



Focused NAPL and Sediment Removal Action Campmarina MGP River OU RAWP



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REMEDIAL ACTION WORK PLAN
TABLE OF CONTENTS

1.0	INTRODUCTION	1
2.0	EI PROJECT TEAM CONTACTS, RESUMES AND SUBCONTRACTOR LIST	3
3.0	BASELINE PROJECT SCHEDULE	4
4.0	SITE MANAGEMENT PLAN	5
4.1	Site Security	6
4.2	Mobilization, Deployment and Staging Plan for Equipment	6
4.3	Temporary Measures/Controls for Protection of Subsurface Features.....	7
4.4	Site Infrastructure Description.....	7
4.5	Controls to Minimize Site Mud and Dust	9
4.6	Installation, Maintenance and Removal of Temporary In-River Sheet Pile Cofferdam.....	9
4.7	Limit Ground Contact Pressures within Waterloo Containment Barrier	12
4.8	Installation, Maintenance and Partial Removal of Buttress Support System	13
4.9	Personnel and Equipment Resource Allocation.....	15
4.10	Other Site Preparation Measures.....	16
4.11	Schedule and Work Sequence	16
5.0	MGP CONTACT WATER MANAGEMENT PLAN	16
5.1	Methods, Equipment and Power for Water Treatment System	17
5.2	Water Treatment System Details.....	18
5.3	Water Treatment System Schedule of Installation and Operation	20
6.0	MECHANICAL DREDGING/EXCAVATION PLAN	21
6.1	Dredging/Excavation Equipment	22
6.2	Sediment/Soil Dewatering and Stabilization Means and Methods.....	23
6.3	River Access for Equipment Mobilization/Demobilization.....	26
6.4	Dredging/Excavation Means and Methods	26
6.5	TSCA Sediment Dredging/Excavation Means and Methods.....	27
6.6	Dredging/Excavation Sequence of Operations.....	28
6.7	Containment of Sediments and Residuals in Water Column	29
6.8	Dredging/Excavation Production Rates	30
6.9	Haul Truck Loading.....	30
6.10	Debris removal	31
6.11	Meeting Dredge Depth and Tolerance	31
6.12	Bathymetric Surveys.....	34
6.13	Means and Methods for Backfilling Dredged/Excavated Areas	37
6.14	Envirocon Project Personnel	38
6.15	Schedule of Operations	38
6.16	Envirocon Self-Perform Work Scope versus Subcontracted Work Scope.....	39
7.0	SITE RESTORATION.....	39
7.1	Partial removal of Waterloo Barrier Support System.....	39
7.2	Repair/Replace Geosynthetic Cover.....	39
7.3	Replace Salvaged Rip Rap on Shoreline.....	39
7.4	Removal of Temporary Sheetpile Cofferdam.....	39



7.5 Removal of Upland Site Support Areas..... 39

7.6 Replacement of Boat Docks 40

7.7 Replacement and Repair of Utilities 40

7.8 Grass Restoration 40

8.0 SITE SPECIFIC HEALTH AND SAFETY PLAN 40

FIGURES

Figure 1. Site & Typical Dredging Plan

Figure 2. Intermediate Work bench Construction

Figure 3. Filtration Process Flow Diagram

Figure 4. NAPL, PAH, & PCB Excavation Areas

Figure 5. TSCA PCB Excavation Areas

Figure 6. Timber Mat Deployment

ATTACHMENTS

Attachment A. Resumes

Attachment B. Envirocon Contact Information

Attachment C. Baseline Schedule

Attachment D. Quality Control Forms

Attachment E. Water Treatment Data Sheets

Attachment F. Dredge Positioning Information

Attachment G. Site Specific Health & Safety Plan

Attachment H. Calciment MSDS

1.0 INTRODUCTION

Envirocon, Inc. (EI) presents this Remedial Action Work Plan (RAWP) as a part of the remedial action for the former Campmarina Manufactured Gas Plant (MGP) site located in Sheboygan, WI. The former Campmarina MGP Site is located at 732 N. Water Street in Sheboygan, Wisconsin and is approximately 1 mile west of Lake Michigan. The River OU is within the limits of the Sheboygan River and Harbor SR&H Superfund Site. The SR&H Superfund Site is subject to a separate Remedial Action, unrelated to the Campmarina MGP Site and this RAWP.

A Record of Decision (ROD) was issued by USEPA in May 2000 to address PCB-contaminated sediment through sediment removal in the Upper River, additional characterization and monitoring in the Middle River, and additional characterization and potential sediment removal subject to natural and recreational disturbances in the Lower River and Inner Harbor. The party addressing the SR&H Superfund Site, Pollution Risk Services (PRS), submitted a Remedial Action Work Plan for the Lower River and Inner Harbor (PRS, March 2011), approved by USEPA on March 17, 2011, which identified PCB-contaminated sediment to be removed from the river. This RAWP was prepared as part of the focused nonaqueous phase liquid (NAPL) sediment removal project to be performed adjacent to the Wisconsin Public Service Corporation's (WPSC) former Campmarina Manufactured Gas Plant (MGP) in the Sheboygan River, Sheboygan, Wisconsin.

The primary contaminants of concern (COC) associated with the Removal Action AOC are polycyclic aromatic hydrocarbons (PAH) and polychlorinated biphenyls (PCB). The PAHs originated from the former MGP, while the PCBs originated from other sources including former Tecumseh die-casting operations located many miles upriver from Campmarina. The primary cleanup goal for the Removal Action AOC is removing sediment with visual observations of NAPL. NAPL is defined for this action as oil-wetted or oil-coated near-shore sediment or under-shore soil. In addition to the NAPL-affected near-shore sediment and under-shore soil, sediment within the cofferdam identified for removal as part of the SR&H 2011 Remedial Action Work Plan, or with PAHs above 45 mg/kg in the top 2 feet of sediment, will also be removed. The post-cleanup goal for PCBs is SWAC-based as described in the PRS Mitigation Plan included in the PRS 100% Design Document (PRS, November 2010). Decisions regarding the need to perform additional dredging activities or placing a cover will be made in consultation with USEPA and PRS in accordance with the PRS Mitigation Plan.

The Base Scope work to be performed involves installation of a sheet pile cofferdam to contain the working area, installation of an Upland OU vertical barrier wall stabilization system, removal of under-shore soil, mechanical dredging of near-shore sediment, stabilization of the sediments with reactive blending materials as needed, water treatment of MGP contact water, and disposal of approximately 21,000 cubic yards (CY) of contaminated sediments from the site. This volume

includes 1,000-CY TSCA and 20,000-CY non-TSCA impacted sediments. This volume is further subject to refinement as part of post-dredge confirmation sampling and analysis and includes sediments to be removed within the cofferdam system in the Sheboygan River.

The removal action also includes removal of non-TSCA sediments outside the cofferdam system in the Sheboygan River. The sediments to be removed outside of the cofferdam system (volume estimated at approximately 7,400-CY) will be conducted under a Supplemental Scope of work in addition to the under-shore and near-shore sediments removed within the cofferdam system alignment as part of the Base Scope work.

Dredge cut lines and the delineation of the dredge areas have been developed by Natural Resource Technology based on RI data collected in 2008, additional sampling by GLNPO in 2010, and PRS's Remedial Design (PRS, November 2010). As discussed above, portions of the area have sediments that must be managed under TSCA due to the presence of PCB concentrations greater than 50 mg/kg. Dredging will be performed to isolate the TSCA sediments from the non-TSCA sediments to comply with regulatory and disposal requirements. Mechanically-dredged sediments will be loaded into transport barges within and outside the cofferdam area in two concurrent dredging operations, where sediments will be offloaded and stabilized (e.g., blended with a lime based reagent) as needed to meet solid waste landfill disposal criteria. Following stabilization, TSCA sediments will be transported by PRS to the Environmental Quality, Wayne Disposal Landfill in Belleville, Michigan, and non-TSCA sediments will be transported by EI to a licensed solid waste facility at Veolia's Hickory Meadows Landfill in Hilbert, Wisconsin.

MGP contact water will be collected and treated using best available treatment technology considering other successful contaminated sediment cleanup projects of a similar nature: solids settling/clarification, multi-media filtration, and granular activated carbon filtration/polish. MGP contact water will be treated and verified to meet the established criteria by the Wisconsin Department of Natural Resources using Substantive Requirements of a Wisconsin Pollution Discharge Elimination System (WPDES) Permit.

The sediment removal action is summarized as follows:

- ◆ Base Scope—1,000-CY TSCA and 20,000-CY non-TSCA impacted sediments (within cofferdam system);
- ◆ Supplemental Scope—7,400-CY non-TSCA impacted sediments (outside of cofferdam system alignment).

The RAWP will contain the following individual work plans inclusive with the document:

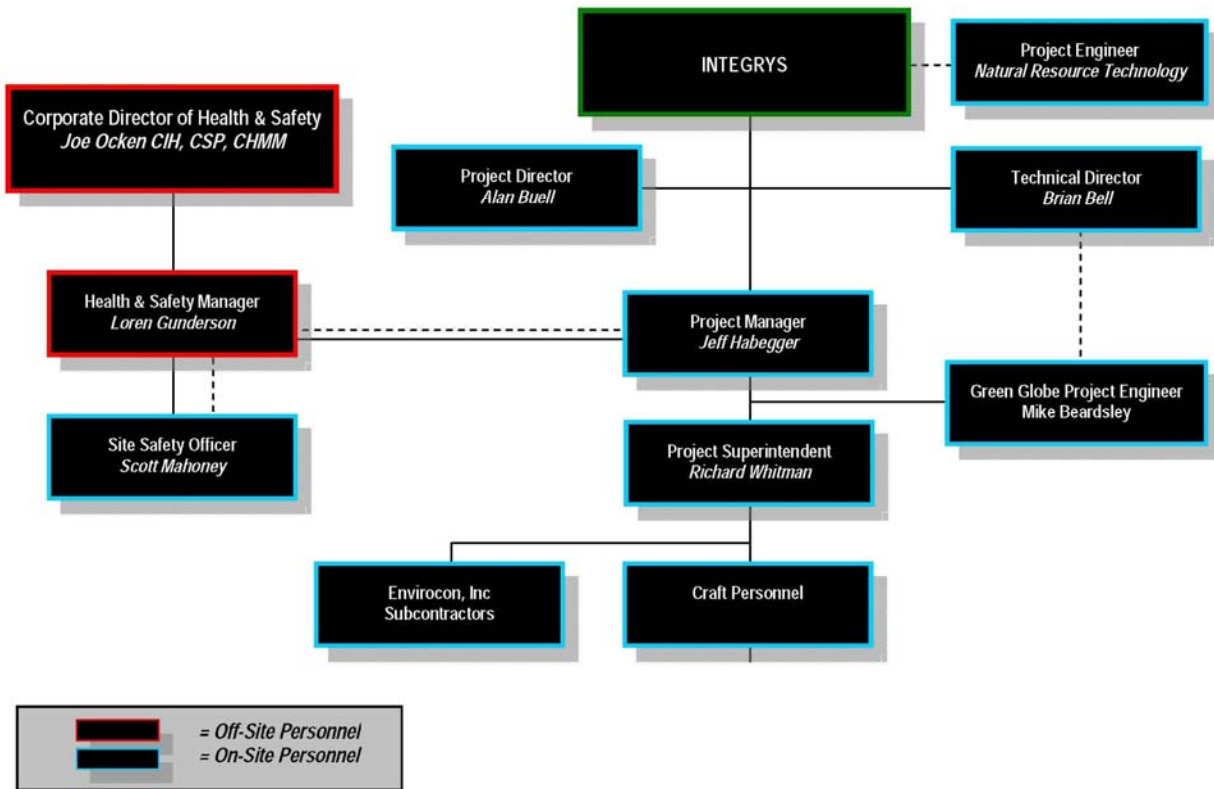
- ◆ Project Team Contacts, Resumes and Subcontractor List;
- ◆ Baseline Schedule;
- ◆ Site Management Plan;
- ◆ MGP Contact Water Management Plan;
- ◆ Mechanical Dredging/Excavation Plan;
- ◆ Site Restoration Plan; and
- ◆ Site Specific Health and Safety Plan

2.0 EI PROJECT TEAM CONTACTS, RESUMES AND SUBCONTRACTOR LIST

EI's proposed key project personnel include the following:

- ◆ Alan Buell—EI Project Director (overall direction and management of project, on-site and off-site);
- ◆ Brian Bell—EI Technical Director (overall technical guidance on project, on-site and off-site);
- ◆ Skip Simpson—EI dredging adviser (startup, troubleshooting and technical guidance of dredging and dewatering operations, on-site and off-site);
- ◆ Jeff Habegger—EI Project Manager (on-site);
- ◆ Richard Whitman – EI Project Superintendent (on-site);
- ◆ Steve Peterson—EI Project Superintendent (on-site);
- ◆ Mike Beardsley—GGE Principal (RTK GPS interfacing and bathymetric surveying, on-site);
- ◆ Randy Mendonsa—EI lead operator of dredging operations (on-site);
- ◆ Kevin George—EI lead operator of dredging operations (on-site); and
- ◆ Scott Mahoney—EI Site Health and Safety Officer.

The resumes for these key project personnel are included in Attachment A, while the personnel contact information is included in Attachment B. The EI project team organization chart is indicated below.



The main subcontractors to be used by EI on the project include the following:

- ◆ Cofferdam installation, marine support for Gillen, and marine support for EI (supplemental dredging)—McMullen and Pitz;
- ◆ Buttress support system installation, including divers when necessary—Edward E. Gillen, Co.;
- ◆ MGP Contact Water Treatment System—Baker Corporation;
- ◆ Offsite Transport – Spielvogel & Sons Exc., Inc.;
- ◆ Bathymetric survey support—Green Globe Environmental;
- ◆ Geosynthetic installer for the stabilization pad and Waterloo containment cap repair—GSI;
- ◆ Paving for stabilization pad-- TJ Asphalt; and
- ◆ Registered land surveyor to establish control points-- Aero-metrics.

3.0 BASELINE PROJECT SCHEDULE

The RAWP Project Baseline schedule is included in Attachment C. The project schedule is inclusive of both Base Scope and Supplemental Scope work. Some salient points offered by our RAWP schedule include the following:

- ◆ Expedited completion of site preparation and access for marine operations;

- ◆ Expedited completion of temporary sheet pile cofferdam;
- ◆ Begin TSCA sediment dredging directly after temporary sheet pile cofferdam is installed;
- ◆ Remove TSCA material and begin drilling for buttress support system; remove shoreline material to Waterloo Barrier at 580-ft. elevation; expose, drill and install buttress system, excavate further and place wale. EI will create the bench and drilling will commence while sheetpile wall is constructed;
- ◆ Continue with completion of buttress support system construction while mechanical dredging is ongoing (buttress support construction is not on the schedule critical path);
- ◆ Backfilling shoreline soils while mechanical dredging is ongoing, which constitutes non-critical path schedule work; and
- ◆ Perform the Supplemental Scope mechanical dredging work concurrently with Base Scope mechanical dredging work, which constitutes non-critical path schedule work, thereby meeting project milestone dates.

The RAWP schedule is based on performing work activities concurrently where possible which consolidates schedule, and allows substantial completion to be attained as early as practicable. The critical-path schedule work is thereby reduced to the lowest common denominator, which is cofferdam installation followed by Base Scope mechanical dredging. The proposed schedule will allow work sensitive to freezing conditions and the generation of MGP contact water to be completed before prevailing seasonal freezing weather sets in.

EI will self-perform the Supplemental Dredging operations outside the cofferdam alignment (with McMullen and Pitz providing tug operations) concurrently with the critical path mechanical dredging operations, which will not add duration to the Base Scope project schedule. EI will provide all resources necessary for completion of the Supplemental Dredging work within the time frame to complete the project according to the established milestone dates.

4.0 SITE MANAGEMENT PLAN

The Site Management Plan is incorporated as part of the RAWP as follows. The Site Management Plan includes the following sections:

- ◆ Site Security;
- ◆ Mobilization, Deployment and Staging Plan for Equipment;
- ◆ Temporary Measures/Controls for Protection of Subsurface Features;
- ◆ Site Infrastructure Description;
- ◆ Controls to Minimize Site Mud and Dust;
- ◆ Installation, Maintenance and Removal of Temporary In-River Sheet Pile Cofferdam;
- ◆ Limit Ground Contact Pressures within Waterloo Containment Barrier;
- ◆ Installation, Maintenance and Partial Removal of Buttress Support System;

- ◆ Personnel and Equipment Resource Allocation;
- ◆ Other Site Preparation Measures; and
- ◆ Schedule and Work Sequence.

4.1 Site Security

EI will install a temporary chain link security fence upon mobilization. The layout of the temporary fencing is indicated on Figure 1, Site and Typical Dredge Plan. The fencing encloses the upland operational and staging areas including the construction entrance, employee parking area, site trailers, decontamination pad, material load out area, material stockpiling area, stabilization area and water treatment plant. The Park will be closed during construction activities. The temporary fence will be removed in December. Depending upon the degree of restoration completed at that time, if disturbed areas of the site remain which require protection for safety, they will be secured by temporary fence.

Truck traffic signage will be provided for public safety and notification outside work areas. The site is manned during operational hours (7 am to 7 pm Monday through Friday), where deliveries and visitors will sign in at the office trailer. During off-work hours, the gates will be locked and the site secured.

4.2 Mobilization, Deployment and Staging Plan for Equipment

EI will mobilize according to the RAWP schedule. All necessary personnel, equipment, supplies, job trailers, temporary utilities, and incidentals to the work will be provided. Equipment will be mobilized and deployed for upland work activities, work in-stream and adjacent to the shoreline. Equipment operating in the upland areas will be deployed in a conventional manner. The equipment planned for in-stream operations will be floated to the job site. Equipment deployment and staging for temporary cofferdam sheet pile and buttress support installation is discussed in more detail in Sections 4.6 and 4.8 respectively.

The in- and near-stream equipment will be staged in a manner that the equipment will be secured safely during off-work hours. Upland equipment will be staged for operations with access provided by installing an access road as indicated on Figure 1. The access road will be comprised of geotextile, and 6 inches of 1-1/2 in. road base.

The equipment operating near-shore will be staged and operated while access is provided by installing a work bench as depicted in Figure 2. EI will install the work bench for the temporary sheet pile cofferdam and Waterloo Barrier Support System installation support. The work bench will be 10 to 12-ft. wide, and will be cut in the bank at an elevation of approximately 580-ft. Shoreline soils and rip rap will be removed and staged/stockpiled in the upland staging area. The

soils will be used for shoreline backfill and the rip rap will be replaced upon completion of removal activities.

EI's subcontractor, McMullen & Pitz Construction Company (McMullen & Pitz) has investigated the water depth and height clearance under the Pennsylvania Avenue Bridge. McMullen and Pitz have concluded that adequate water depth and clearance exists to float their barges up the river from the lake to the project site.

4.3 Temporary Measures/Controls for Protection of Subsurface Features

Planned excavations and penetrations will be more clearly identified in the field in conjunction with Engineer review and input. EI understands that excavation and/or ground penetrations will not be generally allowed within the area of the existing upland Waterloo containment barrier and geosynthetic cover and will require Engineer approval. This is further discussed in Section 4.7.

4.4 Site Infrastructure Description

Figure 1, Site and Typical Dredging Plan illustrates the following site infrastructure areas which will be installed or constructed:

- ◆ Temporary access road;
- ◆ Job trailers;
- ◆ Worker parking;
- ◆ Truck staging;
- ◆ Equipment lay down area;
- ◆ Piling delivery and staging areas;
- ◆ Backfill and rip rap stockpile areas;
- ◆ Decontamination pad;
- ◆ MGP contact water treatment area;
- ◆ Sediment stabilization area; and
- ◆ River access area.

Erosion and sedimentation controls will be installed initially. EI estimates that we will install approximately 2,500-LF of silt fence for the project total. A tracked skid steer with trencher attachment will be used to install the silt fence at approximately 1,000-lf per day. Silt fence will be installed around material stockpiles to be maintained on the northeast corner of the upland site, including shoreline soil and rip rap stockpiles.

The temporary access road is described in Section 2.2. The job trailers and worker parking will be located in the northwest corner of the site, east of the MGP contact water treatment area location. Equipment lay down, piling staging and backfill/rip rap stockpiling will occur on the

eastern side of the site. The MGP contact water treatment area is located in the northwest corner of the site. The sediment stabilization area is located just southeast of the MGP contact water treatment area. The decontamination pad is located adjacent to the stabilization pad truck load out area. The river access areas, including the locations where the dredged sediments are off-loaded for both Base Scope and Supplemental Scope work, are indicated on Figure 1.

The stabilization pad will be constructed for temporary staging, decanting, stabilization and load-out of dredged sediments. The staging pad sizing will correspond to 125-ft. by 175-ft. It will be graded to drain to a sump for decant and contact water collection, management and treatment. The pad will be constructed with a 30-mil LLDPE liner, a geotextile cushion layer, ¾-inch road base and topped with a 4-in. layer of asphalt pavement.

The stabilization pad sizing allowed necessary staging, drying and stabilization residence duration on the stabilization pad before sediments are confirmed and loaded into haul trucks. The stabilization pad sizing will allow a total staging duration of approximately 4 days for sediments on the stabilization pad using our Base Scope production rate of 340-CY dredge spoils per day and approximately 200-CY per day for the Supplemental Scope dredging. The stabilization pad sizing is adequate to accommodate the total sediment dredge spoil production rate of 540-CY which is inclusive of the Supplemental Scope work. The anticipated sediment storage volume on the stabilization pad is expected to correspond to approximately 2,200-CY at any one time.

The decontamination pad is approximately 50-ft. by 20-ft. and graded to drain to a sump for contact water collection, management and treatment. The pad will be underlain with a 30-mil LLDPE liner, over which a cushion geotextile and 3-in. clean rock will be placed. The decontamination pad will be used for decontamination of equipment before it egresses the Exclusion Zone, and is located on Figure 1.

As part of site preparation, EI will also:

- ◆ Locate electrical within the park;
- ◆ Remove walkway light for truck access; and
- ◆ Install survey control and complete initial survey.

EI will complete Construction Quality Control (CQC) Report Forms, including Daily Activity Log, Daily CQC Report Form, and Stormwater Management Plan Field Investigation Reports. These Report Forms together with the Submittal Register which EI will maintain are included in Attachment D.

4.5 Controls to Minimize Site Mud and Dust

EI will take extra precautions and will pro-actively manage the site conditions to mitigate potential cross contamination due to the prevalence of muddy or dusty site conditions. Muddy site conditions will be managed which will minimize the potential for mud to migrate and cross-contaminate into clean areas. Site management will include the use of timber crane mats on access roads where necessary to meet the low ground pressure (4-psi) requirement, and which will minimize the surface area for equipment to contact mud.

Further, a decontamination program will ensure mud is removed from site equipment tires and tracks. Dry decontamination procedures are used when prevailing site conditions allow. However, when prevailing site conditions are predominately muddy, wet decontamination procedures will be employed to mitigate the migration of mud. Cross-contamination due to spillage of sediments during barge off-loading and truck loading operations will be minimized by use of spill aprons and plastic liners covering potentially exposed surfaces. Best Management Practices will also be used to minimize spillage and potential cross-contamination.

Potential migration of airborne dust particulates during prevailing dry weather will be mitigated by use of a water truck to wet dry surfaces and roadways. The use of timber crane mats on access roads will further reduce the potential for airborne particulate generation.

4.6 Installation, Maintenance and Removal of Temporary In-River Sheet Pile Cofferdam

EI's proposed subcontractor, McMullen and Pitz, will perform the temporary sheet pile cofferdam installation and removal. The following represents a summary of the major activities that will be completed as a part of the temporary cofferdam construction and removal work scope.

The following equipment will be mobilized to the jobsite:

- ◆ 32-ft. by 10-ft. Shallow Draft River Tug – 200 HP;
- ◆ 18-ft. Jon Boat w/ 55 HP Outboard Motor;
- ◆ 40-ft. by 70-ft. by 6-ft. six-tank “Manitowoc” steel sectional barge with spuds and deck engine;
- ◆ 30-ft. by 120-ft. by 7-ft. double raked steel ABS load line barge w/ spuds, air compressor, & deck engine;
- ◆ Manitowoc 2900 WC (70 ton) lattice boom crawler crane;
- ◆ Caterpillar 350L Excavator;
- ◆ 48-ft. by 40-ft. by 3-ft. four-tank sectional steel barge with spuds (material barge);
- ◆ MKT V-17 Vibratory Hammer/Extractor with Diesel Power Pack;
- ◆ HVR 100 Excavator Mounted Vibratory Hammer/Extractor;
- ◆ John Deer TC54H Wheel Loader/Material Handler;

- ◆ ¾-CY Esco Clamshell Bucket;
- ◆ 1 set of 34-ft. hardwood reinforced “running sticks” to bridge equipment on/off barges;
- ◆ Miscellaneous small tools: welding machines, slings, shackles, hand tools, etc.; and
- ◆ All equipment will be fitted out, loaded, & floated to the jobsite to avoid weight restrictions on the east bank. All equipment has been sized for the intended use(s).

Layout the Cofferdam:

- ◆ Locate work points for each cofferdam leg;
- ◆ Remove rip rap at shoreline/sheet pile tie-in locations with the excavator; side cast the material for replacement when project is completed (4 total); and
- ◆ Inspect the “drive lines” and remove any obstructions that would impede on driving the sheet piles. Materials will be removed with the excavator on the 40-ft. by 70-ft. sectional barge and taken to shore where they will be offloaded by EI and treated as impacted material.

Unload and Stage Steel Sheet Piling:

- ◆ Unload steel sheet piling off flatbed trailers with material handler and stack near shoreline on private property (Mayline) along west side of the river;
- ◆ Load sheet piles with the crawler crane onto 30-ft. by 40-ft. material sectional barge; this barge will support 20% of the sheet piling for the project (5 loads required);
- ◆ Transport the loaded material barge with the river tug to the excavator/pile driver location; and
- ◆ The excavator/pile driver will take the sheet piling off the material barge as needed.
- ◆ The access agreement with Mayline will be provided to WPSC and the Engineer in advance of operations.

Set and Drive Steel Sheet Pile Cofferdam:

- ◆ Begin cofferdam installation on the north segment and finish with the south segment to divert river current loads around the island. North segment to begin at the existing Waterloo Barrier on the east shore and proceed west toward Boat Island. South segment to begin at Boat Island and proceed east toward the east bank.
- ◆ Greater than 3-feet. Water Depth Areas:
 - Use the 40-ft. by 70-ft. sectional spud barge with the excavator/pile driver (CAT 350L w/ HVR 100 Vibratory Hammer) to set the sheet piling in position.
 - The 40-ft. by 70-ft. sectional spud barge will also serve as a guide to keep the cofferdam segments as straight as possible.
 - The excavator/pile driver will “mate” the steel sheet piling to the previous sheet and drive it vertically to the plan elevation.
- ◆ Less than 3-ft. Water Depth Areas (near boat island):

- The excavator/pile driver will crawl off the 40-ft. by 70-ft. sectional spud barge using the “running sticks” and will be supported by crane mats on the river bottom. McMullen & Pitz Construction inspected the river bottom in these areas on 4-29-11 and found the bottom to be relatively firm, therefore we feel the excavator/pile driver will be supported in this manner.
 - The crawler crane will be placed on the 40-ft. by 70-ft. sectional spud barge and will feed the excavator/pile driver with sheet piling from the material sectional barge. This crane will also assist the progress of the excavator/pile driver by moving the crane mats as needed.
 - The crane mats will be removed from the river bottom after they are no longer needed by the excavator/pile driver and staged for use during removal of the cofferdam.
 - The Manitowoc 2900 WC crawler crane will be rigged with the V-17 vibratory hammer to install sheet piling from the sectional barge if it is determined to be more practical in certain areas where water depths are between 2-ft. and 3-ft.
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- ◆ Install navigational hazard buoys and lights on the upstream and downstream ends of the project to provide proper warning to boaters. Inform the USCG and WIDNR of the navigational hazard so the proper “notice to mariners” can be made.
 - ◆ Remove materials and equipment from the work site and stage for removal.
 - ◆ Monitor debris build-up on the outside of cofferdam and remove as needed to eliminate unnecessary loading on the cofferdam structure.

Extract and Remove Temporary Cofferdam:

- ◆ The cofferdam removal will begin with the southern segment at Boat Island and continue east to the east bank. Once the southern segment is removed, the northern segment will be removed from Boat Island toward the east bank.
- ◆ Over 3-ft. Water Depth Areas:
 - * Use the 40-ft. by 70-ft. sectional spud barge with the excavator/pile driver (CAT 350L w/ HVR 100 Vibratory Hammer) to extract the sheet piling and stack it on the material sectional barge.
- ◆ Less than 3-ft. Water Depth Areas:
 - The excavator/pile driver will crawl off the 40-ft. by 70-ft. sectional spud barge using the “running sticks” and will be supported by crane mats on the river bottom. McMullen & Pitz Construction inspected the river bottom in these areas on 4-29-11 and found the bottom to be relatively firm, therefore we feel the excavator/pile driver will be supported in this manner.

- The crawler crane will be placed on the 40-ft. by 70-ft. sectional spud barge and will take the sheet piles from the excavator/pile driver and stack them on the material sectional barge. This crane will also assist the progress of the excavator/pile driver by moving the crane mats as needed.
 - The crane mats will be removed from the river bottom after they are no longer needed.
 - The Manitowoc 2900 WC crawler crane will be rigged with the V-17 vibratory hammer to extract sheet piling from the sectional barge if it is determined to be more practical in certain areas where water depths are between 2-ft. by 3-ft.
-
- ◆ Transport the contaminated sheet piling on the material sectional barge to the east bank of the river. The sheet piling will be offloaded by McMullen & Pitz personnel and decontaminated by EI personnel in a vacant yard across from the river. A Hotsy will be used on a 40-ft. by 8-ft. modular/transportable decontamination pad set up on the Mayline property. Decontamination liquid will be collected and pumped to a poly tank. The decontamination waste liquids will ultimately be removed into a tank truck and transported for off-site treatment and disposal at a licensed facility. The liquid disposition will be managed by EI. If solids are recovered which are not disposed with the liquid waste stream, the solids will be stabilized, managed and transported to Veolia Hickory Meadows landfill for disposal.
 - ◆ After sheet piling is decontaminated, it will be loaded onto flatbed trailers with the material handler and removed from the jobsite.
 - ◆ Replace rip rap at shoreline tie-in locations (4) to pre-construction conditions.

Demobilize Equipment:

- ◆ Ensure all work has been completed and accepted;
- ◆ Ensure all materials have been decontaminated and removed from the jobsite;
- ◆ Ensure any equipment that has been contaminated is properly cleaned; and
- ◆ Breakdown and load out all equipment and remove from jobsite.

4.7 Limit Ground Contact Pressures within Waterloo Containment Barrier

EI will limit ground pressure in the area contained by the Waterloo barrier and geosynthetic cover to less than 4 pounds per square inch (psi). EI will implement measures for the Engineer's review and approval to insure this standard will be met. One of the primary measures EI will implement includes using timber crane mats for the equipment operational base.

Use of the equipment crane mats will ensure that the effective ground pressure from equipment running in this area will not exceed 4-psi. The timber crane mats are 18-ft. by 4-ft. by 8-in. thick, and will distribute the loading over a relatively greater effective area. The timber crane mats are

rigid while providing minimal deflection. EI will comply with and meet the 4-psi ground pressure loading criteria for planned equipment as follows.

With respect to excavator loading, the excavator track length is 15-ft and the width is 28-in. The load of the footprint will transfer onto at least four mats at any one time when aligned properly. While this machine traverses the Waterloo Containment area to its operating position at the transport barge off-loading area, it will be assured to remain aligned perpendicular to the shorter width of mats. At the Base Scope off-loading area, the excavator will off-load dredge spoils. In the off-loading area of operation, EI will place double layer mats cross ways to each other to ensure the ground contact pressure is met while the excavator turns. The area of double layer mats will correspond to approximately 54-ft. by 16-ft. area.

Regarding the articulated, tandem and mixer trucks, each axle load will transfer onto one mat at a time, conservatively. Each of the front-end loader's axle weight will transfer onto one mat at a time. The following table lists the equipment considered to access the Waterloo Containment Area, with respective loads and estimated maximum ground pressure exerted by each piece (estimated mat load).

Estimated Campmarina Upland Equipment					
Mat Load		Loaded Weight			
(psi)	Equipment	Front Axle	Rear Axle (A)	Rear Axle (B)	Notes
2.1	CAT 330 Long Reach (or equivalent weight)	87,000			Each track 15' long, 28" wide, 11' outside track to track
3.3	Volvo A25 Artic	32,000	34,500	34,500	Rear axle 5' 6" spacing
3.0	15 CY Tandem Axle Truck	22,000	31,000	31,000	Rear axle 4' 6" spacing
3.0	14 CY Mixer Truck	22,000	31,000	31,000	Rear axle 4' 6" spacing
2.5	Volvo 110 Loader	51,000			Wheels 8' 5" outside to outside, axle spacing 6'

The timber mat layout within the Waterloo Containment Area will be installed as indicated on Figure 6.

4.8 Installation, Maintenance and Partial Removal of Buttress Support System

EI will subcontract the buttress installation work to Edward E. Gillen Company (Gillen). For this work scope, McMullen and Pitz will subcontract directly to Gillen for the supply of the tug and barges necessary to complete the work. With respect to access, Gillen will obtain a formal access agreement with the property owner, Mayline Group at 619 North Commerce, Sheboygan, WI,

and will provide a copy to the Project Engineer. Gillen personnel have taken soundings of the water depth. Gillen is confident that sufficient water depth exists to float across the river.

EI and Gillen have considered the work scope necessary to construct the 41-ea, 42-in. dia. bracing columns for the existing Waterloo steel sheeting as shown on the plans for the project. Our work consists of temporary casing the 48-in. dia. hole by ‘forcing’ the temporary casing pipes into the ground, drill out the inside soil to elevation 547± ft., install a 36-ft. long piece of 42-in.dia., ¾-in. thick wall steel casing pipe and grout the casing pipe in place up to elevation 570-ft.

Gillen operating personnel will apply a downward pressure on the temporary casing pipes and screw the casings into and out of the ground. No pounding will take place. The inside of the 42-in. drilled caisson will also be filled with 3000-psi concrete to elevation 570-ft. The temporary casing will be removed. Top waler and inclinometers will be installed as the bracing columns are constructed in the locations shown on the plans.

Due to the very weak soils below the 580-ft. elevation that will most likely fail due to equipment loads during the construction of the 42-in. dia. bracing, we propose to work from a 30-ft by 120-ft barge. We will need to move the barge to within 10-ft of the existing Waterloo steel sheeting wall. A draft of ±3-ft. of water will be necessary at this location.

The lower waler will be put in place, shimmed and videotaped by a diver as the soils along the Waterloo sheeting are removed to a depth below elevation 570-ft. EI will coordinate our dredging work with Gillen’s work very closely when the lower waler is installed.

The following summarizes the buttress system construction work scope:

- ◆ One mobilization and a continuous work schedule;
- ◆ Location, protection and/or relocation of conflicting utilities. Per the plans, there does not appear to be any utilities in the work area;
- ◆ Removal and replacement of the rip rap and soils adjacent to the river side of the Waterloo steel sheeting wall;
- ◆ Furnish the labor and equipment to construct the 42-in. dia. Waterloo bracing system, as specified;
- ◆ A 150,000-lb. drill rig will operate on the equipment barge;
- ◆ Furnish and install the 41-ea, 42-in. dia. steel casing pipe 36-ft. long, temporary casing pipe, concrete grout, waler system, and 4-ea inclinometers;
- ◆ Cut off the 42-in. dia. casing at elevation 581-ft. after dredging is complete and backfill is placed;

- ◆ This work is expected to require 2-1/2 months to 3 months to complete;
- ◆ All workers are HAZWOPER trained;
- ◆ Drill spoils will be removed and managed as all dredge spoils.

4.9 Personnel and Equipment Resource Allocation

The following matrix lists the resource allocation according to RAWP work activity. The number of management personnel, construction workers, subcontractors, and EI's major equipment is listed for each work activity.

No.	Description of Work Task/ Bid Item	Management Personnel	Construction Workers	Subcontractors	Equipment
1	Mobilization	4	0	1	Subcontractor
2	Site Preparation	4	4	2	<ul style="list-style-type: none"> ◆ Tracked Skid Steer 100 HP ◆ Loader 4 CY ◆ Smooth Drum Roller 84" ◆ Road Grader ◆ Small dozer ◆ Excavator - 60,000 lb w/ thumb ◆ Dump Truck 15 CY ◆ 25 ton articulated haul truck
3	MGP Contact Water Management	4	2	1	<ul style="list-style-type: none"> ◆ Subcontractor ◆ Genset, or fixed power
4	Mechanical Dredging/Excavation	4	4		<ul style="list-style-type: none"> ◆ Survey Boat ◆ Work Boat ◆ Excavator - Long Reach 100,000 LB ◆ Excavator - Long Reach 87,000 LB ◆ Dump Truck 15 CY ◆ Tracked Skid Steer 100 HP ◆ Loader 4 CY
5	Sediment Stabilization Additive	4	1		<ul style="list-style-type: none"> ◆ Pneumatic Pig ◆ Genset
6	VOC and Odor Suppressing Foam	4	2		<ul style="list-style-type: none"> ◆ Foam Machine
7	Transportation to Non- TSCA Disposal Facility	4	0	1	<ul style="list-style-type: none"> ◆ Street Cleaner ◆ Subcontract Transport
8	Reactive Core Mat	4	2		<ul style="list-style-type: none"> ◆ Tracked Skid Steer 100 HP
9	Removal & Reinstallation of Riprap and Toe Stones Downstream of Waterloo	4	3		<ul style="list-style-type: none"> ◆ Excavator - Long Reach 87,000 LB / 60,000 lb excavator w/ thumb ◆ Dump Truck 15 CY

No.	Description of Work Task/ Bid Item	Management Personnel	Construction Workers	Subcontractors	Equipment
	Barrier				<ul style="list-style-type: none"> ◆ 25 ton articulated haul truck ◆ Loader 4 CY
10	Furnish and Place Backfill	4	5		<ul style="list-style-type: none"> ◆ Work Boat ◆ Excavator - Long Reach 100,000 LB ◆ Excavator - Long Reach CAT330DL ◆ Rock Box ◆ Survey Boat
11	Site Restoration	4	6	1	<ul style="list-style-type: none"> ◆ Excavator - Long Reach 87,000 LB / 60,000 lb excavator w/ thumb ◆ Loader 4 CY ◆ Dump Truck 15 CY ◆ Tracked Skid Steer 100 HP
12	Supplemental Riprap & Toe Stones	4	1		<ul style="list-style-type: none"> ◆ Excavator - Long Reach CAT330DL / 60,000 lb excavator w/ thumb ◆ Rock Box
13	Demobilization	4	1	1	<ul style="list-style-type: none"> ◆ Subcontractor
Supplemental Scope					
14	Mobilization	4	0	1	<ul style="list-style-type: none"> ◆ Subcontractor
15	MGP Contact Water Management	4	1	1	<ul style="list-style-type: none"> ◆ Subcontractor ◆ Genset
16	Mechanical Dredging/Excavation	4	3	1	<ul style="list-style-type: none"> ◆ 2 Excavator - Long Reach 77,000 LB ◆ Dump Truck 15 CY ◆ Tracked Skid Steer 100 HP ◆ Loader 4 CY
17	Sediment Stabilization Additive	4	1		<ul style="list-style-type: none"> ◆ Pneumatic Pig ◆ Genset
18	VOC and Odor Suppressing Foam	4	2		<ul style="list-style-type: none"> ◆ Foam Machine
No.	Description of Work Task/ Bid Item	Management Personnel	Construction Workers	Subcontractors	Equipment
19	Transportation to Non- TSCA Disposal Facility	4	0	1	<ul style="list-style-type: none"> ◆ Subcontractor
20	Furnish and Place Backfill	4	1	1	<ul style="list-style-type: none"> ◆ Excavator - Long Reach 77,000 LB
21	Demobilization	4	1	1	<ul style="list-style-type: none"> ◆ Subcontractor

4.10 Other Site Preparation Measures

EI has not identified additional site preparation measures applicable for the Site Management Plan to the measures discussed above.

4.11 Schedule and Work Sequence

The project schedule and work sequence are discussed and referenced in Section 3.0.

5.0 MGP CONTACT WATER MANAGEMENT PLAN

The MGP Contact Water Management Plan is incorporated as part of the RAWP as follows. The MGP Contact Water Management Plan includes the following sections:

- ◆ Methods, Equipment and Power for Water Treatment System;
- ◆ Water Treatment System Details; and
- ◆ Water Treatment System Schedule of Installation and Operation.

5.1 Methods, Equipment and Power for Water Treatment System

EI has performed a water mass balance for all site operations. The mass balance accounts for potential MGP contact water that may be generated from the following sources:

- ◆ Dredge spoils decant water (from the dredge spoil containers and the stabilization pad from both Base Scope and Supplemental Scope operations);
- ◆ Precipitation contact water collected from the stabilization pad;
- ◆ Other potential direct contact water; and
- ◆ Decontamination water.

EI analysis indicates that a treatment system with the capability to treat an average of 50-gpm over one 12-hr. shift per day will be adequate to meet the total MGP contact water generated throughout the project. EI estimates that water from the sources listed above will correspond to up to approximately 2.6 million gallons over four month project duration. This would result in an average flow rate of approximately 40-gpm over one shift per day, not including weekend treatment work. If due to unforeseen circumstances, additional capacity were needed, the water treatment system (WTS) could be run during the night shift, thereby doubling the overall treatment capacity. Alternatively, the treatment system capacity may be verified to meet a higher throughput rate than 50-gpm, which would increase overall treatment capacity as well.

The WTS is designed to meet the WPDES discharge criteria as listed in the WPDES Permit provided under Addendum 4 to the RFP. The main constituents of concern to be removed in the WTS include the following:

- ◆ PCB Total—0.8 ug/L daily maximum;
- ◆ PAH's—0.1 mg/L monthly average;
- ◆ Total Suspended Solids (TSS)—10 mg/L daily maximum;
- ◆ Non-aqueous phase liquids (NAPL) —no visible sheen.

The WTS will be set up and located in the area indicated on Figure 1. Decant water pumped from the dredge spoil containers at both Base Scope and Supplemental Scope off-loading areas will be pumped to the WTS location for treatment. A 3-in. Whacker submersible pump will be used to pump decant water from the dredge spoil containers to the WTS surge/mix tank. Lay flat hose will be used to convey decant water from the containers to the shore line, where 4-in. HDPE pipe will convey the decant water to the WTS. Similarly, 2-in Whacker submersible pumps will be used to convey water collected at the stabilization pad sump and decontamination pad sump to the WTS surge/mix tank.

The WTS will be powered by a genset. The WTS setup includes pre-treated and post-treated storage tanks. EI's approach is to start operations on a batch basis, and using sampling and analysis in a startup phase (proof of performance). After analysis confirms that WPDES discharge criteria are continually met, EI may request Engineer's approval to discharge on a continuous operating basis, with appropriate sampling and analysis confirmation.

5.2 Water Treatment System Details

The proposed WTS for the project is supplied by Baker Corporation (Baker). Baker will provide the necessary treatment units that will meet the WPDES discharge criteria. The WTS also includes a proprietary, efficient and cost-effective means for removing potential NAPL in the water stream. The Baker approach uses a specific filtration to filter out NAPL and recover it, following solids removal, and prior to granular activated carbon (GAC) adsorption.

The main process units in the WTS include the following, not listed in order. The proposed WTS Process Schematic is indicated in Figure 3. Data Information data sheets for the primary WTS components are included in Attachment E.

System components

No.	Description
1	3" SS Duplex Bag Filter
2	3" Elec Submersible Pump
10	3" x 25' Suction Hose
2	2K HP Vessels
1	21,000 Gal. Frac Tanks
4	3" x 50' Discharge Hose
2	4" x10' Suction Hose
1	3 POD Sand Filter
1	3" Flow Meter
4	3" Sample Ports
1	21,000 Gal. Mix Tank
1	50 GPM OWS

Carbon Media

- ◆ 4,000 Lbs. 8X30 VCC Media Loaded in Vessel;

- ◆ GAC Media Regeneration;
- ◆ Media Service (Vacuum and DOT Super Sack); and
- ◆ TCLP Test.

Sediment Media

- ◆ 2,700 Lbs. Sand and Gravel Media;
- ◆ Media Disposal;
- ◆ Media Service (Vacuum and DOT Super Sack); and
- ◆ 500 – 10 Micron Filter Bags.

The initial mix tank will serve as WTS surge capacity and will provide for initial NAPL separation and collection if it is present. Oil boom and diapers will be used to absorb accumulated NAPL in the mix tank. Residual NAPL and emulsified organics will be removed efficiently by the oil/water separator media following particulate filtration. Polymers will not be used to assist in settling of suspended solids without prior approval and are not expected to be required.

The system operational units in order include:

- ◆ Mix tank;
- ◆ 3-POD sand filter,
- ◆ Dual bag filtration system;
- ◆ Oil/water media separator with product recovery;
- ◆ Two 2,000 lb. HPV media vessels;
- ◆ Post-treatment storage frac tank; and
- ◆ In-line turbidity meter and flow meter.

The consumable media for the WTS includes filter bags, sand filter media, oil/water separation media and GAC. Since the WTS is operating at a relatively low flow rate, EI estimates 100-200 Filter Bags may be consumed per month. The sand media contained in the 3-POD sand filter should last the life of the project, while backwashing greatly extends the life of the sand. The GAC media is virgin coconut carbon. The relatively low flow rate and low levels of contaminants (low mass loading) will allow the GAC to last the life of the project. The oil/water separation media will be good for the life of the project. EI and Baker Corporation are confident that the WTS will meet the discharge levels specified in the WPDES.

EI considered the possibility that use of Calciment reagent would raise the pH of collected MGP contact water at the stabilization pad. EI expects the total contribution of collected MGP contact

water at the stabilization pad to correspond to less than 20% of the total MGP contact water generated, collected and treated from all the project sources. As such, the contact water collected at the stabilization pad with a relatively higher pH will be mixed with the other sources of MGP contact water (primarily decant water from the dredge spoil containers) at the water treatment system surge control tank. The net result is that the pH of the water to be treated will be effectively buffered through dilution which will meet the WPDES pH discharge requirements. In the case that pH neutralization was needed to meet WPDES requirements, EI will provide the required treatment step at the water treatment system surge control tank using a carbon dioxide infusion pH control system.

The WTS effluent will be discharged by hose line to water contained within the cofferdam enclosure. Scour protection and velocity reduction will be provided at the discharge area by preparing a rock discharge structure. Flow meter and turbidity meter data will be manually recorded hourly by the WTS operator. The data will be provided as a separate table and attached with the daily Quality Control Report forms.

5.3 Water Treatment System Schedule of Installation and Operation

The WTS will be operated by trained EI personnel. The EI operators will be trained by Baker Corporation personnel during system startup. We anticipate operating the WTS on single daily shifts Monday through Friday, and weekends if necessary. The WTS will be mobilized and will be operational in early July 2011 before MGP contact water will be generated. The WTS will be operational through the end of dredging and sediment decanting operations in late November 2011, and while any potential MGP contact water may be generated on the stabilization pad. Following removal of the WTS, if any MGP contact water is generated (e.g., from decontamination operations), the contact water will be collected and taken to a licensed off-site treatment facility for treatment and disposal.

EI will only run the water treatment plant during the night shift if/when additional treatment capacity is needed as a contingency. The WTS equipment is relatively quiet as the Genset represents the only potential noise generating equipment. EI will apply noise suppressing measures for the Genset including baffling if necessary. The WTS operation will meet the City of Sheboygan ordinances including the noise ordinance requirements.

This RAWP considers the excavation quantities and schedule relative to both the Base Scope and Supplemental Scope work. The RAWP considers the potential generation, collection and treatment of approximately 2,600,000-gal of MGP contact water for the project duration. This estimated amount includes both Base Scope and Supplemental Scope quantities. If operations require additional water above what is estimated, the required amounts will be treated as necessary.

With respect to meeting turbidity requirements for the standing water contained within the cofferdam system before removing the cofferdam, EI does not believe that this water will require treatment before the cofferdam is removed. It is estimated in the unlikely event that the turbidity requirement is not satisfied after dredging and backfilling work is completed, the turbidity will be mitigated sufficiently to meet turbidity requirements after 2 or 3 days. This time will allow additional sedimentation of suspended solids under quiescent conditions. The additional settling time is included in the RAWP schedule. In the unlikely event that the standing water would require water filtration treatment for turbidity removal, the schedule duration for this event is not included in the RAWP schedule.

In the unlikely case that standing water within the cofferdam required filtration in order to meet turbidity requirements prior to cofferdam removal, the water would be pumped, filtered and recirculated within the cofferdam. EI has estimated that the volume of standing water contained within the cofferdam system is approximately 4 million gallons. If absolutely necessary, EI would mobilize a 500-gpm filtration system, and house it within a heated enclosure. EI's water treatment subcontractor, Baker, would mobilize and setup the filtration system, which is a 10-Plex Filtration Unit comprised of a 10-bag multi stage filtration bank. The bags would be able to be changed out while the system is operating continuously.

In reference to this case, EI estimates that up to 100% of the standing water volume may need to be pumped, filtered and returned within the cofferdam in order to meet turbidity requirements (less than 70-ntu above background). This would require approximately six days of pumping and filtration. It is likely that a lesser volume of standing water may be able to be filtered and returned which will meet turbidity requirements. EI would utilize a 4-in. diesel pump hard hose intake and HDPE pipe to convey the water within the cofferdam to the filtration system and return. A water withdrawal sump would be located and the water return would be located and installed in a manner that would minimize the additional generation of turbidity. EI would be able to operate the water extraction, filtration and return operation if ice forms on the standing water surface. By running the system continuously, the conveyance hosing will not freeze. The system would operate until turbidity levels are confirmed to meet the turbidity requirements so that the cofferdam can be removed.

6.0 MECHANICAL DREDGING/EXCAVATION PLAN

The Mechanical Dredging Plan is incorporated as part of the RAWP as follows. The Mechanical Dredging Plan includes the following sections:

- ◆ Dredging/Excavation Equipment;
- ◆ Sediment/Soil Dewatering and Stabilization Means and Methods;
- ◆ River Access for Equipment Mobilization/Demobilization;

- ◆ Dredging/Excavation Means and Methods;
- ◆ TSCA Sediment Dredging/Excavation Means and Methods;
- ◆ Dredging/Excavation Sequence of Operations;
- ◆ Containment of Sediments and Residuals in Water Column;
- ◆ Dredging/Excavation Production Rates;
- ◆ Haul Truck Loading;
- ◆ Debris removal;
- ◆ Meeting Dredge Depth and Tolerance;
- ◆ Bathymetric Surveys;
- ◆ Means and Methods for Backfilling Dredged/Excavated Areas;
- ◆ Envirocon Project Personnel;
- ◆ Schedule of Operations; and
- ◆ Envirocon Self-Perform Work Scope versus Subcontracted Work Scope.

6.1 Dredging/Excavation Equipment

The following represents a list of the dredging and excavation equipment to be utilized for the work, including Base Scope within the cofferdam enclosure and the Supplemental Scope outside the cofferdam in the Sheboygan River. The equipment listed is on an “or as equal” basis.

Excavate TSCA and Non-TSCA PCB, PAH, NAPL sediments

- ◆ Work Boat (2);
- ◆ Survey Service Boat (2);
- ◆ Dredge/Work Barge (2)—Poseidon barge, 40-ft. by 40-ft; two spuds in back with double drum winch to lift and lower spuds;
- ◆ Transport Barge (5)—Poseidon barges, total 40-ft. by 30-ft. each; each transport barge fitted with two roll-off type containers, 25-CY nominal volume capacity each container (working capacity expected to correspond to approximately 17-CY each), three transport barges operating Base Scope inside cofferdam and two transport barges operating Supplemental Scope outside cofferdam;
- ◆ Excavator - Long Reach Cat 345 fitted with a specialty fabricated environmental bucket; 1.75-CY capacity environmental bucket w/ hydraulic actuated seal (operating Base Scope inside cofferdam);
- ◆ Excavator - Long Reach Kobelco 295, fitted with a specialty fabricated environmental bucket; 1.25-CY capacity environmental bucket w/ hydraulic actuated seal (operating Supplemental Scope outside cofferdam); and
- ◆ Excavation guidance utilizing Dredgepack (2).

6.2 Sediment/Soil Dewatering and Stabilization Means and Methods

While dredging operations are underway for each of the Base Scope and Supplemental Scope dredging operations, the dredge spoils will be placed in water tight roll-off box type containers with two containers placed on each transport barge. The dredging operations will minimize to the extent practicable the amount of water that will be removed with the dredged sediments. EI expects that the amount of water that will be contained in each dredge spoil container will correspond to approximately 40-45% water and 55-60% solids.

EI further estimates that each dredge spoil container will hold a working volume of approximately 17-CY dredge spoils, which is close to 2/3 of nominal volume capacity. This will allow sufficient free-board on the containers to ensure no spillage may occur. Each container will contain approximately 1,350-gal to 1,500-gal of water, including both free liquid and sediment pore-water. EI plans to transport the barges to the off-loading area indicated on Figure 1 for off-loading.

While the transport barges are moved into place for off-loading, some supernatant/decant water will rise to the top of the container. When the transport barge is moved into position for off-loading, the standing decant water in the container (estimated at up to 12-in. depth) will be pumped off using a submersible pump. The decant water will be pumped to the MGP contact water treatment system surge tank for treatment according to the specifications. The conveyance of the decant water to the MGP contact water treatment system is discussed in Section 5.1.

The transport barge dredge spoil offloading location and stabilization pad location for both Base Scope and Supplemental Scope operations are shown on Figure 1. The sediments will be off-loaded and hauled to the stabilization pad for the Base Scope dredging using the following equipment.

Base Scope Operations-- Offload barge and haul to Stabilization Pad

- ◆ Excavator - Long Reach CAT 330DL—with 2-CY bucket; and
- ◆ Dump Truck 15-CY—haul dredge spoils to stabilization pad.

With respect to Base Scope dredging operations, the Long Reach will off-load dredge spoils from the dredge spoil containers and will load dredge spoils into the on-road and/or off-road dump trucks. Spill aprons, plastic liner and Best Management Practices will be used to collect any potential spillage from the off-loading operation. Spill Aprons will consist of plastic liners, supported and sloped for potential spill collection. The aprons can be easily moved, cleaned and maintained. The dump truck operator will haul the dredge spoils for dumping on the stabilization pad.

Supplemental Scope Operations—Offload Barge and directly place on Stabilization Pad

- ◆ Long Reach Kobelco 295—with 1.25-CY bucket;

For Supplemental Scope dredging operations, the Long Reach will off-load dredge spoils from the dredge spoil containers and will load dredge spoils directly onto the stabilization pad. Spill aprons, plastic liner and Best Management Practices will be used to collect any potential spillage from the off-loading operation. The off-loading long reach excavator operator will swing the bucket in an arc downstream of its position so any potentially dripped materials will be maintained inside the silt fence containment area.

Stabilization Pad Operations

At the stabilization pad, the dredge spoils will be decanted, dried and stabilized as necessary before being loaded for off-site transport and disposal (T&D). The dredge spoils will be placed on the stabilization pad, mixed and stockpiled for decanting, drying and stabilization. After the sediment has been initially mixed, EI will again mix and stack the dredge spoils an average of approximately 4-ft. high. Mixing and drying will continue as needed for stabilization of the sediment. The projected daily dredge rate for Base and Supplemental Scope operations is 540-CY of in-place dredge spoils per day. The average storage time for dredge spoils on the stabilization pad will be nearly 4-days. The average daily stabilization rate will correspond to the average daily dredge rate of approximately 540-CY of in-place sediments per day.

EI will air dry the sediments by bucket turning stockpiled materials using a loader. The weight of the stockpile will aid in passive gravimetric dewatering. All decant water (as well as any precipitation contact water) will be collected on the stabilization pad in the sump and will be pumped to the MGP contact water treatment system for treatment. EI expects to add some stabilization reagent to the sediments for strength gain and to meet the 1,600-PSF UCS or 800-PSF shear strength, paint filter, friction angle and slump test requirements. EI proposes to use a relatively granular lime bed ash product known as Calciment™ as provided by Mintek. The bed ash product has approximately 35% to 40% of available calcium oxide content. Calciment has been used successfully for strength stabilization of MGP impacted sediments on other sites. The MSDS for this reagent product is included in Attachment H.

The project schedule of values reflects an average reagent usage for sediment stabilization of approximately 5% wt/wt of reagent to dredge spoils. EI did not perform any treatability testing of Sheboygan River sediments. We have experience using Calciment reagent at a 5% wt/wt additive rate on other similar sediment stabilization projects. EI's experience on similar sediment stabilization projects includes using additive rates for reagents similar to Calciment from 2% up to approximately 15% (for sediments containing higher proportions of NAPL or free-product). EI can not guarantee the final global reagent dose rate required for stabilization of sediments. EI

will work closely with the Engineer to ensure reagent is used optimally and only as necessary to meet project requirements and maintain the proposed production rates to meet the RAWP schedule.

EI also conferred with the Calciment supplier, Mintek, on the efficacy of using 5% average additive rate for this application. Both EI and Mintek agree that according to the sediment characterization data provided, including beneficial proportions of sand where it is encountered and dredged, a 5% Calciment additive rate appears to be reasonable. EI will mix dryer dredge spoils with wetter dredge spoils (and spoils containing higher amounts of NAPL with spoils containing lesser amounts) at the stabilization pad where possible to minimize the usage rate of Calciment.

Since the use of Super Absorbent Polymer (SAP) is not allowed to be added in the dredge spoil containers prior to off-loading sediments, EI may need to add and mix a relatively low proportion of Calciment (e.g. 1-2%) in with dredge spoils in the dredge spoil containers for pre-conditioning. EI would only add this pre-conditioning step using Calciment if needed in order to manage dredge spoils properly during off-loading operations to minimize spillage and cross-contamination.

The Calciment will be delivered to the site in pneumatic tankers and will be conveyed pneumatically to a storage ‘pig’. Alternatively, the reagent will be transported by end dumps and stored in a prepared and tarped reagent storage area. From there, the calciment will be off-loaded and used as needed for strength stabilization of sediments. A tracked skid steer and loader will be used to mix the Calciment in with the sediments in discrete batches. The volumes and weight of discrete sediment batches and reagent usage will be tracked and reported on daily Construction Quality Control Report forms.

To track and optimize the reagent usage, EI will weigh 10 average loader bucket scoops utilizing the loader bucket scale. This will then establish a baseline average weight of reagent per bucket load so that the number of scoops added to the wet sediment batches can be tracked by the loader operator, or a prescribed dosage can be easily communicated to the operator. Ultimately however, the reagent usage will be reconciled against the weigh tickets supplied on Mintek’s bills of lading. At first, and as the sediment type changes, it will be necessary to add reagent by trial and error to establish a mix that works well for passing the aforementioned acceptance criteria for a particular sediment type.

By tracking the bulk density of the sediments and the weight of reagent added to a given sediment batch, the percent by weight addition can be determined and utilized for forecasting purposes. Additionally, the weight of amended sediments leaving the site will be known from

weigh tickets, as will the amount of reagent brought on site. With an average bulk density and volume measurements of the removed sediments, EI will track the weight percentage of amendment required.

EI will ensure that potential dust and odor generation is minimized during reagent mixing operations. Tarps will be used to minimize precipitation water impacts and contribution to MGP Contact Water on the stabilization pad. EI will use tarps, will cover exposed sediments with stabilized materials and will potentially use foam to cover materials for mitigation of potential odors and/or dust generation where appropriate.

6.3 River Access for Equipment Mobilization/Demobilization

The river access for equipment mobilization and demobilization is discussed in Section 4.2 of the Site Management Plan. Where possible, equipment used in-stream will be ‘floated in’, while equipment operating on the shoreline will access the work areas via the site access roads and will deploy from there. The concrete for the buttress construction will be delivered from shore.

6.4 Dredging/Excavation Means and Methods

Dredging means and methods are summarized as follows. The equipment proposed to be used for dredging operations is included in Section 6.1 inclusive for both Base and Supplemental Scope work.

Base Scope Work Means and Methods

For Base Scope Work operations, a Cat 345 Long Reach Excavator, fitted with a specialty fabricated 1.75-CY capacity environmental bucket will be operated for mechanical dredging of sediments. The mechanical dredge will be positioned on a 40-ft. by 40-ft. Poseidon work barge. Two spuds are positioned in back and will be lifted and lowered using a double drum winch when the barge is to be repositioned. The barge will be relocated as necessary when the final dredge cut lines and grades have been verified using the RTK Dredgepack software and additional surveying support. When dredging the NAPL areas, visual confirmation will be used to determine if additional dredging is warranted as directed by the Engineer.

Figure 4 depicts a simplified dredge plan summary for PAH/PCB/NAPL Base Scope dredge areas. When the final dredge surface Autocad figures are Issued for Construction (IFC), EI (GGE) will load the information into the Dredgepack dredge template. EI will load the IFC Autocad into a Trimble surface model to be used for our surveying services. EI may submit these models to the Engineer if desired when generated for informational purposes.

The mechanical dredge and transport barges operate in cycles. The dredge cut is made while minimizing the over-dredge cut depth, generation of turbidity and amount of water in the

environmental bucket. Some free water will be allowed to drain out while the bucket is lifted from the water and before it is loaded into the dredge spoil container. The dredge spoils will be loaded into one of two dredge spoil containers positioned on one of three transport barges. Each dredge spoil container is expected to contain a working dredge spoil volume of approximately 17-CY, or approximately 34-CY for each transport barge.

When both of the dredge spoil containers are loaded on each transport barge, the transport barge will be maneuvered using a work boat to the dredge spoil off-loading area. Another transport barge will be positioned adjacent and tied off to the work barge for loading dredge spoils. EI's approach of using three transport barges (each with a capacity to hold approximately 34-CY of dredge spoils), ensures that one transport barge is being loaded at the dredge area, while another transport barge is being off-loaded at the off-loading location, and the third transport barge is in transit. This will ensure continuous dredging, transport and off-loading operations. The dredge spoils off-loading, sediment staging and stabilization operations are discussed in Section 6.2.

Supplemental Scope Work Means and Methods

The means and methods pertinent to the Supplemental Scope dredging work are the same as for the Base scope work with the following changes.

- ◆ Excavator - Long Reach Kobelco 295—with 1.25-CY bucket;
- ◆ Instead of three transport barges used for transporting dredge spoils, EI will use two transport barges, each with two dredge spoil containers;
- ◆ Instead of off-loading dredge spoils into a haul truck for hauling to stabilization pad, the Long Reach Kobelco 295 with 1.25-CY bucket will off-load dredge spoils directly onto the stabilization pad.

6.5 TSCA Sediment Dredging/Excavation Means and Methods

EI's approach for TSCA impacted sediment removal is to target TSCA impacted sediments and remove them initially before dredging the NAPL or PAH impacted sediments. The removal of TSCA impacted sediments is included in the Base Scope work. The potential for TSCA cross-contamination in all aspects of operations will be minimized. TSCA impacted sediments are maintained separately from NAPL and PAH impacted sediments by dredging TSCA impacted sediments initially only.

The means and methods of dredging TSCA impacted sediments are the same as those for dredging NAPL and PAH impacted sediments discussed in Section 6.4. EI expects the production rate to be lower for TSCA sediment dredging as it will be performed on start-up of operations (i.e. ramp-up). Further, the lower production rate may be due somewhat to greater

dredge precision being taken while dredging TSCA impacted sediments to minimize over dredging and control TSCA sediment volumes for disposal.

Figure 5 depicts a simplified dredge plan summary for TSCA areas. When the final dredge surface Autocad figures are Issued for Construction (IFC), EI (GGE) will load the information into the Dredgepack dredge template. EI will load the IFC Autocad into a Trimble surface model to be used for our surveying services. EI may submit these models to the Engineer if desired when generated for informational purposes.

The TSCA sediments will be staged on the stabilization pad and will be loaded for off-site T&D. TSCA impacted sediments will already be transported off-site before NAPL and PAH impacted sediment are placed on the stabilization pad, thereby ensuring segregation of the different waste streams. If for any reason PRS controlled off-site transportation is slower than projected, EI may need to isolate TSCA sediments on the pad and maintain segregated, while non-TSCA sediment removal actions commence. Equipment will be decontaminated appropriately when TSCA operations are completed and non-TSCA operations commence.

6.6 Dredging/Excavation Sequence of Operations

Shoreline sediments will be excavated in coordination with the buttress support system installation. The dredging operational approach includes the removal of TSCA targeted sediments first which are isolated within the cofferdam. Once TSCA targeted sediments are removed, the remaining NAPL, PCB and PAH impacted sediments will be dredged. EI will self perform the Base Scope dredging operations using our own barges.

EI will self-perform the Supplemental Dredging concurrently with the critical path mechanical dredging operations, which will not add duration to the project schedule. The Supplemental Scope dredging operation will be a completely independent operation to and running concurrently with the Base Scope dredging operation. The RAWP Project Schedule indicates the progression and sequencing of dredging operations. Regarding Supplemental Scope work, McMullen and Pitz will supply a working barge and one transport barge and push boat. EI will supply the Flexi-floats comprising the second transport barge

When dredging operations begin, the 40-ft. by 40-ft. dredge barge will be pushed from the dock to the dredge site, positioned over the dredge prism, and anchored into position with spuds. Dredging will commence at one edge of the prism and proceed to the full cut depth from the starting edge to the completion edge for each dredge prism.

The supplemental work scope for PAH sediment excavation outside the cofferdam will be integrated with the PCB dredging already in progress by PRS. The supplemental scope bid

quantities did not reflect the volume of PAH sediments that PRS may remove during their PCB dredging. The Engineer will use Envirocon's pre-dredge survey outside the cofferdam, in combination with Engineer's dredge model, to determine where dredging depths/volumes may need to be adjusted. Pre-PAH dredge sampling (i.e., post-PCB dredge sampling) will also likely be performed by the Engineer. It is possible that certain Supplemental Scope dredge areas may require backfilling with no dredging. This may be the appropriate course of action where PRS has already removed PCB materials that overlie PAH materials.

6.7 Containment of Sediments and Residuals in Water Column

For Base Scope work, dredging operations will be conducted within a temporary sheetpile cofferdam, thereby isolating the dredge operations from the Sheboygan River. EI will use Best Management Practices (BMP's) to minimize the generation of turbidity and the re-suspension of sediments while dredging and capping operations are underway.

Suspended solids and turbidity will be further contained in the active dredging and capping work areas by using a working turbidity curtain for Base and Supplemental Scope work. The working curtain is affixed stationary to the work barge and will help contain suspended solids and turbidity directly within the water column of the active work area. Turbidity monitoring for the Base Scope and Supplemental Scope work will be conducted by the Engineer outside of the cofferdam to verify turbidity criteria of less than 70-ntu above background is maintained. The Engineer will also periodically monitor turbidity levels inside the cofferdam and provide results to EI for engineering analysis and confirmation of controls.

These BMP's will be used for both Base and Supplemental Scope dredging operations. If necessary in order to maintain allowable turbidity levels, engineering analyses may be conducted and corrective measures implemented to maintain allowable turbidity levels. Corrective measures may include for example operator control of environmental bucket, the manner in which free water is allowed to drain, cycle times, manner of placement of backfill materials, etc. EI will work closely with the Engineer when performing these types of analyses and implementing potential corrective measures.

Equipment will be decontaminated at the completion of dredging and excavation operations and before backfilling operations will be undertaken and/or demobilization. If practicable, decontamination operations will be conducted on the barges and/or on the shoreline, while decontamination water is collected and pumped to the MGP contact water treatment system for treatment.

6.8 Dredging/Excavation Production Rates

The proposed dredging equipment is discussed in Section 6.1 while dredging means and methods are summarized in Section 6.4. The production rate analysis incorporates those sections by reference. For Base Scope dredging operations, EI has evaluated dredge cycle times and time to load the two dredge spoil containers on each of the three transport barges. With a dredge cycle time for each dredge bucket requiring approximately 90 seconds, and including barge movement inefficiencies, EI has concluded that each transport barge (with approximately 34-CY capacity) will be loaded in approximately 45-min. EI has also estimated that the off-loading of one transport barge (approximately 34-CY capacity) will similarly require approximately 45-min, including the time needed for removal of decant water.

Given a potential 12-hr. shift from 7 am to 7 pm, we have assumed at least 10-hr. operating time is available per day including available sunlight as the season progresses. With an estimated system availability (up time) of approximately 80%, EI has estimated our daily dredging production rate of NAPL and PAH impacted sediments at approximately 340-CY of in-place dredged spoils per day for Base Scope dredging operations. Additional potential system inefficiencies are included in the analysis.

As indicated in Section 6.5, the TSCA impacted sediments will be removed first during dredge operational start-up. EI anticipates the daily dredge rate for TSCA impacted sediments to correspond to approximately 200-CY per day. For the Supplemental Scope independent and concurrent dredging operation, EI estimates that while using two transport barges for dredge spoil transport and off-loading, the daily dredge production rate will correspond to approximately 200-CY per day. Therefore while Base and Supplemental Scope dredging operations are on-going, the daily dredge production rate is expected to correspond to approximately 540-CY per day.

6.9 Haul Truck Loading

From the stabilization pad, the sediments which are verified to meet the disposal criteria will be loaded onto haul trucks for off-site transport and disposal. TSCA sediments will be sampled, analyzed and confirmed before loaded for transport to EQ. A 2-day analytical turn around time is assumed for receipt of analytical results for TSCA sediments. The paint filter test as well as UCS/shear strength criteria (using a calibrated pocket penetrometer) will be verified before loading both TSCA and non-TSCA materials. TSCA trucking is provided by PRS. Generally, PCB analysis will be conducted on non-TSCA sediments at a rate of one sample per 5,000-CY. EI expects this characterization will be performed on a “rolling basis” so that a four day sediment retention time on the stabilization pad will be sufficient.

The loadout of stabilized sediment to transport occurs at the access road / stabilization pad interface. The 4-CY loader will side load the 23 ton capacity trucks (quad axle). The truck will pull forward and engage the tarp system. The truck will be inspected and dry decontaminated as needed. A Manifest will be provided to the driver for Veolia landfill for all non-TSCA material. EI expects to load and ship approximately 36 trucks per day.

The haul trucks will be tarped and decontaminated before egressing the site. A haul plan using the preapproved haul routes will be developed and confirmed with the Engineer for routing through local streets. The site haul traffic will use the access roads indicated on Figure 1. A bucket scale will be used to optimize truck loading weights. During all staging and loading operations, potential odors will be controlled by using RUSMAR foam spray application on exposed sediment surfaces as necessary.

6.10 Debris removal

EI anticipates some debris will be encountered during the cofferdam installation. We expect some trees have settled in the cofferdam alignment. During cofferdam installation, McMullen and Pitz will remove the trees and any other debris encountered as required. EI will manage debris on the upland staging areas. EI assumes that removed debris will be classified as Subtitle D material and will be sized and transported appropriately meeting the landfill criteria.

Some debris is expected to be encountered during dredging operations. The environmental bucket will be used to extract the debris in advance of the dredge cut where practicable. While the ‘flapper’ that is attached to the environmental bucket isn’t as sturdy as a regular thumb, the dredge operator will curl the bucket under the debris and use the flapper to hold it in place for extraction. EI does not anticipate the need to use a grapple for debris removal, but if an inordinate amount of debris were encountered, the excavator is plumbed so that the environmental bucket/flapper could be removed and a grapple could be installed. The debris will be managed and disposed as referenced above.

6.11 Meeting Dredge Depth and Tolerance

The dredge depth and tolerance criteria will be continuously met and verified. Qualified dredge operators with experience using GPS Real Time Kinetics (RTK) equipment will help ensure compliance with requirements. The excavators for both Base and Supplemental Scope work will be fitted with the Dredgepack RTK GPS software. The software allows the dredge operator to maintain and confirm his dredge cut position relative to horizontal and vertical alignment coordinates. The dredge operator’s objective is to meet the dredge template lines and grades in an efficient manner, while minimizing extra dredge cut volume due to over-dredging or having to re-dredge a potential “high” area.

EI together with Etrac Engineering support and verification will create the dredge templates for TSCA and non-TSCA dredge surfaces for Base Scope as well as the dredge template for the Supplemental Scope sediment removal areas. The dredge templates will be generated using the IFC Autocad figures of the dredge lines and grades to be issued by the Engineer. Etrac will install and integrate all position/motion sensors on the excavators with Dredgepack and associated RTK-GPS antennae. The EI GPS base station will support both the Dredgepack systems and the RTK-GPS bathymetric survey.

During dredging operations, the EI surveying and dredging teams will work together to provide real-time topographic survey data of the area being dredged utilizing RTK in conjunction with Dredgepack software. This real-time information will be displayed on a monitor mounted in the dredge excavator cab to provide a visual reference for the operators and will be used to guide the excavation. The Contractor will provide staffing for surveys, calculation of dredged volumes from the QC survey and generate daily reports.

On the dredge barge, position and depth of dredging will be determined using RTK for real-time x, y and z coordinate control. Calibration of instruments will be confirmed once daily or as needed to verify position. One RTK GPS unit will be mounted on each dredge excavator and the correction signal will be broadcast by the base station located on shore. This will provide x, y and z coordinate corrections to the dredge.

The RTK information will be transmitted to the Dredgepack software program where in real time the excavator operator will see the digging elevation of the bucket as well as its x and y position. Information recorded in the Dredgepack software will be downloaded for the generation of dredge reports and will become part of the projects records.

The software provides real time confirmation to the operator that the dredge tolerances are being met. The data is also downloaded for confirmation of target dredge template lines and grades and in-place sediment volumes removed. The dredge lines and grades are confirmed by bathymetric survey as discussed in Section 6.12.

The Dredgepack software will provide the dredge operator a plan, cross section and front view of the dredging operations on a monitor located in the excavator cab. The dredging monitor will show the following:

- ◆ The plan view showing the progress of the dredging in a color matrix of the elevations with planned cuts displayed on the screen. As the excavator bucket passes through an area and removes sediment to the designed cut lines, the area is “painted” and the operator knows to stop dredging.

- ◆ The cross section and front view showing when the dredge has reached the designed dredging depth.

Specification sheets for the hardware that will be used on the dredge excavators are included in Attachment F, Dredge Positioning Information. Vertical Accuracies of the GNSS RTK GPS are listed in the specifications provided. The inclinometers are accurate to 0.08 degree, using similar equipment on previous projects; accuracies in the 0.1-ft range in the vertical were achieved. Using the Dredgepack Software, measurements for boom, stick and bucket are entered prior to calibration. For the best results, measurements from pin to pin are done with a total station. Similarly, once the measurements are entered and the bucket is calibrated in Hypack (XYZ of the middle of the Bucket Cutting edge) RTK Rover is used to confirm the values in Dredgepack which will match that of the Rover/Data collector within the 0.1-ft. range.

Also contained in Attachment F is a Hypack application note describing GPS/sensor hardware, offset measurement and system calibration techniques. This is a 2009 document and some drivers have been updated, but the procedures remain the same.

QA and QC surveys will be taken from the dredged areas to verify that the actual dredge cuts are consistent with those reported by the Dredgepack software. Daily QC surveys will be performed to ensure accuracy and/or make any adjustments to the dredge depth as necessary. The daily QC surveys will be run as soon as possible after the dredge has cleared the digging area and will be used to determine dredge volumes for confirmation of the Dredgepack results. QA surveys will be conducted to generate an isopach map which will show that the area meets or exceeds the required elevations. Survey elevations and state plane coordinates will be derived from the on-site control points established by Aero-metric.

The methods used for QA and QC surveys will largely be the same. Single beam sonar will be utilized (or rover with 1 square foot topo shoe/disk if conditions warrant), with transects located between 10 and 25-ft. apart and according to EM1110-2-1003. The Engineer need not be present during QC surveys, however, the Engineer will observe the QA surveys. The QA surveys are used for measurement and payment. The QC surveys are used to:

- ◆ Guide the excavation and ensure the operators are working correctly and the equipment correlates; and
- ◆ Track progress (grade, volume or other progress).

Until an area is confirmed to grade, the shots taken on it do not constitute a QA survey. EI must provide 24-hours notice to the Engineer before performing a QA survey. The pre-dredging survey will be a QA survey. After an excavation area is to depth, EI will perform the QA survey.

The points taken while helping guide or track an excavation constitute a QC survey. The data quality will be the same for both as the equipment and methods are the same. The QA data will be used to generate the as-built surfaces. The QA surveys may still be frequent, particularly since the "grids" (as identified in the plans) are small. So as soon as one of these "grids" is to grade, EI will provide notice to shoot the QA survey of that area.

6.12 Bathymetric Surveys

Methodology

EI proposes to use the principal of Green Globe Environmental, Inc. (GGE) Mike Beardsley for bathymetric survey support and RTK GPS set up and interface with EI and Etrac Engineering. During mobilization, Site Project Control will be established by Aero-metric, with input from EI and GGE personnel. After this control is established, the base station will be set up within the EI field office trailer (or other location as field conditions warrant). Next, the site calibration file is created on the Trimble TSC2, by taking control grade survey shots at the Aero-metric established control points. This base station and calibration file will be available for any other parties wishing to utilize compatible survey equipment on the project.

The TSC2 can then be utilized with the sonar, the GPS rover, and the robotic total station. It is anticipated that Trimble SCS 900, a software package on the TSC2 will be utilized to collect the survey data, regardless of instrument attached to the TSC2. This software will work with the sonar, the robotic total station, and the RTK GPS. EI/GGE have supplied two supplemental software packages on the TSC2 (Sonarmite and Trimble Survey Controller) should field personnel prefer to utilize those programs to collect the data. All three programs collect survey grade data, but simply have different user interfaces, which different individuals tend to prefer over one another. It will be necessary to switch between instruments during the course of the project as the dredging progresses. For example, in removal areas under the Pennsylvania Avenue Bridge, it is anticipated that RTK GPS will not work, therefore the Robotic total station will be utilized individually and jointly with the sonar to perform the survey work in this area. If necessary, EI will interact with the Etrac Dredgepack installation crew during their installation process and provide any RTK GPS or base station setting information which they may need.

Immediately after the project control, base station and data collector are set up, EI/GGE will perform the initial pre-construction topographic and bathymetric survey to establish the original ground model on both the upland and water areas. This data will be submitted to the Engineer and Owner. This data will be supplied electronically in AutoCAD Civil3D 2011 format as specified, as well as neatly compiled into a PDF exhibit. Next, EI/GGE will place the excavation and original ground models onto the TSC2. These same models will be provided to Etrac Engineering for conversion and installation into the Dredgepack equipped excavators. This will

make it possible to determine in real time the cut or fill to the designed limits and realtime cut or fill from the original ground surface in both the excavators and the survey rovers.

Proxy software will be utilized to allow for remote project support and computer access from others at Etrac Engineering or GGE to assist onsite EI/GGE employees with model changes, data downloads, or other assistance that may be needed on either the Dredgepack excavators or the TSC2.

Given the size of the excavations and the potential for sedimentation or scour, particularly in the supplemental dredging areas, frequent confirmation bathymetric surveys will be conducted as the dredging progresses. Daily QC bathymetric survey will be conducted to ensure that the dredgepack excavators and the sonar based rover are both reading accurately and cut/fill data align between the two systems. Additionally, as soon as practicable after a defined dredge area is excavated to the prescribed limits, the QA bathymetric survey will be conducted with GGE and NRT personnel.

Equipment

GGE will supply a Hydrolite single beam sonar and a 14' aluminum boat, with a 25 HP motor. EI will provide a cleaned Trimble TSC2 with SCS900, Sonarmite, and Survey Controller software packages on the data collector, a GNSS enabled Rover (Trimble R8 or construction grade equivalent SPS 881), as well as the GNSS base station (SPS 850 extreme, with a Zephyr Model 2 (non-geodetic receiver). The base station will broadcast at both 450 and 900 mhz. A Trimble Trimark 3 will broadcast the 450 mhz signal, while the SPS 850 extreme will broadcast the 900 mhz signal. This will ensure that the base station is available for use by all anticipated RTK GPS systems at the site.

The GNSS capability will help ensure the greatest degree of accuracy, precision, and limited down time associated with satellite coverage and DOP at the project. Should satellite coverage become problematic, the robotic total station can be utilized during this time to keep operations on pace. This same technology may be utilized when the rover and sonar are in areas that may have difficulty receiving the GPS signal or accessibility may require the prismless technology.

The Precision of the sonar is 1 cm or 0.1% of depth, (whichever is larger). While 0.1% of 8-ft. (assumed as high-end depth for the project) is 0.008 feet, the random error in the sonar is 0.03 feet. Accounting for the random error in the GPS (we're using a Trimble R8 rover, as stated to be +/- 10mm +/-1ppm RMS in the Horizontal for RTK, and +/- 20 mm +/- 1ppm RMS in the vertical for RTK), the overall accuracy achievable should be about +/-0.1-ft. The greatest source of error with the sonar is not calibrating the sound velocity. EI will calibrate the sound velocity daily as follows.

The Rover will be checked into a control point. That ensures the GPS or robotic total station component is fully functioning. Then a grade rod (or weighted tape) will be placed on the river bottom in a spot and the depth will be measured. The sonar's sound velocity will be calibrated to read the same depth through a representative water column. Factors affecting the sound quality in fresh water include water temperature (or density of the water) and turbidity. This bias is removed by calibrating the sonar sound velocity, leaving only the random error, which should be less than 1-cm on this project. The robotic total station (SPS 730) has an accuracy of 5 arc seconds in the horizontal and 2 arc seconds in the vertical. This is more accurate than RTK GPS.

Bathymetric Survey Procedures

- 1) GGE will setup a GNSS enabled Trimble RTK GPS Base Station at the construction trailer near the active operation. This base station will provide position data for all surveying equipment at the Site, including the Hydrolite rover and the Dredgepack equipped excavators. It is also available for any other parties to use so that multiple base stations need not be deployed at the Site.
- 2) Etrac will set up the dredging excavators with Dredgepack and GPS positioning system equipment. This system is an indicate-only system that provides real time position data to the operator in the cab. It has several pitch sensors that mount onto the excavator, along with GPS receivers to determine the position of the bucket. It works similar to GCS 900, to which both GGE and EI have extensive knowledge, but the software in the cab is different than the GCS 900 software, while still providing the same functional data. Models (Dredge Prism) will be created which then allows the system to compare the current position to the modeled position and inform the operator of the cut or fill needed to get to the designed position. Lastly, the data will be captured from the cab of the equipment and downloaded to other formats such as CAD.
- 3) GGE will set up a surveying boat. The boat is a 14-ft. aluminum boat. A boat will be dedicated for survey operations for each the Base and Supplemental Scope work. Next, the Trimble R8 RTK GPS Rover, with a TSC2 data collector and SCS900 software will be mounted to the side of the boat. Next the Hydrolite package is installed, which consists of a sonarmite single beam sonar and mounting system for the sonar and rover. The sonar fits at the end of the rover pole, much as a topo shoe would be installed. The Sonar and the Rover antenna then connect to the TSC2 via Bluetooth signal. The Rover antenna receives correction data from the base via either a 450 MHZ or 900 MHZ radio. The rod height between the rover receiver and the sonar is known and fixed. The pings from the sonar determine a depth which is then added to the rod height (automatically with the software).



The actual X, Y, and Z of the point just pinged is then known and can be recorded, just as with other traditional GPS or robotic total station topographic methods. According to the manufacturer, this system meets the requirements of EM 1110-2-1003. Just as with Dredgepack, the TSC2 will contain models of the design strata, allowing the surveyor to determine in realtime whether a particular area is to grade or not. Comparisons to multiple surfaces can be made, while still collecting record data at the density specified. So if the oversight would like to know the cut or fill from original ground while collecting a point, that is possible, or if the cut or fill to the designed strata is what is desired, that too can be displayed while displaying the current positional data.

- 4) Should sonar methods be impractical due to the water depth being too shallow, the sonar is simply removed and a large 1-ft diameter topo shoe placed onto the rover and then conventional readings can be captured using the rover in a standard topographic configuration. As noted above, the TSC2 data collector with SCS900 software is capable of capturing this data from multiple equipment setups, including the sonar setup, GPS set up, and robotic total station configuration.
- 5) Data from the TSC2 is then downloaded to a Laptop with Autodesk Civil 3D 2011. The data is then placed into layers and used for building surfaces for further analyses. (Sonar Vista will not be utilized as Autodesk is not only a project requirement, but also the software to which GGE is accustomed).

6.13 Means and Methods for Backfilling Dredged/Excavated Areas

EI has developed an approach for backfilling excavated and dredged areas. The following equipment is anticipated to be used for in-stream backfill of sand and gravel layers and general backfill.

In-stream Backfill

- ◆ Work Boat
- ◆ Work Barge—Poseidon barge, 40-ft. by 40-ft; two spuds in back with double drum winch to lift and lower spuds;
- ◆ Transport Barge (3)—Poseidon barges, total 40-ft. by 30-ft. each; each transport barge fitted with two roll-off type containers, 25-CY nominal volume capacity each container (working capacity expected to correspond to approximately 17-CY each);
- ◆ Excavator - Long Reach Cat 345 fitted with a specialty fabricated environmental bucket; 1.75-CY capacity environmental bucket w/ hydraulic actuated seal;
- ◆ Placement guidance utilizing Dredgepack; and
- ◆ Excavator - Long Reach CAT330DL —with 2-CY bucket.

When directed by the Engineer based on confirmation sampling and analysis, specific areas dredged will be capped with a 1-ft. thick layer of sand followed by a 1-ft. thick layer of gravel. The backfill operation means and methods will essentially be the reverse of the dredge operations. The same equipment will be used as was used during the dredging operations. Prior to capping operations, the equipment will be decontaminated after dredging operations.

The sand or gravel will be imported to the site and temporarily staged near the transport barge off-loading location. From here, one of the transport barges which each contain two dredge spoil containers will be loaded with the sand or gravel backfill material using the CAT 330DL Long Reach excavator. Each container will be loaded to approximately 17-CY capacity (34-CY total capacity per transport barge). Each transport barge will be maneuvered to the capping location. When the transport barge is tied off to the work barge, the CAT Long Reach 345CL Excavator will access the material from the container, and will slowly spread it in the water column where the cap is placed. EI expects an average in-stream backfill production rate will correspond to approximately 200-CY per day.

EI expects up to a 2-minute cycle time will be required for placing the capping materials for each bucket. The bucket will be placed in the water column and slowly released in a sweeping motion to spread the backfill materials. The bucket GPS will be used to verify real-time the backfill placement tolerances as operations are proceeding. Where the material elevation is verified to be too high, the bucket will be used to even out the material elevation. A rake attachment may also be utilized to help make the cap surface more uniform in elevation. Real time probing and bathymetric survey will be performed to confirm backfill placement tolerances are continually met.

Furnish and place general backfill

EI will import and place approximately 6,000-tons of common fill. EI will place the shoreline and bank general backfill from above the bank (upland) using a CAT330DL Long Reach Excavator. EI anticipates to backfill the bank general fill at a rate of approximately 300-CY per day.

6.14 Envirocon Project Personnel

EI's proposed key project personnel are listed in Section 2.0 of the RAWP.

6.15 Schedule of Operations

The RAWP Project Schedule including salient points and schedule reference is discussed in Section 3.0 of the RAWP. EI will operate 7 am to 7 pm Monday through Friday. EI may request some Saturday work if necessary to make up schedule lost due to weather or other circumstance.

6.16 Envirocon Self-Perform Work Scope versus Subcontracted Work Scope

EI will self perform the majority of the work at the Campmarina project. The only major work scope items to be subcontracted include the following specialty work scope:

- ◆ Cofferdam installation, marine support for Gillen, and marine support for EI (supplemental dredging)—McMullen and Pitz;
- ◆ Buttress support system installation, including divers when necessary—Edward E. Gillen, Co.;
- ◆ MGP Contact Water Treatment System—Baker Corporation;
- ◆ Offsite Transport – Spielvogel & Sons Exc., Inc.;
- ◆ Bathymetric survey support—Green Globe Environmental;
- ◆ Geosynthetic installer for the stabilization pad and Waterloo containment cap repair—GSI;
- ◆ Paving for stabilization pad-- TJ Asphalt; and
- ◆ Registered land surveyor to establish control points-- Aero-metrics.

7.0 SITE RESTORATION

The following contains some brief references to the salient points regarding site restoration.

7.1 Partial removal of Waterloo Barrier Support System

The top of the pipe pile will be cut off at elevation 581 during shoreline backfill.

7.2 Repair/Replace Geosynthetic Cover

The geosynthetic cover that was exposed and protected during excavation will be laid in place and any damage will be repaired.

7.3 Replace Salvaged Rip Rap on Shoreline

As the shoreline soils are backfilled, brought to grade and compacted, the riprap previously salvaged will be installed. Supplemental riprap will be added as needed.

7.4 Removal of Temporary Sheetpile Cofferdam

Upon completion of bathymetric survey, confirmation sampling and backfill as directed by the engineer, the sheetpile cofferdam will be removed, decontaminated and demobilized.

7.5 Removal of Upland Site Support Areas

Site support areas including the office parking, access roads, construction entrance, decontamination pad, and sediment stabilization pad will be removed and transported to the proper disposal facility. Erosion controls will remain in place until the revegetation is complete in the spring of 2012.

7.6 Replacement of Boat Docks

EI does not anticipate replacing any boat docks.

7.7 Replacement and Repair of Utilities

The walkway lights scheduled for removal will be replaced and all temporary utilities removed.

7.8 Grass Restoration

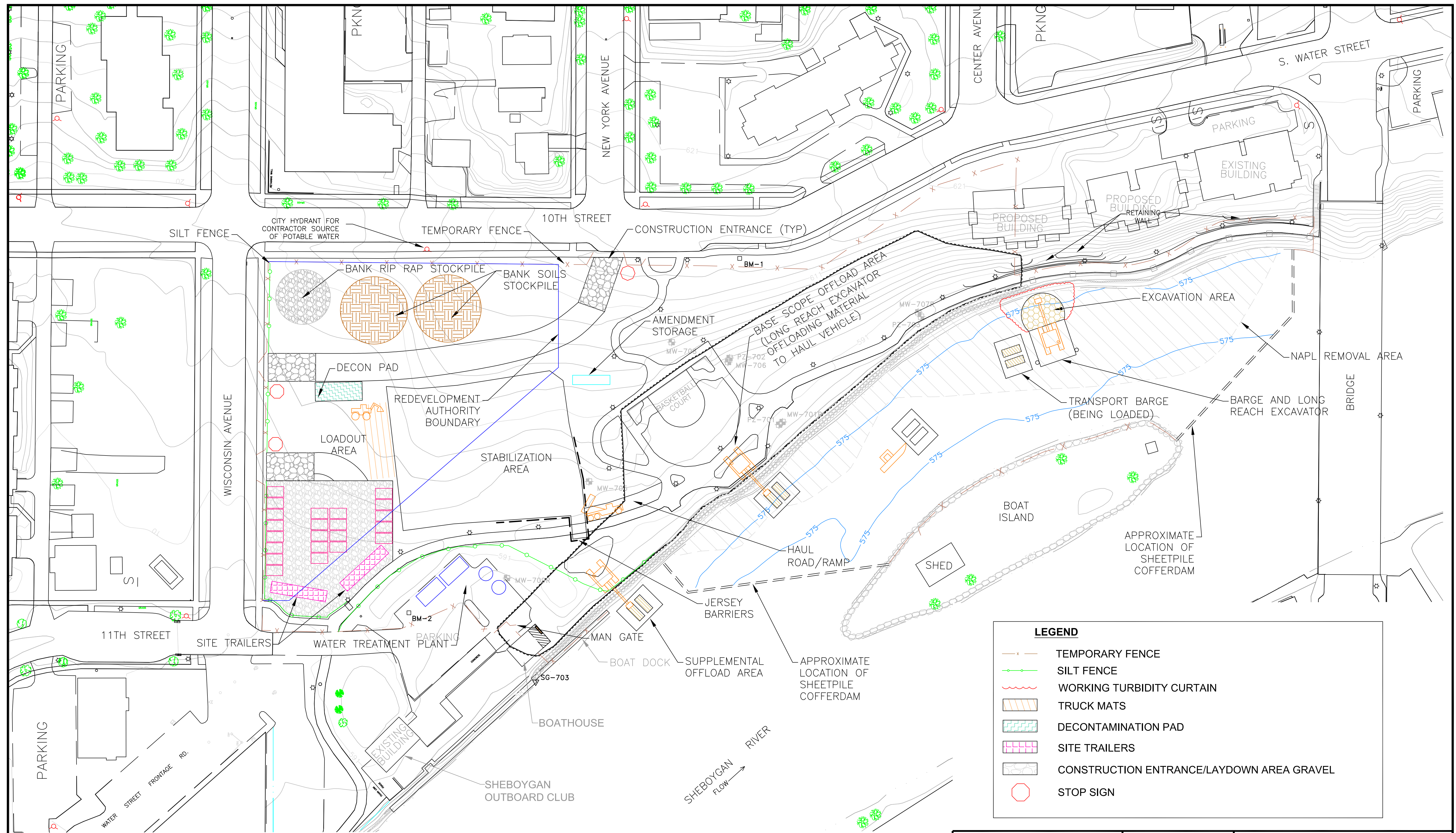
EI anticipates preparing and hydro-seeding approximately 4-½ acres of the park in the spring of 2012.

8.0 SITE SPECIFIC HEALTH AND SAFETY PLAN

The EI Site Specific Health and Safety Plan is included in whole under Attachment G. It is followed with the listing of several Activity Hazard Analyses (AHA's) that are germane to the initial work to be conducted. Subsequent AHA's will be generated previous to the respective work tasks to be performed with review by appropriate management and oversight personnel and crew members.

FIGURES

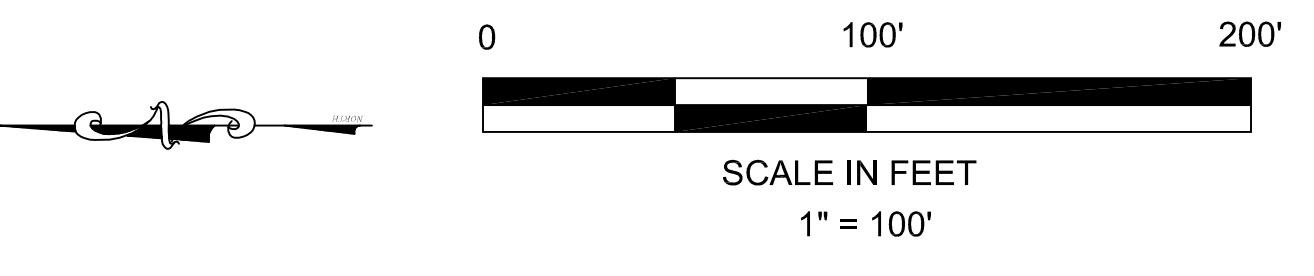
**FIGURE 1.
SITE & TYPICAL DREDGING PLAN**



LEGEND

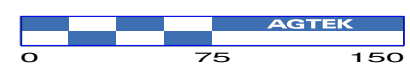
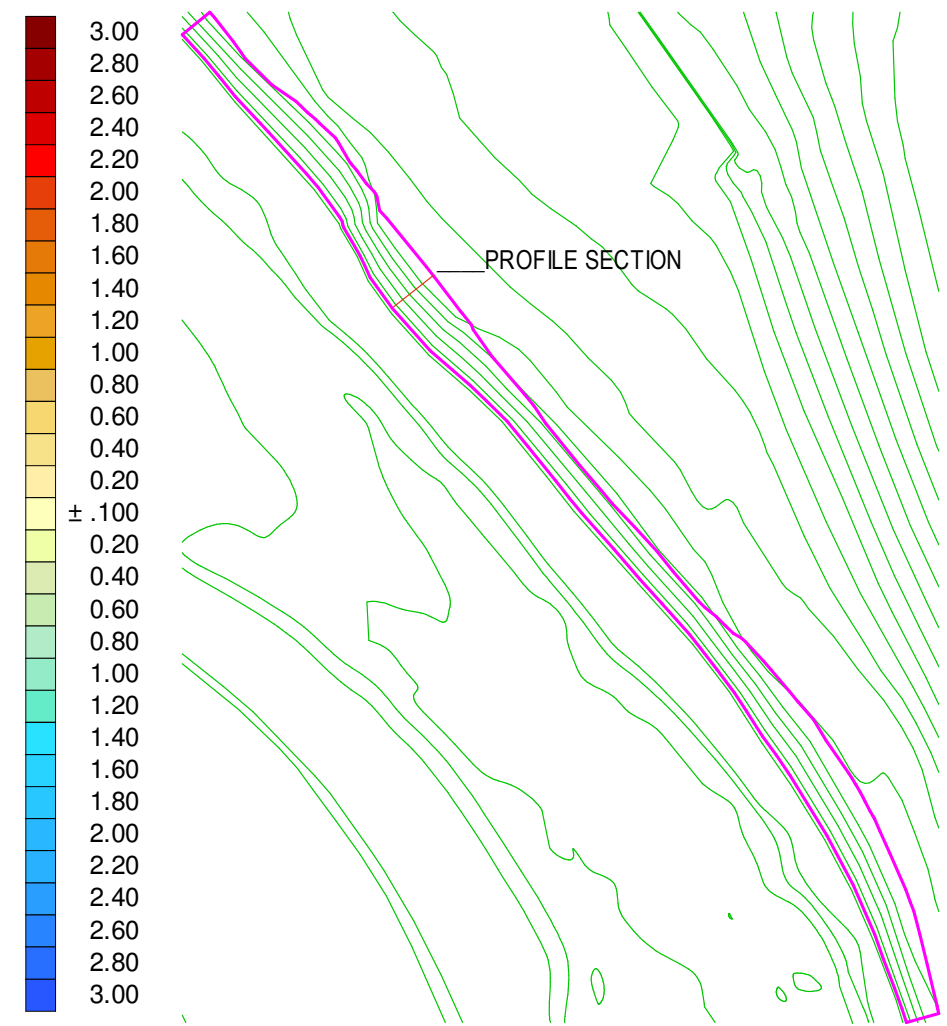
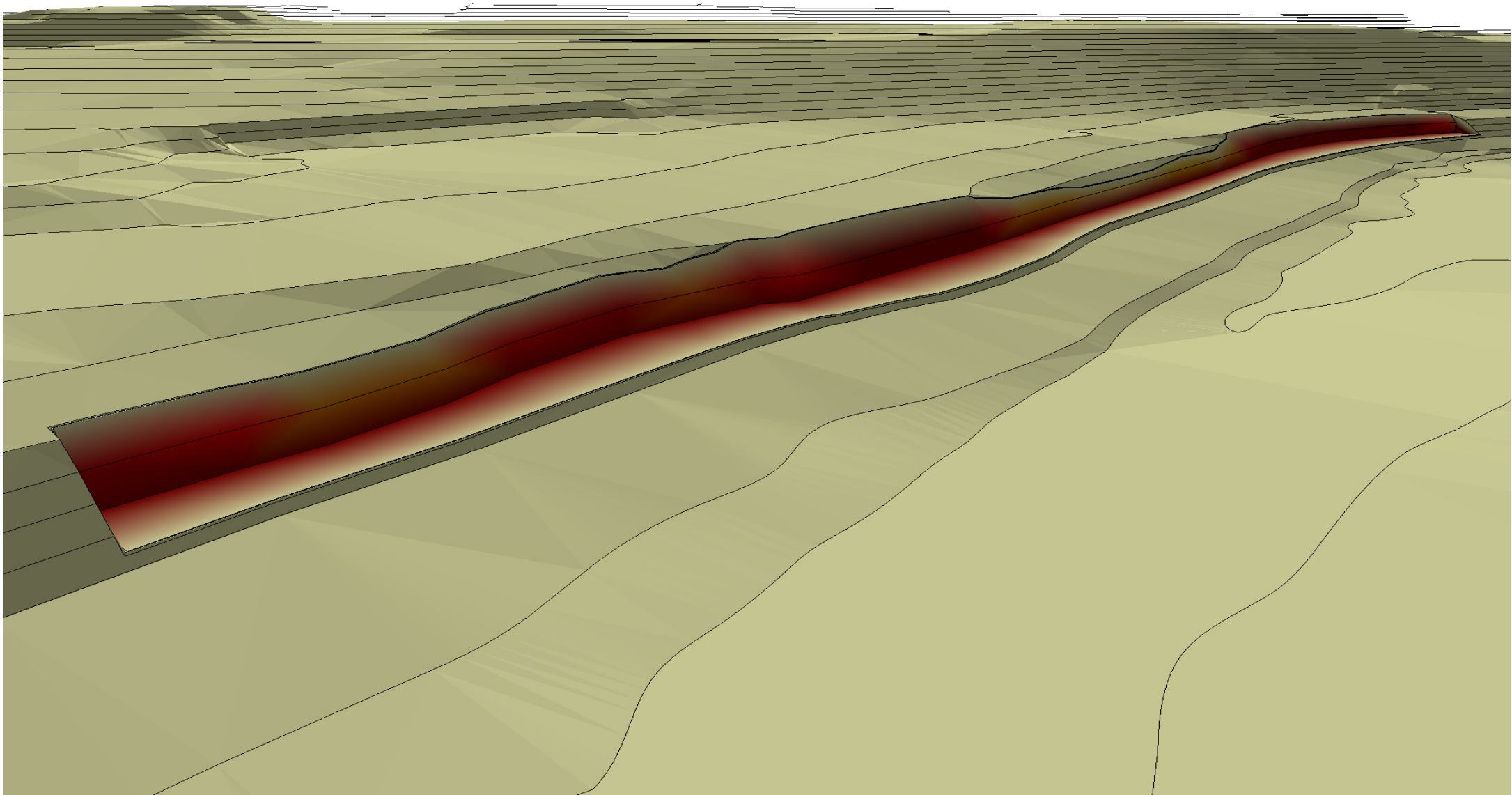
- TEMPORARY FENCE
- SILT FENCE
- WORKING TURBIDITY CURTAIN
- TRUCK MATS
- DECONTAMINATION PAD
- SITE TRAILERS
- CONSTRUCTION ENTRANCE/LAYDOWN AREA GRAVEL
- STOP SIGN

- NOTES:**
- BARGE TO REMAIN APPROXIMATELY WITHIN CONTOUR ELEVATION 575' PRIOR TO EXCAVATING SHALLOW AREAS.
 - EXCAVATION TO PROCEED FROM THE WEST (ISLAND AREA) TO THE EAST (RIVERBANK) AND FROM NORTH TO SOUTH.
 - ILLUSTRATED SITE FEATURES ARE APPROXIMATE AND MAY VARY BASED ON FIELD CONDITIONS.



<p>651 Corporate Circle Suite 114 Golden, Colorado 80401</p>	DES AB	SITE & TYPICAL DREDGING PLAN
	DWG TM	
	CHK AB	PROJECT # 8108
	06-13-2011		Figure 1

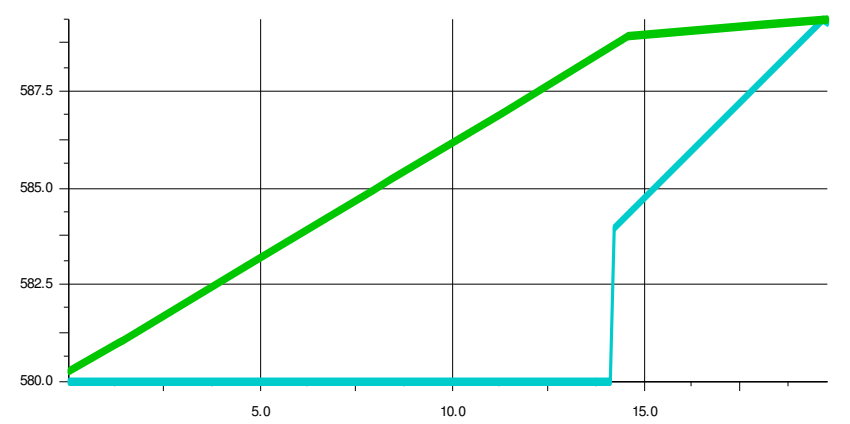
**FIGURE 2.
INTERMEDIATE WORK BENCH
CONSTRUCTION**



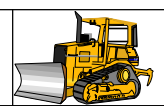
Job: CAMPMARINA-WORK BENCH (04)
 Units: Ft-CY
 Tue May 03, 2011 09:30:15 Page 1

Volume Report
Design vs. Existing

Job Site	Total		Area		Volume		Comp/Ratio		Compact		Export Change	
	Cut	Fill	OnGrade	OnGrade	Cut	Fill	Cut	Fill	Cut	Fill	-Import	Per .1 Ft
Job Site	7,576	7,346	7	223	795	0	1.00	1.00	795	0	795	28

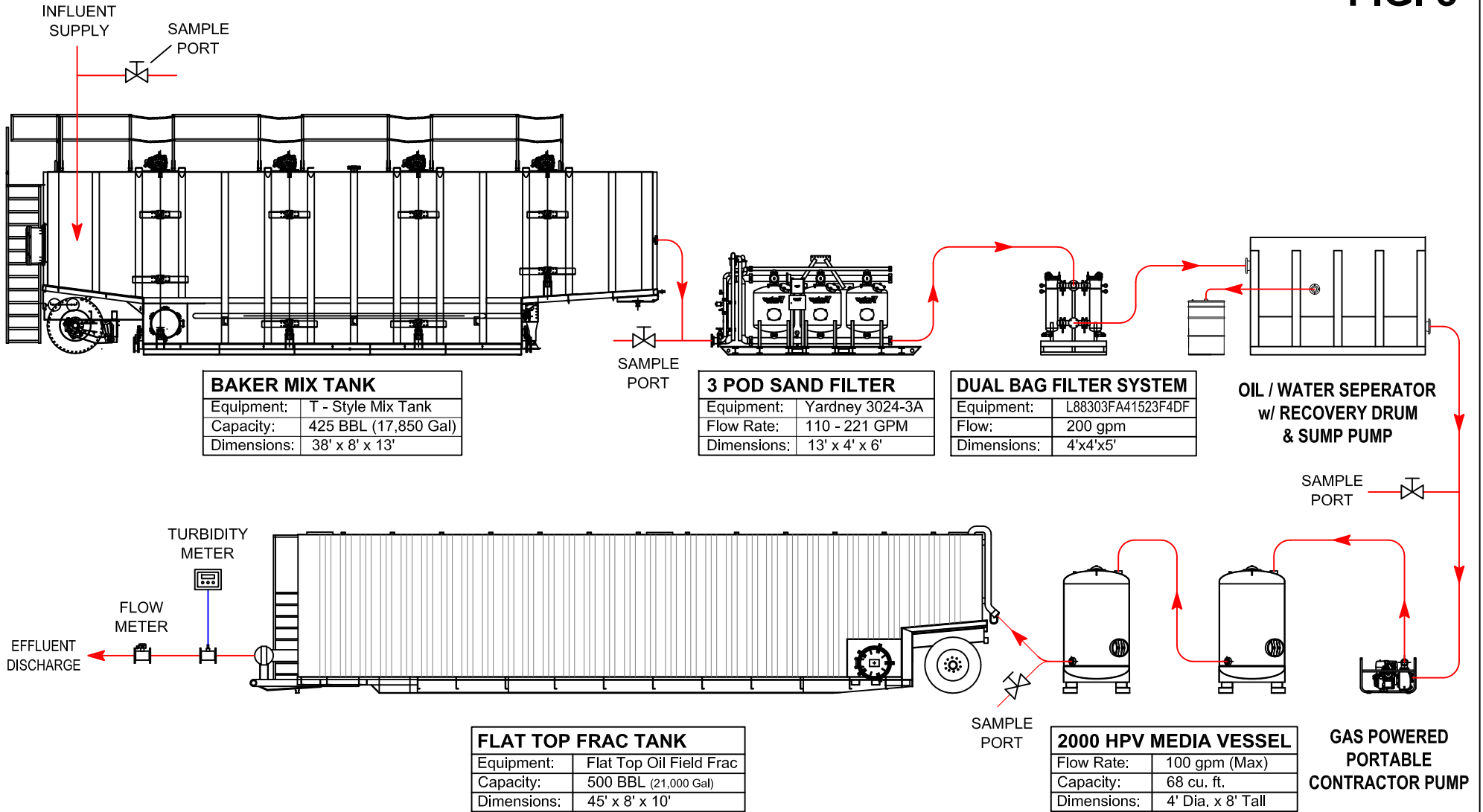


GREEN - EXISTING CONDITIONS
 BLUE - INTERMEDIATE WORK BENCH
 VERTICAL EXAGGERATION = NONE



**FIGURE 3.
FILTRATION PROCESS FLOW DIAGRAM**

FIG. 3



The information presented on this drawing is for informational purposes only. Use of this drawing is not a replacement for a professional engineering evaluation of the application. This drawing is intended to show preliminary equipment requirements and arrangement and is in no way a replacement for a thorough engineering review of the application at hand. A representative of the customer or end user should always conduct the final evaluation of the application. That representative, and not BakerCorp Inc., or its employees and representatives, is responsible for the final engineering design and performance of the application.

No warranty is provided or implied, including any warranty of fitness for a particular purpose. As such, the customer agrees that by using the suggestions shown on this drawing, you assume the risk of all loss or injury resulting from any information found within. In no event shall BakerCorp, or any representative or agent thereof, be liable under any theory based in contract, negligence or strict liability or any other legal or equitable theory to any party for any amounts including, without limitation, lost revenues, lost profits, lost business or indirect, consequential, incidental, special or punitive damages. This disclaimer shall survive any and all notices advising of the possibility that any user may suffer harm from any inaccuracies contained herein.

The designs, information and data contained herein is proprietary and is submitted in confidence and shall not be disclosed, used or duplicated in whole or in part for any purposes whatsoever without prior written permission from Baker Corp. This document shall be returned to Baker Corp. on its demand. Receipt of this document shall be deemed to be an acceptance of the conditions specified herein.

TOLERANCE:
 Fractions: +/- 1/16
 Decimals: .X X +/- 1/16
 .XXX +/- 1/32
 Angles: +/- 0°30'
 Bends: +/- 2"

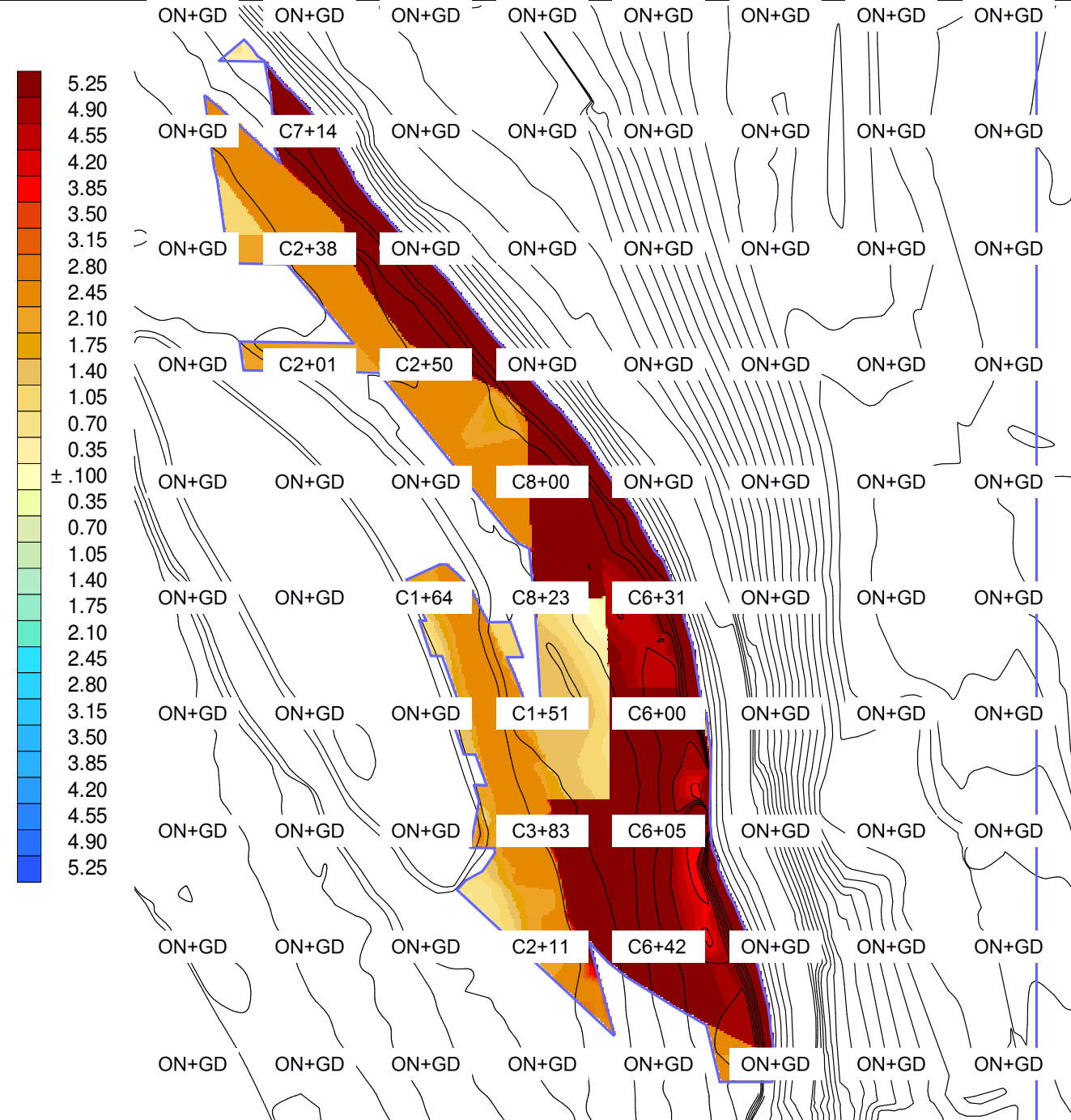
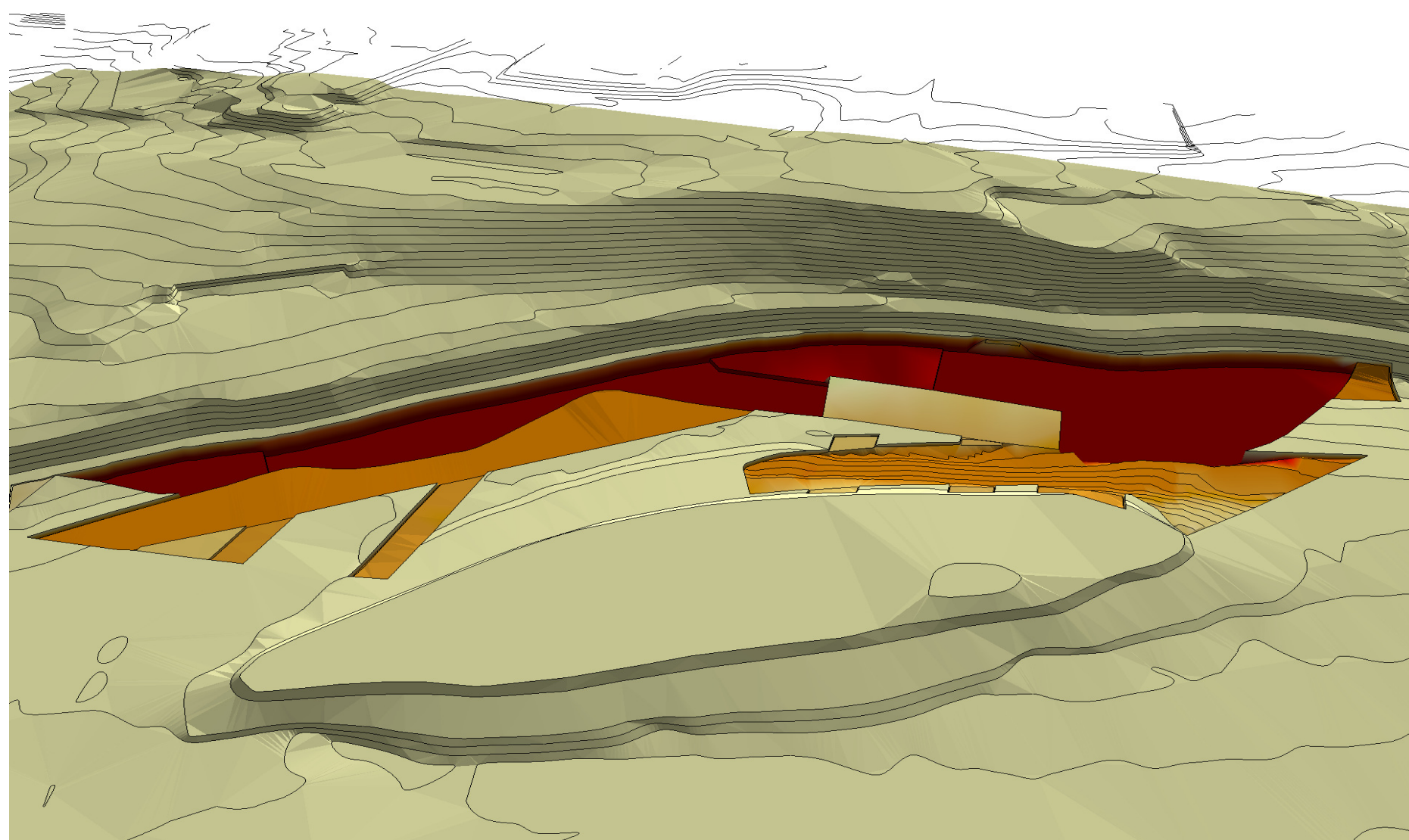
MATERIAL:
 FINISH:

BAKERCORP 3020 OLD RANCH PARKWAY
 SEAL BEACH, CA 90740-2751

TITLE: **CAMP MARINA SHEBOYGAN RIVER FILTRATION PROCESS FLOW DIAGRAM**

CUSTOMER: ENVIROCON	JOB No: _
DWG BY: J. GONZALEZ	DATE: 05-04-11
CKD BY: ROBERT WHITE	DATE: 05-04-11
SCALE: NOTES	SHEET: 1 OF: 1
DWG No: SKF0393	REV: _

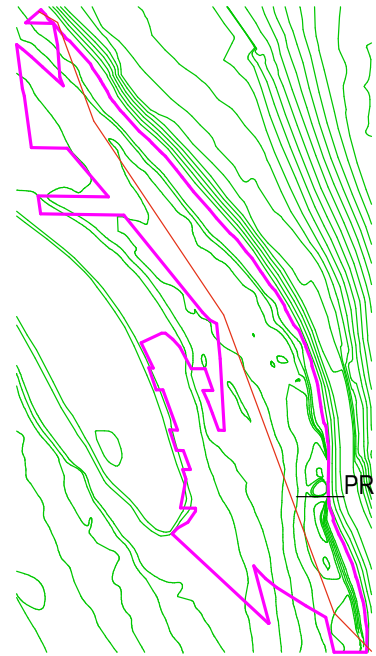
**FIGURE 4.
NAPL, PAH, & PCB EXCAVATION AREAS**



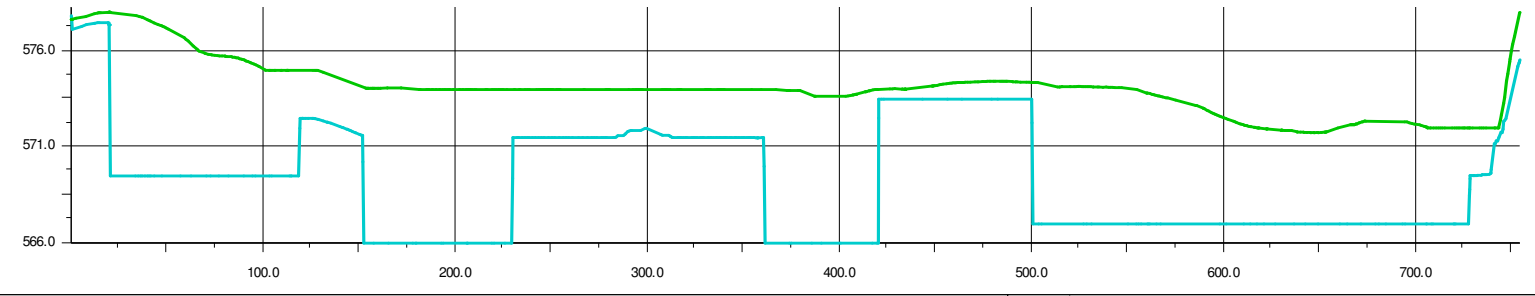
Job: CAMPMARINA-PAH-PCB-NAPL (Units: Ft-CY
 Tue May 03, 2011 09:58:42 Page 1

**Volume Report
 Design vs. Existing**

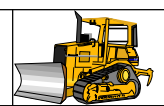
	Total	Cut	Area Fill	OnGrade	Volume Cut	Volume Fill	Comp/Ratio Cut	Comp/Ratio Fill	Compact Cut	Compact Fill	Export -Import	Change Per .1 Ft
NAPL_EXCAV_AREA	18,418	18,418	0	0	4,516	0	1.00	1.00	4,516	0	4,516	68
NAPL_EXCAV_AREA	11,528	11,528	0	0	3,842	0	1.00	1.00	3,842	0	3,842	43
NAPL_EXCAV_AREA	5,407	5,407	0	0	1,183	0	1.00	1.00	1,183	0	1,183	20
NAPL_EXCAV_AREA	5,350	5,152	66	132	217	1	1.00	1.00	217	1	216	20
NAPL_EXCAV_AREA	2,260	2,260	0	0	566	0	1.00	1.00	566	0	566	8
NAPL_EXCAV_AREA Sub:	42,963	42,765	66	132	10,324	1			10,324	1	10,323	159
PAH WEST AREA	11,618	11,618	0	0	1,011	0	1.00	1.00	1,011	0	1,011	43
PAH CUT-2.5	11,621	11,621	0	0	1,049	0	1.00	1.00	1,049	0	1,049	43
PAH CUT-2.5	924	924	0	0	76	0	1.00	1.00	76	0	76	3
PAH CUT Sub:	12,545	12,545	0	0	1,125	0			1,125	0	1,125	46
PCB CUT_2.0	1,407	1,407	0	0	101	0	1.00	1.00	101	0	101	5
PCB CUT_2.0	539	539	0	0	40	0	1.00	1.00	40	0	40	2
PCB CUT_1.0	507	507	0	0	19	0	1.00	1.00	19	0	19	2
PCB CUT_2.0	0	0	0	0	0	0	1.00	1.00	0	0	0	0
PCB CUT_2.0	427	427	0	0	30	0	1.00	1.00	30	0	30	2
PCB CUT_0-5	183	183	0	0	3	0	1.00	1.00	3	0	3	1
PCB CUT_1.0	270	270	0	0	10	0	1.00	1.00	10	0	10	1
PCB CUT_0-5	0	0	0	0	0	0	1.00	1.00	0	0	0	0
PCB CUT_1.0	129	129	0	0	4	0	1.00	1.00	4	0	4	0
PCB CUT-1.5	43	43	0	0	2	0	1.00	1.00	2	0	2	0
PCB CUT-1.5	157	157	0	0	8	0	1.00	1.00	8	0	8	1
PCB CUT-1.5	88	88	0	0	5	0	1.00	1.00	5	0	5	0
PCB Sub:	3,750	3,750	0	0	222	0			222	0	222	14
Regions Total	70,876	70,678	66	132	12,682	1			12,682	1	12,681	262
Unspecified	1,531	1,526	1	4	196	0	1.00	1.00	196	0	196	6
Job Total	72,407	72,204	67	136	12,878	1			12,878	1	12,877	268



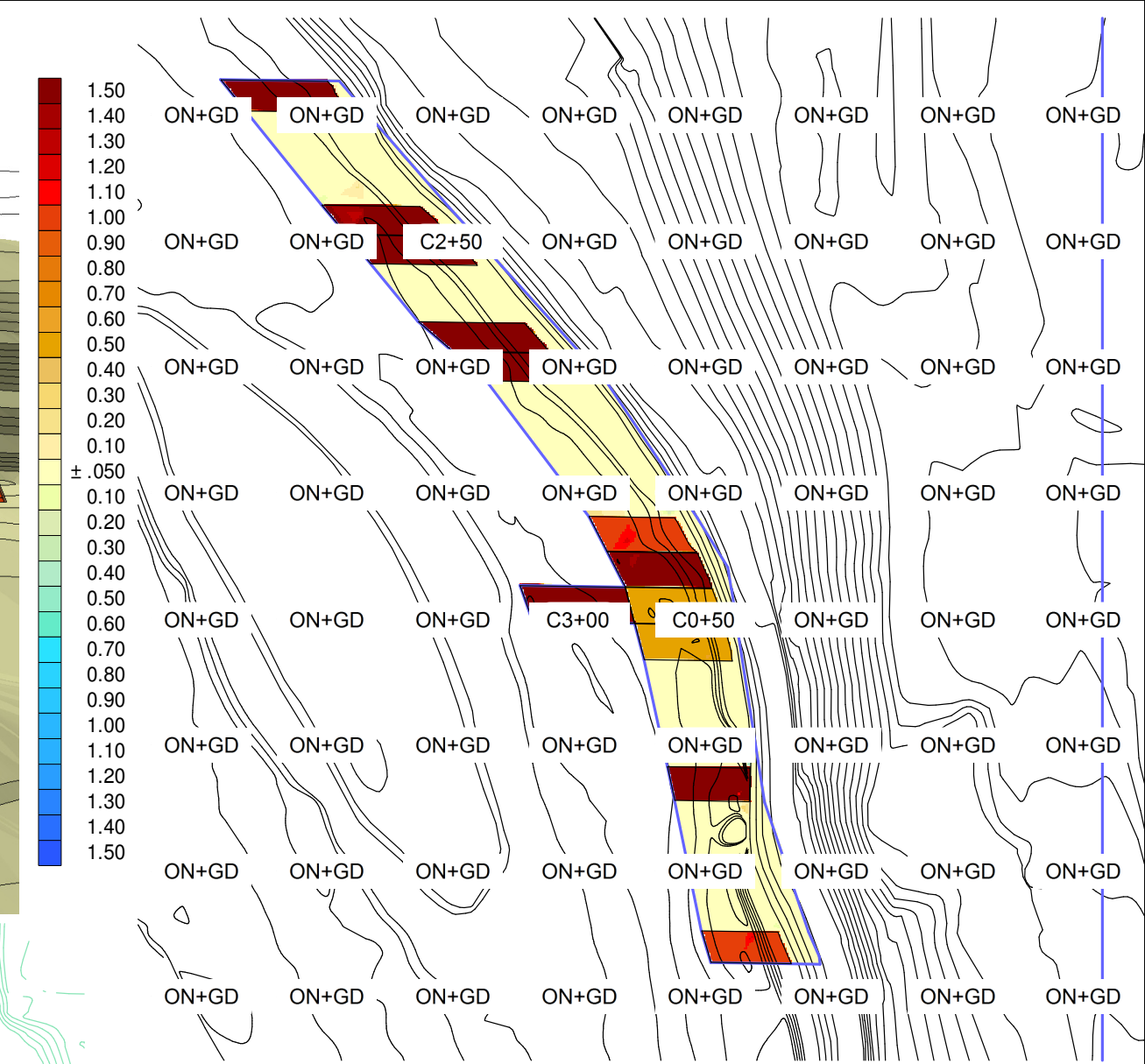
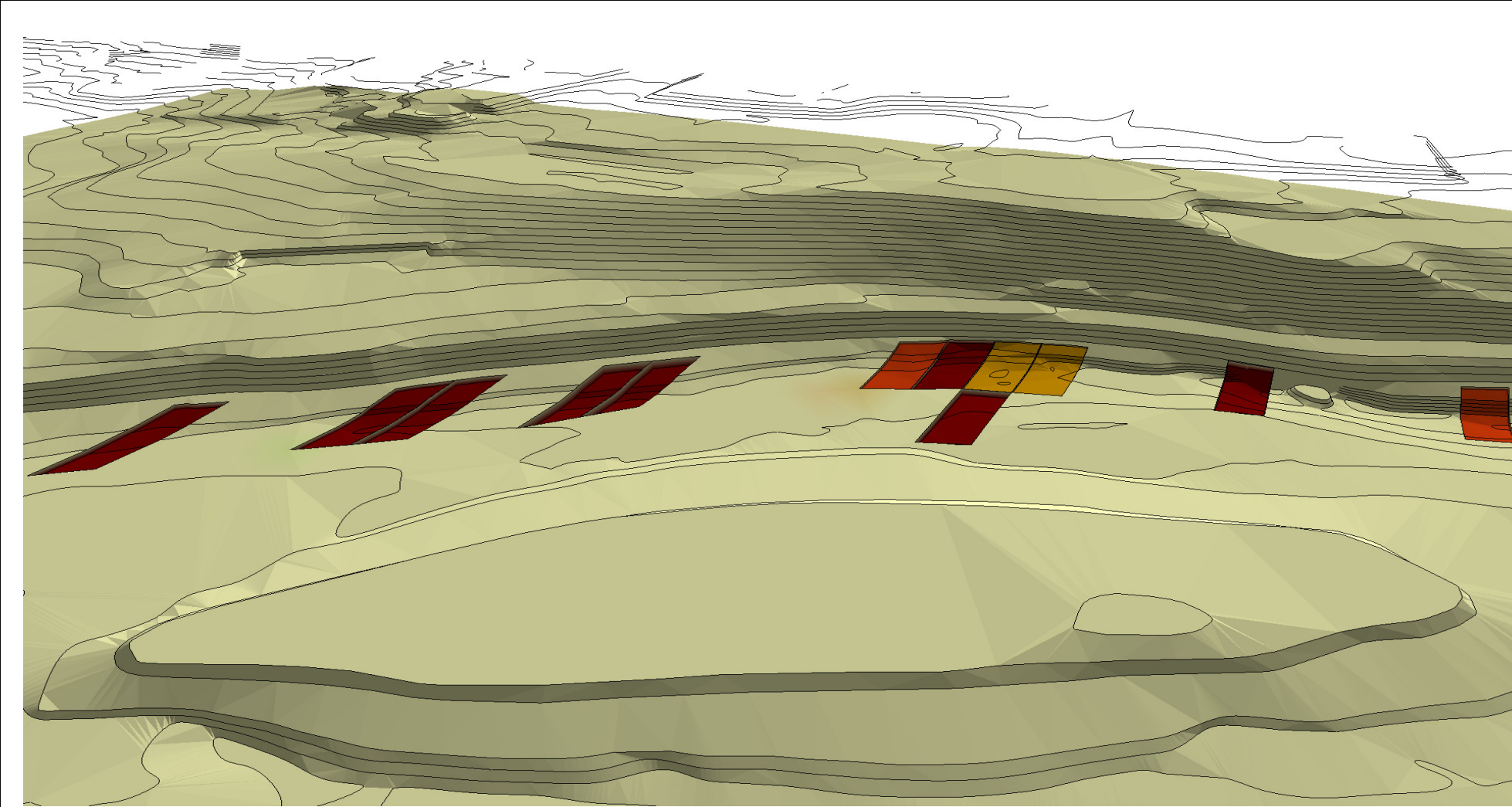
PROFILE SECTION



GREEN - EXISTING CONDITIONS
 BLUE - EXCAVATION GRADES
 VERTICAL EXAGGERATION = 10



**FIGURE 5.
TSCA PCB EXCAVATION AREAS**

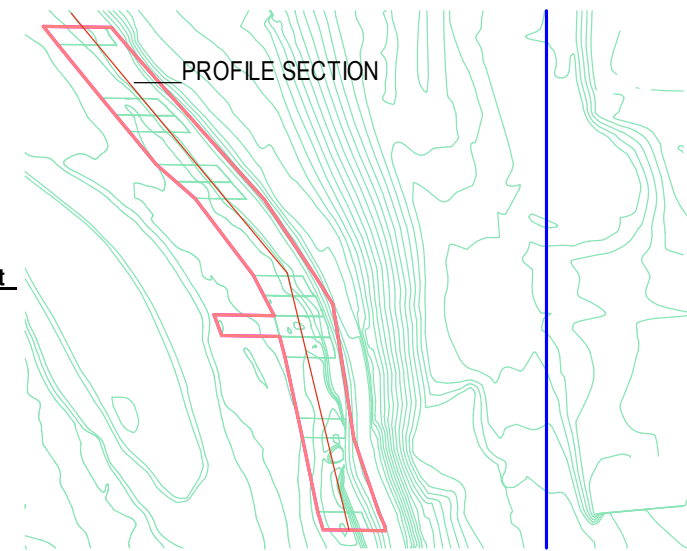


Job: CAMPMARINA-TSCA (050611)
 Units: Ft-CY
 Thu May 05, 2011 08:18:46 Page 1

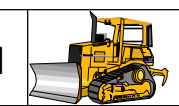
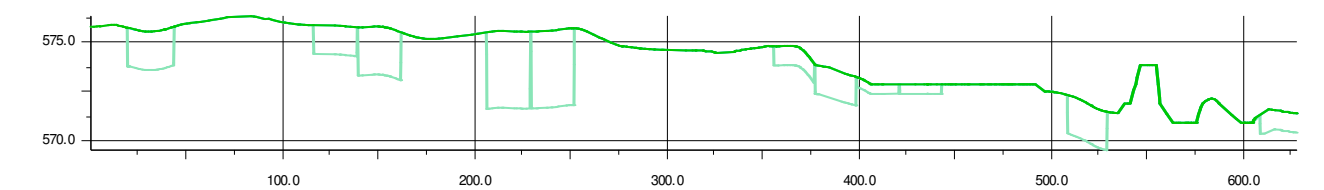
Volume Report
Stripped vs. Existing

Job Site	Area		Volume		Comp/Ratio		Compact		Export Change			
	Total	Cut	Fill	OnGrade	Cut	Fill	Cut	Fill	-Import	Per .1 Ft		
Job Site	35,982	13,316	0	22,666	934	0	1.00	1.00	934	0	934	133

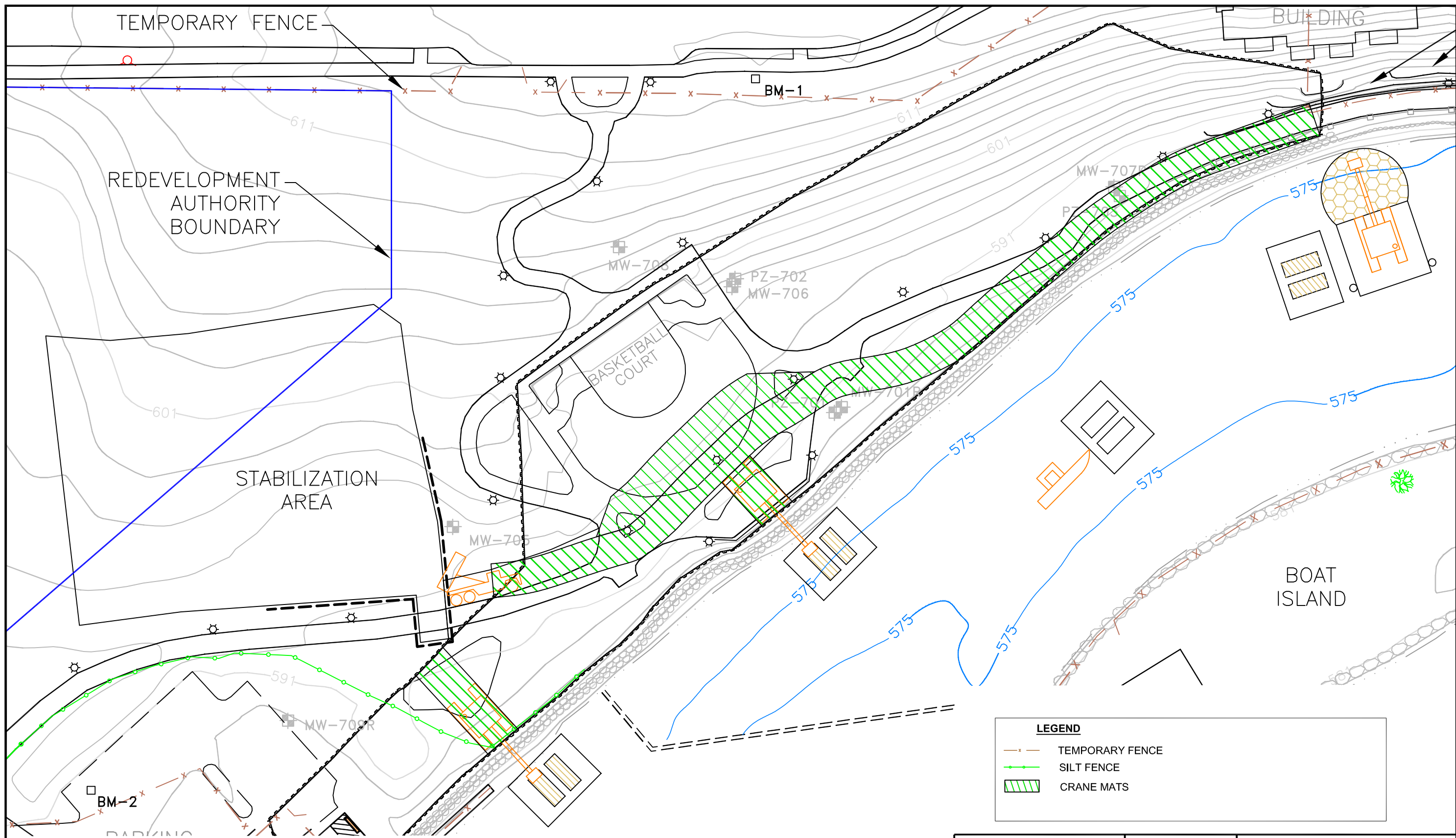
Stripping Qty's	Area		Depth	Volume
	Plane Area	Slope Area		
TSCA-CUT_0-5	1,113	1,134	0.500	21
TSCA-CUT_0-5	1,121	1,147	0.500	21
TSCA-CUT_1	866	895	1.000	33
TSCA-CUT_1	1,047	1,057	1.000	39
TSCA-CUT_1-5	1,037	1,046	1.500	58
TSCA-CUT_1-5	1,086	1,102	1.500	61
TSCA-CUT_3.0	1,297	1,298	3.000	144
TSCA-CUT_2	1,139	1,143	2.000	85
TSCA-CUT_2	929	1,002	2.000	74
TSCA-CUT_4	938	945	4.000	140
TSCA-CUT_4	1,043	1,050	4.000	156
TSCA-CUT_2.5	1,067	1,075	2.500	100
TSCA Sub:	12,683	12,894		932
Stripping Total	12,683	12,894		932



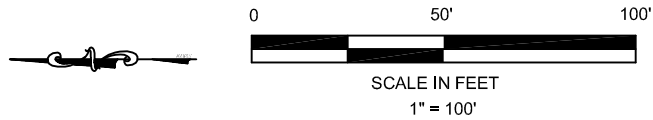
GREEN - EXISTING CONDITIONS
 BLUE - EXCAVATION GRADES
 VERTICAL EXAGGERATION = 10



**FIGURE 6.
TIMBER MAT DEPLOYMENT**



NOTES:
 1. MAT DIMENSIONS ARE 4'X18'X8".
 2. ILLUSTRATED SITE FEATURES ARE APPROXIMATE AND MAY VARY BASED ON FIELD CONDITIONS.



LEGEND	
	TEMPORARY FENCE
	SILT FENCE
	CRANE MATS

 651 Corporate Circle Suite 114 Golden, Colorado 80401	DES AB	CRANE MAT LAYOUT		
	DWG TM			
	CHK AB	PROJECT # 8108	06-19-2011	Figure 6



ATTACHMENTS



**ATTACHMENT A.
RESUMES**

ALAN BUELL

EI Project Director (overall direction and management of project, on-site and off-site)

Qualifications

Mr. Buell has over 31 years of experience in the mining and construction industries. His broad range of experience includes supervision and management of both operations and engineering. Mr. Buell has demonstrated skills in cost control, safety performance, team building, and communication.

As a Project Director, his responsibilities include preparation of project budgets, assisting project managers in project preparation, subcontractor selections, resource development, project procedures, and overall project oversight. During the construction phase of a project, his responsibilities include project administration, production and schedule tracking.

Experience Highlights

- Mine Reclamation
- Contaminated Soil Removal
- Hazardous Waste Handling
- Demolition
- Pipe Removal
- Slurry Wall Installation
- Construction of underground ventilation facilities
- Operations and engineering management
- Blasting

Experience

- ◆ Waco Subsite Waco Designated Area RD/RA – Waco, Kansas. Project Director for the excavation, placement and capping of mine tailings at the Waco RD/RA project in East Cherokee County, Kansas. Mine tailings totaling 110,000 CY from 3 properties was excavated, hauled and placed in two existing mine subsidence features and an existing tailings pond. Over 80,000 CY of clay and topsoil were excavated, hauled and placed as a cap on the mine waste and existing 28 acre tailings pond. Remediation of a 2200 foot drainage slough through a heavily timbered area was performed with small equipment to meet the property owner's demands of no disturbance beyond the banks of the stream. The former mine waste areas and caps were sampled, amended and vegetated. Water management of existing ponds and storm runoff was a critical part of the project. Building and maintaining a working relationship with the property owner and the adjacent Acme #1 contractor added a dimension to the project.
- ◆ Decommissioning and Demolition Project – Hastings on Hudson, New York. Project Director for the decontamination and demolition of nine buildings, asbestos abatement prior to demolition, transportation of waste materials and salvage and recycling of steel. Interior abatement of piping, floor tiles and miscellaneous asbestos-containing material (ACM) was performed prior to demolition of the structure. Controlled demolition of the buildings was utilized as the abatement technique on roofs which were deemed unsafe for entry due to deterioration. Standard roof ACM abatement was performed on approximately 40,000 SF of roof. Most of the buildings were demolished by conventional means utilizing excavator –mounted hydraulic shears and excavator with bucket and thumb attachment. Brick and masonry was segregated for future use on site as fill material, saving the owner thousands of dollars in disposal and transportation costs. Clean demolition debris was segregated from ACM material and placed in end-dump trailers to the client-approved landfill. Controlled demolition of the roofing material required specialized handling of debris which was generated. All ACM material was placed in either double-lined roll-off containers or double –lined end dump trailers.
- ◆ Former Glenrock Oil Refinery Remediation – Glenrock, Wyoming. Project Director for the installation of a cofferdam, excavation of PAH soils, and placement of riprap on river bank. Envirocon's project scope involved removing contaminated sediments adjacent to the river channel and homogenizing sediments between the removal area and the HDPE wall. Envirocon established a river channel dike, erosion control, grubbed the river bank, removed debris, and stockpiled overburden for reuse. A water treatment system designed by Baker

was mobilized and pumping systems installed. Sediments were homogenized in the designated area and excavation of sediments adjacent to the river channel began. Water flowed into the excavation at such a rate the water treatment system failed. The saturated sediments also flowed into the excavation preventing sediment removal to design depth. Envirocon suggested using sheet pile to support the excavation walls and reduce water inflow. A change order was approved. Envirocon brought value to the sheet pile effort by utilizing used sheet pile from the Milltown project and self performing the sheet pile installation/removal with an existing excavator and rented vibratory sheet pile hammer. The excavation area was divided into cells. Once a cell was excavated, a horizontal injection system was installed with a gravel cover, then sand and borrow material were used to complete backfill; the sheet pile was removed and installed in the next cell. Stockpiled overburden covered the backfilled cells and the river bank re-established. Grass seed mix covered with erosion control mat completed the river bank restoration.

- ◆ Former Sinclair Refinery Remediation & Restoration - Wellsville, New York. Project Manager for the impacted soil removal, sheet pile installation, and on site landfill construction at the Former Sinclair Refinery, Wellsville, NY. 15,000 cy of hydrocarbon impacted sediments were excavated from a drainage swale and the Genesee River and then transported and placed in an on site landfill. The existing landfill was reopened and a new cap and cover system installed. Steel sheet pile installed in the Genesee River provided protection from water and saturated soils. An engineered backfill system replaced the excavated sediments.
 - ◆ Landfill Redevelopment – Denver, Colorado. Project Manager for the excavation, sorting and disposal of 750,000 yards of contaminated soils found in portions of the former Arapahoe County (Arapco) Landfill and the Herbertson’s Pay Dump. After cleanup of the contaminated soils, the crew was responsible for the excavation and placement of 650,000 yards clean soil, installation of methane gas collection system, removal of USTs and petroleum contaminated soil, rough grade of access roads, building pads and parking areas. The crew also encountered Anticipated Special Waste including ACM and wastewater sludge containing NORM.
 - ◆ International Smelting and Refining – Tooele, Utah. Project Manager for the consolidation, grading and capping of waste smelter tailings at the Former IS&R Smelter site. This project was essentially cap repair on an existing tailings cap. The work was done late in the season with schedule pressure, and in direct proximity to the local community who often used the site for various outdoor recreation activities. The work was done to meet the requirements of an EPA consent decree. Envirocon established a well water pumping system, water storage, and load-out facility; excavated or capped approximately 53 individual sites; placed excavated impacted soils in IS&R Tailings Repository Site; established borrow areas for fill material on IS&R property; replaced all excavated soils and cap areas with clean on-site borrow fill material; constructed soil berms to divert water flow to existing; and constructed new waterways in existing channels and placed riprap.
 - ◆ 21st Street Pond – Ogden, Utah. Project Manager for the construction of a cofferdam and sediment cap system near an operating railyard in Ogden, Utah. This work was done to mitigate DNAPL contamination emanating from railyard property and potentially threatening the 21st Street Pond and Ogden River. The work was performed in accordance with strict design specifications and subject to EPA and UDEQ oversight in a procedural setting closely paralleling a CERCLA closure. Envirocon lowered the pond water surface by closing the influent structure valve and adding a barrier to stop flow from the Ogden River from entering the pond. When the construction area could no longer be dewatered by this procedure, the pond level was lowered by pumping so all the remediation work could be performed in the dry. Envirocon constructed the cap and containment system for DNAPL and DNAPL impacted sediments including: placement of coarse aggregate, HDPE lining system (associated with the DNAPL cofferdam and DNAPL extraction trench/collection system), filter fabric, hydrocarbon absorbent, permeable material, import fill, rodent control barrier, construction of interlocking sheet pile wingwalls, and groundwater discharge drains. The construction of the cap system will allow groundwater movement and flow towards the 21st Street Pond.
-

- ◆ Refinery Subsurface Pipe Investigation & Removal – Greybull, Wyoming. Project Manager for the remediation of the former Amoco Greybull Refinery. The project began with the removal of lead contaminated soils from a Wyoming DOT Right-of-Way in preparation for a road widening project. After completing the lead contaminated soils removal, Envirocon demobilized and subsequently re-mobilized in to start buried pipe exploration. The first objective was to physically locate and characterize any remaining subsurface pipe within the FRP. The second objective was to remove all remaining subsurface pipe and properly dispose of all pipe, pipe liquids, and impacted soil.
 - ◆ White Mountain Quarry Reclamation – Wheatland, Wyoming. Project Manager for the White Mountain Quarry reclamation. The scope of work included excavation and grading of 600,000 cy of quarry spoil materials, construction of multiple drainage features, top soil application, and seeding and fencing to return the site to its original grazing use. The existing highwall was blasted to provide features in line with long-term stability and enhanced public safety.
 - ◆ Amoco Casper Refinery Redevelopment Project – Casper, Wyoming. Project Manager for the remediation of the former Amoco Casper Refinery and construction of the Platte River Commons development. The nationally recognized and awarded Platte River Commons and Salt Creek Heights development was considered a Brownfield project. The scope of these reused projects included the rough grading of an eighteen hole golf course whose water features doubled as a water treatment system, site development for two business parks, pedestrian trails, conversion of a 400 ft rail road bridge to a pedestrian bridge, five feature kayak park, and concrete bridge demolition.
 - ◆ Pipe and Soil Removal - Casper, Wyoming. Project Manager for a project at the above former gas refinery site after successfully completing CAMU construction in the previous month. The scope of work for this pipe and soil removal project included excavation, decontamination, sizing, and recycling of 1,000,000 lf of refinery process piping. In addition, Envirocon was responsible for the excavation, stockpiling, and crushing of 355,000 tons of concrete, and demolition of seven crude oil storage tanks, several buildings, and electrical power systems.
 - ◆ North Properties Area Waste Unit Removal and CAMU Construction Project - Casper, Wyoming. Project Manager for another project at the above site after successfully completing the CAMU construction projects. The scope of work for North Properties Area Waste Unit Removal Project included excavation, stabilization, transportation, and disposal of materials from public properties including business, industrial properties, and a high school. Over 500,000 cy of refinery waste and contaminated soils from thirteen refinery waste units and the former refinery was placed in the CAMU constructed by Envirocon.
 - ◆ CAMU Construction Phase II – Casper, Wyoming. This project required the construction of a thirteen-acre lined CAMU cell, and access roads in preparation for placement of remediation wastes from a former refinery located approximately four miles away. The cell was constructed with a design capacity of 500,000 cubic yards of waste. The work required clearing, grubbing, and stripping of fifteen-acres of native vegetative cover materials. The topsoil was stockpiled for use on the outside embankment slopes of the CAMU cell and for construction of the cover and cap. The lining system consisted of geosynthetic (GCL) contacting the embankment and cell bottom, a textured 60-mil HDPE as the second layer, and a geocomposite netting as the final layer. Envirocon then placed twelve inches of native soil and twelve inches of approved waste material as a cover/protective layer for the liner system.
-

- ◆ East Boulder Mine – Big Timber, Montana. Chief Engineer responsible for managing an engineering team to accomplish mine planning and underground and surface infrastructure design. Mr. Buell also coordinated and directed outside engineering firms in designing mine related facilities.
- ◆ East Boulder Mine – Big Timber, Montana. Manager of Project Development responsible for facilitating and overseeing expansion projects through the design/build phases.
- ◆ Stillwater Mine - Nye, Montana. Mine Manager responsible for directing and managing personnel and resources in the safe development and production of platinum and palladium ore from an underground hard rock mine. Mr. Buell also negotiated a revised incentive based contract system, implemented new mining methods to increase productivity and lower cost, steadily improved safety performance, and solved many logistical/production issues to increase efficiency.
- ◆ Mt. Taylor Mine – San Mateo, New Mexico. Senior Engineer responsible for engineering support for a 1,000-tpd underground uranium operation. Directed the design and construction of a \$600,000 underground ventilation facility, and supervised mine activities.
- ◆ Ambrosia Lake Mines – Grants, New Mexico. Mine Foreman and Engineer at an underground uranium mine. Responsible for supervising production activities, mine infrastructure activities, and mine development.

Education

- ◆ B.S., Mining Engineering - Colorado School of Mines (1979)

Training & Certifications

- ◆ 40-Hour Hazardous Waste Operations Training
 - ◆ 8-Hour Hazardous Waste Operations Supervisor Course
 - ◆ 1st Class Construction Blasting License, State of Montana
 - ◆ Member of CSM Alumni Association
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BRIAN M. BELL, P.E.

EI Technical Director (overall technical guidance on project, on-site and off-site)

Qualifications

Mr. Bell has over 27 years of experience in management of design, construction, and remediation of hazardous waste sites. His technical expertise includes the knowledge and utilization of a wide variety of soil, sludge, waste and ground water treatment technologies. Mr. Bell also is an expert in the management of material handling operations. His current responsibilities include overall management of engineering, remedial design and action, field technical and construction management responsibilities, the development of work plans, health and safety plans, QA/QC plans, permitting, and overall operations management of complex and multi-disciplined environmental remedial actions.

Mr. Bell has served as Project Director/Manager responsible for technical and operations management of all aspects of projects, including remedial actions and remedial investigations. He is responsible for management of multiple projects, the on-site project management team and field crews. Mr. Bell is also responsible for bid preparation, contract administration, project tracking, management of engineering and field personnel, subcontracting, and preparation of all technical work plans, permits, and reports.

Experience

- ◆ Former Refinery Remedial Action – Wellsville, New York. Project Director for a former refinery located adjacent to a river. Work completed to date is focused on swale remediation adjacent to the river and includes construction of a decon pad, staging area, diversion of water, dewatering, excavate, load, and haul swale sediments and soils, import and place structural fill in swale area, import and place topsoil in swale area, restore vegetation within main drainage swale, demobilization and winterization of site. Work yet to be completed will focus on in-river remedial activities and includes construction of a permanent mid-slope steel sheetpile system, diversion of water, construct/install temporary steel sheet pile, dewatering, excavate, load, haul and stage river sediments, backfill in-river with specified materials, construct on-site landfill expansion, remove existing stockpiles, place all excavated soils/sediments in on-site landfill, close landfill, site restoration, and construct a slurry wall (as Alternate).
- ◆ Creek Sediment Bypass, Removal, and Stabilization Project - Chattanooga, Tennessee. Project Director for remedial action project. Approximately 100,700 tons of coal tar sediments are excavated from the 1.9-mile span of creek. The creek water is bypassed in five major reaches by pumping operations. Following reach dewatering and excavation of the coal tar impacted sediments, the sediments are transported to a constructed 200 foot by 200 foot drying bed. The drying bed was constructed with a 10-foot berm to prevent run-on with a layer of sand followed by a 40-mil PVC geosynthetic liner, and another layer of sand. The drying bed included a leachate system where liquid is collected by pumping to a water treatment system. The coal tar is then treated in the drying bed with 10% lime kiln dust (LKD) to stabilize the material. The LKD is mixed with the coal tar using a SS250 which blends the material and promotes drying. Stabilized sediments are then transported to an off-site facility for disposal. Restoration techniques are employed on all disturbed creek bed and bank areas.

Experience Highlights

- Operations and technical management of complex and multi-disciplined environmental remedial actions
- Soil, sludge, waste, and water treatment technologies, including water bypass and dewatering operations
- Material handling operations
- Sediment remedial action projects
- Remedial design/Constructability Reviews
- Development of Technical Work Plans, Health & Safety and QA/QC plans
- Application of on-site, in-situ and ex-situ treatment technologies
- 27 Years of remedial construction experience

- ◆ Former Refinery Remedial Action – Sugar Creek, Missouri. Project Director for a remedial project at a former refinery. All above ground demolition was completed and the site was earmarked for re-development. The project included utility abandonment, excavation and backfill of approximately 150,000 cubic yards of soil, installation of 1,400 feet of RCP pipe, and construction of a 2,900 foot inline channel with liner and cover system. Culvert headwalls and riprap grouted spillways were constructed as part of the drainage system. Additional features included roadway construction, bridge work and pedestrian trail installation, water service construction including 3,000 feet of 10-in. HDPE pipe, installation of 2,600 feet of Sanitary Sewer and Dry Utility construction. A major re-vegetation program was completed.
 - ◆ Pneumo Abex Corporation for Light Non-Aqueous Phase Liquid (LNAPL) Phase II Remediation- Kalamazoo, Michigan. Impacted Soil Excavation - Kalamazoo, Michigan. Served as Project Director on this phase as a follow-on to earlier work performed there with Envirocon. Special features of this included slope stability below the plant walls for vertical cuts to excavate all the soils. This is an active facility involved with manufacturing and testing hydraulic components for commercial and military aircraft. Soil and water sample results indicated the presence of LNAPL. Envirocon performed the first soil removal effort at this facility in December 02- thru March 03. The chemicals of concern in 2003 and for 2007 are TPH's, PNA's, VOC's- betx, vinyl chloride, tetrachloroehene, 1,1,1-trichloroethane, and PCB's; the 2007 area/work has some higher concentrations. The project included: (1) containing an area of concern (approximately 50-ft x 90-ft x 13 to 15-ft deep) from adjacent facility work areas, (2) construct a “tunnel” for transporting waste materials from the AOC to disposal containers without releasing VOC's into the facility, (3) installing an air handling system to put the AOC and “tunnel” under negative air pressure, (4) cutting the concrete floor into manageable pieces, (5)excavation and removal of soils, (6) backfilling area with pea gravel and top two feet with gravel and compact (7)install rebar and concrete to match existing floor grade. Because the shoring design spec was performance (vs. prescriptive), Envirocon acquired the services of a civil/structural engineer (P.E.) to design those elements and a specialty subcontractor with low-height drilling equipment to place the jet grout structures and tiebacks prior to excavation.
 - ◆ Cannelton Superfund Site - Sault Ste Marie, Michigan. Project Director for Envirocon and its marine subcontractors successful dredging operations in Tannery Bay located on the St. Mary's River in 2006 and 2007. Over 48,000 CY of material was dredged, transported to a sediment off-loading/processing facility, dewatered, and ultimately loaded into haul trucks for off-site Transport and Disposal. The sediment contains tannery waste with significant oversized debris, primarily old lumber. During the winter shutdown, Envirocon retooled the operations to remove inefficiencies relative to the screening/slurry process and to address historically low water levels. The operations being conducted for the remainder of the dredging project include the use of a barge mounted crane with a 2-CY Environmental Clamshell bucket. The dredged sediment/debris is then placed on transport 'shuttle' barges for in-bay transport to the dump scow barges. The shuttle barges contain a 'pig-pen' containment hold for the dredged sediment/debris, each up to 100-CY capacity. At the location of the dump scow barges, the shuttle barges are off-loaded by a second barge mounted crane into the dump scow barges. The dump scow barges then transport the sediment/debris two miles down river to the off-loading/processing facility. Each shuttle barge has approximately 800-1,000 -CY capacity for dredged sediment/debris.
 - ◆ Visteon Storm Water Pond Improvement - Sterling Heights, Michigan. Project Technical Director responsible for the improvements of an existing storm water pond at the Visteon Corporation-Sterling Plant. The improvements included sediment removal and disposal, excavation of the clay bottom to increase the pond capacity, pump station refurbishment and site restoration. The storm water pond collects storm water for the 160-acre property, of this; approximately 155 acres are building roofs and parking lots. The pond sediment has accumulated over the last 40 years. Under direction from the State of Michigan Department of Environmental Quality and Macomb County Drain Commission, Visteon was required to increase the capacity of the storm
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water pond to meet the current capacity requirements. Prior to conducting onsite activities a temporary storm water by-pass system was installed; this by-pass system diverted all storm water to the existing outfall thereby maintaining the pond in a dry condition. The pond was then dewatered; approximately four feet of sediments were solidified with lime, stockpiled and loaded into trucks for disposal. Two feet of the ponds clay bottom was excavated and placed into landscape mounds at various locations on the property. Approximately 19,000 cubic yards of solidified sediments were disposed as non-hazardous material at local landfill and 5500 cubic yards of the clay bottom was placed in the onsite landscaping mounds. The restoration activities included installation of the pond slopes, placement of topsoil, installation of various trees, shrubs and hydro-seeding all disturbed areas. The pump house was refurbished with three new pumps, floats and an electrical control panel for maintaining the pond at a designed operating elevation. The project was completed on schedule and within budget.

- ◆ Former Refinery Remediation/Closure – Okmulgee, Oklahoma. Project Director for remediation and closure of a former refinery site. Envirocon was awarded a contract to stabilize two types of sludge found at the former Okmulgee, Oklahoma Refinery and place the stabilized sludge into a repository to be constructed on site. The work included stabilization of two types of sludge totaling 325,000 cubic yards of material: approximately 162,000 yards of acid filter clays with a pH of 2 that emits substantial amounts of SO₂ when disturbed, and 162,000 cubic yards of petroleum sludge that emits substantial amounts of benzene when disturbed. Also, contaminated sediment from 1.2 miles of Okmulgee Creek is removed and stabilized. Envirocon developed our unique approach that differed from the approach listed in the RFP and that was based on bench scale studies. Envirocon performed an extensive treatability testing program. The overall project approach developed is a comprehensive program which takes advantage of the fact that half the sludges on-site are acidic, and half are near neutral pH. The comprehensive program takes advantage of this fact by mixing the two wastes together, thereby reducing reagents necessary for the initial neutralization reactions. The neutral pH sludges act as a buffer when mixed with the acid refinery sludges.
 - ◆ Subaqueous Sand Cap/Surcharge Placement – Duluth, Minnesota. Project Director for the work which was performed within Stryker Bay, in the St. Louis River estuary, approximately 4 miles up river from Lake Superior in Duluth, Minnesota, at the St. Louis River/Interlake/Duluth Tar Site (SLRIDT) site. The scope of work for this phase of the project required the installation of a 2,020 LF sheet-pile containment wall around an 11-acre area in the Bay, with subsequent placement of a sub-aqueous sand cap (~90,000 cubic yards), followed by conventional/civil sand cap/surcharge placement effort (~90,000 cubic yards). A comprehensive computer program was developed for precise control of subaqueous sand feed rate, tied with GPS positioning control and velocity of spreader barge. This ensured precise control of thickness of each lift placed. The scope of work also included site preparation; spill boom and silt curtain installation and maintenance; installation of deep and shallow sediment monitoring instrumentation; performing a sub-aqueous capping demonstration lift; and sub-aqueous installation of approximately 53,000 square yards of a Reactive Carbon Mat (RCM) geo-textile material between the first 6” lift of sand and the remaining material placed.
 - ◆ Landfill Cap – US Steel - Gary, Indiana. Project Manager for a 55-acre landfill cap for a major steel manufacturer. This 11-month project included 3 1/2 feet of cover materials, more than 2 million square feet of 40-mil PVC liner, and 725,000 square feet of geocomposite drainage material. More than 300,000 cubic yards of granular slag sand was screened and transported from 5 miles away within the steel plant and placed for liner sub-base and protective cover. The cover also included installation of a gas vent and underdrain (8,900 linear feet) system, stormwater control channels, and a 260,000 square foot armor cover system consisting of a polyethylene geocell material. The 4-inch deep geocell was placed on the steeper slopes (approaching 1:1) for stability and erosion control. The geocell was anchored to the slopes and infilled with slag. Envirocon was then required to incorporate compost, fertilizer, and seed over the entire slag cover, using an innovative soil amendment mix to enhance growth in this difficult soil matrix. The project was completed ahead of schedule and incorporated significant cost-saving suggestions initiated by Envirocon.
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- ◆ Arizona Chemical (International Paper) Covers - Dover, Ohio. Project Director for remedial activities at a major paper manufacturing/chemical production facility. The project involved the expedited cover placement over contaminated areas within the active chemical production facility and sewer piping system inspection and cleaning. Part of the construction included a cover and erosion control system placed over a steep (1:1) riverbank to the toe of slope in the river. Amendments were made to USACE permit to allow a more constructible approach.
 - ◆ Arizona Chemical (International Paper) Lagoon Closure - Dover, Ohio. Project Director for this project that involved the geotechnical strength stabilization of sediments contained in a former wastewater treatment lagoon and subsequent cap/cover placement. Engineering and Operations plans were developed initially to define parameters for assessing methods to re-enforce the sludge/sediments. An approach was developed using a state-of-the-art high strength geotextile instead of cement stabilization. The load bearing capacity of the sludge/sediments in the former lagoon were strengthened with high strength geotextile deployment, resulting in significant savings to the client. In the end, approximately 678,000 square feet of re-enforcing geotextile was installed. A total of approximately 85,000 tons of off-site borrow material was imported and together with approximately 13,000 tons of existing berm material was safely placed to bring the cap/cover system to final grade.
 - ◆ Phelps Dodge Environmental Closure of the Wire and Cable Facility - Hopkinsville, Kentucky. Project Director for the decontamination, demolition and removal of piping and tanks and decontamination of flooring, sumps and tunnels at a large motor wire manufacturing facility. Pure product organic solvents (phenols and crecyclic acids) were removed from piping and tanks contained in the building, tunnels and sump rooms. Approximately 100,000 linear feet of piping was decontaminated, removed and scrapped along with approximately 60 tanks. State-of-the-art procedures were developed to mitigate health and safety risks, and to decontaminate the piping/tankage in-place as much as possible before removal. A decontamination water recycling system was designed and implemented to reduce volume of decontamination wash waters requiring off-site disposal, with great savings to the client. This fast-track project was completed in three months and ahead of schedule.
 - ◆ Radioactive Waste Removal Project – Cushing, Oklahoma. Project Director for an expedited low-level radioactive waste removal and shipping operation in two phases. Nuclear Regulatory Commission-Licensed waste materials were excavated, mixed and stabilized as necessary, and loaded into Intermodal Containers for shipment and disposal. Sludge-like materials required stabilization prior to loading and shipping to meet facility disposal restrictions. All required work plans were developed by Envirocon on an expedited basis for NRC review and approval. Building demolition work including low level radioactive materials and asbestos abatement was completed also. Materials excavated in a trash dump were conducted under Asbestos Abatement Procedures. Operations were under continual direct review by NRC. A total of more than 26,500 cubic yards of materials were successfully excavated and shipped in a period of approximately 4 months. An additional 18,000 CY of low level radioactive waste materials were successfully excavated and shipped in Intermodal Containers during the second phase of the project.
 - ◆ Sub-Aqueous Sand Cap Placement, Dredging and Stabilization Project - Muncie, Indiana. Directed a metallic hydroxide sludge dredging, dewatering, and sub-aqueous sand cap placement remedial operation for a specialty steel manufacturer. The project also included the excavation and stabilization of approximately 13,000 cubic yards of lead impacted waste using a pug mill and chemical reagents. A Pilot-scale test program was designed and performed and the reagent mix design was subsequently optimized. The landfill was capped after pug mill treatment operations were completed. After hydraulic dredging operations were completed on the 2.5-acre pond, a strengthening geo-textile was placed on the dredged bottom. A two-foot sand cap was subsequently placed on top of the geotextile in three-inch lifts using sand slurry fed by way of the dredging barge operating in reverse.
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- ◆ Pneumo Abex Corporation for Light Non-Aqueous Phase Liquid (LNAPL) Phase I Remediation- Impacted Soil Excavation - Kalamazoo, Michigan. Project Technical Director responsible for the removal of concrete and excavation of impacted soils in two areas within an active manufacturing facility. The first area, measuring 100' x 100', located inside a building with 20 ft high ceiling was excavated in Level B personal protection equipment and under negative air because of VOC's released from the soils during excavation and the high concentration of carbon monoxide generated from the heavy equipment. The second area was adjacent to the first area, but located outside and measured 100' x 75'. Slopes of both area 1 & 2 had to be maintained at 1:1 ratio to maintain existing structure stability. Survey monuments were located every 20' and on columns and monitored twice/week for movement. Pea-gravel was used as structural backfill and 10 inches of concrete replaced in area one. Area two was also backfilled with pea-gravel and 6 inches of asphalt placed. Both area 1 and 2 had oil recovery piping installed at the floor of excavation prior to backfilling and a soil vapor extraction system installed under a vapor barrier approximately 4 ft below finish grade.
 - ◆ VOC Sludge Stabilization and Solidification – Madison, New Jersey. Project Manager for two phases of a project involving the conditioning and stabilizing of 44,000 cubic yards of a clay/sludge soil matrix contaminated with a high concentration of VOCs. The project began with the modification and upgrade to the vapor control system in the existing treatment building on site. Envirocon then mobilized and erected a pugmill for the treatment of the contaminated soils. Envirocon worked closely with the client to develop a procedure for successfully mixing the conditioning agent (lime) and the stabilizing agent (Portland cement) in a two-stage process. In the first stage, the objective was to thoroughly mix the lime into the soils to volatilize the organic compounds as a result of the exothermic reaction. After mixing, the materials were staged within the enclosed structure to allow sufficient retention time to drive the organics from the soils. The vapor/odor control system was designed to create a negative pressure atmosphere within the structure, and included a baghouse and vapor phase carbon to capture the particulate and VOCs generated from the process. Frequent maintenance and change-outs were required on the vapor system due to the heavy loading and the success of the process. During the second phase, the conditioned soils were again processed through the pugmill. Portland cement was mixed with the soils for stabilization, and to meet structural requirements that would allow the treated soils to be placed back in the excavations. Preconditioning of the soil was required for some of the materials due to the groundwater encountered in the excavation. Magnesium lime was added to the soil before removal from the excavation to increase the solids content and alter the sludge-like material for handling through the pugmill. All work performed in the enclosed structure required workers to suit up in Level B (air-supplied respirators) personal protective equipment.
 - ◆ Alcoa Former Wearever Facility - Chillicothe, Ohio. Project Director for a remedial action including significant clearing and grubbing activities, construction of site infrastructure and haul roads, construction of a permanent Containment Area repository, excavation of lead impacted plant waste in a number of source areas, and hauling and placement of lead impacted waste in the constructed repository. Approximately 29,000 cubic yards of material was placed, graded and compacted in the Containment Area. A cap was constructed on the repository consisting of a 30-in. cover and vegetation.
 - ◆ Kings Run Channel Project - Belmont County, Ohio – Project Technical Director for the solidification of approximately 24,000 cubic yards of sediment in a northern impoundment. The purpose of the project was to provide a solid and stable foundation for the future construction of the Kings Run Channel. The material requiring solidification was a combination of tailings and sediment from a mining and landfill operation. The landfill was closed in preparation for capping. Lime fines and cement were selected as the reagents to be used for the solidification and they were delivered in pneumatic tankers and offloaded into pits in the mixing area. Reagents ranged from 3% to 5% for the lime to up to 10% for the cement. The moisture content ranged from 60% to 130% with some areas covered with water. A Link Belt 4300 and Cat 330 excavator were used for the mixing of the sediments and reagents to a depth of over 15 feet. Quantities increased to 41,044 cubic yards with 1,117 tons of lime and 3,490 tons of cement added for solidification.
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- ◆ Hexavalent Chrome Stabilization - Kearny, New Jersey. Project Manager for a stabilization project involving hexavalent chrome contaminated soil. The ex-situ remediation used a ferrous sulfate chemical reagent and Portland Cement as the stabilization reagent to chemically fix and stabilize the chrome waste. Total chrome levels were reduced from 4,000 mg/kg to <100 mg/kg. 7,500 tons of soil was successfully stabilized at multiple sites in Kearny, New Jersey. Mobile equipment including two pugmills were utilized to complete the project in a two-month period at multiple sites in Kearny, NJ.
 - ◆ Technical Director on projects, including incineration, thermal desorption, stabilization/solidification, vacuum extraction, chemical treatment, bioremediation, air stripping, carbon adsorption, filtration, ion exchange, and chemical precipitation/removal.
 - ◆ TP Industrial and Cannons Engineering Superfund Sites - New Jersey and Massachusetts. Performed and managed two hazardous waste thermal desorption projects in New England.
 - ◆ RI/FS Peak Oil Superfund Site – Tampa, Florida. Managed an area-wide RI/FS project; negotiated settlement with PRP Groups and U.S. Environmental Protection Agency for one RI/FS out of three Superfund sites; subsequently managed overall project and field personnel.
 - ◆ McKin Superfund Site. Completed McKin Superfund site remediation in 1986, first ever application of thermal desorption to hazardous waste soils, as Project Coordinator/Engineer.
 - ◆ Thermal Desorption System - Vicksburg, Arizona. Performed the installation and startup of a fixed base thermal desorption system. Scope of work included construction, startup, shakedown, and verification of compliance operations.
 - ◆ Sand Creek Industrial Superfund Site - Denver, Colorado. Managed the remediation of the Sand Creek Industrial Superfund Site. This project consisted of thermal treatment of soils contaminated with pesticide compounds. Complex water treatment systems were employed. Designed and procured equipment for a \$1.5 million thermal desorption system, first such full-scale system in the country. Designed and managed the construction of a \$2.2 million state-of-the-art thermal desorption system for hazardous soils utilizing many different treatment technologies. Fourth generation system was developed using improvements from three generations of system completed previously in work history.
 - ◆ Corporate Operations Manager for all projects involving unit process/treatment technologies. Responsibilities included management of all technical projects, recommending and soliciting purchases of capitalized equipment, development and tracking of amortization schedules for capitalized equipment, bid preparation, contract negotiation and administration, and oversight of respective regional office operations utilizing the technologies on specific projects. Responsible for all technical aspects of operations. Expertise in the design, construction, and management of hazardous impacted water treatment operations. Wrote and received two patents for thermal desorption technology. Responsible for office and field management of a wide variety of site remedial actions and investigations, using many different technologies. Specializes in ground water treatment technologies, such as air stripping, carbon adsorption, and metals treatment/removal. Managed wide variety of material handling operations which are integral to remedial activities, including screening, sorting, crushing, washing, and conveyance operations. Managed the QA/QC programs as a third party engineer for HDPE liner installations on haz-waste cell construction.
 - ◆ Lake Michigan Superfund Project - Michigan. Member of design team responsible for the design and construction of a large dredge waste containment and de-watering cell for a Superfund project on Lake Michigan. Designed water treatment operations to treat de-watering flows impacted with PCB's.
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- ◆ Waldick Aerospace Devices Superfund Site Remediation - Sea Girt, New Jersey. Managed work performed at the Waldick Aerospace Devices Superfund Site remediation for the U.S. Army Corps of Engineers. Soils impacted with chlorinated VOCs and metals were treated using thermal treatment. Also stabilized soils for metals and conducted water treatment operations.
- ◆ Textron Site and Old Marsh Site Remediation - New Jersey and Arizona. Successfully completed Textron site remediation in Newark, NJ. Negotiated, planned, pilot tested and developed the thermal desorption technology to remediate pesticide-contaminated soil for the Old Marsh site in Goodyear, Arizona. This was the first application of the technology for pesticide impacted soils in the United States.

Education

- ◆ B.E., Chemical Engineering/Environmental and Water Resources Engineering - Vanderbilt University (1983)

Training & Certifications

- ◆ Registered Professional Engineer, Indiana and Tennessee
 - ◆ 40-Hour Hazardous Waste Operations Training
 - ◆ 8-Hour Hazardous Waste Operations Supervisor Course
 - ◆ 8-Hour Lockout/Tagout Training
 - ◆ 8-Hour Confined Space Training
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STEVEN (SKIP) SIMPSON, E.I.T

EI dredging adviser (startup, troubleshooting and technical guidance of dredging and dewatering operations, on-site and off-site)

Qualifications

Mr. Simpson has over 37 years of experience in the environmental remediation and civil construction industries. His duties include management of construction and remediation activities, coordination of subcontractors, construction scheduling, project administration, and construction engineering. Mr. Simpson has varied and valuable experience including mass excavation, civil construction, utilities installation, dredging, sediment remediation, system instrumentation and controls, sheetpiling, and shoring.

Experience

- ◆ NPDES Pond Clean-Up – Goldendale, Washington. Project Manager for the dewatering, moisture conditioning, excavation, stockpile, and load out 40,000 cy of contaminated sediments from four different ponds. The NPDES ponds were used for detention of wastewaters from a nearby aluminum plant. The scope of work included excavating all pond sediment and underlying soil with elevated levels of polycyclic aromatic hydrocarbons (PAHs), dewatering and/or dry sediment to minimize landfill tipping fees, blending sediment to maximize the amount disposed of as a solid waste and minimize the amount disposed of as a hazardous waste, and disposing of excavated soil and sediment at commercial solid waste and hazardous waste landfills.
- ◆ Cannelton Industries Site - Sault Ste. Marie, Michigan. Project Manager responsible for the sediment remediation of a former tannery facility. Under this contract, approximately 40,000 cubic yards of sediment was dredged from Tannery Bay, containing approximately 500,000 pounds of chromium and 25 pounds of mercury. Envirocon was tasked with dredging the sediment from Tannery Bay, barging it about 3 miles east of the bay, offloading the sediment, and drying it to pass a paint filter test. Envirocon's also provided health and safety support, managed the ongoing dredge survey data, treated the water from the sediment, and loaded the trucks carrying the dried sediment to the Dafter Landfill.
- ◆ Barrier Wall/Landfill Cap Construction Project – Astoria, Oregon. Project Manager of the Tongue Point Intertidal Sediment Remediation Project/Tongue Point Landfill Cap Project. Project consisted of the remediation of contaminated sediments and shoreline at a former military base on the shores of the Columbia River near Astoria, OR. The work scope included the excavation of contaminated inter-tidal sediments, debris removal from shoreline, installation of a sediment dewatering and treatment system, stabilization of saturated sediments, onsite landfill construction and capping, and installation of a soil/bentonite barrier wall around the perimeter of the landfill. The work also included construction of interceptor and landfill gas piping trenches, and extensive bank restoration work.
- ◆ Hylebos Shoreline Remediation Project - Tacoma, Washington. Project Engineer/Superintendent for environmental dredging/shoreline remediation project in the upland portion of a large Superfund cleanup of a waterway in Tacoma, Washington. Scope of work included the excavation of 34,000 cubic yards of shoreline bank material and 9,000 tons of intertidal material. In addition, the scope of work included repair and resurfacing of a dredged material storage area, demolition of piers and bank side concrete structures, removal of ACM impacted soils, remediation of 3,500 lf of intertidal shoreline, and building infrastructure to offload/load

Experience Highlights

- RCRA Landfill Cell Construction
- Wetland Rehabilitation
- Sediment Remediation on CERCLA projects
- Environmental Remediation
- Intertidal Excavation and Capping
- Construction Engineering
- Air Sparge System Installation
- Road Construction
- Underground Utility Installation
- Pump Station/Force Main Installation

approximately 400,000 cubic yards of contaminated dredge sediment and debris. Mr. Simpson was responsible for supervision, dredging, bathymetric surveys, and scheduling.

- ◆ Waste Consolidation and RCRA Cap - Spokane, Washington.- Construction Manager for Waste Consolidation and RCRA Cap. The project consisted of the consolidation of approximately 250,000 cubic yards of waste material, construction of a 650,000 square foot multi-layer cap, installation of approximately 2000 lf of 42” storm drainage system, processing of 35,000 cubic yards of drainage layer material, construction of solid waste transfer station, monitoring well extension /rehabilitation and 320,000 square feet of paving. The RCRA cap consisted of a geosynthetic clay liner, 60 mil HDPE, high permeability soil drainage layer, eight-ounce geotextile and a twelve inch thick armored cover layer. The project was completed within a five-month period under varying weather conditions with numerous subcontractors.
- ◆ Air Sparging System - Spokane, Washington. Project Superintendent for the installation of an air sparging system to treat petroleum contaminated soil in Spokane, Washington.
- ◆ Estimator, Project Manager, and Superintendent for multiple heavy construction projects including road construction, installation of underground utilities, commercial, residential, and public site work, civil construction, and installation of pump stations, force mains, and sanitary sewers.
- ◆ Estimator/Project Manager for subdivision construction in Vancouver, Washington, and Oregon City, Oregon. Project tasks included mass excavation, grading, paving, installation of pump stations, force mains, and underground utilities
- ◆ Estimator/Project Manager for site work construction of an Albertson’s Food Center in Marysville, Washington. The project required clearing, grading, installation of all underground utilities, paving 7- acres, and preparing slab on grade for buildings.
- ◆ Estimator/Project Manager for the installation of 220 miles of buried telephone cable in Long Creek, Oregon, and numerous other telephone cable, manhole, and conduit projects.

Education

- ◆ B.S., General Engineering, Civil Engineering Option, Hydrogeology minor (2005)
- ◆ Pre-Engineering Studies – Whitman College
- ◆ Surveying Studies – Walla Walla Community College

Training & Certifications

- ◆ 40-Hour Hazardous Waste Operations Training
 - ◆ 8-Hour Hazardous Waste Site Annual Refresher Training
 - ◆ Fundamentals of Engineering Exam (2005)
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JEFFREY HABEGGER

EI Project Manager (on-site)

Qualifications

Mr. Habegger has 27 years of management and supervisory experience in environmental, civil and industrial construction. He has successfully managed and completed more than 300 projects ranging in value from \$1,000 to \$8,000,000. Mr. Habegger has completed projects for a Fortune 500 companies and a number of government agencies including the US Army Corp of Engineers and the US EPA. Mr. Habegger has been responsible for operations management, contract management, subcontract procurement, cost tracking, cost forecasting and project scheduling. He has been involved in technical approach development for numerous project proposals, work plans, and completion of multiple projects involving a full spectrum of construction technologies. Mr. Habegger has acquired on-site experience in projects involving landfill construction, lining and capping, road construction, demolition, large-scale soil and sediment excavation and transportation, facility decontamination, asbestos abatements, managing PCB-impacted soil, hazardous waste disposal, contaminant sampling, drum recovery, wastewater treatment, underground recovery, filtration and dewatering, radioactive waste recovery and disposal, derailments and shock sensitive, explosives and reactive materials handling and disposal.

Experience Highlights

- Management of multiple task projects
- Sediment excavation
- Cofferdams and earthen containment
- Construction of river bypass
- Water treatment system
- In-water excavation
- Supervision of field crews
- Landfill construction, lining and capping
- Landfill gas vent installation

Select Project Management Experience

- ◆ Phase 8 Landfill Cell Construction and Closure - Johnsonville, TN. Project Manager for this landfill cell construction and capping project involving site clearing, excavation and consolidation of non-hazardous industrial waste, construction of stormwater drainage systems and installation of a multi-layer cap system. Managed the excavation of approximately 46,000 cy of waste from outside the landfill, placement of 44,000 cy of compacted clay liner, placement of 8,000 cy of general fill, placement of 11,200 cy topsoil, installation of leachate collection system, installation of 4,000 liner feet of rip rap and gabion lined channels, and installation of 250,000 square feet of geo-synthetic liner material.
- ◆ Forrestal & Supply Side Landfills - Waukegan, IL. Managed the capping and closure of two landfills. At the Forrestal Landfill managed the excavation and relocation of waste material; acquisition, transportation, placement and compaction of 6,200 cy low permeability clay and 2,400 cy of topsoil; installation of a gas collection system and site restoration. At the Supply Side Landfill, managed the regrading of 46,300 cy of waste material; excavation of borrow soils; placement and compaction of 36,200 cy of low permeability clay; excavation, placement and compaction of 23,000 cy of topsoil; and installation of the gas collection system and site restoration.
- ◆ RCRA Hazardous Waste Landfill Closure - Catlettsburg, KY. Project manager at this capping and closure project. Tasks included waste consolidation, waste/subgrade regrading, borrow area development and restoration, low-permeability clay liner and geo-composite drainage layer placement, gas/leachate collection, grouted rip rap lined channel installation, and gabion-lined letdown channel installation.
- ◆ Sludge Lagoon Cap Closure - Grenada, MS. Project Manager for this lagoon closure and capping project involving sludge stabilization with lime and Portland cement, followed by installation of low permeability clay cap, geo-membrane liner and site restoration including the on site borrow area.

Other Project Experience

- ◆ Lenz Oil Water Treatment Plant Construction and Slurry Wall Construction - Lemont, IL. Project Manager for a water treatment plant and slurry wall containment barrier system, involving site clearing, demolition, waste excavation, rock trenching, slurry wall construction, grout curtain installation, vacuum enhanced recovery system installation, and water treatment system construction.
 - ◆ Velsicol Cypress Creek Remediation Project - Memphis, TN. Project Manager for remediation of residential properties contaminated with pesticides. Project work included the excavation, backfill, and restoration of the impacted residential yards. Project also included construction of a waste consolidation area equipped with HDPE liner cap, installed upon completion of the remediation. Mr. Habegger was responsible for the management of all personnel and subcontractors.
 - ◆ Marcon Facility Site Remediation - Buffalo, NY. Responsibilities included the contractual, financial, and operation management of the project, including health and safety. The project included the excavation of approximately 37,000 tons of petroleum-contaminated soils, pre-treatment of 700,000 impacted ground water, removal of four underground storage tanks, placement of approximately 35,000 tons of backfill material, and other restoration activities.
 - ◆ Doe Run Site - Herculaneum, MO. Project Manager for remediation of residential properties contaminated with lead-impacted soil. This long-term project extended over several years and included the excavation, backfill, and restoration of approximated 180 impacted residential properties per year. Mr. Habegger was responsible for the management of all personnel and subcontractors.
 - ◆ Marion Engineering Depot (MED) Soil Excavation and Transportation - Marion, OH. Managed the hazardous waste excavation and transportation of contaminated materials from MED under the total environmental restoration contract (TERC). Site soils were contaminated with volatile organic compounds (VOCs), particularly trichloroethylene (TCE), and required excavation and removal. Oversaw site mobilization and began preparation activities. These activities included: clearing of utilities, delineating site access areas, establishing control zones and establishing truck entrance and exit areas, installation of erosion- control measures, clearing and grubbing of work areas with chipped wood to be used as on-site material, verifying existing power utility facilities and equipment were deenergized, demolishing and disposing of all existing structures, constructing and repairing perimeter fencing, ensuring adequate protection around monitoring wells, installing portable truck scales, mobilizing, setting up and testing contact water treatment system; erecting facilities to house the VOC suppression equipment and materials and establishing a staging pad.
 - ◆ Soil Stabilization Projects in Metropolitan - Dayton & Cincinnati, OH. Managed the soil stabilization of several roads, streets and building pads with lime, fly ash, and Portland cement. Also managed the reclamation and stabilization of several asphalt parking lots, streets, and roads with lime, fly ash, and Portland cement.
 - ◆ Brownfield Development at the Former Tenneco Automotive Manufacturing Facility - Cleveland, OH. Project Manager for the Brownfield development project, involving excavation of hazardous waste and nonhazardous waste demolition of former plating facility, demolition of non-load-bearing walls, utility relocation, backfilling, and compaction revegetation/restoration.
 - ◆ Demolition and Decontamination - Parkersburg, WV. Project manager for the selective demolition and decontamination of a 25,000 sq ft manufacturing, research and development facility contaminated with PCBs. Also managed the related asbestos abatement activities.
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- ◆ Water Treatment - Louisville, KY. Managed the treatment of water contaminated with hexavalent chrome and other heavy metals. Approximately 6,000 gallons of wastewater was treated per day and sludge was dewatered in a recessed chamber filter press.
 - ◆ Manufacturing Facility Decontamination - Toledo, OH. Project manager of the decontamination of a manufacturing facility contaminated with PCBs. Facility structures and process equipment were decontaminated using high pressure washing and hand scrubbing techniques, rinse water generated during the decontamination operations was collecting using wet/dry vacuums equipped with HEPA filters. Decontamination feasibility studies were successfully performed to determine the optimum decontamination procedures.
 - ◆ RCRA Closure - Findlay, OH. Project manager for the RCRA closure of a hazardous waste storage unit. Excavated and disposed of 330 tons of xylene-contaminated soil. Closure activities were performed in full compliance with OEPA's approved closure plan.
 - ◆ Laboratory Decontamination EI DuPont - Louisville, KY. Managed a project to decontaminate a laboratory facility contaminated with F-listed solvent waste and heavy metal contaminated waste. Performed the successful volume reduction of the waste volume recovered by 70% through the use of a plate and frame filter press system.
 - ◆ Manufacturing Facility Decontamination-Michigan. Managed the decontamination of a manufacturing facility. Recovered 2,000 pounds of mercury and managed the disposal of mercury contaminated process equipment.

Education

B.S. B.A., Accounting and Business Management, May 1984, Ohio Northern University

Training and Certifications

- ◆ OSHA 40 Hour Hazwoper Certified
 - ◆ Hazwoper Site Supervisor 8 Hour Certification ((29CFR 1910.120(e)(4))
 - ◆ Confined Space Entry Supervisor and Competent Person (OSHA 29 CFR 1920.120(e)(4))
 - ◆ Excavation Competent Person (29 CFR 1926.650(b))
 - ◆ Site Accident Prevention Competent Person (29 CFR 1926.20(b)(2))
 - ◆ Envirocon Health and Safety Officer Course February 2011
 - ◆ Lead Abatement Supervisor Certification (40 CFR 745, (77 IL Adm. Code 845),(MO 19 CSR 30-90)), 2006
 - ◆ TEREX/CMI Reclaimers / Stabilizers Equipment Maintenance Training, 2003
 - ◆ Lead Abatement Certified, 1998 (OSHA, CFR 1962.62)
 - ◆ Scaffolding Competent Person 1998
 - ◆ American Management Association, Basic Project Management, 1991
 - ◆ Certified Asbestos Supervisor, 1989
 - ◆ OHM Site Safety Officer, 1988
 - ◆ US Army Ordnance School, 1980
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RICHARD WHITMAN

EI Project Superintendent (on-site)

Qualifications

Mr. Whitman has 17 years experience in the construction field, with 14 years experience in the environmental industry. As a Project Superintendent, Mr. Whitman's responsibilities include supervising field operations, executing work in compliance with plans and specifications, procuring and managing material suppliers and subcontractors, adhering to project work plans and quality control requirements, and being a field leader in the implementation of the project health and safety plan. Mr. Whitman worked for five years at the BP/Atlantic Richfield Casper refinery site where he participated in the construction of the wetlands treatment system and led the remediation of the Soda Lake Inlet Basin, an area containing 250,000 cubic yards of hydrocarbon impacted sediments in a wetlands environment.

Experience Highlights

- Management of heavy equipment
- Production and safety
- Supervision of field crews
- Soil Excavation and Transportation
- Site Development and Utility Installation
- Tank and Piping Removal

Experience

- ◆ Exxon-Mobil VCC Stono Site – Charleston, SC. Project Superintendent. Supervised & assisted dredging subcontractor. Removed 1,700 cy of river & marsh sediments. Loaded material into containers aboard a 40 X 140 barge, where material was stabilized for lead & arsenic & transferred to trucks on shore. Also took over supervising onshore excavations of impacted areas. Moved landowner assets & capped low impacted areas. Removed & stabilized higher contaminated areas according to engineers sampling results.
- ◆ Frontier Refinery Waste Water Pond Cleaning & Reconstruction – Cheyenne, Wy. Project Superintendent for excavating material from four waste water ponds, approximately 1 acre each in size. Hauled over 50,000 tons of material to drying pads & loaded for off-site disposal. Expanded & Reconstructed into three ponds lined with 60ml HDPE liner. Installed 4,500 LF of HDPE pipes of various sizes to facilitate water treatment process. Installed stilling structure in Crow creek for discharging treated water.
- ◆ 21st Street Pond Remediation – Ogden, Utah. Superintendent for the construction of a cofferdam and sediment cap system near an operating railyard in Ogden, Utah. This work was done to mitigate DNAPL contamination emanating from railyard property and potentially threatening the 21st Street Pond and Ogden River. The work was performed in accordance with strict design specifications and subject to EPA and UDEQ oversight in a procedural setting closely paralleling a CERCLA closure. Envirocon lowered the pond water surface by closing the influent structure valve and adding a barrier to stop flow from the Ogden River from entering the pond. When the construction area could no longer be dewatered by this procedure, the pond level was lowered by pumping so all the remediation work could be performed in the dry. Envirocon constructed the cap and containment system for DNAPL and DNAPL impacted sediments including: placement of coarse aggregate, HDPE lining system (associated with the DNAPL cofferdam and DNAPL extraction trench/collection system), filter fabric, hydrocarbon absorbent, permeable material, import fill, rodent control barrier, construction of interlocking sheet pile wingwalls, and groundwater discharge drains. The construction of the cap system will allow groundwater movement and flow towards the 21st Street Pond.
- ◆ Soda Lake Inlet Basin Remediation – Casper, Wyoming. Project Superintendent for the select excavation of 250,000 cubic yards of hydrocarbon sludges and sediments from a wetlands area. The project included select excavation using a laser guided track hoe, loading, transportation, and placement in the on-site CAMU cell.

The approach was developed by Envirocon and submitted as an alternative to a reverse dredge sand cap, saving the client millions in long term O&M.

- ◆ Casper Refinery Redevelopment Project – Casper, Wyoming. Project Foreman for the remediation of the former Casper Refinery and construction of the Platte River Commons development. The nationally recognized and awarded Platte River Commons and Salt Creek Heights development was considered a Brownfield’s project. The scope of these reuse projects included the rough grading of an 18-hole golf course whose water features doubled as a water treatment system, site development for two business parks, pedestrian trails, conversion of a 400 foot rail road bridge to a pedestrian bridge, a five feature kayak park, and concrete bridge demolition.
 - ◆ Pipe and Soil Removal - Casper, Wyoming. Project Foreman for a project at the above former gas refinery site after successfully completing CAMU construction in the previous month. The scope of work for this pipe and soil removal project included excavation, decontamination, sizing, and recycling of 1,000,000 lf of refinery process piping. In addition, Envirocon was responsible for the excavation, stockpiling, and crushing of 355,000 tons of concrete, and demolition of seven crude oil storage tanks, several buildings, and electrical power systems.
 - ◆ North Properties Area Waste Unit Removal and CAMU Construction Project - Casper, Wyoming. Project Foreman for another project at the above site after successfully completing the CAMU construction projects. The scope of work for North Properties Area Waste Unit Removal Project included excavation, stabilization, transportation, and disposal of materials from public properties including a high school, businesses, and industrial properties. Over 500,000 cy of refinery waste and contaminated soils from 13 refinery waste units and the former refinery was placed in the CAMU constructed by Envirocon.
 - ◆ CAMU Construction Phase II – Casper, Wyoming. Project Foreman for the construction of a 13 acre lined CAMU cell and access roads in preparation for placement of remediation wastes from a former refinery located approximately 4 miles away. The cell was constructed with a design capacity of 500,000 cy of waste. The work required clearing, grubbing, and stripping of 15 acres of native vegetative cover materials. The topsoil was stockpiled for use on the outside embankment slopes of the CAMU cell and for construction of the cover and cap. The lining system consisted of geosynthetic (GCL) contacting the embankment and cell bottom, a textured 60-mil HDPE as the second layer, and a geocomposite netting as the final layer. Envirocon then placed 12 inches of native soil and 12 inches of approved waste material as a cover/protective layer for the liner system.
 - ◆ U.S. Army Corps of Engineers, River Flood Control - Napa, California. Project Foreman for in-water excavation of material in order to terrace river bank as part of the Napa River Flood Control Project. Segregated material for disposal, recycling, or placement as fill. Removed and disposed of contaminated material at Class I/II/III landfills. Screened 80,000 cy of material removed from site and crushed oversize material prior to placement. The scope of work included in-water excavation, contaminated material excavation, daily water quality monitoring, levee building, levee restoration, screening, crushing, stockpiling, site restoration, transportation, and disposal.
 - ◆ Portland Cement - Salt Lake City, Utah. Project Superintendent involving the screening of 39,000 cy of concrete kiln dust to segregate chromium brick for disposal at a hazardous waste site in western Utah.
 - ◆ Basin Creek / Tenmile EPA Superfund Project – Basin, Montana. Project Foreman for the Basin Creek/Tenmile EPA Superfund Project. Responsible for the daily field operations at a project effort rate which exceeded \$1,000,000 per month. Job tasks included project staffing, managing approximately 30 pieces of heavy equipment, and interfacing with government personnel and inspectors. Unique challenges to this project
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included high altitude mountain conditions, work sites spread over a 20-mile radius, and coordination work with numerous EPA, USBOR, and USFS representatives.

- ◆ Jacobs Smelter OUI Remedial Action - Stockton, Utah. Project Foreman for the Jacobs Smelter OUI Remedial Action project. The primary objective of the project was to remove the potential for human contact with contaminated soil by removing the soil, refilling the excavated areas with clean material, restoring landscaping and vegetation, and performing selective site clearing. The scope of work required 60,000 cy of soil excavation and backfill, and complete landscaping restoration of 126 properties contaminated with lead and arsenic.
- ◆ Murray Smelter Remedial Construction - Murray, Utah. Project Foreman for an environmental remediation project at Murray Smelter. This project involved the excavation, processing by crushing and screening, and placement of heavy metal contaminated soil. Contaminants of concern were lead and arsenic. Soil was excavated, crushed to 1-inch minus, and placed into a lined repository within a city street right-of-way. Following placement, the repository was capped with geo synthetics and aggregate base materials prior to paving.
- ◆ Environmental Closure of the Wire and Cable Facility - Hopkinsville, Kentucky. Project Foreman responsible for the removal and decontamination of hazardous or RCRA affected components from a magnetic wire manufacturing facility. The components included piping and tanks, both hazardous and non-hazardous, contained in a wire drawing facility, a fine wire facility, enamel-coating facilities, wire curing facilities, a feed tank farm, and bulk storage facilities. The piping and tanks contained significant amounts of pure products including enamel, thinners, phenol, and cresol-type components. A majority of the piping was cleaned in-place using an innovative product withdrawal and cleaning process. The piping and tanks were removed from basement rooms and tunnels as well as from the main production floor. Piping and tanks, which were not feasible to be cleaned in-place, were cleaned outside the plant using a water blasting/lance technique. Water was treated for recycling and re-use. Large tanks were also cleaned, specifically those contained in the feed tank farm. Asbestos abatement was conducted in and around large enamel curing ovens on the main production floor. All surfaces which were potentially impacted were cleaned thoroughly with water blasting techniques. Finally, all underground storage tanks were removed from inside the building.

Training & Certifications

- ◆ 40-Hour HAZWOPER
 - ◆ 8-Hour HAZWOPER Refresher
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STEVEN J. PETERSON

EI Project Superintendent (on-site)

Qualifications

Mr. Peterson has over 8 years of experience in environmental remediation and civil construction. His responsibilities as Superintendent include the supervision of field forces responsible for implementation of project work plans, interface with and supervision of subcontractors, compliance with project safety and quality requirements, and tracking of work progress/quantities for invoicing purposes.

Experience Highlights

- Contaminated soils excavation and transportation
- Hazardous and solid waste landfill operations
- SMWU construction and capping
- Storm/sanitary sewer installation
- Quality control
- GPS and Optical Survey

Experience

- ◆ Operable Unit 1 Remediation Construction Stauffer Chemical Superfund Site – Tarpon Springs, Florida. Superintendent for the excavation, handling and on-site consolidation of approximately 201,700 cubic yards of roadway and former railroad bed slag, waste fill, contaminated soil, and sediment. The scope of work also included construction of a groundwater cut-off wall using fiberglass composite sheeting, shoreline restoration and protection, and the construction of two low-permeability geo-membrane caps.
- ◆ Waco Subsite Waco Designated Area RD/RA – Waco, Missouri. Superintendent for the excavation, placement and capping of mine tailings at the Waco RD/RA project in East Cherokee County, Kansas. Mine tailings totaling 110,000 CY from 3 properties was excavated, hauled and placed in 2 existing mine subsidence features and an existing tailings pond. Over 80,000 CY of clay and topsoil were excavated, hauled and placed as a cap on the mine waste and existing 28 acre tailings pond. Remediation of a 2200 foot drainage slough through a heavily timbered area was performed with small equipment to meet the property owner’s demands of no disturbance beyond the banks of the stream. The former mine waste areas and caps were sampled, amended and vegetated. Water management of existing ponds and storm runoff was a critical part of the project. Building and maintaining a working relationship with the property owner and the adjacent Acme #1 contractor added a dimension to the project.
- ◆ Exxon Parachute Logistics Base – Parachute, Colorado. Superintendent for the installation of three rail spurs and four working pads, excavation of 320,000 cy of soil and the placement of 350,000 cy of import soil. The scope of work also included excavation of a 500,000 gallon retention pond, installation of 25 power and light poles, 65,000 square feet of roadway, local utility taps, and a concrete storm sewer system.
- ◆ River point at Sheridan - Sheridan, Colorado. Superintendent responsible for the removal of roughly 1,000,000 cubic yards of historic landfill debris while backfilling to over lot grades and stability requirements for vertical construction. Other tasks included building a swale channel in preparation for a hundred year storm event, 5 catch ponds with outflow capabilities to North Platte River, and bridge abutment preparations for both a pedestrian and auto-bridge spanning the river.
- ◆ Stryker Bay (Duluth Tar Project) - Duluth, Minnesota. Quality Control/ Survey Tech II for an 11-acre area Bay of Lake Superior finally containing roughly 180,000 cubic yards of material. Project included value engineering the original containment design to add sheet piles for stability, building the containment structure itself for the containment wall around the capping area (a portion of the Bay itself), an active treatment layer, and sub

aqueous sand cap, followed by a sand surcharge cap. The scope of work also included site preparation; spill boom and silt curtain installation; installation of monitoring instruments; performing demonstration lifts; non-woven geotextile installation; sub aqueous cap and above water cap and surcharge construction; and demobilization.

- ◆ Sand Creek Lateral at the Rocky Mountain Arsenal (RMA) - Commerce City, Colorado. Operating Engineer using Excavator and Bulldozer which participated in the excavation and transportation of 80,733 BCY and 75,492 BCY of HHE and Biota impacted soils to the Hazardous Waste Landfill (HWL)/Enhanced Hazardous Waste Landfill (ELF) and Basin A. Notch respectively for disposal. In a majority of the areas, the HHE soil was above Biota soil, consequently HHE impacted soil was removed, quality controlled and surveyed, before the Biota impacted soil was excavated. After the completion of excavated survey, backfill of all excavated areas was placed to the original and final grades. Upon final survey, backfill areas were ripped to a depth of 18-inches to assist RMA Wildlife Management personnel with the planting of native vegetation.
- ◆ Katrina Hurricane Relief Project - Belle Chasse, Louisiana. Project Foreman for Envirocon's Response Team awarded by the U.S. Army Corps of Engineers (USACE) for debris removal in the city of New Orleans and surrounding parishes. Envirocon's portion of the work involved debris removal and disposal in Plaquemines Parish, an area extending over 100 miles southwest of New Orleans. The scopes of work included pumping water from existing borrow pits, developing several landfills, demolishing inhabitable structures, and hauling debris to the appropriate disposal facilities, which accounted for over 500,000 cubic yards of debris. Directly responsible for oversight of approximately 5 subcontract debris pick-up and building demolition crews, and the establishment of living quarters for over 100 personnel. Performed daily coordination of all subcontractor locations and debris quantities, and ensured work was performed in accordance with the ACE and FEMA guidelines and expectations.
- ◆ Rocky Flats Environmental Technology Site – Golden, Colorado. Laborer/ Lead on a project which consisted of final grading of approximately 625-acres in the former Industrial Area. Scope of work included the construction of five Functional Channels stretching over two miles, construction of approximately 7-acres of wetlands, and removal of underground utilities, culverts, roads, and building foundations.

Education

- ◆ Associates Degree of Arts in Social Science, Mesa State College – Grand Junction, Colorado (2008)

Training

- ◆ 40-Hour Hazardous Waste Operations Training
 - ◆ 8-Hour Annual Refresher
 - ◆ A.R.C. First Aid & CPR
 - ◆ AutoCAD 2D certificate
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MICHAEL K. BEARDSLEY, P.E.

GGE Principal (RTK GPS interfacing and bathymetric surveying, on-site)

Qualifications

Mr. Beardsley has over 13 years of experience in the demolition, construction, and environmental remediation fields. As Project and QC Engineer, Mr. Beardsley is responsible for procurement, QA controls, contract administration, project documentation, subcontract management, scheduling, and resource allocation activities. He has assisted with preparation of numerous successful bids and project proposals for a multitude of environmental and civil engineering/construction projects, drafted subcontracts, managed field crews, enforced environmental compliance, health and safety, and QA/QC procedures. He has utilized the Three Phase Inspection System similar to US Army Corps of Engineers projects for QA/QC compliance on all Envirocon projects.

Experience

- ◆ Western Refining Yorktown Refinery Project, Yorktown, Virginia. Developed a remote survey system for a remote controlled dredge used on a 5 acre refinery sludge pit. The system utilized a robotic total station, prism mounting and trolley system designed by Mr. Beardsley, and a TSC2 with grading models. Mr. Beardsley and his team conducted a preconstruction bathymetric survey of the hazardous sludge in three ponds. Built models of all three ponds, and used the data for determining volumes during a pilot study. Also conducted a three phase pilot study involving the sludge. In Phase I, several different sludge additives were tested for their effectiveness at solidifying the sludge to pass the paint filter test (PFT), while yielding desirable handling characteristics. Cement Kiln Dust (CKD) and Ground Peanut Hulls (GPH) were tested in various combinations and concentrations. When these products failed to yield the desired result, bench scale testing of other additives was conducted to determine which reagent to utilize. Lime Kiln Dust (LKD) was determined to be the most effective. In Stage II of the pilot study, test pads were constructed and studied using the various amended sludges from the Stage I studies. Stage III tested the effectiveness of hydraulic dredge for removing the sludge from the ponds. It was determined that too much water came in with the sludge during dredging, though the surveying system worked perfectly. The pilot study was then extended test other removal methods, including dewatering the pond and using a large, hydraulic, submersible, solids pump to remove the sludge. In addition, Mr. Beardsley helped implement and optimize the LKD addition to prevent dust generation during the mixing operation. Lastly, Mr. Beardsley drafted the pilot study test report on behalf of Envirocon for submittal to the USEPA, Client, and Engineer.
- ◆ Granby Airport Part I, Granby, Colorado. Mr. Beardsley trained a college intern to utilize a Trimble robotic total station, TSC2, software and models (Roading and DTM) for the construction stakeout of 2,000 feet of

Experience Highlights

- Demolition, Decontamination, and Decommissioning
- Partial Dismantling and Demolition of Process Units and Strip-Out of Manufacturing Facilities
- Contaminated Soil Excavation
- Autodesk Civil 3D 2011
- Bioremediation Systems
- Civil Construction
- Construction Surveying and Layout
- Groundwater Collection Systems
- Groundwater Treatment
- Geomembrane System Installation
- Iron Wall construction
- Landfill Construction and Closure
- Machine Control (GPS)
- Radiological Remediation
- Remedial Systems - Soil and Groundwater Treatment
- Scheduling (Primavera P6 & MS Project)
- Site Development and Utility Installation
- Slurry and Reactive Wall Systems
- Soil Excavation and Transportation
- Structure and Foundation Demolition
- Tank Piping Removal
- Trimble Hardware and Software
- Wetlands Construction

runway, installation of new runway lighting, construction of a 15 course segmented retaining wall, installation of wildlife fencing and new safety area grading (approximately 30,000 CY of excavation and embankment) and construction of 3 perpendicular taxiways and 1 parallel taxiway. The digital models of the design were built by Mr. Beardsley and were utilized on both the TSC2 and on a laser augmented GCS 900 CAT 140 M motor grader. Mr. Beardsley also provided project management support, SWMP plan preparation, QA/QC audit support, construction layout training, PAVETEC guidance system programming for the automatic asphalt paver, compilation of the as-built records and volumetric analyses. This project had to meet FAA requirements.

- ◆ River Point at Sheridan, Colorado. Supplied DTM support for the removal of a pre-regulation landfill site construction layout using GPS with SCS 900 and survey controller as well as for two GCS 900 Komatsu excavators, one GCS 900 D6 dozer, and 1 Site Vision D5 dozer. Also supplied overall project engineering support including controlling all record documents, managing a field engineering staff of 5 full time and 1 part time employee, managing subcontract survey personnel and their data, and provided technical guidance for volume quantification and change order support.
 - ◆ Outerloop, City and County of Denver Stapleton Redevelopment Project. Conducted site sampling/boring, contaminant delineation, topo'd the site and conducted a volumetric analysis. Developed stormwater and erosion control plans for CCOD WMD and CDPHE permits. Composed cross sections and excavation plans for the remediation of a former landfill. Managed all CAD data, volume analyses, as-builts and closeout document for the VCUP (Voluntary Clean Up Program) No Further Action letter, as well as the CAMU (Corrective Action Management Unit) closure documents. Provided onsite technical assistance and project management support for Envirocon throughout the duration of the entire design build project. Provided justification for change orders.
 - ◆ Wichita Seeps Project, El Paso Energy, – Wichita Kansas. Prepared pressure drop calculations for the conveyance piping system, cutoff wall design and specification preparation, conducted trench stability calculations using Mohr's Circle failure envelopes, built the site conceptual model and lithology from field investigation and boring activities, conducted guar gum biopolymer and bentonite slurry compatibility studies, conducted the soil-bentonite mix design, completed permit paperwork for an on-site landfarm (LTU) as well as feasibility analysis with regard to property ownership, underground utilities, soil and groundwater computability, available technology, etc. Prepared proposal and 30% design information for El Paso Energy and Kansas regulatory agencies.
 - ◆ Denver Water Slurry Wall Project – Denver, Colorado. Prepared submittals and SOPs/Work Plans, including Spill Prevention and Counter Measures Plans, Slurry Wall Trench Plan, and Platform Construction Plan. Maintained all non-financial project documentation, including As-Builts, RFI's, Notice of Completions, redlined drawings and specifications, sampling, and analysis results etc... Directed all technical engineering issues on the construction (non-design) side of the project. Also directed all QA/QC activities, including supervision of permeability testing, compaction testing, filtrate loss, slump, and grain size distribution.
 - ◆ BP Former Casper Refinery Project – Casper, Wyoming. Provided quality control services along with technical guidance and plan interpretation for the construction of the largest subsurface flow treatment system in the US. Additionally, conducted hydrostatic and pneumatic pressure testing of over eight miles of HDPE conveyance piping associated with the treatment system. Performed QA/QC inspections and oversight during 40 mil HDPE lining operations for both subsurface flow wetland treatment ponds, the biofilter, and five water hazard ponds on the associated golf course. Maintained all non-financial project documentation, including As-Builts, RFI's, Notice of Completions, redlined drawings and specifications, sampling, and analysis results etc. Composed Envirocon's closeout reports associated with the South Properties portion of the project. Mr. Beardsley also procured critical components for construction activities.
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- ◆ Basin F Exterior Remediation Project - Rocky Mountain Arsenal, Colorado. Tracked Basin F Exterior Remediation Project soil excavation quantities, man-hours, water usage, survey data--map construction, and many components of project progress. Composed most project submittals and maintained all non-financial project records.
- ◆ North Plants Demolition and Removal Project - Rocky Mountain Arsenal (RMA), Colorado. Quality Representative for the demolition, sizing, transportation, and disposal of 54 structures within the North Plants chemical agent production area at RMA, twenty-eight of which were declared under the Chemical Weapons Convention (CWC) treaty. Envirocon encountered numerous “anomalies” that provided additional opportunity to enhance our knowledge and experience with site-specific UXO observation and response protocols. Supervised the successful removal and salvage operation of “historical equipment” from RMA during the North Plants Demolition and Removal Project. Prepared submittals and SOPs/Work Plans, including Spill Prevention and Counter Measures Plans, Environmental Compliance and Materials Management Plans, Haul Roads, and Traffic Management Plans. Maintained all non-financial project documentation, including As-Builts, RFIs, Notice of Completions, redlined drawings, and specifications, and sampling and analysis results.
- ◆ Highway 139 Pintato Cañon Project - Rangely, Colorado. Supervised trucking operations and base course placement.
- ◆ ELF Test Pads Project - Rocky Mountain Arsenal, Colorado. Prepared submittals and SOPs/Work Plans including Spill Prevention and Counter Measures Plans, Environmental Compliance and Materials Management Plans, and Haul Roads and Traffic Plans. Provided all field engineering support for the construction of six test pads utilized to determine the specification for the clay liner and geomembrane system for the future Enhanced Landfill (ELF) construction at the Rocky Mountain Arsenal.
- ◆ South Plants Balance of Soils Phase II Well Abandonment Project - Rocky Mountain Arsenal, Colorado. Provided QA/QC oversight for LATA (Los Alamos Technical Associates) for the abandonment of 213 monitoring wells at RMA. Mr. Beardsley also prepared submittals and SOPs/Work Plans.
- ◆ Leaching of Vinyl Chloride from PVC Pipes Project - Statewide, Missouri. Lead Researcher, water sampling and GCMS analysis of water to 100 ppt, computer modeling of leach rate using Fick’s First Law, hydraulic modeling of small distribution systems for THM studies and similar using EPANET.
- ◆ Radiological Technician. Conducted both walking and driving gamma surveys utilizing Ludlum 2221 rate meters and 44-10 NaI detectors coupled to Trimble RTK GPS, took 5 point composite soil samples, performed in field gamma spectroscopy, function checked radiological equipment, maintained GPS equipment, created survey maps with Arcview GIS, troubleshoot shine and equipment problems, conducted initial site assessments, supervised the controlled excavation of radiologically impacted soil within Nuclear Regulatory Commission (NRC) restricted areas and conducted attenuation studies. Sites included the Lucky McUranium Mill Project – Gas Hills, Wyoming; Shirley Basin Uranium Mill Project – Shirley Basin, Wyoming; Quivira Uranium Mill Project – Grants, New Mexico; Atlas Minerals Uranium Mill Project – Moab, Utah;

Education

- ◆ M.S., Environmental Engineering, University of Missouri – Rolla (2000)
- ◆ B.S., Chemical Engineering, University of Missouri – Rolla (1999)

Training

- ◆ 8 hour OSHA HAZWOPER Refresher
 - ◆ 40 hour OSHA HAZWOPER
-

- ◆ 8 hour OSHA HAZMAT Supervisor Certified, December 2002

Certifications/Affiliations

- ◆ Colorado PE (# 38824), Kansas PE (# 18420), Mississippi PE (# 18548), Utah PE (# 6992892-2202), Virginia PE (# 047454), Wyoming PE (# 10554), NCEES Record (# 26845)
- ◆ Deep Foundations Institute
- ◆ American Society of Civil Engineers

Publications

- ◆ October 2007, Deep Foundations Institute conference proceedings, *Design and Construction Considerations for the use of Slurry Walls to Construct Reservoirs in the Denver Formation*
 - ◆ September 2003, ASCE Journal of Environmental Engineering, pg 844 – 851, *Modeling and Control of Vinyl Chloride in Drinking Water Distribution Systems*
-

RANDY MENDONSA

EI lead operator of dredging operations (on-site)

Qualifications

Mr. Mendonsa has 12 years of experience in the environmental remediation, construction and marine industries. Mr. Mendonsa is experienced in Operating and maintaining heavy equipment on restoration projects, landfill construction, hazardous waste sites, wetland remediation, water management, soil stabilization and shoreline remediation in tidal areas.

As Senior Operator, Mr. Mendonsa's responsibilities include the operation, maintenance and set up for all aspects of heavy equipment at the project level. Duties include supervising junior operators, oversee the installation and operation of GPS equipment guidance systems, trouble shooting for machine and Base control systems and support for field supervision and safety managers.

Experience Highlights

- River and floodplain restoration
- Soil Stabilization
- Inter -coastal Remediation
- Building demolition
- Residential and commercial building and property remediation
- Contaminated material packaging and transportation
- Decontamination
- GPS Excavation & Grading
- Landfill construction
- UST and piping removal

Experience

- ◆ Wellsville Sinclair Refinery, Wellsville NY. Senior Operator and Foreman in charge of operating and maintaining heavy equipment at this 4 year, multi season remediation project. The scope of work included: River diversion, sheet pile installation, river bed excavation and backfill using a GPS guided equipment, swale remediation, water management, and site restoration.
- ◆ Western Refinery, Yorktown VA. The construction of a 10 acre CAMU, the relocating of 100,000 CY of contaminated sediments to the newly constructed CAMU and decommissioned the existing storm water retention ponds. Duties includes: Overseeing and operating daily, to ensure that all that all Safety Procedures where adhered to and that all GPS systems where installed and operating.
- ◆ Langley AFB, Hampton VA. Senior Operator and Assistant Superintendant in charge of supervising and coordinating all dredging and water management aspects of this project. Duties included supervising field employees, scheduling craft, sizing and identifying equipment, the operation and maintenance of GPS grade control systems on-site, and assisting the superintendant in his absence. Oversight for subcontractors responsible for perimeter sheet pile was paramount to the successful completion of this project. Daily supervision was warranted to uphold the level of quality needed on a project in a tidal area. Operated a GPS guided marsh amphibious excavator and coordinated dredging operations.
- ◆ 12 Mile Creek, Central SC. Senior Operator and Assistant Superintendant in charge of operating and maintaining heavy equipment, oversight and planning of subcontractors and vendors at a very busy remediation project. The scope of work included: Clearing a 45 acre site to facilitate the construction of a 13 acre SMU, storm water management, restoration and O & M for all other aspects of this project.
- ◆ Exxon Mobil, Beaufort SC. Senior Operator in charge of supervising all water management aspect of this project. Duties included supervising field employees, sizing and identifying equipment, and assisting the

superintendent. The scope of work included the remediation of arsenic contaminated material in a tidal area, stabilization of materials, trucking of contaminated materials, and restoration.

- ◆ BASF, Newport News VA. Senior Operator in charge of operating and maintaining heavy equipment at this environmentally sensitive remediation project. The Project consisted of the construction of a reactive storm water control berm in a tidal swamp to protect from contaminated run off.
- ◆ River Point Project, Sheridan CO. Senior Operator performing GPS guided excavation of an old landfill for future development. Also performed GPS guided fill of utility corridors, building pads and access roads. The project involved hazardous waste removal and transportation.

Education

- ◆ High School Education with diploma
- ◆ Roger Williams University

Training & Certifications

- ◆ 40-Hour Hazardous Waste Operations Training
 - ◆ CoW Training for BP RM Projects
 - ◆ Crane and Rigging Training
 - ◆ Software Training for GPS Guided Equipment Operation
 - ◆ First Aid/CPR
 - ◆ Confined Space Rescue, Confined Space Entry
 - ◆ LPS Training
 - ◆ Excavation Competent Person
 - ◆ Marine vessel Operation
-

SCOTT D. MAHONEY

EI Site Health and Safety Officer

Qualifications

Mr. Mahoney has over 27 years of experience in the Health and Safety Industry and brings with him extensive experience in managing safety support for challenging projects. He is well versed in fundamental safety procedures, developing and implementing corporate and site-specific Health and Safety Plans. He has provided H&S support in work involving hazardous materials where personal protective equipment levels included not only the conventional PPE of D and C associated with construction and production, but also Levels A and B. He is well versed in integrated safety management including incident reporting, investigation and lessons learned.

Experience

- ◆ Crab Orchard Plume 1& 3, PCB Contaminated Soil Removal – Marion, Illinois. Health and Safety supervisor during removal of PCB contaminated soil. Mr. Mahoney was responsible for writing and maintaining the Health and Safety Plan (HASP), initial training of all workers reporting to the project, generation of Activity Hazard Analysis (AHA) for task specific work, and ensuring all personnel training/physicals were maintained current. Conducted morning safety meetings prior to start of work each day, and provided training for other site subcontractors during site subcontractor monthly meetings. Performed incident reporting and investigations. Performed air monitoring for dust, benzene, and Volatile Organic Compounds (VOC's). Provided project coordination with state and private agencies for identifying underground utilities. Coordinated with General Dynamics and US Fish and Wildlife Service to ensure all of their site and security regulations were met.
- ◆ Stauffer Tarpon Springs – Performed mobilization for Radiation Safety portion of project. Provided training for H&S personnel regarding survey techniques for personnel, area, and equipment monitoring; also instructed them on the technique for performing daily performance tests. Generated all documentation required for performing all surveys, in addition to providing the training required to perform the documentation. Provided Radiation Safety training for all site personnel regarding any radiological hazards associated with the site; also instructed them on the technique to perform personal monitoring.
- ◆ 12 Mile Creek - Provided H&S support at 12 Mile Creek during initial cover of PCB sediment repository. Performed PCB monitoring for equipment release. Conducted morning safety meetings prior to start of work each day.
- ◆ Rocky Mountain Arsenal, Enhanced Landfill Cover Construction Project – Commerce City, Colorado. Health and Safety Supervisor providing project safety oversight during the cap construction for the Enhanced Landfill at Rocky Mountain Arsenal, a Voluntary Protection Program (VPP) site. This project involved the construction of a cover over a landfill used to contain hazardous waste generated during years of operation at Rocky Mountain Arsenal. Mr. Mahoney was responsible for writing and maintaining the Health and Safety Plan (HASP), initial training of all workers reporting to the project, generation of Activity Hazard Analysis (AHA) for task specific work, and ensuring all personnel training/physicals were maintained current. Conducted morning safety meetings prior to start of work each day, and provided training for other site subcontractors during site subcontractor monthly meetings. Performed incident reporting and investigations. Provided work care case management for employee injuries, which involved no OSHA recordable incidents for the duration of the project. Performed air monitoring during all stages of construction for control of dust, silica, and quartz.

Experience Highlights

- Health and Safety program implementation
- Familiar with Industrial Hygiene Principles
- Incident Reporting and Investigations
- Confined Spaces Competent Person
- Respiratory Protection Qualified
- Lead Worker Trained
- Beryllium Worker Trained
- Asbestos Awareness Trained
- Supervisor Field Sampling Team
- Emergency Response
- Daily equipment inspections

- ◆ Denver Radium Streets Project – Denver, Colorado. Health and Safety / Radiological Safety Supervisor providing project safety oversight during the removal of Radium-226 impacted asphalt and soils for the Denver Radium Streets Project. This project was a multi-year contract to remove radium-contaminated asphalt and underlying subgrade soil material from a number of impacted streets located in residential areas of Denver. Envirocon developed management, health and safety, demolition, and surface and subsurface sampling plans, as well as conducted construction oversight, radiological sampling, air and water monitoring, and street reconstruction oversight for the City and County of Denver. Envirocon also provided radiological training for City and County of Denver employees. The project was extremely high profile and under public scrutiny, and required the management of multiple City subcontractors, public relations, and compliance with regulatory agencies. Mr. Mahoney prepared and reviewed the Envirocon Health and Safety Plan (HASP) and Work Plan prior to final approval. Conducted daily safety meetings prior to work commencing each day. Performed air monitoring to verify absence of airborne contamination. Responsible for survey and sampling of soil to determine levels of contamination remaining following excavation.
- ◆ Bartlett Nuclear, Inc, Various Sites - Senior Health Physics Technician – Mr. Mahoney worked for Bartlett on a variety of projects including but not limited to the Vogtle Electric Generating Plant, Oyster Creek Nuclear Generating Station, and the Palo Verde Nuclear Generating Station. As a Senior Health Physics Technician he provided Radiological Controls during the commercial nuclear power plant outages and operations to ensure personnel radiation exposure was maintained as low as reasonably achievable (ALARA), and prevent personnel contamination by ensuring good work practices and engineering controls. Utilized various contamination, radiation, and airborne monitoring instrumentation and equipment.
- ◆ Bartlett Nuclear, Inc. - Rocky Flats Environmental Technology Site - Health and Safety / Radiological Safety Supervisor providing project oversight for a contaminated glove box removal, outdoor tank demolition involving hazardous materials, contaminated soil removal and packaging. Utilized Level A, B, and C personal protective equipment during all phases of Decontamination and Demolition (D&D). Developed Radiological Work Procedures for routine and job specific evolutions. Conducted training of personnel to ensure compliance with Health and Safety / Radiological Safety Plans was met.
- ◆ The United States Navy - Radiological Controls Shift Supervisor responsible for directing 35 service personnel on board the USS Hunley performing submarine plant maintenance, chiefly involving drafting repair procedures, defining complex tasks, and providing effective managerial leadership to personnel. Also performed assignments on board the USS Theodore Roosevelt. During his time in the Navy, Mr. Mahoney reduced overdue maintenance 80% in a three month period, provided integral guidance in a training program that merited superiors' recognition for excellence over and above that of other submarine tenders on the East Coast, and was merited the Navy Achievement Medal for outstanding supervision.

Education

- ◆ Old Dominion University, Norfolk, VA - 1991
- ◆ Naval Nuclear Power School and Prototype Training - 1984

Training and Certifications

- ◆ Leadership & Management – The US Navy
 - ◆ OSHA 510 Basic Construction Safety
 - ◆ Chevron Loss Prevention System (LPS)
 - ◆ Respiratory Protection Qualified
 - ◆ Lead Worker Trained
 - ◆ Beryllium Worker Trained
-

- ◆ Asbestos Awareness Trained
 - ◆ Supervisor Field Sampling Team (Emergency Response)
 - ◆ Lead Daily Safety Meetings
 - ◆ HAZCOM: Maintained and updated MSDS File
 - ◆ Daily equipment inspections
 - ◆ Lockout/Tagout Trained
 - ◆ OSHA 500 Trainer Course for Construction Industry
 - ◆ Radiation Safety Officer
 - ◆ First Aid/CPR
-

KEVIN GEORGE

Lead Dredge Operator

Qualifications

Mr. George has 19 years of experience in the environmental remediation and construction industries. Mr. George has extensive experience as an operator, foreman, and supervisor for environmental remediation and construction projects. He is also knowledgeable in industry-related regulatory standards and guidelines. His experience includes emergency response, site safety, hazardous exposure mitigation, waste operations, hazardous materials handling, and hazardous waste clean up. Mr. George is also skilled in the operation of marine vessels such as air boats, hovercrafts, multi-engine, and stern drive vessels.

Experience

- ◆ Head of the Hylebos Sediment Remediation Project – Tacoma, Washington. Senior Operator for CERCLA sediment remediation project that included the removal of over 450,000 cubic yards of impacted sediments from the Head of the Hylebos Waterway, which is part of the Commencement Bay Nearshore/Tideflats Superfund Site. Envirocon's scope of work included construction and operation of a sediment trans-loading facility, transfer of 450,000 cy of sediment from barges to rail containers, construction and operation of a sediment dewatering/water treatment facility, treatment of over 18,000,000 gallons of sediment laden water, construction of a fully contained sediment stockpile area, excavation of 35,000 cubic yards of intertidal sediments from shoreline and between piers and under active dock structures, and excavation of 65,000 cy of sediment from the Hylebos Waterway utilizing a barge mounted excavator with a RTK-GPS system. The majority of the sediment dredged by Envirocon was classified as potentially asbestos containing material (ACM), and had to be staged, sampled, transported, and disposed of per stringent ACM requirements.
- ◆ Smelter Demolition Phase 2 and 3 – East Helena, Montana. Foreman for the multi-phase cleaning and demolition project at Asarco, LLC former lead smelter in East Helena, Montana. Scope of work included the interior decontamination and demolition of the Sinter Plant, Dross Building, Baghouse, Cottrell, Wet Precipitator Building, and other associated structures. The project scope also included the salvage and management of all assets generated from the wrecking activities.
- ◆ Carson Refinery Demolition and Remediation Project – Carson, California. Concrete Removal Foreman on the Shell Carson Terminal Demolition Project located at an active refinery in Carson, California. This large subsurface demolition and remediation project had a substantial environmental component due to the sustention quantities of contaminated materials. The scope of work included the demolition of concrete foundations, piping and miscellaneous structures located within the site as well as the excavation and disposal of over 170,000 tons of contaminated soil associated with the concrete and pipe removal activities. Other work on this project included line location, tapping, product recovery, recycling of salvageable pipe, and off-site disposal of non-salvageable debris and impacted soils in a high visibility setting at an active refinery.
- ◆ Gas Plant Demolition – Evanston, Wyoming. Foreman/Operator for the removal of equipment and structures from the 90-acre Whitney Canyon Sour Gas Plant located 20 miles north of Evanston, Wyoming. The gas plant structures to be removed or demolished included 270,000 square feet under roof. The larger structures included

Experience Highlights

- PCB remediation
- Shoreline clean-up
- Soil stabilization and treatment
- Asbestos, cyanide, lead, and high levels of sulfuric acid remediation
- Operation of air boats, hovercrafts, multi-engine, and stern drive vessels
- Oil contaminated concrete removal
- Hazardous waste cleanup
- Decontamination and demolition
- DOE certified training
- Underwater dredging

the main Process Building, Sulfur and Boiler Building, Gas Compressor Building and a Tank Farm. Other features include 8,000 linear feet of pipe rack, a flare stack, (12) demethenizer towers, molten sulfur storage tanks, vapor recovery units and an NGL storage area. The Whitney Canyon demolition project is characterized by the demolition of a number of massive compressors (such as 50-ton sour gas compressors) that must be dismantled and reduced in size with shears and cutting torches before being transported off site for recycling. Envirocon also segregated, sized, and loaded the remaining scrap metal for offsite transport to a nearby recycling facility. By providing asset recovery, Envirocon is able to recover the entire cost to demolish the Whitney Canyon gas plant.

- ◆ Evergreen Aluminum Smelter - Vancouver, Washington. Senior Operator for the complete facility demolition, and asset recovery services at the Evergreen aluminum smelter. The facility was used for aluminum reduction from 1940 through the late 1990's. Activities included demolition of 650 aluminum reductions cells, 70 structures, and removal and processing of 150,000 tons of concrete, 20,000 tons of steel, and 1,600,000 pounds of aluminum.
- ◆ Hastings NY Decommissioning and Demolition Project – Hastings-on-Hudson, New York. Health and Safety Officer for the decontamination and demolition of nine buildings, asbestos abatement prior to demolition, transportation of waste materials, and the salvage/recycling of steel. After ACM and hazardous waste abatement, the crew removed several buildings using shears, grapples, and loaders to collapse, dismantle, and segregate building materials. They then utilized an engineered controlled drop plan on several of the buildings followed by dismantling once the structure was dropped. Brick, CMU, and concrete was stockpiled and staged at an on-site location. Wood, roofing materials and other non-recyclables were direct loaded onto trucks for transport to an approved land fill or stockpiled for later transport.
- ◆ Terminal 4 Removal Action Phase I Wheeler Bay Stabilization – Portland, Oregon. Operating Foreman for Wheeler Bay part of the Portland Harbor Superfund Site. The Terminal 4 facility handled phosphate rock, sulfur, manganese ore, zinc concentrate, coal, chrome ore, lead concentrate, soda ash, alumina, ammonium sulfate, bentonite clay, sodium sulfate, chromite, ferro-phosphate ore, limestone, potash, titanium oxide, talc, tricalcium phosphate, and pencil pitch. General bulk products handled were lumber, logs, wool, rubber, soybean meal and grain. Current uses are transloading grain and soda ash. The contaminants of concern at Wheeler Bay were heavy metals, pencil pitch, PAHs, PCBs and VOCs. The scope of Envirocon's work was to salvage and re-use existing woody debris from the shoreline, clear and grub slope, excavate, transport and dispose of contaminated soil, balance cut and fill slope to subgrade, supply and place slope stabilization materials.
- ◆ Woodside 1 Dam Demolition Project – Catechee, South Carolina. Foreman/Operator for the demolition of the Woodside 1 Dam. Envirocon prepared the Dam Demolition Work Plan and Health and Safety Plan. The scope of work included lowering the pool water level 12 feet utilizing (3) 30-inch siphons and the demolition of the Woodside 1 Dam - a reinforced concrete structure 150 feet across by 30 feet tall. Envirocon completed this project on schedule and without incurring any OSHA recordable incidents.

Training & Certifications

- ◆ 40-Hour HAZWOPER
 - ◆ Certified Asbestos Training
 - ◆ Certified CPR
 - ◆ Valid TWIC ID Card
 - ◆ OSHA 30-Hour General Industry Safety
-

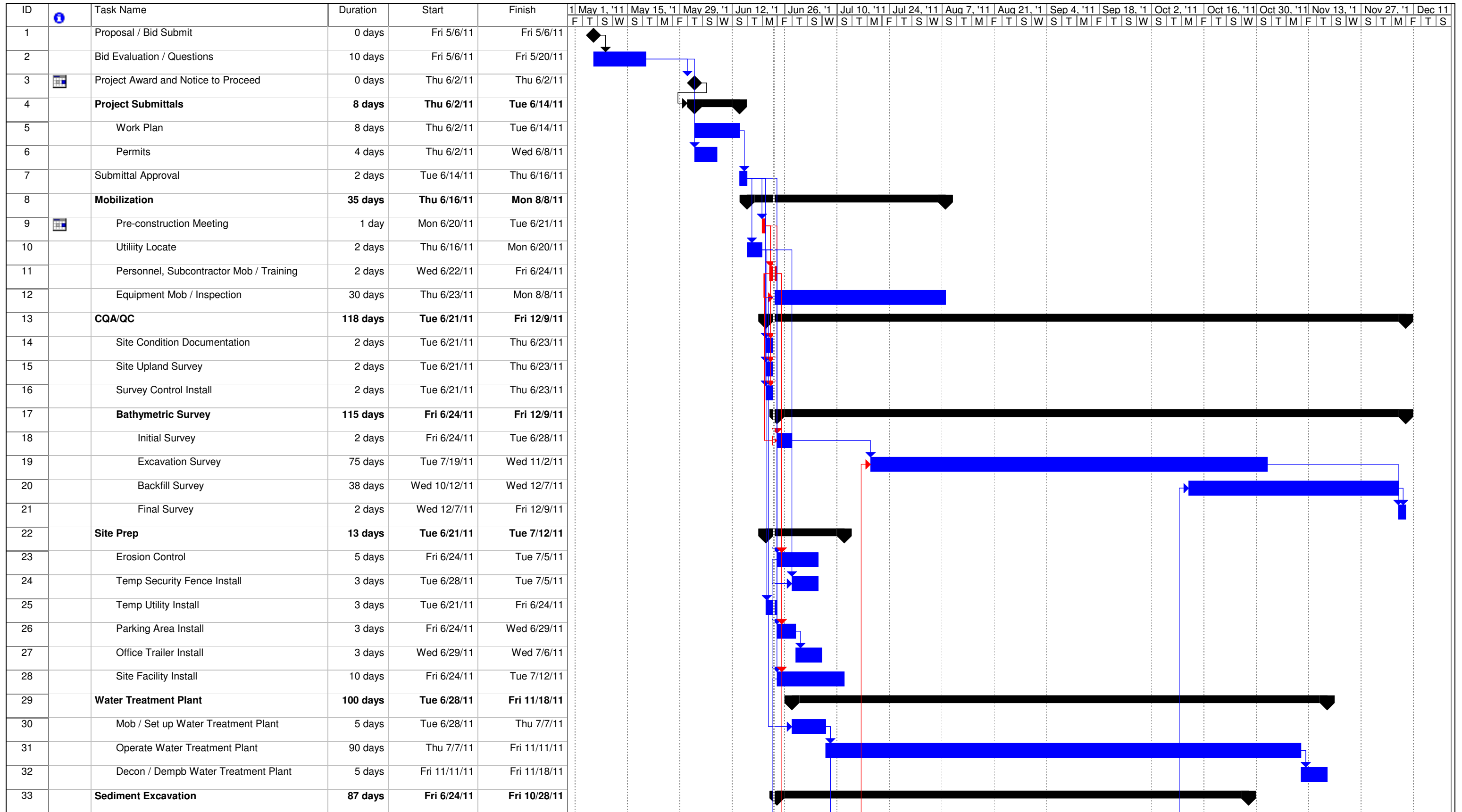


**ATTACHMENT B.
ENVIROCON CONTACT INFORMATION**

NAME	COMPANY	PHONE NO.	Position
Bell, Brian	EVCN	(630) 240-9496	Technical Director
Buell, Alan	EVCN	(406) 698-2012	Project Director
George, Kevin	EVCN	(812) 585-2383	Lead Dredge Operator
Habegger, Jeff	EVCN	(937) 668-6080	Project Manager
Hacke, Craig	EVCN	(303) 562-7838	Procurement
Keller, Steve	EVCN	(303) 513-1764	Staff Engineer
Mahoney, Scott	EVCN	(303) 908-8475	Site Safety Officer
Peterson, Steve	EVCN	(970) 201-2335	Support Superintendent
Shaylor, Mike	EVCN	(406) 240-5215	Surveying Support
Simpson, Skip	EVCN	(503) 930-1985	Dredging Specialist
Whitman, Richard	EVCN	(801) 450-9667	Project Superintendent
Beardsley, Mike	Green Globe	(720) 838-7107	Project Engineer/Survey/QA/QC
Jennejohn, Ted	McMullen & Pitz	(920) 901-2048	McMullen & Pitz
Ritzer, Tom	Gillen	(414) 788-0075	Edward E. Gillen Co.

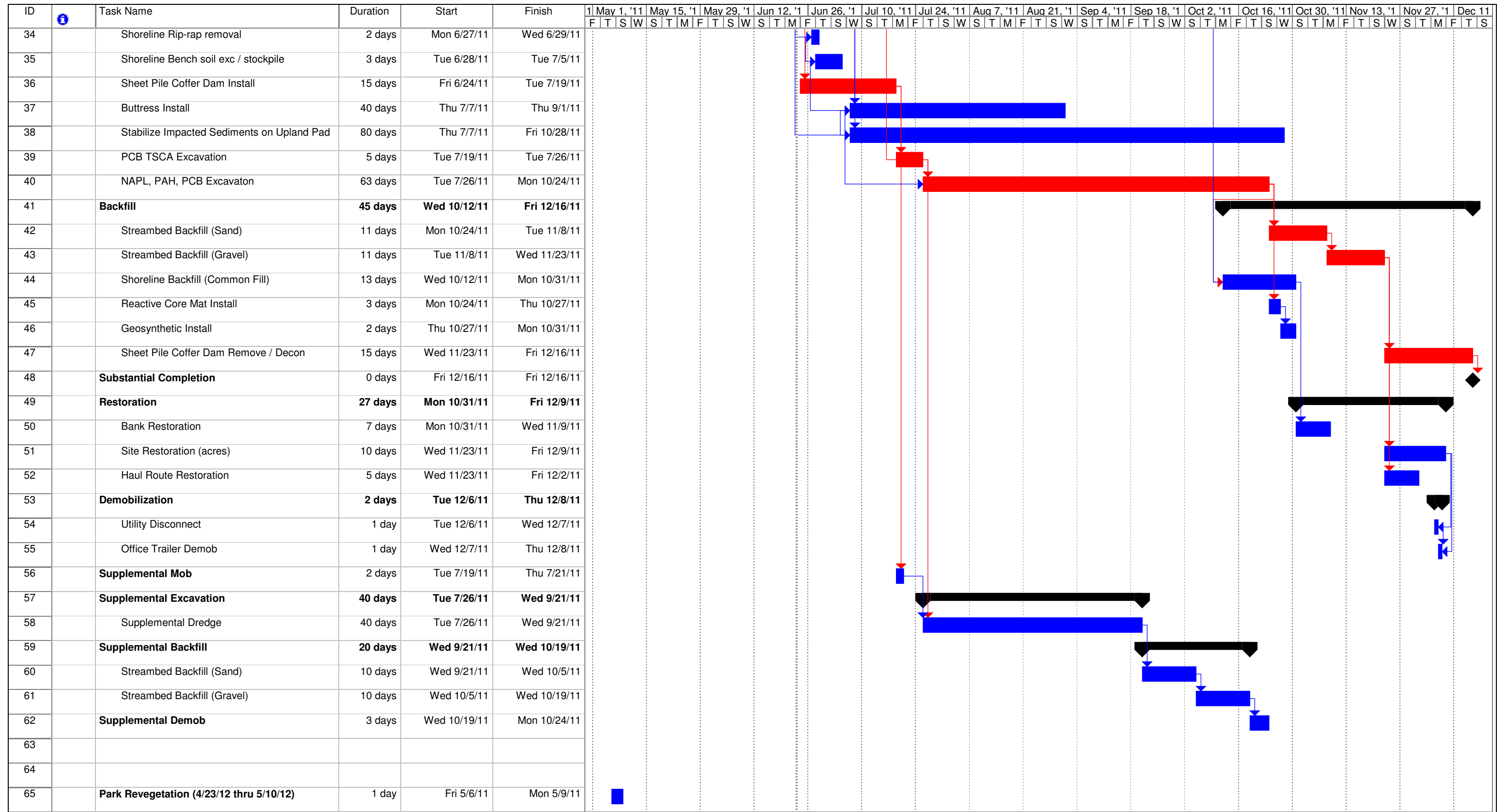


**ATTACHMENT C.
BASELINE SCHEDULE**



Project: Campmarina Base Schedule
Date: Thu 6/23/11

Critical		Split		Slippage		Rolled Up Critical		External Milestone	
Critical Split		Progress		Summary		Rolled Up Critical		Deadline	
Task		Milestone		Project Summary		External Tasks			



Project: Campmarina Base Schedule
Date: Thu 6/23/11

Critical		Split		Slippage		Rolled Up Critical		External Milestone	
Critical Split		Progress		Summary		Rolled Up Critical		Deadline	
Task		Milestone		Project Summary		External Tasks			



**ATTACHMENT D.
QUALITY CONTROL FORMS**



TRANSMITTAL OF SHOP DRAWINGS, EQUIPMENT DATA, MATERIAL SAMPLES, MANUFACTURER'S CERTIFICATES OF COMPLIANCE OR ADMINISTRATIVE SUBMITTALS	DATE: 06/14/2011	TRANSMITTAL NO. 001
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SECTION I – REQUEST FOR APPROVAL OF THE FOLLOWING ITEMS *(This section will be initiated by the Contractor)*

TO: Natural Resource Technology ATTENTION: Richard Weber	FROM: Brian Bell Envirocon, Inc.	EI PROJECT NO. 1484101 CHECK ONE: NEW TRANSMITTAL <input checked="" type="checkbox"/> ____ RESUBMITTAL OF TRANSMITTAL: _____
--	--	--

SPECIFICATION SEC. NO. 01040 (1.04E); 02100(1.04C); 02241(1.05B); 02325 (1.02B); 01900 (1.02B)	PROJECT TITLE AND LOCATION: Campmarina Sediment Removal Sheboygan, WI	CHECK ONE: THIS TRANSMITTAL IS FOR: ____ FIO <input checked="" type="checkbox"/> ____ CLIENT APPROVAL
---	--	--

ITEM NO.	DESCRIPTION OF ITEM SUBMITTED (Type, size, model number, etc.)	MFG./CONTR. CAT, CURVE, DWG OR BROCHURE #	NO. OF COPIES	CONTRACT REFERENCE DOCUMENT			VARIATION (Y/N)	FOR CLIENT USE CODE
				SPEC		DRAWING		
				SECTION	PART	SHEET NO.		
1	Remedial Action Work Plan		1					

REMARKS:

SECTION II: APPROVAL ACTION AND REMARKS:



I have reviewed and approved the attached submittal(s) to ensure contract compliance. All quantities, dimensions, specific performance requirements, materials, catalog numbers and similar data have been verified as complete.

SIGNATURE

DATE

INSTRUCTIONS

1. Section I will be initiated by the Contractor in the required number of copies.
2. Each transmittal shall be numbered consecutively in the space provided for "Transmittal No." This number, in addition to the project number, will form a serial number for identifying each submittal. For new submittals or resubmittals, mark the appropriate box; on resubmittals, insert transmittal number of last submission as well as the new submittal number.
3. The "Item No." will be the same "Item No." as indicated on submittal register for each entry on this form.
4. Submittals requiring expeditious handling will be submitted on a separate form.
5. Separate transmittal form will be used for submittals under separate sections of the specifications.
6. A check shall be placed in the "Variation" column when a submittal is not in accordance with the plans and specifications – also, a written statement to that effect shall be included in the space provided for "Remarks."
7. The Form is self-transmittal, letter of transmittal is not required.
8. When a sample of material or Manufacturer's Certificate of Compliance is transmitted, indicate "Sample" or "Certificate" ..
9. The Engineer or approving authority will assign codes as indicated below in space provided in the column identified as "For Client Use Code" i to each item submitted. In addition, they will ensure enclosures are indicated and attached to the form prior to return to the Contractor.

THE FOLLOWING ACTION CODES ARE GIVEN TO ITEMS SUBMITTED

A	Approved as submitted	E	Disapproved (See attached)
B	Approved, except as noted on drawings.	F	Receipt acknowledged
C	Approved, except as noted on drawings. Refer to attached sheet resubmission required.	FX	Receipt acknowledged, does not comply as noted with contract requirements
D	Will be returned by separate correspondence.	G	Other (Specify)



**FORM 1401.019.01
DAILY ACTIVITY LOG**

<u>Project</u>	<u>Data</u>
Name: _____	Date: _____
Number: _____	Avg. Temp: _____
Location: _____	Wind Speed: _____
Client: _____	Precipitation: _____
S/C#: _____	Shift On/Off: _____

<u>Activities</u>	<u>Site Workers</u>	<u>Equipment</u>
Mobilization _____	Envirocon _____	Excavator _____
Stabilization _____	Contractor _____	Loader _____
Dredging _____	Contractor _____	Water Truck _____
Backfill _____	Operators _____	Backhoe _____
Decon _____	Laborers _____	Haul Trucks _____
Dust Control _____	Teamsters _____	Crane _____
Transport _____	S/C _____	Dozer _____
DeMob _____	S/C _____	Motor Grader _____
Rig/Hoist _____	S/C _____	Service Trucks _____
Survey _____	Other _____	Pickup Trucks _____
Water _____	Other _____	Other _____
Treatment _____	Other _____	Other _____
Other _____	Other _____	Other _____

Activity Details: (Note times, Durations, Number of Loads, Etc.)

Envirocon Activities:

Gallons of Water Treated

Subcontractor Activities:

McMullen & Pitz – Sheetpile Install & Marine Support

Gillen – Buttress (Indicate Pile # and Waler Linear Footage Installed)

Waste Transportation (Indicate Tonnage Per Truck and Number of Truck Loads) (Indicate TSCA & Non-TSCA)

Imported Fill Materials (Indicate Tons of Each Received)

Other Subcontractors & Vendors:

Note: Imported Materials and Waste Transport Quantities will be accumulated and entered daily on-site into Spreadsheets and provided as needed to the Engineer.

REPORT NO:	QC000	ENVIROCON, INC.
DATE:	08-Jun-11	Campmarina Sediment Removal Project CONTRACT NO. XXXXXX SHEBOYGAN, WISCONSIN
PROJECT:	Campmarina Project Project #: 1484101	
CONTRACTOR:	Envirocon, Inc.	DAILY QUALITY CONTROL REPORT
LOWER TIER SUBS:	See below	
TASK:	Sediment Removal	
LOCATION: Sheboygan River, Sheboygan, WI, near Boat Island		
WEATHER: Insert Precipitation data, temperature, winds, and cloud cover here.		
ACTIVITIES		
Envirocon: Summarize EI Activities Here. McMillen & Putz: Summarize our sub's activities here. Gillen: Summarize our sub's activities here. Green Globe Env. Inc. Summarize our sub's activities here. Spielvogel Trucking: Summarize our sub's activities here.		
QUALITY CONTROL ACTIVITIES		
Water Treatment Plant: a) Turbidity: b) Volume Treated (gallons): Erosion & Sedimentation Control: Inspection (Y / N): If Y, see attached Inspection Form Calciment Addition # of buckets utilized: _____. Apprxomate Tonnage: _____. Bathymetric Survey: QA Survey Conducted (Y / N). If Y, provide oversight personnel name. File submitted separately QC Survey Conducted (Y / N). If Y, provide SCS 900 QC printout and attach. Decon Observations: List any equipment leaving the Site and verify that equipment left the Site clean in this area. Rusmar: Foam Needed (Y / N). If yest, how many containers were used: _____. Potable Water: Was potable water used for dust supression? Note meter readings here: _____.		
MATERIALS AND EQUIPMENT RECEIVED (NOTE INSPECTION RESULTS AND STORAGE PROVIDED):		
Calciment Load Weights: Pig chambers containing calciment: Detail other materials received here.		
JOB SAFETY (LIST ITEMS CHECKED, RESULTS, INCIDENTS):		
List any recodables, incidents, or near misses that occurred here. 0630 Tailgate Meeting Topic: _____		

CONTRACTOR DAILY QUALITY CONTROL REPORT

REPORT NUMBER:	QC-0000	PROJECT: Campmarina	EI Project# 1484101
-----------------------	---------	----------------------------	---------------------

FIELD ACTION ITEMS NOTED:

Detail any directives received from the Owner or Engineer here.

CORRECTIVE ACTIONS NOTED:

Note any deficiencies which have been corrected here.

SUMMARY OF MEETINGS AND DISCUSSIONS HELD:

Note meetings held here. Attach meeting Minutes or Meeting Agenda to this report as appropriate.

RFIs/DCNs GENERATED

List any Requests For Information (RFIs) submitted to the Engineer or Owner here.
List any Change Directives/Orders or updated drawings received here: Ensure Record Drawings are Redlined and Updated.

COMMENTS:

None

ADDITIONAL DOCUMENTATION SUBMITTED (I.E. TEST RESULTS, CHECKLISTS, ETC.):

List any supplemental tests, results or other QC related items here.

Contractor's Verification: On behalf of the Contractor, I certify this report is complete and correct, and all materials used and work performed during this reporting period are in compliance with the contract plans and specifications to the best of my knowledge, except as may be noted above.

PREPARED BY:		TITLE/COMPANY:	Project Engineer / Envirocon
SIGNATURE:		DATE:	
REVIEWED BY (OPTIONAL):		TITLE/COMPANY:	
SIGNATURE:		DATE:	

STORMWATER MANAGEMENT PLAN FIELD INSPECTION REPORT	(5) Project Name: Campmarina Sedimentation Removal Project	
	(6) Project Number: 1484101	(7) Town: Sheboygan, WI
	(8) WBS Task Code	
(1) Date of Project Inspection	(9) Reason(s) for Inspection: <input type="checkbox"/> Required 7 Calendar Day Inspection for Active Sites <input type="checkbox"/> Required Runoff Event Inspection for Active Sites <input type="checkbox"/> Required 30 Calendar Day Inspection for Completed Projects <input type="checkbox"/> Complaint: _____ <input type="checkbox"/> Other: _____	
(2) Responsible Contractor: Envirocon, Inc.		
(3) Site SMP Supervisor: Richard Whitman		
(4) Oversight Engineer: Natural Resources Technology		

(10) CONSTRUCTION SITE ASSESSMENT	
(a) Is the construction site perimeter contained? (Y / N)	(d) Are areas used for material and waste storage and fueling contained? (Y / N)
(b) Is offsite tracking minimized? (Y / N)	(e) Estimate of disturbed area at the time of the inspection? _____ Acres
(c) Are disturbed areas contained? (Y / N)	(f) Are areas that have achieved final grade permanently stabilized within 14 days? (Y / N)

(11) BEST MANAGEMENT PRACTICES (BMPs)

BMPs	(12) BMPs		(13) Reason for BMP Changes	(14) Maintenance Required Y/N	(15) BMP Action Item(s)	(16) Compliance Date for Action(s)
	Required	Used				

EROSION CONTROL						
Seeding						
Mulching						
Grading						
Other:						

SEDIMENT CONTROL

Spill Apron (Cofferdam Area)						
Spill Apron (Supplemental Area)						
Silt Fence						
Stabilized Construction Entrance						
Other:						

MATERIALS HANDLING, SPILL PREVENTION, WASTE MANAGEMENT AND GENERAL POLLUTION PREVENTION						
Stockpile Management						
Materials Management						
Decon Pad						
Equipment Servicing & Management						
Wind Erosion (Dust) Control						
Other:						
(17) INSPECTIONS AND MAINTENANCE PROGRAM COMPLIANCE ASSESSMENT						
<input type="checkbox"/> Regular inspections performed at least every 7 calendar days.						Course of Action:
<input type="checkbox"/> Regular inspections performed after runoff events.						Course of Action:
<input type="checkbox"/> Regular inspections performed at least every 30 calendar days since project completion.						Course of Action:
<input type="checkbox"/> Inspection reports retained at the construction project site.						Course of Action:
<input type="checkbox"/> Corrective measures completed within 2 calendar days of inspection.						Course of Action:
CERTIFICATION: I certify this Stormwater Management Plan Field Inspection Report is complete and accurate.						
Site SMP Supervisor (Signature Required)				Date		
Oversight Project Engineer (Signature Required)				Date		

Stormwater Management Plan Field Inspection Report Instructions

1. **Date of Project Inspection:** Indicate the date of the inspection.
2. **Project Contractor:** Envirocon, Inc.
3. **Site SMP Supervisor:** Indicate the name of the inspector designated by the contractor (EI Superintendent or EI Project Engineer).
4. **Oversight Engineer:** Indicate the name of the oversight representative performing the inspection with the contractor. This person should be the Project Engineer or an authorized representative (Natural Resource Technology).
5. **Project Name:** Indicate the name of the project for which the report is being completed (Campmarina Sediment Removal Project).
6. **Project Number:** Indicate the project number of the project for which the report is being completed (EI #1484101).
7. **Town:** Indicate the town in which the project is located (Sheboygan, WI).
8. **WBS Task Code:** Indicate the WBS task code number for which the report is being completed (See EI PM for budget & WBS Structure Codes).
9. **Reason(s) for Inspection:** Indicate the purpose for the inspection. The types of inspections include the following:
 - "Required 7 Calendar Day Inspection for Active Sites". These inspections are required at least every 7 calendar days during the life of the construction project. Suspended projects require the 14 calendar day inspection unless snow cover exists for an extended time over a project area and melting conditions do not exist.
 - "Required Runoff Event Inspection for Active Sites". These inspections are required after any precipitation or snowmelt event that causes surface runoff.
 - "Required 30 Day Inspection for Completed Projects". These inspections are required at least every 30 calendar days following the completion of the construction project. Completed projects are defined as projects that have achieved final acceptance of the work by the oversight Engineer.
 - Specify complaint issue(s) that resulted in the inspection.
 - Specify any other reason(s) that resulted in the inspection.
10. **Construction Site Assessment:** Inspect the assessment areas of the construction site and indicate with a "Y" the project areas where BMP features have been successfully implemented. For each component of the assessment, questions have been developed to assist in determining successful BMP implementation.
 - a. "Is the construction site perimeter contained?" - Are the appropriate BMPs in place and offsite sediment tracking minimized? There is no evidence of pollutants are entering a storm drainage system?
 - b. "Is offsite tracking minimized?" - Is a significant amount of dirt or mud being tracked onto paved surfaces?
 - c. "Are disturbed areas contained?" - Are the appropriate BMPs implemented to minimize erosion or sediment tracking from the disturbed areas? There is no evidence of pollutants are entering a storm drainage system?
 - d. "Are areas used for material and waste storage and fueling contained?" - Are the appropriate BMPs implemented to prevent and contain spills? Are wastes removed from the site and disposed of properly? Are the storage areas located at least 50 feet from a watercourse? There is no evidence of pollutants are entering a storm drainage system?
 - e. Provide an estimate of the disturbed area at the time of the inspection.
 - f. Indicate whether or not areas that have achieved final grade have been permanently stabilized within 30 days as required by the oversight Engineer or permitting authority.
11. **BMPs:** The BMPs shown may not be a complete list of what is required by the SWMP or implemented on site. Add to the form any additional BMPs that are required or in place. Additional sheets can be inserted to show all the BMPs required by the SWMP.
12. **BMPs Required/Used:** This column can be used as follows:
 - If the BMP is required by the SWMP and implemented, indicate by placing a "✓" in both the "Required" and "Used" columns.
 - If the BMP is required by the SWMP, but not implemented, indicate by placing a "✓" in the "Required" column. Indicate the reason for the change in column (13), "Reason for BMP Changes".
 - If the BMP has been added to the SWMP, indicate with a "✓" in the "Used" column. Indicate the reason for the change in column (13), "Reason for BMP Changes".
13. **Reason for BMP Changes:** Indicate the reason(s) for the deletion, addition, or modification of BMP(s) to the SWMP/CASMP.
14. **Maintenance Required:** Indicate whether BMP maintenance or sediment removal is required with a Yes or No. If maintenance and sediment removal is required, indicate what the action plan is in column (15), "BMP Action Item(s)".
15. **BMP Action Items:** If maintenance and/or sediment removal is required, describe the action plan.
16. **Compliance Date for Action(s):** Indicate the date on which the course of action shall be completed. The course of action must be completed in a timely manner, but in no case more than 7 days after the inspection.
17. **Inspections and Maintenance Program Compliance Assessment:** Evaluate the inspection and maintenance aspect of the construction project and check all that apply with a "✓". . Note the action items for any deficiencies in the Program.



**ATTACHMENT E.
WATER TREATMENT DATA SHEETS**

PRODUCT DATA SHEET

January, 2007

YARDNEY 3-POD SAND FILTER SYSTEM (IL3024-3AS)

GENERAL INFORMATION

Skid mounted sand media filters [3 tanks (pods)] with automatic backwashing designed for general-purpose water filtration of organic and inorganic solids. Powered by 120 V external power supply.

WEIGHTS AND MEASURES

» Capacity:	.....	110 – 221 gpm (Normal flow range) 295 gpm (Peak flow)
» Design Pressure:	.....	100 psi maximum
» Temperature:	.....	Limit to ambient. Consult Baker if temperature exceeds 100 degrees.
» Filtration:	.....	Down to 20 - 50 microns
» Height:	.....	6'-3" (overall)
» Width:	.....	3'-10" (skid rail to skid rail)
» Length:	.....	12'-10" (overall); 12'-3" (skid)
» Weight:	.....	2,325 lbs. – equipment only 2,700 lbs. – media only 6,525 lbs. – operational
» Backflush:	.....	74 gpm, automatic

OPERATING REQUIREMENTS

» Compressed Air:	.....	5 cfm minimum at 60 psi
» Sand Media:	.....	Crushed silica, 0.47MM (#80 grit); 7 cu. ft. per vessel
» Gravel Media:	.....	#3 crushed rock, ½" x ¾"; 2.5 cu. ft. per vessel
» Input Power:	.....	120 V AC (customer supplied)

FEATURES

» System Controller:	.....	Automatic Filter Controller. Flush activation based on elapsed time and/or pressure differential.
» Piping:	.....	Inlet & outlet pipe is 4" A53B; weld fittings are A234; flanges are A106. Backflush piping is 2" schedule 40 PVC.

FEATURES – cont

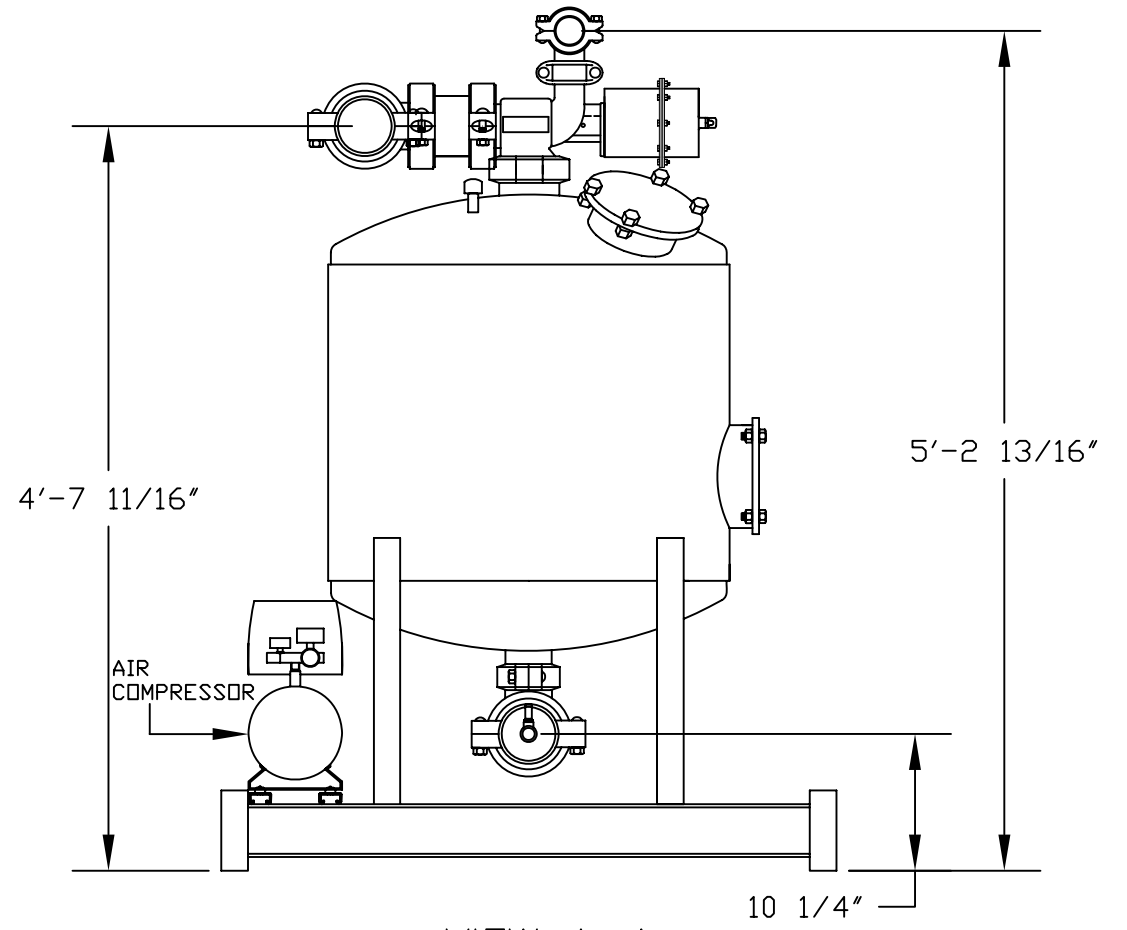
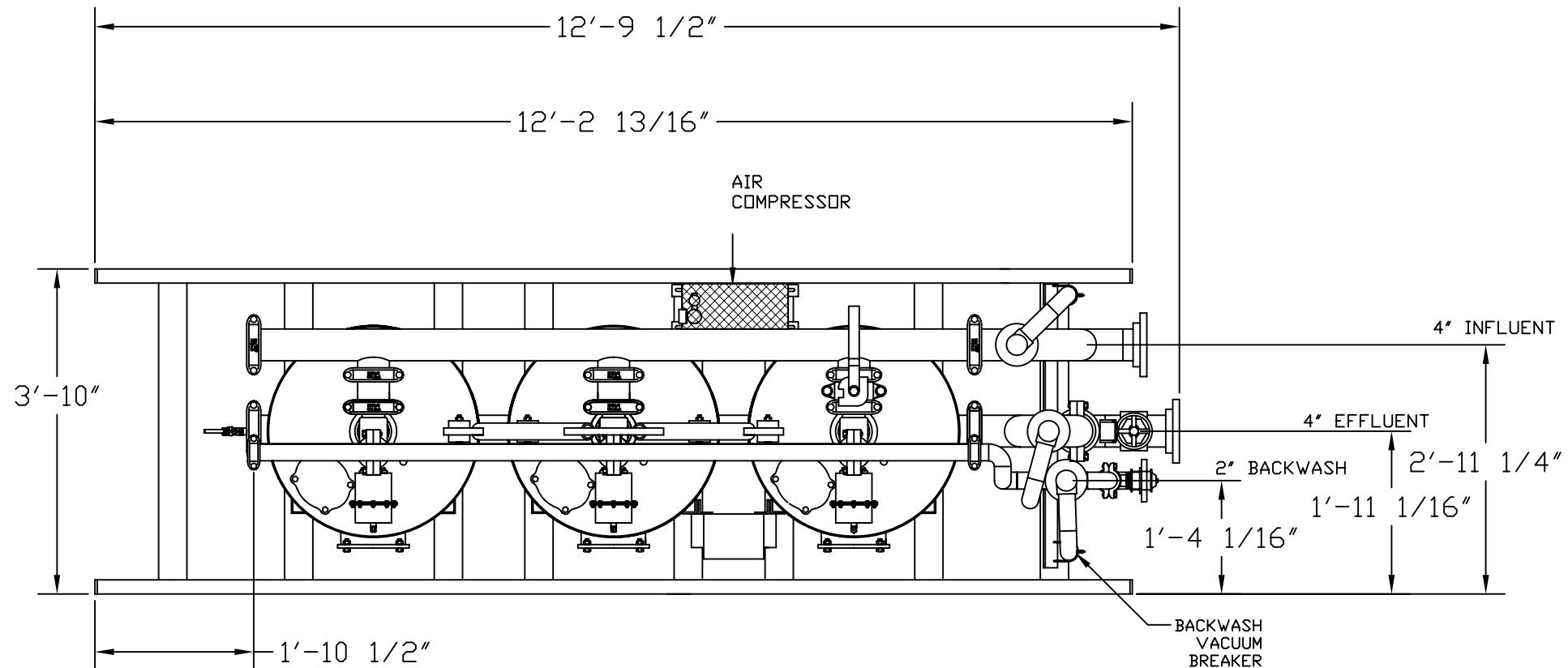
» Press. Gauge:	.....	2" face, ¼" NPT bottom connection, stainless steel case, plexiglass lens, brass bourdon tube, 0-100 psi range.
» Flowmeter:	.....	Four-inch propeller type meter, AWWA C704-92 compliant. Instantaneous flowrate indicator and six-digit totalizer. Accuracy is ±2% of reading. Repeatability of 0.25%. Tube: epoxy-coated carbon steel; Impeller: high-impact plastic.
» Butterfly Valves:	.....	<u>Effluent / Influent:</u> 4" with cast iron body (epoxy coated), EPDM seat, 304 SS stem and aluminum bronze disc. <u>Tank Isolation:</u> 3", grooved ends, EPDM disc coating
» Differential Pressure Switch:	.....	0-30 psid. Two-inch dial, plated steel case, ±3% accuracy.
» Air / Vacuum Release Valve:	.....	2" valve, mounted on backwash, influent and effluent lines
» Tubing:	.....	Pressurized – ¼" 304 ss w/ Hoke fittings; Drain - ¼" polypropylene; Vent – schedule 80 PVC

SURFACE DETAILS

» Interior Coating:	.....	3M Scotchkote 134
» Exterior Coating:	.....	High Gloss Polyurethane

TESTS/CERTIFICATIONS

» Tests Performed:	OEM pressure tested. BakerCorp performs scheduled OMS inspections.
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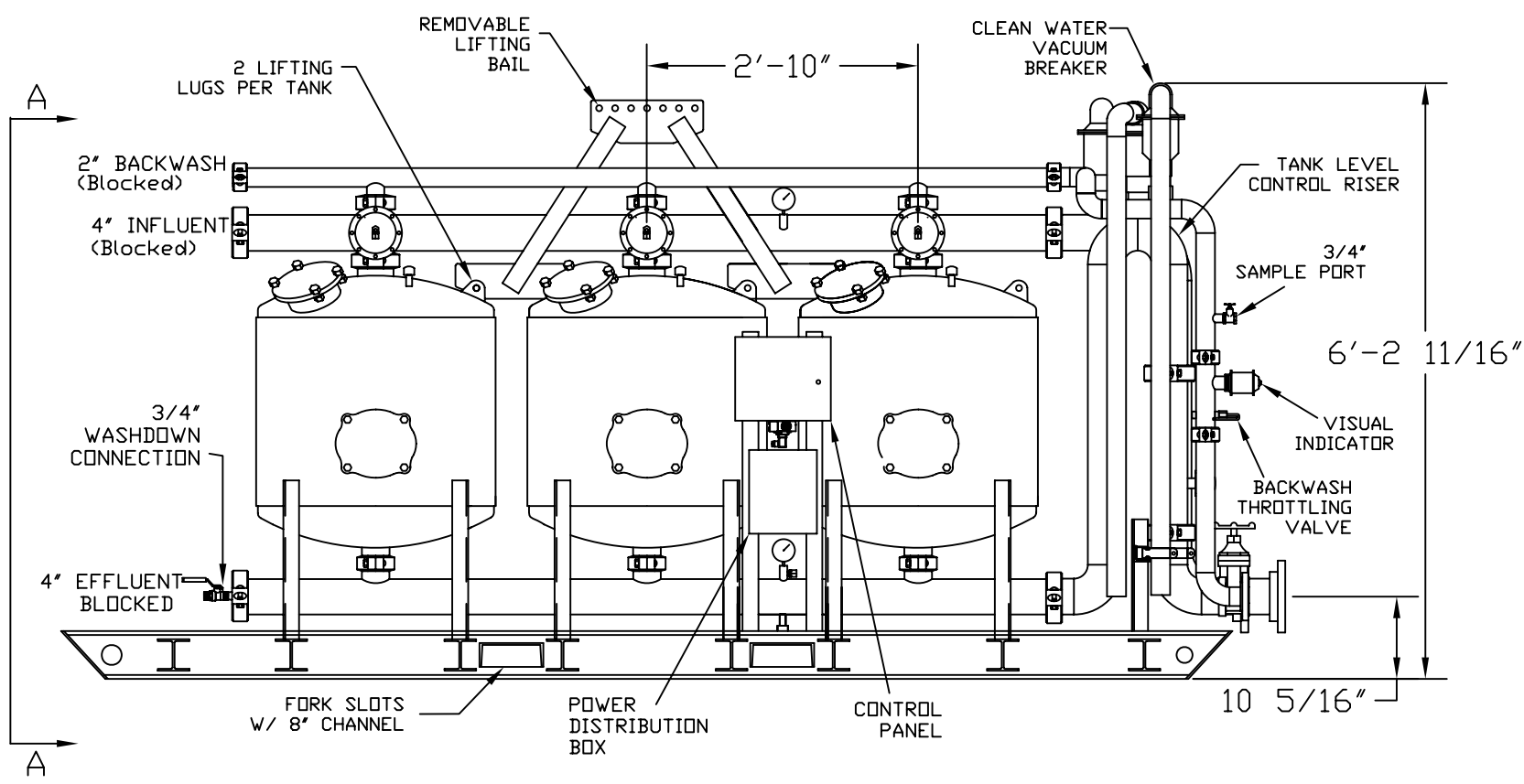
VIEW A-A

IL 3024-3AS

- NOTES:
1. FLOW RATE DESIGN - 110-221 GPM
BACKWASH RATE - 15 GPM / FT², 74 GPM
 2. MAXIMUM WORKING PRESSURE - 100 PSI.
 3. ELECTRICAL:
 - CONTROLLER 120V / 1A; 12VDC SDV's
 - CONTROLLER 120V / 5A
 4. MEDIA REQUIREMENT PER TANK:
 - A. 1/2"x3/4" CRUSHED ROCK - 2.5 CU. FT.
 - B. 0.47mm CRUSHED SILICA SAND - 7.0 CU. FT.
 5. WEIGHT: (APPROX.)
 - SHIPPING - 2,325 LBS (LESS MEDIA)
 - MEDIA - 2,700 LBS
 - OPERATION - 6,525 LBS
 6. PNEUMATICALLY ACTUATED VALVES W/ SS TUBE
 7. STEEL CONDUIT
 8. TUBE TANK VENT VALVES TO GROUND

NOTES:

1. THIS DRAWING IS A BASELINE REPRESENTATION FOR THIS SIZE SKID. VARIATIONS BETWEEN THIS DRAWING AND THE ACTUAL EQUIPMENT IN THE FIELD MAY EXIST, PRIMARILY WITH APPURTENANCES. CONSULT YOUR LOCAL BAKER REPRESENTATIVE IF SPECIFIC NEEDS EXIST.



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BAKERCORP 3020 OLD RANCH PARKWAY
SEAL BEACH, CA 90740-2751

G				SCALE:	SIZE	ORIGINAL DWG. DATE
F				Do Not Scale	B	31MAY05
E				DRAWN BY:	APPROVED BY:	CAT/CLASS
D				P.J.B.	-	--
C				TITLE		SHEET
B				3-POD SAND FILTER SYSTEM YARDNEY MODEL IL 3024-3AS		1 OF 1
A	FIXED TEXT ERROR	7/12/05	Z.E.R.	DRAWING NO.		REV.
REV.	DESCRIPTION	DATE	BY	S-9-M0021-1-		A

PRODUCT DATA SHEET

January, 2007

3" DUPLEX BAG FILTER SYSTEM

GENERAL INFORMATION

Two independent filter housings are skid-mounted and piped such that one filter unit is active while the other is out of service. Inlet and outlet connections are provided on each end of the skid. Use for filtering a wide range of industrial and commercial process fluids, groundwater discharge from construction sites, stormwater or urban runoff.

WEIGHTS AND MEASURES

» Capacity:	.....	Up to 140 gpm per filter when clean (depends on filter media micron rating)
» Design Press:	.....	150 psi
» Design Temp:	.....	140°F max.*
» Height:	.....	5'-0" (overall)
» Width :	.....	3'-8"
» Length:	.....	5'-0"
» Weight:	.....	540 lbs. (approx.)

SKID DESIGN

» Outer Frame:	.....	6 x 8.2 A36 carbon steel channel
» Inter. Frame:	.....	3"x2 "x3/8" A36 carbon steel angle
» Filter Housing Pad:	.....	¼" thk. Steel plate supported by 3x2x3/8 angle iron
» Forklift Pockets:	.....	Through front and rear framing channels
» Cover:	.....	Expanded metal grating
» Lifting Eyes:	.....	All four corners

*Practical limit for the PVC header piping. Unit could be used up to 225°F if carbon steel piping is used instead.

FILTER DESIGN

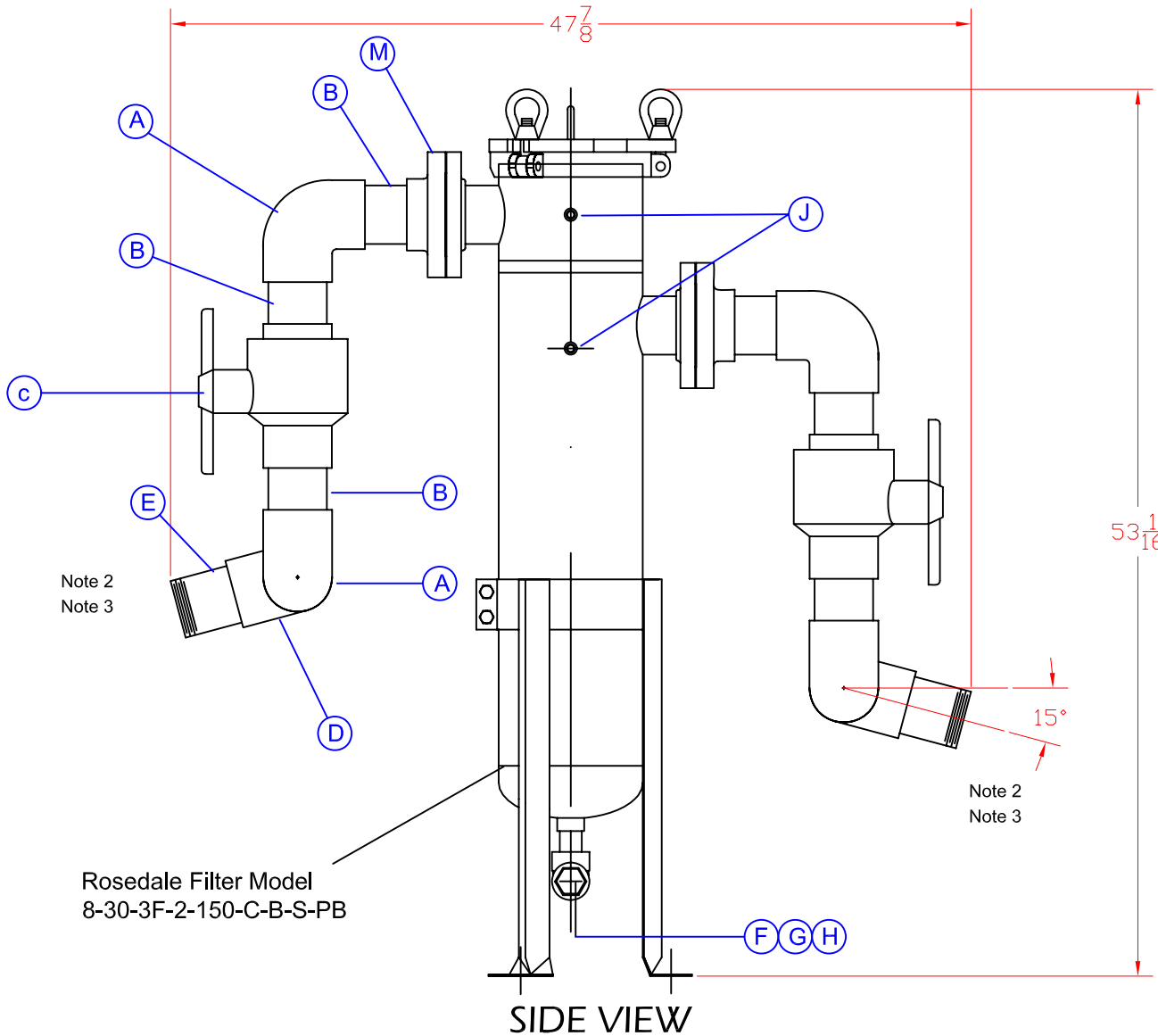
» Filter Housing	.....	Rosedale model 8-30-3F-2-150-C-B-S-PB
» Top Cover:	.....	Three eyenuts; hinged for easy access
» Piping:	.....	3" schedule 80 PVC (inlet and outlet headers)
» Inlet & Outlet:	.....	3" 150# ANSI flanges
» Cover Seal:	.....	Buna N (Nitrile) o-ring
» Housing Material:	.....	Carbon Steel
» Filter Basket:	.....	30" deep, 6.7" diameter, 4.4 sq. ft. surface area, 1000 cu. in. volume, 9/64" dia holes (51% open)
» Filter Media:	.....	Filter bags, size #2. Wide range of micron ratings is available, down to 1.0.
» Vent Valves:	.....	1/4" ball valve on top cover
» Drain Valves:	1" brass ball valve on the bottom of each housing

SURFACE DETAILS

» Exterior Coating:	High gloss polyurethane
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TESTS / CERTIFICATIONS

» Test Performed:	Scheduled QMS inspections
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ITEM	DESCRIPTION
A	Elbow, 90 deg, 3" sch. 80 PVC, socket x socket, Spears 806-030
B	Pipe, 3", sch. 80, PVC, 6-1/4" long
C	Ball valve, 3" PVC, non-shock; Spears 2622-030
D	Tee, 3"x3"x3", sch. 80 PVC, socket ends; Spears 801-030
E	Adapter, 3" PVC, PE x MPT, YARDNEY 126553040
F	1" sch. 80 M.I. MNPTxMNPT pipe nipple, 2" long
G	1" 90 deg. elbow, NPTxNPT
H	1" brass ball valve, FNPTxFNPT; Parker Hannifin XV500P-16
J	Pressure gauge, 0-100 psi oil-filled, 2-1/2" dial
K	NOT USED
L	1/4" 600# WOG brass ball valve; Parker Hannifin XV500P-4
M	Flange, 3" sch. 80 PVC, socket; Spears 851-030

Note 2
Note 3

Note 2
Note 3

Rosedale Filter Model
8-30-3F-2-150-C-B-S-PB

SIDE VIEW

- Notes:**
1. This is a general layout drawing only.
 2. Tee should be rotated downward at an angle of 15-60 degrees to prevent strain on the piping when hose is connected to it.
 3. A 3" female camlock fitting (not shown) will be attached to the adapter.

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BAKER CORP 3020 OLD RANCH PARKWAY
SEAL BEACH, CA 90740-2751

G			
F			
E			
D			
C			
B			
A			
REV.	DESCRIPTION	DATE	BY

SCALE:	-	SIZE	A	ORIGINAL DWG. DATE	18FEB05
DRAWN BY:	P.J.B.	APPROVED BY:	-	CAT/CLASS	NA
TITLE				SHEET	1 OF 1
DRAWING NO.				REV.	0
S-9-M0018-1-					



WATER TREATMENT EQUIPMENT

[Oil Water Separators](#) | [Emulsification Separation](#) | [Clarifiers](#) | [Pre-Wash](#) | [Evaporators](#) | [Wash Bay Solutions](#)

Oil Water Separators

- [Above Ground Separators](#)
- [Below Ground Separators](#)
- [Hoppers](#)
- [Modular Packs](#)

Why Hydro Quip?

- our [technology](#)
- our [coalescing media](#)

Coalescing Media for Oil Water Separators

Advantages of HD Q-PAC® Coalescing Media in Oil Water Separators

HD Q-PAC® has the following advantages when compared to traditional corrugated type and inclined plate type coalescing media used in oil water separators.

1. 132 ft²/ft³ of effective coalescing surface. Removes over 99.9% of oil droplets 20 microns and larger. Meets both EPA Method 413.2 and European Standard EN 858-1 (99.99% removal of free oil).
2. Eliminate the need for 2nd stage polishing pads to attain effluent requirements. HD Q-PAC® can meet effluent requirements without high-maintenance polishing pads.
3. The combination of 90° angle of repose, with round smooth vertical surfaces and 87% void volume provide excellent self-cleaning and anti-plugging properties in oil water separators with heavy sludge, dirt and biological growth loadings.
4. Polypropylene construction allows operating temperatures up to 212°F (100°C).
5. Optimized design allows oil to coat the entire surface of HD Q-PAC® media, unlike corrugated and inclined plate media in which much of the surface is unavailable for coalescing of rising oil droplets.

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WATER TREATMENT EQUIPMENT

[Oil Water Separators](#) | [Emulsification Separation](#) | [Clarifiers](#) | [Pre-Wash](#) | [Evaporators](#) | [Wash Bay Solutions](#)

Oil Water Separators

- [Above Ground Separators](#)
- [Below Ground Separators](#)
- [Hoppers](#)
- [Modular Packs](#)

Why Hydro Quip?

- our [technology](#)
- our [coalescing media](#)

Hydro Quip Technology

Our oil water separator technology is unique:

The most common approach to the design of oil / water separators is to configure parallel corrugated plates that cause the oil droplets to increase in size, thereby speeding the gravity separation process. Hydro Quip uses a unique Unipack cross-fluted design with an internal structure of interconnecting channels having many crossing points between adjacent plates. This produces enhanced efficiencies in significantly smaller units. Hydro Quip's Unipack construction requires a unit with only 5,000 gallon capacity to produce the same yield of a traditional separator unit with 15,000 gallon capacity at a flow rate of 500 gallons per minute.

Coalescing of the oil droplets takes place in three steps:

1. Droplets are intercepted by the corrugated plates as the oil / water mixture flows through the separator.
2. New droplets coalesce with retained droplets, making larger droplets.
3. Enlarged droplets are released and rise to the surface to be decanted into a storage tank. Since Stokes' Law calculations are based on a flow of zero velocity through the Unipack plates, a Reynold's number of less than 500 will ensure optimum separation in a Hydro Quip Oil / Water Separator.

Hydro Quip's staff of experienced profession engineers are dedicated to:

- providing customers with innovative and effective solutions to the problems of contaminant elimination in waste water
- maintaining optimal adherence to establish conformance standards and industry best practices.

Hydro Quip's oil / water separators feature:

- Low maintenance costs
- Easy cleaning through removable vapor tight covers
- No moving parts
- No power consumption
- No consumable wearing elements
- No chemicals, absorbent or filter cartridges to remove, replace or dispose
- Compact size
- Solids storage capability
- Optional integral oil storage

Waste water treatment applications:

- Refineries
- Utilities
- Oil Terminals
- Airports
- Parking Lots
- Tank Farms
- Stormwater Runoff
- Vehicle Maintenance Facilities
- Bilge Water
- Refueling Stations



WATER TREATMENT EQUIPMENT

Oil Water Separators | Emulsification Separation | Clarifiers | Pre-Wash | Evaporators | Wash Bay Solutions

Oil Water Separators

- [Above Ground Separators](#)
- [Below Ground Separators](#)
- [Hoppers](#)
- [Modular Packs](#)

Why Hydro Quip?

- our [technology](#)
- our [coalescing media](#)

Above Ground Oil Water Separators

Features

- Low maintenance costs
- Easy cleaning through removable vapor-tight covers
- No moving parts
- No power consumption
- No consumable wearing elements
- No chemicals, absorbent or filter cartridges to remove, replace or dispose
- Compact size
- Solids storage capability
- Optional integral oil storage



Operation

Fabrication

The oil water separator is a special purpose prefabricated parallel corrugated plate, rectangular, gravity displacement, type oil water separator. The separator shall be comprised of a tank containing an inlet compartment, separation chamber, sludge chamber, and clean water outlet chamber.

Tank

The tank shall be a single wall construction conforming to ASTM A240, type 304 stainless steel. Welding will be in accordance with AWS D1.1 to provide a watertight tank that will not warp or deform under load. Pipe connections to the exterior shall be as follows:

Pipe Connections

All connections 3" and smaller are FNPT couplings. All connections 4" and larger are flat face flanges with ANSI 150 pound standard bolt circle. Use flanged piping connections that conform to ANSI B16.5.

Separator Corrosion Protection (for carbon steel only)

After shop hydrostatic test has been successfully completed, a coating system will be applied to the interior and exterior surfaces of the separator. Interior and exterior shall be sandblasted to SSPC-SP10 & SSPC-SP6; Interior lined with Tnemec Series 61 liner to 9 mils MDFT; Exterior coated with polyamide epoxy to 6 mils MDFT.

Lifting Lugs

The tank shall be provided with properly sized lifting lugs for handling and installation.

Covers

The tank will be provided with a vapor tight covers for vapor control. Gas vents and suitable access openings to each compartment will be provided. The covers shall be constructed of the same material as the tank and will be fastened in place. A gasket shall be provided for vapor tightness. 304 SS Latches will be provided for cover attachment.



High Pressure Steel Filter Vessels

Construction

BakerCorp filter vessels are electric welded, low carbon steel, non-code constructed. The vessels are designed for 100 PSIG working pressure and factory tested. The vessels are lined with TNEMEC series 20HB, 141, or equivalent NSF listed epoxy and exterior epoxy top coated. Standard connections are NPT threaded full couplings.

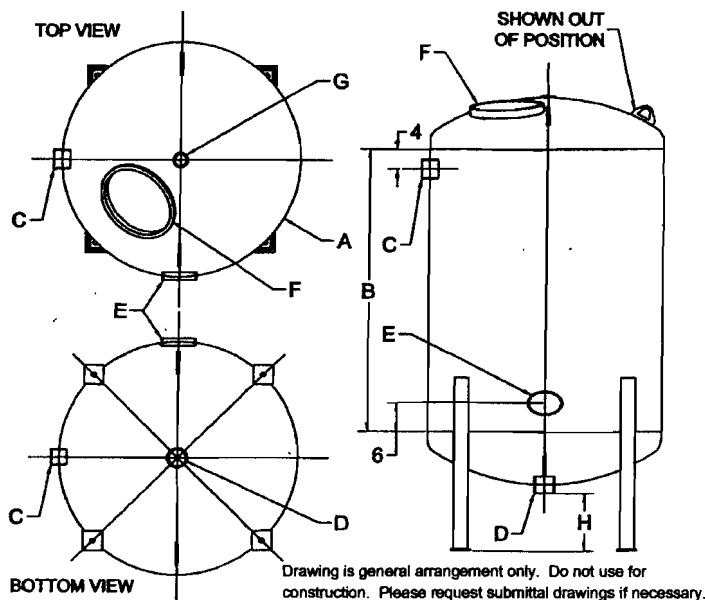
Optional: ASME CODE pressure vessels are fabricated and stamped in accordance with ASME code, Sec. 8, Div. 1. Vessels are available with special pressure ratings, relief valves, various openings and custom interior and exterior coatings. Vessels can be furnished with flanged connections when required.

Distributor System

Filter vessels with a 36" diameter or smaller will be equipped with an outlet distributor hub. Vessels 42" in diameter and larger will include a header - lateral distributor system. All vessels shall be equipped with an inlet diffuser for even distribution of water or liquid and to prevent media loss during backwashing. All internals are Sched 40 PVC unless otherwise specified.

Standard Configuration

Diameter	C & D Fittings	E Opening	F Opening	G Spud	H Distance
24", 30"	2" NPT	4" x 6" Hand hole	4" x 6" Hand hole	1.25"	6"
36", 42"	3" NPT	4" x 6" Hand hole	11" x 15" Manway	2"	9"
48", 66", 72"	4" NPT	4" x 6" Hand hole	11" x 15" Manway	2"	12"



Options & Accessories

1. Flanged or Camlock connections
2. Linings: Rubber, epoxy, galvanize, fiberglass
3. Number, size, location of openings
4. Valves, auto air vents, face piping, controls
5. Vessel pressure ratings and certifications
6. Various grades and mesh sizes of media
7. Additional diameters and sideshell lengths
8. Unitary base and alternate leg configurations

Leg Configuration: 20 - 42" diameter tanks have (3) strap legs; 48 and larger have (4) angle legs

Lifting Lugs: 36" - 42" have (2) lifting lugs on head; 48" - 72" have (2) lifting lugs on top head and (1) on bottom

Shipping: All vessels are palletized, banded and shrink wrapped.

VCC Virgin Coconut Shell Carbon

BakerCorp's VCC 4x8 mesh virgin carbon made from select grades of coconut shell. These activated carbon granules are a uniform adsorbent with well developed pore structure, allowing for a wide range of adsorbate retention. This carbon is ideal for purification of your air stream.

PHYSICAL PROPERTIES:

Carbon Tetrachloride Activity:	60% minimum
Apparent Density (lbs./cu.ft.):	29 average
Total Ash Content:	5% maximum
Hardness (Ball Abrasion):	95% minimum
Moisture (as packed):	5% maximum
Mesh Sizes*:	4x8

*custom sizing available

These specifications represent general parameters and are subject to change. Please consult with BakerCorp before proceeding with your applications.

ATTACHMENT F. DREDGE POSITIONING SYSTEM



KEY FEATURES

Comprehensive GNSS support, including GPS Modernization signals, GLONASS, and Galileo

Robust low-elevation satellite tracking

Minimized multipath

Sub-millimeter phase center repeatability

Ideal for fixed reference stations and GNSS infrastructure networks

The new Trimble® Zephyr™ 2 and Zephyr Geodetic™ 2 antennas break new ground in GNSS surveying antenna technology. Both antennas support modular Trimble systems such as the Trimble® R7 GNSS and Trimble® 5700 GPS receivers, and can be used as part of the Trimble GNSS Infrastructure solution.

TRIMBLE ZEPHYR 2

The Trimble Zephyr 2 GNSS antenna is typically used in roving applications. It minimizes multipath, and offers robust low elevation tracking and sub-millimeter phase center repeatability.

A Trimble GNSS rover comprising the rugged Zephyr 2 and a receiver such as the Trimble R7 GNSS is extremely flexible: Attach the antenna to the top of a pole, wear it on the purpose-built Trimble backpack, or drive with the Zephyr 2 mounted on the roof of a vehicle. The Trimble Zephyr 2 supports the way you want to work.

TRIMBLE ZEPHYR GEODETIC 2

The Trimble Zephyr Geodetic 2 antenna is ideal for control work. The Zephyr Geodetic 2 incorporates a large Trimble Stealth™ Ground Plane, which literally burns up multipath energy using technology similar to that used by Stealth aircraft to hide from radar.

The Zephyr Geodetic 2 antenna's quality performance and extreme accuracy are achieved through sub-millimeter phase center repeatability, robust low-elevation tracking and significantly reduced ground-based multipath.

The Zephyr Geodetic 2 is extremely rugged. It is protected by weather-resistant materials and a low profile design, so when the antenna is used for a permanent installation, you can count on many years of continuous operation without the need for a radome.

COMPREHENSIVE GNSS SUPPORT

The Trimble Zephyr 2 and Zephyr Geodetic 2 antennas offer full support for coming and near-future GNSS signals, including GPS L2C and L5, GLONASS, and even Galileo. This technology future-proofing, in combination with the rugged durability of each antenna, means any investment in a Trimble Zephyr GNSS antenna will last for many years.



The Trimble Zephyr Geodetic 2 antenna is shown as part of a Trimble R7 GNSS base station.

TRIMBLE GNSS ANTENNAS

PERFORMANCE

Trimble Zephyr Geodetic 2 and Trimble Zephyr 2 Antennas

- Broad GNSS Frequency Tracking Band Including:
 - GPS: L1, L2, L5
 - GLONASS: L1, L2, L3
 - Galileo: E1, E2, E5, E6
 - SBAS: WAAS, EGNOS, QZSS, Gagan, MSAS, and OmniStar
- Quality signal tracking, even below 5 degrees elevation
- Four point antenna feed for phase center stability and enhanced polarization
- TNC female signal connector
- Small cross-sectional area to reduce wind loading
- 13 dB amplifier margin supports cable runs of over 60 m without special coaxial cable or in-line amplifiers
- North orientation marking on exterior
- 50 dB signal gain for reliable tracking in difficult environments
- Low voltage, low power consumption
- Integral low noise amplifier
- 5/8" x 11 female threaded stainless steel mount point
- Powered by GNSS receiver via coaxial cable
- Advanced LNA (low noise amplifier) to reduce jamming by high power out-of-band transmitters

Zephyr Geodetic 2 Antenna Only

- Trimble Stealth Ground Plane – integrated lightweight stealth technology with enhanced right hand circular polarization to reduce multipath interference
- Supplementary radome not required (available if desired)

HARDWARE

Dimensions

Zephyr 2	16.5 cm diameter x 7.6 cm height (6.5 in diameter x 3 in height)
Zephyr Geodetic 2	34.3 cm diameter x 7.6 cm height (13.5 in diameter x 3 in height)

Weight

Zephyr 2	0.64 kg (1.4 lb)
Zephyr Geodetic 2	1.36 kg (3 lb)

Operating Temperature.....-40 °C to +70 °C (-40 °F to +158 °F)

Humidity.....100% humidity proof, fully sealed

Shock and Vibration Tested and meets the following environmental standards:

Shock MIL-STD-810-F to survive a 2 m (6.56 ft) drop onto concrete

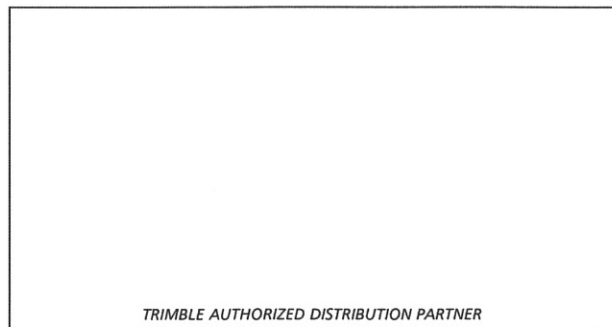
VibrationMIL-STD-810-F on each axis

Input Voltage.....3.5 V DC to 20 V DC

Input Current..... 125 mA maximum

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Specifications subject to change without notice.



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www.trimble.com

Specifications

Trimble SPS852 Modular GPS Receiver



Receiver Name	SPS852 Modular GPS Receiver
Configuration Option	
Base and Rover interchangeability	Yes
Rover position update rate	1 Hz, 2 Hz, 5 Hz, 10 Hz, 20 Hz
Rover maximum range from base radio	Unrestricted, typical range 2–5 km (1.2–3 miles) without radio repeater
Rover operation within a VRS™ network	Yes
Heading and Moving Base operation	Yes ⁷
Factory options	See Receiver Upgrades below
General	
Keyboard and display	Vacuum Fluorescent display 16 characters by 2 rows. Invertable On/Off key for one-button startup Escape and Enter keys for menu navigation 4 arrow keys (up, down, left, right) for option scrolls and data entry
Dimensions (L x W x D)	24 cm x 12 cm x 5 cm (9.4 in x 4.7 in x 1.9 in) including connectors
Weight	1.65 kg (3.64 lb) receiver with internal battery and radio 1.55 kg (3.42 lb) receiver with internal battery and no radio
Antenna Options	
GA510	L1/L2/L2C GPS, SBAS, and OmniSTAR
GA530	L1/L2/L2C GPS, SBAS, and OmniSTAR
GA810	GPS, Glonass, OmniSTAR, SBAS, Galileo (optimized for OmniSTAR)
L1/Beacon, DSM 232	Not Supported
Zephyr™ Model 2	L1/L2/L2C/L5 GPS, Glonass, OmniSTAR, SBAS, Galileo
Zephyr Geodetic™ Model 2	L1/L2/L2C/L5 GPS, Glonass, OmniSTAR, SBAS, Galileo
Zephyr Model 2 Rugged	L1/L2/L2C/L5 GPS, Glonass, OmniSTAR, SBAS, Galileo
Zephyr, Zephyr Geodetic, Z-Plus, Micro-Centered™	Refer to Antenna specification
Temperature	
Operating ¹	-40 °C to +65 °C (-40 °F to +149 °F)
Storage	-40 °C to +80 °C (-40 °F to +176 °F)
Humidity	MIL-STD 810F, Method 507.4
Waterproof	IP67 for submersion to depth of 1 m (3.3 ft), dustproof
Shock and Vibration	
Pole drop	Designed to survive a 1 m (3.3 ft) pole drop onto a hard surface
Shock – Non-operating	To 75 g, 6 ms
Shock – Operating	To 40 g, 10 ms, saw-tooth
Vibration	Tested to Trimble ATV profile (4.5 g RMS): 10 Hz to 300 Hz: 0.04 g/Hz ² 300 Hz to 1,000 Hz; –6 dB/octave

Specifications

Trimble SPS852 Modular GPS Receiver

Measurements

Advanced Trimble Maxwell™ 6 Custom GPS Chip
High-precision multiple correlator for L1/L2 pseudo-range measurements

Unfiltered, unsmoothed pseudo-range measurements data for low noise, low multipath error, low-time domain correlation, and high-dynamic response

Very low noise carrier phase measurements with <1 mm precision in a 1 Hz bandwidth

Signal-to-noise ratios reported in dB-Hz

Proven Trimble low elevation tracking technology

220-channel L1C/A, L1/L2/L2C. Upgradable to L5 and GLONASS L1/L2C/A, L1/L2P Full Cycle Carrier

Trimble EVEREST™ multipath signal rejection

4-channel SBAS (WAAS/EGNOS/MSAS)

Galileo GIOVE-A and GIOVE-B⁸

SBAS (WAAS/EGNOS/MSAS) Positioning³

Accuracy

Better than 5 m 3DRMS (16 ft)

Code Differential GPS Positioning²

Horizontal accuracy

0.25 m + 1 ppm RMS (0.8 ft + 1 ppm RMS)

Vertical accuracy

0.50 m + 1 ppm RMS (1.6 ft + 1 ppm RMS)

OmniSTAR Positioning

VBS service accuracy

Horizontal <1 m (3.3 ft)

XP service accuracy

Horizontal 0.2 m (0.66 ft), Vertical 0.3 m (1.0 ft)

HP service accuracy

Horizontal 0.1 m (0.33 ft), Vertical 0.15 m (0.5 ft)

Location RTK Positioning

Horizontal accuracy

Location RTK (10/10) or (10/2) 10 cm + 1 ppm RMS (0.32 ft + 1 ppm)

Vertical accuracy

Location RTK (10/10) 10 cm + 1 ppm RMS (0.32 ft + 1 ppm)

Location RTK (10/2) 2 cm + 1 ppm RMS (0.065 ft + 1 ppm)

Real-Time Kinematic (RTK up to 30 km)

Positioning²

Horizontal accuracy

8 mm + 1 ppm RMS (0.026 ft + 1 ppm RMS)

Vertical accuracy

15 mm + 1 ppm RMS (0.05 ft + 1 ppm RMS)

Trimble VRS⁹

Horizontal accuracy

8 mm + 0.5 ppm RMS (0.026 ft + 0.5 ppm)

Vertical accuracy

15 mm + 0.5 ppm RMS (0.05 ft + 0.5 ppm)

Precise Heading

Heading accuracy

When combined with SPS552H⁷

2 m antenna separation

0.09° RMS

10 m antenna separation

0.05° RMS

Initialization Time

Regular RTK operation with base station

Single/Multi-base
typically less than 10 seconds

Initialization reliability⁴

>99.9%

Power

Internal

Integrated internal battery 7.2 V, 7800 mA-hr, Lithium-ion

Internal battery operates as a UPS in the event of external power source failure

Internal battery will charge from external power source as long as source can support the power drain

Integrated charging circuitry

Specifications

Trimble SPS852 Modular GPS Receiver

Power

External

Power input on 7-pin 0-shell Lemo connector is optimized for lead acid batteries with a cut-off threshold of 11.5 V
Power input on the 26-pin D-sub connector is optimized for Trimble lithium-ion battery input with a cut-off threshold of 10.5 V
Power source supply (Internal/External) is hot-swap capable in the event of power source removal or cut off
DC external power input with over-voltage protection
Receiver automatically turns on when connected to external power

Power over Ethernet (PoE)

N/A

Power consumption

6.0 W in rover mode with internal receive radio
8.0 W in base mode with internal transmit radio

Operation Time on Internal Battery

Rover

13 hours; varies with temperature

Base station

450 MHz systems

Approximately 11 hours; varies with temperature⁵

900 MHz systems

Approximately 9 hours; varies with temperature

Regulatory Approvals

FCC: Part 15 Subpart B (Class B Device) and Subpart C, Part 90
Canadian ICES-003. Cet appareil numérique de la classe B est conforme à la norme NMB-003 du Canada.
Canadian RSS-310, RSS-210, and RSS-119.
Cet appareil est conforme à la norme CNR-310, CNR-210, et CNR-119 du Canada.

R&TTE Directive: EN 301 489-1/-5/-17, EN 300 440, EN 300 328, EN 300 113, EN 60950, EN 50371

ACMA: AS/NZS 4295 approval

CE mark compliance

C-tick mark compliance

UN ST/SG/AC.10.11/Rev. 3, Amend. 1 (Lithium-ion Battery)

UN ST/SG/AC. 10/27/Add. 2 (Lithium-ion Battery)

RoHS compliant

WEEE compliant

Communications

Lemo (Serial)

7-pin 0S Lemo, Serial 1, 3-wire RS-232

Modem 1 (Serial)

26-pin D-sub, Serial 2, Full 9-wire RS232, using adaptor cable

Modem 2 (Serial)

26-pin D-sub, Serial 3, 3 wire RS-232, using adaptor cable

1PPS (1 Pulse-per-second)

Available on Marine versions

Ethernet

Through a multi-port adaptor

Bluetooth wireless technology

Fully-integrated, fully-sealed 2.4 GHz Bluetooth module⁶

Integrated radios (optional)

Fully-integrated, fully-sealed internal 410-470 MHz Tx/Rx; Internal 900 MHz Tx/Rx

Channel spacing (450 MHz)

12.5 kHz or 25 kHz spacing available

Sensitivity (450 MHz)

-114 dBm (12 dB SINAD)

450 MHz output power

0.5 W, 2.0 W (2.0 W available only in certain countries)

900 MHz output power

1.0 W

Frequency approvals (900 MHz)

USA/Canada (-91)

New Zealand/Australia (-92)

Australia (-93)

External GSM/GPRS, cell phone support

Supported for direct-dial and Internet-based correction streams – directly using the clip on SNM910 or using the SCS900 software
Cell phone or GSM/GPRS modem inside controller

Specifications

Trimble SPS852 Modular GPS Receiver

Internal MSK Beacon receiver

N/A

Receiver position update rate

1 Hz, 2 Hz, 5 Hz, 10 Hz, and 20 Hz positioning

Correction data input

CMR™, CMR+™, CMRx™, RTCM 2.x, RTCM 3

Correction data output

CMR, CMR+, CMRx, RTCM 2.x, RTCM 3

Data outputs

NMEA, GSOF, 1PPS Time Tags (Marine version)

Receiver Upgrades

Location RTK (10/10) or (10/2)
Precision RTK Base, Rover or Base/Rover
L5, Glonass
28 MB Internal Data Logging option

Notes

1 Receiver will operate normally to those temperature limits. Internal batteries will operate from -20°C to $+48^{\circ}\text{C}$

2 Accuracy and reliability may be subject to anomalies such as multipath, obstructions, satellite geometry, and atmospheric conditions. Always follow recommended survey practices.

3 Depends on SBAS system performance.

4 May be affected by atmospheric conditions, signal multipath, and satellite geometry. Initialization reliability is continuously monitored to ensure highest quality.

5 If your receiver has the 2.0 W upgrade, you will experience reduced battery performance compared to the 0.5 W solution.

6 Bluetooth type approvals are country specific. For more information, contact your local Trimble office or representative.

7 When receiver is combined with an SPS552H or other suitable SPS receivers.

8 Galileo Commercial Authorization

Receiver technology having Galileo capability to operate in the Galileo frequency bands and using information from the Galileo system for future operational satellites is restricted in the publicly available Galileo open Service Signal-In-Space Interface Control document (GAL OS SIS ICD) and is not currently authorized for commercial use.

Receiver technology that tracks the GIOVE-A and GIOVE-B test satellites uses information that is unrestricted in the public domain in the GIOVE A + B Navigation Signals-In-Space Interface Control document. Receiver technology having developmental GIOVE-A and B capability is intended for signal evaluation and test purposes.

9 Networked RTK PPM values are referenced to the closest physical base station

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Specifications

Trimble SPS852 Modular GPS Receiver

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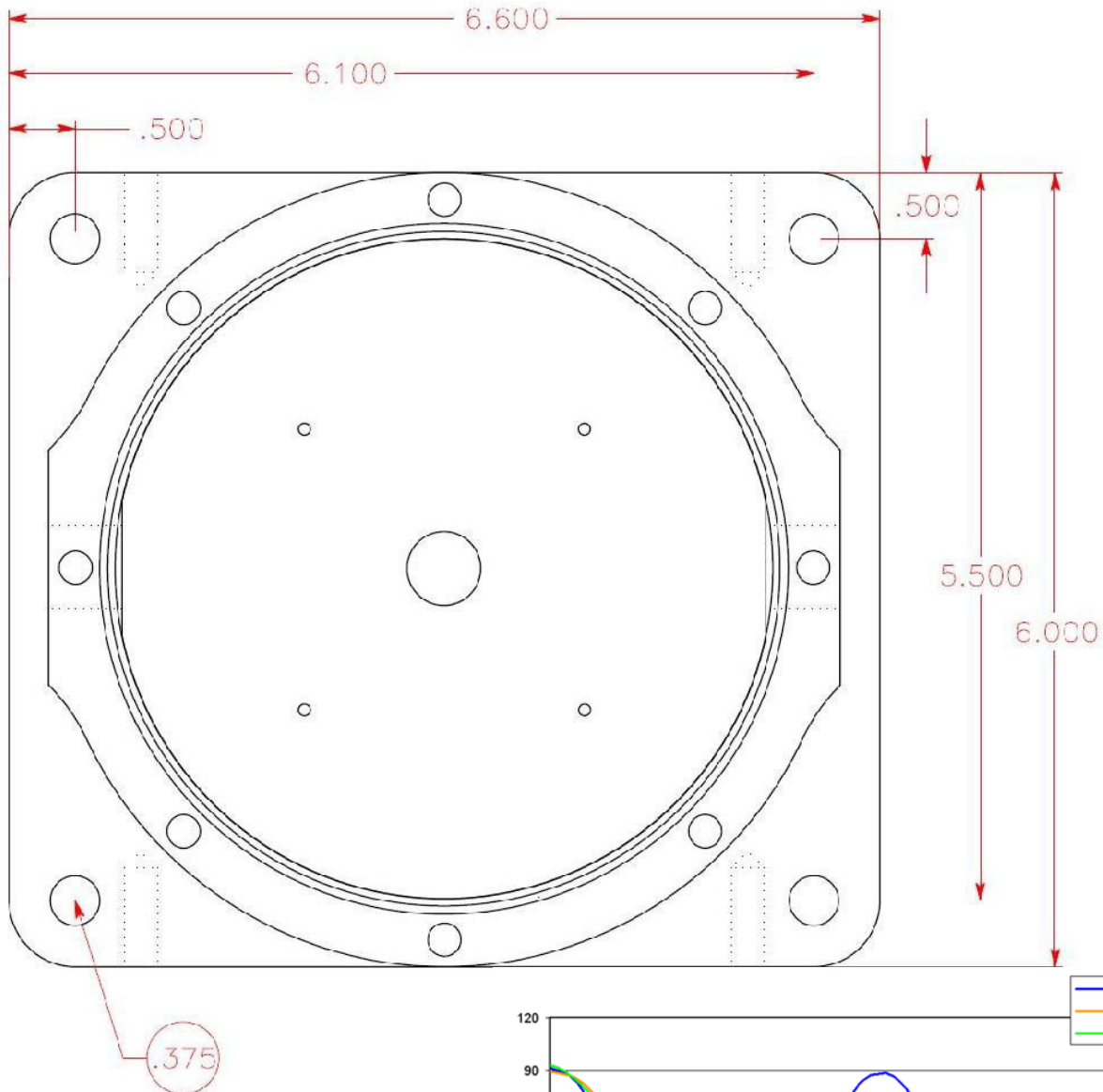
+1-937-245-5154 Phone

+1-937-233-9441 Fax

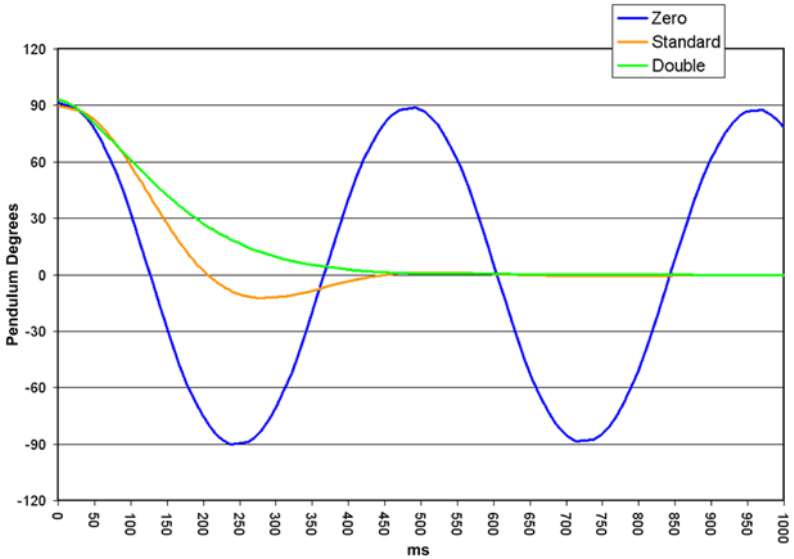
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Trimble Authorized Distribution Partner

Absolute Inclinometer



Inclinometer Spec
All Dimensions in Inches



Absolute Maximum Ratings:

(Voltage referenced to GND)

Parameter	Min.	Max.	Units
Storage Temperature	-40	100	°C
Operating Temperature	-25	70	°C
Humidity (non-condensing)	0	95	%
Supply Voltage (PWR)	0	16	Volts
DataH, DataL, Busy+, Busy-	-14	14	Volts
Positioning Update Rate	-	2	mSec

Mechanical Specifications:

Typical Settling Time	250mSec
Natural Pendulum Time Period	140mSec
Natural Pendulum Frequency	7.4Hz (preliminary)
Position Error	±0.1° max.
Mounting	3" diameter bolt circle
Moment of Inertia	.0001 oz in s ²
Weight	9.40 oz.

Electrical Specifications:

➤ Specifications apply over entire operating temperature range.
➤ Typical values are specified at Vcc= 12V and 25°C.

Parameter	Min.	Typ.	Max.	Units
Supply Voltage (PWR)	5.5	-	16	Volts
Supply Current (active)	-	14	16	mA
Supply Current (sleep)	-	-	0.60	mA
Analog Output Impedance (Anlg+)	950	1000	1050	Ohms
Zero Scale Analog Voltage	0	.0005	.003	Volts
Full Scale Analog Voltage	4.079	4.095	4.111	Volts
Differential Nonlinearity	-1	-	1	LSB



HYPACK

DREDGERBACK GUIDE TO EXCAVATORS

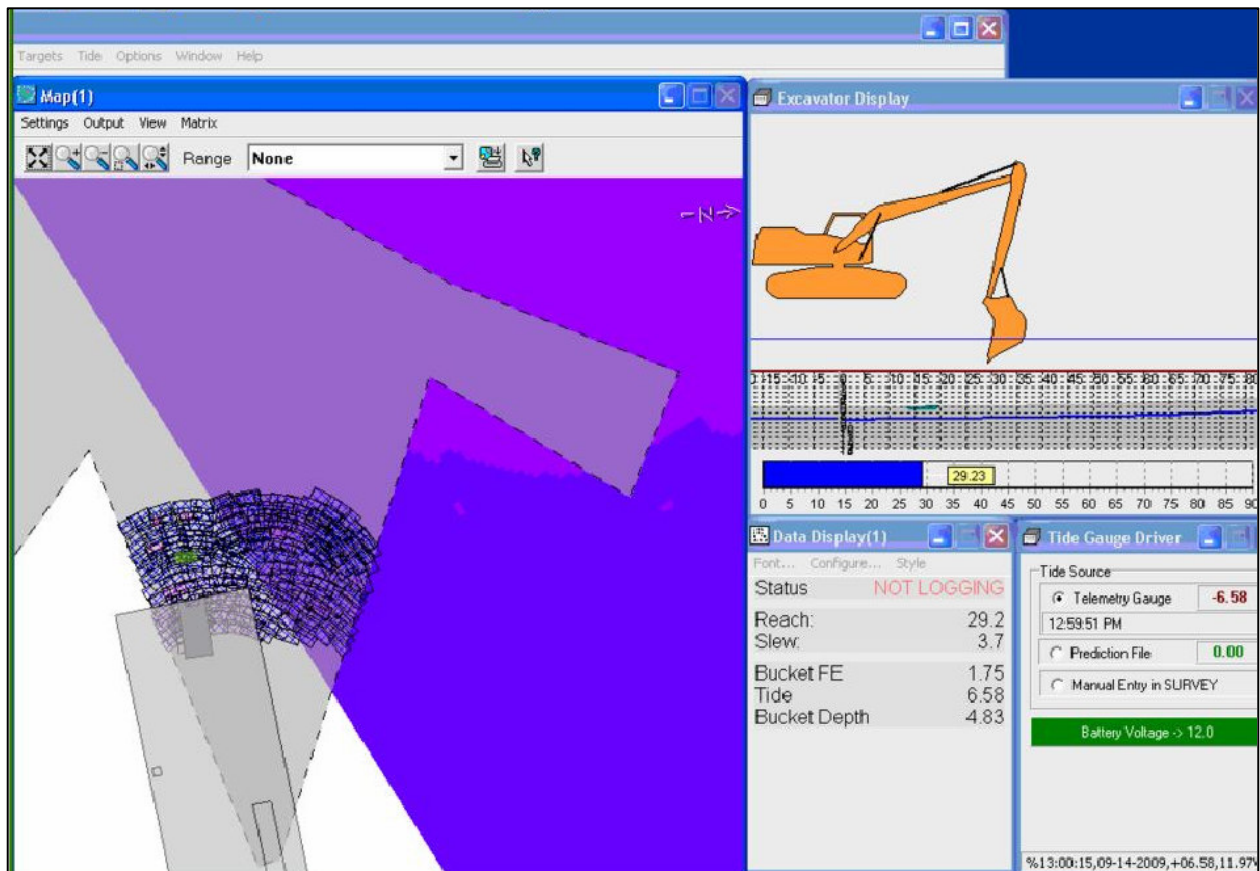
Installers Guide | REV 1

DREDGEPACK GUIDE TO EXCAVATORS

DREDGEPACK GUIDE TO EXCAVATORS

The following guide is designed to aid in the installation of DREDGEPACK on an excavator. Due to the complex nature of installing an Excavator System please follow this guide in order and if there are any questions contact HYPACK Technical Support at Help@HYPACK.Com or via the telephone at (860) 635-1500.

There are two types of excavator setups that are possible in HYPACK. The first is the standard Three Arm Excavator. The standard excavator uses the EXCAVPARSER and EXCAVSM drivers to interface the equipment. The other type of excavator is a Four Arm Excavator. Due to the complexity of a Four Arm Excavator there is a separate driver specifically for that type. In this guide we will discuss the Three Arm Excavator first since most of the items carry over to the Four Arm type.



DREDGEPACK GUIDE TO EXCAVATORS

SENSORS

The TILTRAC Sensor is a waterproof, ruggedized sensor that is designed to perform in a marine environment. The housing is sealed at the factory and pressure tested to ensure that there are no leaks.

The entire standard excavator system uses three TILTRAC Sensors for arm position and angle, with an option to use an additional two sensors used to measure pitch and roll of the excavator.



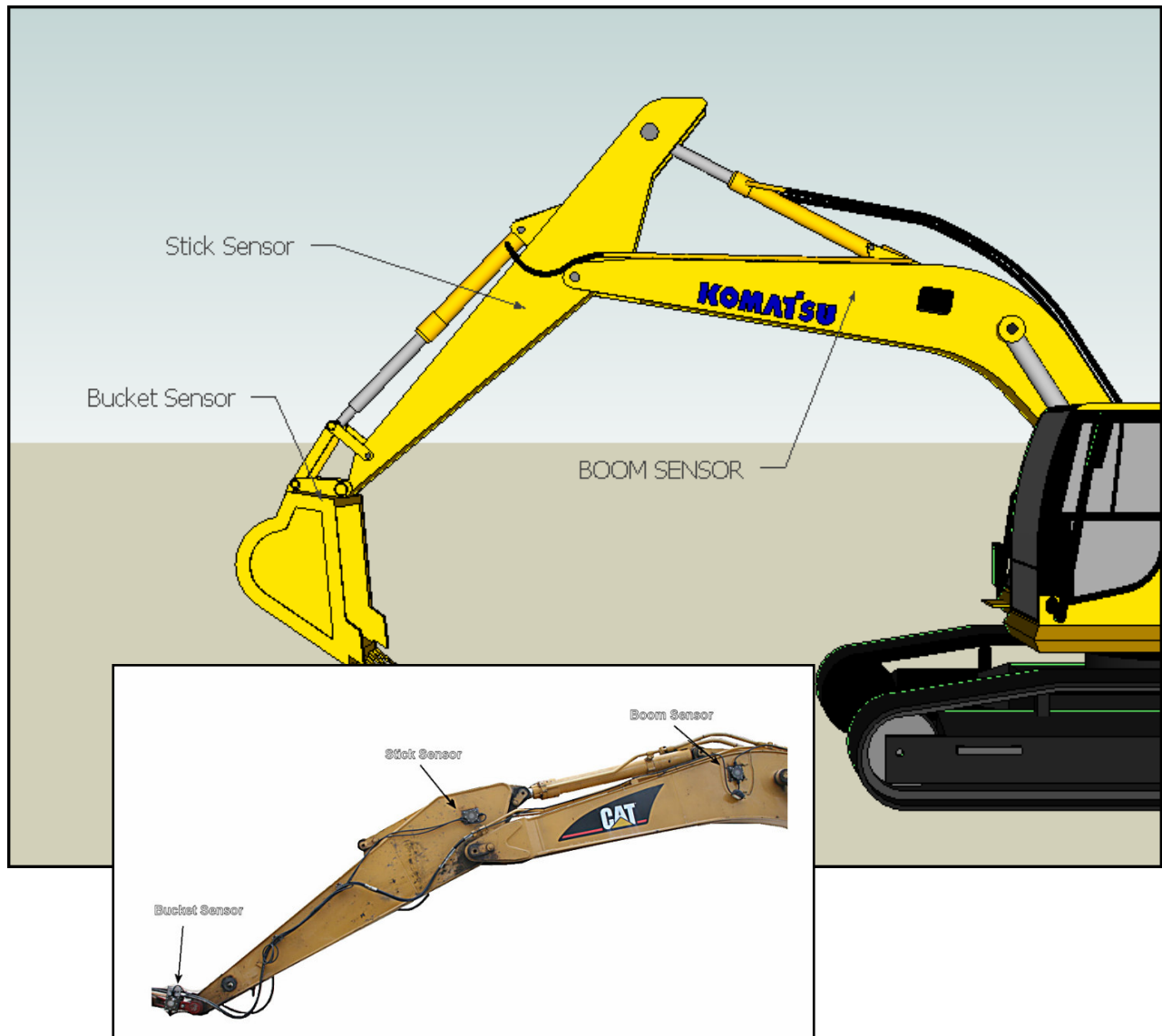
The sensors have two connectors so that they may be connected together in a chain with only one cable returning to the electronics interface box located back at the cabin.

The cables are made with submersible connectors that are designed to force any water out of the female connector as they are joined. When connecting the sensor cable, a small amount of dielectric grease should be applied to the face of the connector. This will make it easier to push the connectors together.



DREDGEPACK GUIDE TO EXCAVATORS

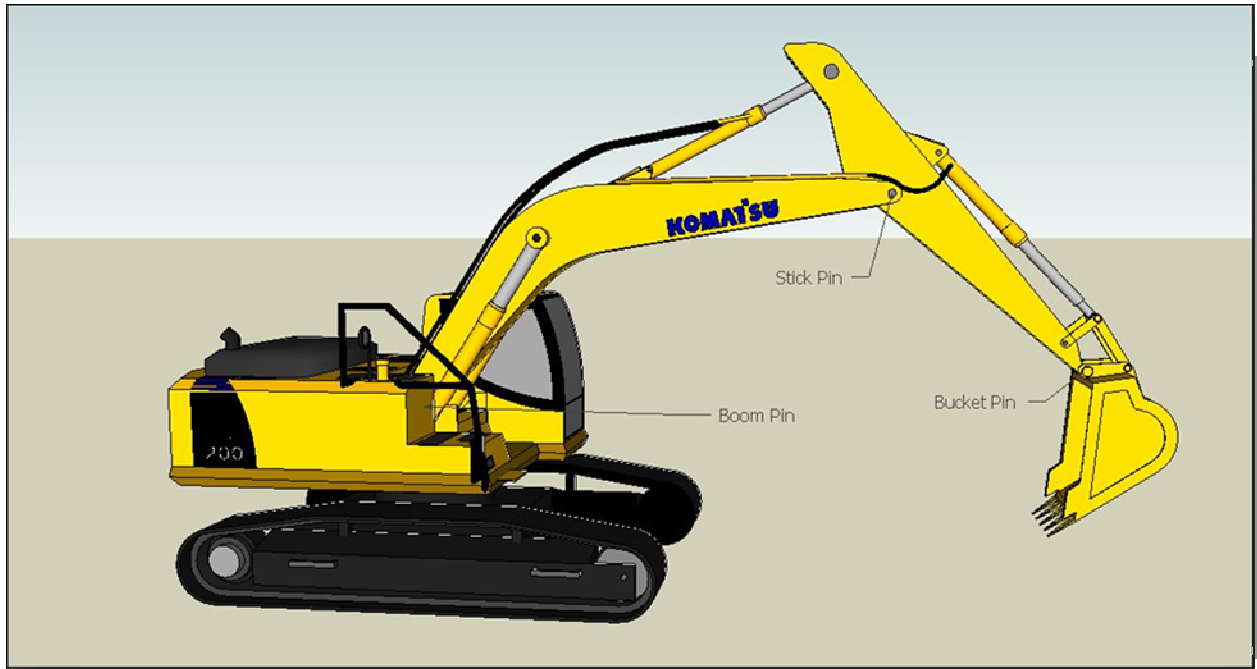
PREFERRED SENSOR LOCATIONS



Sensor location is very important. In most cases the sensors are placed on the side of the excavator arm that the operator can see. This is so that he can monitor the system for damage. The boom sensor is placed on the boom arm so that the sensor rotates with the axis of the boom, above the hydraulic ram attachment to minimize the possibility of damage. The Stick sensor is located just below the stick to boom pin on the stick, along the axis of the sticks rotation. This allows the cable to be aligned with the hydraulic hoses in a way that will minimize damage. Also the excess cable should be located near the boom sensor. This will keep the slack from being in the way or getting pinched when the stick is moved. The Bucket sensor presents a new set of problems. The sensor is best used when it is placed on the top of the bucket. The cable requires enough slack to avoid damage to the cable when the bucket is rolled.

DREDGEPACK GUIDE TO EXCAVATORS

To properly install an excavator there are quite a few measurements that must be taken. Because we use angles and measurements to determine the position and depth of the bucket, the tighter these measurements are made, the more accurate your excavator will be. First we will go over the various terms that we use to reference the key points.



The main part of the excavator that includes the engine and the operator cabin is referred to as the BODY of the excavator. The first arm is referred to as the Boom, the second arm is referred to as the stick and the third arm is the bucket. In a Four Arm Excavator there would be an additional stick between the second arm and the bucket. This is referred to as Stick2 in the FourA2TS driver.

The following Measurements need to be taken. Please refer to the image above when making these measurements.

ALL MEASUREMENTS ARE CENTER OF PIN TO CENTER OF PIN

BOOM PIN to STICK PIN _____ Feet / Meters

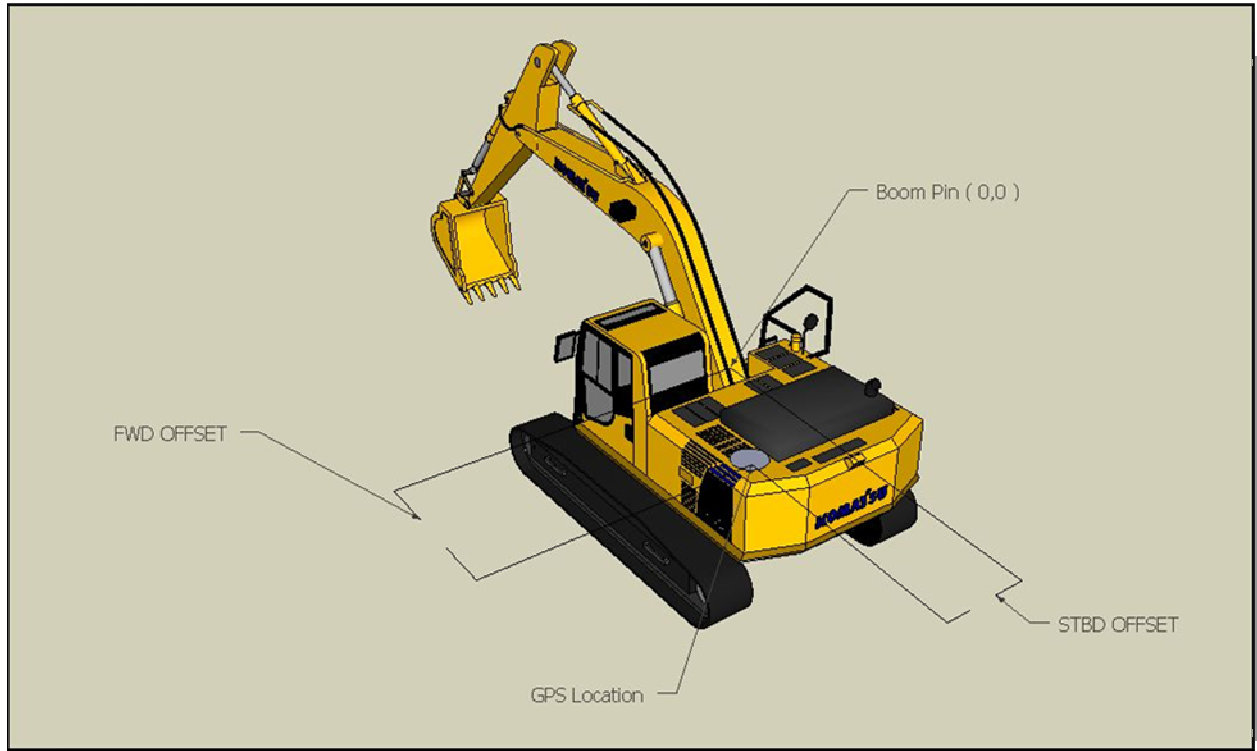
STICK PIN to BUCKET PIN _____ Feet / Meters

BUCKET PIN to TIP OF TEETH _____ Feet / Meters

LENGTH OF BODY _____ Feet / Meters

DREDGEPACK GUIDE TO EXCAVATORS

The horizontal offset of the excavator is just as important as the length of the arm since this will determine the location from the GPS that the angles and distances are applied to.



In my example the excavator Boom Pin is Forward and Starboard of the GPS Location. The GPS Location is typically aft of the Boom Pin to avoid GPS interference when the Boom is fully raised. The boom pin is located at the reference point. The Bucket Mobile is a relative vessel, which means that it derives heading from the mobile that it is attached to. In the example on Page 1 the Bucket is attached to the BOAT mobile that is actually the excavator body. The GPS on the BOAT mobile is the same GPS that is shown in the above image. The GPS on the BOAT mobile should receive the offsets from the Boom Pin. The offsets are referenced in a standard Cartesian Coordinate system. Forward and Starboard of the reference point is positive and Aft and Port of the reference point are negative. In the image above the GPS is both port and aft of the reference point. The accuracy of the measurements affect the horizontal accuracy of the bucket final position.

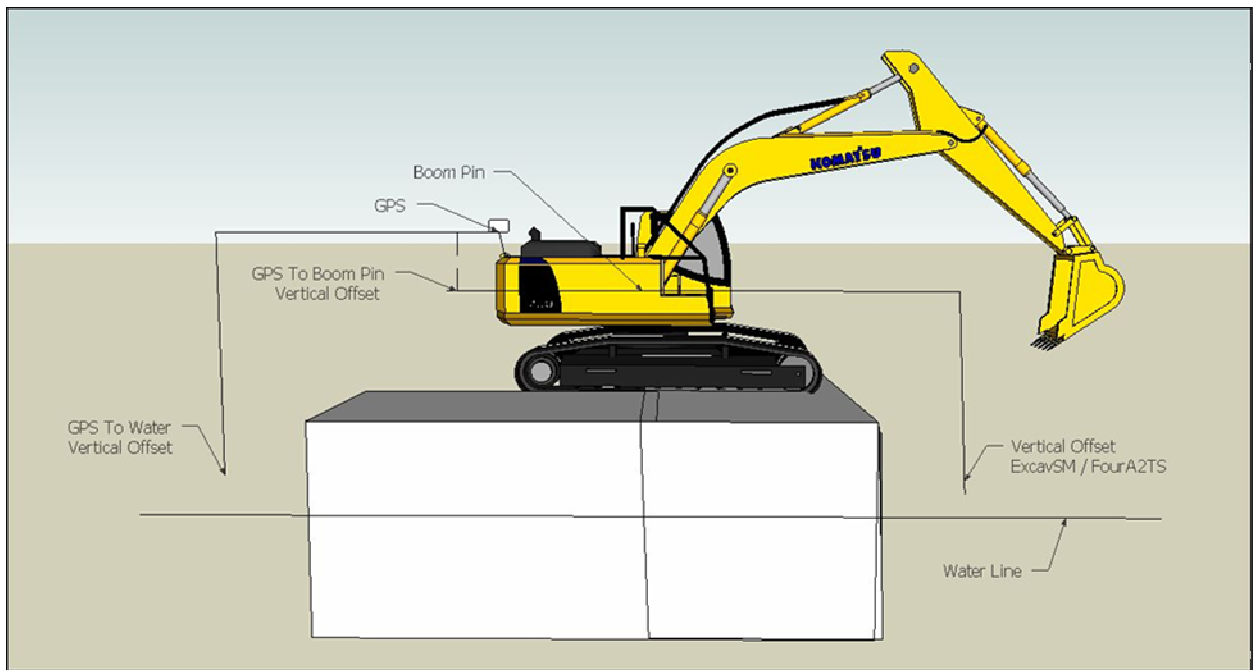
GPS to BOOM PIN in FORWARD AXIS _____ Feet / Meters

GPS to BOOM PIN in STARBOARD AXIS _____ Feet / Meters

ALWAYS REFERENCE THE BOOM PIN (TRUNNION) AS THE ORIGIN POINT (0, 0)

DREDGEPACK GUIDE TO EXCAVATORS

On an Excavator that is using an RTK GPS for tide there are two different methods that can be employed. The user can reference the GPS Vertical Offset from the Boom Pin remembering that up is negative in our offsets. The other method is to measure the GPS Vertical Offset to the Water Line of the Barge the excavator is sitting on. In the second method you will also have to enter the height of the Boom Pin Vertical Offset from the Water Line. This method is preferred when the height of the water surface can be independently verified because the bucket can then be set to the water and the tide/water surface can be compared to the bucket final elevation to ensure vertical calibration. If the tide/water surface is



not independently referenced and is not of concern then the first method is sufficient.

In the image above the GPS offsets are shown to both the water surface and the Boom Pin. This is for reference only.

TIDE / WATER SURFACE METHOD

GPS To Water _____

BOOM PIN to Water _____

BOOM PIN VERTICAL REF METHOD

GPS To BOOM PIN _____

BOOM PIN to Water 0 Vertical Offset

If the GPS is referenced to one it should not be referenced to the other. If the GPS is referenced to the BOOM PIN then the EXCAVSM Vertical Offset is to be entered as zero (0) so that the RTK reference is computed at the BOOM PIN and not the water.

DREDGEPACK GUIDE TO EXCAVATORS

HYPACK HARDWARE

DREDGEPACK GUIDE TO EXCAVATORS

DREDGEPACK GUIDE TO EXCAVATORS

Calibration Sheet – THREE ARM EXCAVATOR

Measure all of the values required.

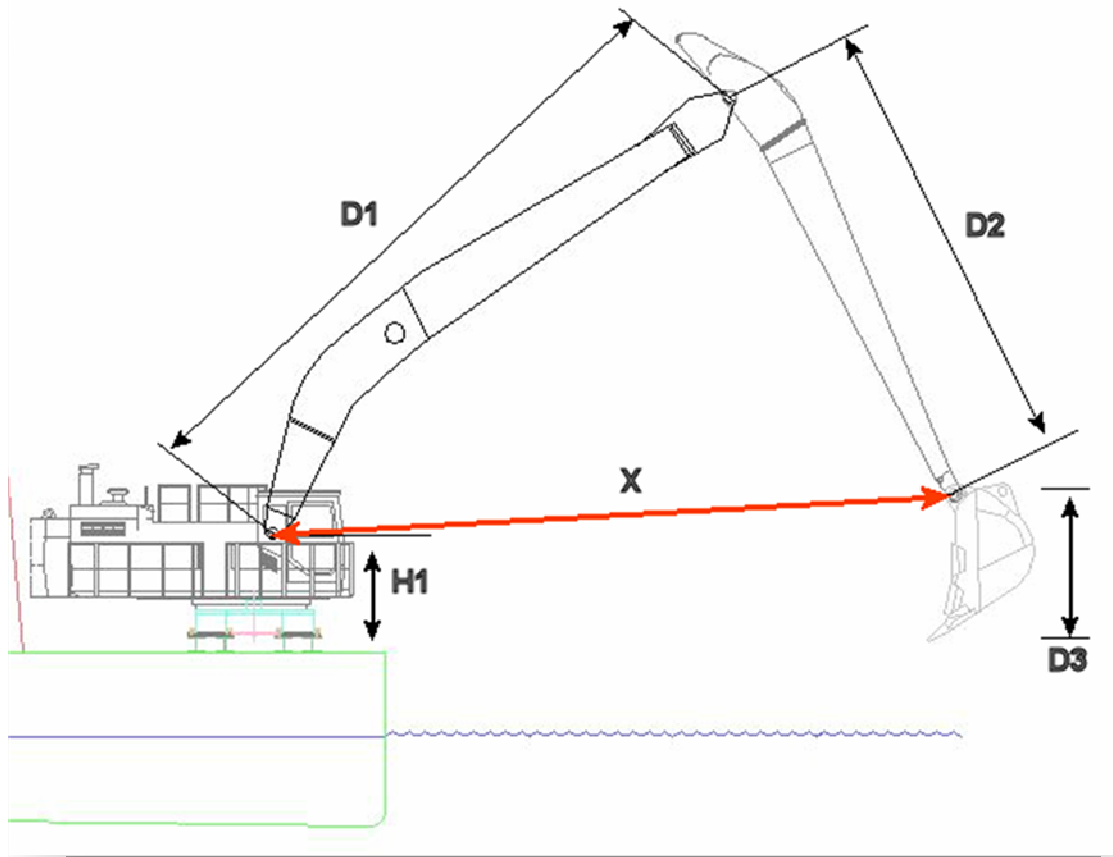
- _____ D1 - Boom to Stick length
- _____ D2 - Stick to Bucket length
- _____ D3- Bucket Pin to deck
- _____ H1- Trunnion to Deck
- _____ X – Trunnion to Bucket Pin

2. In HYPACK HARDWARE, select the ExcavParser driver and the Setup Dialog

- a. Enter the values in the EXCAVATOR PARSER driver
- b. Select the READ INFO Button to ensure that all three sensors are connected.
- c. Select the Calibrate button to set the proper angles

The screenshot shows a software window titled "SETUP" for an "eTrac Tri-Sensor Excavator". It features a diagram of the excavator's arm with dimensions labeled: d1 (boom to stick), d2 (stick to bucket), d3 (bucket pin to deck), h1 (trunnion to deck), and x (trunnion to bucket pin). Below the diagram are input fields for these values: d1 (10), d2 (10), d3 (5), h1 (5), and x (8.65). To the right, there are checkboxes for "Enable Online Calibration", "ReadInfo", and "Calibrate" buttons. At the bottom, there is a "Sensor Override Values" section with checkboxes for "Boom Sensor", "Stick Sensor", and "Bucket Sensor", each with a corresponding input field set to 0. "Cancel" and "OK" buttons are at the bottom right.

DREDGEPACK GUIDE TO EXCAVATORS



DREDGEPACK GUIDE TO EXCAVATORS

Calibration Sheet – FOUR ARM EXCAVATOR

Measure all of the values required.

_____ D1 - Boom PIN to Stick 1 PIN length

_____ H1 - Boom PIN to Deck

_____ D2 – Stick 1 PIN to Stick 2 PIN length

_____ H2 – Stick 1 PIN to Deck

_____ D3- Stick 2 PIN to Bucket Pin

_____ H3 – Stick 2 PIN to Deck

_____ D4- Bucket PIN to Deck

_____ H4 - Bucket PIN to Deck

In HYPACK HARDWARE, select the FOURA2TS driver and the Setup Dialog. Select the Calibrate button to set the proper angles.

Three A12S Setup

Excavator Geometry

d1 28.6 d2 14.2 d3 20.1 d4 5.5 Excav Length 22 Calibrate

h1 9 h2 18.59 h3 14.9 h4 5.5 Excav Height 8

Shapes

Body C:\HYPACK 2008\Boat Shapes\Shapes for the ExcavatorSM driver\bod

Boom C:\HYPACK 2008\Boat Shapes\Shapes for the ExcavatorSM driver\boo

Stick C:\HYPACK 2008\Boat Shapes\Shapes for the ExcavatorSM driver\stic

Stick 2 C:\HYPACK 2008\Boat Shapes\Shapes for the ExcavatorSM driver\stic

Bucket C:\HYPACK 2008\Boat Shapes\MercerBucket.shp

Sensors

Sensor 1 Read Info

Serial No Unknown

Address Unknown

Rotation Unknown

Angle Unknown

Bucket Geometry

Cell Width 3

Cell Height 3

No of Rows 1

No of Colons 1

Profile

Minimal Depth -18

Maximal Depth 50

Profile Width 500

Boat Position 250

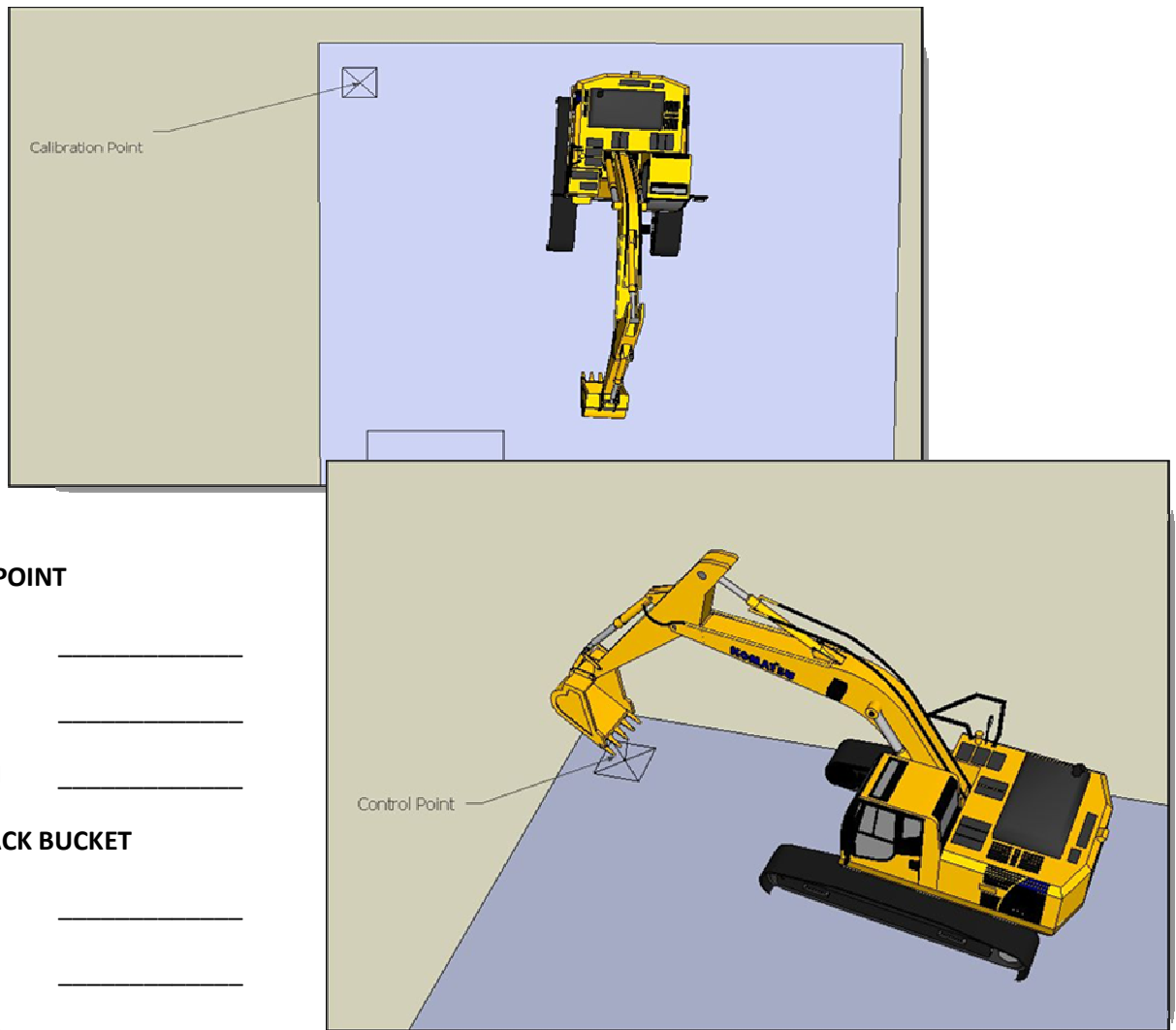
OK Cancel

DREDGEPACK GUIDE TO EXCAVATORS

CALIBRATION VERIFICATION

Regardless of the procedure used to calibrate the system it is ALWAYS recommended that the user take the time to verify both the horizontal and vertical accuracy of the bucket. The easiest method for checking this on a floating platform is to shoot a temporary control point on the barge and then place the center tooth of the bucket on that point. Compare the center point as it is recorded in DREDGEPACK with the actual control point as it is recorded from the RTK GPS. Move the arms to change angles and touch the control point to verify that it is truly calibrated and not just a coincidence.

DO NOT CALIBRATE AT THE CONTROL POINT



DREDGEPACK GUIDE TO EXCAVATORS

CALIBRATION CHECKS

Test #1

Boom Angle _____ Stick Angle _____ Bucket Angle _____

HYPACK Elevation _____ HYPACK Easting _____ HYPACK Northing _____

Ref Elevation _____ Ref Easting _____ Ref Northing _____

Test #2

Boom Angle _____ Stick Angle _____ Bucket Angle _____

HYPACK Elevation _____ HYPACK Easting _____ HYPACK Northing _____

Ref Elevation _____ Ref Easting _____ Ref Northing _____

Test #3

Boom Angle _____ Stick Angle _____ Bucket Angle _____

HYPACK Elevation _____ HYPACK Easting _____ HYPACK Northing _____

Ref Elevation _____ Ref Easting _____ Ref Northing _____

Test #4

Boom Angle _____ Stick Angle _____ Bucket Angle _____

HYPACK Elevation _____ HYPACK Easting _____ HYPACK Northing _____

Ref Elevation _____ Ref Easting _____ Ref Northing _____

DREDGEPACK GUIDE TO EXCAVATORS

HARDWARE SCREEN CAPTURES

TROUBLESHOOTING

This portion is made up of real world issues that have caused problems for installers. It is laid out in a Symptom / Resolution format.

SYMPTOM

The excavator has been added to HARDWARE but when DREDGEPACK is started it instantly crashes

RESOLUTION

In this case the user had not configured the SETUP Dialog of the EXCAVATORSM driver. The Shapes that are defaulted in the driver do not exist on his computer and therefore cannot be loaded. This causes a crash. There are default shapes in the BOAT SHAPES folder.

**ATTACHMENT G.
SITE SPECIFIC HEALTH & SAFETY PLAN**

HEALTH AND SAFETY PLAN ACKNOWLEDGMENT SHEET

I acknowledge having received a briefing on this health and safety plan, and that I understand the requirements of this plan, including the potential for random or for-cause drug and alcohol testing. I further acknowledge that failure to follow the requirements of this plan may result in removal from this site.

Printed Name	Company	Signature	Date

TABLE OF CONTENTS.....	i
A. SITE INTRODUCTION.....	1
A.1. Scope.....	1
A.2. Site Description.....	1
A.3. Description of Work.....	2
A.4. Tasks.....	3
A.4.a. Site Infrastructure Areas to be Installed or Constructed:.....	3
A.4.b. Accepting and Staging Delivered Equipment and Materials.....	3
A.4.c. Cofferdam Installation.....	4
A.4.d. Construction.....	4
A.4.e. Sediment Excavation, Treatment, and Backfill.....	5
A.4.f. Water Treatment System.....	6
A.4.g. Cofferdam Removal.....	6
A.4.h. Demobilization.....	6
B. BASIS.....	7
B.1. Preparation and Approval.....	7
B.1.a. Prepared For.....	7
B.1.b. Prepared By.....	7
B.1.c. Approvals and Modifications.....	7
B.2. Incident-Free Performance of Work.....	8
B.3. Policies and Regulatory Basis.....	8
B.4. Changing Conditions and Management of Change.....	8
B.5. Management of Change (MOC).....	8
B.5.a. Changing Conditions.....	8
B.5.b. Response to Changes in Conditions.....	9
B.5.c. HASP and AHA familiarization.....	9
B.6. Compliance.....	9
C. SITE ORGANIZATION AND KEY PERSONNEL.....	10
C.1. Project Manager: Jeff Habegger.....	10
C.2. Site Superintendent: Richard Whitman.....	10
C.3. Corporate Director Health and Safety: Mr. Joseph Ocken, CIH, CSP, CHMM.....	11
C.4. Project Health and Safety Manager: Loren Gunderson, CIH, CSP.....	11
C.5. Project Health and Safety Supervisor: Scott Mahoney.....	12
C.6. Site Health and Safety Officer(s): Scott Mahoney.....	12
C.7. Site Competent Persons.....	13
C.7.a. Site safety competent persons.....	13
C.7.b. Excavation Competent Person (as designated in the table below).....	14
C.7.c. Scaffold Competent Person (as designated in the table below).....	14
C.7.d. Dive Team Designated Person-in-Charge (Subcontractor to Envirocon, Inc).....	15
C.8. Lower Tier Subcontractors.....	15
C.8.a. Site Access Control.....	15
C.9. Competent Person Designation Form.....	17
D. SITE SECURITY AND CONTROLS.....	18
D.1. Security.....	18
D.1.a. Security Officer.....	18
D.1.b. Public Safety.....	19
D.2. Project Rules.....	19
D.2.a. Unacceptable Conduct.....	19
D.2.b. Prohibited Articles, Materials, Substances.....	20
D.2.c. Substance Abuse.....	21
D.2.d. Discipline.....	21
D.2.e. Subcontractors.....	22
D.3. Homeland Defense Security Issues.....	22

D.4.	Communications	22
D.5.	Site Access	22
D.5.a.	Motor Vehicles	23
D.5.b.	Parking	23
D.5.c.	Inspection	23
D.5.d.	Cameras/VCRs	23
D.6.	Contamination Control Boundaries	23
D.6.a.	Postings	23
D.6.b.	Work Areas	23
D.6.c.	Exclusion Zone (EZ)	23
D.6.d.	Regulated Areas	24
D.6.e.	Contamination Reduction Zone (CRZ)	24
D.6.f.	Support Area	24
D.6.g.	Boundaries	24
D.7.	Decontamination	24
D.7.a.	Contamination Reduction Zone(s) (CRZ)	25
D.7.b.	Frequency	25
D.7.c.	Personnel Decon Procedures	25
D.7.d.	Personnel Decon Procedures	25
D.7.e.	Emergency Decon	27
D.7.f.	Diver Decontamination Procedures	27
D.7.g.	Equipment Decontamination	27
D.7.h.	Small equipment procedure	28
D.7.i.	Disposition of Decontamination Wastes	28
D.8.	Waste Management and RCRA Compliance	28
D.8.a.	Training	28
D.8.b.	Hazardous Waste Manager	28
D.8.c.	Reporting incidents	28
D.8.d.	Waste Stream Management	29
D.8.e.	Categorization	29
D.8.f.	Tracking Records	29
D.8.g.	Emissions Controls	30
D.8.h.	Spill Response and Prevention	31
D.8.i.	Waste Management	31
D.8.j.	Waste Minimization	31
D.9.	Qualifications and Access Requirements	31
D.9.a.	Training qualifications summary	31
D.9.b.	Dive Team Training	33
D.9.c.	Medical Qualifications Summary	34
E.	HAZARDS	36
E.1.	Accident Prevention Program	36
E.1.a.	Elements of the Accident Prevention Program	36
E.1.b.	Responsibilities	37
E.2.	Risk Assessment	38
E.2.a.	Severity	38
E.2.b.	Frequency of Exposure	39
E.2.c.	Probability of Occurrence	39
E.2.d.	Number of Employees and/or Third Party Personnel Exposed	39
E.2.e.	Risk Assessment Table	41
E.3.	Potential Chemical Waste Hazards	41
F.	INDUSTRIAL HYGIENE PROGRAM CONTROLS	42
F.1.	Site Monitoring	42
F.1.a.	Sampling and Monitoring Strategy	43
F.1.b.	Monitoring	44
F.1.c.	TWA Sampling	44

F.1.d.	Characterization and Confirmation	44
F.1.e.	Documentation	46
F.2.	Personal Protective Equipment.....	47
F.2.a.	Summary of PPE Requirements.....	47
F.2.b.	Respiratory Protection Selection	48
F.2.c.	PPE Rules.....	50
F.3.	Site-specific Respiratory Protection	52
F.3.a.	Documents.....	52
F.3.b.	Administration	52
F.3.c.	Continuing respirator effectiveness	52
F.3.d.	Training	52
F.3.e.	Voluntary use of respirators	53
F.3.f.	Medical qualifications.	53
F.3.g.	Fit Testing	53
F.3.h.	Fit testing period.	55
F.3.i.	Use of respirators	55
F.3.j.	General inspection and repairs.....	55
F.3.k.	Respirator cartridges changes.....	56
F.3.l.	Cleaning and disinfecting	57
F.3.m.	Storage.....	58
F.3.n.	IDLH atmospheres	58
F.3.o.	Site Inspections	58
F.3.p.	Emergency use respirator inspections	59
F.4.	Heat Stress	59
F.4.a.	Training	59
F.4.b.	Acclimatization.....	59
F.4.c.	Fluids.....	59
F.4.d.	Shelter	60
F.4.e.	Clothing.....	60
F.4.f.	Monitoring	60
F.4.g.	Personal monitoring programs.....	60
F.4.h.	Pulse	60
F.4.i.	Rehab.....	61
F.4.j.	Action level for personal monitoring.....	61
F.4.k.	Work/rest regimen	62
F.5.	Cold Stress.....	62
F.5.a.	Thermal Balance.	62
F.5.b.	Cold Stress Symptoms.....	62
F.5.c.	Cold Injury	63
F.5.d.	Prevention.....	64
F.5.e.	Treatment of Injuries.....	66
F.6.	Hazard Communication Program	66
F.6.a.	Subcontractors.....	66
F.6.b.	Material Safety Data Sheets (MSDSs)	66
F.6.c.	Container labeling.....	67
F.6.d.	Employee Training and Information.....	67
G.	SITE SAFETY PROCEDURES.....	68
G.1.	Code of Safe Work Practices	68
G.1.a.	Conducting Yourself in a Responsible Manner.....	68
G.1.b.	Participate in Your Safety Programs	69
G.1.c.	Practice Good Housekeeping.....	70
G.1.d.	Follow Standard Procedures	70
G.1.e.	Follow Safety Procedures	71
G.1.f.	Permit Required Procedures	72
G.1.g.	Use Tools Properly	73

G.1.h.	Operate Equipment Safely	74
G.1.i.	Prepare Yourself for Incidents	75
G.1.j.	Supervisors Play a Leadership Role in Safety	75
G.2.	Employee Participation	76
G.2.a.	Training	76
G.2.b.	Daily Safety Briefing	76
G.2.c.	Safety Observer.....	77
G.2.d.	“Buddy System” Plus.....	77
G.2.e.	Stopping Work	77
G.3.	Diving Operations	79
G.3.a.	General	79
G.3.b.	Assignments	80
G.3.c.	Designated person-in-charge	80
G.3.d.	Dive Procedures Manual.....	80
G.3.e.	Pre-dive Emergency Aid Resource Requirements.....	81
G.3.f.	Dive Planning and Assessment.....	81
G.3.g.	Pre-Dive Meetings.....	81
G.3.h.	Pre-Dive Preparations.....	82
G.3.i.	Water Entry and Exit.....	82
G.3.j.	Communications.....	82
G.3.k.	Decompression Tables	83
G.3.l.	Hand-held Power Tools and Equipment	83
G.3.m.	Welding and Burning	83
G.3.n.	Termination of Dive	83
G.3.o.	Post-Dive Procedures	84
G.3.p.	Record of Dive	84
G.3.q.	SCUBA Diving	84
G.3.r.	Surface-Supplied Air Diving	85
G.3.s.	Dive Equipment.	85
G.3.t.	Reporting Injury	88
G.4.	Clearing and Grubbing	88
G.4.a.	Chain Saws, Tree Trimming / Removal	88
G.4.b.	Debris Removal.....	89
G.5.	Intrusive Work (including excavations, drilling, driving posts).....	90
G.5.a.	Facility Requirements.....	90
G.5.b.	Excavations 5 feet or deeper that personnel will be entering.....	90
G.5.c.	Water.....	91
G.5.d.	General excavation practices.....	92
G.5.e.	Utility Lines.....	92
G.5.f.	Competent Person	93
G.6.	Falling and tripping hazards	93
G.6.a.	Falls--Housekeeping and materials storage	93
G.6.b.	Falls--slippery surfaces, unstable surfaces, uneven terrain	94
G.6.c.	Falls--Ladders.....	95
G.6.d.	Falls--Fall Protection working from elevated surfaces	95
G.6.e.	Illumination.....	95
G.7.	Portable Tools.....	96
G.7.a.	Deadman switches	96
G.7.b.	Guards	96
G.7.c.	Field modifications	96
G.7.d.	Electrical.....	96
G.8.	Fire Prevention.....	96
G.8.a.	Use of Gasoline In Vehicles and Small Containers	96
G.8.b.	Extinguishers	99
G.8.c.	Fighting fires	100
G.8.d.	Facility systems	100

G.8.e.	Flammable Liquids, Fuels and fueling	101
G.8.f.	Containments	101
G.8.g.	Smoking, fire and hotwork	102
G.8.h.	Welding, Cutting, and Hotwork	102
G.9.	Lifting Heavy Objects	108
G.9.a.	Lifts Using Rigging	108
G.9.b.	Manual Lifting	109
G.10.	Environmental Hazards	110
G.10.a.	Ticks and spiders	110
G.10.b.	Insect stings (bees, wasps, hornets)	111
G.10.c.	Poisonous plants	112
G.10.d.	Domestic and wild animal bites, rabies, and plague	113
G.10.e.	Snake bites (poisonous)	113
G.10.f.	Work Near Water	114
G.11.	Sanitation and Hygiene	116
G.11.a.	Drinking Water	116
G.11.b.	Restrooms and hygiene facilities	116
H.	RECORDKEEPING	118
H.1.	Training and Safety Meeting Records	118
H.2.	Injury/Illness	118
H.3.	Accident reports	118
H.4.	Medical Surveillance Records	118
H.5.	Written Programs	118
H.6.	Health and Safety Plans	118
H.7.	Employee Access	118
H.8.	Health and Safety and Related Logs	119
H.8.a.	Health and Safety Log	119
H.8.b.	First Aid Log	119
H.8.c.	Equipment Free Release Decon Log	119
I.	INCIDENT AND EMERGENCY PROCEDURES	120
I.1.	General Emergency Procedures	120
I.1.a.	Responsibilities	120
I.1.b.	First Aid	120
I.1.c.	Evacuation Procedures	120
I.2.	Reporting and Investigating Incidents	121
I.2.a.	Project and facility requirements	121
I.2.b.	Reporting Incidents	122
I.2.c.	Procedures for Reporting Incidents	123
I.3.	Personnel Injury	124
I.3.a.	First Aid	124
I.3.b.	Hazard assessment	124
I.4.	Heat Stress	124
I.4.a.	Signs and Symptoms	124
I.4.b.	Treatment	125
I.5.	Discovery of Anomalies	125
I.5.a.	Anomalies	125
I.5.b.	Person discovering:	126
I.6.	Heavy weather	126
I.6.a.	High winds	126
I.6.b.	Lightning	126
I.6.c.	Tornadoes	127
I.7.	Phone Threats	127
I.7.a.	Do not hang up	127
I.7.b.	Report the call immediately to the senior Envirocon supervisor on site	127
I.8.	Emergency Contacts for Site	128

APPENDICES

Appendix A: Voluntary Emergency Data Form

Appendix B: Acronyms

Appendix C: Decon Report/Log for Release of Equipment

Appendix D: Contaminants Of Concern (COC)s

Appendix E: Route to Hospital

Appendix F: Activity Hazard Analysis

Appendix G: Envirocon Incident Report Form

A. SITE INTRODUCTION

This site-specific health and safety plan (HASP) provides safety-related information and requirements specific to the task and work location(s) described. General requirements contained in the Envirocon Health and Safety Program Manual along with this site-specific HASP will be implemented except where noted.

A.1. Scope

This Health and Safety Plan applies to the sediment removal project to be performed adjacent to the Wisconsin Public Service Corporation's (WPSC) former Campmarina Manufactured Gas Plant (MGP) in the Sheboygan River, Sheboygan, Wisconsin.

A.2. Site Description

Campmarina Former Manufactured Gas Plant (MGP) Site is located at 732 North Water Street, Sheboygan, WI, 53081. The Campmarina Site includes the City Park (Upland Operable Unit (OU)) and a portion of the Sheboygan River (River OU).

The project is a non-aqueous phase liquid (NAPL) sediment removal action to be performed adjacent to the Wisconsin Public Service Corporation's (WPSC) former Campmarina Manufactured Gas Plant (MGP) in the Sheboygan River, Sheboygan, Wisconsin

NAPL has been identified in near shore sediment and under shore soil during remedial investigations (RI).

The Upland OU encompasses an area of approximately 2.3 acres adjacent to the Sheboygan River, approximately 1 mile west of Lake Michigan. The River OU is located immediately adjacent to the Upland OU and based on the RI work, is approximately 4.5 acres. This area extends 80 feet upstream of the former northern property boundary, as much as 200-feet outward from the shoreline, and about 1,000 feet downstream of the former southern property line. The River OU is within the limits of the Sheboygan River and Harbor Superfund Site as discussed in Section 1.3.6 of this Report.

The former MGP is located on property owned by the City of Sheboygan, known as Campmarina. In the past, Campmarina was equipped with parking areas, electrical power and potable water for recreational vehicle use. A docking area was also provided for recreational boat use on the Sheboygan River. After WPSC completed remediation work in the Upland OU, the City of Sheboygan redeveloped both Campmarina and the adjoining property to the south into a park, a condominium complex, and a river walk.

Boat Island is a man made land mass located approximately 180 feet from the eastern shoreline of the River OU. The island is approximately 375 feet long by 105 feet wide (at its widest point) and has several buildings used to store materials and supplies for the

Sheboygan Outboard Club, located to the north. The City of Sheboygan owns Boat Island. The island has seasonal docking for boats. There is a polyethylene conduit that was horizontally bored approximately 15 feet below the river bed, between the Sheboygan Outboard Club and Boat Island, containing one or more electrical power lines and a sanitary sewer line to service the island.

The Sheboygan River receives groundwater and surface water from the Sheboygan area and discharges into Lake Michigan. Near the Upland OU, within the River OU, the river varies from approximately 180 feet (on either the east or west side of Boat Island) to 300 feet wide (just upstream of Boat Island). Boat Island is in the approximate center of the river resulting in an east and a west channel. Water depths at normal river levels range from 2 feet at the eastern shoreline of the Upland OU to approximately 10 feet near the eastern shoreline of Boat Island.

Two methods of coal gas production were used at the Campmarina MGP. The coal carbonization method, used from 1872 to 1886, involved heating the coal in an airtight chamber (retort) which produced coke and gases containing a variety of volatilized organic constituents. The process also produced tar, which was sold for roofing, wood treatment, and paving roads. The gas was passed through purifiers to remove impurities such as sulfur, carbon dioxide, cyanide, and ammonia. The gas was then stored in large holders on the property prior to distribution for lighting and heating.

The carbureted water gas process, used from 1886 to 1929, involved passing air and steam over the incandescent coal in a brick-filled vessel to form a combustible gas which was then enriched by injecting a fine mist of oil over the bricks. The gas was then purified and stored in holders prior to distribution. The Campmarina MGP ceased operations in 1929. Site structures were removed between 1950 and 1966.

Remedial actions were performed in the Upland OU beginning in 2000 through 2001 under a State issued ROD. The remedial action consisted of soil treatment or disposal, a vertical sheet pile wall, low permeability geosynthetic cover, and a low flow biosparge groundwater system.

A.3. Description of Work

This project involves construct of a cofferdam to isolate an area of for mechanical dredging. EI will then excavate ~ 15,000 cubic yards of sediment from the Sheboygan River OU. Related activities include installation of a Waterloo barrier wall stabilization system upland, management and treatment water treatment of MGP contact water, and sediment stabilization with cement kiln dust.

The contaminants of concern (COC) for the impacted sediments are polychlorinated biphenyls (PCB), NAPL, and poly aromatic hydrocarbons (PAH). Envirocon, Inc will self-perform the dredging of the impacted sediments. Envirocon primary subcontractors will be the sheet pile and buttress installation and the off site transport to landfill disposal.

A.4. Tasks

The scope of work associated with this project includes supervision, labor, equipment and expertise to perform the following:

A.4.a. Site Infrastructure Areas to be Installed or Constructed:

- Temporary access road;
- Job trailers;
- Worker parking;
- Truck staging;
- Equipment lay down area;
- Temporary chain link security fence
- Piling delivery and staging areas;
- Backfill and rip rap stockpile areas;
- Decontamination pad;
- MGP contact water treatment area;
- Sediment stabilization area;

A.4.b. Accepting and Staging Delivered Equipment and Materials

The following equipment will be mobilized to the jobsite:

- Tracked skid steer with trencher
- Shallow draft river tug
- Jon boat with outboard motor;
- Steel sectional barge with spuds and deck engine;
- Load line barge w/ spuds, air compressor, & deck engine;
- 70 ton lattice boom crawler crane;
- Caterpillar 350L excavator;

- Vibratory hammer/extractor with diesel power pack;
- Wheel loader/material handler;
- Clamshell bucket;
- Water treatment plant and sediment and carbon media;
- Calciment (lime bed ash product) will be delivered and conveyed pneumatically to a storage ‘pig’
- Steel sheetpile

A.4.c. Cofferdam Installation

- Move steel sheet piling off flatbed trailers with material handler
- Load sheet piles with the crawler crane onto material sectional barge;
- Transport the loaded material barge with the river tug to the excavator/pile driver location;
- The excavator/pile driver will take the sheet piling off the material barge
- Use the sectional spud barge with the excavator/pile driver to set the sheet piling in position and drive it vertically.
- “Mate” the steel sheet piling to the previous sheet
- Remove the trees and any other debris encountered.

A.4.d. Construction

- Shoreline soils and rip rap removed and staged/stockpiled
- Installation of work bench for the temporary sheet pile cofferdam and Waterloo Barrier Support System installation support.
- Drill caisson holes, install pipe pile and grout for Waterloo barrier support system
- Installation of whalers (Waterloo barrier support system) Diver will shim in place and videotape.
- Installation of navigational hazard buoys and lights on the upstream and downstream ends of the project to provide proper warning to boaters.

A.4.e. Sediment Excavation, Treatment, and Backfill

- Installation and maintenance of a turbidity curtain.
- Monitor debris build-up on the outside of cofferdam and remove as needed to eliminate unnecessary loading on the cofferdam structure.
- Dredge spoils removed by excavator with clamshell, place in roll –off box type containers on transport barge.
- Transport barges moved for off-loading,
- Decant water at top of the container pumped off using a submersible pump to the MGP contact water treatment system for treatment.
- Super absorbent polymer added to dredge spoil container (absorbing free water)
- Excavator will load dredge spoils from the dredge spoil container into the dump truck.
- The dump truck operator will haul the dredge spoils for dumping on the stabilization pad.
- At the stabilization pad, the dredge spoils will be placed and stockpiled for additional decanting, drying and stabilization.
- Sediments will air dry by bucket turning stockpiled materials using a loader.
- All decant water (as well as any precipitation contact water) will be collected on the stabilization pad in the sump and will be pumped to the MGP contact water treatment system for treatment.
- Calciment will be off loaded pneumatically and used as needed for strength stabilization of sediments. A tracked skid steer and loader will be used to mix the Calciment in with the sediments in discrete batches
- The loadout of stabilized sediment for transport to landfill occurs at the access road / stabilization pad interface.
- During staging and loading operations, potential odors will be controlled by using RUSMAR foam spray application as necessary.
- Specific areas dredged will be capped with a 1-ft. thick layer of sand followed by a 1-ft. thick layer of gravel. The backfill operation means and methods will essentially be the reverse of the dredge operations.

A.4.f. Water Treatment System

Collect, pump, treat and maintain the water treatment plant to manage potential MGP contact water that may be generated from the following sources:

- Dredge spoils decant water (from the dredge spoil containers and the stabilization pad);
- Precipitation contact water collected from the stabilization pad;
- Other potential direct contact water;
- Decontamination water.

A.4.g. Cofferdam Removal

- The sectional spud barge with the excavator will extract the sheet piling and stack it on the material sectional barge.
- The crawler crane will be rigged to extract sheet piling from the sectional barge if it is determined to be more practical
- The excavator/pile driver will crawl off sectional spud barge using the “running sticks” and will be supported by crane mats on the river bottom
- Crane will also assist excavator/pile driver by moving the crane mats as needed.
- The crane mats will be removed from the river bottom after they are no longer needed.
- Materials removed with the excavator will be taken to shore, offloaded and treated as contaminated material.
- Contaminated sheet piling on the material sectional barge will be offloaded and decontaminated.
- After sheet piling is decontaminated, it will be loaded onto flatbed trailers with the material handler and removed from the jobsite.

A.4.h. Demobilization

- Decontaminate and remove all equipment mobilized to the site
- Replace rip rap at shoreline tie-in locations to pre-construction conditions.

B. BASIS

This section will discuss the basis in regulations, standards and policies for the project. It includes OSHA regulations and Envirocon policies and procedures.

B.1. Preparation and Approval

This plan is based upon existing available information regarding the site and upon past experience at other sites. This document is also based on OSHA regulations, contractual specifications applicable to the scope of work, the client's health and safety plans and procedures, Envirocon's Health and Safety Program, and Envirocon policies and procedures. This document describes the site-specific implementation of those policies and procedures. Envirocon personnel and lower tier subcontractors are required to adhere to all of these documents during the course of this project. Some of Applicable regulations and standards are described in Table B.3:

B.1.a. Prepared For

This plan was prepared for:
Integrus Energy Group Corp.
Robert C. Rydzewski
700 North Adams Street
Green Bay, WI 54307

B.1.b. Prepared By

This plan was prepared by:
Loren Gunderson, CIH,CSP
651 Corporate Circle, #114
Golden, CO 80401

B.1.c. Approvals and Modifications

This plan and future changes must be approved as follows:

- 1) After preparation and approval by Envirocon, this plan will be submitted to the client's representative in accordance with the applicable contract and specifications.
- 2) Envirocon's designated Project Manager is responsible for the final approval of this plan before transmittal to the client.
- 3) Envirocon's Corporate Director of Health and Safety or designated representative is responsible for approval of this plan and any future modifications after preparation. Note: Certified Envirocon Safety and Health Professionals (CIH or CSP) are hereby designated to approve changes to this plan.

B.2. Incident-Free Performance of Work

Incident-free performance means error-free project execution: no injuries, illnesses, property damage, community or environmental impacts, or incidents that could have resulted in these occurrences under different conditions. Incident-free performance does not happen by chance: It is achievable through the integration of safety into all management systems, the project process, and individual efforts. We believe that all incidents are preventable.

B.3. Policies and Regulatory Basis

Latest revision	Contract Specifications applicable to the scope of work.
29 CFR 1910.20	Access to employee exposure and medical records
29 CFR 1910.38	Employee emergency plans
29 CFR 1910.95	Occupational noise exposure
29 CFR 1910.134	Respiratory protection
29 CFR 1910.120	Hazardous waste operations
29 CFR 1910.151	Medical services and first aid kit
29 CFR 1910.157	Portable fire extinguisher
29 CFR 1910.401	Commercial Diving Operations
29 CFR 1910.1000	Air contaminants
29 CFR 1910.1200	Hazard communication
29 CFR 1926	Construction Industry Standards

B.4. Changing Conditions and Management of Change

B.5. Management of Change (MOC)

The plan presents a realistic approach to the anticipated hazards at the site. It is expected that site conditions may vary throughout the duration of the project.

B.5.a. Changing Conditions

Changes in conditions and identification of previously unrecognized hazards are identified by the following processes:

- site inspections by supervisory and site safety personnel
- observations and suggestions by all personnel
- proper planning for each new phase of operations

- Activity Hazard Analysis (AHA) for each new phase of operations
- communicating plans and controls to all effected employees
- accident investigations and lessons learned from this and other projects
- contract modification

B.5.b. Response to Changes in Conditions

- 1) A risk assessment will be conducted in response to changing conditions.
- 2) This plan, AHAs, and/or other plans as necessary shall be changed as necessary to reflect the risk assessment.
- 3) Changes in plans will be authorized by responsible individuals.

B.5.c. HASP and AHA familiarization

The information presented in this plan will be reviewed with the employees during site-specific training to be completed before working on site. These site entry briefings will focus on the specific tasks of those being briefed. A copy of this plan will be available at all times on the site for any one to review thoroughly. As the project initiates new tasks on site, the crews for those tasks will be briefed on the appropriate AHA(s). AHAs will highlight applicable controls from this plan. All assigned personnel, visitors, and regulatory personnel are therefore expected to be familiar with and comply with all aspects of this plan. If the safety requirements are unclear each individual is responsible for getting clarification from their supervisor. The qualifications required for various tasks on this project are summarized in the training and qualifications section below.

B.6. Compliance

Failure to follow the rules and procedures prescribed in this document potentially jeopardizes the working environment of other employees. For this reason, Envirocon is prepared to enforce the progressive disciplinary procedures described in the site control section of this document for those who fail to follow the established policies and procedures for this project.

C. SITE ORGANIZATION AND KEY PERSONNEL

29 CFR 1910.120 requires an effective site organization to be responsible for supervision of all work at hazardous waste sites. The purpose of this section is to describe this site's organization as it applies to this project.

C.1. Project Manager: Jeff Habegger

The Project Manager is responsible for oversight and management of all aspects of the project including health and safety, quality assurance, construction, remedial design, equipment, and personnel.

- The Project Manager is responsible for project health and safety performance in accordance with Incident-free performance goals.
- Conducting periodic site inspections.
- Participating in incident investigations.
- Provides safety leadership through example and by holding all personnel assigned to this project accountable for their safety responsibilities.

C.2. Site Superintendent: Richard Whitman

The site superintendent serves as the site's general supervisor in accordance with the requirements of 29 CFR 1910.120(b)(2)(i)(A). The superintendent is responsible for coordinating activities with the project manager and site safety officer. This includes:

- enforcing the provisions of this HASP;
- preparing for new tasks in advance of field operations in accordance with the Envirocon Field Operations Manual;
- ensuring that an AHA has been completed before any new work commences; and
- briefing crew members before assigning them to the new task;
- ensuring that employee safety suggestions are fairly and respectfully evaluated, and that employees are informed of the outcome of the evaluations;
- monitoring the conduct of operations in the field to ensure safe delivery of a quality product for the client;
- supervising subcontractors in accordance with this plan; and
- ensuring that injured personnel (with or without life threatening injuries) are escorted to medical treatment by the safety officer or other supervisory personnel.

C.3. Corporate Director Health and Safety: Mr. Joseph Ocken, CIH, CSP, CHMM

Envirocon's Corporate Director of Health and Safety is responsible for the development and implementation of the Corporate Health and Safety Program. The program contains Envirocon's accident prevention plans and procedures and other related plans, policies and procedures required by OSHA standards. The Corporate Director is responsible for:

- ensuring that all health and safety issues on site are resolved;
- ensuring that employee complaints are addressed in accordance with Envirocon policies and procedures; and applicable laws;
- ensuring that all confidential employee complaints received by the director are kept confidential;
- ensuring appropriate investigation of all incident reports;
- ensuring that audit findings are corrected in accordance with Envirocon policies and procedures; and applicable laws; and
- providing professional support for the project manager's health and safety program.

C.4. Project Health and Safety Manager: Loren Gunderson, CIH, CSP

The project health and safety manager is the senior health and safety professional assigned to the project for the purpose of providing technical assistance to the project manager and on-site health and safety personnel. The project health and safety manager reports to the Corporate Director of Health and Safety with regard to project health and safety issues.

The Project Health and Safety Manager is responsible for the following:

- developing and implementing the Project Manager's site-specific health and safety program and procedures;
- providing professional technical support for the Project Manager with regard to all matters of health and safety associated with the project;
- technical supervision of the health and safety officers and technicians assigned to the project;
- assisting HSOs in developing and reviewing project health and safety procedures, hazard analysis and other supporting documents;
- implementing and administers this HASP;
- conducts periodic inspections and audits of the project site for the Corporate Director;
- coordinates the activities of other health and safety department personnel supporting the project with the senior health and safety official on site and the project manager;
- coordinating all health and safety activities with the Project Manager; and

- in the event that personnel fail to adhere to established safety guidelines, recommending disciplinary and/or corrective actions to the Project Manager.

C.5. Project Health and Safety Supervisor: Scott Mahoney

The Project Health and Safety Supervisor is the senior designated Health and Safety Officer (HSO) assigned to the project, and is responsible for the following:

- developing and implementing the Project Manager’s site-specific health and safety program and procedures;
- providing professional technical support for the Project Manager with regard to all matters of health and safety associated with the project;
- technical supervision of the HSOs and technicians assigned to the project;
- assisting HSOs in developing and reviewing project health and safety procedures, hazard analysis and other supporting documents;
- implementing and administers this HASP;
- conducts periodic inspections and audits of the project site for the Corporate Director;
- coordinating all health and safety activities with the Project Manager; and
- in the event that personnel fail to adhere to established safety guidelines, recommending disciplinary and/or corrective actions to the Project Manager.

C.6. Site Health and Safety Officer(s): Scott Mahoney

Health and Safety Officers (HSO(s)) are the employees designated as the health and safety competent persons for this project. HSO(s):

- serve as the OSHA “site safety and health supervisor” as defined in the HAZWOPER standard 29 CFR 1910.120/1926.65(b) (Note: This includes authorization to administer the requirements of this plan, the Envirocon Health and Safety Program, and applicable OSHA regulations on site);
- implements the provisions of this HASP;
- serves as a safety and health competent person (SCP);
- conducts and documents daily site safety inspections;
- maintains the site health and safety logs;
- maintains health and safety records on site;
- reports, and documents incidents and issues related to site safety;
- assists the project manager with incident investigations related to health and safety;
- supervises decontamination of personnel and equipment;
- conducts monitoring tasks on site;

- monitors the use of PPE to ensure proper usage;
- inventories and inspects PPE;
- selects PPE within the guidelines of this plan;
- ensures all personnel are qualified and "Fit for Duty;"
- inspects first aid kits/fire extinguishers and emergency response equipment;
- as needed, accompanies employees to clinics or other health care providers to ensure proper care and evaluation of injured or ill employees; and
- reports/coordinates return-to-work issues with the Corporate Director of Health and Safety.

C.7. Site Competent Persons

OSHA's general safety and health provisions from the construction industry standards (29 CFR 1926.20(b)) include accident prevention responsibilities. Such programs shall provide for frequent and regular inspections of the job sites, materials, and equipment to be made by competent persons designated by the employers. OSHA's regulations regarding scaffolding, excavation and hazardous waste operations have similar requirements. The construction safety competent person is defined in 29 CFR 1926.32 to mean "one who is capable of identifying existing and predictable hazards in the surroundings or working conditions which are unsanitary, hazardous, or dangerous to employees, and who has authorization to take prompt corrective measures to eliminate them."

Competent persons are designated on the form that follows this section. Each competent person is given responsibility and authority for certain aspects of safety on site. It is important for each competent person to recognize the limits of their own knowledge, training, experience and capability. It is the responsibility of each competent person to act within the limits of their own knowledge, training, experience and capabilities.

C.7.a. Site safety competent persons

The HSO(s) serve as the general site competent person (SCP) responsible for accident prevention in accordance with 29 CFR 1926.20. The competent person is responsible for, and authorized to act to ensure that personnel are not working under conditions which are unsanitary, hazardous, or dangerous to their health or safety.

- 1) The competent person's accident prevention responsibilities includes
 - a) frequent and regular inspections of the job site,
 - b) inspections of materials on site, and
 - c) inspection of equipment on site.
- 2) The project manager may designate additional competent persons.

- 3) Designated persons, in accordance with 29 CFR 1926.32, must be capable of identifying existing and predictable hazards in the surroundings or working conditions which are unsanitary, hazardous, or dangerous to employees.
- 4) Once designated, these competent persons share Envirocon's authority take prompt corrective measures to eliminate these hazards.

C.7.b. Excavation Competent Person (as designated in the table below)

This individual will have direct supervisory control over all excavation activities involving entry into excavations or trenches. All competent persons shall be authorized and acknowledge authorization in the table below.

- 1) Compliance standards

The excavation competent person ensures compliance with 29 CFR 1926, Subpart P (1926.650 thru 652). The scope of these regulations includes all excavations (e.g., hand digging, equipment excavation, with or without personnel entry). Additional competent persons may be designated by the Project Manager in consultation with the Corporate Director of Health and Safety. Designation will be based on experience and knowledge of these standards.

- 2) Specific duties include:

- a) Assists supervisor with planning excavations.
- b) Ensures that utilities are located and marked (underground or overhead hazards) prior to excavating. Hand dig to locate when excavating within six feet of utilities.
- c) Where personnel entries are involved, classifies soils in accordance with OSHA soil classification in 29 CFR 1926 Subpart P.
- d) Ensures the use of protective systems in accordance with Subpart P where personnel entries are required.
- e) Monitors all excavation activities for associated hazards.
- f) The competent person is authorized by Envirocon to take corrective action to eliminate hazardous or dangerous situations. This includes halting excavation operations and/or removing personnel from excavations.
- g) Performs inspections of excavations prior to the start of work, as needed throughout the shift and after every rainstorm.

C.7.c. Scaffold Competent Person (as designated in the table below)

Should scaffolds be needed this individual(s) will have direct supervisory control over all scaffold activities. All competent persons shall be authorized and acknowledge authorization in the table below.

- 1) Compliance standards
The scaffold competent person ensures compliance with 29 CFR 1926, Subpart L (1926.451 thru 453). Additional competent persons may be designated by the Project Manager in consultation with the Corporate Director of Health and Safety. Designation will be based on experience and knowledge of these standards.
- 2) Specific duties
 - a) Supervises scaffold erections.
 - b) Inspects scaffold repairs.
 - c) Inspects scaffolds daily.
 - d) The competent person is authorized by Envirocon to take corrective action to eliminate hazardous or dangerous situations. This includes halting operations and/or removing personnel from scaffolds.

C.7.d. Dive Team Designated Person-in-Charge (Subcontractor to Envirocon, Inc)

- 1) The dive team shall have a Designated Person-In-Charge as described in 29 CFR 1910.140 (c) (2)
- 2) The employer or an employee designated by the employer shall be at the dive location in charge of all aspects of the diving operation affecting the safety and health of dive team members.
- 3) The designated person-in-charge shall have experience and training in the conduct of the assigned diving operation

C.8. Lower Tier Subcontractors

Lower Tier Subcontractors are responsible for supervising their work and personnel in accordance with this plan and applicable site policies and procedures. Regardless of other requirements, lower tier subcontractors shall adhere to all federal, state and local laws and regulations. In particular this includes the requirements of 29 CFR 1910.120/1926.65 HAZWOPER Standards. Lower tier subcontractors' personnel will be supervised in accordance with the same requirements and standards as Envirocon and subcontractor personnel. Where their programs, policies and procedures exceed the requirements of this document and the applicable site policies and procedures, the lower tier subcontractor may use their own policies and procedures to implement these requirements otherwise they must adopt this document.

C.8.a. Site Access Control

Envirocon is in part responsible for controlling access to this site along with our client. Envirocon reserves the right to deny access to personnel who pose a hazard to

operations through serious, willful, or repeated violation of safety requirements; and those personnel who are not otherwise qualified to work on site.

This safety plan does not necessarily address all of the hazards specific to lower tier subcontractors' work. Lower tier shall submit either a site-specific health and safety plan for their particular operation(s) or prepare and submit appropriate Activity Hazard Analysis(es) to append to this plan.

C.9. Competent Person Designation Form

COMPETENT PERSON DESIGNATION		
<p>The following individual(s) has been designated as the "Competent Person," meaning one who is capable of identifying existing and predictable hazards in the surroundings or working conditions which are unsanitary, hazardous, or dangerous to employees, and who is hereby authorized by Envirocon to take prompt corrective measures to eliminate them.</p> <p>The person(s) named below has knowledge of the systems, equipment, conditions and procedures in relationship to the proper use, inspection, manufacturers' recommendations and instructions, and maintenance as designated below. This person(s) has been delegated the responsibility to coordinate all activities and operations as defined by the designation(s). In carrying out these responsibilities, it shall be the duty of the competent to act within the limits of their knowledge and training.</p>		
<p>Competent persons added to the list must be approved by the Project Manager and HSO.</p>		
NAME/DESIGNATION(S)	COMPANY	COMPETENT PERSON
Scott Mahoney	Envirocon	<input checked="" type="checkbox"/> Excavation, <input checked="" type="checkbox"/> Site Safety, <input checked="" type="checkbox"/> Scaffolds
<p>Project Manager's approval: _____; HSM/HSO Approval: _____</p> <p>Acknowledged: _____ Date _____</p> <p style="text-align: center;">Competent Person's Signature</p>		
Richard Whitman	Envirocon	<input checked="" type="checkbox"/> Excavation, <input checked="" type="checkbox"/> Site Safety, <input checked="" type="checkbox"/> Scaffolds
<p>Project Manager's approval: _____; HSM/HSO Approval: _____</p> <p>Acknowledged: _____ Date _____</p> <p style="text-align: center;">Competent Person's Signature</p>		
	Envirocon	<input type="checkbox"/> Excavation, <input type="checkbox"/> Site Safety, <input type="checkbox"/> Scaffolds
<p>Project Manager's approval: _____; HSM/HSO Approval: _____</p> <p>Acknowledged: _____ Date _____</p> <p style="text-align: center;">Competent Person's Signature</p>		
	Envirocon	<input type="checkbox"/> Excavation, <input type="checkbox"/> Site Safety, <input type="checkbox"/> Scaffolds
<p>Project Manager's approval: _____; HSM/HSO Approval: _____</p> <p>Acknowledged: _____ Date _____</p> <p style="text-align: center;">Competent Person's Signature</p>		

D. SITE SECURITY AND CONTROLS

This section deals with site access and general project rules, physical security of the project work areas and the controls related to waste management and access to contaminated areas to ensure qualifications of personnel.

D.1. Security

The work areas associated with this project are within the confines of the site. The security officer is responsible for controlling access to the project site and any established exclusion zones or contamination reduction zones as follows.

D.1.a. Security Officer

The Envirocon Project Manager is responsible for the security of the project site.

- 1) The project manager will be assisted in these duties by the health and safety supervisor who will serve as security officer.
- 2) The security officer's responsibilities include:
 - a) Ensuring that all personnel entering the site are qualified to go into the areas where they are seeking access.
 - b) Ensuring that authorized personnel conduct themselves in accordance with the established security and safety requirements.
 - c) Ensuring that personnel sign in at the beginning of each shift.
 - d) Establishing and maintaining appropriate exclusion zone boundaries around contaminated areas.
 - e) Work areas and zones shall be adequately marked and posted along access routes to give warning of restrictions to visitors.
 - f) Ensuring that adequate barriers and warnings are used to prevent site access by the general public or unqualified personnel.
 - g) Providing adequate surveillance and lock-up for:
 - i. Trailers and storage facilities;
 - ii. Fuel and hazardous materials storage;
 - iii. Materials of potential homeland security concern;
 - iv. Heavy equipment, vehicles, and related equipment;
 - v. small equipment and pilferable items.
 - h) Ensuring that heavy equipment is adequately secured after working hours to prevent theft or mischief.

D.1.b. Public Safety

The work area shall be suitably delineated (i.e., as appropriate for a construction site) in order to prevent unauthorized entry.

Visitors shall be directed to the project manager's designated representative to seek authorization when appropriate. Visitors shall be logged onto the site. Visitors that are not qualified for work in the EZ shall be escorted or otherwise prevented from accidentally entering the EZ.

All unattended equipment will be secured physically and mechanically during periods of non use. Keys shall be removed from equipment and stored in a secure location.

D.2. Project Rules

The project rules have been developed by Envirocon and our client in order to create a problem-free and rewarding work environment, one in which the employee understand what is expected of them on the project site. An employee who fails to maintain at all times the proper standards of conduct or who violates any of the following rules and regulations may be subject to disciplinary action, including but not limited to, termination of employment or denial of access.

D.2.a. Unacceptable Conduct

Unacceptable employee conduct and/or violation of a project rule or requirement may be reason for disciplinary action up to and including suspension without pay, termination of employment, or denial of access to the work area or client facilities. Examples of unacceptable employee conduct and/or rule violation are as follows:

- Use of boats or barges for recreational activities such as dive platforms
- Use any of the water-covered areas described in the Work Plan for recreational purposes including swimming, wading or diving.
- Possessing, when not authorized, project, or other person's property or services, or theft of the same.
- Altering, damaging, or mutilating project, or other person's property.
- Violating the Security Rules.
- Reporting for other employees or other identification misrepresentation.
- Making or stating false claims or falsifying reports or records.
- Refusing to submit to a search.
- Refusing to submit to drug and alcohol screening or testing or other similar inspections.
- Possessing or using alcoholic beverages, controlled substances, or weapons on any project.

- Using or possessing keys or other devices used for lock opening without specific permission.
- Sleeping on the project.
- Improperly using, or failure to use, toilet facilities.
- Failure or refusal to perform assigned work as directed.
- Fighting.
- Negligence resulting in an infraction of health and safety or project rules or requirements.
- Taking unauthorized work breaks.
- Engaging in horseplay of any kind.
- Engaging in gambling or the sponsoring of raffles.
- Not using trash receptacles or otherwise creating unsanitary conditions.
- Smoking, using tobacco, or eating in prohibited areas.
- Unauthorized cooking on the project.
- Selling food, beverages, or other items on the project.
- Violating health and safety or project rules or requirements.
- Sexual harassment.
- Abusing equipment, vehicles or other Envirocon property or rentals.
- Operating equipment or vehicles without authorization and proper qualification.
- Failure to operate equipment or vehicles in the manner specified by the manufacture (including proper maintenance and repairs).
- Not reporting use of prescription drugs.
- Not reporting equipment or material damage.
- Not reporting an accident or incident.
- Displaying pornographic, sexually explicit or otherwise offensive photographs, calendars, or other materials that may be objectionable to other individuals or groups.

The above is not an all-inclusive list. If you are unsure what may constitute unacceptable behavior, ask your Supervisor!

D.2.b. Prohibited Articles, Materials, Substances

The use, possession, concealment, transportation, promotion, or sale of the following items or substances is prohibited on site premises. Employees who violate this policy will be subject to disciplinary action up to and including removal from site and/or

termination. Project management reserves the right to conduct drug and/or alcohol search and screening consistent with the client facility policy.

- Illegal, look-alike, designer drugs and drug paraphernalia
- Controlled substances, such as medications, when usage is abused
- Valid medications, when not kept in marked prescription bottles
- Alcoholic beverages
- Firearms, weapons, and ammunition
- Unauthorized explosives
- Stolen property or contraband
- Unauthorized cameras or photographic equipment
- Unauthorized recording devices

D.2.c. Substance Abuse

It is the policy of Envirocon to run a drug free workplace.

- 1) Envirocon's substance abuse policy and program description are contained in Procedure 1403.006, the detailed procedures for performing substance abuse tests are contained in the medical surveillance procedures (Procedure 1403.005M.f).
- 2) Personnel on site are subject to the following substance abuse testing in accordance with procedures described above:
 - a) Pre-employment and Pre-Project
 - b) Post-accident
 - c) Random
 - d) Reasonable suspicion

D.2.d. Discipline

Envirocon reserve the right to take disciplinary action at its discretion up to and including suspension or termination of employment or denial of access to the site work areas, depending on the severity of the violation.

- 1) At the discretion of Management, suspension with/without pay may be given in lieu of discharge.
- 2) Envirocon employees should refer to the Envirocon Employee Information Manual for policies and procedures related to employee conduct and disciplinary action.
- 3) Verbal warnings and written reprimands are forms of discipline used to document and intended to correct, undesirable actions.

- 4) Unacceptable conduct or failure to adhere to established policies and procedures willfully or repeatedly may be subject to removal from this project and/or termination.

D.2.e. Subcontractors

Subcontractors shall also adhere to established policies and procedures applicable to this project site.

- 1) Subcontractors are responsible for disciplinary actions regarding their own employees and their lower tier subcontractors.
- 2) Failure of subcontractor employees to adhere to policies and procedures as described in this document will result in verbal or written warnings to the responsible subcontractor.
- 3) Envirocon reserves the right to permanently or temporarily remove and bar subcontractor employees from the project site. Unacceptable conduct or failure to adhere to established policies and procedures willfully or repeatedly may result in such removal from the project site.

D.3. Homeland Defense Security Issues

Personnel shall be aware of possible terrorism issues related to the security of this site in accordance with the requirements of 49 CFR 172.704 and 172.800. This includes potential site threats as well as transportation of materials. Personnel shall be especially sensitive to the need to report all suspicious behavior. Personnel will be specifically trained to be alert and report potential threats immediately.

D.4. Communications

Personnel in the Exclusion Zone will remain in constant communication or within sight of the PM, or his representative. Two-way radio is the primary method of communication.

- 1) If radio communication and hand signals are not feasible:
 - a) The PM will identify the site activities that can continue without communication, if any; and
 - b) If necessary, one long air horn signal will be used to evacuate the site until communications have been restored.
- 2) Emergencies
 - a) One long or continuous horn blast.
 - b) Unless otherwise directed, all personnel will leave the Exclusion Zone.

D.5. Site Access

Access to the site shall be limited to those personnel that are qualified and have an acceptable (in the judgment of the client facility's designated representatives and the

Envirocon security manager) reason for being on site. Continuing access is further conditioned on adherence to the established site policies and procedures.

D.5.a. Motor Vehicles

Privately owned vehicles are subject to site rules and regulations when operated on site. Seat belts are required for all vehicle drivers and passengers when the vehicle is in motion.

D.5.b. Parking

Parking areas are provided for employee vehicles as designated by the work plan drawings. Privately owned vehicles are prohibited from entering the work areas. Employees who illegally park in fire lanes, areas posted with no parking signs, handicapped parking spaces, or visitor parking spaces are subject to disciplinary action and removal of the vehicle at the workers expense.

D.5.c. Inspection

All employees are subject to search upon entering or leaving the job site.

D.5.d. Cameras/VCRs

No unauthorized cameras, videocassette recorders, or other photographic recording or playing devices will be allowed on a project.

D.6. Contamination Control Boundaries

The site safety officer is responsible for establishing and maintaining contamination control boundaries and supervising decontamination.

D.6.a. Postings

All work areas and zones shall be posted and demarcated adequately in order to communicate the following:

- 1) The nature of the boundary.
- 2) The hazards associated with the area.
- 3) Applicable controls, work rules or restrictions associated with the area.

D.6.b. Work Areas

The work area, for purposes of this project, is that area defined by hazardous waste and supporting operations. The work area is that area that is regulated by 29 CFR 1910.120 and/or 1926.65.

D.6.c. Exclusion Zone (EZ)

The EZ is that part of the work area where, at a given time, workers may potentially come in contact with contaminated materials. This contact is generally defined as inhalation of airborne levels exceeding site-specific action limits or 50% of established exposure limits (OSHA or ACGIH). Contact also includes any ingestion, skin contact,

injection, or other contact route of exposure to materials exceeding EPA or other established levels of contamination for the site.

D.6.d. Regulated Areas

Regulated areas are those areas managed in compliance with certain vertical standards contained in the following OSHA Subparts:

- 29 CFR 1910, Subpart Z - Toxic and Hazardous Substances
- 29 CFR 1926, Subpart D - Occupational Health and Environmental Controls
- 29 CFR 1926, Subpart Z - Toxic and Hazardous Substances

Regulated areas will be established as a form of exclusion zone, as described in the applicable standard.

- 1) Typically these areas will require special training and medical qualifications as described in the applicable standards.
- 2) In establishing these areas the site safety officer shall rely on the guidance of a qualified person, familiar with the applicable regulations.

D.6.e. Contamination Reduction Zone (CRZ)

The CRZ is that part of the work area between the EZ and support areas where contamination from the EZ is controlled in such a way as to remove the potential for contaminating support areas.

D.6.f. Support Area

The support area is that part of the work area where supporting tasks are conducted, and where the potential for exposure to contaminants has been fully controlled (i.e., personnel are not exposed to potential contact with contaminants).

D.6.g. Boundaries

Boundaries are established by the site safety and health officer based on the definitions above as compared to actual site conditions as monitored. Boundaries are flexible and should reflect current site conditions.

- 1) Boundaries are to be marked with suitable barriers such as yellow banner guards, brightly colored ropes, barricades, or orange snow fence to clearly establish the specified areas and the applicable regulations for that area.
- 2) If rope is used, pennants should be tied to the rope to help increase the visibility to foot and vehicle traffic and to provide a suitable warning.

D.7. Decontamination

The site safety officer is responsible for establishing and supervising decontamination on site. The following procedures are intended to establish guidelines for this purpose. As work progresses control zones may be altered. It is essential that the safety officer adjust this process as necessary to ensure that:

- personnel and equipment leave the site free of contamination, and
- contamination is not spread to other areas on site.

D.7.a. Contamination Reduction Zone(s) (CRZ)

Contamination Reduction Zone(s) are those areas established for the purpose of transition between an EZ and adjoining areas. CRZs should be established for personnel and/or equipment to decontaminate during exit from an EZ into:

- 1) clean support areas, and/or
- 2) an adjoining EZ with different or lesser contamination.

D.7.b. Frequency

- 1) All equipment will be inspected and be adequately decontaminated to avoid cross-contamination when moving out of an EZ.
- 2) All equipment will be decontaminated for site release before leaving the site.
- 3) All personnel will be decontaminated before leaving a designated EZ.

D.7.c. Personnel Decon Procedures

- 1) Entering Contaminated Area through Support Zone:
 - a) Pick up clean PPE and boots.
 - b) All donning of clothing and equipment, taping, etc. is done here.
 - c) Equipment contaminated from the preceding day is to be picked up in the contamination control area when exiting the decon area.
 - d) Proceed to contamination control area.
- 2) CRZ:
 - a) Prior to entering this area, be sure that all personnel protective equipment is in good working condition.
 - b) Conduct final inspection of tape and PPE.
 - c) Enter Exclusion Zone.
- 3) Exiting Exclusion Zone
 - a) Personnel and equipment leaving the Exclusion Zone shall be thoroughly decontaminated.
 - b) The following protocols shall be used for the decontamination stations according to the level of protection as follows. Where a step involves an article that is not prescribed, skip the step.

D.7.d. Personnel Decon Procedures

- 1) Entering Contaminated Area through Support Zone:
 - a) Pick up clean PPE and boots.

- b) All donning of clothing and equipment, taping, etc. is done here.
 - c) Equipment contaminated from the preceding day is to be picked up in the contamination control area when exiting the decon area.
 - d) Proceed to contamination control area.
- 2) CRZ:
- a) Prior to entering this area, be sure that all personnel protective equipment is in good working condition.
 - b) Conduct final inspection of tape and PPE.
 - c) Enter Exclusion Zone.
- 3) Exiting Exclusion Zone
- a) Personnel and equipment leaving the Exclusion Zone shall be thoroughly decontaminated.
 - b) The following protocols shall be used for the decontamination stations according to the level of protection as follows. Where a step involves an article that is not prescribed, skip the step.

Decon Procedures

	LEVEL C	LEVEL D
1	equipment drop	equipment drop
2	outer boot rinse	outer boot rinse
3	outer boot removal	outer boot removal
4	outer glove removal	outer glove removal
5	remove hard-hat	remove hard-hat
6	remove respirator	NA
7	wash respirator	NA
8	rinse respirator	NA
9	coverall/Tyvek removal	coverall/Tyvek removal
10	remove inner gloves	NA
11	wash hands and face	wash hands and face
12	change to street clothing	change to street clothing

D.7.e. Emergency Decon

- a) This procedure will be essentially the same as above.

D.7.f. Diver Decontamination Procedures

Divers are not expected to disturb contaminated sediments in the course of their activities. Concurrent activities that disturb sediments while the divers are in the water are prohibited. If conditions make this unavoidable, a consultation with the Project Health and Safety Manager will be made before commencement of the activity.

Divers shall be required to:

- 1) Rinse with fresh water all dive gear after exit from river-work.
- 2) Shower with soap and water as soon as possible after dive-shift.

D.7.g. Equipment Decontamination

- 1) Equipment decontamination for release from the site will be performed on the facility decon pad.
- 2) Prior to exiting an EZ, the equipment operator will ensure that the equipment is inspected for visible gross contamination. Visible gross contamination will be removed using shovels and hand equipment as necessary to prevent cross-contamination of the site. If necessary a low pressure water hose will be used to remove materials.
- 3) Before release from the site, all equipment will be thoroughly decontaminated at the decon pad using water hoses, low pressure mechanical washers as necessary to remove visible contamination.
 - a) Initially, equipment will be brushed free of contaminated materials with brooms. Equipment coming from exclusion zone tasks will be washed, if necessary, with high-pressure hoses. Special attention must be given to mud flaps, wheel wells, tracks, undercarriage and foot surfaces (cab floor, control pedals, or walking boards).
 - b) If water is used, the vehicles will be held in the area for a short time to allow for collection of drippings.
 - c) Excavators/loaders moved from one area to another will have wheels/tracks frisked and cleaned and buckets wrapped in plastic.
 - d) Following decontamination and prior to release the PM or a designated alternate, shall be responsible for insuring that each piece of equipment (i.e., monitoring instruments, tools, generators, etc.) has been sufficiently decontaminated.
 - e) The final inspection for release will be logged and the log entry documented to the Envirocon Equipment Division.

- 4) If material is judged as uncleanable it will not be used outside the Contamination Zone and will be disposed of at the end of its usefulness.

D.7.h. Small equipment procedure

Surface debris and dirt will be removed from small equipment and tools with vigorous brushing.

D.7.i. Disposition of Decontamination Wastes

All equipment and solvents used for decontamination shall be decontaminated or disposed of with the established waste streams as described in the waste management plan.

D.8. Waste Management and RCRA Compliance

The purpose of this procedure is to establish site-specific practices for compliance with environmental requirements of RCRA. The scope of this procedure includes all work conducted under the project heading.

D.8.a. Training

All personnel responsible for any aspect of waste handling on site shall receive a briefing on this procedure. Training will be documented and submitted as a safety meeting record. Personnel files regarding qualifications on site will be updated accordingly and maintained by the safety officer.

D.8.b. Hazardous Waste Manager

- 1) The hazardous waste manager for this site will be designated by the client facility.
- 2) The hazardous waste manager is responsible for compliance with RCRA and associated environmental compliance standards.
- 3) Envirocon's superintendent or the project manager's designated representative shall serve as the QA/QC engineer responsible for hazardous waste coordination for Envirocon's activities regarding waste materials. The QA/QC engineer shall ensure that:
 - a) the instructions of the client's hazardous waste manager are strictly followed by Envirocon personnel; or
 - b) in the event of disputed procedures, Envirocon's QA/QC engineer shall immediately notify the project manager of the concern for resolution before proceeding.

D.8.c. Reporting incidents

- 1) All incidents must be reported in accordance with the project Health and Safety Plan (HASP) and Envirocon procedures.
- 2) The on-site supervisor is responsible for ensuring that the Hazardous Waste Manager is informed of any spills.

- 3) This includes, but is not limited to, the following:
 - a) accidents (with or without damages);
 - b) finding unusual materials or soil conditions (e.g., previously disturbed soils, materials with unusual odors, materials with unusual coloration, etc.);
 - c) spills of remediation waste; or
 - d) spills of lubricants, coolants, fuels, or any other hazardous materials.

D.8.d. Waste Stream Management

- 1) All waste must be segregated into the established waste streams. It is very important not to mix waste streams unless directed by the Hazardous Waste Manager.
- 2) The Envirocon QA/QC engineer will be responsible for field identification and sorting in accordance with the directions of the Hazardous Waste Manager.
- 3) If you are unclear which type of waste is which... ASK YOUR SUPERVISOR.
- 4) Anticipated Envirocon generated waste streams include:
 - a) Simple trash
 - b) Recyclable Oils (including lubricants, greases and related products that the recycler will accept)
 - c) Non-recyclable oils (e.g., oils contaminated with heavy metals)

D.8.e. Categorization

- 1) Waste streams will be categorized in accordance with the directions of the Hazardous Waste Manager.
- 2) Employees SHALL NOT determine if a waste stream is a "hazardous waste." Only the Hazardous Waste Manager shall make this determination.
- 3) Waste streams will be placed in the appropriate containers designated by the Hazardous Waste Manager.
- 4) Waste streams will be labeled in accordance with the Hazardous Waste Manager's Instruction.
- 5) Waste streams SHALL NOT be labeled as "hazardous waste" unless expressly authorized by the Hazardous Waste Manager.

D.8.f. Tracking Records

- 1) All regulated waste streams (i.e., those identified on the Record of Decision (ROD) for the site) shall be identified and logged immediately after being contained for storage or disposal by Envirocon personnel.
- 2) Envirocon will track and document the movement and disposition of all regulated wastes in the waste handling log until the materials are removed from site or otherwise transferred to the responsibilities of other entities.

- 3) The disposition of waste streams and the tracking records shall be maintained in accordance with the site QA/QC engineer's instructions.
- 4) The transfer of regulated wastes shall be performed in accordance with the directions of the hazardous waste manager for the site.

D.8.g. Emissions Controls

- 1) Odors and Vapors Controls
 - a) Vapors will be monitored on site in accordance with the HASP monitoring requirements for protection of personnel. Recognized limits for this monitoring include the Department of Labor (OSHA) Permissible Exposure Limits (PEL) and/or the American Conference of Governmental Industrial Hygienists (ACGIH) Threshold Limit Values (TLV).
 - b) Perimeter odors and vapors will be monitored to avoid public nuisance.
 - c) Exceedance shall be controlled by a combination of the following:
 - i. changing control zone boundaries
 - ii. upgrading respiratory protection controls
 - iii. slowing or suspending intrusive work
 - iv. application of soil barriers
 - v. application of a foam barrier
 - vi. application of a latex/latex-paper emulsion barrier
- 2) Dust Controls
 - a) Dust levels will be monitored on site in accordance with the HASP monitoring requirements for protection of personnel. Recognized limits for this monitoring include the Department of Labor (OSHA) Permissible Exposure Limits (PEL) and/or the American Conference of Governmental Industrial Hygienists (ACGIH) Threshold Limit Values (TLV).
 - b) Perimeter dust levels will be monitored to avoid public nuisance.
 - c) Exceedance shall be controlled by a combination of the following:
 - i. changing control zone boundaries
 - ii. upgrading respiratory protection control
 - iii. slowing or suspending intrusive work
 - iv. application of water
 - v. application of dust control palliatives
 - vi. application of a foam barrier
 - vii. application of a latex/latex-paper emulsion barrier

D.8.h. Spill Response and Prevention

Spill prevention controls and response procedures are documented in the emergency response procedures of this Health and Safety Plan.

D.8.i. Waste Management

- 1) All hazardous waste streams will be managed in accordance with the established Waste Management procedures. Each waste stream is to be segregated in the field in accordance with these procedures.
- 2) Segregated materials will be temporarily stored and protected until they can be replaced or remediated.

D.8.j. Waste Minimization

- 1) Waste generated on site will be minimized by proper sampling and categorization of waste streams.
- 2) Waste generated on site will be minimized by protecting segregated wastes from wind, weather and runoff.
- 3) Waste generated on site will be minimized through the proper selection of PPE, use of launderable materials where prudent, and reuse of decontaminated materials.

D.9. Qualifications and Access Requirements

Access to project sites is conditioned upon maintaining qualifications with regard to training, medical monitoring, drug & alcohol testing, adherence to required procedures, and related requirements. Failure to maintain these qualifications may result in removal from site and/or termination of employment.

D.9.a. Training qualifications summary

Table D.9.a summarizes the training qualifications for this project.

Table D.9.a TRAINING SUMMARY								
	HAZWOPER Training				Site Specific			
	40 hr with respirator training	24 hr	8 hr annual refresher	8 Hr Supervisor	Site HASP Briefing 2 hr ^⓪	facility orientation 2 hr ^{⓪⓪}	applicable AHAs	Daily safety briefings 20 min ^⓪
Supervisors	X		X	X	X	X	A	X
Level C (i.e., with potential use of respirators)	X		X		X	X	A	X
Level D work only surveyors, engineers, mechanics		X	X		X	X	A	X
Dive Team [ⓐ]	X		X		X	X	X	X
Work outside of EZ					X	X	A	X
Trailer staff					X	X		

Table D.9.a TRAINING SUMMARY

	HAZWOPER Training				Site Specific			
	40 hr with respirator training	24 hr	8 hr annual refresher	8 Hr Supervisor	Site HASP Briefing 2 hr ^①	facility orientation 2 hr ^{①②}	applicable AHAs	Daily safety briefings 20 min ^①
Delivery personnel					E	A	A	
Notes: X = required A = those that are applicable. E = escorted ① Approximate training time. Due to the nature of the tasks associated with this site, exclusion zones are not anticipated unless a change of conditions indicates exposures above action levels may occur. ② Homeland defense security issues and plans training per 49 CFR 172.704 and 172.800. ③ See Section D.9.b below								

- 1) All personnel performing work at the client’s site area will receive a briefing on the site Health and Safety Plan. This training must be acknowledged on the sign-up sheet at the front of this plan. Personnel will also undergo briefings on task specific hazard analysis.
- 2) Personnel entering the exclusion zone shall have a minimum of 24 hours of HAZWOPER training in accordance with 29 CFR 1910.120 or 1926.65.
- 3) Personnel required to wear respiratory protection will have a minimum of 40 hours of HAZWOPER training, to include respiratory protection training.
- 4) Supervisors will have an additional 8 hours of supervisory training for work in the EZ.
- 5) Personnel required to have HAZWOPER training must be up to date on annual 8 hour refresher training.
- 6) Personnel performing support functions (i.e., work outside of the EZ) are not required to have HAZWOPER training but shall be briefed on this HASP and applicable hazard analysis.
- 7) Daily Safety Meetings. In order to maintain qualifications, it is necessary to have regular meetings in order to enhance planning efforts and to pass information from lessons learned or changes in procedures.
 - a) A “toolbox” or “tailgate” safety meeting will be held at least daily before starting work. Safety meetings will also be held when site conditions change, before starting new activities, and after accidents.
 - b) These daily meeting shall be used to keep personnel up to date on changes in plans and procedures since their initial training and also to ensure coordinated work assignments by outlining the day’s activities and job assignments.
 - c) Attendance is mandatory for all site personnel including lower tier subcontractors.

- d) Meetings will also be used to discuss:
 - i. Topics of interest or concern of the crew,
 - ii. suspected hazards for that day's work and what precautions are necessary to deal with these hazards.
 - iii. Necessary training requirements and site work rules
 - iv. Changes in work practices or environmental conditions
 - v. Precautions or safe work practices related to the day's site activities
 - vi. New or modified site-wide procedures or requirements
 - vii. Incident alerts provided by the client
- e) Documentation of daily safety meetings shall be maintained on site.
- f) Daily safety meetings shall be used as a time for personnel to make safety suggestions. Suggestions shall be noted in the minutes and evaluated by supervisory and safety personnel. Actions taken on suggestions should be noted on the daily safety meeting form.
- g) The daily safety meeting shall function as the project's Environmental Health and Safety Committee. At the option of the project manager a separate committee may be established. Members shall be determined from nominations of the wage earning employees.

D.9.b. Dive Team Training

- 1) Each dive team member shall have the experience or training necessary to perform assigned tasks in a safe and healthful manner.
- 2) Each dive team member shall have experience or training in the following:
 - a) The use of tools, equipment and systems relevant to assigned tasks;
 - b) Techniques of the assigned diving mode; and
 - c) Diving operations and emergency procedures.
- 3) All dive team members shall be trained in cardiopulmonary resuscitation and first aid (American Red Cross standard course or equivalent).
- 4) Dive team members who are exposed to or control the exposure of others to hyperbaric conditions shall be trained in diving-related physics and physiology.
- 5) The designated person-in-charge (per 29 CFR 1910.140 (c) (2)) shall have experience and training in the conduct of the assigned diving operation

D.9.c. Medical Qualifications Summary

The following medical qualifications are required to perform work in certain areas.

Table D.9.c: Summary of Medical Requirements						
TEST COMPONENT (1)	Level D Exclusion Zone (1)	Level C Exclusion Zone (1)	Support Zone Workers (1)	Envirocon New Hires (1)(5)	Post-Accident/ exposure (1)	End of Project (1)(2)
Occupational History/update	X	X	(5)	X		(7)
Audiometric Exam	X	X		X		
Manual lifting protocol	X	X		X		
Drug testing(1)				(5)	(4)X	
DOT Breathalyzer Alcohol Testing					(4)X	
PCB Exposure Medical Surveillance Monitoring					(6)X	(6)X
Fitness to return to work (after work/non-work related injuries or illness).					X	
Fitness for Hazardous Waste Work (29 CFR 1910.120) including liver functions		X			(1)	(7)
Fitness to wear respirators (29 CFR 1910.134)		(3)		(3)		
Basic Fitness For Duty (Level D, Construction, or non-HAZWOPER)	X	X	(5)	(5)		X

NOTES:

(1) GMG WorkCare provides medical monitoring for all Envirocon employees through local health care facilities. The appropriate protocol will be scheduled by an authorized Envirocon representative and should never be scheduled by the employee (except in the case of a medical emergency). Lower tier subcontractors and guest are required to produce their own protocols equivalent to those indicated and/or in accordance with the referenced regulatory requirements. Employee may be required at any scheduled exam, examinations conducted after accidents, randomly, or as part of facility procedures to donate specimens for drug and alcohol testing. Failure to conform to medical monitoring requirements, drug & alcohol, or other related requirements may be grounds for removal from site and termination of employment.

(2) This column refers to certain site-specific protocols. It IS NOT A TERMINATION OF EMPLOYMENT EXAM requirement. All Envirocon employees should be notified of potential eligibility for termination exams when they are terminated from employment. If they request such an exam, the Director of Health and Safety will review the request and determine eligibility under the Envirocon Medical Monitoring Program in accordance with 29 CFR 1910.120.

(3) Must be completed prior to wearing respiratory protection

(4) As determined by Envirocon policy and the Director of Health and Safety accidents, incidents, injuries, or illnesses involving medical evaluations, potential OSHA recordability, potential property damages in excess of \$500, involving damages or injuries to parties not affiliated with Envirocon shall be evaluated.

(5) New employees are hired provisionally based on their ability to pass the fitness for duty examination. GMG WorkCare makes the final determination regarding fitness for duty for Envirocon Employees (this includes all aspects of fitness for duty and drug testing results). New hires may begin Level-D work (i.e., this evaluation does not authorize work where exposures may exceed the action levels for chemical exposures) with the basic fitness for duty evaluation provided by the attending or examining physician. The examining or attending physician's evaluation is considered temporary (not to exceed 30 days) until final evaluation by GMG WorkCare's final evaluation.

(6) As indicated by evaluation of potential for disturbance of PCB sediments to the Project Health and Safety Manager..

(7) Employees that will be terminated at the end of the project and have not had a HAZWOPER physical within the last six months shall be offered a termination examination.

E. HAZARDS

An effective safety and health program includes a variety of processes for recognizing and evaluating hazards in order to plan controls. Hazard identification and evaluation must be a continuing process although the focal point is the planning phases of tasks.

E.1. Accident Prevention Program

Envirocon's Health and Safety Program Manual serves as the primary accident prevention program document in accordance with the requirements of 29 CFR 1926.20. This HASP further develops the site-specific procedures to prevent accidents at the site. Beyond these documents, the accident prevention program is an ongoing process which involves the participation of all personnel through hazard identification, hazard analysis and hazard control. Refer to Envirocon's Health and Safety Program Procedure 1403.014 "Correcting Unsafe Conditions and Work Practices."

E.1.a. Elements of the Accident Prevention Program

The accident prevention process at this site includes a number of ways to identify hazards and develop appropriate controls. They include the following programs and procedures.

- 1) Proper planning. There are a number of planning processes that take place prior to execution of a given task. Based on many other plans and programs, Envirocon and the client have developed a HASP for the site. The Field Operations Manual Procedure 1401.030 documents the project procedures for developing individual task plans.
- 2) Activity Hazard Analysis (AHA).
 - a) The planning and hazard assessment process continues into the individual job task through the use of AHAs. Many activities will be covered by the hazard analysis sections in this HASP. As the task planning process and lessons learned evolve during the course of this project, new activity hazard analyses shall be developed to address these changes as necessary.
 - b) The site health and safety officer contributes to the task planning process required by Field Operations Manual 1401.030 by preparing AHAs. The task plans should include a description of key controls from this HASP and AHAs.
 - i. In order to better manage change, duplication should be avoided.
 - ii. Example: There should not be two AHAs for excavation activities or an AHA duplicating a HASP section on excavations.
 - iii. The reason for this is to avoid confusion in instructing the crews involved. It also facilitates incorporating changes in procedures from

lessons learned because multiple procedures do not need to be changed.

- c) AHAs shall be developed for all significant work tasks associated with this project. New tasks, or previously undeveloped hazards require a new AHA or redraft existing ones. AHAs are primarily a planning phase tool. As needed, this HASP may be modified in order to accommodate control requirements identified through the AHA process. AHAs are developed in accordance with Health and Safety Program Procedure 1403.013.
- 3) Work place inspections. All supervisory personnel, safety officers, and competent persons shall conduct site inspections. Site inspections are intended to ensure that established plans and procedures are followed, changes in conditions are identified, effectiveness of controls are assessed, and new hazards identified.
- 4) Employee involvement. The active involvement of every employee is encouraged through the AHA process, site incentives program, “time out for safety” authority, safety observer program, and daily safety briefings. Employee involvement is the cornerstone of the Incident-free performance goal. This goal will not be met (and has no real meaning) without every employee’s complete focus at all times on every task. Additionally, every employee is required to look out for their coworkers when their focus falters.
- 5) Incident investigations. Employees are required to immediately report all incidents in order to ensure a timely investigation. Incident investigation is aggressive at site in order to capture lessons learned from minor incidents and correct controls before significant accidents occur.

E.1.b. Responsibilities

- 1) Responsibilities for Planning, Safety and Quality shall be specifically assigned and acknowledged. The primary means for accomplishing this is as follows:
 - a) Project Plans (e.g., Work Plan and HASP) are assigned to the Project Manager, Health and Safety Supervisor, QA/QC, Engineers, etc. and shall be signed by the individuals assigned responsibility for the document.
 - b) 1401.030 Task Plans and AHA(s) are assigned to and signed by the appropriate Superintendent (or other operations supervisor); health and safety officer; Engineer; QA/QC supervisor; and any other technical supervisors required for proper planning associated with the task. For example, tasks involving crane operations should have a lift supervisor assigned to the task plan.
- 2) Supervisors, assisted by safety and health personnel are responsible for implementing effective accident prevention processes. This includes:
 - a) conducting required planning,
 - b) conducting required inspections,
 - c) aggressively investigating all incidents,

- d) encouraging employee participation, and
 - e) taking a leadership role in achieving Incident-free performance.
- 3) Employees are responsible for:
- a) following established procedures,
 - b) actively participating in training processes,
 - c) reporting all incidents immediately to their supervisors,
 - d) positively assisting in investigations of incidents, and
 - e) looking out for their coworkers (i.e., “buddies”).

E.2. Risk Assessment

For purposes of this document, risk will be described by a ranking methodology. This purpose of this ranking is to focus attention on significant hazards for purposes of better utilizing limited resources. The purpose of this assessment *is not* to determine precise probabilistic measures (it is actually intended that high potentials will go unrealized by focused attention). Two cases define the issue of risk versus hazard in the accident prevention context. Severe hazards that are infrequently encountered, and low severity hazards that are frequently encountered both represent cases where controls may not receive the attention they merit. This ranking system will consider three factors that contribute to overall risk potential. They include severity of outcome, frequency of exposure, and potential for occurrence when exposed.

E.2.a. Severity

Severity describes the significance of consequences if the potential is realized.

- 1) High severity means the following.
 - a) There is a distinct possibility of fatal injury or illness.
 - b) A factor of 4 will be used to score risk potential.
- 2) Moderate severity means the following.
 - a) There is a distinct possibility of permanent disabling injury or illness.
 - b) There may be a residual possibility of fatal injury or illness.
 - c) A factor of 2 or 3 will be used to score risk potential.
- 3) Low severity means the following.
 - a) It is unlikely to result in fatality.
 - b) There may be a residual possibility of permanent disabling injury/illness.
 - c) There is a distinct possibility of medical treatment.
 - d) A factor of 1 will be used to score risk potential.

E.2.b. Frequency of Exposure

For this analysis, frequency represents the amount of exposure to the hazard, or how often risk is experienced.

- 1) Frequent exposure means the following.
 - a) Regular or daily exposure to the hazard.
 - b) A factor of 4 will be used to score risk potential.
- 2) Moderate frequency of exposure means the following.
 - a) Weekly or biweekly exposure to hazard, or
 - b) seasonally it becomes a frequent exposure to hazard.
 - c) A factor of 2 or 3 will be used to score risk potential.
- 3) Infrequent exposure means the following.
 - a) Exposures occur several times a year or less.
 - b) A factor of 1 will be used to score risk potential.

E.2.c. Probability of Occurrence

Probability reflects the likelihood of injury or illness when exposed to the hazard. For purposes of this analysis, probability includes consideration of efficiency of identifying hazards in order to implement controls and effectiveness of controls.

- 1) Probable means the following.
 - a) Difficult to recognize, and
 - b) controls tend to have limited effectiveness.
 - c) A factor of 4 will be used to score risk potential.
- 2) Somewhat probable means the following.
 - a) Either the hazard is difficult to recognize or controls tend to have limited effectiveness.
 - b) A factor of 2 or 3 will be used to score risk potential.
- 3) Generally improbable means the following.
 - a) The hazard is readily recognized and reliably controlled.
 - b) A factor of 1 will be used to score the risk potential.

E.2.d. Number of Employees and/or Third Party Personnel Exposed

This reflects the population of employees exposed to this particular risk. Heat stress for example generally effects ground laborers wearing PPE. Equipment operators or supervisory personnel in enclosed air-conditioned cabs are not exposed to the stress.

- 1) Score of 4 = more than 50.

- 2) Score of 3 = 10 to 50.
- 3) Score of 2 = 3 to 10.
- 4) Score of 1 = 1 to 3.

E.2.e. Risk Assessment Table

<i>Type of Hazard</i>	Severity score	Frequency score	Probability score	Number of employees	<i>RISK Potential</i>	<i>Description of potential hazards</i>
Safety	2	4	2	2	32	Slips/trips/falls and walking and working surfaces
	3	2	2	2	24	Falls from heights > 6 ft
	4	2	1	2	16	Heavy equipment
	4	2	1	2	16	Vehicle traffic
	2	2	2	2	16	Manual Lifting
	3	2	1	2	12	Backing up
	3	3	1	1	9	Pressurized vessels and hoses hazards; struck by
	4	2	1	1	8	Confined space hazards; batch plant, pig
	2	2	1	2	8	Structural and Equipment Fires
	2	2	2	1	8	Fall into water; hypothermia or drowning
	4	1	2	1	8	Utility strikes during mob/demob & support areas.
	2	3	1	1	6	Batch plant pinch points
	2	2	1	1	4	Tipover of equipment on barge
4	1	1	1	4	Diver drowning	
Toxic	2	3	2	2	24	PCB contaminated materials; divers, decon and batch plant
	1	3	1	5	15	Release into environment, contaminated sediment
	2	2	2	1	8	Silica exposure at batch plant
	2	2	2	1	8	Eye exposure, irritation from Calcimet
Biological and Environmental	1	4	2	2	16	Noise from equipment
	2	1	1	2	4	Snakes and insects
	2	1	1	2	4	Heat and cold stresses

E.3. Potential Chemical Waste Hazards

The waste contaminants of concern (COC)s are described along with their hazards and properties in Appendix D. It is not anticipated that levels of PCBs or NAPL

F. INDUSTRIAL HYGIENE PROGRAM CONTROLS

OSHA mandates programmatic controls for many hazards. This section describes the programs in place to control safety and health hazards on site.

F.1. Site Monitoring

Table F.1: Air Monitoring Requirements (1)				
Chemical Hazard	Instrument	Method ¹	Action level	ACTION (3)
Oxygen (O ²) (confined space)	Combustible Gas /O2 meter	Direct read area sample prior to confined space entry.	<19.5%, or >23.5%	<ul style="list-style-type: none"> ventilate until readings can be brought to 21% +/- 1% or do not enter. ventilate until readings can be brought to 21% +/- 1% or do not enter.
Combustible Gas /Vapors (CG) (spills, leaks, confined space)	Combustible Gas /O2 meter	Direct reading area sample prior to entering confined space	>10% LEL	clean, secure source of vapors, ventilate until readings can be brought to +/- 1% LEL or do not enter.
		<ul style="list-style-type: none"> Prior to hotwork near flammables Suspect gas leak 	Any detection above background drift or fluctuation	clean, secure source of vapors, ventilate until readings indicate source has been controlled.
PCBs	Personal Dust Monitor	NIOSH 5503	> 1.0 mg/m ³	<ul style="list-style-type: none"> Sample by personal sampling pump and media
	Personal sampling pumps and media, or monitoring badge in breathing zone of worker		>50% < 10x PEL or TLV	<ul style="list-style-type: none"> Upgrade to level C – Cover or enclose materials. Increase ventilation
			>50X PEL or TLV	Cease work immediately - Cover or enclose materials. Increase ventilation
Volatile Hydrocarbons (VOA's Semi VOA's)	Photoionization Detector	Naphthas; NIOSH 1550 Or Sampling badge for benzene and Total Organic Vapors	10 ppm PID	<ul style="list-style-type: none"> Personal sampling with badge or media
	Personal sampling pumps and		>50% < 10x PEL or TLV	<ul style="list-style-type: none"> Upgrade to level C – Cover or enclose materials. Increase ventilation
			>50X PEL or TLV	Cease work immediately - Cover or enclose materials. Increase ventilation

Table F.1: Air Monitoring Requirements (1)				
Chemical Hazard	Instrument	Method¹	Action level	ACTION (3)
	media, or monitoring badge in breathing zone of worker	Monitor when highest identified concentrations of contaminant are exposed and	>1000 PPM or > IDLH	Cover or enclose stockpiled materials. Increase Exhaust ventilation
Respirable PNOC (Particulates Not Otherwise Classified)	Personal sampling pumps, pre-weighted PVC filter cassette in breathing zone of worker	NIOSH 0600 when suspect or monthly	>50% < 10x PEL or TLV	Apply engineering controls Upgrade PPE as necessary (3).
			>50X PEL or TLV	Apply engineering controls Upgrade PPE as necessary (3).
			>1000 PPM or > IDLH	Stop work, determine source of hazard and apply an engineering control
Silica (respirable fraction)	Personal sampling pumps, w/ PVC filter cassette, and cyclone or respirable dust separator.	NIOSH 7500 when suspect or monthly	>50% < 10x PEL or TLV	Apply engineering controls Upgrade PPE as necessary (3).
			>50X PEL or TLV	Apply engineering controls Upgrade PPE as necessary (3).
			>1000 PPM or > IDLH	Stop work, determine source of hazard and apply an engineering control
Comments or special instructions: 1. Methodology determines the analytical method used by the laboratory 2. Breathing zone is the location of the sampling media, it would be attached to the workers shoulder at approximately the same height of the workers nose and mouth. 3. For PPE upgrades refer to Table F.2.b for respiratory protection selection guidelines and Table F.2.a for other PPE items.				

F.1.a. Sampling and Monitoring Strategy

- 1) Chronic exposure risks.
 - a) The site respiratory hazards pose primarily a chronic exposure risk.
 - b) Based on the site characterization data and risk assessment presented above, the anticipated respiratory hazards are not expected to exceed action levels for respiratory protection purposes.
- 2) Acute exposure risks.

- a) Serious acute respiratory hazards are anticipated only in the event of confined space entries, and in those cases primarily an oxygen deficiency concern.
 - b) Based on the site characterization data and risk assessment presented above, the anticipated respiratory hazards are not expected to exceed action levels for respiratory protection purposes.
- 3) Strategy Selection Matrix

F.1.b. Monitoring

- 1) All monitoring will be conducted in accordance with the equipment manufacturer's operating instructions.
- 2) Readings will generally be taken where indications exceed normal background and drift of the equipment.
- 3) Readings other than peak readings will generally be taken as sustained readings lasting for several seconds.

F.1.c. TWA Sampling

TWA sampling may include time weighted average sampling of personal exposures as well as specific areas (e.g., EZ boundaries, or worst case locations).

- 1) All TWA sampling will be conducted in accordance with NIOSH or OSHA standard methods for purposes of documenting exposure compliance. In some cases TWA sampling may be used for other purposes such as detecting exposure potential, but these samples shall not be documented as compliance samples.
- 2) Routine TWA sampling includes worst case breathing zone sampling. If three consecutive samples are below action levels no further testing is required unless/until conditions changes.
- 3) Where worst case samples indicate exposures above action levels, conduct area TWA sampling of EZ boundaries and discrete job tasks. Where three consecutive samples indicate exposures below the action levels no further testing is required unless/until there is a change in conditions.

F.1.d. Characterization and Confirmation

- 1) Characterize means:
 - a) Collect 3 worst case TWA personal exposure samples matched against 3 worst case TWA area exposure samples from the exclusion zone work areas.
 - i. These samples shall be taken at different times.
 - ii. Each sample shall reflect a full shift of activities and exposures.
 - iii. These samples shall be matched against applicable direct reading monitoring results.

- iv. More samples may be taken to evaluate effectiveness of control modifications.
- b) At such time as the three latest TWA samples indicate a consistent result the work process may be considered to be characterized if the site safety officer determines that there are no other indicates that these samples should not be considered representative. Consistent results include:
- i. 3 consecutive samples below the action level;
 - ii. 3 consecutive samples at or below Level C half mask requirements;
 - iii. 3 consecutive samples at or below Level C Full face requirements; or
 - iv. 3 consecutive samples at or below Level B respiratory protection requirements.
- c) Characterization must be repeated or confirmed whenever a change in conditions is identified. Indications of a change in condition include the following:
- i. New materials are encountered that have been determined to contain significant changes in contaminant concentrations.
 - ii. Odors have changed significantly.
 - iii. Operational methods have changed in a way that could produce different exposures.
 - iv. Direct reading instrument results are no longer consistent with the results taken during characterization.
 - For example the direct reading instrument results associated with a TWA characterization that was half of the action level are now getting close to doubling.
 - A confirmatory TWA sample should be taken to ensure that the current direct readings are still indicative of TWA exposures less than the action level.
 - A change in condition must be assumed and therefore controls must be upgraded (e.g., upgrade respiratory protection).
- d) For wipe samples characterization means to collect pre-activity collections to document PCB contamination levels prior to beginning any PCB disturbing work in the area or adjacent areas. Worst case surfaces are those known or highly suspected to have been in contact with contaminated materials, or, in the case of surfaces exposed to dusts, mist, or other contaminated aerosols; a horizontal surface that is unlikely to be disturbed by the activities going on at that location (e.g., the top of a door frame or locker).

2) Confirmation means:

- a) A direct reading monitoring result or a TWA exposure sample that is consistent with the latest characterization is a confirmation sample or monitoring result.
 - b) 1 UP confirmation sample to upgrade/3 DOWN confirmation samples to downgrade.
 - i. At any time that a confirmatory TWA sample produces a new result which is inconsistent with the latest characterization, a change in condition must be assumed and therefore controls must be upgraded (e.g., upgrade respiratory protection).
 - ii. While any single direct reading or TWA result inconsistent with a lower level of controls must indicate upgrading controls; a full set of 3 consecutive TWA results indicate a consistent characterization appropriate for downgrading controls.
 - iii. Similarly, 3 consecutive direct reading results must be produced to downgrade (provided the direct reading results have been previously confirmed against applicable TWA levels).
 - c) Routine confirmation by TWA sampling and direct reading monitoring should be performed in accordance with the directions in the table.
 - i. Routine confirmation monitoring or sampling means to perform the evaluation even if there is no other indication of a change in conditions.
 - ii. Unless otherwise specified, routine confirmation sampling is conducted daily for direct reading instrument monitoring and monthly for TWA sampling.
 - d) Confirmation wipe samples mean to collect a sample from the same location and over the same amount of surface area as a previously characterized location.
- 3) Downgrading of respiratory protection shall be approved by an Envirocon CIH.

F.1.e. Documentation

See the recordkeeping section below.

- 1) All calibration, sampling information and results will be documented using a log or Envirocon standard forms.
- 2) Results collected for specific individuals will be passed directly to the applicable employee. Result briefings will be documented.
- 3) Results will be generically passed (without mention of specific employee names) to all personnel during morning safety meetings.

F.2. Personal Protective Equipment

F.2.a. Summary of PPE Requirements

Table F.2.a: Summary of Standard PPE					
Activity	Head/ Face	Foot	Hands	Respirator	Clothing
General site labor, non-intrusive support zone tasks	<ul style="list-style-type: none"> • Hard hat(2), • safety glasses(2) 	Steel toed boots	Leather gloves as needed.	None. (1)	<ul style="list-style-type: none"> • Shirt w/sleeves • Long pants • high visibility vest (5)
Supervision of support zone work.	<ul style="list-style-type: none"> • Hard hat(2), • safety glasses(2) 	Steel toed boots		None. (1)	<ul style="list-style-type: none"> • Shirt w/sleeves • Long pants • high visibility vest (5)
Dry equipment decon.	<ul style="list-style-type: none"> • Hard hat(2), • safety glasses(2) • Face shields or goggles 	Steel toed PVC outer boots	Leather or PVC coated outer gloves	None. (1)	<ul style="list-style-type: none"> • Tyveks or launderable coveralls (3) • high visibility vest (5)
General site labor tasks in dry contaminated areas.	<ul style="list-style-type: none"> • Hard hat • Safety glasses • (2) 	PVC outer boots w/steel toes, or Steel toed boots w/Boot covers (4)	Leather or PVC coated cotton as needed	None (1)	<ul style="list-style-type: none"> • Tyvek or launderable coveralls (3) • High vis vest(5)
General site labor tasks in wet contaminated areas. <ul style="list-style-type: none"> •Barge work •Batch plant •Dewatering 	<ul style="list-style-type: none"> • Hard hat • Safety glasses • (2) 	Steel toed boots with water resistant outer boot covers (6)(8)	Nitrile or Leather or PVC coated cotton as needed	None (1)	<ul style="list-style-type: none"> • Water resistant outer coveralls (3)(6) • High vis vest(5)
Wet Decon	<ul style="list-style-type: none"> • Hard hat • Safety glasses • (2) • face shield 	Steel toed boots with water resistant outer boot covers (6)(8)	Nitrile gloves in combination with Leather or PVC coated cotton gloves	None (1)	<ul style="list-style-type: none"> • Water resistant outer coveralls (3)(6)(7) • High vis vest(5)

Table F.2.a: Summary of Standard PPE

<i>Activity</i>	<i>Head/ Face</i>	<i>Foot</i>	<i>Hands</i>	<i>Respirator</i>	<i>Clothing</i>
Drivers	• (9)	• (9)	• (9)	•	<ul style="list-style-type: none"> • long pants • shirts with sleeves • (9)

- (1) Refer to Table F.2.b for initial respiratory protection requirement options.
 Voluntary use of respirators is authorized for nuisance dusts and exposures known to be below PEL levels.
 For nuisance dust use disposable N, R or P 95 or better (dispose of N or R types daily and P type weekly)
 For odors use half mask with OV or OV/P95 or better (change at start of week)
- (2) Hard hats and safety glasses are not required inside of enclosed cabs with windshields; or when working outside of the contaminated areas performing non-labor tasks such as walking to and from buildings/trailers, typing, or making notes.
- (3) Dust resistant outer coveralls such as Tyveks with modesty garments underneath. These are not allowed for use with hazardous materials. The safety officer may remove this requirement for tasks that involve minimal risk of contact with contaminants on personal clothing or skin,
- (4) Boot covers are any suitable covering capable of resisting dust penetration which would contaminate steel toed boots, and with durability appropriate for the task.
- (5) High visibility vests. For heat stress considerations, an orange/high-visibility T-Shirt, or an orange/high-visibility hard hat may be substituted for the vest.
- (6) When working with wet contaminated materials, PVC or other equivalent water resistant outer boot covering will be used to prevent contamination of steel toed boots. Under conditions with launderable coveralls are penetrated by wet conditions they shall be similarly substituted or covered with a suitable outer water proof layer.
- (7) For purposes of preventing heat or cold stress, decon personnel may use water proof outer coverings with holes in the backs or aprons to allow for perspiration to escape (provided inner garments do not get wet as a result.
- (8) Wet work and decon may use a PVC steel-toed boot in place of a leather boot with cover.
- (9) Drivers entering contaminated areas shall be prepared to put on the applicable personal protective clothing worn in that area in the event of an emergency exit.

F.2.b. Respiratory Protection Selection

Table F.2.b: Respirator Selection ⁽¹⁾

Hazard	Levels		Respirator Type (2)	Cartridge Type	Cartridge Change Schedule	Notes
	lower	upper				

Table F.2.b: Respirator Selection ⁽¹⁾

Hazard	Levels		Respirator Type (2)	Cartridge Type	Cartridge Change Schedule	Notes
	lower	upper				
PNOC (nuisance dust)		5 mg/m3 total dust	DFP	P100 or P99 N100 or N99 R100 or R99	WEEK for P100 or P99 SHIFT for N100 or N99 R100 or R99	Optional ... Provide for voluntary use.
	5 mg/m3 total dust or 2.5 mg/m3 respirable	25 mg/m3 total dust or 12.5 mg/m3 respirable	HM APR	P100 or P99 N100 or N99 R100 or R99	WEEK for P100 or P99 SHIFT for N100 or N99 R100 or R99	(6)
	25 mg/m3 total dust or 12.5 mg/m3 respirable	250 mg/m3 total dust or 125 mg/m3 respirable	FF APR	P100 or P99 N100 or N99 R100 or R99	SHIFT	(6)
	250 mg/m3 total dust or 125 mg/m3 respirable		FF PP SA	Airline or SCBA	N/a	(6)
PAHs	½ PEL	5 x PEL	HM APR	P100	each WEEK	(6)
	½ PEL	5 x PEL	HM APR	N100 or R100	each SHIFT	(6)
	5 x PEL	50 x PEL	FF APR	P100/N100/R100	each SHIFT	(6)
Silica	½ PEL	5 x PEL	HM APR	P100	each WEEK	(6)
	½ PEL	5 x PEL	HM APR	N100 or R100	each SHIFT	(6)
	5 x PEL	50 x PEL	FF APR	P100/N100/R100	each SHIFT	(6)
Volatile organics	½ PEL	5 x PEL	HM APR	OV	each WEEK	(6)
	5 x PEL	50 x PEL	FF APR	OV	each SHIFT	(6)
PCB	0.1 mg/m3	5 mg/m3	FF APR	combo: P100 + OV	each SHIFT	(6)
	5 mg/m3		AHA (3)			(6)

Table F.2.b: Respirator Selection ⁽¹⁾

Hazard	Levels		Respirator Type (2)	Cartridge Type	Cartridge Change Schedule	Notes
	lower	upper				
<u>Abbreviations:</u> DFF = disposable filtering facepiece FF = full face HM = half mask (H) = hood APR = Air Purifying Respirator AHA = requires a shift entry permit; or a job-specific hazard analysis			EE = Emergency Egress SCBA (escape only) N100 R100 P100 = NIOSH approval types (for dust filtering cartridges) OV = organic vapor combo = combination cartridges SHIFT = start each shift with a new cartridge (5) WEEK = start each week with a new cartridge (5)			
Notes: (1) This table sets the initial respiratory protection selection options. The Project Health and Safety Manager, the Corporate Director of Health and Safety, or an Envirocon CIH may approve additions or changes to this table based on a written hazard analysis. An Envirocon CIH must approve respiratory protection downgrades. (2) This represents the minimum respiratory protection allowed. Respirators with a higher protection factor assigned by NIOSH may also be used. (3) Activity Hazard Analysis (AHA) must be approved by the Project Health and Safety Manager, the Corporate Director of Health and Safety, or an Envirocon CIH. (4) Regardless of the change schedule, chemical cartridges should always be changed if warning properties are detected. Regardless of the change schedule, filter type respirators should always be change if breathing becomes difficult. (5) Ensure compliance with Subpart Z requirements for applicable heavy metals regulated areas. (6) Use combo OV/P100 cartridges if volatile organics and other contaminant requiring particulate filtration (P100) required.						

F.2.c. PPE Rules

- 1) Downgrading respiratory protection must be approved by an Envirocon CIH.
- 2) All personnel are required to use the personal protection specified for their work. This may include, but is not limited to cartridge respirator, protective suit, gloves, boots, hard hat, hearing protection, and safety glasses.
- 3) All respirator use to be done in accordance with Envirocon’s Respiratory Protection Program and/or site-specific procedures. Refer to Section F.3 for the site-specific respiratory protection program and procedures.
- 4) Safety Boots/Shoes

- a) Safety steel-toed boots/shoes that meet the requirements and specifications of ANSI Z41.1 shall be worn while working in field locations.
 - b) Boots/shoes must be in good repair and laced or fastened. Sandals and tennis-style shoes of any type shall not be worn while working.
- 5) Safety / Hard Hats
- a) Approved safety hats that meet requirements and specifications established in ANSI Z89.1 shall be worn at all times in the field or construction zone/yard removal locations.
 - b) Safety hats are not required to be worn in vehicles (passenger cars or trucks) or offices. Safety hats are not required in construction equipment with enclosed cabs. Safety hats must be worn in all construction equipment (loaders, bobcats, excavators, dump trucks, backhoes, etc.) that do not have enclosed cabs.
- 6) Eye Protection
- a) As a minimum, ANSI-approved safety glasses with side shields will be worn at all times when working on this site.
 - b) ANSI-approved safety glasses must be worn by equipment operators while in cabs unless eye hazards are adequately controlled by other methods listed in the most recent eye hazards analysis for this project.
 - c) Proper eye protection (goggles, safety glasses, etc.) must be worn when performing work with a recognized hazard to the eyes such as wire brushing, hammering, buffing, chipping, grinding, welding, cutting wire rope, working on rust, dirty chains, cables, or handling chemicals. **If the job might result in eye injury, then eye protection is required.**
 - d) Special goggles must be worn while helping or working within close range of welders.
 - e) Goggles or transparent full-face shields must always be worn when grinding.
 - f) Envirocon will not provide prescription safety glasses; Envirocon will provide safety glasses capable of fitting over prescription glasses.
- 7) Hearing Protection
- a) Approved earplugs or earmuffs must be worn in areas of high noise levels.
 - b) High noise level is defined as areas where noise levels exceed, or may exceed, 85 dBA.
 - c) Hearing protection around all pneumatic off-loading operations.
- 8) Safety Vests
- a) Orange safety vests are required anytime Envirocon personnel are working around operating equipment.

- b) This requirement applies to equipment operators whose duties involve them leaving the cab of their equipment and working in general area.
- 9) Clothing
- a) Sleeved shirts must be worn on the job.
 - b) Tank tops will not be allowed.
 - c) Long pants shall be worn. Pants shall cover the work boot top.
 - d) Shorts will only be allowed if they are worn under cotton coveralls or other protective clothing.
 - e) Loose or ragged clothing shall not be worn.
- 10) All personnel are responsible to clean and maintain the protective equipment issued to them. Any noted defects in the equipment shall immediately be reported to the Envirocon Project Manager or the site superintendent, as appropriate.

F.3. Site-specific Respiratory Protection

F.3.a. Documents

Envirocon's written Respiratory Protection Program is contained in Procedure 1403.016. This health and safety plan procedure serves as the site-specific procedure for the use of respirators on this project.

F.3.b. Administration

- 1) The Respiratory Protection Program Administrator is Joe Ocken, CIH.
- 2) The designated site safety officer for this project will serve as assistant program administrator.
- 3) Medical qualification procedures are evaluated and implemented by GMG WorkCare, Dr. Greaney.

F.3.c. Continuing respirator effectiveness

- 1) The assistant administrator (site safety officer) is responsible for conducting daily site inspections, including special inspections described in the inspections section of this procedure.
- 2) Daily site inspections shall include surveillance of work place conditions. In particular the following conditions shall be assessed.
 - a) potential changes in contaminant concentration,
 - b) changes in employee exposure or stress, and
 - c) respirator effectiveness.

F.3.d. Training

- 1) Envirocon Respiratory Protection Training Procedure

- a) Employees may be trained using the Envirocon Respiratory Protection Program lesson plan.
- 2) 40 hr HAZWOPER Training. Employees may be trained in a recent 40 hour or Emergency Response training courses (within the last year), or a recent 8 hour refresher training course which covers the use of respiratory protection (within the last year).
- 3) Respirator wearers may also be trained by certified training using a lesson plan covering the new (1998) revised respiratory protection program standard.

F.3.e. Voluntary use of respirators

- 1) The voluntary use of respirators by employees (e.g., for control of odors or nuisance dusts) must be qualified.
- 2) Voluntary use of respirators is only allowed in areas characterized as not requiring respiratory protection.
- 3) The specific type of respirator and conditions of use must be approved by the Director of Health and Safety.
- 4) Voluntary use of respirators must otherwise be in accordance with this procedure.
- 5) Employees voluntarily using respirators must be trained in the information provided in Appendix D to Sec. 1910.134 “Information for Employees Using Respirators When Not Required Under the Standard.”
- 6) Voluntary use of disposable nuisance dust masks does not require medical evaluation. Voluntary use of these masks does not require a fit test.

F.3.f. Medical qualifications.

- 1) Envirocon (PLHCP)
 - a) Respirator wearer’s shall be medically evaluated by a company designated physician or other licensed health care professional (PLHCP).
 - b) Envirocon’s PLHCP is Dr. Greaney of GMG WorkCare.
 - c) Dr. Greaney will be assisted in these duties by a local PLHCP. Local PLHCPs will also be licensed physicians. Fitness to wear respiratory protection will be determined by the local PLHCP and reviewed by Dr. Greaney.

F.3.g. Fit Testing

- 1) General requirements
 - a) Before an employee uses any respirator with a negative or positive pressure tight-fitting facepiece, the employee must be fit tested with the same make, model, style, and size of respirator that will be used.
 - b) Positive pressure (i.e., pressure-demand mode) supplied air respirators (SAR) or self contained breathing apparatus (SCBA) with tight-fitting facepieces are included in this requirement.

- c) Unless noted otherwise, fit test shall be administered using an OSHA-accepted Quantitative (QNFT) protocol.
 - d) A QLFT may be used to fit test negative pressure air-purifying respirators that must achieve a fit factor of 100 or less (i.e., half mask air purifying respirators).
 - e) Fit testing of tight-fitting atmosphere-supplying respirators and tight-fitting powered air-purifying respirators shall be accomplished by QNFT or QLFT.
- 2) Tight-fitting atmosphere-supply & powered air-purifying respirators
- a) Fit testing of tight-fitting atmosphere-supplying respirators and tight-fitting powered air-purifying respirators shall be accomplished by performing quantitative or qualitative fit testing in the negative pressure mode, regardless of the mode of operation (negative or positive pressure) that is used for respiratory protection.
 - b) Qualitative fit testing of these respirators shall be accomplished by temporarily converting the respirator user's actual facepiece into a negative pressure respirator with appropriate filters, or by using an identical negative pressure air-purifying respirator facepiece with the same sealing surfaces as a surrogate for the atmosphere-supplying or powered air-purifying respirator facepiece.
 - c) Quantitative fit testing of these respirators shall be accomplished by modifying the facepiece to allow sampling inside the facepiece in the breathing zone of the user, midway between the nose and mouth. This requirement shall be accomplished by installing a permanent sampling probe onto a surrogate facepiece, or by using a sampling adapter designed to temporarily provide a means of sampling air from inside the facepiece.
 - d) Any modifications to the respirator facepiece for fit testing shall be completely removed, and the facepiece restored to NIOSH-approved configuration, before that facepiece can be used in the workplace.
 - e) Voluntary use respirators
 - i. Voluntary use of disposable paper masks for nuisance dusts does not require a fit test.
 - ii. Voluntary use of disposable paper masks for nuisance dusts does not require medical evaluation.
 - iii. Voluntary use of any other respiratory protection requires normal fit testing and medical evaluations.
- 3) Loose-fitting respirators
- a) Loose-fitting respirators include respirators such as hood or helmet-type continuous flow (type C or CE) respirators.
 - b) Loose-fitting respirators do not require fit testing.

- 4) Envirocon fit testing will be done in accordance with the OSHA-accepted QLFT and QNFT protocols and procedures are contained in Appendix A of 29 CFR 1910.134.

F.3.h. Fit testing period.

- 1) Fit test results are good for a period of one year.
- 2) If an employee using a tight-fitting facepiece respirator will be assigned a different respirator facepiece (size, style, model or make) the fit testing must be repeated.
- 3) Fit test results are voided whenever the employee, a supervisor, a safety officer, the PLHCP, or program administrator makes visual observations of, changes in the employee's physical condition that could affect respirator fit. Such conditions include, but are not limited to:
 - a) facial scarring,
 - b) dental changes,
 - c) cosmetic surgery, or
 - d) an obvious change in body weight.

F.3.i. Use of respirators

- 1) Employees are not allowed to use respirators with tight-fitting facepieces with:
 - a) facial hair that comes between the sealing surface of the facepiece and the face or that interferes with valve function; or
 - b) any condition that interferes with the face-to-facepiece seal or valve function.
- 2) If an employee wears corrective glasses, Envirocon will obtain the appropriate spectacle kit and have it fitted with prescription lenses.
- 3) Employees are required to perform a fit check when donning all tight-fitting respirators.

F.3.j. General inspection and repairs

- 1) Inspection requirements
 - a) All respirators used in routine situations shall be inspected before each use and during cleaning.
 - b) All respirators maintained for use in emergency situations shall be inspected at least monthly and in accordance with the manufacturer's recommendations, and shall be checked for proper function before and after each use.
 - c) Emergency escape-only respirators shall be inspected before being carried into the workplace for use.
 - d) Self-contained breathing apparatus (SCBA) shall be inspected monthly.
- 2) Repairs

- a) Respirators that fail an inspection or are otherwise found to be defective are removed from service, and are discarded or repaired or adjusted in accordance with these procedures:
 - b) Repairs or adjustments to respirators are to be made only by persons appropriately trained to perform such operations.
 - c) Repairs shall be made using only the respirator manufacturer's NIOSH-approved parts designed for the respirator.
 - d) Repairs shall be made according to the manufacturer's recommendations and specifications for the type and extent of repairs to be performed.
 - e) Reducing and admission valves, regulators, and alarms shall be adjusted or repaired only by the manufacturer or a technician trained by the manufacturer.
- 3) Employees shall inspect their respirator carefully and paying particular attention to:
- a) exhalation valve(s),
 - b) inhalation valve(s),
 - c) tightness of components,
 - d) elasticity of components,
 - e) look for missing components,
 - f) look for cracked components,
 - g) look for missing cartridge gaskets;
 - h) look for damage to cartridges (in particular the seat that seals with the cartridge gasket); and
 - i) ensure that all filters, cartridges and canisters used are labeled and color coded with the NIOSH approval label and that the label is not removed and remains legible.
- 4) For supplied air systems also inspect for:
- a) proper functioning of regulators;
 - b) final regulator pressures not exceeding 125 psi;
 - c) air lines (low pressure) not exceeding 300 feet in length; and
 - d) grade D certification of breathing air.

F.3.k. Respirator cartridges changes

- 1) Respirator cartridges shall be changed
 - a) in accordance with manufacturer's recommendations, and
 - b) as prescribed by this HASP or Activity Hazard Analysis (AHA).
- 2) Cartridges shall also be changed:

- a) If the wearer detects vapor or gas breakthrough;
- b) if the wearer detects changes in breathing resistance; or
- c) if the wearer detects leakage of the facepiece.

F.3.I. Cleaning and disinfecting

- 1) Cleaning
 - a) Whenever respirators are doffed, employees shall wash their faces and respirator facepieces in order to prevent eye or skin irritation.
 - b) Cleaning shall be accomplished by using soap and water or equivalent cleaning solutions.
- 2) Disinfecting requirements
 - a) Respirators issued to more than one employee shall be cleaned and disinfected before being worn by different individuals.
 - b) Respirators maintained for emergency use shall be cleaned and disinfected after each use.
 - c) Respirators used in fit testing and training shall be cleaned and disinfected after each use.
 - d) Respirators used by a single individual shall be disinfected at least weekly.
- 3) Disinfecting procedures
 - a) Respirator components should be immersed for two minutes in one of the following:
 - i. disinfecting agent recommended for respirator sanitizing; or
 - ii. hypochlorite solution (50 ppm of chlorine) made by adding approximately one milliliter of laundry bleach to one liter of water at 43 deg. C (110 deg. F); or
 - iii. aqueous solution of iodine (50 ppm iodine) made by adding approximately 0.8 milliliters of tincture of iodine (6-8 grams ammonium and/or potassium iodide/100 cc of 45% alcohol) to one liter of water at 43 deg. C (110 deg. F).
 - b) Rinse components thoroughly in clean, warm (43 deg. C [110 deg. F] maximum), preferably running water.
 - c) Drain (The importance of thorough rinsing cannot be overemphasized. Detergents or disinfectants that dry on facepieces may result in dermatitis. In addition, some disinfectants may cause deterioration of rubber or corrosion of metal parts if not completely removed.)
 - d) Use a mild solution of baking soda to remove chlorine or disinfectant residues.
 - e) Components should be hand-dried with a clean lint-free cloth or air-dried.

- f) Reassemble facepiece, replacing filters, cartridges, and canisters where necessary.
- g) Test and inspect the respirator to ensure that all components work properly.

F.3.m. Storage

- 1) All respirators shall be stored to protect them from damage, contamination, dust, sunlight, extreme temperatures, excessive moisture, and damaging chemicals.
- 2) All respirators shall be packed or stored to prevent deformation of the facepiece and exhalation valve.
- 3) Emergency respirators shall be:
 - a) kept accessible to the work area;
 - b) stored in compartments or in covers that are clearly marked as containing emergency respirators; and
 - c) stored in accordance with any applicable manufacturer instructions.

F.3.n. IDLH atmospheres

- 1) Use of respirators in IDLH atmospheres must be approved by the Respiratory Protection Program Administrator. The administrator will approve the entry by reviewing and signing off on the AHA for the entry.
- 2) A specific Activity Hazard Analysis (AHA) shall be written for each IDLH entry. The AHA will include:
 - a) the type of respirators to be used,
 - b) area monitoring requirements,
 - c) escape provisions, and
 - d) rescue provisions.
- 3) At least one employee will serve as an attendant.
 - a) Attendants will remain outside the IDLH atmosphere.
 - b) The attendant shall maintain visual, voice, or signal line communication with the employee(s) in the IDLH atmosphere.
 - c) Attendants and rescue personnel will be trained in the approved AHA for the entry.
 - d) Attendants shall not attempt a rescue until provisions have been made for someone else to assume responsibilities as attendant.

F.3.o. Site Inspections

- 1) The assistant administrator (site safety officer) is responsible for conducting certain site inspections on a routine basis.
- 2) Program inspections

- a) Site inspections will be conducted daily.
- b) The site safety officer is responsible for these inspections, including special inspections described in the inspections section of this procedure.
- c) Daily site inspections shall include surveillance of work place conditions. In particular the following conditions shall be assessed.
 - i. potential changes in contaminant concentration,
 - ii. changes in employee exposure or stress; and
 - iii. respirator effectiveness.

F.3.p. Emergency use respirator inspections

- 1) Where the site maintains respirators for emergency use, the following additional inspection items should be included on a monthly basis.
- 2) Certify the respirator by documenting the date the inspection was performed, the name (or signature) of the person who made the inspection, the findings, required remedial action, and a serial number or other means of identifying the inspected respirator.
- 3) Provide this information on a tag or label that is attached to the storage compartment for the respirator, is kept with the respirator, or is included in inspection reports stored as paper or electronic files. This information shall be maintained until replaced following a subsequent certification.

F.4. Heat Stress

The site heat stress program shall be enforced prior during periods when the ambient temperature of 75 °F. Training shall be accomplished prior to implementation.

F.4.a. Training

All site personnel shall be trained in the hazards and controls of heat stress prior to the onset of hot weather.

F.4.b. Acclimatization

Personnel become acclimatized in about 7 to 10 days (and loose acclimatization in about the same period of time). Extra attention should be given during transitional weather and to new employees that are not used to heat stressful conditions.

F.4.c. Fluids

Workers shall be encouraged to increase consumption of water. Cool or cold water shall be used to enhance palatability and consumption. Electrolyte-containing beverages may also be used to encourage consumption.

F.4.d. Shelter

Shelter from radiant heat (i.e., shade) shall be available for ground laborers exposed to direct sunlight (i.e., radiant heat loading) during conditions of heat stress. Shelter does not necessarily require air conditioning, and air conditioning may actually be uncomfortable for employees working in heat stressful conditions.

F.4.e. Clothing

Clean dry undergarments help prevent some heat stress related problems. Provisions should be made for changing PPE garments that may become sweaty and dirty. Showering also helps to rehab personnel that show signs of high stress. Every effort should be made to minimize PPE requirements which may increase the heat stress of personnel without a commensurate gain in personal protection.

F.4.f. Monitoring

- 1) One of the most important aspects of monitoring for heat stress is the buddy system. Employees, through their training must be sensitive to early warning signs. Self/buddy checks of pulse are a simple method of extending this principle.
- 2) At the discretion of the Site Safety Officer one of two monitoring programs may be employed during program implementation. A program of personal stress monitoring is appropriate for personnel wearing PPE (e.g., level C workers) and for most other situations. A program of WBGT & work/rest regimen is appropriate for personnel not wearing chemical resistant PPE which fully encloses the body and prevents evaporative cooling of skin surfaces (e.g., level D workers and workers using certain modified level D or C ensembles). Employees that must be monitored in either program shall include at a minimum:
 - a) exposed personnel (e.g., those not working in air conditioned spaces) conducting ground labor tasks in any ensembles;
 - b) exposed personnel (e.g., those not working in air conditioned spaces) wearing whole body, chemical protective clothing PPE; and
 - c) any additional personnel considered to be at particular risk by the SSO or PHSM.

F.4.g. Personal monitoring programs

A program of personal stress monitoring should be used for most situations where whole body chemical protective clothing PPE is in use. It may also be used for other situations as well. The site safety officer shall use pulse as the primary method for monitoring but may use any combination of the following which includes pulse.

F.4.h. Pulse

- 1) Pulse is the primary means of personal monitoring for heat stress. Pulse should be less than 110 bpm (The radial or carotid pulse should be taken seated or standing if necessary).

- 2) Finger or wrist cuffs are a simple and objective measuring device which can be used by employees to monitor their own crews. If employees are used as part of a monitoring program these devices should be available to ensure objective observations. Training in such case should include: signs and symptoms, this procedure, and thorough reading of the instructions provided for the monitoring device(s) that will be used.
- 3) Take reading before or at the beginning of a break whenever heat stress conditions exist. Workers should be rehabbed until the pulse returns below 100 bpm.
- 4) The safety officer is responsible for establishing a schedule for monitoring and should include the following minimum requirements (additional monitoring may be required on certain days or for more sensitive individuals).

Pulse Monitoring Schedule			
Conditions	8 am to 11 am	11 am to 3 pm	3 pm to shift end
Personnel do not show any signs or symptoms and monitoring is negative.	• Monitor for signs and symptoms	• 2 hr interval	• 1 hr interval
Personnel show any signs or symptoms and monitoring is negative.	• Monitor for signs and symptoms	• 1 hr interval	• 1 hr interval
Monitoring shows employee stress	• 2 hr interval	• 1 hr interval	• half hour interval
For ANY employee that has already removed for stress and is being returned	• Interval should be cut in half for any individual that has been removed from work for rehab earlier in the shift and is now returning to work. Additional monitoring should also be performed on the following days until employee becomes acclimatized and is no longer showing symptoms or positive monitoring results.		

F.4.i. Rehab

Rehabilitation should include at a minimum: seated rest in a shady location; removal of some/all outer garments; fluids; observation; reduction in the ratio of work/rest periods; and increased monitoring after return to work.

F.4.j. Action level for personal monitoring

An action level for personal heat stress monitoring has been established at 85° F ambient temperature when site personnel are wearing chemical protective clothing during the performance of field activities.

At temperatures exceeding 100° F ambient temperature, all ground laborers, regardless of PPE, should be monitored.

F.4.k. Work/rest regimen

The following work/rest schedule may be used to help control heat stress when monitoring removals dictate the need. Ground labor and PPE labor should also be scheduled for early morning or evening if possible.

<i>Ambient Temperature (° F)</i>	<i>Work Period (minutes)</i>	<i>Rest Period (minutes)</i>
72-80	120	15
80-85	90	15
85-90	60	15
90-95	30	15
95-100	15	15

F.5. Cold Stress

To minimize cold related illnesses, site supervisors are to be aware of the symptoms and environmental conditions that lead to cold-related illnesses. Appropriate steps shall be taken to take to prevent their occurrence of these illnesses. This procedure describes the causes, symptoms, treatment and/or prevention of cold-related illness.

F.5.a. Thermal Balance.

When the temperature of the surrounding air or water are cooler than the worker, the body's physical processes must increase to maintain thermal balance.

Shivering is the body's attempt to generate increased heat.

F.5.b. Cold Stress Symptoms.

- 1) Common (but unreliable) symptoms
 - a) Shivering, pain, and numbness, although commonly associated with cold stress, **are not trustworthy indicators** to cold exposures!
 - b) The reason you should not trust these is because prolonged cold exposure numbs all body sensations.
 - c) If these symptoms are detected, cold stress should be suspected.
 - d) The lack of these symptoms **DOES NOT rule out** the possibility of cold stress.
- 2) Wind-chill temperature is a better means of evaluation as it takes into account the wind's ability to strip heat from the body through convection.

- 3) Water conducts heat away from the body much faster than air. Personnel are especially exposed to a cold stress hazard when performing spill clean-up in boats or around open water in cold weather situations. Falling into cold water can rob body heat very quickly.
- 4) Clothing that is wet with perspiration (as well as from water contact) will cause heat loss through conduction.

F.5.c. Cold Injury

- 1) Trench Foot.
 - a) Cause: Occurs as a result of extended exposure of the feet to cold and moisture.
 - b) Injury: Capillary walls of the feet are injured, resulting in tingling, itching and pain.
 - c) Recognition: Blisters may form followed by ulceration of the skin.
- 2) Frost-Nip.
 - a) Cause: Is a localized superficial freezing of extremities such as ears, nose, toes, and fingers.
 - b) Injury: Worker experiencing frost nip are susceptible to future injury and should avoid chilling.
 - c) Recognition: Initially there is a dark bluish color due to bleeding under the skin which at times can become gangrenous.
- 3) Frostbite.
 - a) Cause: Frostbite occurs when the moisture in the skin actually freezes, forming ice crystals, resulting in the damage of skin cells. The ears, nose, toes and fingers are most susceptible because of poorer circulation in these areas. The body may shut down flow to the extremities in order to maintain warmth in body core areas.
 - b) Injury: Tissues are destroyed when bodily fluids turn to ice. Damaged area can become gangrenous resulting in the loss of tissue, finger tips and toes.
 - c) Recognition:
 - i. A burning pain is noted initially, then pain decreases and numbness sets in.
 - ii. The injured area becomes red, then blue/red.
 - iii. The skin becomes waxy pale in appearance because of lack of oxygen.
- 4) Hypothermia.

- a) Cause: Occurs when heat production of the body is not sufficient to replace heat lost to the environment.
- b) Injury: The core body temperature is lowered and the pulse rate slows. Metabolic processes in the body are finely tuned to perform at normal body temperature. As the temperature is lowered, muscular weakness occurs, mental abilities dull and the worker becomes uncoordinated. Cardiac arrest follows if core temperature continues to fall.
- c) Recognition:
 - i. Signs of hypothermia are evident at 95° F body core temperature.
 - ii. Consciousness is lost between 89.6 - 86.0° F.
 - iii. At lower core temperatures, cardiac arrest is possible.
 - iv. Exposure to cold water decreases the body core temperature rapidly and consciousness is quickly lost.
 - v. Workers on or over water should be acutely aware of the danger of immersion during cold weather.
 - vi. Hypothermia results in dulling of senses and could result in poor decision making.

F.5.d. Prevention

- 1) Training and recognition.
 - a) Prevention of cold stress is, in many ways, similar to preventing heat stress. Training and recognition of the hazard is especially important.
 - b) All personnel will receive training on the cause, symptoms, and most importantly, methods of prevention of cold stress injuries.
- 2) Clothing.
 - a) Prevention of hypothermia and other cold injuries is best accomplished by protecting workers from cold and moisture.
 - b) Clothing is the most important factor in prevention of injury.
 - c) Personnel working on land should layer clothing with outer layer being wind and water resistant.
 - d) The layers should be capable of being vented at wrist, neck and waist to reduce wetting by perspiration.
 - e) Protect extremities that have poor circulation.
 - f) Keep head and face covered.
 - g) Wear insulated foot wear, keep socks dry (bring extra socks as needed).
 - h) Gloves are extremely important.

- i) Never allow bare skin to contact metal surfaces at sub-zero temperatures.
- 3) Acclimatization.
 - a) Do not count on acclimatization.
 - b) A limited degree of acclimatization can occur from exposure and working in cold environments.
 - c) Some physiological changes do occur but people also learn how to more effectively protect themselves from temperature extremes.
- 4) Fluid Replacement.
 - a) As with heat stress, blood circulation and heat transfer is critical to dealing with cold temperature extremes.
 - b) Cold weather causes significant water loss as a result of the dryness of the air.
 - c) Fluid intake should be increased to prevent dehydration which directly affects blood volumes and flow to the extremities.
 - d) Warm, sweet, caffeine-free, nonalcoholic drinks and soup offer the best fluid replacement and provide caloric energy.
- 5) Work-Rest Regimens.
 - a) When temperatures are less than 20° F (actual or wind-chill) heated warming shelters should be made available.
 - b) Workers should use these on regular basis. See Table I at the end of this procedure for guidelines for scheduling breaks.
- 6) Diet.
 - a) As with any work in extreme temperatures, personnel will be instructed to eat a well-balanced diet to replace calories burned and provide necessary vitamins and nutrients.
- 7) Environmental Monitoring.
 - a) Regular monitoring of the environment by recording wind speed and actual thermometer readings for comparison to the wind-chill chart should occur at regular intervals depending on conditions. See Table I at the end of this procedure for wind chill equivalents.
- 8) Prohibited Activities.
 - a) Alcohol should not be consumed since it increases blood circulation to the skin and interferes with internal thermostatic control. Alcohol also interferes with mental acuity which can lead to risk taking.
 - b) Cigarette smoking should be prohibited since the nicotine restricts flow of blood to the extremities.
- 9) ACGIH TLV Guidelines:

- a) The current edition of the American Council of Governmental Industrial Hygienists' Threshold Limit Values (TLV) provides a reference on cold stress prevention.
- b) Some of the TLV information is summarized in the following Table I.

F.5.e. Treatment of Injuries

- 1) Trench Foot, Frosting and Frost Bite.
 - a) These injuries require immediate response, including removal of the individual from a cold environment, the gradual warming of the affected areas, having the victim not use the affected limbs, (drive victim or carry, do not allow the victim to walk).
 - b) Obtain immediate medical attention as these types of injuries become more severe as exposure progresses.
 - c) AVOID RAPID WARMING OF EXTREMITIES.
- 2) Hypothermia.
 - a) Hypothermia is a life threatening condition that requires immediate response. Remove victim to a warm area. The individual may be disorientated and unable to talk clearly or understand you.
 - b) Help the individual to a warm place and wrap them in warm blankets or bathe them (if possible) in warm (not hot) water.
 - c) If they are conscious give hot (non-caffeine) liquids to drink.
 - d) Summon immediate medical attention. UNTREATED HYPOTHERMIA CAN LEAD TO VENTRICULAR FIBRILLATION (HEART ATTACK) AND DEATH.

F.6. Hazard Communication Program

The Envirocon Program, in its entirety, is located in a separate labeled notebook in the Envirocon Project Trailer. The notebook is available for review by employees at any time during normal work shift. Envirocon will be responsible for maintaining a copy of their Hazardous Communication Program and MSDSs on site.

F.6.a. Subcontractors

Subcontractors will be responsible for keeping an individual copy of their respective programs.

F.6.b. Material Safety Data Sheets (MSDSs)

MSDSs will be located in a separate labeled notebook in the Envirocon Project Trailer. MSDSs will be available to all employees for review during the work shift. Copies of all MSDSs for materials on site will be provided to the client's representative prior to material delivery on the site.

F.6.c. Container labeling

All containers received on site will be inspected to ensure the following:

- 1) All containers clearly labeled;
- 2) Appropriate hazard warning; and
- 3) Name and address of the manufacturer.

F.6.d. Employee Training and Information

Prior to starting work, each employee will attend a health and safety orientation and will receive information and training on the following: An overview of the requirements contained in the Hazardous Communication Program. This training shall include at a minimum the following:

- 1) Hazardous chemicals brought to the site for the project;
- 2) The location and availability of the written Hazardous Communication Program;
- 3) Physical and health effects of the hazardous chemicals;
- 4) Methods of preventing or eliminating exposure;
- 5) Emergency procedures to follow if exposed;
- 6) How to read labels and review MSDSs to obtain information; and
- 7) Location of MSDS file and location of hazardous chemical list.

G. SITE SAFETY PROCEDURES

This section addresses safe work practices and site-specific safety procedures that will be used to control hazards on site.

G.1. Code of Safe Work Practices

Every employee has a responsibility to ensure that the program proceeds efficiently and safely. The following procedures constitute the basic safe work practices expected of every employee.

G.1.a. Conducting Yourself in a Responsible Manner

Safety programs are not only for your safety, but the safety of everyone on site. Your conduct potentially impacts your coworkers.

- 1) Perform all tasks in a safe and approved manner.
- 2) Do not direct an air hose at another person. Do not use compressed air to remove debris from clothes, hair, or any part of the body.
- 3) Honor the barricades erected by other contractors on the job site.
- 4) Do not stand in front of a door that opens toward you.
- 5) Do not work while your ability or alertness is so impaired by fatigue, illness, or other causes that they might unnecessarily expose yourself or others to injury.
- 6) Do not bring, keep, or use alcoholic beverages, controlled substances, or weapons on site.
- 7) Anyone known to be under the influence of drugs or intoxicating substance, which impair the employees ability to safely perform the assigned duties, shall not be allowed on the job while in that condition.
- 8) Workers shall not handle or tamper with any electric equipment in a manner not within the scope of their duties, unless they have received instructions from a qualified, licensed electrician.
- 9) Do not use any form of solvent, gasoline or kerosene for cleaning hands or clothing. Use soap and water or other cleansers intended for the purpose.
- 10) Keep hands and other part of your body out of pinch points, for example:
 - DO NOT use your hands to dislodge rocks or jams in tailgates (instead raise and lower the bed to use the gate's weight to clear materials and jams);
 - DO NOT get between counterweights on excavators or cranes and tracks, walls, excavation cuts etc.; and
 - DO NOT reach into belts with running machinery.
- 11) Use handrails when climbing or descending stairs and walkways.

- 12) Do not run, except as necessary in an emergency.
- 13) Horseplay, scuffling, and other acts which tend to have an adverse influence on the safety or the well being of other employees is prohibited.
- 14) Do not jump from one level to another or one place to another, for example:
 - Get on and off equipment using three points of contact,
 - walk down stairs without jumping or skipping steps,
 - use ladders or ramps provided to descend into trenches;
 - do not jump out of pickup beds; and
 - do not jump across trenches.
- 15) Always stand on an approved ladder to remove articles that may out of reach from floor level. Do not stand on chairs, boxes, or other makeshift devices.
- 16) Loose or frayed clothing, loose or hanging long hair, dangling ties, finger rings, etc., shall not be worn around moving machinery or other areas where they may become entangled
- 17) Get help lifting heavy objects from heavy equipment, lifting devices, or help from another employee, and do not lift objects greater than 50 lbs unaided.
- 18) Do not improperly use, mishandle, or tamper with health and safety equipment and sampling devices.
- 19) Personnel shall not drop or throw any articles or materials of any kind unless a specific procedure has been developed to do so safely.
- 20) Do not harass, feed, or photograph wildlife. If you find an injured or dead animal, contact the nearest gate attendant or the U.S. Fish and Wildlife Service.

G.1.b. Participate in Your Safety Programs

There are a number of ways for you to influence the safety on site. Don't just complain about problems, participate in your own safety.

- 1) Attend each day's work briefing as scheduled.
- 2) Attend all required safety meetings, training, or briefings.
- 3) Complete safety observer reports when you want to make a suggestion, observe a commendable act of safety or quality, take a "time out for safety" to correct an unsafe act or condition.
- 4) Approach every task with incident-free performance in mind!
- 5) Ask questions when you are uncertain about a procedure or equipment use.
- 6) Participate in the evaluation or investigation of any accident or incident when you are requested to do so.
- 7) If you fear reprisal use the Envirocon safety Hotline **800-224-7389**.

G.1.c. Practice Good Housekeeping

Housekeeping is the hallmark of

- 1) Keep your work area clean and orderly.
- 2) Good housekeeping practices shall be maintained continually.
- 3) Keep work, storage, and access areas clean of tools, equipment, and debris.
- 4) All means of egress shall be kept unblocked, kept clear of debris and slip or trip hazards, kept well lighted, and kept unlocked at times.
- 5) Immediately remove spilled liquids from the floor.
- 6) Clean up or otherwise remove slip/trip/fall hazards immediately.
- 7) Do not leave boards with protruding nails or other loose material on the floor where they may be stepped on.
- 8) Keep aisles and walkways clear of electrical and telephone cords.
- 9) Do not overload electrical outlets.
- 10) Electric cords shall not be exposed to potential damage from vehicles.
- 11) Mark or barricade slip/trip/fall hazards that can not be removed.
- 12) Any time work is performed overhead, barricades shall be erected.
- 13) Barricades shall consist of caution (yellow) or danger (red) barricade colors and appropriately worded tape or signs.
- 14) All barricades shall be removed when not in use.

G.1.d. Follow Standard Procedures

Hazardous waste operations involve a number of standard procedures which are particularly important. Make these procedures a habit.

- 1) Use the Buddy System when performing operations in hazardous areas; when working with hazardous contaminants; when physical capabilities may become stressed (heat stress); or working in proximity of operating machinery or equipment.
- 2) Practice contamination-avoidance techniques.
- 3) Enter and exit the Exclusion Zone (EZ) and the Contamination Reduction Zone (CRZ) through designated areas.
- 4) Complete sign-in/out logs when required.
- 5) Do not eat, drink, chew tobacco or gum, smoke, or engage in any other activity that may increase the possibility of hand-to mouth contact in the EZ or the CRZ. (Exceptions may be permitted by the Project Health and Safety Manager (PHSM) for other reasons, such as to allow fluid intake during heat stress conditions.)
- 6) Do not use lighters or matches in the EZ and CRZ.

- 7) Employees under a physician's care and/or taking prescribed narcotics must notify the designated site safety supervisor.
- 8) Lift material in a safe manner and avoid strains. Bend your knees, keep your back straight, and push upwards with your legs when lifting. The lifting of heavy and bulky objects will normally be done by or more shop personnel. Lifting heavy/bulky objects improperly can result in needless injury.
- 9) Get help (mechanical help or more people) when lifting heavy or awkward materials.
- 10) Wear the personal protective equipment (PPE) specified in the site HASP, including hard hats, steel toed boots, and safety glasses that must be worn at all times in active work areas.
- 11) If you are required to wear a respirator, remove facial hair (beards, long sideburns, or mustaches) that may interfere with the satisfactory fit of the respirator mask.
- 12) Use safety devices provided for your protection (e.g., handrails, guards, pressure relief valves, and seat belts). Do not remove these devices while the equipment is being operated.
- 13) Never approach within 25 feet of the operating area of a piece of equipment without first making eye contact with the operator, signaling your intention, and receiving an acknowledgement from the operator. If you wish to approach the equipment (e.g., to speak with the operator) the operator must first lower all buckets, blades, etc. and idle the engine before you approach.
- 14) When ground personnel support heavy equipment, pay particular attention to pinch points (e.g., the counterweight swing radius and the tracks of an excavator). Keep out from under suspended loads.

G.1.e. Follow Safety Procedures

In addition to standard procedures, there will be many site specific procedures to learn and follow. You need to learn these from your site-specific training and follow the procedures. If you feel the procedures are incorrect or inadequate it is improper to take it upon yourself to modify procedures. Ask your supervisor, make suggestions, or raise questions during planning and training.

- 1) Attend, pay attention, and ask questions during procedure training and briefings.
- 2) Implement, adhere to, and follow established rules, guidelines, procedures, plans, etc., as specified.
- 3) Follow proper decontamination procedures.
- 4) Make sure fall protection or fall arrest systems are in place when working at elevations greater than 6 feet above the surrounding work area.
- 5) Follow the work-rest regimens and other practices required by the heat stress program.

- 6) Where appropriate, lockout procedures shall be used.
- 7) Employees shall not work under vehicles supported by jacks or chain hoists without protective blocking that will prevent injury if jacks or hoists should fail.
- 8) Obey all authorized safety signs and demarcations. Do not place or remove these items except as authorized by the Site Health and Safety Supervisor (HSS).
- 9) Become familiar with the on-site hazards, work zones, PPE requirements, and decontamination methods.

G.1.f. Permit Required Procedures

Many of the most important procedures dealing with the most dangerous hazards involve permit requirements to ensure that necessary precautions are taken before work begins. Pay particular attention to these procedures.

- 1) Do not enter a permit-required Confined Space without a permit, and follow all requirements of permits as issued.
- 2) Don't rely on postings to warn you of confined space hazards. When in doubt ask for a permit and testing. Manholes, underground vaults, chambers, certain confining excavations, tanks, silos or other similar spaces may have a confined space hazard.
- 3) Check with your Supervisor prior to starting any Hot Work operation (welding or cutting operations) and, if you are working in an area that requires a Hot Work Permit, follow the permit as issued.
- 4) Depending on the fire hazards at your facility, hot work permits may be required for use of cigarette lighters, electrical equipment that is not intrinsically safe, flash photography, motors, engines, or spark producing metal tools.
- 5) The combination of hot work and confined spaces is particularly dangerous even if you don't plan to enter the space! No burning, welding, or other source of ignition shall be applied to, or near any enclosed tank or vessel, even if there are some openings, until it has first been determined that no possibility of explosion exists and authority for the work is obtained from the foreman or superintendent. **This includes small voids too!** A sealed can, doubler space, storage compartments or similar small spaces can contain flammable debris or explosive vapors.
- 6) Do not dig or drive objects into the ground without first:
 - a) ensuring that necessary permits have been obtained;
 - b) a competent person has been assigned;
 - c) a competent person has inspected the site;
 - d) utilities have been located prior to beginning excavation activities;
 - e) checking that excavations slopes are checked daily for stability and air quality.

- f) Do not enter an excavation greater than 5 feet deep unless authorized by the HSS and then only after the excavation has been sloped or shored properly. Maintain safe means access and egress from all excavations.
- 7) Follow lockout/tagout procedures when working on equipment involving moving parts or hazardous energy sources. Install and remove locks and tags only in accordance with procedure and only when authorized.

G.1.g. Use Tools Properly

Tools, especially hand tools, are used frequently with minimal supervision. It can be all too easy to use tools improperly and create serious safety hazards.

- 1) Use all tools in the manner intended and/or prescribed. The operating instructions for all tools and equipment **ARE MANDATORY**.
- 2) Modification of use or design must be in accordance with the written instructions or permission of the manufacturer.
- 3) Do not suspend tools or any other items using electrical cords.
- 4) In locations where the use of a portable power tool is difficult, the tool shall be supported by means of a rope or similar support of adequate strength.
- 5) Air hoses shall not be disconnected at compressors until the hose line has been bled.
- 6) Inspect safety devices before every use including but not limited to:
 - a) respirators,
 - b) personal protective equipment,
 - c) body harnesses,
 - d) lanyards,
 - e) monitors,
 - f) fire extinguishers,
 - g) confined space retrieval systems (not the same as fall protection harnesses), and
 - h) manbaskets.
- 7) Inspect other tools and equipment before use.
 - a) A competent person must inspect scaffolds and manlifts before each day's use.
 - b) Ladders must be in good service, placed at the proper angle, secured, and extend to the proper length (for access to heights the ladder must be 3 feet above the landing).
 - c) Inspect power tools, looking especially for damaged insulation or missing ground plugs on electrical cords.

- d) Inspect cutting devices looking especially for properly sharpened and guarded edges.
 - e) Inspect hand tools look especially for chisels, hammers and punches with mushroomed heads; files without handles, and hammers with broken handles.
- 8) Do not use defective equipment.
- a) Don't leave defective equipment in service for others to use. Remove it from service and report the problem to your supervisor.
 - b) At a minimum, defective equipment must be tagged out of service.
 - i. Use a red tag placed near starting switches or levers.
 - ii. Describe the reason the equipment is tagged out.
 - iii. Write your name and the date on the tag.
 - c) Alternatively, defective equipment can be taken out of service by destruction and disposal.
- 9) Use ground fault circuit interrupters (GFCI) for cord and plug equipment used outdoors, in damp locations, or when equipment is not plugged directly into permanent wiring.
- 10) Use only extension cords rated for hard service or junior hard service (e.g., SO, JSO, SOW, JSOW). A UL label on a local hardware store flat cord is probably **NOT** rated for this service!
- 11) Keep electrical cords out of walkways and accumulations of water unless protected and rated for such service.

G.1.h. Operate Equipment Safely

- 1) All equipment is to be operated in accordance with manufacture's written instructions and/or manuals.
- 2) Equipment shall not be modified or operated out of specified limits without written permission from the manufacturer and the health and safety manager for the project.
- 3) Only trained and authorized persons shall operate machinery or equipment.
- 4) Do not operate equipment unless you are properly trained and authorized to do so in a manner consistent with the owner/operators manual.
- 5) DO NOT use a piece of equipment, which has been tagged out of service! Do not remove red tags without authorization from the person placing the tag or the person responsible for the repairs.
- 6) Inspect equipment before using it.
 - a) Heavy equipment inspections shall be documented. Note all discrepancies and tag out equipment that may be dangerous to operate.

- b) Red tags must have a description of the reason for the tag, the name of the person placing the tag, and the date the tag was applied.
- 7) Machinery shall not be serviced, repaired, or adjusted while in operation, nor shall oiling of moving parts be attempted, except on equipment that is designed or fitted with safeguards to protect the person performing the work.
- 8) Use vehicle or equipment seat belts any time the vehicle or equipment is in motion.
- 9) Excavating equipment shall not be operated near tops of 'cuts, banks, or cliffs if employees are working below.
- 10) Do not maneuver equipment into the working area of other equipment without first making eye contact with the operator working in the area and signaling your intentions to maneuver into that area.
- 11) Always acknowledge that you understand that other equipment or ground personnel may enter your working area.
- 12) Do not allow people on foot to approach without lowering hydraulically lifted or suspended components (e.g., buckets, blades, bellies) and reducing engine speed to idle.
- 13) Tractors, bulldozers, scrapers, and carryalls shall not operate where there is a possibility of overturning in dangerous areas such as the edges of deep fills, cut banks, and steep slopes.
- 14) Do not allow supporting ground personnel to work within pinch points of the equipment (e.g., the swing radius of a counterweight and the tracks on an excavator) or under suspended loads.

G.1.i. Prepare Yourself for Incidents

- 1) Become familiar with the emergency response plan so that you can respond properly in an emergency.
- 2) Become familiar with the locations and types of emergency equipment, such as fire extinguishers, emergency showers, or air horns.
- 3) Report all incidents to your supervisor immediately!
- 4) Participate fully and truthfully in incident investigations.

G.1.j. Supervisors Play a Leadership Role in Safety

As with all aspects of conducting operations, the supervisor is ultimately responsible for carrying out work in accordance with company policies and procedures, and in accordance with the specifications and applicable regulations.

- 1) Take a leadership role in establishing safety a safety culture on site.
- 2) Give employees frequent accident prevention instruction and encouragement.
- 3) First through encouragement and incentives, ensure that employees observe and obey all applicable Company, State or Federal regulation and order as is necessary to the

safe conduct of the work. When necessary, compliance must be compelled using progressive disciplinary measures described in this document.

- 4) Ensure that employees are qualified for the work they are assigned.
- 5) No one shall knowingly be permitted or required to work while the employee's ability or alertness is so impaired by fatigue, illness, or other causes that they might unnecessarily expose the employee or others to injury.
- 6) Do not allow anyone to remain on site when under the influence of drugs or intoxicating substance, which impair their ability to safely perform assigned duties.
- 7) Daily "tailgate" safety meetings shall be held to discuss safety concerns, instruct on new procedures, and discuss lessons learned from investigations and other related safety topics.
- 8) Encourage and listen to the suggestions of all employees.
- 9) All work shall be thoroughly planned and supervised to prevent injuries in the handling of materials and in working together with equipment.
- 10) Inspect the site daily.
- 11) Investigate all incidents.
- 12) Ensure thorough documentation of all aspects of the safety program.

G.2. Employee Participation

This project has established a variety of procedures to encourage the participation of employee in their own safety. Employee participation includes all Envirocon, and lower tier subcontract personnel.

G.2.a. Training

Training is required for each employee before starting any new task or working in a new area. Training is considered an employee participation process. Employees are encouraged to ask questions and utilize training sessions to familiarize themselves with procedures.

G.2.b. Daily Safety Briefing

Each day's work begins with a safety briefing. These briefings shall be conducted in a manner to encourage employee participation.

- 1) Supervisors shall report the plan of the day for all employees. This should include other work that may occur near the project site or impact on project work. Special tasks expected for the day. Waste loads expected that will require special procedures.
- 2) Discuss lessons learned from incidents on this site or others.
- 3) Report and discuss safety observations made by employees.
- 4) Report and discuss times out for safety.

- 5) Discuss employee suggestions.
- 6) Recognize safety performance (good and unsatisfactory).

G.2.c. Safety Observer

This site has an established, behavior-based safety observer program. A minimum of two safety observer reports will be discussed each week. Employees will be instructed in the concept of unsafe conditions and behaviors. The primary interest is to draw attention to correcting unsafe conditions and adopting safe behaviors. Safety observations shall be documented and provided to the health and safety supervisor.

- 1) To encourage everyone to participate in this program, employees will take turns making the mandatory weekly reports.
- 2) Voluntary observations are encouraged at any time and shall be handled as a safety suggestion.
- 3) Positive reports are encouraged to point out laudable behaviors for recognition.
- 4) All lower tier subcontractors shall be included in the safety observer program.

G.2.d. “Buddy System” Plus

Envirocon’s Incident-free performance objective is very demanding. This objective can only be met if every employee perform all work without incident. Since none of us is perfect, it is further necessary for each person to take responsibility not only for themselves, but the others working with you. This concept is what Envirocon refers to as an expanded buddy system concept.

- 1) The HAZWOPER standard requires that employees remain in contact with at least one other “buddy” in the event of an emergency or accident.
- 2) The “buddy system” plus challenges each employee on site to not wait for an accident to happen to our buddies. Instead, correct unsafe conditions or challenge unsafe behaviors around us.
 - a) Don’t let it pass! If you see that someone else is about to make a mistake or hasn’t recognized a hazard, take responsibility to challenge the situation.
 - b) It’s not enough to not be at fault! Stop looking on accidents as someone’s fault. Instead, look on an accident as everyone’s failure to prevent the accident.

G.2.e. Stopping Work

Each employee has the right to call for work to stop when they observe a serious potential for injury. The safety officer in particular is responsible for stopping work if there is a hazardous condition. Short of stopping work, Envirocon encourages employees to get involved before things escalate to a threat of injury. Employee “time-outs” and “challenges” help to identify changes in conditions or to challenge improper procedures.

- 1) “Time-Out” for Safety Authority

Changes in conditions, deviations from plans, unexpected or surprise events that have not yet caused an accident, threaten the safety of an operation or job task. These are hazardous conditions that must be recognized and controlled.

The “time-out” authority is intended to challenge each employee to control these hazards by giving each member of the crew the authority to take a “time out” when they recognize such potential problems. Take a “time-out” when:

- a) Conditions change, (examples might include:
 - i. Changes in weather
 - ii. Changes in soil types
 - iii. Changes in the equipment you are using,
 - iv. Changes in other work performed nearby
 - v. Changes in materials being used to do the work
 - vi. Changes in the toxicity of wastes),
 - b) Unexpected conditions are found,
 - c) Work deviates from plans,
 - d) An unplanned event occurs that might lead to an accident,
 - e) You don’t understand what the plan for work is, or
 - f) The work plan no longer seems safe.
- 2) Taking a “time-out” means:
- a) Identifying one of the conditions above exists,
 - b) communicating a concern to your supervisor or safety officer,
 - c) the supervisor or safety officer evaluate the concern,
 - d) an appropriate response is determined (i.e., this might include:
 - i. the plan is not being followed and the team must be regrouped to get back to the planned way of doing the work
 - ii. the crew must regroup and revise plans/procedures
 - iii. the crew must regroup and change PPE
 - iv. the employee must be trained in the appropriate procedures
 - v. the employee must be requalified for new equipment being used
 - vi. the employee needs to be informed of the reason for the current plans/procedures and why they are best for the task)
 - e) regroup the work team (when needed to revise plans, procedures, training, etc.)
 - f) communicate revised plans to all concerned.

3) Employee Challenges

The site safety and health program is the responsibility of all employees. Each employee is required to challenge unsafe conditions or behaviors in their work areas.

The “employee challenge” system is intended to encourage employees to take initiative in correcting unsafe conditions or behaviors. Where an unsafe condition or behavior poses an imminent threat that can be readily addresses without a change in procedure or policy, each employee is encouraged to challenge those responsible.

- a) Challenge another employee that is driving in the wrong direction.
 - b) Challenge a visitor to the work area that might not have signed in, or is not accompanied by a qualified worker.
 - c) Grab a roll of barrier tape to mark a broken step on a stairway and report it to your supervisor.
 - d) Flag traffic around a spill until a response crew arrives.
- 4) When an operation is stopped due to a safety hazard challenge, notify the site supervisor immediately. The supervisor shall report the challenge to the project manager and site health and safety officer.

G.3. Diving Operations

G.3.a. General

- 1) Each dive team member shall have the experience or training necessary to perform assigned tasks in a safe and healthful manner.
- 2) Each dive team member shall have experience or training in the following:
 - a) The use of tools, equipment and systems relevant to assigned tasks;
 - b) Techniques of the assigned diving mode: and
 - c) Diving operations and emergency procedures.
- 3) All dive team members shall be trained in cardiopulmonary resuscitation and first aid (American Red Cross standard course or equivalent).
- 4) Dive team members who are exposed to or control the exposure of others to hyperbaric conditions shall be trained in diving-related physics and physiology.

G.3.b. Assignments

- 1) Each dive team member shall be assigned tasks in accordance with the employee's experience or training, except that limited additional tasks may be assigned to an employee undergoing training provided that these tasks are performed under the direct supervision of an experienced dive team member.
- 2) The employer shall not require a dive team member to be exposed to hyperbaric conditions against the employee's will, except when necessary to complete decompression or treatment procedures.
- 3) The employer shall not permit a dive team member to dive or be otherwise exposed to hyperbaric conditions for the duration of any temporary physical impairment or condition which is known to the employer and is likely to affect adversely the safety or health of a dive team member.

G.3.c. Designated person-in-charge

- 1) The employer or an employee designated by the employer shall be at the dive location in charge of all aspects of the diving operation affecting the safety and health of dive team members.
- 2) The designated person-in-charge shall have experience and training in the conduct of the assigned diving operation.

G.3.d. Dive Procedures Manual

The subcontractor responsible for diving operations shall develop and maintain a safe practices manual which shall be made available at the dive location to each dive team member.

The safe practices manual shall contain a copy of the OSHA 1910 CFR Subpart T Commercial Diving Operations standard and the employer's policies for implementing the requirements of this standard. This will include:

- 1) Safety procedures and checklists for diving operations;
- 2) Assignments and responsibilities of the dive team members;
- 3) Equipment procedures and checklists; and
- 4) Emergency procedures for fire, equipment failure, adverse environmental conditions, and medical illness and injury.

G.3.e. Pre-dive Emergency Aid Resource Requirements

A list shall be kept at the dive location of the telephone or call numbers of the following:

- 1) An operational decompression chamber;
- 2) Accessible hospitals;
- 3) Available physicians;
- 4) Available means of transportation;
- 5) The nearest U.S. Coast Guard Rescue Coordination Center;
- 6) A first aid kit appropriate for the diving operation and approved by a physician shall be available at the dive location, and
- 7) American Red Cross standard first aid handbook or equivalent, and a bag-type manual resuscitator with transparent mask and tubing.

G.3.f. Dive Planning and Assessment

Planning of a diving operation shall include an assessment of the safety and health aspects of the following:

- 1) Diving mode;
- 2) Surface and underwater conditions and hazards;
- 3) Breathing gas supply (including reserves);
- 4) Thermal protection;
- 5) Diving equipment and systems;
- 6) Dive team assignments and physical fitness of dive team members (including any impairment known to the employer);
- 7) Repetitive dive designation or residual inert gas status of dive team members;
- 8) Decompression and treatment procedures (including altitude corrections); and
- 9) Emergency procedures.

G.3.g. Pre-Dive Meetings

To minimize hazards to the dive team, diving operations shall be coordinated with the Envirocon Project Manager to consider other activities in the vicinity which are likely to interfere with the diving operation.

- 1) Dive team members shall be briefed on:
 - a) The tasks to be undertaken;
 - b) Safety procedures for the diving mode;
 - c) Any unusual hazards or environmental conditions likely to affect the safety of the diving operation; and
 - d) Any modifications to operating procedures necessitated by the specific diving operation.

G.3.h. Pre-Dive Preparations

- 1) Prior to making individual dive team member assignments, the Envirocon Subcontractor responsible for dive operations shall inquire into the dive team member's current state of physical fitness, and indicate to the dive team member the procedure for reporting physical problems or adverse physiological effects during and after the dive.
- 2) The breathing gas supply system including reserve breathing gas supplies, masks, helmets, thermal protection, and bell handling mechanism (when appropriate) shall be inspected prior to each dive.
- 3) When diving from surfaces other than vessels in areas capable of supporting marine traffic, a rigid replica of the international code flag "A" at least one meter in height shall be displayed at the dive location in a manner which allows all-round visibility, and shall be illuminated during night diving operations.

G.3.i. Water Entry and Exit

- 1) A means capable of supporting the diver shall be provided for entering and exiting the water.
- 2) The means provided for exiting the water shall extend below the water surface.
- 3) A means shall be provided to assist an injured diver from the water.

G.3.j. Communications.

- 1) An operational two-way voice communication system shall be used between:

- 2) Each surface-supplied air or mixed-gas diver and a dive team member at the dive location and
- 3) An operational, two-way communication system shall be available at the dive location to obtain emergency assistance.

G.3.k. Decompression Tables

- 1) Decompression, repetitive, and no-decompression tables (as appropriate) shall be at the dive location.
- 2) A depth-time profile, including when appropriate any breathing gas changes, shall be maintained for each diver during the dive including decompression.

G.3.l. Hand-held Power Tools and Equipment

- 1) Hand-held electrical tools and equipment shall be de-energized before being placed into or retrieved from the water.
- 2) Hand-held power tools shall not be supplied with power from the dive location until requested by the diver.

G.3.m. Welding and Burning

A current supply switch to interrupt the current flow to the welding or burning electrode shall be:

- 1) Tended by a dive team member in voice communication with the diver performing the welding or burning; and
- 2) Kept in the open position except when the diver is welding or burning.
- 3) The welding machine frame shall be grounded.
- 4) Welding and burning cables, electrode holders, and connections shall be capable of carrying the maximum current required by the work, and shall be properly insulated.
- 5) Insulated gloves shall be provided to divers performing welding and burning operations.

G.3.n. Termination of Dive

The working interval of a dive shall be terminated when:

- 1) A diver requests termination;

- 2) A diver fails to respond correctly to communications or signals from a dive team member;
- 3) Communications are lost and can not be quickly re-established between the diver and a dive team member at the dive location, and between the designated person-in-charge and the person controlling the vessel in liveboating operations; or
- 4) A diver begins to use diver-carried reserve breathing gas or the dive-location reserve breathing gas.

G.3.o. Post-Dive Procedures

After the completion of any dive, the Envirocon Subcontractor responsible for dive operations shall:

- 1) Check the physical condition of the diver;
- 2) Instruct the diver to report any physical problems or adverse physiological effects including symptoms of decompression sickness;
- 3) Advise the diver of the location of a decompression chamber which is ready for use; and
- 4) Alert the diver to the potential hazards of flying after diving.

G.3.p. Record of Dive

The following information shall be recorded and maintained for each diving operation:

- 1) Names of dive team members including designated person-in-charge;
- 2) Date, time, and location;
- 3) Diving modes used;
- 4) General nature of work performed;
- 5) Approximate underwater and surface conditions (visibility, water temperature and current); and
- 6) Maximum depth and bottom time for each diver.

G.3.q. SCUBA Diving

- 1) SCUBA diving shall not be conducted against currents exceeding one (1) knot unless line-tended; or in enclosed or physically confining spaces unless line-tended.
- 2) A standby diver shall be available while a diver is in the water.
- 3) A diver shall be line-tended from the surface, or accompanied by another diver in the water in continuous visual contact during the diving operations.

- 4) A diver shall be stationed at the underwater point of entry when diving is conducted in enclosed or physically confining spaces.
- 5) A diver-carried reserve breathing gas supply shall be provided for each diver consisting of:
 - a) A manual reserve (J valve); or
 - b) An independent reserve cylinder with a separate regulator or connected to the underwater breathing apparatus.
- 6) The valve of the reserve breathing gas supply shall be in the closed position prior to the dive.

G.3.r. Surface-Supplied Air Diving

- 1) Each diver shall be continuously tended while in the water.
- 2) A diver shall be stationed at the underwater point of entry when diving is conducted in enclosed or physically confining spaces.
- 3) Each diving operation shall have a primary breathing gas supply sufficient to support divers for the duration of the planned dive including decompression.
- 4) An extra breathing gas hose capable of supplying breathing gas to the diver in the water shall be available to the standby diver.

G.3.s. Dive Equipment.

Each equipment modification, repair, test, calibration or maintenance service shall be recorded by means of a tagging or logging system, and include the date and nature of work performed, and the name or initials of the person performing the work.

- 1) Air compressor system.
 - a) Compressors used to supply air to the diver shall be equipped with a volume tank with a check valve on the inlet side, a pressure gauge, a relief valve, and a drain valve.
 - b) Air compressor intakes shall be located away from areas containing exhaust or other contaminants.
 - i. Respirable air supplied to a diver shall not contain:
 - ii. A level of carbon monoxide (CO) greater than 20 p/m;
 - iii. A level of carbon dioxide (CO₂) greater than 1,000 p/m;
 - iv. A level of oil mist greater than 5 milligrams per cubic meter; or
 - v. A noxious or pronounced odor.

- c) The output of air compressor systems shall be tested for air purity every 6 months by means of samples taken at the connection to the distribution system, except that non-oil lubricated compressors need not be tested for oil mist.
- 2) Breathing gas supply hoses shall:
 - a) Have a working pressure at least equal to the working pressure of the total breathing gas system;
 - b) Have a rated bursting pressure at least equal to 4 times the working pressure;
 - c) Be tested at least annually to 1.5 times their working pressure; and
 - d) Have their open ends taped, capped or plugged when not in use.
 - 3) Breathing gas supply hose connectors shall:
 - a) Be made of corrosion-resistant materials;
 - b) Have a working pressure at least equal to the working pressure of the hose to which they are attached; and
 - c) Be resistant to accidental disengagement.
 - 4) Umbilicals shall:
 - a) Be marked in 10-ft. increments to 100 feet beginning at the diver's end, and in 50 ft. increments thereafter;
 - b) Be made of kink-resistant materials; and
 - c) Have a working pressure greater than the pressure equivalent to the maximum depth of the dive (relative to the supply source) plus 100 psi.
 - 5) Buoyancy control.
 - a) Helmets or masks connected directly to the dry suit or other buoyancy-changing equipment shall be equipped with an exhaust valve.
 - b) A dry suit or other buoyancy-changing equipment not directly connected to the helmet or mask shall be equipped with an exhaust valve.
 - c) When used for SCUBA diving, a buoyancy compensator shall have an inflation source separate from the breathing gas supply.
 - d) An inflatable flotation device capable of maintaining the diver at the surface in a face-up position, having a manually activated inflation source independent of the breathing supply, an oral inflation device, and an exhaust valve shall be used for SCUBA diving.
 - 6) Diving compressed gas cylinders shall:
 - a) Be designed, constructed and maintained in accordance with the applicable provisions of 29 CFR 1910.101 and 1910.169 through 1910.171.
 - b) Be stored in a ventilated area and protected from excessive heat;

- c) Be secured from falling; and
 - d) Have shut-off valves recessed into the cylinder or protected by a cap, except when in use or manifolded, or when used for SCUBA diving.
- 7) Gauges and timekeeping devices.
- a) Gauges indicating diver depth which can be read at the dive location shall be used for all dives except SCUBA.
 - b) Each depth gauge shall be deadweight tested or calibrated against a master reference gauge every 6 months, and when there is a discrepancy greater than two percent (2 percent) of full scale between any two equivalent gauges.
 - c) A cylinder pressure gauge capable of being monitored by the diver during the dive shall be worn by each SCUBA diver.
- 8) A timekeeping device shall be available at each dive location.
- 9) Masks and helmets.
- a) Surface-supplied air and mixed-gas masks and helmets shall have:
 - b) A non-return valve at the attachment point between helmet or mask and hose which shall close readily and positively; and
 - c) An exhaust valve.
 - d) Surface-supplied air masks and helmets shall have a minimum ventilation rate capability of 4.5 acfm at any depth at which they are operated or the capability of maintaining the diver's inspired carbon dioxide partial pressure below 0.02 ATA when the diver is producing carbon dioxide at the rate of 1.6 standard liters per minute.
- 10) Weights and harnesses.
- a) Except when heavy gear is worn, divers shall be equipped with a weight belt or assembly capable of quick release.
 - b) Except when heavy gear is worn or in SCUBA diving, each diver shall wear a safety harness with:
 - i. A positive buckling device;
 - ii. An attachment point for the umbilical to prevent strain on the mask or helmet; and
 - iii. A lifting point to distribute the pull force of the line over the diver's body.

G.3.t. Reporting Injury

The Envirocon Subcontractor responsible for dive operations shall immediately notify the Envirocon, Inc Project Manager or other member of the project team identified in this manual shall report any injury or illness relating to any member of the Subcontractor's dive team as soon as possible.

G.4. Clearing and Grubbing

G.4.a. Chain Saws, Tree Trimming / Removal

- 1) Chain Saw
 - a) All chain saws must have an automatic chain brake or kickback device.
 - b) The idle speed shall be adjusted so that the chain does not move when the engine is idling.
 - c) Operators will wear the following personal protective equipment (PPE):
 - i. Steel toe leather boots;
 - ii. Safety glasses and faceguard;
 - iii. Hardhat
 - iv. Chainsaw protective chaps
 - v. Hearing protection; and
 - vi. Leather gloves.
 - d) Chain saws will not be fueled while running, hot, or near open flame.
 - e) The operator will hold the saw with both hands during all cutting operations.
 - f) The chain saw must never be used to cut above the operator's shoulder height.
- 2) Tree Removal
 - a) Prior to removal operations, the employee shall consider:
 - i. The tree and surrounding area for anything that may be potentially damaged during tree removal;
 - ii. The shape of the tree, the lean of the tree, and decayed or weak spots;
 - iii. Wind force and direction;
 - iv. Location of other people;
 - v. Above-ground utility lines and electrical hazards; and

- vi. Steps shall be taken during the removal of all trees to ensure that property improvements which are not planned to be removed as part of the remediation activities are not damaged.
- b) Prior to felling operations, the work area shall be cleared to permit safe working conditions and an escape route shall be planned.
- c) Tree cutting teams will work in pairs.
- d) Each worker shall be instructed as to exactly what he is to do.
- e) All workers not involved in the operations shall be kept clear of the work area.
- f) Before starting to cut, the operator shall be sure of his footing and must clear away brush, fallen trees, limbs and other materials that might interfere with cutting operations.
- g) The employee shall work from the uphill side whenever possible.
- h) Just before the tree or limb is ready to fall, an audible warning shall be given to all those in the area; all persons shall be safely out of range when the tree falls.
- i) If there is danger that the trees being felled may fall in the wrong direction or damage property, wedges block and tackle, rope, or wire cable shall be used to lower limbs to the ground.
- j) All limbs shall be removed from trees to a height and width sufficient to allow the tree to fall clear of any wires and other objects in the vicinity.
- k) Special precautions shall be taken when roping rotten or split trees due to the potential for falling in an unexpected direction even though the cut is made on the proper side.
- l) Persons shall be kept back from the butt of a tree that is starting to fall.
- m) In general, trees are to be taken down and removed in sections or parts. Free falling of trees will not be allowed without prior approval from Envirocon's Project manager.
- n) Working From Branches/Fall Protection
- o) All cutting involving personnel working at heights greater than 6 feet above the base of the trunk will utilize fall protection systems.
- p) Options:
 - i. Hydraulic manlift; and
 - ii. Personnel secured to trunk of tree.

G.4.b. Debris Removal

- 1) Use approved paths only, clear existing walkways of debris, vegetation, and excavated material.

- 2) Use face shields and chaps when using hand held power equipment for cutting vegetation.
- 3) Wear cut resistant work gloves, when the possibility of lacerations or other injury may be caused by sharp edges or objects, watch where you are stepping.
- 4) Wear the proper PPE for the task that you are performing (i.e. Rubber Gloves, Boots, Poly Coated Tyvek).
- 5) Review hazardous properties of site contaminants before starting work.
- 6) Observe Proper Lifting techniques, Obey sensible lifting limits (50 lb Max. Per person manual lifting).
- 7) Use mechanical lifting equipment (hand carts, trucks or machinery) to move large awkward loads.
- 8) Keep eye contact with operator, wear high visibility safety vests, and isolate equipment swing areas.
- 9) Stay out from under the dead side of the excavator or crane boom, and don't stand beneath suspended loads.
- 10) Secure loads tightly before you attempt to move it to the Decon Pad or Off Site

G.5. Intrusive Work (including excavations, drilling, driving posts)

The OSHA standards for excavation safety (29 CFR 1926, Subpart P) shall be followed at all times during excavation activities. Excavations include “any man-made cut, cavity, trench, or depression in an earth surface, formed by earth removal.” This includes trenches. This standard applies regardless of the depth of the excavation although many of the requirements do not apply until personnel enter or the depth exceeds 5 feet. Utility locates should be done at any depth for example.

G.5.a. Facility Requirements

- 1) Determine if the client requires an intrusive work permit to be completed and improved before conducting any intrusive work.
- 2) This includes driving fence posts, grubbing with a dozer, manually digging a hole with a shovel, or drilling among other things.
- 3) A competent person shall be designated and supervise all intrusive work.

G.5.b. Excavations 5 feet or deeper that personnel will be entering

In excavations 5 feet deep or deeper, a competent person shall ensure that the following requirements are met.

Table G.5.b Excavation Sloping Requirements

SOIL OR ROCK TYPE	EXAMPLES	MAXIMUM ALLOWABLE SLOPES HORIZONTAL TO VERTICAL FOR EXCAVATIONS LESS THAN 20 FEET DEEP (1)
Stable Rock		Vertical (90°)
Type A Cohesive	Clay, Hardpan, Silty Clay	3/4 : 1 (53°)
Type B Cohesive/Granular	Silt, Unstable Rock, sandy Loam, Fissured type A	1 : 1 (45°)
Type C Granular	Gravel, Submerged, Loamy, Sand	1.5 : 1 (34°)

(1) Excavations greater than 20 feet deep must be designed by a PE.

- 1) Provide safe access and egress. This includes ladders or ramps. In trenches, a point of egress must be within 25 feet at all times while in the trench. Ramps shall be sloped so as not to require the use of hands to walk out of the excavation.
- 2) Employees must be protected from cave-ins.
 - a) In trench excavations the competent person must have all sides sloped in accordance with OSHA requirements on either side of the trench where personnel are working.
 - b) In excavations, at a minimum, employees within a distance equal to the depth of a cut face shall be protected. Where employees are in excavating equipment, at a minimum, the equipment shall not undercut a face in such a way that the cab is closer than the height above the cab.
- 3) Alternative protections, specified by OSHA include trench boxes or shoring.
- 4) In excavations where employees may be required to enter, excavated or other materials shall be effectively stored and retained at least 2 feet or more from the edge of the trench.

G.5.c. Water

Whenever, groundwater may be encountered; a specific classification and slope adjustment will be made on site by the Competent Person. At a minimum an additional 1/2 to 1 slope will be added if flowing conditions are encountered at the toe of the slope where personnel are working.

G.5.d. General excavation practices

- 1) In excavations with potential airborne vapor hazards, where employees may be required to enter shall have the atmosphere tested before each entry and as conditions change.
- 2) Employees exposed to vehicular traffic shall be provided with and instructed to wear warning vests made of reflective or high visibility materials.
- 3) All employees in trenches shall wear the appropriate PPE, e.g., hard hats, safety glasses, hard-toed boots, etc.
- 4) No employees will be permitted under loads.
- 5) Dust conditions shall be kept to a minimum in accordance with the project dust control plan.
- 6) Where employees or equipment are allowed to cross over excavations, all walkways and/or bridges will have guardrails.
- 7) Adequate barrier protection will be provided at remotely located excavations (e.g., reflective cones or sawhorse barriers).
- 8) Each excavation must be inspected daily. If evidence of cave-ins or slides is apparent, all work in the excavation must cease until necessary precautions have been taken to safeguard employees.
- 9) Where vehicles or equipment operate near excavations or trenches, the sides of the excavation must be shored or braced as required to withstand the forces exerted by the superimposed load.

G.5.e. Utility Lines

Utility lines, both above and below ground, must be addressed in any excavation activity regardless of depth.

- 1) Be aware and always suspect the existence of underground utilities such as electrical power, gas, petroleum, telephone, sewer and water. Underground utilities are a concern at any depth.
- 2) Overhead and buried utilities should be located, noted and emphasized on all excavation and work plans (regardless of depth of excavation). Post warning barricades on the ground along the line of excavation in order to alert excavating equipment approaching overhead utilities.
- 3) When excavating within 6 feet of buried utilities, first locate and mark the expected location. Ideally, the utility should be shut off and excavating should be done with a spotter and extra care. Due to the inaccuracies of locating, if the utility can not be shut off, hand digging (i.e., potholing) will be used to visually confirm the utility location before using heavy equipment.
- 4) When excavating within 6 feet of underground utilities, a spotter shall be used to assist mechanical excavating equipment in locating utilities.

- 5) When excavating within 6 feet of underground electrical, phone, flammable gas/liquid lines make every effort to de-energize lines.
- 6) The requirements above should be taken as a minimum. High volume or high pressure mains should be given a wider margin. Fiber-optical lines should be given additional margin. High pressure or high volume water lines should be approached in the same manner as “more dangerous” utilities.
- 7) Overhead Utilities.
 When overhead electrical power lines exist at or near an excavation site, consider all wires to be alive and dangerous. Support overhead utility lines as necessary. Overhead electrical lines may induce a current without actually touching the lines. Be sure to maintain clearances from electrical lines of 50 kV or greater in accordance with 29 CFR 1926.550(a)(15). Place ground markers to indicate overhead hazards as well as those below ground.

G.5.f. Competent Person

The excavation competent persons are assigned in the organization and key personnel section earlier in this document. The excavation competent person is authorized to, and shall take prompt action to correct unsanitary, hazardous, or dangerous working conditions. Other responsibilities include (but are not limited to):

- 1) The competent person will supervise each intrusive work permit.
- 2) The competent person will directly oversee all operations and be present on site at all times while employees are in the excavation.
- 3) The competent person will make a daily inspection of the excavation area before each shift begins, after any changes in the excavation area or after a rainstorm.
- 4) The competent person will ensure that personnel in excavations will not work under suspended loads.
- 5) The competent person will ensure that work activities on the surface of the excavated area will be restricted to prevent working above personnel.
- 6) The competent person will ensure that banner guard and barriers will be placed across public access to the excavation areas at night to protect and warn personnel as necessary.
- 7) The competent person will ensure that personnel exposed to high traffic areas will wear high visibility vests; orange for daytime and reflective for night operations.

G.6. Falling and tripping hazards

G.6.a. Falls--Housekeeping and materials storage

- 1) All material shall be stored in a manner that will ensure that the material is safe from unexpected movement, falling, rolling, blowing, or any other uncontrolled motion.

- 2) Materials and supplies shall be kept away from edges of floors, stairways and access/egress routes (36 inches minimum).
- 3) Forms and scrap lumber with protruding nails and all other debris shall be cleared from work areas, passageways, stairs, and in and around buildings or other structures.
- 4) Tripping hazards, protruding nails, oil slicks, scrap materials and other hazardous conditions occurring during the course of the job shall be eliminated as work progresses.
- 5) Tools and equipment shall not be strewn about where they might cause tripping or falling hazards and shall, at the end of each workday, be collected and stored or disposed of as appropriate.
- 6) All food waste and oily/greasy rag containers shall be equipped with tight closing lids.
- 7) Protruding reinforcing steel (rebar) shall be properly capped or otherwise protected to prevent a hazardous condition.
- 8) All non-hazardous trash, oily wastes, PPE, debris and trash of any kind shall be segregated according to the applicable waste segregation scheme; and shall be labeled accordingly.
- 9) Covers on all roll-offs, drums, and containers of any type shall be securely covered at the end of the day.

G.6.b. Falls--slippery surfaces, unstable surfaces, uneven terrain

- 1) Wet conditions on the site caused by rain and/or work activities are likely to be encountered during the project.
- 2) Employees will be informed of the hazards associated with walking on slippery and or uneven surfaces.
- 3) Mark or remove trip hazards.
- 4) Proper foot wear will be provided to all employees involved with work activities during these conditions.
- 5) When possible, pedestrian traffic will be redirected around potentially dangerous areas.
- 6) Everyone should keep the work area and other areas where people may walk clean and orderly.
- 7) Tools, debris, and other objects should not be left on the floor, decking, or other areas where they present hazards during a job or after a job is completed.
- 8) Oil spills and slippery spots shall be cleaned up immediately.
- 9) Extra precautions should be taken when walking on steel decking during wet/icy weather and/or oily conditions.

- 10) Never walk on piping, never take dangerous shortcuts, and avoid jumping from elevated places.

G.6.c. Falls--Ladders

- 1) Personnel must visually inspect each ladder for defects before use, defective ladders shall not be used.
- 2) When working from a ladder, wear fall protection if work requires your body to extend past the margins of the ladder sides.
- 3) While ascending or descending a ladder, carry nothing which will prevent holding onto the ladder with both hands.
- 4) Metal ladders will not be used if there are any existing or potential electrical hazards in the work area.
- 5) All ladders must be securely tied off or secured by an attendant while the ladder is in use.
- 6) When working from ladders, work facing the ladder with both feet on the rungs.
- 7) Workers shall not stand with their waist above the top step of a ladder without wearing a safety belt that is securely tied off to a local structure.
- 8) Short ladders shall not be spliced together to make a longer ladder.
- 9) The base of the ladder must be set back a safe distance from the vertical; approximately one-fourth the working length of the ladder.

G.6.d. Falls--Fall Protection working from elevated surfaces

Duties involving heights greater than 6 feet above the ground include:

- 1) Utilize fall protection or restraint system as described in the Envirocon Fall Protection Program.
- 2) Append a task specific AHA to this plan to specify type and design of fall protection system on a case by case basis.
- 3) The open edges of all floors 6 feet or more above the next floor or level shall be guarded by an approved barricade secured to prevent accidental displacement.

G.6.e. Illumination

Table D-65.1 of 29 CFR 1926.65: Illumination of Work Areas	
Foot Candles	Area of Operations
5	General Site Areas
3	Excavation and waste areas, accessways, active storage areas, loading platforms, refueling, and field maintenance areas.
5	Indoors: Warehouses, corridors, hallways, and exitways.
5	Tunnels, shafts, and general underground work areas. (Exception: minimum of 10 foot-candles is required at tunnel and shaft heading during drilling, mucking, and scaling. Mine Safety and Health Administration approved cap lights shall be acceptable for use in the tunnel heading.
10	General shops (e.g., mechanical and electrical equipment rooms, active storerooms, barracks or living quarters, locker or dressing rooms, dining areas, and indoor toilets and workrooms.
30	First aid stations, infirmaries, and offices.

Light plants or other sources of light shall be used as necessary to maintain the requirements described in Table D-65.1 of 29 CFR 1926.65.

G.7. Portable Tools

G.7.a. Deadman switches

Portable electrical power tools will be equipped with constant pressure switches or controls that will shut off power when the pressure is released.

G.7.b. Guards

All tools will be equipped with appropriate guards, the guards will be properly adjusted, and the guards will be replaced if they are damaged.

G.7.c. Field modifications

Hand/Powered tools may be used only for their intended purpose. The design or guard capacity shall not be exceeded or circumvented by unauthorized attachments or modifications.

G.7.d. Electrical

- 1) All portable electrical powered tools shall be double insulated or grounded.
- 2) Ground Fault Interrupters (GFCIs) will be used with all outdoor temporary wiring.
- 3) Power tools shall be hoisted or lowered by a hand line; never by the cord or hose.

G.8. Fire Prevention

G.8.a. Use of Gasoline In Vehicles and Small Containers

The use of gasoline is very common on and off the job. The familiarity of its use may lead to complacency regarding the properties of this highly dangerous fuel. Thousands of people are treated each year for burn injuries related to the misuse of gasoline. It is important to remember that gasoline has only ONE proper use - to power vehicles or

machinery. Remember that gasoline is highly volatile! Just one gallon of gasoline is equivalent to 14 sticks of dynamite in explosive force.

Vapors from gasoline are also dangerous! Gasoline vapors are heavier than air; they flow invisibly along the ground and can ignite from a flame, spark, hot surface or static electricity causing a shattering explosion.

- 1) Before Refueling
 - a) Turn off your vehicle engine while refueling.
 - b) Put your vehicle in park and/or set the emergency brake.
 - c) Disable or turn off any auxiliary sources of ignition such as a camper or trailer heater, cooking units, or pilot lights.
- 2) Ignition Sources
 - a) Do not smoke, light matches or lighters while refueling at the pump or when using gasoline anywhere else.
 - b) Turn off your cell phone or any other electrical devices that are not explosion proof or intrinsically safe.
- 3) Refueling
 - a) Use only the refueling latch provided on the gasoline dispenser nozzle, - never jam the refueling latch on the nozzle open.
 - b) Do not re-enter your vehicle during refueling.
 - c) In the unlikely event a static-caused fire occurs when refueling, leave the nozzle in the fill pipe and back away from the vehicle. Notify the station attendant immediately.
 - d) Do not over-fill or top-off your vehicle tank, which can cause gasoline spillage.
 - e) Avoid prolonged breathing of gasoline vapors.
 - f) Do not "top off" tank (i.e., adding additional fuel after the automatic shutoff has tripped) in order to allow for expansion.
 - g) Place cap tightly on the fuel tank - do not use caps that do not seal properly.
 - h) If gasoline spills, make sure that it has been cleaned up before starting the vehicle or equipment.
 - i) Report spills to your supervisor and the station attendant if refueling at a commercial gasoline filling station.
- 4) Store gasoline and other fuels in approved containers such as:
 - a) OSHA fire safety containers of 5 gallons size or less.
 - b) Manufacturer's installed or approved equipment fuel tanks.
 - c) Fuel depot tanks in accordance with fuel depot procedures.

- 5) Use gasoline in accordance with refueling procedures and flammable materials handling procedures.
 - a) Use gasoline only in open areas that get plenty of fresh air.
 - b) Keep your face away from the nozzle or container opening.
 - c) When dispensing gasoline into a container, use only an approved portable container and place it on the ground when refueling to avoid a possible static electricity ignition of fuel vapors.
 - d) Containers should never be filled while inside a vehicle or its trunk, the bed of a pickup truck or the floor of a trailer.
 - e) When filling a portable container, manually control the nozzle valve throughout the filling process.
 - f) Fill a portable container slowly to decrease the chance of static electricity buildup and minimize spilling or splattering.
 - g) Fill container no more than 95 percent full to allow for expansion.
 - h) Place cap tightly on the container after filling - do not use containers that do not seal properly.
 - i) If gasoline spills on the container, make sure that it has evaporated before you place the container in your vehicle.
 - j) Report spills to your supervisor and the station attendant if refueling at a commercial gasoline filling station.
 - k) When transporting gasoline in a portable container make sure it is secured against tipping and sliding, and never leave it in direct sunlight or in the trunk of a car.
 - l) Never siphon gasoline by mouth nor put gasoline in your mouth for any reason. Gasoline can be harmful or fatal if swallowed. If someone swallows gasoline, do not induce vomiting. Contact a doctor immediately.
 - m) Keep gasoline away from your eyes and skin; it may cause irritation. Remove gasoline-soaked clothing immediately.
 - n) Use gasoline as a motor fuel only. Never use gasoline to wash your hands or as a cleaning solvent.
- 6) Filling Containers Inside Vehicles or Pickup Beds
 - a) The National Highway Traffic Safety Administration (NHTSA) has urged motorists to avoid risk of fire by placing portable gasoline containers on the ground while filling them because filling them while they are located in beds of pickup trucks or in trunks or passenger car compartments can be hazardous.
 - b) Take the portable gas container out of your vehicle and set it on the ground while filling it with gasoline.

- c) Static electricity could cause fire to erupt while fueling when it is in your car or pickup bed, NHTSA Administrator says:
 - i. Adding to the danger is the location where these fires could occur -- at a gas station while getting fuel for your snow blower or emergency generator.
 - ii. Cold, dry days in winter increase the chance of ignition, so preventive measures are important.
 - iii. Pickups with bedliners require special concern. A bedliner is a plastic, protective lining that acts as an electrical insulator, allowing static electricity to build up on the gasoline container while it is being filled. The flow of gasoline through the pump nozzle can produce static electricity.
 - iv. During fueling, this can create a spark between the container and the fuel nozzle, igniting gasoline vapors and causing a fire or explosion. This danger also applies to other nonmetallic containers capable of building up a static charge.
 - v. Reports also describe fires that resulted while portable gasoline containers were being filled in trunks and passenger compartments of vehicles, when carpeting acted as an insulator.
- d) NHTSA recommends the following safe procedures for filling portable gasoline containers:
 - i. Dispense gasoline only into approved containers.
 - ii. Do not fill a container while it is inside a vehicle, a vehicle's trunk, pickup bed or on any surface other than the ground.
 - iii. Bring the fill nozzle in contact with the inside of the fill opening before operating the nozzle.
 - iv. Contact should be maintained until the filling operation is complete.

G.8.b. Extinguishers

- 1) Extinguishers will be readily available on site. At a minimum, extinguishers will be placed as follows. (Extinguishers of greater size or inclusive types may be substituted).
- 2) Heavy Equipment will be equipped with a 5# ABC fire extinguisher rated at 2-A:10-B:C.
- 3) Fuel depots and flammable liquid storage/handling areas
 - a) 20# ABC fire extinguishers with a rating of 2-A:40-B:C will be provided within 75 feet of, but no closer than 25 feet to, all refueling depots and flammable storage areas.

- b) 10# ABC fire extinguishers with a rating of 2-A:40-B:C will be provided within 75 feet of, but no closer than 25 feet to, all mobile fueling stations, flammable liquid transfer areas, and generators.
 - c) Where Bureau of Reclamation requirements are applicable: a minimum of two, 40 # ABC extinguishers must be on site.
- 4) Trailers, buildings and work areas
 - a) All trailers and work areas will have at least a 5 # ABC fire extinguisher rated at 2-A:10-B:C.
 - b) Extinguishers in trailers will be mounted near a clear evacuation egress point (door).
 - c) Extinguishers on site will be located at the primary entrance to the work area.
 - 5) Access routes to fire extinguisher shall be kept clear at all times.
 - 6) All fire extinguishers shall be inspected monthly and serviced annually.

G.8.c. Fighting fires

- 1) Personnel are authorized to fight fires in the beginning stages of development and only to the extent that they judge this can be done safely. Personnel are not required to fight fires.
- 2) When a fire is detected, first ensure that the area is safely evacuated and the supervisor is being notified so that the fire department can be summoned.
- 3) Ensure your own evacuation route before attempting to extinguish a fire.
- 4) If more people or more extinguishers are needed, the effort should be abandoned.
- 5) Contact plant fire department if applicable.

G.8.d. Facility systems

- 1) A site-specific procedure will be developed where project work (such as demolition) potentially jeopardizes facility systems.
- 2) Facility managers will generally be notified when any work is done above facility systems such as fixed fire suppression systems for buildings, or where excavations encroach on facility systems such as fire hydrants or related piping.
- 3) When excavating or performing demolition near facility systems, the facility systems should be uniquely marked to avoid damaging these systems.
- 4) Demolition of fire systems will only commence after notification and approval of the facility manager or designated representative.
- 5) Facility fire hydrants shall not be used without notification and permission of the facility manager or designated representative.

G.8.e. Flammable Liquids, Fuels and fueling

- 1) Protection of depots
 - a) Depots will be located in such a manner as to provide clear access for fire trucks.
 - b) Depots will be protected from damage from vehicle or equipment damage using bollards, bails, curbs or similar devices.
- 2) Portable containers
 - a) All portable fuel cans shall be free of deformities which threaten the integrity of the container.
 - b) All flammable storage cans of 1 gallon capacity or greater shall have self closing lids and flame arresters (i.e. safety cans).
 - c) All flammable storage containers shall be labeled as to their contents, and shall include a warning regarding flammable contents.
 - d) Gasoline engines shall not be fueled while the engine is running.

G.8.f. Containments

- 1) All equipment shall be fueled through funnels or spouts that prevent spillage. All spouts and funnels must be of metal construction.
- 2) NFPA flammables (e.g., gasoline) will not be stored in the same containment as NFPA combustibles (diesel fuels).
- 3) Containers and depot tanks in excess of 5 gallons will be held or stored in containments designed to collect spillage.
- 4) Covered containments must be capable of containing a volume equal to:
 - a) the capacity of the largest tank, plus
 - b) the combined displaced volumes of all tanks and containers stored in the containment.
- 5) Uncovered containments must be capable of containing a volume equal to:
 - a) the capacity of the largest tank, plus
 - b) the combined displaced volumes of all tanks and containers stored in the containment, plus
 - c) 25 percent excess capacity for rain collection.
 - d) Uncovered containments will be kept free of standing water.
 - i. Water in excess of 5% containment capacity will be pumped off within a 48 hour period.
 - ii. Water will not be discharged onto the ground unless free of visible residues or films.

- 6) Bonding and grounding
 - a) Any transfer of a flammable liquid from one container to another requires bonding from one container to the other.
 - b) All flammable fuel depot tanks set up on site will be grounded.

G.8.g. Smoking, fire and hotwork

- 1) Hotwork permits shall be issued for all applicable hot work according to facility requirements.
- 2) Smoking and hot work will not be allowed within 50 feet of fuel depots or other flammable liquid storage and/or transfer areas.
- 3) Fuel depots or other flammable liquid storage and/or transfer areas will be posted against smoking, open flames, or hot work.
- 4) Oily rags
 - a) Oily rags, trash and other combustible scrap materials shall be placed in closed receptacles separate from other trash.
 - b) Oily rags shall be stored in containers approved for this purpose.

G.8.h. Welding, Cutting, and Hotwork

- 1) General
 - a) All welding and hotwork will be done in accordance with Envirocon's Health and Safety Procedures 1403.011 and 1403.012;
 - b) All welding and hotwork will be done in accordance with facility requirements.
- 2) Equipment operation
 - a) Welding equipment shall be used only for operations for which it is approved, and as recommended by the manufacturer.
 - b) Workers assigned to operate or maintain oxygen/fuel-gas supply equipment and resistance welding equipment shall be thoroughly instructed in the safe use of such equipment.
- 3) Personal Protective Equipment
 - a) Eye and Face Protection
 - i. Welding helmets and hand shields shall be used during all arc welding/cutting operations, excluding submerged arc welding.
 - ii. Safety goggles or glasses (with side shields) are also worn during arc welding/cutting operations. The goggles or glasses may be either of clear or colored glass, depending upon the type of exposure in welding operations. Helpers or attendants wear proper eye protection.

- iii. Safety goggles or glasses with side shields and suitable filter lenses shall be permitted for use during gas welding operations on light work, torch brazing, or inspection.
 - iv. All operators and attendants on resistance welding or brazing equipment will use face shields or goggles, depending on the particular job.
 - b) Protective Clothing
 - i. All welders/cutters shall wear flameproof gauntlet gloves.
 - ii. Flameproof aprons made of leather, or other suitable material, must be used as protection against radiated heat and sparks.
 - iii. Leather jackets will be utilized if personnel are performing hot cutting/welding work above their shoulders.
 - iv. Nylon clothing is not permitted for welding/cutting operations.
 - v. All outer clothing, such as jumpers or overalls, should be free from oil or grease.
 - c) Respiratory Protective Equipment
 - i. When respiratory protective equipment is required, the Respiratory Protection Program shall be adhered to.
 - ii. Respiratory protection will be required depending on job duration and contaminant specific personal time weighted average air sample results.
 - iii. Supplied air respiratory protection is required for cutting on lead paint until personal exposure sampling indicates exposure requiring lower levels of protection.
- 4) Gas Welding and Cutting Safety
 - a) Fuel-gas hose and oxygen hose are easily distinguishable from each other.
 - i. The contrast is made by different colors or by surface characteristics readily distinguishable by touch.
 - ii. Oxygen and fuel-gas hoses shall not be interchangeable.
 - iii. A single hose having more than one gas passage shall not be used.
 - b) When parallel sections of oxygen and fuel-gas hose are taped together, not more than 4 inches out of 12 inches shall be covered by tape.
 - c) All hose in use shall be inspected at the beginning of each working shift. Defective hose shall be removed from service.
 - d) Hoses, cables, and other equipment shall be kept clear of walkways, ladders, and stairs.

- e) Clogged torch tip openings shall be cleaned with approved cleaning wires, drills, or other devices designed for this purpose.
 - f) Torches to be used shall be inspected at the beginning of each working shift for leaking shutoff valves, damaged hose couplings, and clogged tip connections. Defective torches will not be used.
 - g) Torches shall be ignited by friction lighters or other approved devices only. Matches, flame lighters, or hot work will not be used to ignite torches.
 - h) Oxygen and fuel-gas pressure regulators, including related gauges, shall be in proper working order.
 - i) All oxygen cylinders and fittings shall be kept away from oil or grease. Cylinders, cylinder caps and valves, couplings, regulators, hose, and apparatus shall be kept free from oil or greasy substances and shall not be handled with oily hands or gloves. Oxygen shall not be directed at oily surfaces or greasy clothes, or used within a fuel oil or other storage tank or vessel.
 - j) Flash-back arresters shall be installed on all oxygen and fuel-gas setups, at a minimum at the gauges.
 - k) Torches and hoses shall be completely depressurized (bled) prior to storage, or at the end of each shift.
 - l) Torches and hoses shall not be stored in enclosed areas (e.g., gang boxes, lockers) while connected to cylinders.
 - m) Do not hang torches from the regulators attached to the cylinder.
 - n) Release the hose pressure and close the cylinder valves when work is interrupted for an extended period (breaks, lunch).
 - o) Don't leave a pilot flame burning at the tip of the torch during interruption of operations.
 - p) When working in an elevated position:
 - i. Provide a screen to keep hot metal, electrode stubs, hot metal slag, etc. from falling below;
 - ii. Provide toe boards when working from scaffolding under which workers may be passing or working; and
 - iii. Restrict access to the area below the work site.
- 5) Arc Welding and Cutting Safety
- a) Electrode holders shall be designed for arc welding/cutting and are capable of safely handling the maximum rated current required.
 - b) Exposed current-carrying parts of electrode holders shall be insulated in a manner which provides full protection against electrical shock for operators of arc welders/cutters.

- c) All arc welding/cutting cables must be completely insulated and flexible, capable of handling the maximum current requirements of the work.
 - d) Only cable free from repair or splices for a minimum distance of 10 feet from the electrode holder is used. Cables with standard insulated connectors or splices with insulating quality that is equal to that of the cable may be permitted.
 - e) If it is necessary to splice lengths of cable, insulated connectors equivalent to that of the cable are used. If connections are made by cable lugs, they are securely fastened together and provide a good electrical contact. Exposed metal parts of the lugs must be completely insulated.
 - f) If electrode holders are left unattended, the electrodes shall be removed and the holders placed so that they cannot make electrical contact with employees or conducting objects.
 - g) Electrode holders shall not be dipped in water.
 - h) The power supply to the equipment shall be turned off whenever the arc welder or cutter leaves work or stops work for any appreciable length of time, or when the arc welding/cutting machine is to be moved.
 - i) Any faulty or defective equipment shall be reported to the supervisor and tagged out of service until repaired.
 - j) All arc welding/cutting operations shall be shielded by noncombustible or flameproof screens which will protect employees and other persons working in the vicinity from the direct rays of the arc or from arc flash.
 - k) The frames of all arc welding and cutting machines shall be grounded.
 - l) Never weld on any line or equipment until it has been connected to the ground connection of the welding machine.
 - m) Never pull or disconnect a ground line while the arc is in use.
 - n) Never let the live metal parts of the welding circuit touch damp skin or clothing.
 - o) All parts that are being cut must be supported in such a manner as to prevent them from falling during or at completion of the cut.
- 6) Storage and Handling of Compressed Gas Cylinders
- a) Compressed gas cylinders shall be legibly marked with either the chemical or trade name of the gas. Such markings shall be stenciled, stamped, or labeled and are not easily removable. The marking shall be located on the shoulder of the cylinder.
 - b) Compressed gas cylinders shall be equipped with approved connections.
 - c) Acetylene cylinders shall always be used and stored in an upright position (valve end up) to prevent the acetone (a stabilizing agent) from draining into

the valves or fittings. Acetylene should never be used at a hose pressure exceeding 15 psi. Above 15 psi, acetylene is extremely unstable, and the possibility of an explosion exists.

- d) Oxygen cylinders shall not be stored near oil or grease or other highly combustible/flammable materials.
- e) Oxygen cylinders in storage shall be separated from fuel-gas cylinders by a minimum distance of 20 feet, or by a noncombustible barrier at least 5 feet high and having a fire resistance rating of at least 1/2 hour.
- f) Cylinders shall not be dropped, struck by objects, or permitted to strike against each other violently.
- g) Cylinder valves shall be closed before moving cylinders, at the end of the shift, or when work is finished.
- h) Valves of empty cylinders shall be closed.
- i) Cylinders shall be kept far enough away from the actual welding/cutting operation so that sparks, hot slag, or flames will not reach them.
- j) Cylinder valves shall be opened slowly.
- k) Acetylene cylinder valves shall not be opened more than one and one-half turns of the valve stem and preferably no more than three-fourths of a turn.
- l) Where a special wrench is required, it shall be left in position on the stem of the valve while the cylinder is in use. In the case of manifolded or coupled cylinders, at least one such wrench shall be available for immediate use.
- m) Regulators are removed, valve caps are in place, and valves closed when cylinders are transported by vehicles. All vehicles used to transport cylinders shall have a proper support rack installed.
- n) A suitable cylinder truck, chain, or other steadying device shall be used to prevent cylinders from being knocked over while in use or storage.
- o) Cylinders shall not be placed where they may become part of an electric circuit. Tapping of an electrode against a cylinder to strike an arc is prohibited.
- p) Cylinders shall be stored in shaded areas and secured in upright position with protector caps in place.
- q) Cylinders shall never be used as rollers or supports.
- r) Oxygen cylinders--when full--contain 2400 psi at 70°F and must be treated with respect for the high pressure. The valve protector cap must always be in place when moving the cylinder.
- s) A spontaneous explosion is likely to occur when oxygen comes in contact with hydrocarbons. Keep oxygen and hydrocarbons separated. Never lubricate or allow oil or grease to get oxygen connections or use oxygen for compressed air or pressure.

- t) When handling cylinders by powered vehicles, they shall be secured in a vertical position. Unless cylinders are firmly secured on a special carrier intended for this purpose, regulators shall be removed and valve protection caps put in place before cylinders are moved.
 - u) Oxygen and acetylene must be stored separately or separated by a fire wall rated for a minimum of 30 minutes resistance. Plate steel may be used to separate cylinders in this manner.
- 7) **Manifolding of Cylinders**
- a) Cylinder manifolds shall be installed under the supervision of an experienced person(s) and must comply with proper practices in construction and use.
 - b) All manifolds and parts shall be appropriate for the gases for which they are approved.
 - c) When acetylene cylinders are manifolded, approved flash arresters shall be installed between each cylinder and the coupler block. One flash arrestor installed between the coupler block and regulator is acceptable for outdoor use only if the number of cylinders coupled does not exceed three.
 - d) Each cylinder lead shall be provided with a backflow check valve.
- 8) **Welding/Cutting on Containers**
- a) **Used Containers:** No welding, cutting, or other hot work shall be performed on empty drums, barrels, tanks, or other containers until they have been cleaned thoroughly. (This is to ensure that there are no flammable materials present or any substances such as greases, tars, acids, etc., which might produce a hazard when subjected to heat.) Any connection to the drum or vessel shall be disconnected or blanked off.
 - b) **Venting and Purging:** All hollow spaces, cavities, or containers shall be ventilated to remove gases before preheating, cutting, or welding. Purging with inert gas is recommended.
 - c) All enclosed spaces to be welded on will be checked for flammability and oxygen content prior to any hot work.
- 9) **Fire Protection During Welding.**
- a) Objects to be welded, cut, or heated shall be moved to a designated safe location. If this is not possible, all movable fire hazards in the work space shall be taken to a safe place.
 - b) If the object to be welded, cut, or heated cannot be moved and all fire hazards cannot be removed (e.g., equipment, walls, floors, etc.), positive means shall be taken to confine the heat, sparks, and slag to protect the immovable fire hazards.

- c) Welding, cutting, or heating shall not be performed where the application of flammable paint, the presence of other flammable compounds, or heavy dust concentration create a possible hazard.
- d) Openings or cracks in floors, walls, ducts, tanks, etc., shall be closed. Where openings or cracks cannot be closed, additional precautions shall be taken to prevent sparks from penetrating the openings. The same precautions shall be taken in the presence of open doorways and open or broken windows.
- e) Approved fire extinguishing equipment shall be present in the immediate work area.
- f) Fire Watch
 - i. A fire watch shall be maintained for at least 30 minutes after completion of welding/cutting operations so that possible smoldering fire can be detected and extinguished.
 - ii. Fire watch personnel shall be instructed in the selection and use of appropriate fire extinguishers.
 - iii. Fire watch personnel shall be familiar with facilities and the procedures to be followed in the event of a fire. They watch for fires in all exposed areas and attempt to extinguish fires only when obviously within the capacity of the equipment available.
 - iv. The requirement for a fire watch may be waived when, after completion of the Welding, Cutting, and Heating Permit, it has been determined that there is no possibility of sparks, slag, hot material, etc., coming into contact with flammable or combustible solids, vapors, liquids, or residues.

G.9. Lifting Heavy Objects

Heavy objects will be lifted using appropriate machinery or enough manpower as is required. Employees will be specifically instructed to seek assistance in lifting heavy objects.

G.9.a. Lifts Using Rigging

Lifts utilizing cranes, hoists, and other similar mechanical lifting devices shall:

- 1) A competent person shall conduct a lift assessment prior to the lift.
- 2) A written assessment and lift plan shall be developed for critical lifts (refer to Site Procedure 1403.105 Hoisting and Rigging Guidelines).
- 3) A critical lift is defined as follows:
 - a) A critical lift is any lift which meets the definition established for this site by the facility owner/manager.
 - b) A critical lift is any lift which:

- i. involves lifting of personnel;
- ii. involves loads greater than 30,000 pounds;
- iii. involves loads greater than 75 percent of the crane capacity in the boom configurations potentially required;
- iv. involves lifts for which the path of load travel is at any point out of the view of the crane operator;
- v. involves the use of two or more cranes or lifting devices;
- vi. involves non-routine or unusual rigging;
- vii. involves the potential for damage that would result in unacceptable delay to schedule or significant program impact;
- viii. involves the potential for a significant release of hazardous materials, radioactive materials, or other undesirable conditions;
- ix. involves the potential for unacceptable risk of personnel injury or significant adverse health impact (on-site or off-site); or
- x. any lift which the lifting equipment operator determines to be critical.

G.9.b. Manual Lifting

- 1) Before lifting:
 - a) Determine if the object can be moved by some other means (mechanical device).
 - b) Determine if the object is too bulky and would obscure vision; if so, get another person to help carry it. When handling material with others, everyone should agree on who will act as leader and give the signals. Loads should not be released until everyone is ready. Teamwork is important.
 - c) Determine if the object is within the lifter's capability (a preliminary "heft" will indicate this).
 - d) Determine if the footing around the object is solid.
- 2) Lifting
 - a) Legs should be bent at knees, back nearly vertical, body as close to the object as possible, feet apart but not further than shoulder width. Take a firm hold and straighten knees. Back is still straight and upright. Pull load close to body and lean back slightly to keep center of gravity over feet.
 - b) Avoid twisting the body when lifting or carrying loads.

G.10. Environmental Hazards

G.10.a. Ticks and spiders

- 1) Insect bites may cause localized pain, and in some cases an allergic reaction. Of greatest concern is tick bites (deer ticks carrying Lyme disease, and wood ticks carrying Rocky Mountain Spotted Fever), poisonous spider bites (black widows marked with a red hour-glass under the abdomen and brown recluse marked with a violin on their back).
- 2) Controls (ticks, and spider bites).
 - a) Repellents.
 - i. Use DEET repellents to avoid ticks.
 - ii. Do not apply to open wounds.
 - iii. Do not spray repellents onto face (spray on hands to apply to face or use liquid).
 - iv. Wash hands and clothing at the end of the day's use.
 - b) Long sleeved shirts and full length pants.
 - i. Wearing long sleeved shirts and full length pants will help to avoid all of the above.
 - ii. Wear light colored clothing to better see insects on your clothing.
 - c) Wear bands to seal pant legs at the sock.
 - d) Avoid or clean out their living areas.
 - i. Proper clearing and grubbing helps to remove hiding and nesting locations.
 - ii. Poisonous spiders will normally be found in quiet, secluded, dark, moist areas such as underneath trailers.
 - iii. When entering or working near these locations clean them out first using a broom or other long handled device.
- 3) Signs and symptoms (ticks and spider bites).
 - a) Poisonous spider bites.
 - i. bite marks
 - ii. swelling
 - iii. pain
 - iv. nausea
 - v. difficulty breathing, or
 - vi. difficulty swallowing.

- b) Ticks.
 - i. body of tick remains
 - ii. painful joints
 - iii. fever
 - iv. unusual rashes
 - v. flu - like symptoms
- 4) First Aid.
 - a) Poisonous spider bites.
 - i. wash the wound
 - ii. apply cold pack
 - iii. seek medical attention
 - b) Ticks.
 - i. Use a tweezers to SLOWLY pull tick out of skin
 - ii. Grasp tick as close to the skin as possible before removing
 - iii. DO NOT attempt to burn tick off with matches or hot objects
 - iv. DO NOT attempt other home remedies such as coating ticks with Vaseline
 - v. seek medical attention at the first signs or symptoms
 - vi. seek medical attention if you have difficulty removing tick

G.10.b. Insect stings (bees, wasps, hornets)

- 1) Insect stings can be very painful.
- 2) For those with allergic reactions to bees or wasps, a bite may be fatal.
- 3) Control (insect stings).
 - a) Thorough clearing and grubbing of work areas will help to reduce nesting areas. Use insect control sprays to clear out nesting areas.
 - b) If work is conducted near nesting areas. Personnel should be requested to identify allergies before entering the site.
 - c) Antivenin must be individual prescribed for sensitive individual and must be carried at all times. All personnel entering the site must complete the emergency medical information data sheet.
- 4) Signs and symptoms.
 - a) stinger may be present
 - b) pain

- c) swelling
 - d) allergic reaction (extreme symptoms)
- 5) First Aid.
- a) Remove stingers by scrapping it out with the edge of knife blade, tweezers tips (DO NOT SQUEEZE the stinger), credit card, or similar device.
 - b) DO NOT use a tweezers to grasp a stinger to remove it (this may inject more poison)
 - c) wash wound
 - d) cover
 - e) apply cold pack
 - f) watch for allergic reaction
 - g) use benadryl or other non-prescription antihistamines and seek medical attention if allergic reaction develops

G.10.c. Poisonous plants

- 1) Poison ivy, Poison oak, and Poison sumac may cause varying degrees of allergic reaction in different individuals.
- 2) Control.
 - a) Staying in cleared areas should help prevent contact with poisonous plants.
 - b) Proper clearing and grubbing will help to minimize this hazard.
 - c) Heavy equipment should be used for clearing vegetation to the extent possible.
 - d) Equipment operators must also be protected during this operation.
 - e) Wearing long sleeves and pants legs can minimize skin contact with poisonous plant.
- 3) Signs and symptoms.
 - a) itching
 - b) rash
 - c) weeping sores
- 4) First Aid.
 - a) gently but thoroughly wash the affected area and all around it
 - b) baking soda paste may be applied to sores
 - c) calamine or caladryl lotions helps soothe irritation
 - d) benadryl or other non-prescription antihistamines help dry up sores

- e) if condition continues to get worse or affect large portions of the body, seek medical attention

G.10.d. Domestic and wild animal bites, rabies, and plague

- 1) Bites inflicted by domestic and wild animals primarily pose a serious risk of infection. In some cases they may carry rabies as well.
- 2) Controls.
 - a) In order to prevent problems arising from these bites it is essential that site personnel stay away from all wild or domestic animals.
 - b) Dead animals shall be handled using equipment whenever possible.
 - c) Sanitize equipment or handle remains using the PPE and sanitizing practices in **Error! Reference source not found.** above.
- 3) First Aid (domestic and wild animal bites).
 - a) If bleeding is minor—wash the wound.
 - b) Control bleeding.
 - c) Apply antibiotic ointment.
 - d) Cover the wound.
 - e) Get medical attention.

G.10.e. Snake bites (poisonous)

Bites inflicted by snakes may be handled as with any other wild animal bite. This section is concerned with bites from poisonous snakes.

- 1) Control (poisonous snake bites).
 - a) Clearing and grubbing of work areas will help reduce the risk by removing hiding spots and making it easier to spot snakes.
 - b) In order to prevent problems arising from these bites it is essential that site personnel be made aware of poisonous snakes which may be found in their area and avoid them to the extent possible.

Table G.10.e Wisconsin Poisonous Snakes
Massasauga Rattlesnake Timber Rattlesnake

- 2) First Aid **DON'Ts** for poisonous snake bites.
 - a) DO NOT apply ice packs.
 - b) DO NOT attempt to capture snakes for identification.

- c) DO NOT apply a constrictive bandages or tourniquets (Exception: in isolated locations three to four hours away from help and only as directed by medical personnel).
 - d) DO NOT cut the wound and/or attempt to suck out the poison (Exception: in isolated locations one or more hours away from help—preferably using a snake bite kit—and only as directed by medical personnel by phone).
 - e) DO NOT panic (to the extent possible), run or even walk to get help (this will only help to circulate the poison). Use radio or buddy to summon help and wait for assistance to come to you.
 - f) DO NOT elevate the bitten part of the body.
- 3) First Aid **DO's** for poisonous snake bites.
- a) **DO** wash the wound.
 - b) **DO** keep the bitten part as still as possible.
 - c) **DO** keep the bitten part of the body below heart level.
 - d) **DO** get the victim to medical assistance as soon as possible.

G.10.f. Work Near Water

Work near water is that work which involves a danger of drowning. As a rule of thumb work that is conducted within 6 feet of water more than 3 feet deep.

- 1) Additional considerations may affect the need for these types of controls.
 - a) Flow rate of the water.
 - b) Work on/near thin ice should also be considered a drowning hazard.
 - c) Potential for flooding.
 - d) Bogs, lagoons, quicksand, deep muds or related water entrapment hazards.
- 2) Related standards include:
 - a) Refer to the requirements of 29 CFR 1926.106.
 - b) U.S. Coast Guard standards for approved lifesaving equipment are defined in 46 CFR Part 160.
- 3) Personnel exposed to water related hazards shall be provided with radio communications and/or cell phones.
- 4) Strict adherence to the buddy system must be maintained in these areas.
- 5) Throwing rings.
 - a) Type IV Personal Flotation Devices (PFDs) are U.S. Coast Guard approved "ring life buoys" typically referred to as "life rings" or "throwing rings."
 - b) These devices are required for work near water.

- c) The interval between rings shall not exceed 200 feet and/or
 - d) Throwing rings must be within 100 feet of work.
 - e) Maintain 90 feet of retrieval line attached to throwing rings.
 - f) These devices or equivalent length rescue throwing bags shall also be used where there are potential entrapment hazards such as bogs, lagoons, quicksands, or deep muds.
- 6) Wear Coast Guard approved work vests and inspect work vests before each use.
- a) DO NOT use recreational boating PFDs such as ski jackets for work applications.
 - b) PFDs used as work vests may be Type I, II, III, or V PFDs. A Type V PFD, including Type V Hybrid PFDs, is acceptable only if it is U.S. Coast Guard approved and marked for use as a work vest, for commercial use, or for use on commercial vessels.
 - c) PFDs shall be fitted with a SOLAS (Safety of Life At Sea convention) compliant whistle or noise making device.
 - d) When worn at night, PFDs shall have SOLAS rated reflective tape/materials affixed to the PFD.
 - e) Safety nets, rope grab systems, or similar fall protection or positioning devices may be used in place of PFDs.
 - f) The use of PFDs is generally NOT appropriate for entrapment hazards such as deep muds.
 - g) In hypothermia conditions, PFDs should be insulated (e.g., “mustang suits”).
- 7) Rescue Skiffs.
- a) Rescue skiffs should be used judiciously and may pose an additional drowning risk for rescue personnel. Throwing rings or throwing bags should generally be used before launching a boat.
 - b) A flat bottom rescue skiff should also be used for rescue on thin ice. Rescue personnel should stay in the boat and slide it over the top of thin ice. Ropes from shore or stable ice may be used to help guide the boat.
 - c) The skiff must be in the water or capable of being quickly launched by one person.
 - d) There must be at least one person present and specifically designated to respond to water emergencies and operate the skiff at all times when there are employees above water.
 - i. When the operator is on break another operator must be designated to provide the requisite coverage while employees are above water.

- ii. The designated operator must either man the skiff at all times or remain in the immediate area such that the operator can quickly reach the skiff and get underway.
 - iii. The skiff operator may be assigned other tasks provided the tasks do not interfere with the operator's ability to quickly reach the skiff and get underway.
 - iv. If visual contact is not maintained by the skiff operator, a communication system, such as a walkie-talkie, must be in use to inform the skiff operator of an emergency and to inform the operator where the skiff is needed.
 - v. Skiff operators shall be qualified and shall operate the rescue skiff in a non-emergency situation before being qualified.
- e) Equipment in the skiff:
- i. At least one paddle, attached by lanyard to the skiff (or a fixed oar) shall be included in the skiff (regardless of whether the skiff is powered or unpowered).
 - ii. At least one PFD for each rescue person.
 - iii. At least one throwing ring or throwing bag.

G.11. Sanitation and Hygiene

G.11.a. Drinking Water

- 1) An adequate supply of potable water will be provided on site.
- 2) Portable water containers will be capable of being tightly closed and equipped with a tap.
- 3) Water shall not be dipped from containers for drinking purposes. Single service, disposable drinking cups will be provided.
- 4) No one shall place any objects (e.g. soda pop, ice tea, etc.) in coolers.

G.11.b. Restrooms and hygiene facilities

From Table D-65.2 of 29 CFR 1926.65	
Number of Employees	Minimum Number of Facilities
20 or fewer	One.
21 to 199	One toilet seat and one urinal per 40 employees
200 or more	One toilet seat and one urinal per 50 employees

Toilet facilities (sanitary sewer w/flushing toilets, chemical toilets, recirculating toilets, or combustion toilets) including hand washing stations will be provided in accordance with 29 CFR 1926.65(n) and Table D-65.2.

H. RECORDKEEPING

The health- and safety-related documents for the project will be handled in the following manner:

H.1. Training and Safety Meeting Records

Certificates of completion for all mandatory training for Envirocon and lower tier subcontractor employees will be maintained on site at this site. Minutes for safety and health meetings, including daily safety briefings, will also be maintained on site. These records are located in Envirocon's Safety Trailer office.

H.2. Injury/Illness

Copies of "Supervisor's Report of Injury or Illness" will be maintained on site. Envirocon's official OSHA 300 log is maintained at the Corporate office. See the emergency procedures below for accident reporting procedures. A first aid log will be used to document first aid cases as described below in the log keeping section.

H.3. Accident reports

Accident investigation reports will be maintained on site. All injuries will be reported to the client as well. See the emergency procedures below for accident reporting procedures.

H.4. Medical Surveillance Records

All medical records received on site will be forwarded to the corporate office after review. No medical records will be maintained on site; Fitness For Duty forms, however, will be available on site for all personnel.

H.5. Written Programs

Written programs for compliance with the OSHA standards, such as respiratory protection, hearing conservation, and certain chemical exposure are maintained at the corporate office.

H.6. Health and Safety Plans

At least one copy of the plan and any amendments will be maintained on site.

H.7. Employee Access

All employees have a right to access most of the documents related to health and safety. Medical and training records are available only to individuals requesting their own records. Employees can receive copies of their medical records or air monitoring exposure records upon written request. Medical information can only be released upon the written consent of the individual.

H.8. Health and Safety and Related Logs

The health and safety officer is responsible for maintaining logs of health and safety activities, including safety inspections.

H.8.a. Health and Safety Log

This is a bound log of daily inspections and health and safety issues kept by the project health and safety officer.

H.8.b. First Aid Log

Employees are required to report all injuries and illness regardless of how minor the incident may seem. These reports shall be documented on an injury/illness report form, or in the project first aid log where diagnosis and treatments involve only simple first aid diagnosis and/or treatments.

- 1) Treatment/diagnosis by 3rd party EMTs, physicians, nurses, or other medical professionals shall be reported using the injury/illness reporting procedures. Determination of OSHA recordability/first-aid shall be determined by the Corporate Director of Health and Safety in these cases.
- 2) This First Aid Log is a log of all reported injuries and/or illnesses reported to supervisors and/or the health and safety officer. This log shall document the report, date, name of the injured employee, nature of the injury/illness, diagnosis and the treatment given.
- 3) If no treatment is given the incident shall still be noted in the log. This shall include any dispensing of first aid supplies or administered by a supervisor, safety officer or other first aid trained employee.
- 4) Non-work related injuries/illness reports and use of prescription drugs should also be noted in this log.
- 5) Self-medication by employees with respect to non-prescription (i.e., Over The Counter (OTC)) pharmaceuticals unrelated for colds headaches or other non-work related ailments need not be documented.

H.8.c. Equipment Free Release Decon Log

Decontamination and release of equipment from site shall be logged. Use of the Equipment Decontamination Log, Form 1403.017.a, may be used for this purpose.

I. INCIDENT AND EMERGENCY PROCEDURES

This section documents procedures to be followed in the event of incidents and certain emergencies. Where possible these have been formatted to individual sheets for response training and ready reference when needed.

I.1. General Emergency Procedures

This subsection describes procedures which are common to a variety of incidents.

I.1.a. Responsibilities

- 1) The site supervisor is responsible for the overall conduct of emergency procedures. This includes maintaining an orderly succession of supervision; making necessary reports to all concerned parties; ensuring that the causes of accidents are identified and corrected; and ensuring that injured personnel (with or without life threatening injuries) are escorted to medical treatment by the site safety officer or other supervisory personnel.
- 2) The HSO has the responsibility for ensuring that the provisions of this HASP are adequate and implemented in the field. Changing field conditions may require decisions to be made concerning adequate protection procedures. The HSO is also responsible for conducting site inspections on a regular basis to ensure the emergency readiness. The HSO shall be notified of any on-site emergencies and shall be responsible for ensuring that the appropriate procedures are followed.

I.1.b. First Aid

- 1) First Aid Kits are located in each Envirocon pickup, trailer; and decon facility.
- 2) A first aid trained individual will be on site at all times.
- 3) Emergency eye wash and showers will be located at the decon facility.

I.1.c. Evacuation Procedures

The site safety officer shall select and maintain appropriate assembly points for evacuations. These shall be posted and employees informed of their locations. At least one primary and one secondary assembly point shall be established.

- 1) When an evacuation is called for, employees shall proceed in an orderly fashion to the primary or secondary evacuation assembly points.
- 2) Turn off equipment whenever possible. Avoid leaving hazardous conditions in the process of evacuating.
- 3) Evacuate in the safest direction indicated by wind, smoke, fire, or other hazards.
- 4) Take a head count and report to the supervisor.
- 5) Do not leave the assembly area without reporting to the supervisor.

I.2. Reporting and Investigating Incidents

All incidents at the site shall be reported. It is hoped that most incidents will be small and/or near misses. It is essential that these events be reported as well more serious incidents in order to learn from them and avoid the more serious accidents.

When reporting emergencies to 911 dispatcher, use the following address:

700 NORTH WATER STREET, across from the Wasserman Building.

I.2.a. Project and facility requirements

- 1) An incident is defined as follows:
 - a) A work-related injury or illness
 - b) An exposure to a hazardous substance above the allowable exposure limit
 - c) Property/vehicle/equipment damage
 - d) A uncontrolled fire or explosion
 - e) Unplanned personnel entry into the river;
 - f) Unplanned loss of equipment into the river;
 - g) An unplanned spill or release (including water and air releases) to the environment
 - h) A permit exceedence
 - i) Any unexpected contact or damage to aboveground or below ground utilities
 - j) A “near miss” or an unplanned event that has a reasonable probability in resulting in one of the outcomes described above had the circumstances been different and for which modifications to management programs will reduce the probability of occurrence or the severity of the outcome.
- 2) Verbal Notifications
 - a) In addition to immediate verbal (oral) reporting of all incidents to the client’s project manager.
 - b) A “serious” incident includes the following:
 - i. Imminent danger safety violations
 - ii. Any incident involving the general public or visitors
 - iii. Exposure to a hazardous substance above the allowable exposure limit
 - iv. Work related injury requiring more than First Aid
 - v. Work related illness

- vi. Spills of hazardous material in excess of 1 gallon or Reportable Quantity (RQ)
 - vii. Any unplanned fire on the facility property
- 3) Incident investigations. An incident investigation shall be performed for all incidents for which a report is required. The supervisor and the designated HSS shall perform the investigation and shall include participation by others as necessary. The investigation is to be initiated as soon as possible after the incident.

I.2.b. Reporting Incidents

Report all unplanned, unexpected, events or changes in conditions. Some examples include:

- 1) Personnel incidents such as:
 - a) injuries,
 - b) illnesses,
 - c) first aid cases,
 - d) fights or other acts or threats of violence,
 - e) fatalities, or
 - f) any personnel injuries or incidents which might be the result of acts of other contractors, subcontractors, or facility personnel.
- 2) Accidents such as:
 - a) motor vehicle accidents (with or without damages),
 - b) equipment accidents (with or without damages), or
 - c) property damage (including fires).
- 3) New, previously unknown, or unexpected potential hazards such as:
 - a) buried drums, cylinders, or hazardous materials containers,
 - b) unusual soil conditions (e.g., previously disturbed soils, soils with unusual odors, soils with unusual coloration),
 - c) floating contaminants (e.g., oil, chemicals, or sheens on water).
- 4) Environmental incidents such as:
 - a) oil or chemical spills,
 - b) dead or injured wildlife on the site, or
 - c) disturbed habitats.
- 5) Objects of potential cultural or historical importance such as:
 - a) bones,

- b) buried coins or money,
 - c) arrow heads,
 - d) possible burial sites, or
 - e) finding articles of any potential cultural significance.
- 6) Unauthorized personnel in work areas such as:
- a) unauthorized workers on site,
 - b) unescorted public visitors,
 - c) media personnel, or
 - d) unescorted government visitors.

I.2.c. Procedures for Reporting Incidents

- 1) First Responder's Report
 - a) If your work is involved with the incident of interest, **STOP WORK IMMEDIATELY!**
 - b) Ensure the safety of the area from any imminent hazards.
 - c) Report to your immediate supervisor by radio or phone if at all possible.
 - d) If you must leave the area to make a report, find someone to help secure the area if at all possible.
- 2) Supervisors
 - a) Control imminent hazards as necessary.
 - b) Ensure that injuries are being taken care of, and assign someone to escort injured employees leaving the site for medical evaluation/treatment.
 - c) Ensure that the area is adequately secured.
 - d) Ensure that the scene is not further disturbed.
 - e) Visit the accident scene as soon as possible.
 - f) Interview injured workers and witnesses as soon as possible.
- 3) Reporting requirements
 - a) Report all incidents verbally to the client as soon as the area has been secured.
 - b) Follow up with a written report before the close of business.
 - c) Follow up with a written investigation report within 48 hours.

I.3. Personnel Injury

I.3.a. First Aid

- 1) The PM (or senior supervisor on site) and/or HSO shall ensure necessary first aid or medical attention is obtained. First aid shall be provided by qualified first aid providers or site Fire Department EMTs.
- 2) If personnel need medical evaluation, ensure that a safety officer or supervisor is assigned to escort the employee.
- 3) Do not allow injured personnel to drive themselves unless a doctor determines they are fit to do so.
- 4) If a doctor prescribes medication determine if that medication limits ability to drive. Do not allow employees to drive themselves if the medication impacts on driving safety. (If an employee wants to drive themselves and has been prescribed medication that will impact on driving safety the employee can wait to take the medicine at home if the doctor allows this.)

I.3.b. Hazard assessment

The PM (or senior supervisor on site) and/or HSO shall immediately investigate the nature and cause of injury in order to assess the hazard to ongoing site work. This should include consideration of working short handed if the injured person can not resume work right away. It is the senior supervisor's responsibility to stop work if necessary to make corrective changes.

I.4. Heat Stress

I.4.a. Signs and Symptoms

- 1) The incidence and severity of heat strain will vary widely among people, even under identical heat stress conditions. Disabilities often arise from the combined effects of environmental heat loading and metabolic heat production.
- 2) Prolonged increases in deep body temperature during the first trimester of pregnancy may endanger the fetus and are associated with temporary infertility for people of both genders.
- 3) Profuse and extended sweating produces dehydration and loss of body electrolytes and may lead to heat exhaustion or muscle cramps.
 - a) Cold clammy skin is a sign of heat stress.
 - b) Hot and dry skin is a sign of HEAT STROKE, a medical emergency.
- 4) Oral or tympanic temperature exceeds 99.6 °F is an early warning sign and monitoring should be increased. If temperature exceeds 100.6 °F remove the employee and rehab.
- 5) A prime objective of heat stress management must always be preventing heat stroke, which is life threatening and is the most serious of the heat-induced disabilities.

- a) The **heat stroke** victim is often manic, disoriented, confused, delirious, or unconscious.
- b) The victim's skin is hot and dry, sweating has ceased, and the body temperature is 40°C (104°F) or higher.
- c) Immediate emergency care and hospitalization are essential if signs of heat stroke develop.

I.4.b. Treatment

- 1) Heat Stress
 - a) Force fluids.
 - b) Remove PPE to allow evaporative cooling.
 - c) Seated rest (or lie down).
 - d) Rest in the shade to ensure removal from radiant heat.
 - e) Carefully monitor pulse to ensure that pulse is lowering.
 - f) If treatment fails to reduce pulse and temperature, or if these measures continue to increase, treat as a potential medical emergency.
- 2) Heat Stroke
 - a) This is an extremely serious medical condition.
 - b) Treat as a medical emergency.
 - c) Remove PPE.
 - d) Lie down.
 - e) Watch for signs of shock and treat accordingly.
 - f) Keep skin moist with room temperature water (do not apply chilled water to skin surfaces unless instructed by emergency medical personnel).

I.5. Discovery of Anomalies

I.5.a. Anomalies

Anomalies are unexpected materials or articles, or materials or articles that are protected by law or contract. This includes such things as:

- 1) cylinders;
- 2) drums;
- 3) odorous, stained or previously disturbed soils that might indicate buried utilities, articles or dangerous chemicals;
- 4) animal carcasses;
- 5) potentially protected wildlife, their nests or remains (e.g., antlers or feathers);

- 6) potentially historical artifacts (e.g., arrowheads, war relics, skeletal remains, buried jewelry);

I.5.b. Person discovering:

- 1) Mark the item with a piece of banner tape, survey stake, pile of rocks or other unique item.
- 2) Keep other members of crew clear of the area.
- 3) Notify you supervisor immediately.
- 4) The site supervisor is responsible for notification of the client.

I.6. Heavy weather

I.6.a. High winds

Outdoor equipment operations will be suspended as follows:

- 1) sustained wind speeds of 40 mph,
- 2) gusts exceeding 60 mph,
- 3) when dust control measures are no longer effective,
- 4) wind risk operations at 25 mph.
 - a) crane operations,
 - b) work with sheet materials such as liners, or
 - c) work with large profile materials such as panels.

I.6.b. Lightning

Outdoor operations will be suspended when lightning is within a 20 second count of the site (i.e., the time difference between seeing a lightning strike and hearing the sound). High profile equipment operations shall be suspended when lightning is within 30 seconds of the site.

- 1) High profile operations include crane operations, drilling operations, or electrical wiring tasks.
- 2) Equipment operators shall stop their equipment and park it safely before heading for shelter.
- 3) No personnel will be left on the ground in an exposed location.
- 4) Preferred shelter is a permanent building. Personnel may also take shelter in trailers or low profile rubber tired equipment (e.g., pickups). Avoid driving pickups or any other equipment except to help evacuate personnel.
- 5) Work will resume after a 30 minute period without lightning.

I.6.c. Tornadoes

The supervisor will ensure that a dedicated watch is posted during periods of tornado watch or warning. Get clear of trailers and evacuate to the closer of the following:

- 1) Designated shelter is the Mead Public Library, 710 North 8th St – Entrance is located on north side of building
- 2) If the above can not be reached in time, lay low in nearest ditch or sunken area.

I.7. Phone Threats

This includes bomb threats, threats against personnel, threats of violence or any other threatening communications made by phone or radio.

I.7.a. Do not hang up

Try to remain calm. It is important not to hang up on threatening callers. This may provoke an act of violence.

- 1) Listen carefully to background noises or conversations.
- 2) Take notes on the callers exact words if possible.
- 3) Try to get someone else to report the call immediately to the phone company on another line before the caller hangs up.

I.7.b. Report the call immediately to the senior Envirocon supervisor on site

- 1) DO NOT discuss the call with anyone else.
- 2) The Envirocon supervisor shall immediately bring the call to the attention of the senior client's representative.
- 3) The senior supervisors from Envirocon and the client's project manager shall be responsible for determining if an evacuation will be called.

I.8. Emergency Contacts for Site

Important / Emergency Contacts		
Fire Department		Emergency 911
Ambulance		Emergency 911
Police		Emergency 911
Hospital: Aurora Sheboygan Memorial Medical Center 2629 N 7 th St. Sheboygan, WI 53083	Directions: See Map in Appendix E	Phone: 920-451-5000
Alan Buell	Project Director	406 698 2012
Jeff Habbeger	Project Manager	937 668 6080
Richard Whitman	Project Superintendent	801 450 9667
Scott Mahoney	Health and Safety Officer	303 908 8475
Work Comp	Montana State Comp Fund 5 South Last Chance Gulch P.O. Box 4759 Helena, MT 59604	Zurich American Phone: (877) 405-9045 Fax: (800) 622-8081 Email: USZ Care Center@zurichna.com
Envirocon Corp. Dir Health & Safety	Joe Ocken	(406)-523-1194
Envirocon Loss Control/Investigations	Mel Lockridge	(406) 523-1179
Envirocon Medical Monitoring	Melissa Barkell	(406) 523-1192
WorkCare Medical Monitoring	Ana Martinez	(800) 455-6155 x118
WorkCare Early Return To Work*	WorkCare II (Incident Intervention)	1(888) II-XPRTS OR 1(888) 449-7787
Envirocon Corp Ofc. Missoula, MT		(406) 523-1150
ENVIROCON SAFETY HOTLINE:		800-224-7389
Agency for Toxic Substances and Disease Registry (ATSDR) for chemical exposures		404-639-0615 (emergency) 404-639-6360 / 6000 (non-emergency)

Appendix A: Voluntary Employee's Emergency Information Data Sheet

The following information is being gathered to help us respond to an emergency. **All questions are optional.** You may answer any of the questions you like or leave any blank. The original copy is sent to the Corporate safety office, and a copy will be maintained on site. If the information provided changes, you should submit a new sheet.

Employee Name (please print clearly): _____

Emergency Contacts (name as many as you like)

In the event of an emergency who should we contact to let them know? _____

What City and State do they live in? _____

What is their phone number? _____

What is their relationship to you? _____

Emergency Contact for YOU!

How can we get in touch with you for project recalls, shutdowns, emergencies etc.?

Where are you staying while on site? _____

What is the phone number there? _____

Medical Conditions

Are you allergic to any medications? yes/no What are they? _____

Are you allergic to insect bites or stings? yes/no What are they? _____

Do you carry treatments or medicine(s) (e.g., insulin, sugar/candy/food, bee sting kits) that needs to be given in an emergency? yes/no What are they? _____

Where is it kept? _____

Are you or do you have:

- yes/no: Hypertension (Is it uncontrolled? yes/no)
- yes/no: Asthma (Is it uncontrolled? yes/no)
- yes/no: Diabetes (Is it uncontrolled? yes/no)
- yes/no: Hypoglycemia
- yes/no: Epilepsy/seizures
- yes/no: Fainting spells
- yes/no: Irregular heart beat
- yes/no: Narcolepsy (sleeping spells)

What company do you work for? _____

Safety Officer's Notes:

Appendix B: ACRONYMS

ACGIH	American Conference of Governmental Industrial Hygienists
ADA	Americans with Disabilities Act
AGA	American Gas Association
AHA	Activity Hazard Analysis
AIHA	American Industrial Hygiene Association
ANSI	American National Standards Institute
AOC	Administrative Order by Consent {or Area Of Concern}
APR	Air-Purifying Respirator
ASSE	American Society of Safety Engineers
ASTM	American Society for Testing Materials
BBS	Behavior Based Safety
CAS	Chemical Abstracts Service (Number)
CAMU	Corrective Action Management Unit
CBI	BBS Critical Behavior Inventory
CDL	Commercial Drivers License
CERCLA	Comprehensive Environment Response, Compensation and Liability Act
cfm	Cubic feet per minute
CFR	Code of Federal Regulations
CGA	Compressed Gas Association
CKD	Cement Kiln Dust
COC	Contaminants (or Constituents) of Concern
CSA	Canadian Standard Association
CSI	Closed Surface Impoundment
CWA	Clean Water Act
dB	Decibels
dB(A)	Decibels A-Scale
DNAPL	Dense Non-Aqueous Phase Liquids
DOL	Department of Labor
DOT	Department of Transportation
EPA	Environmental Protection Agency
ESCBA	Escape Self-Contained Breathing Apparatus
FR	Federal Register
GC	Gas Chromatography
GFCI	Ground Fault Circuit Interrupter
GFI	see GFCI (Ground Fault Circuit Interrupter)
gpm	Gallons per minute
H ₂ S	Hydrogen Sulfide
HASP	site-specific Health And Safety Plan (also referred to as SHSP)
HAZ COMM	Hazardous Communication Standard
HDPE	High-Density Polyethylene
HEPA	High-Efficiency Particulate Air (filtration)
Hg	Mercury
HHE	Human Health Exceedance
HPLC	High Performance Liquid Chromatography
HPAH	High density Poly Aromatic Hydrocarbons
HSO	Health and Safety Officer

Appendix B: ACRONYMS

HSS	Health and Safety Supervisor
HSM	Health and Safety Manager (HSM)
IARC	International Agency for Research on Cancer
IDLH	Immediately Dangerous to Life and Health
IIPP	Injury and Illness Prevention Program (IIPP) or IIP Program.
ISEA	Industrial Safety Equipment Association
ISO	International Organization for Standardization
LEL	Lower Explosive Limit
LNAPL	Light Non-Aqueous Phase Liquid
LPAH	Low density Poly Aromatic Hydrocarbons
lpm	liters per minute
mg/m ³	Milligrams per meter cubed
MGP	Manufactured Gas Plant
Mil	One mil equals 1/1000 of a unit
MOC	Management Of Change
mppcf	Million particles per cubic foot
MSDS	Material Safety Data Sheet
MUTCD	Manual for Uniform Traffic Control Devices
NAPL	Non-aqueous phase liquid
NEMA	National Electrical Manufacturer's Association
NEPA	National Environmental Policy Act
NFC	National Fire Code
NFRAP	EPA designated "No Further Remedial Action Planned" (NFRAP) site
NFPA	National Fire Protection Association
NIOSH	National Institute of Occupational Safety and Health
NPDES	National Pollutant Discharge Elimination System
NRR	Noise Reduction Rating
NTP	National Toxicology Program OR Normal Temperature and Pressure
OSHA	Occupational Safety and Health Administration
OU	Operable Unit
OV	Organic Vapor (e.g., respirator cartridges)
OVA	Organic Vapor Analyzer
PAH	Poly Aromatic Hydrocarbons (PAH) see also PNA, HPAH and LPAH
PCB	Polychlorinated Biphenyl
PEL	Permissible Exposure Limit (OSHA exposure standard)
PHSM	Project Health and Safety Manager
PID	Photo Ionization Detector
PM	Project Manager
PNA	Poly Nuclear Aromatic (PNA) see also PAH, HPAH, LPAH
ppb	Parts per billion, 1 x 10 ⁻⁹
PPE	Personal Protective Equipment
ppm	Parts per million, 1 x 10 ⁻⁶
psi	Pounds per square inch
psig	Pounds per square inch gauge
PVC	Polyvinyl Chloride
RAD	Radiological

Appendix B: ACRONYMS

RAO	Remedial Action Objectives
RAP	Remedial Action Plan
RCRA	Resource Conservation and Recovery Act
REL	Recommended Exposure Limit (NIOSH equivalent of the OSHA PEL)
RI	Remedial investigation
ROD	EPA Record of Decision
SAP	Sampling and Analytical Plan (SAP)
SARA	Superfund Amendment and Reauthorization Act
SCBA	Self-Contained Breathing Apparatus
SCUBA	Self-Contained Underwater Breathing Apparatus
SEI	Safety Equipment Institute
SOW	Statement Of Work
SPCC	Spill Prevention, Control and Countermeasures
SSE	Short Service Employee (refer to SSE Addendum to EI Procedure 1403.004)
STEL	Short-Term Exposure Limit (typically 15 minutes)
SWMU	Solid Waste Management Unit
TLM	Tar-like material
TLV	Threshold Limit Value (ACGIH equivalent of the OSHA PEL)
TSCA	Toxic Substance Control Act
TWA	Time Weighted Average (typically 8 hours)
UEL	Upper Explosive Limit
UFC	Uniform Fire Code
UL	Underwriter's Laboratory
USDHS	United States Department of Homeland Security
VMP	Vapor Management Plan
VOC	Volatile Organic Compound
WEEL	Workplace Environmental Exposure Limit
WPSC	Wisconsin Public Service Corporation

Appendix C: Equipment Decontamination Log

Method	Decon Method Description:						
Method 1	Dry decon using shovels, brooms, etc.				Project Name:		
Method 2	Wet decon using high pressure washer				Project Number:		
Method 3	Wet decon using low pressure water hoses, hotsy and scrub brushes				Contaminants:		
DECONTAMINATION ACTIVITIES					INSPECTION ACTIVITIES		
date & time	Equipment Description, Model, and serial number Owner			Decon Method	Decon Supervisor	Inspector	Notes
date	Description			<input type="checkbox"/> Method 1	name	name	<input type="checkbox"/> sat <input type="checkbox"/> unsat
	Owner	Make	Model	<input type="checkbox"/> Method 2	sig	sig	
time		serial		<input type="checkbox"/> Method 3			
date	Description			<input type="checkbox"/> Method 1	name	name	<input type="checkbox"/> sat <input type="checkbox"/> unsat
	Owner	Make	Model	<input type="checkbox"/> Method 2	sig	sig	
time		serial		<input type="checkbox"/> Method 3			
date	Description			<input type="checkbox"/> Method 1	name	name	<input type="checkbox"/> sat <input type="checkbox"/> unsat
	Owner	Make	Model	<input type="checkbox"/> Method 2	sig	sig	
time		serial		<input type="checkbox"/> Method 3			
date	Description			<input type="checkbox"/> Method 1	name	name	<input type="checkbox"/> sat <input type="checkbox"/> unsat
	Owner	Make	Model	<input type="checkbox"/> Method 2	sig	sig	
time		serial		<input type="checkbox"/> Method 3			
date	Description			<input type="checkbox"/> Method 1	name	name	<input type="checkbox"/> sat <input type="checkbox"/> unsat
	Owner	Make	Model	<input type="checkbox"/> Method 2	sig	sig	
time		serial		<input type="checkbox"/> Method 3			
date	Description			<input type="checkbox"/> Method 1	name	name	<input type="checkbox"/> sat <input type="checkbox"/> unsat
	Owner	Make	Model	<input type="checkbox"/> Method 2	sig	sig	
time		serial		<input type="checkbox"/> Method 3			

Appendix D: Contaminants of Concern

contaminant	OSHA PEL	ACGIH TLV	Exposure routes	acute symptoms	Chronic symptoms	Target organ	IP	Spec. gravity	V.P. mmHg	Flash point deg F	LEL %	UEL %
coal tar pitch volatiles {polynuclear aromatic hydrocarbons (PNA); poly aromatic hydrocarbons (PAH)} {e.g., benzo(a)pyrene, bis(2-ethylhexyl)phthalate dibenz(a,h)anthracene, benzo(a) anthracene, benzo(b) flouranthene; naphthalene and benzene soluble or benzene insoluble fractions}	0.2 mg/m3 see OSHA 1910. 1002	0.02 mg/m3	Inhalation of aerosols and contact	eye irritation primarily a chronic skin and respiratory hazard	dermatitis, bronchitis, some are carcinogens for lung, skin, and kidney cancers	skin respiratory sys bladder kidneys	propert ies vary depen ding on individ ual compo und					
polychlorinated biphenyls PCB, Aroclor 1242 chlorodiphenyl (42% chlorine)	1 mg/m3 skin	1 mg/m3 skin	Inhalation Ingestion Contact Absorption	eye irritation, chloracne	eye irritation, chloracne, liver damage, reproductive effects	skin, eyes, liver, reproductive system	na	1.39	0.001	na	na	na
polychlorinated biphenyls PCB, Aroclor 1254 chlorodiphenyl (54% chlorine)	1 mg/m3 skin	0.5 mg/m3 skin	Inhalation Ingestion Contact Absorption	eye irritation, chloracne	eye irritation, chloracne, liver damage, reproductive effects	skin, eyes, liver, reproductive system	na	1.38	6.0 E-5	na	na	na

Appendix E: Hospital Route

Directions to 2629 N 7th St, Sheboygan, WI 53083
 1.7 mi – about 7 mins
 Aurora Sheboygan Memorial Medical Center
 2629 N 7th st, Sheboygan, WI 53083
 (920) 451-5000
 aurorahealthcare.org



A 732 N Water St, Sheboygan, WI 53081

1. Head north on **N Water St** toward **Wisconsin Ave** go 210 ft
total 210 ft
- ➡ 2. Take the 1st right onto **Wisconsin Ave** go 0.2 mi
total 0.3 mi
About 1 min
- ↶ 3. Turn left onto **N 8th St** go 1.1 mi
total 1.3 mi
About 4 mins
- ➡ 4. Turn right onto **Geele Ave** go 436 ft
total 1.4 mi
- ↶ 5. Take the 1st left onto **N 7th St** go 0.3 mi
total 1.7 mi
Destination will be on the right
About 1 min

B 2629 N 7th St, Sheboygan, WI 53083

Appendix F – AHA-01 General Tasks

General Labor Tasks	<ul style="list-style-type: none"> • Not physically fit for duty. 	<ul style="list-style-type: none"> • All personnel will be medically qualified per the HASP by an approved Medical Provider.
	<ul style="list-style-type: none"> • Exposure to vehicular and pedestrian traffic 	<ul style="list-style-type: none"> • Reference Envirocon Procedure 1403.011, General Safety Rules. • Signs, barricades, flashers, flagmen, and other traffic control devices will be used as necessary to control work zone hazards, and vehicle hazards near the work zone. • Wear High Visibility “Orange” warning vests, when exposed to vehicular traffic or involved in work activities.
	<ul style="list-style-type: none"> • Construction hazards. 	<ul style="list-style-type: none"> • Minimum PPE will be hard hat, safety glasses, reflective vest and steel toed boots. • Additional PPE may be required, depending on the activity. • No activity undertaken if it is not addressed in an AHA. • Work will cease unless light levels can be maintained above 3 foot candles.
	<ul style="list-style-type: none"> • Hazard exposure to subcontractors, vendors, visitors or public 	<ul style="list-style-type: none"> • Establish site control as soon as possible with limited and designated points of access. • Require site briefing for all visiting personnel not continuously under Envirocon employee escort. • Coordinate with subcontractors on work zone hazards and access before beginning a task or shift. Safety time-out for unplanned interactions. • Level D construction site PPE is required for site vendors engaged in materials or equipment off-loading, service or repair. Visitors exposed to site activities will be similarly protected. • Demarcate hazard areas to prevent access by non-essential ground personnel or traffic. • Unfamiliar personnel/traffic will be requested to leave the site or report to Envirocon administrative offices.
General Labor Tasks	<ul style="list-style-type: none"> • Hazardous materials • Flammable materials 	<ul style="list-style-type: none"> • MSDSs will be available for all hazardous material stored on the project site. • Reference Envirocon procedure 1403.010 Hazard Communication. • Hazardous material will be properly stored. • Flammable material must be stored in an approved metal cabinet, or bermed co-storage with fuel cell for 3-gallon safety fuel cans.
	<ul style="list-style-type: none"> • Fire 	<ul style="list-style-type: none"> • Appropriate type and size of fire extinguisher available at trailers, vehicles, generators, light plants and fuel storage areas • Designated smoking zones and butt disposal cans
	<ul style="list-style-type: none"> • Noise 	<ul style="list-style-type: none"> • Hearing protection is required for all noisy areas (i.e. all areas that have or are expected to exceed the noise standard at the source in excess of (8 hr TWA of 85 dB-A) (or an impact or impulsive noise rating in excess of 140 dB-A at the source)
	<ul style="list-style-type: none"> • Unhygienic Conditions 	<ul style="list-style-type: none"> • Restroom facilities will be adequately provided and maintained • Hand disinfectant materials shall be available • Hand wipes or wash stations shall be provided and maintained.

Appendix F – AHA-01 General Tasks

<p>General Labor Tasks</p>	<ul style="list-style-type: none"> • Emergency Conditions 	<ul style="list-style-type: none"> • Buddy system required (alternate communications if line-of-sight not practical) • Hospital route and emergency contacts posted • First aid kits (appropriate size) in crew/administrative trailers and site transportation vehicles. • Eyewash stations at crew/administrative trailers. • First aid trained provider on site. • Spill control materials maintained at fueling areas, elsewhere as needed. • Report all spills, injuries, damage, or near misses to superintendent or H&S.
	<p>Exposure to</p> <ul style="list-style-type: none"> • Lightning, • Tornado, • or • Adverse Weather 	<ul style="list-style-type: none"> • Topic will be covered daily in Safety Briefings. • Safety Officer may stop work as necessary when adverse weather or lightning conditions exist or appear to be approaching work area. • Do not operate in high wind conditions. • Identify likely tornado refuge in safety meeting • Stop work if lightning is within a 20-second count of the work area. Proceed to a safe place of refuge. (The interior of a truck or piece of equipment is NOT A SAFE PLACE OF REFUGE.) • High profile equipment operations shall be suspended when lightning is within 30 seconds of the site. • Personnel will proceed to the nearest designated building for lightning. • Standing outside the shelter (i.e. smoking, observing the storm) is not permitted. • If directed by Health & Safety, personnel may return to work after a 30 minute period has expired following the last strike.
<p>General Labor Tasks</p>	<p>Biological hazards</p> <ul style="list-style-type: none"> • Bees, wasps • Mosquitoes • Snakes • Poison plants • Ticks 	<ul style="list-style-type: none"> • Reference Envirocon Procedure 1403.102 for Biological Hazards control. • Survey area for insect and snake habitat. • Use mosquito repellent on exposed skin surfaces. • Snake chaps as necessary • Review information for poison ivy, recognition and treatment • Avoid walking through un-cleared areas with poison biological hazard potential • Poison ivy/oak/sumac susceptible personnel identified by medical data sheets • Maintain housekeeping to provide preferred footpaths for ground based personnel • Wear long-sleeved shirts which should be tucked in, long pants, and hats to cover exposed skin. When you visit areas with ticks tuck pants into socks. • Inspect your body and clothing for ticks during outdoor activity and at the end of the day. Wear light-colored or white clothing so ticks can be more easily seen. Removing ticks right away can prevent some infections.

Appendix F – AHA-01 General Tasks

	<ul style="list-style-type: none"> • Heat Stress • Cold Stress 	<ul style="list-style-type: none"> • Site HSO shall monitor weather forecasts and ambient temperatures, wind speeds and employee working conditions for thermal extremes. • Tail gate meetings to review requirements of the HASP (Section F) • Buddy system to monitor for incipient heat stress symptoms. • Adequate re-hydration equipment, potable water as required on site. • Personnel shall be trained to monitor for indications of heat and cold stress and empowered to take appropriate preventative and recovery measures.
	<ul style="list-style-type: none"> • Environmental Impact 	<ul style="list-style-type: none"> • Never discharge liquid without prior permission. • Dust control to prevent visible release
Work Near Water	<ul style="list-style-type: none"> • Personnel or equipment falls into water • Drowning • Hypothermia 	<ul style="list-style-type: none"> • Evaluate stability of any bank area by river. Warning line or barrier against approach. • PFDs and throw-lines per HASP Section Work Near Water. • Consider fall-restraint for personnel who work near river with banks not stabilized against collapse
Tool Use	<ul style="list-style-type: none"> • Strains from the use of tools 	<ul style="list-style-type: none"> • Appropriate work rest cycles will be maintained especially in the case of repetitive tasks and extreme temperatures. • Tools will be inspected prior to use. Tools not in good working order will be discarded or repaired before use. • Tool selection will be based on the task to be completed. Use the right tool for the job. • Proper lifting techniques will be utilized at all times, regardless of the weight to be lifted.
	<ul style="list-style-type: none"> • Tool damage 	<ul style="list-style-type: none"> • Do not lift hand tools by electrical cords. Use grounded or insulated tools
Electrical Tools	<ul style="list-style-type: none"> • Electrocutation • Fires 	<ul style="list-style-type: none"> • Extension cords will be inspected daily and before use for rips, tears or other damage. • Cords, plugs and receptacles will not be exposed to water, unless approved for such use. • GFCIs will be used on all temporary electrical connections, or where used in or around wet conditions.

Appendix F – AHA-01 General Tasks

Exclusion zone and Contamination Reduction Zone Tasks	<ul style="list-style-type: none"> • Contaminant exposure • Cross-contamination 	<ul style="list-style-type: none"> • For any task where clothing or boots may retain adhered contaminated soil, a barrier of boot covers, Tyvek and appropriate gloves required • Contaminated boots or PPE (adhering soil) may not be removed from the EZ • Hand and face contamination required after <u>every</u> exit from EZ/CRZ. • Reference HASP for <ul style="list-style-type: none"> • PPE ensemble • Decontamination protocols • Emergency response for injuries with contaminant exposure
Work at an Elevation	<ul style="list-style-type: none"> • Falls • Muscle strain 	<ul style="list-style-type: none"> • Protection or fall arrest systems must be used when working at elevations greater than 6 feet. • No stepping heights over 19 inches permitted. • Ladders must be in good service; reference 1403.011, Section 8 for specific ladder safety requirements.
Walking	<ul style="list-style-type: none"> • Slips, trips, and falls 	<ul style="list-style-type: none"> • Work areas will be inspected continuously for signs of poor housekeeping. • Minimum 3-foot candles illumination must be maintained in the foot travel area. • Barricade or demarcate trip hazards, exposed trip hazards, and slick surfaces.
Hand Lifting and Carrying	<ul style="list-style-type: none"> • Muscle strain • Cuts • Pinchpoints 	<ul style="list-style-type: none"> • Appropriate work rest cycles will be maintained especially in the case of repetitive tasks and extreme temperatures. • Use mechanical means to lift heavy materials/objects such as hand-trucks or machinery. • Proper lifting techniques will be used at all times, regardless of the weight to be lifted. • Inspect item to be carried for sharp edges, unbalanced load, shifting weights. • Do not lift and twist torso at the same time. • Identify potential pinch points before the activity.
<ul style="list-style-type: none"> • Confined 	High Hazard Activity	<ul style="list-style-type: none"> • Permits for these activities required before beginning work

Appendix F – AHA-01 General Tasks

<p>space</p> <ul style="list-style-type: none"> • Hot Work • Hoisting-Lifting • Electrical Work • Mechanical Maintenance or Repair • Excavation • Diving • Unplanned Activity 	<ul style="list-style-type: none"> • High Hazard Activity • Multiple hazards 	<ul style="list-style-type: none"> • Competent person must be evaluate planned activity for its hazards. Written plan/procedure or shift inspection form must be prepared for each activity as appropriate <ul style="list-style-type: none"> • Hoisting Rigging Plan • Lock-out Tagout Procedure • Competent person inspection and sign-off • New AHA
<p>Work Around Powerlines, Phone Lines, and Overhead Obstructions</p>	<p>Contact with:</p> <ul style="list-style-type: none"> • overhead obstruction • powerline • guywire 	<ul style="list-style-type: none"> • Evaluate overhead obstructions and location of all overhead utilities, poles and guywires before an activity. • Barricade or demarcate hazard or use spotters to prevent contact.
<p>General Tasks involving Vehicles</p>	<ul style="list-style-type: none"> • Struck by 	<ul style="list-style-type: none"> • Travel only in approved areas. • Do not exceed 5 mph on site. • Avoid backing up if possible. • No vehicle movement without checking all blind zones. • Sound horn before backing and move slow. • Loaded haul trucks and equipment have right of way. • Minimize the number of ground personnel around heavy equipment.
<p>Fueling Equipment</p>	<ul style="list-style-type: none"> • Spill and fire control 	<ul style="list-style-type: none"> • Adequate spill absorbent will be present at all times. Personnel will be trained in the appropriate use. • All nozzles, hoses, caps and all other associated fueling material will be in good working order and properly secured after fueling is complete. • All gasoline fuel storage areas will be both grounded and bonded during fueling operations. • Minimum 20lb ABC fire extinguishers will be present at all fuel storage/fueling sites. Appropriate signage shall also be present. • Envirocon employees are not Fire Fighters, once you have used the entire contents of the fire extinguisher evacuate the area and wait for the Fire Department. • Refueling nozzles will not be equipped with locking mechanisms, the person refueling must maintain hand contact with the nozzle at all times.

Appendix F – AHA-02 Mobilization

Prior Review of AHA 01 – General Site Tasks required before Training to this AHA As Needed: AHA 03 – Handling, Staging, Storing Uncontaminated Materials		
Mobilization of Trailers, Portalets, or Heavy Equipment	<ul style="list-style-type: none"> • Not physically fit • Exposure to traffic • Construction hazards. • Vendors' exposure • Fire • Noise • Environmental hazards • Strains from the use of tools • Heat Stress/Cold Stress • Slips, trips, and falls • Biological hazards • Work Near Water • Work Around Obstructions 	Reference AHA 01 – General Site Tasks Reference AHA 03 – Heavy Equipment
Utility Hook Up of Temporary Buildings	<ul style="list-style-type: none"> • Electrocutation 	<ul style="list-style-type: none"> • The location of all existing utilities will be marked and guarded as necessary before activities commence. • Only qualified electricians will be permitted to perform electrical work. • All electrical work shall be conducted according to procedures of the Envirocon Lock-Out/Tag-Out Procedure
Trailer Set-up	<ul style="list-style-type: none"> • Poor staging • Falls • Wind Damage 	<ul style="list-style-type: none"> • Trailers shall be set up on a well-drained, level site • Trailer steps shall be placed level and even with trailer doors before trailer is used. • Trailer shall be inspected for any pre-existing damage or hazards before accepted on site. • Trailer shall be well anchored and supported according to manufacturer's directions.

Appendix F – AHA-02 Mobilization

<p>Off-loading, Positioning Heavy Equipment, Crane Mats, Heavy Equipment Components</p>	<ul style="list-style-type: none"> • Equipment damage • Struck by 	<ul style="list-style-type: none"> • Complete over-head obstruction survey • Qualified operators only for operating equipment when off-loading equipment from trailers • Spotters and flagmen as necessary • Move crane mats by manufacturer's recommendations
<p>Layout</p>	<ul style="list-style-type: none"> • Traffic hazard • Housekeeping • Damage to Waterloo barrier 	<ul style="list-style-type: none"> • Planning to ensure adequate access, egress and co-use/interference shall be considered prior to mobilization for the following: <ul style="list-style-type: none"> • site traffic; minimize crossing traffic paths • Vendor use (fuel, portalets) • Laydown yard, equipment staging, truck staging, back-fill/rip-rap staging areas, decon pad, MGP contact water treatment area, and sediment stabilization area • Personnel vehicle parking • Company vehicle parking • Planning to minimize conditions where backing up will be required. • Ensure only equipment with ground < 4 psi ground pressure within the Waterloo barrier control line • Planning to minimize housekeeping problems <ul style="list-style-type: none"> • Traffic paths through potentially muddy areas • Designated storage for materials and equipment

Appendix F – AHA-03 Heavy Equipment Operation

<p>All Heavy Equipment Inspection and Operation Activities</p>	<ul style="list-style-type: none">• Not physically fit• Exposure to traffic• Construction hazards• Vendors' exposure• Fire• Noise• Weather• Biological• Heat/Cold• Strains from the use of tools• Slips, trips, and falls• Biological hazards• Work Around Obstructions• Work Near Water• Slips, Trips, Falls	<p>Reference AHA 01 – General Site Tasks</p>
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Appendix F – AHA-03 Heavy Equipment Operation

<p>Operation of loaders, water wagons, excavators, backhoes</p>	<ul style="list-style-type: none"> • Struck by or against Motor Vehicles/ or Operating Heavy Equipment (Yellow Iron) 	<ul style="list-style-type: none"> • Personnel on the ground in the vicinity will be kept to a minimum number, and only for interim that is necessary to complete a task. • Personnel on the ground wear High Visibility “Orange” warning vests, when exposed to vehicular traffic or involved in a work activity. • Delineate potential equipment swing areas, (yellow iron) with use of delineation cones, jersey barriers or with 8 gauge T-Post with rope attached surrounding the work area. • Avoid/Isolate activities in high traffic areas • Personnel in work areas and operating equipment shall not use cell phones or text messaging. • Make eye contact or radio vehicle operators <u>before</u> approaching/crossing within 25-feet. • Do not turn back on equipment in traffic areas or high-noise areas. • Stay alert for the sound of back-up alarms and immediately determine the equipment and likely path when an alarm sounds. • Understand and review hand signals • Emphasize The Buddy System and ensure that it is being utilized at all times • Do not place a body part beneath a suspended load, hydraulic supported equipment . • Do not repair equipment when it is in operation. • Equipment will not be left unattended with hydraulic attachments elevated.
	<ul style="list-style-type: none"> • Traffic Hazards 	<ul style="list-style-type: none"> • Review proposed traffic route. <ul style="list-style-type: none"> • Minimize co-use with other operations, mobile equipment and pedestrian paths. • Avoid travel on slopes, particularly across slopes. • Minimize travel through areas with unstable traction, or potholes. • Identify and mark utility stick-ups, and wells. • Identify and mark overhead obstructions, guy-wires, and blind corners. • Minimum clearance distance to a charged line is 10-feet plus 4-inches for each 10kV over 50-kV • Overhead lines, if not protected by sufficient clearance distance, may need to be de-energized, clad by insulating barrier, or relocated. • Manage materials and travel paths to minimize backing –up. • Use signs, barricades, flashers, traffic control cones, warning devices and flagmen spotters to isolate the operation from hazards

Appendix F – AHA-03 Heavy Equipment Operation

	<ul style="list-style-type: none"> • Equipment Tipover 	<ul style="list-style-type: none"> • Avoid operation near side walls of open trench unless on cribbing, or excavation inspection by competent person has assessed site conditions. • Set barricades, stop-blocks or spotter for equipment backing towards open excavation. • If travel on a steep slope is a possibility, training will address safe methods for moving, carrying load and turning. • Never make a modification to the required roll-over-protection equipment that is not authorized by the manufacturer.
	<ul style="list-style-type: none"> • Operator Slips, Trips and Falls 	<ul style="list-style-type: none"> • Housekeeping will be covered in Safety Briefings routinely and good housekeeping procedures will be followed. • Personnel travel routes will be designated so as to avoid muddy ground. • Three points of contact climbing onto or off of equipment. • No jumping off of equipment. • Appropriate illumination will be maintained, minimum 5-foot-candles in a working or travel area. • Face ladders. Tag out equipment with damaged ladders. • Personnel performing activities exposed to a fall of 6-feet or more shall either be protected with a fall protection system approved by Health and Safety, or a full-time spotter (with no other responsibilities) shall monitor the activity.
<p>Fueling Heavy Equipment</p>	<ul style="list-style-type: none"> • Hazardous materials • Flammable materials 	<ul style="list-style-type: none"> • MSDSs will be available for all hazardous material stored on the project site. • Reference Envirocon procedure 1403.010 Hazard communication. • Hazardous material will be properly stored. • Flammable material must be stored in an approved metal cabinet, or bermed co-storage with fuel cell for 3-gallon safety fuel cans. Adequate spill absorbent will be present at all times. Personnel will be trained in the appropriate use. • All nozzles, hoses, caps and all other associated fueling material will be in good working order and properly secured after fueling is complete. • All gasoline fuel storage areas will be both grounded and bonded during fueling operations. • Minimum 20lb ABC fire extinguishers will be present at all fuel storage/fueling sites. Appropriate signage shall also be present. • Envirocon employees are not Fire Fighters, once you have used the entire contents of the fire extinguisher evacuate the area and wait for the Fire Department. • Refueling nozzles will not be equipped with locking mechanisms, the person refueling must maintain hand contact with the nozzle at all times.

Appendix F – AHA-03 Heavy Equipment Operation

	<ul style="list-style-type: none"> • General Safety 	<ul style="list-style-type: none"> • Review General Work Rules for Heavy Equipment, Envirocon Health and Safety Program 111. • Inspection, operation and maintenance will be performed in accordance with the manufacturer's recommendations. • Modifications to driver restraint system, roll-over-protection, and any other safety feature prohibited. • Seat belts will be worn at all times when a vehicle is in motion. • Backing up a vehicle with obstructed view, around ground personnel, near above-ground utilities, drop-offs, low light conditions or other hazard will require use of a spotter. • All heavy equipment will be equipped with appropriate roll over protection and back up alarms. • Personnel are not permitted inside of the boom radius of heavy equipment. • Only trained and qualified personnel will operate heavy equipment.
	<ul style="list-style-type: none"> • Contact with potentially hazardous substances • Cross-contamination 	<ul style="list-style-type: none"> • Minimize contact with any equipment part that has made contact with groundwater until a decontamination has been completed. • Avoid spread of contamination through work procedures. • Wrap bucket if cross-contaminating clean is a possibility and decontamination not practical. • No eating, drinking, smoking, or chewing will be allowed once you have entered into the CRZ./EZ
	<ul style="list-style-type: none"> • High Noise Levels 	<ul style="list-style-type: none"> • Awareness training in morning safety briefings. • Hearing protection will be worn in all heavy equipment until a noise survey can be made. • Hearing protection required for all noisy areas (i.e. all areas that have or are expected to exceed the noise standard at the source in excess of (8 hr TWA of 85 dB-A) (or an impact or impulsive noise rating in excess of 140 dB-A at the source)
	<ul style="list-style-type: none"> • Electrocutation • Damage to utilities 	<ul style="list-style-type: none"> • Have in place a spotter before moving equipment where an overhead obstruction (power-line, roof eave etc.) is in the proximity. • The location of all existing utilities will be marked and guarded as necessary before activities commence. <ul style="list-style-type: none"> • Identify all underground utilities around the site before work commences, • Work will be suspended immediately if unknown utility markers are uncovered.

Appendix F – AHA-03 Heavy Equipment Operation

<ul style="list-style-type: none">• End of the Day	<ul style="list-style-type: none">• Securing Equipment from Unauthorized Use/Personnel	<ul style="list-style-type: none">• Secure equipment from unauthorized use by removing keys and taking them to the office.
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Appendix F – AHA-04 Soil Operations on Land

Cut and Fill	<ul style="list-style-type: none"> • General Hazards • Heavy Equipment Hazards 	<p>Reference AHA 01 – General Site Tasks Reference AHA 03 – Heavy Equipment Operations</p>
	<ul style="list-style-type: none"> • Contact with subsurface utilities 	<p>Have utility locate performed before excavation;</p> <ul style="list-style-type: none"> • Diggers Hotline: Wisconsin's One-Call Center CALL 811 or (800) 242-8511 • Do not obscure or cover locate lines or markers • Maintain a spotter and at least a 2-foot distance from excavator bucket and utility. • Hand excavate or use non-contact method to pothole for utility location. • Utility corridors do not necessarily run in straight lines • Where possible, de-energize and gap utility lines.
Removal of Rip-Rap and Soils by River	<ul style="list-style-type: none"> • Collapse of Waterloo barrier • Fall of equipment and personnel into river • Struck by, personnel between Waterloo barrier and river 	<ul style="list-style-type: none"> • All equipment operating within the Waterloo barrier control shall be on crane mats capable of distributing weight at no more than 4 psi over the ground surface. • Manage equipment and personnel operations and traffic especially in areas between Waterloo barrier operations and the river. Prohibited access shall be demarcated and enforced. • The Waterloo barrier face and crane mats shall be inspected by a competent person for stability and placement before commencing shift operations or any personnel vehicle access. • Use spotters as necessary to position crane mats and equipment working at near-river position on crane mats. • Visitors shall be notified of any conditions in the work zone that present a potential hazard to personnel or vehicles. • Daily safety meetings shall identify any expansion, contraction of work zones.

Appendix F – AHA-04 Soil Operations on Land

Equipment to be Used	Required Inspections	Training
<p>Heavy Equipment (Yellow Iron)</p> <p>Crane Mats</p> <p>Barricades to protect Excavation as needed</p>	<ul style="list-style-type: none"> • Inspect equipment daily or before each shift. • Survey and marking for underground utilities • Inspect Waterloo barrier and crane mats • Overhead obstruction survey 	<ul style="list-style-type: none"> • Site Orientation • AHA 01, 03 and others as necessary • HASP briefing • Heavy equipment operators must be certified by their supervisors to operate each piece of equipment.

Appendix F – AHA-05 Fence Installation

<p>General Site Tasks for Fence Installation</p>	<ul style="list-style-type: none"> • Not physically fit • Exposure to traffic • Construction hazards. • Vendors' exposure • Fire • Noise • Environmental hazards • Strains from the use of tools • Heat Stress/Cold Stress • Slips, trips, and falls • Biological hazards • Work Around Obstructions 	<p>Reference AHA 01 – General Site Tasks</p>
<p>Utility Check</p>	<ul style="list-style-type: none"> • Contact with the following: <ul style="list-style-type: none"> • Water Line • Electric • Cable • Fiber Optic • Telephone 	<p>Have utility locate performed before driving posts subsurface</p> <ul style="list-style-type: none"> • Diggers Hotline: Wisconsin's One-Call Center CALL 811 or (800) 242-8511 • The location of all existing utilities will be marked and guarded as necessary before activities commence. • Be prepared to hand dig when getting within one foot of a known utility location • Be aware of overhead utilities. Do not get within ten (10) feet of an electrical line. Be aware of overhead communication lines.

Appendix F – AHA-05 Fence Installation

Fence Set-up	<ul style="list-style-type: none"> • Pinch Point • Skin irritation • Fence release 	<ul style="list-style-type: none"> • Personnel will wear leather work gloves when installing fence. Personnel should be careful handling the barb wire if applicable. • If concrete truck will be used, stabilize truck on a secure level area. Do not let concrete set for an extended period of time. Make sure you are using right concrete mix. • If concrete will be prepared on site, personnel will wear rubber coated gloves and minimize exposure to silica dust. • Secure chain link puller securely. Communicate (either by hand or with radio) with personnel pulling the chain link section of fence. Do not over pull. Make sure section of fence is securely in place before wiring up.
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Equipment to be Used	Required Inspections	Training
Heavy Equipment (Yellow Iron) Crane Mats Barricades to protect Excavation as needed	<ul style="list-style-type: none"> • Inspect equipment daily or before each shift. • Survey and marking for underground utilities • Inspect Waterloo barrier and crane mats • Overhead obstruction survey 	<ul style="list-style-type: none"> • Site Orientation • AHA 01, 03 and others as necessary • HASP briefing • Heavy equipment operators must be certified by their supervisors to operate each piece of equipment.

Appendix F – AHA-06 Barge Setup, Operation, and Breakdown

General Activities in Barge Set Up	<ul style="list-style-type: none"> • Not physically fit • Exposure to traffic • Construction hazards. • Vendors' exposure • Fire • Noise • Environmental hazards • Strains from the use of tools • Heat Stress/Cold Stress • Slips, trips, and falls • Biological hazards • Work Near Water • Work Around Obstructions 	<p>Reference AHA 01 – General Site Tasks Reference AHA 03 – Heavy Equipment</p>
Material Handling	<ul style="list-style-type: none"> • Overloading capacity 	<ul style="list-style-type: none"> • Follow Operating Manual procedures for all equipment. • Load charts of all equipment will be maintained and consulted as necessary. • Estimated (or exact) weights of material will be completed prior to demolition. • All rigging will be inspected and capacity determined. Damaged or defective rigging will be destroyed. • Lift plans will be completed as necessary. • Reference Envirocon Procedure 1403.105, Hoisting and Rigging.
Barge Operation and Maintenance	<ul style="list-style-type: none"> • Splash hazard 	<ul style="list-style-type: none"> • Secure materials and equipment against sudden displacement • Personnel within splash-hazard radius to wear Saranex , rubber gloves and boots, or face-shield; taped ankles, wrists and hood. full-face respirator will be available • Eyewash station immediately available. • Access to rinse water for decontamination.
	<ul style="list-style-type: none"> • Energy or fluid release 	<ul style="list-style-type: none"> • Follow lock out/tag out procedure

Appendix F – AHA-06 Barge Setup, Operation, and Breakdown

	<ul style="list-style-type: none"> • Fall from barge, boat, or shore 	<ul style="list-style-type: none"> • Fall restraint measures in place and personal floatation devices worn by barge personnel, and shore personnel within 6-feet of basin edge. • Housekeeping to eliminate trip and slip hazards. • Barge to be level and stable when operator aboard. • Personnel in transition (barge-boat-shore) will step from with 3-points of contact, all surfaces stable; and no more than a 12-inches horizontal, 19-inches vertical step. • Boat to be moored for shore personnel to rescue personnel from barge.
	<ul style="list-style-type: none"> • Tip-over of Excavator on barge 	<ul style="list-style-type: none"> • Excavator shall not move or re-position on the barge except that it is secured by spuds or other positioning device • Operator shall carry emergency glass breaking and seat-belt cutting tool for example http://www.vat19.com/dvds/body-gard-5-in-1-emergency-tool.cfm • Dry run shall be performed to ensure excavator weight, position, and counterweights on the barge provide sufficient stability for proposed sediment excavation.
	<ul style="list-style-type: none"> • Struck by 	<ul style="list-style-type: none"> • Avoid shock-loading and overloading ropes, and chains • Inspect shock-loaded ropes, chains and attaching devices for damage
	<ul style="list-style-type: none"> • Chemical exposure 	<ul style="list-style-type: none"> • Initial level of protection will be Level Modified D, direct reading instruments will be placed on operator to assess initial conditions • Sediments and PCB and MGP contact water have potential for skin contamination and absorption.. Avoid any contact using appropriate PPE. • Rinse off and decontaminate any skin exposure as soon as possible.
	<ul style="list-style-type: none"> • Release of contamination 	<ul style="list-style-type: none"> • Loading barges shall have sufficient free-board to contain excess PCB and MGP contact water • PCB and MGP contact water shall be sufficiently contained by the barges so as not to denigrate water quality • PCB and MGP contact water shall be contained and managed by a water treatment system to prevent free release • Inspection shall ensure that release control barriers and systems are operable, maintained and monitored during use
	<ul style="list-style-type: none"> • Fire hazard 	<ul style="list-style-type: none"> • Fuel containers secured on barge or in boat. • 20-lb A_B_C fire extinguisher on barge.

Appendix F – AHA-06 Barge Setup, Operation, and Breakdown

	<ul style="list-style-type: none">• Loss of Control of Barge	<ul style="list-style-type: none">• Spuds or anchoring mechanisms will be set to prevent the movement of the barges except when the barge is under power or moved by auxiliary boat.• An inspection of these means of position control will be made before personnel leave the barge at end of shift.
Barge Break down	<ul style="list-style-type: none">• Hoisting Rigging	<ul style="list-style-type: none">• Complete lift plan and rigging inspection• Reference Material Handling above

Appendix G – Incident Report Form

<p>General Batch Plant Operation Tasks</p>	<ul style="list-style-type: none"> • Not physically fit • Exposure to traffic • Construction hazards. • Vendors' exposure • Fire • Noise • Environmental hazards • Strains from the use of tools • Heat Stress/Cold Stress • Slips, trips, and falls • Biological hazards • Work Around Obstructions 	<p>Reference AHA 01 – General Site Tasks</p>
	<p>Fire</p>	<ul style="list-style-type: none"> • Ensure that there is a minimum 10 lb fire extinguisher within 25 feet of any fuel storage, or fuel-powered equipment. • All extinguishers must be off the ground and in a marked (Fire Extinguisher Sign) location • Extinguishers must be inspected daily. They must have all pins, keepers, and tags to meet said requirements.
	<ul style="list-style-type: none"> • Tripping Hazards 	<ul style="list-style-type: none"> • Foot traffic shall avoid material storage/laydowns. • Platforms and walkways shall be kept unobstructed. • Engineer out trip hazards: Build a ramp over lines and pipes, bury lines or obstructions in the ground, • Work and traffic areas shall meet the minimum illumination requirements of the HASP.
	<ul style="list-style-type: none"> • Working above 6 feet 	<ul style="list-style-type: none"> • Anyone working above 6 feet must have fall protection on. They also need to be tied off to an approved "Hook point" (If you are unsure about where to tie off, please consult your Health and Safety representative, or the competent person responsible for that task)
	<ul style="list-style-type: none"> • Cement <ul style="list-style-type: none"> • skin and eye burns • dust inhalation 	<ul style="list-style-type: none"> • Cement dust is very alkaline: it can cause 3rd degree burns or blindness! • When offloading/loading of cement stay upwind. • A hand wash station should be in close proximity. • Keep a bottle of vinegar close. Vinegar will lower the PH if cement gets on your skin; apply immediately if redness appears. Do not use vinegar on eye contact with cement! • Goggles, not safety glasses are required to prevent eye exposure to fine cement dust. • When offloading; Let the driver do their part, and ensure that they are wearing the proper PPE

Appendix G – Incident Report Form

	<ul style="list-style-type: none"> • Pressure Washing 	<ul style="list-style-type: none"> • When pressure washing around the plant crews must have proper PPE (i.e. Face shield, etc...) • Do not aim pressure washer at any body part!
	<ul style="list-style-type: none"> • Overhead Hazards or Obstructions 	<ul style="list-style-type: none"> • Survey worksite for overhead obstructions: powerlines, pole guywires, structure eaves. Mark out safe traffic lane with cones or a spotter. • Some work areas may have low overhead clearance. Avoid set-ups or traffic lanes that unnecessarily create this condition. Mark these if unavoidable, and wear hardhats.
	<ul style="list-style-type: none"> • Improper labeling 	<ul style="list-style-type: none"> • Everything needs to be labeled and clearly marked out on the machines and mixing plants. Damaged or illegible labels shall be corrected.
	<ul style="list-style-type: none"> • Slips Trips & Falls 	<ul style="list-style-type: none"> • Where work areas lines run across the ground there is an increased tripping hazard. Lines that are strung across walk ways need to have a safe means for access and egress. Lines should be buried, or ramps should be built in order to alleviate this hazard • Avoid walking in slurries when possible. • Wear PVC or other water resistant boots with heavily textured soles • Maintain neat and orderly storage when working in area. • Work areas will be visually inspected continuously for signs of poor housekeeping. • Identified slip and trip hazards will be removed or guarded prior to beginning work (e.g., hoses, lines) • Appropriate illumination must be at least 5-foot-candles in the work area and personnel travel points. • Areas of standing water, sludge and ice will be removed or reduced so they do not become a slipping hazard.
	<ul style="list-style-type: none"> • Cuts 	<ul style="list-style-type: none"> • Only locked blade tool with protective holster or retractable blade shall be used for cutting.
Mobilizing, off-loading, and Transferring Calciment and at the Site	<ul style="list-style-type: none"> • Struck by • Traffic hazard • Housekeeping 	<ul style="list-style-type: none"> • Plan traffic pattern for incoming trucks to minimize hazards resulting from <ul style="list-style-type: none"> ○ Backing up traffic on public roads at site entry ○ Crossing paths with site vehicles, site personnel, and equipment ○ Blind corners ○ Muddy or uneven terrain ○ Unnecessary backing in (loop traffic pattern)
	<ul style="list-style-type: none"> • Noise from pneumatic operations 	<ul style="list-style-type: none"> • Personnel shall not enter areas with noise > 85 dBA without hearing protection ear inserts may need to be supplemented by ear muffs

Appendix G – Incident Report Form

<ul style="list-style-type: none"> • Eye hazards • Skin exposure 	<ul style="list-style-type: none"> • Any potential for exposure to dusts with eye-irritant properties will require the use of goggles. • MSDSs will be on site for all materials found onsite. Personnel will be trained to hazards, controls, recommended PPE, first aid and clean-up procedures prior to activity. • Monitor for dust generation (visual and real-time dust monitor as necessary) • Particulate respirators (P-100) may be assigned by the safety officer at the request of employees even if dust levels are below action levels in areas with non-toxic dusts “nuisance dust”.
<ul style="list-style-type: none"> • Cement <ul style="list-style-type: none"> • skin and eye burns • dust inhalation 	<ul style="list-style-type: none"> • Cement dust is very alkaline: it can cause 3rd degree burns or blindness! • When offloading/loading of cement stay upwind. • A hand wash station should be in close proximity. • Keep a bottle of vinegar close. Vinegar will lower the PH if cement gets on your skin; apply immediately if redness appears. Do not use vinegar on eye contact with cement! • When offloading; Let the driver do their part, and ensure that they are wearing the proper PPE
<ul style="list-style-type: none"> • Dust release • Dust exposure • Struck by pneumatic hose 	<ul style="list-style-type: none"> • Check all cam-locks and connections before off-loading • Employee shall not leave the area during off-loading • Do not approach a disconnected hose during it’s operation • Damaged vessels, hoses or connectors that permit the release of airborne dust during pressurized operation shall be replaced • Maintain a safe distance from any pressurized connection point, particularly when pressure is initiated. • Release of any non-contaminant dusts in a visible emission will be reported to either Health and Safety or Project Superintendent who will log the time, extent and duration of the non-contaminant release.
<ul style="list-style-type: none"> • Pressurized line and tank hazards 	<ul style="list-style-type: none"> • Do not disconnect pressurized lines, and use valves to bleed off pressure. • Only authorized and qualified personnel will open any hatch, pressure relief on any pressurized vessel. • Pressurized vessels shall be labeled with appropriate warning against opening hatches. • Pressurized vessels shall have a direct read gauge to monitor against over-pressure conditions. • Pressurized vessels shall have a pressure relief system • Pressurized vessels shall be inspected to ensure vessel and connections are not damaged (dents, corrosion, etc.) and that gauges and pressure relief systems are operable

Appendix G – Incident Report Form

Batch operation	plant	<ul style="list-style-type: none"> • Eye hazards • Skin exposure • Cement skin and eye burns • Dust release • Dust exposure • Struck by pneumatic hose 	<ul style="list-style-type: none"> • See notes above
		<ul style="list-style-type: none"> • Struck by. • Pinchpoints 	<ul style="list-style-type: none"> • Batch plant repair or cleanout will follow lockout procedures. A specific lockout plan will be prepared.
		<ul style="list-style-type: none"> • Fall hazard 	<ul style="list-style-type: none"> • Personnel shall not work in a location where a free fall of 6-feet is possible. Fall protection restraints, harnesses, rails, midrails, shall meet OSHA specifications and be free of damage. • Damaged ladders or platforms shall not be used until repaired.
		<ul style="list-style-type: none"> • Confined space 	<ul style="list-style-type: none"> • Personnel shall not enter a hopper, tank or other vessel meeting the definition of a confined space without being trained as an authorized entrant. • A permit system will be required for any confined space entry. • Rescue provisions shall be in place and rescue personnel trained each different type of confined space encountered at the site. • A permit must be signed by the entry supervisor and all personnel trained to the permit before entry. • Personnel will exit immediately if any unanticipated conditions are met, or the full provisions of the permit are not met. • An attendant at the confined space shall monitor all entrants and order a general exit from confined space if conditions so warrant.
		<ul style="list-style-type: none"> • Electrical shock 	<ul style="list-style-type: none"> • Cords, plugs, and receptacles will be kept out of the path of water, unless approved as submersible. • GFCIs will be used on all electrical connections. • Electrical cords shall not be draped or tied off on metal rails.

Appendix G – Incident Report Form

NCIDENT INFORMATION

Incident reporting includes three basic steps. First is an **Initial Report** of basic information provided when the incident first happens or comes to our attention. Facts are very limited and this initial report may be made by email, phone or fax.

Within a prescribed amount of time, typically a week, this **Incident Report** (form 1403.024.a) is to be made after a comprehensive investigation of facts has been made. This is intended to be an internal report of facts. The purpose of this report form 1403.024.a is to document fact finding information **ONLY**. Do not provide speculation or interpretations including analysis of cause.

Third is the **Report of Investigation Findings** which will be made as a separate stand alone document. This is a report developing both basic and root cause analysis, lessons learned and corrective actions. Often this report is the same report developed for these same purposes for our client. When the client specifies a report format for investigation findings there is no need to use an Envirocon form or format.

CLASS OF INCIDENT	<input type="checkbox"/> LOSS EVENT <input type="checkbox"/> COMPLIANCE <input type="checkbox"/> NEAR MISS	REPORT No.:	
PURPOSE OF INVESTIGATION (Brief Statement: Investigation initiated in response to...)			
<input type="checkbox"/> PROPERTY LOSS OR DAMAGE <input type="checkbox"/> MOTOR VEHICLE OR EQUIPMENT DAMAGE <input type="checkbox"/> ENVIRONMENTAL INCIDENT <input type="checkbox"/> 3 RD PARTY <input type="checkbox"/> EMPLOYEE INJURY OR ILLNESS <input type="checkbox"/> COMPLIANCE INCIDENT <input type="checkbox"/> OTHER: _____			
GENERAL INFORMATION:			
PROJECT/DEPARTMENT:		.....
PROJECT/DEPARTMENT No.:			
DATE OF INCIDENT:		TIME OF INCIDENT:	
PROJECT/DEPARTMENT MANAGER:		PROJECT SITE/DEPARTMENT PHONE No.:	
SUPERVISOR ON DUTY:		SUPERVISOR PHONE No.:	
LOCATION OF INCIDENT:		.....
INITIAL REPORTING INFORMATION: [Step by step, use additional pages if necessary]			
<i>Be specific, address all questions.</i>			
1) Who first reported the incident?			
2) When was the initial report made? (date, time)			
3) Who received the initial report?			

Appendix G – Incident Report Form

4) How was report made? (phone, radio, ect.)

5) What was reported initially?

6) What subsequent reports were made, when and who to?

- | | | | |
|-------------------------------|------------------|-------|---------|
| • Client reports? | Who made report: | When: | To who: |
| • To Corporate Loss Control? | Who made report: | When: | To who: |
| • To District/Ops? | Who made report: | When: | To who: |
| • To Corporate H&S Director? | Who made report: | When: | To who: |
| • WorkCare Nurse Case Mngr? | Who made report: | When: | To who: |
| • Work Comp Adjustor? | Who made report: | When: | To who: |
| • Police/Highway Patrol? | Who made report: | When: | To who: |
| • Regulators (EPA/OSHA/etc.)? | Who made report: | When: | To who: |
| • other reports? | Who made report: | When: | To who: |

DESCRIBE WHAT HAPPENED: [Step by step, use additional pages if necessary]

Do not interpret). *Be specific, address all questions.*

1) Who is making this report?

2) Who was involved?

3) What was the observed demeanor of the parties involved like? (e.g., seemed relaxed, seemed barely conscientious, seemed very excited, seemed nervous, seemed unclear of the facts, seemed very upset, etc.)

4) Who are the witnesses?

5) Who else was at the scene (but not perhaps a witness or involved)?

6) Where did the incident occur? (location, properties: public/private)

7) When did the incident occur?

8) What were the conditions at the scene like (weather or other factors like traffic)?

9) How does it appear the incident occurred? (Do not assume, report only actual observations and actual statements made by other.

Appendix G – Incident Report Form

10) What was the incident or accident? (Describer what happened and the sequence of events)

-
-
-

INJURY, EQUIPMENT/PROPERTY DAMAGE: [Step by step, use additional pages if necessary]

N/A

Be specific, address all questions.

1) Were there injuries?

who?

2) What was observed extent of injuries?

3) Was medical treatment required?

who treated?

4) Was there vehicle/equipment damage?

equipment:

- Description of equipment (owner, make/model/ect.)
- Equipment number
- What was observed extent of property/equipment damage

equipment:

- Description of equipment (owner, make/model/ect.)
- Equipment number
- What was observed extent of property/equipment damage

5) Was property damage observed?

- description of property damage.
- Was damage caused by incident or pre-existing?

Appendix G – Incident Report Form

INCIDENT/ACCIDENT SITE INVESTIGATION: [Step by step, use additional pages if necessary]

- 1) Who was at the scene during the investigation?
- 2) When did they arrive at scene?
- 3) Were statements made to investigators?
Who?
What was said?
- 4) Was the site preserved?
- 5) Where were investigators seen?
- 6) How did individuals conduct themselves during investigation (stress/anger/emotion)?
- 7) Were pictures taken at the scene?
- 8) Were additional reports filed?
By who?
- 9) Were citations issued?
- 10) When did investigations conclude?
- 11) What post incident actions taken (drug screening, incident interview and review)?

Appendix G – Incident Report Form

WITNESS(ES) AND INVOLVED PARTIES: [Including Police Officer (Show Badge No.), Federal, State or Local Officials]		<input type="checkbox"/> N/A
WITNESS NAME: _____ WITNESS ADDRESS: _____ <div style="text-align: center; margin-left: 150px;">Street</div> _____ <div style="display: flex; justify-content: space-between; width: 80%; margin-left: 20px;"> City State Zip </div> Code _____ WITNESS PHONE No.: _____ <input type="checkbox"/> WITNESS STATEMENT ATTACHED	WITNESS NAME: _____ WITNESS ADDRESS: _____ <div style="text-align: center; margin-left: 150px;">Street</div> _____ <div style="display: flex; justify-content: space-between; width: 80%; margin-left: 20px;"> City State Zip </div> Code _____ WITNESS PHONE No.: _____ <input type="checkbox"/> WITNESS STATEMENT ATTACHED	
WITNESS NAME: _____ WITNESS ADDRESS: _____ <div style="text-align: center; margin-left: 150px;">Street</div> _____ <div style="display: flex; justify-content: space-between; width: 80%; margin-left: 20px;"> City State Zip </div> Code _____ WITNESS PHONE No.: _____ <input type="checkbox"/> WITNESS STATEMENT ATTACHED	WITNESS NAME: _____ WITNESS ADDRESS: _____ <div style="text-align: center; margin-left: 150px;">Street</div> _____ <div style="display: flex; justify-content: space-between; width: 80%; margin-left: 20px;"> City State Zip </div> Code _____ WITNESS PHONE No.: _____ <input type="checkbox"/> WITNESS STATEMENT ATTACHED	
POLICE REPORT No.: _____		CITATION INFORMATION: _____

TIMELINE SEQUENCE OF EVENTS: (Add lines/pages as needed)		
DATE	TIME	EVENT

Appendix G – Incident Report Form

PERSON(S) PREPARING REPORT: [Health and Safety Officer and/or Supervisor to complete report]		
HEALTH & SAFETY OFFICER: _____ <small>Name (First, Middle, Last)</small>	SIGNATURE: _____	DATE: _____
SUPERVISOR'S NAME: _____ <small>Name (First, Middle, Last)</small>	SIGNATURE: _____	DATE: _____

PERSONNEL NOTIFIED:
CORPORATE OSHA 300 LOG KEEPER'S INITIAL DETERMINATION:
CORPORATE HEALTH AND SAFETY: _____ DATE NOTIFIED: _____ <div style="display: flex; justify-content: space-between; width: 100%; margin-top: 5px;"> <small>Date</small> <small>Signature</small> <small>.....</small> <small>Date</small> </div>
EQUIPMENT DIVISION NOTES:
EQUIPMENT DIVISION: _____ DATE NOTIFIED: _____ <div style="display: flex; justify-content: space-between; width: 100%; margin-top: 5px;"> <small>Date</small> <small>Signature</small> <small>.....</small> <small>Date</small> </div>

First Incident Report is due within 24 hours (immediately if there has been a hospitalization or fatality) and/or in accordance with Envirocon Procedure 1403.024.

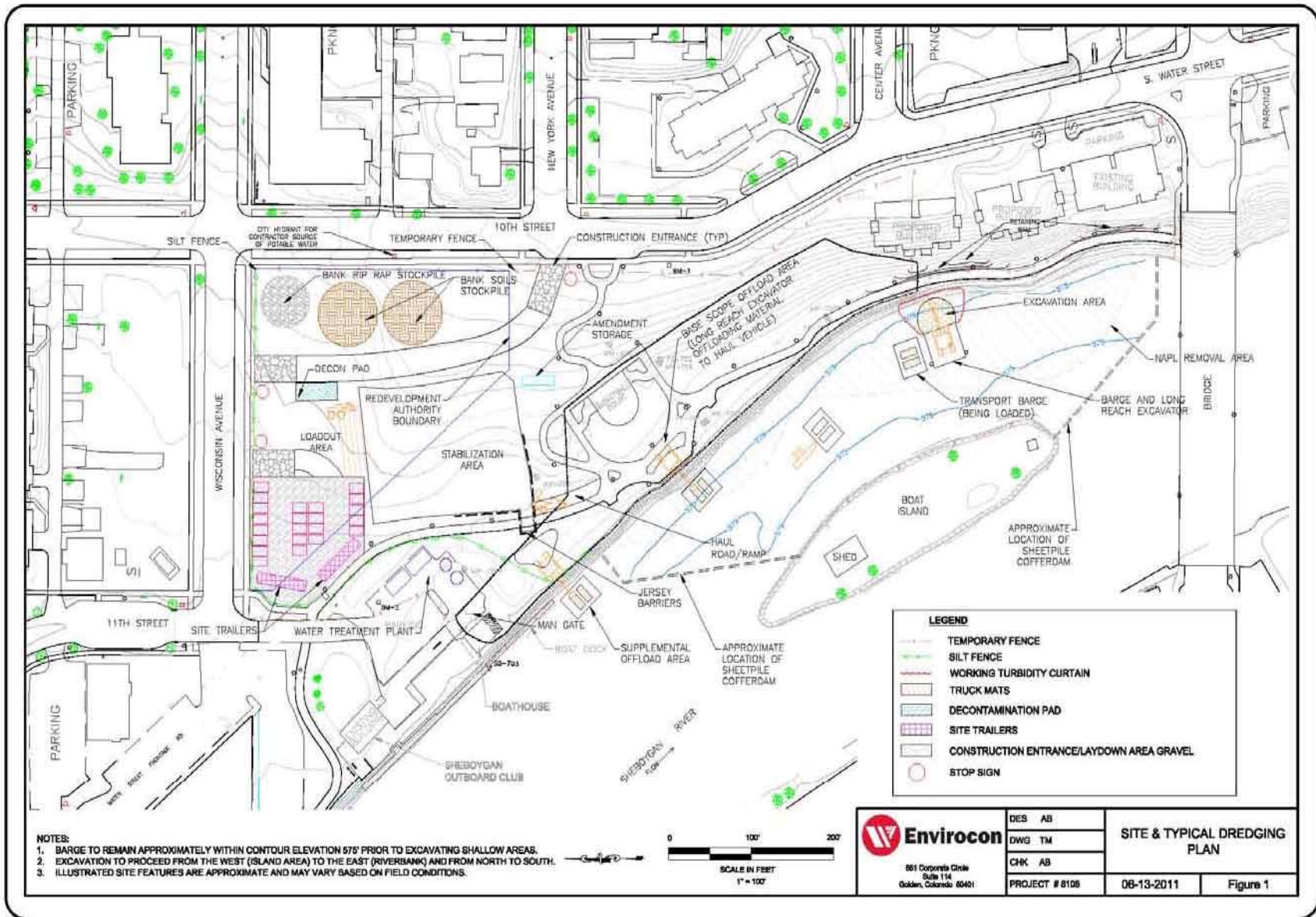
Provide copies of physician's restrictions or fitness for duty. Advise Corporate of the number of restricted or lost days of work.

This report contains the latest information and facts only and is not considered final. Causality evaluation is reported separately.

ATTACHMENTS (LIST):	<input type="checkbox"/> N/A
<input type="checkbox"/> ADDITIONAL PAGES (please indicate how many and for which sections): _____	<input type="checkbox"/>
<input type="checkbox"/> OTHER ATTACHMENTS (please list): _____	<input type="checkbox"/>

<input type="checkbox"/> _____	
<input type="checkbox"/> _____	

Appendix H – Site Map





**ATTACHMENT H.
CALCIMENT MSDS**



MATERIAL SAFETY DATA SHEET

SECTION 1. PRODUCT IDENTIFICATION

Date: 01/01/10
Code: Calciment® Bed Ash

Product Name	Distributor	Telephone
Calciment® - Bed Ash	Mintek Resources, Inc. PO Box 340187 Beavercreek, OH 45434	937-431-0218 Office 937-431-1305 Fax 800-424-9300 CHEMTREC

SECTION 2. TYPICAL COMPOSITION

Component	Formula	% Wt.	CAS No.	PEL
Calcium Oxide	CaO	~50	1305-78-8	10mg/m ³
Silica	SiO	~23	60676-86-0	0.1mg/m ³
Aluminum Oxide	Al ₂ O ₃	~ 3	1344-28-1	10mg/m ³
Ferric Oxide	Fe ₂ O ₃	~ 4	1309-37-1	10mg/m ³
Magnesium Oxide	MgO	~ 3	1309-48-4	15mg/m ³
Sulfur	SO ₃	~ 1	7704-34-9	10mg/m ³

SECTION 3. HAZARD IDENTIFICATION

This product may cause irritation to the eyes, skin and respiratory tract. The reaction of boiler ash to perspiration can cause burns to exposed areas.

Carcinogenicity:

NTP: Known carcinogen (silica).

OSHA: Not listed as a carcinogen IARC Monographs: Group 1 Carcinogen (silica).

California Proposition 65: Known carcinogen (silica).

NTP: The National Toxicology Program, in its "Ninth Report on Carcinogens" (released May 15, 2000) concluded that "Respirable crystalline silica (RCS), primarily quartz dusts occurring in industrial and occupational settings, is *known to be a human carcinogen*, based on sufficient evidence of carcinogenicity from studies in humans indicating a causal relationship between exposure to RCS and increased lung cancer rates in workers exposed to crystalline silica dust (reviewed in IAC, 1997; Brown *et al.*, Hind *et al.*, 1997) IARC: The International Agency for Research on Cancer ("IARC") concluded that there was "*sufficient evidence* in humans for the carcinogenicity of crystalline silica in the forms of quartz or cristobalite from occupational sources", and that there is "*sufficient evidence* in experimental animals for the carcinogenicity of quartz or cristobalite." The overall IARC evaluation was that "crystalline silica inhaled in the form of quartz or cristobalite from occupational sources is *carcinogenic to humans* (Group 1)." The IARC evaluation noted that "carcinogenicity was not detected in all industrial circumstances or studies. Carcinogenicity may be dependent on inherent characteristics of the crystalline silica or on external factors affecting its biological activity or distribution of its polymorphs." For further information on the IARC evaluation, see IARC Monographs on the Evaluation of carcinogenic Risks to Humans, Volume 68, "Silica, Some Silicates..." (1997).

P.O. Box 340187
Beavercreek, OH 45434

Dispatch (937) 431-0218
Fax (937) 431-0254

Effects of Overexposure:

Acute: Irritation of eyes, skin and mucous membranes.

Chronic: Fibrotic diseases of the lungs and potential carcinogenicity.

Emergency and First Aid Procedures:

Skin: Wash with mild soap and water.

Ingestion: Keep warm, at rest, and drink large amounts of water. See Physician.

Eyes: Flush with water for 15 minutes. See Physician.

Inhalation: Move to fresh air.

Medical Conditions Aggravated by Exposure: Persons with history of respiratory illness and reduced pulmonary function should avoid work places with high dust levels. Persons with skin disorders may experience aggravation of the condition.

Chronic Exposure: Dust can cause inflammation of the lining tissue of the interior of the nose and inflammation of the cornea. Hypersensitive individuals may develop an allergic dermatitis. Respirable crystalline silica (quartz) can cause silicosis, a fibrous (scarring) of the lungs and possibly cancer. There is evidence that exposure to respirable silica or the disease silicosis is associated with an increased incidence of Scleroderma, tuberculosis and kidney disorders.

NFPA Rating: Health – 2, Flammability – 0, Reactivity – 1

SECTION 4. FIRST AID MEASURES

Skin: Wash skin thoroughly with plenty of soap and water. Remove contaminated clothing and thoroughly clean before reuse.

Eyes: Flush eyes with clean, low-pressure water for at least 15 minutes, occasionally lifting eyelids. If pain or redness in eyes persists after flushing, obtain medical attention.

Inhalation: Remove personnel from contaminated area to fresh air. Obtain medical attention if there are signs of breathing difficulties.

Ingestion: Do not give anything to eat or drink. Seek medical aid immediately.

SECTION 5. FIRE FIGHTING MEASURES

Fire and Explosion Hazard: None.

Fire Fighting Procedures: Coal fly ash is the final product of combustion and does not create a fire hazard. The reaction of boiler ash to perspiration can cause burns to exposed areas.

Protective Equipment: Gloves, goggles, particulate respirator, and protective clothing.

SECTION 6. ACCIDENT RELEASE MEASURES

Personal Protection: Wear protective equipment during cleanup.

Environmental Precautions: Prevent material from entering waterways.

Spills: Wear protective equipment during cleanup. Sweep up material being sure to minimize creating a dusty environment and place in closed container. Clean up material for use or disposal. Dampen with a water mist to control dust (airborne dust) before removal. Do not use compressed air. If loaded on trucks, wet down ash to prevent dusting during transport.

SECTION 7. HANDLING AND STORAGE

Handling: Handle product to prevent contamination from any source. Avoid high-pressure wash and conditions that may generate dusts.

Storage: Store product to prevent contamination from any source. Keep containers closed.

SECTION 8. PHYSICAL AND CHEMICAL PROPERTIES

Boiling Point: N/A
Flash Point: Greater than 200° C
Color: Brownish Red granular
Odor: Virtually Odorless

SECTION 10. STABILITY AND REACTIVITY

Stability: Stable under normal temperatures and pressures, but reacts with water.
Conditions to avoid: Exposure to high heat and humidity may degrade quality of product.
Materials to avoid: None known.

SECTION 11. TOXICOLOGICAL INFORMATION

No data available.

SECTION 12. ECOLOGICAL INFORMATION

Do not discharge into drains or watercourses. Avoid ground contamination.

SECTION 13. DISPOSAL CONSIDERATIONS

This product, as supplied, when discarded or disposed of, will not be a hazardous waste according to U.S. federal regulations. Care should be taken to ensure that the material or its containers are disposed of in an approved facility in accordance with current federal and local regulations.

SECTION 14. TRANSPORTATION INFORMATION

U.S. DOT: Non-Regulated.

International Maritime Organization (IMO)/International Maritime Dangerous Goods Code

(IMDG): Not regulated by IMO or IMDG.

International Air Transport Association (IATA): Not regulated by IATA.

SECTION 15. REGULATORY INFORMATION

United States

TSCA (Toxic Substance Control Act)

TSCA Status: All components are listed on the TSCA inventory.

SECTION 16. MISCELLANEOUS OTHER INFORMATION

The information in this data sheet does not constitute any contractual warrant as to product properties and is based on the current state of knowledge. For all chemical emergencies, call Chem Trek at 01 703 527-3887

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