstances shall non-waste materials or general trash be placed in waste containers. The consultant/subcontractor should provide a dumpster for management of non-waste materials and general trash.
10. Under certain circumstances, the following exceptions to the above requirements may be made if provided by regulations and state/federal concurrence:

    a. Some regulatory agencies may allow for all or a portion of generated materials (i.e., auger cuttings, drilling fluids) to be placed back into or onto the ground from which they were generated. The consultant is responsible for identifying these requirements.
    b. If an operating water treatment facility exists on-site, groundwater and/or decontamination liquids may be managed into the treatment system if the discharge permit for the treatment facility provides for management of those liquids, and the liquids do not contain materials (e.g., solids or oils) which could potentially effect the operation of the system in an adverse manner. In this instance, consideration must be given to the classification and management of waste materials generated through the treatment of the liquid (e.g., spent activated carbon, filtered soils, etc.)

CONTAINER DESIGNATION AND LABELING

Project-specific requirements for container identification and labeling will be developed during initial project planning. If applicable, this information may be presented in a project-specific waste management plan. Project-specific container designation and labeling requirements should be developed to be consistent with the general guidelines provided below.

1. Each container will be assigned a unique designation. This designation should include a sequential number associated with each waste type, a code which identifies the type of waste (e.g., "S" for soil, "GW" for groundwater, etc.), and the date the material was placed in the container (e.g. 1-GW-12/12/98; 2-GW-12/12/98 etc...). The container designation must be clearly marked on the lid and the side of the container prior to transport to the temporary on-site staging area. The markings must be made in a manner such that the markings are legible, highly visible and permanent (i.e., weather resistant). A "Mean Streak®" grease pen or a paint stick is recommended for marking the container.
2. The appropriate waste classification label, as specified buy the site control documents, shall be affixed to the exterior side of the drum at a location at least two-thirds of the way up from the bottom of the container.
3. In the event the IDW waste stream has not yet be characterized, the Field team Leader will apply a "Contents Pending Analysis" label which will include information as specified in entry number 4 below.
4. The following information is to be recorded by field personnel in the field notebook and/pr on the IDW waste summary sheets, as appropriate.

    a. Container Designation;
    b. Contents (e.g., soil, groundwater, PPE);
    c. Date that the container was filled (i.e. start accumulation date);
    d. Location where the drums are staged;
    e. Location, and plant process area, where the material was generated (e.g., soil boring number, monitoring well designation);
    f. Relative moisture content (e.g., dry, moist, damp, wet, saturated) for soils only, for the purpose of managing the materials for disposal, damp or moist soil are considered "liquid"; and ,
    g. Approximate volume or percentage of the container filled.

CONTAINER STORAGE

Project-specific container storage requirements will be developed during the initial planning phase. If applicable, this information may be presented in a project-specific waste management plan. Project-specific container storage requirements should be developed to be consistent with the general guidelines provided below.

1. If the investigative or remedial work is conducted at active or inactive sites owned formerly by the consultant's client, plans for container storage must be developed in conjunction with the current property owner.
2. If containers are to be transported to an on-site staging area, all container handling and moving must be conducted in a safe manner. Contractors are responsible for providing the necessary equipment (e.g., front-end loader, fork lift with drum grappler, etc.) to provide for safe and efficient staging of containers.

3. All containers shall be stored in a neat and organized fashion with all labels clearly visible. Containers shall not be stacked.
4. Containers holding materials of different waste classifications should be staged together to facilitate loading of the materials onto transport vehicles.
5. To the extent practicable, all containers should be protected from the elements.
6. If stored outdoors in an area where precipitation could accumulate, all containers must be placed on pallets.
7. In accordance with DOT requirements, all containers must be rust-free and in sound condition for shipment.
8. Prior to demobilization, field personnel should conduct an inspection of the container storage area to ensure all containers are clearly marked, clean and staged in a neat and organized manner.

WASTE MATERIAL INVENTORY

FTS personnel are responsible for completing an inventory of waste materials stored at the project site. The inventory will be completed and submitted as part of the Field Trip Report. Monthly the data is updated in the FTS waste management inventory located on the open share ORCA web site. The inventory will include a tabular summary of all containers stored at the project site and their respective contents as well as start accumulation dates for disposal planning and schedule.

WASTE MATERIAL SAMPLING AND ANALYSIS

Composite samples of the containerized materials for laboratory analysis may be collected for each IDW media. The results of the analysis may be used for waste profiling purposes required by the waste management facility and/or waste classification purposes. Project-specific requirements for waste sampling and analysis will be developed during initial project planning. If applicable, this information may be presented in a project-specific waste management plan. Project-specific waste material sampling and analysis requirements should be developed to be consistent with the standard procedures provided below. To the extent practicable, historical information, site-specific analytical data and knowledge of the waste composition should be utilized to minimize sampling and analysis requirements.

1. Specific details regarding the number and types of samples to be collected, required laboratory turn-around time, analytical parameters and analytical methods will be determined on a project-specific basis during the initial planning phase. If applicable, this information may be presented in a project-specific waste management plan.
2. At a minimum, samples must be collected and handled in accordance with standard industry protocols. If an approved project-specific Sampling and Analysis Plan or Quality Assurance Project Plan exists, then sample collection and handling procedures, as specified therein, must be followed.
3. All analyses must be performed using the appropriate analytical methods specified in EPA SW846 “Test Methods for the Evaluation of Solid Wastes”.

4. The sampler must complete and maintain copies of all chain-of-custody documentation.
5. In accordance with Subpart CC or 40CFR Par 264/265 which became effective on December 6, 1996, hazardous wastes containing greater than 500 parts per million by weight total volatile organic compounds (VOCs), are subject to the emission control requirements of this rule. Determination of VOC content may be made through laboratory analyses or generator knowledge. Thus, analysis for VOCs will likely be required by the waste disposal facility for profiling purposes in the future. Analysis is to be performed using method 25D in 40CFR Part 60 Appendix A, or through the use of an approved alternate method. Knowledge-based waste determinations must be thoroughly documented.
6. Composite samples of similar waste classification of containerized materials will be profiled based on the characteristics presented in 40 CFR Part 261 Subpart C - Characteristics of Hazardous Wastes:

   - §261.21 - Characteristic of Ignitability.
   - §261.22 - Characteristic of Corrosivity.
   - §261.23 - Characteristic of Reactivity.
   - §26124 - Toxicity Characteristic.

TRANSPORTATION AND DISPOSAL

Transportation, disposal, and manifesting of IDW are the responsibility of the owner.

ATTACHMENT A

EXAMPLE WASTE INVENTORY SUMMARY

ATTACHMENT A

Field & Technical Services

FTS

IDW INVENTORY LOG

Date:

Project Name:

Project Number:

Location:

Container Identification Number	Type of IDW (SW, GW, NAPL, PPE, Other)	Start Accumulation Date	Date Filled	Comment / Label Description	Staging Location

SOP #157 LOW-FLOW (MINIMAL DRAWDOWN) GROUNDWATER SAMPLING PROCEDURES

1.0 SCOPE AND PURPOSE

This standard operating procedure (SOP) provides guidelines for the collection of representative groundwater samples from monitoring wells. Groundwater samples are typically collected from monitoring wells for laboratory analysis to support the characterization of representative groundwater quality. Low-flow purging has the advantages of minimizing the turbidity and mixing between the overlying stagnant casing water and water within the screened interval. Low-flow refers to the velocity with which water enters the pump intake and that is imparted to the formation pore water in the immediate vicinity of the well screen. Water level drawdown provides the best indication of the stress imparted by a given flow-rate for a given hydrological situation. Typically, flow rates on the order of 0.1-0.5 liter/minute are used; however, these flow rates may be varied dependent upon site-specific hydrogeology.

2.0 REQUIRED MATERIALS

The following list identifies the types of equipment which may be used during groundwater sampling tasks. Project-specific equipment should be selected based upon project objectives, the depth of groundwater, purge volumes, analytical parameters, and well construction. The types of groundwater sampling equipment are as follows:

- Purging/Sample Collection Equipment
  - Low-flow (e.g., 0.1-0.5 liter/minute) pumps such as peristaltic pumps; bladder pumps, electrical submersible pumps, and gas-driven pumps;
  - Pumps are to be constructed of stainless steel or Teflon™;
  - (Note that bailers are inappropriate devices for low-flow sampling.)

Peristaltic pumps may be the least desirable choice, and for some projects, may not be an option at all. Some regions have specific requirements regarding what type of pumps should be used for sampling of particular analytical parameters. For example, USEPA Region II does not allow the use of peristaltic pumps for collecting samples for analysis of organic parameters. For this reason, region-specific requirements regarding pump selection shall be specified in the project-specific work plan. Another consideration is the soft silicon tubing required for use with the peristaltic pump mechanism. There is potential that this tubing may react with more complex organic compounds.

- Related sampling and field measurement equipment will include some or all of the following:
  - A multi-parameter measurement unit with in-line sampling capability such as a Horiba® U-10 or U-22;

  - A photoionization detector (PID) to monitor for volatile organic constituents upon opening the monitoring well cap (the need for this instrument will be specified in the project specific work plan)
  - An in-line dissolved oxygen meter;
  - An in-line turbidity meter;
  - An in-line filtration apparatus, 0.45 µm or 0.1 µm, if dissolved metals are a constituent of interest at the site;
  - A water level meter; and,
  - An interface probe, if light non-aqueous phase liquid (NAPL) or dense NAPL are potentially present on site (the need for this instrument will be specified in the project-specific work plan).

- General Equipment:
  - Safety Glasses or equivalent eye protection;
  - Distilled water and dispenser bottle;
  - Decontamination solutions (such as Alconox and solvents);
  - Field data sheets and log book;
  - Sample preservation solutions;
  - Sample containers;
  - Buckets and intermediate containers;
  - Coolers;
  - Shipping labels;
  - Permanent markers/pens;
  - Packing tape;
  - First aid kit;
  - Key(s) for well locks; and,
  - Stopwatch.

- Disposable Materials:
  - Plastic sheeting/bags;
  - Pump tubing;
  - Gloves;
  - Filters;
  - Chemical-free paper towels; and,
  - Protective coveralls (e.g., Tyvek), if necessary.

3.0 METHODOLOGIES

3.1 Pre-Sampling Considerations

Water samples should not be collected immediately following well development. Sufficient time should be allowed for the groundwater flow regime in the vicinity of the monitoring well to stabilize and to approach chemical equilibrium with the well construction materials. This lag time will depend on site conditions and method of installation. New Jersey protocols require a minimum lag time of two weeks. USEPA protocols recommend an evaluation of site conditions with a typical minimum time lag of one week. (Note: Project personnel shall review applicable regulatory guidelines regarding the required lag time on a project-specific basis).

Several preparatory activities need to be completed prior to actual sampling of each well. These preparatory activities can be summarized as follows:

- Log in sample bottles received from laboratory, prepare any deionized water or preservatives needed for the sampling;

- If necessary, prepare pumps with standard decontamination procedures;

- Don the necessary personnel protective equipment (PPE) stipulated in the Site health and safety plan (HASP);

- Measure static water level prior to well purging. Water levels may be measured to the nearest hundredth of a foot with an electronic probe from the established measuring point of the well casing. If water levels will be used to determine groundwater flow direction and/or hydraulic gradients, all measurements should be collected over as short a time period as possible. Water level measurements will be consistent with the procedures specified in FTS SOP #116, Depth to Groundwater Measurements.

- Unless specified otherwise in the project-specific Field Sampling Plan (FSP), well depth should be obtained from the well logs, rather than from measuring total depth, as this activity may disturb material that has settled to the bottom of the well and increase turbidity in samples. If it is necessary to measure total depth, or to measure dense non-aqueous phase liquid (DNAPL), perform these measurements after the sample has been collected.

3.2 Equipment Calibration

Prior to purging and sampling, all sampling devices and monitoring equipment should be calibrated according to manufacturer's recommendations and the site Quality Assurance Project Plan (QAPP) and FSP. Dissolved oxygen calibration must be corrected for local barometric pressure readings and elevation.

3.3 Well Purging

For low-flow, minimal drawdown sampling protocols, an in-line water quality measurement device such as a flow-through cell is used to establish the stabilization time on a well-specific basis for several indicator parameters, as follows:

- pH;
- specific conductance;
- dissolved oxygen;
- turbidity; and,
- Oxidation-Reduction Potential (ORP) (as required on a project-specific basis).

This differs from the general guideline used in conventional purging and sampling protocols that requires removal of a minimum of three casing volumes prior to sampling. Following are recommendations to be considered before, during, and after purging and sampling:

- establish a flow rate that maintains minimal drawdown in the well during both purging and sampling;
- maximize tubing wall thickness and minimize tubing length;
- place the sampling device intake at the middle or slightly above the middle of the screened interval, unless specified otherwise in the project-specific work plan
- For wells completed as open boreholes in bedrock, placement of the sampling device will be specified in the project-specific work plan;
- minimize disturbances of the stagnant water column above the screened interval during water level measurement and sampling device insertion;
- make proper adjustments to stabilize the flow rate as soon as possible;
- monitor water quality indicators during purging.

PUMP SELECTION

There are no unusual requirements for groundwater sampling devices when using low-flow, minimal drawdown techniques. The primary requirement is that the device give consistent results and minimal disturbance of the sample across a range of low flow rates (i.e., <0.5 liter/minute). Note that pumping rates that cause minimal to no drawdown in one well could easily cause significant drawdown in another well that has been installed in a less transmissive formation. Consistency in operation is critical to meet accuracy and precision goals.

There are several pumps which are used frequently for purging or sampling. These types include the peristaltic, bladder, and submersible pumps. It is desirable that the pump be easily adjustable and operates reliably at these lower flow rates. Gas-driven pumps should be of a type that does not allow the gas to be in direct contact with the sampled fluid. Bailers and other grab-type samplers are not suited for low-flow sampling and shall not be used.

Bladder Pumps

The bladder pump is a compressed air or gas-operated, positive displacement submersible well pump that uses inert compressed gas, e.g., nitrogen, to inflate an internal bladder which pumps water up the discharge line. These pumps are used when large volumes of water must be purged from monitoring wells or when water depths exceed the limits of a peristaltic pump. Usually these pumps are used on wells with diameters of 2 inches or greater and wells with depths up to 150 feet. When economically feasible the bladder pumps will be dedicated to each well. The line assembly is dedicated for use on one well only. After use, the tubing is wrapped, marked, and stored for future use in the well to which it is dedicated.

The following procedures should be followed for using the bladder pump:

1. Connect the line assembly to the pump by first attaching the cable and then connecting the sample and gas lines.

2. Lower the pump down the well by unrolling the line off the spool until the pump is located at the desired position inside the well.

3. Secure the cable to hold the pump at the desired depth.

4. Connect the gas line to the control box. The discharge line should be connected to the water quality meter or flow-through cell, with cell discharge line placed into a container (e.g., 5-gallon bucket or 55-gallon drum) to collect the purged water.

5. Connect the gas supply to the control box and adjust the pressure according to the manufacturer's manual.

6. As noted, the tubing is used on one well only; after each sampling event it is packed, sealed, and stored for future use on that well.

Submersible Pumps

When wells are encountered which require excessive lift (depth to water is greater than 20 feet) or have diameters greater than 2 inches, positive displacement submersible pumps may also be used to purge the required amount of water. When economically feasible, the submersible pumps will be dedicated to each well. However, in some cases, this is not economically feasible, and the same pump must be used in several wells. When this must be done, the pumps will be appropriately decontaminated between wells. Also, a pump will be used on wells known to contain similar constituent levels, or used first in wells with lower constituent levels before use in wells suspected to contain higher constituent concentrations.

1. The submersible pump should be lowered to the desired depth using a safety line that is secured to the well casing.

2. Connect the power cord to the power source (generator) and turn on the pump.

3. Connect the discharge line to the water quality meter or flow-through cell, with cell discharge line placed into a container (e.g., 5-gallon bucket or 55-gallon drum) to collect the purged water.

4. Continue to monitor the pumping rate and water level in the well, slowing the rate if drawdown occurs.

Peristaltic Pumps

Peristaltic pumps must be operated above ground next to the well and are limited to water level depths of 20 to 30 feet below ground surface. The following procedure describes the use of peristaltic pumps for purging and sample collection.

1. New Nalgene or low density polyethylene (LDPE) suction line is used on each well being purged. New silicone pump head tubing will also be used if the pump is also used for sampling.

2. The type of tubing used to collect the sample will be contingent on the parameters of interest.

    - If conventional parameters (i.e., biological oxygen demand [BOD], total suspended solids [TSS], fecal coliform, pH, and oil and grease) are being analyzed, then standard Nalgene tubing is sufficient to collect the sample.

    - If volatile, semi-volatile, or metals parameters are the constituents of interest, Teflon™ tubing is used to collect the sample.

3. Unless authorized otherwise, all purged groundwater is collected, containerized, and when possible, managed in an onsite treatment system. All tubing is discarded after each use or dedicated to future use within the same well.

Unless authorized otherwise, all purged groundwater is collected, containerized, and when possible, managed in an onsite treatment system.

3.4 Monitoring or Water Level and Water Quality Indicator Parameters

Performance criteria for determining stabilization should be based on water-level drawdown, pumping rate, and equipment specifications for measuring indicator parameters. Check the water level periodically during purging and sampling to monitor drawdown in the well as a guide to flow rate adjustment. The goal is minimal drawdown (<0.1 meter) during purging. This goal may not be possible to achieve under some circumstances and may require adjustment based on site-specific conditions and personal experience.

In-line water quality indicator parameters should be continuously monitored during purging, as follows:

- temperature;
- pH;
- ORP;
- conductivity,
- dissolved oxygen; and,
- turbidity.

Measurements should be taken every three to five minutes. Stabilization is achieved after all parameters have stabilized for three successive readings. The three successive reading should be within the following guidelines to indicate stabilization:

- ± 10% for temperature;
- ± 0.2 s.u. for pH;
- ± 3% for conductivity;
- ± 10 mv for ORP;
- ± 10% for turbidity; and,
- ± 10% for dissolved oxygen.

Note that these are guidelines only; for example, in those instances where the field parameters measure at very low quantities, even minor fluctuations can exceed the guidelines, even though stabilization has been achieved. In these instances, the field technician must use professional judgment to determine that parameter stabilization has been achieved.

Parameters will typically stabilize in the following order: pH, temperature, and specific conductance, followed by ORP, dissolved oxygen, and turbidity. If parameter stabilization criteria are too stringent, then minor oscillations in indicator parameters may cause purging operations to become unnecessarily protracted. It should also be noted that turbidity is a very conservative parameter in terms of stabilization and is normally the last parameter to stabilize. Excessive purge times are invariably related to the establishment of too stringent turbidity stabilization criteria. Note that natural turbidity levels in groundwater may exceed 10 nephelometric units (NTU). Pumping rate, drawdown, and the time or volume required to obtain stabilization of parameter readings can be used as a future guide to purge the well.

3.5 Groundwater Sampling

Once parameters have stabilized, begin sample collection as soon as possible. Disconnect or bypass the in-line monitoring device that was used to measure field parameters prior to sample collection. The sampling flow rate should remain at the established purge rate or may be adjusted slightly to minimize aeration, bubble formation, turbulent filling of sample bottles, or loss of volatiles due to extended residence time in tubing. Typically, flow rates <0.5

liters/minute are appropriate. The same device used for purging should be used for sampling. Samples will be collected in decreasing order of their volatility. This order is generally as follows:

- Volatile organic chemicals (VOCs);
- Total organic halogens (TOX);
- Gas sensitive parameters (e.g., Fe2+, CH4, H2S/HS-, alkalinity);
- Total organic carbon (TOC);
- Semivolatile organics chemicals (SVOCs);
- Inorganic parameters; and,
- If filtered samples are to be collected, these should be collected last.

Samples collected for volatile organics should be carefully placed into 40 milliliter glass vials with Teflon septum lids. No air bubbles should be present in the vial after sealing the septum lid; if air bubbles are present, fill the vial more completely. Other common laboratory-provided sample bottles include polyethylene or clear glass for metals and amber glass for phenols and SVOCs.

If the FSP or QAPP specifies dissolved metals analysis, field filtration of each sample will be necessary. Filtering is performed using an in-line filtration device, hand vacuum pumps with transfer vessels, or peristaltic pumps with disposable funnels/filters. If using the vacuum pump method, a laboratory cleaned transfer vessel is used. If using a peristaltic pump, new silicone tubing is used in the pump head for each sample filtered and new Teflon tubing is used from the pump head to the filter. Samples are filtered through 0.45 micron filter unless specified otherwise in the FSP. After filtering, samples requiring preservatives are preserved and all containers are securely placed in coolers and chilled to an appropriate temperature (usually < 4oC). Each cooler containing samples will contain a completed chain-of-custody form.

Sampling technicians should wear a clean pair of disposable gloves for each well.

4.0 QA/QC PROCEDURES

Quality control requirements depend upon project-specific circumstances and objectives and should be addressed in the QAPP or FSP.

5.0 DATA RECORDING AND MANAGEMENT

A written record of each monitoring event must be maintained. The record provides a summary of the sample collection procedures and conditions, shipment method, the analyses requested and the custody history. This record consists of the following:

- Field notebook;

- Groundwater Sample Collection Form;
- Chain of custody form; and,
- Shipping receipts.

Sample labels shall be completed at the time each sample is collected and will include the information listed below.

- Project name;
- Sample number;
- Time and date;
- Preservative (if applicable);
- Analyses to be performed; and,
- Sampler's name.

6.0 REFERENCES

U.S. EPA, Low-Flow (Minimal Drawdown) Ground-Water Sampling Procedures, by Robert W. Puls and Michael J. Barcelona, EPA/540/S-95/504, April 1996.

U.S. EPA, Region II, Ground Water Sampling Procedure - Low Flow Pump Purging and Sampling.

APPENDIX H

HEALTH AND SAFETY PLAN

SITE SPECIFIC HEALTH AND SAFETY PLAN FOR ACTIVITIES ASSOCIATED WITH FIELD SAMPLING PLAN

Prepared for:

Beazer East, Inc.

Prepared by:

Key Environmental, Inc.
200 Third Avenue
Carnegie, Pennsylvania 15106

June 2009

TABLE OF CONTENTS

LIST OF ATTACHMENTS

LIST OF TABLES

REVISIONS/ADDENDA TO HEALTH AND SAFETY PLAN

Revision	Date	**Issued By**	Revisions Made
0	5/11/98	John Francis	Original HASP

1.0 INTRODUCTION

This Health and Safety Plan (HASP) describes the program to be implemented by Key Environmental, Inc. (KEY) for field sampling plan activities at the New York Tar Emulsion Products (NYTEP) Site located in Harbor Point, Utica, New York. The objective of this HASP is to provide Site-specific procedures to protect the health and safety of employees during the conduct of this project. All work will be performed in accordance with applicable federal, state, and local regulations, including, but not limited to:

- U.S. Department of Labor, Occupational Safety and Health Administration (OSHA) - 29 Code of Federal Regulations (CFR) 1910.120, "Hazardous Waste Operations and Emergency Response."
- OSHA - 29 CFR 1926, "Safety and Health Regulations for Construction."

The health and safety practices, procedures, and personal protective equipment (PPE) requirements established for this project are based on hazards known to be present at this Site. All protective measures employed will be commensurate with known hazards associated with specific work activities and job tasks and will be modified if other hazards are identified during the course of the work.

Subcontractor personnel will be adequately trained in health and safety aspects of specific job assignments and in all aspects of this plan, including:

- Program organization and responsibilities;
- Site characterization and hazard assessment;
- Medical surveillance requirements;
- Work practices and Site control;
- Personal protective equipment;
- Monitoring;
- Materials handling and decontamination;
- Emergency response; and,
- Record keeping.

This HASP is derived from existing information on the chemical and physical hazards known to be present. Information and experience gathered during this investigation will be used to modify and/or develop the HASP to tailor protective measures to actual hazards as necessary.

2.0 PROGRAM ORGANIZATION AND RESPONSIBILITIES

The design and implementation of the HASP are accomplished through an integral team effort comprised of the following:

- <u>Project Manager</u> - The Project Manager is responsible for assuring that all activities are conducted in accordance with the HASP. The Project Manager has the authority to suspend field activities if employees are in danger of injury or exposure to harmful agents. The Project Manager's responsibilities include:

    - Coordinating the development of a Site-specific HASP for all phases of the project
    - Ensuring that the appropriate health and safety equipment and PPE are available for project personnel
    - Ensuring that all personnel have received the appropriate training before they engage in activities that are potentially hazardous
    - Ensuring that all required personnel have received the required medical examination, testing, and screening before engaging in work activities
    - Designating a Site Health and Safety Officer (SHSO) and other Site personnel who will assure compliance with the HASP.

- <u>Project Site Supervisor/SHSO</u> - The Site Supervisor also acts as the SHSO and is responsible for assuring that all Site activities are conducted in accordance with the HASP. The Site Supervisor's responsibilities include:

    - Ensuring that personnel, subcontractor personnel, and visitors comply with the requirements of this HASP
    - Notifying the Project Manager of any changes in work conditions or tasks which may require changes to the HASP
    - Suspending field activities if necessary, and resume activities when appropriate.
    - Coordinating safety meetings and daily safety briefings, as necessary
    - Managing health and safety equipment, including instruments, respirators, gloves, suits, and other PPE, used in field activities
    - Acting as the Emergency Coordinator at the Site and arrange for emergency response in cooperation with local emergency and health officials
    - Monitoring conditions during field activities to assure compliance with HASP
    - Monitoring conditions during field activities to determine if more stringent procedures or a higher level of PPE should be implemented
    - Maintaining a log to record conditions, personnel involved in field activities, and other pertinent health and safety data

  - Overseeing the arrangement and execution of personnel and equipment decontamination
  - Controlling visitor, subcontractor, and employee access to hazardous areas
  - Delegating, if necessary and appropriate, some of these responsibilities to other on-Site qualified employees.

- Employees and Subcontractors - Employees and subcontractors will be responsible for the following:

  - Becoming familiar with the HASP
  - Attending training sessions to review the HASP and other safety and health information
  - Being alert to identified and non-identified hazards
  - Reporting unidentified hazards to the SHSO
  - Offering suggestions, ideas, or recommendations that may improve or enhance Site safety
  - Complying with contents of the HASP
  - Conducting themselves in a manner that is orderly and appropriate for the Site.

3.0 SITE CHARACTERIZATION AND HAZARD ASSESSMENT

3.1 SITE BACKGROUND

The Site is a former road tar and asphalt emulsion facility. In 1977, Suit-Kote Corporation (Suit-Kote) purchased the Site, which was operated by NYTEP, a subsidiary of Suit-Kote. Suit-Kote ceased industrial operations at the Site in 1983 and above ground storage tanks and waste materials were removed from the Site.

3.2 SCOPE OF WORK

The scope of work includes:

- Monitoring well installation and development: Three monitoring well clusters will be installed on-Site using Rotosonic drilling methods. Wells will be screened with a photoionization detector (PID) to determine the presence of volatile organic compounds. Drilling equipment will be decontaminated between each borehole and before leaving the Site by steam cleaning.

- Surveying: Each monitoring well will be surveyed for location and elevation and reference to the New York State Plane Coordinate System.

- Groundwater sampling: Groundwater samples from the three monitoring well clusters will be collected from using low flow methods. In addition to the baseline monitoring two subsequent annual sampling events will be conducted. Activities will include using an electronic water level probe to determine depth to water, using an oil/water interface probe if necessary, purging the well with either pumps or bailers, and sampling using bailers or low flow pumps.

3.3 HEALTH HAZARDS

Potential health hazards at the Site include the potential exposure to coal tar by-product constituents including polynuclear aromatic hydrocarbons (PAHs) and the volatile organic compounds (VOCs) benzene, toluene, ethylbenzene, and xylene (BTEX).

A previous investigation at the Site by URS Consultants, Inc. (URS, 1992) found the following range of concentrations of potential constituents:

Constituent	Soil (mg/Kg)	Groundwater (mg/L)
Benzene	0.76 - 13	0.003 - 2.6
Toluene	25 - 36	0.16 - 0.76
Ethylbenzene	13 - 110	0.6 - 0.94
Xylene	18 - 220	0.02 - 1.3
PAHs, total	935 - 16,789	0.084 - 6.732
Naphthalene	74 - 4,600	0.077 - 5.9

A summary of health hazard data is given for BTEX and PAHs. Table 1 presents exposure limits and other properties of chemicals that may be present at this Site.

The main route of exposure for Site chemicals is skin/eye contact and absorption; a second route of exposure is inhalation of vapors/dust. Incidental ingestion is also a possible route of exposure. Potential exposures will be reduced or eliminated by following the work practices and using the PPE designated in this HASP. The overall chemical health hazard assessment for this Site is low.

3.3.1 Coal Tar By-Products and PAHs/SVOCs

The PAHs found on Site pose less of an inhalation hazard than VOCs because they are less likely to vaporize. PAHs also can be a potential constituent of airborne dust and pose an inhalation hazard. However, drilling will produce minimal dust. Other semi-volatile organic compounds (SVOCs) may be potentially present on-Site along with PAHs.

Inhalation of coal tar by-products may irritate the respiratory tract. Eye contact may cause eye irritation, burning and inflammation. Ingestion may result in nausea, vomiting, abdominal pain, rapid pulse, respiratory distress and shock. Absorption into the body systems by any route may cause trouble breathing, dizziness, headache, continuous or drawn out pulse, nausea, vomiting, salivation, and convulsions. Exposure to large doses may be fatal. Chronic or long-term effects of overexposure to coal tar by-products may cause dermatitis, and cancer of the skin, kidneys, and respiratory tract. Some PAHs can cause cancer after prolonged exposure. In general, PAHs are regulated as coal tar pitch volatiles with a Permissible Exposure Limit (PEL) of 0.2 mg/m^3.

Naphthalene is more volatile than other SVOCs/PAHs and can often be used as an indicator compound for potential exposure to SVOCs/PAHs using a Photo-Ionization Detector (PID) such as an HNu. Naphthalene has a PEL of 10 ppm.

Site investigation activities are not expected to generate large amounts of airborne dust that would carry SVOCs/PAHs. Skin contact and exposure to most SVOCs/PAHs during Site activities can be eliminated by the use of gloves and skin protection. For these reasons, potential exposure risks to PAHs are considered to be low.

3.3.2 VOCs/BTEX

VOCs that have been found in some cases in association with coal-tar by-products include BTEX compounds. These VOCs may pose an inhalation hazard as well as a skin and eye hazard. These VOCs have similar health effects which are briefly summarized here. More information concerning health effects of specific chemicals can be found in the Material Safety Data Sheets (MSDSs) in Attachment A.

Acute or immediate effects of overexposure to VOCs include eye, nose, and respiratory tract irritation, headache, dizziness, drowsiness, shortness of breath, intoxication, nausea, vomiting, abdominal pain, and dermatitis. Severe overexposure may lead to unconsciousness and convulsions, coma, and death. Other signs of overexposure may include heartbeat irregularities, bronchitis, pulmonary edema, muscle spasms, incoordination, and confusion.

Effects of frequent or long-term overexposure include headache, nervousness, lack of hunger, pale skin, rash, and sleeplessness. Chronic inhalation of many VOCs may result in lung, liver, and kidney damage. Long-term overexposure to benzene can cause blood disorders, such as leukemia and aplastic anemia. Benzene is a suspected human carcinogen.

3.3.3 Work Task Hazard Assessment

Table 2 indicates the chemical hazards associated with Site work tasks, relative hazard assessment, proposed initial levels of personal protection, and air monitoring requirements.

3.4 PHYSICAL HAZARDS

The primary physical hazards on the Site are those associated with drilling and excavation activities. Safe work practices for these potential hazards are outlined in Section 5.0.

3.5 CONFINED SPACES

Due to the nature of Site activities, confined space entry (CSE) is not expected. However, if any CSE is to occur, the CSE procedure must be followed, including atmospheric testing of the space and completion of the CSE permit before entry. A minimum of two trained employees must be present for any entry.

OSHA defines a "permit required confined space" as a space that:

- Is large enough and so configured that an employee can bodily enter and perform assigned work;
- Has limited or restricted means for entry and exit;
- Is not designed for continuous human occupancy; and has one or more of the following characteristics:
- Contains or has a potential to contain a hazardous atmosphere;
- Contains a material that has the potential for engulfing the entrant;
- Has an internal configuration such that an entrant could be trapped or asphyxiated by inwardly converging walls or by a floor which slopes downward and tapers to a smaller cross section; or,
- Contains any other recognized serious safety or health hazard.

3.6 COLD STRESS

Cold weather conditions may result in cold stress ranging from mild frostbite to severe hypothermia. Cold injury and impaired ability to work are dangers at low temperatures and when the wind chill factor is low. Cold stress normally occurs in temperatures at or below freezing, or under certain circumstances, at temperatures of 40 °F. Extreme cold for a short period of time may cause severe injury to exposed body surfaces or result in profound generalized cooling, causing death. Areas of the body that have high surface area to volume ratio, such as fingers, toes and ears, are the most susceptible. Two factors influence the development of a cold weather injury: ambient temperature and wind speed. For instance, 10 °F with a wind of 15 miles per hour is equivalent in chilling effect to still air at –7 °F. A wind chill chart is presented on the following page.

It does not have to be extremely cold for systemic hypothermia to occur. *Hypothermia* may occur at outdoor temperatures approaching 50 °F. Systemic hypothermia occurs when the body core temperature decreases. Symptoms begin with shivering, apathy, loss of coordination, followed by lethargy and coma; if allowed to continue, hypothermia may result in death. Get the victim out of the cold and into dry clothing. Warm up his or her body slowly. Give nothing to eat or drink until the victim is fully conscious. Warm fluids, but no stimulants such as tea, coffee, alcohol or tobacco should be given. Get medical attention immediately.

Frostnip, or incipient frostbite, usually involves the ears, nose, chin, cheeks, and fingertips and toe tips. It occurs during high wind, low temperature, or both. The skin suddenly blanches (becomes white). Frostnip is painless and can be reversed without tissue damage by warming the affected area by using warm water. The area should not be rubbed.

Superficial frostbite is a more severe local cold injury. This involves the skin and superficial tissue just beneath it. The skin becomes white, waxy, and firm; the tissue beneath it remains soft. Affected personnel should be taken out of the cold and the affected area slowly and carefully rewarmed. Again, the area should not be rubbed. Stinging and burning may follow warming and superficial blisters may occur.

Deep frostbite involves freezing not only of skin and subcutaneous tissue but even muscle and bone. The emergency treatment for deep frostbite is immediate warming. Affected persons should be kept dry, provided with external warming, and the frostbitten part covered by a dressing while being transported promptly to the nearest emergency department. Warm fluids, but no stimulants such as tea, coffee, alcohol or tobacco should be given to frostbite or hypothermia victims.

3.6.1 Cold Stress Prevention

To prevent or minimize the effects of cold stress, the following work practices should be followed:

- Use dry, insulated and/or layered work clothing, warm gloves, hard hat liners, and boots. Combine winter gear with chemical resistant personal protective equipment and waterproof gear to provide the best protection for the given site task and weather conditions.

- Provide rest breaks in warm areas as necessary.

- Use the following wind chill chart to estimate the effects of wind and temperature on the body. Be especially careful to note when frostbite is a potential hazard.

WIND CHILL CHART

Wind (mph)	**Temperature (°F)**																	
Calm	40	35	30	25	20	15	10	5	0	-5	-10	-15	-20	-25	-30	-35	-40	-45
5	36	31	25	19	13	7	1	-5	-11	-16	-22	-28	-34	-40	-46	-52	-57	-63
10	34	27	21	15	9	3	-4	-10	-16	-22	-28	-35	-41	-47	-53	-59	-66	-72
15	32	25	19	13	6	0	-7	-13	-19	-26	-32	-39	-45	-51	-58	-64	-71	-77
20	30	24	17	11	4	-2	-9	-15	-22	-29	-35	-42	-48	-55	-61	-68	-74	-81
25	29	23	16	9	3	-4	-11	-17	-24	-31	-37	-44	-51	-58	-64	-71	-78	-84
30	28	22	15	8	1	-5	-12	-19	-26	-33	-39	-46	-53	-60	-67	-73	-80	-87
35	28	21	14	7	0	-7	-14	-21	-27	-34	-41	-48	-55	-62	-69	-76	-82	-89
40	27	20	13	6	-1	-8	-15	-22	-29	-36	-43	-50	-57	-64	-71	-78	-84	-91
45	26	19	12	5	-2	-9	-16	-23	-30	-37	-44	-51	-58	-65	-72	-79	-86	-93
50	26	19	12	4	-3	-10	-17	-24	-31	-38	-45	-52	-60	-67	-74	-81	-88	-95
55	25	18	11	4	-3	-11	-18	-25	-32	-39	-46	-54	-61	-68	-75	-82	-89	-97
60	25	17	10	3	-4	-11	-19	-26	-33	-40	-48	-55	-62	-69	-76	-84	-91	-98
			Frostbite Times				30 min.		10 min.		5 min.							

Wind Chill (°F) = $35.74 + 0.6215T - 35.75(V^{0.16}) + 0.4275T(V^{0.16})$

Where T = Air Temperature (°F), V = Wind Speed (mph)

From National Oceanographic and Aeronautics Administration and the National Weather Service, 2002

3.7 HEAT STRESS

A general physical hazard associated with outdoor work during warm weather is heat stress. There are three heat disorders that are of particular concern:

- Heat cramps;
- Heat exhaustion; and,
- Heat stroke.

Heat cramps occur due to the depletion of body salts from sweating. Heat exhaustion results from significant loss of body salts and fluid. Its symptoms may include weakness or fatigue, nausea, headaches, and in more serious cases, clammy, moist skin with pale or flushed complexion. Heat stroke is the most serious and occurs when the body's system to regulate internal temperature fails. Symptoms are hot, dry skin; mental confusion or delirium; convulsions or unconsciousness; and body temperature of 105 degrees Fahrenheit (°F) or higher. In this situation, medical attention is needed immediately; heat stroke may be fatal.

To prevent heat disorders, attention will be paid to such variables as temperature, humidity, air movement, and the physical condition of employees. In addition, breaks will be taken as needed to let the body cool. Liquids designed to replace lost body salts will be provided regularly.

3.7.1 Heat Stress Prevention

Heat stress can occur even when temperatures are considered moderate. The following recommendations should be followed to help reduce heat stress:

- Personnel must drink plenty of liquids to replace body fluids lost to sweating. To prevent dehydration, personnel should be encouraged to drink generous amounts of water even if not thirsty. Heat-related problems can happen before the sensation of thirst occurs.
- Cool drinking water, 50°F to 60°F, should be made available to all personnel.
- Only water, or occasionally, electrolyte-balanced drinks, such as Gatorade®, should be used to replace lost fluids due to sweating.
- Beverages containing caffeine, such as colas, coffee, or tea, should be limited or not used because of their diuretic (water depleting) effects.
- Drinking alcohol during hot weather should be kept to a minimum due to dehydration effects.
- Salt tablets should not be used unless prescribed by a physician.
- Self-monitoring of physical condition and buddy monitoring will be essential in order to prevent any heat stress illness. All personnel should be aware of heat stress symptoms and the proper precautions to take if heat stress is observed.
- Rest periods must be provided for all personnel. This means at least 15 minutes in the morning and in the afternoon and at least 30 minutes for lunch. A more frequent rest schedule may be implemented by the SHSO depending on weather conditions and the type of work performed.

4.0 MEDICAL SURVEILLANCE

Medical screening provides a method of identifying those employees whose medical history indicates potentially increased health risk when exposed to chemicals present within the working environment. The medical screening directly and indirectly measures the functional activity of organs affected by potential chemical exposure during the work and includes physiological tests of parameters having a clinical relevance to the potential chemical exposure.

4.1 PRE-EMPLOYMENT SCREENING

Prior to engaging in work with hazardous materials, all employees will have undergone, or will undergo, pre-employment medical screening. This screening will include:

- Medical history;
- Occupational history;
- Physical examination;
- Determination of fitness to work wearing protective equipment; and,
- Baseline laboratory studies.

The Corporate Health and Safety Manager (CHSM) is responsible for scheduling medical examinations, selection of appropriate clinic or physicians, review of physicians' reports, and maintenance of employee medical files. Employee medical files are confidential and will not be released without the express written approval of the employee. A copy of all physicians' reports and medical monitoring data will be made available to the employee if requested.

Repeat tests or additional tests or examinations recommended by the physician, based on the initial medical screening and related to the employee's ability to work with hazardous materials, will be arranged by the CHSM.

4.2 PERIODIC MEDICAL EXAMINATIONS

Employees engaged in work with potential exposure to hazardous materials will undergo a periodic update of medical and occupational history and a periodic physical examination. More frequent medical examinations, consultations, and/or laboratory testing will be provided if the examining physician determines that an increased frequency of examination is medically required. Medical examinations are also available to any employee that has developed, or believes he has developed, signs or symptoms indicating possible overexposure to hazardous substances or health hazards, or if the employee has been injured or exposed above the PEL or published exposure levels in an emergency situation.

The following tests and examinations are required for the pre-employment and periodic physicals:

- Complete medical/occupational history and physical examination;
- Chest X-ray (if not taken within past 3 years and/or indicated by medical judgment);
- Electrocardiogram (EKG) (if indicated by medical judgment);
- Spirometry;
- Complete urinalysis;
- Drug abuse screen (urinalysis);
- Audiometry;
- Visual acuity; and,
- Complete blood count and analysis.

4.3 INFORMATION PROVIDED TO THE PHYSICIAN

The following information will be provided to the examining physician:

- A description of the work performed by employees and the potential for exposure to hazardous substances.
- A description of employee duties that involve the potential for exposure to hazardous substances.
- Potential exposure levels of employees.
- A description of PPE that may be required.
- Information not readily available to the physician relating to previous examinations or emergency situations involving potential exposure to hazardous substances.

4.4 MEDICAL RECORDS

All medical records, including pre-employment medical screening, periodic medical examinations, emergency and non-emergency treatment records, and accident reports, will be maintained in accordance with the following:

- OSHA 29 CFR 1910.20 - Access to employee exposure and medical records
- OSHA 29 CFR 1904 - Recording and Reporting Occupational Injuries and Illnesses.

4.5 TERMINATION EXAMINATION

Upon termination from employment, all employees whose work involved potential exposure to hazardous materials and who have not received a medical examination within the previous six months will be provided a termination examination. Records of the termination examination will be maintained in accordance with 29 CFR 1910.20. Employees will be notified regarding termination physical examination requirements.

4.6 SUBCONTRACTORS

Subcontractors who will perform work at this Site where there is a potential for contact with hazardous waste are required to follow the medical surveillance requirements of 29 CFR 1910.120 and a medical surveillance program. Subcontractors who perform work where there is no potential for exposure to Site chemicals, are not required to follow the medical surveillance requirements of 29 CFR 1910.120.

5.0 WORK PRACTICES AND SITE CONTROL

5.1 SAFE WORK PRACTICES

5.1.1 Routine Safe Work Practices

Proper personal hygiene and the buddy system are integral parts of safe work practices:

- All Site activities that involve hazards and/or the potential for contact with hazardous materials should be performed by a work team of no fewer than two people.

- Hygienic practices consistent with work hazards are necessary. Eating and food preparation will be prohibited in any area other than those designated and properly protected. No food, beverages, or tobacco will be permitted in the work area. Employees who handle contaminated materials or articles will wash with soap or mild detergent and water before eating or using the rest room.

5.1.2 Work Restrictions

All outdoor work at the Site will be conducted during daylight hours unless adequate lighting is provided. Outdoor work will cease immediately upon the signs of impending thunderstorms and lightning or other severe weather, as determined by the SHSO.

5.1.3 Roto-Sonic Drilling

Personnel working on or near drill rigs must be aware of the hazards of moving vehicles, pinch points, noise hazards, and overhead and underground utility hazards during the drilling process.

- Clear away all debris from the immediate area.

- Be sure that the area to be drilled is free of underground power lines, gas lines, water mains, sewers, or other utilities.

- Before erecting the derrick, be sure that there are no overhead power lines, tree branches, or other obstructions in the path. Keep the mast at least 20 feet from utility lines.

- Use proper lifting and material handling techniques to avoid strains and sprains when handling the drill pipe and drive shoe.

- Be aware of and avoid pinch points on the drill rig.

- Only Drilling company employees are allowed on the drill rig and drill platform.

- Make sure that the drill platform is securely supported on a flat, stable surface before drilling.

5.1.4 Noise

Employees near drill rigs must wear hearing protection if the 8-hour time-weighted average noise level exceeds 85 decibels. A general field rule is that hearing protection must be used if normal speech cannot be understood within an arms length of the person talking.

5.1.5 Slip, Trip, and Fall

Use caution in walking in all areas of the Site to avoid, rubble, or debris that could cause a hazard.

5.1.6 Opening Monitoring Wells

Vapors of potentially hazardous chemicals may concentrate in the head space of wells and be released upon opening the well. Precautions to prevent exposures include:

- Open wells carefully and allow to vent before taking measurements of sampling;
- Stand to the side and avert face when opening wells; and,
- Check near opened well head for VOCs before sampling activities.

5.2 SITE ACCESS/SITE CONTROL

Site control procedures will incorporate the elements of a Site control program, as outlined in 29 CFR 1910.120(d) and guidelines from the NIOSH/OSHA/USCG/EPA "Occupational Safety and Health Guidance Manual for Hazardous Waste Site Activities." These include establishing Site work zones and decontamination procedures. Employees, subcontractors, and visitors must follow the Site control restrictions provided.

The possibility of exposure or transfer of contaminated substances will be reduced or eliminated in a number of ways, including:

- Setting up barriers to exclude personnel from contaminated areas;
- Minimizing the number of personnel and equipment at the Site;

- Establishing work zones within the Site;
- Establishing control points with regular access to and egress from work zones;
- Conducting operations in a manner to reduce exposure of personnel and equipment; and,
- Implementing appropriate decontamination procedures.

5.2.1 Site Access

The Site is enclosed by fencing except on the east side near the Rosselli Associates property along Washington Street. The SHSO will be responsible for security around the exclusion zone.

5.2.2 Work Zones

Specific Site work zones are often used at hazardous waste Sites to delineate areas where certain operations may occur and to prevent the transfer of contaminants from one area to another. Three zones are usually used:

- Exclusion Zone (EZ or Hot Zone) - This is defined as the area where the greatest potential for personnel exposure exists.

- Contamination Reduction Zone (CRZ) - This zone is defined as the area adjacent to the hot zone and has a reduced potential for exposure. In this area, personnel will remove protective clothing in a manner as to minimize potential contamination *via* skin contact, inhalation, or ingestion. Gross contamination will be cleaned from protective clothing prior to removal. Wash water and contaminated material will be collected and disposed of properly.

- Support Zone (Clean Zone) - This is defined as the area in which no known potential contamination exists. Operation support activities will be set up in this area. There should be no need for protective clothing to be worn in this area.

Permanent Site work zones have not been defined for this project. The SHSO determines the immediate Site zones. Exclusion zones will be considered as the area within a 40 foot radius of drill rig operations and within a 10 foot radius of well sampling operations. The CRZ is the area immediately adjacent to the EZ where decontamination occurs and PPE is disposed. The location of the Site work zones will change as the work and the type of activity is performed.

5.3 SITE HOUSEKEEPING

The Site will be kept in a neat, organized, and orderly fashion. Items, such as tools, equipment, hoses, *etc*., will be kept picked up to minimize tripping and falling hazards. Used disposable clothing and equipment will be placed in drums immediately upon removal and the drum lids replaced.

5.4 SANITATION/CHANGING FACILITIES

Appropriate sanitation will be used on Site, including, but not limited to, the following:

- There will be an adequate supply of potable water.
- All individuals who enter any designated EZ will be required to follow decontamination procedures as outlined in Section C8.0 of this HASP.
- Access to nearby sanitary facilities, including adequate toilets and wash facilities.
- Sanitary facility arrangements will be provided for the field crew during the period of active field activities.

5.5 CONTAMINATION AND EXPOSURE PREVENTION

Personnel participating in field activities have the potential to become contaminated during various field activities. Exposure to hazardous or contaminated materials will be kept to a minimum by adherence to the recommended PPE and decontamination procedures. All subcontractor personnel are expected to follow contamination avoidance work practices.

5.6 BUDDY SYSTEM

Subcontractor personnel will adhere to the buddy system when conducting field activities, meaning that they will work in groups of at least two when wearing PPE or when working in an exclusion zone.

5.7 SITE COMMUNICATIONS

- <u>Verbal and Hand Signals</u> - will be the main types of Site communication.
- <u>Telephones</u> - A portable telephone will be used for off-Site communication.

6.0 PERSONAL PROTECTIVE EQUIPMENT

The objective of the protective equipment program is twofold:

- To protect employees from safety and health hazards present at the Site; and,
- To prevent injury to workers from incorrect use and/or malfunction of PPE.

Anyone entering waste Sites must be protected against potential hazards. The purpose of PPE is to shield or isolate individuals from the chemical, physical, and biological hazards that may be encountered at a Site. No single combination of protective equipment and clothing is capable of protection against all hazards. PPE must be used in conjunction with safe work practices, decontamination, and good personal hygiene.

6.1 LEVELS OF PROTECTION

Equipment to protect the body against contact with chemical hazards is divided into four categories according to the degree of protection accorded:

- Level A - Should be worn when the highest level of respiratory, skin, and eye protection is needed.

- Level B - Should be worn when the highest level of respiratory protection is needed, but a lesser level of skin protection is needed.

- Level C - Should be worn when the types of airborne substances are known, the concentrations have been measured, and the criteria for using air purifying respirators are met.

- Level D - Should not be worn on any Site where respiratory or skin hazards are present. Level D is primarily a work uniform providing minimal protection.

The level of protection selected is based primarily on:

- The type, toxicity, and measured concentrations of the chemical substances; and,

- The potential or measured exposure to substances in the air, splashes of liquids, or other direct contact with materials due to the work being performed.

6.2 SITE-SPECIFIC LEVELS OF PROTECTION

Table 2 lists a task-specific hazard assessment with proposed initial levels of protection and air monitoring requirements. Section 7.0 of this HASP gives air monitoring action levels associated with different levels of PPE.

The level of protection for <u>surveying, and groundwater sampling, will be Level D.</u> Level D will consist of:

- Coveralls or long sleeve shirts and long pants. (If there is a potential for body contact with contaminated soil, water, waste, materials, or equipment, also wear regular or polycoated Tyvek®).
- Nitrile or neoprene outer gloves at a minimum for all material handling activities, including soil, waste, and liquid sampling, or any other activity where contact with potentially contaminated material, liquid or equipment is likely.
- Steel-toe and shank safety boots (with rubber/chemical resistant overboots when working in the EZ and CRZ; chemical resistant steel-toe boots can also be worn).
- Hard hat.
- Safety glasses with side shields.
- Hearing protection as required.
- Safety goggles as necessary.

The level of protection for monitoring well installation will be a modified Level D as above <u>with Tyvek coveralls when drilling encounters waste materials.</u> Polycoated Tyvek coveralls will be used for activities where there may be a significant splashing hazard.

6.3 HAZARDOUS CONDITIONS

If conditions should change where there is a possibility of overexposure to organic vapors or dust, the work area should be ventilated, vapor/dust suppression techniques used, or employees should work upwind to reduce potential exposures. If these measures do not reduce vapor and/or dust concentrations below the acceptable limits set forth in Section B7.0, then the level of protection will be upgraded to Level C as necessary.

Level C protection will consist of:

- NIOSH-approved full-face, air-purifying respirator equipped with appropriate organic vapor/dust cartridges.

- Chemical-resistant clothing over work clothes, regular Tyvek®, or polycoated Tyvek®, as necessary.
- Nitrile or neoprene outer gloves and latex inner gloves; tape gloves to suit.
- Steel-toe, steel shank safety boots with chemical-resistant outer boots, or PVC steel-toe boots; tape boots to suit.
- Hard hat.
- Hearing protection as required.

Level B protection is not expected to be necessary during this investigation. The SHSO has the responsibility for monitoring Site and work task conditions and deciding the appropriate level of protection based on the air monitoring guidelines presented in Section 7.0.

7.0 AIR MONITORING

Air monitoring is an integral part of the HASP and is used to help determine the appropriate level of protection for field personnel. The SHSO, or qualified designee, is responsible for all air monitoring at the Site.

7.1 REAL-TIME MONITORING

Monitoring for VOCs and oxygen/lower explosive limit (O_2/LEL) will be conducted prior to and during all intrusive Site activities, *i.e.,* test pit excavation, soil boring, and monitoring well installation; and also at the opening of wells for groundwater sampling activities. A PID with a 10.2 electron volt (eV) bulb will be used to conduct air monitoring for VOCs. If there is a potential that benzene may be released during a Site operation, benzene detector tubes may be used to determine if benzene is a component of total VOC readings.

Continuous air monitoring will be conducted in the work zone. Any exceedance of the action level will require additional real-time air monitoring at the perimeter of the Site. Readings will be recorded prior to and during initial drilling, whenever there is a reading above background, and at least once per hour during work activities.

For any work activity, a sustained (greater than 5 minutes) organic vapor level in the breathing zone above the concentrations in the following table will require ventilation of the immediate work area, vapor suppression techniques, or working upwind of the contamination. If these methods are not feasible or do not reduce the potential exposure below acceptable levels, then employees must upgrade to Level C protection if benzene is not present. If benzene is present above the action level of 1 ppm and vapors cannot be controlled, stop work, cover the area, and contact the Project Manager. Air monitoring action levels are presented below. The SHSO will use these action levels when determining the need to upgrade or downgrade the level of PPE. Table 2 also presents air monitoring requirements and proposed initial levels of protection.

AIR MONITORING ACTION LEVELS

Contaminant	Concentration	Location	Response
Total Organic Vapors	Above background to 1 ppm	Active work area, breathing zone	Continue monitoring until vapors subside or other action is called for.
Total Organic Vapors	1 to 10 ppm	Active work area, breathing zone	Upgrade to Level C with full-face respirator and organic vapor/dust cartridges if vapors cannot be controlled or working upwind is not feasible.
Total Organic Vapors	>10 ppm	Active work Area, breathing zone	Evacuate area until vapors dissipate. Monitor from a distance.
Flammable gases	>10% LEL	Active work area, borehole	Evacuate area until vapors dissipate. Monitor from a distance.

7.2 INSTRUMENT CALIBRATION

Monitoring equipment will be calibrated and checked for proper operation daily before the start-up of any field activities requiring monitoring. Before initiating field activities, background measurements will be obtained with each instrument upwind and away from potential Site influences. Instrument calibrations and background levels will be documented on daily air monitoring logs. Copies of air monitoring logs will be made available to Beazer and Suit-Kote upon request.

An RAE Systems PID with a 10.6 eV lamp or equivalent will be used to monitor for volatile vapors.

8.0 MATERIAL HANDLING AND DECONTAMINATION

All waste material, decontamination liquids, and decontamination equipment will be handled in a safe and healthful manner. Decontamination and material handling activities will be carried out within the appropriate work zone.

8.1 DECONTAMINATION

A personnel decontamination area will be provided where surface contamination and outer protective equipment are removed.

8.1.1 Personnel Decontamination

The general decontamination procedure is as follows, whenever leaving the EZ.

Level D Decontamination:

- Equipment drop onto plastic drop cloth.
- Wash and rinse boot covers and gloves if to be reused.
- Remove and dispose of Tyvek® suit in a plastic-lined container.
- Remove boot covers and gloves; dispose in plastic lined containers if not to be reused. Place in "decontaminated PPE" container if to be used again.
- Field-wash hands and face.

Level C Decontamination:

- Equipment drop onto plastic drop cloth.
- Wash and rinse boot covers and outer gloves if to be reused.
- Remove tape from boots and gloves.
- Remove boot covers and other gloves; dispose in plastic lined container if not to be reused. Place in "decontaminated PPE" container if to be used again.
- Remove and dispose of Tyvek® suit in a plastic-lined container.
- Wash and rinse inner gloves.
- Remove respirator and place in container for later cleaning.
- Remove and dispose inner gloves.
- Field-wash face and hands.

Respirators, non-disposable protective clothing, and other personal articles must be sanitized before they can be used again unless they are assigned to individuals. The SHSO is responsible for monitoring the effectiveness of decontamination procedures and modifying the procedures as necessary to ensure proper decontamination.

8.1.2 Equipment Decontamination

All equipment used in an exclusion zone will be decontaminated before it leaves the Site or is taken into a clean area. Small tools and equipment used in the EZ that become contaminated may be taken to the decontamination area taking care to isolate the tools/equipment from clean materials and equipment. Non-sampling equipment will be decontaminated by washing with detergent and water then rinsing, or other appropriate decontamination methods.

Drilling equipment will be decontaminated by steam cleaning between each borehole and before leaving the Site. All decontamination liquids will be collected and temporarily staged on-site in drums or portable tanks. Vehicles that contact potentially contaminated soil or water will be decontaminated before leaving the Site by brushing clean and washing as necessary. Verification that equipment/vehicles leaving the Site has been adequately decontaminated is the responsibility of the SHSO.

Personnel and small equipment decontamination will be performed at locations near the drilling and sampling locations, if possible, to minimize potential contamination when moving to different areas of the Site.

8.2 MATERIAL HANDLING

All potentially contaminated solids and liquids will be handled in a manner to protect Site workers and the public from exposure to Site contaminants and to prevent additional contamination. Excess soils, liquids, and used PPE generated during field activities will be placed in DOT- approved 55-gallon drums and will be stored on Site for subsequent management and proper disposal.

9.0 EMERGENCY PROCEDURES

The HASP for this project has been established to allow Site operations to be conducted without adverse impacts on worker health and safety. In addition, supplementary emergency response procedures have been developed to cover extraordinary conditions that might possibly occur at the Site. Emergency telephone numbers, directions to the nearest hospital, and a route map to the hospital are presented in Attachment B.

9.1 SITE TOPOGRAPHY AND LAYOUT

The Site is located in the central southeastern section of the Harbor Point area in the city of Utica, New York. The Harbor Point area is a peninsula bounded to the west and north by the Mohawk River, to the east by the New York State Barge Canal, and to the south by a railroad corridor. The Site is approximately 3 acres in size and borders Washington Street. The Site is relatively flat.

9.2 PRE-EMERGENCY PLANNING

Pre-emergency planning consists of the preparation of this emergency response plan, posting of the emergency contact list and hospital route map, assigning emergency functions to on-Site personnel, training of personnel as necessary, and ensuring that emergency procedures and equipment are in place.

9.3 PERSONNEL ROLES, LINES OF AUTHORITY, AND COMMUNICATION

The SHSO is responsible for field implementation of the Site emergency response plan. *Responsibilities of the Emergency Coordinator include*:

- Communicating requirements of the Site emergency response plan to personnel who may visit or perform work at the Site, whether they will be directly involved in emergency response or not.
- Specifying a backup alternate.
- Stopping work if any operation threatens worker or public health and safety.
- Knowing emergency procedures, evacuation routes, and emergency telephone numbers.
- Anticipating, identifying, assessing, and controlling fires, explosions, chemical releases, and other emergency situations.
- Ensuring that emergency safety equipment is available at all times and having a working knowledge of that equipment.
- Providing emergency care on Site.

- Designating safe distances and places of refuge and alternate evacuation routes as appropriate.
- Notifying local public emergency response agencies as appropriate.
- Ensuring that the emergency telephone numbers and hospital route map are prominently posted/available at the Site.
- Notifying the Project Manager as soon as practical concerning the emergency.
- Conducting follow-up investigations and preparing reports of incidents.

The investigative oversight staff responsibilities include:

- Ensuring proper spill prevention and response planning is in place.
- Ensuring that Site workers receive adequate training and instruction for spill prevention and response.
- Providing a communications link between the operator and the owner, especially in the case of a release.
- Ensuring that emergency response equipment and supplies are provided.
- Assisting in the response to a release, especially in arranging subcontractor support if needed and in communicating the release to the owner and other parties as appropriate.

The Site Emergency Coordinator has full authority in the event of an emergency. If outside agencies respond to an emergency the Site Emergency Coordinator will pass the responsibility and authority for emergency response to the Incident Commander for the outside agency as appropriate. The Site Emergency Coordinator will assist outside emergency response agencies as much as possible to control and resolve the emergency. All on-Site personnel will be notified of their responsibilities in an emergency. In general, on-Site personnel would immediately evacuate the area to the designated safe place of refuge. On-Site workers or subcontractors may be requested to assist in an emergency, if necessary, under the direction of the Site Emergency Coordinator.

Communications consist of verbal and hand signals on-Site and use of a portable telephone for off-Site communication.

9.4 EMERGENCY RECOGNITION AND PREVENTION

The Site Emergency Coordinator is responsible for anticipating potential sources of emergencies and for attempting to prevent situations that could cause an emergency incident.

The Emergency Coordinator will assess possible hazards to human health or the environment that may result from a chemical release, fire, explosion, or severe weather conditions. The Emergency Coordinator will assess the hazards posed by an incident through the following steps, as appropriate:

- Assess the immediate need to protect human health and safety.
- Identify the materials involved in the incident.
- Identify exposure and/or release pathways and the quantities of materials involved.
- Determine the potential effects of the exposure/release and appropriate safety precautions.
- Determine if release of materials meets EPA requirements for reportable quantities for spills under the Resource Conservation and Recovery Act (RCRA) or the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA).

Based on this assessment, the Emergency Coordinator will determine what risks are posed to on-Site personnel, and community populations. If the incident cannot be controlled by operating personnel without incurring undue risk, the Emergency Coordinator will order the evacuation of all workers at risk and notify the appropriate parties of the situation and the assistance required.

Emergency contacts will be made by the Emergency Coordinator. If the Emergency Coordinator is unavailable, the designated alternate on Site will contact the appropriate emergency services. A copy of emergency telephone numbers will be posted in a conspicuous location on-Site.

9.5 PPE AND EMERGENCY EQUIPMENT

PPE and emergency equipment will be available on-Site for response to small fires, spills and releases of hazardous materials, and care of injured personnel. PPE includes gloves, protective clothing, protective booties, and safety glasses. Other emergency equipment includes portable fire extinguishers, first aid kits, shovels and scoops, absorbent materials, and drums.

9.6 SAFE DISTANCES AND PLACES OF REFUGE

Safe distances and places of refuge will be determined at the time of the emergency based on a combination of Site-specific and incident-specific factors. The Emergency Coordinator will take into account the toxicological properties of the hazardous substance released; the physical state, rate and quantity, method of release, and other physical/chemical characteristics of the substance; wind speed and direction; and other relevant factors. The primary place of refuge for emergencies will be determined before the start of work each day.

9.7 EVACUATION ROUTES AND PROCEDURES

Evacuation routes and places of refuge will be determined before the start of work at the Site and the locations made known to all personnel who enter the Site. The Emergency Coordinator may need to change routes in an emergency.

Immediately following an evacuation, the Emergency Coordinator will conduct a head count to account for all Site personnel. At the evacuation areas emergency needs will be provided such as first aid for injured personnel, decontamination, and communication with emergency responders.

The Emergency Coordinator will assess the hazards posed by the incident considering the direct and indirect effects of the chemical release, fire, or other emergency and determine the risks posed to on-Site personnel, and the community. The Emergency Coordinator will determine if off-Site communication is needed and notify local response agencies if assistance is needed.

9.8 SITE SECURITY AND CONTROL

The Site has restricted access by fencing on the north, west, and south, access is gained off Washington Street which is the east boundary of the Site. The Site is in a remote location in respect to the general public; there is little traffic in this area of Harbor Point. The SHSO will maintain security around the immediate Site work zones.

Because of the limited number of personnel working on the Site, the SHSO will know who is on Site and can control entry of personnel into hazardous areas in an emergency.

9.9 EMERGENCY MEDICAL TREATMENT AND FIRST AID

In the event of a safety or health emergency at the Site, appropriate emergency measures will immediately be taken to assist those who have been injured or exposed and to protect others from hazards. The Project Manager will be immediately informed of any serious injuries. The project field personnel will take the injured party and transport (if possible) to the nearest hospital for treatment, after determining whether personnel decontamination can be performed on the injured party. If a particular injury precludes the possibility of personnel decontamination, the Emergency Coordinator will notify all emergency personnel of the potentially contaminated PPE and provide any assistance necessary in properly decontaminating or removing the PPE. In situations of minor injuries, an injured party may be transported to the nearest hospital or doctor.

If an employee working in a contaminated area is physically injured, first-aid procedures should be followed. Depending on the severity of the injury, emergency medical response may be sought. If the employee can be moved, he will be taken to the edge of the work area (on a stretcher, if needed) where contaminated clothing will be removed, emergency first aid administered, and transportation to a local emergency medical facility awaited. Emergency telephone numbers will be posted on Site.

If the injury to a worker is chemical in nature (e.g., overexposure), the following first-aid procedures will be instituted:

- Eye Exposure - If contaminated solid or liquid gets into the eyes, wash the eyes immediately at the emergency eyewash station using large amounts of water and lifting the lower and upper lids occasionally to help flush the eye. Do not let the victim rub eyes or keep eyes tightly closed. Flush for at least 15 minutes. Obtain medical attention immediately.

- Skin Exposure - If contaminated solid or liquid gets on the skin, promptly wash the contaminated skin using mild soap and flooding amounts of water for at least 15 minutes. For reddened or blistered skin consult a physician. Apply sunblock over affected areas of the skin and cover the skin if possible.

- Swallowing - Do not induce vomiting!! Call poison control center:
  Oneida County Health Department - (315) 798-5206
  National Poison Control Center - (404) 588-4400

- Breathing - If a person has difficulty breathing, move the exposed person to fresh air at once. If breathing has stopped, perform artificial respiration. Keep the affected person warm and at rest. Obtain medical attention as soon as possible.

9.10 EMERGENCY DECONTAMINATION

In the event of a medical emergency, patients are to be adequately decontaminated before transfer, if possible. This is to prevent contamination of the medical transport vehicle and medical facility. At a minimum, the patient should have the following removed before transport:

- Contaminated work boots;
- Respirator;
- Outer disposable work garment; and,
- Gloves.

If necessary, one of the Site personnel may accompany the injured worker and perform de-contamination with supervision of medical personnel.

9.11 EMERGENCY ALERTING AND RESPONSE PROCEDURES

Emergency response procedures usually involve the following steps:

- Alert personnel to the emergency;
- Evaluate the situation;
- Initiate response/rescue action;
- Follow-up and review of the incident; and,
- Documentation.

9.11.1 Alerting/Notification

The Emergency Coordinator will alert Site personnel to an emergency by verbal communication. Site work will be stopped as necessary to respond to an emergency. The general sequence of notification by the Emergency Coordinator will include:

- On Site personnel;
- Off-Site emergency personnel as necessary; and,
- The Project Manager.

The Project Manager will inform as appropriate:

- Beazer and Suit-Kote; and,
- Emergency response subcontractors.

The Beazer and Suit-Kote will inform as appropriate:

- State and federal agencies.

Notification to outside agencies will include:

- Description of the incident (e.g. release, fire);
- Name and telephone of the reporter;
- Name and address of incident;
- Name and quantity of materials involved;
- The extent of injuries, if any;
- The possible hazards to human health or the environment;
- Clean up procedures; and,
- Assistance that is requested.

Following the incident, a written report will be issued to the notified agencies and Beazer and Suit-Kote using the Hazardous Material Spill Report Form, which includes all pertinent information. The report will be submitted within 48 hours of the incident.

9.11.2 Evaluation of Emergency Incident

The Emergency Coordinator will evaluate the available information about the incident and emergency response capabilities. The evaluation will include:

- What happened
    - type and cause of incident
    - extent of any chemical release and transport
    - extent of damage to structures, equipment, or terrain

- Casualties
    - victims: number, location and condition
    - treatment required
    - any missing personnel

- Further accident potential
    - types of chemicals on Site
    - potential for fire, explosion, or release of hazardous substance
    - location of personnel in relation to hazards
    - potential for damage to off-Site populations or the environment

- What can be done
    - personnel and equipment needed for rescue and hazard control
    - on-Site personnel and resources available
    - off-Site resources available
    - time for off-Site personnel to reach the scene
    - hazards involved in response and rescue

9.11.3 Response/Rescue Action

The type of response action will be based on the available information about the emergency incident. Response/rescue actions may include some or all of the following steps:

- Enforce the buddy system;
- Survey casualties - assess their condition and resources for treatment;
- Assess existing and potential hazards to Site personnel and the off-Site population;
- Allocate resources as appropriate;
- Request additional aid if necessary;
- Bring the situation under control;
- Extricate victims;
- Decontaminate personnel;
- Stabilize victims;
- Transport victims; and,
- Evacuate Site personnel (off-Site public notification/evacuation is the responsibility of governmental authorities).

9.11.4 Follow-up and Review

Site personnel must be prepared to handle another emergency before Site activities resume. All equipment and supplies must be restocked, and damaged equipment repaired or replaced. The emergency response plan must be reviewed in light of any new Site conditions and for lessons learned from the emergency response.

9.11.5 Documentation of Incident

The emergency incident must be investigated and all findings put in writing as soon as conditions return to normal. Ensure that documentation is as complete as possible by including:

- Chronological history of the incident;
- Facts about the incident and when they became available;
- Titles and names of personnel and composition of teams;

- Actions - made and by whom
    - orders given: to whom, by whom, when
    - actions taken: who did what, when, and how;
- Samples taken type and results;
- Possible exposures; and,
- History of all injuries or illness during or as a result of the emergency.

9.12 CRITIQUE OF RESPONSE AND FOLLOW-UP

After the situation has returned to normal, all aspects of the emergency incident and the response will be reviewed to assess procedures used, how to improve response, and how to prevent further emergencies. The following information will be reviewed:

- What caused the emergency, including steps leading to the final cause?
- Was the incident preventable? How?
- What procedures/actions taken were correct and adequate, which procedures/actions taken were incorrect or inadequate?
- How can procedures and training be improved?
- Has the incident affected further work at the Site?
- Is the community affected?

10.0 RECORDKEEPING

All Site health and safety activities will be properly documented using appropriate forms (Attachment C). Any unusual events will be recorded on the Site daily log.

10.1 ACCIDENT REPORTS AND RECORDS

An incident investigation report/accident report will be completed in the following work-related circumstances:

- Any work-related injury involving muscles and joints (strains/sprains)
- Any work-related heat stress incidents
- All work-related back injuries
- All work-related chemical exposures
- Any work-related injury/illness that involves medical treatment (treatment by doctor, hospital, clinic, chiropractor, dentist)
- Any work-related accident that results in the death of an employee
- Any incident that involves property damage or questionable property damage but not necessarily employee injury
- Any work-related incident (near miss) in which an injury could have occurred and that attention is needed to prevent similar incidents from occurring and preventing an injury accident.

The incident investigation report is to be completed the day of the injury/accident.
The SHSO will:

- Notify the President as soon as possible
- Complete the report within 24 hours of the occurrence
- Have involved employee(s) review and sign the report
- Send original report to the President within 24 hours
- Retain a copy of the report for Site records.

The following accidents must be immediately reported to the President:

- Fatal injury;
- Three or more persons admitted to the hospital; and,
- Any injury when first aid is administered and there is a potential contact with blood or bodily fluids.

The President will report to OSHA, within eight hours, any fatality, or hospitalizations of three or more employees.

The Incident and Injury Report Form will be kept at the location where first-aid treatment is given at all job sites. All injuries, no matter how minor they appear, are to be recorded. Minor injuries, such as small cuts, scrapes, small first-degree burns, and splinters that require only first-aid treatment, are recorded. Maintaining this record will help in meeting OSHA recordkeeping requirements and in responding to minor incidents before they become major.

10.2 ACCESS TO RECORDS

Employees or their designee will have access to their exposure and medical records as provided under 29 CFR 1910.1020. Employees may seek access by notifying the President. Employees that assign access rights to a designee must submit an authorization request in writing to the President.

OSHA regulations may be reviewed by employees. The Site supervising personnel will provide immediate access to regulations that are kept on site and will request other applicable regulations for employees from the President within a reasonable period of time after the employee request.

Employees will be provided access to information on toxic and hazardous substances to which they have potential exposure in conformance with the Corporate Health and Safety Hazard Communication program and the OSHA 29 CFR 1910.1200 Hazard Communication standard. MSDSs that apply to the Site will appear in the Employee Right-to-Know MSDS binder. Individual copies of MSDSs will be provided as soon as reasonably possible following an employee request. All potentially toxic and hazardous substances brought on Site will be properly labeled with the name of the substance and appropriate hazard warnings.

11.0 TRAINING

11.1 GENERAL

All employees or other personnel entering the Site (other than the support zone) that are also involved in operations which could involve exposure to hazardous waste will receive training in compliance with OSHA 29 CFR 1910.120.

The training requirements are intended to provide employees with the knowledge and skills necessary to perform hazardous waste site operations while minimizing the potential for injury. Initial training consists of a minimum of 40 hours of off-site classroom and practical exercise training and 3 days of actual field experience. Training must be updated annually with 8 hours of off-site training. Supervising personnel will complete an 8-hour training session for supervisors. Training will be certified by record and/or certificate.

11.2 SITE-SPECIFIC TRAINING

Site-specific training will consist of an initial health and safety briefing on the following information:

- Names of individuals responsible for site health and safety and methods of communicating safety and health concerns;
- Site-specific health and safety hazards;
- Use of PPE;
- Work practices by which employees can minimize risk;
- Safe use of equipment on Site;
- Recognition of symptoms and signs of exposure to hazardous materials;
- Site control measures;
- Decontamination procedures; and,
- Emergency response procedures.

The SHSO or Site supervisor will give the health and safety briefing prior to initiation of field activities. This briefing will be of sufficient duration to address all of the material covered in this HASP. All personnel that will be participating in field activities will have had the opportunity to read this HASP prior to this initial meeting so that any questions they have can be addressed at the initial meeting.

11.3 SAFETY MEETINGS

Prior to commencing field activities each day, a short briefing will be conducted by the Site Supervisor to address the day's activities. The daily briefing will provide the opportunity for the SHSO to address any special health and safety issues and to notify individuals of any deficient areas that need to be corrected or operational changes made that affect field work. The briefing will emphasize the specific concerns associated with the day's planned field activities. Daily weather reports will be reviewed to determine work/rest regimens.

TABLES

TABLE 1

Exposure Limits and Other Properties of Chemicals
NYTEP Field Sampling Plan Activities
Utica, New York

CHEMICAL COMPOUND	Exposure Limits [a]	STEL [b]	IDLH [c]	Vapor Pressure [d]	Ionization Potential [e]
Coal Tar Pitch Volatiles (PAHs)	0.2 mg/m^3	-	80 mg/m^3	Varies	Varies
Naphthalene	10 ppm	-	250 ppm	0.08 mm	8.12 eV
Benzene	1 (PEL)	5 ppm	1,000 ppm	75 mm	9.24 eV
Ethylbenzene	100 ppm	125 ppm	2,000 ppm	10 mm	8.76 eV
Toluene	200 ppm	-	500 ppm	21 mm	8.82 eV
Xylene	100 ppm	150 ppm	900 ppm	9 mm	8.56 eV

Chemical Compound	Carcinogen [f]	Skin Exposure [g]	LEL/UEL [h]	Odor Threshold [i]	3M/NIOSH Respirator Selection [j]
Coal Tar Pitch Volatiles (PAHs)	YES	NO	-	-	DM
Naphthalene	NO	NO	0.9 - 5.9	0.038	OV/DM
Benzene	YES	NO	1.3 - 7.9	34-119	SA
Ethylbenzene	NO	NO	1.0 - 6.7	0.092-0.60	OV
Toluene	NO	YES	1.1 - 7.1	0.16-37	OV
Xylene	NO	NO	1.0 - 7.0	20	OV

Notes:

[a] Exposure Limit: 8-hour Time Weighted Average (TWA) from the 2007 Threshold Limit Values of the ACGIH, or OSHA Permissible Exposure Limit (PEL), whichever is lower.
[b] STEL: Short Term Exposure Limit, denotes a 15 minute average that may not be exceeded.
[c] IDLH: Immediately Dangerous to Life or Health - Maximum concentration from which one could escape within 30 minutes without a respirator and without experiencing any irreversible health effects.
[d] Vapor Pressure: From NIOSH Pocket Guide to Chemical Hazards. Water = 0 mm. Above 1 mm is considered volatile;
above 100 mm is considered highly volatile
[e] Ionization Potential: Expressed in electron volts (eV) from NIOSH Pocket Guide to Chemical Hazards. Used to determine type of detector bulb for the HNu.
[f] Carcinogen: "Yes" indicates compound is a confirmed or suspected human carcinogen by NIOSH, OSHA or ACGIH.
[g] Skin Exposure: "Yes" indicates potential significant exposure through skin and mucous membranes, either by airborne or, more particularly, by direct contact.
[h] LEL/UEL: Lower and upper explosive limits. Percent of material needed in air for ignition when exposed to an ignition source.
[i] Odor Threshold: Air concentration at which most people can smell the chemical.
[j] 3M/NIOSH Respirator Selection: Type of respirator recommended by the 3M 2007 Respirator Selection Guide or the NIOSH Pocket Guide to Chemical Hazards.
SA Supplied Air (Level B); OV = Organic Vapor Respirator (Level C); DM = Dust and mist respirator (Level C)

TABLE 2

Task-Specific Hazard Assessment with Proposed Initial Levels of Protection and Air Monitoring Requirements
NYTEP Field Sampling Plan Activities
Utica, New York

Task	**Chemical Hazard Assessment**	**Estimated Initial Level of Protection**	**Air Monitoring**		
	VOCs/SVOCs		**Dust**	**VOCs**	**O_2/LEL**
Site Reconnaissance, including GPR survey	LOW	D	- -	- -	- -
Test Pit Excavation and Sampling	LOW-MED	Modified D	✓	✓	✓
Soil Borings	LOW - MED	Modified D	✓	✓	✓
Monitoring Well Installation	LOW - MED	Modified D	✓	✓	✓
Surveying	LOW	D	- -	- -	- -
Groundwater Sampling	LOW	D	- -	When Opening Wells	When Opening Wells
Weir/sediment sampling	LOW	Modified D	- -	✓	✓

ATTACHMENT A

Material Safety Data Sheets

HILL & GRIFFITH CO -- WESTERN BENTONITE (SODIUM BENTONITE) -- 6810-00N036330

MSDS Safety Information

FSC: 6810
MSDS Date: 04/23/1990
MSDS Num: BQLYG
LIIN: 00N036330
Tech Review: 11/11/1992
Product ID: WESTERN BENTONITE (SODIUM BENTONITE)
Responsible Party
Cage: 28711
Name: HILL & GRIFFITH CO
Address: 1262 STATE AVE
City: CINCINNATI OH 45204 US
Info Phone Number: 800-543-0425
Emergency Phone Number: 800-424-9300(CHEMTREC)
Preparer's Name: STEVE NELTNER
Review Ind: N

Contractor Summary

Cage: 28711
Name: HILL & GRIFFITH CO
Address: 1262 STATE AVE
City: CINCINNATI OH 45204 US
Phone: 800-543-0425

Ingredients

Cas: 7631-86-9
Name: SILICON DIOXIDE. PEL/TLV AS SILICON.
% by Wt: 2-6
OSHA PEL: 10 MG/M3 TDUST
ACGIH TLV: 10 MG/M3 TDUST
Ozone Depleting Chemical: N

Name: DUST, NUISANCE; (INERT NUISANCE DUST)
Other REC Limits: PEL:15 MG/M3 (MFR)
OSHA PEL: 10 MG/M3
ACGIH TLV: 10 MG/M3 TDUST

Health Hazards Data

LD50 LC50 Mixture: NONE SPECIFIED BY MANUFACTURER.
Route Of Entry Inds - Inhalation: YES
Skin: NO
Ingestion: NO
Carcinogenicity Inds - NTP: NO
IARC: NO
OSHA: NO
Effects of Exposure: ACUTE:OVEREXP COULD RESULT IN TEMPORARY MUCOUS MEMBRANE OR RESPIRATORY TRACT IRRITATION. CHRONIC:OVEREXP COULD RESULT IN IRREVERSIBLE MUCOUS MEMBRANE OR RESPIRATORY TRACT DAMAGE. TARGET ORGANS:LUNGS.
Explanation Of Carcinogenicity: NOT RELEVANT
Signs And Symptions Of Overexposure: OVEREXPOSURE COULD RESULT IN COUGHING, SNEEZING, SHORTNESS OF BREATH OR OTHER RESPIRATORY PROBLEMS. OTHER SYMPTOMS MAY RESULT.
Medical Cond Aggravated By Exposure: MAY AGGRAVATE PRE-EXISTING MEDICAL CONDITIONS.
First Aid: INHAL:IMMEDIATELY REMOVE FROM EXPOSURE & SEEK MEDICAL ATTENTION. SKIN:WASH THOROUGHLY W/SOAP & WATER. IF IRRITATION DEVELOPS, SEEK MEDICAL ATTENTION. EYE:FLUSH W/CLEAR FLOWING WATER FOR AT LEAST 15 MI NUTES. IF IRRITATION PERSISTS, SEEK MEDICAL ATTENTION. INGEST:DO NOT INDUCE VOMITING; CALL MD IMMEDIATELY.

Handling and Disposal

Spill Release Procedures: AVOID DUSTING WHEN POSSIBLE. USE A VACUUM W/FINE PARTICULATE FILTER TO CLEAN SPILL. A NIOSH/MSHA APPROVED DUST MASK FOR POWDERS IS RECOM. NOTIFY PROPER AUTHS IF NEED EXISTS.
Neutralizing Agent: NONE SPECIFIED BY MANUFACTURER.
Waste Disposal Methods: WASTE GENERATED DURING APPLICATION, DEMOLITION, BREAKAGE/SPILLAGE ARE NOT HAZ WASTES AS DEFINED BY RCRA (40 CFR 261). PLACE WASTE & SPILLAGE IN CLSD CNTNRS. DISP OF IN APPRVD LANDFILL I/A/W FED, STATE & LOCAL REGULATIONS.
Handling And Storage Precautions: ALWAYS SEGREGATE MATLS BY MAJOR HAZ CLASS. DO NOT TRANSFER CONTENTS TO UNLABELED CNTNRS. COMPLY W/ALL FED, STATE & LOC REGS.
Other Precautions: MINIMIZE BRTHG VAPS, MISTS, FUMES/DUSTS. AVOID PRLNG/RPTD CONT W/SKIN. KEEP CNTNRS & STOR CNTNRS CLSD WHEN NOT IN USE. SPECIAL CONSIDERATIONS FOR REPAIR/MAINT OF CONTAM EQUIP: PROVIDE ADEQ NIOSH/MSHA APPRVD RESP, EYE/SKIN PROT.

Fire and Explosion Hazard Information

Flash Point Method: COC
Extinguishing Media: MEDIA SUITABLE FOR SURROUNDING FIRE (FP N).
Fire Fighting Procedures: WEAR NIOSH/MSHA APPROVED SCBA & FULL PROTECTIVE EQUIPMENT (FP N).
Unusual Fire/Explosion Hazard: NONE

Control Measures

Respiratory Protection: USE NIOSH/MSHA APPROVED ORGANIC CARTRIDGE TYPE 7 RESPIRATOR.
Ventilation: PROVIDE VENTILATION SUFFICIENT TO PREVENT EXCEEDING RECOMMENDED EXPOSURE LIMITS.
Protective Gloves: CHEMICAL-RESISTANT GLOVES.
Eye Protection: CHEM WORK GOGG/FULL LGTH FCSHLD (FP N).
Other Protective Equipment: OTHER CLOTHING & EQUIPMENT AS REQUIRED TO PREVENT CONTACT.
Work Hygienic Practices: REMOVE CONTAMINATED CLOTHES, LAUNDER BEFORE REUSE. REMOVE CONTAMINATED SHOES; CLEAN BEFORE REUSE.
Supplemental Safety and Health: NONE SPECIFIED BY MANUFACTURER.

Physical/Chemical Properties

HCC: N1
Spec Gravity: 2.5 (H*2O=1)
Solubility in Water: NEGLIGIBLE
Appearance and Odor: PALE YELLOW TO WHITE W/EARTHY ODOR.

Reactivity Data

Stability Indicator: YES
Stability Condition To Avoid: DUSTING.
Materials To Avoid: NOT ESTABLISHED.
Hazardous Decomposition Products: NONE
Hazardous Polymerization Indicator: NO
Conditions To Avoid Polymerization: NOT RELEVANT

Toxicological Information

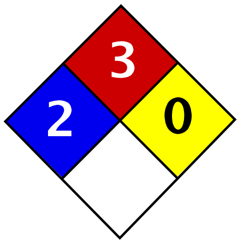
Ecological Information

MSDS Transport Information

```
Regulatory Information
=======================================================
=======================================================
Other Information
=======================================================
=======================================================
Transportation Information
=======================================================
Responsible Party Cage: 28711
Trans ID NO: 40731
Product ID: WESTERN BENTONITE (SODIUM BENTONITE)
MSDS Prepared Date: 04/23/1990
Review Date: 04/28/1993
Article W/O MSDS: N
Multiple KIT Number: 0
Unit Of Issue: NK
Container QTY: NK
Additional Data: NOT REGULATED FOR TRANSPORTATION
=======================================================
Detail DOT Information
=======================================================
DOT Proper Shipping Name: NOT REGULATED BY THIS MODE OF TRANSPORTATION
=======================================================
Detail IMO Information
=======================================================
IMO Proper Shipping Name: NOT REGULATED FOR THIS MODE OF TRANSPORTATION
=======================================================
Detail IATA Information
=======================================================
IATA Proper Shipping Name: NOT REGULATED BY THIS MODE OF TRANSPORTATION
=======================================================
Detail AFI Information
=======================================================
AFI Proper Shipping Name: NOT REGULATED BY THIS MODE OF TRANSPORTATION
=======================================================
HAZCOM Label
=======================================================
Product ID: WESTERN BENTONITE (SODIUM BENTONITE)
Cage: 28711
Company Name: HILL & GRIFFITH CO
Street: 1262 STATE AVE
City: CINCINNATI OH
Zipcode: 45204 US
Health Emergency Phone: 800-424-9300(CHEMTREC)
Date Of Label Review: 12/16/1998
Label Date: 12/16/1998
Hazard And Precautions: ACUTE:OVEREXP COULD RESULT IN TEMPORARY MUCOUS
  MEMBRANE OR RESPIRATORY TRACT IRRITATION. CHRONIC:OVEREXP COULD RESULT
  IN IRREVERSIBLE MUCOUS MEMBRANE OR RESPIRATORY TRACT DAMAGE. TARGET
  ORGANS:LUNGS.
                       OVEREXPOSURE COULD RESULT IN COUGHING, SNEEZING,
  SHORTNESS OF BREATH OR OTHER RESPIRATORY PROBLEMS. OTHER SYMPTOMS MAY RE
  SULT.
=======================================================
Disclaimer (provided with this information by the compiling agencies):
  This information is formulated for use by elements of the Department of
  Defense. The United States of America in no manner whatsoever expressly
  or implied warrants, states, or intends said information to have any
  application, use or viability by or to any person or persons outside the
  Department of Defense nor any person or persons contracting with any
  instrumentality of the United States of America and disclaims all
  liability for such use. Any person utilizing this instruction who is not
  a military or civilian employee of the United States of America should
  seek competent professional advice to verify and assume responsibility
  for the suitability of this information to their particular situation
  regardless of similarity to a corresponding Department of Defense or
```

other government situation.

ScienceLab.com
Chemicals & Laboratory Equipment



Health	2
Fire	3
Reactivity	0
Personal Protection	H

Material Safety Data Sheet
Benzene MSDS

Section 1: Chemical Product and Company Identification

Product Name: Benzene

Catalog Codes: SLB1564, SLB3055, SLB2881

CAS#: 71-43-2

RTECS: CY1400000

TSCA: TSCA 8(b) inventory: Benzene

CI#: Not available.

Synonym: Benzol; Benzine

Chemical Name: Benzene

Chemical Formula: C6-H6

Contact Information:

Sciencelab.com, Inc.
14025 Smith Rd.
Houston, Texas 77396

US Sales: **1-800-901-7247**
International Sales: **1-281-441-4400**

Order Online: ScienceLab.com

CHEMTREC (24HR Emergency Telephone), call:
1-800-424-9300

International CHEMTREC, call: 1-703-527-3887

For non-emergency assistance, call: 1-281-441-4400

Section 2: Composition and Information on Ingredients

Composition:

Name	CAS #	% by Weight
Benzene	71-43-2	100

Toxicological Data on Ingredients: Benzene: ORAL (LD50): Acute: 930 mg/kg [Rat]. 4700 mg/kg [Mouse]. DERMAL (LD50): Acute: >9400 mg/kg [Rabbit]. VAPOR (LC50): Acute: 10000 ppm 7 hours [Rat].

Section 3: Hazards Identification

Potential Acute Health Effects:
Very hazardous in case of eye contact (irritant), of inhalation. Hazardous in case of skin contact (irritant, permeator), of ingestion. Inflammation of the eye is characterized by redness, watering, and itching.

Potential Chronic Health Effects:
CARCINOGENIC EFFECTS: Classified A1 (Confirmed for human.) by ACGIH, 1 (Proven for human.) by IARC.
MUTAGENIC EFFECTS: Classified POSSIBLE for human. Mutagenic for mammalian somatic cells. Mutagenic for bacteria and/or yeast.
TERATOGENIC EFFECTS: Not available.
DEVELOPMENTAL TOXICITY: Classified Reproductive system/toxin/female [POSSIBLE].
The substance is toxic to blood, bone marrow, central nervous system (CNS).
The substance may be toxic to liver, Urinary System.
Repeated or prolonged exposure to the substance can produce target organs damage.

Section 4: First Aid Measures

Eye Contact:
Check for and remove any contact lenses. In case of contact, immediately flush eyes with plenty of water for at least 15 minutes. Cold water may be used. WARM water MUST be used. Get medical attention immediately.

Skin Contact:
In case of contact, immediately flush skin with plenty of water. Cover the irritated skin with an emollient. Remove contaminated clothing and shoes. Wash clothing before reuse. Thoroughly clean shoes before reuse. Get medical attention.

Serious Skin Contact:
Wash with a disinfectant soap and cover the contaminated skin with an anti-bacterial cream. Seek immediate medical attention.

Inhalation:
If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention if symptoms appear.

Serious Inhalation:
Evacuate the victim to a safe area as soon as possible. Loosen tight clothing such as a collar, tie, belt or waistband. If breathing is difficult, administer oxygen. If the victim is not breathing, perform mouth-to-mouth resuscitation. Seek medical attention.

Ingestion:
Do NOT induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person. If large quantities of this material are swallowed, call a physician immediately. Loosen tight clothing such as a collar, tie, belt or waistband.

Serious Ingestion: Not available.

Section 5: Fire and Explosion Data

Flammability of the Product: Flammable.

Auto-Ignition Temperature: 497.78°C (928°F)

Flash Points: CLOSED CUP: -11.1°C (12°F). (Setaflash)

Flammable Limits: LOWER: 1.2% UPPER: 7.8%

Products of Combustion: These products are carbon oxides (CO, CO2).

Fire Hazards in Presence of Various Substances:
Highly flammable in presence of open flames and sparks, of heat.
Slightly flammable to flammable in presence of oxidizing materials.
Non-flammable in presence of shocks.

Explosion Hazards in Presence of Various Substances:
Risks of explosion of the product in presence of mechanical impact: Not available.
Risks of explosion of the product in presence of static discharge: Not available.
Explosive in presence of oxidizing materials, of acids.

Fire Fighting Media and Instructions:
Flammable liquid, soluble or dispersed in water.
SMALL FIRE: Use DRY chemical powder.
LARGE FIRE: Use alcohol foam, water spray or fog.

Special Remarks on Fire Hazards:
Extremely flammable liquid and vapor. Vapor may cause flash fire.
Reacts on contact with iodine heptafluoride gas.

Dioxygenyl tetrafluoroborate is as very powferful oxidant. The addition of a small particle to small samples of benzene, at ambient temperature, causes ignition.
Contact with sodium peroxide with benzene causes ignition.
Benzene ignites in contact with powdered chromic anhydride.
Virgorous or incandescent reaction with hydrogen + Raney nickel (above 210 C) and bromine trifluoride.

Special Remarks on Explosion Hazards:
Benzene vapors + chlorine and light causes explosion.
Reacts explosively with bromine pentafluoride, chlorine, chlorine trifluoride, diborane, nitric acid, nitryl perchlorate, liquid oxygen, ozone, silver perchlorate.
Benzene + pentafluoride and methoxide (from arsenic pentafluoride and potassium methoxide) in trichlorotrifluoroethane causes explosion.
Interaction of nitryl perchlorate with benzene gave a slight explosion and flash.
The solution of permanganic acid (or its explosive anhydride, dimaganese heptoxide) produced by interaction of permanganates and sulfuric acid will explode on contact with benzene.
Peroxodisulfuric acid is a very powferful oxidant. Uncontrolled contact with benzene may cause explosion.
Mixtures of peroxomonsulfuric acid with benzene explodes.

Section 6: Accidental Release Measures

Small Spill: Absorb with an inert material and put the spilled material in an appropriate waste disposal.

Large Spill:
Flammable liquid.
Keep away from heat. Keep away from sources of ignition. Stop leak if without risk. Absorb with DRY earth, sand or other non-combustible material. Do not touch spilled material. Prevent entry into sewers, basements or confined areas; dike if needed. Be careful that the product is not present at a concentration level above TLV. Check TLV on the MSDS and with local authorities.

Section 7: Handling and Storage

Precautions:
Keep locked up.. Keep away from heat. Keep away from sources of ignition. Ground all equipment containing material. Do not ingest. Do not breathe gas/fumes/ vapor/spray. In case of insufficient ventilation, wear suitable respiratory equipment. If ingested, seek medical advice immediately and show the container or the label. Avoid contact with skin and eyes. Keep away from incompatibles such as oxidizing agents, acids.

Storage:
Store in a segregated and approved area. Keep container in a cool, well-ventilated area. Keep container tightly closed and sealed until ready for use. Avoid all possible sources of ignition (spark or flame).

Section 8: Exposure Controls/Personal Protection

Engineering Controls:
Provide exhaust ventilation or other engineering controls to keep the airborne concentrations of vapors below their respective threshold limit value. Ensure that eyewash stations and safety showers are proximal to the work-station location.

Personal Protection:
Splash goggles. Lab coat. Vapor respirator. Be sure to use an approved/certified respirator or equivalent. Gloves.

Personal Protection in Case of a Large Spill:
Splash goggles. Full suit. Vapor respirator. Boots. Gloves. A self contained breathing apparatus should be used to avoid inhalation of the product. Suggested protective clothing might not be sufficient; consult a specialist BEFORE handling this product.

Exposure Limits:

TWA: 0.5 STEL: 2.5 (ppm) from ACGIH (TLV) [United States]
TWA: 1.6 STEL: 8 (mg/m3) from ACGIH (TLV) [United States]
TWA: 0.1 STEL: 1 from NIOSH
TWA: 1 STEL: 5 (ppm) from OSHA (PEL) [United States]
TWA: 10 (ppm) from OSHA (PEL) [United States]
TWA: 3 (ppm) [United Kingdom (UK)]
TWA: 1.6 (mg/m3) [United Kingdom (UK)]
TWA: 1 (ppm) [Canada]
TWA: 3.2 (mg/m3) [Canada]
TWA: 0.5 (ppm) [Canada]Consult local authorities for acceptable exposure limits.

Section 9: Physical and Chemical Properties

Physical state and appearance: Liquid.

Odor:
Aromatic. Gasoline-like, rather pleasant.
(Strong.)

Taste: Not available.

Molecular Weight: 78.11 g/mole

Color: Clear Colorless. Colorless to light yellow.

pH (1% soln/water): Not available.

Boiling Point: 80.1 (176.2°F)

Melting Point: 5.5°C (41.9°F)

Critical Temperature: 288.9°C (552°F)

Specific Gravity: 0.8787 @ 15 C (Water = 1)

Vapor Pressure: 10 kPa (@ 20°C)

Vapor Density: 2.8 (Air = 1)

Volatility: Not available.

Odor Threshold: 4.68 ppm

Water/Oil Dist. Coeff.: The product is more soluble in oil; log(oil/water) = 2.1

Ionicity (in Water): Not available.

Dispersion Properties: See solubility in water, diethyl ether, acetone.

Solubility:
Miscible in alcohol, chloroform, carbon disulfide oils, carbon tetrachloride, glacial acetic acid, diethyl ether, acetone.
Very slightly soluble in cold water.

Section 10: Stability and Reactivity Data

Stability: The product is stable.

Instability Temperature: Not available.

Conditions of Instability: Heat, ignition sources, incompatibles.

Incompatibility with various substances: Highly reactive with oxidizing agents, acids.

Corrosivity: Non-corrosive in presence of glass.

Special Remarks on Reactivity:
Benzene vapors + chlorine and light causes explosion.
Reacts explosively with bromine pentafluoride, chlorine, chlorine trifluoride, diborane, nitric acid, nitryl perchlorate, liquid oxygen, ozone, silver perchlorate.
Benzene + pentafluoride and methoxide (from arsenic pentafluoride and potassium methoxide) in trichlorotrifluoroethane causes explosion.
Interaction of nitryl perchlorate with benzene gave a slight explosion and flash.
The solution of permanganic acid (or its explosive anhydride, dimaganese heptoxide) produced by interaction of permanganates and sulfuric acid will explode on contact with benzene.
Peroxodisulfuric acid is a very powferful oxidant. Uncontrolled contact with benzene may cause explosion.
Mixtures of peroxomonsulfuric acid with benzene explodes.

Special Remarks on Corrosivity: Not available.

Polymerization: Will not occur.

Section 11: Toxicological Information

Routes of Entry: Absorbed through skin. Dermal contact. Eye contact. Inhalation.

Toxicity to Animals:
WARNING: THE LC50 VALUES HEREUNDER ARE ESTIMATED ON THE BASIS OF A 4-HOUR EXPOSURE.
Acute oral toxicity (LD50): 930 mg/kg [Rat].
Acute dermal toxicity (LD50): >9400 mg/kg [Rabbit].
Acute toxicity of the vapor (LC50): 10000 7 hours [Rat].

Chronic Effects on Humans:
CARCINOGENIC EFFECTS: Classified A1 (Confirmed for human.) by ACGIH, 1 (Proven for human.) by IARC.
MUTAGENIC EFFECTS: Classified POSSIBLE for human. Mutagenic for mammalian somatic cells. Mutagenic for bacteria and/or yeast.
DEVELOPMENTAL TOXICITY: Classified Reproductive system/toxin/female [POSSIBLE].
Causes damage to the following organs: blood, bone marrow, central nervous system (CNS).
May cause damage to the following organs: liver, Urinary System.

Other Toxic Effects on Humans:
Very hazardous in case of inhalation.
Hazardous in case of skin contact (irritant, permeator), of ingestion.

Special Remarks on Toxicity to Animals: Not available.

Special Remarks on Chronic Effects on Humans:
May cause adverse reproductive effects (female fertility, Embryotoxic and/or foetotoxic in animal) and birth defects.
May affect genetic material (mutagenic).
May cause cancer (tumorigenic, leukemia))
Human: passes the placental barrier, detected in maternal milk.

Special Remarks on other Toxic Effects on Humans:
Acute Potential Health Effects:
Skin: Causes skin irritation. It can be absorbed through intact skin and affect the liver, blood, metabolism,and urinary system.
Eyes: Causes eye irritation.
Inhalation: Causes respiratory tract and mucous membrane irritation. Can be absorbed through the lungs. May affect behavior/Central and Peripheral nervous systems (somnolence, muscle weakness, general anesthetic, and

other symptoms similar to ingestion), gastrointestinal tract (nausea), blood metabolism, urinary system.
Ingestion: May be harmful if swallowed. May cause gastrointestinal tract irritation including vomiting. May affect behavior/Central and Peripheral nervous systems (convulsions, seizures, tremor, irritability, initial CNS stimulation followed by depression, loss of coordination, dizziness, headache, weakness, pallor, flushing), respiration (breathlessness and chest constriction), cardiovascular system, (shallow/rapid pulse), and blood.

Section 12: Ecological Information

Ecotoxicity: Not available.

BOD5 and COD: Not available.

Products of Biodegradation:
Possibly hazardous short term degradation products are not likely. However, long term degradation products may arise.

Toxicity of the Products of Biodegradation: The products of degradation are less toxic than the product itself.

Special Remarks on the Products of Biodegradation: Not available.

Section 13: Disposal Considerations

Waste Disposal:
Waste must be disposed of in accordance with federal, state and local environmental control regulations.

Section 14: Transport Information

DOT Classification: CLASS 3: Flammable liquid.

Identification: : Benzene UNNA: 1114 PG: II

Special Provisions for Transport: Not available.

Section 15: Other Regulatory Information

Federal and State Regulations:
California prop. 65: This product contains the following ingredients for which the State of California has found to cause cancer, birth defects or other reproductive harm, which would require a warning under the statute: Benzene
California prop. 65 (no significant risk level): Benzene: 0.007 mg/day (value)
California prop. 65: This product contains the following ingredients for which the State of California has found to cause cancer which would require a warning under the statute: Benzene
Connecticut carcinogen reporting list.: Benzene
Connecticut hazardous material survey.: Benzene
Illinois toxic substances disclosure to employee act: Benzene
Illinois chemical safety act: Benzene
New York release reporting list: Benzene
Rhode Island RTK hazardous substances: Benzene
Pennsylvania RTK: Benzene
Minnesota: Benzene
Michigan critical material: Benzene
Massachusetts RTK: Benzene
Massachusetts spill list: Benzene
New Jersey: Benzene
New Jersey spill list: Benzene
Louisiana spill reporting: Benzene
California Director's list of Hazardous Substances: Benzene

TSCA 8(b) inventory: Benzene
SARA 313 toxic chemical notification and release reporting: Benzene
CERCLA: Hazardous substances.: Benzene: 10 lbs. (4.536 kg)

Other Regulations:
OSHA: Hazardous by definition of Hazard Communication Standard (29 CFR 1910.1200).
EINECS: This product is on the European Inventory of Existing Commercial Chemical Substances.

Other Classifications:

WHMIS (Canada):
CLASS B-2: Flammable liquid with a flash point lower than 37.8°C (100°F).
CLASS D-2A: Material causing other toxic effects (VERY TOXIC).

DSCL (EEC):
R11- Highly flammable.
R22- Harmful if swallowed.
R38- Irritating to skin.
R41- Risk of serious damage to eyes.
R45- May cause cancer.
R62- Possible risk of impaired fertility.
S2- Keep out of the reach of children.
S26- In case of contact with eyes, rinse immediately with plenty of water and seek medical advice.
S39- Wear eye/face protection.
S46- If swallowed, seek medical advice immediately and show this container or label.
S53- Avoid exposure - obtain special instructions before use.

HMIS (U.S.A.):

Health Hazard: 2

Fire Hazard: 3

Reactivity: 0

Personal Protection: h

National Fire Protection Association (U.S.A.):

Health: 2

Flammability: 3

Reactivity: 0

Specific hazard:

Protective Equipment:
Gloves.
Lab coat.
Vapor respirator. Be sure to use an approved/certified respirator or equivalent. Wear appropriate respirator when ventilation is inadequate.
Splash goggles.

Section 16: Other Information

References: Not available.

Other Special Considerations: Not available.

Created: 10/10/2005 08:35 PM

Last Updated: 10/10/2005 08:35 PM

Material Safety Data Sheet

MATERIAL SAFETY DATA SHEET	KOPPERS	MEDICAL EMERGENCIES: OUTSIDE U.S.A.: GENERAL INFORMATION:	1 800 553-5631 412 227-2001 412 227-2424

KOPPERS INC.
436 SEVENTH AVENUE
PITTSBURGH, PA. 15219-1800

CHEMTREC ASSISTANCE 1 800 424-9300
CANUTEC: 1 613 996-6666

SECTION I - PRODUCT IDENTIFICATION

PRODUCT NAME: Coal Tar Creosote (Pressure Applications)

SYNONYM: P1/P13

PRODUCT USE: Wood preservative

CHEMICAL FAMILY: Coal tar distillate

FORMULA: Complex mixture of aromatic and heterocyclic hydrocarbons

CAS NUMBER: 8001-58-9

NFPA 704M/HMIS RATING: 2/2 HEALTH 1/1 FLAMMABILITY 1/1 REACTIVITY
0 = Least 1 = Slight 2 = Moderate 3 = High 4 = Extreme

CANADIAN PRODUCT CLASSIFICATION: Class D, Division 2, Subdivision A, Very Toxic Material

SECTION II - HEALTH/SAFETY ALERT

CHRONIC OVEREXPOSURE (as defined by OSHA recommended standards)
MAY CAUSE CANCER
WARNING
MAY BE FATAL IF SWALLOWED
HARMFUL TO THE SKIN OR IF INHALED
CAUSES EYE AND SKIN IRRITATION
AVOID PROLONGED OR REPEATED CONTACT
OBSERVE GOOD HYGIENE AND SAFETY PRACTICES WHEN HANDLING THIS PRODUCT
DO NOT USE THIS PRODUCT UNTIL MSDS & PRODUCT LABEL HAVE BEEN READ/UNDERSTOOD.
WARNING: THIS PRODUCT CONTAINS A CHEMICAL KNOWN TO THE STATE OF
CALIFORNIA TO CAUSE CANCER.

SECTION III - HEALTH HAZARD INFORMATION

EYE: Direct contact with liquid or vapor may cause moderate irritation.

SKIN: Contact with skin can result in severe irritation which when accentuated by sunlight may result in phototoxic skin reaction. This material or similar materials when administered throughout the major portion of their lifetime has caused cancer in laboratory animals. Contact with heated material may cause thermal burns.

INHALATION: Acute overexposure to vapor may result in respiratory tract irritation. Repeated and/or prolonged contact to high concentrations of vapor may result in respiratory difficulties, central nervous system (CNS) effects characterized by headache, drowsiness, dizziness, weakness, incoordination, circulatory collapse, coma and possible death.

INGESTION: Ingestion of material may cause gastrointestinal disturbances including irritation, nausea, vomiting, abdominal pain. Systemic effects are similar to those described under INHALATION.

OTHER: See Section XIII (Comments) for additional information on health effects.

SECTION IV - EMERGENCY AND FIRST AID PROCEDURES

EYE CONTACT: Immediately flush with large amounts of water for 15 minutes. Seek medical aid.

SKIN CONTACT: Remove contaminated clothing. Wipe material from skin. Wash thoroughly with soap and water or waterless hand cleaner. If irritation persists, seek medical aid.

INHALATION: Remove from exposure. If breathing has stopped or is difficult, administer artificial respiration or oxygen as indicated. Seek medical aid.

INGESTION: If victim is conscious and alert, give 1-2 glasses of water or milk. Induce vomiting using ipecac syrup as directed on the label. After vomiting, the victim may be given a slurry of 100 g of activated charcoal in 8 oz. of water. Seek medical aid.

NOTE TO PHYSICIAN: Due to the possibility of sensitization of the myocardium following extreme acute overexposures, cardiorespiratory support should be available.

INGESTION: DO NOT INDUCE VOMITING OR GIVE ANYTHING BY MOUTH TO AN UNCONSCIOUS PERSON.

SECTION V - FIRE AND EXPLOSION HAZARD INFORMATION

FLASH POINT & METHOD: >93 C (>200 F)PMCC AUTOIGNITION TEMP: Not Deter

FLAMMABLE LIMITS (% BY VOLUME/AIR): LOWER: ND UPPER: ND

TDG FLAMMABILITY CLASSIFICATION: None

EXTINGUISHING MEDIA: Use dry chemical, carbon dioxide, foam or water spray. Water or foam may cause frothing, if molten.

FIRE-FIGHTING PROCEDURES: Wear complete fire service protective equipment, including full-face NIOSH certified Self-Contained breathing apparatus. Use water to cool fire-exposed container/structure/protect personnel. Toxic vapors may be given off in a fire.

FIRE AND EXPLOSION HAZARDS: When heated (fire conditions), vapors/decomposition products may be released forming flammable/explosive mixtures in air. Closed containers may explode when exposed to extreme heat(fire).

SENSITIVITY TO MECHANICAL IMPACT: ND

SENSITIVITY TO STATIC DISCHARGE: ND

SECTION VI - SPILL, LEAK AND DISPOSAL INFORMATION

SPILL OR LEAK PROCEDURES (PRODUCT): Stop leak if no risk involved. Stay upwind. Solidified spills: Shovel into dry containers and cover. Flush area with water. Small wet spills: Take up with sand or other noncombustible absorbent material. Flush area with water. Dike large spills for later disposal. Contain runoff from fire control and dilution water. This product released into the environment must be reported to the National Response Center (1 800-424-8802). When this product is spilled or leaked, the CERCLA reportable quantity is 1 pound.

---------------- DOT REPORTABLE QUANTITIES ----------------

1 pound	Creosote
1 pound	Benzo(b)fluoranthene

WASTE DISPOSAL: This product is a US EPA defined toxic waste. Dispose of as a toxic waste in accordance with local, state and federal regulations.

SECTION VII - RECOMMENDED EXPOSURE LIMIT/HAZARDOUS INGREDIENTS

EXPOSURE LIMIT (PRODUCT):

*For coal tar pitch volatiles, OSHA-PEL is 0.2 mg/m3 averaged over an 8 hour work shift, benzene soluble fraction of total particulate including dust, fumes and mists.

**skin

***OSHA-Action Level - 0.5 ppm 8-hr. TWA

#Suspected Human Carcinogen. Percent by weight are the maximum levels of constituents.

HAZARDOUS INGREDIENTS	CAS NUMBER	%BY WT.	EXPOSURE LIMIT (PPM;MG/M3)		
Creosote	8001-58-9	100%	OSHA-TWA	-	0.2*
Phenanthrene	85-01-8	14.13	OSHA-TWA		0.2*
Fluoranthene	206-44-0	7.41	None		
Pyrene	129-00-0	5.14	OSHA-TWA		0.2*
Acenaphthene	83-32-9	6	None		
Fluorene	86-73-7	4.39	None		
Naphthalene	91-20-3	16.11	OSHA-TWA	10	50
Dibenzofuran	132-64-9	3.13	None		
Anthracene	120-12-7	3.76	OSHA-TWA		0.2*
Benzo(a)anthracene	56-55-3	1.40	None		
Chrysene	218-01-9	1.22	OSHA-TWA		0.2*
Biphenyl	95-52-4	1.03	OSHA-TWA	0.2	1
Indeno(1,2,3-c,d)pyrene	193-39-5	0.12	None		
Quinoline	91-22-5	0.90	None		
Benzo(a)pyrene	50-32-8	0.39	OSHA-TWA		0.2*

Benzene	71-43-2	0.13	OSHA-TWA	1	3***
			OSHA-STEL	5	15
Benzo(g,h,i)perylene	191-24-2	0.17	None		
M & P Xylene 108-38-3&106-42-3	mixture	0.13	OSHA-TWA	100	435
Styrene	100-42-5	0.06	OSHA-TWA	100	
			OSHA-STEL	200	
Dibenzo(a,h)anthracene	53-70-3	0.04	None		
Phenol	108-95-2	0.06	OSHA-TWA	5	19**
Toluene	108-88-3	0.15	OSHA-TWA	100	
			OSHA-STEL	150	
Benzofuran (Coumarone)	271-89-6	0.19	None		
Ethylbenzene	100-41-4	0.04	OSHA-TWA	100	435
O Xylene	95-47-6	0.04	OSHA-TWA	100	435
Indene	95-13-6	1.02	None		
2 Methylnaphthalene	91-57-6	4.84	None		
1 Methylnaphthalene	90-12-0	1.80	None		
Benzo(b)fluoranthene	205-99-2	0.42	None		
Benzo(j)fluoranthene	205-82-3	0.30	None		
Benzo(k)fluoranthene	207-08-9	0.28	None		

---------- SARA TITLE III SECTION 313 CHEMICALS ----------
(SEE SECTION VII FOR CAS NUMBERS AND PERCENTAGES)

Creosote
Benzene
Toluene
Ethylbenzene
Styrene
Phenol
Anthracene
Fluoranthene
Naphthalene
Quinoline
Phenanthrene
Benzo(a)anthracene
M,O & P Xylene

Chrysene
Dibenzofuran
Benzo(a)pyrene
Indeno(1,2,3-c,d)pyrene
Dibenzo(a,h)anthracene
Benzo(g,h,i)perylene
Benzo(b)fluoranthene
Benzo(j)fluoranthene
Benzo(k)fluoranthene

SECTION VIII - PERSONAL PROTECTION INFORMATION

EYE PROTECTION: Industrial safety glasses, minimum. As necessary to comply with OSHA 1910.133 and work area conditions: use side shields, goggles or face shield. Chemical goggles; face shield (if splashing is possible).

SKIN PROTECTION: As required, chemical resistant gloves. Depending on working conditions, i.e., contact potential, wear chemical resistant protective garments such as head/neck cover, aprons, jackets, coveralls, or long sleeved shirts and long pants, boots,long pants, chemical resistant overshoes, etc. See Section XIII - Comments for additional information on skin protection recommendations.

RESPIRATORY PROTECTION: Not required under normal use conditions. If ventilation does not maintain inhalation exposures below TLV(PEL), use NIOSH certified air purifying respirators equipped with combination filter/organic vapor cartridge in accordance with OSHA Respiratory Protection Standard 1910.134 and manufacture's "Instructions" and "Warnings".

VENTILATION: Provide sufficient general/local exhaust ventilation in pattern/volume to control inhalation exposures below current exposure limits and areas below flammable vapor concentrations. Local exhaust is necessary for use in enclosed or confined spaces. See OSHA 29 CFR 1910.146 Permit Required Confined Space.

SECTION IX - PERSONAL HANDLING INSTRUCTIONS

HANDLING: Avoid prolonged or repeated breathing of vapors, mists or fumes. Avoid prolonged or repeated contact with skin or eyes. Observe good personal hygiene practices and recommended procedures. Application of certain skin creams (sun screen in conjunction with a general purpose protective cream) - before working/several times during work may be beneficial.

STORAGE: Keep in a closed, labeled container. Protect from physical damage. Keep containers closed when material is not in use. Maintain good housekeeping.

OTHER: Not for use or storage in or around the home. DO NOT TAKE INTERNALLY. Do not use until manufacturer's precautions and product label have been read and understood. Wash exposed areas promptly and thoroughly after skin contact and before eating, drinking, using tobacco products or rest rooms.

SECTION X - REACTIVITY DATA

CONDITIONS CONTRIBUTING TO INSTABILITY: Overheating

INCOMPATIBILITY: none known

HAZARDOUS REACTIONS/DECOMPOSITION/COMBUSTION PRODUCTS: Oxides of carbon

CONDITIONS CONTRIBUTING TO HAZARDOUS POLYMERIZATION: none

SECTION XI - PHYSICAL DATA

BOILING POINT:	>180 C (>355 F)	SPECIFIC GRAVITY:	1.060 g/ml @ 20C*
MELTING POINT:	NA	% VOLATILE BY VOL:	NA
VAPOR PRESSURE:	0.42mm Hg @70f	EVAPORATION RATE(ETHER=1):	slow
VAPOR DENSITY(AIR=1):	>1	VISCOSITY:	7.4 @ 70f
SOLUBILITY: (WATER)	slight	pH:	ND

VOC: 475 g/l

COEFFICIENT OF WATER/OIL DISTRIBUTION: slightly H2O soluble

APPEARANCE/ODOR: brown to black liquid with creosote or tarry odor
*Specific Gravity + 8.76 lb/gal

SECTION XII - TRANSPORT INFORMATION

--------- PRODUCT PACKAGED IN BARGE ---------

RQ ENVIRONMENTALLY HAZARDOUS SUBSTANCES, LIQUID, N.O.S.
(CREOSOTE)
CLASS 9 UN3082 PG III

.
PLACARDED: CLASS 9

--------- PRODUCT PACKAGED IN TANK CAR ---------

RQ ENVIRONMENTALLY HAZARDOUS SUBSTANCES, LIQUID, N.O.S.
(CREOSOTE)
CLASS 9 UN3082 PG III
.
COAL TAR CREOSOTE, OR DISTILLATE, OR SOLUTION
.
PLACARDED: CLASS 9

--------- PRODUCT PACKAGED IN TANK TRUCK ---------

RQ ENVIRONMENTALLY HAZARDOUS SUBSTANCES, LIQUID, N.O.S.
(CREOSOTE)
CLASS 9 UN3082 PG III
.
PLACARDED: CLASS 9

--------- PRODUCT PACKAGED IN DRUM (TIGHT HEAD) ---------

RQ ENVIRONMENTALLY HAZARDOUS SUBSTANCES, LIQUID, N.O.S.
(CREOSOTE)
CLASS 9 UN3082 PG III
MARINE POLLUTANT
PLACARDED: CLASS 9

--------- PRODUCT PACKAGED IN PAIL (REMOVABLE HEAD) ---------

RQ ENVIRONMENTALLY HAZARDOUS SUBSTANCES, LIQUID, N.O.S.
(CREOSOTE)
CLASS 9 UN3082 PG III
MARINE POLLUTANT
PLACARDED: CLASS 9

SECTION XIII - COMMENTS

Persons with pre-existing disease in or a history of ailments involving the skin or blood-forming organs may be at a greater risk of developing adverse health effects when exposed to this material.

The IARC monographs (Vol. 35) states that there is sufficient evidence for the carcinogenicity of creosote in experimental animals. The NTP Annual Report on Carcinogens states that creosote oils are carcinogenic in experimental animals. Creosote does not appear in the OSHA Subpart Z Table.

Epidemiological studies of workers in the woodtreating industry have shown no significant health effects due to occupational exposure to creosote. The application of a commercially available sun-blocking lotion is recommended to greatly reduce the phototoxicity of coal tar derived materials associated sun burning. The sun block should be applied prior to the application of a protective cream and should have a sun protection factor(SPF) greater than 15. Application of a general purpose protective cream or a cream specifically formulated for protection coal tar based products from contacting skin before working/several times during work may be beneficial.

EPA Reg. No. 61468-1.

Coal Tar Creosote (Pressure Applications) is an EPA registered pesticide regulated by the Federal Insecticide Fungicide Rodenticide Act (FIFRA) and failure to follow the label directions is a violation of Federal Law. The label addresses issues of personal hygiene practices, personal protective equipment use, the use, care and disposal of protective clothing and material handling precautions. Please refer to the label for more details.

This product containes benzene. The IARC monographs (vol. 29) states that there is sufficient evidence for the carcinogenicity in humans and limited evidence for the carcinogenicity in animals. Benzene is also listed in the NTP Annual Report on Carcinogens and in the OSHA Subpart Z Table (Specifically Regulated Substances).

Reviewed and revised May 2001.

No known ingredients which occur at greater than 0.1%, other than those listed above, are listed as a carcinogen in the IARC Monographs on the Evaluation of the Carcinogenic Risk of Chemicals to Humans, the NTP Annual Report on Carcinogens or OSHA 29 CFR 1910.1001-1047 subpart Z Toxic and Hazardous Substances (Specifically Regulated Substances).

SKIN PROTECTION (protective material): Permeation/degradation values of chemical mixtures cannot be predicted from pure components or chemical classes. Thus, these materials are normally best estimates based on available pure component data. A significant difference in chemical breakthrough time has been reported for generically similar gloves from different manufacturers (AIHA J., 48, 941-947 1987).

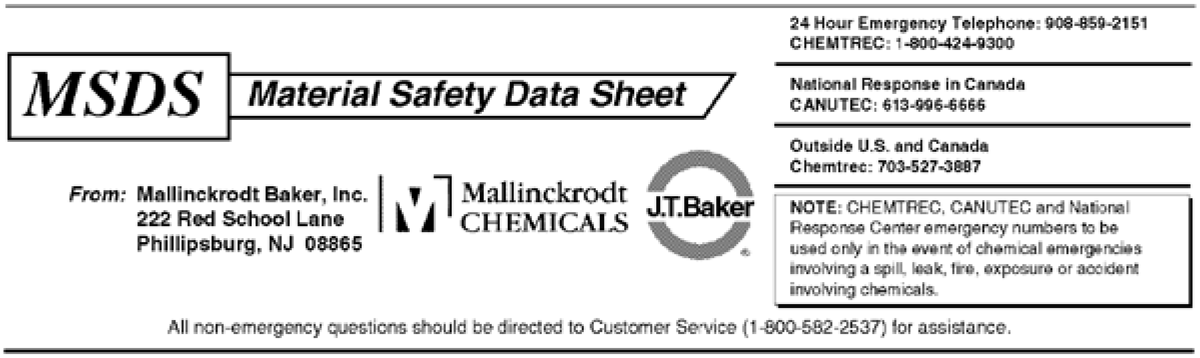
Do not use until manufacturer's precautions have been read/understood. Wash exposed areas promptly and thoroughly after skin contact from working with this product and before eating, drinking, using tobacco products or rest rooms.

Prepared By: Safety and Health Department

REVISION DATE: 05/01   CODE NUMBER: IND00003MY0139
SPECIFICATION SHEET NUMBER: TP-1203-10 REPLACES SHEET: IND00003AP0138
SUPPLIER INFORMATION: Same as manufacturer.

NOTICE: While the information and recommendations set forth herein are believed
to be accurate as of the date hereof, Koppers makes no
from reliance thereon. res

MSDS Number: **E3050** * * * * * *Effective Date:* ***01/31/05*** * * * * * *Supercedes:* ***11/04/04***



MSDS *Material Safety Data Sheet*

From: **Mallinckrodt Baker, Inc.**
222 Red School Lane
Phillipsburg, NJ 08865

Mallinckrodt CHEMICALS

J.T.Baker

24 Hour Emergency Telephone: 908-859-2151
CHEMTREC: 1-800-424-9300

National Response in Canada
CANUTEC: 613-996-6666

Outside U.S. and Canada
Chemtrec: 703-527-3887

NOTE: CHEMTREC, CANUTEC and National Response Center emergency numbers to be used only in the event of chemical emergencies involving a spill, leak, fire, exposure or accident involving chemicals.

All non-emergency questions should be directed to Customer Service (1-800-582-2537) for assistance.

ETHYL BENZENE

1. Product Identification

Synonyms: Benzene, ethyl; ethylbenzen 99%; ethyl benzol
CAS No.: 100-41-4
Molecular Weight: 106.17
Chemical Formula: $C_6H_5C_2H_5$
Product Codes:
J.T. Baker: 5156, 5166
Mallinckrodt: 2427

2. Composition/Information on Ingredients

Ingredient	CAS No	Percent	Hazardous
Ethyl Benzene	100-41-4	100%	Yes

3. Hazards Identification

Emergency Overview

WARNING! FLAMMABLE LIQUID AND VAPOR. HARMFUL IF SWALLOWED OR INHALED. VAPOR OR MIST IS IRRITATING TO THE EYES AND UPPER RESPIRATORY TRACT. CAUSES SKIN IRRITATION. AFFECTS CENTRAL NERVOUS SYSTEM.

SAF-T-DATA$^{\text{(tm)}}$ Ratings (Provided here for your convenience)

Health Rating: 2 - Moderate (Life)
Flammability Rating: 3 - Severe (Flammable)
Reactivity Rating: 1 - Slight
Contact Rating: 2 - Moderate
Lab Protective Equip: GOGGLES & SHIELD; LAB COAT & APRON; VENT HOOD; PROPER GLOVES; CLASS B EXTINGUISHER
Storage Color Code: Red (Flammable)

Potential Health Effects

Inhalation:
Vapors irritate the mucous membranes and respiratory tract. May cause coughing, headache, Labored breathing, dizziness and unconsciousness. May affect blood circulation.
Ingestion:
Harmful if swallowed. Aspiration into the lungs may cause pneumonia. Abdominal pain, nausea, vomiting may occur. May affect central nervous system.
Skin Contact:
Causes irritation with redness and pain. Prolonged contact may cause dermatitis.
Eye Contact:
Vapors irritate the eyes, causing redness, pain, blurred vision.
Chronic Exposure:
Chronic exposure may cause fatigue, sleepiness, headache, and irritation of the eyes, respiratory tract and skin.
Aggravation of Pre-existing Conditions:
Persons with pre-existing skin disorders or eye problems, or impaired liver, kidney or respiratory function may be more susceptible to the effects of the substance.

---

4. First Aid Measures

Inhalation:
Remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention.
Ingestion:
Aspiration hazard. If swallowed, DO NOT INDUCE VOMITING. Give large quantities of water. Never give anything by mouth to an unconscious person. Get medical attention immediately.
Skin Contact:
Immediately flush skin with plenty of water for at least 15 minutes. Remove

contaminated clothing and shoes. Get medical attention. Wash clothing before reuse. Thoroughly clean shoes before reuse.

Eye Contact:

Immediately flush eyes with plenty of water for at least 15 minutes, lifting lower and upper eyelids occasionally. Get medical attention immediately.

---

5. Fire Fighting Measures

Fire:

Flash point: 21C (70F) CC
Autoignition temperature: 432C (810F)
Flammable limits in air % by volume:
lel: 0.8; uel: 6.7

Flammable Liquid and Vapor! Liquid floats on water and may travel to a source of ignition and spread the fire.

Explosion:

Sealed containers may rupture when heated. Above the flash point, explosive vapor-air mixtures may be formed. Vapors can flow along surfaces to distant ignition source and flash back. Sensitive to static discharge.

Fire Extinguishing Media:

Dry chemical, alcohol foam or carbon dioxide. Water may be ineffective. Water spray may be used to keep fire exposed containers cool.

Special Information:

In the event of a fire, wear full protective clothing and NIOSH-approved self-contained breathing apparatus with full facepiece operated in the pressure demand or other positive pressure mode. Vapors can flow along surfaces to distant ignition source and flash back.

---

6. Accidental Release Measures

Ventilate area of leak or spill. Remove all sources of ignition. Wear appropriate personal protective equipment as specified in Section 8. Isolate hazard area. Keep unnecessary and unprotected personnel from entering. Contain and recover liquid when possible. Use non-sparking tools and equipment. Collect liquid in an appropriate container or absorb with an inert material (e. g., vermiculite, dry sand, earth), and place in a chemical waste container. Do not use combustible materials, such as saw dust. Do not flush to sewer! If a leak or spill has not ignited, use water spray to disperse the vapors, to protect personnel attempting to stop leak, and to flush spills away from exposures. US Regulations (CERCLA) require reporting spills and releases to soil, water and air in excess of reportable quantities. The toll free number for the US Coast Guard National Response Center is (800) 424-8802.

---

7. Handling and Storage

Protect against physical damage. Store in a cool, dry well-ventilated location, away from any area where the fire hazard may be acute. Outside or detached storage is preferred. Separate from incompatibles. Containers should be bonded and grounded for transfers to avoid static sparks. Storage and use areas should be No Smoking areas. Use non-sparking type tools and equipment, including explosion proof ventilation. Containers of this material may be hazardous when empty since they retain product residues (vapors, liquid); observe all warnings and precautions listed for the product. Do Not attempt to clean empty containers since residue is difficult to remove. Do not pressurize, cut, weld, braze, solder, drill, grind or expose such containers to heat, sparks, flame, static electricity or other sources of ignition: they may explode and cause injury or death.

---

8. Exposure Controls/Personal Protection

Airborne Exposure Limits:
For Ethyl Benzene:
- OSHA Permissible Exposure Limit (PEL) -
100 ppm (TWA)
- ACGIH Threshold Limit Value (TLV) -
100 ppm (TWA) 125 ppm (STEL), A3 - Confirmed Animal Carcinogen with Unknown Relevance to Humans.

Ventilation System:
A system of local and/or general exhaust is recommended to keep employee exposures below the Airborne Exposure Limits. Local exhaust ventilation is generally preferred because it can control the emissions of the contaminant at its source, preventing dispersion of it into the general work area. Please refer to the ACGIH document, *Industrial Ventilation, A Manual of Recommended Practices*, most recent edition, for details.

Personal Respirators (NIOSH Approved):
If the exposure limit is exceeded and engineering controls are not feasible, a half-face organic vapor respirator may be worn for up to ten times the exposure limit, or the maximum use concentration specified by the appropriate regulatory agency or respirator supplier, whichever is lowest. A full-face piece organic vapor respirator may be worn up to 50 times the exposure limit, or the maximum use concentration specified by the appropriate regulatory agency or respirator supplier, whichever is lowest. For emergencies or instances where the exposure levels are not known, use a full-face piece positive-pressure, air-supplied respirator. WARNING: Air-purifying respirators do not protect workers in oxygen-deficient atmospheres. Where respirators are required, you must have a written program covering the basic requirements in the OSHA respirator standard. These include training, fit testing, medical approval, cleaning, maintenance, cartridge change schedules, etc. See 29CFR1910.134 for details.

Skin Protection:
Wear impervious protective clothing, including boots, gloves, lab coat, apron or coveralls, as appropriate, to prevent skin contact.

Eye Protection:
Use chemical safety goggles and/or a full face shield where splashing is possible. Maintain eye wash fountain and quick-drench facilities in work area.

---

9. Physical and Chemical Properties

Appearance:
Clear, colorless liquid.
Odor:
Aromatic odor.
Solubility:
Insoluble in water.
Specific Gravity:
0.867 @ 20C/4C
pH:
No information found.
% Volatiles by volume @ 21C (70F):
No information found.
Boiling Point:
136C (277F)
Melting Point:
-95C (-139F)
Vapor Density (Air=1):
3.66
Vapor Pressure (mm Hg):
10 @ 25.9C (79F)
Evaporation Rate (BuAc=1):
< 1

---

10. Stability and Reactivity

Stability:
Stable under ordinary conditions of use and storage.
Hazardous Decomposition Products:
Carbon dioxide and carbon monoxide may form when heated to decomposition.
Hazardous Polymerization:
Will not occur.
Incompatibilities:
Contact with strong oxidizing agents may cause fires and explosions. Attacks many plastics.
Conditions to Avoid:
Heat, flames, ignition sources and incompatibles.

---

11. Toxicological Information

For Ethyl Benzene - Oral rat LD50: 3500 mg/Kg; Skin rabbit LD50:15430 mg/Kg. Investigated as a tumorigen, mutagen, reproductive effector.

```
--------\Cancer Lists\------------------------------------------------------
                                              ---NTP Carcinogen---
Ingredient                                    Known    Anticipated    IARC Category
------------------------------------          -----    -----------    -------------
Ethyl Benzene (100-41-4)                       No          No              2B
```

12. Ecological Information

Environmental Fate:
When released into water, this material is expected to readily biodegrade. When released to water, this material is expected to quickly evaporate. This material is not expected to significantly bioaccumulate. When released into the air, this material is expected to be readily degraded by reaction with photochemically produced hydroxyl radicals. When released into the air, this material is not expected to be degraded by photolysis.
Environmental Toxicity:
96 Hr LC50 bluegill:150.0 mg/L (Static);
96 Hr LC50 fathead minnow :9.09 mg/L, (flow-through);
96 Hr LC50 rainbow trout: 14.0 mg/L (Static).

13. Disposal Considerations

Whatever cannot be saved for recovery or recycling should be handled as hazardous waste and sent to a RCRA approved waste facility. Processing, use or contamination of this product may change the waste management options. State and local disposal regulations may differ from federal disposal regulations. Dispose of container and unused contents in accordance with federal, state and local requirements.

14. Transport Information

Domestic (Land, D.O.T.)

Proper Shipping Name: ETHYLBENZENE
Hazard Class: 3
UN/NA: UN1175
Packing Group: II

Information reported for product/size: 52L

International (Water, I.M.O.)

Proper Shipping Name: ETHYLBENZENE
Hazard Class: 3
UN/NA: UN1175
Packing Group: II
Information reported for product/size: 52L

International (Air, I.C.A.O.)

Proper Shipping Name: ETHYLBENZENE
Hazard Class: 3
UN/NA: UN1175
Packing Group: II
Information reported for product/size: 52L

---

15. Regulatory Information

--------\Chemical Inventory Status - Part 1\---------------------------------

Ingredient	TSCA	EC	Japan	Australia
Ethyl Benzene (100-41-4)	Yes	Yes	Yes	Yes

--------\Chemical Inventory Status - Part 2\---------------------------------

		--Canada--		
Ingredient	Korea	DSL	NDSL	Phil.
Ethyl Benzene (100-41-4)	Yes	Yes	No	Yes

--------\Federal, State & International Regulations - Part 1\----------------

	-SARA 302-		------SARA 313------	
Ingredient	RQ	TPQ	List	Chemical Catg.
Ethyl Benzene (100-41-4)	No	No	Yes	No

--------\Federal, State & International Regulations - Part 2\----------------

Ingredient	CERCLA	-RCRA- 261.33	-TSCA- 8(d)
Ethyl Benzene (100-41-4)	1000	No	No

Chemical Weapons Convention: No TSCA 12(b): No CDTA: No
SARA 311/312: Acute: Yes Chronic: Yes Fire: Yes Pressure: No
Reactivity: No (Pure / Liquid)

WARNING:
THIS PRODUCT CONTAINS A CHEMICAL(S) KNOWN TO THE STATE OF CALIFORNIA TO CAUSE CANCER.

Australian Hazchem Code: 3[Y]E
Poison Schedule: None allocated.
WHMIS:
This MSDS has been prepared according to the hazard criteria of the Controlled Products Regulations (CPR) and the MSDS contains all of the information required by the CPR.

---

16. Other Information

NFPA Ratings: Health: **2** Flammability: **3** Reactivity: **0**
Label Hazard Warning:
WARNING! FLAMMABLE LIQUID AND VAPOR. HARMFUL IF SWALLOWED OR INHALED. VAPOR OR MIST IS IRRITATING TO THE EYES AND UPPER RESPIRATORY TRACT. CAUSES SKIN IRRITATION. AFFECTS CENTRAL NERVOUS SYSTEM.
Label Precautions:
Keep away from heat, sparks and flame.
Keep container closed.
Use only with adequate ventilation.
Avoid contact with eyes, skin and clothing.
Avoid breathing vapor or mist.
Wash thoroughly after handling.
Label First Aid:
If swallowed, DO NOT INDUCE VOMITING. Give large quantities of water. Never give anything by mouth to an unconscious person. Get medical attention immediately. If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. In case of contact, immediately flush eyes or skin with plenty of water for at least 15 minutes. Remove contaminated clothing and shoes. Wash clothing before reuse. In all cases, get medical attention.
Product Use:
Laboratory Reagent.
Revision Information:
MSDS Section(s) changed since last revision of document include: 3, 11, 12.
Disclaimer:
****

Mallinckrodt Baker, Inc. provides the information contained herein in good faith but makes no representation as to its comprehensiveness or accuracy. This document is intended only as a guide to the appropriate precautionary handling of the material by a properly trained person using this product. Individuals receiving the information must exercise their independent judgment in determining its appropriateness for a particular purpose. MALLINCKRODT BAKER, INC. MAKES NO REPRESENTATIONS OR WARRANTIES, EITHER EXPRESS OR IMPLIED, INCLUDING WITHOUT LIMITATION ANY WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE WITH RESPECT TO THE INFORMATION SET FORTH HEREIN OR THE PRODUCT TO WHICH THE INFORMATION REFERS.

ACCORDINGLY, MALLINCKRODT BAKER, INC. WILL NOT BE RESPONSIBLE FOR DAMAGES RESULTING FROM USE OF OR RELIANCE UPON THIS INFORMATION.

****

Prepared by: Environmental Health & Safety
Phone Number: (314) 654-1600 (U.S.A.)

Material Safety Data Sheet

Naphthalene

ACC# 16120

Section 1 - Chemical Product and Company Identification

MSDS Name: Naphthalene
Catalog Numbers: AC164210000, AC164210010, AC164210025, AC180200000, AC180200010, AC180200050, AC180202500, AC180900000, AC180900010, AC180902500, S76307, S763071, N134-500, N7-500
Synonyms: Coal tar camphor; Tar camphor; Naphthalin; White tar; Naphthene; Moth flakes: Moth balls.
Company Identification:

Fisher Scientific
1 Reagent Lane
Fair Lawn, NJ 07410

For information, call: 201-796-7100
Emergency Number: 201-796-7100
For CHEMTREC assistance, call: 800-424-9300
For International CHEMTREC assistance, call: 703-527-3887

Section 2 - Composition, Information on Ingredients

CAS#	Chemical Name	Percent	EINECS/ELINCS
91-20-3	Naphthalene	>98	202-049-5

Hazard Symbols: XN N
Risk Phrases: 22

Section 3 - Hazards Identification

EMERGENCY OVERVIEW

Appearance: white solid. Flash Point: 78 deg C. **Warning!** May cause blood abnormalities. Hygroscopic (absorbs moisture from the air). Flammable solid. May be harmful if absorbed through the skin. Harmful if inhaled or swallowed. Causes eye, skin, and respiratory tract irritation.
Target Organs: Blood, respiratory system, eyes, skin.

Potential Health Effects

Eye: Naphthalene is an eye irritant. The vapor causes eye irritation at 15 ppm. Eye contact with the solid material may result in conjunctivitis, superficial injury to the cornea, diminished visual acuity, and other effects. It may cause cataracts.
Skin: Causes mild skin irritation. May be absorbed through the skin in harmful amounts. Incidence of skin hypersensitivity is not widespread in the general population &, based on the long history of use of naphthalene as a consumer product, this effect is mostly confined to industrial exposure where coal tar contamination may be present.
Ingestion: Harmful if swallowed. May cause liver and kidney damage. May cause methemoglobinemia, cyanosis (bluish discoloration of skin due to deficient oxygenation of the blood), convulsions, and death. May cause severe digestive tract irritation with abdominal pain, nausea, vomiting and diarrhea. Ingestion of large quantities may cause severe hemolytic anemia and hemoglobinuria.
Inhalation: Harmful if inhaled. Causes respiratory tract irritation. Readily absorbed when inhaled. Material volatilizes at room temperature. Hemolytic anemia (destruction of red blood cells) is the primary health concern for humans exposed to naphthalene for either short or long periods of time. Other effects may include nausea, profuse perspiration , vomiting, kidney damage and liver damage. Optic neuritis (inflammation of the optic nerve) has been observed. Cataracts have also occurred .

Chronic: Prolonged or repeated skin contact may cause dermatitis. May cause liver and kidney damage. May cause anemia and other blood cell abnormalities. Animal studies have reported that fetal effects/abnormalities may occur when maternal toxicity is seen. Effects may be delayed. Chronic exposure may cause lung damage. Laboratory experiments have resulted in mutagenic effects. Chronic exposure may cause corneal injury, optical neuritis, blurred vision, and possible cataract formation. Chronic inhalation, skin absorption or ingestion of naphthalene have caused severe hemolytic anemia.

Section 4 - First Aid Measures

Eyes: In case of contact, immediately flush eyes with plenty of water for at least 15 minutes. Get medical aid.
Skin: In case of contact, flush skin with plenty of water. Remove contaminated clothing and shoes. Get medical aid if irritation develops and persists. Wash clothing before reuse.
Ingestion: If swallowed, do not induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person. Get medical aid.
Inhalation: If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical aid.
Notes to Physician: Individuals with a glucose-6-phosphate dehyrogenase deficiency are hypersensitive to the effects of naphthalene.

Section 5 - Fire Fighting Measures

General Information: As in any fire, wear a self-contained breathing apparatus in pressure-demand, MSHA/NIOSH (approved or equivalent), and full protective gear. Water runoff can cause environmental damage. Dike and collect water used to fight fire. During a fire, irritating and highly toxic gases may be generated by thermal decomposition or combustion. Use water spray to keep fire-exposed containers cool. Flammable solid. Dusts may be an explosion hazard if mixed with air at critical proportions and in the prescence of an ignition source. Volatile solid that gives off flammable vapors when heated.
Extinguishing Media: Water or foam may cause frothing. Use water spray, dry chemical, carbon dioxide, or appropriate foam.
Flash Point: 78 deg C (172.40 deg F)
Autoignition Temperature: 526 deg C (978.80 deg F)
Explosion Limits, Lower:0.90 vol %
Upper: 5.90 vol %
NFPA Rating: (estimated) Health: 2; Flammability: 2; Instability: 0

Section 6 - Accidental Release Measures

General Information: Use proper personal protective equipment as indicated in Section 8.
Spills/Leaks: Avoid runoff into storm sewers and ditches which lead to waterways. Clean up spills immediately, observing precautions in the Protective Equipment section. Scoop up with a nonsparking tool, then place into a suitable container for disposal. Avoid generating dusty conditions. Remove all sources of ignition. Provide ventilation. Do not let this chemical enter the environment.

Section 7 - Handling and Storage

Handling: Wash thoroughly after handling. Remove contaminated clothing and wash before reuse. Minimize dust generation and accumulation. Avoid breathing dust, vapor, mist, or gas. Avoid contact with eyes, skin, and clothing. Keep container tightly closed. Use only with adequate ventilation.
Storage: Keep away from sources of ignition. Store in a tightly closed container. Store in a cool, dry, well-ventilated area away from incompatible substances. Storage under a nitrogen blanket has been recommended. Store protected from moisture. Separate from oxidizing materials.

Section 8 - Exposure Controls, Personal Protection

Engineering Controls: Use explosion-proof ventilation equipment. Facilities storing or utilizing this material should be equipped with an eyewash facility and a safety shower. Use adequate general or local exhaust ventilation to keep airborne concentrations below the permissible exposure limits.

Exposure Limits

Chemical Name	ACGIH	NIOSH	OSHA - Final PELs
Naphthalene	10 ppm TWA; 15 ppm STEL; skin - potential for cutaneous absorption	10 ppm TWA; 50 mg/m3 TWA 250 ppm IDLH	10 ppm TWA; 50 mg/m3 TWA

OSHA Vacated PELs: Naphthalene: 10 ppm TWA; 50 mg/m3 TWA

Personal Protective Equipment

Eyes: Wear chemical goggles.

Skin: Wear appropriate protective gloves to prevent skin exposure.

Clothing: Wear appropriate protective clothing to prevent skin exposure.

Respirators: A respiratory protection program that meets OSHA's 29 CFR 1910.134 and ANSI Z88.2 requirements or European Standard EN 149 must be followed whenever workplace conditions warrant a respirator's use.

Section 9 - Physical and Chemical Properties

Physical State: Solid

Appearance: white

Odor: Distinctive mothball-like.

pH: Not available.

Vapor Pressure: 0.05 mm Hg @ 20 deg C

Vapor Density: 4.4 (air=1)

Evaporation Rate:<1.0 (butyl acetate=1)

Viscosity: Not available.

Boiling Point: 218 deg C

Freezing/Melting Point:79 - 82 deg C

Decomposition Temperature:540 deg C

Solubility: Insoluble.

Specific Gravity/Density:0.9900g/cm3

Molecular Formula:$C_{10}H_8$

Molecular Weight:128.17

Section 10 - Stability and Reactivity

Chemical Stability: Stable at room temperature in closed containers under normal storage and handling conditions.

Conditions to Avoid: Ignition sources, dust generation, moisture, excess heat, exposure to moist air or water, steam.

Incompatibilities with Other Materials: Strong oxidizing agents.

Hazardous Decomposition Products: Carbon monoxide, irritating and toxic fumes and gases, carbon dioxide.

Hazardous Polymerization: Will not occur.

Section 11 - Toxicological Information

RTECS#:

CAS# 91-20-3: QJ0525000
LD50/LC50:
CAS# 91-20-3:
Draize test, rabbit, eye: 100 mg Mild;
Inhalation, rat: LC50 = >340 mg/m3/1H;
Oral, mouse: LD50 = 316 mg/kg;
Oral, rat: LD50 = 490 mg/kg;
Skin, rabbit: LD50 = >20 gm/kg;
Skin, rat: LD50 = >2500 mg/kg;
Carcinogenicity:
CAS# 91-20-3:
California: carcinogen, initial date 4/19/02
IARC: Group 2B carcinogen
Epidemiology: Incidents in which blankets or clothing containing naphthalene caused acute hemolysis in infants, in some cases fatal, have been described. The percutaneous absorption and systemic intoxication with naphthalene can be facilitated by oily vehicles.
Teratogenicity: Naphthalene and its metabolites have been reported to cross the human placenta in amounts sufficient to cause fetal toxicity. Oral, rat: TDLo = 4500 mg/kg (female 6-15 day(s) after conception) Effects on Embryo or Fetus - fetotoxicity (except death, e.g., stunted fetus) and Specific Developmental Abnormalities - other developmental abnormalities.; Intraperitoneal, rat: TDLo = 5925 mg/kg (female 1-15 day(s) after conception) Specific Developmental Abnormalities - musculoskeletal system and cardiovascular (circulatory) system.
Reproductive Effects: No information available.
Neurotoxicity: No information available.
Mutagenicity: Micronucleus Test: Human, Lymphocyte = 30 mg/L.; Cytogenetic Analysis: Hamster, Ovary = 30 mg/L.; Sister Chromatid Exchange: Hamster, Ovary = 15 mg/L.
Other Studies: Standard Draize Test: Administration onto the skin (rabbit) = 495 mg (Mild).; Standard Draize Test: Administration into the eye (rabbit) = 100 mg (Mild).

Section 12 - Ecological Information

Ecotoxicity: Fish: Rainbow trout: LC50 = 1.60 mg/L; 96 Hr; Flow-through at 15 CFish: Fathead Minnow: LC50 = 6.14 mg/L; 96 Hr; Flow-through at 24.5 CWater flea Daphnia: EC50 = 2.16-8.60 mg/L; 48 Hr; UnspecifiedBacteria: Phytobacterium phosphoreum: EC50 = 0.93 mg/L; 30 min; Microtox testFish: Pink salmon: LC50 = 1.24 mg/L; 96 Hr; (fry) Static bioassay at 12°C Releases into water are lost due to volatilization, photolysis, adsorption, and biodegradation. The principal loss processes will depend on local conditions but half-lives can be expected to range from a couple of days to a few months. When adsorbed to sediment, biodegradation occurs much more rapidly than in the overlying water column. When spilled on land, naphthalene is adsorbed moderately to soil and undergoes biodegradation. However, in some cases it will appear in the groundwater where biodegradation still may occur if conditions are aerobic.
Environmental: Bioconcentration occurs to a moderate extent but since depuration and metabolism readily proceed in aquatic organisms, this is a short term problem. transport and disposal of fuel oil, coal tar, etc. In the atmosphere, naphthalene rapidly photodegrades (half-life 3-8 hr). Naphthalene shows low biological oxygen demand and is expected to cause little O2 depletion in aquatic systems.
Physical: Log P (oct) = 3.01 - 3.59
Other: Harmful to aquatic life in very low concentrations.

Section 13 - Disposal Considerations

Chemical waste generators must determine whether a discarded chemical is classified as a hazardous waste. US EPA guidelines for the classification determination are listed in 40 CFR Parts 261.3. Additionally, waste generators must consult state and local hazardous waste regulations to ensure complete and accurate classification.
RCRA P-Series: None listed.
RCRA U-Series: CAS# 91-20-3: waste number U165.

Section 14 - Transport Information

	US DOT	IATA	RID/ADR	IMO	Canada TDG
Shipping Name:	NAPHTHALENE, CRUDE				NAPHTHALENE
Hazard Class:	4.1				4.1
UN Number:	UN1334				UN1334
Packing Group:	III				III

Section 15 - Regulatory Information

US FEDERAL

TSCA
CAS# 91-20-3 is listed on the TSCA inventory.
Health & Safety Reporting List
CAS# 91-20-3: Effective 6/1/87; Sunset 6/1/97
Chemical Test Rules
None of the chemicals in this product are under a Chemical Test Rule.
Section 12b
None of the chemicals are listed under TSCA Section 12b.
TSCA Significant New Use Rule
None of the chemicals in this material have a SNUR under TSCA.
SARA

CERCLA Hazardous Substances and corresponding RQs
CAS# 91-20-3: 100 lb final RQ; 45.4 kg final RQ
SARA Section 302 Extremely Hazardous Substances
None of the chemicals in this product have a TPQ.
SARA Codes
CAS # 91-20-3: acute, chronic, flammable.
Section 313
This material contains Naphthalene (CAS# 91-20-3, 98%),which is subject to the reporting requirements of Section 313 of SARA Title III and 40 CFR Part 373.
Clean Air Act:
CAS# 91-20-3 is listed as a hazardous air pollutant (HAP). This material does not contain any Class 1 Ozone depletors. This material does not contain any Class 2 Ozone depletors.
Clean Water Act:
CAS# 91-20-3 is listed as a Hazardous Substance under the CWA. CAS# 91-20-3 is listed as a Priority Pollutant under the Clean Water Act. CAS# 91-20-3 is listed as a Toxic Pollutant under the Clean Water Act.
OSHA:
None of the chemicals in this product are considered highly hazardous by OSHA.
STATE
CAS# 91-20-3 can be found on the following state right to know lists: California, New Jersey, Pennsylvania, Minnesota, Massachusetts.
The following statement(s) is(are) made in order to comply with the California Safe Drinking Water Act: WARNING: This product contains Naphthalene, a chemical known to the state of California to cause cancer. California No Significant Risk Level: None of the chemicals in this product are listed.

European/International Regulations

European Labeling in Accordance with EC Directives
Hazard Symbols:
XN N
Risk Phrases:
R 22 Harmful if swallowed.
R 50/53 Very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.

Safety Phrases:

S 36/37 Wear suitable protective clothing and gloves.
S 60 This material and its container must be disposed of as hazardous waste.
S 61 Avoid release to the environment. Refer to special instructions/safety data sheets.

WGK (Water Danger/Protection)
CAS# 91-20-3: 2
Canada - DSL/NDSL
CAS# 91-20-3 is listed on Canada's DSL List.
Canada - WHMIS
This product does not have a WHMIS classification.
Canadian Ingredient Disclosure List
CAS# 91-20-3 is listed on the Canadian Ingredient Disclosure List.
Exposure Limits
CAS# 91-20-3: OEL-ARAB Republic of Egypt:TWA 10 ppm (50 mg/m3) OEL-AUSTRALIA:TWA 10 ppm (50 mg/m3);STEL 15 ppm (75 mg/m3) OEL-BELGIUM:TWA 10 ppm (52 mg/m3);STEL 15 ppm (79 mg/m3) OEL-DENMARK:TWA 10 ppm (50 mg/m3) OEL-FINLAND:TWA 10 ppm (50 mg/m3);STEL 20 ppm (10 mg/m3) OEL-FRANCE:TWA 10 ppm (50 mg/m3) OEL-GERMANY:TWA 10 ppm (50 mg/m3) OEL-HUNGARY:TWA 40 mg/m3;STEL 80 mg/m3;Skin OEL-THE NETHERLANDS:TWA 10 ppm (50 mg/m3) OEL-THE PHILIPPINES:TWA 10 ppm (50 mg/m3) OEL-POLAND:TWA 20 mg/m3 OEL-RUSSIA:STEL 20 mg/m3 OEL-SWITZERLAND:TWA 10 ppm (50 mg/m3) OEL-UNITED KINGDOM:TWA 10 ppm (50 mg/m3);STEL 15 ppm (75 mg/m3) OEL IN BULGARIA, COLOMBIA, JORDAN, KOREA check ACGIH TLV OEL IN NEW ZEALAND, SINGAPORE, VIETNAM check ACGI TLV

Section 16 - Additional Information

MSDS Creation Date: 5/14/1999
Revision #6 Date: 2/06/2004

```
LONE STAR INDUSTRIES INC -- PORTLAND CEMENT -- 5610-00-242-3792
=========================================================
MSDS Safety Information
=========================================================
FSC: 5610
NIIN: 00-242-3792
MSDS Date: 08/10/1994
MSDS Num: CHKFN
Tech Review: 07/01/1998
Product ID: PORTLAND CEMENT
Responsible Party
Cage: LONES
Name: LONE STAR INDUSTRIES INC
Address: 8902 VINCENNES CIRCLE SUITE A
Box: 681250
City: INDIANAPOLIS IN 46268-1250 US
Info Phone Number: 800-782-7236
Emergency Phone Number: 317-653-6766
Review Ind: N
=========================================================
Contractor Summary
=========================================================
Cage: LONES
Name: LONE STAR INDUSTRIES INC
Box: 681250
City: INDIANAPOLIS IN 46268-1250 US
Phone: 713-875-5005
Cage: LSTAR
Name: LONE STAR INDUSTRIES INC
Box: UNKNOW
City: UNKNOWN NK 00000
Country: NK
=========================================================
Item Description Information
=========================================================
Item Manager: GSA
Item Name: CEMENT,PORTLAND
Specification Number: NK
Type/Grade/Class: NK
Unit of Issue: BG
Quantitative Expression: 00000000094LB
UI Container Qty: 0
=========================================================
Ingredients
=========================================================
Cas: 12168-85-3
Name: TRICALCIUM SILICATE; (3CAO.SIO*2)
OSHA PEL: N/K (FP N)
ACGIH TLV: N/K (FP N)
Ozone Depleting Chemical: N
------------------------------
Cas: 10034-77-2
Name: DICALCIUM SILICATE; (2CAO.SIO*2)
OSHA PEL: N/K (FP N)
ACGIH TLV: N/K (FP N)
Ozone Depleting Chemical: N
------------------------------
Cas: 12042-78-3
Name: TRICALCIUM ALUMINATE; (3CAO.AL*2O*3)
OSHA PEL: N/K (FP N)
ACGIH TLV: N/K (FP N)
Ozone Depleting Chemical: N
------------------------------
Cas: 12068-35-8
Name: TETRACALCIUM ALUMINOFERRATE; (CALCIUM ALUMINOFERRITE, A SOLID
  SOLUTION)
```

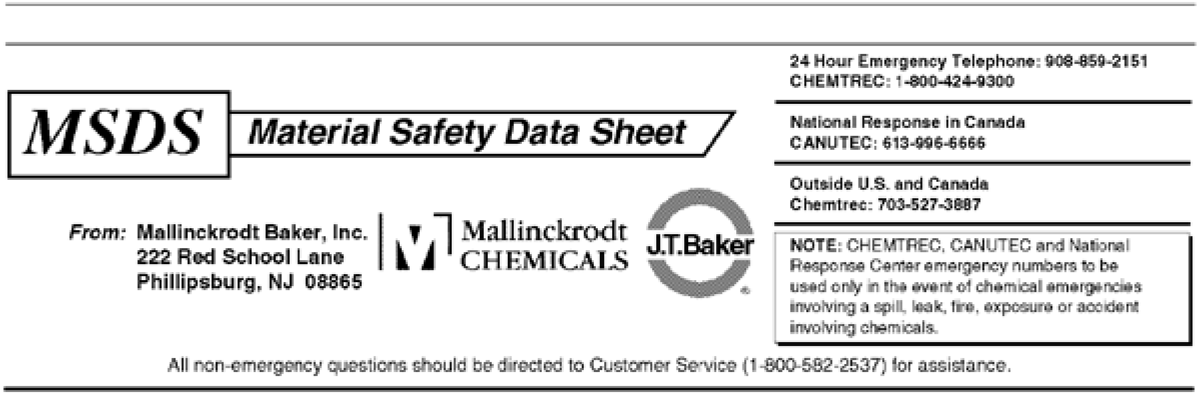
```
OSHA PEL: N/K (FP N)
ACGIH TLV: N/K (FP N)
Ozone Depleting Chemical: N
------------------------------
Cas: 13397-24-5
RTECS #: MG2360000
Name: GYPSUM; (CASO*4-2H*2O)
OSHA PEL: N/K (FP N)
ACGIH TLV: N/K (FP N)
Ozone Depleting Chemical: N
------------------------------
Name: HYDRATED LIME
OSHA PEL: N/K (FP N)
ACGIH TLV: N/K (FP N)
-----------------------------
Cas: 1305-78-8
RTECS #: EW3100000
Name: CALCIUM OXIDE; (CAO)
OSHA PEL: 5 MG/M3
ACGIH TLV: 2 MG/M3
Ozone Depleting Chemical: N
------------------------------
Cas: 1309-48-4
RTECS #: OM3850000
Name: MAGNESIUM OXIDE; (MGO)
OSHA PEL: 15 MG/M3 PARTICULATE
ACGIH TLV: 10 MG/M3 FUME
Ozone Depleting Chemical: N
------------------------------
Cas: 7757-82-6
RTECS #: WE1650000
Name: SODIUM SULFATE; (NA*2SO*4)
OSHA PEL: N/K (FP N)
ACGIH TLV: N/K (FP N)
Ozone Depleting Chemical: N
------------------------------
Cas: 7778-80-5
RTECS #: TT5900000
Name: POTASSIUM SULFATE; (K*2SO*4)
OSHA PEL: N/K (FP N)
ACGIH TLV: N/K (FP N)
Ozone Depleting Chemical: N
------------------------------
Name: PORTLAND CEMENT MAY CONTAIN INGREDIENT 12 - 14.
OSHA PEL: N/K (FP N)
ACGIH TLV: N/K (FP N)
-----------------------------
Name: INSOLUBLE MATTER; (INSOLUBLE RESIDUE)
% by Wt: 0.75
OSHA PEL: N/K (FP N)
ACGIH TLV: N/K (FP N)
-----------------------------
Cas: 60676-86-0
RTECS #: VV7328000
Name: SILICA, CRYSTALLINE-FUSED; (FREE CRYSTALLINE SILICA)
% by Wt: 0.1
OSHA PEL: N/K (FP N)
ACGIH TLV: N/K (FP N)
Ozone Depleting Chemical: N
------------------------------
Cas: 7440-47-3
RTECS #: GB4200000
Name: CHROMIUM (SARA 313) (CERCLA)
% by Wt: TRACE
OSHA PEL: 1 MG/M3
ACGIH TLV: 0.5 MG/M3
```

```
EPA Rpt Qty: 1 LB
DOT Rpt Qty: 1 LB
Ozone Depleting Chemical: N
=======================================================
Health Hazards Data
=======================================================
LD50 LC50 Mixture: NONE SPECIFIED BY MANUFACTURER.
Route Of Entry Inds - Inhalation: YES
Skin: YES
Ingestion: YES
Carcinogenicity Inds - NTP: NO
IARC: YES
OSHA: NO
Effects of Exposure: ACUTE:WET PORTLAND CEMENT LIME BLEND, ESPECIALLY AS
  INGREDIENT IN PLASTIC (UNHARDENED) CONCRETE, MORTAR OR SLURRIES, CAN DRY
  SKIN AND CAUSE SEVERE ALKALI BURNS. PORTLAND/LIME DUST CAN IRRITATE EYES
  AN D UPPER RESPIRATORY SYSTEM. CHRONIC:PORTLAND CEMENT LIME BLEND DUST
  CAN CAUSE INFLAMMATION OF LINING (EFTS OF OVEREXP)
Explanation Of Carcinogenicity: CRYSTALLINE SILICA-FUSED:IARC MONOGRAPHS,
  SUPPLEMENT, VOL 7, PG 341, 1987:GROUP 2A.
Signs And Symptions Of Overexposure: HLTH HAZ:TISSUE OF INTERIOR OF NOSE
  AND INFLAMMATION OF CORNEA. INDIVIDUALS WHO ARE ALLERGIC TO CHROMIUM MAY
  DEVELOP AN ALLERGIC DERMATITIS. FREE CRYSTALLINE SILICA CAN CAUSE
  CANCER. EXPOSURE TO PORTL AND/LIME CEMENT CAN AFFECT THE SKIN, EYES AND
  MUCOUS MEMBRANES.
Medical Cond Aggravated By Exposure: NONE SPECIFIED BY MANUFACTURER.
First Aid: INGEST:CALL MD IMMEDIATELY (FP N). INHAL:REMOVE TO FRESH AIR.
  SUPPORT BREATHING (GIVE O*2/ARTF RESP) (FP N). EYES:IRRIGATE (FLOOD)
  IMMEDIATELY & REPEATEDLY W/CLEAN WATER FOR AT LEAST 15 MINUTES. GET P
  ROMPT MEDICAL ATTENTION. SKIN:WASH EXPOSED AREAS W/SOAP & WATER. APPLY
  STERILE DRESSINGS. GET PROMPT MEDICAL ATTENTION.
=======================================================
Handling and Disposal
=======================================================
Spill Release Procedures: IF PORTLAND CEMENT LIME BLEND IS SPILLED, IT CAN
  BE CLEANED UP USING DRY METHODS THAT DO NOT DISPERSE DUST INTO THE AIR.
  AVOID BREATHING DUST. EMERGENCY PROCEDURES ARE NOT REQUIRED.
Neutralizing Agent: NONE SPECIFIED BY MANUFACTURER.
Waste Disposal Methods: DISPOSAL MUST BE I/A/W FEDERAL, STATE & LOCAL
  REGULATIONS (FP N). PORTLAND CEMENT LIME BLEND CAN BE TREATED AS A
  COMMON WASTE FOR DISPOSAL, OR RETURNED TO CONTAINER FOR LATER USE IF IT
  IS NOT CONTAMIN ATED OR WET.
Handling And Storage Precautions: NONE SPECIFIED BY MANUFACTURER.
Other Precautions: NONE SPECIFIED BY MANUFACTURER.
=======================================================
Fire and Explosion Hazard Information
=======================================================
Extinguishing Media: MEDIA SUITABLE FOR SURROUNDING FIRE (FP N).
Fire Fighting Procedures: USE NIOSH APPROVED SCBA & FULL PROTECTIVE
  EQUIPMENT (FP N).
Unusual Fire/Explosion Hazard: PORTLAND CEMENT LIME BLEND IS
  NON-COMBUSTIBLE & NOT EXPLOSIVE. THEREFORE THERE ARE NO FLAMMABLE OR
  EXPLOSIVE LIMITS NOR UNUSUAL FIRE & EXPLOSION HAZARDS.
=======================================================
Control Measures
=======================================================
Respiratory Protection: IN DUSTY ENVIRONMENTS, THE USE OF A NIOSH APPROVED
  RESPIRATOR IS RECOMMENDED.
Ventilation: LOCAL EXHAUST CAN BE USED, IF NECESSARY, TO CONTROL AIRBORNE
  DUST LEVELS.
Protective Gloves: IMPERVIOUS GLOVES.
Eye Protection: ANSI APPROVED CHEM WORKERS GOGGS (FP N).
Other Protective Equipment: ANSI APPROVED EYE WASH FOUNTAIN & DELUGE
  SHOWER (FP N). USE OF BARRIER CREAMS, BOOTS & CLTHG TO PROT SKIN FROM
  (SUPDAT)
Work Hygienic Practices: FOLLOWING WORK W/PORTLAND CEMENT LIME BLEND,
```

```
  WORKERS SHOULD SHOWER W/SOAP & WATER.
Supplemental Safety and Health: MATLS TO AVOID:REACT IN WET MORTAR OR
  CONCRETE, LIBERATING HYDROGEN GAS. OTHER PROT EQUIP:CONTACT W/WET
  PORTLAND CEMENT IS RECOMMENDED.
=======================================================
Physical/Chemical Properties
=======================================================
Spec Gravity: 2.98-3.05
Solubility in Water: SLIGHT (0.1-1%)
Appearance and Odor: GRAY COLORED POWDER W/NO ODOR.
=======================================================
Reactivity Data
=======================================================
Stability Indicator: YES
Stability Condition To Avoid: KEEP PORTLAND CEMENT LIME BLEND DRY UNTIL
  USED TO PRESERVE PRODUCT UTILITY.
Materials To Avoid: PORTLAND CEMENT LIME BLEND IS INCOMPAT W/ALUMINUM
  POWDER & OTHER ALKALI & ALKALINE EARTH ELEMENTS WHICH CAN (SUPP DATA)
Hazardous Decomposition Products: HYDROGEN GAS.
Hazardous Polymerization Indicator: NO
Conditions To Avoid Polymerization: NOT RELEVANT
=======================================================
Toxicological Information
=======================================================
=======================================================
Ecological Information
=======================================================
=======================================================
MSDS Transport Information
=======================================================
=======================================================
Regulatory Information
=======================================================
=======================================================
Other Information
=======================================================
=======================================================
Transportation Information
=======================================================
Responsible Party Cage: LONES
Trans ID NO: 59906
Product ID: PORTLAND CEMENT
MSDS Prepared Date: 08/10/1994
Review Date: 10/19/1998
Article W/O MSDS: N
Multiple KIT Number: 0
Unit Of Issue: BG
Container QTY: 0
=======================================================
Detail DOT Information
=======================================================
DOT Proper Shipping Name: NOT REGULATED BY THIS MODE OF TRANSPORTATION
=======================================================
Detail IMO Information
=======================================================
IMO Proper Shipping Name: NOT REGULATED FOR THIS MODE OF TRANSPORTATION
=======================================================
Detail IATA Information
=======================================================
IATA Proper Shipping Name: NOT REGULATED BY THIS MODE OF TRANSPORTATION
=======================================================
Detail AFI Information
=======================================================
AFI Proper Shipping Name: NOT REGULATED BY THIS MODE OF TRANSPORTATION
=======================================================
HAZCOM Label
```

Product ID: PORTLAND CEMENT
Cage: LONES
Company Name: LONE STAR INDUSTRIES INC
PO Box: 681250
City: INDIANAPOLIS IN
Zipcode: 46268-1250 US
Health Emergency Phone: 317-653-6766
Date Of Label Review: 07/01/1998
Label Date: 07/01/1998
Chronic Hazard IND: Y
Eye Protection IND: YES
Skin Protection IND: YES
Signal Word: WARNING
Respiratory Protection IND: YES
Health Hazard: Moderate
Contact Hazard: Moderate
Fire Hazard: None
Reactivity Hazard: None
Hazard And Precautions: ACUTE:WET PORTLAND CEMENT LIME BLEND, ESPECIALLY AS INGREDIENT IN PLASTIC (UNHARDENED) CONCRETE, MORTAR OR SLURRIES, CAN DRY SKIN AND CAUSE SEVERE ALKALI BURNS. PORTLAND/LIME DUST CAN IRRITATE EYES AN D UPPER RESPIRATORY SYSTEM. CHRONIC:CANCER HAZARD. CONTAINS CRYSTALLINE SILICA WHICH IS LISTED AS AN ANIMAL LUNG CARCINOGEN (FP N). PORTLAND CEMENT LIME BLEND DUST CAN CAUSE INFLAMMATION OF LINING TIS SUE OF INTERIOR OF NOSE AND INFLAMMATION OF CORNEA. MAY CAUSE ALLERGIC DERMATITIS.

MSDS Number: **T3913** * * * * * *Effective Date:* ***10/05/06*** * * * * * *Supercedes:* ***08/03/04***



MSDS *Material Safety Data Sheet*

From: Mallinckrodt Baker, Inc.
222 Red School Lane
Phillipsburg, NJ 08865

Mallinckrodt CHEMICALS J.T.Baker

24 Hour Emergency Telephone: 908-859-2151
CHEMTREC: 1-800-424-9300

National Response in Canada
CANUTEC: 613-996-6666

Outside U.S. and Canada
Chemtrec: 703-527-3887

NOTE: CHEMTREC, CANUTEC and National Response Center emergency numbers to be used only in the event of chemical emergencies involving a spill, leak, fire, exposure or accident involving chemicals.

All non-emergency questions should be directed to Customer Service (1-800-582-2537) for assistance.

TOLUENE

1. Product Identification

Synonyms: Methylbenzene; Toluol; Phenylmethane
CAS No.: 108-88-3
Molecular Weight: 92.14
Chemical Formula: C6H5-CH3
Product Codes:
J.T. Baker: 5375, 5812, 9336, 9351, 9364, 9456, 9457, 9459, 9460, 9462, 9466, 9472, 9476
Mallinckrodt: 4483, 8092, 8604, 8608, 8610, 8611, V560

2. Composition/Information on Ingredients

Ingredient	CAS No	Percent	Hazardous
Toluene	108-88-3	100%	Yes

3. Hazards Identification

Emergency Overview

POISON! DANGER! HARMFUL OR FATAL IF SWALLOWED. HARMFUL IF INHALED OR ABSORBED THROUGH SKIN. VAPOR HARMFUL. FLAMMABLE LIQUID AND VAPOR. MAY AFFECT LIVER, KIDNEYS, BLOOD SYSTEM, OR CENTRAL NERVOUS SYSTEM. CAUSES IRRITATION TO SKIN, EYES AND RESPIRATORY TRACT.

SAF-T-DATA$^{(tm)}$ Ratings (Provided here for your convenience)

Health Rating: 2 - Moderate (Life)
Flammability Rating: 3 - Severe (Flammable)
Reactivity Rating: 1 - Slight
Contact Rating: 3 - Severe (Life)
Lab Protective Equip: GOGGLES & SHIELD; LAB COAT & APRON; VENT HOOD; PROPER GLOVES; CLASS B EXTINGUISHER
Storage Color Code: Red (Flammable)

Potential Health Effects

Inhalation:
Inhalation may cause irritation of the upper respiratory tract. Symptoms of overexposure may include fatigue, confusion, headache, dizziness and drowsiness. Peculiar skin sensations (e. g. pins and needles) or numbness may be produced. Very high concentrations may cause unconsciousness and death.
Ingestion:
Swallowing may cause abdominal spasms and other symptoms that parallel over-exposure from inhalation. Aspiration of material into the lungs can cause chemical pneumonitis, which may be fatal.
Skin Contact:
Causes irritation. May be absorbed through skin.
Eye Contact:
Causes severe eye irritation with redness and pain.
Chronic Exposure:
Reports of chronic poisoning describe anemia, decreased blood cell count and bone marrow hypoplasia. Liver and kidney damage may occur. Repeated or prolonged contact has a defatting action, causing drying, redness, dermatitis. Exposure to toluene may affect the developing fetus.
Aggravation of Pre-existing Conditions:
Persons with pre-existing skin disorders or impaired liver or kidney function may be more susceptible to the effects of this substance. Alcoholic beverage consumption can enhance the toxic effects of this substance.

---

4. First Aid Measures

Inhalation:
If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing

is difficult, give oxygen. CALL A PHYSICIAN IMMEDIATELY.

Ingestion:

Aspiration hazard. If swallowed, DO NOT INDUCE VOMITING. Give large quantities of water. Never give anything by mouth to an unconscious person. Get medical attention immediately. If vomiting occurs, keep head below hips to prevent aspiration into lungs.

Skin Contact:

In case of contact, immediately flush skin with plenty of soap and water for at least 15 minutes while removing contaminated clothing and shoes. Wash clothing before reuse. Call a physician immediately.

Eye Contact:

Immediately flush eyes with plenty of water for at least 15 minutes, lifting lower and upper eyelids occasionally. Get medical attention immediately.

---

5. Fire Fighting Measures

Fire:

Flash point: 7C (45F) CC
Autoignition temperature: 422C (792F)
Flammable limits in air % by volume:
lel: 1.1; uel: 7.1
Flammable liquid and vapor!
Dangerous fire hazard when exposed to heat or flame. Vapors can flow along surfaces to distant ignition source and flash back.

Explosion:

Above flash point, vapor-air mixtures are explosive within flammable limits noted above. Contact with strong oxidizers may cause fire or explosion. Sensitive to static discharge.

Fire Extinguishing Media:

Dry chemical, foam or carbon dioxide. Water may be used to flush spills away from exposures and to dilute spills to non-flammable mixtures.

Special Information:

In the event of a fire, wear full protective clothing and NIOSH-approved self-contained breathing apparatus with full facepiece operated in the pressure demand or other positive pressure mode. Water spray may be used to keep fire exposed containers cool.

---

6. Accidental Release Measures

Ventilate area of leak or spill. Remove all sources of ignition. Wear appropriate personal protective equipment as specified in Section 8. Isolate hazard area. Keep unnecessary and unprotected personnel from entering. Contain and recover liquid when possible. Use non-sparking tools and equipment. Collect liquid in an appropriate container or absorb with an inert material (e. g., vermiculite, dry sand, earth), and place in a chemical waste container. Do not use combustible materials, such as saw dust. Do not flush to sewer! If a leak or spill has not ignited, use water spray to disperse the vapors, to protect personnel attempting to stop leak, and to flush spills away from exposures. US Regulations (CERCLA) require reporting spills and releases to soil, water and air in excess of reportable quantities. The toll free number for the US Coast Guard National Response Center is (800) 424-8802.

J. T. Baker SOLUSORB® solvent adsorbent is recommended for spills of this product.

---

7. Handling and Storage

Protect against physical damage. Store in a cool, dry well-ventilated location, away from any area where the fire hazard may be acute. Outside or detached storage is preferred. Separate from incompatibles. Containers should be bonded and grounded for transfers to avoid static sparks. Storage and use areas should be No Smoking areas. Use non-sparking type tools and equipment, including explosion proof ventilation. Containers of this material may be hazardous when empty since they retain product residues (vapors, liquid); observe all warnings and precautions listed for the product.

---

8. Exposure Controls/Personal Protection

Airborne Exposure Limits:
Toluene:
- OSHA Permissible Exposure Limit (PEL):
200 ppm (TWA); 300 ppm (acceptable ceiling conc.); 500 ppm (maximum conc.).
- ACGIH Threshold Limit Value (TLV):
50 ppm (TWA) skin, A4 - Not Classifiable as a Human Carcinogen.

Ventilation System:
A system of local and/or general exhaust is recommended to keep employee exposures below the Airborne Exposure Limits. Local exhaust ventilation is generally preferred because it can control the emissions of the contaminant at its source, preventing dispersion of it into the general work area. Please refer to the ACGIH document, *Industrial Ventilation, A Manual of Recommended Practices*, most recent edition, for details.

Personal Respirators (NIOSH Approved):
If the exposure limit is exceeded and engineering controls are not feasible, a half-face organic vapor respirator may be worn for up to ten times the exposure limit, or the maximum use concentration specified by the appropriate regulatory agency or respirator supplier, whichever is lowest. A full-face piece organic vapor respirator may be worn up to 50 times the exposure limit, or the maximum use concentration specified by the appropriate regulatory agency or respirator supplier, whichever is lowest. For emergencies or instances where the exposure levels are not known, use a full-face piece positive-pressure, air-supplied respirator. WARNING: Air-

purifying respirators do not protect workers in oxygen-deficient atmospheres.
Skin Protection:
Wear impervious protective clothing, including boots, gloves, lab coat, apron or coveralls, as appropriate, to prevent skin contact.
Eye Protection:
Use chemical safety goggles and/or a full face shield where splashing is possible. Maintain eye wash fountain and quick-drench facilities in work area.

---

9. Physical and Chemical Properties

Appearance:
Clear, colorless liquid.
Odor:
Aromatic benzene-like.
Solubility:
0.05 gm/100gm water @ 20C (68F).
Specific Gravity:
0.86 @ 20C / 4 C
pH:
No information found.
% Volatiles by volume @ 21C (70F):
100
Boiling Point:
111C (232F)
Melting Point:
-95C (-139F)
Vapor Density (Air=1):
3.14
Vapor Pressure (mm Hg):
22 @ 20C (68F)
Evaporation Rate (BuAc=1):
2.24

---

10. Stability and Reactivity

Stability:
Stable under ordinary conditions of use and storage. Containers may burst when heated.
Hazardous Decomposition Products:
Carbon dioxide and carbon monoxide may form when heated to decomposition.
Hazardous Polymerization:
Will not occur.
Incompatibilities:
Heat, flame, strong oxidizers, nitric and sulfuric acids, chlorine, nitrogen tetraoxide; will attack some forms of plastics, rubber, coatings.

Conditions to Avoid:
Heat, flames, ignition sources and incompatibles.

11. Toxicological Information

Toxicological Data:
Oral rat LD50: 636 mg/kg; skin rabbit LD50: 14100 uL/kg; inhalation rat LC50: 49 gm/m3/4H; Irritation data: skin rabbit, 500 mg, Moderate; eye rabbit, 2 mg/24H, Severe. Investigated as a tumorigen, mutagen, reproductive effector.
Reproductive Toxicity:
Has shown some evidence of reproductive effects in laboratory animals.

```
--------\Cancer Lists\---------------------------------------------------------
                                       ---NTP Carcinogen---
Ingredient                             Known    Anticipated    IARC Category
------------------------------------   -----    -----------    -------------
Toluene (108-88-3)                      No          No               3
```

12. Ecological Information

Environmental Fate:
When released into the soil, this material may evaporate to a moderate extent. When released into the soil, this material is expected to leach into groundwater. When released into the soil, this material may biodegrade to a moderate extent. When released into water, this material may evaporate to a moderate extent. When released into water, this material may biodegrade to a moderate extent. When released into the air, this material may be moderately degraded by reaction with photochemically produced hydroxyl radicals. When released into the air, this material is expected to have a half-life of less than 1 day. This material is not expected to significantly bioaccumulate. This material has a log octanol-water partition coefficient of less than 3.0. Bioconcentration factor = 13.2 (eels).
Environmental Toxicity:
This material is expected to be toxic to aquatic life. The LC50/96-hour values for fish are between 10 and 100 mg/l.

13. Disposal Considerations

Whatever cannot be saved for recovery or recycling should be handled as hazardous waste and sent to a RCRA approved incinerator or disposed in a RCRA approved waste facility. Processing, use or contamination of this product may change the waste management options. State and local disposal regulations may differ from federal disposal regulations. Dispose of container and unused contents in accordance with federal, state and local requirements.

14. Transport Information

Domestic (Land, D.O.T.)

Proper Shipping Name: TOLUENE
Hazard Class: 3
UN/NA: UN1294
Packing Group: II
Information reported for product/size: 390LB

International (Water, I.M.O.)

Proper Shipping Name: TOLUENE
Hazard Class: 3
UN/NA: UN1294
Packing Group: II
Information reported for product/size: 390LB

15. Regulatory Information

```
--------\Chemical Inventory Status - Part 1\---------------------------------
Ingredient                                       TSCA  EC   Japan  Australia
-----------------------------------------------  ----  ---  -----  ---------
Toluene (108-88-3)                                Yes  Yes   Yes      Yes

--------\Chemical Inventory Status - Part 2\---------------------------------
                                                        --Canada--
Ingredient                                       Korea  DSL   NDSL  Phil.
-----------------------------------------------  -----  ---   ----  -----
Toluene (108-88-3)                                Yes   Yes   No     Yes

--------\Federal, State & International Regulations - Part 1\----------------
                                           -SARA 302-    ------SARA 313------
Ingredient                                 RQ    TPQ     List  Chemical Catg.
-----------------------------------------  ---   -----   ----  --------------
Toluene (108-88-3)                         No    No      Yes        No

--------\Federal, State & International Regulations - Part 2\----------------
                                                     -RCRA-    -TSCA-
Ingredient                                 CERCLA     261.33     8(d)
-----------------------------------------  ------     ------    ------
Toluene (108-88-3)                         1000       U220       No
```

```
Chemical Weapons Convention:  No     TSCA 12(b):  No     CDTA:  Yes
SARA 311/312:  Acute: Yes      Chronic: Yes  Fire: Yes Pressure: No
Reactivity: No          (Pure / Liquid)
```

WARNING:
THIS PRODUCT CONTAINS A CHEMICAL(S) KNOWN TO THE STATE OF

CALIFORNIA TO CAUSE BIRTH DEFECTS OR OTHER REPRODUCTIVE HARM.

Australian Hazchem Code: 3[Y]E
Poison Schedule: S6
WHMIS:
This MSDS has been prepared according to the hazard criteria of the Controlled Products Regulations (CPR) and the MSDS contains all of the information required by the CPR.

---

16. Other Information

NFPA Ratings: Health: **2** Flammability: **3** Reactivity: **0**
Label Hazard Warning:
POISON! DANGER! HARMFUL OR FATAL IF SWALLOWED. HARMFUL IF INHALED OR ABSORBED THROUGH SKIN. VAPOR HARMFUL. FLAMMABLE LIQUID AND VAPOR. MAY AFFECT LIVER, KIDNEYS, BLOOD SYSTEM, OR CENTRAL NERVOUS SYSTEM. CAUSES IRRITATION TO SKIN, EYES AND RESPIRATORY TRACT.
Label Precautions:
Keep away from heat, sparks and flame.
Keep container closed.
Use only with adequate ventilation.
Wash thoroughly after handling.
Avoid breathing vapor.
Avoid contact with eyes, skin and clothing.
Label First Aid:
Aspiration hazard. If swallowed, DO NOT INDUCE VOMITING. Give large quantities of water. Never give anything by mouth to an unconscious person. If vomiting occurs, keep head below hips to prevent aspiration into lungs. If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. In case of contact, immediately flush eyes or skin with plenty of water for at least 15 minutes. Remove contaminated clothing and shoes. Wash clothing before reuse. In all cases call a physician immediately.
Product Use:
Laboratory Reagent.
Revision Information:
MSDS Section(s) changed since last revision of document include: 5.
Disclaimer:
****

Mallinckrodt Baker, Inc. provides the information contained herein in good faith but makes no representation as to its comprehensiveness or accuracy. This document is intended only as a guide to the appropriate precautionary handling of the material by a properly trained person using this product. Individuals receiving the information must exercise their independent judgment in determining its appropriateness for a particular purpose. MALLINCKRODT BAKER, INC. MAKES NO REPRESENTATIONS OR

WARRANTIES, EITHER EXPRESS OR IMPLIED, INCLUDING WITHOUT LIMITATION ANY WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE WITH RESPECT TO THE INFORMATION SET FORTH HEREIN OR THE PRODUCT TO WHICH THE INFORMATION REFERS. ACCORDINGLY, MALLINCKRODT BAKER, INC. WILL NOT BE RESPONSIBLE FOR DAMAGES RESULTING FROM USE OF OR RELIANCE UPON THIS INFORMATION.

****

Prepared by: Environmental Health & Safety
Phone Number: (314) 654-1600 (U.S.A.)

MSDS Number: **X2000** * * * * * *Effective Date:* ***02/16/06*** * * * * * *Supercedes:* ***04/01/03***

MSDS *Material Safety Data Sheet*

24 Hour Emergency Telephone: 908-859-2151
CHEMTREC: 1-800-424-9300

National Response in Canada
CANUTEC: 613-996-6666

Outside U.S. and Canada
Chemtrec: 703-527-3887

From: Mallinckrodt Baker, Inc.
222 Red School Lane
Phillipsburg, NJ 08865

Mallinckrodt CHEMICALS

J.T.Baker

NOTE: CHEMTREC, CANUTEC and National Response Center emergency numbers to be used only in the event of chemical emergencies involving a spill, leak, fire, exposure or accident involving chemicals.

All non-emergency questions should be directed to Customer Service (1-800-582-2537) for assistance.

XYLENES

1. Product Identification

Synonyms: Dimethyl benzene, xylol, methyltoluene
CAS No.: 1330-20-7
Molecular Weight: 106.17
Chemical Formula: $C_6H_4(CH_3)_2$
Product Codes:
J.T. Baker: 5377, 5813, 9483, 9489, 9490, 9493, 9494, 9499, 9516, X516
Mallinckrodt: 8664, 8668, 8671, 8672, 8802, V052

2. Composition/Information on Ingredients

Ingredient	CAS No	Percent	Hazardous
m-Xylene	108-38-3	40 - 65%	Yes
o-Xylene	95-47-6	15 - 20%	Yes
p-Xylene	106-42-3	< 20%	Yes
Ethyl Benzene	100-41-4	15 - 25%	Yes

3. Hazards Identification

Emergency Overview

DANGER! HARMFUL OR FATAL IF SWALLOWED. VAPOR HARMFUL. AFFECTS CENTRAL NERVOUS SYSTEM. CAUSES SEVERE EYE IRRITATION. CAUSES IRRITATION TO SKIN AND RESPIRATORY TRACT. MAY BE HARMFUL IF ABSORBED THROUGH SKIN. CHRONIC EXPOSURE CAN CAUSE ADVERSE LIVER, KIDNEY, AND BLOOD EFFECTS. FLAMMABLE LIQUID AND VAPOR.

SAF-T-DATA$^{(tm)}$ Ratings (Provided here for your convenience)

Health Rating: 2 - Moderate (Life)
Flammability Rating: 2 - Moderate
Reactivity Rating: 1 - Slight
Contact Rating: 3 - Severe
Lab Protective Equip: GOGGLES; LAB COAT; VENT HOOD; PROPER GLOVES; CLASS B EXTINGUISHER
Storage Color Code: Red (Flammable)

Potential Health Effects

Inhalation:
Inhalation of vapors may be irritating to the nose and throat. Inhalation of high concentrations may result in nausea, vomiting, headache, ringing in the ears, and severe breathing difficulties which may be delayed in onset. Substernal pain, cough, and hoarseness are also reported. High vapor concentrations are anesthetic and central nervous system depressants.

Ingestion:
Ingestion causes burning sensation in mouth and stomach, nausea, vomiting and salivation. Minute amounts aspirated into the lungs can produce a severe hemorrhagic pneumonitis with severe pulmonary injury or death.

Skin Contact:
Skin contact results in loss of natural oils and often results in a characteristic dermatitis. May be absorbed through the skin.

Eye Contact:
Vapors cause eye irritation. Splashes cause severe irritation, possible corneal burns and eye damage.

Chronic Exposure:
Chronic inhalation can cause headache, loss of appetite, nervousness and pale skin. Repeated or prolonged skin contact may cause a skin rash. Repeated exposure of the eyes to high concentrations of vapor may cause reversible eye damage. Repeated exposure can damage bone marrow, causing low blood cell count. May damage the liver and kidneys.

Aggravation of Pre-existing Conditions:
Persons with pre-existing skin disorders or eye problems, or impaired liver, kidney, blood, or respiratory function may be more susceptible to the effects of the substance.

---

4. First Aid Measures

Inhalation:
Remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Call a physician immediately.
Ingestion:
Aspiration hazard. If swallowed, vomiting may occur spontaneously, but DO NOT INDUCE. If vomiting occurs, keep head below hips to prevent aspiration into lungs. Never give anything by mouth to an unconscious person. Call a physician immediately.
Skin Contact:
Immediately flush skin with plenty of soap and water for at least 15 minutes while removing contaminated clothing and shoes. Get medical attention. Wash clothing before reuse. Thoroughly clean shoes before reuse.
Eye Contact:
Immediately flush eyes with plenty of water for at least 15 minutes, lifting lower and upper eyelids occasionally. Get medical attention immediately.

---

5. Fire Fighting Measures

Fire:
Flash point: 29C (84F) CC
Autoignition temperature: 464C (867F)
Flammable limits in air % by volume:
lel: 1.0; uel: 7.0
Explosion:
Above flash point, vapor-air mixtures are explosive within flammable limits noted above. Contact with strong oxidizers may cause fire. Sealed containers may rupture when heated. Sensitive to static discharge.
Fire Extinguishing Media:
Dry chemical, foam or carbon dioxide. Water spray may be used to keep fire exposed containers cool, dilute spills to nonflammable mixtures, protect personnel attempting to stop leak and disperse vapors.
Special Information:
In the event of a fire, wear full protective clothing and NIOSH-approved self-contained breathing apparatus with full facepiece operated in the pressure demand or other positive pressure mode. Vapors can flow along surfaces to distant ignition source and flash back.

---

6. Accidental Release Measures

Ventilate area of leak or spill. Remove all sources of ignition. Wear appropriate personal protective equipment as specified in Section 8. Isolate hazard area. Keep unnecessary and unprotected personnel from entering. Contain and recover liquid when possible. Use non-sparking tools and equipment. Collect liquid in an appropriate container or absorb with an inert material (e. g., vermiculite, dry sand, earth), and place in a chemical waste container. Do not use combustible materials, such as saw dust. Do not flush to sewer! If a leak or spill has not ignited, use water spray to disperse the vapors, to protect personnel attempting to stop leak, and to flush spills away from exposures. US Regulations (CERCLA) require reporting spills and releases to soil, water and air in excess of reportable quantities. The toll free number for the US Coast Guard National Response Center is (800) 424-8802.

J. T. Baker SOLUSORB® solvent adsorbent is recommended for spills of this product.

---

7. Handling and Storage

Protect against physical damage. Store in a cool, dry well-ventilated location, away from any area where the fire hazard may be acute. Outside or detached storage is preferred. Separate from incompatibles. Containers should be bonded and grounded for transfers to avoid static sparks. Storage and use areas should be No Smoking areas. Use non-sparking type tools and equipment, including explosion proof ventilation. Containers of this material may be hazardous when empty since they retain product residues (vapors, liquid); observe all warnings and precautions listed for the product. Do Not attempt to clean empty containers since residue is difficult to remove. Do not pressurize, cut, weld, braze, solder, drill, grind or expose such containers to heat, sparks, flame, static electricity or other sources of ignition: they may explode and cause injury or death.

---

8. Exposure Controls/Personal Protection

Airborne Exposure Limits:
-OSHA Permissible Exposure Limit (PEL):
100 ppm (TWA) xylene
100 ppm (TWA) ethylbenzene
-ACGIH Threshold Limit Value (TLV):
xylene: 100 ppm (TWA) 150 ppm (STEL), A4 - Not classifiable as a human carcinogen.
ethyl benzene: 100 ppm (TWA) 125 ppm (STEL), A3 - Confirmed Animal Carcinogen with Unknown Relevance to Humans.
Ventilation System:
A system of local and/or general exhaust is recommended to keep employee exposures below the Airborne Exposure Limits. Local exhaust ventilation is generally preferred because it can control the emissions of the contaminant at its source, preventing dispersion of it into the general work area. Please refer to the ACGIH document, *Industrial Ventilation, A Manual of Recommended Practices*,

most recent edition, for details. Use explosion-proof equipment.

Personal Respirators (NIOSH Approved):

If the exposure limit is exceeded and engineering controls are not feasible, a half-face organic vapor respirator may be worn for up to ten times the exposure limit, or the maximum use concentration specified by the appropriate regulatory agency or respirator supplier, whichever is lowest. A full-face piece organic vapor respirator may be worn up to 50 times the exposure limit, or the maximum use concentration specified by the appropriate regulatory agency or respirator supplier, whichever is lowest. For emergencies or instances where the exposure levels are not known, use a full-face piece positive-pressure, air-supplied respirator. WARNING: Air-purifying respirators do not protect workers in oxygen-deficient atmospheres. Where respirators are required, you must have a written program covering the basic requirements in the OSHA respirator standard. These include training, fit testing, medical approval, cleaning, maintenance, cartridge change schedules, etc. See 29CFR1910.134 for details.

Skin Protection:

Wear impervious protective clothing, including boots, gloves, lab coat, apron or coveralls, as appropriate, to prevent skin contact.

Eye Protection:

Use chemical safety goggles and/or a full face shield where splashing is possible. Maintain eye wash fountain and quick-drench facilities in work area.

---

9. Physical and Chemical Properties

The following physical data is for xylene.

Appearance:

Clear, colorless liquid.

Odor:

Characteristic odor.

Solubility:

Insoluble in water.

Specific Gravity:

0.86 @ 20C/4C

pH:

Not applicable.

% Volatiles by volume @ 21C (70F):

100

Boiling Point:

137 - 140C (279 - 284F)

Melting Point:

-25C (-13F)

Vapor Density (Air=1):

3.7

Vapor Pressure (mm Hg):

8 @ 20C (68F)

Evaporation Rate (BuAc=1):

0.7

---

10. Stability and Reactivity

Stability:
Stable under ordinary conditions of use and storage.
Hazardous Decomposition Products:
Involvement in a fire causes formation of carbon monoxide and unidentified organic components.
Hazardous Polymerization:
Will not occur.
Incompatibilities:
Strong oxidizing agents and strong acids.
Conditions to Avoid:
Heat, flames, ignition sources and incompatibles.

---

11. Toxicological Information

Toxicological Data:
Xylene: oral rat LD50: 4300 mg/kg; inhalation rat LC50: 5000 ppm/4H; skin rabbit LD50: > 1700 mg/kg; Irritation eye rabbit: 87 mg mild (Std. Draize); irritation skin rabbit 500 mg/24 moderate (Std. Draize); investigated as a tumorigen, mutagen, reproductive effector.
Ethyl benzene: oral rat LD50: 3500 mg/kg; skin rabbit LD50: 17800 uL/kg; investigated as a tumorigen, mutagen, reproductive effector.
Reproductive Toxicity:
May cause teratogenic effects.

```
--------\Cancer Lists\---------------------------------------------------
                                       ---NTP Carcinogen---
Ingredient                             Known    Anticipated    IARC Category
------------------------------------   -----    -----------    -------------
m-Xylene (108-38-3)                     No          No              3
o-Xylene (95-47-6)                      No          No              3
p-Xylene (106-42-3)                     No          No              3
Ethyl Benzene (100-41-4)                No          No              2B
```

---

12. Ecological Information

Environmental Fate:
Following data for xylene: When released into the soil, this material may evaporate to a moderate extent. When released into the soil, this material is expected to leach into groundwater. When released into the soil, this material may biodegrade to a moderate extent. When released into water, this material may evaporate to a moderate extent. When released into water, this material may biodegrade to a moderate extent. When released into the air, this material may be moderately

degraded by reaction with photochemically produced hydroxyl radicals. When released into the air, this material is expected to have a half-life of less than 1 day. This material is not expected to significantly bioaccumulate. (mixed xylenes: octanol / water partition coefficient 3.1 - 3.2; bioconcentration factor = 1.3, eels)
Environmental Toxicity:
For xylene: This material is expected to be slightly toxic to aquatic life. The LC50/96-hour values for fish are between 10 and 100 mg/l.

---

13. Disposal Considerations

Whatever cannot be saved for recovery or recycling should be handled as hazardous waste and sent to a RCRA approved incinerator or disposed in a RCRA approved waste facility. Processing, use or contamination of this product may change the waste management options. State and local disposal regulations may differ from federal disposal regulations. Dispose of container and unused contents in accordance with federal, state and local requirements.

---

14. Transport Information

Domestic (Land, D.O.T.)

Proper Shipping Name: RQ, XYLENES
Hazard Class: 3
UN/NA: UN1307
Packing Group: III
Information reported for product/size: 398LB

International (Water, I.M.O.)

Proper Shipping Name: XYLENES
Hazard Class: 3
UN/NA: UN1307
Packing Group: III
Information reported for product/size: 398LB

---

15. Regulatory Information

```
--------\Chemical Inventory Status - Part 1\---------------------------------
Ingredient                                        TSCA  EC   Japan  Australia
-----------------------------------------------   ----  ---  -----  ---------
m-Xylene (108-38-3)                                Yes  Yes   Yes      Yes
o-Xylene (95-47-6)                                 Yes  Yes   Yes      Yes
p-Xylene (106-42-3)                                Yes  Yes   Yes      Yes
Ethyl Benzene (100-41-4)                           Yes  Yes   Yes      Yes
```

--------\Chemical Inventory Status - Part 2\---------------------------------

		--Canada--		
Ingredient	Korea	DSL	NDSL	Phil.
m-Xylene (108-38-3)	Yes	Yes	No	Yes
o-Xylene (95-47-6)	Yes	Yes	No	Yes
p-Xylene (106-42-3)	Yes	Yes	No	Yes
Ethyl Benzene (100-41-4)	Yes	Yes	No	Yes

--------\Federal, State & International Regulations - Part 1\----------------

	-SARA 302-		------SARA 313------	
Ingredient	RQ	TPQ	List	Chemical Catg.
m-Xylene (108-38-3)	No	No	Yes	No
o-Xylene (95-47-6)	No	No	Yes	No
p-Xylene (106-42-3)	No	No	Yes	No
Ethyl Benzene (100-41-4)	No	No	Yes	No

--------\Federal, State & International Regulations - Part 2\----------------

		-RCRA-	-TSCA-
Ingredient	CERCLA	261.33	8(d)
m-Xylene (108-38-3)	1000	No	No
o-Xylene (95-47-6)	1000	No	No
p-Xylene (106-42-3)	100	No	Yes
Ethyl Benzene (100-41-4)	1000	No	No

Chemical Weapons Convention: No   TSCA 12(b): Yes   CDTA: No
SARA 311/312: Acute: Yes   Chronic: Yes Fire: Yes Pressure: No
Reactivity: No   (Mixture / Liquid)

WARNING:
THIS PRODUCT CONTAINS A CHEMICAL(S) KNOWN TO THE STATE OF CALIFORNIA TO CAUSE CANCER.

Australian Hazchem Code: 3[Y]
Poison Schedule: None allocated.
WHMIS:
This MSDS has been prepared according to the hazard criteria of the Controlled Products Regulations (CPR) and the MSDS contains all of the information required by the CPR.

16. Other Information

NFPA Ratings: Health: **2** Flammability: **3** Reactivity: **0**
Label Hazard Warning:
DANGER! HARMFUL OR FATAL IF SWALLOWED. VAPOR HARMFUL. AFFECTS CENTRAL NERVOUS SYSTEM. CAUSES SEVERE EYE IRRITATION. CAUSES IRRITATION TO SKIN AND RESPIRATORY TRACT. MAY BE HARMFUL IF ABSORBED THROUGH SKIN. CHRONIC EXPOSURE CAN CAUSE ADVERSE LIVER, KIDNEY, AND BLOOD EFFECTS. FLAMMABLE LIQUID AND

VAPOR.

Label Precautions:

Keep away from heat, sparks and flame.
Avoid contact with eyes, skin and clothing.
Keep container closed.
Use only with adequate ventilation.
Avoid breathing vapor.
Wash thoroughly after handling.

Label First Aid:

Aspiration hazard. If swallowed, vomiting may occur spontaneously, but DO NOT INDUCE. If vomiting occurs, keep head below hips to prevent aspiration into lungs. Never give anything by mouth to an unconscious person. Call a physician immediately. If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. In case of contact, immediately flush eyes or skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Wash clothing before reuse. In all cases get medical attention immediately.

Product Use:

Laboratory Reagent.

Revision Information:

No Changes.

Disclaimer:

****

Mallinckrodt Baker, Inc. provides the information contained herein in good faith but makes no representation as to its comprehensiveness or accuracy. This document is intended only as a guide to the appropriate precautionary handling of the material by a properly trained person using this product. Individuals receiving the information must exercise their independent judgment in determining its appropriateness for a particular purpose. MALLINCKRODT BAKER, INC. MAKES NO REPRESENTATIONS OR WARRANTIES, EITHER EXPRESS OR IMPLIED, INCLUDING WITHOUT LIMITATION ANY WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE WITH RESPECT TO THE INFORMATION SET FORTH HEREIN OR THE PRODUCT TO WHICH THE INFORMATION REFERS. ACCORDINGLY, MALLINCKRODT BAKER, INC. WILL NOT BE RESPONSIBLE FOR DAMAGES RESULTING FROM USE OF OR RELIANCE UPON THIS INFORMATION.

****

Prepared by: Environmental Health & Safety
Phone Number: (314) 654-1600 (U.S.A.)

ATTACHMENT B

Emergency Contacts and Hospital Route Map

EMERGENCY NUMBERS

NYTEP Site
Utica, New York

Fire	911
Police	911
Ambulance	911
Hospital – St. Elizabeth Medical Center	(315) 798-8100
Key Environmental, Inc.	(412) 279-3363
NYSDEC – Region 6 Spill Reporting Hotline, inside NYS	(800) 457-7362
NYSDEC – Region 6 Spill Reporting Hotline, outside NYS	(518) 457-7362
Oneida County DOH	(315) 798-5064
NYS DOH Herkimer Office	(315) 866-6879
NYSDEC Division of Air Resources	(518) 402-8452
Poison Center	(800) 222-1222
National Response Center	(800) 424-8802

DIRECTIONS TO EMERGENCY ROOM

St. Elizabeth Medical Center – (315) 798-8100
2209 Genesee Street
Utica, NY 13501

Take Lee Street to N. Genessee Street (may need to make a U-turn onto Genessee St.)
Follow Genessee St. south into Utica about 2.7 miles to the hospital.

Total travel distance is about 2.8 miles. Total travel time is about 6 minutes.

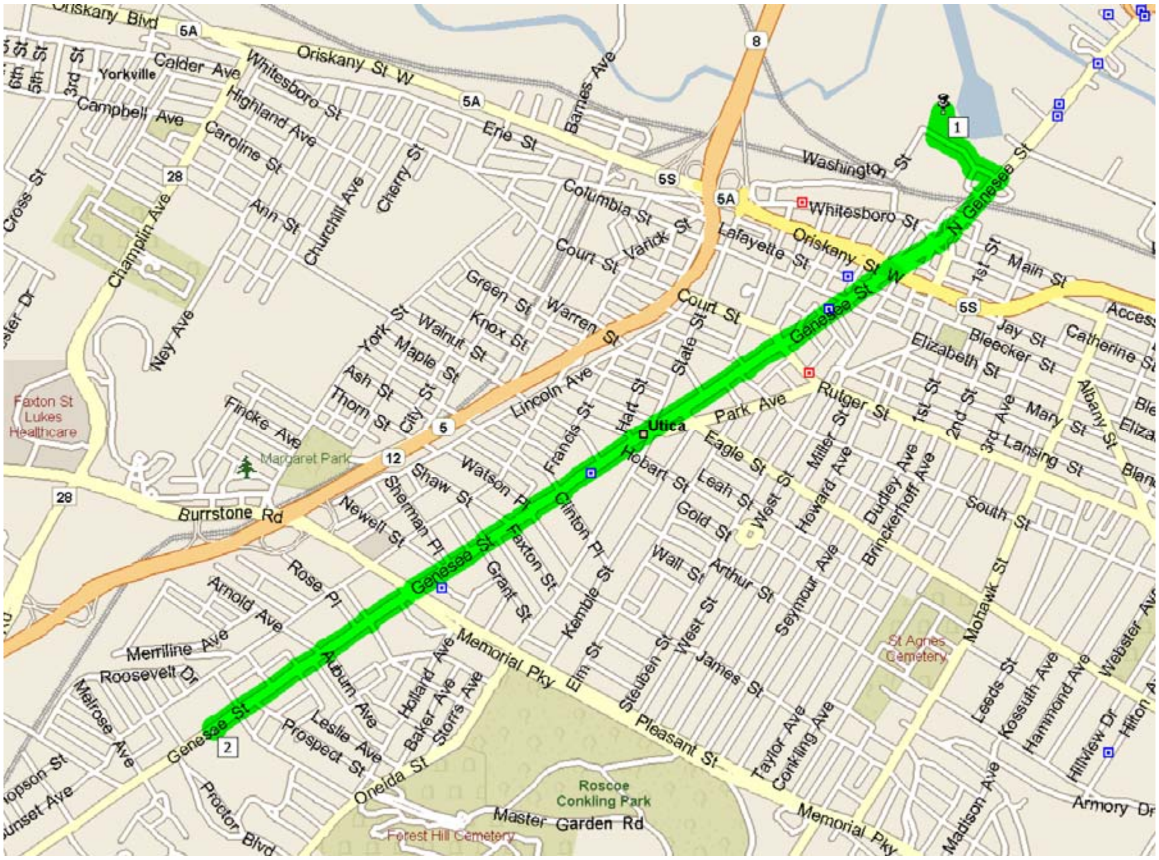
UTILITY NUMBERS

Underground Facilities Protection Organization	(800) 962-7962

St. Elizabeth Medical Center – (315) 798-8100
2209 Genesee Street, Utica, NY 13501

Take Lee Street to N. Genessee Street (may need to make U-turn onto N. Genessee St.)
Follow N. Genessee St. south as it turns into Genessee Street into Utica about 2.7 miles to the hospital.

Total travel distance is about 2.8 miles. Total travel time is about 6 minutes.



ATTACHMENT C

Health and Safety Forms

TRAINING SESSION DOCUMENTATION RECORD

Project Name:	**Date:**
Project Number:	**Time: Start: 1 Stop:**
Instructor: John E. Francis	**Sheet: 1 of 1**
Material Covered:	

NAME (print)	SIGNATURE	COMPANY

I certify that the personnel above have been trained in the subject(s) listed in "Material Covered" as stated.

Key Environmental, Inc.

Instructor Signature

Instructor's Company Affiliation

KEY

SUBCONTRACTOR AFFIDAVIT

I have reviewed the Site Health and Safety Plan for the ______________________ Site and understand the potential health and safety hazards at this operation and the emergency response procedures. I agree to conduct all on-site work in conformity with the requirements of the Health and Safety Plan.

Project Number:

Date:

NAME (print)	SIGNATURE	COMPANY

Site Supervisor ____

REAL-TIME MONITORING INSTRUMENT CALIBRATION LOG

Project Name:		**Project Number:**
Location:		
Instrument (s):		
Model Number(s):		**Serial Number(s):**
Calibration Gas(es):	**Concentration**	

DATE	TIME	READING	CALIBRATED BY	COMMENTS

REAL-TIME MONITORING LOG

KEY

Date:	Person performing sampling:
Project Name:	Signature:
Project No.:	

Time	Monitoring Location (be specific)	READINGS						COMMENTS (Where was sample taken? e.g., breathing zone or other) and **Duration of Monitoring**
		O_2 %	**LEL %**	**VOC ppm**	**Dust mg/ m^3**	**Noise dB**	**Detect or Tube (spec. tube)**	

Real Time Instrument Calibration Log should accompany this form.

ATTACHMENT D

Job Safety Analysis

TASK HAZARD ANALYSIS **(page 1 of 4)**		
Project Description: Field Sampling Plan		
Prepared by: John E. Francis	**Approved by:**	**Date: 12/12/08**

TASK/JOB STEPS	**HAZARD/POTENTIAL DANGER**	**CONTROL METHOD/MEASURES TO ELIMINATE DANGER**
Tasks 1 - Installing monitoring wells Subtask – Locate drill rig	• Struck by moving drill rig. • Contact with overhead utilities. (Fire, electrocution, explosion)	• Drive slowly on-site and only in designated areas. • Site personnel must be aware of drill rig movements. • Driver should warn nearby personnel of intent to move. • Backup alarm must be operational on rig. • Only qualified, experienced operators and helpers used for drill rig. • Daily equipment inspections for safe operation and proper function of safety devices. • Maintain good site communication. • Non-essential personnel stay clear of operation. • Minimize number of personnel in area of operation. • Keep drill rig and mast at least 20 feet from any overhead utility. • Park/position drill rig so as not to obstruct roadways, walkways, electrical lines or temporary passageways.
Tasks 1 - Installing monitoring wells Subtask – Erect the mast.	• Contact with overhead utilities. (Fire, electrocution, explosion) • Struck by or contact with moving portions of rig and mast. • Caught in or between rig and mast.	• Only qualified, experienced operators and helpers used for drill rig. • Daily equipment inspections for safe operation and proper function of safety devices. • Maintain good site communication. • Non-essential personnel stay clear of operation. • Minimize number of personnel in area of operation. • Keep drill rig and mast at least 20 feet from any overhead utility. Refer to Section 5.1.6 of this HASP for more information. • Keep hands, feet and other body parts clear when erecting rig and mast. • Stand to side when operating controls. • Inspect rig and mast to ensure that all parts are secure before set-up.

TASK HAZARD ANALYSIS (page 2 of 4)		
Project Description: Filed Sampling Plan		
Prepared by: John E. Francis	**Approved by:**	**Date: 12/12/08**

TASK/JOB STEPS	**HAZARD/POTENTIAL DANGER**	**CONTROL METHOD/MEASURES TO ELIMINATE DANGER**
Tasks 1 - Installing monitoring wells Subtask – Boring the holes	• Contact with Site constituents in soil or groundwater. • Struck by or against moving/rotating drill shaft, cables or drive hammer. • Caught in rotating drill shaft, cables, or drive hammer. • Contact with overhead or underground utilities. (Fire, electrocution, explosion, or other sudden release of pressure.) • Potential skin and/or air exposure to Site constituents. • Excessive noise. • Physical exertion/lifting augers.	• Level D protection. • Keep aware of drill rig movements. Driver should warn nearby personnel of intent to move. Backup alarm should be operational on rig. • Only qualified, experienced operators and helpers used for drill rig. • Daily equipment inspections for safe operation and proper function of safety devices. • Maintain good site communication. • Non-essential personnel stay clear of operation. • Minimize number of personnel in area of operation. • Drill carefully if utilities are in the area. Check with on-site personnel, drawings, and the local utilities or call 811to locate underground utilities. • Keep drill rig and mast at least 20 feet from any overhead utility. • Drillers must wear hearing protection. • Monitor around and in borehole for VOCs. See Section 7 of the HASP for VOC action levels. • Drill rig operator and helper must be in good physical shape to handle work. • Use proper lifting techniques.
Installing monitoring wells Subtask – Cleaning drilling equipment	• Contact with Site constituents in soil or groundwater. • Struck by or against moving drill shaft, or other parts of rig. • Excessive noise. • Physical exertion/lifting augers	• Wait until drill stops moving until attempting to remove soil. • Use proper lifting techniques. • Wear Level D protection with appropriate gloves.
Installing monitoring wells. Subtask - Sampling of soils from borings.	• Pinch, cut, contusion from opening/handling samples. • Potential skin and/or air exposure to Site constituents.	• Use care when opening samples. • Use Level D protection. Wear nitrile gloves when sampling. • Position self upwind when opening samples if possible. Open samples in area with good ventilation. • Check samples for VOCs.

TASK HAZARD ANALYSIS (page 3 of 4)		
Project Description: Field Sampling Plan		
Prepared by: John E. Francis	**Approved by:**	**Date: 12/12/08**
TASK/JOB STEPS	**HAZARD/POTENTIAL DANGER**	**CONTROL METHOD/MEASURES TO ELIMINATE DANGER**
Installing monitoring wells Subtask – Installing wells (2" PVC,, sand pack, bentonite seal, cement/bentonite grout, 3' stickup with concrete pad)	• Overexertion, twisting, bending when handling pipe and bags of sand, cement and bentonite. • Overexposure to dust from sand, cement and bentonite.	• Drill rig operator and helper must be in good physical shape to handle work. • Use proper lifting techniques. • Wear Level D protection, including appropriate work gloves. • Pour bags slowly to avoid creating excessive dust. Use water mist if necessary to keep dust under control.
Installing recovery wells. Subtask - Develop wells.	• Potential exposure to VOCs in water or air. • Electrical shock when setting up or using pump. • Battery explosion. • Spill of battery acid.	• Check well opening for VOCs and follow air monitoring action levels in Section 7. • Wear Level D protection – safety glasses to avoid splashes and nitrile gloves to avoid groundwater contact. • Follow manufacturer's instructions for proper pump use. If pump is run off car or other battery make sure the battery is charged and has sufficient water and electrolyte before use. Ensure that wires are connected to the proper battery terminals. • Handle batteries with care to avoid spillage.
Sampling of wells. Subtask – Open wells	• Potential exposure to VOCs in water or air. • Bit or stung by spiders/wasps/bees. • Electrical shock when setting up or using pump • Battery explosion. • Spill of battery acid.	• Allow well to vent before sampling. • Use Level D protection. Use nitrile gloves when sampling. • Approach wells carefully and open well caps carefully to avoid overly disturbing wasps/bees. Use wasp spray if necessary and if it can be used without compromising integrity of sample. • Follow manufacturer's instructions for proper pump use. If pump is run off car or other battery make sure the battery is charged and has sufficient water and electrolyte before use. Ensure that wires are connected to the proper battery terminals. • Handle batteries with care to avoid spillage.
Sampling of wells. Subtask – Take water level measurement	• Potential exposure to VOCs in water or air. • Cut by measuring tape.	• Allow well to vent before sampling. • Wear Level D protection. Use nitrile gloves when sampling. • Use gloves when handling the measuring tape or avoid handling the tape by using the reel only to lower and raise the tape.

TASK HAZARD ANALYSIS
(page 4 of 4)

Project Description: Field Sampling Plan

Prepared by: John E. Francis	**Approved by:**	**Date: 12/12/08**

TASK/JOB STEPS	HAZARD/POTENTIAL DANGER	CONTROL METHOD/MEASURES TO ELIMINATE DANGER
Sampling of wells. Subtask – Purge wells before sampling.	• Potential exposure to VOCs in water or air. • Electrical shock when setting up or using pump • Battery explosion. • Spill of battery acid.	• Allow well to vent before sampling. • Wear Level D protection. Use nitrile gloves. • Follow manufacturer's instructions for proper pump use. If pump is run off car or other battery make sure the battery is charged and has sufficient water and electrolyte before use. Ensure that wires are connected to the proper battery terminals. • Handle batteries with care to avoid spillage.
Sampling of wells. Subtask – Collect water samples.	• Potential exposure to VOCs in air or water.	• Wear Level D protection. Wear nitrile gloves when sampling.
Surveying	• Slip, trip, fall. • Cold Stress	• Stay aware of site conditions and avoid unmarked holes, projections or other obstacles.
Manage IDW waste	• Potential for pinch points when arranging drums. Potential for drums to tip over while arranging. • Back and muscle strain,	• Level D protection. • Wear steel toe shoes and proper safety equipment including work gloves and safety glasses. • Keep feet and hands away from pinch points. • Do not overexert when arranging drums. Avoid awkward postures when handling drums.
All tasks	• Heat Stress • Cold Stress • Poison ivy/oak • Ticks	• Heat stress - Drink plenty of fluids before and during work. Observe each other for signs of heat stress. Take rest breaks as necessary in a cool, dry area • Cold stress - Use dry, insulated and/or layered work clothing, warm gloves, hard hat liners, and boots. Wear rubber or nitrile boots and gloves to avoid water contact. Take rest breaks to warm up as necessary. • Know how to identify and avoid poisonous plants. Wear gloves or barrier cream/lotion. Wash with ivy cleansing soap after contact. Wear gloves when removing shoes or clothing that has contacted plants. Wash shoes/boots and clothing before reuse. • If in tick infested area wear tick repellent. Tuck pant legs in boots. Check periodically for ticks on pant legs and remove ticks if any present.

ATTACHMENT E

CERTIFICATION BY HEALTH AND SAFETY PROFESSIONAL

CERTIFICATION BY HEALTH AND SAFETY PROFESSIONAL

This Health and Safety Plan has been prepared in accordance with the requirements of OSHA 1910.120, "Hazardous Waste Operations and Emergency Response" and good safety and health practices and procedures.

Prepared by: John E. Francis, CIH, CSP

Signature: John E Francis

Affiliation: Key Environmental, Inc.
200 Third Avenue
Carnegie, PA 15106

Date: June 26, 2009

CIH Certification No. 5125

CIH Stamp: CERT. NO 5125 CP
EXPIRES 6-1-2008
JOHN E. FRANCIS, C.I.H.

Note: A new stamp is on order, see attached letter from ABIH.

ABIH
american board of industrial hygiene

6015 West St. Joseph, Suite 102 Lansing, Michigan 48917 **P:** (517) 321-2638 **F:** (517) 321-4624 **E:** abih@abih.org

March 12, 2008

John E. Francis, CIH
548 Chaparral Drive
Cranberry Township, PA 16066

Dear Mr. Francis,

I am pleased to inform you that your Certification Maintenance worksheet has been reviewed and your professional activities have been found to fulfill the Board's requirements. Approval of your worksheet does not necessarily mean that all points submitted were acceptable and credited towards the total points required. Your new CM cycle runs for five calendar years from January 1, 2008 to December 31, 2012. Your next re-certification worksheet must be submitted no later than February 1, 2013. Diplomates submitting a CM worksheet postmarked after the February 1 deadline will be required to pay a late fee.

Enclosed you will find a certificate which attests to your continued certification. **Please note that the expiration date is June 1st of your 6th year.** This is to allow time for submission, review, possible audit and approval of your next worksheet. The CM worksheet is available at the ABIH web site (abih.org). CM changes will be reported on the CM worksheet and in the ABIH eNewsletter.

The Board appreciates your continued professional service and your support of the Certification Maintenance Program.

In the meantime, please remember that it is your responsibility to inform us of any address changes, including e-mail address, and keep current with your annual renewal fees. You can update your address and contact information at the website by clicking on Diplomates/Certificants and logging in. Your login ID number is: **1246.**

Very truly yours,

Lynn C. O'Donnell

Lynn C. O'Donnell, CIH
Executive Director, ABIH

F/QS/merge/cmokay2007.doc