MONSANTO

August 2, 2016

MONSANTO COMPANY
800 NORTH LINDBERGH BLVD
ST. LOUIS, MISSOURI 63167
http://www.monsanto.com

Mr. Dennis Matlock
On-Scene Coordinator
U.S. Environmental Protection Agency
Removal Enforcement and Oil Section (3HS32)
401 Methodist Building
Wheeling, WV 26003

Dear Mr. Matlock:

**Re: Submission of Pre-Design Investigation Work Plan**
**Administrative Order by Consent for Removal Response Action**
**EPD Docket No. CERC-03-2004-0171DC**
**Kanawha River Site, West Virginia**

Enclosed, please find the Pre-Design Investigation Work Plan for your review and approval. This document is being submitted in accordance with the Administrative Order by Consent for Removal Response Action for the Kanawha River Site (EPA Docket NO. CERC-03-2004-0171DC) and consistent with your letter dated July 27, 2016.

Complete copies of the Pre-Design Investigation Work Plan are being transmitted directly to Mr. Bill Huggins (Techlaw) and Mr. Charles Armstead (WV DEP).

Approval of this Work Plan is requested by September 15, 2016 in order to allow fish tissue sampling to be completed within the preferred time frame (mid-September to late October 2016). Approval of the Work Plan after this date would require that fish tissue sampling to be completed in 2017 during the preferred time frame.

Should you have any questions, or wish to discuss any items, please do not hesitate to contact me at (314) 694-4111.

Sincerely,

Joseph G. Gabriel
Environmental Remediation Manager
Project Coordinator for the Respondents

cc: Randy Sturgeon, U.S. EPA, Region 3
Bill Huggins, Techlaw, Inc.
Tracy Jeffries/Charles Armstead, WV DEP
Jeff Daniel, GHD

I certify that the information contained in or accompanying this Pre-Design Investigation for the Kanawha River Project is true, accurate, and complete.

I am aware that there are significant penalties for submitting false information, including potential criminal penalties, such as fines and imprisonment, for knowingly submitting false information.

Signature: _____

Name: Joseph G. Gabriel

Title: Environmental Remediation Manager
Project Coordinator for the Respondents

Draft for Review

# Pre-Design Investigation Work Plan

Kanawha River, West Virginia
Administrative Order by Consent for Removal Response Action
U.S. EPA Docket No. CERC 03 2004 0171DC

Monsanto Company

651 Colby Drive Waterloo Ontario N2V 1C2
031884 | Report No 72 | August 2 2016

# Table of Contents



# Figure Index



# Table Index



# Appendices

# List of Acronyms

| | |
|---|---|
| 2,3,7,8-TCDD | 2,3,7,8-Tetrachlordibenzo-p-dioxin |
| 2,4,5-T | 2,4,5-Trichlorophenoxyacetic acid |
| Anchor QEA | Anchor QEA, L.L.C. |
| AOC | Administrative Order by Consent |
| bgs | below ground surface |
| EE/CA | Engineering Evaluation/Cost Analysis |
| EOC | Extent of Contamination |
| Flexsys | Flexsys America, L.P. |
| HASP | Health and Safety Plan |
| Monsanto Company | the corporation presently known as Monsanto Company |
| Old Monsanto | Pharmacia Corporation, formerly known as Monsanto Company and Monsanto Chemical Company |
| QAPP | Quality Assurance Project Plan |
| River | Kanawha River |
| Site | Consists of the normal pool of an approximate 14-mile portion of the Kanawha River from the Coal River downstream to the Winfield Locks and Dam (between RM 31.1 and RM 45.5) |
| U.S. ACE | United States Army Corps of Engineers |
| U.S. EPA | United States Environmental Protection Agency |
| WV DEP | West Virginia Department of Environmental Protection |

# 1. Introduction

This Pre-Design Investigation Work Plan (PDI Work Plan) is being submitted by Monsanto Company[1] for the Kanawha River (River) Site located in Nitro, West Virginia (Site). Monsanto Company retained a consultant team including GHD Limited (GHD) (formerly known as Conestoga-Rovers & Associates, Inc.) and Anchor QEA, L.L.C. (Anchor QEA) to assist with this project. The Site Location is presented on Figure 1.1.

This Work Plan has been prepared consistent with the requirements of the Engineering Evaluation and Cost Analysis (EE/CA) Work Plan (CRA, April 2004, and as amended August 2004) and the EE/CA Report (CRA, February 2015).

This Work Plan is being submitted in accordance with the Administrative Order by Consent for Removal Response Action for the Kanawha River Site (EPA Docket No. CERC-03-2004-0171DC).

This Work Plan is organized as follows:

Section 1.0 – Introduction

Section 2.0 – Background

Section 3.0 – Pre-Design Data Collection

Section 4.0 – Schedule

Section 5.0 – Reporting

Section 6.0 – References

# 2. Background

## 2.1 Project Background and Objectives

In March 2004, U.S. EPA and Monsanto Company entered into an Administrative Order on Consent (AOC) to conduct an EE/CA to study dioxin-contaminated sediment throughout 14-miles of the Site. As described in more detail in the AOC, the purpose of the EE/CA is to evaluate Removal Action alternatives that will be protective of the health and welfare of the public and the environment, and to provide sufficient information for U.S. EPA to determine the necessity, feasibility and efficacy of non–time critical removal actions (40 CFR 300.415[b][4][i]).

[1] The name “Monsanto Company” has been used for many years, but it has been used by two distinct corporations. In 1933, “Monsanto Chemical Company” was incorporated in Delaware, in 1967 it changed its name to “Monsanto Company,” and on March 31, 2000 it changed its name again to Pharmacia Corporation. Pharmacia Corporation was later acquired by Pfizer, Inc. On February 9, 2000, “Monsanto Ag Company” was incorporated, and on March 31, 2000 it changed its name to Monsanto Company. Today, Pharmacia Corporation is a wholly owned subsidiary of Pfizer, Inc., and Monsanto Company is a publically traded corporation. Today’s Monsanto Company has never had manufacturing operations in the Nitro, WV area. Pursuant to certain contractual obligations Monsanto Company has with Pharmacia Corporation, Monsanto Company has engaged Conestoga-Rovers & Associates to compile this PDI Work Plan. For clarity, this document uses the term “Old Monsanto” to refer to Pharmacia Corporation while it was operating under the name “Monsanto Company” and/or “Monsanto Chemical Company.”

The objectives of the EE/CA were to characterize the nature and extent of 2,3,7,8-TCDD in the Kanawha River Site. The EE/CA identifies and evaluates potential Removal Action Alternatives with respect to protectiveness of public health, welfare and the environment. Consistent with U.S. EPA guidance, the EE/CA also included the evaluation of Removal Action Alternatives with respect to effectiveness, implementability, and cost (Capital Cost and Operation, Maintenance and Monitoring). This evaluation formed the basis for selection of a preferred Removal Action alternative (Alternative 4 from the EE/CA Report) which includes capping.

As identified in the EE/CA Report, this Work Plan has been prepared to provide additional data necessary to support detailed design activities for the preferred Removal Action alternative, including the design of subaqueous caps in 6 locations within the Site.

The Pre-Design Work Plan also presents procedures for completion of an additional round of fish tissue sampling, including sportfish and bottom feeder species. Procedures and locations for fish tissue sampling are the same as those utilized for the previous two fish tissue sampling events completed as part of the EOC Study. This sampling event will serve as the baseline sampling event completed as part of the Removal Action implementation.

# 3. Pre-Design Data Collection Activities

Pre-design data collection activities utilize procedures previously approved by U.S. EPA and utilized during the Extent of Contamination Study. Increased measurement/sample density is required in the areas to be capped in order to refine cap limits and complete detailed design activities. Additional bathymetric survey, sediment chemistry, and sediment physical data will be collected utilizing the procedures described in the following sections.

## 3.1 Bathymetric Survey

An experienced hydrographic surveyor will be contracted to perform a bathymetric survey of the Site from the Coal River (RM 46.0) to the Winfield Dam (RM 31), within and immediately adjacent to the proposed cap areas (see Figure 1.1). The survey will be performed with transects using a single channel sounder. Location control will be Differential Global Positioning System (DGPS) with an accuracy of +/- 3 ft; vertical soundings will be calibrated to an accuracy of +/- 0.1 ft. The bathymetric data will be imported into AutoCAD and contoured on 1ft intervals. The bathymetric survey will be augmented by manual survey in areas near the waterline too shallow for operation of the sounder (less than 2 feet of water). Manual surveys will be complete utilizing a survey grade RTK DGPS unit with an accuracy equivalent to the bathymetric survey. In the area of the former Flexsys Facility banks which were armored, the survey will collect detailed information on the limits of the armor to facilitate the tie-in of the subaqueous cap with the bank armoring.

## 3.2 Sediment Sampling

The Pre-Design Investigation will consist of both surficial sediment samples and subsurface sediment cores, providing further delineation of the spatial and vertical extent of 2,3,7,8-TCDD contamination. The surface sediment samples are representative of sediments that are bioavailable. Sediment cores collected as part of the Pre-Design activities will provide additional data on 2,3,7,8-TCDD concentrations on the surficial (0-6 inch) and subsurface (6-24 inch) intervals.

The proposed sediment sampling locations are presented on Figures 3.1 and 3.2. Sampling locations may be modified based on the bathymetric survey data to better follow limits of sediment deposits. Any proposed changes to sampling locations based on the bathymetric survey will be provided to U.S. EPA in advance of sediment sampling activities. Approximately 200 surficial sediment samples are anticipated to be collected (dependent on sediment availability) using a clamshell type sampler (e.g., van Veen, Ponar, or equivalent).

Vibracores will be advanced at approximately 10 percent of the proposed locations. The cores will be advanced to 2 feet below the mudline (unless refusal is encountered sooner), and sectioned into 0-6 inch, and 6-24 inch intervals, consistent with The EE/CA Report. The collected intervals will be submitted for chemical analysis. Selection of specific coring locations will be determined after the bathymetric survey has been completed.

At RM 42 Capped Area 1: there will be a total of 92 samples including, 11 sediment core samples. The proposed sample locations for Capped Area 1 are presented in Figure 3.3.

At RM 42 Capped Area 2: there will be a total of 6 samples including, 2 sediment core samples. The proposed sample locations for Capped Area 2 are presented in Figure 3.3.

At RM 38 Capped Area 3: there will be a total of 48 samples including, 5 sediment core samples. The proposed sample locations for Capped Area 3 are presented in Figure 3.4.

At RM 34 Capped Area 4: there will be a total of 9 samples including, 2 sediment core samples. The proposed sample locations for Capped Area 4 are presented in Figure 3.5

At RM 33 Capped Area 5: there will be a total of 15 samples including, 2 sediment core samples. The proposed sample locations for Capped Area 5 are presented in Figure 3.5.

At RM 31 Capped Area 6: there will be a total of 30 samples including, 4 sediment core samples. The proposed sample locations for Capped Area 6 are presented in Figure 3.6.

**Chemical Analysis:** All sediment samples, both surface and subsurface, will be analyzed for 2,3,7,8-TCDD, total organic carbon (TOC), and grain size (volume permitting).

A summary of the sampling and analysis program is presented in Table 3.1.

## 3.3 Baseline Fish Tissue Sampling

TCDD has been measured in fish tissues by several agencies at numerous locations throughout the Kanawha River, Armour Creek, and Pocatalico River since the early seventies. The most commonly sampled species included channel catfish and various types of bass (largemouth, smallmouth, white, striped, spotted, and hybrid). Fish tissue sampling was completed as part of the Phase I and Phase II EOC sampling.

Phase I EOC fish tissue sampling activities took place in October 2004. The fish tissue sampling and analysis plan described in the Work Plan was modified in August 2004 prior to conducting the sampling activities. The modifications to the target fish species identified in the EE/CA Work Plan, were as follows:

- Adult channel catfish collected well upstream and on-Site/downstream to be representative of bottom feeder fish species.

- Adult bass (largemouth bass, smallmouth bass, and spotted bass) collected at upstream, on-Site, and downstream (RM 33) locations to represent sport fish species.
- Forage fish. The intent was to sample white suckers and red horse suckers less than 150 millimeters (mm) (6 in) in total length. However, because these species could not be found at the Site during the time of sampling, the forage fish was changed to gizzard shad, after consultation with U.S. EPA and U.S. ACE.

Specific sample locations are identified below:

- RM 75 to 95: This location was selected to ensure that the home ranges of channel catfish sampled were beyond potential influence from the Former Flexsys Facility.
- RM 68: This location was selected to be immediately upstream of the Marmet Dam to represent the regional background conditions for sportfish and forage fish unaffected by the releases from the Former Flexsys Facility.
- RM 42: This location was selected for sportfish sampling and forage fish to be in the vicinity of Nitro downstream of the Former Flexsys Facility.
- RM 33 to 45: This provides a sample to represent conditions adjacent/downstream of the Former Flexsys Facility for bottom feeder species.
- RM 33: This location was selected to be in the vicinity of Little Guano Creek and upstream of the Winfield Dam to represent downstream sport fish and forage fish species.

During the pre-design investigation, fish samples will be obtained by electro-fishing conducted by Normandeau Associates, Inc. (Normandeau) under the supervision of GHD. Trotlines will also be utilized, unless electro-fishing is found to provide the best results in obtaining target species. Recovered fish will be prepared by GHD's biologist in accordance with the following procedures.

At each fish sampling location, 5 composite samples of fish will be prepared by GHD's biologist in accordance with the modified EE/CA Work Plan procedures. Forage fish will be sent to the lab whole, with 15 fish per composite sample. Sport (bass) and bottom feeding (channel catfish) fish tissues will be filleted. Fillets from a minimum of 4 to 5 similarly-sized fish will be composited into samples for chemical analysis. Channel catfish will be filleted with skin off, and bass and the forage fish will be filleted with skin on, consistent with U.S. EPA guidance and general local practices (WV DHHR, 2002). Five duplicate and matrix spike/matrix spike duplicate (MS/MSD) samples will be collected at RM 33 for forage fish (gizzard shad); there will be a requirement of 1 duplicate sample for every 20 samples. Fish tissue samples will be collected from the following sampling locations:

- Channel catfish from two areas - RM 33 to 34 and RM 75 to 95.
- Bass from three areas – RM 33, 42, and 68.
- Forage fish (gizzard shad) from three areas - RM 33, 42, and 68.

The locations of the sampling stations at RM68, RM42, and RM33 are consistent with areas sampled in previous investigations. Samples will be stored on dry ice and shipped to the project laboratory for analysis.

### 3.4 Support Plans

The Field Sampling Plan and Quality Assurance Project Plan developed as part of the USEPA approved EE/CA Work Plan (CRA, April 2004, and as amended August 2004) will be utilized for Pre-Design Sampling activities. An updated Health and Safety Plan (HASP) is included as Appendix A.

# 4. Schedule

The anticipated schedule for the implementation of the activities included in this Pre-Design Work Plan is presented on Figure 4.1.

This schedule is based on receipt of U.S. EPA approval the Pre-Design Work Plan by September 15, 2016. Approval by this date is required in order to complete the seasonally dependent fish tissue sampling activities within the preferred timeframe (mid- September to late October). If approval if the Pre-Design Work Plan cannot be provided by September 15, 2016, fish tissue sampling activities would be completed during the preferred timeframe in 2017.

# 5. Reporting

The updated status of the pre-design activities will be included in the currently on-going monthly project reports during planning and execution in accordance with the AOC.

A Pre-Design Investigation report will be prepared following completion of the investigative activities, and receipt and compilation of the data from the investigation. The report will present the data in a format consistent with previous reporting under the Phase I and Phase II EOC Studies.

Should scheduling require that fish tissue sampling be delayed significantly beyond the time during which sediment bathymetric, surficial, and core sampling activities are completed, a separate report may be submitted for the fish tissue sampling.

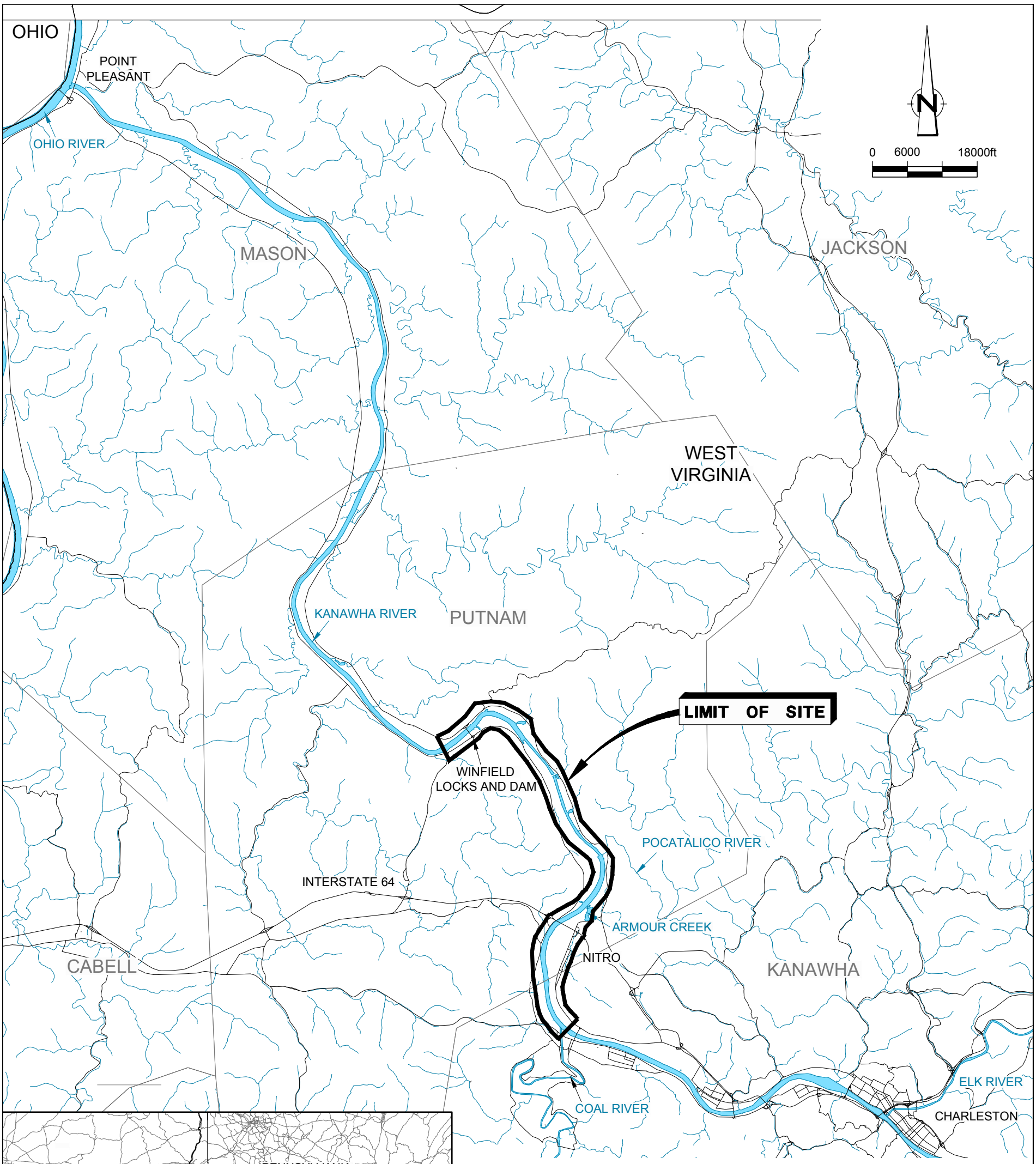
# 6. References

CRA, 2004,Draft Engineering Evaluation/Cost Analysis (EE/CA) Work Plan, Kanawha River Project, Nitro, West Virginia, April 6, 2004, amended August 2004.

CRA, 2015,Engineering Evaluation/Cost Analysis Report, Kanawha River, Nitro, West Virginia, February 27, 2015.

U.S. EPA, 2000,Trip Report, Kanawha River Valley Site, Nitro Stormsewer/Outfall Investigation, Roy F. Weston, Inc. for U.S. EPA, Region III.

WV DHHR, 2002, West Virginia Sportfish Consumption Advisory Guide (Draft).Available at: www.wvdhhr.org/fish/guide.pdf.




KEY MAP
SCALE: 1" = 350000'

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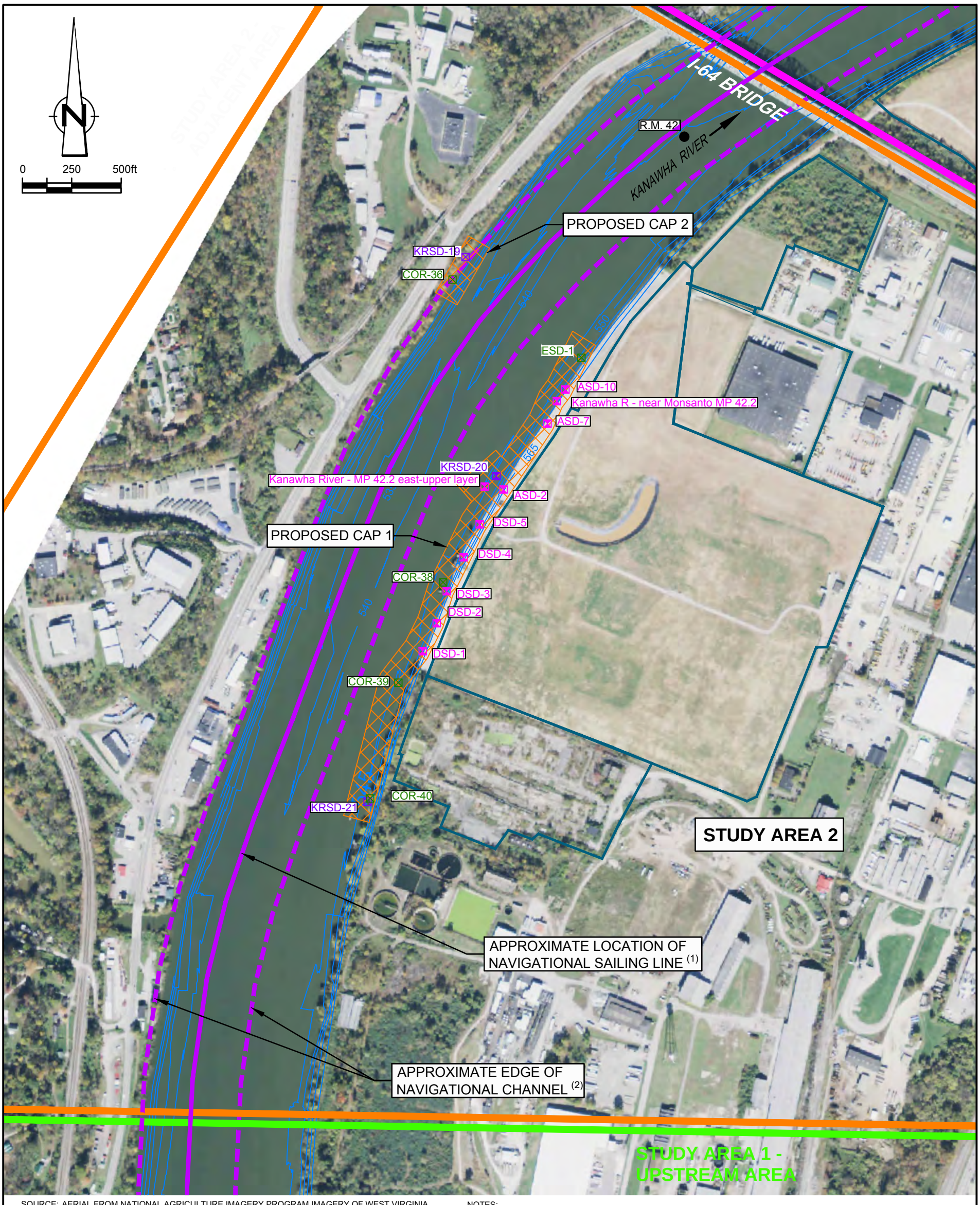
figure 1.1

SITE LOCATION
PRE-DESIGN INVESTIGATION WORK PLAN
*Kanawha River, West Virginia*

31884-00(072)GN-WA001 JUN 2, 2016




SOURCE: AERIAL FROM NATIONAL AGRICULTURE IMAGERY PROGRAM IMAGERY OF WEST VIRGINIA, 2014 - U.S. DEPARTMENT OF AGRICULTURE (USDA) FARM SERVICE AGENCY, AERIAL PHOTOGRAPHY FIELD OFFICE. (WEST VIRGINIA SOUTH SPC, NAD83).

LEGEND

- R.M. 42 — RIVER MILE
- CORE SAMPLE LOCATION
- MAY 2000 SAMPLING LOCATION
- SEDIMENT SAMPLE - 2,3,7,8-TCDD ug/kg
- 540 — BATHYMETRIC CONTOUR ELEVATION (ft AMSL)
- NAVIGATIONAL SAILING LINE APPROXIMATE LOCATION (1)
- APPROXIMATE EDGE OF NAVIGATIONAL CHANNEL (2)
- PRELIMINARY EXTENT OF PROPOSED CAP, APPROXIMATE LOCATION

NOTES:
(1) APPROXIMATE LOCATION OF NAVIGATIONAL SAILING LINE BASED ON KANAWHA RIVER NAVIGATION CHARTS, POINT PLEASANT TO ALLOY WEST VIRGINIA, US ARMY CORPS OF ENGINEERS HUNTINGTON DISTRICT, MARCH 2012.
(2) NAVIGATIONAL CHANNEL IS ASSUMED TO BE 490 FT WIDE BASED ON SKETCH OF THE LOCATION AND DIMENSIONS OF THE NAVIGATIONAL CHANNEL FOR THE KANAWHA RIVER PREPARED BY MR. KENT BROWNING, USACE AND DISCUSSED AT THE DECEMBER 1, 2011 MEETING BETWEEN USACE, US EPA, WV DEP, MONSANTO COMPANY, CRA AND ANCHOR-QEA THAT WAS PROVIDED IN A FEBRUARY 2, 2012 USACE RESPONSE TO FOIA REQUEST LETTER.
(3) APPROXIMATE PRELIMINARY EXTENT OF PROPOSED CAPS ARE SHOWN. LIMITS TO BE REFINED BASED ON ADDITIONAL SAMPLING.

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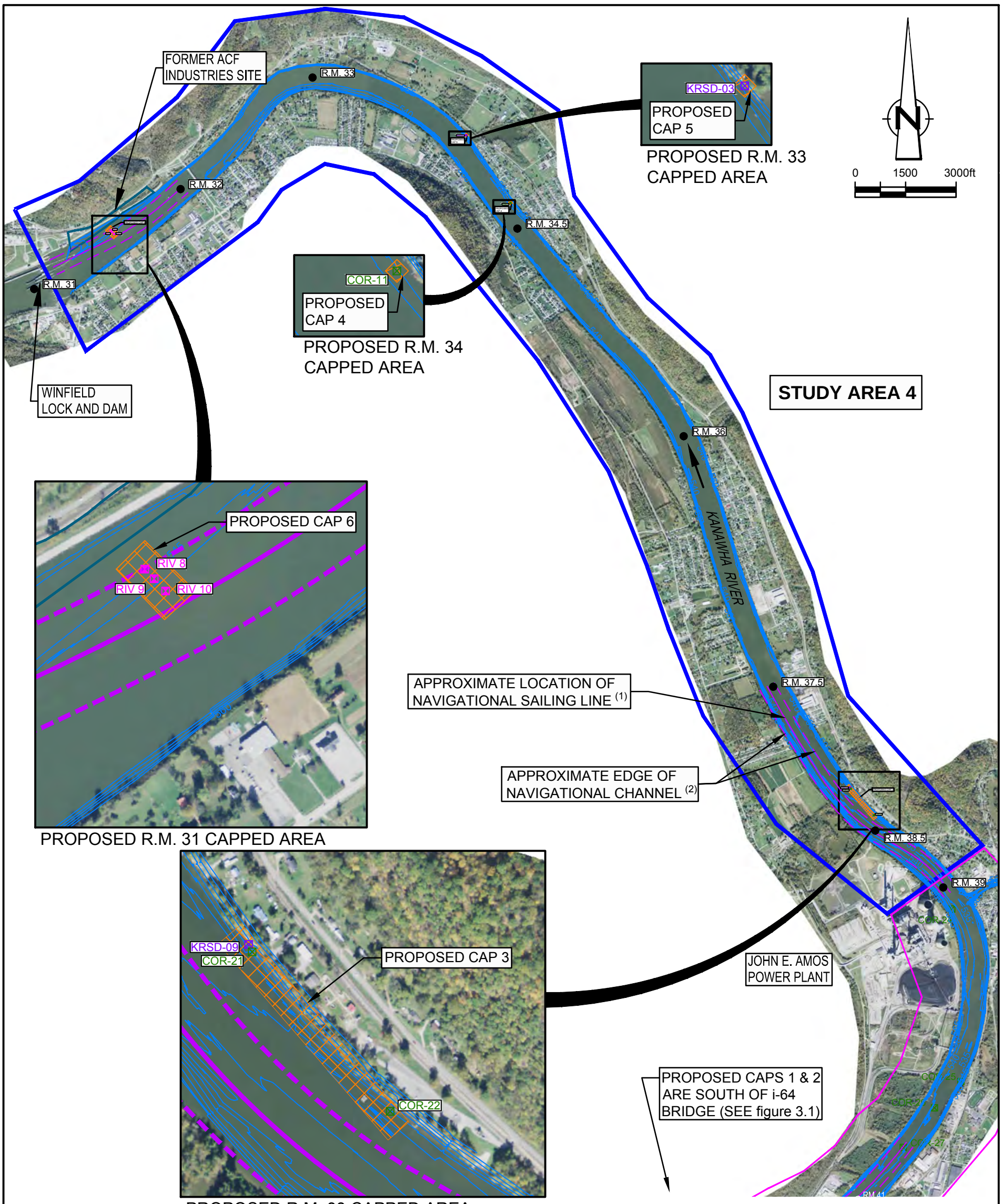
figure 3.1

# RIVER MILE 42 PRELIMINARY EXTENT OF PROPOSED CAP
# PRE-DESIGN INVESTIGATION WORK PLAN
*Kanawha River, West Virginia*

GHD

31884-00(072)GN-WA002 JUN 2, 2016

AR101651




LEGEND

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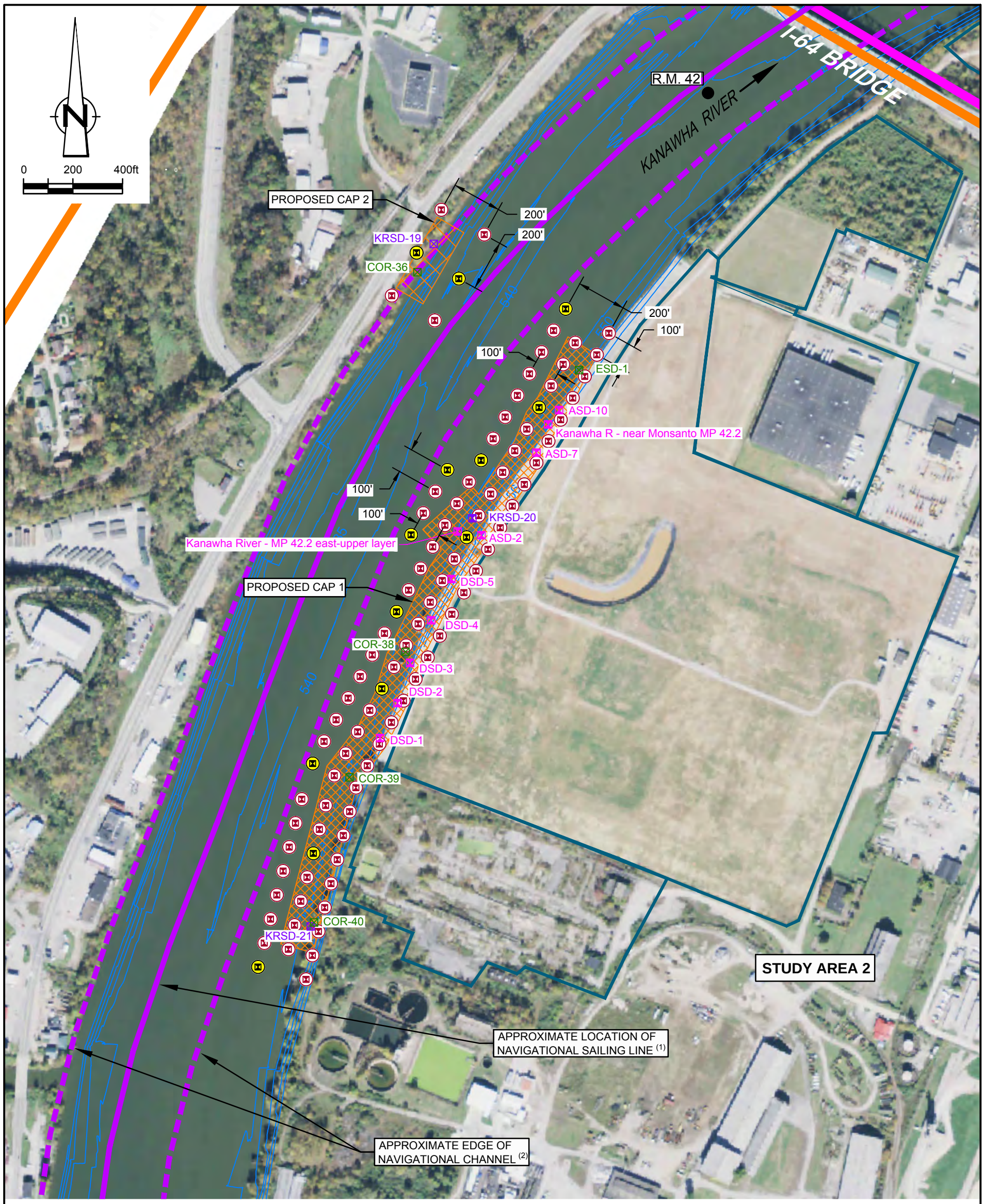
figure 3.2

# RIVER MILE 31 AND 38 PRELIMINARY EXTENT OF PROPOSED CAP
# PRE-DESIGN INVESTIGATION WORK PLAN
*Kanawha River, West Virginia*

GHD

31884-00(072)GN-WA003 JUN 2, 2016

AR101652

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(4) PROPOSED SAMPLE LOCATIONS ARE APPROXIMATE AND WILL BE ADJUSTED IN THE FIELD BASED ON ACCESS (eg. WATER LEVEL, EDGE OF SHORELINE OBSTRUCTIONS).

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figure 3.3

# PROPOSED R.M. 42 CAPPED AREA
# PRE-DESIGN INVESTIGATION WORK PLAN
*Kanawha River, West Virginia*

GHD

31884-00(072)GN-WA004 JUN 9, 2016

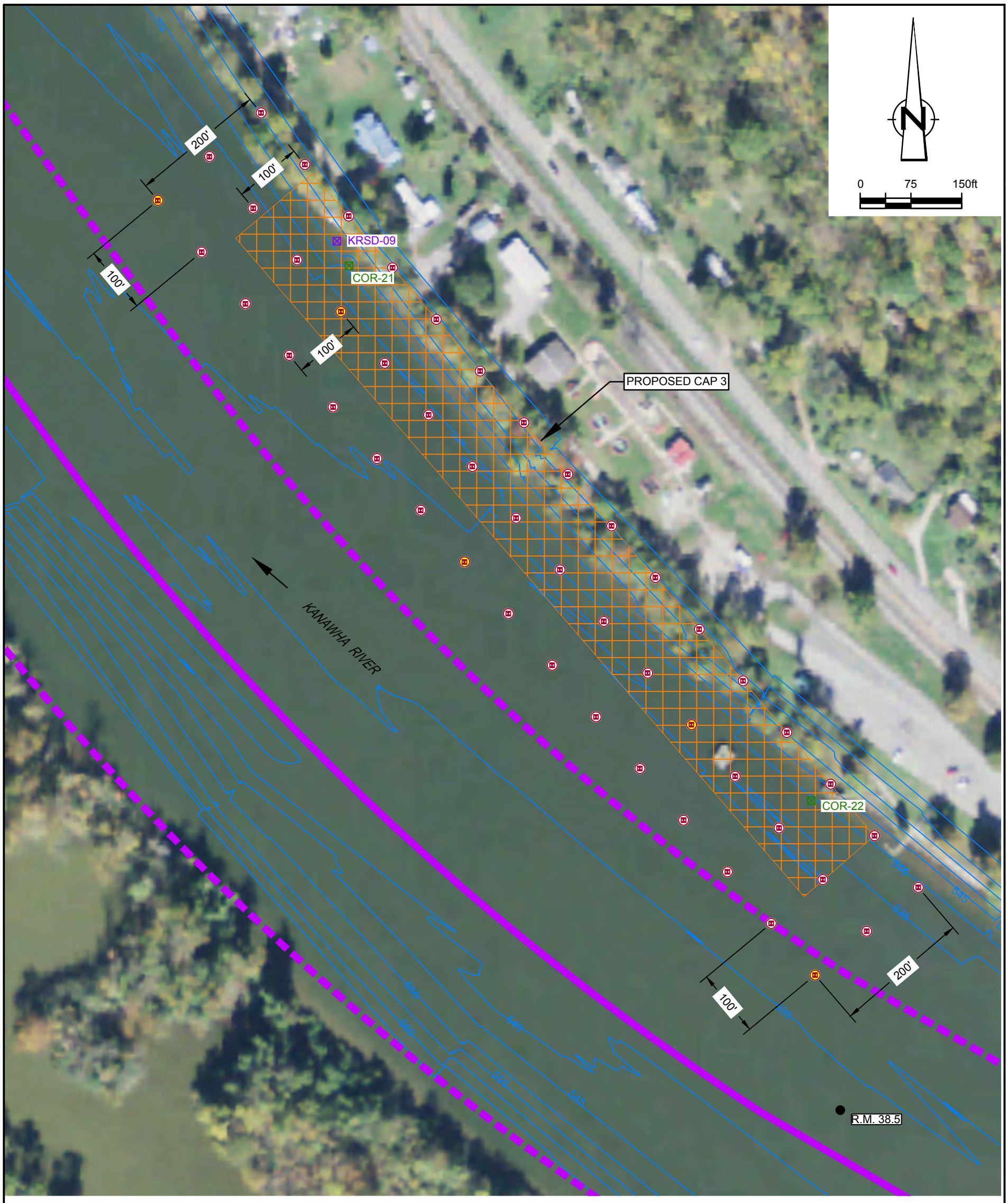


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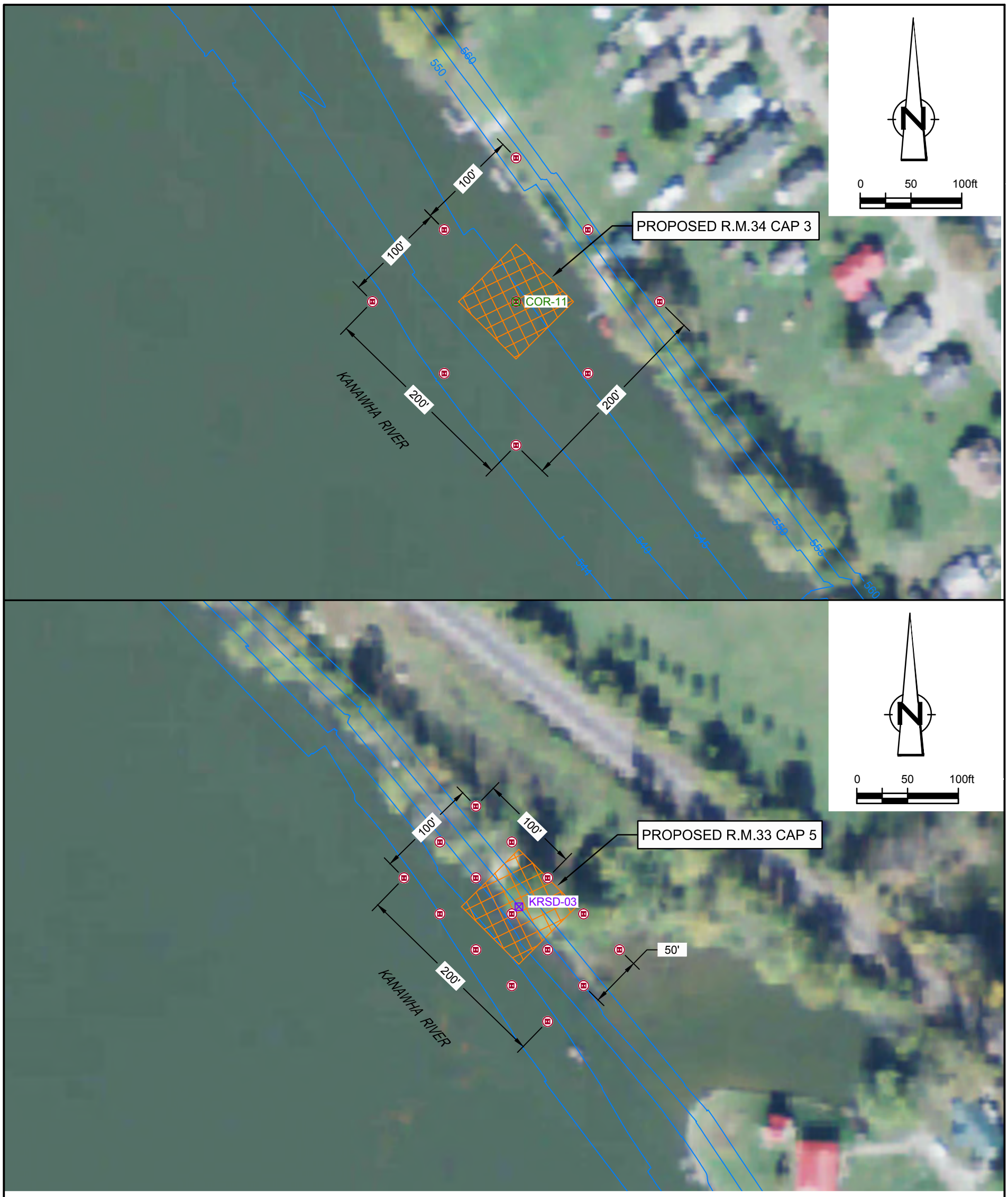
figure 3.4

# PROPOSED R.M. 38 CAPPED AREA
# PRE-DESIGN INVESTIGATION WORK PLAN
*Kanawha River, West Virginia*

31884-00(072)GN-WA005 JUN 2, 2016

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(3) APPROXIMATE PRELIMINARY EXTENT OF PROPOSED CAPS ARE SHOWN. LIMITS TO BE REFINED BASED ON ADDITIONAL SAMPLING.
(4) PROPOSED SAMPLE LOCATIONS ARE APPROXIMATE AND WILL BE ADJUSTED IN THE FIELD BASED ON ACCESS (eg. WATER LEVEL, EDGE OF SHORELINE OBSTRUCTIONS).

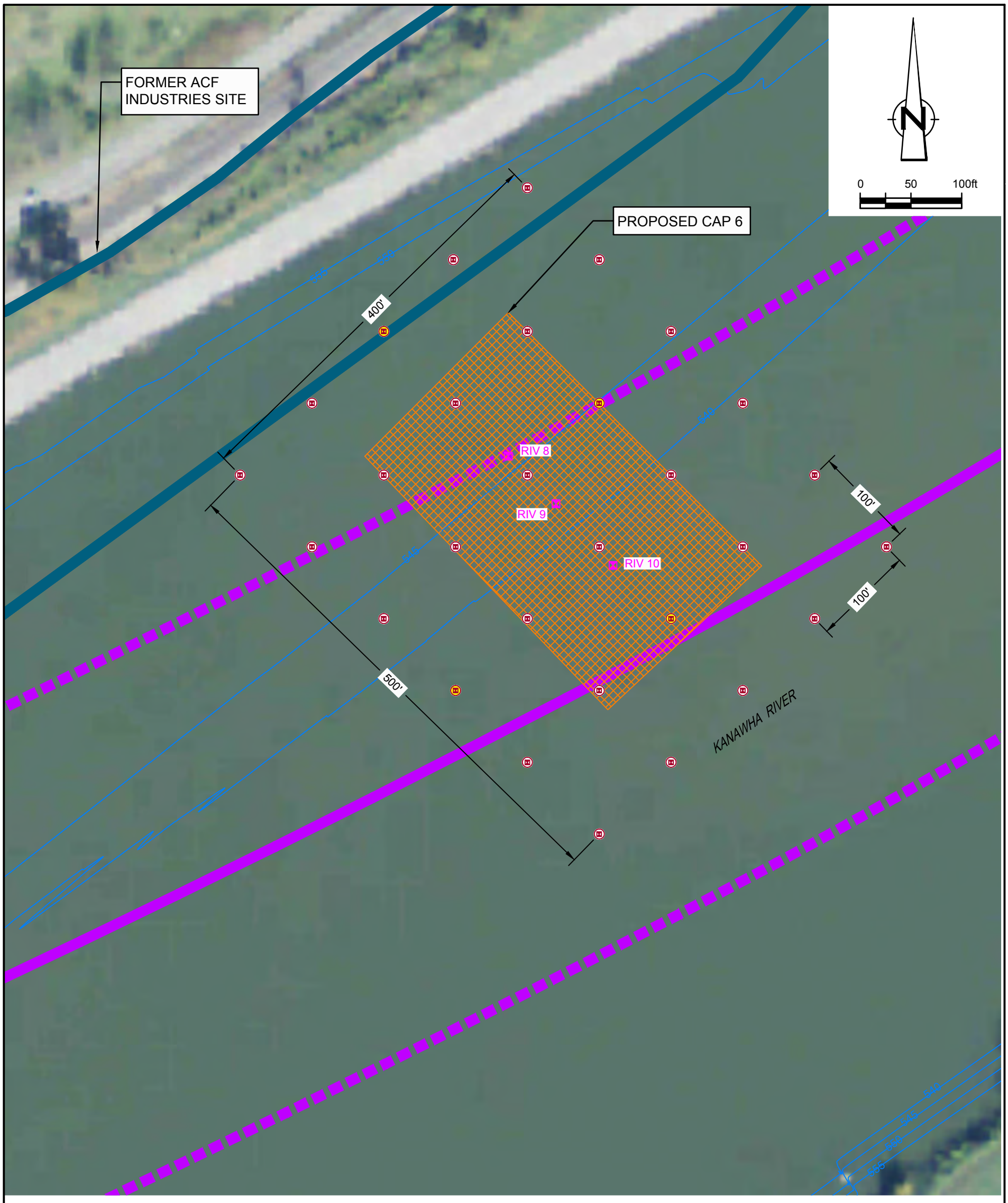
*DRAFT FOR REVIEW*
*DO NOT REPRODUCE OR CIRCULATE*
*PREPARED IN ANTICIPATION OF LITIGATION*

figure 3.5

# PROPOSED R.M. 33 AND 34 CAPPED AREA PRE-DESIGN INVESTIGATION WORK PLAN

*Kanawha River, West Virginia*

31884-00(072)GN-WA006 JUN 2, 2016




SOURCE: AERIAL FROM NATIONAL AGRICULTURE IMAGERY PROGRAM IMAGERY OF WEST VIRGINIA, 2014 - U.S. DEPARTMENT OF AGRICULTURE (USDA) FARM SERVICE AGENCY, AERIAL PHOTOGRAPHY FIELD OFFICE. (WEST VIRGINIA SOUTH SPC, NAD83).

## LEGEND

- R.M. 42 — RIVER MILE
- CORE SAMPLE LOCATION
- MAY 2000 SAMPLING LOCATION
- SEDIMENT SAMPLE - 2,3,7,8-TCDD ug/kg
- 540 — BATHYMETRIC CONTOUR ELEVATION (ft AMSL)
- NAVIGATIONAL SAILING LINE APPROXIMATE LOCATION (1)
- APPROXIMATE EDGE OF NAVIGATIONAL CHANNEL (2)
- PRELIMINARY EXTENT OF PROPOSED CAP, APPROXIMATE LOCATION
- PROPOSED SURFICIAL SEDIMENT SAMPLE LOCATION
- PROPOSED SEDIMENT CORE SAMPLE LOCATION

NOTES:
(1) APPROXIMATE LOCATION OF NAVIGATIONAL SAILING LINE BASED ON KANAWHA RIVER NAVIGATION CHARTS, POINT PLEASANT TO ALLOY WEST VIRGINIA, US ARMY CORPS OF ENGINEERS HUNTINGTON DISTRICT, MARCH 2012.
(2) NAVIGATIONAL CHANNEL IS ASSUMED TO BE 490 FT WIDE BASED ON SKETCH OF THE LOCATION AND DIMENSIONS OF THE NAVIGATIONAL CHANNEL FOR THE KANAWHA RIVER PREPARED BY MR. KENT BROWNING, USACE AND DISCUSSED AT THE DECEMBER 1, 2011 MEETING BETWEEN USACE, US EPA, WV DEP, MONSANTO COMPANY, CRA AND ANCHOR-QEA THAT WAS PROVIDED IN A FEBRUARY 2, 2012 USACE RESPONSE TO FOIA REQUEST LETTER.
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*DRAFT FOR REVIEW*
*DO NOT REPRODUCE OR CIRCULATE*
*PREPARED IN ANTICIPATION OF LITIGATION*

figure 3.6

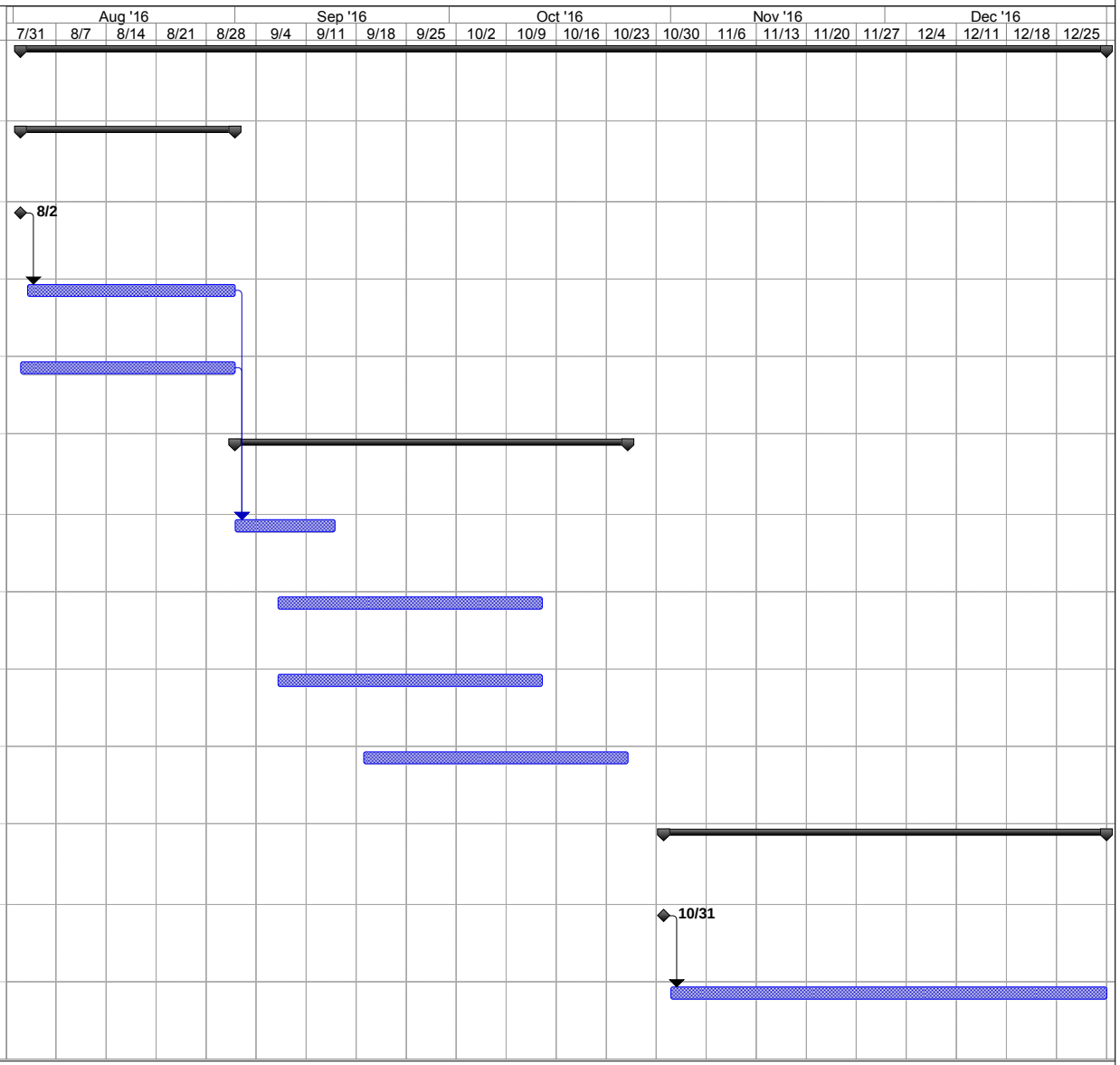
# PROPOSED R.M. 31 CAPPED AREA PRE-DESIGN INVESTIGATION WORK PLAN

*Kanawha River, West Virginia*

31884-00(072)GN-WA008 JUN 2, 2016

**DRAFT FOR REVIEW**

| ID | Task Name | Start | Finish |
|---|---|---|---|
| 1 | **Kanawha River** | **Tue 8/2/16** | **Sat 12/31/16** |
| 2 | **Pre-Design Investigation Work Plan** | **Tue 8/2/16** | **Wed 8/31/16** |
| 3 | Submit PDI Work Plan | Tue 8/2/16 | Tue 8/2/16 |
| 4 | Review/Approval of PDI Work Plan | Wed 8/3/16 | Wed 8/31/16 |
| 5 | Apply for Scientific Collection Permit | Tue 8/2/16 | Wed 8/31/16 |
| 6 | **Field Work Implementation** | **Thu 9/1/16** | **Tue 10/25/16** |
| 7 | Bathymetric Survey | Thu 9/1/16 | Wed 9/14/16 |
| 8 | Surface Sediment Sampling | Wed 9/7/16 | Thu 10/13/16 |
| 9 | Sub Surface Sediment Sampling | Wed 9/7/16 | Thu 10/13/16 |
| 10 | Baseline Fish Tissue Sampling | Mon 9/19/16 | Tue 10/25/16 |
| 11 | **Reporting** | **Mon 10/31/16** | **Sat 12/31/16** |
| 12 | Submit PDI Report | Mon 10/31/16 | Mon 10/31/16 |
| 13 | Approval of PDI Report | Tue 11/1/16 | Sat 12/31/16 |




Project: 031884(RPT072) - figure 4.1
Date: Fri 7/29/16

Task Milestone Summary

NOTE:
The schedule dates are preliminary and weather dependent. They may need to be revised based on agency review and approval.

**figure 4.1**
**CONCEPTUAL PROJECT SCHEDULE**
**PRE-DESIGN INVESTIGATION WORK PLAN**

AR101657

**Table 3.1**

**Summary of Sampling and Analysis Program**
**Pre-Design Investigation Work Plan**
**Kanawha River Site**
**Nitro, West Virginia**

| Task/Event | Sample Matrix | Field Parameters | Laboratory Parameters | Sample Locations | Investigative Samples | Quality Control Samples | | | Total [2] |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | | Field Blanks | Field Duplicates | MS/MSD LCS/LCD [1] | |
| Surface Sediment Sampling | Sediment (grabs) | Yes | 2,3,7,8-TCDD, TOC, Grain Size | 174 | 174 | 9 | 9 | 9 | 192 |
| Subsurface Sediment Sampling | Sediment (cores) | Yes | 2,3,7,8-TCDD, TOC, Grain Size | 26 | 52 | 3 | 3 | 3 | 58 |
| Biological Tissue | Tissue | None | 2,3,7,8-TCDD | 5 | 25 | 1 | 1 | 1 | 27 |

Notes:

[1] Matrix spike/matrix spike duplicate (MS/MSD) or laboratory control sample/laboratory control duplicate (LCS/LCD) are required for each batch of 20 samples submitted.

[2] The total quantity does not include MS/MSD samples or LCS/LCD samples.

# Appendix A
# Health and Safety Plan

# Site-Specific Health and Safety Plan

## Monsanto-Kanawha River, Nitro, WV

Monsanto Company

August 2 2016
031884|***|***
Approval Date: 8-02-2016

# HEALTH AND SAFETY PLAN

## Signature page

**This HASP was electronically signed by the Project Manager and Safety Group within the HASP Builder Software. Fully approved HASP is printed without a DRAFT watermark.**

**Project Name:** Monsanto-Kanawha River, Nitro, WV

**Project Manager Approval Date:** Jeff Daniel, 8-02-2016
**Safety Group Approval Date:** Alan Gallaway, 8-02-2016

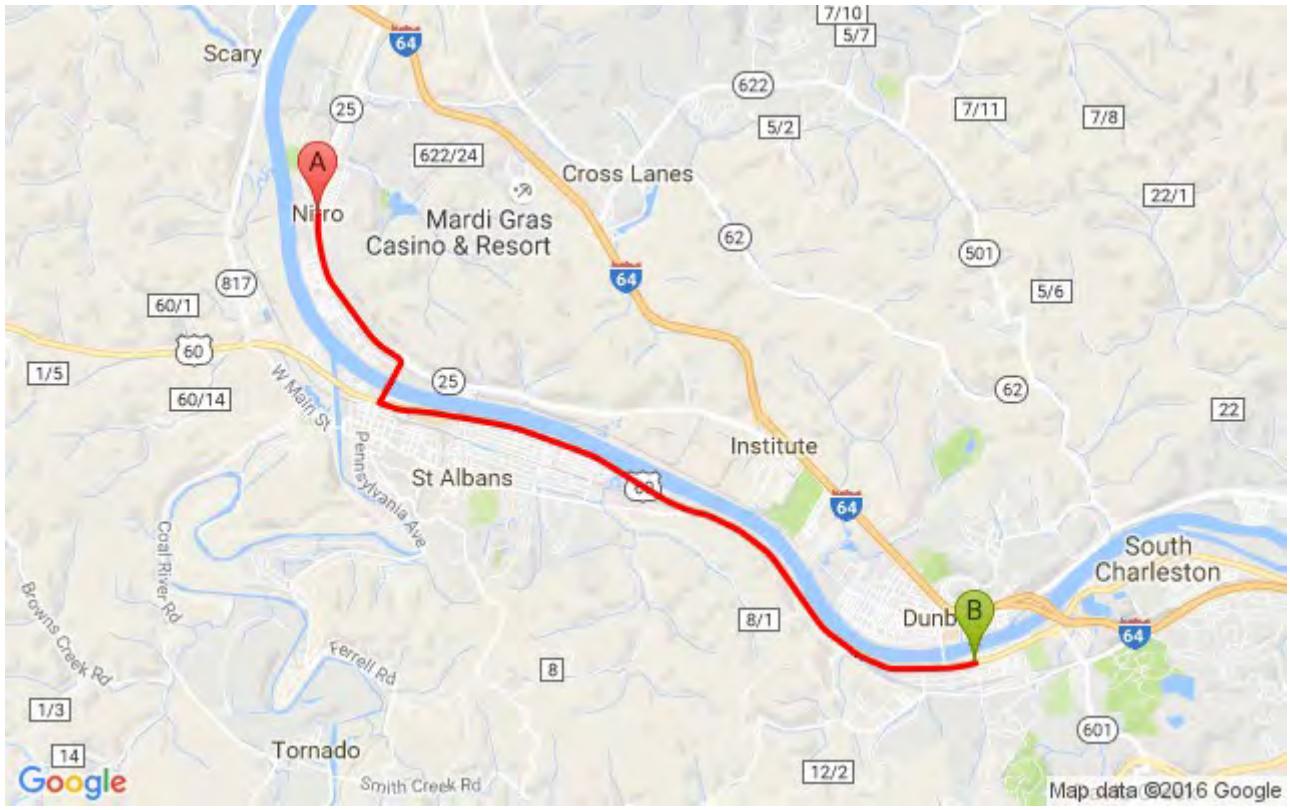
**Project Number:** 031884

---

# Emergency Information

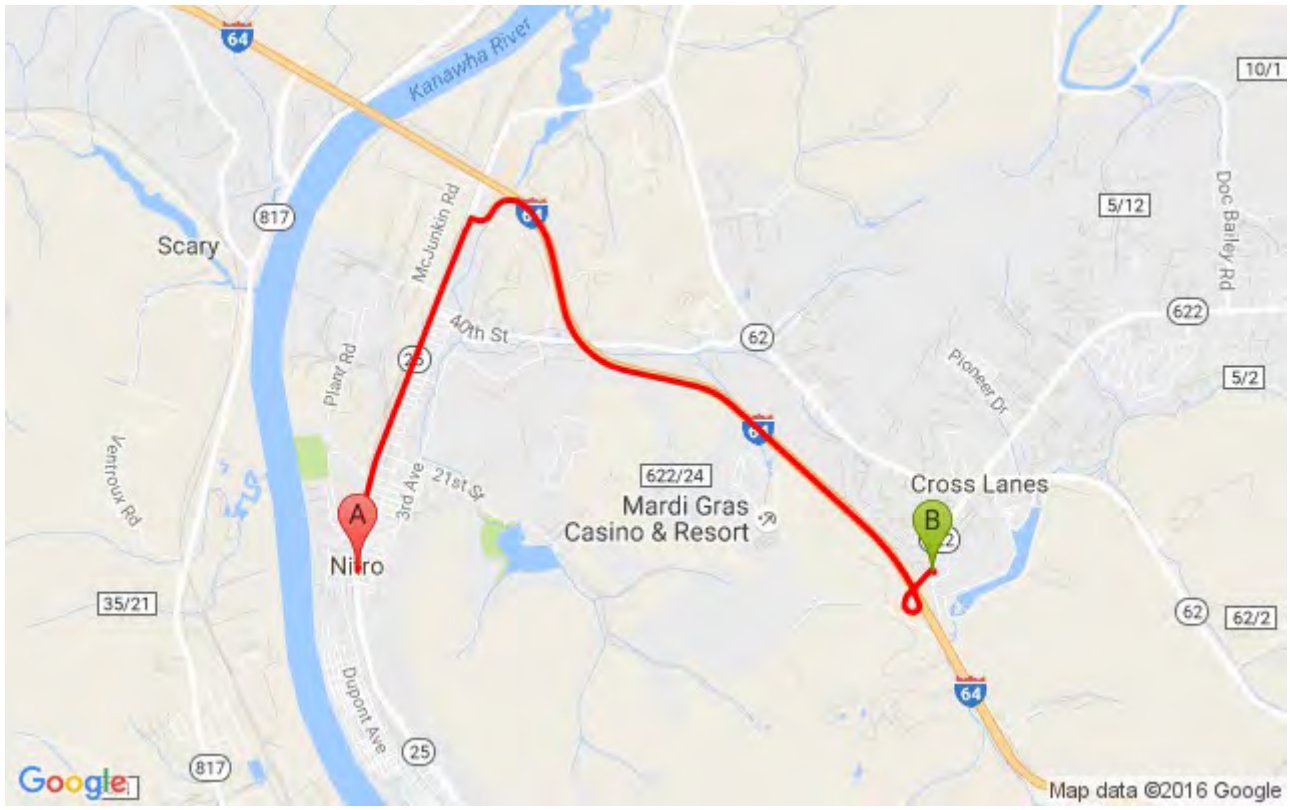
<table>
<tr><th>Contact</th><th>Phone Number</th><th></th></tr>
<tr><td>Local Police<br><br>Nitro Police Department<br>2nd Ave<br>Nitro , West Virginia<br>United States 25143</td><td>911<br>304-357-0191</td><td rowspan="4">Hospital Directions<br><br>Directions:<br><br>1. Head southwest on 2nd Ave toward 1st Ave<br>2. Slight left onto 1st Ave<br>3. Turn right toward Center St<br>4. Continue straight onto Center St<br>5. Turn left onto Maccorkle Ave<br><br>Driving Time: 15 mins<br><br>Driving Distance: 8.4 mi</td></tr>
<tr><td>Fire Department<br><br>Nitro Fire Department<br>20th St.<br>Nitro, West Virginia<br>United States 25143</td><td>911<br>304-755-1437</td></tr>
<tr><td>Ambulance<br><br>KCEAA Station 42<br>Teays Valley Rd<br>Scott Depot, West Virginia<br>United States 25560</td><td>911<br>304-342-1107</td></tr>
<tr><td>Local Hospital<br><br>Thomas Memorial Hospital<br>MacCorkle Avenue SW<br>South Charleston, West Virginia<br>United States 25309</td><td>304-766-3600<br>911</td></tr>
<tr><td>National Poison Center<br><br>West Virginia Poison Centre<br>Maccorkle Ave SE<br>Charleston, West Virginia<br>United States 25304</td><td>800-222-1222<br>911</td><td rowspan="8">GHD - Incident Reporting Hotline<br><br>Please call (866) 529-4886 and provide:<br><br>• Name and location of caller<br>• Description of incident<br>• Name of injured person(s)<br>• Description of injuries<br>• Phone number for return call</td></tr>
<tr><td>Project Manager<br><br>Jeff Daniel</td><td>Work: 519-884-0510 ext.7287<br>Cell: 519-591-2292</td></tr>
<tr><td>Site Supervisor<br><br>Daniel (dan) Deitner</td><td>Work: 519-884-0510 ext. 3449<br>Cell: 519-572-4339</td></tr>
<tr><td>GHD Regional S&H Manager<br><br>Alan Gallaway</td><td>Work: 770-441-0027<br>Cell: 770-295-9104</td></tr>
<tr><td>Client Contact<br><br>Joseph Gaberiel</td><td>314-694-1000</td></tr>
<tr><td>Client Site Contact</td><td></td></tr>
<tr><td>Other Contact</td><td></td></tr>
<tr><td>Site Health Officer</td><td>Phone:</td></tr>
<tr><td>Person to verify hospital route:</td><td colspan="2">Signature:</td></tr>
</table>

# Hospital Driving Directions




1. Head **southwest** on **2nd Ave** toward **1st Ave**
2. Slight **left** onto **1st Ave**
3. Turn **right** toward **Center St**
4. Continue straight onto **Center St**
5. Turn **left** onto **Maccorkle Ave**

# Medical Clinic Driving Directions




1. Head **southwest** on **2nd Ave** toward **1st Ave**
2. Sharp **right** onto **WV-25 W/1st Ave**
3. Turn **right** onto the **64 E** ramp to **Charleston**
4. Merge onto **I-64 E**
5. Take exit **47B** for **State Route 622 N** toward **Cross Lanes**
6. Merge onto **WV-622 N/Goff Mountain Rd**
7. Turn **right** onto **Golf Mountain Rd/Old Co 35/2**
   Destination will be on the left

# Table of Contents

# Appendix

HASP Acknowledgement Sheet
31884-00(072)-figures 1.1.pdf

Appendix B - JSAs

Environmental-Decontamination of Sampling Equipment and Personnel (PPE Level D)
Mobilization-Demobilization
Sediment Sampling (Grab Sampler)
Environmental- Boat Safety
Geophysics Group-Bathymetry Survey
Reciprocating Saw (SAWZALL) Operations
Driving
Environmental-Waste Sorting, Weighing, and Categorization
Environmental-Electrofishing
Construction Oversight
Environmental-Site Recon and Walkthrough

Appendix C - Safety Data Sheets (SDS)

Alconox SDS

Appendix D - Training Records

Record of Training Form

# 1. Introduction

## 1.1 Purpose And Policy

The purpose of this site specific health and safety plan (HASP) is to provide guidelines and establish procedures for reducing and controlling hazard exposure to the public, property, and personnel. The HASP is a living document and must continually evolve as site conditions and knowledge of the site activities develop.

This document has been developed to meet or exceed the requirements set forth by federal, state, and provincial legislation. If any procedure outlined in this plan conflicts with federal, state/provincial, and/or municipal law, prescribed standards, or client requirements, then the most stringent set of standards applies.

## 1.2 Stop Work Authority

All employees are empowered and expected to stop the work of coworkers, subcontractors, client employees, or other contractors if any person's safety or the environment are at risk. No repercussions will result from this action. Reporting of unsafe acts/unsafe condition (UA/UC) or Stop Work Authority (SWA) is documented with the UA/UC/SWA form.

**The discovery of any condition that would suggest the existence of a situation more hazardous than anticipated results in the removal of site personnel from that area and re-evaluation of the hazard and the levels of protection.**

## 1.3 Short Service Employee

The Employee is considered a Short Service Employee (SSE) if he/she has less than 6 months experience with his/her present employee, or in his/her present role. The individual is required to wear a fluorescent orange hardhat, as an obvious indicator of SSE status. Training and mentoring allows them to gain knowledge and experience in procedures and methods. In order for a new employee to work in the field, the following minimum training requirements must be met:

1. GHD New Employee Safety & Health Orientation training (on-line).
2. GHD HAZCOM (US)/WHIMIS (Canada)(on-line).
3. On-boarding completed with Human Resources.
4. Compliance training defined on the QSF-20 as it applies to field work to be conducted.
5. Client specific safety training.

A SSE's primary mentor is their direct Supervisor. GHD Supervisors are responsible for ensuring that a SSE completes the safety, field method, and quality training as appropriate to the work they are assigned. A SSE requires an On-site Mentor for all fieldwork. The On-site Mentor must have experience in the work they are mentoring and they are responsible for the close monitoring of the SSE.

Project team SSE make-up requirements are:

- A one-person project team cannot be a SSE.
- A two-person to four-person project team can have only one SSE.
- A five-person or more project team cannot have more than 20 percent SSE without a written variance from the GHD Corporate Manager of Safety & Health.

New hire employees that can provide sufficient documentation supporting previous experience in working under Behavior Based Safety Systems similar to GHD's system may be exempt from GHD's SSE Program. These exemptions are handled on a case-by-case basis and must be authorized by one of the following staff: the Corporate Manager of Safety & Health or a Senior Regional Safety & Health Manager. Details of the exemptions are covered in the full SSE Policy.

Clients may define specific SSE requirements for work at their facility or on their project. It is the responsibility of the Project Manager to communicate a client's specific requirements to the appropriate staff within GHD and project subcontractors. Client-specific SSE standards shall be posted on the Safety & Health Portal SSE Folder.

## 1.4 Project Management And Safety Organization

**Project Manager – GHD – Jeff Daniel**

The GHD Project Manager (PM) is responsible for the overall implementation, review, and approval of the HASP, and for ensuring that all safety and health (S&H) responsibilities are carried out. The PM will also ensure that appropriate resources are provided to support the project.

**Site Supervisor – GHD – Daniel (dan) Deitner**

The Site Supervisor (SS) is responsible for:

- Ensuring that the HASP is reviewed, approved, and implemented.
- Communicating site requirements to site project personnel and subcontractors through site orientation.
- Consulting with the client/site representative regarding appropriate changes to the HASP.

- Conducting a daily tailgate safety meeting that communicates the site specific hazards. This meeting must be documented on the Tailgate Safety Meeting form in the appendix.
- Ensuring that all necessary cleanup and maintenance of safety equipment is conducted by project personnel.
- Verifying emergency phone numbers and services, including hospital and clinic locations.
- Completing, filing, and correctly submitting the forms attached to the HASP, including daily tailgate meetings, job safety analysis, and daily inspection checklists.
- Implementing behavior-based safety procedures on all activities and enforcing safe work practices for project employees.
- Observing ill effects on any crew member, especially those symptoms caused by cold/heat stress or chemical exposure.
- Overseeing the safety of visitors who enter the site.
- Maintaining communication with the client/site representative(s) and/or government inspectors/agencies.
- Providing and enforcing the use of safety equipment, personal protective equipment (PPE), and other items necessary for employee or community safety.
- Conducting job site inspections as a part of quality assurance for safety and health.
- Ordering the immediate shutdown of site activities in case of a medical emergency, unsafe condition, or unsafe practice.
- Reporting safety and health concerns to site and/or project management as necessary.

**Regional Safety and Health Manager GHD – Alan Gallaway**

The Regional Safety and Health Manager (RSHM) is a full time GHD employee who is trained as a safety and health professional and serves in a consulting role to the PM and SS regarding potential safety and health issues. A RSHM or trained designee must review, coordinate required changes with PM and provide the final approval of the HASP prior to work beginning on site.

**Site personnel**

All employees have a role in GHD's SMART program and a responsibility to implement the program. GHD personnel are responsible for:

- Engaging in all aspects of their tasks and jobs when they are prepared to do the job safely, well rested, and mentally prepared for work.
- Utilizing the STAR process before initiating work.
- Implementing Stop Work Authority for any operations that may cause injury, illness, or unsafe conditions to employees, subcontractors, or others.
- Assisting in the development and revision of Job Safety Analysis (JSA) forms that are appropriate to their current scope of work.
- Use, inspect and maintain PPE as required by JSA and site conditions.
- Preparing, submitting, and reviewing behavior-based safety observations using the Safe Task Evaluation Process (STEP) form.
- Inspecting tools and other equipment before each use or as manufacturer dictates and documenting any defects.
- Correcting job site hazards when possible without endangering life or health.
- Reporting safety and health concerns to the SS, PM, RSHM, or SHO (if appointed).

**Subcontractors**

Subcontractors are responsible for:

- Developing and implementing their own HASP and complying with its contents.
- Attending an initial site orientation and subsequent safety meetings.
- Ensuring that their employees adhere to all site personnel requirements.
- Submitting required documentation to the SS regarding federal, state, or provincial requirements before

beginning any work.
- Obtaining approval for the use of GHD's equipment.
- Observing and obeying all GHD/client requirements as well as any specific direction given by GHD's management team.
- Wearing any personal protective equipment required by their HASP and GHD at all times.
- Meeting all governing legislation/regulation/industry standards for equipment used on GHD projects.
- Verifying that all subcontractor employees have required training, medical clearance, and substance abuse testing as required by project.
- Not being in possession or under the influence of alcohol, incapacitating drugs, or medications.

In the event of conflicting safety procedures or requirements, personnel must implement those safety practices that afford the highest level of safety and protection. In addition, noncompliance with safety and health policies and procedures may subject the subcontractor to disciplinary action up to and including termination of their contract with GHD.

**Equipment Operators**

All equipment operators must meet all the requirements of site personnel listed above and are responsible for the safe operation of heavy equipment. Operators are responsible for conducting documented daily inspections on their equipment to ensure safe performance. Brakes, hydraulic lines, backup alarms, and fire extinguishers must be inspected routinely throughout the project. Equipment will be taken out of service if an unsafe condition occurs. Daily inspections must be provided to the GHD site supervisor prior to the equipment being used.

**Authorized Visitors**

Authorized visitors, as approved by **Jeff Daniel**, are provided with all relevant information regarding site operations and hazards as applicable to the purpose of their visit. Visitors may be required to be accompanied by authorized personnel.

## 1.5 Site Safety And Health Officer

The site safety and health officer (SHO) is responsible for assisting in the communication of site requirements to site project personnel and subcontractors and for carrying out the health and safety responsibilities include the ones listed under the site supervisor. The SHO has prior experience in working at similar sites. The SHO operates under the supervision of the PM, SS, and RSHM.

## 1.6 Recordkeeping

The SS shall establish and maintain records of all necessary and prudent monitoring activities as described below:

- Name and job classification of the employees involved on specific tasks.
- Air monitoring/sampling results and instrument calibration logs.
- Records of training acknowledgment forms (site specific training, toolbox meetings, etc.).
- Documentation of site inspections, results of inspections, and corrective actions implemented.
- Emergency reports describing any incidents or accidents.

## 1.7 Site HASP Amendments

Any change to the scope of work must be evaluated for its impact on the overall health and safety of the project and associated personnel. A minor change is one that adjusts already-documented hazards within the HASP and does not expose site personnel to chemicals above exposure limits, such as the introduction of a new JSA, or PPE that does not involve a change in respiratory protection. Amendments must be documented on the Site Health and Safety Plan Amendment Form located in Appendix, in addition to notifications to key personnel.

Significant changes to the scope of work require a rewrite by the PM and review/approval of the HASP by a RSHM.

## 1.8 Training Requirements

All personnel conducting work at this site shall have completed the appropriate safety and health training and behavioral-based safety(BBS) training, as applicable to their job tasks/duties. The required training is referenced throughout the HASP and identified on each JSA form

## 1.9 Site Specific Training

An initial site specific training session or briefing shall be conducted by the PM or SS prior to commencement of work activities. During this initial training session, employees shall be instructed on the following topics:

- Personnel responsibilities
- Content and implementation of the HASP
- Site hazards and controls
- Site specific hazardous procedures (e.g., drilling, excavations, etc.)
- Training requirements
- PPE requirements
- Emergency information, including local emergency response team phone numbers, route to nearest hospital, incident reporting procedures, and emergency response procedures
- Instruction in the completion of required inspections and forms
- Location of safety equipment, such as portable eyewash, first aid kit, fire extinguishers, etc.

The various components of the project HASP will be presented, followed by an opportunity to ask questions to ensure that each attendee understands the HASP. Personnel will not be permitted to enter or work in potentially contaminated areas of the site until they have completed the site specific training session. Personnel successfully completing the training session shall sign the HASP Acknowledgement Form, which is presented as an Appendix.

In addition to the initial site briefing conducted at the commencement of the project, supplemental brief safety meetings shall be conducted by the SS to discuss potential safety and health hazards associated with upcoming tasks and necessary precautions to be taken.

## 1.10 Safety Meeting/ Hasp Review

"Tailgate" safety meetings will take place each day prior to beginning the day's work. All site personnel will attend these safety meetings conducted by the SS. The safety meetings will cover specific safety and health issues, including the appropriate JSAs, site activities, changes in site conditions, and a review of topics covered in the site specific pre-entry briefing. The safety meetings will be documented each day with written sign in sheets containing a list of topics discussed. To assist with the compliance of documentation of the Tailgate safety meetings, there is a Tailgate Safety Meeting form located in the Appendix.

## 1.11 Fatigue Management

GHD employees and subcontractors are responsible for ensuring they are both physically and mentally fit to perform their job functions safely as part of GHD's Fatigue Management Program. GHD will use the following control measures to minimize fatigue during the project:

- Alter the work schedule to reduce the overall time a worker will perform physically demanding work.
- Monitoring employee behaviors for signs of fatigue.
- Eliminate or reduce where practicable the need to work extended hours, night shifts, or overtime.
- Use work-rest patterns during repetitive tasks to control fatigue and increase mental fitness.

GHD's work/rest balance requirements are referenced based on weight of the vehicle. Less than 10,000 lbs/4536 kg (passenger cars, pickup trucks, SUV) will follow the following guidelines:

- Maximum working time and/or driving and working time within one work day: 14 hours (extendable up to 16 hours if drive time < 4 hours and/or airplane travel is involved; this approach can be taken three times in a 7 day period)
- Maximum continuous drive time: 3 hours followed by a 15 minute break
- Maximum drive time per day: 9 hours (extendable up to 10 hours twice in 7 day period)

Employees that drive vehicles greater than 10,000 lbs/4,536 kg must meet the requirements of the transportation agency for which they work and travel.

Management, as represented by an employee's manager, Project Manager or any Principal, may grant a documented variance to the standard work/rest balance for specific employees for a period covering no longer than one week. Additional variances can be issued after for each week. For further information see Fatigue Management Program on the portal.

## 1.12 Management Of Change

Safety incidents are known to occur when key changes are not communicated to all stakeholders related to a project. Management of Change is covered by the GHD Quality Manual Section 7.3.7 Control of Project Changes and is documented using QSF-006 Management of Change Form (see Appendix ).

The types of changes that are to be documented and communicated are:

- Project management/Resources (key personnel)
- Equipment
- Safety – this would not include daily changes to JSA when dirtied in the field.
- Field Operations/SOP

Form QSF-006 is the tool to document and communicate the change. The completed QSF-006 is to be filed in the GHD field folder of the project file.

## 1.13 Field Notes

All activities undertaken in the field must be correctly and completely recorded in bound field books, Quality System Field Data Record Forms (QSF 200, QSF 400 , and QSF 500 Series D), or in some other GHD approved format (i.e., electronically, loose paper). All records will be kept in the GHD approved format specified for the activities undertaken. The formats have been established to ensure completeness and to provide consistency amongst the field staff regardless of which office they are from. Refer to Section 7 - Control of Monitoring and Measuring Equipment of the GHD Quality System Manual and Section 3.4.1 – Field Notes of the GHD Field Training Manual for more information regarding field note content requirements.

These field notes may be called as evidence in a court of law.

In addition to the formal field notes, field personnel are expected to keep running tables that summarize the field activities so that when questioned at any time during the program, a detailed status of the work completed and that yet to be done can be provided. These lists also serve as checklists to confirm that the correct number and sequence of samples, wells, boreholes, etc. have been collected or completed.

Upon completion of each project, all of the field documentation is brought back and suitably stored at the GHD office in which the field staff who performed the field work are located.

> *GHD demands that all field note entries are factual and accurate. Everyone recognizes that errors and omissions will be made on occasion. While GHD does not condone a level of effort that is incomplete or inaccurate, it is recognized that it may happen and most of our clients will understand these situations. However, anyone who is caught falsifying any record, no matter how small, will be immediately dismissed.*

# 2. History & Scope

## 2.1 Site History/Background

The Kanawha River site is located in Nitro, West Virginia. The Kanawha River along with the Pocatalico River and Armour Creek have been placed on the State of West Virginia's 303(d) list of water quality impaired bodies for dioxin.

At a facility approximately 1.5 miles north of Nitro, WV on the east bank of the River, Old Monsanto produced the pesticide 2,4,5-trichlorophenoxyacetic acid (2,4,5-T). 2,3,7,8-tetrachlorodibenzo-p-dioxin (2,3,7,8-TCDD) was a by-product of the 2,4,5-T production process. Operation of this facility was transferred to Flexsys America LP (Flexsys), a joint venture between Old Monsanto and Akzo Nobel, in 1995. In 1997, Old Monsanto transferred its interest in the facility, including the real estate, to Solutia Inc. (Solutia). Activities began during the second quarter of 2004 to decontaminate, dismantle, and remove all surface structures. Demolition was completed in December 2005.

In March 2004, U.S. EPA and Monsanto Company entered into an Administrative Order on Consent to conduct an EE/CA to study dioxin-contaminated sediment throughout 14-miles of the Site. The objectives of the EE/CA were to characterize the nature and extent of 2,3,7,8-TCDD in the Kanawha River Site. The EE/CA identifies and evaluates potential Removal Action Alternatives with respect to protectiveness of public health, welfare and the environment.

A Pre-Design Investigation Work Plan is now being submitted to Monsanto Company in accordance with the Administrative Order by Consent for Removal Response Action.

## 2.2 Scope Of Work Tasks

Activities that will be conducted within this Pre-Design Investigation Work Plan include:

- surficial sediment sampling
- subsurface sediment sampling
- fish tissue sampling.

This HASP covers the specific site activities that will be conducted by GHD personnel and their subcontractors. These activities listed here, and in the attached JSAs cover the tasks being performed onsite.

Driving, Site Reconnaissance and Walk through Activities, Mob/Demob of personnel, material, and equipment, Decontamination of Sampling Equipment and Personnel, Site Inspection(Construction)

If site operations are altered or if additional tasks are assigned, an addendum to this HASP shall be developed to address the specific hazards associated with these changes.

All addendums will be required to be developed in conjunction with project management and a GHD safety professional.

# 3. Chemical Hazards

## 3.1 Introduction To Chemical Hazards

Chemical exposures occur via four major routes of entry: absorption, inhalation, ingestion, and injection. The chemical hazards of concern that may be encountered during the tasks are identified in the projects scope of work. A listing of the contaminants of concern is found in the **Chemical Table** and the **Safety Data Sheets (SDSs),** which include exposure limits, signs and symptoms of exposure, chemical properties, and physical characteristics.

## 3.2 Control Measures

Before the proper control(s) can be selected, GHD personnel conduct a hazard evaluation of the process, activity, or material. A hazard evaluation may include reviewing information from a chemical container label, MSDS, manufacturer, National Institute for Occupational Safety and Health (NIOSH) website, and other resources as needed; identifying route(s) of exposure; and evaluating the process/activity to determine if an exposure evaluation is needed. If necessary, a RSHM conducts and documents exposure evaluations.

Exposure to potential on site contaminants/chemicals, such as those listed in Table 1.0 and MSDSs, include the following methods:

- Engineering controls such as wetting methods, ventilation, elimination, or substation.
- Administrative controls such as work rotation, training, or proper hygiene practices (washing facilities).
- Monitoring air concentrations with appropriate equipment in the breathing zone.
- Selecting and using personal protective equipment (PPE) such as gloves or respiratory protection.

JSAs are developed and revised to list the associated hazard controls on a task-specific basis.

## 3.3 Safety Data Sheets

SDSs are documents created by the chemical manufacturer that describe the substance. Some information found on an SDS includes: hazardous and physical characteristics, handling requirements, storage and disposal information, and signs and symptoms of exposure.

When working with hazardous chemicals, readily available and up-to-date SDSs are required for each chemical. GHD personnel and its subcontractors are responsible for obtaining and maintaining SDSs for their controlled products and for products that they are bringing onto site. All projects maintain an inventory of SDS and are made readily available to all employees and visitors.

## 3.4 Container Labels

All hazardous materials, hazardous waste, chemical containers, and chemical storage areas are appropriately labeled indicating the chemical identity, hazards present, and any relevant regulatory requirements. Labeling of all chemical containers assists emergency personnel and others in identifying hazards if a spill occurs or emergency situation arises.

Chemical container labeling is the responsibility of the individual who fills and/or uses the chemicals. All containers into which chemicals are transferred are legibly labeled in the language that can be understood by the employees who work with or in proximity (English, French, Spanish, etc.) and include the name of the chemical and appropriate hazard warnings.

## 3.5 Workers Training

All employees who may work in proximity to controlled products has and maintains current applicable training as appropriate to client, state, provincial or federal requirements, which may include: HAZCOM, WHMIS, TDG, or DOT. Records of training are readily available upon request.

# 4. Physical Hazards

## 4.1 Introduction To Physical Hazards

Physical Hazards are factors within the environment that can harm the body without necessarily touching it. Vibration and noise are examples of physical hazards. Physical hazards for this site have been identified in the following section. If the hazards change due to site conditions or additions to the scope of work, a Stop Work must be implemented and the conditions identified to the PM and RHSM.

In addition, personnel must be aware that the protective equipment identified in the JSA may limit dexterity and visibility and may increase the difficulty of performing some tasks.

## 4.2 Heavy Equipment

The following practices are adhered to by personnel operating heavy equipment (such as backhoes, excavators, bull dozers, rock trucks) and personnel working in the vicinity of heavy equipment.

- Heavy equipment is only operated by authorized, qualified operators.
- All equipment is inspected when equipment is initially mobilized, delivered to a job site, or after it is repaired and returned to service, to ensure that it meets all manufacturer and legislative specifications. Documentation of maintenance records must be available upon request.
- The operator inspects the equipment prior to each use and documents the first use on a daily basis. Documentation of this daily pre operational inspection is available upon request, and, if required, filed with the project files.
- Ensure operator conducts a 360-degree walk around of the equipment prior to entering the equipment
- Seat belts/restraining devices are used on heavy equipment that is not designed for stand up operation.
- Equipment/vehicles that are loaded by crane, excavator, loader, etc. have a cab shield and/or canopy to protect the operator.
- Personnel only ride in equipment that is designed for transporting individuals and have a fully functional seat and available restraining devices. “Piggybacking,” such as riding on fender steps or any place outside the cab, is not allowed.
- Personnel are not raised/lowered in buckets.
- Before leaving the equipment controls, the equipment is in its safe resting position or cribbed in a “dead” or neutral position. No controls are abandoned while under load.
- Before raising any booms, buckets, etc., overhead obstructions are checked.
- A competent spotter is used when moving heavy equipment, working within 10 feet of a stationary object, encroaching overhead utilities clearance minimums, in tight quarters, or with limited visibility.
- Employees involved in the operation do not wear any loose fitting clothing, as it can be caught in moving machinery.
- Personnel must wear an approved high-visibility safety vest where any vehicular traffic occurs.
- The work site should be designed to limit the operations being performed in reverse.
- Working areas are properly delineated to keep unauthorized individuals out. All personnel should never proceed into a work zone without making eye contact and receiving authorization by the operator or spotter to cross the path of any heavy equipment. Authorization is given from outside the blind or crushing zones of the equipment.

## 4.3 Utility Clearances - OSHA

Extreme caution is needed when working around electrical power lines. Electricity flows through metal, wood, and many other conducting materials, including human beings. Elevated equipment such as drill rigs, backhoes, scaffolding, ladders, etc must remain the required distance according

to the local/state/provincial regulations.

These minimum requirements are:

| Occupational safety and health act 1926.550(a)(15) | |
|---|---|
| **Operating voltage of overhead power** | **Operating voltage of overhead power safe limit of approach distance forpersons and equipment** |
| <50 kv | 10 feet |
| >50 kv | 20 feet |
| For lines rated over 50 kv, minimum clearance between the lines and any part of the crane or load shall be 10 feet plus 0.4 inch for each 1 kv, over 50 kv, or twice the length of the line insulator, but never less than 10 feet. | |

- If any part of a machine may encroach these parameters, SWA is implemented, a review of the SOW is conducted with the PM and RHSM, and a spotter is used.
- If the client has requirements that exceed the above minimums, then the client requirements are used.

**Underground Utilities**

Underground utilities, if present, are to be clearly marked and identified prior to commencement of work. Follow applicable regulations and client requirements with regards to utility-locating requirements (e.g., One Call).

Personnel involved in intrusive work will:

- Confirm proposed excavation(s) and heavy truck routes are not in the area of subsurface utilities. This meeting is to be documented.
- Review and adhere to GHD's Subsurface Utility Clearance Protocol SOP at a minimum. Use air knifing or vacuum truck digging techniques inside 36 inches of the outside edge of an underground facility; this distance can vary based on regulations, legislation, facility/client requirements, etc.
- **Complete the Property Access/Utility Clearance Data Sheet (QSF 019) prior to initiating excavation activities.**
- On private property, request that the owner of the service, locate and mark the service.
- If a service may pose a hazard and cannot be shut off or disconnected, request that the owner of the service supervise the uncovering of the service during the work.
- Identify the work that can be conducted with the assistance of the locator line service, coordinate document/drawing review, and inspect the site for manholes, catch basins, valve boxes, etc. that may indicate the direction/depth of underground installations. Marking indicates only the approximate location of buried lines.

***The following are the Uniform Color Codes for utility locates***

| | |
|---|---|
| white | proposed excavation |
| pink | temporary survey marking |
| red | electrical power lines,cables, conduit and lighting cables |

| | |
|---|---|
| yellow | gas,oil, steam,petroleum or gaseous material |
| orange | communication, alarm or signal lines,cables or conduit |
| blue | potable water |
| purple | reclaimed water, irrigation and slurry lines |
| green | sewers and drain lines |

## 4.4 Material Handling

Material handling and storage practices are conducted at the project site. Proper lifting reduces the hazard out of moving objects. No one person should handle, lift, or move 50 pounds or more by themself. Even if the object weighs less than 50 pounds, the configuration or shape of the object should be evaluated to see if two people should be used to lift the object.

**Manual Lifting**

Consider the following prior to a lift.

- Establish that you can lift the load safely.
- Inspect route to be travelled, confirming sufficient clearance.
- Look for any obstructions or spills.
- Inspect the object to determine how it should be grasped.
- Select and use containers with handles where practical.
- Look for any sharp edges, slivers, or other things that may cause personal injury.
- Do not move any object that will obstruct your field of vision when transporting the load.
- When lifting objects, use proper lifting techniques. Position the body so that the weight of the body is centered over the feet, which provides a more powerful line of thrust and ensures better balance. Start the lift with a thrust of the rear foot. Do not twist.

**General Storage Practices**

Storage of materials and supplies must not create a hazard. General storage area practices include the following:

- Bags, containers, bundles, etc. stored in tiers must be stacked, blocked, interlocked, and limited in height so that they are stable and secure against sliding or collapse.
- All stacked materials, cargo, etc. must be examined for sharp edges, protrusions, signs of damage, or other factors likely to cause injury to persons handling these objects. Defects are to be corrected as they are detected.
- Storage areas must be kept free from accumulation of materials that constitute hazards from tripping, fire, explosion, or pest harborage.
- Storage areas have provisions to minimize manual lifting and carrying. Aisles and passageways provide for the movement of mechanical lifting and conveyance devices.
- Stored materials do not block or obstruct access to emergency exits, fire extinguishers, alarm boxes, first aid equipment, lights, electrical control panels, or other control boxes.
- Hazardous materials are stored in accordance with the details outlined in the MSDS, or accepted guidelines from reputable agencies. Guidelines include details about the materials reactivity, corrosivity, flammability, etc., as well as appropriate signage.

## 4.5 Noise

Hearing protection is required for project activities when working in close proximity to machinery, drilling operations, or impact/power tools where noise levels may exceed the decibel range of 85 dBA.

When hearing a coworker at normal conversation distance is difficult or the noise level is approaching or exceeding 85 dBA, hearing protection such as earplugs or muffs must be available/worn by all site personnel and visitors that may be exposed to elevated levels of noise. Individuals who wear hearing protection are to be adequately trained in the safe use and handling of hearing PPE.

GHD employees who have the potential to be exposed to noise exceeding 85dba in the work environment will be enrolled in the GHD Hearing Conservation Program.

## 4.6 Cranes

The use of cranes carries many associated hazards. When cranes are brought on site for use, the following safety practices at a minimum are enforced.

- Only qualified operators are allowed to operate cranes on site. Records of training are made available and copies submitted to the SHO/site supervisor (SS) prior to work commencing.
- Crane operator/subcontractor provides a copy of the crane's annual inspection report to the SHO/SS prior to initiating operations.
- Operators of cranes and hoists make visual and operational inspections of the equipment prior to use. Any discrepancies that jeopardize the safe operation of the equipment are corrected prior to use. These inspections are documented via a daily inspection checklist or equivalent.
- The posted capacity of the crane is adhered to and overloading of the equipment is not allowed.
- The accessible swing radius of the crane is demarcated and/or barricaded to prevent employees from entering the area.
- The crane's load and boom is kept a minimum of 10 feet away from all overhead utilities. Any deviation must be approved by the project manager (PM) in conjunction with the regional safety and health manager (RSHM).
- A competent person investigates the soil for stability and determines the necessary amount of "cribbing/mudsills" to be placed under the outrigger pads or whether crane mats are necessary.
- No personnel are permitted to work under a suspended load.

Except for emergency communications, the operator only recognizes signs and signals from one designated competent signal person. If the operator looses line of site or communication with the signal person, the operator performs SWA and discontinues operation until communication has been re-established.

## 4.7 Rigging And Hoisting

If hoisting and rigging operations occur, the following standards apply as minimum guidelines.

- Only qualified competent personnel trained in safe rigging procedures are authorized to engage in rigging procedures. This includes understanding and use of recognized rigging methods and crane signals. Records of Training are available on site.
- Wire ropes, chains, ropes, and other rigging equipment are inspected prior to each use and as necessary during use to ensure their safety. Defective rigging equipment are tagged and immediately removed from service.
- No equipment is modified or used outside of its intended design.
- Rigging is not used unless the weight of the load falls within the rigging's manufacturer's safe work operating range. This must be verified by the authorized rigger prior to any "pick" or lifting operation.
- The proper length of rope or chain slings is used to avoid wide angle lifts and dangerous slack. Knotted ropes or lengths of ropes reduced by bolts, knots, or other keepers are not used.
- Tag lines are used during load movements unless they create an unsafe condition.
- Job or shop hooks and links and other makeshift fasteners are not used. When U bolts are used for eye splices, the U bolt is applied so the "U" section is in contact with the dead end of the rope.
- Wire ropes, chains, ropes, and other rigging equipment are stored where they will remain clean, dry, and protected from the weather, traffic, and corrosive fumes.

## 4.8 Working Near Water

The procedures outlined in this section are to be implemented by all GHD and subcontractor personnel when there is the potential for slipping or falling into water that is greater than 3 feet in depth. Additionally, these procedures are to be adhered to when water is flowing and has the potential to carry personnel away.

- When working in or around water implement the buddy system
- When working at ground level, a 5 foot "no entry zone" can be established between the work area and the water hazard. The no entry zone is to be clearly defined and/or demarcated. Personnel will not be permitted to enter into this area unless the other provisions of this section are in place.
- Standard guardrails are required on any walking/working surface over or near water.
- Where guardrails are not practical due to impairment of work being performed, other types of safeguarding, such as safety harnesses, lifelines, and lanyards may be used (see GHD's Fall Protection SOP).
- If providing fall protection is not feasible due to the scope of work or location, personnel will be required to wear U.S. Coast Guard/Transport Canada approved life jackets or buoyant work vests. Prior to each use and after each use, the buoyant work vests and life preservers must be inspected for defects that would affect strength and/or buoyancy. Any damaged or defective buoyant work vest or life preserver cannot be used.
- Call in or make prearranged contacts after each activity posing a drowning hazard is completed.
- If work on wet or slippery surfaces above water is necessary, non slip tape or other methods are to be used to increase traction.
- Ring buoys with a minimum 90 feet of line must be readily available for emergency operations. The distance between buoys cannot exceed 200 feet.
- Due to the anticipated scope of work, a life saving skiff may be necessary. However, the SS in conjunction with the RSHM will evaluate current site conditions to determine if a skiff is required.

## 4.9 Boating

This section provides the minimum requirements for safe work practices during the operation of boating equipment. Proper instruction, practice, and training are important. Boating equipment is used for work purposes only. No recreational use or horseplay is allowed.

Boating rules apply to all GHD personnel utilizing these pieces of equipment on private or public bodies of water. Additionally, GHD subcontractors adhere to this procedure unless they have an operating procedure as stringent as or more stringent than this program.

The following list summarizes key guidelines for the safe operation of boats:

- In any boat equipped with a motor, the operator is in possession of a Pleasure Craft Competency Card.
- An approved Department of Transportation personal floatation device (PFD) is available onboard for each person on the boat. PFDs are worn at all times while collecting samples from bodies of water or on GHD business.
- The boat has the following items on board:
  - One buoyant heaving line at least than 15 m (49'3") long
  - One bailer or one manual water pump
  - A watertight flashlight or three approved flares if further than 1 nautical mile from shore
  - A sound signaling device or appliance
- Boats are not operated in poor visibility or during hours of restricted illumination.
- No vessel is operated in a reckless or negligent manner.
- All vessels with an inboard motor and fixed fuel tank have an approved, fully charged fire extinguisher on board.
- Obstructions and sampling supplies, including tools, are stowed and/or secured in safe locations while vessel is in use.
- During sampling, outboard motors are shut off and the kill switch is engaged.

## 4.10 Electrical Safety

Employees do not accept unnecessary exposure to hazards, such as working on energized electrical installations. When possible, circuits are de - energized according to the GHD Lockout/Tagout program and client requirements to achieve safe working conditions. When it is not possible to de - energize circuits, the Workplace Electrical Safety Program (WESP) requirements ensure that safe conditions and work practices are implemented.

The WESP is the electrical safety program that covers all electrical work performed at GHD facilities and work performed by GHD at client facilities. It also provides mandatory program requirements and is used in conjunction with all other procedures and practices on the site to ensure that electrical work is accomplished safely.

To protect employees from shock and/or arc flash hazards, only individuals who are "qualified" in accordance with the NFPA 70E or CSA Z462 Standards will be allowed to perform Arc Flash Hazards Analysis, LOTO, diagnostic testing, work on live electrical circuits or perform electrical work on equipment. The term "qualified" does not relate to a job title or job assignment, but rather to the activity being performed. Employees who perform electrical work must successfully complete the “Electrical Safety for Qualified Persons” training to be authorized as “qualified”. Only persons who have received this training and are knowledgeable in the construction and operation of equipment or a specific work method, and are trained to recognize and avoid the electrical hazards that may be present with respect to that equipment or work practice are allowed to perform this type of work. Consult the GHD Workplace Electrical Safety Program for additional program requirements and permits.

## 4.11 Control Of Hazardous Energy(Loto)

Hazardous energy sources may be encountered during the servicing and maintenance of machines and equipment, in which the unexpected energization or start-up of the machines or equipment could cause injury to employees.

The minimum performance requirements to control hazardous energy requires that employers develop and implement an energy control program. The elements of an energy control program are as follows:

- Lockout/tagout
- Employee protection
- Energy control procedure
- Protective materials and hardware
- Periodic inspections
- Training and communication
- Energy isolation
- Employee notification

Project personnel who are required to conduct operations and maintenance activities that will require the isolation of an energy hazard through the use of a lockout/tagout device shall follow the GHD program requirements and written procedures for that operation. The program requirements can be located in the Appendix.

**Employee Training**

Employees authorized to attach and remove lockout/tagout devices shall be provided with initial training regarding the safe application, usage, and removal of such devices. Each authorized employee will receive training in the recognition of applicable hazardous energy sources, the type and magnitude of the associated energy, and the methods necessary for energy isolation and control.

All authorized employees will be provided with refresher training annually, or at more frequent intervals whenever the following conditions apply:

- A job assignment change.
- A change in machinery or equipment, or a process change that presents new hazards.
- A change in the energy control procedures.
- Possible deficiencies in the employee's understanding of the following:
  - The hazards associated with the energy that controls the machinery or equipment in the employee's work area.
  - Application and removal procedures for lockout/tagout devices.

Employees who work in areas where lockout/tagout procedures are used shall receive initial and annual refresher training in the purpose and use of lockout/tagout devices and principles behind their use.

## 4.12 Heat Stress

Heat stress is one of the most common illnesses faced by project personnel when working in elevated temperatures and/or humidity.

**Prevention**

The following procedures will be carried out to reduce heat stress:

- Heat stress monitoring.
- Acclimatization.
- Sun exposures.
- Work/rest regimes (schedule of breaks) in accordance with Occupational Health Clinics for Ontario Workers (OHCOW).
- Humidex Heat Stress Response Plan – mandatory breaks scheduled in summer months or during high risk activities for heat stress (based on ACGIH)
- Heat stress safety PPE (e.g., cool vests, bandanas)
- Cool potable water available
- Use of buddy system
- Seek shade - Shade is a good source of protection, but keep in mind that shade structures (e.g., trees, umbrellas, canopies) do not offer complete sun protection.

| **OHCOW Humidex Heat Stress Response Plan** | | |
|---|---|---|
| **°F** | **°C** | **Response** |
| 77-84°F | 25-29°C | •supply water to workers on an "as needed" basis |
| 86-91°F | 30-33°C | •post "heat stress alert" notice<br>•encourage workers to drink extra water<br>•start recording hourly temperature and relative humidity |
| 93-98°F | 34 37°C | •post "heat stress warning" notice<br>•notify workers that they are drinking extra water<br>•ensure workers are trained to recognize symptoms |
| 100-102°F | 38 39°C | •provide 15 minutes relief per hour<br>•provide adequate cool (10 15°C) water, at least 1 cup (240 ml) of water every 20 minutes<br>•workers with symptoms should seek medical attention |
| 104-107°F | 40 42°C | •provide 30 minutes relief per hour in addition to the provisions listed previously |
| 109-111°F | 43 44°C | •if feasible provide 45 minutes relief per hour in addition to the provisions listed above<br>•if a 75% relief period is not feasible then stop work until the humidex is 42°C or less |
| 113°F | 45°C or over | •stop work until the humidex is 44°C or less |
| Note: Humidex plan is a simplified way of protecting workers from heat stress which is based on the 2007 ACGIH heat stress TLV® (threshold limit value®) which uses wet bulb globe temperatures (WBGT) to estimate heat strain. These WBGT's were translated into humidex | | |

**Sun Exposure**

Overexposure to sunlight is a common concern when field activities occur during warm weather

conditions. Overexposure can occur on clear, sunny days, as well as on overcast and cloudy days. The following steps should be taken to protect against overexposure to sunlight:

- Always use sunscreen on exposed body parts.
- Cover up.
- Wear safety rated sunglasses.
- Limit time in the midday sun.

## 4.13 Cold Stress

Cold stress is similar to heat stress in that it is caused by a number of interacting factors including environmental conditions, clothing, and workload, as well as the physical and conditioning characteristics of the individual.

**Prevention**

A variety of measures can be implemented to prevent or reduce the likelihood of employees developing cold related ailments and disorders.

- Acclimatization.
- Fluid and electrolyte replenishment.
- Eat a well balanced diet.
- Wear warm clothing.
- Follow work/rest regimes.

The parts of the body most important to keep warm are the feet, hands, head, and face. As much as 40 percent of body heat can be lost when the head is exposed.

**TLVs Work/Warm Up Schedule for 4 Hour Shift**

**THRESHOLD LIMIT VALUES WORK/WARM-UP SCHEDULE FOR FOUR-HOUR SHIFT***

| Air Temperature Sunny Sky | | No Noticeable Wind | | 5 mph Wind | | 10 mph Wind | | 15 mph Wind | | 20 mph Wind | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| °C (approx) | °F (approx) | Max. Work Period | No. of Breaks | Max. Work Period | No. of Breaks | Max. Work Period | No. of Breaks | Max. Work Period | No. of Breaks | Max. Work Period | No. of Breaks |
| -26° to -28° | -15° to -19° | (Norm breaks) 1 | | (Norm breaks) 1 | | 75 min. | 2 | 55 min. | 3 | 40 min. | 4 |
| -29° to -31° | -20° to -24° | (Norm breaks) 1 | | 75 min. | 2 | 55 min. | 3 | 40 min. | 4 | 30 min. | 5 |
| -32° to -34° | -25° to -29° | 75 min. | 2 | 55 min. | 3 | 40 min. | 4 | 30 min. | 5 | Non-emergency work should cease ↓ | |
| -35° to -37° | -30° to -34° | 55 min. | 3 | 40 min. | 4 | 30 min. | 5 | Non-emergency work should cease ↓ | | | |
| -38° to -39° | -35° to -39° | 40 min. | 4 | 30 min. | 5 | Non-emergency work should cease ↓ | | | | | |
| -40° to -42° | -40° to -44° | 30 min. | 5 | Non-emergency work should cease ↓ | | | | | | | |
| -43° to below | -45° & below | Non-emergency work should cease | | | | | | | | | |

*2008 TLVs and BEIs - Threshold Limit Values for Chemical Substances and Physical Agents and Biological Exposure Indices. Cincinnati: American Conference of Governmental Industrial Hygienists (ACGIH), 2008

## 4.14 Hand And Power Tools

### Hand Tools

- Hand tools must meet the manufacturer's safety standards.
- Hand tools are not to be altered in any way.
- At a minimum, appropriate eye and face protection that meets current applicable standards (ANSI/CSA) must be used.
- Wrenches, including adjustable, pipe, end, and socket wrenches, are not used when jaws are sprung to the point that slippage occurs.
- Impact tools such as drift pins, wedges, and chisels are kept free of mushroom heads.
- Wooden handles are free of splinters or cracks and secured tightly to the tool.
- Any damaged or defective tools are immediately removed from service and tagged for destruction.

### Power Tools

- All power tools must be inspected regularly and used in accordance with the manufacturer's instructions and the tool's capabilities.
- Electric tools are not used in areas subject to fire or explosion hazards, unless they are approved for that purpose.
- Corded portable electric tools are connected to a ground fault circuit interrupter (GFCI) when working in wet areas.
- Coiled cords/extension cords are uncoiled when plugged in to allow for dissipation of heat.
- Cords/extension cords rated appropriately for the temperature are used.
- Appropriate eye and face protection that meets current applicable standards (ANSI/CSA) are used.
- Personnel are trained in the proper use of the tool.
- Any damaged or defective power tools must be immediately tagged and removed from service.
- Repairs to hand or power tools are only made by qualified individuals and in accordance with the manufacturer’s standards.
- Field or shop modifications to tools or equipment are only made by qualified individuals and in accordance with either manufacturer or engineer-approved specifications.

## 4.15 Portable Ladders

When portable ladders are in use on work sites, the following guidelines apply as a minimum standard.

- Use the 4 to 1 ratio. The ladder feet are 1 foot away from what it leans against for every 4 feet in height to the point where the ladder rests.
- Never use a ladder in a horizontal position as a runway or a scaffold.
- Never place a ladder in front of a door that opens toward it unless the door is locked, blocked, or guarded by a person.
- Place a portable ladder so that both side rails provide secure footing on soft ground to prevent the ladder from sinking.
- Place the ladder's feet on a substantial and level base, not on a movable object.
- On uneven surfaces, use a block, wedge, or ladder foot.
- Always lash, block, or otherwise secure a ladder's footing on wet or oily pavement, a smooth floor, or an icy or metal surface..
- Do not lean a ladder against unsafe backing, such as loose boxes or barrels.
- Securely lash or otherwise fasten the ladder to prevent it from slipping when using a ladder to access to high places.
- Always extend the ladder at least three rungs (3 feet) above the point of support when gaining access to a roof or elevated platform.
- Always maintain three points of contact when ascending or descending. If material must be handled, place in a bag or bucket and raise or lower it with a rope.
- Always face the ladder when ascending or descending.
- Maintain clean, dry footwear as much as possible to prevent slipping on the rungs.

## 4.16 Slip, Trip, Hit, Fall

Slip/trip/hit/fall injuries are the most frequent of all injuries to workers. They occur for a wide variety of reasons, but can be minimized by the following prudent practices:

- Spot-check the work area to identify hazards and communicate hazards to on site personnel.
- Update/dirty the JSA to reflect changes.
- Keep work areas clean and free of clutter, especially in storage areas and walkways.
- Secure all loose clothing and ties, and remove jewelry that may pose an entanglement hazard.
- Establish, maintain, and utilize walkways that are free of slip and trip hazards.
- Utilize/install appropriate lighting for walking paths and working areas.
- Beware of slip/trip hazards such as wet floors, slippery floors, and uneven surfaces or terrain.
- Carry only loads you can see over (Refer to Material Handling for additional information).
- Refrain from the use of portable communication devices (cell phones, two-way radios) while traversing the site.
- Keep a safe buffer zone between workers using equipment and tools.

## 4.17 Special Conditions

GHD may be asked to conduct work that requires special precautions/considerations. Potential exposure factors are identified on the left, with associated mandatory conditions identified on the right.

| | |
|---|---|
| • Remote work locations | • Working alone is not permitted. Submit a Journey Management Plan. Use call-in procedure to include use of satellite phone if no cell or direct line access. |
| • Project site is in an area known for high crime or violence activity | • Working alone is not permitted. A police or security escort is required. |
| • Entry into abandoned buildings | • Working alone is not permitted. Use call-in procedure. |
| • Entry into wooded areas during hunting season | • Working alone is not permitted. Use a reflective vest. Submit a Journey Management Plan. Use call-in procedure. |
| • Project work involving single employees (lone worker) | • Use call-in procedure. |

If these situations are possible, please consult with your RSHM to develop a plan prior to your project's start date.

## 4.18 Aggressive Or Menacing Behavior

When confronted by an individual whose behavior becomes aggressive or menacing, remain as calm as possible. Avoid arguing with or physically confronting the individual. Attempt to distance yourself from the individual. Advise others in the area to leave the scene and request police assistance by having someone call the emergency number listed on the Emergency Contact Sheet. Use the team approach. A staff member who is physically unable to break away from an attacker should shout for help.

The use of physical force is justified when a person believes that such force is necessary to protect himself or herself against the use or imminent use of unlawful physical force by another person.

Should an aggressor only be interested in the taking or damaging of property, do not interfere. Obtain a description of the individual to provide to local authorities, including height, weight, race, sex, clothing, accent, unusual markings such as tattoos, piercings, scars, hair color, and weapon, if any.

Contact the Emergency Hotline and file an incident report with your immediate supervisor as soon as it's safe to do so.

## 4.19 Adverse Weather Conditions

Adverse weather is the existence of or impending weather conditions such as heavy rain, freezing rain, sleet, snow, high winds (50km/30mph), dust storms, tornadoes, hurricanes, lightning, or any combination of weather that is either not reasonable or not safe for employee exposure. Stop Work Authority (SWA) is executed prior to these conditions as reasonably possible. The site is evacuated according to the emergency plan developed and listed in this Health and Safety Plan.

Based on their expertise and knowledge of manufacturer's recommendations for the equipment being operated, heavy equipment operators such as crane and drill rigs are responsible for advising the site supervisor whether it is safe to continue operations.

The site supervisor decides on the continuation or discontinuation of work based on current and pending weather conditions, the equipment manufacturer recommendations, and the equipment operator's recommendations.

# 5. Biological Hazards

## 5.1 Introduction To Biology

GHD employees conduct numerous project activities where they may encounter biological hazards such as listed in the following table. This section identifies the problems associated with these biological hazards and the precautions to be taken if these hazards are encountered.

The biological hazards identified are applicable to this site. If you are bitten, stung, or attacked by any of the listed hazards, contact the GHD Incident Hotline at 1-866-529-4886

## 5.2 Wildlife

| | | |
|---|---|---|
| Tick and Chiggers | •Wear light colored clothing •Keep clothing buttoned or zipped •Keep socks tucked in •Apply repellant containing 30% DEET to clothing and exposed skin •Check hair and clothing periodically using buddy system | •Remove tick with tweezers or fingers and tissue •Grab tick as close as possible to attachment site and pull firmly •Inspect tick to ensure that no parts remain in attachment site •Apply AfterBite containing antiseptic to affected areas •Call GHD Incident Reporting Hotline |
| Flying, Stinging, Biting Insects: Bees, Wasps | •Avoid wearing perfume, hairspray, cologne, and scented deodorant while working outside •If eating outside, keep all food and drinks covered; sweet foods and strong scents attract stinging insects •Never swat or swing at the insect; wait for it to leave, softly blow it away, or gently brush it aside •Inspect areas carefully as bees, wasps, and hornets can nest both in the ground and above ground •If the nests pose a threat, have them professionally removed | •Apply AfterBite containing antiseptic to affected areas or place an ice cube or ice pack over the sting to reduce pain •Remove the stinger with tweezers or scratch with a credit card (catch barbs with card and pull out) •Seek medical attention when the reaction to a sting includes swelling, itching, dizziness, and shortness of breath •Call GHD Incident Reporting Hotline |
| Mosquitoes | •Wear light colored clothing •Keep your body covered as much as possible; wear a hat or mosquito screen •Apply repellant containing 30% DEET to clothing and exposed skin | •Apply AfterBite containing antiseptic to affected areas •If moderate to extreme itchiness is experienced, use over the counter antihistamines |
| Venomous Snakes | •Watch where you step, sit, or put your hands •Wear appropriate clothing, boots, and snake chaps •Stay on your feet as much as possible or clear work area before starting | •Call 911 or the local emergency number •Wash the wound •Keep injured area still and lower than the heart •Do not apply ice •Do not apply suction •Do not apply a tourniquet •Call GHD Incident Reporting Hotline |

| | | |
|---|---|---|
| Venomous Spiders - Brown Recluse, Black Widow | •Shake out clothing and shoes before getting dressed •Practice good housekeeping skills •Exercise care when handling materials that have been undisturbed for some time; wear leather gloves •Check voids and dark cluttered areas before inserting hands •Always wear gloves | •Retain specimen of spider if possible •Apply AfterBite containing antiseptic to affected areas •Seek medical attention immediately •Do not drive if bitten by a black widow •Call GHD Incident Reporting Hotline |
| Threatening Dogs | •Stop walking, face the dog, and be relaxed •Keep the dog in your peripheral vision as it circles •If it tries to bite – yell "NO" in a loud stern voice •If you have an item such as a briefcase or field book, keep it between you and the dog •If the dog continues to nip or attacks, fight back; protect your throat and if possible hit the dog in the nose, or kick it in the rib cage, which may stun it and deter it from continuing the attack | •If bitten and the skin is not broken, clean with antiseptic •Notify Supervisor/PM •If skin is broken, clean with antiseptic, cover, and seek medical attention •Notify Supervisor/PM •Call GHD Incident Reporting Hotline |
| Rodents/Rats | •Inspect work area for rodent droppings •For low amounts of droppings, use Level C with N95 disposable respiratory protection •For heavy accumulation, use Level C Full Face PAPR with P100 cartridge or, in severe cases, Level B •Soak dead mice, nests, and droppings thoroughly with a 1:10 solution of sodium hypochlorite (household bleach); bleach kills the virus and reduces the chance of further transmission •Place contaminated material in a plastic bag and seal for disposal •Disinfect by wet wiping all reusable respirator surfaces, gloves, rubber boots, and goggles with bleach solution •Place all disposable protective clothing, gloves, and respirators in plastic bags and seal for disposal •Thoroughly wash hands with soap and water after removing gloves | •If bitten by a rodent, clean with antiseptic •Cover the wound •Retain specimen if possible and seek medical attention •Notify Supervisor/PM •Call GHD Incident Reporting Hotline |

| | | |
|---|---|---|
| Coyotes/Wolves/Foxes | •Do not approach it to get a better look, entice it to come closer, or harass it •Do not feed it •Leave room for it to escape •Use the buddy system | •Raise your arms and wave them in the air to make yourself look larger •Back away slowly while remaining calm; do not turn your back on or run from a wolf or any other wild animal •Make noise and throw objects at the wolf •Use whistles, personal alarm devices, or commercially available pepper spray (effective only at short ranges) to frighten an approaching or threatening animal •Call GHD Incident Reporting Hotline |
| Canadian Geese | •Easily recognized by black head and grey breasts •Weigh up to 13 lbs and territorial and aggressive •Be aware of nesting areas •Bird and dropping carry several diseases that affect humans | •Remain calm and do not act aggressive or afraid •Gradually back away while keeping eye contact •Wear appropriate PPE when handling nests or dead animals •Wash hands with soap and warm running water •Disinfect hands with sanitizer •If attacked and injured, call GHD Incident Reporting Hotline |

## 5.3 Poisonous Plants

| | | |
|---|---|---|
| Poison Ivy/Poison Oak | •Learn to identify poison ivy and poison oak (leaves of three, let them be) •Urushiol oil is in the wood portion of the plant and is active all year long •Wear proper PPE in known areas (gloves, long sleeves, long pants, safety glasses) •Proper hygiene extremely important to prevent ingestion and eye contact | •You may only have 30 minutes to get the oil off skin before it absorbs, and less time in hotter climates •Rinse with cold water, as hot water will open your pores •Apply alcohol to dissolve oils •Watch for an itchy red skin rash, which is the most common reaction; over time, large blisters may form •Use topical cream to assist with the itching (consult your pharmacy) •In severe cases, contact your doctor •Call GHD Incident Reporting Hotline |
| Stinging Nettles | •Common plant found throughout North America •Silky hairs attach to the skin and cause pain and irritation •Wear proper PPE in known areas (gloves, long sleeves, long pants, safety glasses) | •Rinse area with cool water •Use tape to remove hairs if you can see them •Use mix of baking soda and water to create a paste and apply to inflicted area. •Obtain first aid/medical treatment if required •Call GHD Incident Reporting Hotline |
| Poison Hemlock Water, spotted, bulbiferous | •Learn to identify Poison Hemlock •Most poisonous plant in North America •Found in marshy areas across the country •All plant parts are poisonous | •Watch for symptoms including dilation of the pupils, trembling, dizziness, and slowing of the heartbeat •Contact the nearest poison control center (see emergency contact sheet) •Give the victim a tablespoon of salt in a glass of warm water to induce vomiting, and keep the person lying down, warm, and quiet, until help arrives •Call GHD Incident Reporting Hotline |
| Vegetation Overgrowth | •common weeds and tall grasses •increase in trip hazard, and entanglement •risk of fire during summer season •wear proper PPE, long pants, eye protection •increase in rodent, snake, stinging insect hazards | •discuss clearing area with management to reduce risks •use extra caution when walking due to unseen holes or trip hazards •watch for grass cuts on arms, contact GHD Incident Reporting Hotline if reaction occurs |

## 5.4 Biological

| | | |
|---|---|---|
| Histoplasmosis | Look for evidence of bird or bat colonies. •Before you work in or dig soil that's likely to harbor the fungus that causes histoplasmosis, spray it thoroughly with water. •Wear appropriate PPE for the task. •Clean footwear before leaving the site to prevent spore dissemination in cars, the office, at home, and elsewhere | •Wash hands with soap and warm water after removing your gloves. •If you have persistent flu like symptoms, see your doctor. Tell then if you have been around a bird or bat colony. •Call GHD Incident Reporting Hotline |
| Hantavirus | •Inspect work area for rodent droppings •For low amounts of droppings, use Level C with N95 disposable respiratory protection •For heavy accumulation, use Level C Full Face PAPR with P100 cartridge or, in severe cases, Level B •Soak dead mice, nests, and droppings thoroughly with a 1:10 solution of sodium hypochlorite (household bleach); bleach kills the virus and reduces the chance of further transmission •Place contaminated material in a plastic bag and seal for disposal •Disinfect all equipment | •Wash gloved hands with soap and water or spray a disinfectant or bleach solution on gloves before taking them off. •Wash hands with soap and warm water after removing your gloves. •If you have been around rodents and have symptoms of fever, deep muscle aches, and severe shortness of breath, see your doctor immediately •Call GHD Incident Reporting Hotline |
| Waterborne Pathogens | •Wear proper PPE when working near water sources •Use standard guard rails for working near water •Follow GHD's Fall Protection SOP •If fall protection isn't feasible, personnel are required to wear a regulation life jacket to prevent drowning •Call-in or make prearranged contacts after each activity posing a drowning hazard is complete •Ensure all employees have been vaccinated •Keep vaccination records up to date | •Stay hydrated with clear liquids including water, broth, herbal tea and light fruit juices •Consult a physician if symptoms persist •Call GHD Incident Reporting Hotline |
| Blood-borne Pathogens | • Exposure comes through work activities such as landfill, sewage treatment, sewers, contaminated medical waste • Virus, Bacteria, Fungus, and Parasites are considered blood-borne • Proper hygiene is extremely important to prevent ingestion • Wear proper PPE in known areas (gloves, long sleeves, long pants, safety glasses) | • All human blood and human body fluids treated as infectious • Cover all nicks and cuts to prevent cross-contamination. • Disinfect hands with sanitizer • Proper hygiene extremely important to prevent ingestion and eye contact • More information review GHD blood-borne policy • Call GHD Incident Reporting Hotline if exposed. |

| | | |
|---|---|---|
| Psitticosis - Bird Droppings | • Breathing in the organism when the urine, respiratory secretion, or dried feces • Other sources of exposure include mouth-to-beak contact, a bite from an infected bird. • Bacteria starts an infection that varies in severity from a mild flu-like illness to severe pneumonia • PPE may include gloves, protective clothing, boots, and where appropriate, a respirator | • Adequate ventilation systems including the use of high efficiency particulate air (HEPA) filters to reduce the spread of contaminated air. • Disinfectants area with ammonium compounds, isopropyl alcohol, 70% ethanol, household bleach (diluted to 1%) • Wetting the wastes before removal decreases aerosolization. • Call GHD Incident Reporting Hotline if exposed |
| Legionella | •Minimize water misting, stagnant water, and dead zones •Manage water temperature •Implement a preventative maintenance and inspection program to monitor equipment •Conduct Legionella testing of water systems and equipment | •If you are suffering a respiratory ailment, notify your supervisor and contact the GHD Incident Reporting Hotline |

# 6. Personal Protective Equipment

## 6.1 Introduction To PPE

Controlling a hazard at the source is the best way to protect employees. When engineering, work practice, and administrative controls are not able to protect our employees, GHD provides personal protective equipment (PPE) to its employees and ensures that the PPE is used appropriately. PPE is equipment worn as a barrier to minimize exposure to a variety of hazards.

This section covers applicable PPE requirements, which include eye, face, hand, head, foot, and respiratory protection.

## 6.2 Types of Personal Protective Equipment (PPE)

The type of PPE required for work varies based on the task being performed. The specific PPE required for each individual task is documented in the appropriate task-specific JSA. The recommended minimum PPE for GHD site work is as follows:

- Shirts with a minimum 6-inch sleeve.
- Long pants made from suitable sturdy material .
- Grade 1 protective footwear meeting CSA Z195 M92 (Canada)/ ANSI Z41.1 (US), green patched (triangle), steel-toed/puncture-resistant and electric shock-resistant sole with a 6-inch cuff, fully laced and secured, in material appropriate for weather and task.
- Safety glasses or goggles (based on the type of hazard – dust, splash, etc.), meeting CSA Z94.3 (Canada) or ANSI Z87.1 (US) standards.
- Hand protection such as gloves meeting standards EN 388 and ANSI 105-2000 as appropriate for the task as per JSA, with selection based on the hazards (abrasion, blade cut, tearing, puncture, and impact) associated with the task being performed.
- Reflective garment meeting CSA Z96 02 or ANSI 107 (as required).
- Type 1 Class E hardhat, meeting either CSA Z94.1 05, Z94.1 92, ANSI Z89.1, or Z89.1.
- Hearing protection meeting CSA/ANSI approved NRR of at least 20 dBA if noise levels exceed 85 dBA.

Additional minimum requirements for PPE include:

- All PPE are maintained in good condition with no rips, tears, or damage that compromise integrity.
- PPE is not loose fitting as to avoid entanglement issues.
- All PPE is disposed of and/or decontaminated at the conclusion of each workday. The most contaminated PPE is decontaminated first.
- All disposable equipment is removed before meal breaks and at the conclusion of the workday, and replaced with new equipment prior to commencing work.
- Reusable equipment (safety glasses, hard hats, goggles, etc.) is cleaned and sanitized according to GHD and/or manufacturer guidelines.
- Eating, drinking, chewing gum or tobacco, and smoking are prohibited while working in areas where the potential for chemical and/or explosive hazards may be present. Personnel must wash thoroughly before initiating any of the aforementioned activities.

## 6.3 Types Of Protective Material

No universal protective material exists. All materials will decompose, be permeated, or otherwise fail to protect under certain circumstances. Protective clothing can be constructed from a variety of materials for protection against exposure to specific physical, chemical, or biological hazards.

Fortunately, most manufacturers list guidelines for the use of their products. These guidelines usually concern gloves or coveralls and generally only measure rate of degradation, which is failure to maintain structure. A protective material may not necessarily degrade, but may allow a particular chemical to permeate its surface. For this reason, guidelines must be used with caution. When permeation tables are available, they are used in conjunction with degradation tables.

To obtain optimum usage from PPE, the following procedures are followed by all site personnel using PPE:

- When using disposable coveralls, don a clean, new garment after each rest break or at the beginning of each shift
- Inspect all clothing, gloves, and boots both prior to and during use for:
  - Imperfect seams
  - Non uniform coatings
  - Tears
  - Poorly functioning closures
- Inspect reusable garments, boots, and gloves both prior to and during use for:
  - Visible signs of chemical permeation
  - Swelling
  - Discoloration
  - Stiffness
  - Brittleness
  - Cracks
  - Any sign of puncture
  - Any sign of abrasion

Reusable gloves, boots, or coveralls exhibiting any of the characteristics listed above are discarded. PPE used in areas known or suspected to exhibit elevated concentrations of chemicals are not reused.

## 6.4 Respiratory Protection

Respiratory protection is sometimes required for personnel during project activities when action levels exceed the occupational exposure levels. When respirators are required, personnel identify and select the appropriate air purifying respirator and supporting cartridge medium, and follow the procedures and guidelines in their respective written Respiratory Protection program.

At a minimum, all personnel required to use this equipment are:

- Instructed in how to properly fit a respirator to achieve the required face piece to face seal for respiratory protective purposes.
- Medically cleared for the use of respiratory protection.
- Appropriately fitted for the selected respirator through established recognized fit testing methods (quantitative/qualitative), and documentation of fit is readily available.
- Free of beards, sideburns, eyeglasses, and upper or lower dentures that could affect the face seal.

Further regulations for the use of respiratory protection include:

- Cartridges are changed prior to breakthrough, daily, or when personnel begin to experience increased inhalation resistance or breakthrough of a chemical warning property.
- Respiratory equipment and other non disposable equipment are fully decontaminated.
- Appropriate action levels are established and documented based on the applicable occupational exposure limits.

***NOTE: This HASP is not intended for the use of supplied air operations. For supplied air operations, the project manager and a GHD safety professional conduct a review of the scope of work.***

GHD identifies the type of respirator and cartridge and documents on the applicable JSA for the affected tasks and on Table 2.

## 6.5 Respirator Cleaning

Respirator decontamination is conducted once daily at a minimum. Face pieces are disassembled, the cartridges are thrown away, and all other parts are placed in a cleansing solution. After an appropriate amount of time in the solution, the parts are removed and re seated with tap water.

Face pieces are allowed to air dry before being placed in sanitized bags and stored in a clean area.

## 6.6 Levels Of Protection

Protection levels provided by PPE selection are upgraded or downgraded based upon a change in site conditions or the review of the results of air monitoring or the initial exposure assessment monitoring program, if one was conducted.

When a significant change occurs, the hazards are reassessed. Some indicators of the need for reassessment are:

- Commencement of a new work phase.
- Change in job tasks during a work phase.
- Change of season/weather.
- Temperature extremes or individual medical considerations limiting the effectiveness of PPE.
- Chemicals other than those expected to be encountered are identified.
- Change in ambient levels of chemicals.
- Change in work scope that affects the degree of contact with areas of potentially elevated chemical presence MUST be re-evaluated.

All proposed changes to protection levels and PPE requirements are reviewed and approved prior to implementation by the SS.

# 7. Site Control

## 7.1 Introduction To Site Control

The purpose of site control is to minimize potential contamination of workers and protect the public from hazards found on site. Site control also includes site security for the protection of GHD employee and subcontractor when working in public areas. Site Control is especially important in emergency situations.

Site control, work area demarcation, and site security will be achieved through posting of signage and placement of barricades and or personnel. All controlled areas will have the appropriate signage posted. Barricades and warning signs will be placed to warn personnel of potential hazards. A standby person (spotter) may be utilized in place of barricades, where appropriate. The following materials may be used to barricade the work area and protect both public and GHD:

- Warning Signs
- Traffic Cones
- Delineators

Approved pedestrian and vehicle traffic paths will be determined during Tailgate Safety Meetings based upon current site conditions and work locations. When applicable, one pathway should be established for heavy equipment and one for personnel decontamination.

The majority of site operations, as well as access to the site, could be controlled from the support zone. The support zone will provide for team communications, emergency response, and sanitary facilities. Appropriate safety and support equipment also will be located in this zone.

The support zone will be located upwind of site operations if possible, and would be used as a potential evacuation point if appropriate. No potentially contaminated personnel or materials are allowed in this zone.

## 7.2 Work Zone Demarcation

When performing work that could put yourself or others at risk, you must demarcate an exclusion zone around your work. This is typically done with yellow and black plastic "barricade tape." Use signs, placards, and other postings as necessary to warn others not to enter the demarcated area unless they have business in the area and have authorization to enter. Where appropriate, post special requirements for entry.

The levels and requirement for work zone demarcation is based on the task being performed or the requirement of the client.

## 7.3 Work Zone Demarcation Level 2

Is required for active or inactive retail sites when there is heavy equipment operation. Level 2 is to be set up to isolate the work area from public access.

- Excavation including test pitting and tank pulls
- Crane and Aerial lifts
- Anytime an excavation is being left open for any duration

These task require sawhorse barrier or temporary fencing which prevents the public from entering the work area. Signs must be posted indicating the required PPE.

## 7.4 Two-Person Crew/Buddy System

A Two-Person Crew or Buddy System shall be implemented to protect the employees and public when conducting high risk activies such as:

- Working near traffic
- Working ON or NEAR water
- Excessive noise to which hearing traffic or communication is difficult
- Confined or restricted spaces
- In an isolated area such as landfills or wooded areas
- Areas with high crime rates

When using the buddy system, visual contact must be maintained between crew members at all times, and crew members must observe each other for signs of chemical exposure, heat, or cold stress. Indications of adverse effects include, but are not limited to:

- Changes in complexion and skin coloration
- Changes in coordination
- Excessive salivation and pupillary response
- Changes in speech pattern.

Project personnel must also be aware of potential exposure to possible safety hazards, unsafe acts, or noncompliance with safety procedures. Individuals must inform their partners or fellow team members of non visible effects of exposure to toxic materials. The symptoms of such exposure may include:

- Headaches
- Dizziness
- Nausea
- Blurred vision
- Cramps
- Irritation of eyes, skin, or respiratory tract.

If protective equipment or noise levels impair communications, prearranged hand signals must be used for communication. Personnel must stay within line of sight of another team member.

## 7.5 Communication

Each member of the project team will be able to communicate with other team members at all times. Communications will be by way of an

- Cell Phones/Smart Phones
- Two-Way Radio

The primary means for external communication are telephones and radio. If telephone lines are not installed at a site, all team members should:

- Know the location of the nearest telephone
- Have the necessary telephone numbers readily available

**Note: The authorized use of cellular phones must be cleared by the client prior to entering site.**

The following procedures will be followed by all site workers when using a cell phone on site:

- No cell phone use while driving or operating equipment.
- No cell phone use while in the exclusion zone.
- If using a cell phone on site, find a location where you can safely use the phone. Do not walk around the site while using a cell phone.

Understanding of the following standard hand signals will be mandatory for all employees, regardless of other means of communication:

- Hand gripping throat — Cannot breathe
- Hands on top of head — Need assistance
- Thumbs up — OK, I'm alright, I understand
- Thumbs down — No, negative
- Gripping partner's wrist, or gripping both of your own hands on wrist (if partner is out of reach) – Leave area immediately

## 7.6 Decontamination And Hygiene

**Decontamination**

In general, everything that enters the site must either be decontaminated or properly discarded upon exit from the site. Prior to demobilization, potentially contaminated equipment will be decontaminated on a wash pad (decontamination pad), drum, or containment pad which then will be placed into appropriate container and labeled as hazardous waste and will be stored in a designated area until disposal arrangements are made.

The type of decontamination solution to be used is dependent on the type of chemical hazards. The decontamination solution for heavy equipment and for any reusable PPE is Alconox/Liqui nox soap. The MSDSs for Alconox/Liquinox will be located in the Appendix.

**Personnel Decontamination Procedures**

Personnel decontamination will be completed in accordance with the GHD Safety and Health Program for personnel decontamination. Wash water and sediments will be collected and stored with any runoff water collected for subsequent treatment/disposal. PPE, trash, etc. will be sent

off-Site for disposal. It will be kept separate from trash generated in clean areas of the Site.

All disposable equipment shall be doffed before meal breaks and at the conclusion of the workday and replaced with new equipment prior to commencing work.

Procedures for decontamination must be followed to prevent the spread of contamination and to eliminate the potential for chemical exposure.

Personnel - Decontamination will take place prior to exiting the contaminated work area.

Decontamination procedures are as follows:

Step 1 Remove all visible contamination and loose debris by washing with clean water.

Step 2 Remove all outer clothing that came in contact with the contamination (i.e., boot covers and outer gloves) and either dispose of in disposable container or wash in detergent solution and rinse.

Step 3 Remove protective clothing; dispose of in disposable container.

Step 4 Remove respirator, sanitize prior to reuse.

Step 5 Remove inner gloves, dispose of in disposable container.

Step 6 Wash and rinse hands.

**General Safety and Personnel Hygiene**

1. Eating at the site is prohibited, except in specifically designated areas. Designation of eating areas will be identified to each employee. The location of these areas may change over the duration of the project to maintain adequate separation from the active work area(s).
2. Smoking at the site is prohibited.
3. Individuals getting wet to the skin with effluent from the washing operation must wash the affected area immediately. If clothes in contact with skin are wet, then these must be changed.
4. Hands, face, neck, and other exposed areas must be washed with soap and water before eating, drinking, smoking, before using toilets, and before leaving the site.
5. All disposable coveralls and soiled gloves will be placed in covered containers at the end of every shift or sooner, if deemed necessary by the SHO. Wastes will be stored until proper disposal arrangements have been made.
6. Personnel working on site will not be permitted to wear facial hair that interferes with the mask to face seal on air purifying respirators.
7. All personnel performing or supervising work within the EZ must wear appropriate PPE, observe, and adhere to the personal hygiene related provisions of this section.
8. Personnel found to be disregarding the personal hygiene related provisions of this HASP will, at the discretion of the SHO, be barred from the site.

## 7.7 Social Protection

**Security Measures**

A site assessment should be made prior to performing work in high risk areas for violent crime. Additionally, it may be important to gather as much information as possible from the client, describing the location and social conditions of the area where work will be performed.

In the event it has been determined that this work will occur in an area of high risk, consideration

shall be given to providing on site security for the protection of the employee. This option may include services from a security agency, local law enforcement (if available), or the services of an off duty law enforcement officer. The Project Manager and/or Project Coordinator shall be contacted and provide authorization prior to making these arrangements.

Anti-social behavior means different things to different people – noisy neighbors who ruin the lives of those around them, 'crack houses' run by drug dealers, loitering by drunkards, people begging by cash points, abandoned cars, litter and graffiti, young people using airguns to threaten and intimidate or people using fireworks as weapons.

When in this situation, there is no single strategy that always works. Remember these tips when faced with work conditions in volatile neighborhoods:

**Street Precautions**

When walking to and from your vehicle, or in and around the work site:

- Be alert to your surroundings and the people around you, especially if you are alone or it is dark
- Whenever possible, travel with a colleague
- Stay in well lighted areas as much as possible
- Walk close to the curb; avoid doorways, bushes, and alleys where someone could hide
- Walk confidently, and at a steady pace; make eye contact with people when walking
- Do not respond to conversation from strangers on the street, continue walking

**Harm Reduction**

Do as much as you can to avoid a confrontation "anticipation and avoidance" are the key words.

- If you get caught up in a situation, try to talk to an aggressor without provoking them.
- Practice relaxation, as appearing fearful or stressed can actually provoke an attack.
- Remember that body language is important in aggressive situations, so maintain a comfortable distance between you and the aggressor.
- It may be more advisable to submit than to resist and risk severe injury or death. You will have to make this decision based on the circumstances. Be especially careful, if your attacker has a weapon.
- Avoid arguing with or physically confronting the individual. Attempt to distance yourself from the individual. Advise others in the area to leave the scene and request police assistance by having someone call the emergency number listed on the Emergency Contact Sheet. Use the team approach. A staff member who is physically unable to break away from an attacker should shout for help.
- Steady yourself if danger threatens. Panic can disable you, so again it's useful to learn how to keep control in a difficult situation.
- If you must fight back, adopt what police term the "bash and dash" approach. Primary targets are the eyes, nose, mouth, ears, throat, groin, knees, or shins; choose whichever is easiest to get to.
- Be aware that your attacker might be stronger than you, or may take what you are using in self defense and use it against you. It is often better just to shout loudly and run away.
- When confronted by an individual whose behavior becomes aggressive or menacing, remain as calm as possible. Avoid arguing with or physically confronting the individual. Attempt to distance yourself from the individual. Advise others in the area to leave the scene and request police assistance by having someone call the emergency number listed on the Emergency Contact Sheet. Use the team approach. If you are physically unable to break away from an attacker, shout for help.
- The use of physical force is justified when a person believes that such force is necessary to protect him or herself against the use or imminent use of unlawful physical force by another person. The use of physical force is also justified in the defense of another party, such as a co worker, who is being subjected to unlawful physical force. You can use any technique of legal self defense in order to halt or distract an attacker until law officers arrive on the scene.

- Should an aggressor only be interested in taking or damaging property, do not interfere. Obtain a description of the individual to provide to local authorities, including height, weight, race, sex, clothing, accent, unusual markings such as tattoos, facial piercing, scars, hair color, and weapon, if any.
- Shout 'fire' rather than 'help' – it can get more results.
- Stay alert and observant so that you can better describe your attacker and the assault to the police.
- Report to the GHD Hotline and work with your PM and Regional Safety and Health Manager (RSHM) to complete the investigation.

**Drug Activity**

The safe retrieval and disposal of used hypodermic needles and syringes:

- GHD employees must not handle or remove any hypodermic needles or syringes. You should contact the local Police Department, Fire Department, or Health Department for removal from the job site.
- **If you are injured by a discarded needle, you can receive a vaccination against Hepatitis B within 48 hours of the incident. Call the GHD Hotline, seek medical attention.**
- If an accident occurs where a needle or other sharp object has punctured the skin, then the injured person should:
  - Encourage the wound to bleed gently
  - Wash well with soap under cold running water
  - Cover the wound with a waterproof dressing
  - Seek medical attention as soon as possible
  - Inform the SS and/or PM
  - Complete a GHD Incident Reporting Form

**Car Jacking**

You can help prevent yourself being a victim of car jacking by:

- Keeping your doors locked in built up areas, and trying to keep the windows wound up, especially at traffic lights
- Being aware of what people are doing around you
- Using the middle lane, if there is one, when waiting at junctions or lights, so that your car is harder to get to from the pavement
- Not stopping to help someone who has broken down (if you really want to help, pull over at the next garage or police station and call for help)
- Driving to the next garage or police station and reporting them if someone tries to pull you over for no reason

A car jackers may 'accidentally' bump into your car, aiming to get you out of the car so they can steal it. If this happens, you may choose not to get out of the car – especially if you do not think it is a genuine accident. Wind the window down a little bit to talk to them if you want to.

**Aggressive or Menacing Behavior**

Report to the GHD Hotline and work with your PM and RSHM to complete the investigation.

## 7.8 Site Security

Site security is necessary to prevent the exposure of unauthorized, unprotected people to site hazards and to avoid interference with safe working procedures. Security shall be maintained outside of the actual work area(s) so as to prevent unauthorized entry into the work area(s). Members of the general public are to be protected from site hazards.

# 8. Emergency Procedures

## 8.1 Introduction Emergency Procedures

Emergencies can range from minor to serious conditions. Various procedures for responding to site emergencies are listed in this section. The PM or SS is responsible for contacting local emergency services, if necessary, for specific emergency situations. Various individual site characteristics will determine preliminary action to ensure that these entry procedures are successfully implemented in the event of an emergency. The project team will address necessary facility/client emergency protocols to ensure compatibility between this document and facility/client programs and expectations.

Field employees will identify the primary (on site) and secondary (off site) evacuation routes to muster locations prior to initiating work. A site map is provided in the Appendix.

At client facilities, site emergencies may be indicated by a fog horn or other loud audible sound. If an adjacent facility's alarm is activated, work will stop immediately, equipment will be de energized and/or secured as necessary for safety reasons and personnel will go immediately to the secondary evacuation location as indicated in pre-start and tailgate meetings.

Emergency evacuation drills will be conducted as deemed necessary by the SS, and documentation of the drills will be maintained by the SS in project file.

An Emergency Information Sheet containing the hospital location, directions, government agency phone numbers, emergency phone numbers, and a map with directions to the hospital is located in the Appendix.

## 8.2 Incident, Injury, Illness Reporting And Investigation

Any work related incident, injury, illness, exposure, vehicle accident, property loss and or security issues must be reported to your supervisor, the SS immediately. Stop Work Authority will be implemented. Provide care for any injured persons and secure the scene.

GHD will call the GHD PM and the GHD Incident Hotline. Personnel on site should maintain the work area as it was at the time of the incident until further directions are given by the GHD PM, a GHD Safety Professional. No GHD person on site has the authority to call a regulatory agency (environmental or OSHA); this shall be completed by GHD Leadership Team in conjunction with the client. Emergency medical care or support of fire departments is not a restricted call if immediately necessary to protect life and property.

The GHS PM, RSHM, will coordinate with onsite personnel to gather critical information. The GHD PM is responsible to contract the client which a positive verbal contact is required. The GHD Staff listed above will coordinate the completion and submission of the GHD First Report of Incident and Near Miss form to the GHD PM. This same group of GHD staff will manage further communications with the client.

The report must be filed for the following circumstances:

- Incident, injury, illness, or exposure of an employee.
- Injury of a subcontractor.
- Damage, loss, or theft of property.
- Any motor vehicle accident, regardless of fault, which involves a company vehicle, rental vehicle, or personal vehicle while the employee is acting in the course of employment.
- Any sting, involving a puncture of the skin must immediately be reported to Work Care and follow all GHD reporting requirements
- Security Issues
- Environmental releases or loss of containment.

Occupational incidents resulting in employee injury or illness will be investigated by the SS. This investigation will focus on determining the cause of the incident and modifying future work activities to eliminate the hazard.

All employees have the right and obligation to report unsafe work conditions, previously unrecognized safety hazards, or safety violations of others. If you wish to make such a report, it may be made orally to your supervisor or other member of management, or you may submit your concern in writing, either signed or anonymously.

## 8.3 Emergency Equipment/First Aid

Safety equipment will be available for use by site personnel, located within 30 feet of the work area(s), and maintained at the site.

- Automated External Defibrillators (AEDs) are optional first aid response equipment for conditions related to heart stoppage. If a unit is on site, designated personnel must be trained in the specific AED unit in addition to First Aid and CPR certification, conduct monthly inspections, and contact listed AED Unit coordinator.
- Emergency eyewash bottles and/or an eyewash station lasting 15 minutes.
- Emergency alarms as a means to alert all personnel instantaneously for an emergency.
- Fire extinguisher (at a minimum, a 2A/10BC will be on site).

## 8.4 Emergency Procedures For Contaminated Personnel

Whenever possible, personnel should be decontaminated in the contamination reduction zone before administering first aid, without causing further harm to the patient.

- Skin Contact: Remove contaminated clothing, wash immediately with water, and use soap, if available.
- Inhalation: Remove victim from contaminated atmosphere. Remove any respiratory protection equipment. Initiate artificial respiration, if necessary. Transport to the hospital.
- Ingestion: Remove from contaminated atmosphere. Do not induce vomiting if victim is unconscious. Never induce vomiting when acids, alkalis, or petroleum products are suspected. Transport to the hospital, if necessary.

Any person transporting an injured/exposed person to a clinic or hospital for treatment should take with them directions to the hospital and a listing of the contaminants of concern to which they may have been exposed.

Any vehicle used to transport contaminated personnel will be cleaned or decontaminated, as necessary.

## 8.5 Site Evacuations

In the event of an emergency situation such as fire, explosion, or significant release of toxic gases, project personnel in the field will be notified by established communications to evacuate the area. In the event of an emergency, GHD personnel will gather at their primary mustering point for a head count. The SS will determine a primary and secondary muster point to be used as an assembly area in the event of an emergency. The secondary muster point will be located at least 90 degrees from the primary. These locations will be communicated to the work crew(s) during the Tailgate Safety Meeting (TGSM) as part of the site specific training prior to commencement of work activities, weekly thereafter, and prior to the advent of potentially threatening weather. Muster points will be identified in the site map attached to the HASP.

## 8.6 Spill And Release Contingencies

If a spill has occurred, the first step is personal safety, then controlling the spread of contamination, if possible. GHD personnel will immediately contact site management to inform them of the spill and activate emergency spill procedures.

# 9. Environmental Control Program

## 9.1 Introduction

This section of the HASP outlines measures to be implemented at the Site to prevent hazards associated with environmental conditions.

## 9.2 Weather Monitoring

The Site Supervisor will be responsible for checking weather forecasts for the next day and week of work to provide advance notification of any severe weather conditions. Severe weather conditions (e.g., heavy rains) many cause unsafe conditions at the site and in some situations work may have to be stopped.

## 9.3 Tornado Safety Policy And Procedures

Tornadoes occur most frequently between April and October from 3:00 to 7:00 p.m. but can occur any time. In most cases, tornadoes move from a west/southwest direction. A typical tornado is a swirling storm of short duration with winds up to 300 miles per hour and a near vacuum at its center. It appears as a rotating funnel shaped cloud, from gray to black in color, extending towards the ground from the base of a thundercloud.

Tornadoes usually only cover a limited geographical area and give off a roaring sound. A tornado is the most concentrated and destructive potential weather event at the Site. Tornadoes are usually the result of the interaction of a warm, moist air mass with a cool or cold air mass. Secondary effects of tornadoes include flash flooding, electric power outages, transportation system and communication system disruption, and fires.

Whenever weather conditions develop that indicate tornadoes are expected, the National Weather Service will issue a tornado watch to alert people in a designated area for a specific time period (normally 6 hours) to remain alert for approaching storms. The tornado watch is upgraded to a tornado warning when a funnel cloud (tornado) is actually sighted or indicated by weather radar.

When a tornado is approaching, Site personnel will only have a short time to react. Therefore, Site personnel must be prepared to react during periods of severe weather. Memorize the following tornado danger signs:

i) Approaching clouds of debris can mark the location of a tornado even if a funnel cloud is not visible

ii) Before a tornado hits, the wind may die down and the air can become very still/calm

iii) It is not uncommon to see clear, sunlit skies behind a tornado as they usually occur at/near the trailing edge of thunderstorms.

**Tornado Evacuation Procedures**

GHD and contractor personnel monitor weather related information provided by National Weather Service. If the National Weather Service issues a tornado warning, Site supervisor will activate the emergency response plan.

AR101713

The "take shelter" warning signal is a "slow wail" of the alarm system. GHD Site personnel will evacuate the work zone(s) when a tornado watch has been issued by the National Weather Service. Personnel will contact the Project Management team to inform them they are leaving the site and provide them a location of the muster point (shelter) they are going. The Site Supervisor are responsible for work areas, they will check remote areas of the work zone(s) to ensure personnel have reacted to the alert. Personnel must proceed to the Site mustering point (shelter) and wait for further instructions. If a tornado watch is upgraded to a tornado warning, personnel will proceed to the designated tornado shelters. Once inside the shelter, conduct a head count to ensure that personnel are accounted for. In general, stay away from all windows and doors that lead to the outside. Remain in the shelter until the "all clear" signal is given by the Site Supervisor.

The tornado shelter most accessible to GHD personnel should be noted on the site map attached to this HASP

Directions to the shelter are to be communicated to Site personnel during initial Site safety orientation and throughout the tornado season during subsequent safety meetings.

If unable to reach the designated shelter, the best protection in a tornado is usually an underground area. If an underground area is not available, consider small interior rooms on the lowest floor without windows, hallways on the lowest floor away from doors and windows, rooms constructed with reinforced concrete/brick/block with a heavy concrete floor and roof, and protected areas away from doors and windows.

## 9.4 Rain And Snow

Excessive amounts of precipitation may cause potential safety hazards for work tasks. The hazards that would be most commonly associated are slipping, tripping, or falling due to slippery surfaces.

Severe weather conditions will result in work stoppage and the implementation of further emergency measures.

## 9.5 Temperature

Site activities are expected to be conducted year round. Temperature extremes may be experienced which require measures to be implemented to prevent health and safety hazards from occurring. Potential hazards arising from temperature extremes are heat stress and cold exposure.

## 9.6 Wind

High winds may be encountered at the Site and these can cause hazards that may affect Site personnel health and safety. Preventative measures that will be implemented if necessary are as follows:

i) Restrict Site activities.

ii) Batten down light equipment or building materials.

iii) Partially enclose work areas.

iv) Reduce or stop work activities.

## 9.7 Lightning & Thunder

Light travels at a faster speed than sound, you can see a lightning bolt before the sound of thunder reaches you.

To judge how close lightning is, count the seconds between the flash and the thunder clap. Each second represents about 328 yards/300 meters. If you can count less than 30 seconds between the lightning strike and the thunder, the storm is less than 6.2 miles/10 km away and there is an 80 percent chance the next strike will happen within that 6.2 miles/10 kilometers.

Lightning may strike several miles/kilometers away from the parent cloud and therefore precautions should be taken even if the thunderstorm is not directly overhead.

If you hear thunder or see lightning, stop work immediately and seek safe shelter.

Remain sheltered for 30 minutes after hearing the last thunder before returning to work.

## 9.8 Outdoor Precautions During Severe Weather

- Keep a safe distance from tall objects, such as trees, hilltops, and telephone poles.
- Avoid projecting above the surrounding landscape. Seek shelter in low lying areas such as valleys, ditches, and depressions, but also be aware of flooding.
- Stay away from water. Don't go boating if a storm threatens. Move to land as quickly as possible if you are on the water. Lightning can strike the water and travel some distance from its point of contact. Don't stand in puddles even if you are wearing rubber boots.
- Stay away from objects that conduct electricity, such as tractors, metal fences, motorcycles, lawnmowers, and tall metal objects.
- Avoid being the highest point in an open area. Holding a conductive tool, holding an umbrella, can make you the tallest object and a target for lightning.
- You are safe inside a car during lightning, but don't park near or under trees or other tall objects, which may topple over during a storm. Be aware of downed power lines, which may be touching your car.
- In a forest, seek shelter in a low lying area under a thick growth of small trees or bushes.
- Be alert for flash floods, which are sometimes caused by heavy rainfall, if seeking shelter in a ditch or low lying area.
- If caught in a level field far from shelter and you feel your hair stand on end, lightning may be about to hit you. Kneel on the ground immediately, with feet together, place your hands on your knees and bend forward. Don't lie flat.
- If you are in a group in the open, spread out, keeping people several yards/meters apart.

## 9.9 Indoor Precautions During Severe Weather

- Before the storm hits, disconnect electrical appliances including radios and television sets. Do not touch them during the storm.
- Don't go outside unless absolutely necessary.
- Stay away from doors, windows, fireplaces, and anything that will conduct electricity, such as radiators, stoves, sinks, and metal pipes. Keep as many walls as possible between you and the outside.
- Don't handle electrical equipment or telephones. Use battery operated appliances only.

## 9.10 Flash Flooding

FLASH FLOODS

Floods are one of the most common hazards in low lying areas, however not all floods are alike. Some floods develop slowly, while others such a flash floods, can develop in just a few minutes and without visible signs of rain. Additionally, floods can be local, impacting a neighborhood or community, or very large, affecting entire river basins and multiple states.

Flash floods can occur within a few minutes or hours of excessive rainfall, a dam or levee failure, or a sudden release of water held by an ice jam. Flash floods often have a dangerous wall of roaring water carrying rocks, mud and other debris.
Be aware of flood hazards no matter where you live or work, but especially if you are in low-lying areas, near water, behind a levee or downstream from a dam. Even very small streams, gullies, creeks, culverts, dry streambeds or low-lying ground that appear harmless in dry weather can flood.

During the flood

- If any possibility of a flash flood, move immediately to higher ground. Do not wait for instructions to move.
- Be aware of stream, drainage channels, canyons and other areas known to flood suddenly.

If you must prepare to evacuate, you should do the following:

- Do not walk through moving water. Six inches of moving water can make you fall.
- If you have to walk in water, walk where the water is not moving. Use a stick to check the firmness or depth of the ground in front of you.
- Do not drive into flooded areas. If floodwaters rise around your car, abandon the car and move to higher ground if you can do so safely.
- Observe weather in the distance, rain in the hills can cause flooding in the valleys..Do not park your vehicle along streams, rivers or creeks, particularly during threatening conditions.

## APPENDIX DOCUMENTS

AR101717

**Chemical Table**

| Chemical/CAS # | Chemical Name (Synonyms) | Exposure Limits | Routes Of Entry | Symptoms/Health Effects | Chemical Properties | Physical Characteristics | Concentration at Site |
|---|---|---|---|---|---|---|---|
| Dioxin CAS-1746-01-6 | 2, 3, 7, 8-tetrachloro-dibenzo-p-dioxin Dioxine TCDBD TCDD 2, 3, 7, 8-TCDD CAS-1746-01-6 | TLV: NE PEL: NE STEL: NE IDLH: NE | Inhalation Absorption Ingestion Eye/skin contact | ACUTE: Irritation to the eyes; allergic dermatitis; gastrointestinal disturbance; CHRONIC: Chloracne; Porphyria; possible reproductive and teratogenic effects; liver and kidney damage; hemorrhage. Potential occupational carcinogen. | (FP) NE (VP) 0.000002 mm (IP) NE (UEL) NE (LEL) NE | Colorless to white, crystalline solid. (Exposure may occur through contact at previously contaminated worksites | <30 ppb (sediment) |

# Tailgate Safety Meeting Form
## Large Group Format - Single Day

| | | | | | |
|---|---|---|---|---|---|
| Date: | | Time: | | Project No.: | |
| Presenter: | | | Project Name: | | |

Safety topics/items discussed:

| |
|---|
| |
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| |
| |

Site personnel in attendance:

| Print Name | Signature | Company |
|---|---|---|
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# Tailgate Safety Meeting Form
## Small Group Format – Multiple Days

| | | | | | |
|---|---|---|---|---|---|
| Date: | | Time: | | Project No.: | |
| Presenter: | | | Project Name: | | |

Safety topics/items discussed:

| Print Name | Signature | Company |
|---|---|---|
| | | |
| | | |
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| | | | | | |
|---|---|---|---|---|---|
| Date: | | Time: | | Project No.: | |
| Presenter: | | | Project Name: | | |

Safety topics/items discussed:

| Print Name | Signature | Company |
|---|---|---|
| | | |
| | | |
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| | | | | | |
|---|---|---|---|---|---|
| Date: | | Time: | | Project No.: | |
| Presenter: | | | Project Name: | | |

Safety topics/items discussed:

| Print Name | Signature | Company |
|---|---|---|
| | | |
| | | |
| | | |
| | | |

# Field Safe Task Evaluation Process (F-STEP)

| Report status: (insert date) | Initial report | Updated report | Final report | Verification/validation | Report input to SMART database |
|---|---|---|---|---|---|
| | | | | | |

| | | |
|---|---|---|
| Observer's name: | Date: | Time: |
| Client: | Project name : | |
| Observer's office: | Site location: | |
| Observer's supervisor: | Project no. (if applicable): | |
| Subcontractor: ☐ Yes ☐ No | Subcontractor company name: | |

| | |
|---|---|
| Feedback conducted by: | Date: |
| Observee's supervisor: | Time: |

| Check task being observed (if not listed here, go to columns at right) | | If checking this column, write in the specific task | |
|---|---|---|---|
| ☐ Air knifing | ☐ Mob/demob | ☐ Agricultural services | |
| ☐ Clearing | ☐ Project oversight | ☐ Construction | |
| ☐ Demolition | ☐ Soil sampling | ☐ Landfill | |
| ☐ Drilling | ☐ Stack testing | ☐ Office operations | |
| ☐ Electrical work | ☐ Surveys & audits | ☐ O&M | |
| ☐ Excavation | ☐ Traffic control | ☐ Pipeline | |
| ☐ General site cleaning | ☐ UST removal | ☐ Refinery | |
| ☐ Heavy equipment operations | ☐ Water sampling | ☐ Treatment plants | |
| ☐ IH sampling | ☐ Well management | ☐ Other | |
| ☐ Manual lifting | | | |

**Background information (Give a brief description of task being performed and your surroundings)**

**Observer's positive comments**

1.

2.

3.

**Feedback session conclusion:**
**If no questionable Items: brief recap of positive actions/comments**
**If questionable Items: brief recap of positive actions/comments and why did the questionable item(s) occur?**

AR101721

| Personal protective equipment | Meets work standards | ??? | N/A | Evaluation comments |
|---|---|---|---|---|
| 1. Hearing protection (e.g., ear plugs) | | | ☐ | |
| 2. Head protection (e.g., hard hat) | | | ☐ | |
| 3. Eye protection (e.g., safety glasses/goggles) | | | ☐ | |
| 4. Hand protection (e.g., gloves) | | | ☐ | |
| 5. Foot protection (e.g., steel-toe boots) | | | ☐ | |
| 6. Respiratory protection | | | ☐ | |
| 7. Fall protection (e.g., lanyard/harness) | | | ☐ | |
| 8. High visibility clothing (e.g., work vest) | | | ☐ | |
| 9. First aid kit/fire extinguisher | | | ☐ | |
| 10. Other (be specific) | | | ☐ | |
| **Body position** | **Meets work standards** | **???** | **N/A** | **Evaluation comments** |
| 11. Proper body positioning when exerting force (lifting/pushing/pulling) | | | ☐ | |
| 12. Pinch points/moving equipment - hands/body placement | | | ☐ | |
| 13. 3-points of contact | | | ☐ | |
| 14. Other (be specific) | | | ☐ | |
| **Work environment** | **Meets work standards** | **???** | **N/A** | **Evaluation comments** |
| 15. Work/walk surface clear (free and clear pathway) | | | ☐ | |
| 16. Housekeeping/equipment storage | | | ☐ | |
| 17. Controlled work zone (e.g., warning devices, barricades, cones, flags) | | | ☐ | |
| 18. Emergency stop/safety switches | | | ☐ | |
| 19. Materials labeled correctly | | | ☐ | |
| 20. Storage/disposal of waste | | | ☐ | |
| 21. Other (be specific) | | | ☐ | |
| **Operating procedures** | **Meets work standards** | **???** | **N/A** | **Evaluation comments** |
| 22. Star performed/job planning | | | ☐ | |
| 23. Stop work authority process – understood and considered | | | ☐ | |
| 24. JSA/JLA/risk assessment reviewed and followed | | | ☐ | |
| 25. Daily site inspection | | | ☐ | |
| 26. High risk task specific (hot work, confined space, LOTO, excavation/ trenching) | | | ☐ | |
| 27. Inspect work zone for hazards | | | ☐ | |
| 28. Coordinate/communicate with site rep and/or others on site | | | ☐ | |
| 29. Spotters used appropriately | | | ☐ | |
| 30. Underground/overhead utilities identified | | | ☐ | |
| 31. Other (be specific) | | | ☐ | |
| **Tools/equipment** | **Meets work standards** | **???** | **N/A** | **Evaluation comments** |
| 32. Hand/power tool - selection, condition, and use | | | ☐ | |
| 33. Field/test equipment - selection, condition, and use | | | ☐ | |
| 34. Heavy equipment - selection, condition, and use | | | ☐ | |
| 35. Other (be specific) | | | ☐ | |
| **Observation total occurrences** | | | ☐ | |
| **% observations to meet work standards** | | | ☐ | |
| **Item specific to work task** | **Meets works standards** | **???** | **N/A** | **Evaluation comments** |
| Insert task/JSA/SOP Step | | | ☐ | |
| Insert task/JSA/SOP Step | | | ☐ | |
| Insert task/JSA/SOP Step | | | ☐ | |

AR101722

| Causative factors and corrective actions | | | | | | Verification (Did we do what we said we would do?) and Validation (Is it working?) | | |
|---|---|---|---|---|---|---|---|---|
| **Item No.** | **CF** | **Corrective actions (Must match Causative Factor)** | **Responsible party** | **Date due** | **Date completed** | **Verified by/ Validated by** | **Date** | **Details** |
| | | | | | | **Verified by:**<br>**Validated by:** | | |
| | | | | | | **Verified by:**<br>**Validated by :** | | |
| | | | | | | **Verified by:**<br>**Validated by:** | | |
| | | | | | | **Verified by:**<br>**Validated by:** | | |

## Causative factors

| Personal factors | | Company factors | | External factors | |
|---|---|---|---|---|---|
| 1 | Insufficient training for task | 5 | Incomplete or no procedures | 10 | Exposure to conditions |
| 2 | Hurrying to complete the task | 6 | Procedures not known or enforced | | |
| 3 | Easier if proper process not followed | 7 | Improper PPE | | |
| 4 | Took shortcuts without prior incident | 8 | Improper tools | | |
| | | 9 | Improper workplace layout | | |

AR101723

# Driving Safe Task Evaluation Process (D-STEP)

| Report status: | | | | | |
|---|---|---|---|---|---|
| (insert date) | Initial report | Updated report | Final report | Verification/validation | Report input to SMART database |

| Observer's name: | Date: | Time: |
|---|---|---|
| Client: | Project name: | |
| Observer's office: | Site location: | |
| Observer's supervisor: | Project no. (if applicable): | |
| Subcontractor: ☐ Yes ☐ No | Subcontractor company name: | |

| Feedback conducted by: | Date: |
|---|---|
| Observee's supervisor: | Time: |

| **Driving conditions** | | | |
|---|---|---|---|
| ☐ Freeway/interstate | ☐ Wet | ☐ Day | ☐ Raining |
| ☐ Surfaced street | ☐ Dry | ☐ Night | ☐ Windy |
| ☐ Dirt road | ☐ Snow/ice | | ☐ Snowing |
| | ☐ Mud | | ☐ Fog |

| **Vehicle condition** | | | |
|---|---|---|---|
| ☐ Car | ☐ Truck | ☐ Van | ☐ Pulling trailer |
| ☐ Company owned | ☐ Rental | ☐ Personal | |

**Background information (Give a brief description of where you are driving from and to and your surroundings)**

**Observer's positive comments**

1.

2.

3.

**Feedback session conclusion:**
**If no questionable Items: brief recap of positive actions/comments**
**If questionable Items: brief recap of positive actions/comments and why did the questionable item(s) occur?**

AR101724

| Pre-driving | Meets work standards | ??? | N/A | Evaluation comments |
|---|---|---|---|---|
| 1. JMP/JSA/Risk Assessment developed and/or reviewed | | | ☐ | |
| 2. STAR performed/job planning | | | ☐ | |
| 3. Stop Work Authority – understood and considered | | | ☐ | |
| 4. Registration/insurance/last maintenance report | | | ☐ | |
| 5. Tire inflation and tread | | | ☐ | |
| 6. Wipers and washer fluid/clean windows/mirrors | | | ☐ | |
| 7. Horn/lights operation/instrument panel | | | ☐ | |
| 8. Body damage/overall vehicle appearance | | | ☐ | |
| 9. Under-vehicle check for leaks/obstructions | | | ☐ | |
| 10. Secure loose items | | | ☐ | |
| 11. Check fluid levels | | | ☐ | |
| 12. Fire extinguisher/triangles/first aid kit/jack/spare | | | ☐ | |
| 13. Verifies area is clear before moving vehicle | | | ☐ | |
| **Body positioning** | **Meets work standards** | **???** | **N/A** | **Evaluation comments** |
| 14. Adjust seat | | | ☐ | |
| 15. Adjust head rest | | | ☐ | |
| 16. Adjust mirrors to minimize blind spots | | | ☐ | |
| 17. Seat belts (driver/passengers) | | | ☐ | |
| 18. Locks doors | | | ☐ | |
| **Operating procedures** | **Meets work standards** | **???** | **N/A** | **Evaluation comments** |
| 19. Yields right-of-way and allows other vehicles to merge, change lanes, turn | | | ☐ | |
| 20. Respects pedestrians, cyclists, other drivers | | | ☐ | |
| 21. Is courteous/tolerant of others' poor driving | | | ☐ | |
| 22. Two hands on wheel no higher than 9 and 3 | | | ☐ | |
| 23. Skill in handling distractions | | | ☐ | |
| 24. Adjusts to traffic conditions (speed / traffic) | | | ☐ | |
| 25. Uses turn signals (for turns and lane changes) | | | ☐ | |
| 26. Following distance is appropriate (4-second rule) | | | ☐ | |
| 27. Avoids sudden acceleration and deceleration | | | ☐ | |
| 28. Before backing up, looks behind vehicle/checks for traffic, pedestrians, parked vehicles, uses spotter | | | ☐ | |
| 29. Scans the road ahead (15-second eye lead or 2-3 blocks-1/4 mile) and anticipates actions of others to avoid sudden swerves, stops, lane changes | | | ☐ | |
| 30. Checks mirrors every 5-8 seconds | | | ☐ | |
| 31. Checks for hazards on the road (e.g., animals, debris, road conditions) | | | ☐ | |
| 32. Reads and obeys traffic signals | | | ☐ | |
| 33. Makes complete stops at signals, at a safe distance | | | ☐ | |
| 34. Scans intersection left and right/anticipates intent of other vehicles before reaching "point of no return" | | | ☐ | |
| 35. Covers brakes safely and adjusts speed | | | ☐ | |
| 36. Does not use cell phone during operation of vehicle | | | ☐ | |
| 37. Other (be specific) | | | ☐ | |
| **Operating procedures - Parking** | **Meets work standards** | **???** | **N/A** | **Evaluation comments** |
| 38. Looks for pull through parking before backing in | | | ☐ | |
| 39. Uses signals, leaves adequate space before pulling back into lane | | | ☐ | |
| 40. Obeys signs and uses signals in parking lot | | | ☐ | |
| 41. Maintains proper speed inside the lot | | | ☐ | |
| 42. Ensures vehicle is legally/properly parked | | | ☐ | |
| 43. Sets parking brake and secures vehicle | | | ☐ | |
| 44. Other (be specific) | | | ☐ | |
| **Observation total occurrences** | | | ☐ | |
| **% Observations to meet work standards** | | | ☐ | |
| **Item specific to work task** | | | | |
| Insert Task/JSA/SOP Step | | | ☐ | |
| Insert Task/JSA/SOP Step | | | ☐ | |

| Causative factors and corrective actions | | | | | | Verification (Did we do what we said we would do?) and Validation (Is it working?) | | |
|---|---|---|---|---|---|---|---|---|
| **Item No.** | **CF** | **Corrective actions (Must match Causative Factor)** | **Responsible party** | **Date due** | **Date completed** | **Verified by/ Validated by** | **Date** | **Details** |
| | | | | | | **Verified by:**<br>**Validated by:** | | |
| | | | | | | **Verified by:**<br>**Validated by:** | | |
| | | | | | | **Verified by:**<br>**Validated by:** | | |
| | | | | | | **Verified by:**<br>**Validated by:** | | |

**Causative factors**

| Personal factors | | Company factors | | External factors | |
|---|---|---|---|---|---|
| 1 | Insufficient training for task | 5 | Incomplete or no procedures | 10 | Exposure to conditions |
| 2 | Hurrying to complete the task | 6 | Procedures not known or enforced | | |
| 3 | Easier if proper process not followed | 7 | Improper PPE | | |
| 4 | Took shortcuts without prior incident | 8 | Improper tools | | |
| | | 9 | Improper workplace layout | | |

# Unsafe Act / Unsafe Condition / Stop Work Authority (SWA) Report

| | | | |
|---|---|---|---|
| Reported by: | | Employee's office: | |
| RSHM: | | Date: | Time: |
| Employee's supervisor: | | Employee's principal: | |
| Project related: | ☐ No ☐ Yes | If yes, name of client: | |
| Client contact (if applicable): | | Project no (if applicable): | |

Re: (check all that apply) ☐ **Unsafe act** ☐ **Unsafe condition** ☐ **Stop work authority (SWA)**

Location: (check one) ☐ Driving ☐ Field ☐ Office

| | | | |
|---|---|---|---|
| Date reported to supervisor/PM: | | Date corrected: | |
| Time reported to supervisor/PM: | | Time corrected: | |

## Describe the unsafe act, unsafe condition or SWA situation

## List corrective action(s) implemented

## Did the corrective action(s) mitigate the unsafe act/unsafe condition?

## For SMART administrators use only:

**Category:**

- ☐ **PPE** Personal Protective Equipment
- ☐ **BP** Body Positioning
- ☐ **WE** Work Environment
- ☐ **OP** Operating Procedures
- ☐ **TE** Tools and Equipment
- ☐ **CU** Computer Usage
- ☐ **PD** Pre-Driving
- ☐ **OPP** Operating Procedures – Parking

**Chevron category:**

- ☐ **A** Person or People
- ☐ **B** Equipment
- ☐ **C** Environmental
- ☐ **D** Procedures/ Processes/
  - ☐ JSA-review/revise
- ☐ **E** Visitors

**Causative factor:**

- ☐ **1** Insufficient training for task
- ☐ **2** Hurrying to complete the task
- ☐ **3** Easier if proper process not followed
- ☐ **4** Took shortcuts without prior incident
- ☐ **5** Incomplete or no procedures
- ☐ **6** Procedures not known or enforced
- ☐ **7** Improper PPE
- ☐ **8** Improper tools
- ☐ **9** Improper workplace layout
- ☐ **10** Exposure to conditions

**Energy source:**

- ☐ **G** Gravity
- ☐ **M** Motion
- ☐ **ME** Mechanical
- ☐ **E** Electrical
- ☐ **P** Pressure
- ☐ **T** Temperature
- ☐ **B** Biological
- ☐ **C** Chemical
- ☐ **R** Radiation
- ☐ **S** Sound

Are additional actions required? ☐ No ☐ Yes If yes, what?

# Near Miss Reporting Form

**Note: A Significant Near Miss must be called into the Incident Reporting Hotline: 1-866-529-4886**

Instructions:
*1) Employee completes the Near Miss Report and submits to Supervisor.*
*2) Supervisor reviews and makes other comments.*
*3) Employee discusses Near Miss with Project Manager.*
*4) Submit to applicable SMART Reporting submission address*

| Report status: | | | | | |
|---|---|---|---|---|---|
| (insert date) | Initial report | Updated report | Final report | Verification/validation | Report input to SMART database |

## Section 1

| A. Employee Identification ☐ GHD Employee ☐ Temporary Employee ☐ Subcontractor | | | |
|---|---|---|---|
| Employee No. | Last Name | First Name | Employee's Company - if Subcontractor |
| Date of Hire | Position/Title | Supervisor | Home Office Location - if GHD Employee |

| B. General Information | | | | |
|---|---|---|---|---|
| Where did the Near Miss occur?<br>☐ Office ☐ Project Site ☐ Other _____<br>☐ Canada ☐ United States ☐ UK | | Type of Near Miss (Check all that apply)<br>☐ Employee Injury/Illness ☐ Vehicle Accident ☐ Property Damage ☐ Environmental | | |
| Address of Near Miss (City, State/Province/County, Postal/Zip Code) | | Specific Location of Near Miss (e.g., where on site) | | |
| Date and Hour of Near Miss<br>Month Day Year | a.m. p.m. | Date and Hour Reported to GHD<br>Month Day Year | a.m. p.m. | Time Employee Began Work<br>a.m. p.m. |
| Witnesses?<br>☐ Yes ☐ No | Witness Name and Telephone Number | | | |

| C. Project Information (Project Related Near Miss Only): Project Related: ( ) Yes ( ) No | | | | |
|---|---|---|---|---|
| Project # | Project Name | GHD Project Manager | Client | Client Contact |
| Was the Client Advised of the Near Miss?<br>☐ Yes ☐ No ☐ N/A | Name: | Date and Time<br>Month Day Year Time | | |

## Section 2

| A Details of the Near Miss |
|---|
| 1. What job/task was being performed when the Near Miss occurred? (Example: collecting groundwater samples). |
| 2. Provide a detailed description of the employee's specific activities at the time of the Near Miss. Include details of equipment/materials being used, including the size and weights of objects being handled, and weather conditions at time of the Near Loss. If necessary, attach additional pages to the report. |

## Section 2 (continued)

| B. Near Miss Investigation | |
|---|---|
| Conduct a 5-Why Root Cause Analysis Investigation. In addition, if there was the potential for a significant injury or loss, report the Near Miss to the Incident Hot Line (this will determine if a Tap Root Cause Analysis is necessary). | |
| HASP prepared?<br>☐ Yes ☐ No ☐ N/A<br>Submit a PDF of HASP to Investigation Team.<br>If yes, was the HASP on site?<br>☐ Yes ☐ No | Did the safety plan identify and provide safety procedures for the specific tasks being performed when the Near Miss occurred?<br>☐ Yes ☐ No If no, why not? (Explain) _____<br>Did the employee utilize the STAR process before initiating the task?<br>☐ Yes ☐ No If no, why not? (Explain) _____ |

| 5-Why Root Cause: | Additional information: Attach photos, witness statement(s), affected employee statement, as applicable, to the end of this document. |
|---|---|
| **1. Why did "above" happen?** | |
| **2. Why did "1" happen?** | |
| **3. Why did "2" happen?** | |
| **4. Why did "3" happen?** | |
| **5. Why did "4" happen?** | See Section 3 Below: Corrective Actions/ Verification and Validation |
| **6. Why did "5" happen?** | |

| C. Accountability | | |
|---|---|---|
| Initial Report Date<br>Month Day Year | Initial Report Prepared by: (please print) | Initial Report Prepared by: (signature) |
| Investigation Team | Company | Position/Title |
| | | |
| | | |
| | | |
| Final Report Date<br>Month Day Year | Final Report Prepared by: (please print) | Final Report Prepared by: (signature) |

| D. Stewardship | | |
|---|---|---|
| Will a Near Miss Summary be Prepared? ☐ Yes ☐ No If yes, by: | | |
| Quality Review By: | Date: | Findings: |

**Section 3** (continued)

| Corrective Action | | | | | Validation & Verification | | |
|---|---|---|---|---|---|---|---|
| **CF** | **Corrective Actions (Must match Causative Factor)** | **Responsible Party** | **Due Date** | **Date Completed** | **Verified By/ Validated By** | **Date** | **Details** |
| | | | | | *Verified By* | | |
| | | | | | *Validated By* | | |
| | | | | | *Verified By* | | |
| | | | | | *Validated By* | | |
| | | | | | *Verified By* | | |
| | | | | | *Validated By* | | |

## Causative factors

| Personal factors | | Company factors | | External factors | |
|---|---|---|---|---|---|
| 1 | Insufficient training for task | 5 | Incomplete or no procedures | 10 | Exposure to conditions |
| 2 | Hurrying to complete the task | 6 | Procedures not known or enforced | | |
| 3 | Easier if proper process not followed | 7 | Improper PPE | | |
| 4 | Took shortcuts without prior incident | 8 | Improper tools | | |
| | | 9 | Improper workplace layout | | |

# Incident Reporting Form

**Note: Incidents must be called into the Incident Reporting Hotline: 1-866-529-4886**

Instructions: *1) For Personal Injuries, Occupational Illnesses, and Property Damage, complete Sections 1 and 2*
*2) For Motor Vehicle Accidents, complete Sections 1, 2, and 4.*
*3)* ***Initial report must be submitted within 24 hours.***

| Report status: | | | | | |
|---|---|---|---|---|---|
| (insert date) | Initial report | Updated report | Final report | Verification/validation | Report input to SMART database |

## Section 1

| **A. Employee Identification** ☐ **GHD Employee** ☐ **Temporary Employee** ☐ **Subcontractor** | | | | |
|---|---|---|---|---|
| Employee No. | Last Name | First Name | Middle Name/Initial | ☐ Male ☐ Female |
| Area Code ( ) Telephone Number | Employee Home Address (Street, City, State/Province/County, Postal/Zip Code) | | | |
| Date of Hire Month Day Year | Position/Title | Supervisor | Employee's Company/Home Office Location | |

| **B. General Information** | | | | | | | |
|---|---|---|---|---|---|---|---|
| Where did the Incident occur and which country? ☐ Office ☐ Project Site ☐ Other _____ ☐ Canada ☐ United States | | | | Type of incident (Check all that apply) ☐ Employee Injury/Illness ☐ Vehicle Accident ☐ Property Damage Only | | | |
| Address of Incident (City, State/Providence/County, Postal/Zip Code) | | | | Specific Location of incident (e.g., where on site) | | | |
| Date and Hour of Incident | | Date and Hour Reported to Employer | | Date and Hour Last Worked | | Time Employee Began Work | |
| Month Day Year | a.m. p.m. | Month Day Year | a.m. p.m. | Month Day Year | a.m. p.m. | | a.m. p.m. |
| Normal Work Hours From:. To: | | | | Witnesses? ☐ Yes ☐ No | | Witness Name and Telephone Number | |

| **C. Project Information (Project Related Incident Only) Project Related?** ☐ Yes ☐ No | | | | |
|---|---|---|---|---|
| Project # | Project Name | Project Manager | Site Telephone Number ( ) | Project Manager Cell Number ( ) |
| Client Name | | Was the Client Advised of the Incident? ☐ Yes ☐ No | Name of Person Contacted | Date and Time Contacted |

## Section 2

| **A. Details of the Incident** |
|---|
| 1. What job/task was being performed when the incident occurred? (Example: collecting groundwater samples). |
| 2. Provide a detailed description of the employee's specific activities at the time of the incident. Include details of equipment/materials being used, including the size and weight of objects being handled, and weather conditions at time of the incident. If necessary, attach additional pages to the report. |
| 3. For injuries, identify the specific part of body injured, and specify left or right side. For illnesses, identify and describe the affected area/body part. |
| 4. Identify the object or substance that directly injured the employee and how. Include size, weight, and shape of object, quantity of substance, etc. |
| 5. Identify property damaged and how it was damaged (include owner of property, nature and source of damage, and model and serial number, if appropriate). |

| **B. Health Care/Medical Treatment** | |
|---|---|
| Employee received health care? ☐ Yes ☐ No | Identify the type of health care provided and where it was performed. **(Check all that apply).** ☐ First Aid ☐ Medical treatment other than first aid (sutures, etc.) ☐ Hospitalized ☐ Clinic ☐ Hospital emergency room ☐ On location by self or GHD employee ☐ On site by EMT |
| Name of Health Care Provider, Physician Name, Phone Number, Address (Street, City, Province/State/County, and Postal/Zip Code) | |

Section 2 (continued)

| **C. Incident Investigation**<br>☐ **5 Why Root Cause Analysis Investigation [Non-OSHA Recordable, <$5,000/£3,000 damage]**<br>☐ **Tap Root Cause Analysis [OSHA Recordable, and/or >$5,000/£3,000 damages]** | |
|---|---|
| HASP prepared?<br>☐ Yes ☐ No ☐ N/A<br>Submit a PDF of HASP and relevant JSA(s)/Risk Assessment to Investigation Team.<br>If yes, was the HASP on site?<br>☐ Yes ☐ No | Did the safety plan identify and provide safety procedures for the specific tasks the employee was conducting when injured?<br>☐ Yes ☐ No If no, why not? (Explain) _____<br>Did the employee utilize the STAR process before initiating the task?<br>☐ Yes ☐ No If no, why not? (Explain) _____<br>Was the employee drug & alcohol tested post incident? ☐ Yes ☐ No |

| **5-Why Root Cause: Incident Statement** | Additional information: Attach photos, witness statement(s), affected employee statement, accident diagrams, as applicable, to the end of this document. |
|---|---|
| **1. Why did "above" happen?** | |
| | |
| **2. Why did "1" happen?** | |
| | |
| **3. Why did "2" happen?** | |
| | |
| **4. Why did "3" happen?** | |
| | See *Corrective Actions/Verification and Validation* Section (Page 4) |
| **5. Why did "4" happen?** | |
| | |
| **6. Why did "5" happen?** | |
| | |

| **D. Accountability** | | |
|---|---|---|
| Initial Report Date<br>Month Day Year | Initial Report Prepared by: (please print) | Initial Report Prepared by: (signature) |
| Investigation Team | Company | Position/Title |
| | | |
| | | |
| | | |
| Final Report Date<br>Month Day Year | Final Report Prepared by: (please print) | Final Report Prepared by: (signature) |

| **E. Stewardship** | | |
|---|---|---|
| Will an Incident Summary be Prepared? ☐ Yes ☐ No<br>By: | | |
| Quality Review By: | Date: | Findings: |

Section 3

| **A. Agency Reporting and Recording Information (To be completed by an HSE Team Member)** | | | |
|---|---|---|---|
| **CANADA** | | | |
| Provincial Regulatory Agency Reporting Required?<br>☐ Yes ☐ Not required | Employee Injury Information (Injury met the following criteria):<br>☐ First Aid ☐ Medical Treatment ☐ Critical Injury ☐ Modified Duty ☐ Lost Time Injury<br>If medical treatment, what? | | |
| Joint Safety and Health Committee Notified?<br>☐ Yes ☐ No | Total days of modified duty<br>If exceeds 7 days, report to WSIB | Total days of lost time (if any) | Date employee returned to work<br>Month Day Year |
| **UNITED STATES** | | | |
| OSHA Recordable Injury?<br>☐ Yes ☐ No<br>OSHA Recordable.pdf | Employee Injury Information (Injury met the following OSHA 300 Log criteria)<br>☐ First Aid ☐ Medical Treatment ☐ Restricted Duty ☐Lost Time Injury<br>If medical treatment, what? | | |
| Total days of restricted duty: | Total days of lost time (if any) | | Date employee returned to work<br>Month Day Year |

Section 4

**A. Vehicle GHD Employee was Operating** ☐ Personal ☐ GHD-Owned ☐ Rental - Rental Company:

| License Plate No. | State/Province/County | Police Department City | State/Province/County |
|---|---|---|---|
| Vehicle Year/Make/Model | Odometer Reading at Time of Accident | Police Report Number | Weather Conditions |

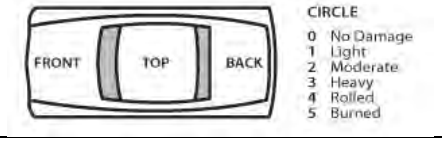
Name of Person Operating Vehicle

Address

City State/Province/County Postal/Zip Code

Telephone: Area Code ( )

"X" IN AREA OF VEHICLE DAMAGE



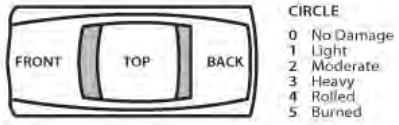

Description of Vehicle Damage:

**B. Other Vehicles Involved**

| Name of Owner | Address | City/State/Prov./County/Postal/Zip | Area Code and Telephone Number ( ) |
|---|---|---|---|
| Operator's Name (if different from above) | Address | City/State/Prov./County/Postal/Zip | Area Code and Telephone Number ( ) |

| Year/Make/Model | Description of Property Damage: |
|---|---|
| Insurance Co. Name & Telephone | |
| License Plate No./State/Province | |

"x" IN AREA OF VEHICLE DAMAGE




**C. Injured Persons**

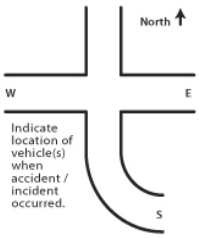
| Name | Address Street, City, State/Prov./County/Postal/Zip Code | Phone Number | Nature of Injury | Indicate if Injured was a Vehicle Driver/ Passenger, GHD Employee, Other, or Pedestrian |
|---|---|---|---|---|
| 1. | | | | |
| 2. | | | | |
| 3. | | | | |

**D. Witnesses**

| Name | Address Street, City, State/Prov./County/Postal/Zip Code | Area Code and Telephone Number |
|---|---|---|
| 1. | | ( ) |
| 2. | | ( ) |

**E. Description of Accident**

PLEASE COMPLETE OR ATTACH SEPARATE DIAGRAM




Was Ticket Issued? Reason:

☐ Other Operator

☐ GHD Operator

| Report Date Month Day Year | Report Prepared by: (please print) | Report Prepared by: (signature) |
|---|---|---|

Note: If Additional Space is Required to Complete this Report, Use Separate Sheet of Paper and Attach.

| Causative factors and corrective actions | | | | | | Verification (Did we do what we said we would do?) and Validation (Is it working?) | | |
|---|---|---|---|---|---|---|---|---|
| **Item No.** | **CF** | **Corrective actions (Must match Causative Factor)** | **Responsible party** | **Date due** | **Date completed** | **Verified by/ Validated by** | **Date** | **Details** |
| | | | | | | **Verified by:**<br>**Validated by:** | | |
| | | | | | | **Verified by:**<br>**Validated by:** | | |
| | | | | | | **Verified by:**<br>**Validated by:** | | |
| | | | | | | **Verified by:**<br>**Validated by:** | | |

**Causative factors**

| Personal factors | | Company factors | | External factors | |
|---|---|---|---|---|---|
| 1 | Insufficient training for task | 5 | Incomplete or no procedures | 10 | Exposure to conditions |
| 2 | Hurrying to complete the task | 6 | Procedures not known or enforced | | |
| 3 | Easier if proper process not followed | 7 | Improper PPE | | |
| 4 | Took shortcuts without prior incident | 8 | Improper tools | | |
| | | 9 | Improper workplace layout | | |

Form initiated by: _____ Date initiated: _____

Initiator's role/responsibility: _____ Project number: _____

Affected location(s): _____

Client's management of change documentation attached, if required or applicable: ☐ Yes ☐ N/A

Type of change:

- ☐ Field operations/SOPs
- ☐ Equipment
- ☐ Safety
- ☐ Project management/resources

Duration of change:

- ☐ Permanent
- ☐ Temporary (specify how long change will be in place): _____
- ☐ Emergency

Describe the change:

Describe the procedure/task(s) required to complete the change:

Who needs to know about the change and how will you communicate this to them?

Is additional training for GHD people required as a result of this change? ☐ Yes ☐ No

If yes, please describe training needs and those who require it:

Coordination with Business School Learning Centre underway: ☐ Yes ☐ No

Identify any associated risks/hazards/impacts as a result of this change:

AR101736



This completed form is a quality record

Does the change need to be approved by a client? ☐ Yes ☐ No

If Yes, state client's name: _____

Client role/responsibility: _____

Date authorized by client: _____
(mm/dd/yyyy)

Change approved by project manager: _____
(please print)

_____ _____
(signature) (approval date – mm/dd/yyyy)

**Summary:**

| Item | Completion date | Confirmed by |
|---|---|---|
| 1. Task(s) to execute change have been completed | | |
| 2. Those who need to know have been notified | | |
| 3. Additional training has been completed | | |
| 4. Risk(s) have been mitigated | | |
| 5. Change has been approved by all required parties | | |

**Notes:**

Scope: GHD may use the Management of Change Form (QSF-006) to identify and record project additions, revisions, changes, or updates regarding field operations, field SOPs, equipment, safety, resources, or project management.

Detail: The level of detail to a documented project change is ultimately determined by the project manager and/or any client expectations.

File location: Correspondence folder of the project file.

AR101737



This completed form is a quality record

# Underground Utilities Checklist

(QSF-019)

**Pre-Drilling/Excavation Checklist and Utility Clearance Log**

| | |
|---|---|
| **Project number:** | **Project name:** |
| **Date:** | **Project location:** |
| **Public utility locator:** | **Public utility locator phone number:** |
| **Date of public utility locator request:** | **Public locator call reference number:** |
| **Private utility locator (If applicable):** | **Private utility locator phone number:** |

**Utilities (indicate that location/utility presence was checked)**

| Borehole/ Excavation location | Date (mm/dd/yyyy) | Telephone | Water | Storm sewer | Sanitary sewer | Process sewer | Gas | Electrical | Cable | Overhead utilities | Other | Comments/Warnings |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | | |
| | | | | | | | | | | | | |
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| | | | | | | | | | | | | |
| **Utility owner** | | | | | | | | | | | | |

**Instructions:** This checklist is to be completed by GHD personnel prior to initiation of field activities as a safety measure, to ensure that all underground utility lines, other underground structures, and above-ground power lines are clearly marked in the area selected for boring or excavation.

**Notes:** _____

**Client:** _____ **Client representative:** _____ **Phone number:** _____

**Client or property owner acknowledgement of utility clearance:** _____ **(Client, property owner, or authorized agent signature)**

**Subcontractor acknowledgement of utility clearance:** _____ **(Subcontractor or subcontractor representative signature)**

**GHD field representative name:** _____ **Signature:** _____

**GHD project manager's review/confirmation of locate completion:** _____

In the event that client or property owner acknowledgement cannot be obtained, all boreholes shall be hydro vacuumed and the costs passed on to the client. Attach any clearance documentation from utility owner/operator to this document.

# Underground Utilities Checklist for GHD Personnel

**Pre-Drilling/Excavation Checklist and Utility Clearance Log**

Drilling or excavation work may not proceed if any of the questions answered below are answered "No." Implement stop work authority and contact the GHD project manager to discuss and resolve any concerns or issues. Document the reason for a "No" answer in the comments section below.

| Yes | No | N/A | Pre-Mobilization |
|---|---|---|---|
| ☐ | ☐ | ☐ | 1. Has a utility locator request been completed within the last 30 days (verify time limit with state or provincial law)? If no, stop work and comment below. |
| ☐ | ☐ | ☐ | 2. Is a scaled site plan, map or drawing showing the proposed borehole locations attached to this form? |
| ☐ | ☐ | ☐ | 3. Does each borehole and excavation location allow for clear entry and exit, adequate workspace, and a clear path for raising the mast (or boom) and operating the drill rig and all support equipment? Ensure that the minimum OSHA/state/provincial utility clearance requirements between the mast or boom and the power line(s) are met. For instance, OSHA requires a minimum approach distance of 10 feet for systems below 50 kV and an increase of 4" for every 10 kV over 50 kV. Confirm if additional permits are required if the boom or mast will be working 5 meters (15 feet) or less from the electrical lines. |
| ☐ | ☐ | ☐ | 4. Are all of the proposed borehole and excavation locations at least 1.0 meters (3 feet) from any subsurface or above-ground utilities shown on client's building plans? Check here ☐ if plans not provided by client (therefore not applicable to this job. |
| ☐ | ☐ | ☐ | 5. Are all of the proposed borehole and excavation locations at least 1.0 meters (3 feet) from any subsurface or above-ground utilities shown on public right-of-way street improvement or other public property plan or site map? |
| ☐ | ☐ | ☐ | 6. Has the site representative, familiar with the site, indicated no knowledge of any subsurface or above-ground utilities within 3 metres (10 feet) of the proposed borehole and excavation locations? (Review locations with site representative) |
| ☐ | ☐ | ☐ | 7. Are all of the proposed borehole and excavation locations at least 1.0 meters (3 feet) from any subsurface utilities identified during a geophysical survey? Check here ☐ if no geophysical survey has been completed (therefore not applicable to this job). |
| ☐ | ☐ | ☐ | 8. Have all utility locating service providers, notified by the public line locator, marked out their facilities in the vicinity of the borehole and excavation locations or otherwise notified us that they do not have any facilities near the proposed locations? (Attached confirmation and utility locate sheets from public locator) |
| ☐ | ☐ | ☐ | 9. Are all proposed borehole and excavation locations at least 1.5 meters (5 feet) from a visual line connecting two similar looking manhole covers? |
| ☐ | ☐ | ☐ | 10. Are all proposed borehole and excavation locations at least 1.5 meters (5 feet) from a visual line perpendicular to the street from the water, gas, and electrical meters? |
| ☐ | ☐ | ☐ | 11. Are all proposed boring and excavation locations clear of pavement joints, curbs, crash posts, or other engineered structures? |
| ☐ | ☐ | ☐ | 12. Does the ground surface/pavement lack signs of previous excavation (e.g., no pavement subsidence, no differences in pavement texture or relief, no pavement patching)? |
| | | | **Pre-Drilling and Excavation** |
| ☐ | ☐ | ☐ | 13. Has it been verified that the proposed drilling or excavation work will not affect any work currently in progress? |
| ☐ | ☐ | ☐ | 14. Has the drill rig or heavy equipment been inspected prior to use and documented? (See Drill Rig Inspection Checklist or Mobile Equipment Safety Inspection Checklist) |
| | | | 15. Have barricades been erected to prevent unauthorized access, where applicable? |
| ☐ | ☐ | ☐ | 16. Have all known live electrical or product lines within 3 meters (10 feet) of the dig path been visually verified? If no, comment below. |
| | | | 17. For boreholes that have not been cleared or are within 3 meters of a utility: |
| ☐ | ☐ | ☐ | a. Before drilling have you cleared a hole to 2.4 meters (8 feet) below grade using an air-knife, or equivalent, before drilling and is the diameter of this hole greater than the final outside diameter of the boring? If not required comment below. |
| ☐ | ☐ | ☐ | b. Does the soil you encountered in the hand-dug hole appear to be native material (i.e., free of clean gravel, clean sand, aggregate base [gravelly sand ~ 10% fines] or other non-native looking material)? If not required comment below. |

Have the above concerns been discussed with the GHD project manager? ☐ Yes ☐ No ☐ Not Applicable
Has the start of subsurface work been communicated to the GHD project manager? ☐ Yes ☐ No ☐ Not Applicable
Have the above concerns been discussed with the client? ☐ Yes ☐ No ☐ Not Applicable
Has the scope of work been approved by the client? ☐ Yes ☐ No ☐ Not Applicable

**Comments:** _____

**GHD field representative name:** _____ **Date:** _____

# Site Health and Safety Plan Amendment Form

This document is to be completed for ANY changes that occur within the Site Health and Safety Plan (HASP). This document is to be sent to the Regional Safety & Health Manager (RSHM) for review, verification and sign off of the HASP.

| | |
|---|---|
| Amendment # | |
| Site Name/Project ID | |
| Date | |
| Client Contact (same/change) | |
| Reason for Amendment (SOW change, JSA addition, Chemical, etc.) | |
| Alternate or Additional Safeguard Procedures | |
| Required changes in PPE | |
| Additional Comments: | |

| | |
|---|---|
| Project Manager Notified | ☐ |
| RSHM Notified | ☐ |
| Client PM Notified (if necessary) | ☐ |

| | |
|---|---|
| | |
| Site HSE Officer (sign above) | Date |

The Project Manager is ultimately responsible for the accuracy of the information on this amendment and ensuring any changes to the original HASP is discussed with all affected site personnel prior to commencing work

This original form must be placed in the project file and a copy needs to be attached to the Site Health and Safety Plan (HASP).

## HASP Acknowledgment Sheet

Project Name:_____ Project Number: _____

This is to certify that I have received a pre-entry briefing regarding this HASP, and I understand its contents. My failure to follow and comply with the requirements contained in this plan may result in disciplinary action and/or termination.

| Print Name | Signature | Date |
|---|---|---|
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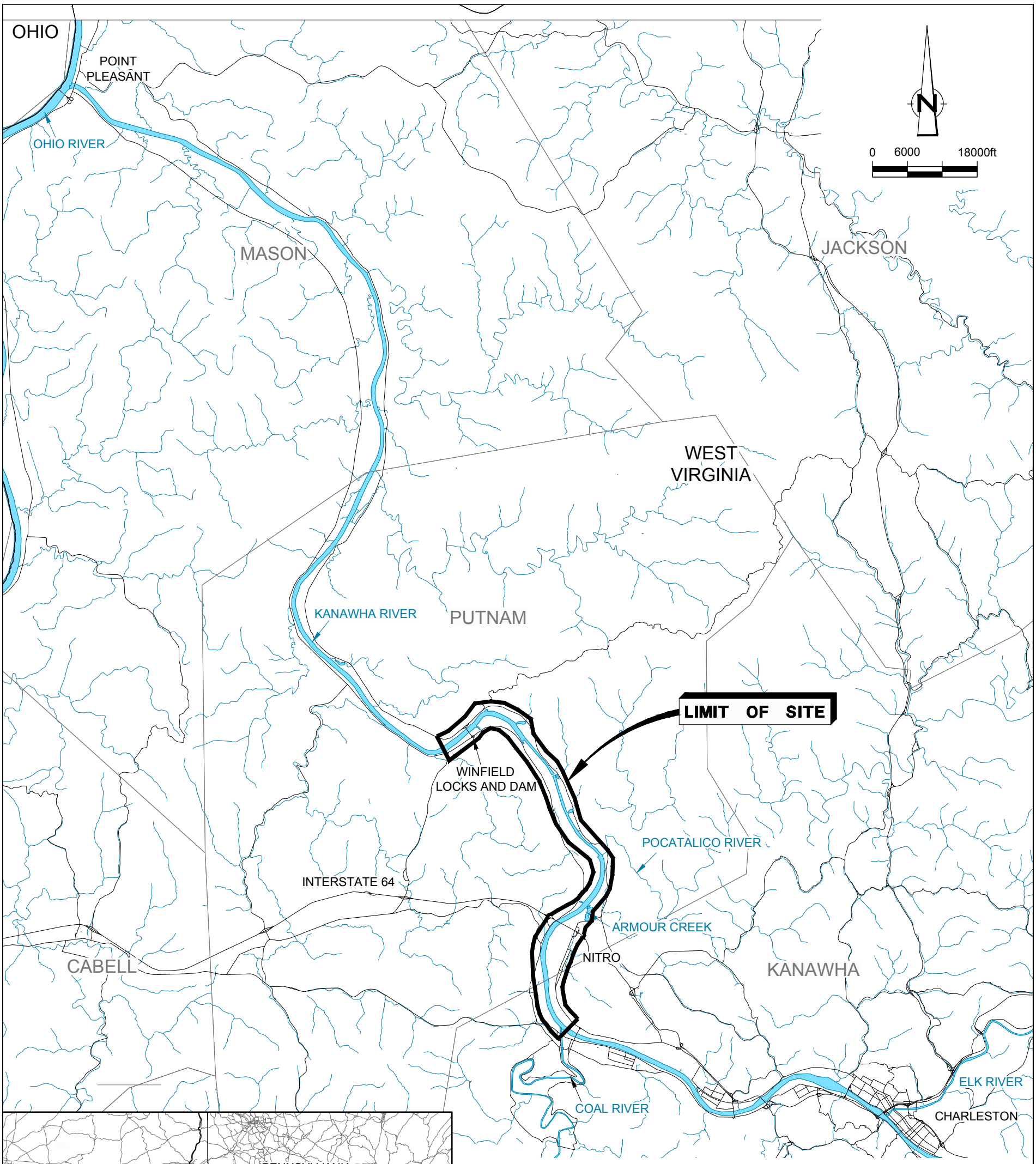


KEY MAP
SCALE: 1" = 350000'

*DRAFT FOR REVIEW*
*DO NOT REPRODUCE OR CIRCULATE*
*PREPARED IN ANTICIPATION OF LITIGATION*

figure 1.1

SITE LOCATION
PRE-DESIGN INVESTIGATION WORK PLAN
*Kanawha River, West Virginia*

31884-00(072)GN-WA001 JUN 2, 2016

# Job Safety Analysis (JSA)

**Insert Name:** Environmental-Decontamination of Sampling Equipment and Personnel (PPE Level D)

Field staff must review job specific work plan and coordinate with project manager to verify that all up front logistics are completed prior to starting work including, but not limited to, permitting, access agreements, and notification to required contacts (e.g., site managers, inspectors, clients, subcontractors, etc.). Additionally, a tailgate safety meeting must be performed and documented at the beginning of each workday. **Stop, Think, Act, Review (STAR)** must be used prior to any activity. All personnel must possess the appropriate training prior to initiating scheduled tasks. Also consider weather conditions. GHD personnel have the authority and responsibility to use **Stop Work Authority (SWA).**

| | | | | | |
|---|---|---|---|---|---|
| **Date Issued/Revised:** | 05/19/2016 14:37:52 | **Client:** | GHD - CORE | | |
| **Project Number:** | 031884 | **Created By:** | cra\jcivel | SIM OPS? YES/NO | SSE on site? YES/NO |
| **Project Address:** | | | | | |
| **Key Equipment:** | Alconox brushes, Tap water, Deionized (DI) Water | | | | |
| **Task-specific Training:** | Decontamination/Site Control; Quality Control/Sampling Plan | | | | |

| Hard Hat | Gloves (ANSI/EN 388) | Eye Protection | Fall Protection | APR | Vest | PPE Clothing |
|---|---|---|---|---|---|---|
| ☐ Type 1 (Top Impact) | ☑ Chemical Protective (ie.Nitrile) | ☑ ANSI/CSA Safety Glasses | ☐ Harness | ☐ Full Face Mask | ☑ Class II (standard) | ☐ Coveralls |
| ☐ Type 2 (Side Impact) | ☐ Level 1 - Light Duty | ☐ Goggles/Spoggles | ☐ Shock Absorbing Lanyard | ☐ Half Face Mask | ☐ Class III ( Night or Highway Traffic) | ☐ Fire Retardent Clothing (FRC) |
| ☑ Class E (standard) | ☐ Level 2 - Light Duty with Protection | ☐ Face Shields | ☐ Lifeline | | ☐ Anti-Static | ☐ High Viz Clothing |
| ☐ Class G | ☐ Level 3 - Medium Duty | ☐ Other* | | **Cartridges** | ☐ FRC | ☑ Long Pants |
| | ☐ Level 4 - Heavy Duty | | | ☐ N95 | ☑ PFD | ☑ Long Sleeve Shirts |
| **Foot Protection** | ☐ High Viz | **Hearing Protection** | **Arc Flash/Shock Protection** | ☐ P100 | | ☐ Paper Tyvek (disposible) |
| ☑ )Industrial Grade Safety Boot | ☐ Other* | ☐ NOT Required for this task | ☐ Hazard Category 2 | ☐ P95 | | ☐ Polyethyene Tyvek |

| Hard Hat | Gloves (ANSI/EN 388) | Eye Protection | Fall Protection | APR | Vest | PPE Clothing |
|---|---|---|---|---|---|---|
| ☐ Rubber Boots (industrial grade) | | ☑ Required | ☐ Hazard Category 4 | ☐ R95 | | ☐ Other* |
| ☐ Hip Waders | | | | ☐ Organic Vapour | | |
| | * see key equipment | | | ☐ Speciality* | | |

| Project Development Team | | Modified by | Reviewed by | Date |
|---|---|---|---|---|
| Name | Signature | | | |
| Jeff Daniel | | | | |
| | | | | |
| | | | | |

| Job steps[1] | Task activity | Potential hazard(s)[2] | Corrective measure(s)[3] | Person responsible (Print first and last names) |
|---|---|---|---|---|
| 1 | Decontamination of sampling equipment (including pumps, bailers, tubing, etc.) | • Contaminant exposure<br>• Pinch points<br>• Slip/trip/hit/fall hazards<br>• Lifting hazards<br>• Back injury<br>• Manual material handling | • Set up decon station to capture any spills to avoid cross contamination and manage wastes<br>• Wear appropriate PPE<br>• Scrub equipment clean then rinse and verify it is clean and free of contamination<br>• Avoid putting hands in or near pinch points<br>• Maintain good housekeeping and be aware of surroundings<br>• Size up the load; if the object is too large or odd shaped OR is in excess of 50 pounds (23 kg) then assistance (mechanical means, such as a dolly, cart, or a buddy lift) will be required<br>• Lift with the legs (bend at the knees and use the leg muscles) to protect the lower back and keep lower back in a neutral position<br>• Refer to the HASP for additional lifting techniques | Sampling Personnel |
| 2 | Decontamination of personnel | • Contaminant exposure<br>• Slip/trip/hit/fall hazards | • Refer to the HASP for specific procedures but in general start with most contaminated article and remove until inner gloves are the last item left<br>• Dispose of used PPE in accordance with site requirements<br>• Wash hands and face before eating, drinking, or using tobacco products<br>• Take care when removing PPE (boots, gloves, etc.); sit down to remove/change boots as necessary | Sampling personnel |
| 3 | Management of waste derived from decontamination activities | • Contaminant exposure<br>• Lifting hazards<br>• Back injury<br>• Manual material handling | • Containerize decon waste (e.g., water, used PPE) as required<br>• Properly dispose of decon fluids (e.g., sediments)<br>• Refer to step 1 and the HASP for additional lifting information | Sampling personnel |

1. Each Job or Task consists of a set of steps. Be sure to list all the steps in the sequence that they are performed. Specify the equipment or other details to set the basis for the potential (associated) hazards.

2. A hazard is a potential danger. What can go wrong? How can someone get hurt? Consider, but do not limit, the analysis to: **Contact** - victim is struck by or strikes an object; **Caught** - victim is caught on, caught in or caught between objects; **Fall** - victim falls to ground or lower level (includes slips and trips); **Exertion** - excessive strain or stress/ergonomics/lifting techniques; **Exposure** - inhalation/skin hazards. Specify the hazards and do not limit the description to a single word such as "Caught".

3. Aligning with the Job Steps, Task Activity Description, and Potential Hazard columns, describe what actions or procedures are necessary to eliminate or minimize the hazards. Be clear, concise and specific. Use objective, observable, and quantified terms. Avoid subjective general statements such as "be careful" or "use as appropriate".

**Site Personnel Participating in JSA Review:**
I have participated in the review and discussion of the Job Safety Analysis (JSA) listed on this document and understand the duties I am responsible to fulfill. As part of my work, I know I have the responsibility and obligation to STOP work with a Stop Work Authority (SWA) if conditions change and/or potential hazards have been identified.

| Name/Company | Sign | Date |
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**SSE(s) on job:** _____ **Assigned mentor:** _____

Presenter Signature: _____ Date/Time: _____

My signature below indicates that all conditions and requirements listed above have been verified, met, and reviewed with all affected personnel prior to start of work.
Supervisor Signature: _____ Date/Time: _____

Location of Mustering Point: _____ Wind direction (current): _____

GHD Emergency contact (Name and verified phone number): _____

Supervisor Signature documenting Daily Debrief has been completed: _____

# Job Safety Analysis (JSA)

## Insert Name: Mobilization-Demobilization

Field staff must review job specific work plan and coordinate with project manager to verify that all up front logistics are completed prior to starting work including, but not limited to, permitting, access agreements, and notification to required contacts (e.g., site managers, inspectors, clients, subcontractors, etc.). Additionally, a tailgate safety meeting must be performed and documented at the beginning of each workday. **Stop, Think, Act, Review (STAR)** must be used prior to any activity. All personnel must possess the appropriate training prior to initiating scheduled tasks. Also consider weather conditions. GHD personnel have the authority and responsibility to use **Stop Work Authority (SWA).**

| | | | | | |
|---|---|---|---|---|---|
| **Date Issued/Revised:** | 05/19/2016 14:37:52 | **Client:** | GHD - CORE | | |
| **Project Number:** | 031884 | **Created By:** | cra\jcivel | SIM OPS? YES/NO | SSE on site? YES/NO |
| **Project Address:** | | | | | |
| **Key Equipment:** | 360 degree topper | | | | |
| **Task-specific Training:** | | | | | |

| Hard Hat | Gloves (ANSI/EN 388) | Eye Protection | Fall Protection | APR | Vest | PPE Clothing |
|---|---|---|---|---|---|---|
| ☐ Type 1 (Top Impact) | ☐ Chemical Protective (ie.Nitrile) | ☐ ANSI/CSA Safety Glasses | ☐ Harness | ☐ Full Face Mask | ☑ Class II (standard) | ☐ Coveralls |
| ☐ Type 2 (Side Impact) | ☑ Level 1 - Light Duty | ☐ Goggles/Spoggles | ☐ Shock Absorbing Lanyard | ☐ Half Face Mask | ☐ Class III ( Night or Highway Traffic) | ☐ Fire Retardent Clothing (FRC) |
| ☐ Class E (standard) | ☐ Level 2 - Light Duty with Protection | ☐ Face Shields | ☐ Lifeline | | ☐ Anti-Static | ☐ High Viz Clothing |
| ☐ Class G | ☐ Level 3 - Medium Duty | ☐ Other* | | **Cartridges** | ☐ FRC | ☐ Long Pants |
| | ☐ Level 4 - Heavy Duty | | | ☐ N95 | ☐ PFD | ☐ Long Sleeve Shirts |
| **Foot Protection** | ☐ High Viz | **Hearing Protection** | **Arc Flash/Shock Protection** | ☐ P100 | | ☐ Paper Tyvek (disposible) |
| ☑ )Industrial Grade Safety Boot | ☐ Other* | ☐ NOT Required for this task | ☐ Hazard Category 2 | ☐ P95 | | ☐ Polyethyene Tyvek |
| ☐ Rubber Boots (industrial grade) | | ☐ Required | ☐ Hazard Category 4 | ☐ R95 | | ☐ Other* |
| ☐ Hip Waders | | | | ☐ Organic Vapour | | |
| | * see key equipment | | | ☐ Speciality* | | |

| Project Development Team | | Modified by | Reviewed by | Date |
|---|---|---|---|---|
| Name | Signature | | | |
| Jeff Daniel | | | | |
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| Job steps[1] | Task activity | Potential hazard(s)[2] | Corrective measure(s)[3] | Person responsible (Print first and last names) |
|---|---|---|---|---|
| 1 | Discuss STAR and SWA | • Site personnel not aware of STAR and SWA | • Project team (CRA) discusses importance of and documentation procedures for SWA during pre job safety meeting<br>• Use SWA to stop any work that is unsafe | |
| 2 | Check weather | • Unexpected storm<br>• Fog, rain, snow; lightening/thunder<br>• Heat/cold stress | • Check local weather forecast<br>• If adverse weather conditions are likely, prepare a contingency plan for lodging, etc. with project manager<br>• Discuss weather issues and precautions to take while driving and on site during the pre job safety meeting<br>• If weather conditions (e.g., fog, rain, snow, etc.) impair the ability/vision of the driver, exit at nearest safe location and assess the situation<br>• While on site, at first sign of lightening/thunder utilize SWA and assess weather conditions<br>• In extreme temperatures, ensure all personnel have proper clothing, hydration, and heat/cold protection (e.g., canopy, fan, glove warmers) | |
| 3 | Load equipment into vehicle | • Lifting hazards<br>• Manual material handling<br>• Back injury<br>• Cuts<br>• Pinch points<br>• Hand/foot injury<br>• Forgotten or damaged equipment | • Reduce travel distance when there is a need to carry/lift materials<br>• Make sure grip is adequate; wear leather/cotton gloves<br>• Size up the load; if the object is too large or odd shaped OR is in excess of 50 pounds (23 kg) then assistance (mechanical or a buddy lift) will be required<br>• Maintain neutral back posture - Lift with the legs (bend at the knees and use the leg muscles) to protect the lower back and make sure to shift with the feet rather than twisting at the back<br>• Maintain neutral wrist posture when lifting, carrying, pushing or pulling. The wrist is the strongest and most stable when it is straight.<br>• Avoid one handed carrying if possible; maintain awareness of footing<br>• Avoid placing hands/fingers in pinch point locations<br>• Wear safety toed boots<br>• Verify requested equipment against warehouse form<br>• Load equipment in an organized manner to prevent shifting during transport or use cargo netting | |

| Job steps[1] | Task activity | Potential hazard(s)[2] | Corrective measure(s)[3] | Person responsible (Print first and last names) |
|---|---|---|---|---|
| 4 | Complete CRA Daily Operator Vehicle Checklist | • Damaged vehicle lights, tires, windows, mirrors, horn<br>• Inadequate vehicle documents and/or safety items | • Check for fluid leaks under vehicle<br>• Test operation of headlights, front/rear turn signals, backup lights, brake lights, and emergency flashers<br>• Visually check the pressure/wear of tires<br>• Ensure the vehicle has a spare tire<br>• Assure windshield and window glass is clean and free from obstructions<br>• Test the windshield wipers and horn<br>• Verify vehicle registration, insurance card, and inspection sticker is present and valid<br>• Ensure the vehicle contains a first aid kit, fire extinguisher, and road hazard kit<br>• Check immediate vehicle perimeter and initial path of travel for obstructions | |
| 5 | Check and adjust seat, steering wheel, headrest, and mirrors | • Back/body strain<br>• Blind spot<br>• Impaired vision | • Adjust seat, headrest, and steering wheel height so body is fully supported/comfortable and pedals are within easy reach<br>• Ensure mirrors are properly adjusted | |
| 6 | Fasten seat belt(s) and ensure passenger(s) seat belts are fastened | • Serious injury, ejection, or death from collision and/or traffic citation | • Verify driver and passenger(s) seat belts are in good condition and properly latched | |
| 7 | Ensure vehicle doors are locked | • Serious injury, ejection, or death from collision<br>• Unwanted intrusion<br>• Lost equipment | • Manually lock all doors to vehicle | |
| 8 | Start engine and check gauges and warning lights | • Vehicle breakdown | • Verify sufficient fuel and other hazard lamps (e.g., battery, oil, and temperature) are not lit | |
| 9 | Mobilize to site | • Arriving late<br>• Collision<br>• Injury or death to occupants or other parties | • Do not use cell phones or perform other distracting activities while vehicle is in motion<br>• Constantly scan intersections, move eyes, check mirrors, and assess traffic lights (fresh vs. stale)<br>• Maintain safety cushion around vehicle (front, sides, and rear) and 4 second following distance<br>• Utilize all driving defensive techniques | |
| 10 | Arrive at site | • Pedestrian injury<br>• Collision | • Maintain awareness of pedestrian/vehicular traffic when entering site and traveling to work zone | |

| Job steps[1] | Task activity | Potential hazard(s)[2] | Corrective measure(s)[3] | Person responsible (Print first and last names) |
|---|---|---|---|---|
| 11 | Park vehicle | • Pedestrian injury<br>• Collision<br>• Property damage | • Maintain awareness of pedestrian/vehicular traffic<br>• Park vehicle in pull through parking space or facing the exit<br>• Parking in a parking space that is not a designated parking space will require the placement of the 360 degree topper on the hood of the vehicle<br>• Use caution and mirrors/spotter when backing vehicle<br>• Set parking brake | |
| 12 | Demobilization | • Collision<br>• Injury or death to occupants or other parties | • Check immediate vehicle perimeter and initial path of travel for obstructions<br>• Maintain awareness of pedestrian/vehicular traffic when exiting site<br>• Utilize defensive driving techniques | |

1. Each Job or Task consists of a set of steps. Be sure to list all the steps in the sequence that they are performed. Specify the equipment or other details to set the basis for the potential (associated) hazards.
2. A hazard is a potential danger. What can go wrong? How can someone get hurt? Consider, but do not limit, the analysis to: **Contact** - victim is struck by or strikes an object; **Caught** - victim is caught on, caught in or caught between objects; **Fall** - victim falls to ground or lower level (includes slips and trips); **Exertion** - excessive strain or stress/ergonomics/lifting techniques; **Exposure** - inhalation/skin hazards. Specify the hazards and do not limit the description to a single word such as "Caught".
3. Aligning with the Job Steps, Task Activity Description, and Potential Hazard columns, describe what actions or procedures are necessary to eliminate or minimize the hazards. Be clear, concise and specific. Use objective, observable, and quantified terms. Avoid subjective general statements such as "be careful" or "use as appropriate".

**Site Personnel Participating in JSA Review:**
I have participated in the review and discussion of the Job Safety Analysis (JSA) listed on this document and understand the duties I am responsible to fulfill. As part of my work, I know I have the responsibility and obligation to STOP work with a Stop Work Authority (SWA) if conditions change and/or potential hazards have been identified.

| Name/Company | Sign | Date |
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**SSE(s) on job:** _____ **Assigned mentor:** _____

Presenter Signature: _____ Date/Time: _____

My signature below indicates that all conditions and requirements listed above have been verified, met, and reviewed with all affected personnel prior to start of work.
Supervisor Signature: _____ Date/Time: _____

Location of Mustering Point: _____ Wind direction (current): _____

GHD Emergency contact (Name and verified phone number): _____

Supervisor Signature documenting Daily Debrief has been completed: _____

# Job Safety Analysis (JSA)

## Insert Name: Sediment Sampling (Grab Sampler)

Field staff must review job specific work plan and coordinate with project manager to verify that all up front logistics are completed prior to starting work including, but not limited to, permitting, access agreements, and notification to required contacts (e.g., site managers, inspectors, clients, subcontractors, etc.). Additionally, a tailgate safety meeting must be performed and documented at the beginning of each workday. **Stop, Think, Act, Review (STAR)** must be used prior to any activity. All personnel must possess the appropriate training prior to initiating scheduled tasks. Also consider weather conditions. GHD personnel have the authority and responsibility to use **Stop Work Authority (SWA).**

| | | | | | |
|---|---|---|---|---|---|
| **Date Issued/Revised:** | 05/19/2016 14:38:04 | **Client:** | GHD - CORE | | |
| **Project Number:** | 031884 | **Created By:** | cra\jcivel | SIM OPS? YES/NO | SSE on site? YES/NO |
| **Project Address:** | | | | | |
| **Key Equipment:** | Boat and van Veen Grab Sampler (Ponar and hydrowire winch), personal flotation device (PFD). | | | | |
| **Task-specific Training:** | Boating Safety | | | | |

| Hard Hat | Gloves (ANSI/EN 388) | Eye Protection | Fall Protection | APR | Vest | PPE Clothing |
|---|---|---|---|---|---|---|
| ☐ Type 1 (Top Impact) | ☑ Chemical Protective (ie.Nitrile) | ☑ ANSI/CSA Safety Glasses | ☐ Harness | ☐ Full Face Mask | ☑ Class II (standard) | ☐ Coveralls |
| ☐ Type 2 (Side Impact) | ☐ Level 1 - Light Duty | ☐ Goggles/Spoggles | ☐ Shock Absorbing Lanyard | ☐ Half Face Mask | ☐ Class III ( Night or Highway Traffic) | ☐ Fire Retardent Clothing (FRC) |
| ☑ Class E (standard) | ☑ Level 2 - Light Duty with Protection | ☐ Face Shields | ☐ Lifeline | | ☐ Anti-Static | ☐ High Viz Clothing |
| ☐ Class G | ☐ Level 3 - Medium Duty | ☐ Other* | | **Cartridges** | ☐ FRC | ☐ Long Pants |
| | ☐ Level 4 - Heavy Duty | | | ☐ N95 | ☑ PFD | ☐ Long Sleeve Shirts |
| **Foot Protection** | ☐ High Viz | **Hearing Protection** | **Arc Flash/Shock Protection** | ☐ P100 | | ☐ Paper Tyvek (disposible) |
| ☑ )Industrial Grade Safety Boot | ☐ Other* | ☐ NOT Required for this task | ☐ Hazard Category 2 | ☐ P95 | | ☐ Polyethyene Tyvek |
| ☑ Rubber Boots (industrial grade) | | ☑ Required | ☐ Hazard Category 4 | ☐ R95 | | ☐ Other* |

| Hard Hat | Gloves (ANSI/EN 388) | Eye Protection | Fall Protection | APR | Vest | PPE Clothing |
|---|---|---|---|---|---|---|
| ☐ Hip Waders | | | | ☐ Organic Vapour | | |
| | * see key equipment | | | ☐ Speciality* | | |

| Project Development Team | | Modified by | Reviewed by | Date |
|---|---|---|---|---|
| Name | Signature | | | |
| Jeff Daniel | | | | |
| | | | | |
| | | | | |

| Job steps[1] | Task activity | Potential hazard(s)[2] | Corrective measure(s)[3] | Person responsible (Print first and last names) |
|---|---|---|---|---|
| 1 | Inspection and setup of sampling equipment on boat or barge | • Lost time from improperly functioning equipment<br>• Incorrect sampling procedures/collection due to malfunctioning equipment<br>• Moving or flying projectiles inside boat while transporting equipment | • Ensure all PPE is worn including PFD for each person<br>• Ensure all equipment is functioning properly; complete Quality Control documents<br>• Ensure boat/barge is sufficiently stable for retrieval of samples<br>• Ensure equipment and supplies are loaded correctly and do not shift during transport | Sampling Technician |
| 2 | Prepare to lower sampler into water | • Lifting hazards<br>• Back injury<br>• Manual material handling<br>• Pinch points<br>• Cuts<br>• Punctures<br>• Sampling misidentification | • Reduce travel distance when there is a need to carry/lift materials<br>• Make sure grip is adequate; wear nitrile and level 2 light duty with protection gloves<br>• Size up the load; if the object is too large or odd shaped or is in excess of 50 pounds (23 kg) then assistance (mechanical or a buddy lift) will be required<br>• Lift with the legs (bend at the knees and use the leg muscles) to protect the lower back and keep lower back in a neural position<br>• Avoid one-handed carrying if possible; maintain awareness of footing<br>• Sampler will be heavier when raised; take breaks to rest arms/shoulders<br>• Avoid placing hands/fingers in pinch point locations (i.e. ponar arms, winch)<br>• Use proper tools when opening container packaging<br>• Do not use fixed open blade knives when opening boxes<br>• Ensure the sample ID label matches the sample location and site plan | Sampling Technician |
| 3 | Retrieving sampler when sample collected | • Cuts due to sharp edges of the ponar; contaminant exposure<br>• Lifting hazards<br>• Pinch points<br>• Back injury<br>• Manual material handling<br>• Cuts from sharp objects retrieved by sampler<br>• Contamination hazards | • Refer to step 2 and the HASP for additional lifting information<br>• Wear nitrile gloves and level 2 light duty with protection gloves<br>• Maintain awareness of sharp edges from objects that may be in sampler<br>• Avoid placing hands/fingers in pinch point locations (i.e. near winch) | Sampling Technician |

| Job steps[1] | Task activity | Potential hazard(s)[2] | Corrective measure(s)[3] | Person responsible (Print first and last names) |
|---|---|---|---|---|
| 4 | Opening sampler | • Cuts to hands due to sharp edges of the ponar or objects in sample<br>• Contaminant exposure<br>• Pinch points on the ponar sampler | • Wear nitrile and level 2 light duty with protection gloves when opening the sampler<br>• Maintain awareness of sharp edges of the ponar and from objects that may be in the sampler<br>• Avoid placing hands/fingers in pinch point locations | Sampling Technician |
| 5 | Sample Handling | • Bottle breakage<br>• Contaminant exposure<br>• Cuts to hands from sharp objects in sample<br>• Lost time due to incorrect sample handling | • Inspect bottles for breaks/cracks, do not use any suspect containers<br>• Were nitrile gloves and level 2 light duty with protection gloves<br>• Maintain awareness of sharp edges from objects that may be in the sample<br>• Confirm selected samples are correct based on work plan selection criteria | Sampling Technician |
| 6 | Packing samples in cooler(s) | • Bottle breakage<br>• Contaminant exposure<br>• Cuts<br>• Pinch points<br>• Lifting hazards<br>• Back injury<br>• Manual material handling<br>• Lost time due to incorrect sample packaging or hold time exceedances<br>• Moving or flying projectiles inside boat while transporting equipment | • Wear nitrile and level 2 light duty with protection gloves when handling sample containers<br>• Pack glass containers in bubble wrap<br>• Check COC against sample labels and SSOW for accuracy before shipping<br>• Avoid placing hands/fingers in pinch point locations (e.g. between cooler and lid)<br>• Refer to step 2 and the HASP for additional lifting information<br>• Ensure equipment and supplies are loaded correctly and do not shift during transport | Sampling Technician |

1. Each Job or Task consists of a set of steps. Be sure to list all the steps in the sequence that they are performed. Specify the equipment or other details to set the basis for the potential (associated) hazards.

2. A hazard is a potential danger. What can go wrong? How can someone get hurt? Consider, but do not limit, the analysis to: **Contact** - victim is struck by or strikes an object; **Caught** - victim is caught on, caught in or caught between objects; **Fall** - victim falls to ground or lower level (includes slips and trips); **Exertion** - excessive strain or stress/ergonomics/lifting techniques; **Exposure** - inhalation/skin hazards. Specify the hazards and do not limit the description to a single word such as "Caught".

3. Aligning with the Job Steps, Task Activity Description, and Potential Hazard columns, describe what actions or procedures are necessary to eliminate or minimize the hazards. Be clear, concise and specific. Use objective, observable, and quantified terms. Avoid subjective general statements such as "be careful" or "use as appropriate".

**Site Personnel Participating in JSA Review:**
I have participated in the review and discussion of the Job Safety Analysis (JSA) listed on this document and understand the duties I am responsible to fulfill. As part of my work, I know I have the responsibility and obligation to STOP work with a Stop Work Authority (SWA) if conditions change and/or potential hazards have been identified.

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**SSE(s) on job:** _____ **Assigned mentor:** _____

Presenter Signature: _____ Date/Time: _____

My signature below indicates that all conditions and requirements listed above have been verified, met, and reviewed with all affected personnel prior to start of work.
Supervisor Signature: _____ Date/Time: _____

Location of Mustering Point: _____ Wind direction (current): _____

GHD Emergency contact (Name and verified phone number): _____

Supervisor Signature documenting Daily Debrief has been completed: _____

# Job Safety Analysis (JSA)

## Insert Name: Environmental- Boat Safety

Field staff must review job specific work plan and coordinate with project manager to verify that all up front logistics are completed prior to starting work including, but not limited to, permitting, access agreements, and notification to required contacts (e.g., site managers, inspectors, clients, subcontractors, etc.). Additionally, a tailgate safety meeting must be performed and documented at the beginning of each workday. **Stop, Think, Act, Review (STAR)** must be used prior to any activity. All personnel must possess the appropriate training prior to initiating scheduled tasks. Also consider weather conditions. GHD personnel have the authority and responsibility to use **Stop Work Authority (SWA).**

| | | | | | |
|---|---|---|---|---|---|
| **Date Issued/Revised:** | 05/19/2016 14:42:56 | **Client:** | GHD - CORE | | |
| **Project Number:** | 031884 | **Created By:** | cra\jcivel | SIM OPS? YES/NO | SSE on site? YES/NO |
| **Project Address:** | | | | | |
| **Key Equipment:** | PFD | | | | |
| **Task-specific Training:** | Towing and Trailering, Boating Safety | | | | |

| Hard Hat | Gloves (ANSI/EN 388) | Eye Protection | Fall Protection | APR | Vest | PPE Clothing |
|---|---|---|---|---|---|---|
| ☐ Type 1 (Top Impact) | ☑ Chemical Protective (ie.Nitrile) | ☐ ANSI/CSA Safety Glasses | ☐ Harness | ☐ Full Face Mask | ☑ Class II (standard) | ☐ Coveralls |
| ☐ Type 2 (Side Impact) | ☐ Level 1 - Light Duty | ☐ Goggles/Spoggles | ☐ Shock Absorbing Lanyard | ☐ Half Face Mask | ☐ Class III ( Night or Highway Traffic) | ☐ Fire Retardent Clothing (FRC) |
| ☑ Class E (standard) | ☐ Level 2 - Light Duty with Protection | ☐ Face Shields | ☐ Lifeline | | ☐ Anti-Static | ☐ High Viz Clothing |
| ☐ Class G | ☐ Level 3 - Medium Duty | ☐ Other* | | **Cartridges** | ☐ FRC | ☑ Long Pants |
| | ☐ Level 4 - Heavy Duty | | | ☐ N95 | ☑ PFD | ☑ Long Sleeve Shirts |
| **Foot Protection** | ☐ High Viz | **Hearing Protection** | **Arc Flash/Shock Protection** | ☐ P100 | | ☐ Paper Tyvek (disposible) |
| ☑ )Industrial Grade Safety Boot | ☐ Other* | ☐ NOT Required for this task | ☐ Hazard Category 2 | ☐ P95 | | ☐ Polyethyene Tyvek |
| ☐ Rubber Boots (industrial grade) | | ☑ Required | ☐ Hazard Category 4 | ☐ R95 | | ☐ Other* |
| ☐ Hip Waders | | | | ☐ Organic Vapour | | |

| Hard Hat | Gloves (ANSI/EN 388) | Eye Protection | Fall Protection | APR | Vest | PPE Clothing |
|---|---|---|---|---|---|---|
| | * see key equipment | | | ☐ Speciality* | | |

| Project Development Team | | Modified by | Reviewed by | Date |
|---|---|---|---|---|
| Name | Signature | | | |
| Jeff Daniel | | | | |
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| Job steps[1] | Task activity | Potential hazard(s)[2] | Corrective measure(s)[3] | Person responsible (Print first and last names) |
|---|---|---|---|---|
| 1 | Mob equipment to boat launch | • Over loading boat capacity<br>• Inclement weather<br>• Lifting hazards<br>• Manual material handling<br>• Back injury<br>• Pinch points<br>• Moving or flying projectiles inside vehicle while transporting equipment<br>• Slip/trip/fall hazards<br>• Fuel spill | • Review boat capacity and complete weight survey including personnel and gear<br>• Monitor weather forecasts<br>• Make sure grip is adequate; wear leather/cotton gloves<br>• Size up the load; if the object is too large or odd shaped OR is in excess of 50 pounds (23 kg) then assistance (mechanical or a buddy lift) will be required<br>• Ensure all equipment is properly secured during transport<br>• Lift with the legs (bend at the knees and use the leg muscles) to protect the lower back and keep lower back in a neutral position<br>• Avoid one handed carrying if possible; maintain awareness of footing<br>• Refuel in appropriate location, no sparks or static buildup<br>• Practice STAR | Competent Operator and survey crew |
| 2 | Launch boat | • Lifting hazards<br>• Manual material handling<br>• Back injury<br>• Pinch points<br>• Moving or flying projectiles inside vehicle while transporting equipment<br>• Slip/trip/fall hazards<br>• Fuel spill<br>• Drowning | • Practice STAR<br>• Make sure grip is adequate; wear leather/cotton gloves<br>• Size up the load; if the object is too large or odd shaped OR is in excess of 50 pounds (23 kg) then assistance (mechanical or a buddy lift) will be required<br>• Lift with the legs (bend at the knees and use the leg muscles) to protect the lower back and keep lower back in a neutral position<br>• Avoid one handed carrying if possible; maintain awareness of footing<br>• Review JSA for proper fuelling<br>• Wear appropriate PFD or life vest<br>• Bring boating safety kit | Competent Operator |
| 3 | Navigate boat to site | • Causing unnecessary wake<br>• Running aground<br>• Disturbing others<br>• Drowning | • Obey posted signage<br>• Follow channel marked with buoys<br>• Follow proper boating etiquette<br>• Practice STAR<br>• Wear appropriate PFD or life vest<br>• Bring boating safety kit<br>• Remain seated | Competent Operator |
| 4 | Perform survey activities | • Tipping boat<br>• Wet equipment<br>• Boating traffic | • Remain seated when operating; If the boat tips over, remain with the boat<br>• Keep equipment dry by storing in waterproof storage containers during transport<br>• Be aware of surroundings, verify water depth in shallow waters | Survey Crew |

1. Each Job or Task consists of a set of steps. Be sure to list all the steps in the sequence that they are performed. Specify the equipment or other details to set the basis for the potential (associated) hazards.

2. A hazard is a potential danger. What can go wrong? How can someone get hurt? Consider, but do not limit, the analysis to: **Contact** - victim is struck by or strikes an object; **Caught** - victim is caught on, caught in or caught between objects; **Fall** - victim falls to ground or lower level (includes slips and trips); **Exertion** - excessive strain or stress/ergonomics/lifting techniques; **Exposure** - inhalation/skin hazards. Specify the hazards and do not limit the description to a single word such as "Caught".

3. Aligning with the Job Steps, Task Activity Description, and Potential Hazard columns, describe what actions or procedures are necessary to eliminate or minimize the hazards. Be clear, concise and specific. Use objective, observable, and quantified terms. Avoid subjective general statements such as "be careful" or "use as appropriate".

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**SSE(s) on job:** _____ **Assigned mentor:** _____

Presenter Signature: _____ Date/Time: _____

My signature below indicates that all conditions and requirements listed above have been verified, met, and reviewed with all affected personnel prior to start of work.
Supervisor Signature: _____ Date/Time: _____

Location of Mustering Point: _____ Wind direction (current): _____

GHD Emergency contact (Name and verified phone number): _____

Supervisor Signature documenting Daily Debrief has been completed: _____

# Job Safety Analysis (JSA)

## Insert Name: Geophysics Group-Bathymetry Survey

Field staff must review job specific work plan and coordinate with project manager to verify that all up front logistics are completed prior to starting work including, but not limited to, permitting, access agreements, and notification to required contacts (e.g., site managers, inspectors, clients, subcontractors, etc.). Additionally, a tailgate safety meeting must be performed and documented at the beginning of each workday. **Stop, Think, Act, Review (STAR)** must be used prior to any activity. All personnel must possess the appropriate training prior to initiating scheduled tasks. Also consider weather conditions. GHD personnel have the authority and responsibility to use **Stop Work Authority (SWA).**

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|---|---|---|---|---|---|
| **Date Issued/Revised:** | 05/19/2016 19:03:52 | **Client:** | GHD - CORE | | |
| **Project Number:** | 031884 | **Created By:** | cra\jcivel | SIM OPS? YES/NO | SSE on site? YES/NO |
| **Project Address:** | | | | | |
| **Key Equipment:** | Bathymetry Instrumentation<br><br>Additional PPE: PFD (Personal Floatation Device) to be worn when working near water or in a boat; sunscreen, insect repellant, mosquito jacket<br><br>Leather gloves to be worn when loading/unloading equipment | | | | |
| **Task-specific Training:** | PPE, Boat Safety | | | | |

| Hard Hat | Gloves (ANSI/EN 388) | Eye Protection | Fall Protection | APR | Vest | PPE Clothing |
|---|---|---|---|---|---|---|
| ☐ Type 1 (Top Impact) | ☐ Chemical Protective (ie.Nitrile) | ☑ ANSI/CSA Safety Glasses | ☐ Harness | ☐ Full Face Mask | ☑ Class II (standard) | ☐ Coveralls |
| ☐ Type 2 (Side Impact) | ☑ Level 1 - Light Duty | ☐ Goggles/Spoggles | ☐ Shock Absorbing Lanyard | ☐ Half Face Mask | ☐ Class III ( Night or Highway Traffic) | ☐ Fire Retardent Clothing (FRC) |
| ☑ Class E (standard) | ☐ Level 2 - Light Duty with Protection | ☐ Face Shields | ☐ Lifeline | | ☐ Anti-Static | ☐ High Viz Clothing |
| ☐ Class G | ☐ Level 3 - Medium Duty | ☐ Other* | | **Cartridges** | ☐ FRC | ☐ Long Pants |
| | ☐ Level 4 - Heavy Duty | | | ☐ N95 | ☑ PFD | ☐ Long Sleeve Shirts |
| **Foot Protection** | ☐ High Viz | **Hearing Protection** | **Arc Flash/Shock Protection** | ☐ P100 | | ☐ Paper Tyvek (disposible) |

| Hard Hat | Gloves (ANSI/EN 388) | Eye Protection | Fall Protection | APR | Vest | PPE Clothing |
|---|---|---|---|---|---|---|
| ☑ )Industrial Grade Safety Boot | ☐ Other* | ☐ NOT Required for this task | ☐ Hazard Category 2 | ☐ P95 | | ☐ Polyethyene Tyvek |
| ☐ Rubber Boots (industrial grade) | | ☐ Required | ☐ Hazard Category 4 | ☐ R95 | | ☐ Other* |
| ☐ Hip Waders | | | | ☐ Organic Vapour | | |
| | * see key equipment | | | ☐ Speciality* | | |

| Project Development Team | | Modified by | Reviewed by | Date |
|---|---|---|---|---|
| Name | Signature | | | |
| Jeff Daniel | | | | |
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| Job steps[1] | Task activity | Potential hazard(s)[2] | Corrective measure(s)[3] | Person responsible (Print first and last names) |
|---|---|---|---|---|
| 1 | Mob bathymetry instruments and boat to surveying area with CRA vehicle | • Vehicle/boat damage<br>• Lifting hazards<br>• Manual material handling<br>• Back injury<br>• Pinch points<br>• Moving or flying projectiles inside vehicle while transporting equipment<br>• Slip/trip/fall hazards | • Beware of potential obstructions or hazards on the roads<br>• Reduce travel distance when there is a need to carry/lift materials<br>• Make sure grip is adequate; wear leather/cotton gloves<br>• Size up the load; if the object is too large or odd shaped OR is in excess of 50 pounds (23 kg) then assistance (mechanical or a buddy lift) will be required<br>• Lift with the legs (bend at the knees and use the leg muscles) to protect the lower back and keep lower back in a neutral position<br>• Avoid one handed carrying if possible; maintain awareness of footing<br>• Properly secure all equipment inside the vehicle<br>• Properly secure boat to trailer<br>• Experienced operator for towing and backing up boat on trailer<br>• Review JSA and HASP<br>• Practice STAR | |
| 2 | Unload/load bathymetry instruments from vehicle | • Lifting hazards<br>• Manual material handling<br>• Back injury<br>• Instruments<br>• Pinch points | • Refer to step 1 and HASP for additional lifting methods/information<br>• Review JSA and HASP<br>• Practice STAR | |
| 3 | Launch boat | • Vehicle damage<br>• Lifting hazards<br>• Manual material handling<br>• Back injury<br>• Pinch points<br>• Slip/trip/fall hazards<br>• Cuts<br>• Drowning | • Beware of potential obstructions or hazards in launching area<br>• Beware of slippery launch ramp<br>• Experienced operator for backing up boat/trailer on launch ramp<br>• Refer to step 1 and HASP for additional lifting methods/information<br>• Wear leather gloves<br>• Ensure PFD is worn<br>• Review JSA and HASP<br>• Practice STAR<br>• Survey area for glass/sharps before walking in water | |

| Job steps[1] | Task activity | Potential hazard(s)[2] | Corrective measure(s)[3] | Person responsible (Print first and last names) |
|---|---|---|---|---|
| 4 | Load bathymetry equipment into boat | • Lifting hazards<br>• Manual material handling<br>• Back injury<br>• Pinch points<br>• Potential to overturn boat<br>• Tripping hazard | • Ensure boat is properly secured before loading equipment<br>• Refer to step 1 and HASP for additional lifting methods/information<br>• Ensure PFD is worn<br>• Utilize buddy system for loading equipment into boat – person on land hands equipment to person in boat<br>• Wear leather gloves when moving instruments around<br>• Ensure weight of equipment is evenly distributed in the boat<br>• Ensure instruments are secure to prevent tripping hazard<br>• Review JSA and HASP<br>• Practice STAR | |
| 5 | Inspect/calibrate/test equipment | • Loss due to malfunctioning equipment | • Check all equipment to ensure it is in proper working order<br>• Ensure all equipment has been calibrated to CRA and manufacturer's standards and document this<br>• Complete CRA pre departure boarding checklist | |
| 6 | Perform bathymetry survey | • Drowning<br>• Slip/trip/fall hazards<br>• Potential to overturn boat<br>• Moving or flying projectiles inside boat while conducting survey<br>• Heat/cold stress<br>• Insect hazards<br>• Severe weather | • Ensure personal floatation device (PFD) is worn<br>• Complete water borne tour of proposed survey area ahead of time, noting potential hazards<br>• Conduct survey at a safe speed, to avoid potential injury<br>• Ensure all passengers remain seated<br>• Ensure weight of equipment is evenly distributed in the boat<br>• Ensure instruments are secure to prevent tripping hazard<br>• Implement adequate breaks, to adjust instrumentation and to prevent over exertion<br>• Use of sunscreen and insect repellant<br>• Follow Heat/Cold Stress procedures presented in the HASP<br>• Continuously monitor changing weather patterns<br>• Review JSA and HASP<br>• Practice STAR | |
| 7 | Unloading bathymetry equipment from boat | • Lifting hazards<br>• Manual material handling<br>• Back safety<br>• Pinch points<br>• Slip/trip/fall hazards<br>• Potential to tip boat<br>• Tripping hazard | • Ensure boat is properly secured before unloading equipment<br>• Utilize buddy system for unloading equipment from boat – person in boat hands equipment to person on land<br>• Refer to step 1 and HASP for additional lifting methods/information<br>• Ensure PFD is worn<br>• Wear leather gloves when moving instruments around<br>• Review JSA and HASP<br>• Practice STAR | |

| Job steps[1] | Task activity | Potential hazard(s)[2] | Corrective measure(s)[3] | Person responsible (Print first and last names) |
|---|---|---|---|---|
| 8 | Placing boat on trailer | • Vehicle/boat damage<br>• Lifting hazards<br>• Manual material handling<br>• Back safety<br>• Pinch points<br>• Slip/trip/fall | • Beware of potential obstructions or hazards in launching area<br>• Beware of slippery ramp<br>• Experienced operator for backing up trailer on ramp<br>• Refer to step 1 and HASP for additional lifting methods/information<br>• Wear leather gloves<br>• Ensure PFD is worn<br>• Review JSA and HASP<br>• Practice STAR | |
| 9 | De-mob bathymetry instruments and boat with CRA vehicle | • Vehicle/boat damage<br>• Lifting hazards<br>• Manual material handling<br>• Back safety<br>• Pinch points<br>• Moving or flying projectiles inside vehicle while transporting equipment<br>• Slip/trip/fall | • Beware of potential obstructions or hazards on the roads<br>• Refer to step 1 and HASP for additional lifting methods/information<br>• Wear leather gloves when moving equipment around<br>• Properly secure all equipment inside the vehicle<br>• Properly secure boat to trailer<br>• Experienced operator for towing boat and trailer<br>• Review JSA and HASP<br>• Practice STAR | |

1. Each Job or Task consists of a set of steps. Be sure to list all the steps in the sequence that they are performed. Specify the equipment or other details to set the basis for the potential (associated) hazards.
2. A hazard is a potential danger. What can go wrong? How can someone get hurt? Consider, but do not limit, the analysis to: **Contact** - victim is struck by or strikes an object; **Caught** - victim is caught on, caught in or caught between objects; **Fall** - victim falls to ground or lower level (includes slips and trips); **Exertion** - excessive strain or stress/ergonomics/lifting techniques; **Exposure** - inhalation/skin hazards. Specify the hazards and do not limit the description to a single word such as "Caught".
3. Aligning with the Job Steps, Task Activity Description, and Potential Hazard columns, describe what actions or procedures are necessary to eliminate or minimize the hazards. Be clear, concise and specific. Use objective, observable, and quantified terms. Avoid subjective general statements such as "be careful" or "use as appropriate".

**Site Personnel Participating in JSA Review:**
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**SSE(s) on job:** _____ **Assigned mentor:** _____

Presenter Signature: _____ Date/Time: _____

My signature below indicates that all conditions and requirements listed above have been verified, met, and reviewed with all affected personnel prior to start of work.
Supervisor Signature: _____ Date/Time: _____

Location of Mustering Point: _____ Wind direction (current): _____

GHD Emergency contact (Name and verified phone number): _____

Supervisor Signature documenting Daily Debrief has been completed: _____

# Job Safety Analysis (JSA)

## Insert Name: Reciprocating Saw (SAWZALL) Operations

Field staff must review job specific work plan and coordinate with project manager to verify that all up front logistics are completed prior to starting work including, but not limited to, permitting, access agreements, and notification to required contacts (e.g., site managers, inspectors, clients, subcontractors, etc.). Additionally, a tailgate safety meeting must be performed and documented at the beginning of each workday. **Stop, Think, Act, Review (STAR)** must be used prior to any activity. All personnel must possess the appropriate training prior to initiating scheduled tasks. Also consider weather conditions. GHD personnel have the authority and responsibility to use **Stop Work Authority (SWA).**

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|---|---|---|---|---|---|
| **Date Issued/Revised:** | 05/31/2016 14:30:10 | **Client:** | GHD - CORE | | |
| **Project Number:** | 031884 | **Created By:** | cra\jcivel | SIM OPS? YES/NO | SSE on site? YES/NO |
| **Project Address:** | | | | | |
| **Key Equipment:** | Powered hand saw; assortment of blades - for material to be cut; operator's instruction manual (manufacturer's manual);<br>Minimum Level D PPE; type of gloves dependent on job-specific requirements. Additional PPE may be required in the Health and Safety Plan (HASP). Also refer to the HASP for required traffic control, air monitoring, and emergency procedures. | | | | |
| **Task-specific Training:** | CRA SMART (BBS) training; 40-hour HAZWOPER, 8-Hour Refresher, Hazard Communication; Supervisor shall be trained in CPR, First Aid, AED and have Supervisor Training; Hand and Power Tool Training. **Saw operator will review the Manufacturer's Operating Instructions prior to use.** | | | | |

| Hard Hat | Gloves (ANSI/EN 388) | Eye Protection | Fall Protection | APR | Vest | PPE Clothing |
|---|---|---|---|---|---|---|
| ☐ Type 1 (Top Impact) | ☐ Chemical Protective (ie.Nitrile) | ☑ ANSI/CSA Safety Glasses | ☐ Harness | ☐ Full Face Mask | ☑ Class II (standard) | ☐ Coveralls |
| ☐ Type 2 (Side Impact) | ☑ Level 1 - Light Duty | ☐ Goggles/Spoggles | ☐ Shock Absorbing Lanyard | ☐ Half Face Mask | ☐ Class III ( Night or Highway Traffic) | ☐ Fire Retardent Clothing (FRC) |
| ☑ Class E (standard) | ☑ Level 2 - Light Duty with Protection | ☐ Face Shields | ☐ Lifeline | | ☐ Anti-Static | ☐ High Viz Clothing |
| ☐ Class G | ☑ Level 3 - Medium Duty | ☐ Other* | | **Cartridges** | ☐ FRC | ☑ Long Pants |
| | ☐ Level 4 - Heavy Duty | | | ☐ N95 | ☑ PFD | ☑ Long Sleeve Shirts |
| **Foot Protection** | ☐ High Viz | **Hearing Protection** | **Arc Flash/Shock Protection** | ☐ P100 | | ☐ Paper Tyvek (disposible) |
| ☑ )Industrial Grade Safety Boot | ☐ Other* | ☐ NOT Required for this task | ☐ Hazard Category 2 | ☐ P95 | | ☐ Polyethyene Tyvek |

| Hard Hat | Gloves (ANSI/EN 388) | Eye Protection | Fall Protection | APR | Vest | PPE Clothing |
|---|---|---|---|---|---|---|
| ☐ Rubber Boots (industrial grade) | | ☑ Required | ☐ Hazard Category 4 | ☐ R95 | | ☑ Other* |
| ☐ Hip Waders | | | | ☐ Organic Vapour | | |
| | * see key equipment | | | ☐ Speciality* | | |

| Project Development Team | | Modified by | Reviewed by | Date |
|---|---|---|---|---|
| Name | Signature | | | |
| Jeff Daniel | | | | |
| | | | | |
| | | | | |

| Job steps[1] | Task activity | Potential hazard(s)[2] | Corrective measure(s)[3] | Person responsible (Print first and last names) |
|---|---|---|---|---|
| 1 | Discuss STAR and SWA Process. Discuss Emergency Evacuaton Plan and review JSA | • Stakeholder encounters<br>• Miscommunication<br>• Unsafe acts/conditions by others<br>• Fire/explosion on refinery<br>• Inclement weather | • All personnel will clearly understand SWA<br>• Follow stakeholder communications guide<br>• Communicate mustering points<br>• Follow emergency notications from Main Gate; stop all work as directed when lightning or severe storms are in the area; personnel must wait until an ALL CLEAR has been announced over the radio before resuming work | Operator |
| 2 | Inspect Saw - Refer to the specific equipment manufacturer's operating manual before using the equipment | • Cracked, missing or broken parts<br>• Dull blades<br>• Improper blade for the task being performed<br>• Accidental start | • **Wear ANSI Cut/Abrasion Level 2 or greater gloves and other required PPE**<br>• Complete a Hand and Power Tool safety checklist; report defects to supervisor immediately; do not use until replaced or repaired<br>• Inspect power cord on tool<br>• A portable GFCI unit must be used in between power cord and extension cord<br>• Test the GFCI unit; run tool and hit the trip button of GFCI; ensure GFCI works<br>• Unplug tool before making any adjustments to saw | Operator |
| 3 | Set up materials to be cut | • Slips/trips/falls<br>• Personal injury<br>• Property damage<br>• Strains<br>• Pinch points | • **Wear ANSI Cut and Puncture, Level 3 Med/Heavy duty impact gloves**<br>• Use the buddy system if material to be cut needs to be lifted and placed on the ground and is bulky or weighs 50 lbs or greater<br>• Keep hands out of pinch point areas when placing material<br>• Use proper body posture when lifting using your legs; slight bend in knees and back straight | Operator |

| Job steps[1] | Task activity | Potential hazard(s)[2] | Corrective measure(s)[3] | Person responsible (Print first and last names) |
|---|---|---|---|---|
| 4 | Saw Operations (warm up muscles to be used prior to initiating saw operation). Rotate personnel frequently to ensure active recovery time is provided to each saw operator. Take breaks. | • Excessive force<br>• Blade breakage<br>• Vibrations<br>• Body strains<br>• Fatigue<br>• Muskuloskeletel/ergonomic issues<br>• Cuts<br>• Caught by<br>• Visibility<br>• Electrocution | • **Wear ANSI Cut and Puncture, Level 3 Med/Heavy duty impact gloves**<br>• Use both hands when operating the saw; no one-handed operation.<br>• Get assistance to hold the material while cutting or use blocking/wedges to support circular material; never use your feet to support or hold down material being cut<br>• Always hold saw at designated insulated grip points<br>• When blade becomes dull, replace to avoid excessive force using your hands and arms<br>• Keep saw out in front of your body and cut vertically starting from the top and moving down<br>• Rotate saw operations to a fresh operator frequently; allow for active recovery<br>• Take concurrent breaks so all team members can recover<br>• For larger diameter or surface area cuts, take necessary breaks to avoid hand fatigue and stretch fingers<br>• Warm up muscles prior to beginning saw operation and after any extended break periods<br>• Stretch arms, shoulders, wrists, and neck throughout breaks and as needed<br>• Release trigger on saw immediately after making cut; keep saw off the ground and put away when completed<br>• Secure all loose fitting clothing<br>• Unplug device when changing blades<br>• Do not use in wet conditions | Operator |

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2. A hazard is a potential danger. What can go wrong? How can someone get hurt? Consider, but do not limit, the analysis to: **Contact** - victim is struck by or strikes an object; **Caught** - victim is caught on, caught in or caught between objects; **Fall** - victim falls to ground or lower level (includes slips and trips); **Exertion** - excessive strain or stress/ergonomics/lifting techniques; **Exposure** - inhalation/skin hazards. Specify the hazards and do not limit the description to a single word such as "Caught".
3. Aligning with the Job Steps, Task Activity Description, and Potential Hazard columns, describe what actions or procedures are necessary to eliminate or minimize the hazards. Be clear, concise and specific. Use objective, observable, and quantified terms. Avoid subjective general statements such as "be careful" or "use as appropriate".

**Site Personnel Participating in JSA Review:**
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**SSE(s) on job:** _____ **Assigned mentor:** _____

Presenter Signature: _____ Date/Time: _____

My signature below indicates that all conditions and requirements listed above have been verified, met, and reviewed with all affected personnel prior to start of work.
Supervisor Signature: _____ Date/Time: _____

Location of Mustering Point: _____ Wind direction (current): _____

GHD Emergency contact (Name and verified phone number): _____

Supervisor Signature documenting Daily Debrief has been completed: _____

# Job Safety Analysis (JSA)

## Insert Name: Driving

Field staff must review job specific work plan and coordinate with project manager to verify that all up front logistics are completed prior to starting work including, but not limited to, permitting, access agreements, and notification to required contacts (e.g., site managers, inspectors, clients, subcontractors, etc.). Additionally, a tailgate safety meeting must be performed and documented at the beginning of each workday. **Stop, Think, Act, Review (STAR)** must be used prior to any activity. All personnel must possess the appropriate training prior to initiating scheduled tasks. Also consider weather conditions. GHD personnel have the authority and responsibility to use **Stop Work Authority (SWA).**

| | | | | | |
|---|---|---|---|---|---|
| **Date Issued/Revised:** | 05/31/2016 14:43:03 | **Client:** | GHD - CORE | | |
| **Project Number:** | 031884 | **Created By:** | cra\jcivel | SIM OPS? YES/NO | SSE on site? YES/NO |
| **Project Address:** | | | | | |
| **Key Equipment:** | Vehicle, valid driver's license, 360 degree topper | | | | |
| **Task-specific Training:** | Defensive Driving | | | | |

| Hard Hat | Gloves (ANSI/EN 388) | Eye Protection | Fall Protection | APR | Vest | PPE Clothing |
|---|---|---|---|---|---|---|
| ☐ Type 1 (Top Impact) | ☐ Chemical Protective (ie.Nitrile) | ☐ ANSI/CSA Safety Glasses | ☐ Harness | ☐ Full Face Mask | ☐ Class II (standard) | ☐ Coveralls |
| ☐ Type 2 (Side Impact) | ☐ Level 1 - Light Duty | ☐ Goggles/Spoggles | ☐ Shock Absorbing Lanyard | ☐ Half Face Mask | ☐ Class III ( Night or Highway Traffic) | ☐ Fire Retardent Clothing (FRC) |
| ☐ Class E (standard) | ☐ Level 2 - Light Duty with Protection | ☐ Face Shields | ☐ Lifeline | | ☐ Anti-Static | ☐ High Viz Clothing |
| ☐ Class G | ☐ Level 3 - Medium Duty | ☐ Other* | | **Cartridges** | ☐ FRC | ☐ Long Pants |
| | ☐ Level 4 - Heavy Duty | | | ☐ N95 | ☐ PFD | ☐ Long Sleeve Shirts |
| **Foot Protection** | ☐ High Viz | **Hearing Protection** | **Arc Flash/Shock Protection** | ☐ P100 | | ☐ Paper Tyvek (disposible) |
| ☐ )Industrial Grade Safety Boot | ☐ Other* | ☐ NOT Required for this task | ☐ Hazard Category 2 | ☐ P95 | | ☐ Polyethyene Tyvek |
| ☐ Rubber Boots (industrial grade) | | ☐ Required | ☐ Hazard Category 4 | ☐ R95 | | ☐ Other* |
| ☐ Hip Waders | | | | ☐ Organic Vapour | | |

| Hard Hat | Gloves (ANSI/EN 388) | Eye Protection | Fall Protection | APR | Vest | PPE Clothing |
|---|---|---|---|---|---|---|
| | * see key equipment | | | ☐ Speciality* | | |

| Project Development Team | | Modified by | Reviewed by | Date |
|---|---|---|---|---|
| Name | Signature | | | |
| Jeff Daniel | | | | |
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| Job steps[1] | Task activity | Potential hazard(s)[2] | Corrective measure(s)[3] | Person responsible (Print first and last names) |
|---|---|---|---|---|
| 1 | Discuss STAR and SWA | • Site personnel not aware of STAR and SWA | • Project team (CRA) discusses importance of and documentation procedures for SWA during pre job safety meeting<br>• Discuss route, concerns, and alternate routes with passenger and drivers of other vehicles<br>• Use SWA to stop any work that is unsafe<br>• Ensure proper vehicle selected for travel (use a truck if going to construction site or area with rough conditions that would damage a small vehicle?) | Driver and passenger |
| 2 | Check weather | • Unexpected storm<br>• Fog; rain; snow; lightning/thunder<br>• Heat/cold stress | • Check local weather forecast<br>• Discuss weather issues and precautions to take while driving and on site during the pre job safety meeting<br>• If weather conditions (e.g., fog, rain, snow, etc.) impair the ability/vision of the driver, exit at nearest safe location and assess the situation<br>• While on site, at first sign of lightning/thunder utilize SWA and assess weather conditions<br>• In extreme temperatures, ensure all personnel have proper clothing, hydration, and heat/cold protection (e.g., canopy, fan, glove warmers) | Driver or Passenger |
| 3 | Complete CRA Daily Operator Vehicle Checklist | • Damaged vehicle lights, tires, windows, mirrors, horn<br>• Inadequate vehicle documents and/or safety items | • Check for fluid leaks under vehicle<br>• Test operation of headlights, front/rear turn signals, backup lights, brake lights, and emergency flashers<br>• Visually check the pressure/wear of tires<br>• Ensure the vehicle has a properly inflated spare tire and associated tools to install<br>• Assure windshield and window glass is clean and free from obstructions<br>• Assure all fluids are topped off (e.g., windshield wiper fluid) and scheduled routine maintenance has occurred (e.g., oil changes).<br>• Test the windshield wipers and horn<br>• Verify vehicle registration, insurance card, and inspection sticker is present and valid<br>• If the vehicle contains a first aid kit, fire extinguisher, and road hazard kit, verify that all items with expiration dates are current and that fire extinguisher has had documented monthly check<br>• Do not use vehicle if any safety device is found not functioning | Driver or Passenger |

| Job steps[1] | Task activity | Potential hazard(s)[2] | Corrective measure(s)[3] | Person responsible (Print first and last names) |
|---|---|---|---|---|
| 4 | Check and adjust seat, steering wheel, headrest, and mirrors | • Back/body strain<br>• Blind spot<br>• Impaired vision | Adjust seat, headrest, and steering wheel height so body is fully supported/comfortable and pedals are within easy reach<br><br>Ensure mirrors are properly adjusted | Driver or Passenger |
| 5 | Fasten seat belt(s) and ensure passengers' seat belts are fastened | • Serious injury, ejection, or death from collision and/or traffic citation | • Verify driver and passenger(s) seat belts are in good condition and properly latched | Driver or Passenger |
| 6 | Ensure vehicle doors are locked | • Serious injury, ejection, or death from collision<br>• Unwanted intrusion<br>• Lost equipment | • Manually lock all doors to vehicle prior to starting the vehicle | Driver |
| 7 | Start engine and check gauges and warning lights | • Vehicle breakdown | • Verify sufficient fuel and other hazard lamps (e.g., battery, oil, and temperature) are not lit | Driver |
| 8 | Driving – Use defensive driving techniques and stay alert | • Arriving late<br>• Collision<br>• Blind spots of other vehicles<br>• Injury or death to occupants or other parties | • Acknowledge and comply with all traffic regulations, laws, and ordinances<br>• Do not use two way communicating devices or perform other distracting activities while vehicle is in motion<br>• Constantly scan intersections, move eyes, check mirrors, and assess traffic lights (fresh vs. stale)<br>• Recognize other vehicle's blind spots and minimize time spent within these zones<br>• Maintain safety cushion around vehicle (front, sides, and rear) and 4 second following distance (add an extra second for each hazardous condition, triple following distance in poor weather conditions)<br>• Signal well in advance before changing lanes or turning<br>• Utilize all driving defensive techniques | Driver |
| 9 | Arrive at site | • Pedestrian injury<br>• Collision | • Maintain awareness of pedestrian/vehicular traffic when entering site and traveling to work zone | Driver |
| 10 | Park vehicle – assign a spotter if necessary (when in doubt use a spotter) | • Pedestrian injury<br>• Collision<br>• Property damage | • Maintain awareness of pedestrian/vehicular traffic<br>• Park vehicle in pull through parking space or facing the exit<br>• Parking in a parking space that is not a designated parking space will require the placement of the 360 degree topper on the hood of the vehicle<br>• Use caution and mirrors/spotter when backing vehicle<br>• Set parking brake | Driver |

| Job steps[1] | Task activity | Potential hazard(s)[2] | Corrective measure(s)[3] | Person responsible (Print first and last names) |
|---|---|---|---|---|
| 11 | Demobilization – conduct a vehicle walk around inspection paying particular attention to path(s) of travel | • Collision<br>• Injury or death to occupants or other parties | • Perform perimeter vehicle check<br>• Maintain awareness of pedestrian/vehicular traffic when exiting site<br>• Utilize defensive driving techniques<br>• Complete post departure checklist and report vehicle problems to company vehicle maintenance manager or rental car agency | Driver or Passenger |
| 12 | Report maintenance or mechanical problems upon returning vehicle | • Conditions worsen leading to mechanical failure resulting in collision and injury | • Report vehicle problems immediately to company representative or rental car agency<br>• Schedule and/or perform repairs as soon as possible | Driver |

1. Each Job or Task consists of a set of steps. Be sure to list all the steps in the sequence that they are performed. Specify the equipment or other details to set the basis for the potential (associated) hazards.
2. A hazard is a potential danger. What can go wrong? How can someone get hurt? Consider, but do not limit, the analysis to: **Contact** - victim is struck by or strikes an object; **Caught** - victim is caught on, caught in or caught between objects; **Fall** - victim falls to ground or lower level (includes slips and trips); **Exertion** - excessive strain or stress/ergonomics/lifting techniques; **Exposure** - inhalation/skin hazards. Specify the hazards and do not limit the description to a single word such as "Caught".
3. Aligning with the Job Steps, Task Activity Description, and Potential Hazard columns, describe what actions or procedures are necessary to eliminate or minimize the hazards. Be clear, concise and specific. Use objective, observable, and quantified terms. Avoid subjective general statements such as "be careful" or "use as appropriate".

**Site Personnel Participating in JSA Review:**
I have participated in the review and discussion of the Job Safety Analysis (JSA) listed on this document and understand the duties I am responsible to fulfill. As part of my work, I know I have the responsibility and obligation to STOP work with a Stop Work Authority (SWA) if conditions change and/or potential hazards have been identified.

| Name/Company | Sign | Date |
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**SSE(s) on job:** _____ **Assigned mentor:** _____

Presenter Signature: _____ Date/Time: _____

My signature below indicates that all conditions and requirements listed above have been verified, met, and reviewed with all affected personnel prior to start of work.
Supervisor Signature: _____ Date/Time: _____

Location of Mustering Point: _____ Wind direction (current): _____

GHD Emergency contact (Name and verified phone number): _____

Supervisor Signature documenting Daily Debrief has been completed: _____

# Job Safety Analysis (JSA)

## Insert Name: Environmental-Waste Sorting, Weighing, and Categorization

Field staff must review job specific work plan and coordinate with project manager to verify that all up front logistics are completed prior to starting work including, but not limited to, permitting, access agreements, and notification to required contacts (e.g., site managers, inspectors, clients, subcontractors, etc.). Additionally, a tailgate safety meeting must be performed and documented at the beginning of each workday. **Stop, Think, Act, Review (STAR)** must be used prior to any activity. All personnel must possess the appropriate training prior to initiating scheduled tasks. Also consider weather conditions. GHD personnel have the authority and responsibility to use **Stop Work Authority (SWA).**

| | | | | | |
|---|---|---|---|---|---|
| **Date Issued/Revised:** | 05/31/2016 14:52:02 | **Client:** | GHD - CORE | | |
| **Project Number:** | 031884 | **Created By:** | cra\jcivel | SIM OPS? YES/NO | SSE on site? YES/NO |
| **Project Address:** | | | | | |
| **Key Equipment:** | Scale, hand tools, PPE, bins<br><br>Additional PPE: Level D PPE; | | | | |
| **Task-specific Training:** | Chemical handling training requirements (HAZCOM); WHMIS | | | | |

| Hard Hat | Gloves (ANSI/EN 388) | Eye Protection | Fall Protection | APR | Vest | PPE Clothing |
|---|---|---|---|---|---|---|
| ☐ Type 1 (Top Impact) | ☑ Chemical Protective (ie.Nitrile) | ☑ ANSI/CSA Safety Glasses | ☐ Harness | ☐ Full Face Mask | ☑ Class II (standard) | ☐ Coveralls |
| ☐ Type 2 (Side Impact) | ☑ Level 1 - Light Duty | ☐ Goggles/Spoggles | ☐ Shock Absorbing Lanyard | ☐ Half Face Mask | ☐ Class III ( Night or Highway Traffic) | ☐ Fire Retardent Clothing (FRC) |
| ☑ Class E (standard) | ☐ Level 2 - Light Duty with Protection | ☐ Face Shields | ☐ Lifeline | | ☐ Anti-Static | ☐ High Viz Clothing |
| ☐ Class G | ☐ Level 3 - Medium Duty | ☐ Other* | | **Cartridges** | ☐ FRC | ☑ Long Pants |
| | ☐ Level 4 - Heavy Duty | | | ☐ N95 | ☐ PFD | ☑ Long Sleeve Shirts |
| **Foot Protection** | ☐ High Viz | **Hearing Protection** | **Arc Flash/Shock Protection** | ☐ P100 | | ☐ Paper Tyvek (disposible) |
| ☑ )Industrial Grade Safety Boot | ☐ Other* | ☐ NOT Required for this task | ☐ Hazard Category 2 | ☐ P95 | | ☐ Polyethyene Tyvek |

| Hard Hat | Gloves (ANSI/EN 388) | Eye Protection | Fall Protection | APR | Vest | PPE Clothing |
|---|---|---|---|---|---|---|
| ☐ Rubber Boots (industrial grade) | | ☐ Required | ☐ Hazard Category 4 | ☐ R95 | | ☐ Other* |
| ☐ Hip Waders | | | | ☐ Organic Vapour | | |
| | * see key equipment | | | ☐ Speciality* | | |

| Project Development Team | | Modified by | Reviewed by | Date |
|---|---|---|---|---|
| Name | Signature | | | |
| Jeff Daniel | | | | |
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| Job steps[1] | Task activity | Potential hazard(s)[2] | Corrective measure(s)[3] | Person responsible (Print first and last names) |
|---|---|---|---|---|
| 1 | Perform STAR process | | • Stop, Think, Act, and Review<br>• Change JSA accordingly, discuss task and expectations of the task | Site Supervisor |
| 2 | Select work area | • Vehicle and pedestrian traffic, interference, distractions | • Chose sorting area with low pedestrian and vehicle traffic patterns<br>• Demarcate work area with caution tape, floor cones, or other barriers | |
| 3 | Open bag filled with waste | • Spills<br>• Cutting hazard<br>• Slip/trip/fall hazards<br>• Lifting hazards<br>• Back injury<br>• Manual material handling<br>• Chemical exposure<br>• Biological exposure | • Use absorbent pads to soak up excess liquids<br>• Protect hands and beware of potential sharp objects or needles mixed in with waste<br>• Do not stand on platforms or ladders if liquids are spilled<br>• Reduce travel distance when there is a need to carry/lift materials<br>• Make sure grip is adequate; wear leather/cotton gloves<br>• Size up the load; if the object is too large or odd shaped OR is in excess of 50 pounds (23 kg) then assistance (mechanical or a buddy lift) will be required<br>• Lift with the legs (bend at the knees and use the leg muscles) to protect the lower back and keep lower back in a neutral position<br>• Avoid one handed carrying if possible; maintain awareness of footing<br>• Wear required PPE<br>• Heightened awareness of sharps, syringes, etc.<br>• Do not operate any equipment unless properly trained and authorized | Site Supervisor |
| 4 | Sort waste | • Spills<br>• Cutting hazard<br>• Slip/trip/fall hazards<br>• Lifting hazards<br>• Back injury<br>• Manual material handling<br>• Chemical exposure<br>• Biological exposure<br>• Heightened awareness of sharps, syringes, etc. | • Use absorbent pads to soak up liquids<br>• Protect hands and beware of potential sharp objects or needles mixed in with waste<br>• Do not stand on platforms or ladders if liquids are spilled<br>• Refer to step 5 and the HASP for additional lifting methods/information<br>• Wear required PPE<br>• Do not operate any equipment unless properly trained and authorized | Site Supervisor |

1. Each Job or Task consists of a set of steps. Be sure to list all the steps in the sequence that they are performed. Specify the equipment or other details to set the basis for the potential (associated) hazards.

2. A hazard is a potential danger. What can go wrong? How can someone get hurt? Consider, but do not limit, the analysis to: **Contact** - victim is struck by or strikes an object; **Caught** - victim is caught on, caught in or caught between objects; **Fall** - victim falls to ground or lower level (includes slips and trips); **Exertion** - excessive strain or stress/ergonomics/lifting techniques; **Exposure** - inhalation/skin hazards. Specify the hazards and do not limit the description to a single word such as "Caught".

3. Aligning with the Job Steps, Task Activity Description, and Potential Hazard columns, describe what actions or procedures are necessary to eliminate or minimize the hazards. Be clear, concise and specific. Use objective, observable, and quantified terms. Avoid subjective general statements such as "be careful" or "use as appropriate".

**Site Personnel Participating in JSA Review:**
I have participated in the review and discussion of the Job Safety Analysis (JSA) listed on this document and understand the duties I am responsible to fulfill. As part of my work, I know I have the responsibility and obligation to STOP work with a Stop Work Authority (SWA) if conditions change and/or potential hazards have been identified.

| Name/Company | Sign | Date |
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**SSE(s) on job:** _____ **Assigned mentor:** _____

Presenter Signature: _____ Date/Time: _____

My signature below indicates that all conditions and requirements listed above have been verified, met, and reviewed with all affected personnel prior to start of work.
Supervisor Signature: _____ Date/Time: _____

Location of Mustering Point: _____ Wind direction (current): _____

GHD Emergency contact (Name and verified phone number): _____

Supervisor Signature documenting Daily Debrief has been completed: _____

# Job Safety Analysis (JSA)

## Insert Name: Environmental-Electrofishing

Field staff must review job specific work plan and coordinate with project manager to verify that all up front logistics are completed prior to starting work including, but not limited to, permitting, access agreements, and notification to required contacts (e.g., site managers, inspectors, clients, subcontractors, etc.). Additionally, a tailgate safety meeting must be performed and documented at the beginning of each workday. **Stop, Think, Act, Review (STAR)** must be used prior to any activity. All personnel must possess the appropriate training prior to initiating scheduled tasks. Also consider weather conditions. GHD personnel have the authority and responsibility to use **Stop Work Authority (SWA).**

| | | | | | |
|---|---|---|---|---|---|
| **Date Issued/Revised:** | 06/01/2016 15:51:29 | **Client:** | GHD - CORE | | |
| **Project Number:** | 031884 | **Created By:** | cra\jcivel | SIM OPS? YES/NO | SSE on site? YES/NO |
| **Project Address:** | | | | | |
| **Key Equipment:** | Backpack unit; tote barge or boat; electrofishing equipment; hand nets and tools made of non conductive material; rubber boots; rubber gloves<br><br>PTFE cutting board, utensils<br><br>Additional PPE: Rubber footwear/chest high waders; heavy duty, high voltage (electrician type) gloves or other type approved for working with electrical currents in water; wooden or properly insulated net handles and tools; PFD (approved Type I life jacket by US Coast Guard) | | | | |
| **Task-specific Training:** | Basic First Aid and CPR; Electrofishing Equipment, Boat Safety | | | | |

| Hard Hat | Gloves (ANSI/EN 388) | Eye Protection | Fall Protection | APR | Vest | PPE Clothing |
|---|---|---|---|---|---|---|
| ☐ Type 1 (Top Impact) | ☑ Chemical Protective (ie.Nitrile) | ☑ ANSI/CSA Safety Glasses | ☐ Harness | ☐ Full Face Mask | ☑ Class II (standard) | ☐ Coveralls |
| ☐ Type 2 (Side Impact) | ☐ Level 1 - Light Duty | ☐ Goggles/Spoggles | ☐ Shock Absorbing Lanyard | ☐ Half Face Mask | ☐ Class III ( Night or Highway Traffic) | ☐ Fire Retardent Clothing (FRC) |
| ☐ Class E (standard) | ☐ Level 2 - Light Duty with Protection | ☐ Face Shields | ☐ Lifeline | | ☐ Anti-Static | ☐ High Viz Clothing |
| ☐ Class G | ☐ Level 3 - Medium Duty | ☐ Other* | | **Cartridges** | ☐ FRC | ☐ Long Pants |
| | ☐ Level 4 - Heavy Duty | | | ☐ N95 | ☑ PFD | ☐ Long Sleeve Shirts |
| **Foot Protection** | ☐ High Viz | **Hearing Protection** | **Arc Flash/Shock Protection** | ☐ P100 | | ☐ Paper Tyvek (disposible) |
| ☑ )Industrial Grade Safety Boot | ☐ Other* | ☑ NOT Required for this task | ☐ Hazard Category 2 | ☐ P95 | | ☐ Polyethyene Tyvek |

| Hard Hat | Gloves (ANSI/EN 388) | Eye Protection | Fall Protection | APR | Vest | PPE Clothing |
|---|---|---|---|---|---|---|
| ☑ Rubber Boots (industrial grade) | | ☐ Required | ☐ Hazard Category 4 | ☐ R95 | | ☐ Other* |
| ☑ Hip Waders | | | | ☐ Organic Vapour | | |
| | * see key equipment | | | ☐ Speciality* | | |

| Project Development Team | | Modified by | Reviewed by | Date |
|---|---|---|---|---|
| Name | Signature | | | |
| Jeff Daniel | | | | |
| | | | | |
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| Job steps[1] | Task activity | Potential hazard(s)[2] | Corrective measure(s)[3] | Person responsible (Print first and last names) |
|---|---|---|---|---|
| 1 | Inspect/startup/fuel electrofishing equipment | • Loss due to malfunctioning equipment<br>• Electrical shock<br>• Fire hazard | • Check all equipment to ensure it is in proper working order according to manufacturer's standards<br>• All electrofishing equipment should be turned off before making connections/disconnections or repairs<br>• Fueling should be conducted in well ventilated area (near vehicle) and away from water (fire extinguisher should be available nearby) | CRA Biologists |
| 2 | Establish work zone(s) in water body | • Unstable footing<br>• Submerged objects<br>• High water<br>• Biological hazards | • Maintain awareness; check footing for debris/soft sediments<br>• Be aware of water depths and current; use buddy system<br>• Heightened awareness of wasps, ants, bees, spiders, and poison plants | CRA Biologists |
| 4 | Conducting electrofishing from a boat | • Water hazards<br>• Electrical shock<br>• Excess equipment<br>• Lifting hazards<br>• Back injury<br>• Manual material handling<br>• Thermal stress | • Maintain awareness; use buddy system<br>• Inspect boat and boating equipment<br>• Have rescue equipment available (ropes, PFDs, rescue donut)<br>• Leave at least one person on shore in the event of an emergency<br>• All equipment should be grounded<br>• Wear appropriate PPE<br>• Stay behind the direction of movement of the electrode(s)<br>• Keep hands out of water<br>• Stow extra equipment to keep walkways clear<br>• Refer to step 2 and the HASP for additional lifting techniques<br>• Take breaks; stay hydrated; be able to recognize the signs of heat stress in yourself and others<br>• Use a PFD | CRA Biologists |
| 6 | Netting/capturing fish from a boat | • Slip/trip/fall hazards<br>• Water hazards<br>• Electrical shock<br>• Excess equipment<br>• Lifting hazards<br>• Back injury<br>• Manual material handling<br>• Thermal stress | • Maintain awareness<br>• use buddy system<br>• All equipment should be grounded<br>• Wear appropriate PPE<br>• Stay behind the direction of movement of the electrode(s)<br>• Keep hands out of water<br>• Stow extra equipment to keep walkways clear<br>• Refer to step 2 and HASP for additional lifting techniques<br>• Take breaks; stay hydrated; be able to recognize the signs of heat stress in yourself and others<br>• Use a PFD | CRA Biologists |

| Job steps[1] | Task activity | Potential hazard(s)[2] | Corrective measure(s)[3] | Person responsible (Print first and last names) |
|---|---|---|---|---|
| 7 | Processing fish (identifying, weighing, measuring, photographing, storing for sample preparation, etc.) | • Slip/trip/fall hazards<br>• Water hazards<br>• Lifting hazards<br>• Back injury<br>• Manual material handling<br>• Thermal stress | • Maintain awareness<br>• Check footing for debris/soft sediments<br>• Be aware of water depths and current<br>• Use buddy system<br>• Wear appropriate PPE<br>• Keep hands away from electrodes<br>• Refer to step 2 and the HASP for additional lifting techniques<br>• Take breaks; stay hydrated; be able to recognize the signs of heat stress in yourself and others<br>• Use a PFD if conducting work on water | CRA Biologists |
| 8 | Reviving/releasing fish | • Slip/trip/fall hazards<br>• Water hazards<br>• Lifting hazards<br>• Back injury<br>• Manual material handling<br>• Thermal stress | Maintain awareness<br><br>Check footing for debris/soft sediments<br><br>Be aware of water depths and current<br><br>Use buddy system<br><br>Wear appropriate PPE<br><br>Keep hands away from electrodes<br><br>Refer to step 2 and the HASP for additional lifting techniques<br><br>Take breaks; stay hydrated; be able to recognize the signs of heat stress in yourself and others<br><br>Use a PFD | CRA Biologists |

1. Each Job or Task consists of a set of steps. Be sure to list all the steps in the sequence that they are performed. Specify the equipment or other details to set the basis for the potential (associated) hazards.
2. A hazard is a potential danger. What can go wrong? How can someone get hurt? Consider, but do not limit, the analysis to: **Contact** - victim is struck by or strikes an object; **Caught** - victim is caught on, caught in or caught between objects; **Fall** - victim falls to ground or lower level (includes slips and trips); **Exertion** - excessive strain or stress/ergonomics/lifting techniques; **Exposure** - inhalation/skin hazards. Specify the hazards and do not limit the description to a single word such as "Caught".
3. Aligning with the Job Steps, Task Activity Description, and Potential Hazard columns, describe what actions or procedures are necessary to eliminate or minimize the hazards. Be clear, concise and specific. Use objective, observable, and quantified terms. Avoid subjective general statements such as "be careful" or "use as appropriate".

**Site Personnel Participating in JSA Review:**
I have participated in the review and discussion of the Job Safety Analysis (JSA) listed on this document and understand the duties I am responsible to fulfill. As part of my work, I know I have the responsibility and obligation to STOP work with a Stop Work Authority (SWA) if conditions change and/or potential hazards have been identified.

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**SSE(s) on job:** _____ **Assigned mentor:** _____

Presenter Signature: _____ Date/Time: _____

My signature below indicates that all conditions and requirements listed above have been verified, met, and reviewed with all affected personnel prior to start of work.
Supervisor Signature: _____ Date/Time: _____

Location of Mustering Point: _____ Wind direction (current): _____

GHD Emergency contact (Name and verified phone number): _____

Supervisor Signature documenting Daily Debrief has been completed: _____

# Job Safety Analysis (JSA)

## Insert Name: Construction Oversight

Field staff must review job specific work plan and coordinate with project manager to verify that all up front logistics are completed prior to starting work including, but not limited to, permitting, access agreements, and notification to required contacts (e.g., site managers, inspectors, clients, subcontractors, etc.). Additionally, a tailgate safety meeting must be performed and documented at the beginning of each workday. **Stop, Think, Act, Review (STAR)** must be used prior to any activity. All personnel must possess the appropriate training prior to initiating scheduled tasks. Also consider weather conditions. GHD personnel have the authority and responsibility to use **Stop Work Authority (SWA).**

| | | | | | |
|---|---|---|---|---|---|
| **Date Issued/Revised:** | 06/02/2016 20:02:54 | **Client:** | GHD - CORE | | |
| **Project Number:** | 031884 | **Created By:** | cra\ydebowski | SIM OPS? YES/NO | SSE on site? YES/NO |
| **Project Address:** | | | | | |
| **Key Equipment:** | Modified Class D Personal Protective Equipment, Field notebook, Pen/Pencil, Paper, Camera, Hand Sanitizer | | | | |
| **Task-specific Training:** | Introduction to the CRA SMART Program, HAZCOM/WHMIS, HAZWOPER | | | | |

| Hard Hat | Gloves (ANSI/EN 388) | Eye Protection | Fall Protection | APR | Vest | PPE Clothing |
|---|---|---|---|---|---|---|
| ☐ Type 1 (Top Impact) | ☑ Chemical Protective (ie.Nitrile) | ☑ ANSI/CSA Safety Glasses | ☐ Harness | ☐ Full Face Mask | ☑ Class II (standard) | ☐ Coveralls |
| ☐ Type 2 (Side Impact) | ☑ Level 1 - Light Duty | ☐ Goggles/Spoggles | ☐ Shock Absorbing Lanyard | ☐ Half Face Mask | ☐ Class III ( Night or Highway Traffic) | ☐ Fire Retardent Clothing (FRC) |
| ☑ Class E (standard) | ☐ Level 2 - Light Duty with Protection | ☐ Face Shields | ☐ Lifeline | | ☐ Anti-Static | ☑ High Viz Clothing |
| ☐ Class G | ☐ Level 3 - Medium Duty | ☐ Other* | | **Cartridges** | ☐ FRC | ☑ Long Pants |
| | ☐ Level 4 - Heavy Duty | | | ☐ N95 | ☐ PFD | ☐ Long Sleeve Shirts |
| **Foot Protection** | ☐ High Viz | **Hearing Protection** | **Arc Flash/Shock Protection** | ☐ P100 | | ☐ Paper Tyvek (disposible) |
| ☑ )Industrial Grade Safety Boot | ☐ Other* | ☐ NOT Required for this task | ☐ Hazard Category 2 | ☐ P95 | | ☐ Polyethyene Tyvek |
| ☐ Rubber Boots (industrial grade) | | ☑ Required | ☐ Hazard Category 4 | ☐ R95 | | ☐ Other* |
| ☐ Hip Waders | | | | ☐ Organic Vapour | | |

| Hard Hat | Gloves (ANSI/EN 388) | Eye Protection | Fall Protection | APR | Vest | PPE Clothing |
|---|---|---|---|---|---|---|
| | * see key equipment | | | ☐ Speciality* | | |

| Project Development Team | | Modified by | Reviewed by | Date |
|---|---|---|---|---|
| Name | Signature | | | |
| Jeff Daniel | | | | |
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| Job steps[1] | Task activity | Potential hazard(s)[2] | Corrective measure(s)[3] | Person responsible (Print first and last names) |
|---|---|---|---|---|
| 1 | Review STAR and SWA | • Personnel not aware of STAR and SWA<br>• Traffic hazards, unfamiliar locations | • Reminder of importance of and documentation procedures for SWA; use SWA to stop any unsafe or illegal work practices<br>• Discuss inspection activities with construction site supervisor and appropriate subcontractors<br>• Sign in with general contractor<br>• Review CRA's and contractors site-specific HASP/orientation<br>• Take time to map quest/plot route to and from site. Drive defensively, allow plenty of time for unforeseen traffic conditions | Inspector |

| Job steps[1] | Task activity | Potential hazard(s)[2] | Corrective measure(s)[3] | Person responsible (Print first and last names) |
|---|---|---|---|---|
| 2 | Traversing the site, accessing work area(s) (ladder/scaffold/stairs/climbing) | ● Fall hazard (working from heights, floor openings, conveyor pit, etc.)<br>● Slip/trip hazards<br>● Falling debris and materials<br>● Heavy equipment (cranes, dozers, excavator, etc.)<br>● Heat/Cold stress | ● Spot check to identify hazards, establish pathways which is most free of slip and trip hazards, beware of trip hazards, keep work areas free of clutter, communicate hazards to on site personnel,<br>● Ensure appropriate railings/guarding/delineations are in place around any temporarily open pits or that a spotter is in attendance.<br>● Inspect ladder before use to ensure safe working condition<br>● Test ladder for stability and ensure it is tied off in safe manner<br>● Maintain three points of contact<br>● Ensure scaffold has been cleared for use before climbing. (planks inspected, etc.)<br>● Never climb scaffolding structure - always use the integral scaffold ladder or external ladder<br>● Follow the most stringent fall protection requirements (proper protection systems) if no systems are in place, use your SWA<br>● Be aware of your surroundings at all times; know where the heavy equipment is at all times while walking the site<br>● Stay clear of heavy equipment swing radius (cranes)<br>● Make eye contact with heavy equipment operators<br>● Look for and obey all commands from flagmen<br>● Look for loose debris which may be resting on ceiling tiles or framing<br>● Stairs may have temporary railings; keep to the wall side of the steps<br>● Stairs may have tarps draped to keep the heat on a particular floor; listen for people on the other side before entering<br>● If worker is performing a task in the stair take another stair; do not try to walk around<br>● Always yield right of way to workers carrying materials<br>● Do not cross barrier tape<br>● Take frequent water breaks to stay hydrated. Adhere to CRAs H&S guidelines on heat/cold stress | Inspection |

| Job steps[1] | Task activity | Potential hazard(s)[2] | Corrective measure(s)[3] | Person responsible (Print first and last names) |
|---|---|---|---|---|
| 3 | Inspection activities (electrical, mechanical equipment, dead spaces with limited exiting) | ● Entrapment<br>● Potential for exposure to different types of energy sources<br>● Working from heights<br>● Slip/trip/fall hazards, (see step 2) | ● Never enter a dead space without someone present and waiting at the exit<br>● Inform site superintendent of your plans and get approval to enter a dead space<br>● Carry a flashlight and obtain a radio<br>● Adhere to CRA's policies and guidelines for confined space entry<br>● Some rooms may have one way locks on the doors; check to ensure that the handle on the inside is unlocked prior to entering<br>● Assess the risk versus benefit:<br>1. Is there any other way to observe what you need to observe?<br>2. Observe from location out of the way of workers?<br>3. Is it possible to take a picture instead?<br>4. Can worker use your camera to take a photo for you?<br>● Do not open panel boards or switchboards<br>● Do not touch wiring either with hands or other items such as pens or sticks<br>● Be aware of hanging wiring; report any hanging wire to electrician, electrical superintendent, and site superintendent<br>● Adhere to CRA's LOTO program<br>● Ask contractor where you should stand during testing of equipment<br>● Be aware of low hanging piping and plan your walking path accordingly<br>● Don't walk when looking at the ceiling for installation deficiencies; walk to the point you need to observe and stop<br>● Do not touch piping to check if it is hot<br>● Do not lean on or place anything on equipment such as notepads, etc.<br>● Spot check to identify hazards, establish pathways which is most free of slip and trip hazards, beware of trip hazards, keep work areas free of clutter, communicate hazards to on site personnel | Inspector |

| Job steps[1] | Task activity | Potential hazard(s)[2] | Corrective measure(s)[3] | Person responsible (Print first and last names) |
|---|---|---|---|---|
| 4 | General activities | • Distractions<br>• Slip/trip/fall hazards (see step 2)<br>• Entanglement | • Do not answer or make calls from your cell phone; let your cell phone take a message<br>• When talking to a contractor or other worker; stop walking; find a place to talk where you do not interfere with ongoing construction activities<br>• Spot check to identify hazards, establish pathways which is most free of slip and trip hazards, beware of trip hazards, keep work areas free of clutter, communicate hazards to on site personnel<br>Wear appropriate clothing (no loose fitting clothing, tuck in draw strings, shoes/boots tied appropriately, sleeved shirts, long pants, etc.)<br>• Carry flashlight in your hand, not hanging from your hip<br>• Carry your camera in a pocket under sweater/coat/jacket; remove any strap from camera<br>• Never put your hand into a void or wall space<br>• Do not wear a “hoody” under your hard hat as it may obstruct your peripheral vision<br>• Do not carry a cell phone on your hip in a holster; place it in your shirt pocket and remove any strap from cell phone | Inspectors |

1. Each Job or Task consists of a set of steps. Be sure to list all the steps in the sequence that they are performed. Specify the equipment or other details to set the basis for the potential (associated) hazards.

2. A hazard is a potential danger. What can go wrong? How can someone get hurt? Consider, but do not limit, the analysis to: **Contact** - victim is struck by or strikes an object; **Caught** - victim is caught on, caught in or caught between objects; **Fall** - victim falls to ground or lower level (includes slips and trips); **Exertion** - excessive strain or stress/ergonomics/lifting techniques; **Exposure** - inhalation/skin hazards. Specify the hazards and do not limit the description to a single word such as "Caught".

3. Aligning with the Job Steps, Task Activity Description, and Potential Hazard columns, describe what actions or procedures are necessary to eliminate or minimize the hazards. Be clear, concise and specific. Use objective, observable, and quantified terms. Avoid subjective general statements such as "be careful" or "use as appropriate".

**Site Personnel Participating in JSA Review:**
I have participated in the review and discussion of the Job Safety Analysis (JSA) listed on this document and understand the duties I am responsible to fulfill. As part of my work, I know I have the responsibility and obligation to STOP work with a Stop Work Authority (SWA) if conditions change and/or potential hazards have been identified.

| Name/Company | Sign | Date |
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**SSE(s) on job:** _____ **Assigned mentor:** _____

Presenter Signature: _____ Date/Time: _____

My signature below indicates that all conditions and requirements listed above have been verified, met, and reviewed with all affected personnel prior to start of work.
Supervisor Signature: _____ Date/Time: _____

Location of Mustering Point: _____ Wind direction (current): _____

GHD Emergency contact (Name and verified phone number): _____

Supervisor Signature documenting Daily Debrief has been completed: _____

# Job Safety Analysis (JSA)

## Insert Name: Environmental-Site Recon and Walkthrough

Field staff must review job specific work plan and coordinate with project manager to verify that all up front logistics are completed prior to starting work including, but not limited to, permitting, access agreements, and notification to required contacts (e.g., site managers, inspectors, clients, subcontractors, etc.). Additionally, a tailgate safety meeting must be performed and documented at the beginning of each workday. **Stop, Think, Act, Review (STAR)** must be used prior to any activity. All personnel must possess the appropriate training prior to initiating scheduled tasks. Also consider weather conditions. GHD personnel have the authority and responsibility to use **Stop Work Authority (SWA).**

| | | | | | |
|---|---|---|---|---|---|
| **Date Issued/Revised:** | 08/02/2016 15:02:50 | **Client:** | GHD - CORE | | |
| **Project Number:** | 031884 | **Created By:** | cra\ajgallaway | SIM OPS? YES/NO | SSE on site? YES/NO |
| **Project Address:** | | | | | |
| **Key Equipment:** | Basic PPE, hand/power tools based on site condition, site inspection checklist or notebook, JSA forms, pens, flashlight.<br><br>Additional PPE: Insect repellant. Coveralls may be necessary based on type of brush/plants/insects in work area(s) being inspected. Leather gloves if overgrown vegetation or rundown buildings. | | | | |
| **Task-specific Training:** | SMART Safety training (STAR), JSA development, Poison Plant Identification | | | | |

| Hard Hat | Gloves (ANSI/EN 388) | Eye Protection | Fall Protection | APR | Vest | PPE Clothing |
|---|---|---|---|---|---|---|
| ☐ Type 1 (Top Impact) | ☐ Chemical Protective (ie.Nitrile) | ☑ ANSI/CSA Safety Glasses | ☐ Harness | ☐ Full Face Mask | ☑ Class II (standard) | ☐ Coveralls |
| ☐ Type 2 (Side Impact) | ☑ Level 1 - Light Duty | ☐ Goggles/Spoggles | ☐ Shock Absorbing Lanyard | ☐ Half Face Mask | ☐ Class III ( Night or Highway Traffic) | ☐ Fire Retardent Clothing (FRC) |
| ☑ Class E (standard) | ☐ Level 2 - Light Duty with Protection | ☐ Face Shields | ☐ Lifeline | | ☐ Anti-Static | ☐ High Viz Clothing |
| ☐ Class G | ☐ Level 3 - Medium Duty | ☐ Other* | | **Cartridges** | ☐ FRC | ☐ Long Pants |
| | ☐ Level 4 - Heavy Duty | | | ☐ N95 | ☐ PFD | ☐ Long Sleeve Shirts |
| **Foot Protection** | ☐ High Viz | **Hearing Protection** | **Arc Flash/Shock Protection** | ☐ P100 | | ☐ Paper Tyvek (disposible) |
| ☑ )Industrial Grade Safety Boot | ☐ Other* | ☑ NOT Required for this task | ☐ Hazard Category 2 | ☐ P95 | | ☐ Polyethyene Tyvek |

| Hard Hat | Gloves (ANSI/EN 388) | Eye Protection | Fall Protection | APR | Vest | PPE Clothing |
|---|---|---|---|---|---|---|
| ☐ Rubber Boots (industrial grade) | | ☐ Required | ☐ Hazard Category 4 | ☐ R95 | | ☐ Other* |
| ☐ Hip Waders | | | | ☐ Organic Vapour | | |
| | * see key equipment | | | ☐ Speciality* | | |

| Project Development Team | | Modified by | Reviewed by | Date |
|---|---|---|---|---|
| Name | Signature | | | |
| Jeff Daniel | | | | |
| | | | | |
| | | | | |

| Job steps[1] | Task activity | Potential hazard(s)[2] | Corrective measure(s)[3] | Person responsible (Print first and last names) |
|---|---|---|---|---|
| 1 | Discuss STAR and SWA | • Site personnel not aware of STAR and SWA | • Project team (CRA) discusses importance of and documentation procedures for SWA during pre job safety meeting<br>• Use SWA to stop any work that is unsafe | All persons on project team |
| 2 | Check weather | • Unexpected storm, fog; rain; snow; lightening, thunder<br>• Heat/cold stress | • Check local weather forecast<br>• Discuss weather issues and precautions to take while driving and on site during the pre job safety meeting<br>• If weather conditions (e.g., fog, rain, snow) impair the ability/vision of the driver, exit at nearest safe location and assess the situation<br>• While on site, at first sign of lightning/thunder utilize SWA and assess weather conditions<br>• In extreme temperatures, ensure all personnel have proper clothing, hydration, and heat/cold protection (e.g., canopy, fan, glove warmers) | Assessor |
| 3 | Sign in | • Site Manager and Operator not aware of CRA staff presence in facility or on grounds | • Sign in at front desk<br>• Ask to speak to Site Manager or alternate designate | Assessor |
| 4 | Don necessary CRA and client required PPE | • Contact with recyclable material or equipment | • Wear all required PPE (hard hat, vest, boots, and glasses) at all times while in the facility | Assessor |
| 5 | Unload equipment from vehicle | • Lifting hazards<br>• Back injury<br>• Manual material handling<br>• Cuts<br>• Pinch points<br>• Hand/foot injury<br>• Forgotten equipment<br>• Damaged equipment | • Reduce travel distance when there is a need to carry/lift materials<br>• Make sure grip is adequate; wear leather/cotton gloves<br>• Size up the load; if the object is too large or odd shaped OR is in excess of 50 pounds (23 kg) then assistance (mechanical or a buddy lift) will be required<br>• Lift with the legs (bend at the knees and use the leg muscles) to protect the lower back and keep lower back in a neutral position<br>• Avoid one handed carrying if possible; maintain awareness of footing<br>• Wear leather/cotton gloves and avoid placing hands/fingers in pinch point locations<br>• Wear steel toed boots<br>• Verify requested equipment against warehouse form<br>• Load equipment in an organized manner to prevent shifting during transport or use cargo netting | Assessor |

| Job steps[1] | Task activity | Potential hazard(s)[2] | Corrective measure(s)[3] | Person responsible (Print first and last names) |
|---|---|---|---|---|
| 6 | Complete site inspection and walkover of the property and work areas – Note any hazards that will impact site personnel and/or their operations | • Slip/trip/fall hazards<br>• Insects/reptiles<br>• Pedestrian injury<br>• Poison plants | • Check in with site personnel and sign appropriate visitor or safety log (may require watching safety video [i.e., plant])<br>• Check with site contact to determine safely accessible areas and areas where PPE are required<br>• Wear PPE as directed by site personnel or dependent upon your evaluation of conditions<br>• If building(s) looks dilapidated or in poor condition, do not enter<br>• Watch for vehicles or other mobile equipment moving around<br>• Make sure areas are well lit and you are accompanied by a site representative (if applicable)<br>• Watch where you step on pavement (potholes, dips, or obstructions) and in vegetated/wooded areas (dips, holes, branches, vines, etc.)<br>• Do not take photographs while walking<br>• Do not talk on cell phone while walking<br>• If in vegetated or wooded areas, watch for beehives, wear insect repellent (if area and season dictate) as needed, be mindful of gopher holes/tunnels, small animal dens, snakes, stray dogs/cats, transient/homeless individuals, poison ivy/oak/sumac, etc. | Assessor |
| 7 | Sign out | • Site Manager and Operator not aware that CRA staff have left facility | • Sign out at front desk<br>• Ask to speak to Site Manager or alternate designate | Assessor |
| 8 | Demobilization | • Collision<br>• Injury or death to vehicle occupants or other parties | • Perform perimeter vehicle check<br>• Maintain awareness of pedestrian/vehicular traffic when exiting the site<br>• Utilize defensive driving techniques<br>• Complete post departure checklist and report vehicle problems to company vehicle maintenance manager or rental car agency | Assessor |

1. Each Job or Task consists of a set of steps. Be sure to list all the steps in the sequence that they are performed. Specify the equipment or other details to set the basis for the potential (associated) hazards.
2. A hazard is a potential danger. What can go wrong? How can someone get hurt? Consider, but do not limit, the analysis to: **Contact** - victim is struck by or strikes an object; **Caught** - victim is caught on, caught in or caught between objects; **Fall** - victim falls to ground or lower level (includes slips and trips); **Exertion** - excessive strain or stress/ergonomics/lifting techniques; **Exposure** - inhalation/skin hazards. Specify the hazards and do not limit the description to a single word such as "Caught".
3. Aligning with the Job Steps, Task Activity Description, and Potential Hazard columns, describe what actions or procedures are necessary to eliminate or minimize the hazards. Be clear, concise and specific. Use objective, observable, and quantified terms. Avoid subjective general statements such as "be careful" or "use as appropriate".

**Site Personnel Participating in JSA Review:**
I have participated in the review and discussion of the Job Safety Analysis (JSA) listed on this document and understand the duties I am responsible to fulfill. As part of my work, I know I have the responsibility and obligation to STOP work with a Stop Work Authority (SWA) if conditions change and/or potential hazards have been identified.

| Name/Company | Sign | Date |
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**SSE(s) on job:** _____ **Assigned mentor:** _____

Presenter Signature: _____ Date/Time: _____

My signature below indicates that all conditions and requirements listed above have been verified, met, and reviewed with all affected personnel prior to start of work.
Supervisor Signature: _____ Date/Time: _____

Location of Mustering Point: _____ Wind direction (current): _____

GHD Emergency contact (Name and verified phone number): _____

Supervisor Signature documenting Daily Debrief has been completed: _____

# MATERIAL SAFETY DATA SHEET

## ALCONOX®

*Prepared to U.S. OSHA, CMA, ANSI, Canadian WHMIS, Australian WorkSafe, Japanese Industrial Standard JIS Z 7250:2000, and European Union REACH Regulations*

## SECTION 1 - PRODUCT AND COMPANY IDENTIFICATION

| | |
|---|---|
| PRODUCT NAME: | **ALCONOX®** |
| CHEMICAL FAMILY NAME: | Detergent. |
| PRODUCT USE: | Critical-cleaning detergent for laboratory, healthcare and industrial applications |
| U.N. NUMBER: | Not Applicable |
| U.N. DANGEROUS GOODS CLASS: | Non-Regulated Material |
| SUPPLIER/MANUFACTURER'S NAME: | Alconox, Inc. |
| ADDRESS: | 30 Glenn St., Suite 309, White Plains, NY 10603. USA |
| **EMERGENCY PHONE:** | **TOLL-FREE in USA/Canada** 800-255-3924 |
| | **International calls** 813-248-0585 |
| BUSINESS PHONE: | 914-948-4040 |
| DATE OF PREPARATION: | May 2011 |
| DATE OF LAST REVISION: | February 2008 |

## SECTION 2 - HAZARDS IDENTIFICATION

**EMERGENCY OVERVIEW:** This product is a white granular powder with little or no odor. Exposure can be irritating to eyes, respiratory system and skin. It is a non-flammable solid. The Environmental effects of this product have not been investigated.

US DOT SYMBOLS

Non-Regulated

CANADA (WHMIS) SYMBOLS

EUROPEAN and (GHS) Hazard Symbols

Signal Word: **Warning!**

**EU LABELING AND CLASSIFICATION:**

**Classification of the substance or mixture according to Regulation (EC) No1272/2008 Annex 1**
**EC# 205-633-8 This substance is not classified in the Annex I of Directive 67/548/EEC**
**EC# 268-356-1 This substance is not classified in the Annex I of Directive 67/548/EEC**
**EC# 231-838-7 This substance is not classified in the Annex I of Directive 67/548/EEC**
**EC# 231-767-1 This substance is not classified in the Annex I of Directive 67/548/EEC**
**EC# 207-638-8 Index# 011-005-00-2**
**EC# 205-788-1 This substance is not classified in the Annex I of Directive 67/548/EEC**

**GHS Hazard Classification(s):**

Eye Irritant Category 2A

**Hazard Statement(s):**

H319: Causes serious eye irritation

**Precautionary Statement(s):**

P260: Do not breath dust/fume/gas/mist/vapors/spray
P264: Wash hands thoroughly after handling
P271: Use only in well ventilated area.
P280: Wear protective gloves/protective clothing/eye protection/face protection/

**Hazard Symbol(s):**

[Xi] Irritant

**Risk Phrases:**
R20: Harmful by inhalation
R36/37/38: Irritating to eyes, respiratory system and skin

**Safety Phrases:**
S8: Keep container dry
S22: Do not breath dust
S24/25: Avoid contact with skin and eyes

**HEALTH HAZARDS OR RISKS FROM EXPOSURE:**

**ACUTE:** Exposure to this product may cause irritation of the eyes, respiratory system and skin. Ingestion may cause gastrointestinal irritation including pain, vomiting or diarrhea.

**CHRONIC:** This product contains an ingredient which may be corrosive.

**TARGET ORGANS:** ACUTE: Eye, respiratory System, Skin CHRONIC: None Known

## SECTION 3 - COMPOSITION and INFORMATION ON INGREDIENTS

| HAZARDOUS INGREDIENTS: | CAS # | EINECS # | ICSC # | WT % | HAZARD CLASSIFICATION; RISK PHRASES |
|---|---|---|---|---|---|
| Sodium Bicarbonate | 144-55-8 | 205-633-8 | 1044 | 33 - 43% | HAZARD CLASSIFICATION: None<br>RISK PHRASES: None |
| Sodium (C10 – C16) Alkylbenzene Sulfonate | 68081-81-2 | 268-356-1 | Not Listed | 10 – 20% | HAZARD CLASSIFICATION: None<br>RISK PHRASES: None |
| Sodium Tripolyphosphate | 7758-29-4 | 231-838-7 | 1469 | 5 - 15% | HAZARD CLASSIFICATION: None<br>RISK PHRASES: None |
| Tetrasodium Pyrophosphate | 7722-88-5 | 231-767-1 | 1140 | 5 - 15% | HAZARD CLASSIFICATION: None<br>RISK PHRASES: None |
| Sodium Carbonate | 497-19-8 | 207-638-8 | 1135 | 1 - 10% | HAZARD CLASSIFICATION: [Xi] Irritant<br>RISK PHRASES: R36 |
| Sodium Alcohol Sulfate | 151-21-3 | 205-788-1 | 0502 | 1 – 5% | HAZARD CLASSIFICATION: None<br>RISK PHRASES: None |
| Balance of other ingredients are non-hazardous or less than 1% in concentration (or 0.1% for carcinogens, reproductive toxins, or respiratory sensitizers). | | | | | |

**NOTE:** ALL WHMIS required information is included in appropriate sections based on the ANSI Z400.1-2004 format. This product has been classified in accordance with the hazard criteria of the CPR and the MSDS contains all the information required by the CPR, EU Directives and the Japanese Industrial Standard *JIS Z 7250: 2000*.

## SECTION 4 - FIRST-AID MEASURES

Contaminated individuals of chemical exposure must be taken for medical attention if any adverse effect occurs. Rescuers should be taken for medical attention, if necessary. Take copy of label and MSDS to health professional with contaminated individual.

**EYE CONTACT:** If product enters the eyes, open eyes while under gentle running water for at least 15 minutes. Seek medical attention if irritation persists.

**SKIN CONTACT:** Wash skin thoroughly after handling. Seek medical attention if irritation develops and persists. Remove contaminated clothing. Launder before re-use.

**INHALATION:** If breathing becomes difficult, remove victim to fresh air. If necessary, use artificial respiration to support vital functions. Seek medical attention if breathing dificulty continues.

**INGESTION:** If product is swallowed, call physician or poison control center for most current information. If professional advice is not available, do not induce vomiting. Never induce vomiting or give diluents (milk or water) to someone who is unconscious, having convulsions, or who cannot swallow. Seek medical advice. Take a copy of the label and/or MSDS with the victim to the health professional.

**MEDICAL CONDITIONS AGGRAVATED BY EXPOSURE:** Pre-existing skin, or eye problems may be aggravated by prolonged contact.

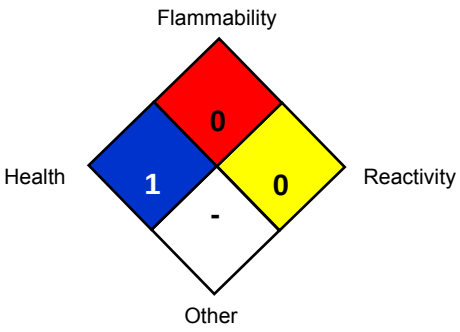
**RECOMMENDATIONS TO PHYSICIANS:** Treat symptoms and reduce over-exposure.

## SECTION 5 - FIRE-FIGHTING MEASURES

**FLASH POINT:** Not Flammable
**AUTOIGNITION TEMPERATURE**: Not Applicable
**FLAMMABLE LIMITS (in air by volume, %)**: Lower (LEL): NA Upper (UEL): NA
**FIRE EXTINGUISHING MATERIALS**: As appropriate for surrounding fire. Carbon dioxide, foam, dry chemical, halon, or water spray.

**UNUSUAL FIRE AND EXPLOSION HAZARDS**: This product is non-flammable and has no known explosion hazards.
Explosion Sensitivity to Mechanical Impact: Not Sensitive.
Explosion Sensitivity to Static Discharge: Not Sensitive
**SPECIAL FIRE-FIGHTING PROCEDURES**: Incipient fire responders should wear eye protection. Structural firefighters must wear Self-Contained Breathing Apparatus and full protective equipment. Isolate materials not yet involved in the fire and protect personnel. Move containers from fire area if this can be done without risk; otherwise, cool with carefully applied water spray. If possible, prevent runoff water from entering storm drains, bodies of water, or other environmentally sensitive areas.

**NFPA RATING SYSTEM**




**HMIS RATING SYSTEM**

**HAZARDOUS MATERIAL IDENTIFICATION SYSTEM**

| | |
|---|---|
| HEALTH HAZARD (BLUE) | 1 |
| FLAMMABILITY HAZARD (RED) | 0 |
| PHYSICAL HAZARD (YELLOW) | 0 |

**PROTECTIVE EQUIPMENT**

| EYES | RESPIRATORY | HANDS | BODY |
|---|---|---|---|
|  | See Sect 8 |  | See Sect 8 |

For Routine Industrial Use and Handling Applications

**Hazard Scale:** **0** = Minimal **1** = Slight **2** = Moderate **3** = Serious **4** = Severe * = Chronic hazard

## SECTION 6 - ACCIDENTAL RELEASE MEASURES

**SPILL AND LEAK RESPONSE:** Personnel should be trained for spill response operations.
**SPILLS:** Contain spill if safe to do so. Prevent entry into drains, sewers, and other waterways. Sweep, shovel or vacuum spilled material and place in an appropriate container for re-use or disposal. Avoid dust generation if possible. Dispose of in accordance with applicable Federal, State, and local procedures (see Section 13, Disposal Considerations).

## SECTION 7 - HANDLING and STORAGE

**WORK PRACTICES AND HYGIENE PRACTICES:** As with all chemicals, avoid getting this product ON YOU or IN YOU. Wash thoroughly after handling this product. Do not eat, drink, smoke, or apply cosmetics while handling this product. Avoid breathing dusts generated by this product. Use in a well-ventilated location. Remove contaminated clothing immediately.

**STORAGE AND HANDLING PRACTICES:** Containers of this product must be properly labeled. Store containers in a cool, dry location. Keep container tightly closed when not in use. Store away from strong acids or oxidizers.

## SECTION 8 - EXPOSURE CONTROLS - PERSONAL PROTECTION

**EXPOSURE LIMITS/GUIDELINES:**

| Chemical Name | CAS# | ACGIH TWA | OSHA TWA | SWA |
|---|---|---|---|---|
| Sodium Bicarbonate | 144-55-8 | 10 mg/m³ Total Dust | 15 mg/m³ Total Dust | 10 mg/m³ Total Dust |
| Sodium (C10 – C16) Alkylbenzene Sulfonate | 68081-81-2 | 10 mg/m³ Total Dust | 15 mg/m³ Total Dust | 10 mg/m³ Total Dust |
| Sodium Tripolyphosphate | 7758-29-4 | 10 mg/m³ Total Dust | 15 mg/m³ Total Dust | 10 mg/m³ Total Dust |
| Tetrasodium Pyrophosphate | 7722-88-5 | 5 mg/m³ | 5 mg/m³ | 5 mg/m³ |
| Sodium Carbonate | 497-19-8 | 10 mg/m³ Total Dust | 15 mg/m³ Total Dust | 10 mg/m³ Total Dust |
| Sodium Alcohol Sulfate | 151-21-3 | 10 mg/m³ Total Dust | 15 mg/m³ Total Dust | 10 mg/m³ Total Dust |

Currently, International exposure limits are not established for the components of this product. Please check with competent authority in each country for the most recent limits in place.

**VENTILATION AND ENGINEERING CONTROLS:** Use with adequate ventilation to ensure exposure levels are maintained below the limits provided below. Use local exhaust ventilation to control airborne dust. Ensure eyewash/safety shower stations are available near areas where this product is used.

*The following information on appropriate Personal Protective Equipment is provided to assist employers in complying with OSHA regulations found in 29 CFR Subpart I (beginning at 1910.132) or equivalent standard of Canada, or standards of EU member states (including EN 149 for respiratory PPE, and EN 166 for face/eye protection), and those of Japan. Please reference applicable regulations and standards for relevant details.*

**RESPIRATORY PROTECTION:** Based on test data, exposure limits should not be exceeded under normal use conditions when using Alconox Detergent. Maintain airborne contaminant concentrations below guidelines listed above, if applicable. If necessary, use only respiratory protection authorized in the U.S. Federal OSHA Respiratory Protection Standard (29 CFR 1910.134), equivalent U.S. State standards, Canadian CSA Standard Z94.4-93, the European Standard EN149, or EU member states.

**EYE PROTECTION:** Safety glasses. If necessary, refer to U.S. OSHA 29 CFR 1910.133 or appropriate Canadian Standards.

**HAND PROTECTION:** Use chemical resistant gloves to prevent skin contact.. If necessary, refer to U.S. OSHA 29 CFR 1910.138 or appropriate Standards of Canada.

**BODY PROTECTION:** Use body protection appropriate to prevent contact (e.g. lab coat, overalls). If necessary, refer to appropriate Standards of Canada, or appropriate Standards of the EU, Australian Standards, or relevant Japanese Standards.

## SECTION 9 - PHYSICAL and CHEMICAL PROPERTIES

| | |
|---|---|
| **PHYSICAL STATE:** | Solid |
| **APPEARANCE & ODOR:** | White granular powder with little or no odor. |
| **ODOR THRESHOLD (PPM):** | Not Available |
| **VAPOR PRESSURE (mmHg):** | Not Applicable |
| **VAPOR DENSITY (AIR=1):** | Not Applicable. |
| **BY WEIGHT:** | Not Available |
| **EVAPORATION RATE (nBuAc = 1):** | Not Applicable. |
| **BOILING POINT (C°):** | Not Applicable. |
| **FREEZING POINT (C°):** | Not Applicable. |
| **pH:** | 9.5 (1% aqueous solution) |
| **SPECIFIC GRAVITY 20°C: (WATER =1)** | 0.85 – 1.1 |
| **SOLUBILITY IN WATER (%)** | >10% w/w |
| **COEFFICIENT OF WATER/OIL DIST.:** | Not Available |
| **VOC:** | None |
| **CHEMICAL FAMILY:** | Detergent |

## SECTION 10 - STABILITY and REACTIVITY

**STABILITY:** Product is stable
**DECOMPOSITION PRODUCTS:** When heated to decomposition this product produces Oxides of carbon (COx)
**MATERIALS WITH WHICH SUBSTANCE IS INCOMPATIBLE:** Strong acids and strong oxidizing agents.
**HAZARDOUS POLYMERIZATION:** Will not occur.
**CONDITIONS TO AVOID:** Contact with incompatible materials and dust generation.

## SECTION 11 - TOXICOLOGICAL INFORMATION

**TOXICITY DATA:** Toxicity data is available for mixture:

| | |
|---|---|
| CAS# 497-19-8 LD50 Oral (Rat) | 4090 mg/kg |
| CAS# 497-19-8 LD50 Oral (Mouse) | 6600 mg/kg |
| CAS# 497-19-8 LC50 Inhalation (Rat) | 2300 mg/m³ 2H |
| CAS# 497-19-8 LC50 Inhalation (Mouse) | 1200 mg/m³ 2H |
| CAS# 7758-29-4 LD50 Oral (Rat) | 3120 mg/kg |
| CAS# 7758-29-4 LD50 Oral (Mouse) | 3100 mg/kg |
| CAS# 7722-88-5 LD50 Oral (Rat) | 4000 mg/kg |

**SUSPECTED CANCER AGENT:** None of the ingredients are found on the following lists: FEDERAL OSHA Z LIST, NTP, CAL/OSHA, IARC and therefore is not considered to be, nor suspected to be a cancer-causing agent by these agencies.
**IRRITANCY OF PRODUCT:** Contact with this product can be irritating to exposed skin, eyes and respiratory system.
**SENSITIZATION OF PRODUCT:** This product is not considered a sensitizer.
**REPRODUCTIVE TOXICITY INFORMATION:** No information concerning the effects of this product and its components on the human reproductive system.

## SECTION 12 - ECOLOGICAL INFORMATION

**ALL WORK PRACTICES MUST BE AIMED AT ELIMINATING ENVIRONMENTAL CONTAMINATION.**
**ENVIRONMENTAL STABILITY:** No Data available at this time.
**EFFECT OF MATERIAL ON PLANTS or ANIMALS:** No evidence is currently available on this product's effects on plants or animals.

**EFFECT OF CHEMICAL ON AQUATIC LIFE:** No evidence is currently available on this product's effects on aquatic life.

## SECTION 13 - DISPOSAL CONSIDERATIONS

**PREPARING WASTES FOR DISPOSAL:** Waste disposal must be in accordance with appropriate Federal, State, and local regulations, those of Canada, Australia, EU Member States and Japan.

## SECTION 14 - TRANSPORTATION INFORMATION

**US DOT; IATA; IMO; ADR:**

**THIS PRODUCT IS NOT HAZARDOUS AS DEFINED BY 49 CFR 172.101 BY THE U.S. DEPARTMENT OF TRANSPORTATION.**
**PROPER SHIPPING NAME:** Non-Regulated Material
**HAZARD CLASS NUMBER and DESCRIPTION:** Not Applicable
**UN IDENTIFICATION NUMBER:** Not Applicable
**PACKING GROUP:** Not Applicable.
**DOT LABEL(S) REQUIRED:** Not Applicable
**NORTH AMERICAN EMERGENCY RESPONSE GUIDEBOOK NUMBER (2004):** Not Applicable
**MARINE POLLUTANT:** None of the ingredients are classified by the DOT as a Marine Pollutant (as defined by 49 CFR 172.101, Appendix B)

U.S. DEPARTMENT OF TRANSPORTATION (DOT) SHIPPING REGULATIONS:
This product is not classified as dangerous goods, per U.S. DOT regulations, under 49 CFR 172.101.

TRANSPORT CANADA, TRANSPORTATION OF DANGEROUS GOODS REGULATIONS:
This product is not classified as Dangerous Goods, per regulations of Transport Canada.

INTERNATIONAL AIR TRANSPORT ASSOCIATION (IATA):
This product is not classified as Dangerous Goods, by rules of IATA:

INTERNATIONAL MARITIME ORGANIZATION (IMO) DESIGNATION:
This product is not classified as Dangerous Goods by the International Maritime Organization.

EUROPEAN AGREEMENT CONCERNING THE INTERNATIONAL CARRIAGE OF DANGEROUS GOODS BY ROAD (ADR):

This product is not classified by the United Nations Economic Commission for Europe to be dangerous goods.

## SECTION 15 - REGULATORY INFORMATION

**UNITED STATES REGULATIONS**

**SARA REPORTING REQUIREMENTS:** This product is not subject to the reporting requirements of Sections 302, 304 and 313 of Title III of the Superfund Amendments and Reauthorization Act., as follows: None

**TSCA:** All components in this product are listed on the US Toxic Substances Control Act (TSCA) inventory of chemicals.

**SARA 311/312:**

Acute Health: Yes Chronic Health: No Fire: No Reactivity: No

**U.S. SARA THRESHOLD PLANNING QUANTITY:** There are no specific Threshold Planning Quantities for this product. The default Federal MSDS submission and inventory requirement filing threshold of 10,000 lb (4,540 kg) may apply, per 40 CFR 370.20.

**U.S. CERCLA REPORTABLE QUANTITY (RQ):** None

**CALIFORNIA SAFE DRINKING WATER AND TOXIC ENFORCEMENT ACT (PROPOSITION 65):** None of the ingredients are on the California Proposition 65 lists.

**CANADIAN REGULATIONS:**

**CANADIAN DSL/NDSL INVENTORY STATUS:** All of the components of this product are on the DSL Inventory

**CANADIAN ENVIRONMENTAL PROTECTION ACT (CEPA) PRIORITIES SUBSTANCES LISTS:** No component of this product is on the CEPA First Priorities Substance Lists.

**CANADIAN WHMIS CLASSIFICATION and SYMBOLS:** This product is categorized as a Controlled Product, Hazard Class D2B as per the Controlled Product Regulations

**EUROPEAN ECONOMIC COMMUNITY INFORMATION:**

**EU LABELING AND CLASSIFICATION:**

**Classification of the mixture according to Regulation (EC) No1272/2008. See section 2 for details.**

**AUSTRALIAN INFORMATION FOR PRODUCT:**

**AUSTRALIAN INVENTORY OF CHEMICAL SUBSTANCES (AICS) STATUS:** All components of this product are listed on the AICS.

**STANDARD FOR THE UNIFORM SCHEDULING OF DRUGS AND POISONS:** Not applicable.

**JAPANESE INFORMATION FOR PRODUCT:**

**JAPANESE MINISTER OF INTERNATIONAL TRADE AND INDUSTRY (MITI) STATUS:** The components of this product are not listed as Class I Specified Chemical Substances, Class II Specified Chemical Substances, or Designated Chemical Substances by the Japanese MITI.

**INTERNATIONAL CHEMICAL INVENTORIES:**

Listing of the components on individual country Chemical Inventories is as follows:

| | |
|---|---|
| Asia-Pac: | Listed |
| Australian Inventory of Chemical Substances (AICS): | Listed |
| Korean Existing Chemicals List (ECL): | Listed |
| Japanese Existing National Inventory of Chemical Substances (ENCS): | Listed |
| Philippines Inventory if Chemicals and Chemical Substances (PICCS): | Listed |
| Swiss Giftliste List of Toxic Substances: | Listed |
| U.S. TSCA: | Listed |

## SECTION 16 - OTHER INFORMATION

**PREPARED BY:** Paul Eigbrett Global Safety Management, 10006 Cross Creek Blvd. Suite 440, Tampa, FL 33647

**Disclaimer:** To the best of Alconox, Inc. knowledge, the information contained herein is reliable and accurate as of this date; however, accuracy, suitability or completeness is not guaranteed and no warranties of any type either express or implied are provided. The information contained herein relates only to this specific product.

**ANNEX:**

**IDENTIFIED USES OF ALCONOX® AND DIRECTIONS FOR USE**

**Used to clean:** Healthcare instruments, laboratory ware, vacuum equipment, tissue culture ware, personal protective equipment, sampling apparatus, catheters, tubing, pipes, radioactive contaminated articles, optical parts, electronic components, pharmaceutical apparatus, cosmetics manufacturing equipment, metal castings, forgings and stampings, industrial parts, tanks and reactors. Authorized by USDA for use in federally inspected meat and poultry plants. Passes inhibitory residue test for water analysis. FDA certified.

**Used to remove:** Soil, grit, grime, buffing compound, slime, grease, oils, blood, tissue, salts, deposits, particulates, solvents, chemicals, radioisotopes, radioactive contaminations, silicon oils, mold release agents.

**Surfaces cleaned:** Corrosion inhibited formulation recommended for glass, metal, stainless steel, porcelain, ceramic, plastic, rubber and fiberglass. Can be used on soft metals such as copper, aluminum, zinc and magnesium if rinsed promptly. Corrosion testing may be advisable.

**Cleaning method:** Soak, brush, sponge, cloth, ultrasonic, flow through clean-inplace. Will foam—not for spray or machine use.

**Directions:** Make a fresh 1% solution (2 1/2 Tbsp. per gal., 1 1/4 oz. per gal. or 10 grams per liter) in cold, warm, or hot water. If available use warm water. Use cold water for blood stains. For difficult soils, raise water temperature and use more detergent. Clean by soak, circulate, wipe, or ultrasonic method. Not for spray machines, will foam. For nonabrasive scouring, make paste. Use 2% solution to soak frozen stopcocks. To remove silver tarnish, soak in 1% solution in aluminum container. RINSE THOROUGHLY—preferably with running water. For critical cleaning, do final or all rinsing in distilled, deionized, or purified water. For food contact surfaces, rinse with potable water. Used on a wide range of glass, ceramic, plastic, and metal surfaces. Corrosion testing may be advisable.

# Records of Training

Date: _____ Project Name:_____Project Number: _____

Project Location: _____

Project Description _____

The Project Manager is ultimately responsible for the accuracy of the information on this Record of Training and ensuring GHD Employees and Subcontractors are familiar with the site and have the required training to do the task

| Employee's Name: | Confined Space Entry | Excavation Safety | Fall Protection | GHS (HazCom/WHMIS) | Lock Out Tag Out (LOTO) | Motor Vehicle Safety | Aerial Lift | Other - | Other - | Other - | Other - |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ |
| | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ |
| | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ |
| | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ |
| | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ |
| | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ |
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| | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ |
| | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ |
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| | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ |
| | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ |

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