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Appendix D

Health and Safety Plan

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Infrastructure · Water · Environment · Buildings

Imagine the result

HERCULES

Site-Specific Health & Safety Plan

Phase I and II Sampling and Analysis
Hattiesburg, Mississippi

14 July 2011

ARCADIS

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Site-Specific Health & Safety Plan

Phase I and II Sampling and Analysis
Hattiesburg, Mississippi

Prepared for:
Hercules Incorporated

Prepared by:
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Our Ref.:
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Date:
14 July 2011

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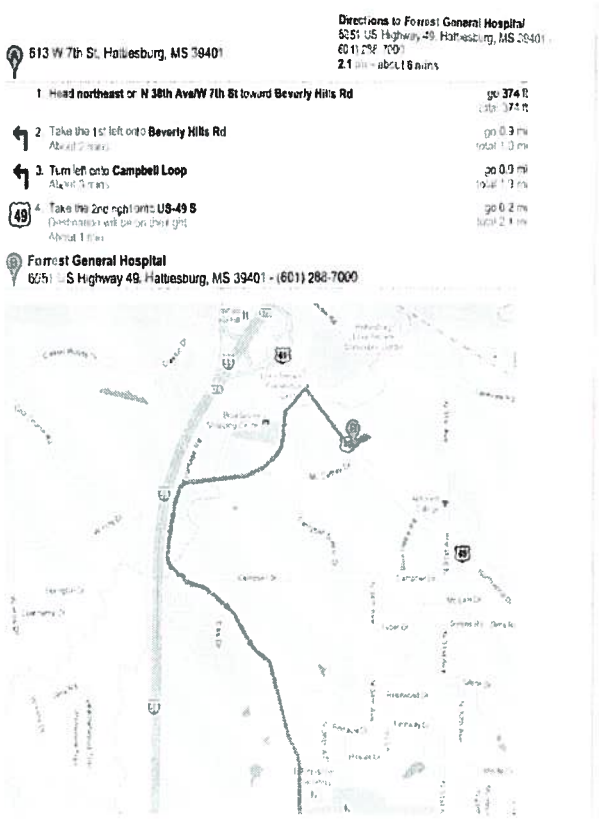
Hospital Route

Ashland Hercules Facility to Forrest General Hospital



613 W 7th St, Hattiesburg, MS 39401

Directions to Forrest General Hospital
6051 US Highway 49, Hattiesburg, MS 39401
(601) 288-7000
2.1 mi – about 6 mins

1. **Head northeast** on **N 38th Ave/W 7th St** toward **Beverly Hills Rd** — go 374 ft
2. Take the 1st left onto **Beverly Hills Rd** — go 0.9 mi
3. Turn left onto **Campbell Loop** — go 0.9 mi
4. Take the 2nd right onto **US-49 S** — go 0.2 mi

Forrest General Hospital
6051 US Highway 49, Hattiesburg, MS 39401 - (601) 288-7000

1. Emergency Contact Information and Procedures

Local Police – *Country of Webster Sheriff – 87 Government Street, Hattiesburg, MS 39744*	911 and (662) 258-7701
Local Ambulance – *AAA Ambulance Services – 6-92 US Highway 49, Hattiesburg, MS*	911 and (601) 545-8996
Local Fire Department – *Hattiesburg Fire Department – 810 North main Street, Hattiesburg, MS*	911 and (601) 582-3311
Local Hospital – *Forrest General Hospital – 6051 US Highway 49, Hattiesburg, MS*	(601) 288-7000
Local Weather Data	Weather.com
Poison Control	(800) 332-3073
National Response Center (all spills in reportable quantities)	(800) 424-8802
U.S. Coast Guard (spills to water)	(800) 424-8802
ARCADIS Project Manager – John Ellis	Office: (225) 292-1004 Cell: (225) 803-7012
ARCADIS H&S Manager – Craig Derouen	Office: (225) 292-1004 Cell: (225) 802-7005
Client Contact – Tim Hassett	Office: (302) 995-3456 Cell: (302) 379-0512
WorkCare	1-800-455-6155

Directions to Hospital

Medical Facility: Forrest General Hospital
Address: 6051 US Highway 49, Hattiesburg, MS

Phone Number: (601) 288-7000

See map and directions on Page a.

Emergency Notification Procedure for the project:

Step 1:Dial 911 (if necessary) and/or Work Care 800-455-6155
Step 2:John Ellis – Office: (225) 292-1004 Cell: (225) 803-7012
Step 3:Craig Derouen – Office: (225) 292-1004 Cell: (225) 802-7005
Step 4:Tim Hassett - Office: (302) 995-3456 Cell: (302) 379-0512

Emergency Supplies and Equipment List

Emergency Supplies and Equipment (check all that apply)	Location on Project Site
☒ First Aid Kit (type):	Vehicles and office
☒ Fire Extinguisher	Vehicles and office
☒ Mobile Phone ☐ Satellite Phone	On person
☒ Traffic Cones	When working near roadways
☐ Walkie Talkies	
☒ Water or Other Fluid Replenishment	Vehicles and office
☒ Eye Wash/Quick Drench Station	Office
☒ Eye Wash Bottle	Vehicles
☒ Wash and Dry Towelettes	Office
☒ Sunscreen (SPF 15 or higher)	Vehicles and office
☒ Insect Repellant	Vehicles and office (needs project approval)
☐ Chemical Spill Kit	
☐ *Other (specify):*	

2. Introduction

All work on this project will be carried out in compliance with ARCADIS, U.S., Inc. (ARCADIS') Health and Safety Standards and the Occupational Safety and Health Administration's Hazardous Waste Operations and Emergency Response regulation. The design of this health and safety plan (HASP) conforms to the requirements of the ARC HSFS010-H&S Plan Standard. Specific health and safety information for the project is contained in this HASP. All personnel working on hazardous operations or in the area of hazardous operations shall read and be familiar with this HASP before doing any work. All project personnel shall sign the certification page acknowledging that they have read and understand this HASP.

Changes in the scope of the project or introduction of new hazards to the project shall require revision of the HASP by the HASP writer and reviewer, and approval by the Project Manager. The HASP Addendum Form and log table are included as Appendix A.

Hercules Incorporated (Hercules) in Jackson, MS received an Administrative Order (AO) from the United States Environmental Protection Agency (USEPA) May 9, 2011, to determine, if any, the presence of contamination off-site, originating from the Hercules facility. The USEPA AO directs Hercules to identify potential off-site migration of contaminants and the respective pathways. ARCADIS has been contracted by Hercules to conduct further environmental investigation of the Hercules facility and to conduct an environmental investigation of the surrounding area. The surrounding area for the initial investigations is a 0.5-mile radius, with the potential to extend out to a 4 mile radius, as defined in the USEPA AO. The primary goal of sampling activities will be to assess the presence, magnitude, extent, direction, and rate of movement of any of the constituents to be monitored under the AO. The approach will include incorporating and utilizing existing sampling data previously collected as part of Site-related assessments conducted in the area by Hercules, USEPA, or the state that relate to the purposes of the AO, including assessments to: characterize the source(s) of any Constituents; characterize the potential pathways of migration of any Constituents; define the degree and extent of the presence of any Constituents; and identify actual or potential human and/or ecological receptors. Detected Constituents will be investigated to determine the extent of any impacts. The impacts will then be evaluated to determine the potential impact to any identified human or ecological receptors.

3. Project Site History and Requirements

3.1 Site Background

The Hattiesburg, Mississippi, facility was developed in the 1920s as Hercules Powder Company. In the mid-1960s, the name of the company that owned the plant was changed to Hercules Incorporated. Additional production plants were added in the 1960s and 1970s. Portions of the plant were demolished in the 1980s. In November 2008, Ashland Inc. purchased the stock of Hercules Incorporated, and Hercules became a wholly owned subsidiary of Ashland Inc. During 2008 and 2009, two active plants on the property produced chemicals for the pulp and paper industry: the Kymene Plant and the AKD Plant. Hercules closed the facility in December 2009. Currently, no active plants are on the property, nor are any such facilities planned.

The Hercules facility began operations in 1923. Throughout the facility's history the operations consisted of extracting and/or working with rosins to produce rosin derivatives, paper chemicals, and Delnav, an agricultural insecticide. Structures at the facility included offices, a laboratory, a powerhouse, production buildings, a wastewater treatment plant, settling ponds, a landfill, and central loading and packaging areas. The plant began to downsize in the 1980s (i.e. there was no new chemical expansion) and process operations at the facility were shut down at the end of 2009. Currently, many of the former plant buildings have been demolished. As part of plant demolition and decommissioning activities, Hercules has been working with the Mississippi Department of Environmental Quality to gain approval for decommissioning of the on-site wastewater treatment impoundment basin (IB) and is awaiting a response to the August 2010 Impoundment Basin Decommissioning Work Plan.

Various environmental investigations have been conducted at the Hercules facility since the early 1980's. The work has included geophysical investigations and sampling of soil, groundwater, surface water, and stream sediment for analysis of various constituents, including volatile organic compound (VOCs), semivolatile organic compounds, pesticides, polychlorinated biphenyls, metals, cyanide, Dioxathion (cis- and trans-), and Dioxenethion.

In 2005, a Corrective Action Plan was approved for monitored natural attenuation with institutional controls. A monitoring program was implemented and controls were established to restrict the land use and activities on-site. The monitoring program for groundwater and surface water is currently conducted on a semiannual basis and consists of water level gauging and analysis of select samples for VOCs (semiannually) and Dioxathion/Dioxenethion (annually).

As noted above, the scope of the Order, and the activities to be performed under the Order, including but not limited to the implementation of the AO, is to assess the presence, magnitude, extent, direction, and rate of movement of any Constituents.

3.2 Site Description

Site Type: (Check as many as applicable)

	Active	X	Secure	X	Industrial		Landfill		Service station
X	Inactive		Unsecured		Commercial		Well field		Water work
			Uncontrolled		Residential		Railroad		Undeveloped
Other specify:									

The Hercules Site is located on approximately 200 acres of land north of West Seventh Street in Hattiesburg, Forest County, Mississippi. The Site is located in Township 4 North, Range 13 West, within Sections 4 and 5 just north of Hattiesburg, Mississippi. The geographic coordinates of the Site are 31° 20' 20" north latitude and 89° 18' 25" west longitude. The physical address of the facility is 613 West Seventh Street, Hattiesburg, Mississippi.

The Site is bordered to the north by Highway 42 and beyond which is Illinois-Central & Gulf Railroad, along with various residential and commercial properties. The southern property boundary is bordered by 7th Avenue; and by Roseland Park cemetery and Zeon Chemical Corporation to the south-southwest. Across from these locations are residential areas. The eastern and western boundaries are bordered by sparsely populated residential and commercial areas.

The primary Chemicals of Concern (COCs) on this project are:

Known Compounds	Source (soil/water/drum, etc.)	Known Concentration Range (ppm, mg/kg, mg/l)	
		Lowest	Highest
Benzene	Groundwater	0.0063 mg/L	7.6 mg/L
Chloroform	Groundwater	0.0027 mg/L	7.3 mg/L
Carbon Tetrachloride	Groundwater	0.97 mg/L	32 mg/L
Total Dioxathion (Dioxathion & Dioxenethion)	Groundwater	ND	0.0847 mg/L
Chlorobenzene	Groundwater	0.15 mg/L	0.760 mg/L
Methylene Chloride	Groundwater	ND	0.560 mg/L
1,2 – Dichloroethane	Groundwater	ND	0.084 mg/L
Methyl Isobutyl Ketone	Groundwater	ND	0.51 mg/L
Toluene	Groundwater	ND	4.5 mg/L

ND Nondetect.

3.3 List of Project Tasks and Scope of Work

- *Task 1: Drinking Water Well Survey and Sampling* – A potable water well survey and sampling program will be implemented in the area surrounding the facility. Sampling will be phased within the initial 0.5-mile radius as defined in the AO. ARCADIS will identify and sample all appropriate water wells according to the Sampling and Analysis Work Plan (SAP) developed for the project. An additional assessment will be conducted in appropriate directions; based on initial well survey findings, in 0.5-mile radial increments, until COC are no longer detected. If warranted, additional sampling will be conducted out to a 4 mile radius.

  Sampling activities will utilize low flow techniques (bladder or peristaltic pumps). Modified Level D (hard hat, safety glasses, nitrile gloves, and steel toed boots) personal protective equipment (PPE) will be required during water well sampling activities. The Site Safety Officer (SSO) will conduct periodic air monitoring with an organic vapor analyzer (OVA), during initial sampling activities to monitor the ambient air for VOC concentrations. PPE upgrades (action level) will be based on sustained readings of one half the threshold limit value (TLV) of the constituent with the lowest TLV requirement. Benzene is the constituent of concern with the lowest TLV, which is 0.5 parts per million (PPM). The project personal will base PPE upgrades on Benzene, unless the OVAs utilized on site can distinguish the

various constituent concentrations separately. If the OVAs can monitor concentrations of the project constituents separately, project management may base PPE upgrades on the respective TLV values for each constituent deemed present.

Higher constituent concentrations are expected in the area of the Hercules facility, with lower constituent concentrations in the radius surrounding the Hercules facility. Initial air monitoring for VOCs will be conducted during water well sampling activities on or close to the Hercules facility. If air monitoring determines that ambient air around the water well sampling activities are free or below one half of the threshold limit value throughout the task, air monitoring frequency will be adjusted accordingly by project management. Based on known groundwater concentrations at the Hercules facility, all sampling activities are expected to require level D personal protective equipment (PPE). ARCADIS will conduct all water well sampling procedures according to the SAP. Additional hazards could result from unfriendly or unsafe neighborhoods or people. If ARCADIS personal identifies or observes any dangerous activities, stop work authority (SWA) will be initiated and the proper notifications will be made. Work on the project will be conducted in the daylight hours and staff will periodically check in with project management approximately every 30 minutes. If deemed necessary by project management, police escorts may be required.

- *Task 2: Surface Water and Sediment Sampling* – ARCADIS will conduct a surface water and sediment sampling in the area surrounding the facility. Assessment will be conducted up to 0.5 mile away from the Facility. ARCADIS will identify any wetlands, creeks, lakes or other surface water bodies, including any ditches located within a 0.5 mile radius of the Facility's property boundaries. ARCADIS will identify any such bodies of water which are used for public recreational purposes or may contain endangered species. Sampling will be focused on surface water bodies that could potentially be impacted.

  Level D PPE is expected for both the sediment and surface water sampling activities. ARCADIS will utilize the buddy system at all times during these activities. Due to the nature of the areas where surface and sediment sampling activities will be conducted, additional PPE or work protocol may be required. Sediment and surface water sampling activities have increased likelihood of contact with biological hazards such as: snakes, ticks, bees, wild animals, dogs, spiders, and poisonous plants. The SSO will evaluate the conditions and determine if PPE needs upgraded (snake chaps, dog whistle, poison ivy block) based on both physical and chemical conditions. Additionally, Kevlar gloves will be

utilized when handling glass sample containers. ARCADIS will conduct all sediment and surface water sampling procedures according to the SAP.

- *Task 3: Groundwater Sampling* – Current shallow (water table) groundwater data will be screened against calculated groundwater screening levels protective of indoor air exposure. These values will be calculated from USEPA Regional Screening Levels. If the groundwater screening level is below a Maximum Contaminant Levels (MCLs), the MCL will be used as the criteria instead. As necessary, additional groundwater samples may be collected to complete the delineation of shallow groundwater. As described in USEPA (2002) VI Guidance, further investigation of the VI pathway is necessary for any building within 100 feet the screening level or MCL.

  A Direct Push Technology (DPT) rig will be utilized to install the temporary monitoring wells. Project management may determine to collect soil samples during the installation of the monitoring wells. ARCADIS will ensure the proper utility locates have been completed with a minimum of three lines of evidence. Groundwater sampling activities will utilize low flow techniques (bladder or peristaltic pumps). Level D PPE will be required during the installation of the monitoring wells. If the well location is in or near a residential area, ARCADIS will section off the work zone with caution tape and monitor pedestrian activity. If any unauthorized individuals approaches or enters the work zone, stop work authority will be used until it's safe to continue work activities. The SSO will conduct periodic air monitoring during installation activities to monitor the area for VOC concentrations. Air monitoring for VOCs will also be conducted during initial groundwater sampling activities on or close to the Hercules facility. If air monitoring determines that ambient air around the groundwater sampling activities is free or below one half of the TLV, throughout the tasks, air monitoring frequency will be adjusted accordingly by project management. At minimum level D PPE will be worn at all times. PPE upgrades will be base on sustained reading of one half the action level of the constituent with the lowest TLV.

  Groundwater samples will be obtained from the temporary wells following standard sampling protocol. Upon completion of the groundwater sampling, project management will determine when and if the temporary wells will be removed and the borings will be plugged and abandoned. ARCADIS will conduct all groundwater sampling procedures according to the SAP.

- *Task 4: Soil Gas Sampling* – A soil gas sampling program will be implemented. Sampling will be phased within the initial 0.5-mile radius. Assessment will be

conducted up to 0.5-mile away from the Facility, if warranted. Identify residential and commercial properties within a 0.5-mile radius of the Facility's property boundaries.

Soil gas sampling activities will utilize a hand auger to create a boring down to the groundwater interface. If boring hand augering exceeds 5 feet, ARCADIS will rotate staff to ensure muscle strain and fatigue hazards are minimized. A Summa® canister or tubing attach to the canister, will be advanced into the boring to approximately one foot above the groundwater interface. When properly positioned, ARCADIS will collect the soil gas sample with the Summa® canister for the timeframe indicated by the laboratory. Air monitoring for VOCs will be conducted during soil-gas sampling activities. If air monitoring determines that ambient air around the soil-gas sampling activities is free or below one half of the TLV, throughout the task, air monitoring frequency will be adjusted accordingly by project management.

A DPT rig may be utilized to create the boring needed to the collect the soil gas samples if the groundwater interface is to deep to hand auger. Project management will determine where the DPT rig is appropriate, however for Health and Safety purposes anything over 10 feet depth will utilized DPT rig to obtain the sample. If a DPT rig is utilized; ARCADIS will ensure that skilled associates or sub-contractors are operating the DPT rig, that three lines of evidence are obtained for proper utility clearance, and that PPE will be upgraded accordingly. ARCADIS will section off the work zone with caution tape and monitor pedestrian activity. If any unauthorized individuals approaches or enters the work zone, stop work authority will be used until it's safe to continue work activities. ARCADIS will conduct all soil gas sampling procedures according to the SAP.

- *Task 5: Sub-Slab Soil Gas and Indoor Air Sampling* – Based on the soil gas results, a sub-slab soil gas and indoor air sampling program may be implemented. Assessment will be conducted up to 0.5-mile away from the Facility. Identify residential and commercial properties within a 0.5-mile radius of the Facility's property boundaries.

  ARCADIS will obtain the proper access and acknowledgement agreements prior to conducting any sub-slab soil gas sampling. ARCADIS will ensure that three lines of evidence are obtained for proper utility clearance prior to conducting sub-slab soil sampling. To obtain a sub-slab soil sample, ARCADIS personal will use a hammer drill or like equipment to create a small hole in the building slab, down to the soil below the slab. When the hole is created ARCADIS may utilize helium gas

to test the hole for integrity. When ready, ARCADIS will use a Summa® canister to collect the sub-slab soil gas sample. Upon completion ARCADIS will fill and seal the hole in the slab and return the property to its previous condition. If ARCADIS encounters unfriendly or unsafe conditions or people, or observes an illegal activity while conducting indoor sub-slab soil sampling activities, ARCADIS will use SWA and make the proper notifications. ARCADIS will conduct all sub-slab soil gas procedures according to the SAP.

4. ARCADIS Organization and Responsibilities

4.1 All Personnel

Each person is responsible for completing tasks safely, and reporting any unsafe acts or conditions to their supervisor. No person may work in a manner that conflict with these procedures. Prior to initiating Site activities, all ARCADIS and subcontractor personnel will receive training in accordance with applicable regulations, and be familiar with the requirements and standards referenced in this HASP. In addition, all personnel will attend daily safety meetings (tailgate meetings) to discuss Site-specific hazards prior to beginning each day's work. Every ARCADIS employee, subcontractor, and client representative at the Site has the responsibility to stop the work of a coworker or subcontractor if the working conditions or behaviors are considered unsafe.

4.2 Project Manager/Task Manager

The Project Manager is responsible for verifying that project activities are completed in accordance with the requirements of this HASP. The Project Manager is responsible for confirming that the project has the equipment, materials, and qualified personnel to fully implement the safety requirements of this HASP, and/or that subcontractors assigned to this project, meet the requirements established by ARCADIS. It is also the responsibility of the Project Manager to:

- Review all applicable H&S Standards, and ensure that project activities conform to all requirements;
- Obtain client-specific health and safety information and communicate with the client on health and safety issues;
- Communicate with the SSO on health and safety issues;

- Allocate resources for correction of identified unsafe work conditions;
- Ensure ARCADIS Site workers have all training necessary for the project; and
- Report all injuries, illnesses and near-misses to the client representative, lead incident investigations, and ensure that any recommendations made are implemented.

4.3 Site Safety Officer

The SSO has overall responsibility for the technical health and safety aspects of the project. Inquiries regarding ARCADIS health and safety standards, project procedures, and other technical or regulatory issues should be addressed to this individual. It is also the responsibility of the SSO to:

- Review and work in accordance with the components of this HASP;
- Ensure that this HASP is available to and reviewed by all Site personnel including subcontractors;
- Ensure that necessary Site-specific training is performed (both initial and "tailgate" safety briefings);
- Ensure Site visitors have been informed of the hazards related to ARCADIS work;
- Ensure that work is performed in a safe manner and has authority to stop work when necessary to protect workers and/or the public;
- Coordinate activities during emergency situations;

- Ensure that all necessary permits and safety information provided by the client is disseminated to other Site personnel and is maintained in an organized manner;
- Communicate with the PM on health and safety issues;
- Reports all injuries, illnesses and near-misses to the PM; and
- Ensures that necessary safety equipment is maintained and used at the Site.

The SSO will contacts a health and safety professional for assistance in establishing the respiratory cartridge change schedule as required.

5. Project Hazards and Control Measures

5.1 Hazard Analysis

Rank the hazards in the table below using HIGH (H), MEDIUM (M) or LOW (L) based on current Site knowledge. For hazards that are not applicable, leave blank. Use results of this analysis to verify controls in Job Loss Analysis (JLA) or other supporting documents are adequate to mitigate task hazards. When in the field, use the Tailgate Safety Meeting Form for task specific evaluation of task hazards.

Table 1. Hazard Ranking Chart

Severity	Consequence		Probability				
	Property Damage	Injury	Frequent	Likely	Occasional	Seldom	Unlikely
	> $100,000	Fatality	H	H	H	H	M
	> $10,000	Injury Requiring Hospitalization	H	H	H	M	L
	> $1000	Injury Requiring Medical Treatment Beyond First Aid	H	M	M	L	L
	< $1000	Injury Requiring First Aid	M	L	L	L	L

☒ Hazards are ranked using the ARCADIS HARC Process: *ARC_HSMS002*

Biological		***Mechanical***		***Chemical/Radiation***	
M	Biting/stinging insects	L	Cuts on equipment/tools		Not applicable
L	Biting animals	L	Pinch points on equipment	L	General
H	Poisonous plants	L	Burns from equipment	L	Dusts, toxic
M	Phys. damaging plants	L	Struck by equipment	L	Dusts, nuisance
				L	Chemicals, ARCADIS use
Driving		***Motion***			Chemicals, corrosive
L	Night driving	M	Lifting/awkward body positions		Chemicals, explosive
M	Off-road driving	M	Struck by vehicle/traffic	L	Chemicals, flammable
M	Urban driving				Chemicals, oxidizing
M	All terrain vehicle	***Personal Safety***			Chemicals, toxic
M	Boat	L	Working late/night		Chemicals, reactive
		L	Working alone		Radiation, ionizing
Electrical		M	High crime area		Radiation, non-ionizing
	Wet environments				
	Electrical panels	***Pressure***		***Compound Specific***	
	Electric utilities	H	Utilities (gas, water, etc)		Asbestos
	Electric power tools	L	Compressed gas cylinders	L	Benzene
			Compressed air/aerosols		Cadmium
Environment		L	Hydraulic systems		Hydrogen sulfide
H	Heat				Lead
	Cold	***Sound***			Silica
M	Lightning	M	Equipment noise		
M	Inclement weather	M	Tool noise	***Gravity***	
L	High wind	L	Traffic noise (vehicle/train/etc)	M	Slip, trip, fall
				L	Fall from height
					Ladders or scaffolds
				L	Struck by falling object

5.2 Job Loss Analyses, H&S Standards, and Personal Protective Equipment

A JLA has been completed for each DPT rig soil sampling, along with sediment and surface water sampling. The Site SSO will develop additional JLAs on an as needed basis with project specific information, and are included in Appendix B. The SSO will be responsible for developing additional JLAs for the project on an as needed basis. Hazards identified in the table above are addressed specifically in the JLAs as well as control methods to protect employees and property from hazards. The JLA also lists

the type of personal protective equipment (PPE) required for the completion of the project. A detailed list of PPE for the project is located in Appendix D.

ARCADIS H&S Standards applicable to this project are listed below. These standards should be reviewed by the project manager, task manager and Site personnel. The Client H&S Resource should be contacted with any questions concerning the standards.

- ARC HSFS019 – Utility Location.
- ARC HSIH003 – Benzene.

5.3 Field Health & Safety Handbook

The Field H&S Handbook (FHSHB) is an ARCADIS document containing information about topic-specific health and safety requirements for the field. This handbook contains relevant general topics and is used as part of the overall HASP process. To aid in the consistency of the HASP process the handbook will be used as an informational source in conjunction with this HASP.

The following handbook sections are required reading for this project:

- Section III-F. General Housekeeping, Personal Hygiene and Field Sanitation.
- Section III-G. Site Security, Work Zone and Decontamination for HAZWOPER Sites.
- Section III-GG. HAZWOPER and HAZMAT Response.
- Section III-II. Drums and other Material Handling.
- Section III and Title N. Biological Hazards.
- Section III and Title X. Boating Operations Safety.
- Section III and Title Y. Confined Spaces (ARCHSSF003).
- Section III and Title BB. Fall Protection (ARCHSFS007).
- Section III and Title CC. Hand and Power Tools.

6. Hazard Communication (HazCom)

All project required chemicals must be handled in accordance with the ARCADIS-HazCom Standard (ARC HSGE007), and the requirements outlined in the Field H&S Handbook. The table below lists all chemicals that will be brought, used, and/or stored on the Site by ARCADIS or its subcontractors. Material Safety Data Sheets (MSDS) for chemicals brought on site are included in Appendix E.

List the chemicals anticipated to be used by ARCADIS on this project subject to HazCom requirements.

(Modify quantities as needed)

	Acids/Bases	Qty
☐	Not applicable	
☒	Hydrochloric acid	<500 ml
☒	Nitric acid	<500 ml
☐	Sulfuric acid	<500 ml
☐	Sodium hydroxide	<500 ml
☐	Zinc acetate	<500 ml
☐	Ascorbic acid	<500 ml
☐	Acetic acid	<500 ml
☐	Other:	

	Decontamination	Qty
☐	Not applicable	
☐	Alconox	• 5 lbs
☒	Liquinox	• 1 gal
☐	Acetone	• 1 gal
☐	Methanol	• 1 gal
☐	Hexane	• 1 gal
☐	Isopropyl alcohol	• 4 gal
☐	Nitric acid	• 1 L
☐	Other:	

	Calibration	Qty.
☐	Not applicable	
☒	Isobutylene/air	1 cyl
☐	Methane/air	1 cyl
☐	Pentane/air	1 cyl
☐	Hydrogen/air	1 cyl
☐	Propane/air	1 cyl
☐	Hydrogen sulfide/air	1 cyl
☐	Carbon monoxide/air	1 cyl
☒	pH standards (4,7,10)	• 1 gal
☒	Conductivity standards	• 1 gal
☐	Other:	

	Fuels	Qty.
☐	Not applicable	
☒	Gasoline	• 5 gal
☒	Diesel	• 5 gal
☐	Kerosene	• 5 gal
☐	Propane	1 cyl
☐	Other:	

	Kits	Oty.
☐	Not applicable	
☐	Hach (specify):	1 kit
☐	DTECH (specify):	1 kit
☐	EPA 5035 Soil (specify kit):	1 kit
☐	Other:	

	Remediation	Qty.
☒	Not applicable	
☐	Other:	
☐	Other:	
☐	Other:	
☐	Other:	

	Other:	Qty.
☐	Not applicable	
☐	Spray paint	• 6 cans
☐	WD-40	• 1 can
☒	Helium	• 1 cyl
☐	Pipe primer	• 1 can
☐	Mineral spirits	• 1 gal

Material safety data sheets (MSDSs) must be available to field staff. Manufacturer supplied MSDSs are preferred, however, if the manufacturer's MSDS cannot be located, use the source provided below. Indicate below how MSDS information will be provided:

- ☐ Not applicable
- ☐ Printed copy in company vehicle
- ☒ Printed copy in the project trailer/office
- ☐ Printed copy attached
- ☐ Electronic copy on field computer

Bulk quantities of the following materials will be stored:

Find an MSDS	
Source:	www.hz.genium.com
Username:	arcadis_library
Password:	library1

Contact the project H&S contact for information in determining code and regulatory requirements associated with bulk storage of materials.

6.1 Chemical Hazards

Air monitoring will be conducted as outlined in this HASP to collect exposure data for COC or for chemicals brought on site for use. Table 2 lists the properties of chemicals that will be encountered at the Site.

Table 2. Chemical Hazard Information

Chemical Name	IP (eV)	Odor Threshold (ppm)	Routes of Entry/ Exposure Symptoms	8-hr TWA[1] (ppm)	IDLH (NIOSH) (ppm)	STEL (ppm)	Source TLV/PEL
Benzene	9.25	4.68	inhalation, skin absorption, ingestion, skin and/or eye contact	0.5	500	2.5	ACGIH
Carbon Tetrachloride	11.28	21.4	inhalation, skin absorption, ingestion, skin and/or eye contact	5 (skin)	200	10 (skin)	ACGIH
Chlorobenzene	9.07	0.741	inhalation, skin absorption, ingestion, skin and/or eye contact	10	1,000	N/A	ACGIH
Chloroform	11.37	250-1,000	inhalation, skin absorption, ingestion, skin and/or eye contact	10	500	2 (NIOSH)	ACGIH
Dioxathion/Dioxenethion	N/A	N/A	inhalation, skin absorption, ingestion, skin and/or eye contact	0.1 (skin)	N/A	N/A	ACGIH
1,2-Dichloroethane	11.05	24-440	inhalation, skin absorption, ingestion, skin and/or eye contact	10	50	100 (OSHA)	ACGIH

Chemical Name	IP (eV)	Odor Threshold (ppm)	Routes of Entry/ Exposure Symptoms	8-hr TWA[1] (ppm)	IDLH (NIOSH) (ppm)	STEL (ppm)	Source TLV/PEL
Methylene Chloride	11.32	540-2,160	inhalation, skin absorption, ingestion, skin and/or eye contact	50	2,300	125 (OSHA)	ACGIH
Methyl Isobutyl Ketone	N/A	N/A	inhalation, skin absorption, ingestion, skin and/or eye contact	50	500	75	ACGIH
Toluene	8.82	2.9	inhalation, skin absorption, ingestion, skin and/or eye contact	20	500	300	ACGIH

[1]The TLV (Threshold Limit Value) from the American Conference of Governmental Industrial Hygienists (ACGIH) is listed unless the PEL (Permissible Exposure Limit), designated by OSHA, is lower.

See Section 7 for information on air monitoring requirements.

7. Tailgate Meetings

Tailgate safety briefings must be conducted at least once daily and should be conducted twice daily (at the start of the job and after mid-day meal break), or as tasks/hazards change. Each tailgate safety briefing must be documented on the form included in Appendix C and maintained with the project files. The tailgate safety briefing will serve as a final review for hazard identification and controls to be utilized. JLAs and the ARCADIS FHSHB controls should be reviewed as part of the briefing to ensure hazard controls are adequate for planned work.

8. Personal Exposure Monitoring and Respiratory Protection

Personal and area exposure monitoring will be documented on the Real Time revamped Exposure Monitoring Data Form provided in Appendix C. All monitoring equipment will be maintained and calibrated in accordance with manufacturer's recommendations. All pertinent monitoring data will be logged on the form and maintained on site for the duration of project activities. Calibration of all monitoring equipment will be conducted daily and logged on the same form.

Table 3 lists exposure monitoring requirements and associated action levels for site exposure hazards (e.g. chemical, noise, radiation, etc). Action levels have been developed for exposure monitoring with real-time air monitoring instruments as specified in the table. Air monitoring data will determine the required respiratory protection levels at the Site during scheduled intrusive activities. The action levels are based on sustained readings indicated by the instrument(s). Air monitoring will be performed and recorded at up to 30-minute intervals.

If elevated concentrations are indicated, the monitoring frequency will be increased, as appropriate. If sustained measurements are observed during this time, the following actions will be instituted, and the Project Manager and Project Health and Safety Manager will be notified. For purposes of this HASP, sustained readings are defined as the average airborne concentration maintained for a period of one minute.

Table 3. Exposure Monitoring Requirements

TASK 1 – Water well sampling
Is exposure monitoring required for the completion of this task?
☒ YES ☐ NO If yes, complete the following:

Exposure Hazard	Monitoring Equipment	Monitoring Frequency	Action Level (ppm)	Required Action
Benzene	PID / FID / Dräger Tube	Continuous	0.25	Level C (full face)
Chloroform	PID / FID / Dräger Tube	Continuous	5	Level C (full face)
Chlorobenzene	PID / FID / Dräger Tube	Continuous	5	Level C (full face)
1,2-Dichloroethane	PID / FID / Dräger Tube	Continuous	5	Level C (full face)
Methylene Chloride	PID / FID / Dräger Tube	Continuous	25	Level C (full face)
Methyl Isobutyl Ketone	PID / FID / Dräger Tube	Continuous	25	Level C (full face)
Toluene	PID / FID / Dräger Tube	Continuous	10	Level C (full face)

TASK 2 – Surface Water and Sediment Sampling
Is exposure monitoring required for the completion of this task?
☐ YES ☒ NO If yes, complete the following:

TASK 3 – Groundwater well installation and sampling
Is exposure monitoring required for the completion of this task?
☒ YES ☐ NO If yes, complete the following:

Exposure Hazard	Monitoring Equipment	Monitoring Frequency	Action Level (ppm)	Required Action
Benzene	PID / FID / Dräger Tube	Continuous	0.25	Level C (full face)
Chloroform	PID / FID / Dräger Tube	Continuous	5	Level C (full face)
Chlorobenzene	PID / FID / Dräger Tube	Continuous	5	Level C (full face)
1,2-Dichloroethane	PID / FID / Dräger Tube	Continuous	5	Level C (full face)
Methylene Chloride	PID / FID / Dräger Tube	Continuous	25	Level C (full face)
Methyl Isobutyl Ketone	PID / FID / Dräger Tube	Continuous	25	Level C (full face)
Toluene	PID / FID / Dräger Tube	Continuous	10	Level C (full face)

TASK 4 – Soil gas sampling

Is exposure monitoring required for the completion of this task?

☒ YES ☐ NO If yes, complete the following:

Exposure Hazard	Monitoring Equipment	Monitoring Frequency	Action Level (ppm)	Required Action
Benzene	PID / FID / Dräger Tube	Continuous	0.25	Level C (full face)
Chloroform	PID / FID / Dräger Tube	Continuous	5	Level C (full face)

TASK 5 – Sub-slab soil gas sampling

Is exposure monitoring required for the completion of this task?

☒ YES ☐ NO If yes, complete the following:

Exposure Hazard	Monitoring Equipment	Monitoring Frequency	Action Level (ppm)	Required Action
Benzene	PID / FID / Dräger	Continuous	0.25	Level C (full face)
Chloroform	PID / FID / Dräger	Continuous	5	Level C (full face)
Chlorobenzene	PID / FID / Dräger	Continuous	5	Level C (full face)
1,2-Dichloroethane	PID / FID / Dräger Tube	Continuous	5	Level C (full face)
Methylene Chloride	PID / FID / Dräger Tube	Continuous	25	Level C (full face)
Methyl Isobutyl Ketone	PID / FID / Dräger Tube	Continuous	25	Level C (full face)
Toluene	PID / FID / Dräger	Continuous	10	Level C (full face)

8.1 Respirator Cartridge Change Schedule

Respirators will be stored in clean containers (i.e., self-sealing bag) when not in use. If respirators are required to be worn based on the action levels established above, respirator cartridges will be replaced in accordance with the following change-out schedule.

Type of Cartridge	Cartridge Change-out Schedule
Particulate (i.e., High Efficiency Particulate Air)	At least weekly or whenever the employee detects an increase in breathing resistance. This will occur as the filter becomes loaded with particulate matter.
Sorbent (i.e., organic vapor)	At the end of each day's use or sooner, if the respirator manufacturer change-out schedule software program dictates otherwise. The Project H&S Manager or the Project Manager must be consulted regarding gas/vapor cartridge change-out schedule. This will be determined per the ARCADIS Respiratory Protection standard – ARC HSGE017.

Personnel who wear APRs must be trained in their use, must have successfully passed a qualitative respiratory fit test within the last 12 months, and must have medical clearance for APR use.

With the exception of protection against particulates*, if the action plan outlined above calls for an upgrade to an air-purifying respirator (for protection against organic vapors and other gaseous chemicals), the following will apply:

- The respirator cartridge will be equipped with an end-of-service-life indicator (ESLI) certified by NIOSH for the contaminant; or
- If there is no ESLI appropriate for a contaminant, the project will implement a change schedule for cartridges to ensure that they are changed before the end of their service life.

**Note – A Cartridge Change Schedule is not necessary for cartridges used in the protection against particulates provided that the cartridges are changed out when there is a perceived resistance in breathing experienced by the user.*

9. Medical Surveillance

Medical surveillance requirements are outlined in the ARCADIS Medical Monitoring Program Standard ARCHSGE010. All medical surveillance requirements as indicated must be completed and Site personnel medically cleared before being permitted on the project Site.

10. General Site Access and Control

The SSO will coordinate access and control security at the work site. As the work dictates, the SSO will establish a work area perimeter. The size of the perimeter will be based on the daily task activities and will be discussed with all project personnel during the tailgate meeting and then documented on the tailgate meeting form. Control zones for Level C or above will be demarcated by either visual or physical devices and will be monitored for effectiveness by the SSO.

Only authorized personnel will be allowed beyond the perimeter. Other Site workers and visitors to the Site should be kept out of the work site. If visitors need access to the Site, the SSO will escort the visitor at all times. All visitors will log in and out with the SSO. The visitor log sheet is included in Appendix C.

ARCADIS will obtain access and acknowledgement agreements for all properties where work tasks will be conducted. Due to the nature and residential surroundings where some of the projects work tasks will be conducted, additional safety concerns are present. ARCADIS will instruct all associates to use SWA if any dangerous or illegal activity is observed. If SWA is used in relation to dangerous or illegal activity, ARCADIS will proceed directly to the project meeting point or office and will contact project management. If warranted, project management may decide to contact the local authorities to manage the situation.

10.1 Sanitation at Temporary Workplaces

10.1.1 Potable Water

An adequate supply of potable water must be provided on the Site. Portable containers used to dispense drinking water shall be capable of being tightly closed, and equipped with a tap. Water shall not be dipped from containers. Any container used to distribute drinking water shall be clearly marked as to the nature of its contents and not used for any other purpose. Where single service cups (to be used but once) are supplied, both a sanitary container for the unused cups and a receptacle for disposing of the used cups shall be provided.

10.1.2 Toilet Facilities

Under temporary field conditions, the SSO will make provisions so that no less than one toilet facility is available. Use of a nearby toilet facility is an acceptable arrangement for mobile crews having transportation readily available.

11. Decontamination Control Zones and Procedures

The decontamination procedures outlined in the Field H&S Handbook are provided for typical Level D and Level C ensembles.

The zones for Level C and above will be designated by traffic cones, barricades, signs, caution tape, or other means effective in identifying the different areas. The SSO will establish control boundaries for the exclusion zone, contamination reduction zone, and the support zone. The zones will be identified by the SSO during tailgate meetings and documented on the meeting form. Entrance and exit to the exclusion zone will only be through controlled access points established for each work area.

Level B or Level A decontamination procedures are detailed in the below table:

Table 4. Level A/B Decontamination Steps

Level A Decontamination Steps		Level B Decontamination Steps	
EZ-1	Segregated Equipment Drop	EZ-1	Segregated Equipment Drop
EZ-2	Boot Cover and Glove Wash	EZ-2	Boot Cover and Glove Wash
EZ-3	Boot Cover and Glove Rinse	EZ-3	Boot Cover and Glove Rinse
EZ-4	Tape Removal	EZ-4	Tape Removal
EZ-5	Boot Cover Removal	EZ-5	Boot Cover Removal
EZ-6	Outer Glove Removal	EZ-6	Outer Glove Removal
CRZ-7	Suit/Safety Boot Wash	CRZ-7	Outer Glove Removal
CRZ-8	Suit/Safety Boot Rinse	CRZ-8	Suit/SCBA/Boot/Glove Rinse
CRZ-9	Encapsulated Suit Partial Removal/Tank Change	CRZ-9	Tank Change
CRZ-9a	Redress-return to EZ	CRZ-9a	Redress-return to EZ
CRZ-10	Safety Boot Removal	CRZ-10	Safety Boot Removal
CRZ-11	Encapsulated Suit Removal	CRZ-11	SCBA Removal
CRZ-12	SCBA Removal	CRZ-12	Splash Suit Removal
CRZ-13	Inner Glove Wash	CRZ-13	Inner Glove Wash
CRZ-14	Inner Glove Rinse	CRZ-14	Inner Glove Rinse
CRZ-15	Face-piece Removal	CRZ-15	Face-piece Removal
CRZ-16	Inner Glove Removal	CRZ-16	Inner Glove Removal
CRZ-17	Inner Clothing Removal	CRZ-17	Inner Clothing Removal

Level A Decontamination Steps		Level B Decontamination Steps	
SZ-18	Field Wash	SZ-18	Field Wash
SZ-19	Redress	SZ-19	Redress

EZ-Exclusion Zone CRZ-Contamination Reduction Zone SZ-Support Zone

12. Emergency Action Plan (EAP)

In the event that an injury, over-exposure or spill has occurred, an EAP will be implemented. All employees working on this project must be shown the location and proper use of all emergency equipment prior to beginning work on the project.

13. Client-Specific Health and Safety Requirements

ARCADIS project personnel must comply with the client's specific H&S requirements at all times. Client-specific H&S requirements are as follows:

- Conform to Ashland Incorporated Procedure No. EHS-PR07 for confined spaces. (Copies of the Ashland and ARCADIS procedures are included in Appendix H.)

14. Ground or Air Shipments of Hazardous Materials (HazMat)

All samples, electronic equipment with batteries, powders, gases, liquids, magnetized materials or radioactive materials being shipped by air or ground transport will be evaluated using the ARCADIS Shipping Determination process to determine if the material or equipment being shipped is hazardous for transport. All materials identified as HazMat will be shipped according to applicable Department of Transportation (DOT) and International Air Transport Association (IATA) regulations and requirements as prescribed by the ARCADIS DOT Program.

All employees collecting samples, preparing HazMat packages, or offering HazMat to a 3rd party carrier such as FedEx will have current HazMat training as prescribed by the **ARCADIS DOT Program.**

14.1 Department of Transportation Dangerous Goods Shipping Requirements

ARCADIS has policies in place for transporting small quantities of hazardous materials and for offering for shipping via ground or air. These policies are designed to meet the applicable requirements. As such, only ARCADIS staff that have been trained in the proper methods to prepare and ship hazardous materials are authorized to do so.

Tasks associated with the packaging, labeling, marking, and preparation of hazardous materials for shipping or transport must have all appropriate and applicable training.

14.2 Materials of Trade (MOT)

DOT allows for a small amount of hazardous materials that are used in or an inherent part of our work to be transported in company vehicles. This includes things like gasoline, paint, small compressed gas cylinders, calibration gas, etc. To transport these:

- Staff will complete MOT training.
- Vehicles used in transportation to and from off-site work locations will be in conformance with ARCADIS vehicle safety procedures.

Hazardous materials will be transported as described above as a result of the activities covered in this HASP. Site personnel who transport materials mentioned above will complete the Hazardous Materials Transportation Form included in Appendix E.

14.3 Department of Transportation

Staff who collect, prepare, package, mark, label, complete shipping declarations, offer shipments to a transporter, directly transport or are engaged in other activities associated with the transportation of Hazardous Materials (referred to as Dangerous Goods in Canada and by the IATA) will have appropriate and applicable training. DOT requires all individuals who participate in hazmat shipping including activities such as completing the paperwork (but not signing it), filling a container with a hazardous material (including filling a drum with drill cuttings or purge water), marking, labeling, and packaging the hazardous material, etc., have awareness level training on the DOT requirements. DOT requires additional job function training for those who conduct specific activities including:

- Staff who have to sign shipping papers or manifests, are listed as the 24-hour emergency contacts on shipping and have the responsibility for identifying, classifying, packaging, marking, and labeling HazMat packages, and/or are directing or overseeing others who do these tasks will become certified through the completion of additional training.

- The above training allows the offering employee to ship only by ground. If the shipment is to be offered for air transport, additional training is required.

Shipments as described above will be made as a result of the activities covered in this HASP. Site personnel shipping hazardous materials will complete the Hazardous Materials Shipment Form included in Appendix E.

15. Loss Prevention System™ and Loss Prevention Observations (LPOs)

As part of any project, no matter how simple or complex, LPOs should be conducted when practical and when able to integrate into normal business activities. LPOs should be scheduled based on the risk of the tasks being performed, and should be conducted for different tasks and at different times. Completion of LPOs should be documented on the tailgate meeting form.

The following table outlines the LPO plan for the project:

Identified Task for LPO	Schedule Date	Observer Name	Observee Name	Feedback Supervisor Name

16. Subcontractors

A copy of this HASP is to be provided to all subcontractors prior to the start of work so that the subcontractor is informed of the hazards at the Site. While the ARCADIS HASP will be the minimum health and safety requirements for the work completed by ARCADIS and its subcontractors, each subcontractor, in coordination with ARCADIS health and safety personnel, is expected to perform its operations in accordance with its own HASP, policies and procedures unique to the subcontractor's work to ensure that hazards associated with the performance of the work activities are properly

controlled. Copies of any required safety documentation for a subcontractor's work activities will be provided to ARCADIS for review prior to the start of on-site activities.

In the event that the subcontractor's procedures/requirements conflict with requirements specified in this HASP, the more stringent guidance will be adopted after discussion and agreement between the subcontractor and ARCADIS project health and safety personnel. Hazards not listed in this HASP, but known to the subcontractor or known to be associated with the subcontractor's services, must be identified and addressed to the ARCADIS project or task manager and SSO prior to beginning work operations.

If the subcontractor prefers to adopt this HASP, the **"Subcontractor Acknowledgement Memo" must be signed and dated by the subcontractor's management and placed in the project file.** Once the signed memo is received by the project manager, an electronic version of our HASP can be submitted to the subcontractor to use as their own. Subcontractors working at the Site will need to have this plan with them, and will also need to sign the Subcontractor HASP receipt signature page of the ARCADIS HASP (Appendix C). Subcontractors are responsible for the H&S of their employees at all times, and have the authority to halt work if unsafe conditions arise.

The Project/Task Manager and SSO (or authorized representative) has the authority to halt the subcontractor's operations and to remove the subcontractor or subcontractor's employee(s) from the Site for failure to comply with established health and safety procedures or for operating in an unsafe manner.

17. Project Personnel HASP Certification

All Site project personnel will sign the certification signature page provided in Appendix C of this HASP.

18. Roadway Work Zone Safety

All project work performed in a public (ARC DOT-301) or private (ARC DOT-302) roadway, regardless of work duration, will require a either a written Traffic Control Plan (TCP) or a Site Traffic Awareness and Response (STAR) Plan. Projects having work activities on both public and private roadways will operate under a TCP approved by an employee designated with Engineering Judgment.

ARCADIS

Appendix A

HASP Addendum Pages and Log Table

ARCADIS

Addendum Page

This form should be completed for new tasks associated with the project. The project manager and/or task manager should revise the Project Hazard Analysis Worksheet with the new task information and attach to this addendum sheet. JLAs should be developed for any new tasks and attached as well.

Review the addendum with all Site staff, including subcontractors, during the daily tailgate briefing, and complete the tailgate briefing form as required. Attach a copy of the addendum to all copies of the HASP including the Site copy, and log in the Addendum Log Table A-1 on the next page.

Addendum Number: _____ Project Number: _____

Date of Changed Conditions: _____ Date of Addendum: _____

Description of Change that Results in Modifications to HASP:

Signed: _____
Project Manager

Signed: _____
Site Safety Officer

Signed: _____
H&S Plan Writer

Signed: _____
H&S Plan Reviewer

ARCADIS

Addendum Log Table

Addendums are to be added to every copy of the HASP, and logged on Table A-1 to verify that all copies of the HASP are current:

Table A-1 Addendum Log Table

Addendum Number	Date of Addendum	Reason for Addendum	Person Completing Addendum
1			
2			
3			
4			
5			
6			
7			
8			
9			
10			

Make additional copies of this form as necessary.

Appendix B

JLAs

Job Loss Analysis

General

Client Name	Hercules
JSA ID	
Job Name	Environmental-Surface water sampling
Task Description	Surface Water and Sediment Sampling
Project Number	
Project Name	
PIC Name	
Project Manager	
Status	
Creation Date	
Auto Closed	

User Roles

Role	Employee	Due Date	Completed	Approve	Supervisor	Active
Created By	Joel Riley					
Developer (Primary Contact)						
HASP Reviewer						
Quality Reviewer						
Reviewer						

Reviewer Comments

Role	Employee	Approval Status	Completed Date	Comments

Job Steps

Job Step	Job Step Description		Potential Hazard	Critical Action	HSP Reference
1	Approaching sample location near river	1	Slip, trips, and falls. Biological hazards.	Approach sample location with a free hand, and wearing the required PPE, sans boots or waders. Inspect the path before walking to make sure the least steep path has been taken. Scan for biological hazards, wear sname chaps if working in heavy vegetation. Use the buddy systems at all times.	
2	Surface Water Sampling from shoreline or wading	1	Fall/Drown Hazard	Don PPE. Don Personal Floatation Device (PFD) within 20 ft of the River's edgeg 5 ft of steam edge. withi. Personnel working within 5 ft of the river edge must don harness, and attach to a lifeline. Additional personnel must provide oversight as sampler enters the River to retrieve sampler, if necessary. If working only near small streams, PFD and buddy system is adequate. Ensure footing and equipment is stable at all times. Sample using the buddy system. Utlize sampling metods that allow shoreline sampling if possible. Ring bouy should be staged adjacent to shorline near support personnel at all times. Stay in constabt communication (verbal, eye contact, hand signals).	Field Guide: V.G.Water Operations Work/Working near or on Water/Ice

		2	muscle strains from carrying equipment to sampling locations	Make multiple trips if necessary. Use the buddy system to lift heavy or akward objects. Take water breaks. Plan routes prior to carrying loads. Coolers with samples will get heavier as job progresses. Use smaller coolers to keep loads light. Do not overfill backpacks.	Field Guide: V.G.Water Operations Work/Working near or on Water/Ice
		3	slips from walking on wet surfaces near shoreline	wear boots with good tread and avoid heavily muddied areas.	Field Guide: V.G.Water Operations Work/Working near or on Water/Ice
		4	Fall Hazard	Workers must wear U.S. Coast Guard approved (Type I or II) PFD (e.g. life jacket) when: working close to fast-flowing water or water that is deeper than 4 feet, where the work could results in slipping or falling into the water (circumstances may require the use of lifelines).	Field Guide: V.G.Water Operations Work/Working near or on Water/Ice
		5	Water entering boots can increase the chance for blisters and other skin issues with feet/ankles	Wear rubber outerboots when appropriate. Waders should be worn when wading into deeper water.	Field Guide: V.G.Water Operations Work/Working near or on Water/Ice
		6	falling into water can cause injury/drowning	Wear PFD if falling into water deeper than waist high is a hazard, or if working proximal to turbulent/fast moving water. TRACK water conditions every day as rain/snow thaw can cause water condtions to worsen. Person walking through water should minimize what they are carrying so they can maintain balance.	Field Guide: V.G.Water Operations Work/Working near or on Water/Ice
3	Soil sampling (auger or trowel advancement)	1	muscle strainge from carrying equipment to sampling locations	make multiple trips if necessary. Coolers with samples will get heavier as job progresses. Use smaller coolers to keep loads light. Do not overfill backpacks.	
		2	Slips from walking on wet surfaces near shoreline	wear rubber outerboots when appropriate. Waders should be worn when wading into deeper water.	
		3	Water entering boots can increase the change for blisters and other skin issues with feet/ankles	wear rubber outerboots when appropriate. Waders should be worn when wading into deeper water.	
		4	falling into water can cause injury/drowning	wear PFD if falling into water deeper than waist high is a hazard, or if working proximal to turbulent/fast moving water. TRACK water coinditions every day as rain can cause water conditions to worsen. Person walking through water should minimize what they are carrying so they can maintain balance.	

		5	Muscle strains or falling	Rotate personnel advancing the auger to limit fatigue. Identify a non-slippery, flat area for advancement. The auger can be advanced easier in a more vegetated area (traction) than in the soft, muddy, sandy, shoreline areas. Properly collect and containerize all samples.	
4	Leaving sample location with equipment	1	Muscle fatigue and footing	Limit weight of coolers and sampling equipment by packing smart and mutiple people carrying the load to the vehicle. This will free up an arm in case of a fall or to keep balance.	

Personal Protective Equipment

Type	Personal Protective Equipment	Description	Required
Eye Protection	safety glasses		Required
Foot Protection	boots		Required
Foot Protection	rubber boots		Required
Hand Protection	chemical resistant gloves (specify type)	nitrile	Required
Miscellaneous PPE	other	Waders or overboots	Required
Miscellaneous PPE	personal flotation device		Required
Miscellaneous PPE	traffic vest–Class II or III		Required

Supplies

Type	Supply	Description	Required
Communication Devices	mobile phone		Required
Decontamination	Decon supplies (specify type)		Required
Miscellaneous	fire extinguisher		Required
Miscellaneous	first aid kit		Required
Miscellaneous	Other	Life line	Recommended
Personal	eye wash (specify type)		Required

Job Loss Analysis

General

Client Name	Hercules
JSA ID	
Job Name	Environmental-Soil sampling/well installation - drill rig
Task Description	Soil sampling using DPT drill rig
Project Number	
Project Name	Hercules
PIC Name	
Project Manager	
Status	
Creation Date	7/11/2011 12:00:00 AM
Auto Closed	

User Roles

Role	Employee	Due Date	Completed	Approve	Supervisor	Active
Created By	Riley, Joel					

Job Steps

Job Step	Job Step Description		Potential Hazard	Critical Action	HSP Reference
1	Load equipment and supplies into vehicle	1	Lifting hazards/back stain. Pinch points. Breaking glass in coolers. Spilling decon chemicals.	Use proper lifting technique, do not twist while lifting, use buddy system, lift with legs not back. Request assistance when lifting heavy equipment. Use dolly to transport coolers, as necessary. Load coolers and decon materials so they will not shift during transport.	
2	Mobilization - Driving to the Site.	1	Vehicle collision. Loss of equipment/supplies from moving vehicle.	Follow safe driving procedures (inspect vehicle prior to driving, safe following distances, headlights, safety belts, etc.). Do not use cell phones while driving. Properly secure all equipment and supplies before operating vehicle. DO NOT operate a cell phone or GPS while driving.	Smith Driving System Training
3	Working outdoors	1	Temperature-related illnesses (cold/heat stress). Weather. Biological hazards (animals, vegetation, etc.)	Drink plenty of fluids, take breaks as needed to avoid heat stress and dress appropriately for weather conditions. Postpone work if lightning is observed or expected. Watch for signs of heat stress or exhaustion in fellow co-workers. Use sunscreen. Scan for biological hazards when lifting objects.	
4	Tailgate safety meetings	1	Injury or property damage due to unknown or known hazards.	Discuss work to be performed and associated hazards. Open communication. All team members sign safety meeting form and JLA. Review utility drawings and sampling locations. Discuss routes of egress, rally points, and location specific hazards.	

5	Clear drilling locations	1	Traffic hazards, overhead and underground installations,product releases, and property damage	Have a minimium of three lines of evidence before conducting intrusive activities. Review proposed locations against known utilities. Mark out proposed boring locations. Call Utility locate company or have plant engineering conduct thorough utility locates before work commences. Hand clear borings with hand auger to 5ft.bgs using a hand probe to clear every ft.	Utility Location Policy/Procedure
6	Set up work/decon area	1	Slips from uneven terrain, wet ground, wet plastic sheeting. Pinched fingers from moving drums and augers. Strains and sprains. Custs from metal edges/knife.	Secure staging/decon area. Use spotter while moving in staging area. Scan ground ahead for obstacles. Use alternate routes if needed. Avoid placing hands between adjacent objects and between objects and ground (pinch points). Use two people to load/unload truck. Cut away from hands and body. Make sure to use proper ppe (work or nitrile gloves)	
7	Set up DPT rig	1	Electric shock from overhead power lines. Pinches from moving hydraulics. Contact with hydraulic fluid from busted hose. Uneven ground that could cause rig to turn over. Damage caused by rig while accessing setup location.	Minimum distance 15ft from overhead power lines. Inspect hoses for signs of wear/deterioration. Keep hands, feet, clothing at least 2 ft from moving parts. Use parking brake, chock wheels, level rig. Identify/avoid areas where rig could get stuck. Place cones or tape off work zone if in a busy area of the plant or near roadways.	
8	Commence DPT drilling	1	Cross-contamination from previous borehole. Back strain, heat/cold stress, eye injury, noise, exposure to chemicals, hitting underground utility, slip/trip/fall, and equipment failure.	Decontaminate drill equipment after each borehole. Use proper lifting technique. Use proper PPE and air monitoring equipment. Stay safe distance from drill rig. Watch for pinch points when handling augers. Keep hands, body parts and clothing away from moving parts of the rig. Good housekeeping. Maintain spill kit and fire extingusisher near rig. Keep in constant communication: voice, hand signals and eye contact.	
9	Soil logging and screening	1	Exposure to contaminants. Cross-contamination. Improper body positioning.	Use proper positioning and PPE. Use PID to screen air and borehole. Use nitrile gloves and change gloves between samples.	
10	Packaging samples for lab	1	Bottle breakage, back strain, sample cross-contamination, mislabeling	Keep samples stored in proper containers, on ice, and away from work area. Pack coolers to minimize sample jar movement. Use proper lifting technique. Label samples immediately upon sample collection.	
11	Demobilization	1	Lifting hazards and back strain. Vehicle collision. Loss of equipment/supplies from moving vehicle.	Leave Site clean of refuse and debris. Use proper lifting technique. Secure all equipment and supplies before operating vehicle. Follow safe driving procedures. Do not use cell phones while driving.	

Personal Protective Equipment

Type	Personal Protective Equipment	Description	Required
Dermal Protection	long sleeve shirt/pants		Required

Eye Protection	safety glasses		Required
Foot Protection	steel-toe boots		Required
Hand Protection	chemical resistant gloves (specify type)		Required
Hand Protection	work gloves (specify type)	Leather	Recommended
Head Protection	hard hat		Required
Hearing Protection	ear plugs		Required

Supplies

Type	Supply	Description	Required
Communication Devices	mobile phone		Required
Decontamination	Decon supplies (specify type)		Required
Miscellaneous	fire extinguisher		Required
Miscellaneous	first aid kit		Required
Miscellaneous	flashlight		Recommended
Personal	eye wash (specify type)		Required
Personal	insect repellant		Recommended
Personal	sunscreen		Recommended

Appendix C

HASP Forms

ARCADIS

Document Control Number:TGM - _____
TGM + *project number plus date as follows: xxxxxxxx.xxxx.xxxxx - dd/mm/year*

TAILGATE HEALTH & SAFETY MEETING FORM

This form documents the tailgate meeting conducted in accordance with the Project HASP. Personnel who perform work operations on-site during the day are required to attend this meeting and to acknowledge their attendance, at least daily.

Project Name:			**Project Location:**
Date:	**Time:**	**Conducted by:**	**Signature/Title:**
Client:		**Client Contact:**	**Subcontractor companies:**

TRACKing the Tailgate Meeting

Think through the Tasks (list the tasks for the day):

1 _____ 3 _____ 5 _____

2 _____ 4 _____ 6 _____

Other Hazardous Activities - Check the box if there are any other ARCADIS, Client or other party activities that may pose hazards to ARCADIS operations ☐ If there are none, write "None" here: _____

If yes, describe them here: _____

How will they be controlled? _____

Prework Authorization - check activities to be conducted that require permit issuance or completion of a checklist or similar before work begins:

	Doc #		Doc #		Doc #
☐ Not applicable		☐ Working at Height	_____	☐ Confined Space	_____
☐ Energy Isolation (LOTO)	_____	☐ Excavation/Trenching	_____	☐ Hot Work	_____
☐ Mechanical Lifting Ops	_____	☐ Overhead & Buried Utilities	_____	☐ Other permit	_____

Discuss following questions (for some review previous day's past activities). **Check if yes :**

☐ Incidents from day before to review?	☐ Lessons learned from the day before?	☐ Any Stop Work Interventions yesterday?
☐ Any corrective actions from yesterday?	☐ Will any work deviate from plan?	☐ If deviations, notify PM & client
☐ JLAs or procedures are available?	☐ Field teams to "dirty" JLAs, as needed?	☐ All equipment checked & OK?
☐ Staff has appropriate PPE?	☐ Staff knows Emergency Plan (EAP)?	☐ Staff knows gathering points?

Comments: _____

Recognize the hazards (check all those that are discussed) (Examples are provided) and **A**ssess the Risks (Low, Medium, High - circle risk level) - Provide an overall assessment of hazards to be encountered today and briefly list them under the hazard category

☐ Gravity (i.e., ladder, scaffold, trips) (L M H)	☐ Motion (i.e., traffic, moving water) (L M H)	☐ Mechanical (i.e., augers, motors) (L M H)
☐ Electrical (i.e., utilities, lightning) (L M H)	☐ Pressure (i.e., gas cylinders, wells) (L M H)	☐ Environment (i.e., heat, cold, ice) (L M H)
☐ Chemical (i.e., fuel, acid, paint) (L M H)	☐ Biological (i.e., ticks, poison ivy) (L M H)	☐ Radiation (i.e., alpha, sun, laser) (L M H)
☐ Sound (i.e., machinery, generators) (L M H)	☐ Personal (i.e. alone, night, not fit) (L M H)	☐ Driving (i.e. car, ATV, boat, dozer) (L M H)

Continue TRACK Process on Page 2

TAILGATE HEALTH & SAFETY MEETING FORM - Pg. 2

Control the hazards (Check all and discuss those methods to control the hazards that will be implemented for the day): Review the HASP, applicable JLAs, and other control processes. Discuss and document any additional control processes.

- [x] **STOP WORK AUTHORITY** (Must be addressed in every Tailgate meeting - (*See statements below*)
- [ ] Elimination
- [ ] Engineering controls
- [ ] General PPE Usage
- [ ] Personal Hygiene
- [ ] Emergency Action Plan (EAP)
- [ ] JLA to be developed/used ***(specify)***
- [ ] Substitution
- [ ] Administrative controls
- [ ] Hearing Conservation
- [ ] Exposure Guidelines
- [ ] Fall Protection
- [ ] LPO conducted ***(specify job/JLA)***
- [ ] Isolation
- [ ] Monitoring
- [ ] Respiratory Protection
- [ ] Decon Procedures
- [ ] Work Zones/Site Control
- [ ] Traffic Control
- [ ] Other ***(specify)***

Signature and Certification Section - Site Staff and Visitors

Name/Company/Signature	Initial & Sign In Time	Initial & Sign out Time	I have read and understand the HASP

Important Information and Numbers

All site staff should arrive fit for work. If not, they should report to the supervisor any restrictions or concerns.

In the event of an injury, employees will call WorkCare at 1.800.455.6155 and then notify the field supervisor who will, in turn, notify Corp H&S at 1.720.344.3844.

In the event of a motor vehicle accident, employees will notify the field supervisor who will then notify Corp H&S at 1.720.344.3844 and then Corp Legal at 1.720.344.3756.

In the event of a utility strike or other damage to property of a client or 3rd party, employees will immediately notify the field supervisor, who will then immediately notify Corp Legal at 1.678.373.9556 and Corp H&S at 1.720.344.3500

Visitor Name/Co - not involved in work

	In	Out
	In	Out
	In	Out
	In	Out

I will STOP the job any time anyone is concerned or uncertain about health & safety or if anyone identifies a hazard or additional mitigation not recorded in the site, project, job or task hazard assessment.

I will be alert to any changes in personnel, conditions at the work site or hazards not covered by the original hazard assessments.

If it is necessary to STOP THE JOB, I will perform TRACK; and then amend the hazard assessments or the HASP as needed.

I will not assist a subcontractor or other party with their work unless it is absolutely necessary and then only after I have done TRACK and I have thoroughly controlled the hazard.

Post Daily Activities Review - Review at end of day or before next day's work (Check those applicable and explain:)

- [ ] Lessons learned and best practices learned today: _____
- [ ] Incidents that occurred today: _____
- [ ] Any Stop Work Interventions today? _____
- [ ] Corrective/Preventive Actions needed for future work: _____
- [ ] Any other H&S Issues: _____

Keep H&S 1st in all things

WorkCare - 1.800.455.6155
Near Loss Hotline - 1.888.242.4304

Real Time Exposure Monitoring Data Collection Form

Document all air monitoring conducted on the Site below. Keep this form with the project file.

Site Name: _____ Date: _____

Instrument: _____ Model: _____ Serial #: _____

Calibration Method: (Material used settings, etc.)	
Calibration Results:	
Calibrated By:	

Activity Being Monitored	Compounds/Hazards Monitored	Time	Reading	Action Required? Y/N

Describe Any Actions Taken as a Result of this Air Monitoring and Why

_____

_____

Subcontractor Acknowledgement: Receipt of HASP Signature Form

ARCADIS claims no responsibility for the use of this HASP by others although subcontractors working at the site may use this HASP as a guidance document. In any event, ARCADIS does not guarantee the health and/or safety of any person entering this site. Strict adherence to the health and safety guidelines provided herein will reduce, but not eliminate, the potential for injury at this site. To this end, health and safety becomes the inherent responsibility of personnel working at the site.

Printed Name	Company	Signature	Date

Visitor Acknowledgement and Acceptance of HASP Signature Form

By signing below, I waive, release and discharge the owner of the site and ARCADIS and their employees from any future claims for bodily and personal injuries which may result from my presence at, entering, or leaving the site and in any way arising from or related to any and all known and unknown conditions on the site.

Name	Company	Reason for Visit	Date/Time On Site	Date/Time Off Site

Employee Signature Form

I certify that I have read, understand, and will abide by the safety requirements outlined in this HASP.

Printed Name	Signature	Date

Hazardous Materials Transportation Form

	Vehicle (place X in box)	Type (pick-up, car, box truck, etc.)
Personal		
Rental		
ARCADIS owned/leased		
Government owned		
Trailer		

Materials Transported	Quantity	Storage/Transport Container

List Trained Drivers:

_____

_____

Hazardous Materials Shipment Form

Material Description and Proper Shipping Name (per DOT or IATA)	Shipment Quantity	DOT Hazard Classification	Shipment Method (air/ground)

List Shipper (i.e., who we are offering the shipment to):

_____

_____

List Trained Employee(s):

_____

_____

Appendix D

PPE Equipment List

ARCADIS

PPE CHECKLIST

R = Equipment required to be present on the site. **O** = Optional equipment. Subcontractors must have the same equipment listed here as a minimum.

Description (Put Specific Material or Type in Box)	Level Of Protection		
	D	C	B
Body			
Coveralls	O	O	O
Chemical Protective Suit	O	R	R
Splash Apron	O	O	O
Rain Suit	O	O	O
Traffic Safety Vest (reflective)	R (near roadways)	R (near roadways)	R (near roadways)
Head			
Hard Hat (if does not create other hazard)	R	R	R
Head Warmer (depends on temperature and	O	O	O
Eyes & Face			
Safety Glasses (incorporate sun protection as	R	R	R
Goggles (based on hazard)	O	R	R
Splash Guard (based on hazard)	O	O	O
Ears			
Ear Plugs	R (near noisy operations)	R (near noisy operations)	R (near noisy operations)
Ear Muffs	O	O	O
Hands and Arms			
Outer Chemical Resistant Gloves	O	R	R
Inner Chemical Resistant Gloves	R (when sampling)	R	R
Insulated Gloves	O	O	O
Work Gloves*	R	O	O
Foot			
Safety Boots (steel toe and shank)	R	R	R
Rubber, Chemical Resistant Boots	O	R	R
Rubber Boots	O	N/A	N/A
Disposable Boot Covers	O	R	R
Respiratory Protection			
1/2 Mask APR	O	O	N/A
Full Face APR	O	R	R
Dust Protection	O	N/A	N/A
Powered APR	O	O	O
SCBA	N/A	N/A	O
Air Line	N/A	N/A	O

Appendix E

MSDSs (To be determined prior to mobilization)

Appendix F

TCP/STAR Plan Template

Site Traffic Awareness and Response (STAR) Plan for Private Roadways and Parking Areas

1.0 GENERAL

Project Name	Hercules Incorporated
Project Number	LA002999.0003
STAR Plan Developer Name	Joel Riley
Reviewed By:	
Duration of Work (hours or days)	
Time restrictions (state times, describe in Section 2.0)	
Posted Speed Limits for Roadway	
Number of Lanes for Roadway (each direction)	

2.0 WORK DESCRIPTION

Provide a brief description of work activities in the roadway or parking area.

ARCADIS will be conducting groundwater sampling and maintenance activities at Hercules facility in Hattiesburg, Mississippi.

3.0 TRAFFIC TYPE

Check all that apply:

- ☒ Automobiles
- ☒ Straight Trucks
- ☒ Semi Trucks
- ☒ Construction Equipment
- ☒ Forklifts
- ☒ Bicycles
- ☒ Pedestrian
- ☒ Other – Specify: Train

4.0 TRAFFIC CONTROL LAYOUT

For roadway and parking area work, check all that apply and click link to print layout and attach. Manually revise to address specific requirement.

Roadway Work:

- ☒ Work Beyond the Shoulder (DOT Facts-301i)
- ☒ Work on the Shoulder (DOT Facts-301j)
- ☒ Short Duration Work or Mobile Operations Work on the Shoulder (DOT Facts-301k)
- ☐ Shoulder Closure with Minor Encroachment (DOT Facts-301m)
- ☐ Lane Closure on 2 Lane Road with Flagger (DOT Facts-301n)

☐ Lane Closure on 2 Lane Road with Low Traffic Flow (DOT Facts-301o)

☐ Temporary Road Closure (DOT Facts-301p)

☐ Haul Road Crossing (DOT Facts-301q)

☐ Work in the Center of Low Volume Traffic Road (DOT Facts-301r)

☐ Atypical Roadway Layout or Work in Congested Facilities (Attach Drawing) (DOT Facts-301u)

Parking Area Work:

DOT Fact Sheets for parking areas have numbered scenarios. Select applicable scenario(s) and work duration (S-Short, I – Intermediate, L – Long)

☒ Short Duration (<1 Hour) Retail Gas Station or Small Single Business (DOT Facts-302a) 1 2 3 4 5

☐ Intermediate Duration (1-8 Hours) Retail Gas Station or Small Single Business (DOT Facts-302b) 1 2 3 4

☐ Long Duration (>8 Hours) Retail Gas Station or Small Single Business (DOT Facts-302c) 1 2 3

☐ Multi Business Parking Lot (Malls, Strip Malls, etc) (DOT Facts-302e) 1 2 3 4 5 6 7 8 9 S I L

☐ Facility Parking Area (DOT Facts-302e) 1 2 3 4 5 6 7 8 9 S I L

☐ Parking Garage (develop drawing for controls)

☐ Other:

5.0 REQUIRED TRAFFIC CONTROL DEVICES

Need Sign Help? DOT Facts-301d
Need Channelizing Device Help? DOT Facts-302d (see also DOT Facts-301e)
Need Flagger Help? DOT Facts-301f
Review Flagger training and certification requirements by state: DOT Facts-301w.

Device	Number Required	Wording or Pictogram	Comments
Warning Signs			
Warning Signs			
Stop/Slow Paddle			
Red Flag			
Channelizing Cones 10 lb			
Channelizing Cones 30 lb			
Cones	4		Place around vehicle and site workers
Drums[1]			
Tubular Markers			
Vertical Panels[1]			
Barricade[1] (Type I)			
Barricade[1] (Type II)			
Barricade[1] (Type III)			
Arrow Panels			

Other: Emergency flashers	1		Activate emergency flashers on vehicle
Other: High reflective Safety vest	3		One per person
Other:			

Notes:

1) Provide with warning lights if night work or traffic control use is required at night.

All vehicles used in the roadways or parking areas should be equipped with functioning high intensity rotating, flashing, oscillating, or strobe lights. If the vehicle is not equipped with supplemental lighting devices use vehicle flashers (be aware of battery drain when using any of the lighting devices).

Personal protective equipment required for this work is listed in the applicable project Job Loss analysis (JLA) or project specific HASP. A Class II (minimum) high visibility vest is required.

6.0 WORK SEQUENCE FOR ROADWAY WORK (PHASING)

Describe the sequence for placement, working and removal of traffic control devices:

ARCADIS will park the vehicle in front of any monitoring wells located adjacent to roadways. Before exiting, ARCADIS will activate the vehicles emergency flashers and will apply the parking brake. ACADIS will don high reflective safety vests and will then exit the vehicle to place safety cones on the border between the work zone and the roadway. ARCADIS will conduct sampling activate, remove the cones, get in the vehicle, remove the safety vest, de-activate the emergency flashers and parking brake.

7.0 APPROVALS

STAR Plan Developer	
Designated HASP Reviewer[1]	

1) An individual with Engineering Judgment may also approve this STAR Plan, even if not a designated HASP Reviewer

8.0 REVIEWED BY:

To be signed by each employee working on the project affected by this STAR Plan:

Name Printed	**Signature**

Appendix G

Shipping Determination Form Template

ARCADIS SHIPPING/TRANSPORTATION DETERMINATION

(Rev.4, 8/10)

General Information *(Need Help?)*

Revision Number	
Project Name	
Project Number	
City of Shipment	
City of Destination	
Analytical/MSDS/Hazard Information Attached?	

Description of Material to be Shipped/Transported

Determination

	Not Restricted/Regulated
	Hazardous Material

Complete for Hazardous Materials (Refer to 49 CFR 172.101 or IATA DGR section 4.2)

Proper Shipping Name	
UN or ID Number	
Hazard Class	
Packing Group	

"X"	*How Do You Want to Ship/Transport This Material?*	*24/7 Emergency Number Required? (FedEx criteria)*	*Packing Instruction / Shipping Guide / Support Package*
	Materials of Trade Exception	No	
	Excepted Quantity	No	
	Limited Quantity (Ltd Qty)	Ground –Yes Air - No	
	Special Permit/49 CFR 173.13	Ltd Qty Ground –Yes Ltd Qty Air – No Non-Ltd Qty- Yes	
	UN Specification Ground, Non-Bulk	Yes	
	UN Specification Ground, Bulk	Yes	
	UN Specification Air, Passenger or Cargo Aircraft	Yes	
	UN Specification Air, Cargo Aircraft Only	Yes	
	Other:	Yes/No	
	Batteries (Excepted)	No	ARCADIS Guide US050
	Compressed Gases (Non-flammable)	Yes	ARCADIS Guide US020
	Dry Ice	No	ARCADIS Guide US015
	Radioactive Material, Excepted Package, Limited Quantity of Material	No	ARCADIS Guide US016
	Sample Coolers (Print Guide and provide to field staff)	NA	ARCADIS Guide US001

Other Determinations

	This material is a Hazardous Waste (being offered under a Hazardous Waste Manifest)
	This material is a Hazardous Substance (49 CFR 172.101 appendix A)
	This material is a Marine Pollutant or Severe Marine Pollutant (49 CFR 172.101 appendix B)

Method of Shipment/Transportation

	FedEx Freight		Ground (FedEx)		Air (FedEx)		Lab Courier
	FedEx Custom Critical		Ground (UPS)		Air (UPS)		Rail
	Freight Other		ARCADIS Transport		Non DOT Spec.		Other
Comments:							

Special Instructions

•

Rationale for Determination

Regulatory Reference/Interpretation

Determination Performed By

Name Printed	Signature	Date

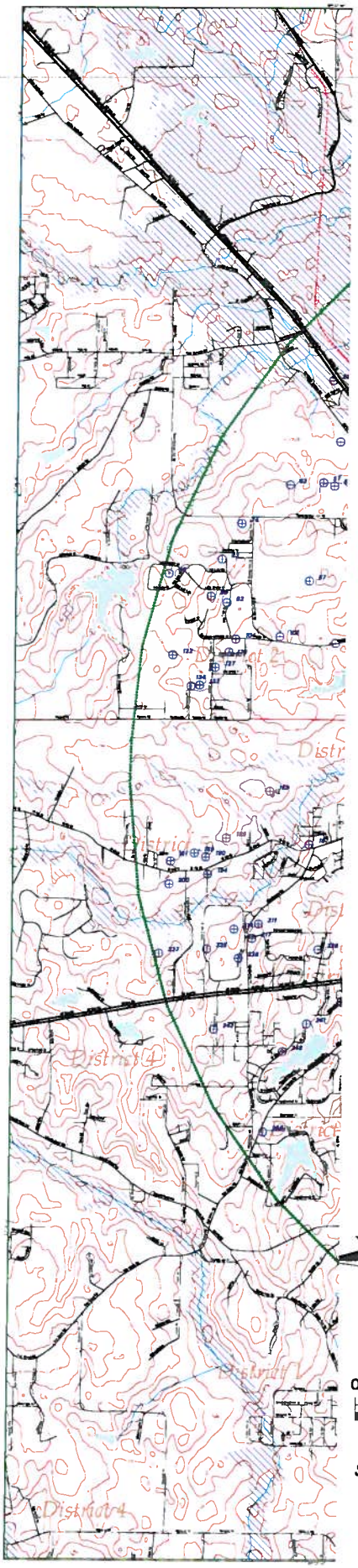
QA/QC Check Performed By

Name Printed	Signature	Date

ARCADIS

Appendix E

EDR Well Search Map



EDR DataMap®

Well Search

Hercules, Inc.

- Listed Water Wells
- Oil & Gas Wells
- Study Boundary
- Roads
- Major Roads
- Waterways
- Railroads
- Contour Lines
- Fault Lines
- Water
- Superfund Sites
- 100-Yr Flood Zones

N

Hattiesburg, MS

0 1/2 1

Scale in Miles

EDR® Environmental Data Resources Inc

ARCADIS

Appendix F

Community Well Questionnaire

ARCADIS

Infrastructure · Water · Environment · Buildings

ARCADIS U.S., Inc.
10352 Plaza Americana Drive
Baton Rouge
Louisiana 70816
Tel 225 292 1004
Fax 225 218 9677
www.arcadis-us.com

«Property_Owner»
«Contact_Address»
«CityStateZip»

Subject:
Hattiesburg Water-Well Survey – Hercules Incorporated
Hattiesburg Facility
Hattiesburg, Forrest County, Mississippi

ENVIRONMENT

Your Property:
«Parcel_ID»; «Property_Address»

Date:
xx xxxx 2011

Contact:
Craig Derouen

Extension:
238

Email:
craig.derouen@arcadis-us.com

Our ref:
LA002933.0003.00001
2933.3/C/2/jk

Dear Property Owner or Occupant:

ARCADIS U.S., Inc. (ARCADIS) is conducting an investigation on behalf of Hercules Incorporated (Hercules) and with the support of the Mobile Bouie Neighborhood Association, the North Main Historic Neighborhood Association and the City of Hattiesburg. The U. S. Environmental Protection Agency requested Hercules to find all wells within a half-mile radius of the Hercules facility, whether currently in use or not. This includes wells used for drinking water, irrigation, industrial supply, heat pumps or some other use.

ARCADIS is sending this letter to you because we believe your property is located within the half-mile radius of the former Hercules plant. To enable us to complete an accurate list, please respond to the questions and return the postcard within 10 days. By returning this survey with as much detail as you can provide, you are helping an important project to benefit your community. If you have any questions regarding this survey, please contact me by telephone at XXX-XXXX.

Sincerely,

ARCADIS U.S., Inc.

Craig A. Derouen, P.E.
Task Manager

CD:jk

Your Property:

«Parcel_ID»; «Property_Address»

ARCADIS

Please answer the following questions by placing an "X" in Yes or No box.

1. Is a water well installed on your property for drinking, irrigation or other purposes? Yes ☐ No ☐

   Well Type: Irrigation ☐ Drinking Water (Domestic) ☐ Industrial Water Supply ☐ Agricultural ☐ Public Supply ☐ Other _____

   Well Details: Year Installed: _____ Diameter: _____ Depth: _____ Pump Type: _____

2. If YES to #1: Is the water well still in use? If not, please explain. Yes ☐ No ☐

   _____

3. Are you obtaining your drinking water from a municipal or private source (i.e., from the city or village)? Yes ☐ No ☐

4. Are you aware of any water wells in the area other than any that may be on your property? If yes, please explain. Yes ☐ No ☐ Comments: _____

   _____

5. Are you aware of any environmental issues that may be on your property? If yes, please explain. Yes ☐ No ☐ Comments: _____

   _____

Signature of property owner/occupant: _____ Date: _____

Please Print Name: _____

ARCADIS

Appendix G

Surface Water Sampling Standard Operating Procedures

1.0 OVERVIEW

This policy provides guidance on the proper procedures associated with shallow (less than 3 ft deep) surface water sample collection.

2.0 HEALTH AND SAFETY

The following health and safety policies are applicable to this policy:

- SWP HSP-1.3, "Hazard Communication;"
- SWP HSP-1.11, "Field Readiness Assessment Process;"
- SWP-HSP-2.2, "Lifting and Materials Handling;"
- SWP HSP-3.4, "Personal Protective Equipment;" and
- **SWP HSP-3.13, "Groundwater and Surface Water Sampling."**

The policy in **BOLD** contains specific safety information related to procedures described in this policy.

3.0 PROCEDURE/POLICY

3.1 General Requirements

The following requirements are applicable to the collection of shallow surface water samples:

- Wear personal protective equipment required by the task/project Task Hazard Analysis.
- Sampling equipment and supplies to be used for surface water sampling will be determined during the task/project Field Readiness Assessment.
- All sampling equipment will be decontaminated in accordance with SWP FSP-7.5, "Decontamination Procedures."
- All sampling devices will be constructed from glass, Teflon®, or stainless steel materials.
- Once collected, all surface water samples will be prepared, packaged and shipped in accordance with SWP FSP-3.5, "Preparation of Water Samples for Environmental Analysis."
- All equipment and procedures used to collect surface water samples will be documented in accordance with SWP FSP-7.1, "Field Documentation." Physical parameters and field analysis results should be recorded on the Water Sampling Log (Exhibit 1).

3.2 Shallow Surface Water Sampling Procedure

The following general procedure is applicable to collection of shallow surface water samples:

1. Prepare sample containers and mobilize to the sample location. If wading to the location, approach the sample location from the downstream direction.
2. Facing the upstream direction, open the sample container and gently place the container in the water at a slight angle with the mouth of the container in the elevated position. As good sampling practice, collect the sample in the following order:
   - Volatile organic compounds;
   - Total organic carbon;
   - Extractable organics;
   - Total metals (see note below);
   - Dissolved metals;
   - Cyanide;
   - Sulfate and chloride;
   - Turbidity; and
   - Nitrate and ammonia.
3. Allow the container to fill by letting water flow down the inner wall of the container.
4. Fill container to approximately 90% capacity. For volatile organic compounds (VOCs) fill the vial nearly full and remove from the water. Use the cap of the vial to retrieve additional water and gently pour the water into the vial until the meniscus forms. For all containers containing preservatives, avoid overfilling the container and losing preservative.
5. Promptly cap the container(s), collect additional sample for field test kit analysis in an unpreserved sample bottle or other suitable container.
6. Collect physical parameters in accordance with task/project data quality objectives.

Note: When surface water and sediment samples are being collected at the same location, always collect the surface water samples first.

If the surface water location has good flow but is so shallow that the sample container can not be filled without creating a lot of sediment disturbance, use the following procedures:

1. Using a decontaminated stainless steel spoon/scoop/shovel and dig out a hole in the bottom of the surface water sampling location of sufficient size to allow the container to be safely dipped into the water.
2. Wait a minimum of 24 hours for the area to return to equilibrium before sampling using the procedure above.
3. If rock prevents digging out a location to sample by dipping, use a stainless steel ladle to collect and transfer the sample appropriate container. The sample order should follow the sampling sequence described above.

4.0 REFERENCES AND GUIDANCE

United States Army Corps of Engineers. 2001. Requirements for the Preparation of Sampling and Analysis Plans. EM 200-1-3. February 1, 2001.

United States Environmental Protection Agency. 2001. Environmental Investigations Standard Operating Procedures and Quality Assurance Manual. United States Environmental Protection Agency Region IV. November, 2001.

Exhibit 1. Example Water Sampling Log

ARCADIS **Water Sampling Log**

Project _____ Project No. _____ Page ____ of ____

Site Location _____ Date _____

Site/Well No. _____ Replicate No. _____ Code No. _____

Weather _____ Sampling Time: Begin _____ End _____

Evacuation Data		Field Parameters	
MP Elevation (ft)		Color	
Land Surface Elevation (ft)		Odor	
Sounded Well Depth (ft bmp)		Appearance	
Depth to Water (ft bmp)		pH (s.u.)	
Water-Level Elevation (ft)		Conductivity (mS/cm)	
Water Column in Well (ft)		Turbidity (NTU)	
Casing Diameter/Type		Temperature (°C)	
Gallons in Well		Dissolved Oxygen (mg/L)	
Gallons Pumped/Bailed Prior to Sampling		ORP (mV)	
Sample Pump Intake Setting (ft bmp)		TDS (g/L)	
Purge Time	begin ____ end ____	Alkalinity (mg/L)	
Pumping Rate (gpm)		Ferrous Iron (mg/L)	
Evacuation Method		Sulfide (mg/L)	
		Sample Method	

Constituents Sampled	Container Description	Number	Preservative

Sampling Personnel _____

Well Casing Volumes

Gal./Ft.	1-¼" = 0.06	2" = 0.16	3" = 0.37	4" = 0.65
	1-½" = 0.09	2-½" = 0.26	3-½" = 0.50	6" = 1.47

bmp	below measuring point	ml	milliliter	ORP	Oxidation Reduction Potential
°C	Degrees Celsius	mS/cm	Millisiemens per centimeter	PVC	Polyvinylchloride
ft	feet	msl	mean sea-level	s.u.	Standard units
gpm	Gallons per minute	N/A	Not Applicable	TDS	Total Dissolved Solids
g/L	Grams per liter	NR	Not Recorded	VOC	Volatile Organic Compounds
mg/L	Milligrams per liter	NTU	Nephelometric Turbidity Units		

Field Equipment Decontamination

Rev. #: 3

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Approval Signatures

Prepared by: _____ Date: 4/26/2010
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Reviewed by: _____ Date: 4/26/2010
Richard Murphy (Technical Expert)

I. Scope and Application

Equipment decontamination is performed to ensure that sampling equipment that contacts a sample, or monitoring equipment that is brought into contact with environmental media to be sampled, is free from analytes of interest and/or constituents that would interfere with laboratory analysis for analytes of interest. Equipment must be cleaned prior to use for sampling or contact with environmental media to be sampled, and prior to shipment or storage. The effectiveness of the decontamination procedure should be verified by collecting and analyzing equipment blank samples.

The equipment cleaning procedures described herein includes pre-field, in the field, and post-field cleaning of sampling tools which will be conducted at an established equipment decontamination area (EDA) on site (as appropriate). Equipment that may require decontamination at a given site includes: soil sampling tools; groundwater, sediment, and surface-water sampling devices; water testing instruments; down-hole instruments; and other activity-specific sampling equipment. Non-disposable equipment will be cleaned before collecting each sample, between sampling events, and prior to leaving the site. Cleaning procedures for sampling equipment will be monitored by collecting equipment blank samples as specified in the applicable work plan or field sampling plan. Dedicated and/or disposable (not to be re-used) sampling equipment will not require decontamination.

II. Personnel Qualifications

ARCADIS field sampling personnel will have current health and safety training, including 40-hour HAZWOPER training, site supervisor training, and site-specific training, as needed. In addition, ARCADIS field sampling personnel will be versed in the relevant SOPs and possess the skills and experience necessary to successfully complete the desired fieldwork. The project HASP and other documents will identify any other training requirements such as site specific safety training or access control requirements.

III. Equipment List

- health and safety equipment, as required in the site Health and Safety Plan (HASP)
- distilled water

- Non-phosphate detergent such as Alconox or, if sampling for phosphorus phosphorus-containing compounds, Luminox (or equivalent).
- tap water
- rinsate collection plastic containers
- DOT-approved waste shipping container(s), as specified in the work plan or field sampling plan (if decontamination waste is to be shipped for disposal)
- brushes
- large heavy-duty garbage bags
- spray bottles
- (Optional) – Isoprophyl alcohol (free of ketones) or methanol
- Ziploc-type bags
- plastic sheeting

IV. Cautions

Rinse equipment thoroughly and allow the equipment to dry before re-use or storage to prevent introducing solvent into sample medium. If manual drying of equipment is required, use clean lint-free material to wipe the equipment dry.

Store decontaminated equipment in a clean, dry environment. Do not store near combustion engine exhausts.

If equipment is damaged to the extent that decontamination is uncertain due to cracks or dents, the equipment should not be used and should be discarded or submitted for repair prior to use for sample collection.

A proper shipping determination will be performed by a DOT-trained individual for cleaning materials shipped by ARCADIS.

V. Health and Safety Considerations

Review the material safety data sheets (MSDS) for the cleaning materials used in decontamination. If solvent is used during decontamination, work in a well-ventilated area and stand upwind while applying solvent to equipment. Apply solvent in a manner that minimizes potential for exposure to workers. Follow health and safety procedures outlined in the HASP.

VI. Procedure

A designated area will be established to clean sampling equipment in the field prior to sample collection. Equipment cleaning areas will be set up within or adjacent to the specific work area, but not at a location exposed to combustion engine exhaust. Detergent solutions will be prepared in clean containers for use in equipment decontamination.

Cleaning Sampling Equipment

1. Wash the equipment/pump with potable water.

2. Wash with detergent solution (Alconox, Liquinox or equivalent) to remove all visible particulate matter and any residual oils or grease.

3. If equipment is very dirty, precleaning with a brush and tap water may be necessary.

4. (Optional) – Flush with isopropyl alcohol (free of ketones) or with methanol. This step is optional but should be considered when sampling in highly impacted media such as non-aqueous phase liquids or if equipment blanks from previous sampling events showed the potential for cross contamination of organics.

5. Rinse with distilled/deionized water.

Decontaminating Submersible Pumps

Submersible pumps may be used during well development, groundwater sampling, or other investigative activities. The pumps will be cleaned and flushed before and between uses. This cleaning process will consist of an external detergent solution wash and tap water rinse, a flush of detergent solution through the pump, followed

by a flush of potable water through the pump. Flushing will be accomplished by using an appropriate container filled with detergent solution and another contained filled with potable water. The pump will run long enough to effectively flush the pump housing and hose (unless new, disposable hose is used). Caution should be exercised to avoid contact with the pump casing and water in the container while the pump is running (do not use metal drums or garbage cans) to avoid electric shock. Disconnect the pump from the power source before handling. The pump and hose should be placed on or in clean polyethylene sheeting to avoid contact with the ground surface.

VII. Waste Management

Equipment decontamination rinsate will be managed in conjunction with all other waste produced during the field sampling effort. Waste management procedures are outlined in the work plan or Waste Management Plan (WMP).

VIII. Data Recording and Management

Equipment cleaning and decontamination will be noted in the field notebook. Information will include the type of equipment cleaned, the decontamination location and any deviations from this SOP. Specific factors that should be noted include solvent used (if any), and source of water.

Any unusual field conditions should be noted if there is potential to impact the efficiency of the decontamination or subsequent sample collection.

An inventory of the solvents brought on site and used and removed from the site will be maintained in the files. Records will be maintained for any solvents used in decontamination, including lot number and expiration date.

Containers with decontamination fluids will be labeled.

IX. Quality Assurance

Equipment blanks should be collected to verify that the decontamination procedures are effective in minimizing potential for cross contamination. The equipment blank is prepared by pouring deionized water over the clean and dry tools and collecting the deionized water into appropriate sample containers. Equipment blanks should be analyzed for the same set of parameters that are performed on the field samples collected with the equipment that was cleaned. Equipment blanks are collected per equipment set, which represents all of the tools needed to collect a specific sample.

X. References

USEPA Region 9, Field Sampling Guidance #1230, Sampling Equipment Decontamination.

USEPA Region 1, Low Stress (low flow) Purging and Sampling Procedure for the Collection of Groundwater Samples from Monitoring Wells.