



8 September 2016

Mr. Nathan Freeman Remedial Bureau B, Section D Division of Environmental Remediation New York State Department of Environmental Conservation 625 Broadway, 12th Floor Albany, NY 12233-7012

RE: Pre-Design Investigation Activities

Contract/WA No: D007624-32

Site/Spill No./Pin: Former Adirondack Steel Site OU-3 (Site No. 401039)

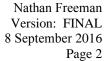
Dear Mr. Freeman:

EA Engineering, P.C., and its affiliate EA Science and Technology (EA) were tasked by the New York State Department of Environmental Conservation (NYSDEC) under Work Assignment Number (No.) D007624-32 to perform pre-design investigation (PDI) activities and prepare a basis of design for Former Adirondack Steel Site OU-3 (Site No. 401039). This Letter Work Plan describes Task 4 – Environmental Sampling and Implementation activities proposed for the Former Adirondack Steel Site located in Colonie, New York, shown on Figure 1. This Work Plan is being prepared based on historical data and the onsite meeting held with the NYSDEC in January 2016. EA will conduct field activities for additional site characterization to refine the nature and extent of soil contamination.

The specific objectives for Task 4 include:

- Develop and implement a soil sampling program to fill identified data gaps and to confirm the extents of soil contamination.
- Perform a high-resolution topographic survey before and after soil sampling.
- Evaluate stormwater flow in the drainage ditch along the north eastern property boundary.

Data collected from the soil sampling, survey, and stormwater flow study will be incorporated into the remedial design (RD).





Field sampling activities will be conducted in accordance with EA's Generic Field Activities Plan¹, Quality Assurance Project Plan², and Health and Safety Plan³. Additionally, a site-specific Health and Safety Plan Addendum is included in Appendix A. The following PDI activities will be completed as part of the site investigation:

- Geoprobe® sampling and laboratory analysis
- Surface soil sampling and laboratory analysis
- Transducer installation and data collection (stormwater flow study)
- Data validation
- Site surveying.

BACKGROUND AND RATIONALE

Site Description

The Former Adirondack Steel Site is currently a Class 2 site listed on the NYSDEC Registry of Inactive Hazardous Waste Sites (Site No. 401039). The site is located at 191 Watervliet-Shaker Road in the Town of Colonie, Albany County, New York, and it is the location of an abandoned steel mill called the Adirondack Steel Casting Co. Inc. It is located within a mile of five other sites in the New York State Remedial Program. A site location map is provided in Figure 1.

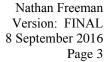
Adirondack Steel Casting Co. Inc. produced steel casting for various industrial customers. The site contained transformers associated with the steel mill that were the source of the known polychlorinated biphenyl (PCB) contamination. A variety of tenants also occupied the property while it was known as the Adirondack Industrial Park. PCBs are understood to have reached the soils at the site through routine maintenance of transformers, poor handling of used fluids, and/or unauthorized scavenging. In 1993, the United States Environmental Protection Agency (EPA) responded to spilled PCBs and soil contamination by excavating soil and disposing of it; however, significant PCB soil contamination remained.

The site currently occupies 4.2 acres of the 38.5 former industrial property and includes three operable units (OU): OU-1 (0.4 acres), OU-2 (2.1 acres offsite), and OU-3 (3.8 acres onsite). The property contains eight dilapidated, unoccupied buildings, foundation slabs of the original production buildings, deteriorating access roads, and emerging tree growth. Drainage ways also border the east and north sides of the property. The drainage way to the east (OU-2) is largely stagnant and is located between the site and an active rail line owned and operated by Canadian Pacific. OU-3 contains the northern drainage way, which flows between the site and an industrial landfill, and the PCB contaminated soil in the adjacent uplands

¹EA. 2011. Generic Field Activities Plan for Work Assignments under NYSDEC Contract D007624. April.

² EA. 2011. Generic Quality Assurance Project Plan for Work Assignments under NYSDEC Contract D007624. October.

³ EA. 2011. Generic Health and Safety Plan for Work Assignments under NYSDEC Contract D007624. October.





The area surrounding the property is mixed industrial-residential use. The OU-3 site borders on undeveloped land to the west and north, and an active rail line to the east. The property itself is zoned "industrial" and has recently been acquired by a private party who is actively developing the property surrounding OU-3 into an industrial park. OU-3 is comprised of building foundations and debris, a clean-fill area, a recyclable material stockpile and brownfield areas with the previously noted drainage way, which also contains PCB contaminated sediment. A site layout map is provided in Figure 2.

Remedial Investigation/Selected Remedy

A Remedial Investigation (RI) was performed for OU-1 and OU-3 between 2005 and 2007⁴. In 2008, Ecology and Environment Engineering, P.C. further assessed the lateral extent of PCB contamination in sediment identified during the RI. Based on the results, an interim remedial measure was conducted to excavate PCB contaminated soil in OU-1 and OU-3⁵. In March 2010, NYSDEC completed the Record of Decision (ROD) for OU-1⁶ and in 2011, the EPA conducted PCB delineation sampling in OU-2 and OU-3. A supplemental RI was also performed for OU-3 in 2014⁷. Potential remedial alternatives for the site were identified, screened, and evaluated in the 2014 Feasibility Study (FS)⁸. Potential remedial alternatives for the site were identified, screened, and evaluated in the FS. Based on the RI and FS, the NYSDEC issued the ROD that identified the selected remedy for the Site⁹. The remedy includes excavation and disposal of PCB contaminated soil, sediment, and fill from OU-3, backfilling of the excavation with clean fill, abandonment of onsite groundwater monitoring wells, imposition of an industrial control, and development of a corresponding site management plan.

The remedy in the ROD will be refined during the Remedial Design (RD).

SCOPE OF WORK

The primary focus of this Work Assignment is to design the construction plans and specifications of the selected remedial action at the Former Adirondack Steel Site OU-03. Prior to design of the remedial action, additional site characterization will be performed to refine the nature and extent of soil contamination. Field sampling activities will be conducted in accordance with EA's Generic Field Activities Plan¹, Quality Assurance Project Plan², and Health and Safety Plan³.

⁴ Ecology and Environment Engineering, P.C. 2008. Final Remedial Investigation Report for the Former Adirondack Steel Site, Colonie, New York.

⁵ Ecology and Environment Engineering, P.C. 2010. Final Interim Remedial Measure Report for the Former Adirondack Steel Site, Colonie, New York.

⁶ NYSDEC. 2010. Former Adirondack Steel Site Record of Decision OU-1. March.

⁷ Ecology and Environment Engineering, P.C. 2014. Draft Supplemental Remedial Investigation Report. February.

⁸ Ecology and Environment Engineering, P.C. 2014. Feasibility Study for Former Adirondack Steel Site Operable Unit OU-3. May.

⁹NYSDEC. 2015. Record of Decision. March.





The following PDI activities will be completed as part of the site investigation portion of the Work Assignment:

- Soil sampling
- Site surveying
- Stormwater flow study.

Soil Sampling

EA, in conjunction with a drilling sub-contractor, SJB Services, Inc. (SJB), will perform soil sampling and profiling at the site to further define the extent of PCB contamination. This data will be used to refine the limits of soil contamination depths and the quantities of potential toxic substances control act (TSCA) and non-TSCA waste materials within the RD package.

EA applied a 25 foot (ft) by 25 ft grid to the site and evaluated the existing data for data gaps. If contamination is not bound in a grid space horizontally or vertically, a sample will be collected. A total of 76 samples, not including QA/QC samples, will be collected during a 3-day field effort (Figure 3).

Surface soil sampling locations, where only the top foot of soil will be sampled (0–1 ft below ground surface), will be composite samples. Soil will be collected by hand using a drain spade from the center and each corner of the grid space, composited, and placed into sample containers. Descriptions of the soil sample texture, composition, color, consistency, moisture content, odor, photoionization detector (PID) readings, and staining will be documented using the Unified Soil Classification System. Surface samples will be analyzed for PCBs by EPA Method 8082.

Soil borings will be completed using direct push methodology (Geoprobe®). Soil cores will be collected continuously at each boring location using 4-ft macro-core sample units. Soil boring logs describing subsurface soil encountered at each of the borings will be prepared by the onsite geologist. Descriptions of soil sample texture, composition, color, consistency, moisture content, recovery, odor, PID readings, and staining will be documented using the Unified Soil Classification System. The soil borings will be advanced up to approximately 10 ft below ground surface and multiple soil samples will be collected from some of the borings based on the location and confirmation needed. Boreholes will be backfilled with hydrated bentonite to grade.

Soil samples will be analyzed for PCBs by EPA Method 8082, total metals by EPA Method 6010B, and select samples will be analyzed for Toxicity Characteristic Leaching Procedure by EPA Method 1311 – Cat B, as determined in the field. Soil samples collected from the shallowest depth interval will be analyzed first, while the remaining samples are held at the laboratory. Samples of subsequent depth intervals will be analyzed if the sample interval above exceeds NYSDEC Soil Cleanup Objectives and additional vertical delineation is required.

Table 1 outlines the proposed sampling and analysis plan. Figure 3 depicts the PDI sampling locations.





Site Surveying

Prior to the soil sampling effort, a high resolution (1-ft contours) topographic survey will be completed by Popli Design Group (Popli). The survey will cover the approximately 4.2 acres and will tie into the previous survey of the adjacent drainage channels, completed as part of the RI for OU-02. Popli will also mark out the sampling locations prior to sampling. EA will provide field oversight of Popli during performance of the site surveys. The survey is expected to take 2 days to complete.

Stormwater Flow Study

EA will perform a stormwater flow study in the drainage ditch along the north property boundary. Up to three transducers will be placed along the bottom of the drainage channel to record flow volume through the channel, and one transducer will be placed at the bank full channel height as a reference point. The transducers will be left in place through the final design preparation in July 2017, recording continuous data. EA will be onsite periodically to download the data from the transducers. The data will be correlated with rainfall events to help determine the volume of flow through the channel. This data will be used and presented in the preliminary design, since surface water bypass of the drainage channel will be required during the remedial action.

Documentation

Field activities will be documented in a dedicated field logbook that will be maintained for all site activities. Field forms including soil boring logs will be used during onsite work. Photographs will also be taken to document field activities, as appropriate.

Investigation Derived Waste/Decontamination

All downhole equipment will be decontaminated between drilling locations. Any fluids and soil waste produced during drilling and decontamination will be containerized in 55-gallon Department of Transportation drums and staged onsite for disposal during the remedial action.

Data Validation

An independent third-party data validator will review the chemical data generated during the course of the PDI to ensure that data quality objectives have been met.

Final Report

Upon completion of the PDI activities, all data will be evaluated relative to the ROD. Based on this evaluation, a final report will be completed to identify necessary requirements to complete the remedial action, including any recommended changes or additions to the conceptual design as described in the ROD. The final report will include at a minimum:





- Summary of task activities with regard to pre-design investigation
- Necessary requirements to excavate, manage, and properly dispose of contaminated sediment
- Identify other concerns which may affect the public health, the environment, or implementation of the remedy
- Summary tables of analytical results
- Conclusions and recommendations for the RD.

The findings of the final report will be produced by EA, analyzed, and made available to NYSDEC for review.





This Scope of Work is to be completed in one mobilization and is estimated to require five days to complete during Fall 2016. A preliminary schedule of milestones is provided in the following project schedule table. Key milestones are identified in order to monitor work progress throughout the duration of the project.

Project Schedule

Investigation Milestone	Estimated days from Submittal of Work Plan
Prepare PDI Work Plan to NYSDEC	
Receive comments from NYSDEC	15
Submit Final PDI Work Plan NYSDEC	5
Initiate field activities	15
Submit PDI report to NYSDEC	60

If you have any questions or require additional information, please do not hesitate to contact me at 315-565-6570.

Sincerely yours,

EA SCIENCE AND TECHNOLOGY

Ben Young

Project Manager

Don Conan, P.E.

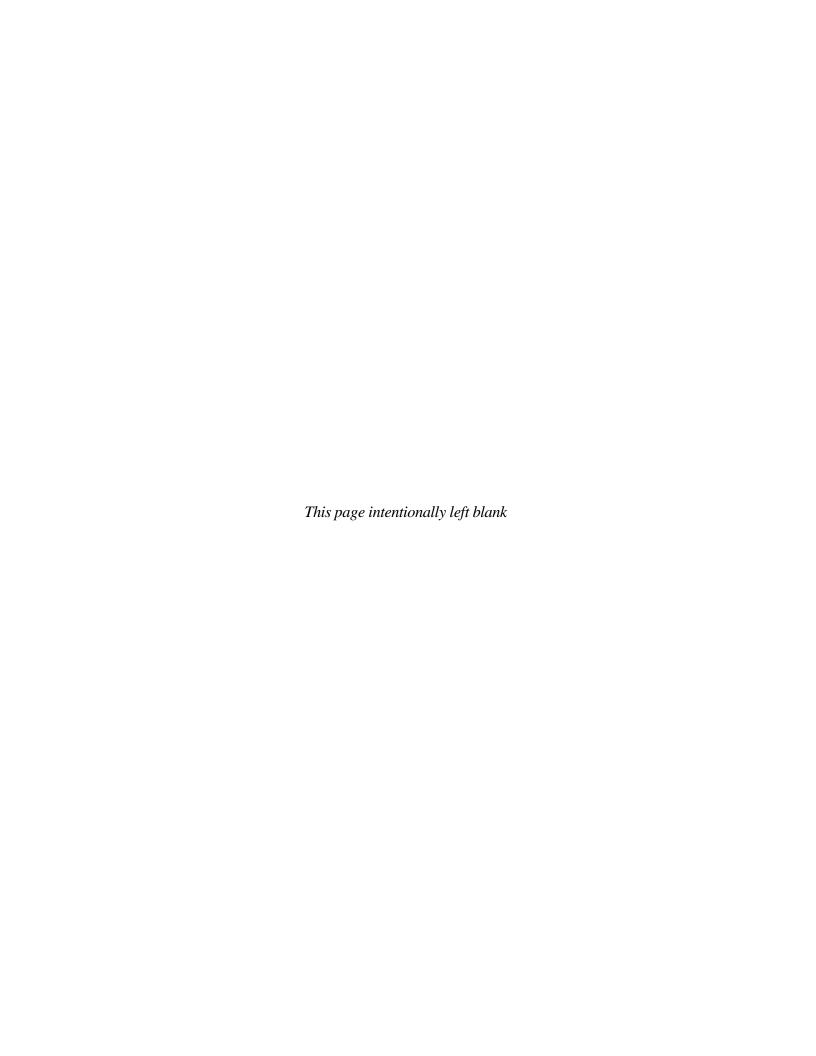
Vice President

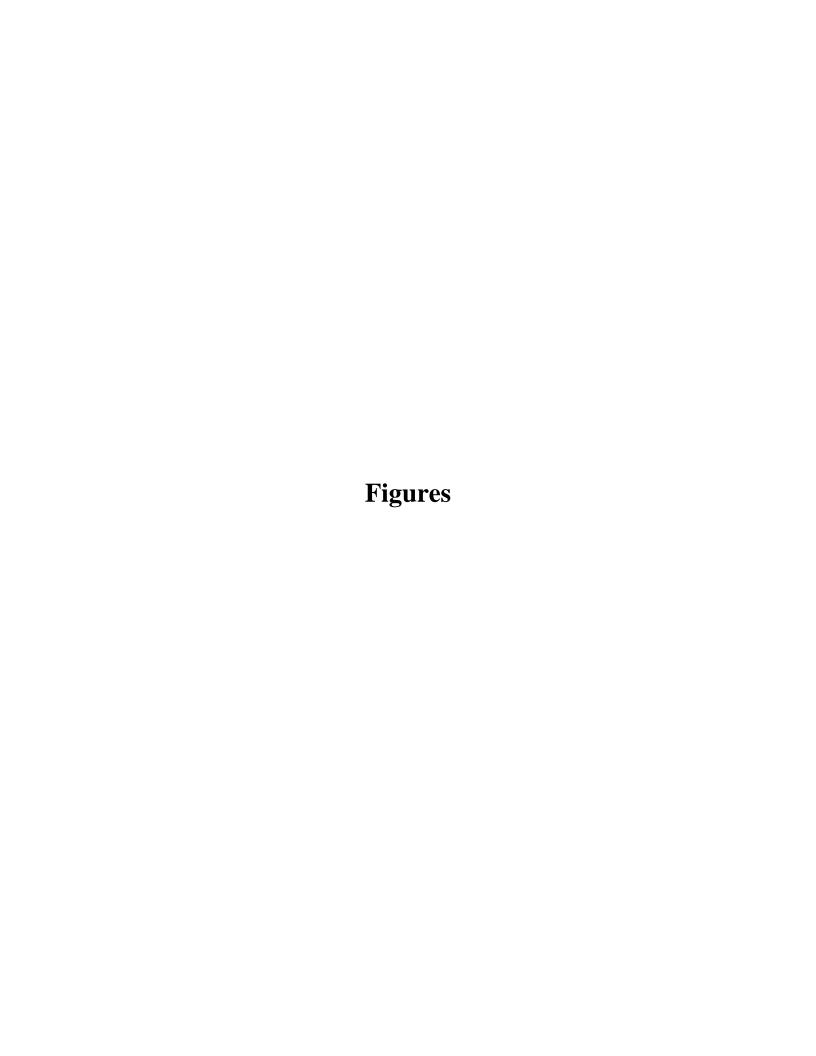
Appendix A: Health and Safety Plan Addendum

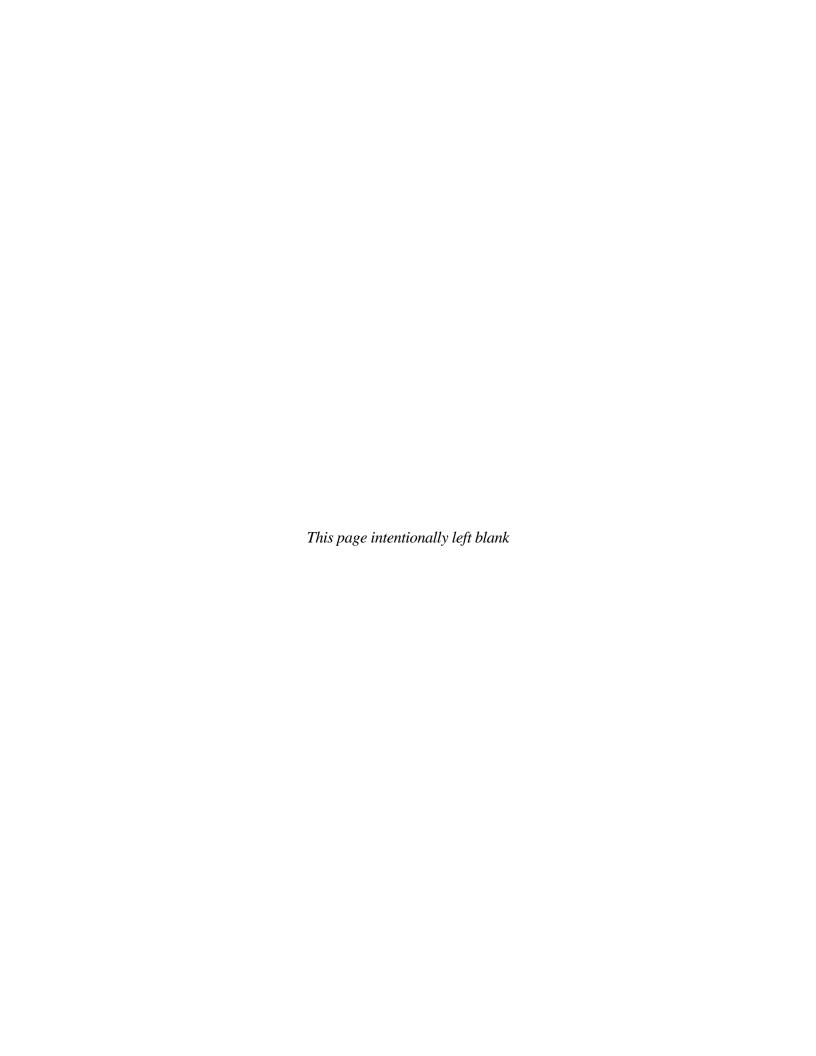
cc: S. Dewes (NYSDEC)

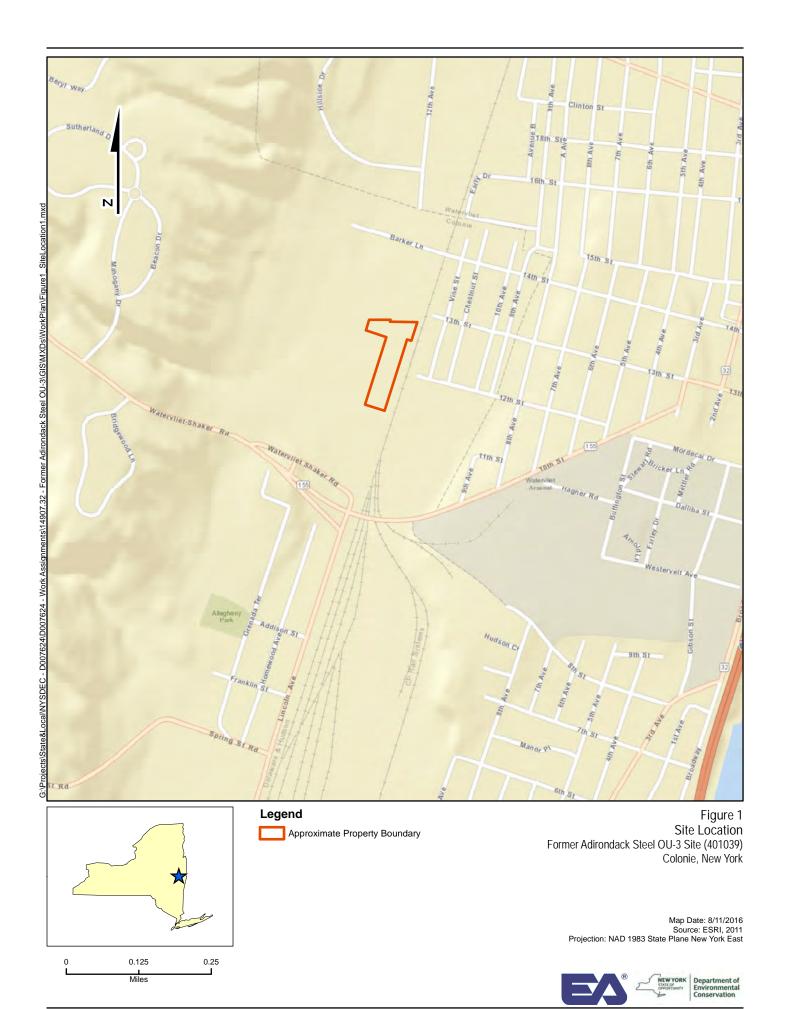
R. Casey (EA)

B. Conden (EA)

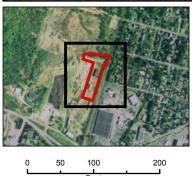












Approximate Drainageway

Waste Fill Area

Sediment Impacted Area

OU 1

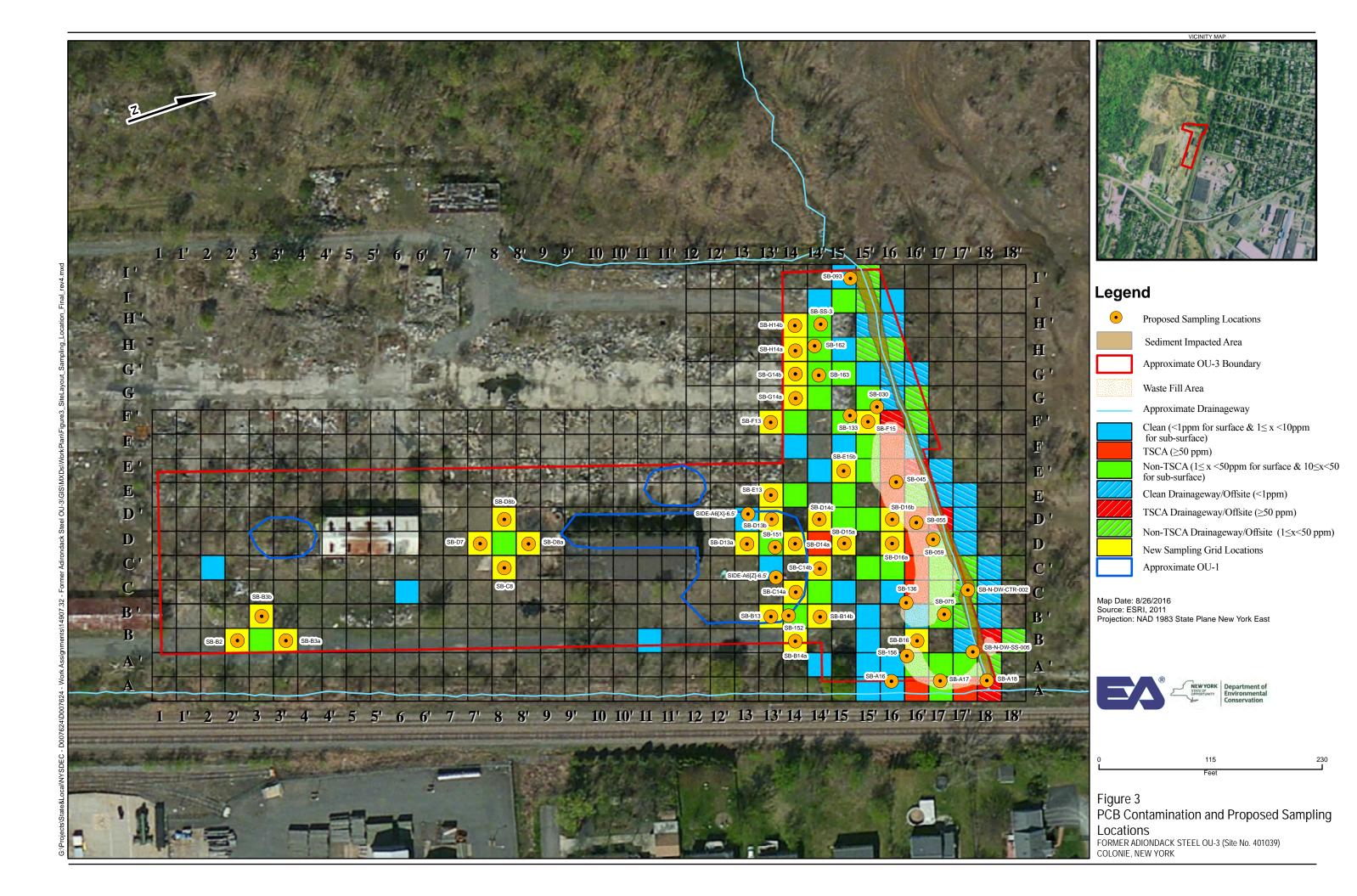
OU 3 Buildings

Approximate OU-3 Boundary

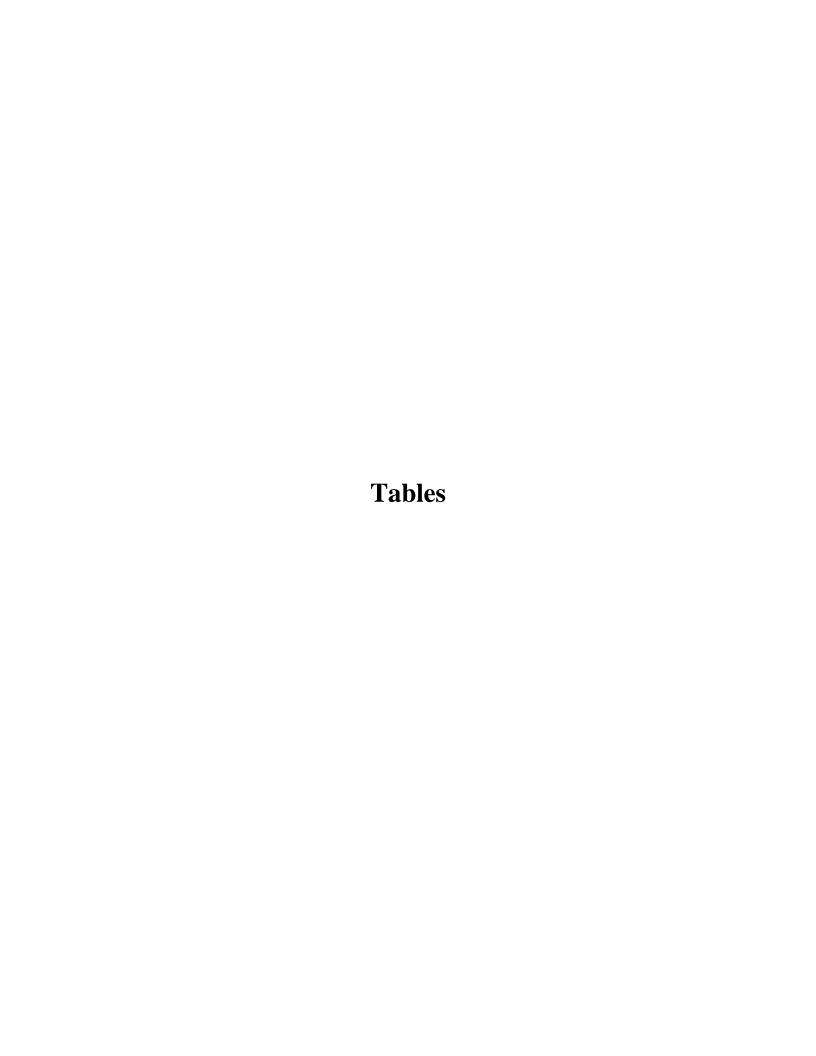
Figure 2
Site Layout
Former Adirondack Steel OU-3 (Site No. 401039)
Colonie, New York

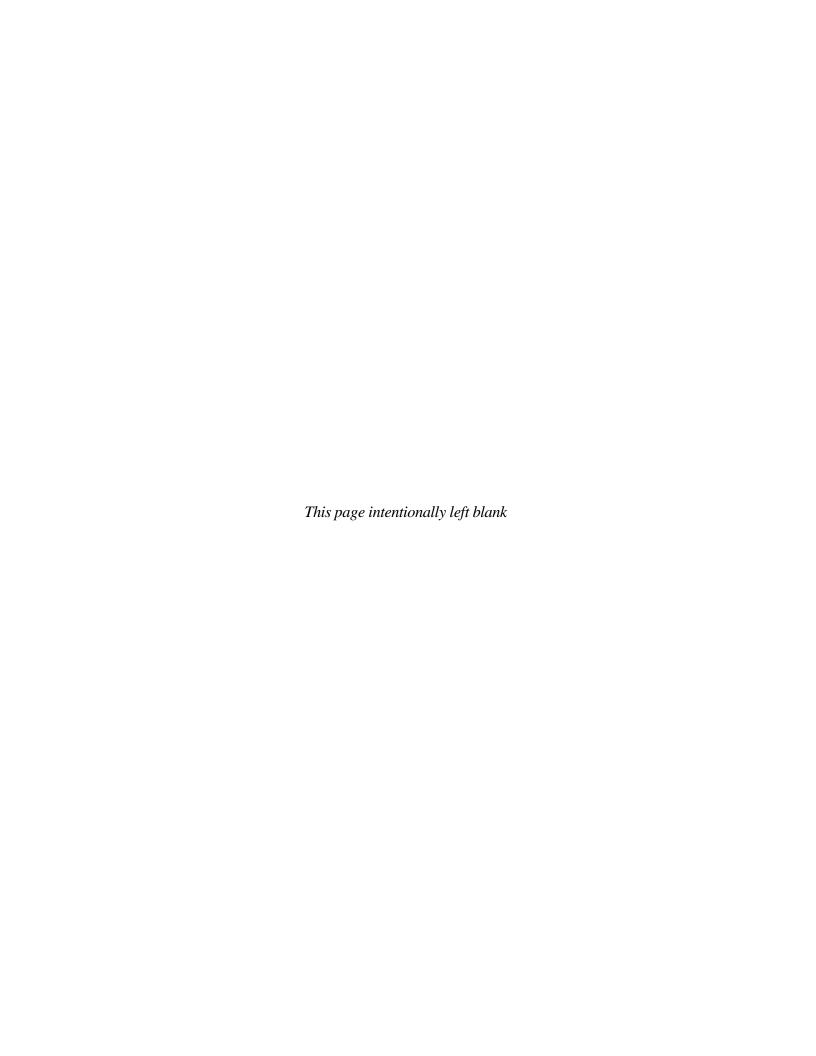
Map Date: 8/11/2016 Source: ESRI, 2011 Projection: NAD 1983 State Plane New York East











SN	Sampling Location/ID Number*	Northing	Easting	Depth (ft bgs)	Analysis	Rationale	
1	SB-SS-3	702979	1418711	1-2	PCBs by EPA Method 8082	Vertically unbound	
2	3D-33-3	102515	1410/11	2-3	1 CBs by El A Method 6062	vertically unbound	
3	SIDE-A6[Z]-6.5	703212	1418584	0-1	PCBs by EPA Method 8082	Possible surface contamination	
4	SIDE-A6[X]-6.5	703140	1418578	0-1	PCBs by EPA Method 8082	Possible surface contamination	
5	SB-A18	703381	1418757	0-1	PCBs by EPA Method 8082	Contamination at OU-3 property boundary	
6	SD-A16	703361	1410/3/	2-3	1 CBs by El A Method 8082		
7	SB-A17	703366	1418711	0-1	PCBs by EPA Method 8082	Contamination at OU-3 property boundary	
8	SD-A17	703300	1416/11	2-3	1 CDs by El A Method 8082		
9	SB-A16	703351	1418663	0-1	PCBs by EPA Method 8082	Contamination at OU-3 property boundary	
10	3D-A10	703331	1410003	2-3	1 CDs by El A Method 8082	Contamination at OO-3 property boundary	
11	SB-B3a	703113.1	1418085	2-4	PCBs by EPA Method 8082	Horizontally unbound	
12	SB-B2	703097.2	1418037	2-4	PCBs by EPA Method 8082	Horizontally unbound	

Note:

All depths for the category "No data for excavation grid" was determined based on the contamination depths of neighboring grids.

bgs = below ground surface

ft = Feet (foot)

ID = Identification

SN = Sample number

SB = Soil boring

OU = Operable unit

PCB = Polychlorinated biphenyl

EPA = U.S. Environmental Protection Agency

^{*} Sample IDs assigned to locations during previous investigations were utilized when re-sampling locations for further delineation. New sampling location IDs were determined by grid location.

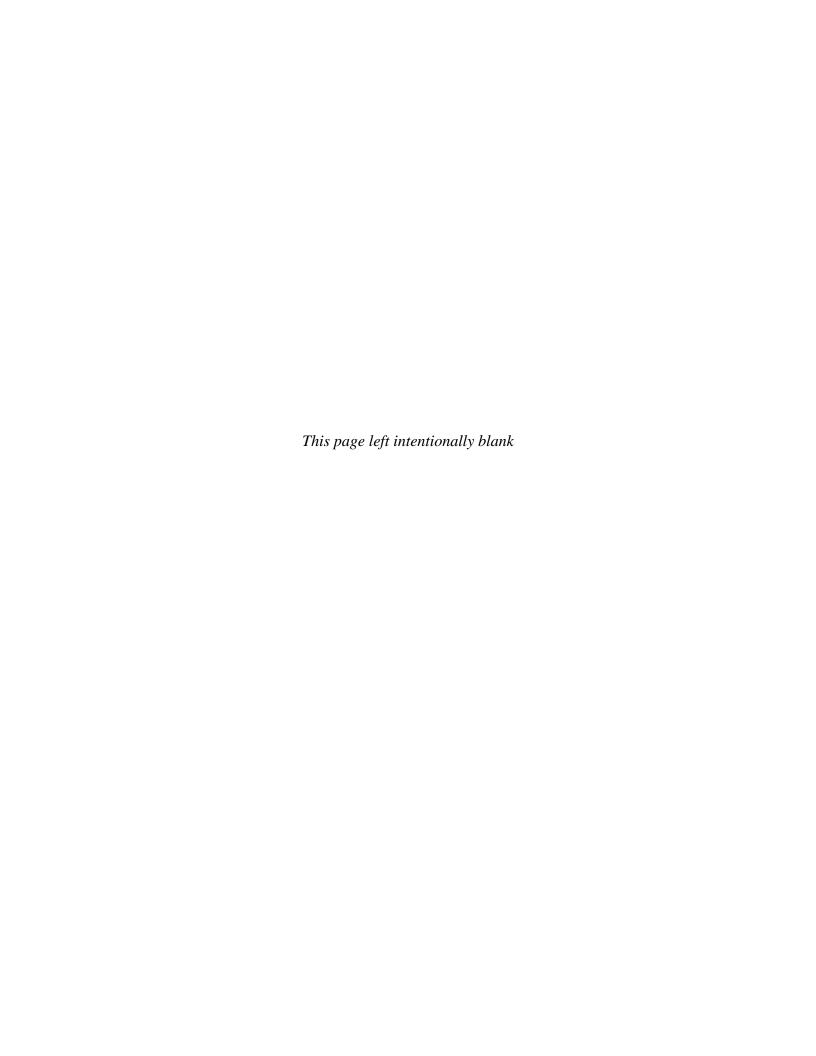
	Table 1 Sampinig and Analysis Flan						
SN	Sampling Location/ID Number*	Northing	Easting	Depth (ft bgs)	Analysis	Rationale	
13 14	SB-163	703028	1418692	1-2 2-3	PCBs by EPA Method 8082	Vertically unbound	
15 16	SB-162	702998	1418698	1-2 2-3	PCBs by EPA Method 8082	Vertically unbound	
17 18	SB-156	703331	1418686	4-5 5-6	PCBs by EPA Method 8082	Vertically unbound	
19 20	SB-152	703253	1418584	1-2 2-3	PCBs by EPA Method 8082	Vertically unbound	
21 22	SB-151	703182	1418593	1-2 2-3	PCBs by EPA Method 8082	Vertically unbound	
23 24	SB-133	703078	1418709	4-5 5-6	PCBs by EPA Method 8082	Vertically unbound	
25 26	SB-093	702944	1418755	1-2 2-3	PCBs by EPA Method 8082	Vertically unbound	
27 28	SB-075	703303	1418737	4-5 5-6	PCBs by EPA Method 8082	Vertically unbound	
29 30	SB-045	703158	1418733	4-5 5-6	PCBs by EPA Method 8082	Vertically unbound	
31	SB-030	703078	1418739	4-5	PCBs by EPA Method 8082	Vertically unbound	
32 33	SB-N-DW-SS-005	703349	1418752	0-1 1-2	PCBs by EPA Method 8082	Vertically unbound	
34 35	SB-N-DW-CTR-002	703287	1418768	8-9 9-10	PCBs by EPA Method 8082	Vertically unbound	
36	SB-E15b	703130	1418685	0-1	PCBs by EPA Method 8082	No data for excavation grid	
37	SB-D13a	703169	1418567	0-1	PCBs by EPA Method 8082	Horizontally unbound	
38	SB-D13b	703153	1418599	0-1	PCBs by EPA Method 8083	No data for excavation grid	

	Table 1 Samping and Emarysis Flan						
SN	Sampling Location/ID Number*	Northing	Easting	Depth (ft bgs)	Analysis	Rationale	
39	SB-D14a	703185	1418614	0-1	PCBs by EPA Method 8082	No data for excavation grid	
40	SB-D14a	703183	1418614	2-3	rCBs by EFA Method 8082	No data for excavation grid	
41	SB-D16a	703217	1418709	0-1	PCBs by EPA Method 8082	No data for excavation grid	
42	3D-D10a	703217	1418/09	2-3	1 CBs by El A Method 8082	No data for excavation grid	
43	SB-D16b	703193	1418717	0-1	PCBs by EPA Method 8082	No data for excavation grid	
44	55 5100	703173	1110717	2-3	1 CBs by El 11 Mediod 0002	No data for excavation grid	
45	SB-D14c	703169	1418646	0-1	PCBs by EPA Method 8082	No data for excavation grid	
46		, , , , ,		1-2		Tro data for Orba varion Brid	
47	SB-E13	703129	1418606	0-1	PCBs by EPA Method 8082	Horizontally unbound	
48	SB-F13	703058	1418630	0-1	PCBs by EPA Method 8082	Horizontally unbound	
49				0-1			
50	SB-F15	703090	1418725	2-3	PCBs by EPA Method 8082	No data for excavation grid	
51				4-5			
52	SB-B3b	703081	1418069	2-4	PCBs by EPA Method 8082	Horizontally unbound	
53	SB-D8b	703066	1418338	0-1	PCBs by EPA Method 8082	Horizontally unbound	
54	SB-C8	703113	1418322	0-1	PCBs by EPA Method 8082	Horizontally unbound	
55	SB-D7	703082	1418306	0-1	PCBs by EPA Method 8082	Horizontally unbound	
56	SB-D8a	703098	1418353	0-1	PCBs by EPA Method 8082	Horizontally unbound	
57	SB-136	3-136 703279 1418703		8-9	PCBs by EPA Method 8082	Vertically unbound	
58	50-150	103217	1410703	9-10	1 CD3 by El A Method 6062	vertically unbound	

SN	Sampling Location/ID Number*	Northing	Easting	Depth	Analysis	Rationale	
SIN	Number .	Northing	Lasting	(ft bgs)	Allarysis	Kationaic	
59	SB-059	703226	1418750	4-5	PCBs by EPA Method 8082	Vertically unbound	
60	22 007			5-6			
61	SB-H14a	702996	1418677	0-1	PCBs by EPA Method 8083	Horizontally unbound	
62	SB-H14b	702972	1418685	0-1	PCBs by EPA Method 8084	Horizontally unbound	
63	SB-G14b	703019	1418670	0-1	PCBs by EPA Method 8085	Horizontally unbound	
64	SB-G14a	703043	1418662	0-1	PCBs by EPA Method 8086	Horizontally unbound	
65	SB-D15a	703201	1418662	0-1	PCBs by EPA Method 8087	No data for excavation grid	
66	SD-D13a	703201	1410002	1-3	reds by EFA Mediod 8087	ino data for excavation grid	
67	SB-C14b	703217	1418630	0-1	PCBs by EPA Method 8090	No data for excavation grid	
68	SD-C140	703217	1416030	1-3	1 CDs by El A Mctilod 8090	ino data for excavation grid	
69	SB-C14a	703232	1418599	0-1	PCBs by EPA Method 8091	No data for excavation grid	
70	SB-B13	703248	1418567	0-1	PCBs by EPA Method 8092	Horizontally unbound	
71	SB-B14b	703265	1418615	0-1	PCBs by EPA Method 8093	No data for excavation grid	
72	SB-B14a	703280	1418582	0-1	PCBs by EPA Method 8094	Horizontally unbound	
73				0-1			
74	SB-B16	703320	1418702	2-3	PCBs by EPA Method 8095	Horizontally unbound	
75				4-5	1		
76	SB-055			5-6	PCBs by EPA Method 8096	Vertically unbound	

Appendix A

Health and Safety Plan Addendum





Health and Safety Plan Addendum Former Adirondack Steel Site OU-3 (401039) Colonie, New York

Prepared for

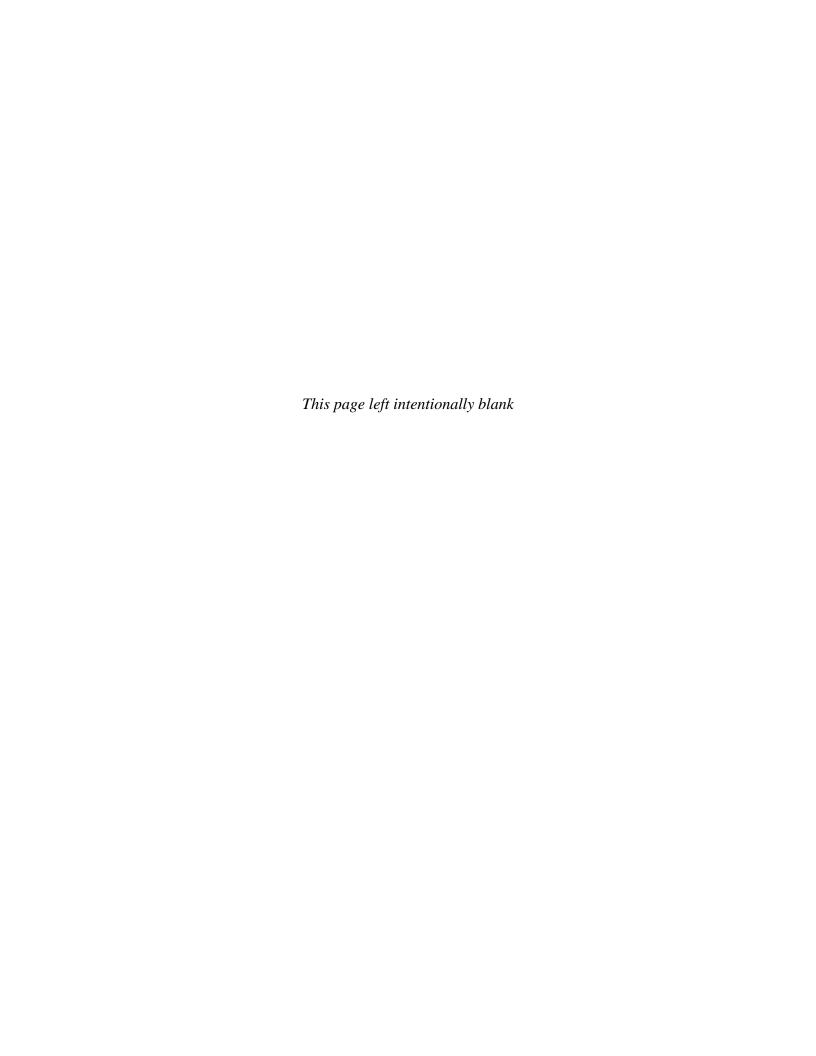
New York State Department of Environmental Conservation 625 Broadway Albany, New York 12233



Prepared by

EA Engineering, P.C., and Its Affiliate EA Science and Technology 6712 Brooklawn Parkway, Suite 104 Syracuse, New York 13211 (315) 431-4610

> September 2016 Version: FINAL EA Project No. 14907.32



Health and Safety Plan Addendum Former Adirondack Steel Site OU-3 (401039) Colonie, New York

Prepared for

New York State Department of Environmental Conservation 625 Broadway Albany, New York 12233



Prepared by

EA Engineering, P.C. and Its Affiliate EA Science and Technology 6712 Brooklawn Parkway, Suite 104 Syracuse, New York 13211-2158 (315) 431-4610

Oonall Ca____ 8 September 2016

Don Conan, P.E., Vice President

Date

EA Engineering, P.C.

Ben Young, Project Manager EA Science and Technology

8 September 2016

Date

September 2016 Version: FINAL EA Project No. 14907.32

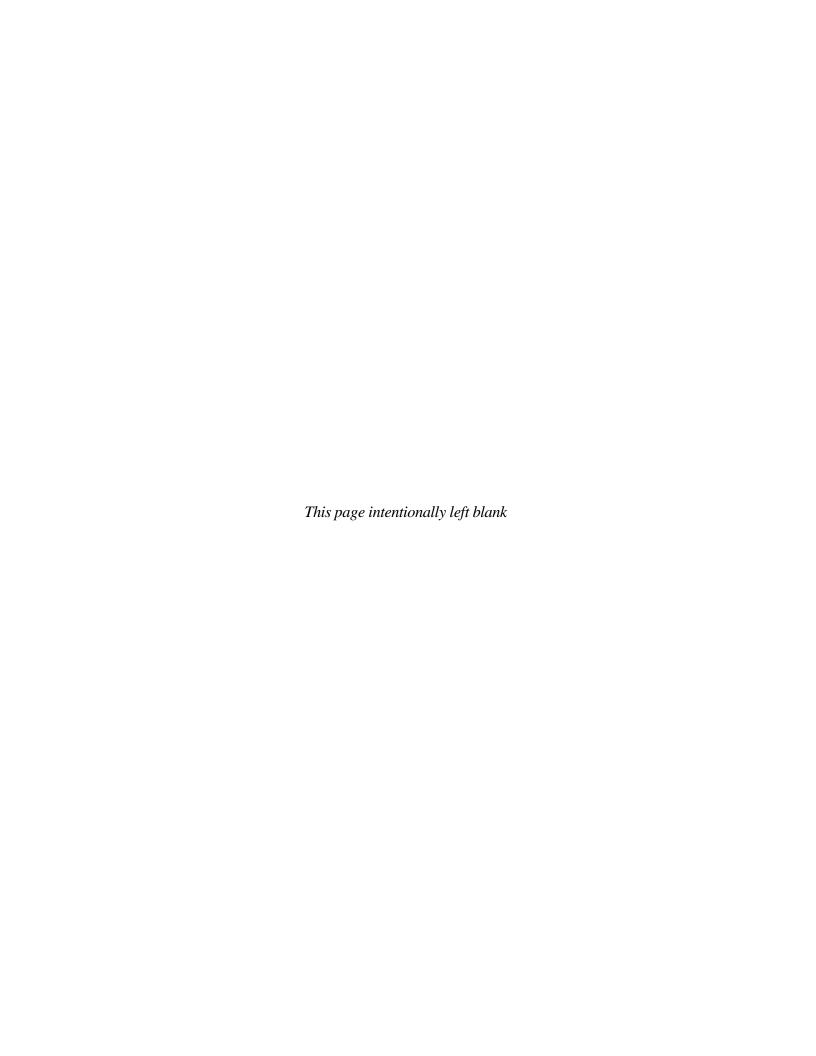


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LIST OF FIGURES

Number	<u>Title</u>
1	Site location
2	Site layout
3	PCB Contamination and Proposed Sampling Locations
	LIST OF TABLES
1	Sampling and Analysis Plan

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September 2016

LIST OF ACRONYMS

°F Degrees Fahrenheit

CFR Code of Federal Regulations

DER Division of Environmental Remediation

DEET N,N-Diethyl-meta-toluamide

EA Engineering, P.C. and its Affiliate EA Science and Technology

EEEPC Ecology and Environment Engineering, P.C.
EPA United States Environmental Protection Agency

FS Feasibility Study

HASP Health and Safety Plan

IRM Interim remedial measure

No. Number

NYSDEC New York State Department of Environmental Conservation

OSHA Occupational Safety and Health Administration Standards

OU Operable units

PCB Polychlorinated biphenyl PDI Pre-design investigation

ppm Parts per million

RI Remedial investigation ROD Record of Decision

SHSO Site Health and Safety Officer

TSCA Toxic Substances Control Act

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1. INTRODUCTION

1.1 **GENERAL**

A Generic Health and Safety Plan (HASP)¹ was developed by EA Engineering, P.C. and its Affiliate EA Science and Technology (EA) for field activities performed under the New York State Department of Environmental Conservation (NYSDEC) Standby Contract Number (No.) D007624. This HASP Addendum is to supplement the Generic HASP¹ with site-specific information to protect the health and safety of personnel while performing field investigation activities to complete implementation of a pre-design investigation (PDI) for the Former Adirondack Steel Site OU-3, Colonie, Albany County, New York (NYSDEC Site No.401039).

This HASP Addendum describes the safety organization, procedures, and protective equipment that have been established based on an analysis of potential physical, chemical, and biological hazards. Specific hazard control methodologies have been evaluated and selected to minimize the potential for accidents or injuries to occur. One copy of the Generic HASP¹ and this HASP Addendum will be maintained for use during the scheduled field investigation activities. The copies will be made available for site use and employee review at all times.

This HASP Addendum addresses regulations and guidance practices set forth in the Occupational Safety and Health Administration Standards (OSHA) for Construction Industry, 29 Code of Federal Regulations (CFR) 1926, including 29 CFR 1926.65, Hazardous Waste Operations and Emergency Response and 29 CFR 1926.59, Hazardous Communications.

The following are provided as attachments:

- Attachment A: Worker Training and Physical Examination Record
- Health and Safety Plan Addendum Review Record • Attachment B:
- Site Entry and Exit Log • Attachment C: Accident/Loss Report • Attachment D:
- Attachment E: Emergency Telephone Numbers and Hospital Directions
- Emergency Equipment Available Onsite • Attachment F:
- Map to Hospital • Attachment G:
- Personal Protective Equipment Activity Record **Attachment H:**
- Material Safety Data Sheets **Attachment I:**

NOTE: This site-specific HASP Addendum should be left open to display Attachment E (Emergency Telephone Numbers and Hospital Directions) and made available to all site personnel in a conspicuous location for the duration of field investigation activities in the event of an emergency.

¹ EA. 2011. Generic Field Activities Plan for Work Assignments under NYSDEC Contract D007624. April.

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1.2 SITE DESCRIPTION

The Former Adirondack Steel Site OU-3 is currently a Class 2 site listed on the NYSDEC Registry of Inactive Hazardous Waste Sites (Site No. 401039). The site is an abandoned steel mill called the Adirondack Steel Casting Co. Inc. located at 191 Watervliet-Shaker Road in the Town of Colonie, Albany County, New York. It is located within one mile of five other sites in the New York State Remedial Program.

The site currently occupies 4.2 acres of the 38.5-acre former industrial property and includes three operable units (OU): OU-1 (0.4 acres onsite), OU-2 (2.1 acres offsite), and OU-3 (3.8 acres onsite). The property contains eight dilapidated, unoccupied buildings, foundation slabs of the original production buildings, deteriorating access roads, and emerging tree growth. Drainage ways also border the east and north sides of the property. The drainage way to the east (OU-2) is largely stagnant and is located between the site and an active rail line owned and operated by Canadian Pacific. OU-3 contains the northern drainage way, which flows between the site and an industrial landfill, and the polychlorinated biphenyl (PCB) contaminated soil in the adjacent uplands

The area surrounding the property is a mix of industrial/residential use. The OU-3 site borders on undeveloped land to the west and north, and an active rail line to the east. The property itself is zoned industrial and has recently been acquired by a private party who is actively developing the property surrounding OU-3 into an industrial park. OU-3 is comprised of building foundations and debris, a clean-fill area, a recyclable material stockpile and brownfield areas with the previously noted drainage way, which also contains PCB contaminated sediment.

1.3 SITE HISTORY

Adirondack Steel Casting Co. produced steel casting for various industrial customers. The site contained transformers associated with the steel mill that were the source of the known PCB contamination. A variety of tenants also occupied the property while it was known as the Adirondack Industrial Park. PCBs are understood to have reached the soils at the site through routine maintenance of transformers, poor handling of used fluids, and/or unauthorized scavenging. In 1993, the United States Environmental Protection Agency (EPA) responded to spilled PCBs and soil contamination by excavating soil and disposing of it; however, significant PCB soil contamination remained.

A Remedial Investigation (RI) was performed for OU-1 and OU-3 between 2005 and 2007². In 2008, Ecology and Environment Engineering, P.C. (EEEPC) further assessed the lateral extent of PCB contamination in sediment that was identified in the RI. Based on the results, an interim remedial measure (IRM) was conducted to excavate PCB contaminated sediment in OU-1 and OU-3³. In March 2010, NYSDEC completed the record of decision for OU-1⁴ and in 2011, the

² Ecology and Environment Engineering, P.C. 2008. Final Remedial Investigation Report for the Former Adirondack Steel Site, Colonie, New York.

³ Ecology and Environment Engineering, P.C. 2010. Final Interim Remedial Measure Report for the Former Adirondack Steel Site, Colonie, New York.

⁴ NYSDEC. 2010. Former Adirondack Steel Site Record of Decision OU-1. March.

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EPA conducted PCB delineation sampling in OU-2 and OU-3. A supplemental RI was also performed for OU-3 in 2014⁵. Potential remedial alternatives for OU-3 were identified, screened, and evaluated in the 2014 Feasibility Study (FS)⁶. Potential remedial alternatives for the site were identified, screened, and evaluated in the FS. Based on the RI and FS, the NYSDEC issued the Record of Decision document which identified the selected remedy for the site⁷. The remedy includes excavation and disposal of PCB contaminated soil, sediment and fill from OU-3, backfilling of the excavation with clean fill, abandonment of onsite groundwater monitoring wells, imposition of an industrial control and development of a corresponding site management plan.

1.4 POLICY STATEMENT

EA will take every reasonable step to provide a safe and healthy work environment; and to eliminate or control hazards in order to minimize the possibility of injuries, illnesses, or accidents to site personnel. EA and EA subcontractor employees will be familiar with this HASP Addendum for the project activities that they are involved in. Prior to entering the site, the HASP Addendum will be reviewed, and an agreement to comply with the requirements will be signed by EA personnel, subcontractors, and visitors (Attachment B).

Operational changes that could affect the health and safety of the site personnel, community, or environment will not be made without approval from the Project Manager and the Program Health and Safety Officer. This document will be periodically reviewed to ensure that it is current and technically correct. Any changes in site conditions and/or the scope of work will require a review and modification to the HASP Addendum. Such changes will be documented in the form of a revision to this Addendum.

⁵ Ecology and Environment Engineering, P.C. 2014. Draft Supplemental Remedial Investigation Report. February.

⁶ Ecology and Environment Engineering, P.C. 2014. Feasibility Study for Former Adirondack Steel Site Operable Unit OU-3. May.

⁷ NYSDEC. 2015. Record of Decision. March.

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2. KEY PERSONNEL

The following table contains information on key project personnel:

Title	Name	Telephone No.
Program Health and Safety Officer	Peter Garger, Certified Industrial Hygienist	732-404-9370
Program Manager	Don Conan	315-431-4610
Quality Assurance/Quality Control Officer	Frank Barranco	315-431-4610
Project Manager	Ben Young	315-431-4610
Site Manager/Site Health and Safety Officer (SHSO)	Emily Cummings	860-309-3837
Site Geologist/Scientist	Emily Cummings	860-309-3837
	Kritika Thapa	478-390-2213
NYSDEC Project Manager	Nathan Freeman	518-402-9768

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3. SCOPE OF WORK

This HASP Addendum was developed to designate and define site-specific health and safety protocols applicable to project activities to be implemented and followed during field activities and consulting work at the Former Adirondack Steel Site OU-3, Colonie, New York. The Scope of Work covered by this HASP Addendum includes the following PDI activities:

- Site evaluation with NYSDEC representative
- Site survey
- Soil and sediment sampling
- Storm water flow study
- Waste storage and disposal.

Each of these activities is summarized below and additional detail for each activity is provided in the Letter Work Plan⁸.

3.1 SITE EVALUATION

EA conducted a site visit in order to further define scope of work to be done. This included a meeting with the NYSDEC.

3.2 SITE SURVEY

EA and EA's subcontractor (Popli Design Group) will conduct survey work to compliment the previous surveys conducted during the RI. This survey work will include a topographic survey and all PDI sample locations.

3.3 SOIL AND SEDIMENT SAMPLING PROGRAM

EA will implement an onsite soil sampling program as described in the Letter Work Plan to further define the nature and extent of contamination in the soil at the site and quantify the volume of potential toxic substance control act (TSCA) and non-TSCA waste material within the remedial design package.

Sediment samples will be collected from 75 locations. The sediment sampling locations will be flagged before sampling so their locations can be recorded with a high-precision global positioning system unit. Proposed soil and sediment sampling locations are shown on Figure 3 of the Letter Work Plan.

3.4 STORMWATER FLOW STUDY

EA will implement a stormwater flow study as described in the letter Work Plan⁸ to quantify the discharge on the onsite drainage way. Transducers will be installed in the channel and on the

⁸ EA. 2016. Draft Pre-Design Investigation Letter Work Plan. Former Adirondack Steel Site OU-3 (401039). August.

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bank to autonomously log stream stage. EA will periodically download data from the transducers for analysis in the office.

3.5 STORAGE AND DISPOSAL OF WASTE

EA is responsible for the proper storage, handling, and disposal of investigative-derived waste including personal protective equipment, and solids and liquids generated during sampling activities. All drummed materials will be clearly labeled as to their contents and origin. All investigative-derived waste will be managed in accordance with NYSDEC-Division of Environmental Remediation (DER)-10 Technical and Administrative Guidance Memorandum 4032⁹.

⁹ NYSDEC. 2010. DER-10/Technical Guidance for Site Investigation and Remediation. May.

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4. POTENTIAL HAZARD ANALYSIS

Based on the field activities detailed in Section 3, the following potential hazard conditions may be anticipated:

- The use of mechanical and construction equipment such as Geoprobes®, drill rigs, front loaders, dump trucks, backhoes, excavators, and bobcats can create a potential for crushing and pinching hazards due to movement and positioning of the equipment. In addition, the ambient noise levels around heavy equipment machinery can cause disorientation and reduced awareness levels. Hearing protection, hard hats, and steel-toe boots are required when working around this type of equipment.
- Personnel may be injured during physical lifting and handling of heavy equipment, construction materials, or containers. Additionally, personnel may encounter slip, trip, and fall hazards associated with sampling activities. Precautionary measures should be taken in accordance with the Generic HASP¹ and this HASP Addendum.
- Field operations conducted during the winter months can impose excessive heat loss to
 personnel conducting strenuous activities during unseasonably cold weather days, and
 can impose cold-related illness symptoms during unseasonably cold weather days or
 when the wind chill is high. In addition, heavy rains, electrical storms, and high winds
 may create extremely dangerous situations for employees.
- Field operations conducted during the summer months can impose heat stress on field personnel conducting strenuous activities during unseasonably hot weather days. Because wearing personal protective equipment can increase the risk of developing heat stress, workers must be capable of recognizing the signs and symptoms of heat-related illnesses and be able to recognize these signs and symptoms in both themselves and their co-workers.
- Entry into a confined space in support of this project is forbidden. However, it is not anticipated that confined space entry will be required during the completion of the field activities.
- Field investigation activities intended to define potential sources of environmental contamination often require employees to be in direct proximity or contact with hazardous substances. Employees may be exposed through inhalation of toxic dusts, vapors, or gases. Normal dust particulates from surficial soil may have adsorbed or absorbed toxic solvents, petroleum compounds, or toxic metal salts or metal particulates. Air monitoring equipment will be used to monitor airborne organic vapors and particulates. Toxic materials contained in dusts or particulates can be ingested if eating, smoking, drinking, and gum chewing are permitted prior to personnel washing their hands and face or removing contaminated work clothing and personal protective equipment. Some chemicals may be absorbed directly through the skin. Personal

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protective equipment, properly designed for the chemicals of concern, will always be provided and worn when a potential for skin contact is present.

- Biological Hazards—Potential hazards may be present at the site due to bites from stray domestic and wild animals (to include rodents), spiders, bees, and other venomous arthropods. Potential hazards may also be present at the site in the form of poisonous plant life, which can result in skin rashes or abrasions. In the case of an animal or insect bite that can be serious or fatal, workers must seek immediate medical attention and report the incident to the SHSO prior to leaving the site. An employee known to be allergic or sensitive to poisonous insects should alert the Site Manager and SHSO. The following are the main potential biological hazards at the site:
 - Deer Ticks (*Ixodes scapularis*) or black-legged ticks are potentially present throughout forested areas at the site and can transmit Lyme disease to humans. The limiting of exposed skin and use of DEET and permethrin is the most effective means to avoid tick bits.
 - Poison ivy (*Toxicodendron radicans*) is present throughout forested areas in and around Colonie, New York and may occur as a climbing vine or a rooted, singular plant. It can be identified by three shiny leaves that grow outward from a thick woody vine or thin pale stem. Urushiol, an oil that causes rash on human skin, is present on the entire plant. Proper identification and avoidance are the best options when conducting field work at the site.
- The potential chemicals of concern present at the site include, but are not limited to, volatile organic compounds, semi-volatile organic compounds, PCBs, pesticides, and metals. Material safety data sheets for these chemicals are provided in Attachment I.

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5. PERSONAL PROTECTIVE EQUIPMENT

Based upon currently available information, it is anticipated that Level D personal protective equipment will be required for currently anticipated conditions and activities; however, Level C equipment is to be available for all site workers during sampling activities. If, at any time, the sustained level of total organic vapors in the worker breathing zone exceeds 5 parts per million (ppm) above background, site workers will evacuate the area and the condition will be brought to the attention of the SHSO. Efforts will be undertaken to mitigate the source of the vapors. Once the sustained level of total organic vapors decreases to below 5 ppm above background, site workers will be allowed to continue activities at the direction of the SHSO. If respirable dust levels exceed the OSHA¹ Permissible Exposure Limit (5 milligrams per cubic meter) dust masks will be worn by all onsite personnel until water methods reduce the levels.

The personal protective equipment components for use during this project are detailed in the Generic HASP¹. The components of Level D personal protective equipment are summarized below. Level D will be worn for initial entry onsite and initially for all activities and will consist of the following:

- Coveralls or appropriate work clothing
- Steel-toe, steel-shank safety boots/shoes
- Hard hats (when overhead hazards are present or as required by the SHSO)
- Chemical resistant gloves (nitrile/neoprene) when contact with potentially contaminated soil or water is expected
- Safety glasses with side shields
- Hearing protectors (during operations producing excessive noise).

In the event that Level C is deemed necessary, the following will be worn:

- Boot covers (optional unless in contact with visually contaminated soil or water)
- Respirators and appropriate cartridges (i.e., combination particulate/organic vapor cartridge)
- Poly-coated coveralls (when contact with contaminated soil and water is anticipated, (e.g., when surging/pumping wells and pressure-washing equipment).

Insulated clothing, hats, etc. must be worn when temperatures or wind chill fall below 40°F.

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6. SITE CONTROL AND SECURITY

Only authorized personnel will be permitted to conduct field activities. Authorized personnel include those who have completed hazardous waste operations initial training, as defined under OSHA Regulation 29 CFR 1910.120/29 CFR 1926.65, have completed their training or refresher training within the past 12 months, and have been certified by a physician as fit for hazardous waste operations.

6.1 SAFE WORK PRACTICES

Safe work practices that will be followed by site workers include, but are not limited to, the following rules:

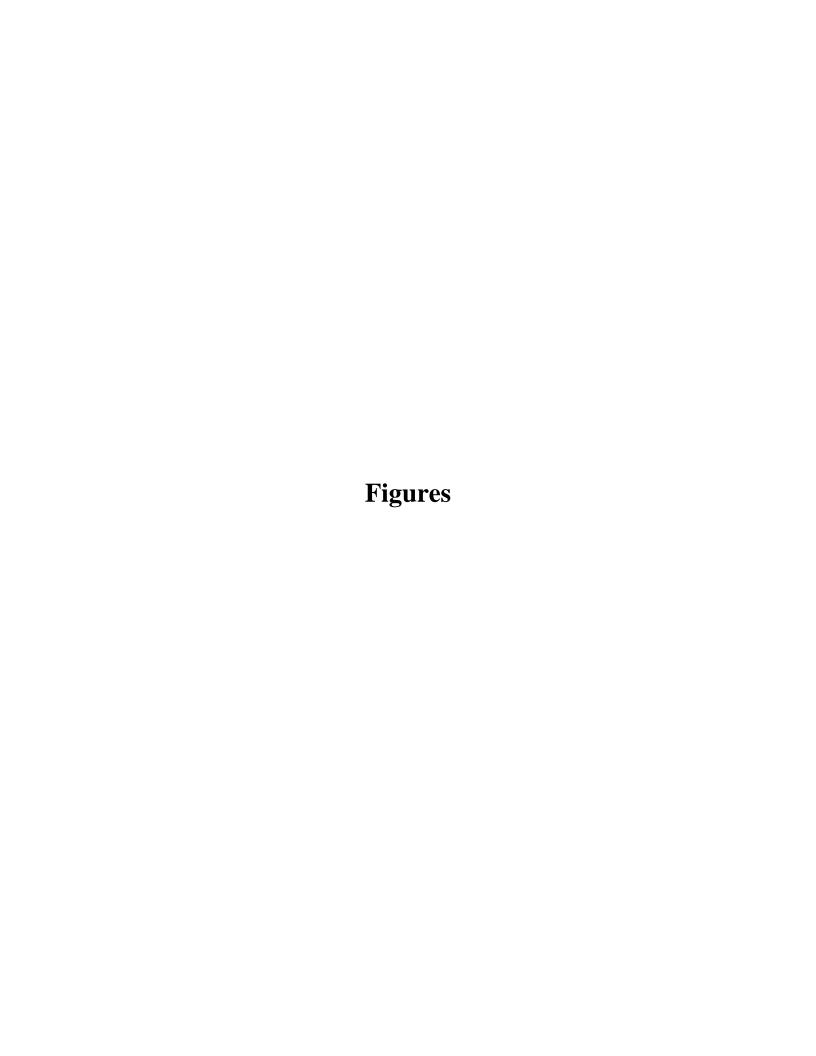
- Working before or after daylight hours without special permission are prohibited.
- Do not enter restricted or posted areas without permission from the SHSO.
- Smoking is limited to designated areas.
- Possessing, using, purchasing, distributing, or having controlled substances in their system throughout the day or during meal breaks is prohibited.
- Consuming or possessing alcoholic beverages is prohibited.
- Good housekeeping—employees will be instructed about housekeeping throughout field activities.
- Sitting or kneeling in areas of obvious contamination is prohibited.
- Avoid overgrown vegetation and tall grass areas.
- Employees must be aware, and inform their partners or fellow team members, of the potential non-visible effects of exposure to toxic materials. The symptoms of such exposures may include:
 - HeadachesDizziness
 - DIZZIIIC
 - Nausea
 - Blurred vision
 - Cramps
 - Irritation of eyes, skin, or respiratory tract.

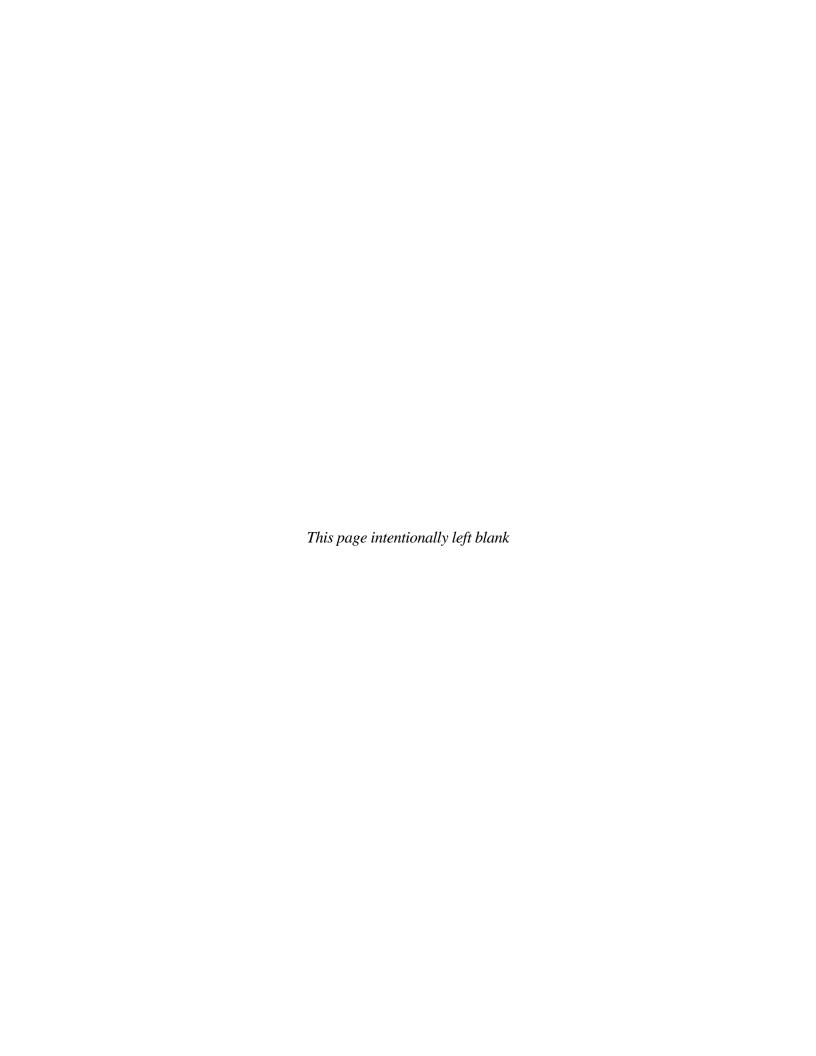
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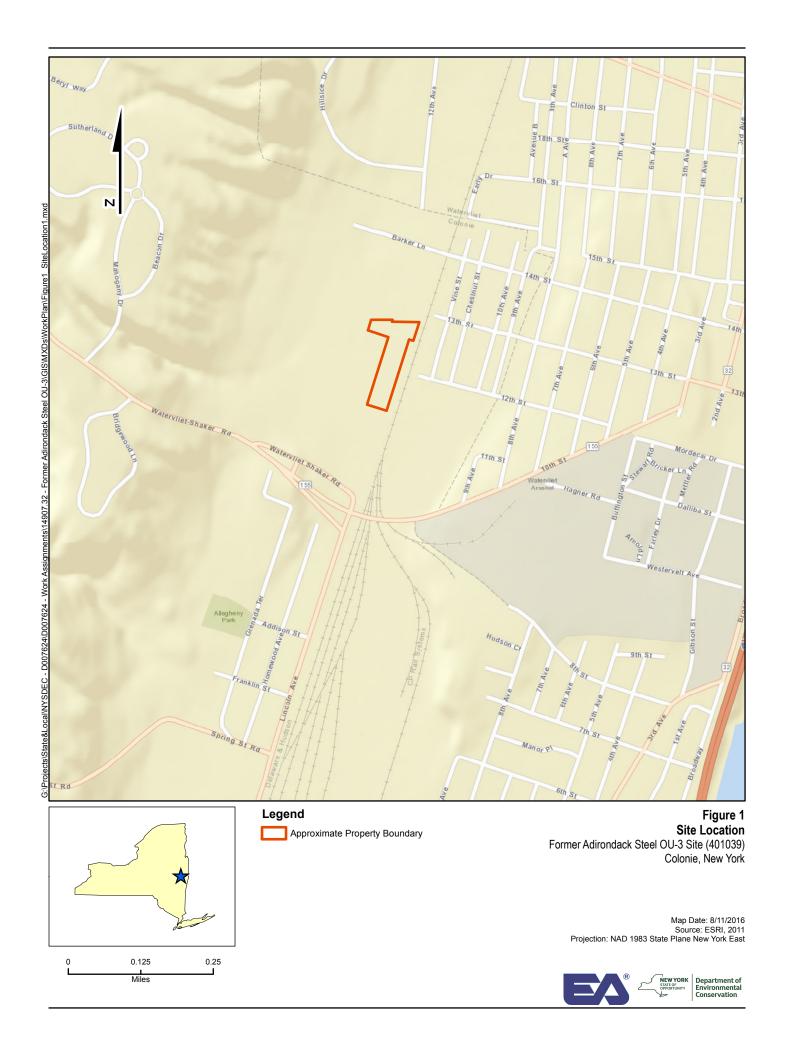
6.2 DAILY STARTUP AND SHUTDOWN PROCEDURES

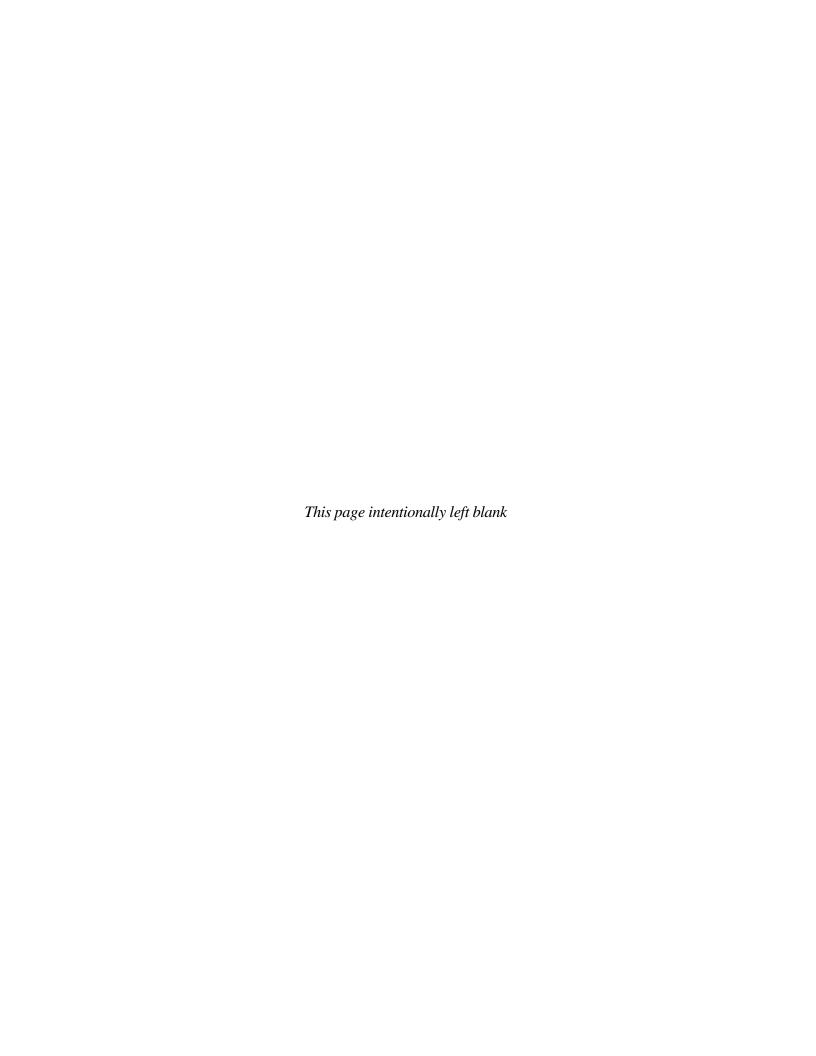
The following protocols will be followed daily prior to start of work activities:

- The SHSO will review site conditions to determine if modification of work and safety plans is needed.
- Personnel will be briefed and updated on new safety procedures as appropriate.
- Safety equipment will be checked for proper function.
- The SHSO will ensure that the first aid kit is adequately stocked and readily available.
- Onsite equipment and supplies will be locked and secure.









Attachment A

Worker Training and Physical Examination Record

ATTACHMENT A

WORKER TRAINING AND PHYSICAL EXAMINATION RECORD

SITE: Former Adirondack Steel Site OU-3, Colonie, New York						
	OSHA 4	0-hour				
	Hazardou		OSHA Hazardous	CPR	First Aid	Date of Last
	Operations	Training	Waste Supervisor	(date of	(date of	Physical
Name	Initial	Annual	Training	expiration)	expiration)	Examination
EA PERSONNEL						
Ben Young	1989	1/13/16	1992			
Robert Conden	5/12/15	3/6/14	2005			6/8/15
Emily Cummings	1/15/14	5/11/16	_	1/12/17	1/12/17	8/13/15
Kritika Thapa	12/4/15		_	4/8/17	4/8/17	11/18/15
SUBCONTRACTOR OR ADDITIONAL PERSONNEL						
			_		_	_
_			<u> </u>			_

NOTE: Prior to performing work at the site, this Health and Safety Plan Addendum must be reviewed and an agreement to comply with the requirements must be signed by all personnel, including contractors, subcontractors, and visitors. Contractors and subcontractors are ultimately responsible for ensuring that their own personnel are adequately protected. In signing this agreement, the contractors and subcontractors acknowledge their responsibility for the implementation of the Health and Safety Plan Addendum requirements. All personnel onsite shall be informed of the site emergency response procedures and any potential safety or health hazards of the operations.

CPR = cardiopulmonary resuscitation

OSHA = Occupational Safety and Health Administration Standards

Attachment B

Health and Safety Plan Addendum Review Record

ATTACHMENT B

HEALTH AND SAFETY PLAN ADDENDUM REVIEW RECORD

I have read the Health and Safety Plan Addendum for this site and have been briefed on the nature, level, and degree of exposure likely as a result of participation in this project. I agree to conform to all the requirements of this Plan.

SITE: Former Adirondack Steel Site OU-3, Colonie, New York			
Name	Signature	Affiliation	Date

Attachment C Site Entry and Exit Log

ATTACHMENT C

SITE ENTRY AND EXIT LOG

SITE: Former Adirondack Steel Site OU-3, Colonie, New York				
Name	Date	Time of Entry	Time of Exit	Initials

Attachment D Accident/Loss Report



ACCIDENT/LOSS REPORT

THIS REPORT MUST BE COMPLETED BY THE INJURED EMPLOYEE OR SUPERVISOR AND FAXED TO EA CORPORATE HUMAN RESOURCES WITHIN 24 HOURS OF ANY ACCIDENT. THE FAX NUMBER IS (410) 771-1780.

NOTE: WHENEVER AN EMPLOYEE IS SENT FOR MEDICAL TREATMENT FOR A WORK RELATED INJURY OR ILLNESS, PAGE 4 OF THIS REPORT MUST ACCOMPANY THAT INDIVIDUAL TO ENSURE THAT ALL INVOICES/BILLS/CORRESPONDENCE ARE SENT TO HUMAN RESOURCES FOR TIMELY RESPONSE.

A. DEMOGRAPHIC INFORMATION:

NAME OF INJURED EMPLOYEE:	
HOME ADDRESS:	
HOME PHONE:	DATE OF BIRTH:
AGE:	SEX: M F NAME OF SPOUSE (if applicable): DATE OF HIRE:
MARITAL STATUS:	NAME OF SPOUSE (if applicable):
SOCIAL SECURITY NUMBER:	DATE OF HIRE:
NUMBER OF DEPENDENTS:	
EMPLOYEES JOB TITLE:	
DEPT. REGULARLY EMPLOYED:	
WAS THE EMPLOYEE INJURED ON T	
PRIMARY LANGUAGE OF THE EMPL	OYEE:
B. ACCIDENT/INCIDENT INFORMA	ATION:
DATE OF ACCIDENT:	TIME OF ACCIDENT:
REPORTED TO WHOM:	TIME OF ACCIDENT: NAME OF SUPERVISOR:
EXACT LOCATION WHERE ACCIDEN	NT OCCURRED (including street, city, state and
County):	
	what the employee was doing at the time of the
accident and how the accident occurred):_	
	ECIFIC PART OF THE BODY AFFECTED (i.e.,
laceration, right hand, third finger):	

OBJECT OR SUBSTANCE THAT DIRECTLY INJURED EMPLOYEE:
NUMBER OF DAYS AND HOURS EMPLOYEE USUALLY WORKS PER WEEK: IS THE EMPLOYEE EXPECTED TO LOSE AT LEAST ONE FULL DAY OF WORK? DOES THE EMPLOYEE HAVE A PREVIOUS CLAIM? Y N If yes, STATUS Open Closed WAS THE EMPLOYEE ASSIGNED TO RESTRICTED DUTY?
C. ACCIDENT INVESTIGATION INFORMATION
WAS SAFETY EQUIPMENT PROVIDED? Y N If yes, was it used? Y N WAS AN UNSAFE ACT BEING FORMED ? Y N If yes, describe_ WAS A MACHINE PART INVOLVED? Y N If yes, describe_ WAS THE MACHINE PART DEFECTIVE? Y N If yes, in what way_ WAS A 3RD PARTY RESPONSIBLE FOR THE ACCIDENT/INCIDENT? Y N If yes, list name, address, and phone number_
WAS THE ACCIDENT/INCIDENT WITNESSED? Y N If yes, list name, address, and phone number:
D. PROVIDER INFORMATION WAS FIRST AID GIVEN ONSITE? Y N If yes, what type of medical treatment was given PHYSICIAN INFORMATION (if medical attention was administered) NAME: ADDRESS (include city, state, and zip): PHONE:
HOSPITAL ADDRESS (include name, address, city, state, zip code, and phone)
WAS THE EMPLOYEE HOSPITALIZED? Y N If yes, on what date
PLEASE ATTACH THE PHYSICIANS WRITTEN RETURN TO WORK SLIP NOTE: A PHYSICIAN'S RETURN TO WORK SLIP IS REQUIRED PRIOR TO ALLOWING THE WORKER TO RETURN TO WORK.
E. AUTOMOBILE ACCIDENT INFORMATION (complete if applicable)
AUTHORITY CONTACTED AND REPORT #

V.I.NPLATE/TAG#
OWNER'S NAME AND ADDRESS:
DRIVER'S NAME AND ADDRESS:
RELATION TO INSURED: DRIVER'S LICENSE #
DESCRIBE DAMAGE TO YOUR PROPERTY:
DESCRIBE DAMACE TO OTHER VEHICLE OF PROPERTY.
DESCRIBE DAMAGE TO OTHER VEHICLE OR PROPERTY:
OTHER DRIVER'S NAME AND ADDRESS:
OTHER DRIVER'S PHONE:
OTHER DRIVER'S PHONE: OTHER DRIVER'S INSURANCE COMPANY AND PHONE:
LOCATION OF OTHER VEHICLE: NAME, ADDRESS, AND PHONE OF OTHER INJURED PARTIES:
NAME, ADDRESS, AND PHONE OF OTHER INJURED PARTIES:
WITNEGGEG
WITNESSES NAME: PHONE:
NAME:PHONE:
ADDRESS:STATEMENT:
SIGNATURE:
NAME:PHONE:
ADDRESS:STATEMENT:
SIGNATURE:
F. ACKNOWLEDGEMENT
NAME OF GUIDEDAYGOD
NAME OF SUPERVISOR:REPORT PREPARED BY:
DATE OF THIS REPORT:REPORT PREPARED BY:
I have read this report and the contents as to how the accident/loss occurred are accurate to the
best of my knowledge.
Signature: Date:
Signature: Date:

I am seeking medical treatment for a work related injury/illness.

Please forward all bills/invoices/correspondence to:

EA ENGINEERING, SCIENCE, AND TECHNOLOGY, INC., PBC 225 SCHILLING CIRCLE SUITE 400 HUNT VALLEY, MD 21031

ATTENTION: Michele Bailey HUMAN RESOURCES

(410) 584-7000

Attachment E

Emergency Telephone Numbers and **Hospital Directions**

ATTACHMENT E

EMERGENCY TELEPHONE NUMBERS AND HOSPITAL DIRECTIONS

SITE: Former Adirondack Steel Site OU-3, Colonie, New York			
Police: Colonie Police Department	9-1-1 / (518) 783-2744		
Fire: Colonie Fire Department	9-1-1 / (518) 869-9306		
Ambulance: Colonie EMS	9-1-1 / (518) 782-2645		
Hospital: Albany Memorial Hospital	(518) 471-3221		
New York Regional Poison Control Center: 219 Bryant St.,	(716) 878-7654		
Buffalo New York, 14222	800-222-1222 (emergency)		

Directions to Albany Memorial Hospital:

Starting at 191 Watervliet-Shaker Road, travel 0.2 miles east on 12th Street toward Vine Street. Turn right onto 8th Avenue and travel 0.2 miles. Take a right onto NY-155/10th Street and travel 0.4 miles. Turn right onto Lincoln Ave followed by a quick right to stay on Lincoln Ave for another 0.6 miles. Continue onto Spring Street for 1.2 miles, then make a left on Schuyler Road. A left turn onto NY-378E is followed by a quick left onto NY-377 S / Van Rensselaer Blvd. After 1.5 miles, turn right onto Norther Blvd to Albany Memorial Hospital. Travel time is approximately 11 minutes.

Program Safety and Health Officer:	(410) 584-7000
Pete Garger, CIH	
Program Manager:	(315) 431-4610 Office
Don Conan	(315) 877-7403 Cell
EA Project Manager	(315) 431-4610 Office
Ben Young	(315) 430-7429 Cell
In case of spill, contact <i>James Hayward</i> , <i>P.E.</i>	(315) 431-4610
EA Medical Services (Physician)	(800) 229-3674
All One Health Services	
Field Manager/Site Health and Safety Officer:	(315) 431-4610 Office
Emily Cummings	(860) 309-3837 Cell
Site Geologist/Scientist:	(315) 431-4610
Emily Cummings (EA)	(860) 309-3837 Cell
Kritika Thapa (EA)	(478) 390-2213 Cell
In case of accident or exposure incident, contact Corporate Health	(410) 584-7000
and Safety Officer	
Peter Garger, Certified Industrial Hygienist	

Attachment F Emergency Equipment Available Onsite

ATTACHMENT F

EMERGENCY EQUIPMENT AVAILABLE ONSITE

Type of Equipment	Location		
Communications Equipment			
Mobile Telephone	In EA vehicle		
Medical Support Equipment			
First Aid Kits	In EA vehicle		
Eye Wash Station	In EA vehicle		
Firefighting Equipment			
Fire Extinguishers	In EA vehicle		

Attachment G

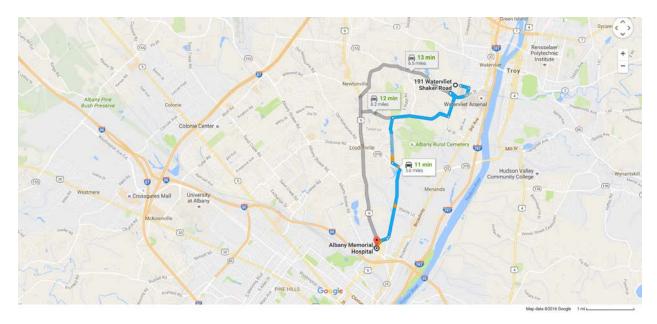
Map to Hospital

ATTACHMENT G

MAP TO HOSPITAL

Directions to Albany Mercy Hospital:

Starting at 191 Watervliet-Shaker Road, travel 0.2 miles east on 12th Street toward Vine Street. Turn right onto 8th Avenue and travel 0.2 miles. Take a right onto NY-155/10th Street and travel 0.4 miles. Turn right onto Lincoln Ave followed by a quick right to stay on Lincoln Ave for another 0.6 miles. Continue onto Spring Street for 1.2 miles, then make a left on Schuyler Road. A left turn onto NY-378E is followed by a quick left onto NY-377 S / Van Rensselaer Blvd. After 1.5 miles, turn right onto Norther Blvd to Albany Memorial Hospital. Travel time is approximately 11 minutes.



Attachment H

Personal Protective Equipment Activity Record

ATTACHMENT H

PERSONAL PROTECTIVE EQUIPMENT ACTIVITY RECORD

SITE: Former Adirondack Steel Site OU-3, Colonie, New York			
Weather Condition:	Onsite Hours: From		
		То	
Changes in Personal Protective			
Equipment Levels(a)	Work Operations	Reasons for Change	
Site Health and Safety Plan	Corrective Action	Corrective Action	
Violations	Specified	Taken (yes/no)	
Observations and Comments:			
Completed by:			
Site Health and Safety Officer		Date	
(a) Only the Site Health and Safety Officer may change personal protective equipment levels, using			

(a) Only the Site Health and Safety Officer may change personal protective equipment levels, using only criteria specified in the Health and Safety Plan Addendum.

Attachment I Material Safety Data Sheets



MATERIAL SAFETY DATA SHEET

(POLYCHLORINATED BIPHENYLS)

COMPOSITION/INFORMATION ON INGREDIENTS

Ingredients Name: polychlorinated biphenyls (PCBs)

HAZARD IDENTIFICATION

Reports of Carcinogenicity: YES

HEALTH HAZARDS ACUTE AND CHRONIC

- **Eyes**: Moderately irritating to eye tissues.
- Skin: Can be absorbed through intact skin, may cause de-fatting, potential for chloracne.
- **Inhalation**: Possible liver injury.
- <u>Ingestion</u>: Slightly toxic; reasonably anticipated to be carcinogenic.

EFFECTS OF OVER-EXPOSURE

Can cause dermatological symptoms; however, these are reversible upon removal of exposure source.

FIRST AID MEASURES

- **Eyes**: Irrigate immediately with copious quantities of running water for at least 15 minutes if liquid or solid PCBs get into them.
- **Skin:** Contaminated clothing should be removed and the skin washed thoroughly with soap and water. Hot PCBs may cause thermal burns.
- <u>Inhalation</u>: Remove to fresh air; if skin rash or respiratory irritation persists, consult a physician (if electrical equipment arcs over, PCBs may decompose to produce hydrochloric acid).
- <u>Ingestion</u>: Consult a physician. Do not induce vomiting or give any oily laxatives. (If large amounts are ingested, gastric lavage is suggested).

FIRE FIGHTING MEASURES: Flash Point: >141 °C (285.8 °F)

EXTINGUISHING MEDIA: PCBs are fire-resistant compounds.

FIRE-FIGHTING PROCEDURES

Standard fire-fighting wearing apparel and self-contained breathing apparatus should be worn when fighting fires that involve possible exposure to chemical combustion products. Fire fighting equipment should be thoroughly cleaned and decontaminated after use.

UNUSUAL FIRE/EXPLOSION HAZARD

If a PCB transformer is involved in a fire-related incident, the owner of the transformer is required to report the incident. Consult and follow appropriate federal, provincial and local regulations.

<u>Note</u>: When askarel liquid becomes involved in a fire, toxic by-products of combustion are typically produced including polychlorinated dibenzofurans and polychlorinated dibenzodioxins, both known carcinogens. The structures of these chemical species are as follows:

CI
CI
CI
CI
$$C_{12}$$
 $H_{8-n}CI_{n}O$
 $n = 4-8$

2,3,7,8-tetrachlorodibenzofuran

CI
$$C_{12}$$
 H_{8-n} Cl_n O_2 Cl_n O_2 O_3 O_4 O_4 O_5 O_5 O_7 O_8 O_8 O_8 O_9 O_9

2,3,7,8-tetrachloro-dibenzo-p-dioxin

<u>Note</u>: 2,3,7,8-tetrachloro-dibenzo-p-dioxin is one of the most potent teratogenic, mutagenic and carcinogenic agents known to man.

SPILL RELEASE PROCEDURES

Cleanup & disposal of liquid PCBs are strictly regulated by the federal government. Ventilate area. Contain spill/leak. Remove spill by means of absorptive material. Spill clean-up personnel should use proper protective clothing. All wastes and residues containing PCBs should be collected, containerized, marked and disposed of in the manner prescribed by applicable federal, provincial and local laws.

HANDLING AND STORAGE PRECAUTIONS

Care should be taken to prevent entry into the environment through spills, leakage, use, vaporization, or disposal of liquid. Avoid prolonged breathing of vapours or mists. Avoid contact with eyes or prolonged contact with skin. Comply with all federal, provincial and local regulations.

OTHER PRECAUTIONS

Federal regulations require PCBs, PCB items, storage areas, transformer vaults, and transport vehicles to be appropriately labelled.

RESPIRATORY PROTECTION

Use OHSA approved equipment when airborne exposure limits are exceeded. Full facepiece equipment is recommended and, if used, replaces need for face shield and/or chemical splash goggles. The respirator use limitations specified by the manufacturer must be observed.

VENTILATION

Provide natural or mechanical ventilation to control exposure levels below airborne exposure levels.

PROTECTIVE GLOVES: Wear appropriate chemical resistant gloves to prevent skin contact.

EYE PROTECTION: Wear chemical splash goggles and have eye baths available.

OTHER PROTECTIVE EQUIPMENT

Wear appropriate protective clothing. Provide a safety shower at any location where skin contact can occur.

WORK HYGIENIC PRACTICES

Wash thoroughly after handling. Supplemental safety and health: none

PHYSICAL/CHEMICAL PROPERTIES

- **Vapour pressure:** (mm Hg @100 °F) 0.005 0.00006
- **Viscosity:** (CENTISTOKES) 3.6 540
- Stability indicator/materials to avoid: Yes
- Stability Condition to Avoid: PCBs are very stable, fire-resistant compounds.

HAZARDOUS DECOMPOSITION PRODUCTS

Carbon monoxide, carbon dioxide, hydrogen chloride, phenolics, aldehydes, furans, dioxins

WASTE DISPOSAL METHODS

Consult the applicable PCB regulations prior to any disposal of PCBs or PCB-contaminated items.

MATERIAL SAFETY DATA SHEET

UNITED MINERAL & CHEMICAL CORPORATION

1100 VALLEY BROOK AVENUE LYNDHURST, NJ 07071

TEL: 201-507-3300 FAX: 201-507-1506

FOR EMERGENCY CALL: CHEMTREC

1-800-424-9300

SECTION A - PRODUCT INFORMATION

TRADE NAME: ARSENIC METAL: **REVISION DATE:** NOVEMBER 16, 2007

MBE CHARGES, ARSENIC CHUNK & GRANULE

CAS NUMBER: 7440-38-2

SYNONYMS: METALLIC ARSENIC; GREY ARSENIC; ARSENIA

CHEMICAL FAMILY: METALS - GROUP 5a

FORMULA: As

SECTION B - HAZARDOUS COMPONENTS

COMPONENT CAS NO. % **PEL/TLV**

0.01mg/m3 ACGIH TWA AS As ARSENIC METAL (As) 7440-38-2 100

0.01mg/m3 OSHA TWA, INORGANIC COMPOUNDS AS As (SEE 29 CFR 1910.1018)

0.5 mg/m3 OSHÀ TWA, ORGANIC COMPOUNDS AS As 0.002 mg/m3/15 min. CEILING-NIOSH, INORGANIC CMPD. 5 mg As/m^{3*}IDLH-CARCINOGEN, INORGANIC COMPOUNDS

TWA - Time Weighted Average over 8 hours IDLH - Immediately dangerous to life & health

See the OSHA Inorganic Arsenic Standard at 29 CFR 1910.1018 before processing.

SECTION C - PHYSICAL PROPERTIES

BOILING POINT (°C): SUBLIMES @ 615 SPECIFIC GRAVITY: 5.72 MELTING POINT (°C): 817 @ 3.6477 Mpa FREEZING POINT (°): N/A VAPOR PRESSURE (mm Hg): 1mm @ 372℃ PERCENT VOLATILE (BY WT.): N/A VAPOR DENSITY (AIR=1): **EVAPORATION RATÉ:** N/A N/A **SOLUBILITY IN WATER: INSOLUBLE** pH (0 % IN WATER): NONE

ODOR THRESHOLD: N/A

APPEARANCE & ODOR: SILVER GRAY CRYSTALLINE CHUNKS, RODS, OR GRANULES; NO ODOR AS METAL

AS COMPOUND, AsH3 HAS GARLIC ODOR

SECTION D - FIRE & EXPLOSION DATA

FLASH POINT (°): NONE

AUTO IGNITION TEMP (° F): (UNKNOWN) FLAMMABLE LIMITS: LEL: (N/A) UEL: (N/A) **EXTINGUISHING MEDIA:** WATER: () FOAM: (X) DRY CHEMICAL: (X) CO2: (X)

SPECIAL FIRE FIGHTING PROCEDURES: ARSENIC IN MASS FORM IS NON-FLAMMABLE. IN THE EVENT OF A FIRE, RESTRICT PERSONS

NOT WEARING PROTECTIVE EQUIPMENT FROM AREA. TRY TO SNUFF FIRE WITH SAND, DRY MEDIA, FOAM OR CO2. IF NO OTHER OPTIONS AVAILABLE, USE WATER & ALWAYS WEAR SELF CONTAINED BREATHING APPARATUS OR NIOSH TOXIC VAPOR RESPIRATOR. POISONOUS

GASES ARE PRODUCED IN FIRE, INCLUDING ARSENIC OXIDES.

UNUSUAL FIRE & EXPLOSION HAZARDS: ARSENIC, WHEN HEATED OR IN CONTACT WITH ACID OR ACID FUMES, CAN PRODUCE HIGHLY

TOXIC FUMES (SUCH AS ARSINE). ARSENIC REACTS VIGOROUSLY WITH OXIDIZING MATERIALS. ARSENIC IS FLAMMABLE IN THE FORM OF DUST WHEN EXPOSED TO HEAT OR FLAME OR BY CHEMICAL REACTION WITH POWERFUL OXIDIZERS (SEE SECTION E). SLIGHT EXPLOSION HAZARD EXISTS IN THE FORM OF DUST WHEN EXPOSED TO FLAME. IN THE EVENT OF A FIRE OR SPILL, CONTACT THE STATE DEPT. OF THE ENVIRONMENT & YOUR REGIONAL

OFFICE OF THE FEDERAL ENVIRONMENTAL PROTECTION AGENCY.

SECTION E - REACTIVITY DATA

STABILITY: STABLE

HYDROGEN GAS CAN REACT WITH INORGANIC ARSENIC TO FORM THE HIGHLY TOXIC GAS INCOMPATIBILITY:

ARSINE. INCOMPATIBLE WITH BROMINE AZIDE, DIRUBIDIUM ACETYLIDE, HALOGENS, PALLADIUM ZINC, PLATINUM, NCI₃, AgNO₃, CrO₃, Na₂O₂, HEXAFLUOROISOPROPYLIDENEAMINO LITHIUM. CAN REACT WITH ACIDS OR ACID FUMES AND POWERFUL OXIDIZERS SUCH AS BROMATES, CHLORATES, IODATES, PEROXIDES, LITHIUM, NaCl₃, KNO₃, KMnO₃, Rb₂C₂, AgNO₄,

NOCI, IF₅, CrO₃, CIF₃, CIO, BrF₃, BrF₅, BrN₃, RbC₃BCH, CsC₃BCH.

HAZARDOUS DECOMPOSITION PRODUCTS: ARSENIC FUMES, ARSINE, OTHER ARSENIC COMPOUNDS

HAZARDOUS POLYMERIZATION: WILL NOT OCCUR

CONDITIONS TO AVOID: AVOID OPEN CONTAINERS AND CONTACT WITH INCOMPATIBLE MATERIALS

N/A = NOT APPLICABLE LOC

SECTION F - PERSONAL PROTECTIVE EQUIPMENT INFO

RESPIRATORY EQUIPMENT: FOR HANDLING ELEMENTAL ARSENIC IN CHUNK, ROD, OR GRANULES USE NIOSH APPROVED,

AIR PURIFYING, TOXIC VAPOR RESPIRATOR FOR PARTICULATE & FUME/ AIR LEVEL. IF PROCESSING MATERIAL INTO INORGANIC ARSENIC COMPOUNDS, CHOOSE PROPER RESPIRATORY PROTECTION IN ACCORDANCE WITH THE OSHA INORGANIC ARSENIC STANDARD AT 29 CFR 1910.1018 (h). FOR UNKNOWN CONCENTRATIONS OF INORGANIC ARSENIC OR UNDER FIRE-FIGHTING CONDITIONS USE FULL FACEPIECE SELF-CONTAINED

BREATHING APPARATUS OPERATED IN POSITIVE PRESSURE MODE.

PROTECTIVE GLOVES: NEOPRENE OR PLASTIC

EYE PROTECTION: FACE SHIELD OR VENTED GOGGLES FOR WHEN DUST/ FUME OR INORGANIC COMPOUNDS

ARE GENERATED.

VENTILATION: LOCAL EXHAUST/MECHANICAL(GENERAL) SCRUBBER OR TRAP IF POSSIBLE TO MAINTAIN

EXPOSURE TO LESS THAN PERMISSIBLE LIMITS FOR ELEMENTAL ARSENIC AND ANY

COMPOUNDS BEING GENERATED (SEE SECTION B)

OTHER PROTECTIVE EQUIPMENT: LAB COAT, COVERALLS, COVERLETS FOR SHOES, AND ACCESS TO EYEWASH FOUNTAIN FOR

DUST OR INORGANIC COMPOUND GENERATION

SECTION G - HEALTH HAZARD DATA

THRESHOLD LIMIT VALUE: 0.01mg/m3 TWA ARSENIC, ELEMENTAL & INORGANIC COMPOUNDS(EXCEPT ARSINE), AS As

PRIMARY ROUTES OF EXPOSURE: INHALATION OF FUMES, DUST, REACTION GASES; INGESTION; SKIN CONTACT

763 mg/m3 RAT; ORAL RAT TDLo 605 micrograms/kg - REPRODUCTIVE EFFECTS; ORAL-MAN TDLo ORAL LD₅₀:

7857 mg/kg/55 year old – SKIN & GASTROINTESTINAL EFFECTS

DERMAL IRRITATION-RABBIT: UNKNOWN: SUBCUTANEOUS RABBIT LDLo: 300 mg/kg

EYE IRRITATION-RABBIT: UNKNOWN

0.01mg/m³ TWA INORGANIC COMPOUNDS AS As; 0.5 mg/m³ TWA ORGANIC COMPOUNDS AS As. 0.01mg/m³ TWA ELEMENTAL ARSENIC & INORGANIC COMPOUNDS (EXCEPT ARSINE), AS As OSHA PEL:

ACGIH TLV:

ARSENIC METAL IS NOT AS READILY AVAILABLE IN THE BODY AS ARSENIC IN THE FORM OF **EFFECTS OF OVEREXPOSURE:** DUST OR VAPOR OR WHEN PROCESSED INTO ARSENIC COMPOUNDS (ARSENICALS).

INORGANIC ARSENICALS ARE MORE TOXIC THAN ORGANIC ARSENICALS.

ACUTE EFFECTS: ARSENIC IS A POISON BY SUBCUTANEOUS, INTRAMUSCULAR, AND INTRAPERITONEAL ROUTES. ACUTE ARSENIC POISONING FROM INGESTION RESULTS IN BURNING LIPS, THROAT CONSTRICTION, ABDOMINAL PAIN, MARKED IRRITATION OF THE STOMACH AND INTESTINES WITH NAUSEA, VOMITING, AND DIARRHEA. IN SEVERE CASES THE STOOLS AND VOMIT ARE BLOODY AND THE PATIENT MAY GO INTO COLLAPSE AND SHOCK WITH WEAK, RAPID PULSE, COLD SWEATS, COMA, AND DEATH. INHALATION MAY CAUSE ULCERATION OF NASAL SEPTUM, RESPIRATORY IRRITATION (COUGH, SORE THROAT), SHORTNESS OF BREATH AND WEAKNESS, SKIN OR EYE CONTACT MAY CAUSE DERMATITIS. SKIN AND EYE IRRITATION. AFTER ABSORPTION, ARSENIC MAY CAUSE MULTI-ORGAN FAILURE AS DELAYED EFFECTS. ARSENIC IS AN EXPERIMENTAL TERATOGEN (MAY CAUSE DAMAGE TO THE DEVELOPING FETUS) AND MAY CAUSE SPONTANEOUS ABORTION OR STILLBIRTH WITH EITHER ACUTE OR CHRONIC POISONING.

CHRONIC EFFECTS: ARSENIC IS A CONFIRMED HUMAN CARCINOGEN AND HAS BEEN ASSOCIATED WITH LUNG, BLADDER, SKIN, AND OTHER CANCERS IN HUMANS. CHRONIC ARSENIC POISONING MAY INCLUDE ANY OR ALL OF THE FOLLOWING: DIGESTIVE SYSTEM DISTURBANCES, LOSS OF APPETITE, CRAMPS, NAUSEA, CONSTIPATION, DIARRHEA; LIVER DAMAGE WHICH MAY RESULT IN JAUNDICE; DISTURBANCES OF THE BLOOD, KIDNEYS AND NERVOUS SYSTEM; SKIN ABNORMALITIES INCLUDING ITCHING, PIGMENTATION, AND POSSIBLE

CANCEROUS CHANGES. ARSENIC HAS INDUCED DNA DAMAGE IN HUMAN CELLS.

(FOR INORGANIC COMPOUNDS AS As): LIVER, KIDNEYS, SKIN, LUNGS, LYMPHATIC SYSTEM TARGET ORGANS (NIOSH): KNOWN EFFECTS ON OTHER ILLNESSES: EXPECTED TO AGGRAVATE PRE-EXISTING GASTROINTESTINAL, NERVOUS SYSTEM, SKIN,

LIVER & KIDNEY PROBLEMS.

LISTED CARCINOGEN: NONE () OSHA (YES) NTP (YES) IARC (YES) OTHER (YES)

SECTION H - EMERGENCY & FIRST AID DATA

FLUSH WITH SOAP & WATER. AVOID RUBBING INTO THE SKIN. CONTACT PHYSICIAN IMMEDIATELY. SKIN:

EYES: FLUSH WITH WATER FOR AT LEAST 15 MINUTES, LIFTING UPPER AND LOWER EYELIDS. CONTACT PHYSICIAN

IMMEDIATELY.

INHALATION: REMOVE TO FRESH AIR. PROVIDE OXYGEN IF NECESSARY. CONTACT PHYSICIAN IMMEDIATELY.

INGESTION: IMMEDIATELY CALL POISON CONTROL OR A PHYSICIAN. DO NOT INDUCE VOMITING UNLESS DIRECTED TO DO

SO BY POISON CONTROL OR EMERGENCY MEDICAL PERSONNEL. TAKE TO HOSPITAL IMMEDIATELY.

MEDICAL NOTE: AGGRESSIVE DECONTAMINATION WITH GASTRIC LAVAGE IS RECOMMENDED. IF AN X-RAY INDICATES THE PRESENCE OF ARSENIC IN THE LOWER GI TRACT, WHOLE BOWEL IRRIGATION SHOULD BE CONSIDERED. ACTIVATED CHARCOAL MAY NOT BIND SIGNIFICANT AMOUNTS BUT IS RECOMMENDED UNTIL DEFINITIVE QUANTITATIVE DATA IS AVAILABLE. FLUID REPLETION SHOULD BEGIN AS SOON AS POSSIBLE.

N/A = NOT APPLICABLE LOC

SECTION I - SPILL & DISPOSAL INFORMATION

STEPS TO BE TAKEN IN CASE OF SPILL OR LEAK:

EVACUATE THE DANGER AREA. WEARING FULL PROTECTIVE EQUIPMENT (RESPIRATOR, GLOVES, GOGGLES, LAB COAT), GATHER UP CHUNKS, RODS, OR GRANULES WITH VACUUM OR UTENSILS RESERVED FOR POISONOUS SOLIDS AND PLACE IN SUITABLE CONTAINER AND SEAL. DO NOT RELEASE TO THE ENVIRONMENT. AVOID GENERATING DUST. VENTILATE THE AREA AFTER CLEANUP OF MATERIAL AND RESIDUE IS COMPLETE.

WASTE DISPOSAL INFORMATION:

SOLID WASTES SHOULD BE VITRIFIED, PLACED IN LABELED CONTAINER & BURIED IN AN EPA SUPERVISED FACILITY. ETCHING SOLUTIONS & CUTTING WASTES SHOULD BE PRECIPITATED, CEMENTED/VITRIFIED & PLACED IN METAL/PLASTIC LABELED CONTAINERS & BURIED IN EPA SUPERVISED FACILITY. PASS GAS THROUGH POTASSIUM PERMANGANATE, PRECIPITATE & TREAT AS ABOVE. WASTE MAY BE CONSIDERED HAZARDOUS DEPENDING ON LEVEL OF TOXICITY CHARACTERISTIC OF ARSENIC. SEE 40 CFR 261.24 FOR DETERMINATION.

RCRA HAZARDOUS WASTE: NO () YES (**X) RCRA #: (**D004)

** - IF TESTED POSITIVE AS CHARACTERISTIC OF TOXICITY FOR ARSENIC

CERCLA: NO () YES (X)

RQ (1 LB. RQ IS APPLICABLE ONLY IF THE DIAMETER OF THE PIECES OF THE SOLID METAL RELEASED IS
LESS THAN 100 MICROMETERS OR 0.004 INCH. THIS PRODUCT FORM IS LARGER THAN 100

MICROMETERS AND HAS NO RQ IN ITS CURRENT FORM. IF AS HAZARDOUS WASTE

CHARACTERISTIC OF ARSENIC, THEN RQ=1 LB.)

FOLLOW ALL LOCAL, STATE AND FEDERAL INFORMATION AND REGULATIONS

SECTION J - OTHER REGULATORY INFORMATION

TSCA: WE CERTIFY THAT ALL COMPONENTS OF THIS PRODUCT ARE REGISTERED UNDER THE REGULATIONS OF THE TOXIC SUBSTANCES CONTROL ACT.

SARA TITLE III, SECT. 313: LISTED (X) UNLISTED ()

DOT REGULATED: YES: (X) NO: () RQ: (N/A - PIECES ARE LARGER THAN 100 MICROMETERS IN DIAMETER)

IF REGULATED, PROPER SHIPPING NAME: ARSENIC HAZARD CLASS: (6.1)

IDENTIFICATION NO.: (UN1558) PACKING GROUP: (II) LABEL REQUIRED: (POISON)

INLAND B/L: UN1558, ARSENIC, 6.1, PACKING GROUP II, POISON

EMERGENCY RESPONSE GUIDE NO.: (152)

SECTION K - SPECIAL PRECAUTIONS

FOR INDUSTRIAL USE ONLY

HANDLING & STORAGE INFORMATION:

PRIOR TO WORKING WITH ARSENIC, PERSONNEL SHOULD BE TRAINED IN PROPER HANDLING & STORAGE. STORE IN ORIGINAL PACKAGING IN COOL DRY AREA. WHEN HANDLING, WEAR FULL PROTECTIVE EQUIPMENT (SEE SECTION F). PLACE INTO INERT ATMOSPHERE IMMEDIATELY. IF PROCESSING INTO INORGANIC ARSENIC COMPOUNDS, FOLLOW THE OSHA STANDARD AT 29 CFR 1910.1018. DO NOT INGEST. DO NOT INHALE DUST OR ANY PROCESSING FUMES. AVOID SKIN AND EYE CONTACT.

NOTE: MAINTENANCE PERSONNEL OF PROCESSING AND EXTRACT EQUIPMENT MUST ALSO WEAR FULL PROTECTIVE EQUIPMENT (SEE SECTION F) AND OBSERVE THE REQUIREMENTS OF THE OSHA INORGANIC ARSENIC STANDARD (29 CFR 1910.1018) AS RESIDUES MAY CONTAIN ARSENIC PARTICLES AND VARYING COMPOUNDS OF ARSENIC.

OTHER PRECAUTIONS:

MINIMUM - HAVE QUARTERLY MEDICAL CHECKS INCLUDING URINE TESTS OF PERSONNEL WORKING WITH ARSENIC OR ARSENIC COMPOUNDS. DO NOT EAT, DRINK OR SMOKE IN THE WORK AREA.

IN ACCORDANCE WITH GOOD PRACTICES OF PERSONAL HYGIENE, HANDLE WITH DUE CARE AND AVOID ANY UNNECESSARY CONTACT WITH THIS PRODUCT. THIS INFORMATION IS BEING SUPPLIED TO YOU UNDER OSHA "RIGHT TO KNOW" REGULATION 29 CFR 1910.1200 AND IS OFFERED IN GOOD FAITH AS TYPICAL VALUES AND NOT AS PRODUCT SPECIFICATION. THE INFORMATION IS BELIEVED TO BE TRUE AND ACCURATE. NO WARRANTY, EXPRESSED OR IMPLIED, REGARDING THE ACCURACY OF THIS DATA, THE HAZARD CONNECTED WITH USE OF THE MATERIAL, OR THE RESULTS TO BE OBTAINED FROM THE USE OF THE PRODUCT DESCRIBED HEREIN. UNITED MINERAL & CHEMICAL CORPORATION

N/A = NOT APPLICABLE LOC







Section I - Identification

Product Identity: Benzo(a)pyrene
Product Number: SCB-007

Product Number: SCB-007 Phone: 512-310-5100

 Manufacturer:
 Cerilliant Corporation
 FAX:
 512-238-9129

 811 Paloma Drive, Suite A Round Rock, TX 78665
 Emergency
 800-424-9300

 (ChemTrec)
 703-527-3887

Section II - Hazard Information

Target Organs: N/A
Signal Words: Danger



GHS/CLP Classification:

Carcinogen-Cat 1B

Mutagen-Cat 1B

Reproductive toxicity-Cat 1B

Skin sensitisation-Cat 1

Aquatic toxicity, acute-Cat 1

Aquatic toxicity, chronic-Cat 1

Hazard Statements:

H317 May cause an allergic skin reaction.

H340 May cause genetic defects

H350 May cause cancer.

H360 May damage fertility or the unborn child

H400 Very toxic to aquatic life.

H410 Very toxic to aquatic life with long lasting effects.

Precautionary Statements:

P261 Avoid breathing dust/fume/gas/mist/vapours/spray.

P273 Avoid release to the environment.

P280 Wear protective gloves/protective clothing/eye protection/face protection.

P302+P352 IF ON SKIN: Wash with plenty of soap and water.
P308+P313 IF exposed or concerned: Get medical advice/attention.
P333+P313 If skin irritation or rash occurs: Get medical advice/attention.

EU Directives Classification:

Symbol of Danger: Indication of Danger:

N/A

Risk Phrases:

R43 May cause sensitization by skin contact.

R45 May cause cancer.

R46 May cause heritable genetic damage.

R50/53 Very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.

R60 May impair fertility.

R61 May cause harm to the unborn child.

Safety Phrases:

S45 In case of accident or if you feel unwell, seek medical advice immediately (show the label where possible).

S53 Avoid exposure - obtain special instructions before use.

S60 This material and its container must be disposed of as hazardous waste.

S61 Avoid release to the environment. Refer to special instructions/Safety data sheets.

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Revision Date: 12/5/2010



Section III - Composition/Information on Ingredients

Hazardous Components	CAS Number	Molecular Formula	Molecular Weight	EC Number	CLP Index Number	%
Benzo(a)pyrene	50-32-8	C20H12	252.32	200-028-5	601-032-00-3	100

Section IV - First Aid Measures

Eye Contact: Flush eyes with copious amounts of water for a minimum of 15 minutes and consult a physician.

Ingestion: Do not induce vomiting. Rinse mouth with water and consult a physician.

Skin Contact: Wash affected areas with copious amounts of water and consult a physician.

Inhalation: Remove to fresh air. If breathing is disturbed, give artificial respiration while transporting to a medical facility.

Section V - Fire Fighting Measures

Flash point: N/A Flammable Limits:

Method Used: N/A LEL: N/A UEL: N/A

Autoignition Temperature: N/A

Extinguishing Media: Water spray, chemical, or carbon dioxide extinguisher.

Special Fire Fighting Procedures: Wear SCBA and protective clothing to prevent contact with skin and eyes.

Unusual Fire and Explosion Hazards: N/A

Section VI - Accidental Release Measures

Evacuate area. Remove all sources of ignition. Use inert absorbent to pick up all spilled material. Transfer to a suitable waste container with non-sparking tools. Wash spill site with appropriate cleaning agents to remove residual traces of spilled material.

Section VII - Handling and Storage

Handling: Do not breathe dust or vapor. Avoid contact with eyes, skin, and clothing. Avoid prolonged, repeated exposure. Wash thoroughly after

nandling.

Storage: Room Temperature. Protect from light. Keep container closed. Keep away from ignition sources.

Section VIII - Exposure Controls/Personal Protection

As appropriate to quantity handled.

Ventilation-Local Exhaust: Use with forced ventilation.

General Mechanical: Normal laboratory air exchange.

Respiratory Protection: NIOSH approved cartridge type respirator with organic vapor cartridge with HEPA pre-filter recommended.

Eye Protection: Safety glasses with side shields or chemical safety goggles.

Protective Gloves: Compatible chemical resistant gloves.

Other Protective Clothing or Equipment: Lab Coat

Work/Hygienic Practices: Only experienced personnel should be allowed to handle this material.

Exposure Limits						
	OSHA PEL	ACGIH TLV	DFG MAK	Other Limits		
Benzo(a)pyrene	TWA 0.2 mg/m3	N/A	N/A	N/A		

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Section IX- Physical and Chemical Properties

Boiling Point (°C): N/A

Melting Point (°C): 176.5

Specific Gravity (Water =1): 1.351

Vapor Pressure (mm Hg): N/A

Vapor Density (Air =1): N/A

Evaporation Rate (Butyl Acetate =1): N/A

Solubility in Water: 0.00162 mg/L @ 25 °C

Appearance and Odor: Pale-yellow crystals

Section X- Stability and Reactivity

Stability: Stable
Conditions to Avoid: N/A

Incompatible Materials: Strong oxidizing agents

Hazardous Decomposition Products: carbon monoxide and carbon dioxide

Section XI- Toxicological Information

Routes of Entry: Inhalation: Yes Ingestion: Yes Skin: No

Carcinogenicity: IARC: Group 1-Carginogenic to humans

NTP: Reasonably anticipated to be a carcinogen.

OSHA: N/A

Symptoms of Exposure: N/A

Toxicity Data:

Oral-mouse TDLO: 1280 mg/kg (female 16D pre-5D post) teratogen

Oral-rat TDLO: 15 mg/kg carcinogen

The toxicological properties of Benzo(a)pyrene have not been fully investigated. It should be assumed to have toxic effects and, therefore, procedures appropriate for the safe handling of hazardous chemicals should be followed.

Section XII- Ecological Information

N/A

Section XIII- Disposal Considerations

Waste materials should be disposed of under conditions that meet Federal, State, and Local environmental control regulations. Contact a licensed waste disposal specialist to dispose of this material.

Section XIV- Transport Information

DOT ΙΑΤΑ Proper Shipping Name: Environmentally hazardous substance, solid n.o.s. Proper Shipping Name: Environmentally hazardous substance, solid, n.o.s. 3077 UN Number: 3077 UN Number: 9 Class: Ш Packing Group: Packing Group: Ш PIH: Ν PIH: Small quantities exempted Small quantities exempted

Section XV- Regulatory Information

SARA 302: No SARA 313: Listed RCRA Code: U022 CERCLA RQ (pounds): 1

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Revision Date:12/5/2010



Section XVI- Other Information

The information contained herein is believed to be accurate and is supplied in good faith. Cerilliant Corporation makes no warranty with respect to and assumes no legal responsibility for use or reliance upon this information. Individuals receiving this data must exercise their own judgement in determining its suitability for a particular purpose.

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SIGMA-ALDRICH

sigma-aldrich.com

Page 1 of 8

Material Safety Data Sheet

Version 4.2 Revision Date 01/19/2012 Print Date 04/10/2012

1. PRODUCT AND COMPANY IDENTIFICATION

Product name : Cadmium

Product Number : 414891 Brand : Aldrich

Supplier : Sigma-Aldrich

3050 Spruce Street

SAINT LOUIS MO 63103

USA

Telephone : +1 800-325-5832 Fax : +1 800-325-5052 Emergency Phone # (For : (314) 776-6555

both supplier and

manufacturer)

Preparation Information : Sigma-Aldrich Corporation Product Safety - Americas Region

1-800-521-8956

2. HAZARDS IDENTIFICATION

Emergency Overview

OSHA Hazards

Carcinogen, Target Organ Effect, Highly toxic by inhalation, Toxic by ingestion, Reproductive hazard, Mutagen

Target Organs

Lungs, Kidney

GHS Classification

Acute toxicity, Inhalation (Category 2) Acute toxicity, Oral (Category 3) Germ cell mutagenicity (Category 2) Carcinogenicity (Category 1B) Reproductive toxicity (Category 2)

Specific target organ toxicity - repeated exposure (Category 1)

Acute aquatic toxicity (Category 1)
Chronic aquatic toxicity (Category 1)

GHS Label elements, including precautionary statements

Pictogram

00000308

\$\$

Signal word Danger

Hazard statement(s)

H301 Toxic if swallowed. H330 Fatal if inhaled.

H341 Suspected of causing genetic defects.

H350 May cause cancer.

H361 Suspected of damaging fertility or the unborn child.

H372 Causes damage to organs through prolonged or repeated exposure.

H410 Very toxic to aquatic life with long lasting effects.

Aldrich - 414891 Delivery 0841446388-000010 Purchase Order 120733RP Precautionary statement(s)

P201 Obtain special instructions before use.

P260 Do not breathe dust/ fume/ gas/ mist/ vapours/ spray.

P273 Avoid release to the environment.

P281 Use personal protective equipment as required.

P284 Wear respiratory protection.

P310 Immediately call a POISON CENTER or doctor/ physician.

P501 Dispose of contents/ container to an approved waste disposal plant.

HMIS Classification

Health hazard: 3
Chronic Health Hazard: *
Flammability: 0
Physical hazards: 0

NFPA Rating

Health hazard: 4
Fire: 0
Reactivity Hazard: 0

Potential Health Effects

Inhalation May be fatal if inhaled. May cause respiratory tract irritation.

Skin May be harmful if absorbed through skin. May cause skin irritation.

Eyes May cause eye irritation.
Ingestion Toxic if swallowed.

3. COMPOSITION/INFORMATION ON INGREDIENTS

Formula : C

Molecular Weight : 112.41 g/mol

Component		Concentration
Cadmium		
CAS-No.	7440-43-9	
EC-No.	231-152-8	
Index-No.	048-002-00-0	

4. FIRST AID MEASURES

General advice

Consult a physician. Show this safety data sheet to the doctor in attendance. Move out of dangerous area.

If inhaled

If breathed in, move person into fresh air. If not breathing, give artificial respiration. Consult a physician.

in case of skin contact

Wash off with soap and plenty of water. Take victim immediately to hospital. Consult a physician.

In case of eye contact

Flush eyes with water as a precaution.

If swallowed

Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

5. FIREFIGHTING MEASURES

Conditions of flammability

Not flammable or combustible.

Suitable extinguishing media

Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.

Special protective equipment for firefighters

Wear self contained breathing apparatus for fire fighting if necessary.

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Hazardous combustion products

Hazardous decomposition products formed under fire conditions. - Cadmium/cadmium oxides

6. ACCIDENTAL RELEASE MEASURES

Personal precautions

Wear respiratory protection. Avoid dust formation. Avoid breathing vapors, mist or gas. Ensure adequate ventilation. Evacuate personnel to safe areas. Avoid breathing dust.

Environmental precautions

Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

Methods and materials for containment and cleaning up

Pick up and arrange disposal without creating dust. Sweep up and shovel. Keep in suitable, closed containers for disposal.

7. HANDLING AND STORAGE

Precautions for safe handling

Avoid contact with skin and eyes. Avoid formation of dust and aerosols.

Provide appropriate exhaust ventilation at places where dust is formed.

Conditions for safe storage

Keep container tightly closed in a dry and well-ventilated place.

Air sensitive.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Components with workplace control parameters

Components	CAS-No.	Value	Control parameters	Basis			
Cadmium .	7440-43-9	TWA	0.1 mg/m3	USA. Occupational Exposure Limits (OSHA) - Table Z2			
Remarks		.5-1970 This standard applies to any operations or sectors for which the Cadmium standard, 0.1027, is stayed or otherwise not in effect.					
		CEIL	0.3 mg/m3	USA. Occupational Exposure Limits (OSHA) - Table Z2			
			lard applies to any or otherwise not in	operations or sectors for which the Cadmium standard, effect.			
		TWA	0.0020 mg/m3	USA. ACGIH Threshold Limit Values (TLV)			
	Suspected h	uman car	cinogen				
		TWA	0.01 mg/m3	USA. ACGIH Threshold Limit Values (TLV)			
			ances for which the man carcinogen	re is a Biological Exposure Index or Indices (see BEI®			
		TWA	0.002 mg/m3	USA. ACGIH Threshold Limit Values (TLV)			
			ances for which the man carcinogen	ere is a Biological Exposure Index or Indices (see BEI®			
	See 1910.10 exposure lim	27. See T iits in 1910	able Z-2 for the ex 0.1027 are stayed	posure limits for any operations or sectors where the or are otherwise not in effect.			
		TWA	0.2 mg/m3	USA. Occupational Exposure Limits (OSHA) - Table Z2			

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		dard applies to ar or otherwise not i	ny operations or sectors for which the Cadmium standard, in effect.
	CEIL	0.6 mg/m3	USA. Occupational Exposure Limits (OSHA) - Table Z2
		dard applies to ar or otherwise not i	ny operations or sectors for which the Cadmium standard, in effect.
 Potential O	ocupationa	l Carcinogen See	B Appendix A

Personal protective equipment

Respiratory protection

Where risk assessment shows air-purifying respirators are appropriate use a full-face particle respirator type N100 (US) or type P3 (EN 143) respirator cartridges as a backup to engineering controls. If the respirator is the sole means of protection, use a full-face supplied air respirator. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Hand protection

Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.

Eve protection

Face shield and safety glasses Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).

Skin and body protection

Complete suit protecting against chemicals, The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.

Avoid contact with skin, eyes and clothing. Wash hands before breaks and immediately after handling the product.

9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance

granular Form Colour light grey

Safety data

no data available

Meltina

Melting point/range; 320.9 ℃ (609.6 ℃) - lit.

point/freezing point

Boiling point 765 °C (1,409 °F) - lit.

not applicable Flash point no data available Ignition temperature no data available Autoignition temperature

Lower explosion limit no data available Upper explosion limit no data available Vapour pressure no data available

8.65 g/cm3 at 25 °C (77 °F) Density

Water solubility no data available Partition coefficient: no data available

n-octanol/water

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Relative vapour

no data available

density Odour

no data available

Odour Threshold

no data available

Evaporation rate

no data available

10. STABILITY AND REACTIVITY

Chemical stability

Stable under recommended storage conditions.

Possibility of hazardous reactions

no data available

Conditions to avoid

no data available

Materials to avoid

Oxidizing agents, acids

Hazardous decomposition products

Hazardous decomposition products formed under fire conditions. - Cadmium/cadmium oxides

Other decomposition products - no data available

11. TOXICOLOGICAL INFORMATION

Acute toxicity

Oral LD50

LD50 Oral - rat - 225 mg/kg

Inhalation LC50

LC50 Inhalation - rat - 30 h - 25 mg/m3

Remarks: Lungs, Thorax, or Respiration: Dyspnea.

Dermal LD50

no data available

Other information on acute toxicity

no data available

Skin corresion/irritation

no data available

Serious eye damage/eye irritation

no data available

Respiratory or skin sensitization

no data available

Germ cell mutagenicity

In vitro tests showed mutagenic effects

Carcinogenicity

Possible human carcinogen

IARC:

1 - Group 1: Carcinogenic to humans (Cadmium)

NTP:

Known to be human carcinogen (Cadmium)

Known to be human carcinogenThe reference note has been added by TD based on the

background information of the NTP. (Cadmium)

OSHA:

1910.1027 (Cadmium)

Reproductive toxicity

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Suspected human reproductive toxicant

Teratogenicity

no data available

Specific target organ toxicity - single exposure (Globally Harmonized System)

no data available

Specific target organ toxicity - repeated exposure (Globally Harmonized System)

Causes damage to organs through prolonged or repeated exposure.

Aspiration hazard

no data available

Potential health effects

Inhalation

May be fatal if inhaled. May cause respiratory tract irritation.

Ingestion

Toxic if swallowed.

Skin

May be harmful if absorbed through skin. May cause skin irritation.

Eves

May cause eye irritation.

Signs and Symptoms of Exposure

Damage to the lungs., Kidney injury may occur., prolonged or repeated exposure can cause:, Vomiting, Diarrhoea, Lung

Synergistic effects

no data available

Additional Information

RTECS: EU9800000

12. ECOLOGICAL INFORMATION

Toxicity

Toxicity to fish

mortality LOEC - Oncorhynchus mykiss (rainbow trout) - 0.0015 mg/l - 96 h

LC50 - Pimephales promelas (lathead minnow) - 1.0 μg/l - 96 h

Toxicity to daphnia

and other aquatic

invertebrates

mortality LOEC - Daphnia - 0.039 mg/l - 24 h

mortality NOEC - Daphnia - 0.019 mg/l - 24 h

EC50 - Daphnia magna (Water flea) - 0.024 mg/l - 48 h

Growth inhibition IC50 - Chaetoceros sp. - 0.028 mg/l - 48 h Toxicity to algae

Persistence and degradability

no data available

Bioaccumulative potential

Bioaccumulation

Oncorhynchus mykiss (rainbow trout) - 72 d

Bioconcentration factor (BCF): 55

Mobility in soil

no data available

PBT and vPvB assessment

no data available

Other adverse effects

An environmental hazard cannot be excluded in the event of unprofessional handling or disposal.

Very toxic to aquatic life with long lasting effects.

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13. DISPOSAL CONSIDERATIONS

Product

Offer surplus and non-recyclable solutions to a licensed disposal company. Contact a licensed professional waste disposal service to dispose of this material. Dissolve or mix the material with a combustible solvent and burn in a chemical incinerator equipped with an afterburner and scrubber.

Contaminated packaging

Dispose of as unused product.

14. TRANSPORT INFORMATION

DOT (US)

UN number: 2570 Class: 6.1 Packing group: I Proper shipping name: Cadmium compounds (Cadmium)

Reportable Quantity (RQ): 10 lbs

Marine pollutant: No

Poison Inhalation Hazard: No

IMDG

UN number: 2570 Class: 6.1 Packing group: I

Proper shipping name: CADMIUM COMPOUND (Cadmium)

Marine pollutant: No

IATA

UN number: 2570 Class: 6.1 Packing group: I

Proper shipping name: Cadmium compound (Cadmium)

IATA Passenger: Not permitted for transport

15. REGULATORY INFORMATION

OSHA Hazards

Carcinogen, Target Organ Effect, Highly toxic by inhalation, Toxic by ingestion, Reproductive hazard, Mutagen

SARA 302 Components

SARA 302: No chemicals in this material are subject to the reporting requirements of SARA Title III, Section 302.

SARA 313 Components

The following components are subject to reporting levels established by SARA Title III, Section 313:

CAS-No. Revision Date

EMS-No: F-A, S-A

Cadmium 7440-43-9 1993-04-24

SARA 311/312 Hazards

Acute Health Hazard, Chronic Health Hazard

Massachusetts Right To Know Components

Cadmium	CAS-No. 7440-43-9	Revision Date 1993-04-24
Caomun	7440-43-3	1333-04-24
Pennsylvania Right To Know Components		
	CAS-No.	Revision Date
Cadmium	7440-43-9	1993-04-24
New Jersey Right To Know Components		
• •	CAS-No.	Revision Date
Cadmium	7440-43-9	1993-04-24
California Prop. 65 Components		
WARNING! This product contains a chemical known to the State of	CAS-No.	Revision Date
California to cause cancer.	7440-43-9	2009-02-01
Cadmium		

California Prop. 65 Components

WARNING! This product contains a chemical known to the State of CAS-No. Revision Date

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California to cause birth defects or other reproductive harm.

7440-43-9

2009-02-01

16 OTHER INFORMATION

Further information

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Material Safety Data Sheet Chromium MSDS

Section 1: Chemical Product and Company Identification

Product Name: Chromium

Catalog Codes: SLC4711, SLC3709

CAS#: 7440-47-3

RTECS: GB4200000

TSCA: TSCA 8(b) inventory: Chromium

CI#: Not applicable.

Synonym: Chromium metal; Chrome; Chromium Metal

Chips 2" and finer

Chemical Name: Chromium

Chemical Formula: Cr

Contact Information:

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

US Sales: **1-800-901-7247**

International Sales: 1-281-441-4400

Order Online: ScienceLab.com

CHEMTREC (24HR Emergency Telephone), call:

1-800-424-9300

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

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

Section 2: Composition and Information on Ingredients

Composition:

Name	CAS#	% by Weight
Chromium	7440-47-3	100

Toxicological Data on Ingredients: Chromium LD50: Not available. LC50: Not available.

Section 3: Hazards Identification

Potential Acute Health Effects:

Hazardous in case of skin contact (irritant), of eye contact (irritant), of inhalation. Slightly hazardous in case of ingestion.

Potential Chronic Health Effects:

CARCINOGENIC EFFECTS: A4 (Not classifiable for human or animal.) by ACGIH, 3 (Not classifiable for human.) by IARC. MUTAGENIC EFFECTS: Not available. TERATOGENIC EFFECTS: Not available. DEVELOPMENTAL TOXICITY: Not available. The substance may be toxic to kidneys, lungs, liver, upper respiratory tract. Repeated or prolonged exposure to the substance can produce target organs damage.

Section 4: First Aid Measures

Eye Contact:

Check for and remove any contact lenses. In case of contact, immediately flush eyes with plenty of water for at least 15 minutes. Get medical attention.

Skin Contact:

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

Serious Skin Contact:

Wash with a disinfectant soap and cover the contaminated skin with an anti-bacterial cream. Seek medical attention.

Inhalation:

If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention.

Serious Inhalation: Not available.

Ingestion:

Do NOT induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person. Loosen tight clothing such as a collar, tie, belt or waistband. Get medical attention if symptoms appear.

Serious Ingestion: Not available.

Section 5: Fire and Explosion Data

Flammability of the Product: May be combustible at high temperature.

Auto-Ignition Temperature: 580°C (1076°F)

Flash Points: Not available.

Flammable Limits: Not available.

Products of Combustion: Some metallic oxides.

Fire Hazards in Presence of Various Substances:

Slightly flammable to flammable in presence of open flames and sparks, of heat. Non-flammable in presence of shocks.

Explosion Hazards in Presence of Various Substances:

Risks of explosion of the product in presence of mechanical impact: Not available. Risks of explosion of the product in presence of static discharge: Not available.

Fire Fighting Media and Instructions:

SMALL FIRE: Use DRY chemical powder. LARGE FIRE: Use water spray, fog or foam. Do not use water jet.

Special Remarks on Fire Hazards:

Moderate fire hazard when it is in the form of a dust (powder) and burns rapidly when heated in flame. Chromium is attacked vigorously by fused potassium chlorate producing vivid incandescence. Pyrophoric chromium unites with nitric oxide with incandescence. Incandescent reaction with nitrogen oxide or sulfur dioxide.

Special Remarks on Explosion Hazards:

Powdered Chromium metal +fused ammonium nitrate may react violently or explosively. Powdered Chromium will explode spontaneously in air.

Section 6: Accidental Release Measures

Small Spill:

Use appropriate tools to put the spilled solid in a convenient waste disposal container. Finish cleaning by spreading water on the contaminated surface and dispose of according to local and regional authority requirements.

Large Spill:

Use a shovel to put the material into a convenient waste disposal container. Finish cleaning by spreading water on the contaminated surface and allow to evacuate through the sanitary system. Be careful that the product is not present at a concentration level above TLV. Check TLV on the MSDS and with local authorities.

Section 7: Handling and Storage

Precautions:

Keep away from heat. Keep away from sources of ignition. Ground all equipment containing material. Do not ingest. Do not breathe dust. Wear suitable protective clothing. In case of insufficient ventilation, wear suitable respiratory equipment. If ingested, seek medical advice immediately and show the container or the label. Avoid contact with skin and eyes. Keep away from incompatibles such as oxidizing agents, acids, alkalis.

Storage: Keep container tightly closed. Keep container in a cool, well-ventilated area.

Section 8: Exposure Controls/Personal Protection

Engineering Controls:

Use process enclosures, local exhaust ventilation, or other engineering controls to keep airborne levels below recommended exposure limits. If user operations generate dust, fume or mist, use ventilation to keep exposure to airborne contaminants below the exposure limit.

Personal Protection:

Splash goggles. Lab coat. Dust respirator. Be sure to use an approved/certified respirator or equivalent. Gloves.

Personal Protection in Case of a Large Spill:

Splash goggles. Full suit. Dust respirator. Boots. Gloves. A self contained breathing apparatus should be used to avoid inhalation of the product. Suggested protective clothing might not be sufficient; consult a specialist BEFORE handling this product.

Exposure Limits:

TWA: 0.5 (mg/m3) from ACGIH (TLV) [United States] TWA: 1 (mg/m3) from OSHA (PEL) [United States] TWA: 0.5 (mg/m3) from NIOSH [United States] TWA: 0.5 (mg/m3) [United Kingdom (UK)] TWA: 0.5 (mg/m3) [Canada]Consult local authorities for acceptable exposure limits.

Section 9: Physical and Chemical Properties

Physical state and appearance: Solid. (Metal solid.)

Odor: Odorless.

Taste: Not available.

Molecular Weight: 52 g/mole

Color: Silver-white to Grey.

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

Boiling Point: 2642°C (4787.6°F)

Melting Point: 1900°C (3452°F) +/- !0 deg. C

Critical Temperature: Not available.

Specific Gravity: 7.14 (Water = 1)

Vapor Pressure: Not applicable.

Vapor Density: Not available.

Volatility: Not available.

Odor Threshold: Not available.

Water/Oil Dist. Coeff.: Not available.

Ionicity (in Water): Not available.

Dispersion Properties: Not available.

Solubility:

Insoluble in cold water, hot water. Soluble in acids (except Nitric), and strong alkalies.

Section 10: Stability and Reactivity Data

Stability: The product is stable.

Instability Temperature: Not available.

Conditions of Instability: Excess heat, incompatible materials

Incompatibility with various substances: Reactive with oxidizing agents, acids, alkalis.

Corrosivity: Not available.

Special Remarks on Reactivity:

Incompatible with molten Lithium at 180 deg. C, hydrogen peroxide, hydrochloric acid, sulfuric acid, most caustic alkalies and alkali carbonates, potassium chlorate, sulfur dioxide, nitrogen oxide, bromine pentafluoride. It may react violently or ignite with bromine pentafluoride. Chromium is rapidly attacked by fused sodium hydroxide + potassium nitrate. Potentially hazardous incompatibility with strong oxidizers.

Special Remarks on Corrosivity: Not available.

Polymerization: Will not occur.

Section 11: Toxicological Information

Routes of Entry: Inhalation. Ingestion.

Toxicity to Animals:

LD50: Not available. LC50: Not available.

Chronic Effects on Humans:

CARCINOGENIC EFFECTS: A4 (Not classifiable for human or animal.) by ACGIH, 3 (Not classifiable for human.) by IARC. May cause damage to the following organs: kidneys, lungs, liver, upper respiratory tract.

Other Toxic Effects on Humans:

Hazardous in case of skin contact (irritant), of inhalation. Slightly hazardous in case of ingestion.

Special Remarks on Toxicity to Animals: Not available.

Special Remarks on Chronic Effects on Humans:

May cause cancer based on animal data. There is no evidence that exposure to trivalent chromium causes cancer in man.

Special Remarks on other Toxic Effects on Humans:

Acute Potential Health Effects: May cause skin irritation. Eyes: May cause mechanical eye irritation. Inhalation: May cause irritation of the respiratory tract and mucous membranes of the respiratory tract. Ingestion: May cause gastrointestinal tract irritation with nausea, vomiting, diarrhea. Chronic Potential Health Effects: Inhalation: The effects of chronic exposure include irritation, sneezing, reddness of the throat, bronchospasm, asthma, cough, polyps, chronic inflammation, emphysema, chronic bronchitis, pharyngitis, bronchopneumonia, pneumoconoisis. Effects on the nose from chronic chromium exposure include irritation, ulceration, and perforation of the nasal septum. Inflammation and ulceration of the larynx may also occur. Ingestion or Inhalation: Chronic exposure may cause liver and kidney damage.

Section 12: Ecological Information

Ecotoxicity: Not available.

BOD5 and COD: Not available.

Products of Biodegradation:

Possibly hazardous short term degradation products are not likely. However, long term degradation products may arise.

Toxicity of the Products of Biodegradation: The product itself and its products of degradation are not toxic.

Special Remarks on the Products of Biodegradation: Not available.

Section 13: Disposal Considerations

Waste Disposal:

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

Section 14: Transport Information

DOT Classification: Not a DOT controlled material (United States).

Identification: Not applicable.

Special Provisions for Transport: Not applicable.

Section 15: Other Regulatory Information

Federal and State Regulations:

Connecticut hazardous material survey.: Chromium Illinois toxic substances disclosure to employee act: Chromium Illinois chemical safety act: Chromium New York release reporting list: Chromium Rhode Island RTK hazardous substances: Chromium Pennsylvania RTK: Chromium Minnesota: Chromium Michigan critical material: Chromium Massachusetts RTK: Chromium Massachusetts spill list: Chromium New Jersey: Chromium New Jersey spill list: Chromium Louisiana spill reporting: Chromium California Director's List of Hazardous Substances: Chromium TSCA 8(b) inventory: Chromium SARA 313 toxic chemical notification and release reporting: Chromium CERCLA: Hazardous substances.: Chromium: 5000 lbs. (2268 kg)

Other Regulations:

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

Other Classifications:

WHMIS (Canada): Not controlled under WHMIS (Canada).

DSCL (EEC):

R40- Limited evidence of carcinogenic effect S36/37/39- Wear suitable protective clothing, gloves and eye/face protection. S45- In case of accident or if you feel unwell, seek medical advice immediately (show the label where possible).

HMIS (U.S.A.):

Health Hazard: 2

Fire Hazard: 1

Reactivity: 0

Personal Protection: E

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

Health: 2

Flammability: 1

Reactivity: 0

Specific hazard:

Protective Equipment:

Gloves. Lab coat. Dust respirator. Be sure to use an approved/certified respirator or equivalent. Splash goggles.

Section 16: Other Information

References: Not available.

Other Special Considerations: Not available.

Created: 10/10/2005 08:16 PM

Last Updated: 11/01/2010 12:00 PM

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Material Safety Data Sheet Copper, powder or dust

MSDS# 05430

Section 1 - Chemical Product and Company Identification

MSDS Name: Copper, powder or dust Catalog Numbers: C431-500, C434-500

Synonyms: None.

Fisher Scientific
Company Identification:
One Reagent Lane

Fair Lawn, NJ 07410

For information in the US, call: 201-796-7100
Emergency Number US: 201-796-7100
CHEMTREC Phone Number, US: 800-424-9300

Section 2 - Composition, Information on Ingredients

CAS#: 7440-50-8 Chemical Name: Copper %: 100

EINECS#: 231-159-6

Hazard Symbols: None listed Risk Phrases: None listed

Section 3 - Hazards Identification

EMERGENCY OVERVIEW

Warning! Flammable solid. Causes respiratory tract irritation. May cause lung damage. May cause liver and kidney damage. Causes eye and skin irritation. Inhalation of fumes may cause metal-fume fever. Can be explosive when exposed to heat or flames. Target Organs: Kidneys, liver, lungs.

Potential Health Effects

Eye: Causes eye irritation.

Skin: Causes skin irritation. May cause skin discoloration.

Ingestion: Causes gastrointestinal irritation with nausea, vomiting and diarrhea. May cause liver and kidney damage.

Dust is irritating to the respiratory tract. Inhalation of fumes may cause metal fume fever, which is characterized Inhalation: by flu-like symptoms with metallic taste, fever, chills, cough, weakness, chest pain, muscle pain and increased

white blood cell count.

Chronic: Prolonged or repeated skin contact may cause dermatitis. May cause liver and kidney damage. May cause lung

damage.

Section 4 - First Aid Measures

Eyes: Flush eyes with plenty of water for at least 15 minutes, occasionally lifting the upper and lower eyelids. Get

medical aid.

Skin: Flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Get

medical aid if irritation develops or persists.

Ingestion: Get medical aid. Do NOT induce vomiting. If conscious and alert, rinse mouth and drink 2-4 cupfuls of

milk or water.

Inhalation: Remove from exposure and move to fresh air immediately. If not breathing, give artificial respiration. If

breathing is difficult, give oxygen. Get medical aid.

Physician: Individuals with Wilson's disease are more susceptible to chronic copper poisoning.

Section 5 - Fire Fighting Measures

General Information: As in any fire, wear a self-contained breathing apparatus in pressure-demand, MSHA/NIOSH (approved or equivalent), and full protective gear. Dust can be an explosion hazard when exposed to heat or flame. Flammable solid. May burn rapidly with flare burning effect. May re-ignite after fire is extinguished. Finely

divided dusts may exhibit pyrophoric tendencies.

Extinguishing Media:

Use dry sand, Met-L-X powder, or G-1 graphite powder. Contact professional fire-fighters immediately. Use dry sand, graphite powder, dry sodium chloride-based extinguishers. Dousing metallic fires with water may generate hydrogen gas, an extremely dangerous explosion hazard, particularly if fire is in a confined

environment.

Autoignition Temperature: Not applicable.

Flash Point: Not applicable.

Explosion Not available Limits: Lower:

Explosion Not available Limits: Upper:

NFPA Rating: health: 2; flammability: 2; instability: 0;

Section 6 - Accidental Release Measures

General

Use proper personal protective equipment as indicated in Section 8.

Information:

Clean up spills immediately, observing precautions in the Protective Equipment section. Sweep up, then

Spills/Leaks:

place into a suitable container for disposal. Scoop up with a nonsparking tool, then place into a suitable

container for disposal. Avoid generating dusty conditions. Remove all sources of ignition.

Section 7 - Handling and Storage

Handling:

Use with adequate ventilation. Minimize dust generation and accumulation. Avoid contact with skin and eyes. Empty containers retain product residue, (liquid and/or vapor), and can be dangerous. Keep away from heat, sparks and flame. Avoid ingestion and inhalation. Do not pressurize, cut, weld, braze, solder, drill, grind, or expose empty containers to heat, sparks or open flames.

Storage:

Keep away from sources of ignition. Store in a tightly closed container. Store in a cool, dry, well-ventilated area away from incompatible substances. Do not expose to air.

Section 8 - Exposure Controls, Personal Protection

Chemical Name	+	NIOSH	OSHA - Final PELs
Copper 	(fume); 1 mg/m3 (dust and mist,	1 mg/m3 TWA (dust and mist) 100 mg/m3 IDLH (dust, fume and mist)	(fume); 1 mg/m3

OSHA Vacated PELs: Copper: 0.1 mg/m3 TWA (dust, fume, mists, as Cu)

Engineering Controls:

Facilities storing or utilizing this material should be equipped with an eyewash facility and a safety shower. Use adequate general or local explosion-proof ventilation to keep airborne levels to acceptable levels.

Exposure Limits

Personal Protective Equipment

Wear appropriate protective eyeglasses or chemical safety goggles as described by OSHA's eye and face Eyes:

protection regulations in 29 CFR 1910.133 or European Standard EN166.

Skin: Wear appropriate gloves to prevent skin exposure.

Wear appropriate protective clothing to minimize contact with skin. Clothing:

Follow the OSHA respirator regulations found in 29 CFR 1910.134 or European Standard EN 149. Use a

Respirators: NIOSH/MSHA or European Standard EN 149 approved respirator if exposure limits are exceeded or if

irritation or other symptoms are experienced.

Physical State: Powder

Color: red to brown Odor: none reported pH: Not available

Vapor Pressure: 1 mm Hg @1628C

Vapor Density: Not available Evaporation Rate: Not applicable. Viscosity: Not applicable.

Boiling Point: 2595 deg C (4,703.00°F)

Freezing/Melting Point: 1083 deg C (1,981.40°F)

Decomposition Temperature: Not available

Solubility in water: Insoluble in water.

Specific Gravity/Density: 8.92 Molecular Formula: Cu Molecular Weight: 63.54

Section 10 - Stability and Reactivity

Stable at room temperature in closed containers under normal storage and handling Chemical Stability:

conditions.

Conditions to Avoid: Ignition sources, dust generation, moisture, exposure to air, excess heat.

Incompatibilities with Other

Materials

Strong oxidizing agents.

Hazardous Decomposition

Products

Copper fumes.

Hazardous Polymerization Has not been reported.

Section 11 - Toxicological Information

CAS# 7440-50-8: GL5325000 GL7440000 GL7590000 RTECS#:

LD50/LC50: RTECS: Not available.

Copper - Not listed as a carcinogen by ACGIH, IARC, NTP, or CA Prop 65. Carcinogenicity:

Other: See actual entry in RTECS for complete information.

Section 12 - Ecological Information

Not available

Section 13 - Disposal Considerations

Dispose of in a manner consistent with federal, state, and local regulations.

Section 14 - Transport Information

US DOT

Shipping Name: METAL POWDERS, FLAMMABLE, N.O.S.

Hazard Class: 4.1 UN Number: UN3089 Packing Group: II Canada TDG

Shipping Name: METAL POWDER, FLAMMABLE, N.O.S. (Copper)

Hazard Class: 4.1 UN Number: UN3089 Packing Group: II

USA RQ: CAS# 7440-50-8: 5000 lb final RQ (no reporting of releases of this hazardous substa

Section 15 - Regulatory Information

European/International Regulations

European Labeling in Accordance with EC Directives

Hazard Symbols:Not available

Risk Phrases:

Safety Phrases:

S 24/25 Avoid contact with skin and eyes.

WGK (Water Danger/Protection)

CAS# 7440-50-8: 0

Canada

CAS# 7440-50-8 is listed on Canada's DSL List

Canadian WHMIS Classifications: D2B, B4

This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations and the MSDS contains all of the information required by those regulations.

CAS# 7440-50-8 is listed on Canada's Ingredient Disclosure List

US Federal

TSCA

CAS# 7440-50-8 is listed on the TSCA Inventory.

Section 16 - Other Information MSDS Creation Date: 12/12/1997

Revision #7 Date 7/20/2009

The information above is believed to be accurate and represents the best information currently available to us. However, we make no warranty of merchantibility or any other warranty, express or implied, with respect to such information, and we assume no liability resulting from its use. Users should make their own investigations to determine the suitability of the information for their particular purposes. In no event shall the company be liable for any claims, losses, or damages of any third party or for lost profits or any special, indirect, incidental, consequential, or exemplary damages howsoever arising, even if the company has been advised of the possibility of such damages.

MATERIAL SAFETY DATA SHEET

VENDEE AND THIRD PERSONS ASSUME THE RISK OF INJURY PROXIMATELY CAUSED BY THIS PRODUCT IF REASONABLE SAFETY PROCEDURES ARE NOT FOLLOWED AS PROVIDED FOR IN THE DATA SHEET, AND VENDOR SHALL NOT BE LIABLE FOR SUCH INJURY. FURTHERMORE, VENDOR SHALL NOT BE LIABLE FOR INJURY TO VENDEE OR THIRD PERSONS PROXIMATELY CAUSED BY ANY ABNORMAL USE OF THIS PRODUCT EVEN IF REASONABLE SAFETY PROCEDURES ARE FOLLOWED.

ALL PERSONS USING THIS PRODUCT, ALL PERSONS WORKING IN AN AREA WHERE THIS PRODUCT IS USED, AND ALL PERSONS HANDLING THIS PRODUCT SHOULD BE FAMILIAR WITH THE CONTENTS OF THIS DATA SHEET. POSTING THIS DOCUMENT FOR EMPLOYEE NOTIFICATION IS RECOMMENDED BY THE VENDOR.



	1. CHEMI	ICAL PRODUCT A	ND COM	PANY ID	ENTIFIC	CATION		
TRADE NAMES	Pure Lead				T	ELEPHON	E#585	-442-85
SYNONYMS Pu	re Pig Lead, Pu	ure Block Lead , Lea	ıd, Lead	Strips	T)	ELEPHON	E#585	5-442-85
MANUFACTURE	R'S NAME	Rochester Lea	d Works	TR	ANSP. EM	ERGENC	Y #	
ADDRESS 76	Anderson	Ave., Rochest	er, NY	14607		INTENDE	USE	Industrial
PREPARED BY	Rochest	ter Lead Works				DATE	Dec-	00 Revised
	2. COMPOSITION, INFORMATION ON INGREDIENTS							
MATERIAL OR CO	MPONENT	WEIGHT	OSH.	A	AC	GIH		Other
(CAS#)		%]	PEL/TWA	Ceiling	TLV/TWA	TLV/STEL		
Lead (CAS# 7439-92	-1)	99.9-100	50μg/m³	None	50μg/m³	None	$30 \mu g/m^3$	Action Level
*Fume		**Respirable D	oust ***C	Ceiling Limit				
		3. HAZARDS	S IDENTII	FICATIO	N			
	e for Users							

Dust, vapor or fume may be absorbed by the respiratory system and can result in both acute and chronic

Inhalation

overexposure.

overexposure as well as respiratory irritation.

Effects of Overexposure If left untreated: weakness, vomiting, loss of appetite, uncoordinated body movements, convulsions, stupor Acute and possibly coma. If left untreated: weakness, insomnia, hypertension, slight irritation to skin and eyes, metallic taste in Chronic mouth, anemia, constipation, headache, muscle and joint pains, neuromuscular dysfunction, possible paralysis and encephalopathy. Lead exposure can pose risk to developing fetuses and may also impair the reproductive systems in both men and women. Damage to the kidneys, hematopoietic and/or central nervous system may occur. Irritation and effects of overexposure as described above. Signs and Symptoms of Exposure **Aggravated Medical Conditions** Chronic forms of kidney, hematopoietic or neurologic diseases; preexisting skin or respiratory disorders may be aggravated by exposure to this product. Lead and its inorganic compounds are neurotoxins which may produce peripheral neuropathy. For an overview of the effects of lead exposure, consult Appendix A of OSHA's Occupational Exposure to Lead (29 C.F.R. §1910.1025). For combustion product effects see Hazardous Combustion Products in Section 5. Fire Fighting Measures. 4. FIRST AID MEASURES Eyes Flush with copious amounts of water. Get immediate medical attention. Skin Wash thoroughly with soap and water. If irritation occurs, get medical attention. Ingestion Get immediate medical attention. Remove from exposure. Get medical attention if experiencing effects of overexposure. Inhalation 5. FIRE FIGHTING MEASURES Flash Point Not Applicable Test Method: Not Applicable Flammable Limits in Air (% by volume, estimated) Lower: Not Applicable Upper: Not Applicable Auto-ignition Temperature Not Applicable **Hazardous Combustion Products** High temperatures may produce heavy metal fume, vapor, and/or dust. Combustion products may cause effects of overexposure as noted in Section 3. Hazards Identification. Other unidentified health effects may occur. **Conditions Contributing to Flammability** Not Applicable Extinguishing Media Dry chemical or carbon dioxide should be used on surrounding fire. Do not use water on fires where molten metal is present. **Special Fire Fighting Procedures** Use full-body protection and full-face, self-contained breathing apparatus operated in a positive-pressure mode. Unusual Fire and Explosion Hazards Molten metals produce fume, vapor or dust that may be toxic or respiratory irritants. The product, or its dust, can react vigorously with strong oxidizing agents. Sensitivity to Impact Not Applicable Sensitivity to Static Discharge Not Applicable

MSDS 021F (1A) Page 2 of 4

6. ACCIDENTAL RELEASE MEASURES

Dust material should be vacuumed, or wet swept where vacuuming Steps to be Taken if Material is Released or Spilled is not feasible. Particulate matter should be stored in dry containers for later disposal or reclamation. Do not use compressed air or dry sweeping as a means of cleaning. Assure conformity with applicable governmental regulations.

Neutralizing Chemicals

Not Applicable

7. HANDLING AND STORAGE

The two major means of metal absorption are inhalation and ingestion. Most inhalation problems can be prevented with adequate use of Section 8 ventilation and respirator information. Always exercise normal, good personal hygiene prior to smoking, eating or drinking. Smoking, eating and drinking should be confined to uncontaminated areas. Avoid skin contact. Wash hands, face, neck and arms thoroughly with soap and water before eating, drinking or smoking. Work clothes and equipment should remain in designated lead contaminated areas; never taken home or laundered with personal clothing. Launder contaminated clothing before reuse.

This product is intended for industrial use only. <u>Isolate from children and their environment.</u>

Store in a dry area where accidental contact with acids is not possible.

Adhere to all personal protection equipment procedures when handling, and ventilation requirements when heavy metal exposures are above permissible exposure limits or threshold limit values.

8. EXPOSURE CONTROLS, PERSONAL PROTECTION

Ventilation, as described in Industrial Ventilation, A Manual of Recommended Practice, Ventilation Requirements produced by the American Conference of Governmental Industrial Hygienists, shall be provided in areas where exposures are above the permissible exposure limits or threshold limit values specified by OSHA or other local, state and federal regulations.

Specific Personal Protection Equipment

RESPIRATORY As specified by 29 C.F.R. §1910.1025 Subpart (f) of the Federal Occupational Safety and Health Administration Standard for Occupational Exposure to Lead. Other local and state regulations may also apply.

EYE

Face shield or vented goggles should be worn around molten metal.

GLOVE

Gloves should be worn when handling this product.

Coveralls or other full body clothing shall be worn during product use and OTHER CLOTHING AND EQUIPMENT properly laundered after use, with the wash water disposed of in accordance with local, state and federal regulations. Hard hat, safety boots and other safety equipment should be worn as appropriate for the industrial environment. Personal clothing and shoes should be protected from contamination with this product.

	9. PHYSICAL AND C	9. PHYSICAL AND CHEMICAL PROPERTIES					
BOILING POINT @ 760 mm Hg	3164°F (1740°C) Approx.	MELTING POINT	621°F (327°C)				
SPECIFIC GRAVITY (H ₂ O = 1)	11.3 Approx.	VAPOR PRESSURE (Reference Temperature)	Negligible				
VAPOR DENSITY (Air = 1)	Not Applicable	SOLUBILITY IN H ₂ O (% by wt.)	Insoluble				
% VOLATILE BY VOLUME	Negligible	EVAPORATION RATE (Butyl Acetate = 1)	Negligible				
COEFF. WATER/OIL DISTRIBUTION	Not Applicable	рН	Not Applicable				
FREEZING POINT	See melting point	ODOR THRESHOLD	Not Applicable				
· · · · · · · · · · · · · · · · · · ·	· · · · · · · · · · · · · · · · · · ·						

APPEARANCE AND ODOR Silver-gray metal, tarnishes; no apparent odor.

10. STABILITY AND REACTIVITY Conditions Contributing to Instability Not Applicable Reactivity Not Applicable Strong oxidizers combined with this product may liberate hydrogen gas. Incompatibility **Hazardous Decomposition Products** Under normal temperatures this product will not decompose. Conditions Contributing to Hazardous Polymerization Not Applicable 11. TOXICOLOGICAL INFORMATION Toxicity, Mutagenic, Teratogenic, Synergistic and Sensitization Information LD_{so} and LC_{so} information is not avail-Carcinogenicity Listed by: [X] IARC 2B [] NTP OSHA [X] California Component: **LEAD** 12. ECOLOGICAL INFORMATION Not Available 13. DISPOSAL CONSIDERATIONS

Waste Disposal Method

Dispose or recycle toxic substances and hazardous wastes in accordance with local, state, and federal regulations.

14. TRANSPORT INFORMATION

U.S. Department of Transportation No special requirements for solid metal. Quantities less than 100 µm in diameter and greater than or equal to 10 pounds in one container are considered by DOT as an Environmentally Hazardous Substance, Solid, n.o.s., Class 9, UN3077, Packing Group III.

Canadian Transportation of Dangerous Goods This product is not considered a Hazardous Material for shipping under Canadian Transportation of Dangerous Goods.

15. REGULATORY INFORMATION

Toxic Chemical Release Reporting, EPA Regulation 40 C.F.R. §372 (SARA Section 313)

Reportable chemicals in product: 99.9-100% lead (CAS #7439-92-1)

California Safe Drinking Water and Toxic Enforcement Act of 1986 ("Proposition 65")

WARNING: This product contains lead, a chemical known to the State of California to cause cancer, birth defects or other reproductive harm. Overexposure from this product may be prevented by following the recommendations throughout this MSDS.

Toxic Substances Control Act (TSCA), EPA Regulation 40 C.F.R. §710

The chemical ingredients in this product are in the Section 8(b) Chemical Substance Inventory (40 C.F.R. §710) and/or are otherwise in compliance with TSCA.

Canadian Workplace Hazardous Materials Information System

This product is considered controlled in Canada and has been placed in WHMIS Subdivision B of Division 2 of Class D due to lead content. This MSDS has been prepared to meet WHMIS and OSHA requirements using the ANSI 16 heading MSDS format.

16. OTHER INFORMATION

Before Using This Product Be Familiar With The Information Contained In: The Federal Standard for Occupational Exposure to Lead (29 C.F.R. §1910.1025), published in the Federal Register on Tuesday, November 14, 1978, by the Occupational Safety and Health Administration.

Material Safety Data Sheet



NICKEL SHOT

Revised: 10/13/2011 **Replaces:** 07/13/2010 **Printed:** 10/13/2011

Carolina Biological Supply Company

2700 York Rd | Burlington, NC 27215 • to order: 800.334.5551 • for support: 800.227.1150



Section 1 - Product Description

Product Name: Nickel, Shot / Metal **Product Code(s):** 87-6998, 87-7000

Size: 100 g, 500 g

Chemical Name: Nickel, Metal **CAS Number:** 7440-02-0

Formula: Ni **Synonyms:** N/A

Distributor: Carolina Biological Supply Company, 2700 York Road, Burlington, NC 27215

Chemical Information: 800-227-1150 (8am-5pm (ET) M-F) Chemtrec 800-424-9300 (Transportation Spill Response 24

hours)

Section 2 - Hazard Identification

Emergency Overview: Harmful if inhaled or swallowed.

Potential Health Effects: Eyes: May cause irritation.

Eyes: May cause irritation. Skin: Irritating to skin.

Ingestion: Harmful if swallowed. **Inhalation:** Irritating to respiratory system.

Section 3 - Composition / Information on Ingredients

Principal Hazardous Components: Nickel, Metal (CAS#7440-02-0) 100%

TLV units: Nickel, Metal: ACGIH-PEL 0.1 mg/m3 (TWA) **PEL units:** Nickel, Metal: OSHA-PEL 0.1 Ni mg/m3

Section 4 - First Aid Measures

Emergency and First Aid Procedures:

Eyes - In case of contact with eyes, rinse immediately with plenty of water and seek medical advice.

Skin - After contact with skin, take off immediately all contaminated clothing, and wash immediately with plenty of water. **Ingestion** - If swallowed, do not induce vomiting: seek medical advice immediately and show this container or label.

Inhalation - In case of accident by inhalation: remove casualty to fresh air and keep at rest.

Section 5 - Firefighting Procedures

Flash Point (Method Used): N/A

NFPA Rating:

Product Name: NICKEL SHOT Page 1 of 3

Health: 2 Fire: 4 Reactivity: 0

Extinguisher Media: Use dry chemical, CO2 or appropriate foam.

Flammable Limits in Air % by Volume: N/A

Autoignition Temperature: N/A

Special Firefighting Procedures: Firefighters should wear full protective equipment and NIOSH approved self-contained

breathing apparatus.

Unusual Fire and Explosion Hazards: Avoid Dusting. May become explosive when dispersed in air.

Section 6 - Spill or Leak Procedures

Steps to Take in Case Material Is Released or Spilled: Ventilate area of spill. Clean-up personnel should wear proper protective equipment. Avoid creating dust. Sweep or scoop up and containerize for disposal.

Section 7 - Special Precautions

Precautions to Take in Handling or Storing: Do not breathe dust.

Keep away from ... (incompatible materials to be indicated by the manufacturer). Keep in a cool, well-ventilated place away from ... (incompatible materials to be indicated by the manufacturer).

Section 8 - Protection Information

Respiratory Protection (Specify Type): None needed under normal conditions of use with adequate ventilation. A NIOSH/MSHA chemical cartridge respirator should be worn if PEL or TLV is exceeded.

Ventilation:

Local Exhaust: Yes **Mechanical(General):** Yes

Special: No **Other:** No

Protective Gloves: Natural rubber, Neoprene, PVC or equivalent. **Eye Protection:** Splash proof chemical safety goggles should be worn.

Other Protective Clothing or Equipment: Lab coat, apron, eye wash, safety shower.

Section 9 - Physical Data

Molecular Weight:58.71 g/molMelting Point:1455 °CBoiling Point:2900 °CVapor Pressure:N/A

Vapor Density(Air=1):N/ASpecific Gravity (H2O=1):8.9Percent Volatile by Volume:N/AEvaporation Rate (BuAc=1):N/A

Solubility in Water: Practically Insoluble **Appearance and Odor:** Clear, Yellow-Green fluorescent liquid

with piney odor.

Section 10 - Reactivity Data

Stability: Stable

Conditions to Avoid: Avoid dusting.

Keep away from heat.

Keep away from sources of ignition - No smoking.

Incompatibility (Materials to Avoid): Acids,

Hazardous Decomposition Products: Metal Fumes,

Hazardous Polymerization: Will not occur

Section 11 - Toxicity Data

Toxicity Data: Nickel Shot: itr-rat LD-lo 12 mg/kg

Effects of Overexposure:

Product Name: NICKEL SHOT Page 2 of 3

Acute: See Section 2

Chronic: Certain components or species of this product are considered potential carcinogens.

Conditions Aggravated by Overexposure: N/A **Target Organs:** Eyes, Mucous Membranes,

Primary Route(s) of Entry: Inhalation, ingestion, eye or skin contact.

Section 12 - Ecological Data

EPA Waste Numbers: N/A

Section 13 - Disposal Information

Waste Disposal Methods: Dispose in accordance with all applicable Federal, State and Local regulations. Always contact a permitted waste disposer (TSD) to assure compliance.

Section 14 - Transport Information

DOT Proper Shipping Name: N/A

Section 15 - Regulatory Information

EPA TSCA Status: On TSCA Inventory

Hazard Category for SARA Section 311/312 Reporting: Acute

Name List: Chemical Category:

Nickel, Metal - Yes Nickel. Metal - Nickel Compounds

CERCLA Section 103 RQ(lb.): Nickel, Metal - No

RCRA Section 261.33: Nickel, Metal - No

Section 16 - Additional Information

The information provided in this Material Safety Data Sheet represents a compilation of data drawn directly from various sources available to us. Carolina Biological Supply makes no representation or guarantee as to the suitability of this information to a particular application of the substance covered in the Material Safety Data Sheet. Any employer must carefully assess the applicability of any information contained herein in regards to the particular use to which the employer puts the material.

Glossary

ACGIH American Conference of Governmental Industrial Hygienists

CAS Number Chemical Services Abstract Number

CERCLA Comprehensive Environmental Response, Compensation, and Liability Act

DOT U.S. Department of Transportation

IARC International Agency of Research on Cancer

N/A Not Available

NTP National Toxicology Program

OSHA Occupational Safety and Health Administration

PEL Permissible Exposure Limit

ppm Parts per million

RCRA Resource Conservation and Recovery Act
SARA Superfund Amendments and Reauthorization Act

TLV Threshold Limit Value TSCA Toxic Substances Control Act

Product Name: NICKEL SHOT Page 3 of 3



MSDS FOR ZINC DUST 122

ZC-D004

SECTION I - GENERAL INFORMATION

NAME: ZINC DUST

MANUFACTURER:
HORSEHEAD CORPORATION
300 Frankfort Road
Monaca, PA 15061
724-774-1020

TRANSPORTATION EMERGENCY:
CHEMTREC: 800-424-9300

CHEMICAL FAMILY: Nonferrous Metal CAS NO.: 7440-66-6

FORMULA: Zn

DOT HAZARD CLASS: See Below* **UN NO.:** N/A **NA NO.:** N/A

SARA SECTION 313: This product is subject to the reporting requirements of Section 313 of Title III of the Superfund Amendments and Reauthorization Act and 40 CFR 372. The materials underlined below are present in quantities above the applicable deminimis concentrations and are listed as Toxic Chemicals in 40 CFR 372.65.

ISSUE DATE: 2/25/88 **REVISION DATE**: 10/14/2010

*This product has been tested using the applicable tests in Section 33 of the Second Revised Addition of the United Nations Recommendations on the Transportation of Dangerous Goods, Manual of Test and Criteria. Results of the testing show that the sample did not meet the minimum standards for classification into either Division 4.1 Flammable Solid or Division 4.3 Dangerous when Wet. Because it does not meet the classification criteria in paragraph 173.124, it is not a DOT hazardous material as shipped.

SECTION II - INGREDIENTS

<u>MATERIAL</u>	<u>CAS NO.</u>	<u>%</u>
ZINC DUST	7440-66-6	97
ZINC OXIDE	1314-13-2	3
LEAD	7439-92-1	0.01 max.
CADMIUM	7440-43-9	0.002 max.

SECTION III PHYSICAL DATA

BOILING POINT (760 MM HG): 1665° F **MELTING POINT:** 788° F

SPECIFIC GRAVITY: 7.11 EVAPORATION RATE (=1): N/A

VAPOR DENSITY (air = 1): N/A **SOLUBILITY IN WATER:** Reacts with water.

PERCENT VOLATILE BY VOLUME (%): N/A VAPOR PRESSURE AT 20° C: N/A

APPEARANCE AND ODOR: Very fine blue-gray powder

SECTION IV - FIRE AND EXPLOSION HAZARD DATA

MINIMUM EXPLOSION CONCENTRATION: 460,000 mg/M³ NFPA FIRE RATING

IGNITION TEMPERATURE: Cloud 690° C HEALTH 0

Layer 540° C FLAMMABILITY 1
REACTIVITY 1

IGNITION SENSITIVITY: < 0.1

EXPLOSION SEVERITY: < 0.1

Dust with an ignition sensitivity less than 0.2 and an explosion severity less than 0.5 should be considered as constituting only a weak explosion hazard. Class II electrical equipment should not be required.*

EXTINGUISHING MEDIA: Smother and cool with a suitable dry extinguishing agent (Class D fires) such as dry powder (Ansul Met-L-X), zinc oxide or dry sand. Do not use water.

SPECIAL FIRE FIGHTING PROCEDURES: Use NIOSH/MSHA approved self-contained breathing apparatus. Do not spread burning material. Smother and allow fire to go out. Dry zinc dust will not ignite spontaneously, but once ignited, may burn readily in air.

UNUSUAL FIRE AND EXPLOSION HAZARDS: Bulk dust in contact with water or damp air evolves hydrogen. The heat produced during this reaction could ignite the hydrogen. An explosive condition may exist if this happens in a confined space. Dry dust may form a dust explosive mixture in air. Zinc oxide fume may result from combustion of zinc dust.

^{*}National Materials Advisory Board Publication 353-4 issued July, 1982.

SECTION V - HEALTH HAZARD DATA

MATERIAL	<u>FORM</u>	OSHA-PEL	<u>ACGII</u>	H-TLV
		TWA mg/m³	TWA mg/m³	STEL mg/m ³
ZINC	Oxide Fume	5	2	10
ZINC OXIDE	Total Dust	15	10	
	Respirable (Fume)	5	2	10

ROUTES OF ENTRY

PRIMARY: Inhalation

SECONDARY: Ingestion

EFFECTS OF SHORT TERM OVEREXPOSURE:

ZINC/ZINC OXIDE: Inhalation of high levels of zinc oxide may result in tightness of chest, metallic taste, cough, dizziness, fever, chills, headache, nausea, and dry throat. Overexposure may produce symptoms known as metal fume fever or "zinc shakes"; an acute, self-limiting condition without recognized complications. Symptoms of metal fume fever include: chills, fever, muscular pain, nausea and vomiting. Like any finely divided particulate matter, zinc oxide may cause mechanical irritation to skin and eyes.

MEDICAL CONDITIONS GENERALLY AGGRAVATED BY EXPOSURE: Inhalation of dust may be an irritant to pre-existing respiratory conditions.

EMERGENCY AND FIRST AID PROCEDURES: Symptoms resulting from inhalation overexposure usually disappear within 24 hours. Symptomatic treatment, such as bed rest and possibly aspirin is recommended to provide relief from fever and chills. Eye contact, flush eyes with copious amounts of water. In all cases, consult physician for medical attention.

EFFECTS OF LONG TERM OVEREXPOSURE:

ZINC/ZINC OXIDE: Chronic exposure to zinc may cause respiratory tract irritation with nasopharyngitis and laryngitis.

CARCINOGENIC ASSESSMENT:

NTP? No IARC MONOGRAPH? No OSHA? No

SECTION VI - REACTIVITY DATA

STABILITY: () Unstable

(X) Stable

CONDITIONS TO AVOID: Hydrogen may evolve when in contact with water or damp air.

INCOMPATIBILITY (MATERIALS TO AVOID): Avoid contact with water, acids, and alkalis.

HAZARDOUS DECOMPOSITION PRODUCTS: None

HAZARDOUS POLYMERIZATION: () May occur

(X) Will not occur

SECTION VII - SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED: Avoid contact with water. Material should be contained for recycling.

WASTE DISPOSAL METHOD: Contain in a dry closed container. Material may be recycled or disposed of in accordance with Federal, State, and Local Environmental Regulations. This material may be regulated under CERCLA, TSCA, SARA, and/or RCRA Regulations.

SECTION VIII - SPECIAL PROTECTION INFORMATION

RESPIRATORY PROTECTION (SPECIFY TYPE): Use NIOSH/MSHA approved type respirator for protection against dust and metal fumes.

VENTILATION: Local exhaust ventilation to reduce dust concentrations to less than permissible exposure limits.

PROTECTIVE GLOVES: Recommended to prevent skin irritation in hypersensitive individuals.

EYE PROTECTION: Use safety eyewear for protection against airborne particulate matter.

OTHER PROTECTIVE EQUIPMENT: Barrier creams may help prevent skin irritation in hypersensitive individuals. Fire resistant coveralls are recommended.

SECTION IX - SPECIAL PRECAUTIONS

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORING: Store in a cool, dry, well-ventilated location, separate from acids and alkalis. Protect from physical damage.

OTHER PRECAUTIONS: Practice good personal hygiene when working in areas where this material is used. Avoid prolonged contact with skin.

<u>DISCLAIMER</u>: As the conditions or methods of use are beyond our control, we do not assume any responsibility and expressly disclaim any liability for any use of the material. Information contained herein is believed to be true and accurate but all statements or suggestions are made without any warranty, express or implied, regarding accuracy of the information, the hazards connected with the use of the material or the results to be obtained from the use thereof.

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