

REMEDIAL ACTION PLAN

**FORMER BLAIR AUTO REPAIR
3575 Schuylkill Road
Spring City, Pennsylvania 19475
Facility ID# 15-42616
USTIF # 2013-0002(M)**

Submitted To:

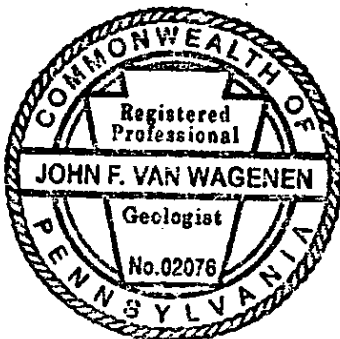
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Project No. BLAIR--0001

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December 19, 2014

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1.0 INTRODUCTION

This Remedial Action Plan (RAP) details the proposed remedial action prepared by Coventry Environmental Associates, Inc. (CEA) for the former Blairs Automotive repair and service station facility located at 3575 Schuylkill Road in Spring City, Pennsylvania (Facility ID# 15-42616).

This RAP was prepared in response to correspondence from the Pennsylvania Department of Environmental Protection (PADEP) dated October 1, 2014 acknowledging receipt of the Site Characterization Report (SCR) and requesting a remedial action plan to address the presence of dissolved phase hydrocarbons in groundwater at the site. This report provides a summary of the site environmental conditions; detailed findings of the site characterization is provided in the SCR previously submitted to the PADEP.

2.0 SITE DESCRIPTION

The subject property is the former Blairs automotive repair and service station facility located at 3575 Schuylkill Road in Spring City, Pennsylvania (Facility ID# 15-42616), East Vincent Township, Chester County, Pennsylvania (Figures 1 and 2). The subject facility is currently comprised of approximately 3/4 acres of land with one building (automotive repair facility). Site historical use includes operation the facility as a gasoline service station and automotive repair facility.

Five 4,000 gallon fiberglass underground storage tanks (USTs) containing unleaded gasoline were removed from one excavation at the subject property in December, 2012. The post excavation soil and groundwater sample results indicated all results were below the applicable standards with the exception of low level dissolved phase impact by benzene (10.2 - 20.5 ppb) and Methyl Tertiary Butyl Ether (MTBE, 27.8 - 89.3 ppb) to the groundwater in the gasoline UST excavation. The PADEP issued a Notice of Violation dated January 10, 2013 requiring a Site Environmental Characterization which was completed and submitted to the PADEP, dated September 22, 2014. There was no obvious leak location in the UST systems and historical records do not indicate a known release. In addition, on June 24, 2013, a 2,000 gallon heating oil UST was excavated and removed for disposal. The tank exhibited several holes and the impacted soil/backfill was removed and disposed. Post excavation soil samples indicated the absence of hydrocarbon impact above the applicable statewide health standards.

The project area is located within a mixed commercial and residential setting. The subject facility and immediate area of the site is served by the public water supply and sanitary sewage systems. The closest surface water body to the site is a small tributary stream to the Schuylkill River located approximately 1,000 feet north of the subject property. Topographic gradient at the site exhibits a moderate downward gradient to the northeast toward this tributary stream.

The bedrock at the site is comprised primarily of reddish brown shale with limited interbedded siltstone of the Triassic Brunswick Formation. Competent bedrock was encountered at a depth of approximately 16 to 33 feet below grade surface (bgs). Materials overlying the competent bedrock have been completely weathered to a silt and clay. Available published data on the structural conditions of the Brunswick Formation in the general area indicates that the bedrock formation strikes to the east-northeast with a dip to the north of 14 degrees. CEA conducted slug testing in three site wells (MW-4, MW-7, MW-8) to determine the hydraulic conductivity of the subsurface materials at the site. The resulting values for hydraulic conductivity (k) ranged between 3.5×10^{-5} and 1×10^{-6} cm/sec which corresponds closely to the observed subsurface material which is a shale/siltstone.

There is no currently known impact to any receptor in the site vicinity. Residential and commercial properties located near the site have basement or subgrade areas, however, the depth to the water table at the site has ranged between approximately 10 and 30 feet bgs, below the depth of the basement floors and consequently the potential for impact is extremely limited. Additionally, soil and groundwater analytical results indicate compound concentrations below the PADEP residential screening values for protection of indoor air. The closest surface water body to the site is a small tributary stream to the Schuylkill River located approximately 1,000 feet north of the subject property. Topographic and groundwater flow gradient at the site exhibits a moderate downward gradient to the northeast toward this tributary stream. Due to the substantial distance from the subject site, the potential for impact is extremely limited. Two notable underground utilities which are present in the project area include the sanitary and stormwater sewers, however, based on the anticipated depth of these sewer lines of eight feet or less, the potential for infiltration of impacted groundwater is extremely limited.

However, while the general area is served by the public water supply system, groundwater supply wells are utilized in the general project area. Three private groundwater supply wells were identified and sampled for water quality. Two wells (Barner,, 80 Mennonite Church Road and The Depository, 25 Mennonite Church Road) were located approximately one quarter mile west of the project site and the third well was located immediately west of the site across Schuylkill Road (French residence). Analytical results indicated the absence of detectable concentrations (Not Detectable). With the exception of the French residence well, no private or public groundwater supply wells were located in the immediate site vicinity and consequently, potential impact to groundwater supply wells is very limited.

2.0 ENVIRONMENTAL CHARACTERIZATION

CEA installed a total of eleven monitoring wells to depths ranging between 25 and 35 feet bgs to investigate hydrogeologic conditions and groundwater quality. Analytical results of the groundwater samples, collected on numerous occasions during July, 2013 through August, 2014 (summarized in Tables 1.0 and 2.0 and Figures 4 through 10 for May 23, 2014 and August 6, 2014) indicates an area of groundwater impact located downgradient of the former gasoline USTs exceeding the residential statewide health standards for benzene, MTBE, 1,2,4 trimethylbenzene and 1,3,5 trimethylbenzene. With the exception of the detection of benzene exceeding the groundwater standard in monitoring well MW-8 on one occasion (August 6, 2014), the groundwater impact is limited to within site property boundaries. The data indicates a general declining trend of groundwater contaminant concentrations in site wells with the exception of monitoring wells MW-5, MW-6 and MW-8 where the trend is increasing. This increasing trend may be indicative of plume migration downgradient, however, the higher concentrations may be a result of the influence of water table fluctuation. Horizontal transport of contaminants in groundwater is likely to be very limited based on the measured very low hydraulic conductivity of shallow subsurface materials. However, since the shallow aquifer includes bedrock, groundwater/contaminant transport is through fractures within the bedrock which can be difficult to evaluate. Biodegradation of the contaminants is important to limit the transport of contaminants downgradient. Other processes act on the compounds in the subsurface to limit transport, including diffusion (spreading/dilution), dispersion (fluid mixing due to groundwater movement) and sorption (compounds become sorbed to organics and clay). The site data indicates that subsurface materials are comprised of low permeability shale (clay rich) which will likely exhibit a high level of contaminant sorption limiting compound transport.

The following summarizes the groundwater measurements and well elevation data on May 23, 2014 and August 28, 2014

Well #/ PVC Elevation	May 23, 2014		August 28, 2014	
	Depth to Water (FT)	W.L. Elevation (FT)	Depth to Water (FT)	W.L. Elevation (FT)
MW-1 (100.00)	14.30	85.70	19.55	80.49
MW-2 (100.07)	18.65	81.42	24.30	75.77
MW-3 (98.00)	18.50	79.50	23.72	74.28
MW-4 (97.50)	18.40	79.10	23.40	74.10
MW-5 (96.23)	18.88	77.35	24.13	72.10
MW-6 (90.73)	14.06	76.67	25.50	65.15
MW-7 (99.70)	17.95	81.75	24.40	75.30
MW-8 (96.09)	18.70	77.39	29.87	66.22
MW-9 (90.20)	13.90	76.30	25.10	65.10
MW-10 (88.73)	12.27	76.46	23.93	64.80
MW-11 (87.97)	--	--	23.92	64.05

The direction of the groundwater flow based on the water level data is shown on Figures 4.0 and 5.0. Determination of the groundwater flow direction at the site indicates that the general component of flow is to the northeast, coincident with topography and the area surface drainage system.

3.0 REMEDIAL ACTION PLAN

3.1 Remedial Alternatives Assessment

Numerous remedial technologies were evaluated in order to select the most appropriate technologies for potential remedial testing/implementation at the site. The technologies reviewed and brief discussion are provided as follows.

- Groundwater extraction and treatment ("Pump and Treat"): While hydraulic control of contaminant migration can be achieved with this technology, experience has shown relatively low contaminant mass recovery rates, high cost, and long periods of system operation, especially in low permeability and fractured rock subsurface conditions.
- Dual phase extraction: This technology can maintain hydraulic control, achieve moderate to high contaminant recovery rates within a moderate period of system operation and is suitable for low permeability and fractured bedrock settings. However, remedial costs can be very high and system maintenance can be extensive.
- Bioremediation (microbial inoculation including air or oxygen sparging): While this technology is potentially feasible, this remedial approach is generally a slow process, requires a high level of technical expertise to implement effectively and may not be effective in the degradation of MTBE.
- Bioremediation (groundwater extraction and treatment – bioreactor, microbial/oxygen enhancement and reinjection): While this technology is also potentially feasible, this remedial approach is generally also a slow process and requires a high level of technical expertise to implement effectively.
- Air sparging and soil vapor extraction: This technology requires a relatively dense network of sparging/vapor extraction wells in low permeability materials and associated subgrade piping system. In addition, vapor extraction would be limited in effectiveness due to the presence of the contamination below the saturated zone.
- In-well air stripping and vapor extraction: This technology performs the groundwater treatment within the recovery or monitoring well with vapor recovery to the surface for

treatment prior to discharge. The technology potentially produces a groundwater flow gradient toward the well and thereby increasing the treatment zone for each well and reducing treatment well density requirements. Additionally, the groundwater oxygen concentrations achieved by this technology are high, achieving significant oxygenation of the subsurface, necessary for the bioremediation of MTBE. This technology has the potential to be relatively limited in construction and cost.

- Chemical Oxidation (Active ozone injection): This technology requires the installation of injection wells and ozone is generated on-site and injected daily. This technology has been documented to be effective in the treatment of MTBE. However, this technology has the potential to be relatively high in cost due to the on-site generation of ozone.
- Monitored Natural Attenuation: This technology relies on the natural physical, chemical and biological processes in the subsurface that under favorable conditions act, without intervention, to reduce the concentration of contaminants.
- Bioenhanced Natural Attenuation: For petroleum hydrocarbons in the subsurface, biological degradation is often the most important destructive mechanism. Dissolved oxygen is the most thermodynamically favored electron acceptor used in the biodegradation of MTBE and fuel hydrocarbons. This technology requires the inoculation of aqueous phase oxidants on a routine basis into the subsurface to stimulate insitu aerobic biodegradation and acts in conjunction with the processes of natural attenuation to remediate site contamination.

3.2 Remedial Action/Monitoring/Schedule

Based on the results of the environmental assessment at the site and the above evaluation of potential remedial alternatives, the remedial action which appears to be warranted at the site is as follows.

Available data indicates bioenhanced natural attenuation is a remedial approach warranted at this site to meet compliance with the applicable regulations pursuant to a residential statewide health standard. This technology will involve the passive routine injection of aqueous phase oxidants to

enhance the biodegradation of MTBE/hydrocarbons. The oxidant utilized will be Regenox (Regenesis, Inc., sodium percarbonate, nitrogen, phosphorus) at 160 pounds per month mixed with 350 gallons of water. Two injection galleries with six inch diameter inoculation wells will be installed to a depth of approximately 15 feet in the area of the former UST excavations for routine oxidant injection as shown in Figure 11. A permit for injection will be obtained pursuant to the EPA underground injection control program.

This technology will be implemented with two months of PADEP plan approval and tested for a one year period in the area of the hydrocarbon/MTBE plume. All appropriate baseline and follow on water quality and hydraulic data will be collected to evaluate the performance and cost effectiveness of the technology. Baseline remedial testing will include measuring the groundwater geochemical parameters (primarily dissolved oxygen and oxidation-reduction potential) in the site monitoring wells using a Horiba U-22 water quality monitoring system and collecting two groundwater samples for submittal to Microbial Insights, Inc. for laboratory analysis to assess the genetic potential for hydrocarbon biodegradation. In addition, groundwater samples from several wells will be submitted to ALS Laboratories for analysis of the anaerobic electron acceptors, ferrous iron (II), nitrate and sulfate. While oxidants will stimulate biodegradation of dissolved compounds, treating the adsorbed mass takes time since the compounds are not all bio-available and must desorb from the matrix which can lead to "rebound" and consequently at least one year of monitoring is necessary to assess effectiveness.

The groundwater monitoring program will include quarterly groundwater sampling and measurement of the contaminant concentrations and the geochemical parameters of dissolved oxygen and oxidation-reduction potential. In addition, liquid level data will be acquired quarterly for hydrogeologic assessment. Site monitoring data will be summarized and a remedial action progress report will be prepared and submitted to the PADEP on a quarterly basis. Based on the findings of the remedial action monitoring, the plan will be revised, if necessary.

TABLES

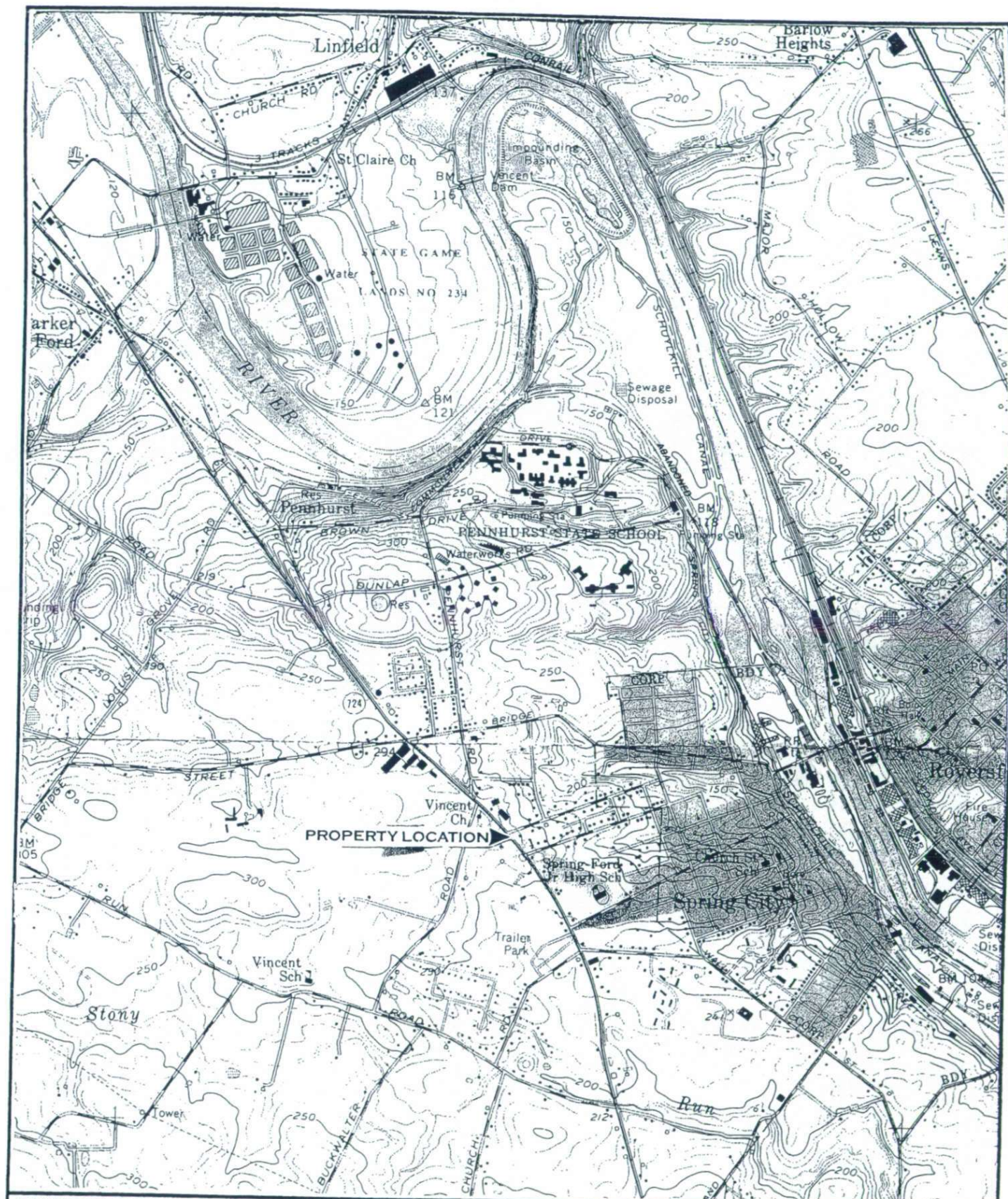
Table 1
Groundwater Analytical Data Summary
(May 23, 2014)
Former Blairs Auto
Spring City, Pennsylvania

<i>Parameter/ Sample I.D.</i>	MW-1	MW-2	MW-3	MW-4	MW-5	MW-6	MW-7	MW-8	MW-9	MW-10	PADEP Standard*
Benzene	ND	ND	ND	ND	200	51.9	ND	ND	38.4	ND	5
Toluene	ND	ND	ND	ND	37.4	10.2	ND	ND	10.2	ND	1,000
Ethylbenzene	ND	ND	ND	201	54.1	7.8	ND	ND	16.3	ND	700
Xylene (Total)	ND	ND	ND	392	108	24.8	13.8	ND	9.2	ND	10,000
Cumene	ND	ND	ND	81.3	32	16.7	ND	ND	25.6	ND	840
Naphthalene	ND	ND	ND	171	47.2	15	ND	ND	14.4	ND	100
MTBE	ND	ND	ND	ND	36.1	33.8	ND	ND	28.6	ND	20
1,2,4 Trimethylbenzene	ND	ND	ND	602	15.5	7.8	5.7	ND	7.3	ND	15
1,3,5 Trimethylbenzene	ND	ND	ND	95.1	7.8	2.5	3.1	ND	4.3	ND	13
Notes: All results reported in Parts Per Billion (ppb). * PADEP statewide health groundwater standard for a used aquifer in a residential setting. ND Denotes Not Detected above the laboratory limit of detection. NA Denotes Not Analyzed											

Table 2
Groundwater Analytical Data Summary
(August 6 /28, 2014)
Former Blairs Auto
Spring City, Pennsylvania

<i>Parameter/ Sample I.D.</i>	MW-1	MW-2	MW-3	MW-4	MW-5	MW-6	MW-7	MW-8	MW-9	MW-10	MW-11 8-6/8-28	PADEP Standard*
Benzene	ND	ND	ND	ND	NA	NA	ND	42.3	2.7	ND	ND/ND	5
Toluene	ND	ND	ND	ND	NA	NA	ND	11.8	ND	ND	ND/ND	1,000
Ethylbenzene	ND	ND	ND	142	NA	NA	ND	ND	ND	ND	ND/ND	700
Xylene (Total)	ND	ND	ND	286	NA	NA	3.8	8.9	ND	ND	ND/ND	10,000
Cumene	ND	ND	ND	57.4	NA	NA	ND	8.9	ND	ND	ND/ND	840
Naphthalene	ND	ND	ND	78.4	NA	NA	ND	9.9	ND	ND	ND/ND	100
MTBE	ND	ND	ND	ND	NA	NA	ND	ND	4.3	ND	14/9.3	20
1,2,4 Trimethylbenzene	ND	ND	ND	267	NA	NA	1.8	ND	ND	ND	ND/ND	15
1,3,5 Trimethylbenzene	ND	ND	ND	32.3	NA	NA	1.2	1	ND	ND	ND/ND	13
Notes: All results reported in Parts Per Billion (ppb). * PADEP statewide health groundwater standard for a used aquifer in a residential setting. ND Denotes Not Detected above the laboratory limit of detection. NA Denotes Not Analyzed												

FIGURES



COVENTRY ENVIRONMENTAL
ASSOCIATES, INC.

991 RIDGE ROAD
BUCKTOWN, PENNSYLVANIA 19405

JOB NO.
BLAIR-001

DATE: 9/210/12

DRAWN BY:
JVW

CHECKED BY:

SCALE:
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DRAWING NO.
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FORMER BLAIRS AUTO PROPERTY
3575 SCHUYLKILL ROAD
SPRING CITY, PENNSYLVANIA

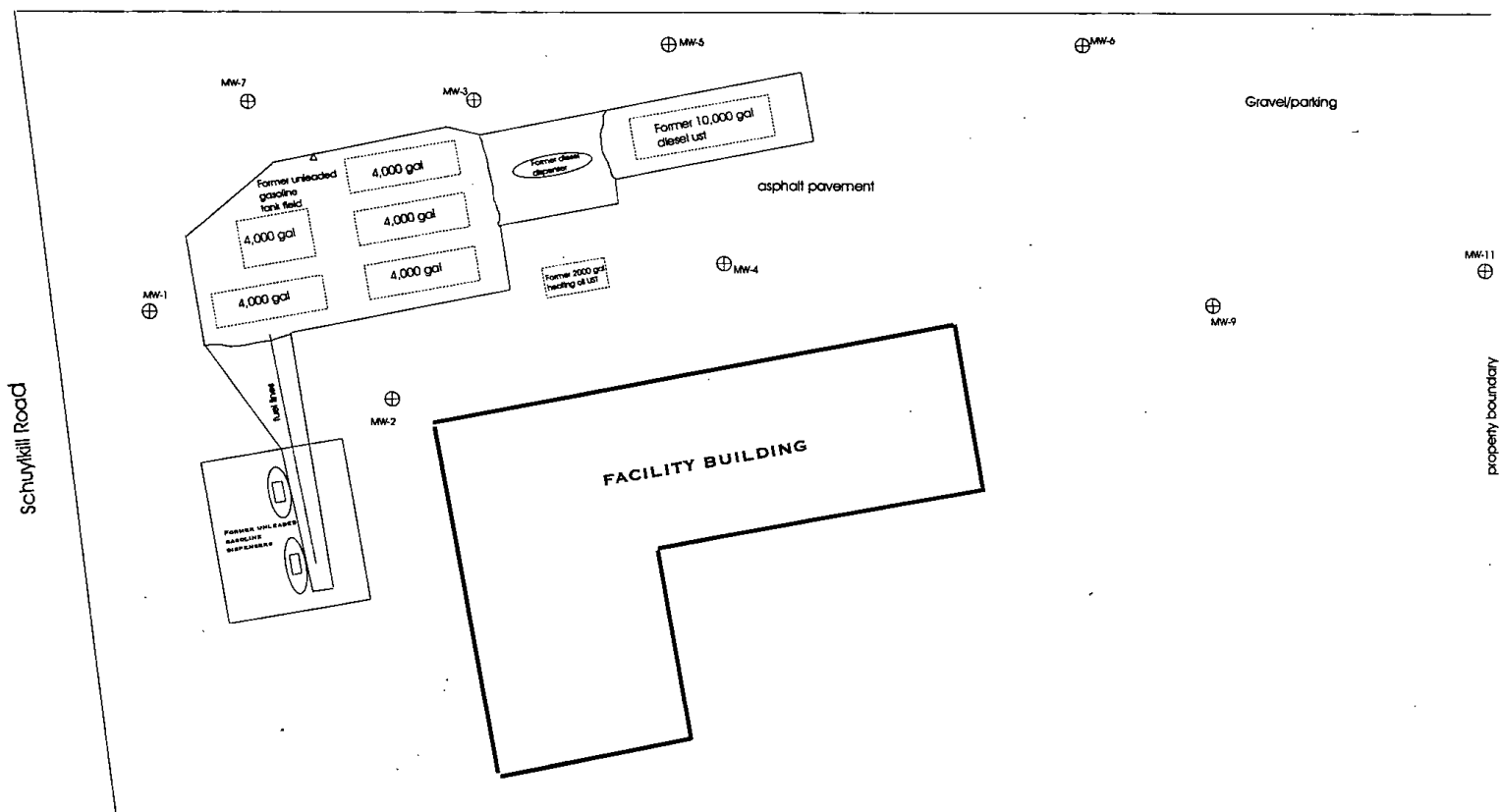
SITE LOCATION MAP

NORTH



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Heckel Avenue



COVENTRY ENVIRONMENTAL
ASSOCIATES, INC.
991 Ridge Road
Bucktown, Pennsylvania

JOB NO.

BLAIR-001

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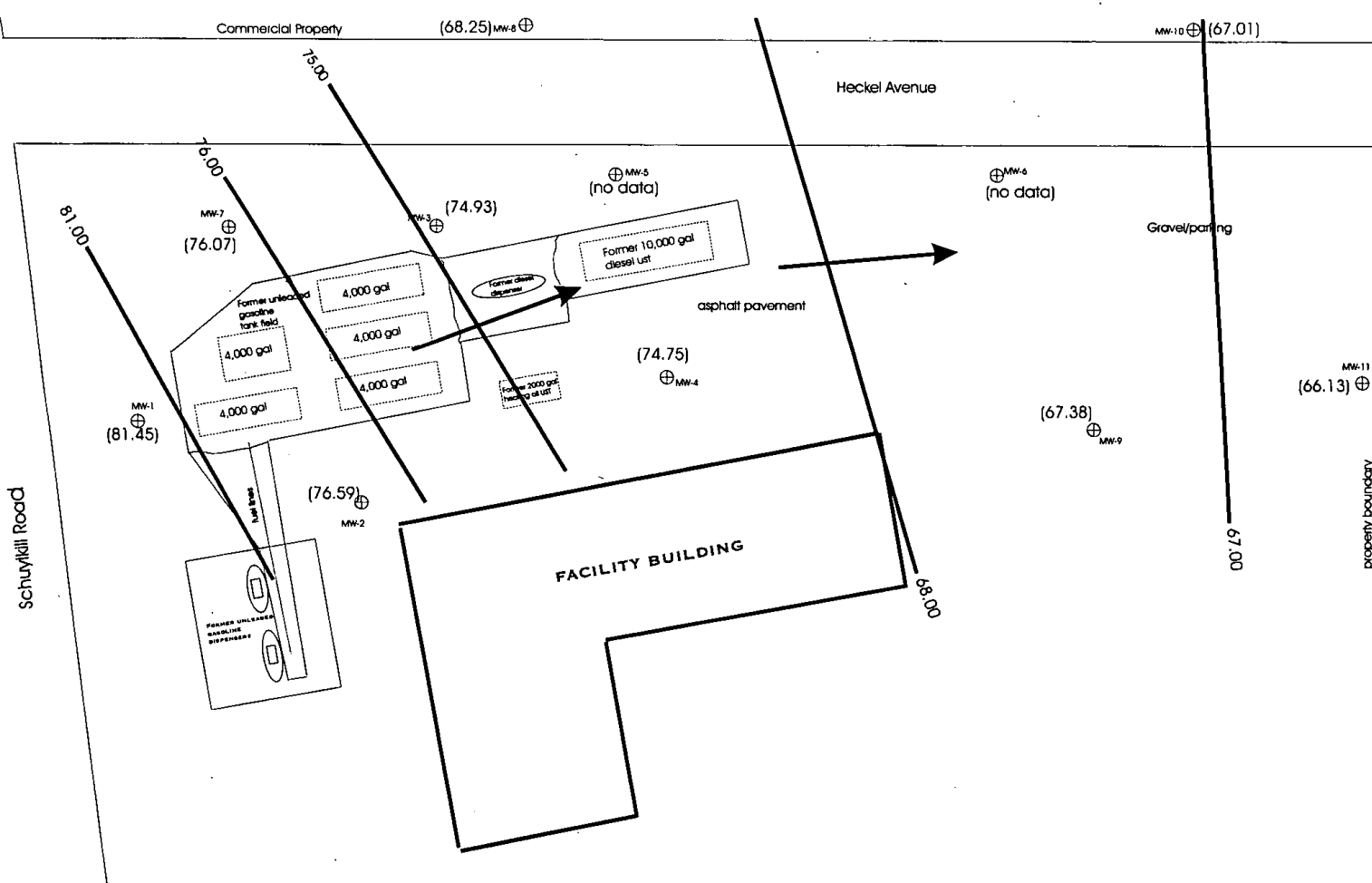
FORMER BLAIRS AUTO
3575 SCHUYLKILL ROAD
SPRING CITY, PENNSYLVANIA
(FACILITY ID 15-42616)

TITLE:

SITE PLAN



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COVENTRY ENVIRONMENTAL
ASSOCIATES, INC.
991 Ridge Road
Bucktown, Pennsylvania

JOB NO.

BLAIR-001

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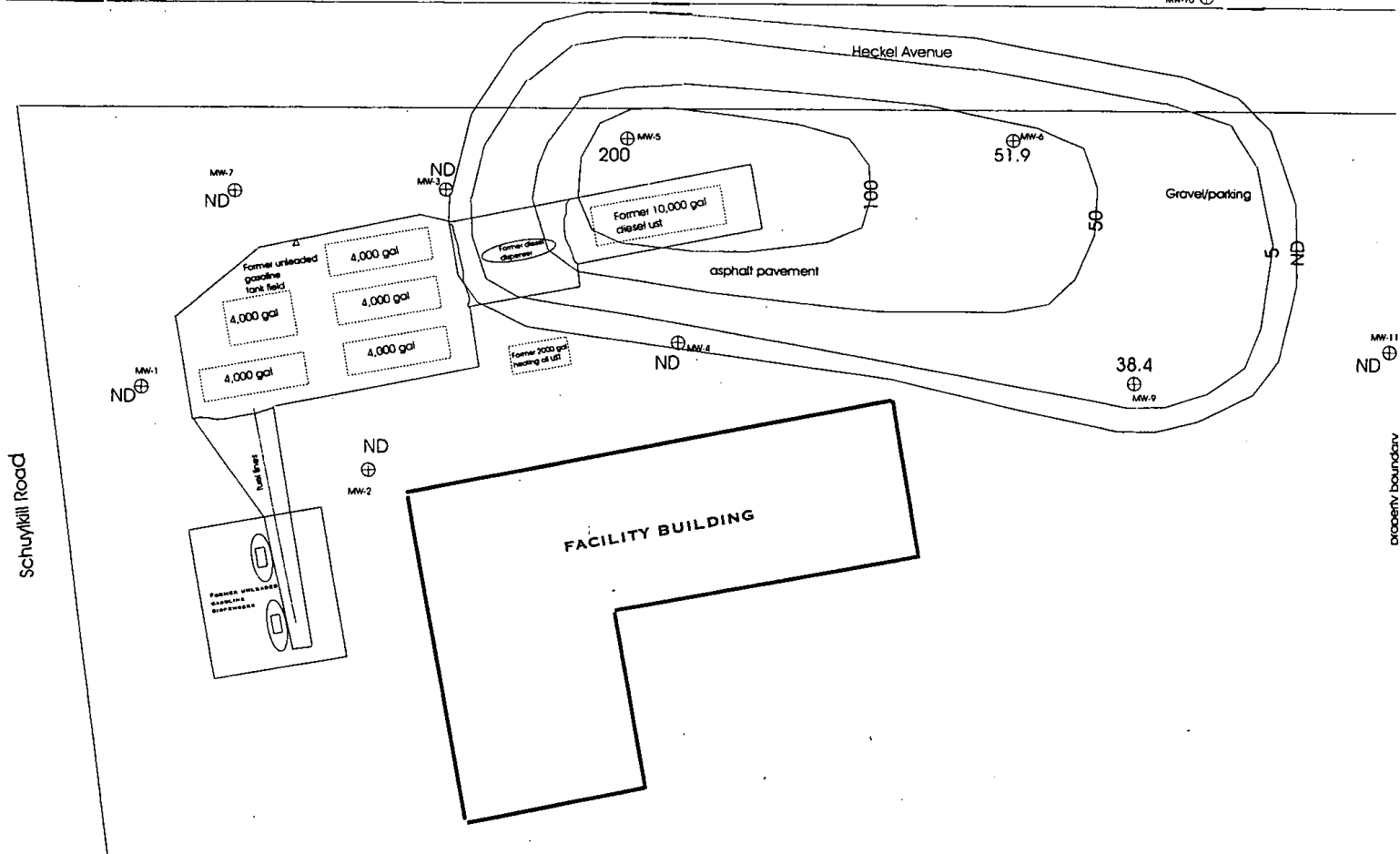
FORMER BLAIRS AUTO
3575 SCHUYLKILL ROAD
SPRING CITY, PENNSYLVANIA
(FACILITY ID 15-42616)

TITLE:

GROUNDWATER FLOW DIRECTION
(8/6/2014)



1/26/2015 2:33:00 PM



COVENTRY ENVIRONMENTAL
ASSOCIATES, INC.
991 Ridge Road
Bucktown, Pennsylvania

JOB NO.

BLAIR-001

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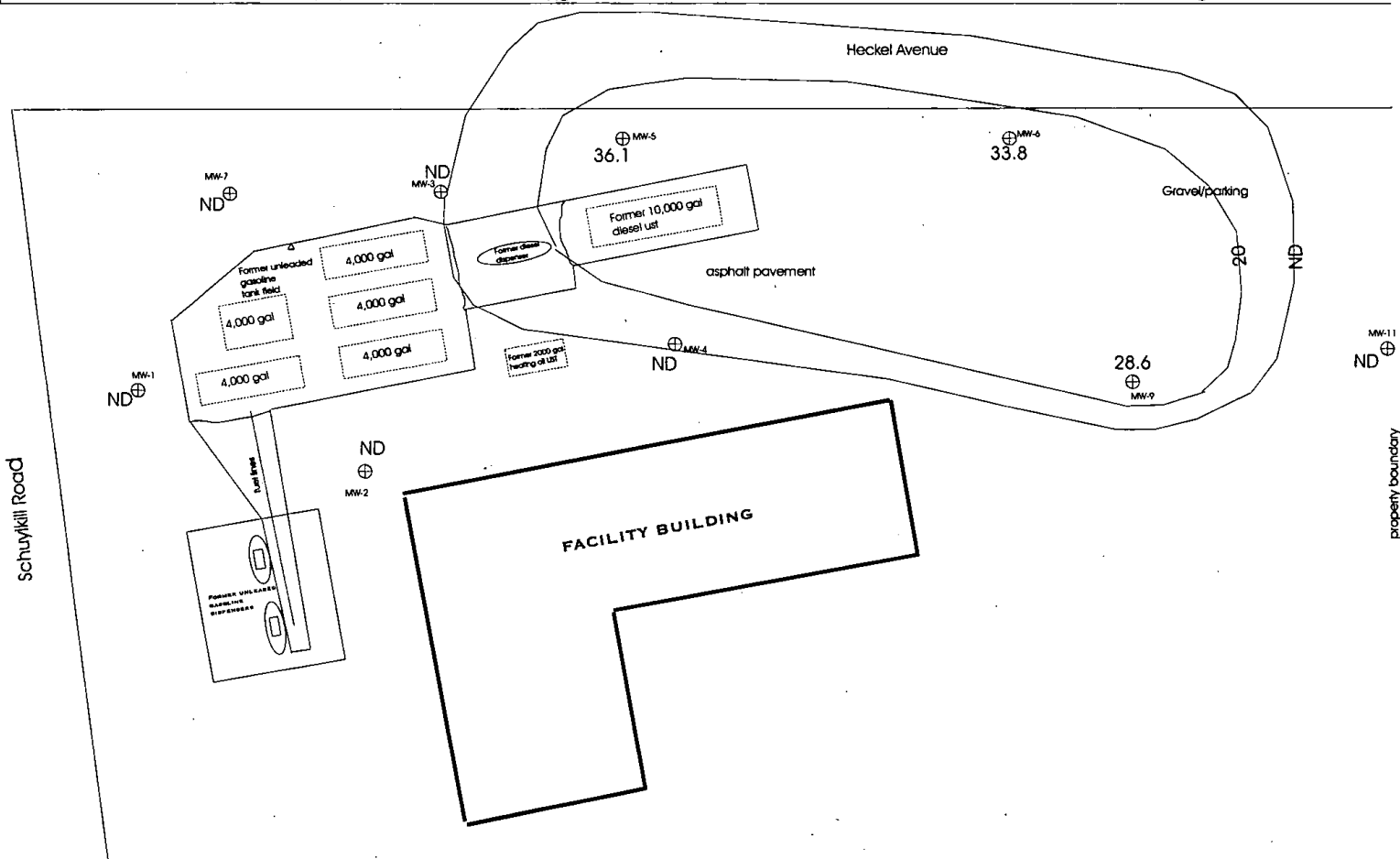
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SPRING CITY, PENNSYLVANIA
(FACILITY ID 15-42616)

TITLE:

BENZENE
ISOCONCENTRATION MAP
(5/23/2014)



1/26/2015 2:33:02 PM



COVENTRY ENVIRONMENTAL
ASSOCIATES, INC.
991 Ridge Road
Bucktown, Pennsylvania

JOB NO.

BLAIR-001

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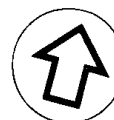
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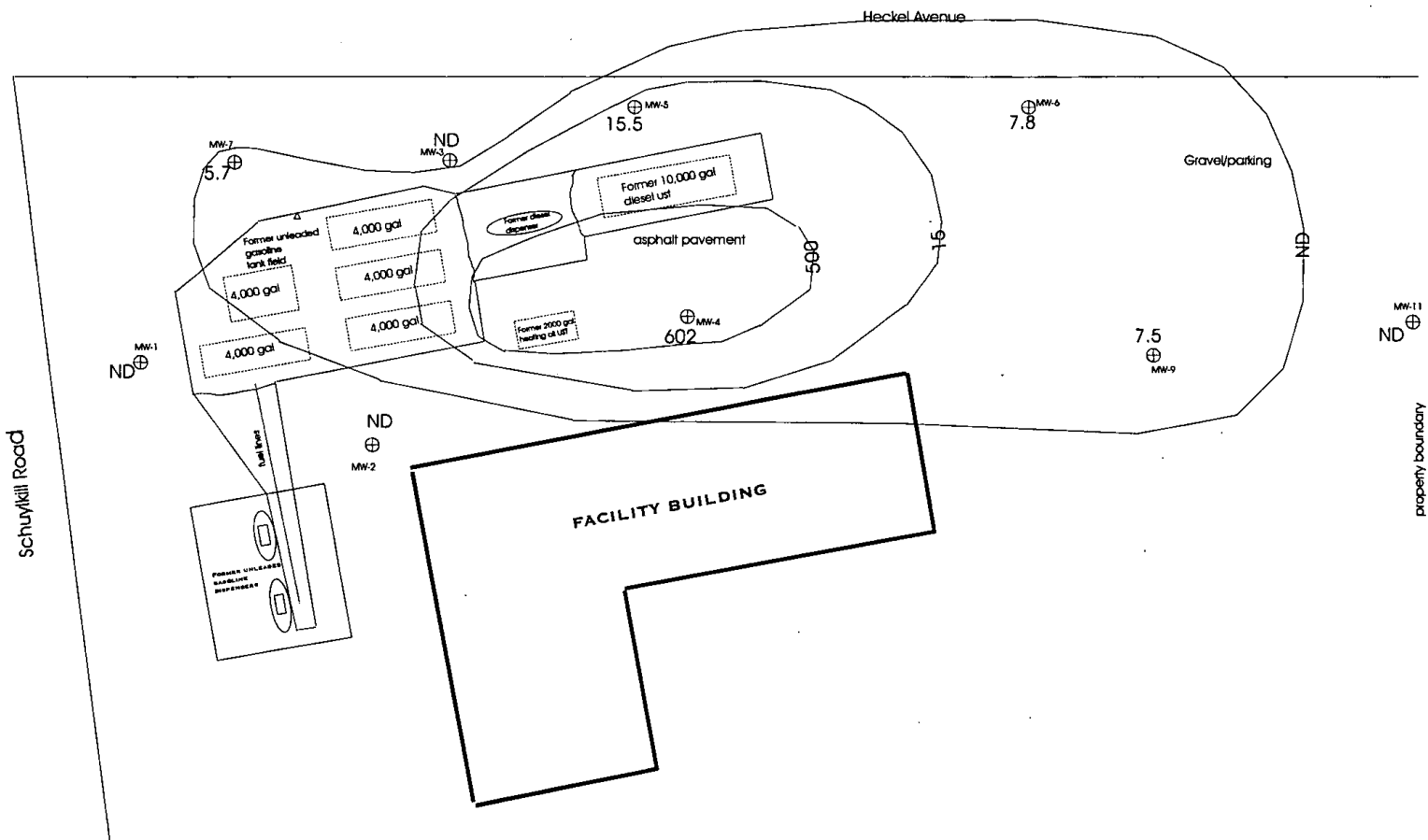
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3575 SCHUYLKILL ROAD
SPRING CITY, PENNSYLVANIA
(FACILITY ID 15-42616)

TITLE:

MTBE
ISOCONCENTRATION MAP
(5/23/2014)



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COVENTRY ENVIRONMENTAL
ASSOCIATES, INC.
991 Ridge Road
Bucktown, Pennsylvania

JOB NO.

BLAIR-001

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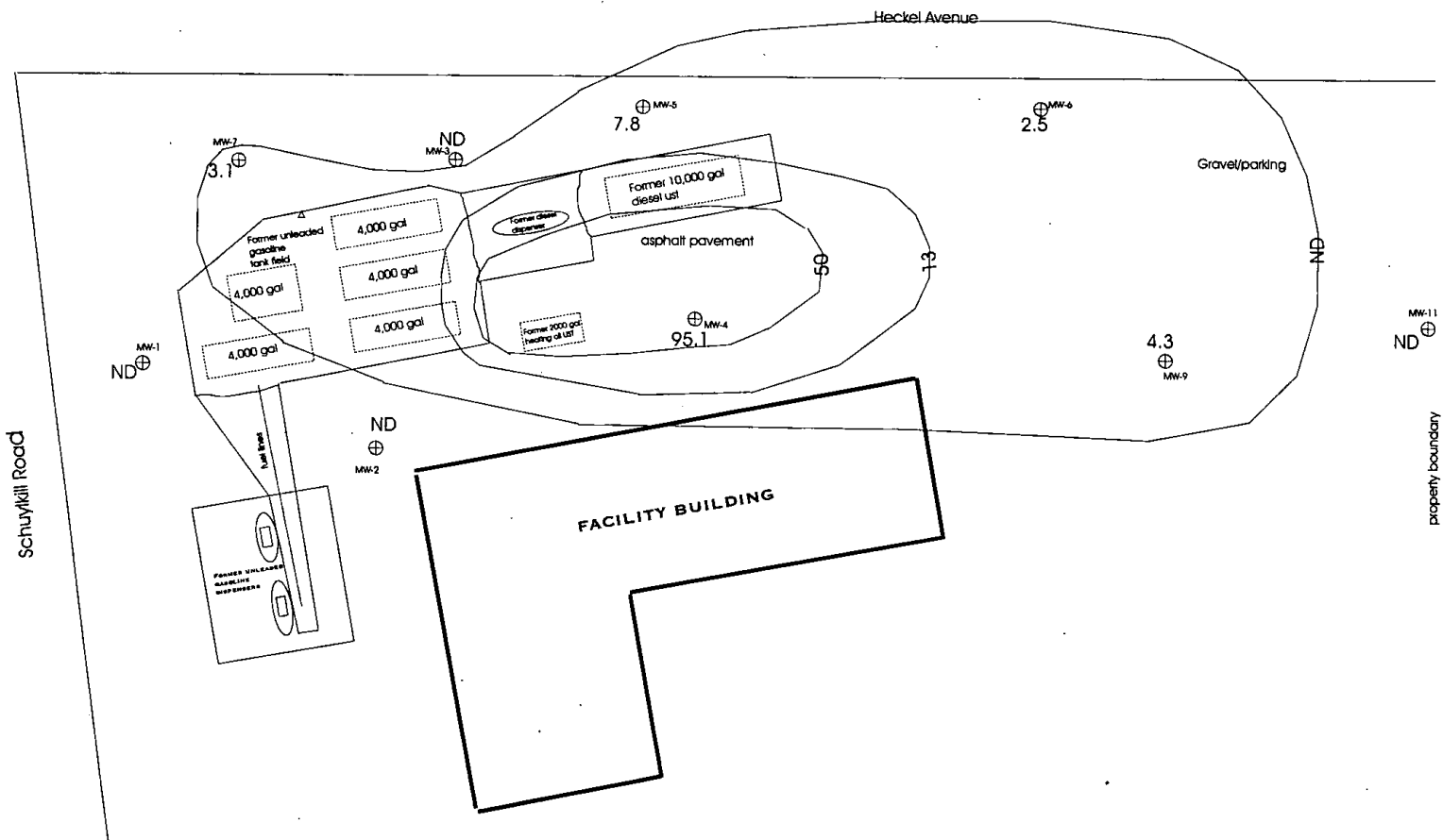
FORMER BLAIRS AUTO
3575 SCHUYLKILL ROAD
SPRING CITY, PENNSYLVANIA
(FACILITY ID 15-42616)

TITLE:

1,2,4 TRIMETHYLBENZENE
ISOCONCENTRATION MAP
(5/23/2014)



1/26/2015 2:33:04 PM



COVENTRY ENVIRONMENTAL
ASSOCIATES, INC.
991 Ridge Road
Bucktown, Pennsylvania

JOB NO.

BLAIR-001

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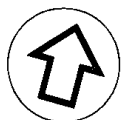
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FORMER BLAIRS AUTO
3575 SCHUYLKILL ROAD
SPRING CITY, PENNSYLVANIA
(FACILITY ID 15-42616)

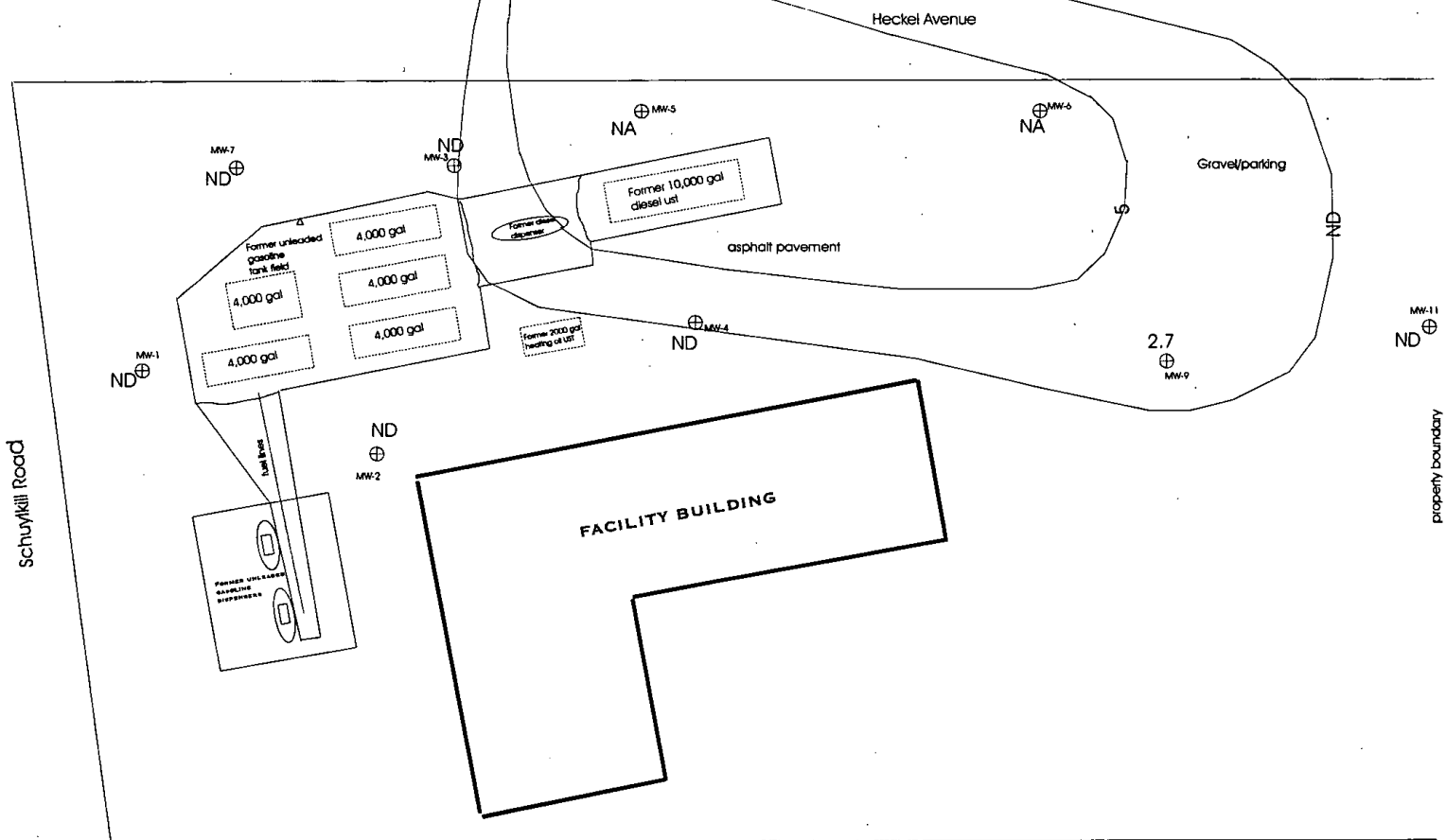
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1,3,5 TRIMETHYLBENZENE
ISOCONCENTRATION MAP
(5/23/2014)



property boundary

MW-11
ND ⊕



COVENTRY ENVIRONMENTAL
ASSOCIATES, INC.
991 Ridge Road
Bucktown, Pennsylvania

JOB NO.

BLAIR-001

SCALE:

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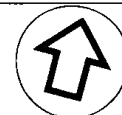
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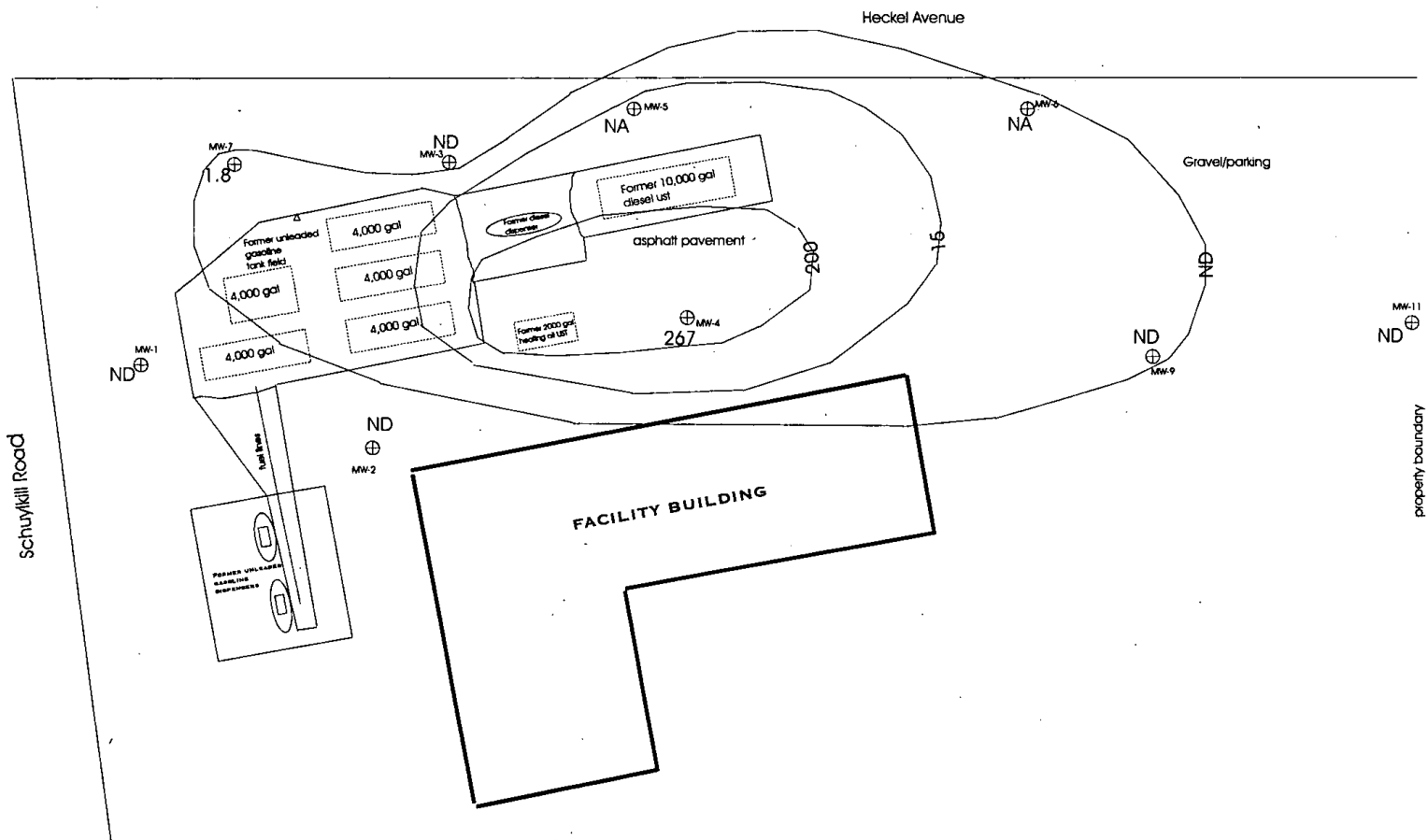
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FORMER BLAIRS AUTO
3575 SCHUYLKILL ROAD
SPRING CITY, PENNSYLVANIA
(FACILITY ID 15-42616)

TITLE:

BENZENE
ISOCONCENTRATION MAP
(8/6/2014)





COVENTRY ENVIRONMENTAL
ASSOCIATES, INC.
991 Ridge Road
Bucktown, Pennsylvania

JOB NO.

BLAIR-001

SCALE:

1" = 25' (APPROX)

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9

FORMER BLAIRS AUTO
3575 SCHUYLKILL ROAD
SPRING CITY, PENNSYLVANIA
(FACILITY ID 15-42616)

TITLE:

1,2,4 TRIMETHYLBENZENE
ISOCONCENTRATION MAP
(8/6/2014)

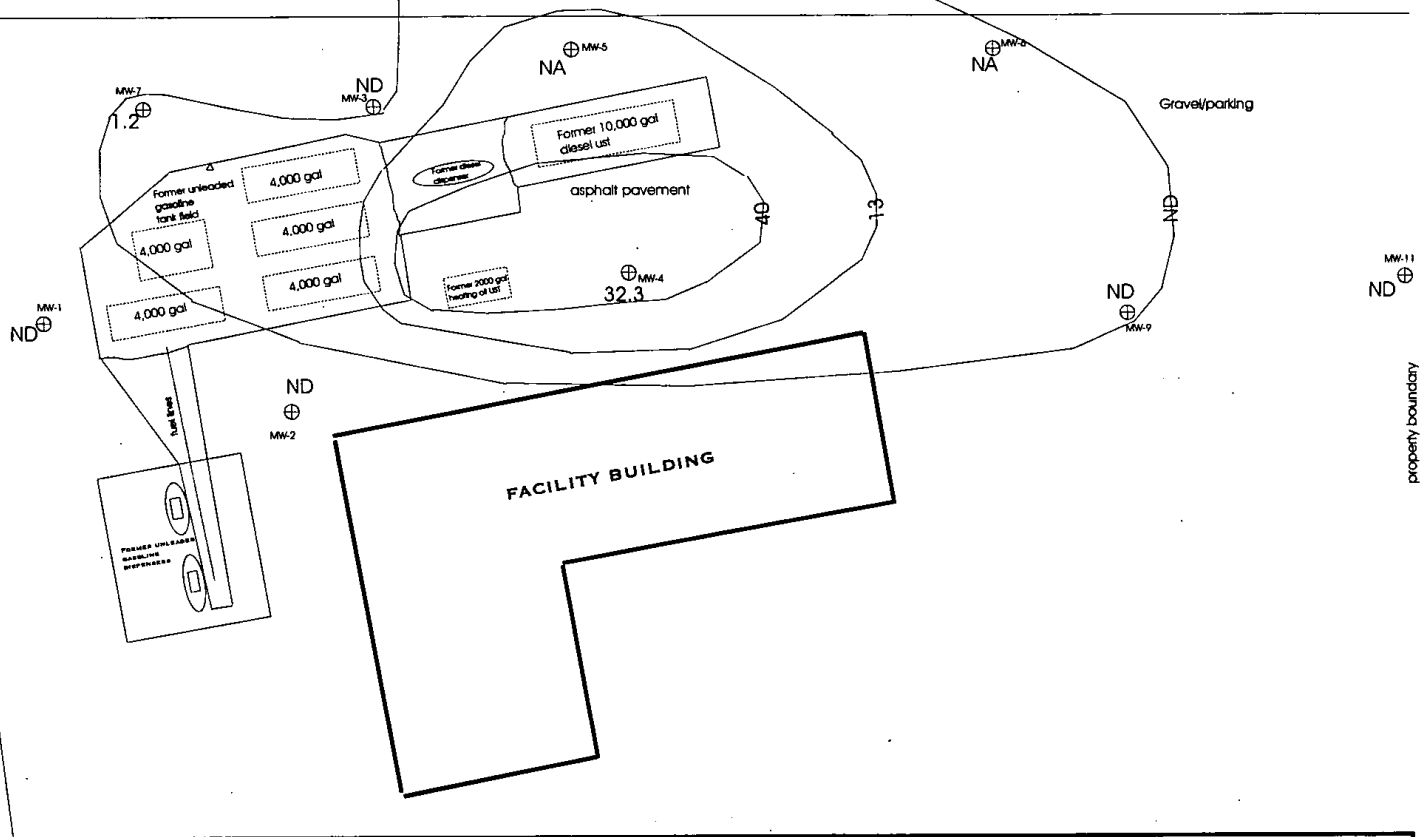


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Heckel Avenue

Gravel/parking

Schuylkill Road



COVENTRY ENVIRONMENTAL
ASSOCIATES, INC.
991 Ridge Road
Bucktown, Pennsylvania

JOB NO.

BLAIR-001

SCALE:

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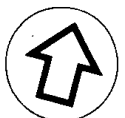
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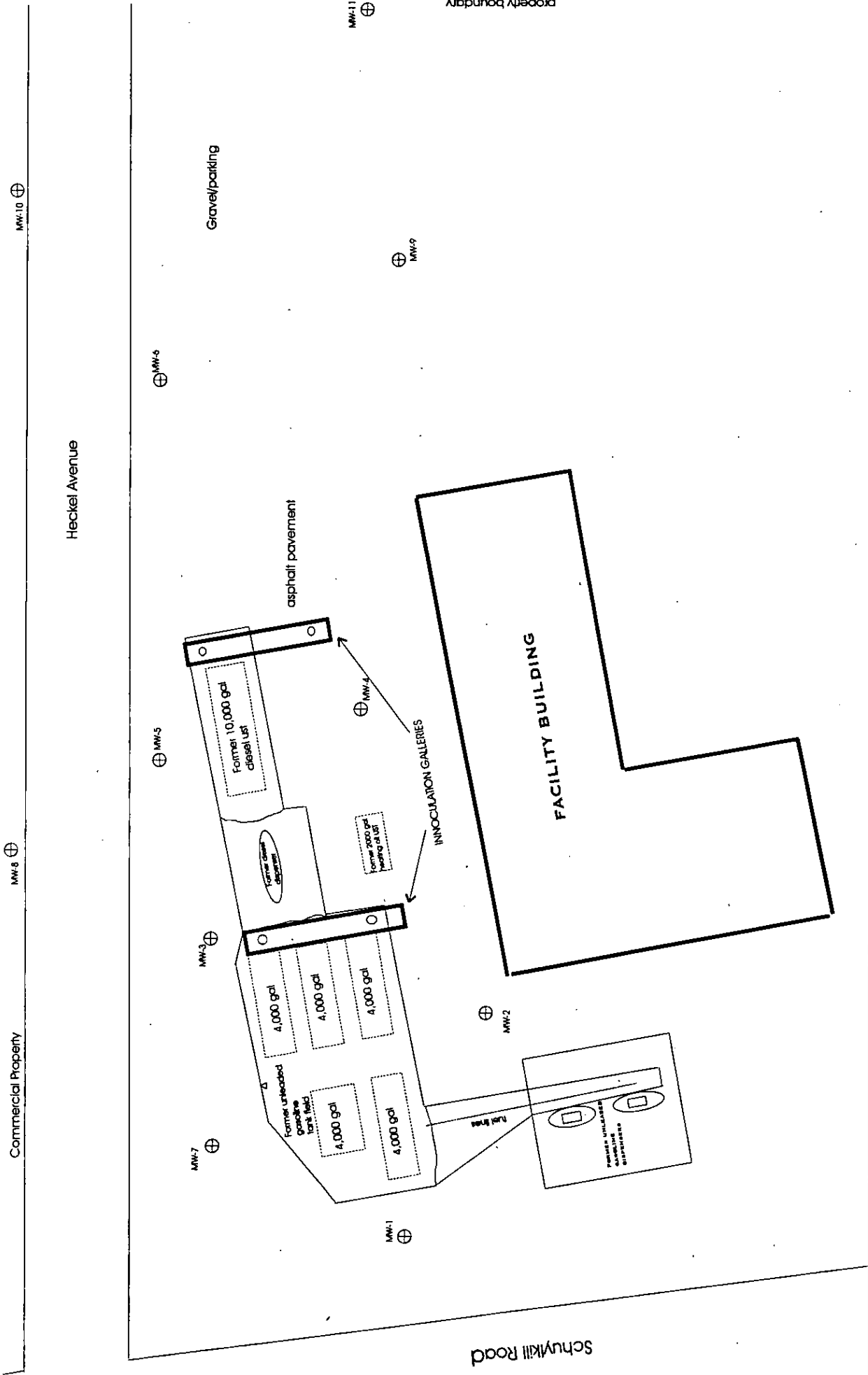
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FORMER BLAIRS AUTO
3575 SCHUYLKILL ROAD
SPRING CITY, PENNSYLVANIA
(FACILITY ID 15-42616)

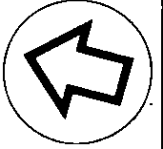
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1,3,5 TRIMETHYLBENZENE
ISOCONCENTRATION MAP
(8/6/2014)





COVENTRY ENVIRONMENTAL ASSOCIATES, INC. 991 Ridge Road Bucktown, Pennsylvania	JOB NO. BLAIR-001	SCALE: 1" = 25' (APPROX)	DRAWING NO. 11
TITLE: FORMER BLAIRS AUTO 3575 SCHUYLKILL ROAD SPRING CITY, PENNSYLVANIA (FACILITY ID 15-42616)		REMEDIAL OXIDANT INNOCULATION GALLERIES	



APPENDICES

APPENDIX A
HEALTH AND SAFETY PLAN

COVENTRY ENVIRONMENTAL ASSOCIATES, INC.

Health and Safety Plan/Procedures

**Project: SITE CHARACTERIZATION/REMEDIATION
FORMER BLAIR AUTO REPAIR
3575 Schuylkill Road
Spring City, Pennsylvania**

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1.0 INTRODUCTION

This Health and Safety Plan was prepared to properly document procedures to be used by employees of Coventry Environmental Associates, Inc. (CEA) in conjunction with the Site Specific Health and Safety Plan. This Health and Safety Plan (HASP) is in accordance with the Occupational Safety and Health Administration's ("OSHA's") Hazardous Waste Operation and Emergency Response Standard (29 CFR 1910.120 and 1926.65). Various guidance documents were consulted in preparing this HASP, including the National Institute for Occupational Safety and Health's ("NIOSH's") Occupation Safety and Health Guidance Manual for Hazardous Waste Site Activities.

Objective of this HASP

The objective of this HASP is to establish policies and procedures which protect field personnel and the general public by minimizing the possibility of injury and/or exposure to potential hazards associated with potentially contaminated sites.

Health and Safety Policy

CEA is committed to providing a safe and healthful workplace for all employees and contractors. Health and Safety must never be compromised. Your health, safety, and well being are a #1 priority. Everyone involved has the absolute right and obligation to question, stop, and correct any unsafe act or condition. We will achieve an accident free environment through a health and safety culture built on these values:

TRUST: Respect and trust each other's opinions and decisions and follow through on all Health and Safety concerns. Managers are committed and actively involved as leaders and set the example for all.

CARE: Approach each day with the determination to care for ourselves, co-workers, contractors and the communities we serve. Individuals must accept personal accountability for their own safety.

KNOWLEDGE: We have the knowledge and skills to be healthy and safe. Workforce must be convinced that all injuries are preventable.

COMMUNICATION: We communicate in a clear, open and honest manner. Individuals must be willing and able to intervene to ensure the safety of others. All projects and tasks will be performed with the deliberate intention for safety and quality in all we do. To help achieve this goal, we ask all workers to stop and think about the task at hand and perform safety checks to assure that all procedures and safety precautions are being addressed.

Performing Safety Checks

Step 1 - EVALUATE the Risk!

- Employees are encouraged to assess the hazards associated with each job and to ask:

What could possibly go wrong with this task or job?

What is the worst thing that could happen if something does go wrong?

Step 2 - CONSIDER Your Options on How to Reduce the Risk!

- Employees are encouraged to evaluate each identified potential risk to see that appropriate safeguards are in place to control the hazard and to ask:

Do I have the appropriate training and knowledge to perform the job safely?

Do I have all the proper tools and personal protective equipment?

Step 3 - TAKE ACTION to Ensure Safe Operations!

- Employees should take the necessary steps or ask for help to ensure the job is done safely.

Follow written standards.

Ask for assistance if needed.

Scope of Work

This Health and Safety Plan ("HASP") applies to sites where environmental work is to be conducted. Specific tasks covered in this HASP include but are not limited to:

- General Construction;
- Phase I Environmental Site Assessments;
- Soil and Groundwater Sampling;
- Drilling;
- Trenching;
- Excavation; and,
- Underground Storage Tank Removals
- Remedial Activities

2.0 RESPONSIBILITIES OF PERSONNEL & INCIDENT/INJURY REPORTING

This section describes site personnel and Health and Safety responsibilities for the project site. Personnel and visitors are responsible for ensuring compliance with this HASP. The specific responsibilities and authority of management, Health and Safety, and other personnel on this site are detailed in the following paragraphs. Prior to conducting work on the site, all personnel are required to sign the HASP Acknowledge Form included in **Appendix A** of this HASP.

Project Manager / Engineer

The Project Manager or Engineer ("PM") has responsibility and authority to direct all work operations. The PM coordinates the health and safety functions. The specific duties of the PM are:

- Prepare and coordinate the work plan;
- Provide site supervisor(s) with work assignments and overseeing their performance;
- Coordinate Health and Safety efforts;
- Serve as primary site liaison with public agencies, officials, and site contractors;
- Ensure that fieldwork is scheduled with adequate personnel and equipment resources;
- Ensure that field personnel are adequately trained and qualified to work.

Health and Safety Officer

The Health and Safety Officer ("HSO") has full responsibility and authority to develop and implement the HASP and to verify compliance. The HSO reports to the Project Manager. The HSO is onsite or readily accessible to the site during all work operations and has the authority to halt site work if unsafe conditions are detected. The specific responsibilities of the HSO are:

- Managing the Health and Safety functions on the site;
- Serve as the site's point of contact for health and safety matters;
- Ensure site monitoring, worker training and effective selection and use of personal protective equipment ("PPE");
- Assessing site conditions for unsafe acts and conditions and providing corrective action;
- Assisting in the preparation and review of the HASP;
- Maintaining effective Health and Safety records as described in this HASP;
- Coordinating with the Site Supervisor(s), and others as necessary for Health and Safety efforts;
- Directing and coordinating Health and Safety monitoring activities;
- Ensuring that field teams utilize PPE;

- Conducting initial onsite, specific training prior to personnel and/or subcontractors proceeding to work;
- Conducting and documenting periodic safety briefings;
- Ensuring that field team members comply with the HASP;
- Completing and maintaining Accident/Incident report forms;
- Notifying PM(s) of all accident/incidents, who will communicate at the end of the day to the designated representative;
- Determining upgrade or downgrade of PPE based on site conditions and/or real time monitoring results;
- Ensuring that monitoring instruments are calibrated daily or as manufacturers recommended;
- Reporting to PM to provide summaries of field operations and progress, and;
- Submitting and maintaining Health and Safety field log books, daily safety logs, training logs, air monitoring result reports, and weekly safety report.

Site Supervisor

The Site Supervisor ("SS") is responsible for field operations and reports to the PM. The SS ensures the implementation of the HASP requirements and procedures in the field. The specific responsibilities of the SS are:

- Executing the work plan and schedule as detailed by the PM;
- Coordinating with the HSO on Health and Safety, and;
- Ensuring site work compliance with the requirements of the HASP.

Field Personnel and Subcontractors

Site workers are responsible for complying with the HASP, using the proper PPE, and following the lines of authority established for the project. Site workers will:

- Report any unsafe or potentially hazardous conditions to the HSO;
- Maintain knowledge of the information, instructions, and emergency response actions contained in the HASP;
- Comply with rules, regulations and procedures as set forth in the HASP and any revisions which are instituted, and;
- Prevent admittance to work sites by unauthorized personnel.

Safety Checks Roles and Authorities

Employees & Contractors

- Perform Safety Checks as appropriate before and during work day;
- Contact supervisor if unsure whether it is safe to proceed with task; and,
- Peer support for use of the tool.

First Line Supervisors

- Perform Safety Checks as appropriate before and during work day;
- Spot check use of Safety Checks on site;
- Provide positive feedback to personnel using Safety Checks appropriately;
- Provide "Coaching" to employees as needed to ensure consistent use of Safety Checks by everyone;
- Managers Perform Safety Checks as appropriate before and during work day;
- Spot check use of Safety Checks in the workplace; and,
- Provide positive feedback and "Coaching" to personnel as needed to ensure consistent use of Safety Checks by everyone.

Safety Rule Compliance and Enforcement

- The HSO reserves the right to remove any employee from the work site that is not in full compliance with the provisions of this plan;
- Refer to the HSO for specific concerns on each individual task;
- Use the buddy system when required;
- Practice contamination avoidance, both on and offsite;
- Plan activities ahead of time;
- Do not climb over/under obstacles;
- Be alert to your own physical condition;
- Watch your co-workers for signs of fatigue, exposure, heat or cold stress, etc;
- Report all accidents, no matter how minor;
- Do not eat, drink, chew gum, apply cosmetics, or use tobacco products while working onsite (except in the support zone);
- Be aware of traffic, heavy equipment, and other obstacles;
- Do not work onsite while under the influence of drugs or alcohol, including prescription drugs that may cause drowsiness, and;
- Do not carry firearms or weapons.

Incident & Injury Reporting

At the first sign, indication, warning, or symptom of any incident, potential injury, overexposure, work must **IMMEDIATELY STOP**. Determine the need for medical treatment and administer First Aid. Immediately call **911** if an injury or illness is serious. Immediately notify the Marathon PM. The Incident Reporting Form is included as **Appendix B** in this HASP.

Incident Definitions

- A work-related injury is defined as an injury such as a cut, fracture, sprain, burn, etc., which results from a work accident or from an exposure in the work environment.

- A work-related illness is defined as an illness of an employee which an abnormal condition or disorder associated with his/her is working environment other than on resulting from an occupational injury, caused by exposure to environmental factors associated with employment.
- A lost-time injury or illness such as an injury or illness as defined above, which involves days away from work or days of restricted work activity following the day of the incident.
- A recordable incident is an injury as defined above which involves medical treatment (other than first aid) or lost time, a diagnosed illness as defined above and any work related death.
- A near-miss is defined as an incident that could have resulted in a work related injury or illness to an employee or damage to the company, environment, general public or client property.

3.0 SITE HEALTH AND SAFETY CONCERNS

The primary Health and Safety concerns are the potential exposures to petroleum contaminated groundwater and oxidant chemicals. This HASP also includes standard construction safety concerns. This HASP can be modified to address additional exposure concerns that may be encountered.

Msd's Regenox is attached and safety protocol to be followed.

4.0 HAZARD RECOGNITION & POTENTIAL ROUTES OF EXPOSURE

Hazards related to the site may be Chemical, Physical, Biological or Mechanical. Below are examples of these types of hazards.

Chemical Hazards

Chemical hazards are commonly encountered on project sites. Action levels, PPE and symptoms of over-exposure shall be listed on the Site Specific HASP.

Physical Hazards

Physical hazards normally associated with site activities include slips, trips, falls, eye, hearing, heat/cold stress and traffic. Appropriate footwear and eye protection shall be donned to minimize the risk of eye and foot injury. Traffic control procedures are described in **Section 7.0**. Appropriate hearing protection shall be available to all personnel to reduce potentially harmful noise levels present during field operations. Appropriate fall protection shall be used when working on elevated surfaces above six (6) feet. Temperatures may be encountered which could trigger heat and cold stress. Below are a few more examples of Physical Hazards.

Chemical Vapors (volatile and semi-volatile)

- Based on the nature of the contamination, air monitoring with a photo-ionization detector ("PID") with a lamp equal or greater than 9.8 electron volts (eV) will be used. Monitoring should be done on an hourly basis or as needed based on site conditions, during site activities.

Flying Debris/Objects

- The use of heavy equipment may cause debris or objects to become airborne. Contractors shall provide shielding and PPE when the potential for flying debris or objects is realized.

Noise > 85 decibels

- Noise protection (earplugs or earmuffs) are required when conducting activities around equipment during environmental activities. The rule of thumb is that if noise prevents conversation in a normal voice at a distance of 3 feet, the noise level is assumed to exceed 85 decibels.

Steep Terrain/Unstable Surface

- Equipment will be braced and shored. Sheeting or sloping of the sidewalls of deep pits and trenches is required when depths exceed 6 feet. Do not work or observe from positions down gradient of heavy equipment.

Explosive Gas

- Based upon the nature and concentration of the contaminants, potential build-up of explosive gases is possible. Use of a LEL/UEL monitoring device should be employed to monitor the potential buildup of these gases.

Static Electricity

- No spark sources are allowed within 50 feet of an excavation/boring and heavy equipment or fuel sources are not permitted. Provide electrical grounding equipment and tools as appropriate.

Gas Cylinders

- Make certain gas cylinders are stored upright, and are properly anchored and chained. Keep cylinders away from ignition sources.

High Pressure Hose Rupture

- Check to see that fittings and pressurized lines are in good condition prior to use.

Underground Utilities

- Contact public utility locator to mark all public utilities and coordinate with appropriate private utilities locator to mark all private utilities. Visually locate remedial systems components from As-Built Drawings.

Electric Shock

- Make certain the third wire is properly grounded. Do not tamper with electrical wiring unless qualified to do so. Inspect and promptly replace damaged electrical cords. Use Ground Fault Circuit Interrupters.

Suspended Loads

- Work/positioning of personnel are not permitted under suspended loads. Maintain visual contact with machine operators at all times.

Moving Vehicles

- When working near operating equipment and site access roads, wear high-visibility vest and use traffic controls (traffic cones, signs, flares or barriers) to alert traffic of operations during any situation that warrants it. Back-up alarm and seat belts are required for heavy equipment. Maintain visual contact with operator at all times and obtain confirmation from operator prior to moving around equipment. Personnel to remain outside turning radius of heavy equipment.

Overhead Electrical Wires

- Heavy equipment must remain at least 20 feet from overhead power line for power lines of 50 kV or less. For each kV>50 increase separation distance of an additional 0.5 feet is required.

Buried Utilities, Drums, Tanks, Etc.

- Locate buried utilities, drums, tanks etc. prior to digging, drilling and mark locations.

Overhead Hazards

- Overhead protection (hard hats) is required during site activities and anytime overhead hazards are present.

Slips, Trips and Falls

- Maintain good housekeeping and site development derived waste management. Under muddy conditions use wood pallets or similar devices in work areas.

Confined Space Entry

- Contractor entry into confined spaces (as defined by OSHA) to be governed by OSHA and contractor policy and contractor shall provide confined space entry permit. Because of the potential of vapors within sub-grade confined spaces, appropriate PPE screening for explosive vapors and/or oxygen concentrations via Lower Explosive Limit (LEL) and oxygen sensing meters is required for confined space entry per the Contractor's confined space policy.

Materials Handling

- Work in teams when handling heavy loads. Use material handling equipment (forklifts, hoist, drum dolly etc.). Use proper lifting techniques.

Open Excavations

- Cover or mark the limits of open excavations and restrict access. Prior to leaving the site for the day, properly barricade the excavation to prevent the public from falling into the excavation.

Mechanical

- Verify daily that all equipment and tools are in good operating condition.

Protruding Objects

- Flag visible objects. Adequately cover or remove objects that may become an impalement hazard.

Welding and Burning (Hot Work)

- Must obtain approval from Marathon representative. Hot work is defined as anything that has the potential to produce a spark.

Meteorological Extremes

- Stop and evaluate site conditions during extreme wind, precipitation and/or thunderstorm conditions. No work permitted during active lightning conditions.

Temperature Extremes

- Provide adequate shade, rest periods and liquids when temperature is above 85 degrees Fahrenheit.

Heat and Cold Stress

Heat Stroke

- Symptoms: Red, hot, dry skin, dizziness, confusion, rapid breathing and pulse, high body temperature.
- Treatment: Cool victim rapidly by soaking in cool (not cold) water. Get medical attention immediately.

Heat Exhaustion

- Symptoms: Pale, clammy, moist skin, profuse sweating, weakness, normal temperature, headache, dizziness, vomiting.

- Treatment: Remove victim to a cool, air-conditioned place. Loosen clothing, place head in low position, have victim drink cool (not cold) water. Get medical attention immediately.

Frostbite

- Symptoms: Blanched, white, waxy skin, but tissue resilient, tissue cold and pale.
- Treatment: Remove victim to a warm place. Re-warm victim quickly in warm (not hot) water. Have victim drink warm fluids, avoiding alcoholic and caffeinated beverages. Do not break blisters. Elevate the injured area and get medical attention.

Hypothermia

- Symptoms: Shivering, apathy, sleepiness, rapid drop in body temperature, glassy state, slow pulse, slow respiration.
- Treatment: Remove victim to a warm place. Re-warm victim quickly in warm (not hot) water. Have victim drink warm fluids, avoiding alcoholic and caffeinated beverages. Do not break blisters. Elevate the injured area and get medical attention.

Biological Hazards

Vegetation, insects and wildlife may present a potential hazard. Below are a few examples of Biological Hazards.

Insect and Animals

- Do not approach or agitate animals. Avoid contact with stinging insects, rodents, and snakes. Wear appropriate clothing for site conditions. Use insect repellent to avoid contact with ticks, mosquitoes and other insects, as necessary.
- Tick bites, Lyme disease, Rocky Mountain Spotted Fever, and West Nile Virus. Use insect repellent and appropriate clothing to preclude tick bites. Check often for tick bites. If bitten, carefully remove the tick with tweezers making certain to remove the biting parts of the insect, while being careful not to crush the tick. After removing the tick, wash your hands, disinfect area and dress. If the tick resists or cannot be completely removed, seek medical attention. Look for symptoms of Lyme disease or Rocky Mountain Spotted Fever. Lyme disease rash looks like a "bulls-eye" with a small welt in the center several days to weeks after the infection. Rocky Mountain Spotted Fever manifests as red spots under the skin, three to ten days after the infection. Symptoms for both Lyme disease and Rocky Mountain Spotted Fever include: chills, fever, headache, fatigue, stiff

neck and bone pain. If symptoms appear, seek medical attention. Most people who are infected with West Nile virus will not have any symptoms. Approximately 20% of those who are infected will develop the mild symptoms of West Nile Fever, which include: fever, headaches, body aches, and occasionally a skin rash on the trunk of the body and swollen lymph nodes. The symptoms of severe infection include headache, high fever, neck stiffness, stupor, disorientation, coma, tremors, convulsions, muscle weakness and paralysis.

- The presence of poison ivy, oak and sumac may require additional caution by those who are known to be allergic. Personnel with hay fever or allergies to pollen, ragweed, goldenrod, etc., should discuss these allergies and possible medications with their personal physician since these allergies may affect the use of respiratory protection. Personnel with allergies to insect bites should receive appropriate medical care during insect season.

Mechanical Hazards

The planned activities may also present hazards specific to working with heavy equipment, such as an excavator. Prior to intrusive activities, utilities shall be located and identified. Clearance of overhead lines shall be observed. Heavy equipment operator's shall operate and maintain the equipment in accordance with the manufacturer's directions and appropriate ANSI standards. All personnel shall respect and stay clear of all moving machinery parts and swing paths. All personnel will be trained to use and understand basic hand signals. Further safety requirements described in 29 CFR 1926.550 – Cranes, Derricks, Hoists, Elevators and Conveyors will be observed by all personnel onsite.

POTENTIAL ROUTES OF EXPOSURE

Dermal Contact

- Contact with contaminants serves as a potential route of exposure. Proper Use of PPE should preclude or minimize exposure through this route.

Inhalation

- Monitoring with a PID will be done to evaluate inhalation hazards as site conditions/activities dictate. Frequent monitoring and use of engineering controls (dust suppression) and proper use of PPE should minimize exposure through this route.

Ingestion

- Following good work practices such as the use of gloves and hand-washing will minimize potential ingestion of contaminants. No eating or smoking in the vicinity of the disturbed area is a requirement of this HASP. Work clothes should be removed immediately upon entering personal residences and washed separate from other domestic laundry.

5.0 HEALTH & SAFETY SITE LAYOUT

Site Access

Site access will be limited to personnel involved in the environmental activities. The PM or his designee will escort all visitors. All personnel must sign in on the HASP Acknowledge Form included in **Appendix A** of this HASP.

Work Zones

The HSO or his representative will establish and clearly mark the following areas with consultation of the PM.

Restricted Area, Hot Area or Red Zone

- This will be the actual work area where excavation, stockpiling, loading and any other work directly related to the handling of controlled materials will be conducted. An outer boundary will be established and clearly designated by temporary construction fencing, warning table or other appropriate method. The Restricted Area, if required, shall be described in the Site Specific Health and Safety Plan.

Limited Access Area, Warm Area or Yellow Zone

- This is an area between the actual Restricted Area, Hot Area or Red Zone and the Support Zone, Cold Area or Green Zone, established to facilitate employee and equipment decontamination, sample staging, protective equipment storage and supply and employee rest areas. The Limited Access Area, if required, shall be described in the Site Specific Health and Safety Plan.

Support Zone, Cold Area or Green Zone

- A clearly marked area is free from contamination and will be identified where administrative and other support functions can be performed. The actual location of this zone will be established by the PM and HSO by considering distances from the work zone, visibility, accessibilities and minimization of cross contamination. The Support Zone will have an area clearly marked that will house first aid and eye wash stations as well as the HASP Acknowledge Form. The Support Zone, if required, shall be described in the Site Specific Health and Safety Plan.

6.0 Personnel Protective Equipment

Level of PPE Required

All onsite personnel will be issued appropriate personal safety equipment and protective clothing according to the HASP. All safety equipment is to be used properly and protective clothing is to be kept clean and well maintained. The HSO has the authority to require the use of additional equipment if necessary for specific operations. The PPE levels required will be based on the action levels triggered by real time air monitoring and/or by conditions encountered at the site.

Recommended Action level

If at any time there is doubt about which level of PPE is acceptable per task, the higher level of protection will be selected.

Level D

- PPE will consist of steel-toed work boots, work gloves or chemical resistant gloves, long-sleeved shirts and pants or coveralls, and safety glasses. Hardhats and hearing protection will be worn during activities associated with heavy machinery. Hearing protection will be worn in close proximity to any sound source greater than 85 decibels.

Level C

- PPE will consist of Level D PPE plus the addition of a full-face air purifying respirator using combination organic vapor/P-100 cartridges or air purifying cartridges indicated in the Site Specific HASP. The addition of a Tyvek® or long-sleeved shirt if warranted will be worn due to spill hazards. If the respirator is qualitatively fit-tested (e.g. banana oil, irritant smoke), the assigned protection factor ("APF") is 10.

Level B

- PPE will consist of a full-face respirator using self-contained breathing apparatus (SCBA) or dedicated supply air line, a chemical resistant suit and a long-sleeved shirt if warranted due to spill hazards. These respirators should be quantitatively fit-tested giving an APF of 2,000 for supplied air and 10,000 for SCBA. If PPE is upgraded to Level B, the Site Safety Officer will "Stop-work" and the appropriate PPE will be donned to continue work.

If PPE is upgraded to Level C or Level B, respiratory protection requirements, such as the calculation of the end of service life (ESL) for air purifying cartridges will be performed in compliance with 29 CFR 1910.134. Used PPE will be disposed as municipal solid waste.

Changes in Levels of Protection

Any field changes to PPE will be documented in the field book and the PM will be notified.

Upgrade

- Monitoring indicates that chemical concentrations exceed action levels or a change in work task or conditions that will increase contact or potential contact with hazardous materials.

Downgrade

- Monitoring indicates that the situation is less hazardous than originally thought (e.g. monitoring indicates that chemical concentrations do not exceed action levels). A change in site conditions that decrease the hazard. A change in work task that will reduce contact with hazardous materials.

7.0 WORK PROCEDURES

Workers are required to adhere to established safe work practices for their respective specialties. The need to exercise caution in the performance of specific work tasks is made more acute due to:

- Physical and chemical properties of contaminated material;
- Other types of hazards present;
- Weather Conditions;
- Restricted mobility and reduced vision caused by the protective equipment itself; and,
- The need to maintain the integrity of the protective gear.

Work on site shall be conducted according to established protocols and guidelines for the Health and Safety of all involved.

General

- In any unknown situation, the worst conditions must always be assumed and operations must be planned accordingly.
- All personnel must minimize contact with contaminated materials. Work areas, decontamination areas and procedures must be effectively planned.
- Smoking, eating, chewing, or drinking in the Restricted Area or Limited Access Area is prohibited.
- Heat and other work stresses related to wearing protective gear shall be avoided. Work breaks should be planned to prevent stress related accidents or fatigue.
- The "buddy" system will be used at all times in the Restricted Area with backup safety personnel standing by.
- Work zones may require modification based on air contaminants measured. If concentrations increase above the Recommended Action Level, work will be suspended until the source is identified, the situation rectified or an expanded Restricted Area is established.
- Medicine and alcohol can potentate the effects from exposure to chemicals and heat/cold stress. Personnel taking prescription drugs shall not be permitted to work in the Restricted Area, unless approval has been given by the physician and reviewed by the HSO. Alcoholic beverage consumption and smoking is prohibited on the site. Persons under the influence of alcohol or prescription drugs will be excluded from the site.
- Personnel must be aware that chemical contaminants may mimic or enhance symptoms of other illnesses or intoxication. Avoid use of alcohol or working while ill during the duration of task assignment.
- Personnel must be observant of not only one's own immediate surroundings, but also those of others. Everyone will be working under constraints; therefore, a team effort is needed to warn of impending dangerous situations.

- Extra precaution is necessary when working near heavy equipment while utilizing thereby maintaining continuity.

Site Personnel

- HASP Acknowledge Forms will be maintained.
- No matches or lighters of any kind will be allowed in the Restricted Zone unless authorized by the HSO.
- All personnel will have their "buddy" with them when the "buddy" system is in effect.
- All personnel will notify the HSO of any unusual occurrences, which might effect the overall safe operation of the site.
- Any time a fire extinguisher is used, personnel shall notify the HSO of what took place. Any used fire extinguishers shall be recharged or replaced.
- All injuries and accidents shall be immediately reported to the HSO and the appropriate reports will be filed.
- All safety equipment will be located in construction trailer with additional equipment such as a fire extinguisher and an eyewash station.

Traffic Safety Rules

The specific location of traffic hazards and the procedures for protection from those hazards shall be described in the Site Specific Health and Safety Plan.

General Traffic Requirements

- High visibility safety vests shall be worn when performing work on or along roadways or highways. Safety vests must meet the minimum requirements of ANSI/ISEA 107-1999 Class 1, 2 or 3 materials, depending on the speed and sight distance available to oncoming vehicles while working on or along roadways.
- For operations located off of traveled roadways or on closed/inactive sites, high visibility clothing and/or reflective fluorescent traffic safety vests must be worn by all workers exposed to traffic hazards.
- All personnel will park and meet in a location agreed upon prior to site mobilization on the first day and at a designated area at the beginning of each workday.
- Any vehicles that will not be involved in the site operations shall be secured and the motor shut down.
- At no time should any equipment be allowed to block any access roads or entrances unless the vehicle is being utilized as a traffic control barricade, or is required to ensure worker safety from approaching traffic.
- Proactive traffic control methods such as local police enforcement and traffic control devised, such as signs, cones and flags, shall be utilized when appropriate.

- Coordination with all State and Local Highway/Roadway authorities must be made prior to roadway or highway work. Posted speed limits and other information must be obtained prior to mobilization. Specific permits are required in most jurisdictions for work on or along roadways and highways.

Fire/Explosion Safety Plan

When areas or activities susceptible to fire/explosion hazards are encountered, only tools of brass or other non sparking materials will be utilized. Monitoring for oxygen and combustible gases is required in all such situations. Levels of oxygen shall be above 19.5% or below 23.5%. Combustible gas concentrations should be maintained below 10% LEL.

Daily Housekeeping

The site and all work zones shall be kept in a neat and orderly fashion and the site is to be left safe and secure on completion of each day's work. All contaminated material removed from its original location will be labeled, contained and stored in a designated area onsite will be appropriately secured on completion of each workday. Any work vehicle entering the restricted area must be decontaminated prior to entering any clean area.

Site Personnel Conduct

All site personnel shall conduct themselves properly and in line with generally accepted good work practices. The PM will be responsible for the overall Health and Safety operations of the site. Any operation not within the scope of the HASP will be discussed fully before that operation begins.

8.0 AIR MONITORING

Air monitoring will be conducted by the HSO or designee for the express purpose of safeguarding the health and welfare of onsite personnel. The HSO will accomplish this goal by using PID, LEL, Oxygen or particulate meters as defined in the Site Specific HASP. All air monitoring for unknowns will be based against established background readings. If readings are above background levels, the HSO or his designee will investigate to determine what action must be taken. All monitoring instruments will be protected from contamination during use. All instrumentation shall be calibrated before daily use and calibration checks conducted regularly for the duration of the field activities. Calibration logs for each instrument will be kept in the field book.

9.0 RADIOLOGICAL CONCERNS

If the area in and around the site is suspected to have radioactive material, a radiation survey shall be conducted to determine if there are any radiological concerns prior to the initiation of site activities. In addition, if radioactive material is known to have been deposited onsite, screening of the soil shall be conducted during the field activities. If the radiation survey and/or screening of soils detect any radiological impacts, fieldwork must immediately STOP and the HASP will need to be reevaluated for potential worker exposure. Requirements for a radiation survey, soil screening and use of radiation detecting equipment shall be defined in the Site Specific HASP and prior to the initiation of site activities.

10.0 EMPLOYEE TRAINING

CEA's training program is designed to ensure that workers receive the training they need to work safely. Site Health and Safety training requirements are based on the job hazard assessments contained in the HASP and relevant OSHA requirements.

Hazardous Waste Operations and Emergency Response

Personnel will complete a 40-hour initial HAZWOPER training consistent with the requirements set in OSHA 29 CFR 1910.120(e)(3)(i), or have received equivalent training consistent with the provisions of 29 CFR 1910.120(e)(9), in order to work in contaminated areas.

All on-site investigators or observers conducting activities must meet the medical surveillance and training requirements in accordance with OSHA 1910.120. These requirements include the following:

- 40-hour OSHA Hazardous Waste Site Operators training.
- 8-hour OSHA annual refresher training.
- Tri-annual first aid training, Biannual CPR training and blood borne pathogens training.

Documentation regarding training certification will be maintained by CEA. All field personnel must read the HASP and sign the HASP Acknowledgment Form. Field personnel will have experience in the proper use of PPE and equipment and in performing the assigned tasks. Contractors are responsible for supplying appropriate air purifying respirators, cartridges and PPE cleaning stations to their employees.

Management and Supervisor Training

On-site managers and supervisors who are directly responsible for or who supervise workers engaged in hazardous waste operations receive, in addition to the appropriate level of worker HAZWOPER training described above, eight (8) additional hours of specialized supervisory training, in compliance with 29 CFR 1910.120(e)(4).

Refresher Training

All workers will receive annual HAZWOPER refresher training consistent with the requirements of 29 CFR 1910.120. This consists of a minimum of 8 hours of refresher class training.

Site-Specific Briefings for Visitors and Workers

All Project Field Team Members will read the HASP and will indicate their understanding of the requirements by signing the HASP Acknowledgment Form. Persons who are unable to read this document will have it read to them.

11.0 DECONTAMINATION PROCEDURES

Decontamination procedures are designed to achieve an orderly, controlled removal or neutralization of contaminants that may accumulate on personnel or equipment. These procedures minimize worker contact with contaminants and protect against the transfer of contaminants outside designated work zones. They also extend the useful life of PPE by reducing the amount of time that contaminants contact and permeate PPE surfaces. The decontamination procedures described below are designed to meet the requirements of 1910.120(k) and include project-specific information about:

- The location and type of project decontamination facilities;
- General and specific decontamination procedures for personnel and PPE;
- General and specific decontamination procedures for equipment;
- Disposal of residual waste from decontamination;
- Decontamination equipment and solutions, and;
- The monitoring procedures used to evaluate the effectiveness of decontamination.

If the conditions warrant, the PM will oversee implementation of project decontamination procedures and is responsible for ensuring their effectiveness. Decontamination is conducted in the Limited Access Area. The Limited Access Area acts as a buffer between the Restricted Area and the Support Zone. The location and design of decontamination stations minimize the spread of contamination beyond these stations. Separate facilities are used for personnel and for equipment. If project decontamination procedures are required, they will be described in the Site Specific HASP.

Personnel

Decontamination is required for all workers exiting a contaminated area. Personnel may enter the Support Zone only after undergoing the decontamination procedures.

- Brush footwear, remove and dispose of gloves, wash and rinse hands and face, shower as soon as possible;
- Used protective clothing is decontaminated, cleaned, laundered, maintained and/or replaced as needed to ensure its effectiveness;
- PPE that requires maintenance or parts replacement is decontaminated prior to repairs or service;
- PPE is decontaminated or prepared for disposal on the premises;
- Personnel who handle contaminated equipment have been trained in the proper means to do so to avoid hazardous exposure;
- Workers are required and trained to immediately exit the work zone, perform applicable decontamination procedures, shower, and change into uncontaminated clothing if their permeable clothing is splashed or becomes wetted with a hazardous substance, and;

- Procedures for decontamination waste disposal meet all applicable local, State, and Federal regulations.

Field Equipment

All tools, equipment, and machinery from the Restricted Area are decontaminated in the Limited Access Area prior to removal to the Support Zone. Equipment decontamination procedures are designed to minimize the potential for hazardous skin or inhalation exposure, cross-contamination, and chemical incompatibilities. All intrusive equipment will be decontaminated using a laboratory grade detergent wash and triple rinse with distilled/deionized water.

Heavy Equipment

- All heavy equipment shall be scraped / brushed and pressure washed or steamed cleaned prior to leaving the site;
- Equipment in the Exclusion Zone / Restricted Area that can be used again, that is still operable, and that will not pose an increased exposure hazard during re-use is left in Exclusion Zone until it is no longer needed. This eliminates unnecessary decontamination and reduces the potential for physical transfer of contaminants outside the Exclusion Zone / Restricted Area;
- Decontamination is required for all equipment exiting a contaminated area. Equipment may re-enter the Support Zone only after undergoing the equipment decontamination procedures;
- Equipment that is transported regularly between the contaminated and clean areas of the facility (e.g., monitoring equipment) is carefully decontaminated each time it is removed from the Exclusion Zone / Restricted Area and the effectiveness of decontamination is monitored to reduce the likelihood that contamination will be spread outside designated work zones, and;
- Equipment that cannot be successfully decontaminated is disposed of as hazardous waste.

Monitoring the Effectiveness of Decontamination Procedures

Visual examination and sampling are used to evaluate the effectiveness of decontamination procedures, in compliance with 29 CFR 1910.120(k)(2)(iv). Visual examination is used to ensure that procedures are implemented as described and that they appear to control the spread of contaminants under changing conditions. Where feasible, visual examination is also used to inspect for signs of residual contamination or for contaminant permeation of PPE.

Both air sampling and surface sampling are used to verify the effectiveness of decontamination. Air samples are taken in the Limited Access Area to ensure that airborne contaminants have not spread to clean areas of the facility. Surface samples are taken from the inside surfaces of PPE, from decontaminated equipment, and from surfaces within clean areas of the facility to ensure that decontamination and control

procedures are performing as anticipated. If required, the type and frequency of air and surface sampling used to ensure the effectiveness of decontamination procedures will be defined in the Site Specific HASP.

Results of the inspections of decontamination procedures and documentation of any action taken to correct deficiencies are recorded.

Personnel who work in contaminated areas are trained in the principles and practices of decontamination described in this chapter of the HASP and in related SOPs. If procedures are changed as a result of inspection and monitoring, all affected employees are notified of these changes.

Decontamination Equipment List

- HEPA vacuum and filters
- Washtubs
- Buckets
- Scrub brushes
- Pressurized sprayer
- Detergent
- Solvent
- Household bleach solution
- Distilled water
- Demonized water
- Disposable face piece sanitizer wipes
- Facemask sanitizer powder
- Wire brush
- Spray bottle.
- Banner/barrier tape
- Plastic sheeting
- Tarps and poles
- Trash bags
- Trash cans
- Masking tape
- Duct tape
- Paper towels
- Folding chairs
- Step ladders
- 5-Gallon water jugs
- Tables

12.0 COMMUNICATION

When conditions warrant, each person onsite conducting environmental investigations must remain in line-of-sight of at least one other party/buddy. Cell phones or walkie talkies are permitted for situations that require parties being out of site from other parties.

13.0 EMERGENCY RESPONSE

Pre-Emergency Planning

- The HSO performs the applicable pre-emergency planning task before starting field activities and coordinates emergency response with the construction project manager and local emergency providers as appropriate. A route from the Subject Property to the nearest hospital is as follows:
Phoenixville Memorial Medical facility is nearby and is located at 140 Nutt Road, Phoenixville, PA (610) 983-1000

Emergency Contacts

- Emergency contacts are as follows: 911

Emergency Response

- In the event of fire, medical emergency or chemical spill the HSO or designee must utilize the nearest phone and call the appropriate emergency contact. For incidents or accidents the HSO will immediately contact the Project Manager to verbally report the occurrence. If the occurrence is determined to be an OSHA-recordable injury or illness, results in property damage, requires medical attention (beyond on-site first-aid) and/or includes lost time from work, the HSO will prepare an incident report, included in **Appendix B** and submit it within 48 hours.

Emergency Medical Treatment

- The HSO will assume charge during a medical emergency until the ambulance arrives, or the injured person is admitted to the emergency room.
- Prevent further injury, and decontaminate if it would not make injury worse.
- Initiate first aid, if properly trained and designated to do so.
- Make certain that injured person is accompanied to emergency room.
- Notify the PM (s) of the injury as soon as possible.

Evacuation

- Evacuation routes will be designated by HSO prior to beginning of work.
- Onsite and offsite assembly points will be designated by CEA or Client prior to beginning of work.
- The HSO will account for all personnel in the onsite assembly points.

Spill Containment

- Contain and minimize the spill using available absorbent materials appropriate to the spilled material. Locate the nearest spill kit.

Emergency Equipment and Supplies

- ABC fire extinguisher
- First Aid Kit
- Emergency eye wash
- Spill containment materials
- 6-mil Polyethylene Sheeting

14.0 CODES, STANDARDS AND REGULATIONS

All work shall be conducted in accordance with all applicable Federal, State, City, and Industry Codes, Standards, Regulations and Procedures including but not limited to the following:

- National Fire Protection Association (NFPA)
- Underwriter Laboratory
- Compressed Gas Association
- PADOT Standards
- Coast Guard Regulations for marine construction equipment and transporting hazardous materials
- PADEP Regulations
- Federal Occupational Safety and Health Administration 29 CFR 1926
- Resource Conservation and Recovery Act 42 U.S.C. Par.6921 et seq.
- Solid Waste Disposal Act 42 U.S.C. par 6930 and 6935
- Federal Register, Volume 57, Page 41612, 10 September 1992
- Title 40, Code of Federal Regulations, Part 261 – Identification and Listing of Hazardous Waste
- Title 40, Code of Federal Regulations, Part 262.11 – Hazardous Waste Determination
- Title 40, Code of Federal Regulations, Part 279 – Standards for the Management of Used Oil
- Environmental Conservation law Par. 27-0101 et seq. – Solid and Hazardous Waste Management Policy and Planning
- Environmental Conservation law Par. 27-0101 et seq. – Waste Transporter Permits
- Environmental Conservation law Par. 71-2727 – Enforcement of Articles 27 and 71
- US DOT-Manual Uniform Traffic Control Devices (MUTCD)
- OSHA - Standard - 29 CFR Underground Lines - 1926.956
- OSHA - Standards - 29 CFR Ladders - 1926.1053
- OSHA -Standards - 29 CFR Electric Power Generation, Transmission, and Distribution - 1910.269
- Electrical Enclosed Spaces
- OSHA Standard - 29 CFR Eye and Face Protection - 1910.133
- OSHA Standard - 29 CFR Hand Protection - 1910.138
- OSHA Standard - 29 CFR Occupational Foot Protection - 1910.136
- OSHA -Standard - 29 CFR Respiratory Protection - 1910.134
- OSHA Standard – 29 CFR 1926.59 – Hazard Communication
- OSHA Standard – 29 CFR 1926.52 –Occupational Noise Exposure
- OSHA Standard – 29 CFR 1926 Subpart H – Material Handlings, Storage,
- OSHA Standard – 19 CFR 1926 Subpart I – Tools _Hand & Power (1926.300 through 1926.307)

15.0 RECORD KEEPING

All Health and Safety records related to the HASP will be maintained in the CEA project files. The HASP Acknowledgement Form is attached to this HASP. A daily report of field activities will be maintained in the field book and part of CEAs project files. The Material Safety Data Sheets for chemicals of concern are attached.

16.0 HASP APPROVAL

HASP Prepared By:

John Van Wagenen, PG

Signature:

John Van Wagenen

Date:

12/5/2014

HASP Approved By:

John Van Wagenen, PG

Signature:

John Van Wagenen

Date:

12/5/2014

17.0 PLAN REVISION

Revisions to the HASP will be reviewed and approved by CEA. Revisions will be kept as an attachment to this HASP.

APPENDIX A - HASP ACKNOWLEDGMENT FORM

Client: Ms. Stephanie Fanfera

Project: Former Blair Auto Center Site Characterization/Remediation

Project Number: BLAIR.01

Work Location: 3575 Schuylkill Road, Spring City, PA

I certify that I have read, understand the potential hazards at the site and procedures to minimize exposure and will abide by the Health and Safety Plan.

[illegible]

APPENDIX B - INCIDENT REPORTING FORM

Date:

Time of Accident:

Climatic Conditions:

Field Team Leader/SSO:

Employee Injured:

Company Affiliation:

Social Security Number:

Insurance Company:

Number of Workers at Site:

Name of Worker:

1 _____
2 _____
3 _____
4 _____
5 _____

Company Affiliation:

Circumstances of the Injury/Emergency Action:

Emergency Action Taken:

Was First Aid was provided?

Was an emergency phone call made to the Safety Officer?

Ambulance Service Used:

Hospital Used:

Attending Physician:

Company Representative Contacted:

Contractor Representatives Contacted:

APPENDIX C - TAILGATE MEETING ATTENDANCE FORM

Prepared by:

Date:

Client:

Project:

Project Number:

Work Location:

Scope of Work:

Safety Topics Presented

- Name of SSO and designated alternate;
- Site history;
- Hazardous substances which may be encountered during initial site development activities, including their properties and symptoms of exposure as well as location of Material Safety Data Sheets;
- Work Tasks to be performed;
- Use and maintenance of environmental surveillance equipment;
- Action levels and identification of situations which require and upgrade or downgrade in levels of protection;
- Level of protection to be employed for work area tasks, including use , operation, limitations and maintenance of respiratory protection;
- Site control measures;
- Physical hazards including safe operating practices, communications, etc.
- Training requirements;
- Decontamination procedures;
- Personal exposure procedure (skin contact, inhalation, ingestions, falls, etc.);
- Potential or actual fire or explosion emergency procedure;
- Environmental accidents emergency procedure (spread of contamination outside of exclusion zone)
- Emergency signals and/or codes;
- Location of the nearest medical facility and emergency phone numbers.

Attendees

Name	Company	Date	Signature

Comments/Questions

Regen OX – Part A (Oxidizer Complex) Material Safety Data Sheet (MSDS)

Last Revised: November 7, 2005

Section 1 – Supplier Information and Material Identification

Supplier:



REGENESIS

1011 Calle Sombra

San Clemente, CA 92673

Telephone: 949.366.8000

Fax: 949.366.8090

E-mail: info@regenesis.com

Chemical Description: A mixture of sodium percarbonate [$2\text{Na}_2\text{CO}_3 \cdot 3\text{H}_2\text{O}_2$], sodium carbonate [Na_2CO_3], sodium silicate and silica gel.

Chemical Family: Inorganic Chemicals

Trade Name: Regen Ox – Part A (Oxidizer Complex)

Product Use: Used to remediate contaminated soil and groundwater (environmental applications)

Section 2 – Chemical Information/Other Designations

<u>CAS No.</u>	<u>Chemical</u>
15630-89-4	Sodium Percarbonate
5968-11-6	Sodium Carbonate Monohydrate
1344-09-8	Silicic Acid, Sodium Salt, Sodium Silicate
63231-67-4	Silica Gel

Section 3 – Physical Data

Form: Powder

Color: White

Odor: Odorless

Melting Point: NA

Boiling Point: NA

Section 3 – Physical Data (cont)

Flammability/Flash Point:	NA
Vapor Pressure:	NA
Bulk Density:	0.9 – 1.2 g/cm ³
Solubility:	Min 14.5g/100g water @ 20 °C
Viscosity:	NA
pH (3% solution):	~ 10.5
Decomposition Temperature:	Self-accelerating decomposition with oxygen release starts at 50 °C.

Section 4 – Reactivity Data

Stability:	Stable under normal conditions
Conditions to Avoid/Incompatibility:	Acids, bases, salts of heavy metals, reducing agents, and flammable substances
Hazardous Decomposition Products:	Oxygen. Contamination with many substances will cause decomposition. The rate of decomposition increases with increasing temperature and may be very vigorous with rapid generation of oxygen and steam.

Section 5 – Regulations

TSCA Inventory Listed:	Yes
CERCLA Hazardous Substance (40 CFR Part 302)	
Listed Substance:	No
Unlisted Substance:	Yes
SARA, Title III, Sections 313 (40 CFR Part 372) – Toxic Chemical Release Reporting: Community Right-To-Know	
Extremely Hazardous Substance:	No
WHMIS Classification:	C, D2B
Canadian Domestic Substance List:	Appears

Section 6 – Protective Measures, Storage and Handling

Technical Protective Measures

Storage:

Oxidizer. Store in a cool, well ventilated area away from all sources of ignition and out of the direct sunlight. Store in a dry location away from heat and in temperatures less than 40 °C.

Keep away from incompatible materials and keep lids tightly closed. Do not store in improperly labeled containers.

Protect from moisture. Do not store near combustible materials. Keep containers well sealed.

Store separately from reducing materials. Avoid contamination which may lead to decomposition.

Handling:

Avoid contact with eyes, skin and clothing. Use with adequate ventilation.

Do not swallow. Avoid breathing vapors, mists or dust. Do not eat, drink or smoke in the work area.

Label containers and keep them tightly closed when not in use.

Wash hands thoroughly after handling.

Personal Protective Equipment (PPE)

Engineering Controls:

General room ventilation is required if used indoors. Local exhaust ventilation, process enclosures or other engineering controls may be needed to maintain airborne levels below recommended exposure limits. Avoid creating dust or mists. Maintain adequate ventilation at all times. Do not use in confined areas. Keep levels below recommended exposure limits. To determine actual exposure limits, monitoring should be performed on a routine basis.

Respiratory Protection:

For many conditions, no respiratory protection is necessary; however, in dusty or unknown conditions or when exposures exceed limit values a NIOSH approved respirator should be used.

Hand Protection:

Wear chemical resistant gloves (neoprene, rubber, or PVC).

Section 6 – Protective Measures, Storage and Handling (cont)

Eye Protection:	Wear chemical safety goggles. A full face shield may be worn in lieu of safety goggles.
Skin Protection:	Try to avoid skin contact with this product. Chemical resistant gloves (neoprene, PVC or rubber) and protective clothing should be worn during use.
Other:	Eye wash station.
Protection Against Fire & nonExplosion:	Product is non-explosive. In case of fire, evacuate all essential personnel, wear protective clothing and a selfcontained breathing apparatus, stay upwind of fire, and use water to spray cool fire-exposed containers.

Section 7 – Hazards Identification

Potential Health Effects

Inhalation:	Causes irritation to the respiratory tract. Symptoms may include coughing, shortness of breath, and irritations to mucous membranes, nose and throat.
Eye Contact:	Causes irritation, redness and pain.
Skin Contact:	Causes slight irritation.
Ingestion:	May be harmful if swallowed (vomiting and diarrhea).

Section 8 – Measures in Case of Accidents and Fire

After Spillage/Leakage:	Eliminate all ignition sources. Evacuate unprotected personnel and never exceed any occupational exposure limit. Shovel or sweep spilt material into plastic bags or vented containers for disposal. Do not return spilled or contaminated material to the inventory.
Extinguishing Media:	Water
First Aid	
Eye Contact:	Flush eyes with running water for at least 15 minutes with eyelids held open. Seek a specialist.
Inhalation:	Remove affected person to fresh air. Seek medical attention if the effects persist.

Ingestion:	If the individual is conscious and not convulsing, give two four cups of water to dilute the chemical and seek medical attention immediately. <u>Do Not</u> induce vomiting.
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Section 8 – Measures in Case of Accidents and Fire (cont)

Skin Contact:	Wash affected areas with soap and a mild detergent and large amounts of water.
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Section 9 – Accidental Release Measures

Precautions:

Cleanup Methods:	Shovel or sweep spilt material into plastic bags or vented containers for disposal. Do not return spilled or contaminated material to the inventory.
-------------------------	--

Section 10 – Information on Toxicology

Toxicity Data

LD50 Oral (rat):	2,400 mg/kg
LD50 Dermal (rabbit):	Min 2,000 mg/kg
LD50 Inhalation (rat):	Min 4,580 mg/kg

Section 11 – Information on Ecology

Ecology Data**Ecotoxicological
Information:**

NA

Section 12 – Disposal Considerations

Waste Disposal Method

Waste Treatment:	Dispose of in an approved waste facility operated by an authorized contactor in compliance with local regulations.
-------------------------	--

Package (Pail) Treatment:	The empty and clean containers are to be recycled or disposed of in conformity with local regulations.
----------------------------------	--

Section 13 – Shipping/Transport Information

D.O.T. Shipping Name: Oxidizing Solid, N.O.S. [A mixture of sodium percarbonate [$2\text{Na}_2\text{CO}_3 \cdot 3\text{H}_2\text{O}_2$], sodium carbonate [Na_2CO_3], sodium silicate and silica gel.]

UN Number: 1479

Hazard Class: 5.1

Labels: 5.1 (Oxidizer)

Packaging Group: III

Section 14 – Other Information

HMIS® Rating	Health – 1 (slight)	Reactivity – 1 (slight)
	Flammability – 0 (none)	Lab PPE – goggles, gloves, and lab coat

HMIS® is a registered trademark of the National Painting and Coating Association.

Section 15 – Further Information

The information contained in this document is the best available to the supplier at the time of writing, but is provided without warranty of any kind. Some possible hazards have been determined by analogy to similar classes of material. The items in this document are subject to change and clarification as more information become available. This document is intended only as a guide to the appropriate precautionary handling of the material by a properly trained person. Individuals receiving this information must exercise their independent judgment in determining its appropriateness for a particular purpose.

Regen OX – Part B (Activator Complex)
Material Safety Data Sheet (MSDS)

Last Revised: November 7, 2005

Section 1 – Supplier Information and Material Identification

Supplier:



REGENESIS

1011 Calle Sombra
San Clemente, CA 92673
Telephone: 949.366.8000
Fax: 949.366.8090
E-mail: info@regenesisis.com

Chemical Description:	A mixture of sodium silicate solution, silica gel and ferrous sulfate
Chemical Family:	Inorganic Chemicals
Trade Name:	Regen Ox – Part B (Activator Complex)
Product Use:	Used for environmental remediation of contaminated soils and groundwater

Section 2 – Chemical Information/Other Designations

<u>CAS No.</u>	<u>Chemical</u>
1344-09-8	Silicic Acid, Sodium Salt, Sodium Silicate
63231-67-4	Silica Gel
7720-78-7	Ferrous Sulfate
7732-18-5	Water

Section 3 – Physical Data

Form:	Liquid
Color:	Blue/Green
Odor:	Odorless
Melting Point:	NA
Boiling Point:	NA
Flammability/Flash Point:	NA
Vapor Pressure:	NA

Section 3 – Physical Data (cont)

Specific Gravity	1.39 g/cm ³
Solubility:	Miscible
Viscosity:	NA
pH (3% solution):	11
Hazardous Decomposition Products:	Oxides of carbon and silicon may be formed when heated to decomposition.

Section 4 – Reactivity Data

Stability:	Stable under normal conditions.
Conditions to Avoid:	None.
Incompatibility:	Avoid hydrogen fluoride, fluorine, oxygen difluoride, chlorine trifluoride, strong acids, strong bases, oxidizers, aluminum, fiberglass, copper, brass, zinc, and galvanized containers.

Section 5 – Regulations

TSCA Inventory Listed:	Yes
CERCLA Hazardous Substance (40 CFR Part 302)	
Listed Substance:	No
Unlisted Substance:	Yes
SARA, Title III, Sections 302/303 (40 CFR Part 355) – Emergency Planning and Notification	
Extremely Hazardous Substance:	No
SARA, Title III, Sections 311/312 (40 CFR Part 370) – Hazardous Chemical Reporting: Community Right-To-Know	
Hazard Category:	Acute
SARA, Title III, Sections 313 (40 CFR Part 372) – Toxic Chemical Release Reporting: Community Right-To-Know	
Extremely Hazardous Substance:	No

Section 6 – Protective Measures, Storage and Handling

Technical Protective Measures

Storage: Keep in a tightly closed container (steel or plastic) and store in a cool, well ventilated area away from all incompatible materials (acids, reactive metals, and ammonium salts). Store in a dry location away from heat and in temperatures less than 24 °C. Do not store in aluminum, fiberglass, copper, brass, zinc or galvanized containers.

Handling: Avoid contact with eyes, skin and clothing. Avoid breathing spray mist. Use with adequate ventilation. Do not use product if it is brownish-yellow in color.

Personal Protective Equipment (PPE)

Engineering Controls: General room ventilation is required if used indoors. Local exhaust ventilation, process enclosures or other engineering controls may be needed to maintain airborne levels below recommended exposure limits. Safety shower and eyewash station should be within direct access.

Respiratory Protection: Use NIOSH-approved dust and mist respirator where spray mist exists. Respirators should be used in accordance with 29 CFR 1910.134.

Hand Protection: Wear chemical resistant gloves.

Eye Protection: Wear chemical safety goggles. A full face shield may be worn in lieu of safety goggles.

Skin Protection: Try to avoid skin contact with this product. Gloves and protective clothing should be worn during use.

Other:

Protection Against Fire & Explosion: Product is non-explosive and non-combustible.

Section 7 – Hazards Identification

Potential Health Effects

Inhalation:	Causes irritation to the respiratory tract. Symptoms may include coughing, shortness of breath, and irritations to mucous membranes, nose and throat.
Eye Contact:	Causes irritation, redness and pain.
Skin Contact:	Causes irritation. Symptoms include redness, itching and pain.
Ingestion:	May cause irritation to mouth, esophagus, and stomach.

Section 8 – Measures in Case of Accidents and Fire

After Spillage/Leakage (small):	Mop up and neutralize liquid, then discharge to sewer in accordance with local, state and federal regulations.
After Spillage/Leakage (large):	Keep unnecessary personnel away; isolate hazard area and do not allow entrance into the affected area. Do not touch or walk through spilled material. Stop leak if possible without risking injury. Prevent runoff from entering into storm sewers and ditches that lead to natural waterways. Isolate the material if at all possible. Sand or earth may be used to contain the spill. If containment is not possible, neutralize the contaminated area and flush with large quantities of water.
Extinguishing Media:	Material is compatible with all extinguishing media.
Further Information:	
First Aid	
Eye Contact:	Flush eyes with running water for at least 15 minutes with eyelids held open. Seek a specialist.
Inhalation:	Remove affected person to fresh air. Give artificial respiration if individual is not breathing. If breathing is difficult, give oxygen. Seek medical attention if the effects persist.
Ingestion:	If the individual is conscious and not convulsing, give two-four cups of water to dilute the chemical and seek medical attention immediately. <u>DO NOT</u> induce vomiting.
Skin Contact:	Wash affected areas with soap and a mild detergent and large amounts of water. Remove contaminated clothing and shoes.

Section 9 – Accidental Release Measures

Precautions:

PPE: Wear chemical goggles, body-covering protective clothing, chemical resistant gloves, and rubber boots (see Section 6).

Environmental Hazards: Sinks and mixes with water. High pH of this material may be harmful to aquatic life. Only water will evaporate from a spill of this material.

Cleanup Methods: Pick-up and place in an appropriate container for reclamation or disposal. US regulations (CERCLA) require reporting spills and releases to soil, water and air in excess of reportable quantities.

Section 10 – Information on Toxicology

Toxicity Data

Sodium Silicate: When tested for primary eye irritation potential according to OECD Guidelines, Section 405, a similar sodium silicate solution produced corneal, iridal and conjunctival irritation. Some eye irritation was still present 14 days after treatment, although the average primary irritation score has declined from 29.7 after 1 day to 4.0 after 14 days. When tested for primary skin irritation potential, a similar sodium silicate solution produced irritation with a primary irritation index of 3 to abraded skin and 0 to intact skin. Human experience confirms that irritation occurs when sodium silicates get on clothes at the collar, cuffs, or other areas where abrasion may exist.

The acute oral toxicity of this product has not been tested.

Ferrous Sulfate: LD50 Oral (rat): 319 mg/kg not a suspected carcinogen.

Section 11 – Information on Ecology

Ecology Data**Ecotoxicological
Information:**

Based on 100% solid sodium silicate, a 96 hour median tolerance for fish of 2,320 mg/l; a 96 hour median tolerance for water fleas of 247 mg/L; a 96 hour median tolerance for snail eggs of 632 mg/L; and a 96 hour median tolerance for Amphipoda of 160 mg/L.

Section 12 – Disposal Considerations

Waste Disposal Method**Waste Treatment:**

Neutralize and landfill solids in an approved waste facility operated by an authorized contactor in compliance with local regulations.

Package (Pail) Treatment:

The empty and clean containers are to be recycled or disposed of in conformity with local regulations.

Section 13 – Shipping/Transport Information

D.O.T.

This product is not regulated as a hazardous material so there are no restrictions.

Section 14 – Other Information

HMIS® Rating

Health – 2 (moderate)

Reactivity – 0 (none)

Flammability – 0 (none)

Lab PPE – goggles,

Contact – 1 (slight)

gloves, and lab coat

HMIS® is a registered trademark of the National Painting and Coating Association.

Section 15 – Further Information

The information contained in this document is the best available to the supplier at the time of writing, but is provided without warranty of any kind. Some possible hazards have been determined by analogy to similar classes of material. The items in this document are subject to change and clarification as more information become available. This document is intended only as a guide to the appropriate precautionary handling of the material by a properly trained person. Individuals receiving this information must exercise their independent judgment in determining its appropriateness for a particular purpose.