BUFFALO COLOR CORPORATION AREAS A and B – OFF-SITE AREA

ERIE COUNTY

BUFFALO, NEW YORK

SITE MANAGEMENT PLAN

NYSDEC Site Number: C915230A

Prepared for:

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Prepared by:

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Revision No.	Date Submitted	Summary of Revision	NYSDEC Approval Date
0	November 2023	Original Issue	

FEBRUARY 2024

CERTIFICATION STATEMENT

I Ram K. Mohan certify that I am currently a New York State registered professional engineer and that this Site Management Plan was prepared in accordance with all applicable statutes and regulations and in substantial conformance with the DER Technical Guidance for Site Investigation and Remediation (DER-10).

Ram K Mohan P.E.

February 9, 2024 DATE

Ram K. Mohan

Digitally signed by Ram K. Mohan
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SITE MANAGEMENT PLAN

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List of Acronyms

AOC	Area of Concern
BCA	Brownfield Cleanup Agreement
CCR	Construction Completion Report
CDF	confined disposal facility
COC	Certificate of Completion
DER	Division of Environmental Remediation
DGPS	differential global positioning system
DMU	Dredge Management Unit
EC	Engineering Control
EWP	Excavation Work Plan
GLNPO	Great Lakes National Program Office
HASP	Health and Safety Plan
IC	Institutional Control
IGLD85	International Great Lakes Datum of 1985
NYCRR	New York Codes, Rules and Regulations
NYSDEC or Department	New York State Department of Environmental Conservation
NYSDOH	New York State Department of Health
Off-Site Area or Site	Former Buffalo Color Corporation Site – Areas A and B – Off-Site
PCB	polychlorinated biphenyl
P.E. or PE	Professional Engineer
RAO	Remedial Action Objective
RAWP	Remedial Action Work Plan
SMP	Site Management Plan
SPT	Standard Penetration Test
USACE	U.S. Army Corps of Engineers
USEPA	U.S. Environmental Protection Agency

ES EXECUTIVE SUMMARY

The following provides a brief summary of the controls implemented for the Site, as well as the inspections, monitoring, maintenance and reporting activities required by this Site Management Plan:

Site Identification:	Former Buffalo Color Corporation Site – Areas A and B – Off-Site, 1337 South Park Avenue, in the City of Buffalo, County of Erie, New York
Institutional Controls:	1. All Engineering Controls (ECs) must be operated and maintained as specified in this Site Management Plan (SMP).
	2. All ECs must be inspected at a frequency and in a manner defined in this SMP.
	3. No excavation activities including dredging, trenching, grading, leveling, or stripping that uncover, displace, destroy, or otherwise disturb the previously installed environmental controls is allowed.
	4. Monitoring to assess the performance and effectiveness of the remedy must be performed as defined in this SMP.
	5. Monitoring, inspection, and reporting of any physical component of the remedy shall be performed as defined in this SMP.
	6. Access to the Site must be provided to agents, employees, or other representatives of the State of New York with reasonable prior notice to the property owner to assure compliance with the restrictions identified by the Deed Restriction (provided in Appendix A).
Engineering Controls:	1. Cover system and knee wall confinement
Monitoring:	Frequency:
Bathymetric Survey	Every 5 years for 20 years
Reporting:	Frequency:
Periodic Review Report	Every 5 years for 20 years or as otherwise determined by the NYSDEC

Further descriptions of the above requirements are provided in detail in the latter sections of this Site Management Plan.

1.0 INTRODUCTION

1.1 General

This Site Management Plan (SMP) is a required element of the remedial program for the former Buffalo Color Corporation (BCC) Site – Areas A and B – Off-Site Area located in Buffalo, New York (hereinafter referred to as the "Off-Site Area" or the "Site"). See Figure 1. The Site is currently in the New York State Brownfield Cleanup Program (BCP); Site No. C915230A (program defined offsite area), which is administered by New York State Department of Environmental Conservation (NYSDEC or Department).

Honeywell International Inc. (Honeywell) entered an Order on Consent and Administrative Settlement (Order), Index No. CO 9-20151109-113 on August 17, 2016, with the NYSDEC to remediate the site. A figure showing the site location and boundaries of this site is provided in Figure 1. The boundaries of the site are more fully described in the metes and bounds site description that is part of the Deed Restriction provided in Appendix A.

After completion of the remedial work, some contamination was left at this site, which is hereafter referred to as "remaining contamination." Institutional Controls (ICs) and Engineering Controls (ECs) have been incorporated into the site remedy to control exposure to remaining contamination to ensure protection of public health and the environment. A Deed Restriction granted to the NYSDEC, and recorded with the Erie County Clerk, requires compliance with this SMP and all ECs and ICs placed on the site.

This SMP was prepared to manage remaining contamination at the site until the Deed Restriction is extinguished in accordance with Environmental Conservation Law Article 71, Title 36. This plan has been approved by the NYSDEC, and compliance with this plan is required by the grantor of the Deed Restriction and the grantor's successors and assigns. This SMP may only be revised with the approval of the NYSDEC.

It is important to note that:

- This SMP details the site-specific implementation procedures that are required by the Deed Restriction. Failure to properly implement the SMP is a violation of the Deed Restriction;
- Failure to comply with this SMP is also a violation of Environmental Conservation Law, 6 NYCRR Part 375 and the Order on Consent (Index #CO 9-20151109-133; Site # C915230A) for the site, and thereby subject to applicable penalties.

All reports associated with the site can be viewed by contacting the NYSDEC or its successor agency managing environmental issues in New York State. A list of contacts for persons involved with the site is provided in Appendix B.

This SMP was prepared by Anchor QEA Engineering, PLLC, on behalf of Honeywell , in accordance with the requirements of the NYSDEC's DER-10 ("Technical Guidance for Site Investigation and Remediation"), dated May 3, 2010, and the guidelines provided by the NYSDEC. This SMP addresses the means for implementing the ICs and/or ECs that are required by the Deed Restriction for the site.

1.2 Revisions

Revisions to this plan will be proposed in writing to the NYSDEC's project manager. The NYSDEC can also make changes to the SMP or request revisions from the remedial party. Revisions will be necessary upon, but not limited to, the following occurring: a change in media monitoring requirements, upgrades to or shutdown of a remedial system, post-remedial removal of contaminated sediment or soil, or other significant change to the site conditions. In accordance with the Deed Restriction (provided in Appendix A) for the site, the NYSDEC project manager will provide a notice of any approved changes to the SMP, and append these notices to the SMP that is retained in its files.

1.3 Notifications

Notifications will be submitted by the property owner, City of Buffalo, and/or Honeywell and/or South Buffalo Development (SBD) the Area A Remedial Party to the NYSDEC, as needed, in accordance with NYSDEC's DER-10 for the following reasons:

1. 60-day advance notice of any proposed changes in site use that are required under the terms of the Order on Consent, 6 NYCRR Part 375 and/or Environmental Conservation Law.
2. 7-day advance notice of any field activity associated with the remedial program.
3. 15-day advance notice of any proposed ground-intrusive activity pursuant to the Excavation Work Plan (provided in Appendix C). If the ground-intrusive activity qualifies as a change of use as defined in 6 NYCRR Part 375, the above mentioned 60-day advance notice is also required.
4. Notice within 48 hours of any damage or defect to the foundation, structures or EC that reduces or has the potential to reduce the effectiveness of an EC, and likewise, any action to be taken to mitigate the damage or defect.
5. Notice within 48 hours of any non-routine maintenance activities.
6. Verbal notice by noon of the following day of any emergency, such as a fire; flood; or earthquake that reduces or has the potential to reduce the effectiveness of ECs in place at the site, with written confirmation within 7 days that includes a summary of actions taken, or to be taken, and the potential impact to the environment and the public.
7. Follow-up status reports on actions taken to respond to any emergency event requiring ongoing responsive action submitted to the NYSDEC within 45 days describing and documenting actions taken to restore the effectiveness of the ECs.

Any change in the ownership of the site or the responsibility for implementing this SMP will include the following notifications:

8. At least 60 days prior to the change, the NYSDEC will be notified in writing of the proposed change. This will include a certification that the prospective purchaser/Remedial Party has been provided with a copy of the Order on Consent and all approved work plans and reports, including this SMP.
9. Within 15 days after the transfer of all or part of the site, the new owner's name, contact representative, and contact information will be confirmed in writing to the NYSDEC.

Table 1 includes contact information for the above notifications. The information on this table will be updated as necessary to provide accurate contact information. A full listing of site-related contact information is provided in Appendix B.

Table 1: Notifications*

Name	**Contact Information**	**Required Notification****
NYSDEC: Regional Hazardous Waste Engineer	(716) 851-7220	All Notifications
NYSDEC Site Control Manager	(518) 402-9569	Notifications 1 and 8
NYSDOH: Bureau of Environmental Exposure and Investigation	(518) 402-7890 beei@health.ny.gov	Notifications 4, 6, and 7

* Note: Notifications are subject to change and will be updated as necessary.

** Note: Numbers in this column reference the numbered bullets in the notification list in this section.

2.0 SUMMARY OF PREVIOUS INVESTIGATIONS AND REMEDIAL ACTIONS

2.1 Site Location and Description

The Site is located in the City of Buffalo, Erie County, New York, represented by the portion of Buffalo River adjacent to former **BCC** Site Area A located at 1337 South Park Avenue with Tax Parcel SBL#122.16-1-9 (see Figure 1). The site is referred to as an offsite area to the BCC Area A and B BCP Site C915230. The NYSDEC on December 31, 2013, issued South Buffalo Development a Certification of Completion for remediation of areas A and B. This portion of the river is located between the former BCC Area A Site property line and the federal navigation channel that is maintained through dredging by the U.S. Army Corps of Engineers (USACE) at a depth of 22 feet below low water datum (see Figure 1). This area is also located within Dredge Management Units (DMUs) 9 and 10 of the Buffalo River Area of Concern (AOC) project. The area extends approximately 200 feet along the Buffalo River shoreline and varies in width from approximately 30 to 55 feet. The site is approximately 8,000 square feet (less than one-fifth of an acre). The boundaries of the site are more fully described in the Deed Restriction provided in Appendix A. The owner(s) of the site parcel(s) at the time of issuance of this SMP is the City of Buffalo, which owns the Buffalo River riverbed.

2.2 Physical Setting

2.2.1 Land Use

Brownfield remediation efforts associated with the upland BCC Area A site were completed in December 2013. The BCP remedial action work included building and structure demolition, installation of a groundwater cut-off wall , a groundwater pump and treatment system, soil cap and cover installations, and shoreline restoration. The submerged offsite portion, which is the focus of this SMP, includes a portion of the shoreline below a previously installed, rock-filled marine mattress protecting the shoreline as well as submerged portions of the Buffalo River at the bottom of the upland slope, along the BCC Area A parcel.

2.2.2 Geology

Subsurface conditions in the Off-Site Area were characterized through observations of samples obtained during advancement of soil borings performed in May 2015 as part of the Buffalo River AOC remedial investigations. The following five principal soil units, and bedrock, were identified during the investigation. These soil units are described from the ground surface/mudline downward.

1. **Fill/SAND/Silty SAND and Clayey Gravel (SM/SP/GC)** – This unit, a variable mixed fill, is described as a loose to medium dense, damp to moist, reddish dark brown, fine to medium silty sand with variable gravel content and occasional brick and concrete debris and glass fragments. The bottom elevation of the unit varied from 545.9 to 555.5 feet International Great Lakes Datum of 1985 (IGLD85).
2. **SILT (ML/MH) –** This unit is observed at in-water locations typically above the clay or an alluvium deposit. The silt varied between areas investigated but in general is described as a very soft, moist to wet, olive gray to dark gray, clayey silt with medium to high plasticity and varying organic content. In DMUs 9 and 10, the thickness ranged from 3.0 to 5.0 feet.
3. **Alluvium (SP-SM/SM) –** The alluvium unit was observed immediately beneath the fill unit in DMUs 9 and 10. The unit is described as a loose to medium dense, olive gray-brown, fine to medium-coarse sand with silt and silty sand and angular rock fragments. The thickness ranged from 4.0 to 6.0 feet in the two borings where the unit was observed. The bottom elevation of the unit varied from 539.9 to 541.9 feet IGLD85.
4. **CLAY (CL/CH) –** This unit was observed in all borings and was the principal unit targeted for this investigation. The unit is described as a very soft to soft, moist, reddish gray-brown, silty, and sandy clay with low to medium plasticity. In upland borings, the unit is soft to medium stiff. In DMUs 9 and 10, the observed thickness of the clay at the upland borings ranged from 28 to 30 feet. The unit was typically underlain by a glacial till unit or bedrock.
5. **Till (SC/CL)** – This unit was observed in all borings immediately beneath the clay unit. The unit is typically soft to stiff, moist, gray to gray-brown, silty sandy clay with low plasticity and varying sand and gravel content. The unit is readily identified by presence of course, granular particles and a change in color from reddish brown to grayish. The material is observed to be 5.0 to 8.0 feet thick near DMUs 9 and 10.
6. **Bedrock** – Bedrock was encountered in all borings. The bedrock was observed to be intact because Standard Penetration Test (SPT) sampling met refusal criteria (i.e., 50 blows per 6-inch drive interval) typically with 1 to 2 inches of

driving. Fragments of bedrock recovered from SPT sampling were observed in the field and estimated to be consistent with limestone.

Site-specific boring logs are provided in Appendix D.

2.3 Investigation and Remedial History

The following narrative provides a remedial history timeline and a brief summary of the available project records to document key investigative and remedial milestones for the Site. Full titles for each of the reports referenced below are provided in Section 7.0 - References.

2.3.1 Summary of Remedial Investigations

Numerous environmental investigations dating back to the 1980s for the former BCC industrial complex (Areas A, B, C, D and E) site. The *Former Buffalo Color Corporation Site – Area A/B Site Management Plan* (AMEC Environment and Infrastructure, Inc., 2015a) provides a detailed discussion of the history of the former BCC Site, contaminated media, remedial actions, and ongoing monitoring.

Sediments within Buffalo River AOC DMUs 9 and 10, in which the Off-Site Area is located, were sampled, in part, by the U.S. Environmental Protection Agency (USEPA) Great Lakes National Program Office (GLNPO) and NYSDEC, between 2005 and 2010. Four primary indicator chemicals for the AOC were determined during the 2005 to 2010 sampling programs, including polycyclic aromatic hydrocarbons, polychlorinated biphenyls (PCBs), lead, and mercury. Exceedances of the AOC remedial goals for these four contaminants of concern were observed in DMUs 9 and 10. All data were provided as part of the *Final Basis of Design Report – Final Design for Sediment Remediation: Volume 1* (CH2M Hill, 2013). Within the Off-Site Area footprint, there are no known environmental sediment samples with analytical data. Due to the presence of both the marine mattress and an upland cut-off wall USEPA GLNPO designated DMU 9 & 10 as a critical structure within the Buffalo River AOC.

2.3.2 Remedy on Record

The Off-Site Area consists of portions of the former BCC Area A Site and the Buffalo River AOC DMUs 9 and 10. Initial riverbank stabilization was part of the former BCC Area A On-Site remediation. The riverbank stabilization was a pre-BCP interim remedial measure (IRM) that included the installation of a marine armor mattress in 2006. The marine armor mattress consisted of a series of anchored rock-filled marine armor mattresses providing containment and erosion protection along a 200-foot-long section of the shoreline. The mattress sections comprise geo-composite grids filled with armor stone and anchored at the top of the slope and extend down into the Buffalo River (the Off-Site Area). The marine armor mattress along with engineered vegetative plantings stabilize and provide protection of the Area A riverbank that runs parallel to a vertical hydraulic barrier wall, a critical remedy component of the BCC Area A BCP remedy. Details regarding the as-built condition of the marine armor mattresses are included in the *Final Engineering Report – Buffalo Color Site – Area ABCE Interim Corrective Measure* (MACTEC, 2008). Survey monitoring of the marine armor mattress top of slope is conducted on an annual basis as a component of the On-Site Area A monitoring plan. There has been no verified measured displacement of the slope protection that exceeds the established monitoring criteria.

The Off-Site Area project limits that extend beyond the marine armor mattress system were addressed via a steel sheetpile knee wall, dredging, and backfill remedy that was conducted in accordance with USEPA GLNPO- and NYSDEC-approved designs conducted as part of the Buffalo River AOC remedy. The initial remedial design of DMUs 9 and 10 as presented in the *Final Basis of Design Report – Final Design for Sediment Remediation: Volume 1* (CH2M Hill, 2013) consisted of dredging impacted sediments with contaminants of concern exceeding remedial goals to the depth at which glacial till is reached, which had been determined through the AOC investigation work to represent a confining layer. Initial dredging of contaminated sediments in 2013 and 2014 removed sediments from DMUs 9 and 10 in the main channel up to the navigation channel boundary. Contaminated sediment remained in DMUs 9 and 10 between the navigation channel boundary and the marine armor mattress cover over a section of the BCC Area A river

embankment. *An Alternatives Evaluation for DMUs 9 & 10 Marine Mattress* (Anchor QEA, 2014) for addressing the contaminated sediments in the Off-Site Area was provided to the Buffalo River AOC project stakeholders, including NYSDEC, in 2014.

The alternative design was finalized in 2015 and consisted of the installation of a knee wall. The final design for dredging and sheeting installation is depicted in the *Buffalo River AOC 2015 Additional Dredging, Construction Drawings* (Anchor QEA, 2015). A detailed description of the remedial design process including project timelines is memorialized in the Off-Site Area Remedial Action Work Plan (RAWP; Anchor QEA, 2021). Details of the construction process and supporting confirmation information are provided in the Off-Site Area Construction Completion Report (CCR; Anchor QEA, 2019) The following is a summary of the remedial actions performed at the site:

- In November 2015, sheetpile sections were installed under water, forming a knee wall along the toe of the marine armor mattress. Sheetpile sections were driven to bedrock, providing support for the removal of sediments in front of the knee wall without impacting the marine armor mattress and upland hydraulic barrier wall of On-Site Area A. Dredging was completed on the channel side of the knee wall in December 2015. Approximately 1,182 cubic yards of sediment were removed and disposed of in the USACE owned and operated confined disposal facility (CDF) #4. The CDF #4 is located at the south end of Buffalo Harbor, in Buffalo, New York. Post-dredge backfill consisting of 18 inches of clean sand was placed over a narrow band of sediments located between the toe of the existing marine armor mattress and the knee wall (see Figures 2-1, 2-2, and 2-3). The CCR (Anchor QEA, 2019) details the remedial construction and provides as-built records for the final remedy of the Former Buffalo Color Corporation Off-Site Areas A and B.

2.4 Remedial Action Objectives

The primary objective of the overall Buffalo River AOC Great Lakes Legacy Act Project, under which the Off-Site Area work was completed, is to remediate the Buffalo River AOC by a combination of removing the contaminated sediments, covering the bottom portion of the embankment with sand fill up to 18 inches in thickness, and habitat restoration to support lifting the Beneficial Use Impairments designations for the waterway. The following are Remedial Action Objectives (RAOs) developed for the larger

AOC project of which the Off-Site Area is a component, as presented in the final Feasibility Study Report for the project (ENVIRON et al., 2011):

- Reduce human exposure for direct sediment contact and fish consumption from the Buffalo River by reducing the availability and/or concentrations of the contaminants of concern in sediment.
- Reduce the exposure of wildlife populations and the aquatic community to sediment contaminant of concern concentrations above protective levels.
- Reduce or otherwise address legacy sediment contaminant of concern concentrations to improve the likelihood that future dredged sediments (for routine navigational, commercial, and recreational purposes) will not require confined disposal.
- Implement a remedy compatible with the Buffalo River Remedial Advisory Committee's goal of protecting and restoring habitat and supporting wildlife.
- Along with the RAOs, supportive goals were considered during the assessment of remedial alternatives, such as the following:
  - Reduce the long-term potential of contaminants of concern contaminated sediments to migrate outside of the Buffalo River AOC.
  - Implement a sediment remedy that is compatible with and complements ongoing regional redevelopment goals, upland remediation, and restoration activities.

2.5 Remaining Contamination

2.5.1 Sediment

Sediments within Buffalo River AOC DMUs 9 and 10, where the Off-site Area is located, were sampled in 2005, 2008, and 2010 as part of the remedial investigation and feasibility study of the AOC. This sediment sampling program was conducted, in part, by USEPA GLNPO and NYSDEC. Four primary indicator chemicals for the AOC were determined during this sampling program, including polycyclic aromatic hydrocarbons (PAHs), polychlorinated biphenyls (PCBs), lead (Pb), and mercury (Hg). Exceedances of the AOC cleanup levels for these four contaminants of concern (COCs) were observed in DMUs 9 and 10. All data were provided as part of the Final Basis of Design Report – Final Design for Sediment Remediation: Volume 1 (CH2M Hill 2013).

Known or suspected contaminated sediment within the Off-Site Area has either been removed by dredging, contained behind the installed knee wall, or covered with either a marine armor mattress or post-dredge backfill. Within the Off-Site Area, there are no

known environmental sediment samples with analytical data. A wedge of sediment remains beneath the marine mattress and the upland cut-ff wall. As a conservative measure, and in the absence of discrete post-dredging data, remaining sediment and contaminated fill beneath the marine armor mattress and post-dredge backfill and above the confining layer have been assumed to exceed NYSDEC Sediment Guidance Values.

Post-dredging data from DMU 9 and 10 areas outside of the Off-Site Area footprint were collected in 2020 as part of the Year 5 Verification Monitoring effort for the Buffalo River AOC Great Lakes Legacy Act (GLLA) project and provide information on sediment conditions proximate to the Off-Site Area. Discrete sample results for PAHs collected within these DMUs showed no exceedances of the PAH remedial goal (16 mg/kg). Furthermore, surface-weighted area concentrations for PCBs, Pb, and Hg for samples collected from DMU 9 and 10 were also below remedial goals of 0.2 mg/kg, 90 mg/kg, 0.44 mg/kg, respectively (Ramboll and Anchor QEA, 2021).

3.0 INSTITUTIONAL AND ENGINEERING CONTROL PLAN

3.1 General

Since remaining contamination exists at the site, Institutional Controls (ICs) and Engineering Controls (ECs) are required to protect human health and the environment. This IC/EC Plan describes the procedures for the implementation and management of all IC/ECs at the site. The IC/EC Plan is one component of the SMP and is subject to revision by the NYSDEC project manager.

This plan provides:

- A description of all IC/ECs on the site;
- The basic implementation and intended role of each IC/EC;
- A description of the key components of the ICs set forth in the Deed Restriction (provided in Appendix A);
- A description of the controls to be evaluated during each required inspection and periodic review;
- A description of plans and procedures to be followed for implementation of IC/ECs, such as the implementation of the Excavation Work Plan (EWP) (provided in Appendix C) for the proper handling of remaining contamination that may be disturbed during maintenance or redevelopment work on the site; and
- Any other provisions necessary to identify or establish methods for implementing the IC/ECs required by the site remedy, as determined by the NYSDEC project manager.

3.2 Institutional Controls

A series of ICs is required by the RAWP to: (1) implement, maintain and monitor Engineering Control systems; (2) prevent future exposure to remaining contamination; and (3) limit the use and development of the site. Adherence to these ICs on the site is required by the Deed Restriction and will be implemented under this SMP. ICs identified in the Deed Restriction may not be discontinued without an amendment to or extinguishment of the Deed Restriction. The IC boundaries are shown in the Deed Restriction provided in Appendix A. These ICs are:

- All ECs must be operated and maintained as specified in this SMP;
- All ECs must be inspected at a frequency and in a manner defined in the SMP;
- No excavation activities including dredging, trenching, grading, leveling, or stripping that uncover, displace, destroy, or otherwise disturb the previously installed environmental controls is allowed;
- Monitoring to assess the performance and effectiveness of the remedy must be performed as defined in this SMP;
- Monitoring, inspection, and reporting of any physical component of the remedy shall be performed as defined in this SMP; and
- Access to the site must be provided to agents, employees or other representatives of the State of New York with reasonable prior notice to the property owner to assure compliance with the restrictions identified by the Deed Restriction.

3.3 Engineering Controls

3.3.1 Cover

Exposure to remaining contamination at the site is prevented by a cover system placed over the site. This cover system is comprised primarily of a marine armor mattress. In areas not covered with the marine armor mattress, approximately 18 inches of clean sand cover has been installed. Figure 1 presents the location of the cover system and applicable demarcation layers. The Excavation Work Plan (EWP) provided in Appendix C outlines the procedures required to be implemented in the event the cover system is breached, penetrated or temporarily removed. Procedures for the inspection of this cover are provided in the Monitoring Plan included in Section 4.0 of this SMP. Any work conducted pursuant to the EWP must also be conducted in accordance with the procedures defined in a Health and Safety Plan (HASP) prepared for the site and provided in the *Former Buffalo Color Corporation Site - Area A/B Site Management Plan* (AMEC Environment and Infrastructure, Inc., 2015a). A copy of this HASP is provided in Appendix E. Any disturbance of the site's cover system must be overseen by a qualified environmental professional as defined in 6 NYCRR Part 375, a Professional Engineer (PE) who is licensed and registered in New York State, or a qualified person who directly reports to a PE who is licensed and registered in New York State.

The cover system is a permanent engineering control, and the quality and integrity of this system will be inspected at defined, regular intervals in accordance with this SMP in perpetuity.

4.0 MONITORING PLAN

4.1 General

This Monitoring Plan describes the measures for evaluating the overall performance and effectiveness of the remedy. This Monitoring Plan may only be revised with the approval of the NYSDEC project manager.

This Monitoring Plan describes the methods to be used for:

- Physical monitoring of subaqueous riverbank cover and stabilization elements;
- Evaluating site information periodically to confirm that the remedy continues to be effective in protecting public health and the environment;

To adequately address these issues, this Monitoring Plan provides information on survey location, methods, and frequency.

Reporting requirements are provided in Section 6.0 of this SMP.

Monitoring of the upland Area A BCP site is outlined in the BCC Area A and B SMP (AMEC Environment and Infrastructure, Inc., 2015).

4.2 Bathymetric Survey

Periodic bathymetric surveys will be the primary means of monitoring subaqueous remedial elements in the Off-Site Area. Bathymetric surveys will be performed to document the presence and condition of the knee wall, marine armor mattress, and post-dredge backfill. Surveys will be compared against the 2015 post-construction conditions as-built drawings (CCR; Anchor QEA, 2019). Bathymetric surveys will be performed a minimum of every 5 years for a total of 20 years. The ACOE as a component of the navigation channel maintenance completes a bathymetric survey of the navigation channel for this section of the Buffalo River every 3 to 5 years. The bathymetric survey will be scheduled to coincide with the ACOE survey, and this survey used to document the Riverbank Restoration Monitoring of the Former Buffalo Color Corporation Site – Area D Sediment Containment Monitoring. A copy of the post dredging and capping bathymetric

survey and the 2020 bathymetric survey is contained in Appendix F. The design plans for the sheet pile knee wall, dredging and cover installation are also contained in Appendix F.

4.2.1 Bathymetric Survey Methods

Bathymetric survey methods shall be consistent with the methods utilized to develop the 2015 as-built drawings to allow for an equal comparison of survey data from varying time periods. Bathymetric survey methods shall conform to the following:

- Survey shall cover 100% of the submerged portions of the Off-Site Area and extend a minimum of 50 feet outside the extents of the Off-Site Area.
- The USACE hydrographic surveying requirements referenced in EM-1110-2-1003 *Engineering and Design Hydrographic Surveying* (USACE, 2013) shall be mandatory, unless stated otherwise. Bathymetric surveys shall be performed with multi-beam survey equipment. The survey software must be capable of collecting XYZ data in real time. Horizontal positioning shall be by a differential global positioning system (DGPS), or an equivalent technology capable of achieving DGPS accuracy.
- Survey methods shall have a horizontal (x, y) accuracy of 3 feet (or better) and a vertical (z) accuracy of +1, -3 inches (or better).
- Horizontal datum shall be in New York State Plane Coordinates North American Datum 1983, West Zone (U.S. feet). Vertical datum shall be in IGLD85 (feet).
- In shallow water areas inaccessible by survey vessels, bathymetric surveys shall be supplemented as necessary with topographic surveys conducted by a qualified land surveyor.
- Surveyor shall provide:
  - Drawings depicting labeled contour lines, property line locations, horizontal grid systems, cross sections and details modified to show variations in conditions, details and cross sections from original drawings, and any authorized field changes of elevations, dimensions, and details
  - AutoCAD 2014 (or subsequent version(s) in general use), Civil 3D, and LDD electronic files or xml files, as appropriate, for the project provided on CD and a data file provided of all the points surveyed using PNEZD format (point number, northing, easting, elevation, and description)
  - An electronic scanned copy of the survey book upon completion of each phase of survey work, including all field notes, notations, and descriptions used and compiled during the field survey
  - The AutoCAD model space drawing shall be plotted in hardcopy on sheet size 22 inches by 34 inches, at an appropriate scale; three copies shall be

submitted, and all copies shall bear the seal and signature of the professional surveyor licensed in the State of New York

4.2.2 Performance Criteria and Response Actions

Monitoring of the submerged riverbank stabilization elements will be conducted to document the condition of the system and identify deficiencies that require maintenance or repair. Specifically, the monitoring will focus on the following:

- **Marine Armor Mattress** – Bathymetric surveys will monitor the marine armor mattress and surrounding riverbank for potential movement or damage. Changes in elevation of the marine armor mattress may be an indication of slope movement, sloughing, scour, or damage and should be evaluated by the certifying engineer.
- **Post-Dredge Backfill** – Bathymetric surveys will monitor the post-dredge backfill area for potential material loss indicated by changes in elevation. A reduction in the post-dredge backfill elevation (as determined by bathymetric surveys) may be an indication of potential material loss and should be evaluated by the certifying engineer. Settlement of the substrate or backfill materials, if observed, will not warrant repairs or maintenance. This monitoring will be used to qualitatively assess the below-surface condition of the mattress. Separate quantitative monitoring of the marine armor mattress for stability along surface monuments will continue to occur as part of the existing Site Management Plan for the Former Buffalo Color Corporation Site – Areas A and B (AMEC Environment and Infrastructure, Inc., 2015a).
- **Knee Wall** – Bathymetric surveys will monitor the top of the knee wall (if exposed) and surrounding river bottom to monitor for potential changes in the top of wall elevations (if exposed) and surrounding sediment elevation changes for potential scour or irregularities. Scour, changes in wall position, or other documented irregularities should be further evaluated by the certifying engineer.

Following the completion of each bathymetric survey, the certifying engineer will review the data and prepare the required reports detailed in Section 6.0 of this SMP. In the event that monitoring activities identify areas where the remedial elements may be physically compromised, a corrective measures work plan will be developed in accordance with reporting requirements detailed in Section 6.3 of this SMP. The collection of supplemental data (e.g., underwater video survey, probing, or diver survey) may be necessary to determine the cause of and delineate the extent of any deficiencies identified before response actions are initiated.

Routine site wide inspections will not be performed on any regular basis as the remedial elements are submerged along the Buffalo River embankment. Routine and emergency inspections of the upland areas and marine mattress will be performed as part of the site management of the upland BCC Areas and B (C915230) BCP site (see BCC Areas And B SMP, AMEC Environment and Infrastructure, Inc., 2015). Any unusual conditions observed along the upland sections of the marine mattress and embankment may require an in-water inspection or bathymetric survey for further assessment.

4.3 Completed Monitoring Events to Date

To date, one monitoring event, including a bathymetric survey, has been completed at the site (2020; Year 5). The results of the 5 year bathymetric survey and post dredging bathymetric survey are included in Appendix F.

5.0 OPERATION AND MAINTENANCE PLAN

5.1 General

The site remedy does not rely on any active treatment systems, such as groundwater treatment systems, sub-slab depressurization systems or air sparge/soil vapor extraction systems to protect public health and the environment. Routine maintenance of the steel knee wall or sediment cover are not anticipated or expected. Remedial elements will be repaired as needed as detailed in Section 4 (Monitoring Plan) of this SMP. Therefore, operation and maintenance of such components is not included in this SMP.

6.0. REPORTING REQUIREMENTS

6.1 Site Management Reports

All site management inspection, maintenance and monitoring events will be recorded on the appropriate site management forms provided in Appendix G. These forms are subject to NYSDEC revision. All monitoring events will be conducted at the frequency specified in Section 4 (Monitoring Plan) of this SMP. Monitoring events will also occur whenever a severe event has taken place, such as flooding, erosion, or vessel collision, that may have potentially damaged remedial elements of the Off-Site Area. Monitoring of the upland BCP site remedies will be completed as part of the BCP site inspection and monitoring. All site management inspection, maintenance, and monitoring events will be conducted by a qualified environmental professional as defined in 6 NYCRR Part 375, a PE who is licensed and registered in New York State, or a qualified person who directly reports to a PE who is licensed and registered in New York State.

All applicable inspection forms and other records generated for the site during the reporting period will be provided in electronic format to the NYSDEC in accordance with the requirements of Table 2 and summarized in the Periodic Review Report.

Table 2: Schedule of Monitoring/Inspection Reports

Task/Report	Reporting Frequency*
Bathymetric Survey	Every 5 years for 20 years
Periodic Review Report	Every 5 years for 20 years or as otherwise determined by the NYSDEC

* The frequency of events will be conducted as specified until otherwise approved by the NYSDEC project manager.

All monitoring/inspections reports will include, at a minimum:

- Date of event or reporting period;
- Name, company, and position of person(s) conducting monitoring/inspection activities;
- Description of the activities performed;

- Where appropriate, color photographs or sketches showing the approximate location of any problems or incidents noted (included either on the checklist/form or on an attached sheet).

6.2 Periodic Review Report

A Periodic Review Report will be submitted to the NYSDEC project manager every 5 years after the completion of the project and the Satisfactory Completion Letter is issued. After submittal of the initial Periodic Review Report, the next Periodic Review Report shall be submitted every fifth year, as appropriate, to the NYSDEC project manager or at another frequency as may be required by the NYSDEC project manager. In the event that the site is subdivided into separate parcels with different ownership, a single Periodic Review Report will be prepared that addresses the site described in the Deed Restriction provided in Appendix A. The report will be prepared in accordance with NYSDEC's DER-10 and submitted within 30 days of the end of each certification period. The report will include:

- Identification, assessment and certification of all ECs/ICs required by the remedy for the site.
- All applicable site management forms and other records generated for the site during the reporting period in the NYSDEC-approved electronic format, if not previously submitted.
- A site evaluation, which includes the following:
  - The compliance of the remedy with the requirements of the site-specific Remedial Action Work Plan (RAWP);
  - Any new conclusions or observations regarding site contamination based on inspections
  - Recommendations regarding any necessary changes to the remedy and/or Monitoring Plan;
  - The overall performance and effectiveness of the remedy.

6.2.1 Certification of Institutional and Engineering Controls

Following the last inspection of the reporting period, a PE licensed to practice and registered in New York will prepare, and include in the Periodic Review Report, the following certification as per the requirements of NYSDEC DER-10:

"*For each institutional or engineering control identified for the site, I certify that all of the following statements are true:*

- *The inspection of the site to confirm the effectiveness of the institutional and engineering controls required by the remedial program was performed under my direction;*
- *The institutional control and/or engineering control employed at this site is unchanged from the date the control was put in place, or last approved by the Department;*
- *Nothing has occurred that would impair the ability of the control to protect the public health and environment;*
- *Nothing has occurred that would constitute a violation or failure to comply with any site management plan for this control;*
- *Access to the site will continue to be provided to the Department to evaluate the remedy, including access to evaluate the continued maintenance of this control;*
- *If a financial assurance mechanism is required under the oversight document for the site, the mechanism remains valid and sufficient for the intended purpose under the document;*
- *Use of the site is compliant with the Deed Restriction;*
- *The engineering control systems are performing as designed and are effective;*
- *To the best of my knowledge and belief, the work and conclusions described in this certification are in accordance with the requirements of the site remedial program and generally accepted engineering practices; and*
- *The information presented in this report is accurate and complete.*

I certify that all information and statements in this certification form are true. I understand that a false statement made herein is punishable as a Class "A" misdemeanor, pursuant to Section 210.45 of the Penal Law. I, [To Be Determined] of [To Be Determined], am certifying as Remedial Party's Designated Site Representative for the site."

"I certify that the New York State Education Department has granted a Certificate of Authorization to provide Professional Engineering services to the firm that prepared this Periodic Review Report."

- *The assumptions made in the qualitative exposure assessment remain valid.*

The signed certification will be included in the Periodic Review Report.

The Periodic Review Report will be submitted, in electronic format, to the NYSDEC project manager. The Periodic Review Report may also need to be submitted in hard-copy format if requested by the NYSDEC project manager.

6.3 Corrective Measures Work Plan

If any component of the remedy is found to have failed, or if the periodic certification cannot be provided due to the failure of an institutional or engineering control or failure to conduct site management activities, a Corrective Measures Work Plan will be submitted to the NYSDEC project manager for approval. This plan will explain the failure and provide the details and schedule for performing work necessary to correct the failure. Unless an emergency condition exists, no work will be performed pursuant to the Corrective Measures Work Plan until it has been approved by the NYSDEC project manager.

7.0 REFERENCES

Anchor QEA, 2014. *An Alternatives Evaluation for DMUs 9 &10 Marine Mattress.* Buffalo River Area of Concern. July 2014.

Anchor QEA, 2015. *Buffalo River AOC 2015 Additional Dredging, Construction Drawings*. November 2015.

Anchor QEA, 2017. *Citizen Participation Plan for Buffalo Color Corporation Site Area A and B – Off-Site*. March 2017.

Anchor QEA, 2018. *Remedial Investigation and Alternatives Analysis Report Buffalo Color Corporation Site Areas A and B – Off-Site NYSDEC Site No. C915230A.* June 2018.

Anchor QEA, 2021. *Construction Completion Report Buffalo Color Corporation Site Areas A and B – Off-Site NYSDEC Site No. C915230A.* February 2019.

Anchor QEA, 2021. *Remedial Action Work Plan for Buffalo Color Corporation Site Areas A and B Off-Site: NYSDEC Site No. C915230A.* June 2021.

Anchor QEA, 2021. *Alternative Analysis Report for Buffalo Color Corporation Site Areas A and B Off-Site: NYSDEC Site No. C915230A.* June 2021

CH2M Hill, 2013. *Final Basis of Design Report - Final Design for Sediment Remediation: Volume 1, Buffalo, New York*. March 2013.

ENVIRON, MACTEC, and Limnotech, 2011. *Final Feasibility Study for the Buffalo River, New York*. October 2011.

MACTEC, 2008. *Final Engineering Report – Buffalo Color Site – Area ABCE Interim Corrective Measure.* October 2008.

AMEC Environment and Infrastructure, Inc., 2015a. *Former Buffalo Color Corporation Site – Area A/B Site Management Plan*. May 2015.

NYSDEC (New York State Department of Environmental Conservation), 2006. 6 New York Codes, Rules and Regulations (NYCRR) Part 375, Environmental Remediation Programs. December 14, 2006.

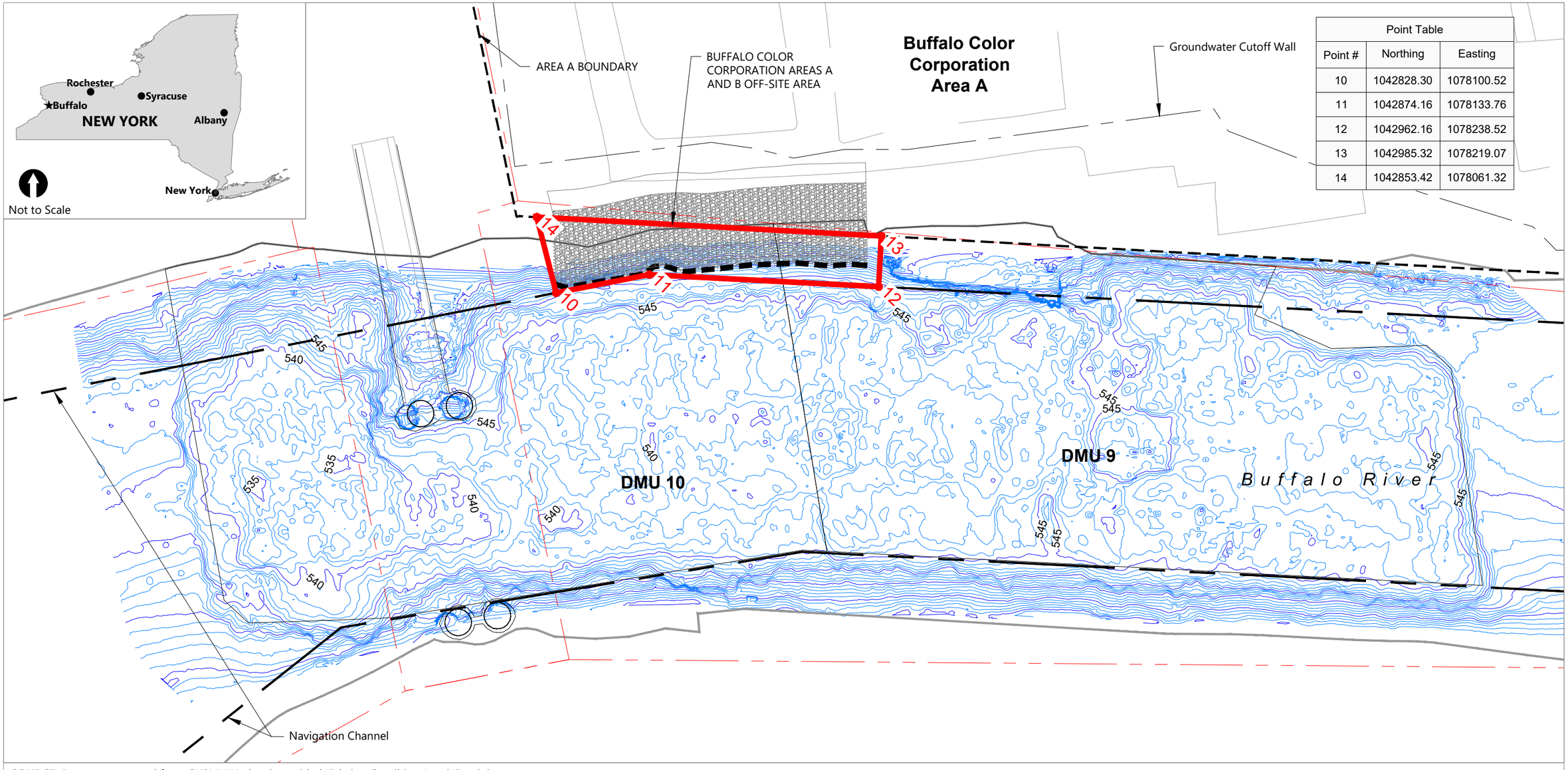
NYSDEC, 2016. *Order on Consent and Administrative Settlement Index No. CO 9-20151109-133*, August 16, 2016

NYSDEC, 2019. *Technical Guidance for Site Investigation and Remediation* (DER-10). Issued May 3, 2010; effective June 18, 2010; and errata sheet last revised April 9, 2019.

Ramboll and Anchor QEA, 2021. Year 5 Verification Monitoring Results for the Buffalo River. Prepared for Honeywell International Inc. October 2021.

USACE (U.S. Army Corps of Engineers), 2013. *Engineering and Design Hydrographic Surveying*. EM 1110-2-1003. Engineer Manual. November 30, 2013.

FIGURE 1



Point Table		
Point #	Northing	Easting
10	1042828.30	1078100.52
11	1042874.16	1078133.76
12	1042962.16	1078238.52
13	1042985.32	1078219.07
14	1042853.42	1078061.32

SOURCE: Basemap prepared from CH2MHILL drawings, titled 'Existing Conditions' and 'Dredging Operations'. Bathymetry from AECOM, dated October 2014.
HORIZONTAL DATUM: New York State Plane West, NAD83, U.S. Feet.
VERTICAL DATUM: International Great Lakes Datum of 1985 (IGLD85)
NOTES:

1. Base map information including navigation channel, in-water structure and 90% Design toe of marine mattress is shown as indicated in the Basis of Design Report prepared by CH2MHill/Ecology and Environment (March, 2013)
2. Actual toe of marine mattress is based on May 28, 2013 diver survey and probing conducted by OSI (April 2014).

LEGEND:

- 550 — Existing Contours
- Toe of Marine Mattress
- DMU Boundary
- Marine Mattress Design Footprint (Mactec now known as Wood)
- Parcels
- Groundwater Cutoff Wall

0 100 Feet

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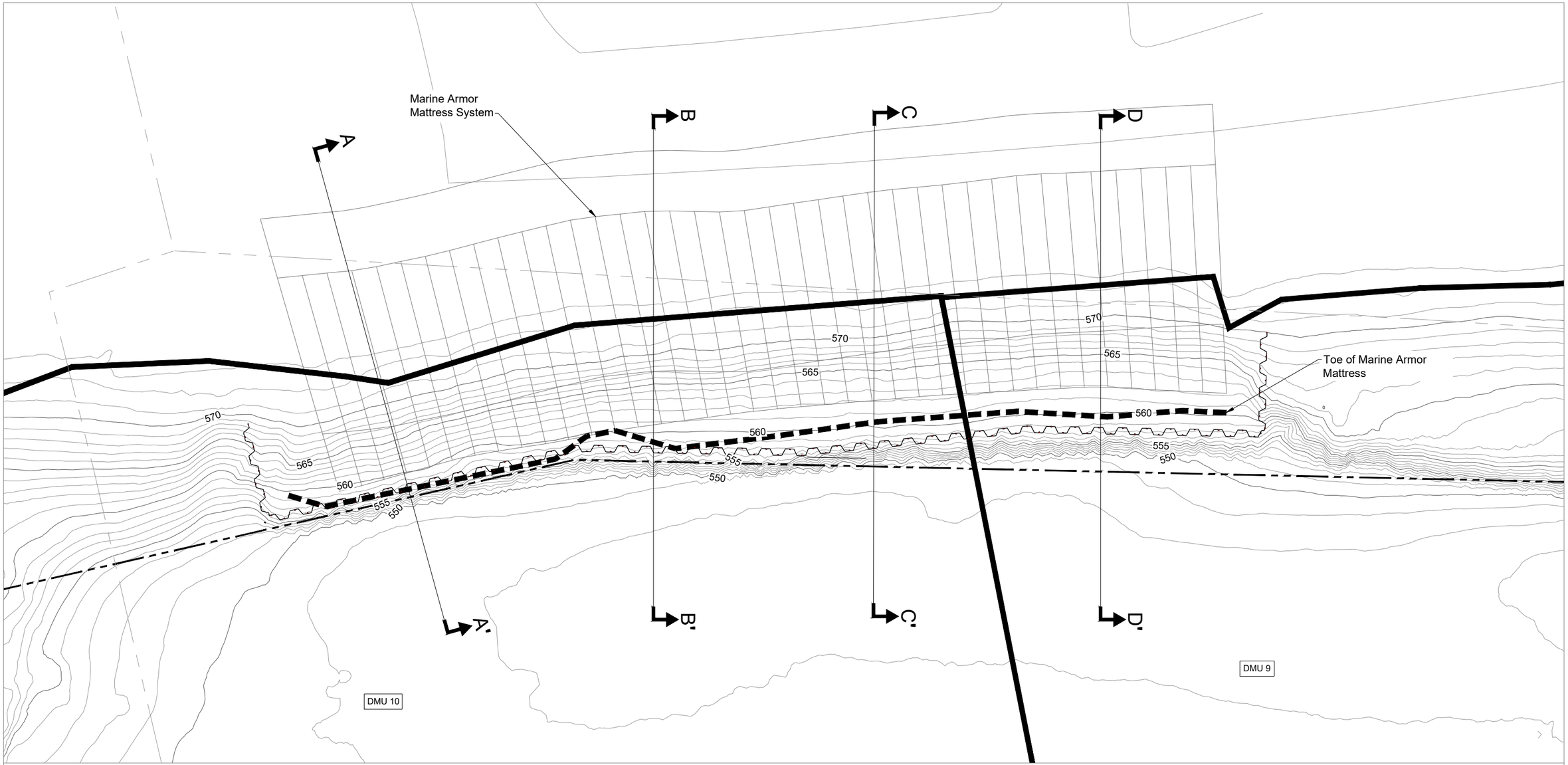
ANCHOR QEA

Figure 1
Site Location Map

Buffalo Color Corporation Areas A and B Off-Site Area
Buffalo, New York

FIGURES 2-1 to 2-3



SOURCE: Basemap from CH2MHill (2015). Knee Wall As-Built from OSC (2020). Long Term Monitoring Bathymetry from Seaworks, (June 2020).

HORIZONTAL DATUM: New York State Plane West, NAD83, U.S. Feet.

VERTICAL DATUM: International Great Lakes Datum of 1985 (IGLD85).

LEGEND:

- 560 — 2020 Existing Surface
- Parcels
- DMU 9 and 10 Knee Wall
- Federal Navigation Channel
- DMU Boundary

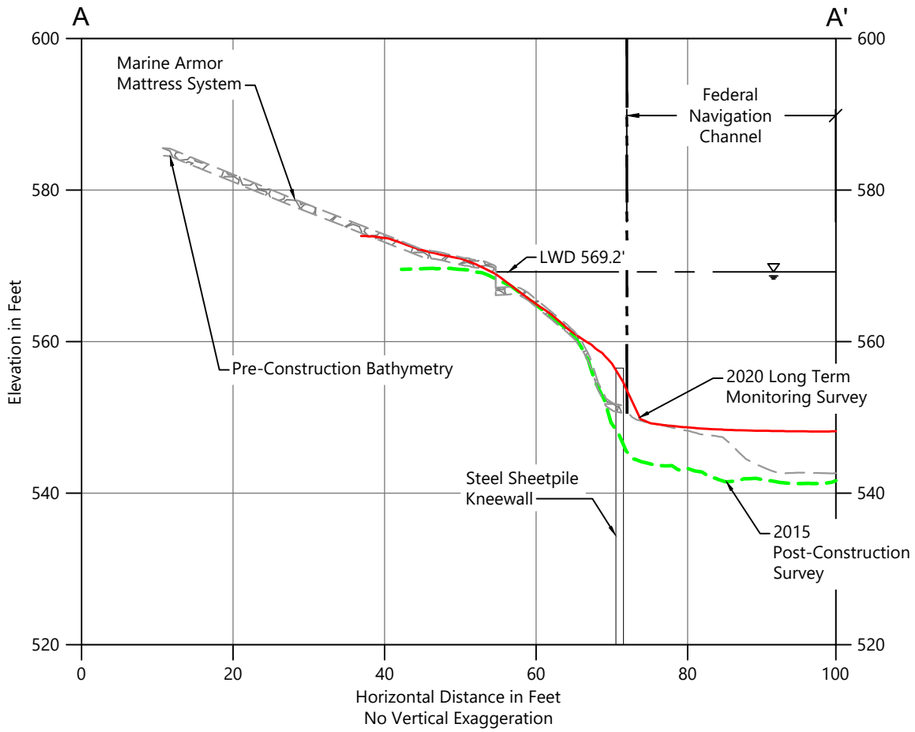
0 20
Feet

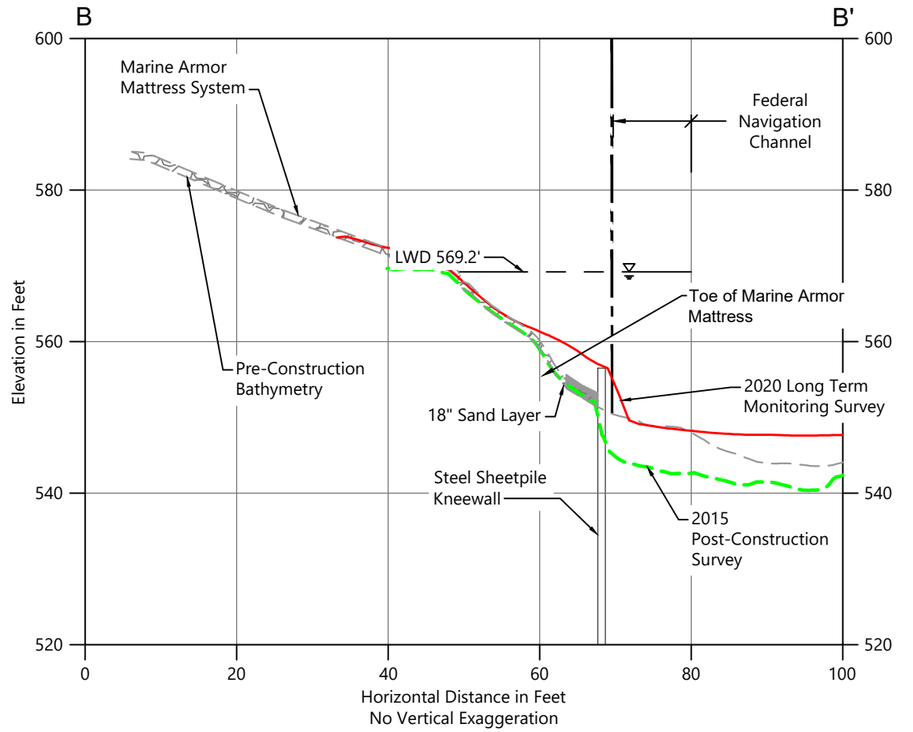
Publish Date: 2021/09/24 7:18 AM | User: bhurry
Filepath: K:\Projects\0287-Honeywell International Inc\Buffalo River Site Strategy & Eng Sup\0287-RP-088 (DMU 9 AND DMU 10 - POST CONSTRUCTION) 20210923.dwg Figure 2-1

ANCHOR QEA

Figure 2-1
DMUs 9 and 10 Plan View

Buffalo River DMUs 9 and 10
Buffalo River AOC





SOURCE: Pre-Construction Bathymetry from OSI 2014. 2015 Post-Construction Survey from Sevenson Environmental Services. 2020 Long Term Monitoring Survey from Seaworks, June 2020.

HORIZONTAL DATUM: New York State Plane West, NAD83, U.S. Feet.

VERTICAL DATUM: International Great Lakes Datum of 1985 (IGLD85).

LEGEND:

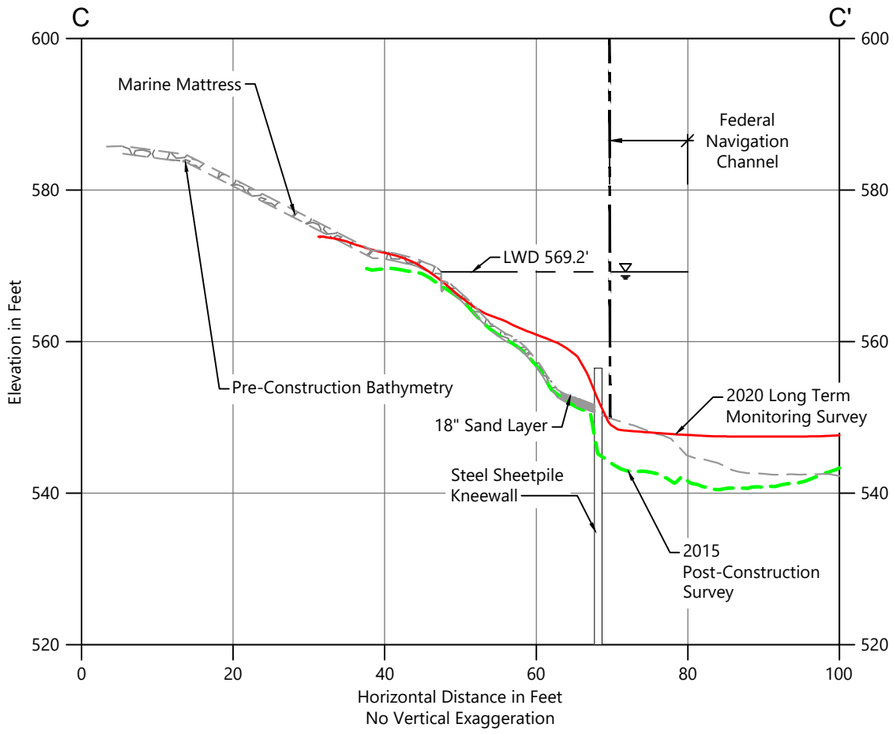
- Pre-Construction Bathymetry
- Federal Navigation Channel
- 2015 Post-Construction Survey
- 2020 Long Term Monitoring Survey

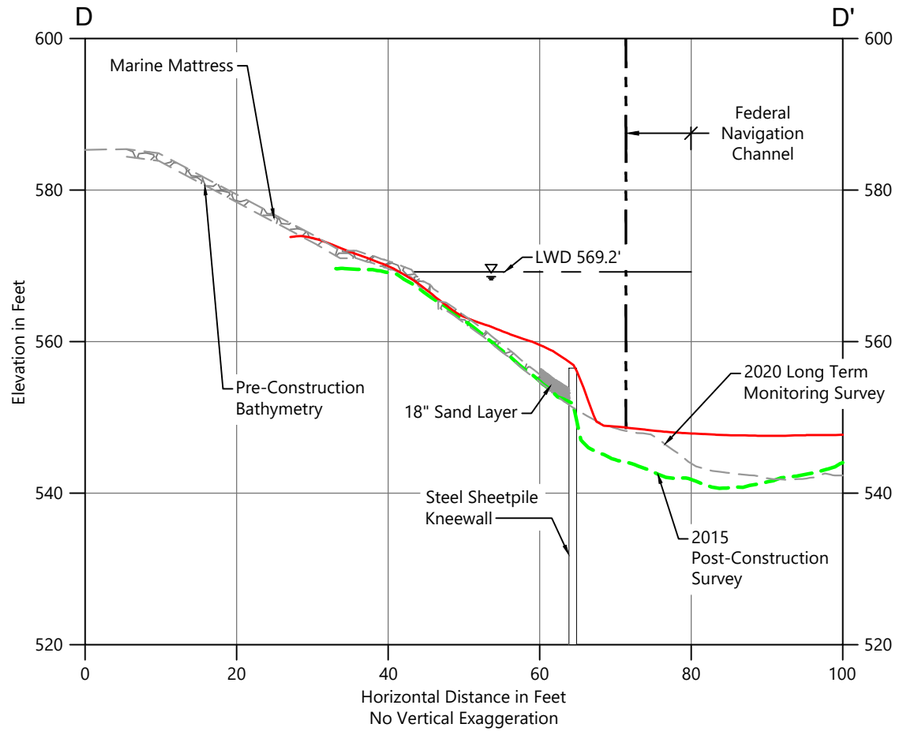
Publish Date: 2021/09/24 7:22 AM | User: bhurry
Filepath: K:\Projects\0287-Honeywell International Inc\Buffalo River Site Strategy & Eng Sup\0287-RP-088 (DMU 9 AND DMU 10 - POST CONSTRUCTION) 20210923.dwg Figure 2-2

ANCHOR QEA

Figure 2-2
DMUs 9 and 10 Cross Sections A-A' and B-B'

Buffalo River DMUs 9 and 10
Buffalo River AOC





SOURCE: Pre-Construction Bathymetry from OSI 2014. 2015 Post-Construction Survey from Sevenson Environmental Services. 2020 Long Term Monitoring Survey from Seaworks, June 2020.

HORIZONTAL DATUM: New York State Plane West, NAD83, U.S. Feet.

VERTICAL DATUM: International Great Lakes Datum of 1985 (IGLD85).

LEGEND:

- Pre-Construction Bathymetry
- Federal Navigation Channel
- 2015 Post-Construction Survey
- 2020 Long Term Monitoring Survey

Publish Date: 2021/09/24 7:25 AM | User: bhurry
Filepath: K:\Projects\0287-Honeywell International Inc\Buffalo River Site Strategy & Eng Sup\0287-RP-088 (DMU 9 AND DMU 10 - POST CONSTRUCTION) 20210923.dwg Figure 2-3

ANCHOR QEA

Figure 2-3
DMUs 9 and 10 Cross Sections C-C' and D-D'

Buffalo River DMUs 9 and 10
Buffalo River AOC

APPENDIX A – DEED RESTRICTION

DECLARATION OF RESTRICTIVE COVENANTS

THIS DECLARATION OF RESTRICTIVE COVENANTS ("Declaration") is made as of this 5TH day of DECEMBER, 2022 by Honeywell International Inc. ("Honeywell"), with its primary address of 115 Tabor Road, Morris Plains, N.J. 07950 ("Declarant").

RECITALS

WHEREAS, the City of Buffalo ("City") with its primary address of 65 Niagara Square, Buffalo, N.Y. 14202 is the owner of certain real property located in Buffalo, N.Y. adjacent to that property described in the survey attached hereto titled *Buffalo Color Areas A and B Offsite Area* (Exhibit A), Map No. 64372 prepared by KHEOPS, and more particularly described on Schedule I attached hereto (the "Property"); and

WHEREAS, certain deed restrictions ("Restrictions") are required as part of the environmental remediation and restoration for areas of the Property identified in Exhibit A and more particularly described on Schedule II attached hereto ("Restricted Area"); and

WHEREAS, Honeywell, has been duly authorized by the City to take actions necessary to place the Restrictions on the Property, as set for in a Consent for Remedial Deed Restriction agreement dated 12-20-22 and attached hereto as Exhibit B; and

NOW THEREFORE, Declarant hereby declares that the Property shall be held, occupied and used, and shall be transferred, conveyed, leased, or otherwise disposed of subject to the following covenants, conditions and restrictions, which shall run with the land and be binding on all heirs, successors, assigns, lessees, other occupiers and users of the Property.

1. The following activities are prohibited on that part of the Property identified as the Restricted Area: excavation activities including dredging, trenching, grading, leveling, or stripping that uncover, displace, destroy, or otherwise disturb the previously installed environmental controls.

2. The covenants, conditions and restrictions set forth in this Declaration are created solely for the benefit of the Property and the owner thereof, and the City reserves the ownership of the fee simple estate in the Property and all rights appertaining thereto, including the right to engage in all acts or uses not prohibited by this Declaration and not inconsistent with the purposes hereof. It is expressly understood and agreed that the terms of this Declaration do not grant or convey to members of the general public any rights of ownership of the Property.

3. New York State Department of Environmental Conservation (NYSDEC) and U.S. Environmental Protection Agency Great Lakes National Program Office (USEPA GLNPO) have the right to enforce the covenants, conditions and restrictions set forth in this Declaration in a judicial action against any person or other entity violating or attempting to violate same; provided, however, that no violation of the provisions of this Declaration shall result in a forfeiture or reversion of title. As it may be impossible to measure monetarily the damages which may accrue to the beneficiary(ies) hereof by reason of a violation of this Declaration, any beneficiary hereof shall be entitled to relief by way of injunction or specific performance, as well as any other relief available at law or in equity, to enforce the provisions hereof.

4. The City shall include the following notice on all deeds, mortgages, plats, or any other legal instruments used to convey any interest in the Property (failure to comply with this paragraph does not impair the validity or enforceability of the provisions of this Declaration):

"NOTICE: This real property is subject to Declaration of Restrictive Covenants recorded in the Erie County Clerk's Office in Liber _____ of Deeds at page _____."

5. Declarant shall promptly record this Declaration in the records of the Erie County Clerk, shall insure that this Declaration is indexed against the City, and shall provide the City with a recorded copy of this Declaration within 10 days of execution hereof.

6. This Declaration shall continue with full force and effect unless and until terminated by an instrument executed and acknowledged by NYSDEC or USEPA GLNPO. This Declaration may only be amended by an instrument executed and acknowledged by both the City and NYSDEC or USEPA GLNPO. No termination or amendment shall be effective until said instrument is recorded in the Erie County Clerk's Office.

7. The determination by any court that any provision hereof is unenforceable, invalid or void shall not affect the enforceability or validity of any other provisions hereof.

IN WITNESS WHEREOF, Declarant has executed or has caused this instrument to be executed by its duly authorized representative, on the day and year set forth opposite the signature below.

Honeywell International Inc.

By _____ Date 12/5, 2022
Name:
Title: V.P. Global Remediation & Redevelopment

STATE OF ~~NEW YORK~~ North Carolina)
) ss.:
COUNTY OF Mecklenburg)

On this 5 day of ~~November~~ December in the year 2022, before me personally appeared Benay Dehghi personally known to me or proved to me on the basis of satisfactory evidence to be the individual whose name is subscribed in the within instrument and acknowledged to me that he/she executed the same in his/her capacity, and that by his/her signature on the instrument, the individual, or the person upon behalf of which the individual acted, executed the instrument.

_____
Notary Public

REGINA M OENBRINK
NOTARY
PUBLIC
MECKLENBURG COUNTY, NC

SCHEDULE I

PARENT PROPERTY OUTBOUNDS DESCRIPTION BY CONVEYANCE LIBVER 11258, PAGE 6475, PARCEL "A"

PARCEL "A" (1037 South Park Avenue S/B/L No, 122.16-1-9):

ALL THAT TRACT OR PARCEL OF LAND, situate in the city of Buffalo, County of Erie and State of New York, being part of Lots Nos. 177 and 178, Township 10, Range 8 of the Buffalo Creek Reservation and part of the bed of the Buffalo River, bounded and described below as follows:

BEGINNING at the intersection of the southerly line of South Park Avenue with the easterly line of lands of Buffalo Creek Railroad;

Thence S 51° 04' 00" E, and along the southerly line of South Park Avenue, 693.64 feet;
Thence S 43° 22' 10" E, 50.02 feet to the Buffalo River Improvement Channel;
Thence E S 58° 17' 30" W, and along said Channel, 107.28 feet;
Thence S 49° 51' 37" W, and still along said Channel, 653.75 feet;
Thence S 35° 01' 00" W, and still along said Channel, 1.75 feet to the northerly line of lands of Erie Lackawanna Railroad;
Thence N 54° 54' 48" West, and along the northerly line of lands of Erie Lackawanna Railroad, 412.84 feet to the lands of Buffalo Creek Railroad;
Thence N 26° 20' 52" E, and along the lands of Buffalo Creek Railroad, 223.63 to a point on the south line of Lot No. 177;
Thence S 51° 04' 00" E, along the south line of Lot No. 177, a distance of 2.05 feet;
Thence N 26° 20' 52" E, and along the lands of Buffalo Creek Railroad, 574.81 feet to the point or place of beginning.

SCHEDULE II

DEED RESTRICTION AREA DESCRIPTION BEING WITHIN THE BUFFALO RIVER

All that Tract or Parcel of Land, situate in the City of Buffalo, County of Erie and State of New York, being part of Lot Number 178, Township 10, Range 8 of the Buffalo Creek Reservation, further bounded and described as follows:

COMMENCING at the intersection of the southerly line of South Park Avenue being (66' wide) with the easterly line of lands now or formerly of the Buffalo Creek Railroad;

THENCE South 51°-04'-00" East along the southerly line of South Park Avenue, 693.64 feet to an angle point in said southerly line;

THENCE South 43°-22'-10" East along the southerly line of said South Park Avenue, 50.02 feet to the Buffalo River Improvement Channel;

THENCE South 58°-17'-30" West along said Channel, 107.28 feet to an angle point in said Channel;

THENCE South 49°-51'-37" West and continuing along said Channel, 440.06 feet to the TRUE POINT of BEGINNING;

THENCE South 40°-01'-26" East across a portion of said Buffalo River Improvement Channel, 29.58 feet;

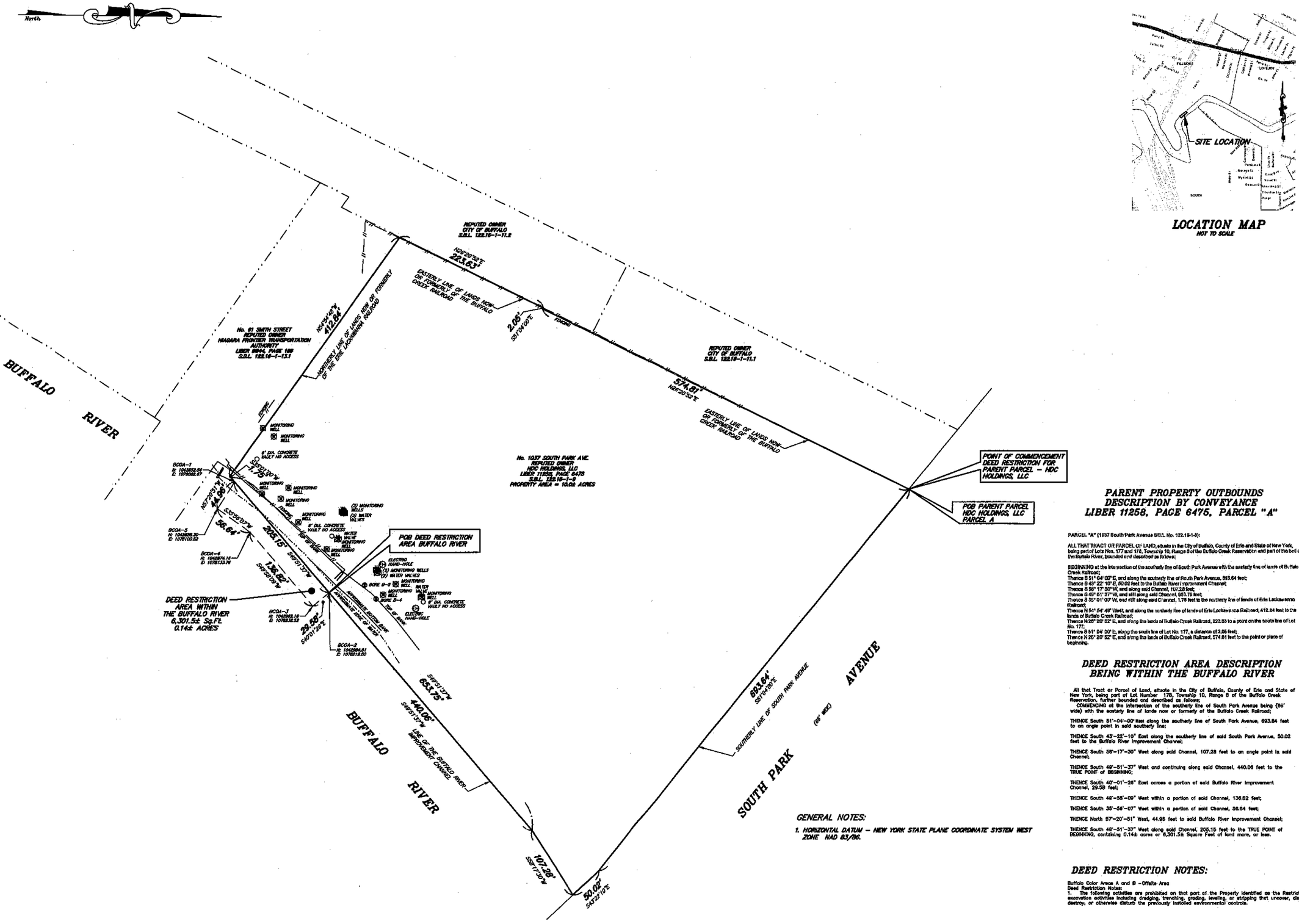
THENCE South 49°-58'-09" West within a portion of said Channel, 136.82 feet;

THENCE South 35°-56'-07" West within a portion of said Channel, 56.64 feet;

THENCE North 57°-20'-51" West, 44.96 feet to said Buffalo River Improvement Channel;

THENCE South 49°-51'-37" West along said Channel, 205.15 feet to the TRUE POINT of BEGINNING, containing 0.14± acres or 6,301.5± Square Feet or land more, or less.

EXHIBIT A



LOCATION MAP
NOT TO SCALE

PARENT PROPERTY OUTBOUNDS DESCRIPTION BY CONVEYANCE LIBER 11258, PAGE 6475, PARCEL "A"

PARCEL "A" (1037 South Park Avenue S/B/L No. 122.19-1-9):

ALL THAT TRACT OR PARCEL OF LAND, situate in the City of Buffalo, County of Erie and State of New York, being part of Lots Nos. 177 and 178, Township 10, Range 8 of the Buffalo Creek Reservation and part of the bed of the Buffalo River, bounded and described as follows;

BEGINNING at the intersection of the southerly line of South Park Avenue with the easterly line of lands of Buffalo Creek Railroad;
Thence S 51° 04' 00" E, and along the southerly line of South Park Avenue, 693.64 feet;
Thence S 43° 22' 10" E, 50.02 feet to the Buffalo River Improvement Channel;
Thence S 56° 17' 30" W, and along said Channel, 107.28 feet;
Thence S 49° 51' 37" W, and still along said Channel, 653.75 feet;
Thence S 35° 01' 00" W, and still along said Channel, 1.75 feet to the northerly line of lands of Erie Lackawanna Railroad;
Thence N 54° 54' 49" West, and along the northerly line of lands of Erie Lackawanna Railroad, 412.84 feet to the lands of Buffalo Creek Railroad;
Thence N 26° 20' 52" E, and along the lands of Buffalo Creek Railroad, 223.63 to a point on the south line of Lot No. 177;
Thence S 51° 04' 00" E, along the south line of Lot No. 177, a distance of 2.05 feet;
Thence N 26° 20' 52" E, and along the lands of Buffalo Creek Railroad, 574.81 feet to the point or place of beginning.

DEED RESTRICTION AREA DESCRIPTION BEING WITHIN THE BUFFALO RIVER

All that Tract or Parcel of Land, situate in the City of Buffalo, County of Erie and State of New York, being part of Lot Number 178, Township 10, Range 8 of the Buffalo Creek Reservation. Further bounded and described as follows;

COMMENCING at the intersection of the southerly line of South Park Avenue being (66' wide) with the easterly line of lands now or formerly of the Buffalo Creek Railroad;

THENCE South 51°-04'-00" East along the southerly line of South Park Avenue, 693.64 feet to an angle point in said southerly line;

THENCE South 43°-22'-10" East along the southerly line of said South Park Avenue, 50.02 feet to the Buffalo River Improvement Channel;

THENCE South 56°-17'-30" West along said Channel, 107.28 feet to an angle point in said Channel;

THENCE South 49°-51'-37" West and continuing along said Channel, 440.06 feet to the TRUE POINT of BEGINNING;

THENCE South 40°-01'-26" East across a portion of said Buffalo River Improvement Channel, 29.58 feet;

THENCE South 49°-58'-09" West within a portion of said Channel, 136.82 feet;

THENCE South 35°-56'-07" West within a portion of said Channel, 56.64 feet;

THENCE North 57°-20'-51" West, 44.96 feet to said Buffalo River Improvement Channel;

THENCE South 49°-51'-37" West along said Channel, 205.15 feet to the TRUE POINT of BEGINNING, containing 0.14± acres or 6,301.5± Square Feet of land more, or less.

GENERAL NOTES:

1. HORIZONTAL DATUM – NEW YORK STATE PLANE COORDINATE SYSTEM WEST ZONE NAD 83/96.

DEED RESTRICTION NOTES:

Buffalo Color Areas A and B – Offsite Area
Deed Restriction Notes:
1. The following activities are prohibited on that part of the Property identified as the Restricted Area: excavation activities including dredging, trenching, grading, leveling, or stripping that uncover, displace, destroy, or otherwise disturb the previously installed environmental controls.

NOTES:

NO.	DESCRIPTION	DATE	BY

Field Date: 10-28-19
Office Date: 11-5-19
Job No.: 19N172
Book: 422
Page: 122
Map: 64372
File Name: BUFFALO COLOR
Designed by:
Drawn by: JSM
Checked by: JSM
Dwg Scale:
Horiz: 1"= 60'
Vert:

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ARCHITECTURE, ENGINEERING & SURVEY, DPC
300 Pearl Street, Suite 300
Buffalo, New York 14202
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F. 716.852.2281
WWW.KHEOPSPC.COM

CITY OF BUFFALO
COUNTY OF ERIE
NEW YORK

BUFFALO COLOR AREAS A AND B OFFSITE AREA
PART OF LOT 178, TOWNSHIP 10, RANGE 8
OF THE BUFFALO CREEK RESERVATION

MAP NUMBER:
64372

EXHIBIT B

CONSENT FOR REMEDIAL DEED RESTRICTION
Buffalo River Cleanup and Restoration

WHEREAS, the City of Buffalo ("City"), with its primary address of 65 Niagara Square, Buffalo, N.Y. 14202 is the owner of certain real property located in Buffalo, N.Y. adjacent to that property described in the survey attached hereto titled Buffalo Color Areas A and B Offsite Area (Exhibit A), Map no. 64372 prepared by KHEOPS ("Property"), and more particularly described on Schedule I attached hereto; and

WHEREAS certain deed restrictions ("Restrictions") are required as part of the environmental remediation and restoration for areas of the Property identified in Exhibit A and more particularly described on Schedule II attached hereto; and

WHEREAS these Restrictions include the prohibition of excavation activities such as dredging, trenching, grading, leveling, or stripping that uncover, displace, destroy, or otherwise disturb the previously installed environmental controls that are located within the identified property areas; and

WHEREAS the City agrees to comply with the Restrictions identified herein; and

WHEREAS the City will allow Honeywell International Inc. ("Honeywell") to take those actions necessary to place the Restrictions on the Property.

THE CITY HEREBY CONSENTS AS FOLLOWS:

(i) Honeywell may take those actions necessary to place the Restrictions on the Property in a form and manner required by the Erie County Clerk; and (ii) the City will take those actions

reasonably required so that Honeywell may place the Restrictions on the Property.

CITY OF BUFFALO

By Byron W. Brown

Its mayor

Dated: 12/22/2022

APPROVED
AS TO FORM ONLY

Corporation Counsel

By John Heffron

HONEYWELL INTERNATIONAL INC.

By _____

Its _____

Dated: _____

Acknowledgement - City of Buffalo

STATE OF New York)

COUNTY OF Erie)

On the 20th day of December in the year 2021 before me, the undersigned, to personally appeared Byron W. Brown, personally known to me or proved to me on the basis of satisfactory evidence to be the individual whose name is subscribed to the within instrument and he acknowledged to me that he executed the same and that by his signature on the instrument, he, or the person upon behalf of whom he acted, executed the instrument.

Notary Public, State of New York

JANET R. POYDOCK
Notary Public, State of New York
No. 01PO6204394
Qualified in Erie County
Commission Expires 4/20/2025

City of Buffalo's execution of this document was authorized by the City of Buffalo Common Council at Common Council Proceedings held on April 27, 2021 as Item Number 21-388.

reasonably required so that Honeywell may place the Restrictions on the Property.

CITY OF BUFFALO

By _____

Its _____

Dated: _____

HONEYWELL INTERNATIONAL INC.

By _____

Its V.P. Global Remediation & Redevelopment

Dated: 12/5/2022

SCHEDULE I

PARENT PROPERTY OUTBOUNDS DESCRIPTION BY CONVEYANCE LIBVER 11258, PAGE 6475, PARCEL "A"

PARCEL "A" (1037 South Park Avenue S/B/L No, 122.16-1-9):

ALL THAT TRACT OR PARCEL OF LAND, situate in the city of Buffalo, County of Erie and State of New York, being part of Lots Nos. 177 and 178, Township 10, Range 8 of the Buffalo Creek Reservation and part of the bed of the Buffalo River, bounded and described below as follows:

BEGINNING at the intersection of the southerly line of South Park Avenue with the easterly line of lands of Buffalo Creek Railroad;

Thence S 51° 04' 00" E, and along the southerly line of South Park Avenue, 693.64 feet;
Thence S 43° 22' 10" E, 50.02 feet to the Buffalo River Improvement Channel;
Thence E S 58° 17' 30" W, and along said Channel, 107.28 feet;
Thence S 49° 51' 37" W, and still along said Channel, 653.75 feet;
Thence S 35° 01' 00" W, and still along said Channel, 1.75 feet to the northerly line of lands of Erie Lackawanna Railroad;
Thence N 54° 54' 48" West, and along the northerly line of lands of Erie Lackawanna Railroad, 412.84 feet to the lands of Buffalo Creek Railroad;
Thence N 26° 20' 52" E, and along the lands of Buffalo Creek Railroad, 223.63 to a point on the south line of Lot No. 177;
Thence S 51° 04' 00" E, along the south line of Lot No. 177, a distance of 2.05 feet;
Thence N 26° 20' 52" E, and along the lands of Buffalo Creek Railroad, 574.81 feet to the point or place of beginning.

SCHEDULE II

DEED RESTRICTION AREA DESCRIPTION BEING WITHIN THE BUFFALO RIVER

All that Tract or Parcel of Land, situate in the City of Buffalo, County of Erie and State of New York, being part of Lot Number 178, Township 10, Range 8 of the Buffalo Creek Reservation, further bounded and described as follows;

COMMENCING at the intersection of the southerly line of South Park Avenue being (66' wide) with the easterly line of lands now or formerly of the Buffalo Creek Railroad;

THENCE South 51°-04'-00" East along the southerly line of South Park Avenue, 693.64 feet to an angle point in said southerly line;

THENCE South 43°-22'-10" East along the southerly line of said South Park Avenue, 50.02 feet to the Buffalo River Improvement Channel;

THENCE South 58°-17'-30" West along said Channel, 107.28 feet to an angle point in said Channel;

THENCE South 49°-51'-37" West and continuing along said Channel, 440.06 feet to the TRUE POINT of BEGINNING;

THENCE South 40°-01'-26" East across a portion of said Buffalo River Improvement Channel, 29.58 feet;

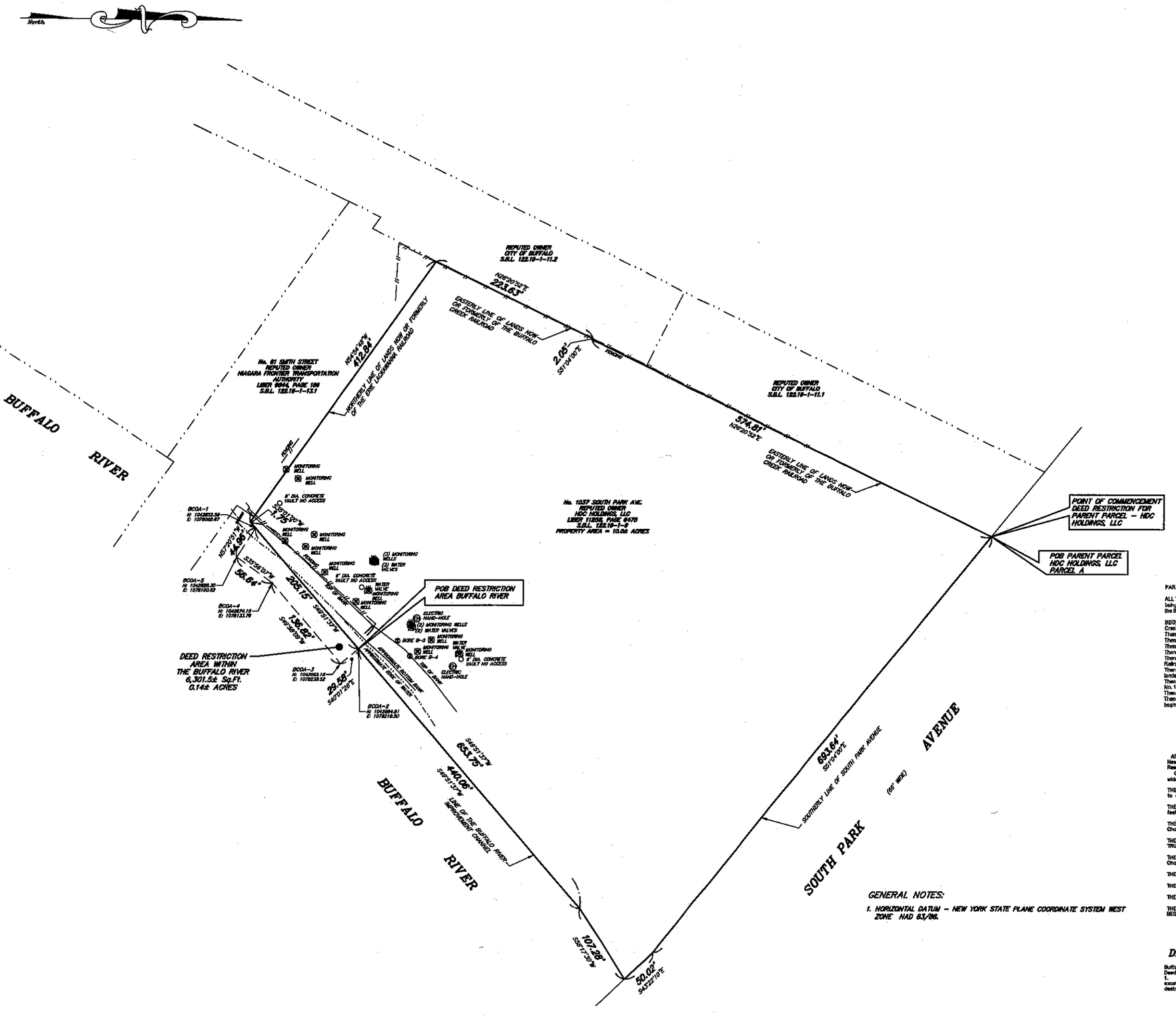
THENCE South 49°-58'-09" West within a portion of said Channel, 136.82 feet;

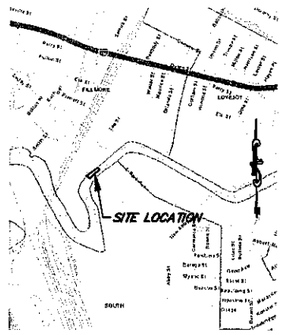
THENCE South 35°-56'-07" West within a portion of said Channel, 56.64 feet;

THENCE North 57°-20'-51" West, 44.96 feet to said Buffalo River Improvement Channel;

THENCE South 49°-51'-37" West along said Channel, 205.15 feet to the TRUE POINT of BEGINNING, containing 0.14± acres or 6,301.5± Square Feet or land more, or less.

EXHIBIT A





LOCATION MAP
NOT TO SCALE

PARENT PROPERTY OUTBOUNDS DESCRIPTION BY CONVEYANCE LIBER 11258, PAGE 6475, PARCEL "A"

PARCEL "A" (1037 South Park Avenue S.B.L. No. 122.16-1-6):

ALL THAT TRACT OR PARCEL OF LAND, situate in the City of Buffalo, County of Erie and State of New York, being part of Lots Nos. 177 and 178, Township 10, Range 8 of the Buffalo Creek Reservation and part of the bed of the Buffalo River, bounded and described as follows:

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Thence S 43° 22' 10" E, 50.02 feet to the Buffalo River Improvement Channel;
Thence S 59° 17' 37" W, and along said Channel, 107.28 feet;
Thence S 49° 51' 37" W, and still along said Channel, 653.75 feet;
Thence S 33° 01' 00" W, and still along said Channel, 1.75 feet to the northerly line of lands of Erie Lackawanna Railroad;
Thence N 54° 54' 49" West and along the northerly line of lands of Erie Lackawanna Railroad, 412.84 feet to the lands of Buffalo Creek Railroad;
Thence N 28° 20' 52" E, and along the lands of Buffalo Creek Railroad, 223.53 to a point on the south line of Lot No. 177;
Thence S 51° 04' 00" E, along the south line of Lot No. 177, a distance of 2.05 feet;
Thence N 28° 20' 52" E, and along the lands of Buffalo Creek Railroad, 574.81 feet to the point or place of beginning.

DEED RESTRICTION AREA DESCRIPTION BEING WITHIN THE BUFFALO RIVER

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THENCE South 33°-56'-07" West within a portion of said Channel, 56.64 feet;

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THENCE South 49°-51'-37" West along said Channel, 205.15 feet to the TRUE POINT of BEGINNING, containing 0.14± acres or 6,301.5± Square Feet of land more, or less.

GENERAL NOTES:

1. HORIZONTAL DATUM – NEW YORK STATE PLANE COORDINATE SYSTEM WEST ZONE NAD 83/96.

DEED RESTRICTION NOTES:

Buffalo Color Areas A and B – Offsite Area
Deed Restriction Notes:
1. The following activities are prohibited on that part of the Property identified as the Restricted Area: excavation activities including dredging, trenching, grading, leveling, or stripping that uncover, displace, destroy, or otherwise disturb the previously installed environmental controls.

NO.	DESCRIPTION

Field Date: 10-28-19
Office Date: 11-5-19
Job No. 19N1T72
Book: 422
Page: 122
Map: 64372
File Name:
BUFFALO COLOR
Designed by:
Drawn by: JSW
Checked by: DRH
Dwg Scale:
Horiz: 1"= 60'
Vert:

KHEOPS
ARCHITECTURE, ENGINEERING & SURVEY, DPC
300 Pearl Street, Suite 300
Buffalo, New York 14202
T. 716.856.0599
F. 716.856.0583
WWW.KHEOPSPC.COM

CITY OF BUFFALO
COUNTY OF ERIE
NEW YORK

BUFFALO COLOR AREAS A AND B OFFSITE AREA
PART OF LOT 178, TOWNSHIP 10, RANGE 8
OF THE BUFFALO CREEK RESERVATION

MAP NUMBER:
64372

File: N:\2019_Residential Surveys\19N1T72 Buffalo Color Survey\4 - Technical Data\CADD Drawings\Autocad\BUFFALO COLOR PENINSULA-2018.dwg, Last saved: 12/20/2019, Plot Date: 12/20/2019, By: GRANT MCEWEN

APPENDIX B – RESPONSIBILITIES OF OWNER AND REMEDIAL PARTY

Responsibilities

The responsibilities for implementing the Site Management Plan ("SMP") for former Buffalo Color Corporation (BCC) Site – Areas A and B – Off-Site Area site (the "site"), number C915230A, are divided between the site owner(s) and a Remedial Party, as defined below. The owner(s) is/are currently listed as:
South Buffalo Development, LLC, with its contact Jon Williams and its primary address of 333 Gansen Street, Buffalo, New York 14203 (the "owner").

Solely for the purposes of this document and based upon the facts related to a particular site and the remedial program being carried out, the term Remedial Party ("RP") refers to any of the following: certificate of completion holder, volunteer, applicant, responsible party, and, in the event the New York State Department of Environmental Conservation ("NYSDEC") is carrying out remediation or site management, the NYSDEC and/or an agent acting on its behalf. The RP is:
Honeywell International Inc., with its contact as Benny Dehghi and its primary address of 855 South Mint Street, Charlotte, North Carolina, 28202.

Nothing on this page shall supersede the provisions of an Environmental Easement, Consent Order, Consent Decree, agreement, or other legally binding document that affects rights and obligations relating to the site.

Site Owner's Responsibilities:

1) The owner shall follow the provisions of the SMP as they relate to future construction and excavation at the site.

2) In accordance with a periodic time frame determined by the NYSDEC, the owner shall periodically certify, in writing, that all Institutional Controls set forth in a(n) Deed Restriction remain in place and continue to be complied with. The owner shall provide a written certification to the RP, upon the RP's request, in order to allow the RP to

include the certification in the site's Periodic Review Report (PRR) certification to the NYSDEC.

3) In the event the site is delisted, the owner remains bound by the Deed Restriction and shall submit, upon request by the NYSDEC, a written certification that the Deed Restriction is still in place and has been complied with.

4) The owner shall grant access to the site to the RP and the NYSDEC and its agents for the purposes of performing activities required under the SMP and assuring compliance with the SMP.

5) The owner is responsible for assuring the security of the remedial components located on its property to the best of its ability. If damage to the remedial components or vandalism is evident, the owner shall notify the site's RP and the NYSDEC in accordance with the timeframes indicated in Section 1.3 Notifications.

6) If some action or inaction by the owner adversely impacts the site, the owner must notify the site's RP and the NYSDEC in accordance with the time frame indicated in [Section 1.3] Notifications and coordinate the performance of necessary corrective actions with the RP.

7) The owner must notify the RP and the NYSDEC of any change in ownership of the site property (identifying the tax map numbers in any correspondence) and provide contact information for the new owner of the site property. 6 NYCRR Part contains notification requirements applicable to any construction or activity changes and changes in ownership. Among the notification requirements is the following: Sixty days prior written notification must be made to the NYSDEC. Notification is to be submitted to the NYSDEC Division of Environmental Remediation's Site Control Section. Notification requirements for a change in use are detailed in Section 1.3 of the SMP. A change of use includes, but is not limited to, any activity that may increase direct human or environmental exposure (e.g., day care, school or park). A 60-Day Advance Notification Form and Instructions are found at http://www.dec.ny.gov/chemical/76250.html.

8) The owner will perform Operation, Monitoring, and Maintenance (OM&M) activities, as outlined in Attachment A on behalf of the RP. The RP remains ultimately responsible for maintaining the engineering controls.

Remedial Party Responsibilities

1) The RP must follow the SMP provisions regarding any construction and/or excavation it undertakes at the site.

2) The RP shall report to the NYSDEC all activities required for remediation, operation, maintenance, monitoring, and reporting. Such reporting includes, but is not limited to, periodic review reports and certifications, electronic data deliverables, corrective action work plans and reports, and updated SMPs.

3) Before accessing the site property to undertake a specific activity, the RP shall provide the owner advance notification that shall include an explanation of the work expected to be completed. The RP shall provide to (i) the owner, upon the owner's request, (ii) the NYSDEC, and (iii) other entities, if required by the SMP, a copy of any data generated during the site visit and/or any final report produced.

4) If the NYSDEC determines that an update of the SMP is necessary, the RP shall update the SMP and obtain final approval from the NYSDEC. Within 5 business days after NYSDEC approval, the RP shall submit a copy of the approved SMP to the owner(s).

5) The RP shall notify the NYSDEC and the owner of any changes in RP ownership and/or control and of any changes in the party/entity responsible for the operation, maintenance, and monitoring of and reporting with respect to any remedial system (Engineering Controls). The RP shall provide contact information for the new party/entity. Such activity constitutes a Change of Use pursuant to 375-1.11(d) and requires 60-days prior notice to the NYSDEC. A 60-Day Advance Notification Form and Instructions are found at http://www.dec.ny.gov/chemical/76250.html .

6) The RP shall notify the NYSDEC of any damage to or modification of the systems as required under Section 1.3 Notifications of the SMP.

7) Prior to a change in use that impacts the remedial system or requirements and/or responsibilities for implementing the SMP, the RP shall submit to the NYSDEC for approval an amended SMP.

8) Any change in use, change in ownership, change in site classification (*e.g.*, delisting), reduction or expansion of remediation, and other significant changes related to the site may result in a change in responsibilities and, therefore, necessitate an update to the SMP and/or updated legal documents. The RP shall contact the NYSDEC project manager to discuss the need to update such documents.

Change in RP ownership and/or control and/or site ownership does not affect the RP's obligations with respect to the site unless a legally binding document executed by the NYSDEC releases the RP of its obligations.

Future site owners and RPs and their successors and assigns are required to carry out the activities set forth above.

INVENTUM ENGINEERING, PC

January 9, 2024

From: Todd Waldrop

To: Rich Galloway – Honeywell; Jon M. Williams – South Buffalo Development

Cc: John Yensan – OSC; John Black, P.E. – Inventum Engineering, P.C.

RE: Operation, Monitoring & Maintenance Scope of Work
Former Buffalo Color Corporation Site – Areas A and B – Offsite
NYSDEC Site No. C915230A
South Buffalo Development, LLC, Buffalo, New York

The bulleted list below describes South Buffalo Development LLC (SBD) Operation, Monitoring & Maintenance (OM&M) responsibilities for the Former Buffalo Color Corporation Site – Areas A and B – Offsite, located at 1337 South Park Avenue, in the City of Buffalo, County of Erie, New York (Off-Site Area). The OM&M scope of work for the Off-Site Area is included as an amendment to the May 2011 Agreement Regarding Operation, Monitoring & Maintenance (Agreement) between SBD and Honeywell International Inc (Honeywell).

The OM&M activities will be conducted on behalf of Honeywell who is the Remedial Party (RP) under the New York State Department of Environmental Conservation (NYSDEC) Brownfield Cleanup Program (BCP) Agreement for Site No. C915230A.

The boundaries of the Off-Site Area are more fully described in the metes and bounds site description provided in Appendix A of the Site Management Plan (SMP) [1] and shown on Figure 1 of the SMP. All work will be conducted in accordance with the NYSDEC approved SMP.

OM&M Scope of Work

- Periodic bathymetric surveys will be performed, by others, to document the presence and condition of the knee wall, marine armor mattress, and post-dredge backfill. Bathymetric surveys will be performed, by others, every 5 years for a total of 20 years (ending 2035). Bathymetric survey will be scheduled to coincide with the Riverbank Monitoring of the Former Buffalo Color Corporation Site – Area D Sediment Containment Monitoring (NYSDEC Site No. 915012).
- Survey data provided to SBD shall include, at minimum, an AutoCAD 2014 electronic file and data fille of all the points surveyed using PNEZD format (point number, northing, easting, elevation, and description).
- SBD will compare surveys against the 2015 post construction conditions as-built drawings[2].

[1] Anchor QEA, 2024. *Site Management Plan Buffalo Color Corporation Areas A and B – Off-Site Area.* NYSDEC Site No.: C915230A. January 2024.
[2] Anchor QEA, 2019. *Construction Completion Report Buffalo Color Corporation Site Areas A and B – Off-Site* NYSDEC Site No. C915230A. February 2019

441 Carlisle Drive
Suite C
Herndon, Virginia 20170

- SBD will prepare a Periodic Review Report (PRR) in accordance with the SMP and NYSDEC's DER-10. The PRR will be submitted within 30 days of the end of each certification period. The PRR will be certified by a Professional Engineer licensed to practice and registered in New York.
- The PRR will be submitted every fifth year (planned 2025, 2030, and 2035) to the NYSDEC project manager or at another frequency as may be required by the NYSDEC project manager.

Note: Bathymetric Survey to be obtained from the U.S. Army Corps of Engineers Buffalo District. Contact information (2024) as follows:

Buffalo Civil Works District
1776 Niagara St
Buffalo, NY 14207-3199
716-879-4410
Public.Affairs@lrb01.usace.army.mil
https://www.lrb.usace.army.mil

OM&M Exclusions

SBD's OM&M responsibilities under the Agreement exclude any corrective measures to the Off-Site Area as may be required based on SBD's and/or NYSDEC's assessment of the periodic bathymetric surveys. The Buffalo River was successfully remediated and restored under an August 2012 Great Lakes Legacy Act Project Agreement between the United States Environmental protection Agency, Buffalo Niagara Waterkeeper and Honeywell (see below).

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
GREAT LAKES NATIONAL PROGRAM OFFICE
77 WEST JACKSON BOULEVARD
CHICAGO, IL 60604-3590

January 9, 2024

Richard Galloway
Honeywell
115 Tabor Road
Morris Plains, NJ 07950

Jill Jedlicka
Buffalo Niagara Waterkeeper
721 Main Street
Buffalo, NY 14203

RE: Close-Out of the Sediment Remediation and Habitat Restoration of the Buffalo River Area of Concern Great Lakes Legacy Act Project Agreement

Dear Mr. Galloway and Ms. Jedlicka:

The United States Environmental Protection Agency (U.S. EPA) Great Lakes National Program Office (GLNPO) completed its final accounting review of the eligible project costs including the federal and non-federal funding amounts for the referenced project. The Project Agreement (PA) was signed on September 20th, 2012, by GLNPO, Buffalo Niagara Riverkeeper and Honeywell to conduct a sediment remediation and habitat restoration project for the Buffalo River Area of Concern. The PA was amended on December 23, 2015. This agreement identified the cost share for this project to be 50% GLNPO and 50% from the non-federal sponsors (NFSs). The amended PA established the project costs at $48,500,000 with a 5% contingency.

This project was determined to be complete from a technical standpoint as of GLNPO's April 3, 2023, construction completion letter. With completion of both the technical project and final accounting review, GLNPO has determined that all remedial objectives and requirements in the PA's Scope of Work have been met, and the PA is closed out as of the date of this letter.

GLNPO has determined that the final project costs are $48,021,374.10. GLNPO expended $23,308,286.89. The Non-Federal Sponsor, Honeywell, contributed $4,100,000 in cash payments to GLNPO and $20,613,087.21 in accepted in-kind costs for a total NFS contribution of $24,713,087.21.

GLNPO has concluded that the NFSs successfully met their cost share requirement for this project. Please note that closeout of the PA does not affect GLNPO's right to disallow costs and recover funds based on later GLNPO review. To support such reviews, you must retain all

project records for a period of five years following the closeout of the PA. Please contact GLNPO if you intend to destroy project records after the five-year period.

Thank you for working with GLNPO on the successful completion of this Great Lakes Legacy Act project. If you have any questions, please feel free to contact me or Rance Albert (albert.rance@epa.gov, 312.886.2844).

Sincerely,

SCOTT CIENIAWSKI

Digitally signed by SCOTT CIENIAWSKI
Date: 2024.01.30 14:04:54 -06'00'

Scott Cieniawski
Section Supervisor, Great Lakes Remediation and Restoration Section 1
Great Lakes National Program Office

CC:

Rance Albert, GLNPO
Patricia Bradberry, GLNPO
Andy Chen, GLNPO
Nolan Flaherty, GLNPO
Mary Beth Giancarlo, GLNPO
Edwin Smith, GLNPO
Loreen Targos, GLNPO
Susan Prout, ORC

APPENDIX C – EXCAVATION WORK PLAN (EWP)

C-1 NOTIFICATION

This EWP covers dredging operations at the Site. If dredging is required, a dredging work plan (DWP) will be developed in similar manner as the EWP described herein. At least 15 days prior to the start of any activity that is anticipated to encounter remaining contamination or breach or alter the site's cover system, the site owner or their representative will notify the NYSDEC contacts listed in the table below. Table 1 in Section 1.3 of the former Buffalo Color Corporation Site – Areas A and B – Off-Site Area Site Management Plan (SMP) includes contact information for the above notification. The information on this table will be updated as necessary to provide accurate contact information. A full listing of site-related contact information is provided in Appendix B.

This notification will include:

- A detailed description of the work to be performed, including the location and areal extent of excavation, plans/drawings for site re-grading, estimated volumes of contaminated sediment to be excavated, and any work that may impact an engineering control;
- A summary of environmental conditions anticipated to be encountered in the work areas, including the nature and concentration levels of contaminants of concern, potential presence of grossly contaminated media, and plans for any pre-construction sampling;
- A schedule for the work, detailing the start and completion of all intrusive work;
- A summary of the applicable components of this EWP;
- A statement that the work will be performed in compliance with this EWP and 29 CFR 1910.120;
- A copy of the contractor's Health and Safety Plan (HASP), in electronic format, if it differs from the HASP provided in the *Former Buffalo Color Corporation Site - Area A/B Site Management Plan* (AMEC Environment and Infrastructure, Inc., 2015a [see references in SMP]) is provided in Appendix E of this SMP;
- Identification of disposal facilities for potential waste streams; and

- Identification of sources of any anticipated backfill, along with the required request to import form and all supporting documentation including, but not limited to, chemical testing results.

The NYSDEC project manager will review the notification and may impose additional requirements for the excavation that are not listed in this EWP.

C-2 SOIL SCREENING METHODS

Visual, olfactory and instrument-based (e.g., photoionization detector) soil screening will be performed during all excavations into known or potentially contaminated material (remaining contamination) or a breach of the cover system. A qualified environmental professional as defined in 6 NYCRR Part 375, a PE who is licensed and registered in New York State, or a qualified person who directly reports to a PE who is licensed and registered in New York State will perform the screening. Soil screening will be performed when invasive work is done and will include all excavation and invasive work performed during development, such as excavations for foundations and utility work, after issuance of the COC.

Soils will be segregated based on previous environmental data and screening results into material that requires off-site disposal and material that requires testing to determine if the material can be reused on-site as soil beneath a cover or if the material can be used as cover soil.

C-3 SOIL STAGING METHODS

Soil stockpiles will be continuously encircled with a berm and/or silt fence. Hay bales will be used as needed near catch basins, surface waters and other discharge points.

Stockpiles will be kept covered at all times with appropriately anchored tarps. Stockpiles will be routinely inspected, and damaged tarp covers will be promptly replaced.

Stockpiles will be inspected at a minimum once each week and after every storm event. Results of inspections will be recorded in a logbook and maintained at the site and available for inspection by the NYSDEC.

C-4 MATERIALS EXCAVATION AND LOAD-OUT

A qualified environmental professional as defined in 6 NYCRR Part 375, a PE who is licensed and registered in New York State, or a qualified person who directly reports to a PE who is licensed and registered in New York State will oversee all invasive work and the excavation and load-out of all excavated material.

The owner of the property and remedial party (if applicable) and its contractors are responsible for safe execution of all invasive and other work performed under this Plan.

The presence of utilities and easements on the site will be investigated by the qualified environmental professional. It will be determined whether a risk or impediment to the planned work under this SMP is posed by utilities or easements on the site. A site utility stakeout will be completed for all utilities prior to any ground intrusive activities at the site.

Loaded vehicles leaving the site will be appropriately lined, tarped, securely covered, manifested, and placarded in accordance with appropriate Federal, State, local, and NYSDOT requirements (and all other applicable transportation requirements).

A truck wash will be operated on-site, as appropriate. The qualified environmental professional will be responsible for ensuring that all outbound trucks will be washed at the truck wash before leaving the site until the activities performed under this section are complete. Truck wash waters will be collected and disposed of off-site in an appropriate manner.

Locations where vehicles enter or exit the site shall be inspected daily for evidence of off-site soil tracking.

The qualified environmental professional will be responsible for ensuring that all egress points for truck and equipment transport from the site are clean of dirt and other materials derived from the site during intrusive excavation activities. Cleaning of the adjacent streets will be performed as needed to maintain a clean condition with respect to site-derived materials. Material accumulated from the street cleaning and egress cleaning

activities will be disposed off-site at a permitted landfill facility in accordance with all applicable local, State, and Federal regulations.

C-5 MATERIALS TRANSPORT OFF-SITE

All transport of materials will be performed by licensed haulers in accordance with appropriate local, State, and Federal regulations, including 6 NYCRR Part 364. Haulers will be appropriately licensed and trucks properly placarded.

Material transported by trucks exiting the site will be secured with tight-fitting covers. Loose-fitting canvas-type truck covers will be prohibited. If loads contain wet material capable of producing free liquid, truck liners will be used.

All trucks loaded with site materials will exit the vicinity of the site using only these approved truck routes. This is the most appropriate route and considers: (a) limiting transport through residential areas and past sensitive sites; (b) use of city mapped truck routes; (c) prohibiting off-site queuing of trucks entering the facility; (d) limiting total distance to major highways; (e) promoting safety in access to highways; and (f) overall safety in transport; [(g) community input [where necessary]

Trucks will be prohibited from stopping and idling in the neighborhood outside the project site.

Egress points for truck and equipment transport from the site will be kept clean of dirt and other materials during site remediation and development.

Queuing of trucks will be performed on-site in order to minimize off-site disturbance. Off-site queuing will be prohibited.

C-6 MATERIALS DISPOSAL OFF-SITE

All material excavated and removed from the site will be treated as contaminated and regulated material and will be transported and disposed off-site in a permitted facility in accordance with all local, State and Federal regulations. If disposal of material from this site is proposed for unregulated off-site disposal (i.e., clean soil removed for development

purposes), a formal request with an associated plan will be made to the NYSDEC project manager. Unregulated off-site management of materials from this site will not occur without formal NYSDEC project manager approval.

Off-site disposal locations for excavated soils will be identified in the pre-excavation notification. This will include estimated quantities and a breakdown by class of disposal facility if appropriate, (e.g., hazardous waste disposal facility, solid waste landfill, petroleum treatment facility, C&D debris recovery facility) Actual disposal quantities and associated documentation will be reported to the NYSDEC in the Periodic Review Report. This documentation will include but will not be limited to waste profiles, test results, facility acceptance letters, manifests, bills of lading and facility receipts.

Non-hazardous historic fill and contaminated soils taken off-site will be handled consistent with 6 NYCRR Parts 360, 361, 362, 363, 364 and 365. Material that does not meet Unrestricted SCOs is prohibited from being taken to a New York State C&D debris recovery facility (6 NYCRR Subpart 360-15 registered or permitted facility).

C-7 MATERIALS REUSE ON-SITE

The qualified environmental professional as defined in 6 NYCRR part 375 will ensure that procedures defined for materials reuse in this SMP are followed and that unacceptable material (i.e., contaminated) does not remain on-site. Contaminated on-site material, including historic fill and contaminated soil, that is acceptable for reuse on-site will be placed below the demarcation layer or impervious surface, and will not be reused within a cover soil layer, within landscaping berms, or as backfill for subsurface utility lines.

Proposed materials for reuse on-site must be sampled for full suite analytical parameters including per- and polyfluoroalkyl substances (PFAS) and 1,4-dioxane. The sampling frequency will be in accordance with DER-10 Table 5.4(e)10 unless prior approval is obtained from the NYSDEC project manager for modification of the sampling frequency. The analytical results of soil/fill material testing must meet the site use criteria presented in NYSDEC DER-10 Appendix 5 – Allowable Constituent Levels for Imported

Fill or Soil for all constituents listed, and the NYSDEC Sampling, Analysis, and Assessment of Per- and Polyfluoroalkyl Substances [October 2020 or date of current version, whichever is later] guidance values. Approvals for modifications to the analytical parameters must be obtained from the NYSDEC project manager prior to the sampling event.

Soil/fill material for reuse on-site will be segregated and staged as described in Sections C-2 and C-3 of this EWP. The anticipated size and location of stockpiles will be provided in the 15-day notification to the NYSDEC project manager. Stockpile locations will be based on the location of site excavation activities and proximity to nearby site features. Material reuse on-site will comply with requirements of NYSDEC DER-10 Section 5.4(e)4. Any modifications to the requirements of DER-10 Section 5.4(e)4 must be approved by the NYSDEC project manager.

Any demolition material proposed for reuse on-site will be sampled for asbestos and the results will be reported to the NYSDEC for acceptance. Concrete crushing or processing on-site will not be performed without prior NYSDEC approval. Organic matter (wood, roots, stumps, etc.) or other solid waste derived from clearing and grubbing of the site will not be reused on-site.

C-8 FLUIDS MANAGEMENT

All liquids to be removed from the site, including but not limited to, excavation dewatering, decontamination waters and groundwater monitoring well purge and development waters, will be handled, transported and disposed off-site at a permitted facility in accordance with applicable local, State, and Federal regulations. Dewatering, purge and development fluids will not be recharged back to the land surface or subsurface of the site, and will be managed off-site, unless prior approval is obtained from NYSDEC.

Discharge of water generated during large-scale construction activities to surface waters (i.e., a local pond, stream or river) will be performed under a SPDES permit.

C-9 COVER SYSTEM RESTORATION

After the completion of soil removal and any other invasive activities the cover system will be restored in a manner that complies with the RAWP. The cover system is comprised primarily of a marine armor mattress. In areas not covered with the marine armor mattress, approximately 18 inches of clean sand cover has been installed. If the type of cover system changes from that which exists prior to the excavation (i.e., a soil cover is replaced by asphalt), this will constitute a modification of the cover element of the remedy and the upper surface of the remaining contamination. A figure showing the modified surface will be included in the subsequent Periodic Review Report and in an updated SMP.

C-10 BACKFILL FROM OFF-SITE SOURCES

All materials proposed for import onto the site will be approved by the qualified environmental professional, as defined in 6 NYCRR Part 375, and will be in compliance with provisions in this SMP prior to receipt at the site. A Request to Import/Reuse Fill or Soil form, which can be found at http://www.dec.ny.gov/regulations/67386.html, will be prepared and submitted to the NYSDEC project manager allowing a minimum of 5 business days for review.

Material from industrial sites, spill sites, other environmental remediation sites, or potentially contaminated sites will not be imported to the site.

All imported soils will meet the cover soil quality standards established in 6 NYCRR 375-6.7(d) and DER-10 Appendix 5 for residential use. Soils that meet 'general' fill requirements under 6 NYCRR Part 360.13, but do not meet cover soil objectives for this site, will not be imported onto the site without prior approval by NYSDEC project manager. Soil material will be sampled for the full suite of analytical parameters, including PFAS and 1, 4-dioxane. Solid waste will not be imported onto the site.

Trucks entering the site with imported soils will be securely covered with tight fitting covers. Imported soils will be stockpiled separately from excavated materials and covered to prevent dust releases.

C-11 STORMWATER POLLUTION PREVENTION

Barriers and hay bale checks will be installed and inspected once a week and after every storm event. Results of inspections will be recorded in a logbook and maintained at the site and available for inspection by the NYSDEC. All necessary repairs shall be made immediately.

Accumulated sediments will be removed as required to keep the barrier and hay bale check functional.

All undercutting or erosion of the silt fence toe anchor shall be repaired immediately with appropriate backfill materials.

Manufacturer's recommendations will be followed for replacing silt fencing damaged due to weathering.

Erosion and sediment control measures identified in the SMP shall be observed to ensure that they are operating correctly. Where discharge locations or points are accessible, they shall be inspected to ascertain whether erosion control measures are effective in preventing significant impacts to receiving waters.

Silt fencing or hay bales will be installed around the entire perimeter of the construction area.

C-12 EXCAVATION CONTINGENCY PLAN

If underground tanks or other previously unidentified contaminant sources are found during post-remedial subsurface excavations or development related construction, excavation activities will be suspended until sufficient equipment is mobilized to address the condition. The NYSDEC project manager will be promptly notified of the discovery.

Sampling will be performed on product, sediment and surrounding soils, etc. as necessary to determine the nature of the material and proper disposal method. Chemical analysis will be performed for a full list of analytes [TAL metals, TCL volatiles and semi-volatiles (including 1,4-dioxane), TCL pesticides and PCBs, and PFAS], unless the site

history and previous sampling results provide sufficient justification to limit the list of analytes. In this case, a reduced list of analytes will be proposed to the NYSDEC project manager for approval prior to sampling. Any tanks will be closed as per NYSDEC regulations and guidance.

Identification of unknown or unexpected contaminated media identified by screening during invasive site work will be promptly communicated by phone within two hours to NYSDEC's Project Manager. Reportable quantities of petroleum product will also be reported to the NYSDEC spills hotline. These findings will be also included in the Periodic Review Report.

C-13 COMMUNITY AIR MONITORING PLAN

The property is completely submerged. No air monitoring is anticipated.

C-14 ODOR CONTROL PLAN

This odor control plan is capable of controlling emissions of nuisance odors off-site. Specific odor control methods to be used on a routine basis will include monitoring during operations. If nuisance odors are identified at the site boundary, or if odor complaints are received, work will be halted, and the source of odors will be identified and corrected. Work will not resume until all nuisance odors have been abated. NYSDEC and NYSDOH will be notified of all odor events and of any other complaints about the project. Implementation of all odor controls, including the halt of work, is the responsibility of the remedial party's Remediation Engineer, and any measures that are implemented will be discussed in the Periodic Review Report.

All necessary means will be employed to prevent on- and off-site nuisances. At a minimum, these measures will include: (a) limiting the area of open excavations and size of soil stockpiles; (b) shrouding open excavations with tarps and other covers; and (c) using foams to cover exposed odorous soils. If odors develop and cannot be otherwise controlled, additional means to eliminate odor nuisances will include: (d) direct load-out of soils to trucks for off-site disposal; (e) use of chemical odorants in spray or misting systems; and (f) use of staff to monitor odors in surrounding neighborhoods.

If nuisance odors develop during intrusive work that cannot be corrected, or where the control of nuisance odors cannot otherwise be achieved due to on-site conditions or close proximity to sensitive receptors, odor control will be achieved by sheltering the excavation and handling areas in a temporary containment structure equipped with appropriate air venting/filtering systems.

C-15 DUST CONTROL PLAN

The remedial party will also take measures listed below to prevent dust production on the site.

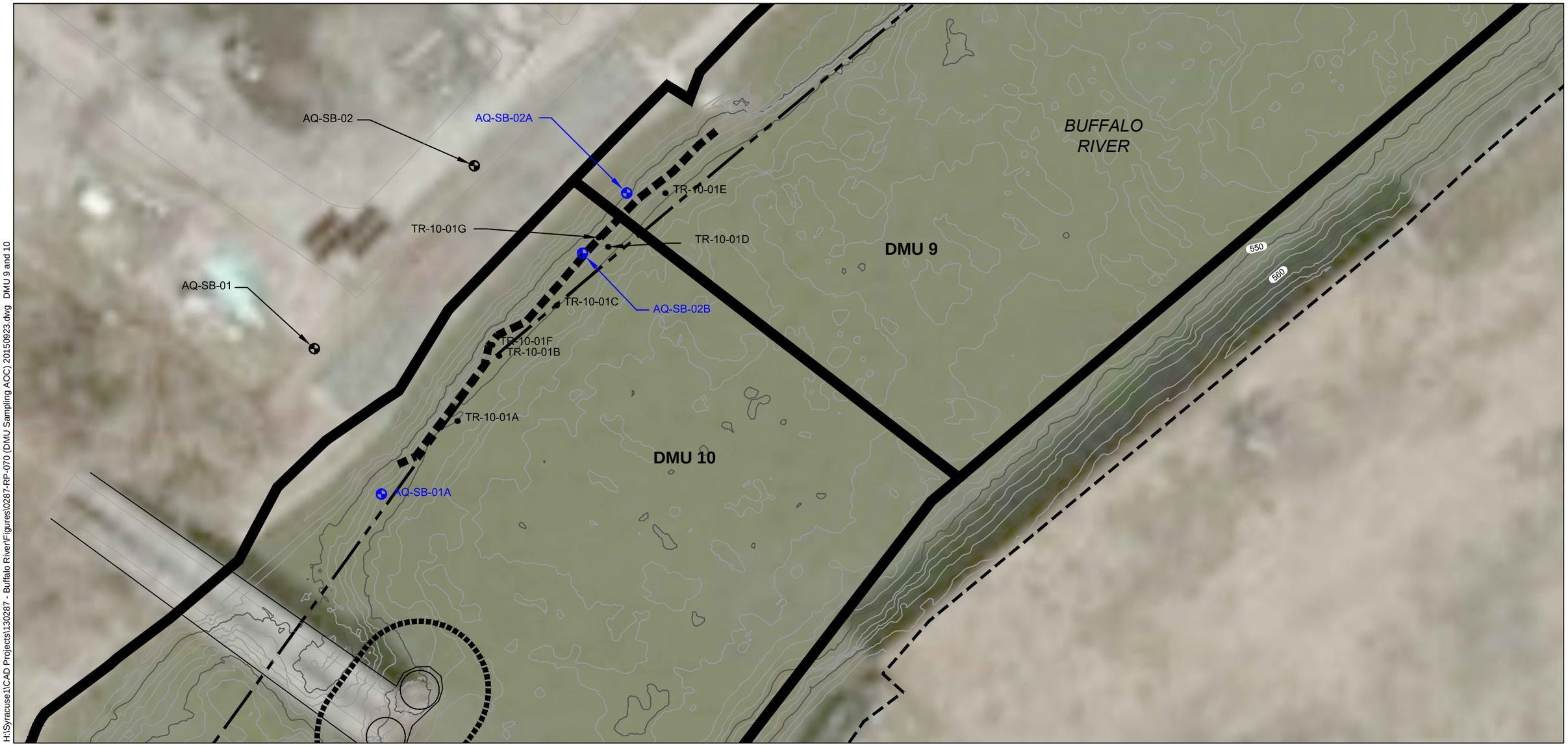
A dust suppression plan that addresses dust management during invasive on-site work will include, at a minimum, the items listed below:

- Dust suppression will be achieved using a dedicated on-site water truck for road wetting. The truck will be equipped with a water cannon capable of spraying water directly onto off-road areas including excavations and stockpiles.
- Clearing and grubbing of larger sites will be done in stages to limit the area of exposed, unvegetated soils vulnerable to dust production.
- Gravel will be used on roadways to provide a clean and dust-free road surface.
- On-site roads will be limited in total area to minimize the area required for water truck sprinkling.

C-16 OTHER NUISANCES

A plan will be developed and utilized by the contractor for all remedial work to ensure compliance with local noise control ordinances.

APPENDIX D – SITE-SPECIFIC BORING LOGS



H:\Syracuse1\CAD Projects\130287 - Buffalo River\Figures\0287-RP-070 (DMU Sampling AOC) 20150923.dwg DMU 9 and 10

Sep 24, 2015 8:48am bhurry

SOURCE: Aerial from ESRI. Basemap from CH2MHill. Bathymetry from USACE, dated September-December 2014.
HORIZONTAL DATUM: New York State Plane West, NAD83, U.S. Feet.

LEGEND:

- Navigation Channel
- DMU Limits
- Shoreline
- Existing Contours, 2' and 10'
- Boundary of No Dredge Area
- Toe of Marine Mattress (May 2013 and April 2014)
- Actual Sediment Probing Location
- Actual Upland Boring Location
- Actual Over-water Boring Location

0 90
Scale in Feet

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Figure 1
Subsurface Exploration Locations - DMUs 9 and 10
Buffalo River AOC

Soil Boring Log

AQ-SB-01

Project: **Buffalo River AOC**	Location: **Buffalo, NY**	Method: **Wash Rotary**
Project #: **E50287-03.01**	N/LAT: **1078061.599** E/LONG: **1042878.313**	Total Depth (ft): **67.0**
Client: **Honeywell International**	Horiz. Datum: **New York State Plane West, NAD1983, US Survey Feet**	Observed GW (bgs): **N/A**
Collection Date: **5/19/15-5/20/15**	Vert. Datum: **IGLD 85**	Ground Surface Elevation (ft): **584.5**
Contractor: **Atlantic Testing Laboratories**	Sampler(s): **2 inch O.D. Split - Spoon** **3 inch O.D. Shelby Tube (Piston Sampler)**	Hammer: **Auto Hammer - 140lbs w/ 30-inch drop**
Logged By: **Chad Robinson**		Hammer Efficiency: **NA**

Depth (ft)	Samples	Uncorrected Standard Penetration Resistance (blows per foot) and Water Content (%) 0 10 20 30 40 50	Values Greater than 50	Soil Description Samples and descriptions are in recovered depths. Classification scheme: USCS	Lab Test	Elevation (ft)
0	S-1	▲		TOPSOIL: Very stiff, dry, light brown, sandy clayey TOPSOIL (approx. 2 - inches).		580
	S-2	▲		FILL (SM): Loose, damp, reddish dark brown to black, silty, fine to medium SAND (FILL), some gravel, occasional brick, concrete, and glass fragments, no odor.		
5	S-3	▲				
	S-4	▲				
	S-5	▲				575
10	S-6	▲				
	S-7	▲		Becomes medium dense, moist, with very slight hydrocarbon odor @12.0ft.		570
15						
	S-8	▲		Becomes wet.		
20						565
	S-9	▲				
25						560
	S-10	▲				
30	ST-11	●		Silty CLAY (CL): Very soft to medium stiff, moist, brownish gray, silty CLAY, trace fine sand, medium plasticity, no odor.	MC, SG, AL, UUTX	555
35	S-12	▲ ●	W.O.H.	Vane Shear Test @35ft. Peak - 1328 psf, Remold - 516 psf.	MC	550
	S-13	▲ ●	W.O.R.		MC	
40						545
	S-14	▲ ●			MC	
45	ST-15	●			MC, SG, AL, CUTX	540
	S-16	▲ ●	W.O.H.	Vane Shear Test @47ft. Peak - 1224 psf, Remold - 664 psf.	MC	
50						535

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▲ SPT N-Value
● Water Content (%)

Notes:
1. Soil descriptions and stratum lines are interpretive and actual conditions may vary.
2. Groundwater level was observed at the time and date specified.
3. W.O.H. = Weight of Hammer; W.O.R. = Weight of Rods; GS = Grain Size Analysis; AL = Atterberg Limits; SG = Specific Gravity; CUTX = Consolidated-Undrained Tri-Axial.

Soil Boring Log

AQ-SB-01

Project: **Buffalo River AOC**	Location: **Buffalo, NY**	Method: **Wash Rotary**
Project #: **E50287-03.01**	N/LAT: **1078061.599** E/LONG: **1042878.313**	Total Depth (ft): **67.0**
Client: **Honeywell International**	Horiz. Datum: **New York State Plane West, NAD1983, US Survey Feet**	Observed GW (bgs): **N/A**
Collection Date: **5/19/15-5/20/15**	Vert. Datum: **IGLD 85**	Ground Surface Elevation (ft): **584.5**
Contractor: **Atlantic Testing Laboratories**	Sampler(s): **2 inch O.D. Split - Spoon** **3 inch O.D. Shelby Tube (Piston Sampler)**	Hammer: **Auto Hammer - 140lbs w/ 30-inch drop**
Logged By: **Chad Robinson**		Hammer Efficiency: **NA**

Depth (ft)	Samples	Uncorrected Standard Penetration Resistance (blows per foot) and Water Content (%) 0 10 20 30 40 50	Values Greater than 50	Soil Description Samples and descriptions are in recovered depths. Classification scheme: USCS	Lab Test	Elevation (ft)
50						530
55	S-17	▲ ●	W.O.R.	trace fine sand; transition to light gray. Driller noted possible cobble or boulder @56.5 to 57.0ft.	MC	525
60	S-18	▲ ●		trace well-rounded gravel; increasing sand content.	MC	520
65	S-19	● ▲		Silty SAND (SM): Medium dense, moist, gray, gravelly silty fine SAND to sandy SILT.	MC	515
70	S-20	▲	100/0.5"	Driller noted change in drilling (bedrock) @65.5ft., advance with roller bit to 67.0ft. BEDROCK: Poor recovery, broken rock fragments, possible limestone.		510
75				Bottom of Boring at 67.0ft below ground surface. Completed on 5/20/15.		505
80						500
85						495
90						490
95						485
100						

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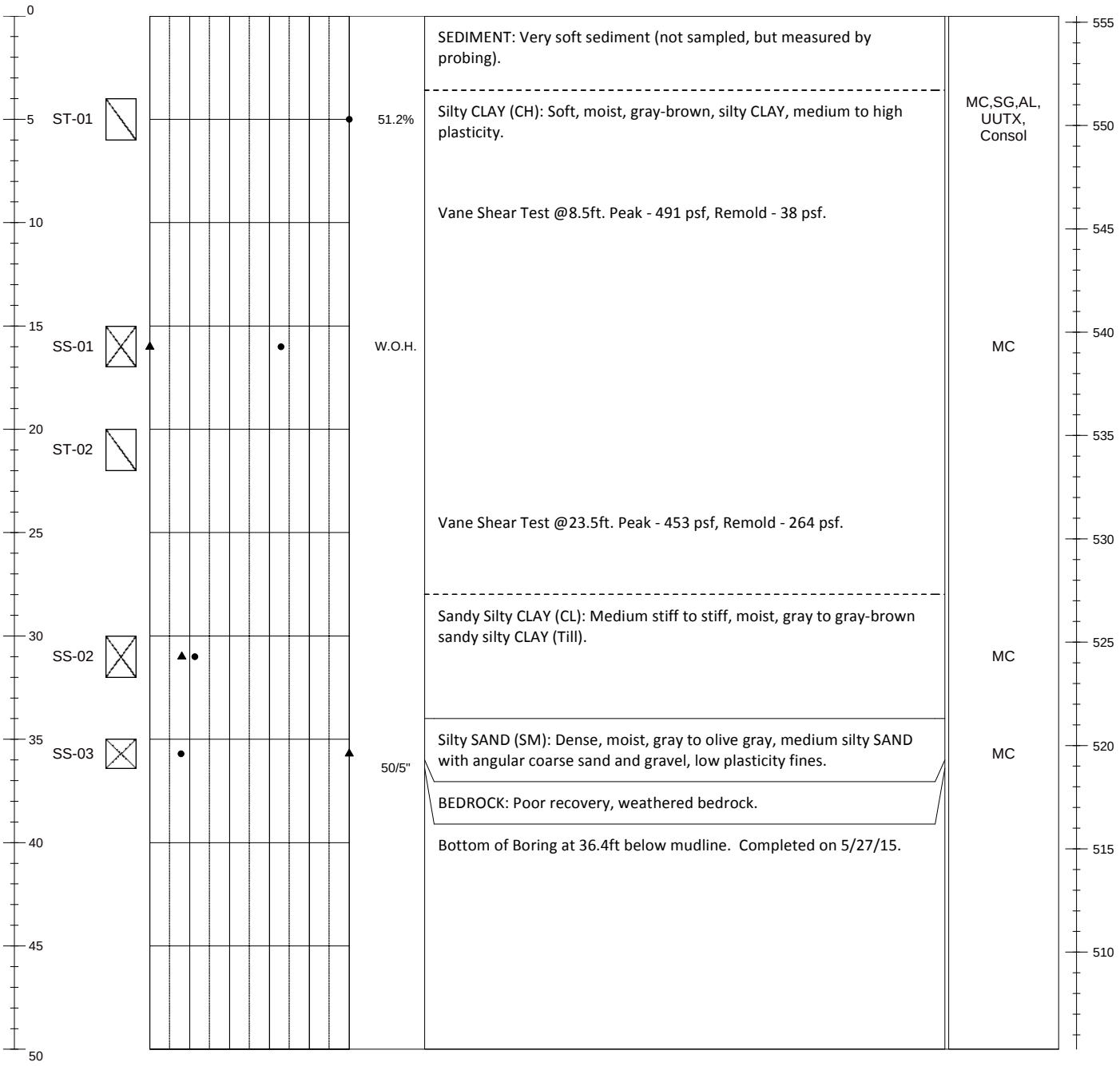
▲ SPT N-Value
● Water Content (%)

Notes:
1. Soil descriptions and stratum lines are interpretive and actual conditions may vary.
2. Groundwater level was observed at the time and date specified.
3. W.O.H. = Weight of Hammer; W.O.R. = Weight of Rods; GS = Grain Size Analysis; AL = Atterberg Limits; SG = Specific Gravity; CUTX = Consolidated-Undrained Tri-Axial.

Soil Boring Log

AQ-SB-01A

Project: **Buffalo River AOC**	Location: **Buffalo, NY**	Method: **Wash Rotary**
Project #: **E50287-03.01**	N/LAT: **1078088.876** E/LONG: **1042819.286**	Total Depth (ft): **36.4**
Client: **Honeywell International**	Horiz. Datum: **New York State Plane West, NAD1983, US Survey Feet**	Water Depth (ATD): **16.3ft.**
Collection Date: **5/27/15**	Vert. Datum: **IGLD 85**	Ground Surface Elevation (ft): **555.3**
Contractor: **Atlantic Testing Laboratories**	Sampler(s): **2 inch O.D. Split - Spoon** **3 inch O.D. Shelby Tube (Piston Sampler)**	Hammer: **Auto Hammer - 140lbs w/30-inch drop**
Logged By: **Zac Koehn**		Hammer Efficiency: **NA**



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▲ SPT N-Value
● Water Content (%)

Notes:
1. Soil descriptions and stratum lines are interpretive and actual conditions may vary.
2. Groundwater level was observed at the time and date specified.
3. W.O.H. = Weight of Hammer; W.O.R. = Weight of Rods; GS = Grain Size Analysis; AL = Atterberg Limits; SG = Specific Gravity; CUTX = Consolidated-Undrained Tri-Axial.

Soil Boring Log

AQ-SB-02

Project: **Buffalo River AOC**	Location: **Buffalo, NY**	Method: **Wash Rotary**
Project #: **E50287-03.01**	N/LAT: **1078126.613** E/LONG: **1042952.62**	Total Depth (ft): **66.0**
Client: **Honeywell International**	Horiz. Datum: **New York State Plane West, NAD1983, US Survey Feet**	Observed GW (bgs): **N/A**
Collection Date: **5/20/15 - 5/21/15**	Vert. Datum: **IGLD 85**	Ground Surface Elevation (ft): **584.9**
Contractor: **Atlantic Testing Laboratories**	Sampler(s): **2 inch O.D. Split - Spoon** **3 inch O.D. Shelby Tube (Piston Sampler)**	Hammer: **Auto Hammer - 140lbs w/ 30-inch drop**
Logged By: **Chad Robinson**		Hammer Efficiency: **NA**

Depth (ft)	Samples	Uncorrected Standard Penetration Resistance (blows per foot) and Water Content (%) 0 10 20 30 40 50	Values Greater than 50	Soil Description Samples and descriptions are in recovered depths. Classification scheme: USCS	Lab Test	Elevation (ft)
0	S-1			TOPSOIL: Stiff, dry, light brown, silty clayey TOPSOIL (approx. 2-inches).		580
	S-2			Silty Sand (SM): Loose to medium dense, dry, dark brown to reddish brown, silty fine to medium SAND, occasional brick, concrete, and glass fragments, no odor (FILL).		
5	S-3					
	S-4					
	S-5			SAND/GRAVEL (SP/GC): Loose, dry to moist, reddish brown, interbedded medium SAND and clayey GRAVEL (FILL).		575
10						
	S-6					
15						570
	S-7			Silty SAND (SM): Medium dense, wet, black, silty gravelly, fine to medium SAND, cemented black pieces, no odor (FILL).		
20						565
	S-8					
25						560
	S-9					
30				Driller notes wash water return turns to dark gray @31.0ft.		555
	S-10		W.O.R.	Silty CLAY (CL): Very soft, moist, brownish gray, silty CLAY, medium plasticity.	MC	
35						550
	S-11		W.O.H.		MC	
40	ST-12			Mottled gray and brown from 39.0 to 40.0ft.	MC, SG, AL, UUTX	545
	S-13		W.O.R.	Vane Shear Test @43.0ft. Peak - 604 psf, Remold - 302 psf.	MC	
45						540
	S-14		W.O.H.		MC	
50						535

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△ SPT N-Value
● Water Content (%)

Notes:
1. Soil descriptions and stratum lines are interpretive and actual conditions may vary.
2. Groundwater level was observed at the time and date specified.
3. W.O.H. = Weight of Hammer; W.O.R. = Weight of Rods; GS = Grain Size Analysis; AL = Atterberg Limits; SG = Specific Gravity; CUTX = Consolidated-Undrained Tri-Axial.

Soil Boring Log

AQ-SB-02

Project: **Buffalo River AOC**	Location: **Buffalo, NY**	Method: **Wash Rotary**
Project #: **E50287-03.01**	N/LAT: **1078126.613** E/LONG: **1042952.62**	Total Depth (ft): **66.0**
Client: **Honeywell International**	Horiz. Datum: **New York State Plane West, NAD1983, US Survey Feet**	Observed GW (bgs): **N/A**
Collection Date: **5/20/15 - 5/21/15**	Vert. Datum: **IGLD 85**	Ground Surface Elevation (ft): **584.9**
Contractor: **Atlantic Testing Laboratories**	Sampler(s): **2 inch O.D. Split - Spoon** **3 inch O.D. Shelby Tube (Piston Sampler)**	Hammer: **Auto Hammer - 140lbs w/ 30-inch drop**
Logged By: **Chad Robinson**		Hammer Efficiency: **NA**

Depth (ft)	Samples	Uncorrected Standard Penetration Resistance (blows per foot) and Water Content (%) 0 10 20 30 40 50	Values Greater than 50	Soil Description Samples and descriptions are in recovered depths. Classification scheme: USCS	Lab Test	Elevation (ft)
50	ST-15			Silty CLAY (CL): Very soft, moist, brownish gray, silty CLAY, medium plasticity.		535
55	S-16	▲ ●	W.O.R.	Vane Shear Test @53.0ft. Peak - 944 psf, Remold - 310 psf. transitions to brown, silty CLAY with occasional gray silt lens and silt partings.	MC	530
60	S-17	▲ ●	W.O.R.		MC	525
65	S-18	● ▲		Silty Sandy CLAY (CL): Stiff, moist, gray, silty sandy CLAY, some fine semi angular gravel (Till).	MC	520
	S-19	▲	100/6"	Driller noted change in drilling (bedrock), advance with roller bit to 66.0ft. BEDROCK: Poor recovery, broken rock fragments, possible limestone.		
70				Bottom of Boring at 66.0ft below ground surface. Completed on 5/21/15.		515
75						510
80						505
85						500
90						495
95						490
100						485

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△ SPT N-Value
● Water Content (%)

Notes:
1. Soil descriptions and stratum lines are interpretive and actual conditions may vary.
2. Groundwater level was observed at the time and date specified.
3. W.O.H. = Weight of Hammer; W.O.R. = Weight of Rods; GS = Grain Size Analysis; AL = Atterberg Limits; SG = Specific Gravity; CUTX = Consolidated-Undrained Tri-Axial.

Soil Boring Log

AQ-SB-02A

Project: **Buffalo River AOC**	Location: **Buffalo, NY**	Method: **Wash Rotary**
Project #: **E50287-03.01**	N/LAT: **1078179.056** E/LONG: **1042939.751**	Total Depth (ft): **35.7**
Client: **Honeywell International**	Horiz. Datum: **New York State Plane West, NAD1983, US Survey Feet**	Water Depth (ATD): **17.5ft.**
Collection Date: **5/28/15**	Vert. Datum: **IGLD 85**	Ground Surface Elevation (ft): **554.3**
Contractor: **Atlantic Testing Laboratories**	Sampler(s): **2 inch O.D. Split - Spoon** **3 inch O.D. Shelby Tube (Piston Sampler)**	Hammer: **Auto Hammer - 140lbs w/30-inch drop**
Logged By: **Zac Koehn**		Hammer Efficiency: **NA**

Depth (ft)	Samples	Uncorrected Standard Penetration Resistance (blows per foot) and Water Content (%) 0 10 20 30 40 50	Values Greater than 50	Soil Description	Lab Test	Elevation (ft)
0	SS-01		W.O.R.	Organic SILT (OH): Very soft, wet, dark gray to olive gray, organic SILT with some sand and decayed plant matter, strong odor.		550
5	SS-02			Silty SAND (SM): Loose, wet, black, silty SAND, some debris (brick pieces and leaf like matter), potential product observed, strong odor, sheen in return water (Fill). Hard drilling @7.5ft. - possible debris.		545
10	SS-03			SAND with silt (SP-SM): Loose, wet, dark black with light colored grains, medium to coarse SAND with silt and angular rock fragments, potential product observed, strong odor.		540
15	ST-01			Silty CLAY(CH): Soft, moist, gray to gray-brown, silty CLAY, trace sand, medium plasticity.	MC, AL, GS	535
20	ST-02				MC, AL, SG, CUTX, Consol	530
25				Vane Shear Test @ 23.5ft. Peak - 672 psf, Remold - 234 psf.		525
30	ST-03 SS-04			Silty Clayey SAND (SC-SM): Medium dense, moist, gray to gray-brown, silty clayey SAND with occasional gravel (Till).	MC, AL, SG, UUTX	520
35	SS-05		50/2"	Driller notes hard drilling, likely weathered bedrock @34.5ft. BEDROCK: Poor recovery, rock fragments, possible limestone.		515
40				Bottom of Boring at 35.8ft below mudline. Completed on 5/28/15.		510
45						505
50						

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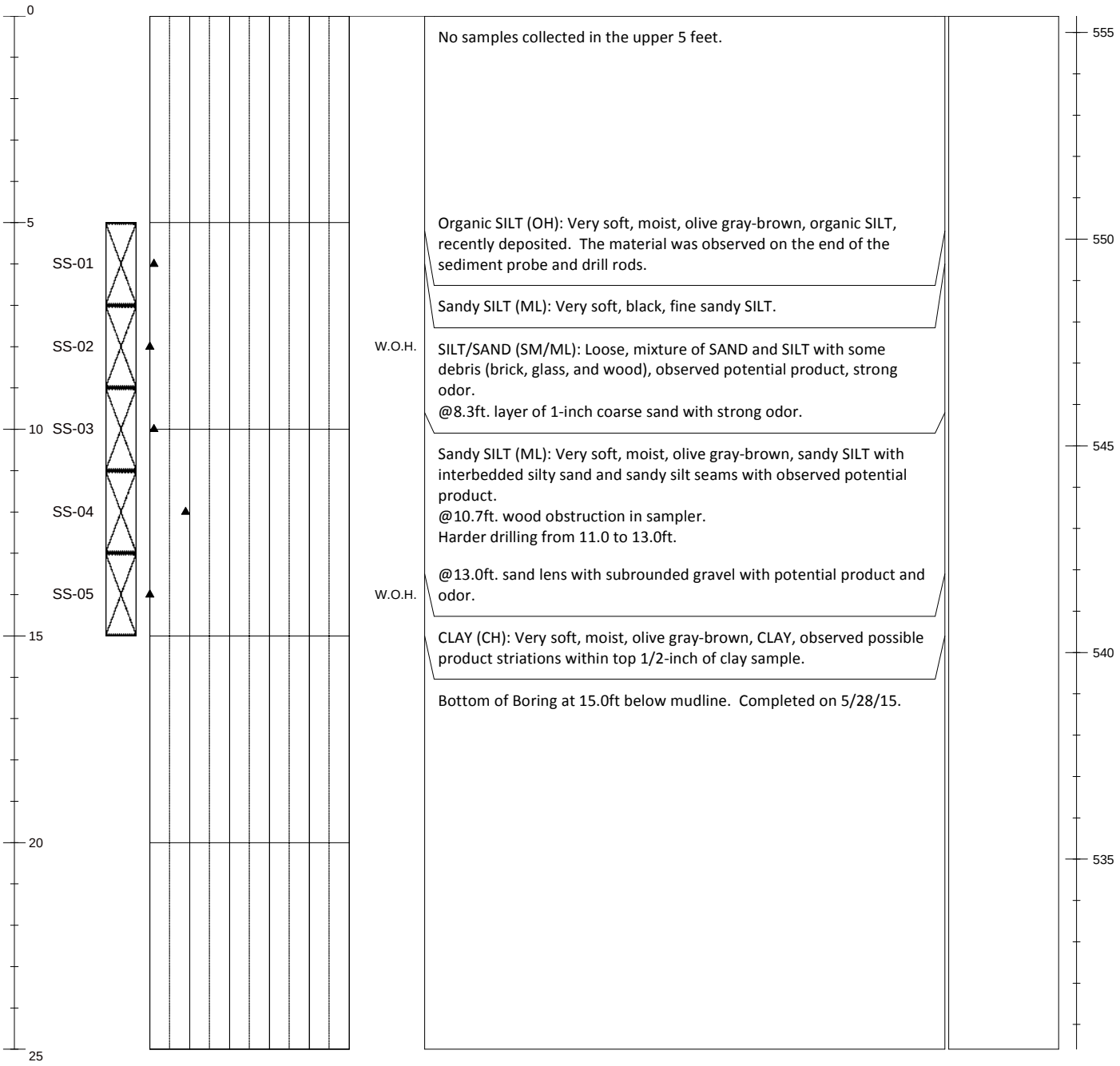
△ SPT N-Value
● Water Content (%)

Notes:
1. Soil descriptions and stratum lines are interpretive and actual conditions may vary.
2. Groundwater level was observed at the time and date specified.
3. W.O.H. = Weight of Hammer; W.O.R. = Weight of Rods; GS = Grain Size Analysis; AL = Atterberg Limits; SG = Specific Gravity; CUTX = Consolidated-Undrained Tri-Axial.

Soil Boring Log

AQ-SB-02B

Project: **Buffalo River AOC**	Location: **Buffalo, NY**	Method: **Wash Rotary**
Project #: **E50287-03.01**	N/LAT: **1078191.537** E/LONG: **1042937.594**	Total Depth (ft): **15.0**
Client: **Honeywell International**	Horiz. Datum: **New York State Plane West, NAD1983, US Survey Feet**	Water Depth (ATD): **16.4ft.**
Collection Date: **5/28/15**	Vert. Datum: **IGLD 85**	Ground Surface Elevation (ft): **555.4**
Contractor: **Atlantic Testing Laboratories**	Sampler(s): **2 inch O.D. Split - Spoon** **3 inch O.D. Shelby Tube (Piston Sampler)**	Hammer: **Auto Hammer - 140lbs w/30-inch drop**
Logged By: **Zac Koehn**		Hammer Efficiency: **NA**



ANCHOR QEA
720 Olive Way, Suite 1900
Seattle, WA 98101
206-287-9130

△ SPT N-Value
● Water Content (%)

Notes:
1. Soil descriptions and stratum lines are interpretive and actual conditions may vary.
2. Groundwater level was observed at the time and date specified.
3. W.O.H. = Weight of Hammer; W.O.R. = Weight of Rods; GS = Grain Size Analysis; AL = Atterberg Limits; SG = Specific Gravity; CUTX = Consolidated-Undrained Tri-Axial.

APPENDIX E – HEALTH AND SAFETY PLAN

Ontario Specialty Contracting, Inc.

333 Ganson Street
Buffalo, NY 14203

Corporate Health, Safety and Environment (HSE) Plan

Revision Date: July 30, 2010

Table of Contents

Appendices

OSC HSEMS Document

Policy Statement

Revision Date: 6/02/2010

Policy Statement:

In fulfilling legal obligation, and the moral responsibility to provide a place of employment free from recognized hazards, Ontario Specialty Contracting, Inc. (***OSC***) has set forth a Health, Safety and Environment (HSE) Policy Statement, reinforcing our commitment to maintaining a safe and healthy work environment for our employees, protection of the environment and the safety of the General Public. This Policy Statement is the basis for the Company's HSE management process and is communicated to employees, customers, vendors and subcontractors. It is considered equally as important as any other primary business objectives.

The ***OSC*** HSE philosophy is simple: while performing our work, our primary concern is the health and welfare of the people involved and the protection of client assets, the environment and the General Public.

NO JOB IS SO IMPORTANT THAT WE CANNOT TAKE THE TIME TO DO IT SAFELY AND WITHOUT CONSEQUENCE TO THE ENVIRONMENT.

The HSE Management System (HSEMS) outlines how we identify hazards and subsequently eliminate them or provide a means to minimize risk. The HSE management process is intended to demonstrate to ***OSC*** management, appropriate regulatory agencies, customers and other interested parties, that equipment and operations associated with the performance of our work are capable of being utilized without undue risk to those involved or the environment.

We believe that incidents are caused, and therefore, can be prevented. The safety and health of individuals involved in operations, the protection of assets and the environment is everyone's responsibility. Employees at all levels of the company are accountable and responsible for preventing job related illnesses and injuries as well as equipment and environment losses through the diligent and consistent application of the HSE management process.

Employee HSE performance is considered in decisions affecting promotions, salary actions and continued employment.

Stephen M. Robinson, CSS, CST	Jon M. Williams
HSE Director	President

Section 1
Program Overview

1.1 Introduction

Ontario Specialty Contractors (***OSC***) affirms the following philosophy and principles as the basis of our company's Health and Safety Program.

1.1.1 Health and Safety Philosophy

The Companies Health and Safety Program is guided by the belief that our employees are our greatest asset and that every employee's health and safety must receive top priority and support. Prevention of occupationally related injuries and illnesses is an integral part of the firm's goals for quality service to clients, growth, and profit.

Only projects completed without injury or accident are considered successful by OSC.

OSC will maintain a Health and Safety Program designed to minimize the number of injuries and illnesses, with an ultimate goal of zero accidents and injuries. ***OSC's*** program will be equal or superior to the standard of practice in our industry. The firm, guided by management, shares responsibility for health and safety and will provide the appropriate supervision, training and protective equipment (ppe) to keep its employees safe and healthful. Employee owned ppe is not required. Full participation by all ***OSC*** employees is crucial to the overall success of the program.

1.1.2 Health and Safety Principles

To guide our employees in understanding and adherence to ***OSC***'s Health and Safety Program, our health and safety goals can be summarized by the following principles. ***OSC*** believes that:

- Occupationally caused injuries and illnesses are preventable.
- Preventing occupationally caused injuries and illnesses is one of our highest responsibilities.
- Providing safe working conditions in the office and in the field requires commitment from all involved parties.
- Employees have a right to information and training.
- Working safely is a condition of employment and a shared responsibility between management and staff.
- Neither ***OSC***, nor its projects, can succeed unless injuries and exposures are mitigated, managed and prevented.

1.2 Health and Safety Compliance

Safety is the responsibility of every ***OSC*** employee. ***OSC***'s Corporate Health, Safety and Environmental Director (CHSED) is responsible for the creation and updating of the Corporate Health, Safety and Environmental Plan. This individual has the responsibility to provide for the continued health and welfare of all

company employees and to provide support to by promoting, maintaining and documenting a safe work environment. (See *Section 2* for an explanation of our health and safety personnel's roles and responsibilities.)

OSC achieves compliance with all applicable health and safety regulations, and client requirements, through a company wide oversight and coordination of all health and safety functions. These regulations and requirements include the following:

- 29 CFR 1910, *OSHA Safety and Health Standard for General Industry*
- 29 CFR 1904, *OSHA Recording and Reporting Occupational Injuries and Illnesses*
- 29 CFR 1926, *OSHA Safety and Health Standards for the Construction Industry*
- EPA Order 1440.2, *EPA Health and Safety Requirements*
- EM 385-1-1, *U.S. Army Corps of Engineers, Safety and Health Requirements Manual*
- U.S. Department of Health and Human Services, Public Health Service, Centers for Disease Control, NIOSH Publication Number 85-115, *Occupational Safety and Health Guidance Manual for Hazardous Waste Site Activities*
- Title 8 of the California Code of Regulations, *General Industry Safety Orders*, specifically 8 CCR § 3203, *Injury and Illness Prevention Program (California operations only)*
- Title 8 of the California Code of Regulations, *Construction Safety Orders*, specifically 8 CCR § 1509, *Injury and Illness Prevention Program (California operations only)*
- State and local regulations pertaining to health and safety

1.3 Health and Safety Employee Guidance

A copy of this Health and Safety Manual will be provided to all ***OSC*** personnel upon request. This will provide an up-to-date reference guide for personnel and minimize potential legal or administrative actions against ***OSC*** for noncompliance.

OSC will make available to employees all appropriate safety documents to ensure that all personnel are informed of safety guidelines and procedures.

OSC will also develop Site-Specific Health and Safety Plans (HASPs) to reflect client, contract, or site-specific requirements. These documents are required to be maintained onsite and will be made available to all ***OSC*** project personnel upon request.

In addition to the guidelines and procedures contained in this Health and Safety Manual, ***OSC*** makes the following documents available to personnel as applicable:

- *Hazardous Waste Operation* - procedures for investigation and remediation of hazardous waste sites.
- *Right to Know Program* - a program addressing employees' right to information on the hazards of the substances located at the worksite.
- *Radiation Protection* - procedures, including a no-work level, for work at any

site where elevated radiation levels are present

- *Confined Space Entry Procedures* - procedures for safe work in, near, or adjacent to confined spaces
- *Lyme Disease Policy* - procedures for the prevention of, recognition of, and response to Lyme disease

The documents listed above are available from the Health, Safety and Environmental Director (CHSED).

1.4 Health and Safety Program Considerations

While a primary consideration for all of ***OSC*** operations is the health and safety of its personnel, the protection of the general public and the environment is also important in developing and implementing the Health and Safety Program. The application of standardized health and safety procedures by trained personnel reduces the possibility of injury or exposure. To be effective, ***OSC*** health and safety procedures must be:

- Based on available and current information, operational principles and technical guidance;
- Field tested, reviewed and revised, when appropriate, by the CHSED and relevant safety personnel;
- Adjusted to site or task specific situations and conditions;
- Understandable, feasible and appropriate for site conditions;
- Available to site personnel who have been briefed on their use; and
- Performed, implemented and used by individuals appropriately trained.

The prevention of occupational injuries and illnesses is of such consequence that it will be given precedence over project operations at all times. To the greatest degree possible, ***OSC*** management will provide all mechanical and physical facilities required for personal health and safety to meet required standards, the most current professional practices and applicable regulations.

To be successful, the program will embody a proactive and concerned attitude toward injury exposure and illness prevention on the part of managers, supervisors and employees. ***OSC*** also requires employee cooperation in all health and safety matters. Only through such a cooperative effort can a safety program, in the best interest of all, be established and preserved.

1.5 Health, Safety and Environmental Objectives

OSC's objective is a Health and Safety Program that will reduce the number of injuries, exposures and illnesses to an absolute minimum. **Our goal is zero accidents, exposures and injuries.**

Specific elements that form the foundation of the ***OSC*** Health and Safety Program include the following:

- **Employee Health** Surveillance - This objective includes the administration of baseline and annual/interim physical examinations, project and material-specific periodic biological monitoring and periodic physical examinations for administrative personnel.
- **Health and Safety Education and Training Program** - This continuous program is designed to promote hazard recognition and accident/illness prevention as well as to familiarize each employee with

pertinent Environmental Protection Agency (EPA), Occupational Safety and Health Administration (OSHA), Corps. Of Engineers {COE} and Department of Transportation (DOT) regulations. In addition, this program addresses potential specific hazards of tasks that employees may be assigned to perform. The program is not limited to project personnel. Administrative personnel receive periodic materials related to proper lifting techniques, office ergonomics, slips, trips and falls.

- **Employee Exposure Assessment to Potential Chemical and Physical Hazards** - This element includes a review of tasks, both administrative and project related, to ascertain hazard potentials to those individuals assigned to perform those tasks and to take appropriate actions designed to minimize those hazard potentials. Project-related hazard potentials are typically addressed in a project-specific HASP. These plans describe hazard potentials, prescribe specific procedures and personnel protective equipment, and determine the types of specific monitoring that may be required to ascertain the effectiveness of these efforts in minimizing hazards.

Through implementation of these foundation elements, ***OSC*** intends to achieve our health and safety objectives, which include:

OSC's goal is zero accidents, exposures, and injuries.

- Aiming to ensure that employees assigned to specific tasks are mentally and physically able to perform those tasks. Secondly, individuals will be required to wear personnel protective equipment relevant to performance of specific tasks and participate in documented, annual training in the selection, use and maintenance of such equipment. Re-training will occur after changes occur in the workplace, after lack of use, or when an employee cannot demonstrate proper use and understanding of the item or
- Providing a mechanism by which employees assigned to various tasks have been trained in the proper performance of these tasks.

- Generating task-specific or site-specific HASPs by, or under the direction of, the CHSED, or the Site Health and Safety Officer (SHSO). Chemical and physical hazard potentials associated with specific project operations are considered in advance of performance of those operations.
- Providing a mechanism for monitoring specific hazard potentials and the effectiveness of procedures and personal protective equipment in minimizing those potentials.

1.6 Health, Safety and Environmental Program Implementation

Implementation of ***OSC*** Health and Safety Program is the responsibility of the CHSED. It is to be accomplished through the identification and designation of responsibilities to individuals assigned to each branch office and/or project location. Those designated individuals implement the requirements of the program in each ***OSC*** office and at each individual **OSC** project site.

The successful implementation of ***OSC*** Health and Safety Program depends upon the following primary factors:

- **Management Commitment**. As stated in our corporate health and safety philosophy, ***OSC*** management is committed to the policy that health and safety is an integral part of all the firm's operations.
- **Assignment of Accountability**. All ***OSC*** employees are identified and held accountable for the development and reinforcement of proper health and safety attitudes in the performance of all tasks and operations.
- **Employee Involvement**. All employees are continuously encouraged to participate and contribute to the overall Health and Safety Program effort.

Section 2
Organization and Personnel

2.1 Organization and Responsibilities

Overall responsibility for **providing** the Health, Safety and Environmental Program belongs to the President of ***OSC***, the CHSED in turn, **has responsibility for the development, implementation and maintenance of the Health, Safety and Environmental Program**.

To administer the Health, Safety and Environmental Program effectively, a network of ***OSC*** health and safety employees has been established and integrated into the operational activities being performed at, and by, each ***OSC*** branch or field office. All health and safety management employees can stop work in the event of a problem resulting from a changed or unanticipated site condition.

OSC health and safety management structure is illustrated below. Roles and responsibilities for these individuals are outlined in Table 2-1 in the following pages.

Role	***Definition***	***Responsibilities***
Corporate Health, Safety and Environmental Director (CHSED)	As a member of the ***OSC*** corporate staff, the CHSED reports directly to, and is held accountable by, the ***OSC*** Chief Executive Officer/ President to ensure that all health and safety matters of the entire organization are being followed.	▪ Implement and maintain a program that is consistent with the corporate health, safety and environmental philosophy. ▪ Develop and maintain a company-wide safety training program. ▪ Coordinate injury/illness reports with each state project office and workers compensation insurance carrier. ▪ Develop company-wide competent person program. ▪ Provide a mechanism for the preparation and review of site-specific HASPs and task-specific safe operating procedures (SOPs). ▪ In conjunction with the Site Health and Safety Officer[s] (SHSO), develop and implement specific project and/or equipment SOPs, where appropriate. ▪ Assure that individuals who have health and safety responsibilities have the necessary resources and support to discharge those responsibilities effectively. ▪ Resolve health and safety-related differences of opinion that may occur within the organization. ▪ Assure health, safety and environmental awareness throughout the entire organization. ▪ Act as a contact point for health, safety and environmental issues for the entire organization.

Site Health and Safety Officer (SHSO)	SHSO's are responsible for managing health and safety on specific project sites, and report directly to the CHSED and project manager on health and safety-related issues associated with all onsite project work. The SHSO may be the site superintendent or foreman, or be a designated full-time safety officer for the project. Accountability of these individuals is assessed jointly by the project manager and the CHSED.	▪ Implement and maintain the provisions of the site-specific HASPs. ▪ Communicate any identified health and safety hazard concerns to all employees involved with the specific project activities and **has authority to "STOP" work if "Dangerous" conditions are observed.** ▪ Conduct site-specific health and safety training as required. ▪ Coordinate site activities with the project manager to ensure that all tasks are reviewed and thought out with regard to potential health, safety and environmental hazards. ▪ Ensure that proper, positive, and immediate corrective actions are implemented as a result of deficiencies identified through periodic site inspections, employees concerns, or incident investigations. ▪ Promote a positive attitude with regard to all health and safety issues related to specific project activities. ▪ Coordinate any changes to the plan with the CHSED.

To maintain a system of checks and balances, health and safety management personnel will work with local project managers on all project/site matters, while maintaining the general reporting structure indicated above for health and safety management. **Health and safety professionals should strive to work with local project managers, using the avenue of reporting to the CHSED when persistent conflicts or policy issues arise.** Accidents, injuries and trends are reported to both local directors and the CHSED.

2.2 Individual Personnel Responsibilities

Successful implementation of effective accident prevention requires dedication and participation from all members of the project team. **In addition to health and safety management personnel, project managers, branch office managers, and site superintendents and corporate personnel, all carry responsibility and accountability for maintaining safe work sites and preventing injuries.**

2.2.1 *OSC* President

OSC's President leads ***OSC*** in all of its programs, particularly the safety program. Pursuant to this charge, his specific responsibilities include:

- Maintaining management support of safety by holding managers, project managers, and supervisors responsible and accountable for safety
- Ensuring the adequate provision of resources -- such as training, time, and equipment – needed to successfully carry out these procedures

2.2.2 Corporate Health, Safety and Environmental Director

The CHSED maintains authority to implement the procedures outlined in this Health and Safety Manual and carries the responsibility to:

- Advise and support management on safety needs and issues.

- Prepare and approve HASPs, conduct training, site safety audits and accident investigations.
- Measure safety performance and provide feedback and recommendations to the President, Senior Project Managers and Site Project Managers.
- Review the Health and Safety Manual periodically and amend it accordingly.
- Assist project staff in developing and implementing site safety programs.

2.2.3 Site Health and Safety Officers

The Site Health and Safety Officers (SHSO) handle health and safety management on a project level and report to the CHSED. Their specific duties include:

- Acting as a point of contact for all project/site health and safety concerns
- Resolving differences of opinion that may occur at any individual office or project locations
- Conducting health and safety training
- Periodically reviewing the Health and Safety Manual and providing suggestions to the CHSED
- The SHSO may be the site superintendent, depending on project size. **SHSOs (other than the site superintendents)** report to site superintendents and assist with their implementation of safety procedures. The site superintendent can delegate the health and safety activities to another member of the project team, but cannot delegate the responsibility of ensuring those functions are carried out. SHSOs hold safety meetings, conduct accident investigations, perform safety audits, amend HASPs, and perform other safety functions.
- Subcontractors usually have their own site safety designee, knowledgeable and accountable in the subcontractor's field of expertise. For example, subcontractors provide "competent persons," as required by the OSHA excavation regulations, to manage excavation safety. It is important for the SHSO to understand his/her role and not assume responsibility for subcontractor safety. Safety concerns regarding subcontractor activity should be brought to the attention of the site superintendent.

2.2.4 Project Managers and Superintendents

Project managers and superintendents are responsible for the following:

- Assuring compliance with this Health and Safety Manual and HASP during the proposal and initial project stages

Project managers get the level of safety that they demonstrate themselves.

- Implementing the procedures and guidelines outlined in this Health and Safety Manual throughout the project duration
- Maintaining open communication with employees to encourage participation and feedback
- Performing accident investigations (***OSC*** employee injuries only). In cases where subcontractors are involved, the site superintendent should notify the CHSED immediately. The CHSED will collect

appropriate injury or accident documentation with help from the site superintendent. If the CHSED is unavailable, the SHSO will investigate the accident.

- Performing and supporting site safety audits and promptly addressing deficiencies
- Providing incentive and motivation for safe work practices, as well as discipline for unsafe practices
- Ensuring that a copy of this Health and Safety Manual is on site and available to all employees
- Conducting initial site orientation meetings

The actions of ***OSC*** management personnel play an integral role in either enforcing or undermining the Health and Safety Program. Additional project manager duties include demonstrating the importance of safety by making safety a routine topic of conversation and by considering all safety concerns and suggestions brought to them. Project managers participate in safety meetings and safety inspections and set an example by observing all safety rules. **Project managers, site superintendents and Site Health and Safety Officers [SHSO] have the authority to shut down jobs when they feel safety conditions warrant such action.**

2.2.5 All Employees

All employees share the following responsibilities to implement the Health and Safety Program effectively and prevent injuries, including:

- Learning and understanding the hazards of the tasks expected
- Following the guidelines presented in this Health and Safety Manual, the procedures outlined at Toolbox Safety Meetings, Task Specific AHA's, safety training courses, and the instruction of supervisors
- Reporting unsafe conditions or practices and offering suggestions to maintain a safe work site
- Inspecting equipment, tools, and work areas and maintaining safe working conditions by repairing and reporting deficiencies
- Reporting all injuries, illnesses, falls, and near misses to the site superintendent immediately
- Maintaining proper and positive health and safety attitudes during the performance of all tasks associated with project activities
- Advising the project manager and SHSO of any required medication to be taken during the performance of any site activity

Each employee and subcontractor must successfully implement the guidelines and procedures discussed in this Health and Safety Manual. Employees and subcontractors can void the efforts and intentions of this Health and Safety Manual by choosing to use unsafe work practices. It often takes only one bad decision to result in injury and erase the accident prevention efforts of many others.

All ***OSC*** employees speak and understand the English language.

2.2.6 Subcontractors

Generally, subcontractors are hired for their expertise in their area of business and, as experts, are expected to be knowledgeable on all aspects of their field, including safety. ***OSC*** uses a prequalification process for all potential subcontractors. This process includes reviewing their EMR and DART; as well as, evaluating their HSE program, verifying their training records and assessing their background screening processes. Subcontractors are expected to have a safety program at least as stringent as the ***OSC*** Health and Safety Program, Comply with ***OSC***'s Drug Free Work Place (DFWP) requirements and are expected to adhere to applicable federal, state, and local safety regulations pertaining to their work. Site specific HASPs, SOPs, and or safety manuals may be requested from subcontractors by ***OSC*** for review prior to allowing subcontractors to work on site. **Subcontractors are required to sign and adhere to *OSC* "*Health and Safety Protocol for Subcontractors".***

Subcontractors hired by ***OSC*** subcontractor are the responsibility of the ***OSC*** subcontractor hiring them. ***OSC*** subcontractors are responsible for enforcing safety requirements with all their subcontractors.

On some projects, subcontractors may be similarly affected by general site conditions and procedures, such as emergency response, and will be trained accordingly. When one site health and safety procedure can be written and be applicable to all subcontractors, ***OSC*** may choose to prepare and institute one site procedure for ***OSC*** and site subcontractors. For example, a large construction project with several subcontractors and several ongoing tasks may need only one procedure for emergency response. In this case, ***OSC*** would prepare one emergency response procedure and all subcontractors would be trained on that procedure and partake in drills.

As needed, subcontractors are also required to designate competent individuals that comply with OSHA standards as shown in the Designation of Competent Person Form.

Following completion of work onsite, an ***OSC*** competent person (CHSED or SHSO) will conduct a post-job safety performance review. This review will analyze the performance of the subcontractor in regards to their compliance with ***OSC*** H&S protocol.

Section 3
Injury and Illness Prevention

OSC's purpose for the Health, Safety and Environmental Program is the reduction of illnesses and injuries to an absolute minimum. The firm's goal is not merely to keep pace with, but to surpass industry safety standards, with an ultimate goal of zero accidents and injuries.

To achieve these objectives, ***OSC*** corporate strategy includes the following elements:

- **Identification and employment of quality employees.** In addition to a detailed interviewing session, previous employment record checks, investigation into education and training, and personal reference checks are all tools utilized to evaluate potential employability.

- **Quality, consistent, and ongoing health and safety training programs.** ***OSC*** training programs are designed to exceed those required in OSHA standards 29 CFR 1910, 29 CFR 1926, COE - EM 385-1-1, Title 8 CCR § 1509, and Title 8 CCR § 3203.

- **Identification and appraisal of accident and loss producing conditions and practices.** This consists of a detailed hazard analysis of materials, materials handling operations, and materials handling systems, including advanced and detailed studies of all hazard potentials where possible.

- **Development of accident prevention and loss control methods, procedures, and programs.** Using knowledge in accident causation and control, ***OSC*** aims to eliminate factors that cause accidents. This is accomplished through the establishment of methods, development of procedures, and the education of supervisors and managers.

- **Communication of accident and loss control intervention to all layers of management.** This element is accomplished with an accident information management system. With formatted information provided on the accident report form, a signature is required from the project manager and the appropriate site manager before being submitted to corporate headquarters. The system allows for the generation of required documents (i.e. OSHA 300 logs) as well as tracking and sorting by accident type, cause, etc. This information is summarized and distributed to all management personnel.

- **Assigning accountability and responsibility to all employees for implementation and maintenance of methods, procedures, and practices involved with the Health, Safety and Environmental Program.** Each branch or field office has a designated SHSO that oversees the implementation of all program elements on a day-to-day basis and motivates employees to have proper attitudes towards health and safety.

- **Measurement and evaluation of the effectiveness of the accident and loss control system**. Annual summaries of frequency, type, and cost of accidents are used to evaluate the Health, Safety and Environmental Program's effectiveness. Quarterly summaries allow for trend and statistical analysis.

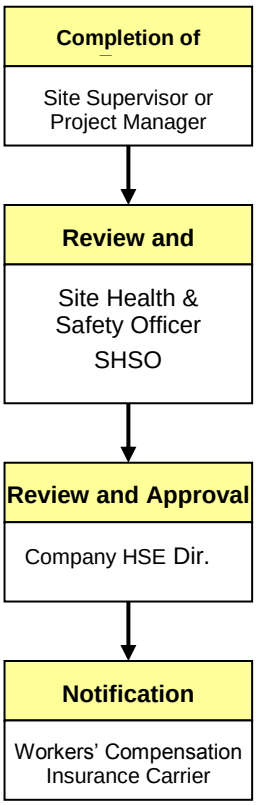
3.1 Site-Specific Health and Safety Plans

On a project-specific level, ***OSC*** develops and implements detailed, site-specific HASPs. The development of these plans begins prior to mobilization with a detailed review of all information currently available on the project. Contaminants present, operations to be performed, and potential health and safety hazards are all

reviewed for incorporation in a HASP. Functions that may be performed by the SHSO and/or the CHSED, at this time, include the following:

- **An assessment of materials present** and calculation of potential airborne concentrations that can reasonably be anticipated during all operations
- A review, with ***OSC*** occupational physician, of the materials expected to be presented at the job site, anticipated exposure concentrations, and the physical requirements of the work to be performed so that an appropriate project-specific health surveillance program can be designed
- **An assignment of protection levels** for operations with exposure potential, **based on information provided and/or anticipated**
- A review of the site characteristics which may lead to development of an appropriate ambient air and employee exposure air monitoring program
- A review of all job functions that are high hazard (i.e. form work, stripping procedures, concrete pouring, high elevation work, confined space entry, lockout/tagout, setting both H and Sheet piles and trench/excavating). **High hazard activities will be monitored and managed with the use of an Activity Hazard Analysis (AHA) and Daily Activity Plan (DAP).**
- An assessment of potential physical hazards including, but not limited to, equipment operation, exposures to temperature extremes, and hearing protection (See *Section 8* for more detailed information on site-specific HASPs.)

Procedure for Completion of Injury/Illness and Workers' Compensation Reports



3.2 Accident Reporting and Investigation

The Injury/Illness Report Form (in Appendix A) will serve as the basis for the written reporting and investigating of all accidents resulting in employees receiving more than non-intrusive first aid. This includes any injury that requires off-site medical treatment or on-site first aid that hinders an employee's ability to function as normal (i.e. a sling or neck brace). To determine severity of injury, refer to Guidelines for Classification of Medical Treatment (in Appendix A).

All such accidents are to be verbally communicated to the SHSO or the project manager as soon as medical services are secured. These individuals will verbally notify the CHSED immediately or no more eight hours of the accident.

Necessary medical services and employee care are to be secured prior to the initiation of reporting and investigation. The investigation is to be thorough and performed, at a minimum, by the injured employee's immediate supervisor. The results of the investigation are to be documented using the Injury/Illness Report Form, to be signed by the investigator. The form is then sent to the appropriate Project Manager, who, following a review, is also required to sign the form before forwarding it to the SHSO. Following the SHSO's review and signature, a copy of the form is to be made for the project file, with the original forwarded to the CHSED.

Completion of a customer form cannot be substituted for the required *OSC* Injury/Illness Report Form. Hence, both forms must be completed.

The Injury/ Illness Report Form is to be completed for all accidents, including ***OSC*** employees

and subcontractor's employees. In the event of an accident to a subcontractor employee, the form and investigation are to be prepared and performed by the subcontractor.

If the accident requires off-site medical treatment, the project manager or site superintendent my also have to complete a worker's compensation report. These reports vary from state to state; check with CHSED to acquire the appropriate forms.

3.3 Follow Up

As soon as practical, following the initial medical treatment, the injured employee is to be admitted to the clinic that administers the annual examinations for the injured employee's office. This is necessary to ensure that the employee receives quality medical treatment. This does not apply to a subcontractor employee.

Additional follow-up is required if the injury/illness resulted from the uncontrolled release of hazardous material. Under these circumstances, the CHSED is to be notified immediately so that he/she can inform the occupational physician, who can determine if additional biological monitoring should be prescribed.

Before follow-up is completed, the CHSED and the SHSO will meet with the Project Manager to ensure that corrective action, if identified in the Injury/Illness Report Form, has been implemented. Accident reporting procedures that are client-specific and applicable are also to be enacted at this time.

3.4 Modified Work Program

The Modified Work program, *Light Duty Work*, is a system established to minimize the results of injury to both the employee and ***OSC***. The objective is to return injured employees to work as soon as they are physically able to perform modified or light duty work.

Modified work means placing the employee in a working environment that will not cause further aggravation to an injury or a previously existing condition, but one accomplishing a meaningful task. Modified work is accomplished by working directly with the employee, his/her supervisor, the treating physician, and ***OSC*** CHSED.

3.4.1 Procedure

Once the Modified Work program is deemed necessary, the following procedures will guide set-up of the appropriate employee duties.

- The employee must notify his/her direct supervisor and project superintendent immediately of any injury or condition that would place him/her in jeopardy during normal work assignments. Failure to report any such condition may be grounds for removal from the project and denial of workers' compensation benefits.

- If the employee is under a doctor's care, the employee must report to his/her direct supervisor and the project superintendent immediately. A copy of the treating physician's report listing specific work restrictions must be presented to the project superintendent.

- The superintendent will then work with the employee and his/her direct supervisor to place the employee in a temporary modified work position that will not violate any restrictions listed by the treating physician. Employees placed in a modified work assignment must inform their supervisor of any required doctor visits that may occur during normal working hours. Otherwise, they will be required to be on the project during normal working hours.

- Effort will be made to keep the employee working on the project where the injury may have occurred. However, this may not be feasible in all cases. The employee may be required to report to another work location where a more suitable work environment can be developed.

- Any employee placed on a modified work assignment will be evaluated on a weekly basis to monitor his/her recovery and ability to return to a regular work assignment. This will be the responsibility of the project superintendent, working in conjunction with the employee, treating physician, foreman, and ***OSC*** CHSED.

Subcontractors, who have employees injured or placed in a modified work assignment as a result of an incident that may have occurred on a ***OSC*** project, are required to provide weekly medical updates on the employee's condition to the project superintendent and ***OSC's*** CHSED.

Section 4
Program Implementation

The following section details ***OSC*** procedures for implementing the Health, Safety and Environmental Program. These measures include modes of communication, documentation procedures, and disciplinary action guidelines.

4.1 Communication

4.1.1 Hazard Reporting

Employees who suffer from or observe injuries, illnesses, accidents, near-miss accidents, or exposures shall report them to the ***OSC*** - SHSO. Employees who observe potentially hazardous conditions in ***OSC*** workspaces shall implement controls for those hazards or report them to the SHSO. Until the hazards have been corrected, ***OSC*** employees shall avoid the dangerous areas.

4.1.2 24-Hour Emergency Support Personnel

OSC maintains a 24-hour health and safety emergency support system to provide emergency health and safety, medical, and toxicological support to ***OSC*** field personnel. Routine matters such as health and safety clearance are to be handled through normal channels during business hours. You may contact the following personnel for emergency support:

Name	Office	Mobile	Home	Alternate
Stephen M. Robinson	Buffalo	716-570-2699	315-342-6792	315-346-9557

4.1.3 Safety Suggestion Box

A safety suggestion box will be located at Field/Project office to enhance the communication between field and management personnel. The safety suggestion box will be collected monthly and all questions will be answered in the Monthly Health & Safety Bulletin. Anonymous complaints may be placed in the box as well. All issues will be addressed.

4.1.4 Monthly Health & Safety Bulletin

Each month, a Health & Safety Bulletin will be placed on all project bulletin boards. This is a forum used to communicate accomplishment, regulation changes, and overall safety for our organization.

4.1.5 Weekly Toolbox Safety Meeting

During the mandatory weekly Toolbox Safety Meetings, questions and concerns can be expressed. The presenter will forward all comments to the SHSO. The SHSO will respond to all concerns or issues. If the issue is not resolved, the CHSED will intervene and resolve the issue.

4.1.6 Daily Activity Plan

Foremen and superintendents should use the Daily Activity Plan Form (in Appendix) when planning the following day's work.

4.2 Documentation

Health and safety documentation is a critical component of ***OSC*** project files. No separate filing system exists for health and safety documents and, although the CHSED receives copies of certain documents, originals must remain in the project files. Health and safety documentation is the responsibility of the project manager. Auditing of project files, conducted periodically by the CHSED, ensures maintenance of required documentation.

Documents required prior to site work may include:

- Site-specific health and safety plan (HASP)
- ***OSC*** Health, Safety and Environmental Manual with applicable hazard modules
- Subcontractor's Health and Safety Agreement [Protocol for Subcontractors]
- Subcontractor's Safety Manual
- Subcontractor's HASP [They can also agree to abide by ***OSC's*** HASP exclusively and must sign the agreement in the HASP]

The following documents, generated on site, are required in the project files:

- Toolbox Safety Meetings documentation
- Site-specific training records
- Site safety assessment reports
- HASP signature sheet with ALL site personnel signatures including Subcontractors.
- Injury reports and accident investigation documentation
- Site orientation signature sheet
- Hazard Communication Program documentation
- Material Safety Data Sheets (MSDS) location
- Documentation required by state, federal and local regulations

To ensure the project file contains appropriate records, document closeout checklists are completed prior to file closure. The documents listed above are required for closeout, and the above list is suitable for use as a checklist for most ***OSC*** projects. Projects with unique or extensive health and safety requirements may require additional items to be added to the checklist, such as documentation showing blood lead levels during lead remediation work. Project managers are responsible for maintaining these project records.

4.3 Office and Job Site Employee Board Postings

The following postings must appear in all ***OSC*** offices at a location visible to all employees. The postings must also be located at project sites when ***OSC*** employees are not regularly reporting or passing through a local ***OSC***

office. A complete package of the subsequent list of postings can be obtained by contacting the Health, Safety and Environmental Manager.

- ***OSC*** Injury/Illness packet
- OSHA Poster (5 posters in 1)
- Zero Tolerance Policy
- Core Values Statement
- EEO/Affirmative Action Plan Statement
- ***OSC*** Safety Incentive Program
- ***OSC*** Emergency Contact Poster
- OSHA 300 Log
- Davis Bacon Act **(prevailing wage projects only)**

4.4 Violations and Discipline

If any ***OSC*** employee, both supervisory (audits, etc.) and general, witness violations of safe work practices or safety codes and standards that endanger employees', contractors', or third party health or welfare, they shall report these acts to the Site Supervisor. These acts will not be tolerated and may be grounds for immediate termination of employment. ***OSC*** employees who knowingly or willfully violate the safety rules and practices described in this Health and Safety Manual are subject to disciplinary action up to and including termination.

Site supervisors will investigate the violation and report findings to the project manager and CHSED. The project manager will take disciplinary action consistent with ***OSC*** *Personnel Policy and Procedures*, described in *Section 16* of this manual. All employees are required to use safe work practices. Additional safety tasks, suspension or termination may be necessary disciplinary actions.

The CHSED, SHSO, site superintendent, and the project manager have authority to stop work activities, or to limit participation of personnel in project activities when safety policies and procedures have been violated or when site conditions become unsafe. Determination of resolution of a safe site is the responsibility of the SHSO and the project manager, or ultimately between the CHSED and President or his designee.

Section 5
Employee Training

Ensuring that employees have the appropriate skills to perform the tasks assigned to them safely is a key accident prevention tool. Employees who have not been trained in safety cannot be expected to behave in a safe manner. The three main goals of ***OSC*** employee training are to:

- Train employees to identify and evaluate hazards correctly.
- Give employees the technical understanding of how to work in a safe manner.
- Promote safety awareness so that employees develop an attitude that embraces safety.

5.1 Initial Training

OSC employees and subcontractors are trained regarding the hazards and precautions applicable to their work when initially assigned to a new site and when processes, hazards, or controls change.

The contents of initial training include:

- Comprehensive training on hazards and precautions specific to the employee's work or task[s]
- A discussion of employee rights and responsibilities under OSHA regulations, COE EM385-1-1 and CALOSHA (California OSHA) or Canadian regulations, if applicable
- An explanation of who to contact with questions or concerns
- OSHA's *Hazardous Waste Operations and Emergency Response Standard*, 29 CFR 1926.65, training
- A competency course, such as the OSHA 500 10-hour Construction Outreach Program
- A review of this Health and Safety Manual
- Fire protection and extinguisher training will be provided initially, annually and prior to start up at any jobsite. Employees will be familiarized with fire extinguishers; as well as their use and the hazards of fire fighting.
- Certified first aid training from the American Red Cross. Each employee who completes the course will be given a Certificate of Completion.

5.2 Supervisor Training

Personnel who manage job sites are responsible for directing activities in accordance with this Health, Safety and Environmental Manual. Project managers and supervisors receive the initial training, as stated above in Section 5.1, as well as training in:

- Conducting accident investigations

- Performing site safety inspections
- The OSHA 500 30-Hour Construction Outreach Program
- Following health and safety reporting procedures
- Understanding liability issues
- Holding Toolbox Safety Meetings
- The Competent Person Program for trench/excavation and confined space

5.3 Refresher Training

Previously hired ***OSC*** employees typically require refresher training annually, or when:

- Safety rules and regulations change.
- Organizational structure changes (e.g. training in whom to contact).
- New equipment or procedures are introduced.
- Additional skills, such as first aid, are needed.
- A site-specific refresher training is needed.

5.4 Site Orientation

A thorough site orientation meeting is held to review the health and safety procedures required on site. All employees, vendors and subcontractors working onsite must attend this orientation. The site-specific HASP is discussed, emergency procedures are reviewed and tested, and site security is explained. Subcontractor coordination is addressed, if applicable. The site orientation is documented with a Toolbox Safety Meeting Form (in Appendix A) and the HASP signature page. The site superintendent usually holds site orientation meetings. Subsequent orientations are held as new site employees or subcontractors come on site. The site superintendent may choose to delegate some site orientations to the site safety coordinator. The site superintendent, however, is still responsible for ensuring that the meetings are held.

5.5 Toolbox Safety Meetings

Site-specific discussions on work tasks and hazard control maintain employee safety awareness. Productive safety meetings include a review of actual field conditions and feedback and suggestions from employees. ***OSC*** refers to these site safety meetings as Toolbox Safety Meetings.

The first Toolbox Safety Meeting is the site orientation and HASP review on the first day of the job. After the initial meeting, site superintendents should hold Toolbox Safety Meetings on a weekly basis, at a minimum. On certain projects, Toolbox Safety Meetings may be required daily, determined by the degree of hazards, injuries, or accidents, and the number of employees and/or contractors. Toolbox Safety Meetings should also discuss specific work tasks, the hazards involved, and controls for those hazards. ***OSC's*** *Hazardous Communication* video should be shown prior to work beginning.

Toolbox Safety Meetings usually last between 20 to 30 minutes. Documentation of the meeting is recorded on the Toolbox Safety Meeting Form. When only one or two ***OSC*** employees are on site, they may choose to attend the Toolbox Safety Meeting held by the subcontractor rather than hold their own. In this case, documentation of the ***OSC*** personnel in attendance should be obtained and kept in the project files; noting attendance in the logbook alone is not acceptable.

5.6 Training Material

Weekly safety topics, otherwise known as *Toolbox Talk*, are provided by the CHSED. These two-page guidance sheets are excellent reference and review materials for site superintendents to use during Toolbox Safety Meetings. A signature sheet accompanies each Toolbox Talk.

5.7 Subcontractor Training

Subcontractors are solely responsible for ensuring appropriate training for their employees, agents, and lower tier subcontractor employees.

Depending on site operations, joint subcontractor Toolbox Safety Meetings may be appropriate. These joint meetings offer the opportunity to coordinate and improve common site safety procedures, such as emergency evacuation and decontamination. Joint Toolbox Safety Meetings are held by the ***OSC*** site superintendent and subcontractors.

In addition to the ***OSC*** joint Toolbox Safety Meeting, the subcontractors still must hold their own specific safety meetings in their area of expertise, such as crane safety or blasting safety. The ***OSC*** joint Toolbox Safety Meeting is in addition to the subcontractors' own safety meetings and does not serve to replace them.

5.8 Record Keeping

Records of site-specific training are maintained by the site superintendent, on the Site-Specific Training Record (Appendix A), and must be made available to employees and their authorized representative. Copies are submitted at project end, or more frequently if necessary, to the CHSED. Weekly Toolbox Safety Meetings are documented, with submission of documents at the end of the project to the CHSED.

All project forms (ex. Toolbox Talk Form) and certifications must contain the employees name, trainer signature and the date. Originals of all project-generated forms, including health and safety forms, are kept with the other project records in the project file. Documentation of training is maintained for a minimum of three years. Site-specific training is documented for use towards the OSHA Hazardous Waste 8-hour Refresher Course. At project closeout, copies of this form are to be forwarded to the CHSED and project manager.

5.9 Hazard Communication

Employees have the right to know about the hazards of chemicals with which they work. ***OSC's*** Right to Know program implements the requirements of OSHA's *Hazard Communication Standard* (29 CFR 1910.1200). A right to know coordinator has been designated at each office, field office or facility to implement the program locally. The written Hazard Communication Program is located in *Section 13*. In addition, the Hazard Communication video should be shown prior to work beginning, to all personnel working onsite (employees, vendors, subcontractors) or as new employees are hired.

Section 6
Code of Safe Practices

OSC requires that this Code of Safe Practices be posted in a conspicuous location at each job site office or be kept readily available on site as part of the site-specific HASP. The site supervisor is responsible for ensuring that this Code of Safe Practices is present on site, readily available, and obeyed. This Code of Safe Practices is not inclusive of all requirements that may apply and is supplemented by site-specific HASPs and hazard modules.

The ***OSC*** Code of Safe Practices includes the following requirements:

- ***OSC*** employees must follow the Code of Safe Practice and assist in maintaining safe operations by continually observing for unsafe practices and conditions, reporting all unsafe conditions or practices to the site supervisor, and offering suggestions on eliminating unsafe practices and conditions.

- Management enforces compliance with these procedures and applicable regulations. Management takes disciplinary action, as necessary, to obtain compliance.

- All employees participate in Toolbox Safety Meetings once a week, at a minimum, to receive accident prevention instruction.

- All injuries, illnesses, near misses, and falls are reported immediately to the site supervisor who arranges for medical or first aid treatment, if needed, and reports the incident to the ***OSC*** - CHSED.

- If the physician, hospital or clinic is too far away from the jobsite in time or distance, and therefore considered to be not reasonably accessible or absent, the Site Supervisor, who has a valid certificate in American Red Cross first aid training will be available to render first aid. If the Site Supervisor is unavailable, the SHSO or any other employees that can furnish proof of first aid training my render the aid.

- First aid kits shall be easily access able on every jobsite and will consist of appropriate items adequate for the environment in which they will be used. For outside construction operations, first aid items will be stored in weather proof containers with all inside items individually wrapped for sterilization purposes.

- Contents of the first aid kits will be periodically checked by either the SHSO or Site Supervisor, to ensure the availability of the items inside. For construction operations, first aid kits will be checked before they are sent to a jobsite and at least weekly after that.

- In the instance where an employees eyes or body are exposed to corrosive or toxic materials there will be suitable work facilities at every jobsite that allow for quick drenching and flushing of the eyes or body. Procedures for these practices will be posted onsite.

- ***OSC*** site superintendents audit site conditions to recognize site hazards and determine the safeguards necessary to work safely. The CHSED periodically supplements audits performed by the site on high hazard work sites.

- Persons under the influence of drugs or intoxicating substances that impair their ability to perform assigned duties safely are not allowed to work on the job. Supervisors will remain alert for these conditions and employees will notify their supervisor when their ability is impaired.

- Employees are not permitted or required to work when impaired by fatigue, illness, or another cause that may unnecessarily expose the employee or others to injury. Site superintendents will remain alert for these conditions, and employees will notify their supervisor when their ability is impaired.

- Horseplay, fighting, practical jokes, poor housekeeping, and other acts that can adversely impact the safety or well-being of employees are prohibited.

- Work involving materials handling and equipment operations are planned and supervised by the site superintendent to prevent injuries.

- Employees do not enter confined spaces, such as manholes, sewers, or tanks, unless ***OSC*** Confined Space Entry Program is followed **AND they are trained and qualified to do so. (See *Section 12* for details.)**

- No employee is permitted or required to work in an unsafe place, unless his/her task is to make the place safe, and then only if the employee is properly protected.

- Employees are instructed on and should adhere to safe lifting procedures.

- Hard hats, safety glasses, and sturdy work boots are required at all times, unless specific conditions allow otherwise, as determined by the CHSED.

- Burning, welding, and other hot work is not permitted near potentially explosive atmospheres until properly monitored and authorized. (See *Section 7* for details.)

- Where appropriate, lockout/tagout procedures are followed. (See *Section 14* for details.)

- Excavation activities should comply with OSHA excavation regulations found in 29 CFR 1926.650. (See *Section 7* for details.)

Section 7
Safety Management On-Site

7.1 Project Management

- **To control project safety, the most influential factor *OSC* possesses is effective project management by project managers and site superintendents**. Listed below in descending order are the five most important tools that project managers and site superintendents can use to influence project safety:

- Safe work environment
- Effective project management
- Job coordination
- Safety emphasis by management
- Communication

Jobs that run smoothly and are planned properly will show good safety performances. The opposite also holds true; jobs that run poorly because of, for example, bad scheduling, under staffing, or poor equipment will ultimately show reduced safety performances.

7.1.1 Planning

Safety must be incorporated into the project from start to finish to maintain good safety performance. Incorporating safety into initial project planning enables site workers to perform tasks safely with adequate staff, time, and equipment. Up-front planning also allows for comprehensive hazard recognition and control planning by qualified staff. Activities such as shoring, confined space entry, emergency response, and site safety meetings must be recognized and coordinated early in the project planning stages.

Incorporating safety into initial project planning enables site workers to perform tasks safely with adequate staff, time, and equipment.

When planning for safety, project managers and site superintendents should consider the following:

- **Costs.** Costs should be considered for safety equipment such as decontamination trailers, shoring equipment, air monitoring instruments, rescue equipment, protective clothing, and respirators. (See Project Planning for Safety Costs, in Appendix A, for an example cost checklist.)

- **Staff.** Project managers should plan for adequate, qualified staff to perform the job safely. Staffing considerations include rescue personnel, partners for the buddy system, and staff to perform air monitoring and prepare the HASP. (Refer to the Project Planning for Safety Staff form in Appendix A.)

- **Time**. Time should be allotted for necessary safety activities, including site safety inspections, weekly Toolbox Safety Meetings, and HASP preparation and review.

7.1.2 Effective Job Coordination

Safety performance improves with improved job coordination. The following areas, when effectively coordinated by project managers and site superintendents, can improve project safety performance:

- Subcontractor activities
- Staff and crew size
- Local hospital, rescue, and fire departments numbers posted
- Public notices, public meetings, and site security
- Prompt waste disposal
- Equipment and material deliveries and safe storage

7.1.3 Management Emphasis on Safety

Management emphasis on safety is a key component of site safety management. Project managers and site superintendents convey respect for safety and lead by example. **Project managers and site superintendents should wear appropriate safety equipment,** maintain safety as a routine topic of planning and progress meetings, and reward safe employees and discipline unsafe employees. **Effective project managers and site superintendents will send a clear and consistent message that safe behavior is expected and anything less will not be tolerated.**

7.1.4 Communication

Possessing good "people skills" is often a significant factor in project safety. Site superintendents and project managers need to communicate safety expectations and instructions effectively. Site employees should understand the site safety procedures and be aware that compliance with them is required. They should feel comfortable to ask questions, report injuries, incidents, and safety concerns, and to provide general feedback and recommendations to the site superintendent and project manager.

Toolbox Safety Meetings offer not only the opportunity to provide technical safety instruction, but also provide occasion for feedback and suggestions from site employees. Personnel performing their craft can often suggest effective solutions to hazards, especially those pertinent to their trade. Overlapping hazards require effective communication and teamwork between the involved project staff. For example, welding in a contained asbestos abatement area requires communication between the site superintendent, the welder, and the asbestos abatement contractor to ensure ventilation is adequate and work zones are appropriate.

7.1.5 Safe Work Environment

Site superintendents maintain a safe work environment by consistently implementing the site HASP and adhering to OSHA standards and guidelines. Whether subcontractors have an approved HASP of their own or follow the ***OSC*** HASP, site superintendents should require that it be consistently implemented. The CHSED should be consulted when tasks change and unanticipated hazards arise to discuss safety issues and amend health and safety procedures accordingly.

The first step in controlling hazards is the recognition of the hazard. Employees share responsibility for observing the work areas and procedures to identify potential or existing hazards. Site superintendents and SHSO's perform daily inspections to identify and direct the correction of unsafe conditions and work practices.

7.1.6 Safety Audits

Safety audits are an effective tool in identifying unsafe conditions and work practices. Safety audits may be conducted by superintendents or project managers on a weekly basis, or when new substances, processes, procedures, or equipment are introduced that pose a new occupational safety and health hazard and when new or unrecognized hazards are observed. The ***OSC*** Safety Audit Procedure is located in Appendix. The Jobsite Safety Audit Form (Appendix) is used for documenting audits.

Incorporating safety into initial project planning enables site workers to perform tasks safely with adequate staff, time, and equipment.

Completed audits shall be forwarded to the project manager and the CHSED. Subcontractor operations will be included in the assessment in addition to ***OSC*** operations. Subcontractor operations are audited to evaluate compliance with federal, state and local regulations. The CHSED performs audits as necessary to supplement the local management audits.

7.1.7 Correcting Unsafe Conditions

Unsafe conditions noted during safety audits are assigned to a responsible person(s) for required follow-up action. The project manager and CHSED review safety audits to assure follow-up actions adequately control the hazard(s). Project managers and the CHSD will not close a Site Safety Audit Report file until the required follow-up action is complete.

For situations presenting an imminent hazard to employees, the auditor directs work to cease and workers to exit the area immediately until the hazards are controlled. The site superintendent, SHSO, CHSED, and project manager have the authority to stop work until hazards are abated.

Hazards shall be controlled as quickly as possible, based on the severity of the hazard as determined by the site superintendent, project manager, SHSO or the CHSED.

7.2 Standard Site Procedures

Due to the diverse nature of activities performed by ***OSC***, there are a number of construction industry standards that must be considered during the performance of construction and demolition activities. In addition, there are standard procedures that are applicable to activities performed at all hazardous, or potentially hazardous, waste sites. This section summarizes some of the key OSHA standards and procedures that may be applicable to construction activities.

The following project health and safety program rules are adopted for the protection of all persons involved with the construction or demolition on all *OSC* projects. These rules apply to *OSC* management, owner/client, and contractor personnel as well as visitors while on the job site. These rules are general in nature and are not to be considered all-inclusive, nor do they relieve *OSC*, subcontractors, or their employees from applicable occupational health and safety regulations promulgated by governmental authorities.

7.2.1 Housekeeping

For the protection of all persons involved with the construction of all ***OSC*** projects, the following housekeeping rules apply:

- Leads, hoses, and extension cords shall be hung up with a nonconductive material, off all floors, stairways, and walkways. Trash such as drinking cups, cans, and scraps from lunch are not to be thrown down, but disposed of properly in marked containers.

- Available material, equipment, concrete forms, pipe, etc. are to be stacked orderly away from walkways, doors, stairways, and ladders.

- Oil, grease, and other such liquid spills shall be cleaned up at the time of spill and are not to be left unattended.

- Each craft is responsible for housekeeping in their respective work areas.

- Where such items as protruding rebar or anchor bolts create a tripping hazard, they shall be properly protected and conspicuously marked.

7.2.2 Personal Protective Equipment

For the protection of all persons involved with the construction of all ***OSC*** projects, application of the following personal protective equipment is required:

- **Eye Protection.** Safety glasses shall be worn at all times except while in vehicles with enclosed cabs or where additional eye protection is required. Safety goggles shall be worn when possible eye hazards are present. Full-face shields shall be worn while grinding, chipping concrete, or when possible eye and face hazards are present. [ANSI Z-87]

- **Hard Hats.** Hard hats shall be worn at all times in the construction area. All areas of operation on the job site are hard hat areas. This includes elevators and cabs on heavy equipment such as cranes, backhoes and haulage vehicles, if not equipped with a ROPS. **Upon exiting the equipment ALL operators must wear their hard hat. [ANSI Z-89]**

- **Shoes.** In the construction area, good leather shoes or boots are required. Steel-toe safety boots or shoes that support the ankle are preferred. Tennis shoes shall not be allowed on the job site unless they meet the requirements of ANSI Z41.1.

- **Shirts and Pants**. Shirts covering the full trunk and shoulders are required. Tank tops or midriff shirts are not allowed. Cut-off jeans or shorts shall not be worn on the job site.

- **Hearing Protection**. Hearing protection shall be worn when working in excessively noisy areas [85db +].

- **Respiratory Protection**. Respiratory protection shall be worn when exposed to gas, vapor, mists, or particulate contaminants in the atmosphere.

- **Vehicle Safety**. Seat belts shall be worn on all heavy equipment, including forklifts and vehicles. No riders other than the operator shall be allowed on any piece of mobile equipment. When pickup trucks are used to

transport employees, benches with backrests shall be provided or the employees must sit down in the bed area, not on the side rails.

All employees will be properly fitted for the necessary PPE and instructed on their use. Instruction includes the proper way to put on, remove, clean and maintain the PPE.

7.2.3 Fall Protection

The CHSED will create a Site Specific Fall Protection Plan that will be located in the Site Health and Safety Manuel. For the protection of all persons involved with the construction of all ***OSC*** projects, the following fall prevention rules apply:

- **Fall protection is required 100 percent of the time when exposed to a fall in excess of six feet or when required by additional rules.** One hundred percent fall protection is required whether climbing, traveling from point A to point B, connecting structural steel, or erecting scaffolds or other temporary platforms. **No employee or work operation is exempt from the 100 percent fall protection requirement.**

- All onsite employees are trained in fall protection, how to recognize fall hazards and how to minimize these hazards. All training is documented by the CHSED; certificates that contain where and when the training occurred, signature of trainer and date effective are kept in ***OSC***'s safety records. Employees will be subject to refresher training when beginning work on a new site; as well as when there are deficiencies found in the training and when the fall protection system or equipment changes.

- When not protected by any other means of fall protection, such as safety nets or scaffold with proper guardrails, employees shall use full body harnesses, lanyards with double-locking snap hooks, and an adequate anchor-age (fall arrest equipment). To achieve 100 percent fall protection, employees may need to use a double lanyard system and/or vertical or horizontal lifelines, retractable lifelines, or other approved positioning devices.

- Employees shall rig fall arrest equipment so that they can neither free-fall more than six feet or contact any lower object. Anchorage points for fall arrest equipment shall be capable of supporting twice the potential impact energy of an employee free falling six feet or the distance permitted by the system, whichever is less. Anchorage points for fall arrest equipment shall be located above the employee's body harness attachment point where practical.

- When vertical lifelines are used, a separate lifeline shall protect each employee. The lifeline shall be properly weighted at the bottom and terminated to preclude a device such as a rope grab from falling off the line.

- Horizontal lifelines should be limited to two persons at one time between supports and maintain a safety factor of at least two.

- Prior to each use, employees shall visually inspect all fall arrest equipment for cuts, cracks, tears or abrasions, undue stretching, overall deterioration, mildew, operational defects, heat damage, or acid or other corrosion. Equipment showing any defect shall be withdrawn from service. All fall arrest equipment subjected to impacts caused by a free fall or by testing shall be removed from service.

- Employees should store all fall arrest equipment in a cool dry place not subjected to direct sunlight.

- Employees shall not use fall arrest equipment until they have been properly trained and show an understanding of its use.

- Foremen shall ensure fall protection is available and used as required for all employees for whom they are responsible.

- Fall arrest equipment shall not be used for any other purpose, such as tow ropes or hoist lines.

- Proper guardrails shall be installed on open sides of all walkways and runways where the fall distance exceeds four feet. Proper guardrails shall be installed on open sided floors where the fall distance exceeds six feet. All floor openings or floor holes shall be protected by guardrails or hole covers. If hole covers are used, they shall be strong enough to support twice the maximum intended load, secured against displacement, and properly labeled.

- When operating a scissor lift work platform, the lift shall have guardrails on all open sides, with the door access chains or rails in place.

- Employees operating aerial lifts shall wear a body harness and lanyard attached to the aerial lift. Employees shall not attach the lanyard to an independent structure.

- Employees riding in a crane suspended work platform shall wear a body harness and lanyard attached to the grab rail of the platform.

- Employees working on wall forms or rebar shall wear a body harness, lanyard and/or positioning device when exposed to a fall in excess of six feet. Position devices shall be rigged to prevent a free fall greater than 24 inches.

- Stairs, ladders, or ramps shall be provided for all access ways where there is a change in elevation greater than 19 inches.

- When **guardrails** are used for fall protection, they shall consist of a top rail, intermediate [mid] rail, and toe board. The top rail shall have a vertical height of 42 inches (plus or minus 3 inches), the mid-rail shall be at 21 inches, and the toe board three and one-half inches. When wood **railing**s are used, the post shall be of at least two inch by four inch stock spaced not to exceed eight feet, the top rail shall be of at least two inch by four inch stock, and the intermediate rail shall be of at least one inch by six inch stock. If pipe is used, it shall be at least 1 ½ inch nominal diameter. If structural steel is used, it shall be of two inch by two inch by 3/8-inch angles or equivalent. If wire rope is used for railings, it shall have a diameter of at least two-inch and shall be stretched taut to allow no more than a 3-inch deflection.

- Manila or synthetic rope shall not be used as guardrails.

- Employees shall not stand or sit on guardrails.

- Personal fall arrest systems shall not be attached to guardrail systems.

- In the instance of a fall, management onsite will determine if the employee can rescue themselves, if this is not the case a prompt rescue must be arranged.

- An accident investigation will take place after any accidents or serious incidents. Changes will be made to the Fall Protection Plan as necessary.

7.2.4 Compressed Gases

For the protection of all persons involved with the construction of all ***OSC*** projects, the following rules apply when compressed gases are located or used at the project site:

- Care shall be exercised in handling all compressed gas cylinders. They shall not be dropped, jarred, or exposed to temperature extremes.
- Cylinders shall have the valve cap or valve protection device in place at all times, except when in actual use or connected to a welding set.
- Cylinders shall not be rolled and shall not be lifted by the valve or valve cap; a suitable cradle or other device shall be used to move or lift cylinders.
- Cylinders shall have their contents properly identified.
- Cylinders not having fixed hand wheels shall have keys, handles, or nonadjustable wrenches on the valve stems while the cylinders are in service.
- Compressed gas cylinders, whether full or empty, shall be stored and transported in an upright position and chained or otherwise secured so they cannot fall or be upset.
- Cylinders shall not be placed where they might become part of an electrical circuit or within five feet of an electrical outlet.
- Employees shall never force connections, which do not fit, nor shall they tamper with the safety relief devices of cylinder valves.
- Before the regulator is removed from a cylinder, the valve shall be closed and all pressure released from the regulator.
- A leaking cylinder shall not be used. Such cylinders shall be taken outdoors away from sources of ignition. The supervisor shall be notified.
- A flame shall never be used to detect gas leaks.
- The recessed top of cylinders shall not be used as a place for tools.

In addition to the above handling rules, special care must be used for the following compressed gases.

7.2.4.1 Oxygen

- Oil, grease, or similar materials shall not be allowed to come in contact with any valve, fitting, regulator, or gauge of oxygen cylinders.
- Oxygen shall never be used as a substitute for compressed air.

- Oxygen cylinders in storage shall be separated from fuel-gas cylinders or combustible materials, especially oil or grease, a minimum distance of 20 feet or by a 5-foot high noncombustible barrier having a fire resistance rating of at least one hour.

- When an oxygen cylinder is in use, the valve should be opened fully in order to prevent leakage around the valve stem.

7.2.4.2 Acetylene

- Acetylene cylinders shall be properly secured and always used, transported, or stored in a vertical position.

- Cylinders shall be protected from sparks, flames, and contact with energized electrical equipment.

- An acetylene cylinder valve shall not be opened more than one and one-half turns of the spindle and preferably no more than three-fourths of a turn.

- Employees shall not use acetylene in a free state at pressures higher than 15 pounds per square inch (psi).

7.2.5 Welding and Cutting

For the protection of all persons involved with the construction of all ***OSC*** projects, the following welding and cutting rules apply:

- Before performing welding, cutting, grinding, or any other "hot work" in a hazardous area on a ***OSC*** construction site, the Project Manager or SHSO shall inspect the site and grant authorization to weld; as well as, obtaining a Hot Work Permit (see Appendix A for form). Hazardous areas are those areas where there is the presence or the potential of the presence of flammable or combustible materials, liquids, gases, vapors, mists, or dusts.

- Only experienced employees who are properly trained in the hazards of the field, safe operations of their equipment and safe use of the processes, shall perform welding and cutting. Onsite Supervisors must also be trained in this field. Supervisors responsible for oxygen and fuel-gas supply equipment will be properly trained and tested to show competency to perform this work. Before welding or cutting is started, the area shall be inspected for potential fire hazards.

- If the object being welded/cut cannot be easily moved, then all movable fire hazards will be removed from the site. When all fire hazards cannot be removed, guards shall be used to protect those immovable fire hazards; as well as, to confine the heat, sparks and slag. If none of this can be accomplished (hazards cannot be moved, guards cannot be used) then it can be assumed that the welding/cutting work cannot be performed safely and therefore will not be performed at all.

- When welding or cutting in elevated positions, precautions shall be taken to prevent sparks or hot metal from falling onto people or flammable material below.

- A 20 lb. B:C rated or larger dry chemical fire extinguisher will be provided and located within 30 feet of any welding or hot work operation

- Welders or their assistants shall not carry matches when engaged in welding or cutting operations.

- A fire watch shall be conducted when welding, cutting or soldering is being performed and maintained for 30 minutes following completion of work, wherever welding or cutting is performed in locations where

combustible materials present a fire hazard. A **fire check** shall be made of the area two hours after completion of welding. The employee assigned to fire watch will be trained in the proper use of fire extinguisher and, in case of an emergency, will know where the fire alarm is located in the building.

- Where combustible materials such as paper clippings, coal, or wood shavings are present, the floor shall be swept clean for a radius of 35 feet before welding. Combustible floors shall be kept wet or protected by fire-resistant shields. Where floors have been wetted down, personnel operating arc welding or cutting equipment shall be protected from possible shock.

- To protect the eyes, face, and body during welding and cutting, the operator shall wear an approved helmet or goggles equipped with proper eye glass shading, proper protective gloves, and clothing. Helpers or attendants shall wear proper eye protection. Other employees shall not observe welding operations unless they use approved eye protection.

- Proper eye protection shall be worn to guard against flying particles when the helmet or goggles are raised.

- In the event of an emergency, first aid equipment will be made easily accessible on every jobsite.

- Machinery, tanks, equipment, shafts, or pipes that could contain explosive or highly flammable materials shall be thoroughly cleaned and decontaminated prior to the application of heat.

- In dusty or gaseous spaces where there is a possibility of an explosion, welding or cutting equipment shall not be used until the space is adequately ventilated.

- Welders shall place welding cable, hoses, and other equipment so that it is clear of passageways, ladders, and stairways.

- Equipment operators will report faults with the equipment to a supervisor and use of the equipment will be suspended until a qualified personnel has made repairs.

- Where the work permits, the welder should be enclosed in an individual booth or shall be enclosed with noncombustible screens. Workers or other persons adjacent to the welding areas shall be protected from rays by shields or shall be required to wear appropriate eye and face protection.

- After welding or cutting operations are completed, the welder shall mark the hot metal or provide other means of warning other workers.

- Potentially hazardous materials are materials used in fluxes, coatings, and coverings, filler metals used in welding and cutting, or materials released to the atmosphere during welding or cutting operations. While welding or cutting, adequate ventilation or approved respiratory protection equipment shall be used. Special precautions shall be taken when using materials that contain cadmium, fluorides, mercury, chlorinated hydrocarbons, stainless steel, zinc, galvanized materials, beryllium, and lead. Employees shall refer to ***OSC*** Hazard Communication Program for specific requirements pertaining to the above listed hazardous materials (see *Section 13*).

- All cylinders shall be transported in an upright position with the protective caps securely screwed on. All such cylinders shall be chained to a brace welded to the vehicle.

- Oxygen cylinders or cylinders containing oxidizing gases should not be stored within 35 feet of combustible materials or other cylinders containing flammable gases. If the area does not permit, the cylinders should be separated by a fire resistant partition at least 5 feet high with a fire resistant rating of at least 60 minutes.

- Cylinder should be stored on a level, fireproof floor. Use cylinders in an upright position, ensuring that they are firmly secured with a dedicated chain against being knocked over.

In addition to the above welding and cutting rules, special attention must be given to the equipment used.

7.2.5.1 Gas Welding and Cutting

- Only approved gas welding or cutting equipment shall be used.

- Approved **backflow check valves shall be used** on gas welding rigs in both gas and oxygen lines.

- Welding hose shall not be repaired with tape.

- Matches shall not be used to light a torch; a torch shall not be lighted on hot work. A friction lighter or other approved device shall be used.

- Oxygen, acetylene, or fuel gas cylinders shall not be taken into confined spaces.

7.2.5.2 Electric Welding

- Only approved electric welding equipment shall be used.

- The electric welding machine shall be properly grounded prior to use.

- Rules and instructions supplied by the manufacturer or affixed to the machine shall be followed.

- No employee shall operate arc welding equipment without being properly trained and qualified to so.

- Welders shall not strike arc with an electrode whenever there are persons nearby who might be affected by the arc. When electrode holders are to be left unattended, the electrodes shall be removed and the holders shall be so placed or protected that they cannot make electrical contacts with employees or conducting objects.

- When the welder must leave his work or stop work for any appreciable length of time, or when the welding machine is to be moved, the power supply switch to the equipment shall be opened.

7.2.6 Rigging Equipment

For the protection of all persons involved with the construction of all ***OSC*** projects, the following rules apply when rigging equipment:

- All rigging equipment shall be sufficient strength, proper type, and safe for its intended use.

- Rigging equipment shall not be loaded in excess of its recommended safe working load. Load identification will be attached to the rigging.

- Prior to each use and as necessary during use, a competent person shall inspect all slings, fasteners, and attachments for damaged or defective equipment. Equipment found defective shall be immediately removed from service.

- Tag lines will be used, unless it creates unsafe conditions.

- Makeshift lifting devices formed from bolts, rods, or reinforcing steel shall not be used.

- Slings shall not be shortened with knots, bolts, or other makeshift devices.

- Slings used in a basket hitch shall have the load balanced to prevent slippage.

- Slings shall be securely attached to the load by the use of hooks with retaining devices (latches that can lock ex. Snap Hook) thus eliminating the hook throat opening, or by the use of shackles or other positive latching device.

- Slings shall be padded or protected from the sharp edges of their loads.

- A sling shall not be pulled from under a load when the load is resting on the sling.

- Slings shall be long enough to provide the maximum practical angle between the sling leg and the horizontal plane of the load. **NOTE: DO NOT EXCEED 30deg TO THE HORIZONTAL PLANE OF THE LOAD BEING LIFTED!!**

- **ALL EMPLOYEES MUST BE CLEARED OUT OF THE AREA WHERE THERE ARE SUSPENDED LOADS OR A WHERE A LOAD IS ABOUT TO BE LIFTED**

- Shackle pins shall never be replaced with bolts or other non-approved devices.

- Only hooks with approved retaining devices shall be used. Hooks shall never be rigged so that they are point loaded at the tip of the hook unless they are designed for that purpose. The load shall be securely seated in the saddle of the hook.

- When eyebolts are used, care shall be taken to ensure the bolt is not side loaded.

- Chain falls, come-alongs, and other such devices shall not be loaded beyond their rated capacities.

- Chain falls, come-alongs, and other such devices shall always be rigged for a straight pull.

- The chain or hoist cable for chain falls, come-alongs, or other such devices shall not be wrapped around a load and used in place of a sling unless specifically designed for that purpose.

- To avoid a hazard to employees, all rigging equipment will be removed from the immediate work area when not in use.

7.2.7 Excavation

For the protection of all persons involved with the construction of all ***OSC*** projects, the following excavation rules apply:

- Before excavation work begins, a *Trenching and Excavation Notice* shall be obtained from ***OSC***. A separate permit must be obtained for each excavation (Trench/Excavation Permit Form, in Appendix A).
- All excavations that are five feet deep or deeper, and excavations shallower than five feet in unstable soil shall be sloped, braced, shored or trench box used to prevent cave-ins.
- All excavations that are four feet deep or deeper shall have a ladder for access into the excavation with no more than 25 feet of lateral travel in any direction.
- All excavated and available material shall be retained two feet or more from the edge of the excavation.
- All excavations shall be barricaded with the appropriate barrier tape and other protective devices as required.
- When entering an excavation that may be considered a hazardous environment or Permit required Confined Space, by site safety representatives, proper personal protective equipment must be worn.
- Full compliance with 29 CFR 1926.650 through .652 is required.
- See Appendix A for Daily Excavation Checklist.

7.2.8 Safe Supports and Scaffolds

For the protection of all persons involved with the construction of all ***OSC*** projects, the following rules apply for safe use safe supports and scaffolds:

- No employee may use scaffolding without the proper hazard training from the Corporate HSE Director.
- Training topics include use of scaffolds, hazards, fall protection and load capacity. If conditions change re-training will occur and will supersede all previous training.
- No employee, or any material or equipment, shall be supported or permitted to be supported on any portion of a pole structure, scaffold, ladder, walkway, or other elevated structure, crane or derrick, etc., without it first being determined that such support is adequately strong and properly secured in place.
- Competent Person/Employee shall check all scaffolding prior to use, and periodically, to ensure it is of sufficient strength and rigidity to safely support the weight of persons and material to which it will be subjected.
- Employees shall not use a scaffold from four to 10 feet in height having a mini-mum horizontal dimension of less than 45 inches unless proper guardrails are present to provide employee protection.
- Employees shall not use a scaffold over 10 feet in height unless a standard guardrail is present, with midrail and toeboard, to provide adequate employee protection.
- Scaffold planks shall be secured in place and extend over their end supports by not less than six inches, unless cleated, or more than 12 inches.
- Scaffolds shall not be moved without first removing all loose tools, materials, and equipment resting on the scaffold deck.

- The footing or anchorage points for scaffolds shall be sound, rigid, and capable of carrying the maximum intended load without settling or displacement. Unstable objects such as barrels, boxes, loose brick, or concrete blocks shall not be used to support scaffolds or planks.

- Scaffolds shall be erected level and plum and rigidly braced to prevent swaying and displacement.

- Scaffolds shall not be altered or moved horizontally while being used or occupied except when specifically designed for such use. Movable scaffolds shall have the casters or wheels locked to prevent movement.

- The width of all scaffolds, ramps, and platforms shall be sufficient to prevent congestion of persons, materials, or equipment, and in no case shall they be less than 18 inches wide.

- Synthetic or natural fiber rope shall not be used as guardrails.

- An independent lifeline, body harness, and a lanyard shall protect employees working on suspended scaffolds.

- Safe access shall be provided for all scaffolds. Structural members should not be used as a means of access.

- No scaffold shall be erected, moved, dismantled, or altered except under the supervision of competent persons.

- Employees shall not use a scaffold unless it is properly tagged, by a Competent Person, according to the Scaffold Tagging Procedure, available from the site superintendent or project manager.

7.2.9 Ladders

For the protection of all persons involved with the construction of all ***OSC*** projects, the following rules apply when use of ladders is involved:

- Wooden ladders shall not be painted so as to obscure a defect in the wood; only a clear, nonconductive finish shall be used.

- All ladders shall be visibly inspected frequently and regularly; as well as, after an event that could have affected their safe use. Ladders with weakened, broken, or missing steps, broken side rails, or other defects shall be tagged and removed from service.

- Ladders and scaffolds shall be sufficiently strong for their intended use. Ladders should not be loaded beyond maximum capacity or manufacturer's rated capacity.

- Portable metal ladders shall not be used in the vicinity of energized electrical circuits. (Exception: Such ladders may be used in specialized work, such as high voltage substations, where nonconductive ladders might present a greater hazard. These ladders shall be properly marked.)

- Ladders shall not be placed in front of doors opening toward the ladder unless the door is open, locked, or guarded.

- When ascending or descending ladders, employees shall have both hands free and shall face the ladder.

- Only one employee shall work from a ladder at one time, except for hook type ladders. If two employees are required, a second ladder shall be used.
- Ladders shall not be used as scaffold platforms. Ladders will only be used for their intended purpose.
- Boxes, chairs, etc. shall not be used as ladders.

7.2.9.1 Straight Ladders

- Portable straight ladders shall not be used without nonskid bases.
- The ladder shall be placed so that the distance between the bottom of the ladder and the supporting point is approximately one-fourth of the ladder length between supports.
- Once in position for use all ladder rungs/steps must be uniformly spaced, parallel and level.
- Straight ladders shall not be climbed beyond the third step from the top.
- When working from a portable ladder, the ladder must be securely placed, held, tied, or otherwise made secure to prevent slipping or falling.
- When dismounting from a ladder at an elevated position (e.g. from a roof), the employee shall ensure that the ladder side rails extend at least three feet above the dismount position, or that grab bars are present.
- Employees shall wear a body harness and lanyard, and tie off to a secure anchor whenever both hands must be used for the job or are exposed to a fall in excess of six feet.
- Ladders shall not be spliced together to form a longer ladder.
- A ladder shall not be placed against an unsafe support.
- Employees climbing a ladder with a fall exposure greater than 24 feet shall be protected by an approved cage, ladder-climbing device, or by the use of personal fall arrest equipment.

7.2.9.2 Step Ladders

- The top two steps shall not be used.
- Stepladder legs shall be fully spread and the spreading bars locked in place.
- Stepladders shall not be used as straight ladders.
- When an employee is working on a stepladder over six feet high, the employee shall use a body harness and lanyard attached to a substantial anchor, if possible.

7.2.10 Material Handling

For the protection of all persons involved with the construction of all ***OSC*** projects, the following material handling rules apply:

- An employee shall obtain assistance in lifting heavy objects or power equipment shall be used. Back belts or back braces shall be used as required.

- When two or more persons carry a heavy object that is to be lowered or dropped, there shall be a prearranged signal for releasing the load.

- When two or more persons are carrying an object, each employee, if possible, should face the direction in which the object is being carried.

- The right way to lift is easiest and safest. Crouch or squat with the feet close to the object to be lifted, secure good footing, take a firm grip, bend the knees, keep the back vertical, and lift by bending at the knees and using the leg and thigh muscles. Employees shall not attempt to lift beyond their capacity. Caution shall be taken when lifting or pulling in an awkward position.

- Employees should avoid twisting or excessive bending when lifting or setting down loads.

- When moving a load horizontally, employees should push the load rather than pull it.

- When performing a task that requires repetitive lifting, the load should be positioned to limit bending and twisting. The use of lift tables, pallets, and mechanical devices should be considered.

- When using such tools as screwdrivers and wrenches, employees should avoid using their wrists in a bent, flexed, extended, or twisted position for long periods of time. Employees should maintain their wrists in a neutral or straight position.

- When gripping, grasping, or lifting an object such as a pipe or board, the whole hand and all the fingers should be used. Gripping, grasping, and lifting with just the thumb and index finger should be avoided.

7.2.11 Powered Industrial Trucks (Forklifts)

For the protection of all persons involved with the construction of all ***OSC*** projects, the following rules apply for use of powered industrial trucks or forklifts:

- Training is conducted by a qualified instructor and includes formal instruction on industrial trucks, demonstrations and employee exercises. Employees will learn operating instructions, load capacities, controls, refueling ramps, visibility and balancer and counterbalances for load stability. Employees will be qualified to utilize powered industrial trucks after they have successfully been evaluated and critiqued while in the workplace.

- Refresher will occur annually, prior to any job start-up, when changed conditions occur, after unsafe operations are observed and after accidents; as well as when a different machine then normal will be used. Re-evaluation of all operators will occur at least every three years, earlier if unsafe behavior is observed.

- Only authorized persons shall be permitted in the cab or on the equipment. Only those designated persons who are trained and qualified shall operate a powered industrial truck.

- Industrial trucks shall be examined daily before being placed in service. The vehicle shall not be placed in service if any condition is found that would adversely affect safety.

- All operators must verify that their trailers chocks, supports and dock plates are secured prior to loading and unloading.

- No unauthorized person shall be permitted to ride on truck.

- Industrial trucks shall not be altered unless approved by the truck manufacturer.
- Load limits, as specified by the manufacturer, shall not be exceeded under any circumstances.
- Operating and maintenance procedures, as specified by the manufacturer, shall be followed.
- Any power-operated industrial truck not in safe operating condition shall be removed from service. Authorized personnel shall make all repairs.
- No load shall be lifted until its weight has been determined.
- Only stable or safely arranged loads shall be handled. Caution shall be exercised when handling off-center loads that cannot be centered.
- Trucks shall not be driven up to anyone standing in front of any fixed object.
- No person shall be allowed to stand or pass under the elevated portion of any truck, whether loaded or empty.
- When a truck is left unattended, out of view or is located more than 25 feet away, the load engaging means shall be fully lowered, controls shall be neutralized, power shut off and brakes set. Wheels shall be blocked if on an incline.
- The truck operator shall be required to look in the direction of, and keep a clear view of, the path of travel.
- When ascending or descending grades in excess of ten degrees, loaded trucks shall be driven slowly with the load upgrade.
- No truck shall be operated with a leak in the fuel system until the leak has been corrected.
- Truck operators shall exercise extreme caution when in close proximity to energized lines or equipment. The operator shall maintain ten feet of clearance from the energized source.
- Refer to Appendix B for supporting forms and documents.

7.2.12 Hand Tools

For the protection of all persons involved with the construction of all ***OSC*** projects, the following hand tools rules apply:

- All tools, regardless of ownership, shall be of an approved type and maintained in good and safe condition. Tools are subject to inspection at any time. A foreman has the authority and responsibility to condemn unserviceable tools, regardless of ownership.
- Defective tools shall be tagged to prevent their use or they shall be removed from the jobsite.
- Employees shall always use the proper tool for the job performed.
- Hammers with metal handles, screwdrivers, knives with metal continuing through the handle and metallic measuring tapes shall not be used on or near energized electrical circuits or equipment.

- Tools shall not be thrown from place to place or from person to person; tools that must be raised or lowered from one elevation to another shall be placed in tool buckets or firmly attached to hand lines.
- Tools shall never be placed unsecured on elevated places.
- All impact tools such as chisels, punches, drift pins, etc., that become mushroomed or cracked shall be dressed, repaired, or replaced before further use.
- Chisels, drills, punches, ground rods, and pipes shall be held with suitable holders or tongs, not with the hands, while being struck by another employee.
- Shims shall not be used to make a wrench fit.
- Wrenches with sprung or damaged jaws shall not be used.
- Pipe shall not be used to extend a wrench handle for added leverage unless the wrench was designed for such use.
- Tools shall be used only for the purposes for which they have been approved.
- Tools with sharp edges shall be stored and handled so that they will not cause injury or damage. They shall not be carried in pockets.
- Wooden handles that are loose, cracked, or splintered shall be replaced. The handle shall not be taped or lashed with wire.
- All cutting tools such as saws, wood chisels, knives, or axes shall be kept in suitable guards or in special compartments.
- Tools shall not be left lying around where they may cause a person to trip or stumble.
- When working on or above open grating, a canvas or other suitable covering shall be used to cover the grating to prevent tools or parts from dropping to a lower level where others are present or the danger area shall be barricaded or guarded. The barricade or guard shall in no way be manipulated to the point where it can no longer provide the protection it is intended for.
- The insulation on hand tools shall not be depended upon to protect users from shock.
- The proper PPE will be provided and must be worn by any employee onsite when hand/power tools are in use and the employee is exposed to any hazards (i.e. falling objects, toxic fumes, etc.).

7.2.13 Portable Electric Tools

For the protection of all persons involved with the construction of all ***OSC*** projects, the following rules apply when portable electric tools are used.

- The non-current carrying metal parts of portable electric tools such as drills, saws, and grinders shall be effectively grounded when connected to a power source unless the tool is an approved double-insulated type, or the tool is connected to the power supply by means of an isolating transformer or other isolated power supply, such as a 24-volt DC system.

- All power tools shall be examined prior to use to ensure general service-ability and the presence of all applicable safety devices. The electric cord and electric components shall be given an especially thorough examination.
- Power tools shall be used only within their capability and shall be operated in accordance with the instructions of the manufacturer.
- All tools shall be kept in good repair and shall be disconnected from the power source while repairs are being made.
- Electrical tools shall not be used where there is a hazard of flammable vapors, gases, or dusts.
- Ground fault circuit interrupters (GFCI) will protect all power tools and cord sets.

7.2.14 Pneumatic Tools

For the protection of all persons involved with the construction of all ***OSC*** projects, the following rules apply when pneumatic tools are used:

- Compressed air and compressed air tools shall be used with caution.
- Pneumatic tools shall never be pointed at another person.
- Pneumatic power tools shall be secured to the hose or whip by some positive means to prevent the tool from becoming accidentally disconnected.
- Safety clips or retainers shall be securely installed and maintained on pneumatic impact tools to prevent attachments from being accidentally expelled.
- Compressed air shall not be used for cleaning purposes except when reduced to less than 30 psi and then only with effective chip guarding and personal protective equipment.
- Compressed air shall not be used to blow dust or dirt from clothing.
- The manufacturer's safe operating pressure for hoses, pipes, valves, filters, and other fittings shall not be exceeded.
- The use of hoses for hoisting or lowering tools shall not be permitted.
- All hoses exceeding 2-inch inside diameter shall have a safety device at the source of supply or branch line to reduce pressure in case of hose failure or disengagement of a connection.
- Before making adjustments or changing air tools, unless equipped with quick-change connectors, the air shall be shut off at the air supply valve ahead of the hose. The hose shall be bled at the tool before breaking the connection.
- Eye protection, foot protection, and other protective devices shall be worn when their use could reduce the possibility of injury.
- Pneumatic tools shall be operated only by competent persons trained in their use.

- A pneumatic tool used where it may contact exposed live electrical parts shall have a nonconductive hose and an accumulator to collect moisture.

- Employees shall not use any part of their bodies to locate or attempt to stop an air leak.

7.2.15 Cranes, Derricks, Hoisting Equipment

For the protection of all persons involved with the construction of all ***OSC*** projects, the following rules apply when use of cranes, derricks, or hoisting equipment is involved:

- Only authorized trained employees will be permitted in the cab or on the equipment.

- Only designated employees who are trained and qualified shall operate the hoisting equipment.

- Cranes shall be inspected, by a designated competent person, on a daily basis via use of the Daily Crane Inspection Report (in Appendix A). Any defect shall be repaired before use.

- A detailed, thorough inspection of all rigging equipment will be conducted annually by a competent person or by a private agency that is recognized by the U.S. Dept. of Labor. Records of the results and dates of these inspections will be maintained and stored by the CHSED.

- No person shall be permitted to ride the hook, sling, or load of any hoisting equipment.

- Load limits as specified by the manufacturer shall not be exceeded under any circumstances. Warnings and instructions will be posted on equipment and will be visible to the operator while he is at the control station.

- Operating and maintenance procedures as specified by the manufacturer shall be followed. When these are not provided, a competent qualified engineer's determinations will be documented, recorded and followed.

- Safety can be compromised when attempting to modify or put and addition to the equipment; therefore NO modifications or additions will be made to the equipment without the written consent of the manufacturer.

- Before a lift is attempted, the lifting mechanism shall be level and firmly supported with the hoist line centered over the center of gravity of the load to be lifted.

- No load shall be lifted until its weight has been determined.

- For the first lift of each day, the load shall be test lifted at least several inches and the brakes checked.

- With every load, the slings and bindings shall be checked and shall be readjusted as necessary to ensure safety and stability.

- Hand signals to the equipment operator shall be given by one person designated to perform the task. The operator shall, however, obey a "stop" signal given by anyone. Signals will be determined by ANSI standards for the type of crane or derrick being used.

- No employee shall be under a suspended load or inside the "boom" angle of a hoist line. No employee will stand or work near a cable, chain, or rope under tension unless the nature of his work requires it.

- Hoist lines, ropes, or wire cables shall not be guided by hand when standing within reach of the drum or sheave.
- Wire rope loops shall be made by proper splicing or mechanical clamping of the tail section. Wire rope clips shall not be used to form eyes in wire rope bridles or slings.
- Operators shall not leave their position at the controls of cranes, hoists, derricks, or other lifting devices while the load is suspended.
- Operators of cranes, derricks, hoists, and other hoisting equipment shall exercise extreme caution when in close proximity to energized lines or equipment. The operator shall keep the equipment at least ten feet away from all lines energized up to 50 kV and 0.4 inch more for each 1 kV over 50 .
- Tests to ensure employees are not exposed to unsafe amounts of toxic gases of oxygen deficient atmospheres will be conducted on all exhaust-releasing equipment that is operating in an enclosed space. All testing will be recorded.
- Tag lines shall be used on all loads.
- All spreader bars shall be tagged with the rated capacity.
- For the safety of all employees, a fire extinguisher with a 5BC rating will be available in the cabs of all equipment.

7.2.16 Flammable and Combustible Liquids

For the protection of all persons involved with the construction of all ***OSC*** projects, the following rules apply for use of flammable and combustible liquids:

- "Danger" and "No Smoking" signs shall be posted around all flammable and combustible liquid storage areas.
- All aboveground tanks shall have adequately sized concrete containment, such as slab and walls, to contain spills.
- Tanks shall be vented with a pipe not less than 13 inch inside diameter and shall be 12 feet high from the adjacent ground level.
- Tanks shall be kept 20 feet from buildings.
- At least one 20 pound Class ABC fire extinguisher shall be kept between 25 feet to 75 feet from tanks.
- All tanks shall be properly grounded.
- All tanks shall be labeled with the contents and owner's name.

7.2.17 Confined or Enclosed Spaces

For the protection of all persons involved with the construction of all ***OSC*** projects, the following rules apply around confined or enclosed spaces:

- Only employees who have been properly trained on the hazards associated with confined space work shall be allowed to enter a confined space.

- Before entering a confined space, a Confined Space Entry Permit form (in Appendix A) shall be obtained from ***OSC***.

- Before any entrance cover to a confined space is removed, it shall be determined that there are no temperature or pressure differences, or other hazardous conditions that may injure the employees removing the cover.

- When covers are removed from confined spaces, a railing, temporary cover, or other temporary barrier shall guard the opening, for employee protection.

- Prior to entering a confined space, all levels of the confined space shall be tested for the presence of flammable or toxic gases and vapors or an oxygen deficient atmosphere.

- If flammable or toxic gases or vapors are detected or if an oxygen deficiency is found, forced ventilation shall be used to maintain oxygen at a safe level and to prevent a hazardous concentration of flammable or toxic gases and vapors.

- While work is being performed in the confined space, a person with basic first aid training shall be immediately available to render emergency assistance if there is reason to believe that a hazard may exist in the space or if a hazard exists.

- Entry into a confined space with an unsafe atmosphere shall be avoided if at all possible. Employees required to enter a confined space with an unsafe atmosphere shall be equipped with a fresh air breathing apparatus, body harness, and attended life line.

- Electric welding, gas welding, cutting, or any other hot work shall not be performed on the interior, exterior, or near the openings of any confined space which may contain flammable or explosive gases or vapors until the space has been properly cleared. The space is cleared when it is determined to have proper ventilation, secured cylinders, proper lifelines, removal of electrodes, gas cylinders are shut off and warning signs are displayed around the work area.

- Compressed gas bottles shall not be taken into a confined space.

- Safe access to the confined space shall be maintained at all times. If possible, all cords, hoses, leads, etc., shall be routed through an entrance other than the employee access into the confined space.

- Before employees are allowed to enter a confined space, all electrical and mechanical energy sources that could affect the employees working in the space shall be physically rendered inoperative, locked out, and tagged. If required, the space shall be drained, vented, and cleaned.

- Contractors are responsible for supplying workers with the proper air monitoring equipment.

7.2.18 Heaters

For the protection of all persons involved with the construction of all ***OSC*** projects, the following rules apply around use of heaters:

- UL-approved salamanders, Redi-heaters, and space heaters are the only approved heaters on the jobsite.
- Heaters shall be kept at least 20 feet from buildings and other combustible items.
- Job-made heaters, solid fuel salamanders, and open fires are prohibited on the jobsite.

Section 8
Site-Specific Health and Safety Plans

Site-specific health and safety plans (HASPs) may be generated for all construction activities and hazardous waste sites. The complexity of each individual plan will vary as to the types of operations and the chemical and physical exposure hazard potential associated with each individual site.

At the start of each project, the project manager or site supervisor should complete the Preliminary Hazard Analysis form (Appendix A). This form will provide an initial assessment of potential health and safety concerns on the project and help determine whether a complete HASP is required.

On a project valued under $50,000 or when specific hazards are present on a small project, a Safe Work Plan should be used. For projects larger than $50,000 a Site Specific HASP should be used.

Should a HASP be needed, it will serve as a vehicle for providing health and safety information to all individuals assigned to site activities and will be available onsite and reviewed by each individual employee before performing site activities. Documentation as to this review will be performed onsite. In general, the HASP will be prepared, as a minimum, in accordance with the requirements of 29 CFR 1910 and 29 CFR 1926.

Pertinent reasons to establish a HASP are as follows:

- To create policies and procedures to protect employees and the public from potential site-specific health and safety hazards
- To provide measures to minimize/eliminate accidents and injuries that may result from chemical and physical hazards associated with the site
- To ensure that all aspects of site operations have been carefully thought out prior to initiation of any site tasks
- To communicate to site employees the chemical and physical hazard potentials that exist at the site, how those hazards can impact their health and well-being, and the personal protection equipment and procedures required to minimize those hazards
- To assure that all potential contingencies have been thoroughly examined in advance of injuries, illnesses, fires, or other catastrophic events

8.1 HASP Elements

The site-specific HASP will address, at minimum, the following:

- Names of key personnel and alternates responsible for the implementation and maintenance of the HASP. This section will describe these personnel and the lines of communication to be followed in performance of the project work.
- A health and safety risk analysis for each anticipated site task and operation. This will include a discussion of the materials thought to be on site, their health and safety hazard potentials, etc. Also to be included in this section is a discussion concerning the types of equipment and physical hazards associated with the operation of equipment that will be required to perform the project work.

- Site-specific health and safety training that will be provided to all employees participating in project work. This training will include, at a minimum, the requirements of the HASP and will be provided by the designated SHSO.
- Initial personal protective equipment requirements specified for each anticipated site task and operation. This equipment will be prescribed based on materials suspected as being on site and the activities associated with these materials.
- Medical surveillance requirements, when different from ***OSC*** Health and Safety Program. The occupational physician who oversees the medical surveillance program, when warranted, will prescribe additional medical surveillance.
- The types and frequencies of both personal and environmental air quality sampling, defined by specific, anticipated site task and operation. Specifics as to types of equipment, sampling and analytical methodologies, and sampling equipment operation, calibration, and maintenance, will also be provided in this section.
- Details as to site control measures. This will include site delineation (i.e. exclusion, contamination reduction, and support zones), procedures for site entry and exit, the use of a "buddy system" site communications, site-specific safe work practices, and the identification of the nearest medical assistance.
- Site-specific equipment and personnel decontamination procedures
- Standard operating procedures that are specific to the site
- A contingency plan, to be implemented in the event of injury/illness, fires, etc
- Confined space entry procedures, as necessary
- Site excavation guidelines, where required. These will be shored, trench boxes used and/or sloped as per Subpart P of 29 CFR Part 1926.

The site SHSO and/or the CHSED are responsible for reviewing all HASPs for site-specific project work. This review is performed to ensure that health and safety hazard potentials have been considered for all anticipated project work. No work associated with hazardous waste sites will be performed until an acceptable site-specific HASP has been submitted. The SHSO or CHSED accepts this document upon signature.

8.2 Standard HASP Form

OSC has developed a standardized HASP form [see Appendix], and an abbreviated form known as the Safe Work Plan (see Appendix), to assist with the generation process. This format is to be used when it is acceptable to the client.

The HASP is often supplemented by Activity Hazard Analysis data sheets that outline health and safety concerns associated with particular, specific tasks (e.g., excavations, fall protection, confined space entry, etc.). These sheets may be obtained from the SHSO, CHSED, ***OSC*** Intranet, and the Appendix of this manual.

8.3 Hazardous Material HASP Form

OSC has developed a standardized HASP form to assist with the generation process. This format is used when it is acceptable to the client.

The HASP outlines health and safety concerns associated with particular, specific tasks (e.g. hazardous materials, hazardous waste, etc.). These sheets may be obtained from the SHSO, CHSED, and the ***OSC*** Intranet.

Section 9
Personal Protective Equipment

The activities performed by ***OSC*** frequently require the use of clothing and equipment that shields employees from chemical and physical hazards that may be encountered.

In order to prescribe personal protective equipment requirements effectively, the nature and extent of potential chemical and physical hazards associated with various activities need to be assessed. Prior to mobilization, ***OSC*** performs a detailed review of the project site. This includes a review of the site history, types and quantities of materials handled at the site, types of operations performed at the project site, and types of activities to be performed during the course of the project.

From this review, personal protective equipment is selected based on the reasonable anticipation of exposure to the chemical and physical hazard exposure potential.

9.1 Levels of Protection

Each type of protective equipment has been designed specifically to protect against a reasonably anticipated chemical and physical hazard. In order to standardize personal protective equipment ensembles, "levels of protection" have been defined to address those chemical and physical hazards, which may be present at hazardous waste sites. The levels of protection are defined accordingly:

- **Level A**. Level A is worn when the highest level of respiratory, skin, and eye protection is anticipated as being required.
- **Level B**. Level B is worn when the highest level of respiratory protection is anticipated as being required, with a lesser level of skin protection being necessary.
- **Level C**. Level C is worn when criteria for air-purifying respirators are determined to be necessary and a lesser level of skin protection needed.
- **Level D.** Level D is worn when activities and areas do not present a respiratory or skin hazard.
- **Level D, Modified**. Level D, modified, is worn when activities do not pose a problem from a respiratory protection point of view but may present a skin problem and where cross contamination via shoes needs to be considered.

Detailed equipment, use, and limitations associated with each level of protection appear in Table 9-1 below.

Table 9-1 *Levels of Protection*				
Level	**Equipment**	**Protection Provided**	**Should be Used When:**	**Limiting Criteria**
A	**Recommended**: • Pressure-demand, full facepiece SCBA or pressure-demand supplied-air respirator with escape SCBA • Full-encapsulating, chemical-resistant suit • Inner chemical-resistant gloves • Chemical-resistant safety boots/shoes • Two-way radio communications **Optional:** • Cooling Unit • Coveralls • Long cotton underwear • Hard hat • Disposable gloves and boot covers	• The highest available level of respiratory, skin, and eye protection	• The chemical substance has been identified and requires the highest level of protection for skin, eyes, and the respiratory system based on either: - Measured (or potential for) high concentration of atmospheric vapors, gases, or particulates - Site operations and work functions involving a high potential for splash, immersion, or exposure to unexpected vapors, gases, or particulates of materials that are harmful to skin or capable of being absorbed through intact skin • Substances with a high degree of hazard to the skin are known or suspected to be present, and skin contact is possible • Operations must be conducted in confined, poorly ventilated areas until the absence of conditions requiring Level A protection is determined	Fully encapsulating suit material must be impermeable to the substances involved.

B	**Recommended:** • Pressure-demand, full-facepiece SCBA or pressure-demand supplied air respirator with escape SCBA • Chemical-resistant clothing (overalls and long-sleeved jacket; hooded, one-piece chemical splash suit; disposable chemical resistant one-piece suit) • Inner and outer chemical-resistant gloves • Chemical-resistant safety boots/shoes • Hard hat • Two-way radio communications **Optional**: • Coveralls • Disposable boot covers • Face shield • Long cotton underwear	• The same level of respiratory protection but less skin protection than Level A. • It is the minimum level recommended for initial site entries until the hazards have been further identified.	• The type and atmospheric concentrations of substances have been identified and require a high level of respiratory protection, but less skin protection. This involves atmospheres: - With immediately dangerous to life or health (IDLH) concentrations of specific substances that do not represent a severe skin hazard *or* - That do not meet the criteria for use of air-purifying respirators • Atmosphere contains less than 19.5 percent oxygen • Presence of incompletely identified vapors or gases is indicated by direct-reading organic vapor detection instrument, but vapors and gases are not suspected of containing high levels of chemicals harmful to skin or capable of being absorbed through the skin	Used only when the vapor of gases present are not suspected of containing high concentrations of chemicals that are harmful to skin or capable of being absorbed through the intact skin Use only when it is highly unlikely that the work being done will generate either high concentrations of vapors, gases, or particulates or splashes of material that will affect exposed skin

Table 9-1
Levels of Protection

Level	Equipment	Protection Provided	Should be Used When:	Limiting Criteria
C	**Recommended** • Full-facepiece, air-purifying, cartridge-equipped respirator • Chemical-resistant clothing (overalls and long-sleeved jacket; hooded, one-piece chemical splash suit; disposable chemical-resistant one-piece suit • Inner and outer chemical-resistant gloves • Chemical-resistant safety boots/shoes • Hard hat • Two-way radio communications **Optional:** • Coveralls • Disposable boot covers • Face shield • Escape mask • Long cotton underwear • Cooling Unit	• The same level of skin protection as Level B, but a lower level of respiratory protection.	• The atmospheric contaminants, liquid splashes, or other direct contact will not adversely affect any exposed skin • The types of air contaminants have been identified, concentrations measured, and a cartridge is available that can remove the contaminant • All criteria for the use of air-purifying respirators are met	
A	**Recommended:** • Pressure-demand, full facepiece SCBA or pressure-demand supplied-air respirator with escape SCBA • Full-encapsulating, chemical-resistant suit • Inner chemical-resistant gloves • Chemical-resistant safety boots/shoes • Hard hat • Two-way radio communications **Optional:** • Coveralls • Long cotton underwear • Cooling Unit	• The highest available level of respiratory, skin, and eye protection	• The chemical substance has been identified and requires the highest level of protection for skin, eyes, and the respiratory system based on either: - Measured (or potential for) high concentration of atmospheric vapors, gases, or particulates - Site operations and work functions involving a high potential for splash, immersion, or exposure to unexpected vapors, gases, or particulates of materials that are harmful to skin or capable of being absorbed through intact skin • Substances with a high degree of hazard to the skin are known or suspected to be present, and skin contact is possible • Operations must be conducted in confined, poorly ventilated areas until the absence of conditions requiring Level A protection is determined	Fully encapsulating suit material must be impermeable to the substances involved.
D **MODIFIED**	**Recommended:** • Long cotton underwear • Chemical-resistant outer gloves • Hard hat • Disposable gloves and boot covers • Disposable shoe covers • Tyvek outer clothing • Work clothes • Safety boots/shoes • Safety glasses or chemical splash goggles • Hard hat	X No respiratory protection X Minimal skin protection	X The atmosphere contains no known hazard. X Work functions may involve skin contact with hazardous chemicals.	
D	**Recommended:** • Work Clothes • Safety boots/shoes • Safety glasses or chemical splash goggles • Hard hat	X No respiratory protection X Minimal skin protection	X The atmosphere contains no known hazard	

B	**Recommended:** • Pressure-demand, full-facepiece SCBA or pressure-demand supplied air respirator with escape SCBA • Chemical-resistant clothing (overalls and long-sleeved jacket; hooded, one-piece chemical splash suit; disposable chemical resistant one-piece suit) • Inner and outer chemical-resistant gloves • Chemical-resistant safety boots/shoes • Hard hat • Two-way radio communications **Optional**: • Coveralls • Disposable boot covers • Face shield • Long cotton underwear	• The same level of respiratory protection but less skin protection than Level A. • It is the minimum level recommended for initial site entries until the hazards have been further identified.	• The type and atmospheric concentrations of substances have been identified and require a high level of respiratory protection, but less skin protection. This involves atmospheres: - With immediately dangerous to life or health (IDLH) concentrations of specific substances that do not represent a severe skin hazard *or* - That do not meet the criteria for use of air-purifying respirators • Atmosphere contains less than 19.5 percent oxygen • Presence of incompletely identified vapors or gases is indicated by direct-reading organic vapor detection instrument, but vapors and gases are not suspected of containing high levels of chemicals harmful to skin or capable of being absorbed through the skin	Used only when the vapor of gases present are not suspected of containing high concentrations of chemicals that are harmful to skin or capable of being absorbed through the intact skin Use only when it is highly unlikely that the work being done will generate either high concentrations of vapors, gases, or particulates or splashes of material that will affect exposed skin

Table 9-1 *Levels of Protection*				
Level	**Equipment**	**Protection Provided**	**Should be Used When:**	**Limiting Criteria**
A	**Recommended:** • Pressure-demand, full-facepiece SCBA or pressure-demand supplied-air respirator with escape SCBA • Full-encapsulating, chemical-resistant suit • Inner chemical-resistant gloves • Chemical-resistant safety boots/shoes • Hard hat • Two-way radio communications **Optional:** • Coveralls • Disposal boot covers • Face shield • Escape mask • Long cotton underwear • Cooling Unit • Coveralls • Chemical-resistant outer gloves • Disposable gloves and boot covers • Tyvek outer clothing • Work clothes • Safety boots/shoes • Safety glasses or chemical splash goggles • Hard hat	• The highest available level of respiratory, skin, and eye protection	• The chemical substance has been identified and requires the highest level of protection for skin, eyes, and the respiratory system based on either: - Measured (or potential for) high concentration of atmospheric vapors, gases or particulates - Site operations and work functions involving a high potential for splash, immersion, or exposure to unexpected vapors, gases, or particulates of materials that are harmful to skin or capable of being absorbed through intact skin • All criteria for the use of air-purifying respirators are met	Fully encapsulating suit material must be impermeable to the substances involved.
D **MODIFIED**	**Recommended:** • Long cotton underwear • Hard hat • Disposable gloves and boot covers • Tyvek outer clothing • Work clothes • Safety boots/shoes • Safety glasses or chemical splash goggles • Hard hat	X No respiratory protection X Minimal skin protection	X The atmosphere contains no known hazard. • Substances with a high degree of hazard to the skin are known or suspected to be present, and skin contact is possible. X Work functions may involve skin contact with hazardous chemicals. • Operations must be conducted in confined, poorly ventilated areas until the absence of conditions requiring Level A protection is determined	
D	**Recommended:** • Work Clothes • Safety boots/shoes • Safety glasses or chemical splash goggles • Hard hat	X No respiratory protection X Minimal skin protection	X The atmosphere contains no known hazard.	

B	**Recommended:** • Pressure-demand, full-facepiece SCBA or pressure-demand supplied air respirator with escape SCBA • Chemical-resistant clothing (overalls and long-sleeved jacket; hooded, one-piece chemical splash suit; disposable chemical resistant one-piece suit) • Inner and outer chemical-resistant gloves • Chemical-resistant safety boots/shoes • Hard hat • Two-way radio communications **Optional**: • Coveralls • Disposable boot covers • Face shield • Long cotton underwear	• The same level of respiratory protection but less skin protection than Level A. • It is the minimum level recommended for initial site entries until the hazards have been further identified.	• The type and atmospheric concentrations of substances have been identified and require a high level of respiratory protection, but less skin protection. This involves atmospheres: - With immediately dangerous to life or health (IDLH) concentrations of specific substances that do not represent a severe skin hazard *or* - That do not meet the criteria for use of air-purifying respirators • Atmosphere contains less than 19.5 percent oxygen • Presence of incompletely identified vapors or gases is indicated by direct-reading organic vapor detection instrument, but vapors and gases are not suspected of containing high levels of chemicals harmful to skin or capable of being absorbed through the skin	Used only when the vapor of gases present are not suspected of containing high concentrations of chemicals that are harmful to skin or capable of being absorbed through the intact skin Use only when it is highly unlikely that the work being done will generate either high concentrations of vapors, gases, or particulates or splashes of material that will affect exposed skin

C	**Recommended** • Full-facepiece, air-purifying, cartridge-equipped respirator • Chemical-resistant clothing (overalls and long-sleeved jacket; hooded, one-piece chemical splash suit; disposable chemical-resistant one-piece suit • Inner and outer chemical-resistant gloves • Chemical-resistant safety boots/shoes • Hard hat Two-way radio communications **Optional:** • Coveralls • Disposal boot covers • Face shield • Escape mask • Long cotton underwear	• The same level of skin protection as Level B, but a lower level of respiratory protection.	• The atmospheric contaminants, liquid splashes, or other direct contact will not adversely affect any exposed skin • The types of air contaminants have been identified, concentrations measured, and a cartridge is available that can remove the contaminant • All criteria for the use of air-purifying respirators are met	
D **MODIFIED**	**Recommended:** • Chemical-resistant outer gloves • Disposable shoe covers • Tyvek outer clothing • Work clothes • Safety boots/shoes • Safety glasses or chemical splash goggles • Hard hat	X No respiratory protection X Minimal skin protection	X The atmosphere contains no known hazard. X Work functions may involve skin contact with hazardous chemicals.	
D	**Recommended:** • Work Clothes • Safety boots/shoes • Safety glasses or chemical splash goggles • Hard hat	X No respiratory protection X Minimal skin protection	X The atmosphere contains no known hazard.	

9.2 Use of Personal Protective Equipment

Use of personal protective equipment is required by OSHA regulations contained in 29 CFR 1910 and 29 CFR 1926, and is reinforced by EPA regulations in 40 CFR Part 300. These regulations include all individuals who may perform work at hazardous, or potentially hazardous, waste sites, when applicable. Types of protection relevant to OSHA regulation, and the source of the regulation appear below in Table 9-2.

Personal protective equipment in use shall be inspected daily and maintained in serviceable condition. Items of personal issue shall be cleaned and sanitized as appropriate prior to being reissued to another employee. Defective or damaged personal protective equipment shall be taken out of service immediately.

Table 9-2
OSHA Standards for the Use of Personal Protective Equipment

Type of Protection	**Regulation**	**Source**
General	29 CFR 1910.132	41 CFR Part 50-204.7, *General Requirements for Personal Protective Equipment*
	29 CFR 1910.1000	41 CFR Part 50-204.5, except for Table Z-2, the source of which *is American National Standards Institute*, Z37 series[1]
	29 CFR 1910.1000-1045	OSHA Rulemaking
Eye and Face	29 CFR 1910.133(a)	ANSI Z87.1-[1] *Eye and Face Protection*
Noise Exposure	29 CFR 1910.95	41 CFR 50-204.10 and OSHA Rulemaking
Respiratory	29 CFR 1910.134	ANSI Z88.2-[1] *Standard Practice for Respiratory Protection*
Head	29 CFR 1910.135	ANSI Z89.1-[1] *Safety Requirements for Head Protection*
Foot	29 CFR 1910.136	ANSI Z41.1-[1] *Men's Safety Toe Footwea*r
Electrical Protective Devices	29 CFR 1910.137	ANSI Z9.4-[1], *Ventilation and Safe Practices of Abrasive Blasting Operations*

9.2.1 Hard Hats

Hard hats are required at all times while on the construction site. Hard hats shall comply with the ANSI Z89.1 requirements.

9.2.2 Safety Glasses

Safety glasses are required at all times while on the construction site. Safety glasses shall comply with the ANSI Z87.1 requirements.

9.2.3 Respirators

(Please refer to Section 11.)

9.2.4 Hearing Protection

Employees shall use hearing protection when noise levels exceed the allowable limit, or ***OSC's*** requirement of 85db TWA in an 8 hour period. A Hearing Conservation Program shall be implemented if the allowable limits are exceeded.

Whenever noise levels are measured or anticipated to exceed a time-weighted average (TWA) Action Level of 85 decibels as measured on the A scale (dBA), worker protection against the effects of noise exposure will be provided in accordance with 29 CFR 1910.95 or 29 CFR 1926.52 as appropriate and at no cost to the employee. At times double protection may be required. Employees will be property trained on the use and cleaning of their hearing protectors.

Section 10
Medical Surveillance Program

OSC medical surveillance program, which is designed and administered by a board certified, occupational physician, consists of a combination of:

- Baseline, annual, interim, exit, and return to work examinations
- Services for the evaluation of occupationally related injuries and illnesses
- Emergency medical services that are required to stabilize severely injured or ill patients prior to their transport to an offsite medical care facility

All employees are instructed that they are to advise management of prescription drug usage during the performance of any assigned activities. Female employees are also encouraged to advise their immediate supervisor of any change of physical status related to pregnancies. Medical monitoring protocol for personnel assigned to hazardous, or potentially hazardous, waste sites is provided in Table 10-1.

Table 10-1
Medical Monitoring Protocol

Exam Components	***Baseline[1]***	***Annual[2]***	***Interim***	***Exit***
Blood and Urine Specimen	YES	YES	YES	YES
Vital Signs	YES	YES	YES	YES
Vision Screening (to include peripheral & color)	YES	YES	YES	YES
Dipstick Urine Analysis	YES	YES	YES	YES
Audiometry	YES	YES	NO	YES
Spirometry	YES	YES	YES	YES
EKG	3	3	NO	3
Chest X-Ray	YES	3	NO	3
Review of History	YES	YES	YES	YES
Physical Exam	YES	YES	YES	YES

1. *Only do an X-ray if not done within the last 12 months*
2. *Only do an X-ray if not done within the last 3 years*
3. *For medical indications only*

All ***OSC*** field personnel will be provided with a thorough, initial medical examination to assess fitness for the job and provide baseline health data for subsequent reference. Examinations will be repeated every other year unless abnormal test results, annual "questionnaire" answers or other problems dictate more frequent observation.

During the medical examination, employees will be evaluated for their ability to wear respiratory protection and other protective equipment, such as extensive clothing ensembles. This evaluation will include, at a minimum, an examination of the cardiopulmonary system; including forced vital capacity (FVC) and forced expiratory volume C 1 second (FEV 1.0). When indicated by the physician, other tests of the respiratory and cardiovascular systems will be performed on the basis of an individual's past history, findings of the above evaluation, and/or the type of equipment the individual may be required to use.

A Medical Authorization Form is provided in Appendix A.

10.1 Baseline Medical Examination

The baseline medical examination is conducted to determine whether an employee is physically and mentally suitable to perform work requirements and assignments as outlined in the job description; to provide baseline values for comparison with later test results; and to evaluate the employee's ability to utilize personal respiratory protection and other protective equipment. The baseline medical examination will include, at a minimum a:

- Medical and work history
- Physical examination, which includes vital signs and an evaluation of all major organ systems
- Audiogram
- Vision screening
- Chest X-ray, only if there was no X-ray within 12 months
- Blood chemistry screen and profile
- Urinalysis
- Spirometry

10.2 Annual and Interim Medical Examinations

Annual and interim medical examinations will be given at least every 12 months unless indicated by substandard performance, evidence of particular stress or difficulty in using personal respiratory protection, signs or symptoms of illness commonly associated with chemicals present at the site, or unprotected exposure. Employees experiencing signs and symptoms or having complaints must immediately report the problem to the SHSO or to the CHSED. Employees having abnormal test results will also be monitored and rested by the physician at intervals prescribed in appropriate federal codes (i.e., 29 CFR, 1926.52, 1910.134, 1910.1001, 1910.1025, 1910.1018, and 1910.120).

Components of the annual medical exam are similar to the baseline examination. Following the annual or interim examination, the physician will submit in writing to the SHSO and the CHSED any medical and safety restrictions required, and the physician will inform the employee of the test results. The physician will indicate the reasons for restricting work and will submit an appropriate plan of medical supervision for any work-related illnesses or injuries.

Note: ***There are site-specific contaminants that may warrant specific biological monitoring. When these types of contaminants are identified, the contaminants and the work to be performed are discussed with the occupational physician.***

10.3 Exit Medical Examination

If employment is terminated voluntarily or involuntarily, an exit medical examination will be offered. The content of the exit medical examination will incorporate those elements included in the baseline examination. Signs or symptoms of work-related illnesses will be reported immediately.

An employee who refuses to submit to an exit examination will be advised of the potential hazards and will complete a waiver form stating that the employee has been advised of the need for an examination, has voluntarily refused an examination, and waives the right to future litigation relative to conditions which may have been detected in the course of the examination.

An attempt to contact employees who terminated employment without an exit examination will be made. A record of efforts to contact employees who leave employment without notice and without undergoing an exit examination will be kept. The record will become part of the employee's medical records.

10.4 Return-to-Work Examinations

An employee desiring to return to work following a leave of absence due to injury or illness, or return to full status from a restricted work period resulting from an injury or illness will have to obtain clearance by means of a physical examination. Extent of the physical examination will be determined by the occupational physician and will be performed at the locally established medical service provider.

10.5 Access to Employee Medical Records

In compliance with 29 CFR 1910.120, all ***OSC*** employees and their designated representatives have access to their own medical records developed as part of this program. Employees must request the records in writing and specify the name, address, and telephone number of the physician who is to receive the records. Such requests are to be sent to the CHSED. The Request for Medical Records Form is included in Appendix A.

Section 11
Respiratory Protection

To protect the health and safety of ***OSC*** employees and subcontractors, an awareness of the proper selection, use, and maintenance of respiratory protective devices is needed. These guidelines are applicable to all employees performing duties requiring the use of respiratory protection.

11.1 Definitions

Some commonly used terms utilized when describing respiratory devices and agents are described in the following list.

- **Approved**. Tested and listed as satisfactory by the National Institute for Occupational Safety and Health (NIOSH) or the Mine Safety and Health Administration (MSHA)
- **Contaminant**. A harmful, irritating, or nuisance material in concentrations exceeding those normally found in the ambient air
- **Disinfection**. The destruction of pathogenic organisms, especially by means of chemical substances
- **Immediately Dangerous to Life or Health (IDLH)**. An atmospheric concentration of any toxic, corrosive, or asphyxiate substance that poses an immediate threat to life, would cause irreversible or delayed adverse health effects, or would interfere with an individual's ability to escape from a dangerous atmosphere
- **Oxygen-Deficient Atmosphere**. An atmosphere containing 19.5 percent or less of oxygen by volume
- **Particulate Matter**. A suspension of fine solid or liquid particles or fibers in air such as dust, fog, fume, mist, smoke, or sprays
- **Pneumoconiosis-Producing Dust**. Dust which when inhaled, deposited, and retained in the lungs may produce signs and symptoms of pulmonary disease
- **Respirator**. An approved device designed to provide the wearer with respiratory protection against inhalation of a contaminated atmosphere and, for some devices, oxygen-deficient atmospheres
- **Vapor**. The gaseous state of a substance that is solid or liquid at ordinary temperature and pressure
- **Dusts.** Solid particles, mechanically produced, with a size ranging from submicroscopic to macroscopic
- **Fumes**. Solid particles generated by condensation from the gaseous state, generally after volatilization from molten metals, with a size usually less than one micrometer in diameter
- **Mists**. Suspended liquid droplets generated by condensation or by breaking up of a liquid with a size ranging from submicroscopic to macroscopic
- **Gases**. Substances that are gaseous at ordinary temperature and pressures

11.2 General Requirements

Respirators will be considered an acceptable method of protecting the health of ***OSC*** personnel **only under the following circumstances:**

- When it has been determined that there are no feasible engineering or work practice controls that can be used to adequately control the hazard
- During intermittent, non-routine operations
- During interim periods when engineering controls are being designed or installed
- During emergencies
- As part of a safety procedure where a possibility for an excessive or potentially hazardous condition has been defined
- When the site atmosphere contains at least 19.5 percent and not more than 23.5 percent oxygen
- When contaminants of concern, which must be discernable by the wearers, have warning properties below permissible exposure limits or threshold limit values, or the selected respirator provides the proper level of protection for reasonable anticipated exposure levels

The multiplicity of hazards that may exist in a given operation requires a careful and intelligent respirator selection. The selection is made complex by the many types of respirators available. Each type has its special limitations, application, operational and maintenance requirements. For these reasons it is important that the individual responsible for the respiratory program be trained and knowledgeable in the basic principles of respiratory selection and use.

The standards governing the development of this program include but are not limited to the following:

- American National Standard Institute (ANSI), *Practices for Respiratory Protection*, Z88.2-1992
- OSHA, *Respiratory Protection*, 29 CFR 1910.134 and 29 CFR 1926.103

11.3 Medical Surveillance

Employees will not be assigned to tasks requiring the use of respiratory protection unless they have been determined to be physically able to wear such equipment in accordance with the Medical Surveillance Program described in *Section 10*.

11.4 Selection of Respiratory Protective Devices

Respiratory devices are provided, at no cost, to all employees. Selection of respiratory protective devices for projects which require the use of such personal protective equipment is performed during the generation of site-specific HASPs, as described in *Section 8*. When selecting the correct respiratory protective devices, there are several factors that must be considered, including the:

- **Nature of the Hazard**. Before selecting a respirator, the nature of the inhalation hazard must be identified. Oxygen deficiencies, physical hazards, chemical properties, movement and work rate limitations, and actual chemical concentrations and warning properties are all factors that must be considered.

- **Nature of Operation**. The details of the actual operation or process that is creating the hazard are important in selecting appropriate respiratory protection.

- **Respirator Capabilities and Limitations**. There are limitations associated with each type of respiratory protection devices. These limitations are discussed in Table 11-2.

- **Responsibility of Correct Selection**. The office SHSO and the CHSED are responsible for the correct selection of respiratory protective devices. Generally speaking, when Level C personal protective equipment is required, it will consist of a full-face respirator with an MSA GMC-H, NIOSH approval number TC-23C-1283 cartridge, or equivalent. When supplied air respirators are required, they will be equipped with emergency escape bottles.

Please see Table 11-1 on the following page for a description of protection factors used in the selection process. The descriptions and limitations of respiratory protection devices included in Table 11-2 are extracted from 30 CFR 11.

Table 11-1[1]
Respiratory Protection Factors*

Respirator	*Protection Factor*
I. Particulate Filter Respirators	
• Powered air-purifying respirator with high-efficiency particulate filter (full-face).	1,000
• High-efficiency particulate filter respirator with a full facepiece.	100
• High-efficiency particulate filter respirator with a half facepiece.	10
II. Chemical Cartridge and Gas Masks	
• Powered air-purifying respirator with chemical cartridge (full-face).	1,000
• Chemical cartridge respirator with a full facepiece.	100
• Half-mask chemical cartridge respirator.	10
III. Combination Particulate and Gas/Vapor Air Purifying	
Powered air-purifying respirator with chemical cartridge and high efficiency particulate filer (full-face).	1,000
• Chemical cartridge respirator with a full facepiece, chemical cartridge, and filter.	100
• Half-mask chemical cartridge respirator with a chemical cartridge and filter.	10
IV. Supplied-Air Respirators	
Type C supplied-air respirator with a full facepiece operated in pressure-demand or other positive pressure mode, or with full facepiece, helmet, or hood operated in continuous flow.	1,000
• Type C supplied-air respirator without full facepiece, helmet or hood, operated in pressure-	1,000

demand or other positive pressure or continuous flow mode. • Supplied-air respirator with full facepiece helmet, or hood not operated in positive pressure or continuous mode. • Any other supplied-air respirator.	50 10
V. Self-Contained Breathing Apparatus • Combination respirator including a Type C supplied-air respirator with a full facepiece operated in pressure-demand or other positive pressure or continuous flow mode and an auxiliary self-contained breathing apparatus operated in pressure-demand or other positive pressure mode. • Self-contained breathing apparatus with a full facepiece operated in pressure-demand or other positive mode. • Self-contained breathing apparatus with a full facepiece operated in demand mode. • Self-contained breathing apparatus without a full facepiece.	10,000 10,000 50 10

* *Adapted from ANSI Z88.2-1992*

Definition: Ratio of contaminant concentration outside respirator to inside.

Use: Allows calculation of maximum use concentration in which a particular type of respirator will provide adequate protection to wearer [i.e., (PEL) x (P.F.) = maximum use concentration].

Table 11-2
Respiratory Protection Devices

General Description	*Limitations*	*OSC Requirements*
Air Purifying Respirators		
A half-mask or full facepiece respirator equipped with air purifying units to remove gases, vapor, and particulate matter from the ambient air prior to its inhalation. Some air purifying respirators are power-operated and provide respirable air to the facepiece (or hood) under a slight positive pressure.	• They do not protect against oxygen deficient (<19.5%) atmospheres or atmospheres that are immediately dangerous to life and health (IDLH). • The method of purification is generally chemical or chemical group specific so they cannot be used in atmospheres that contain unknown concentrations of unknown materials. • They cannot be used in atmospheres containing chemicals that present a health risk below their odor or taste thresholds. • The useful life of this type of respirator is limited to the concentrations of contaminants, the breathing demand of the wearer, and the removal capacity of the purification medium.	When Level C respiratory protection devices are specified, they will consist of a full-face respirator with an MSA GMC-H (NIOSH approval number TC-23C-1283) cartridge or equivalent. Alternative respirators and cartridges must be approved by the CHSD.
Atmosphere-Supplying Respirators		
A respirable atmosphere is supplied independent of the ambient air surrounding the wearer. These devices provide protection against oxygen deficiency and most toxic atmospheres.	• Some limitations of atmosphere supplying respirators include time limitations of supplied air, bulkiness of equipment, and inherent safety hazards associated with working while dragging an airline or while wearing an air cylinder.	SCBAs will be pressure-demand types of devices, and where appropriate, equipped with an emergency escape bottle.

11.5 Training

Respirators will not be issued to employees who have not been adequately trained in their use. At a minimum, all employees and supervisory personnel who may be required to wear respiratory protective devices will receive training in the following:

- Problems associated with improper respirator usage
- The nature of hazards associated with airborne contaminants
- The capabilities and limitations of respirator types
- The proper care, use, and maintenance of respirators
- The performance of positive and negative field fit checks each time respiratory protection is donned. This includes the importance of the facepiece-to-face seal and of not using respirators when a good seal is not achievable.
- The fact that parts from different respirators are not interchangeable
- How to properly inspect respiratory protective devices prior to use
- Successful completion of a fit test for the specific respirator that is to be used.

Documentation of training is completed for each individual and maintained in the ***OSC*** training tracking system. An example of the Respirator Training Documentation Form appears in Appendix A.

11.6 Fit Testing and Field Checks

Fit testing will be performed on all employees assigned to project work that may require the use of respiratory protective devices. Employees are required to pass a Qualitative fit test before initial use of the respirator, annually and if a different respirator is used. Testing will be performed by the SHSO or another trained and qualified individual in accordance with accepted fit test procedures. Documentation of fit testing is completed for each tested employee and maintained in the ***OSC*** training tracking system. Positive and negative pressure field checks are performed immediately prior to use.

11.7 Inspections

All respirators are inspected before and after use. Respirators stored for emergency use only are inspected monthly. Inspections generally cover the following elements:

- Condition of facepiece, connecting tubes, cartridges, and straps
- Condition of the lens. Lenses should be free of scratches and seated tightly in retainers.
- Flexibility of all rubber parts. Deteriorated pieces should be replaced.
- Condition of all valves. Exhalation and inhalation valves are to be checked to ensure correct seating.

- On self-contained breathing apparatus (SCBA), air cylinder charges, regulators, and warning devices are to be inspected prior to use by individuals trained to perform these inspections. For units stored for emergency use, these inspections are to occur at least monthly.

11.8 Use, Maintenance and Care

Employees are not assigned to tasks requiring the use of respiratory protection unless they have been determined to be physically able to wear such equipment, have been trained, and have completed a successful fit test. Once approved, the following rules must be followed:

- Employees requiring the use of respirators must be clean-shaven. Additionally, anything that interferes with the face piece-to-face seal, such as glasses, long hair, or skullcaps, will not be permitted when respirators are required.

- All respirators and cartridges are to be NIOSH/MSHA approved.

- Maintenance on respirators is to be performed only by the SHSO or a designate. Only approved replacement parts will be used in respirator repair. Maintenance on self-contained breathing apparatus will only be performed by individuals certified by the manufacturer.

- Respirators assigned to and worn by one individual will be cleaned and sanitized after each use. Extreme care is to be taken during the cleaning process to prevent damage from handling. Employees must leave the work area to wash their respirators, change cartridges or if break-through or resistance is detected.

- When not in use, respirators will be stored to protect them from physical damage, sunlight, extreme temperatures, and excessive moisture.

11.9 Breathing Air

When used, breathing air will be Grade D or better as per the specifications described by the American National Standard Institute.

Section 12
Confined Space Entry Guidelines

These guidelines apply to all ***OSC*** employees performing duties involving confined spaces. They are designed to provide information necessary to ensure that ***OSC*** confined space entry program is consistent with OSHA's standard for confined spaces, 29 CFR 1910.146. ***OSC***'s Confined Space Program will be reviewed annually to assess if revisions need to be administered.

12.1 Definitions

When discussing and describing confined spaces, ***OSC*** employees and subcontractors should know the meaning of the following terms:

- **Acceptable Entry Conditions**. The conditions that must exist in a permit space to allow entry and to ensure that employees involved with a permit-required confined space entry can safely enter into and work within the space.

- **Attendant**. An individual stationed outside one or more permit spaces that monitors the authorized entrants.

- **Blinding or Blanking**. The absolute closure of a pipe, line, or duct by the fastening of a solid plate, such as a spectacle blind or a skillet blind, that completely covers the bore and that is capable of withstanding the maximum pressure of the pipe, line, or duct with no leakage beyond the plate.

- **Confined Space**. Any space that is large enough and so configured that an employee can bodily enter and perform assigned work; is not designed for continuous employee occupancy; and has limited or restricted means for entry or exit, such as tanks, vessels, silos, storage bins, hoppers, vaults, and pits are spaces that may have limited means of entry.

- **Double Block and Bleed**. The closure of a line, duct, or pipe and locking or tagging two in-line valves and by opening and locking or tagging a drain or vent valve in the line between the two closed valves.

- **Emergency**. Any occurrence, including any failure of hazard control or monitoring equipment, or event internal or external to the permit space that could endanger entrants.

- **Engulfment**. The surrounding and effective capture of a person by a liquid or finely divided or flowable solid substance that can be aspirated to cause death by filling or plugging the respiratory system or that can exert enough force on the body to cause death by strangulation, constriction, or crushing.

- **Entry**. The action by which a person passes through an opening into a permit-required confined space. Entry is considered to have occurred as soon as any part of the entrant's body breaks the plane of an opening into the space.

- **Entry Permit**. The written or printed document that is provided by the employer to allow and control entry into a permit space and provided by ***OSC*** to allow and control entry into a permit space.

- **Entry Supervisor**. The person, such as the Field Team Leader, responsible for determining if acceptable entry conditions are present at a permit space where entry is planned, for authorizing entry and overseeing entry operations, and for terminating entry as required by the permit.

- **Hazardous Atmosphere**. An atmosphere that may expose employees to the risk of death, incapacitation, impairment of self-rescue ability, injury, or acute illness may result from one or more of the following causes:

  - Flammable gas, vapor, or mist in excess of 10 percent of its lower flammable limit (LFL)

  - Airborne combustible dust at a concentration that meets or exceeds its LFL. This condition is approximated as a condition in which the dust obscures vision at a distance of 5 feet or less.

  - Atmospheric oxygen concentration below 19.5 percent or above 23.5 percent

  - Atmospheric concentration of any substance for which a dose or a permissible exposure limit (PEL) is published and which could result in employee exposure in excess of its dose or PEL.

  - Any atmospheric condition that is immediately dangerous to life or health

- **Hot Work Permit**. ***OSC*** written authorization to perform operations capable of providing a source of ignition.

- **Immediately Dangerous to Life or Health (IDLH)**. Any condition that poses an immediate or delayed threat to life or that would cause irreversible adverse health effects or that would interfere with an individual's ability to escape unaided from a permit space.

- **Inerting**. The displacement of the atmosphere in a permit space by a noncombustible gas, such as nitrogen, to such an extent that the resulting atmosphere is noncombustible.

- **Isolation**. The process by which a permit space is removed from service and completely protected against the release of energy and material into the space.

- **Line Breaking**. The intentional opening of a pipe, line, or duct that is or has been carrying flammable, corrosive, or toxic materials, an inert gas, or any fluid at a volume, pressure, or temperature capable of causing injury.

- **Non-Permit-Required Confined Space**. A confined space that does not contain or, with respect to atmospheric hazards, have the potential to contain any hazard capable of causing death or serious physical harm.

- **Oxygen Deficient Atmosphere**. An atmosphere containing less than 19.5 percent oxygen by volume.

- **Oxygen Enriched Atmosphere**. An atmosphere containing more than 23.5 percent oxygen by volume.

- **Permit-Required Confined Space**. A confined space that has one or more of the following characteristics:

  - Contains, or has the potential to contain, a hazardous atmosphere

  - Contains a material that has the potential for engulfing the entrant

- Has an internal configuration such that an entrant could be trapped or asphyxiated by inwardly converging walls or by a floor that slopes downward and tapers to a smaller cross-section

- Contains any other recognized serious safety or health hazard

- **Prohibited Condition**. Any condition in a permit space that is not allowed by the permit during the period when entry is authorized.

- **Rescue Service**. The personnel designated to rescue employees from permit spaces.

- **Retrieval System**. The equipment used for non-entry rescue of persons from permit spaces.

- **Testing**. The process by which the hazards that may confront entrants of a permit space are identified and evaluated. Testing includes specifying the tests that are to be performed in the permit space.

12.2 Roles and Responsibilities

All ***OSC*** employees and subcontractors located or performing duties involving confined spaces have certain roles and responsibilities, as defined in the following list:

- **CHSED**. He/she is responsible for the overall design, implementation, maintenance, and review of effectiveness of the confined space entry program. These responsibilities include coordinating the appropriate training for individuals that may function as authorized entrants, attendants, or entry supervisors.

- **SHSO**. He/she is responsible for the implementation and maintenance of all relevant procedures and guidelines pertaining to fieldwork.

- **Authorized Entrant**. This is the individual who has been appropriately trained and authorized for permit-required confined space entry. Specific responsibilities include:

  - Knowing the hazards associated with the confined space including the model of exposure and the signs and symptoms of over-exposure

  - Properly using the prescribed personal protective equipment

  - Maintaining communication with the attendant

  - Exiting from the confined space as soon as possible when ordered by the attendant or when a prohibited condition exists or when a pre-set alarm activates

  - Alerting the attendant when a prohibited condition is observed or when signs and symptoms of exposure are encountered

  - Reviewing the completed permit prior to entry to verify that pre-entry preparations have been completed

- **Attendant**. This is the individual who has been appropriately trained and authorized to perform the duties of the attendant. Specific responsibilities include:

- Remaining outside the permit space during entry operations
- Performing non-entry rescues when specified in the site-specific rescue -procedure
- Knowing the existing and potential hazards
- Maintaining communication with all entrants
- Ordering evacuation of the permit space when a prohibited condition exists or when physiological signs of entrant exposure become apparent
- Ensuring that unauthorized persons stay clear of permit spaces
- Summoning rescue services if such services become necessary
- Refraining from performing other duties that may interfere with the primary duty to monitor and protect the safety of authorized entrant(s)
- An Attendant will only monitor one confined space site at a time. Each confined space will have its own Attendant.

■ **Entry Supervisor**. This individual is primarily responsible for the permit-required confined space entry. Specific duties include:

- Issuing of the confined space entry permit
- Verifying that individuals have performed all testing of the space properly trained to conduct the tests
- Ensuring that proper procedures and equipment are in place and in good working order before endorsing the permit
- Verifying that rescue services are available and that a mechanism to contact these services have been determined
- Terminating and canceling permits when entry operations are completed or if a new condition is encountered

■ **Rescue Services**. These services can be secured from on-site employees or from an off-site service. They are required to be onsite during all immediately dangerous to life & health (IDLH) conditions when work is being conducted. If the rescue services are provided by an off-site service, they must be given the opportunity to decline. If they do not decline, the off-site service must be allowed to examine the entry site and practice a rescue at the site. These individuals must be properly trained and have a complete knowledge in the use of personal protective and rescue equipment, and first aid/CPR. They are to be made aware of the confined space hazards and provided with adequate information to aid in the rescue and treatment of employees. They are also to prevent unauthorized personnel from attempting a rescue.

12.3 Testing of Confined Space Atmospheres

Atmospheric testing of confined spaces is necessary for two distinct purposes: to evaluate the hazards of the permit space and to verify that acceptable conditions exist for entry into the space.

Table 12-1
Atmospheric Testing

Evaluation Testing	Confined space atmospheres are tested using equipment with sufficient sensitivities and specificity to identify and evaluate any hazardous atmospheres that may exist or arise during the performance of operations. This evaluation is necessary so that entry procedures can be developed and acceptable conditions stipulated on the permit. Testing is to be performed in the following order: 1) Oxygen 2) Flammable gases and vapors 3) Toxic gases and vapors
Verification Testing	This testing is performed to verify that confined space atmospheres remain within acceptable ranges, as outlined on the permit, during the performance of the entry work.
Heat Stress	Certain confined spaces can present conditions that may represent a heat stress hazard for entrants. These spaces should be monitored for this potential.

12.4 Confined Space Entry

Entry into a confined space will be by permit only. The permit is an authorization and approval in writing that specifies the location and type of work to be performed; certifies that all existing hazards have been evaluated by a qualified person; and ensures that necessary protective measures have been considered.

The Entry Supervisor is responsible for completing a Confined Space Entry Permit Form, a copy of which appears in Appendix A. Prior to signing, the Entry Supervisor is to ensure that the following areas and actions have been considered and addressed:

- Location and description of the work to be performed
- Hazards that may be encountered
- Isolation of the space which may include blanking or blinding of pipes, lines, or ducts, electrical isolation, and mechanical lockout. Identification of specific equipment to be used during entry, such as personal protective equipment, lighting, ventilation, safety harnesses, and ground-fault circuit interruption.
- Results of atmospheric testing, including oxygen levels, flammability levels, and other toxic substance levels
- A description of the types and frequencies of atmospheric testing that will be performed during entry

- Identification of the entrants
- Identification of the attendant
- Identification of the operating and rescue procedures

Once the Confined Space Entry Permit is completed, a copy will be made available to all authorized entrants at the time of entry by posting at every portal or by any other equally effective means.

The duration of the permit may not exceed the time required to complete the assigned task as identified on the permit. Generally, the permit will be valid only for the date specified on the permit.

The Entry Supervisor will terminate the entry and cancel the permit when the operation covered by the permit has been completed, or when a condition that is not allowed under the permit arises in or near the permit space.

Copies of all canceled permits are to be sent to the CHSED where they will be maintained for at least five years. Any problem encountered during the entry operation is to be specifically noted on the permit to facilitate appropriate revisions to the program.

12.5 Entry without an Attendant

All spaces are to be considered permit-required confined spaces until pre-entry procedures demonstrate otherwise. Confined spaces may be entered without the need for an attendant, provided that either the space has been determined not to be a permit-required confined space or the space can be maintained in a safe condition for entry by mechanical ventilation alone.

Entry to and the type of all non-confined types of spaces will be determined during the completion of the *Pre-Entry Preparation* section of the Confined Space Entry Permit. This section is to be completed by the Entry Supervisor who is to ensure that:

- The confined space has been isolated from all energy sources, including mechanical and electrical.
- Concentrations of the confined space atmosphere are within the acceptable ranges as appear on the permit.
- There is no reason to believe that conditions within the confined space may change adversely.
- The permit is to be completed and posted near the confined space. *The Authorized Attendant* section of the permit will be completed to indicate that an attendant is not required.

Section 13
Hazard Communication Program

OSHA Standard 29 CFR 1910.1200, *Hazard Communication Standard*, requires that all employees handling or using materials which may be hazardous, be advised and informed as to the hazard potential associated with those materials. The following sections outline ***OSC*** program designed for compliance with the scope and intent of the standard. The main elements of this program include a health and biological surveillance program, employee education and training program, and employee exposure determination program. It is only through the proper implementation and maintenance of such programs that maximum employee health and safety protection can be assured. The ***OSC*** - CHSED has overall responsibility for the development, maintenance and implementation of the Hazard Communication Program. The program will be made available at each work site and will discuss warning labels, MSDS; as well as, ensure that all employee information will be met.

13.1 Material Safety Data Sheets

A Material Safety Data Sheet (MSDS) is an information sheet that provides specific identification information about a chemical or material. The MSDS information may include:

- Ingredients and hazards
- Physical data
- Fire and explosion information
- Reactivity data
- Health hazard information
- Spill risk and disposal procedures
- Special protection information
- Special precautions required for use

It is the manufacturer's responsibility to provide this information for any/every material containing hazardous or potentially hazardous ingredients.

A comprehensive collection of MSDSs exists and is maintained in each of ***OSC*** division offices. Prior to any project startup, it is the SHSO's responsibility to ensure that MSDSs are available for any material expected to be utilized or encountered during project work which represents a potential health and safety hazard to ***OSC*** employees through possible exposure. MSDSs that are not available from ***OSC*** office collections should be secured from the manufacturer or project owner.

Copies of all MSDSs for materials expected to be utilized or encountered during project work are to be available at each project site, and each employee is to be made aware that these exist and are available. Use the Chemical Inventory List Form (in Appendix A), to organize the MSDS notebook. This form can serve as the table of contents for the MSDS book.

13.2 Labels

It is the responsibility of the SHSO to ensure that all potentially hazardous materials brought to a project site are labeled as to the contents of each container and have the appropriate hazard warnings. Also, every label should contain the name and address of the responsible party (i.e. the chemical manufacturer or importer). Employees cannot remove or deface the label of any container of hazardous chemicals coming onto the site.

All containers containing hazardous materials shall be labeled with a hazard warning (words, pictures, symbols or combination) that will describe the hazardous substance. Examples of well-known labeling systems are the National Fire Protection Agency (NFPA), Dept. of Transportation (DOT) labeling systems. These systems use spatial, visual and numeric methods to simply describe the hazard. Another labeling system is the Hazardous Materials Identification System (HMIS), it uses colored bars, numbers and symbols to convey the hazards.

13.3 Non-routine Tasks

When employees are required to perform hazardous non-routine tasks, including confined space entry, line breaking, or tank cleaning, a special training session will be conducted to inform those employees as to the hazardous materials to which they may be exposed and the proper procedures and personal protective equipment to be utilized to minimize exposure potential.

13.4 Education and Training

Prior to any field project startup, a pre-project training session must be conducted with all employees and subcontractors involved in project work. Included in this training session are the following:

- An overview of the hazard communication requirement
- A review of the chemicals present and anticipated to be encountered during the course of the project
- Identification of the location and availability of the written hazard communication program, the inventory of chemicals expected to be utilized or encountered, and the MSDSs for those materials
- Discussion of the methods and observation techniques that may be used to detect the presence of a release of hazardous chemicals in the work area
- Discussion of how to lessen or prevent exposure to hazardous workplace chemicals
- Instruction in emergency procedures to follow if employees are exposed to hazardous chemicals
- An explanation of the hazard communication program, including how to read labels and MSDSs to obtain appropriate hazard information
- An explanation of the proper use of personal protective equipment

13.5 Informing Other Employees

To ensure that the employees of subcontractors have access to information on the hazardous chemicals at a project site, it is the responsibility of the SHSO to provide the following information:

- The location of the MSDSs
- The name and location of the hazardous chemicals to which employees may be exposed and the appropriate protective measures
- An explanation of the labeling system

Section 14
Lockout and Tagout System

14.1 Purpose

The purpose of the lockout and tagout system is to protect personnel from injury caused by unexpected startup or release of stored energy, gases, or liquids. This is accomplished by establishing procedures for appropriate lockout and tagout of equipment that is capable of storing hazardous energy including, but not limited to, electrical, chemical, mechanical, hydraulic, pneumatic or thermal energies. These procedures must be followed before any work begins that would place any employee in danger, such as servicing or maintenance, demolition, or installation of equipment or systems. See the Lockout/Tagout Plan Form in Appendix A for a detailed description of the system.

14.2 Objectives

OSC promotes the following objectives regarding the Lockout and Tagout Plan:

- Preventing inadvertent operation of the equipment or process in order to protect personnel.
- Establishing methods for achieving zero energy state.
- Complying with applicable regulatory standards.

14.3 Scope

This procedure covers the installation, inspection, servicing and maintenance of machines and equipment in which the unexpected activation or startup of the machines or equipment, or release of stored energy, could cause injury to personnel.

This procedure is for the lockout/tagout of circuits, tools equipment and machines. Under this procedure, employers will establish a program and utilize procedures for affixing appropriate lockout devices or tagout devices to energy isolating devices and to otherwise disable machines or equipment prior to working on these systems.

14.4 Procedures

This procedure establishes minimum performance requirements for the control of such hazardous energy as required by Regulatory Agencies.

No employee shall attempt to work on any circuit, equipment or machine until:

- The employee has been trained and specifically authorized for the task to be performed.
- All sources of potential hazardous energy have been identified.
- The circuit of equipment is completely isolated from each source of energy. Each isolating device is locked out to prevent the unexpected activation on startup of the circuit or machine, which could cause injury.

14.5 Equipment Material and Hardware

OSC Lockout and Tagout Plan includes guidelines for use of associated equipment material and hardware. Each employee working on or using lockout equipment or locking devices shall:

- Have a uniquely keyed, individualized lock installed on the isolating device, with the employee retaining the only key
- Use locking devices of durable construction capable of withstanding exposure to the atmosphere in which they are to be installed
- Use locking devices of substantial construction capable of preventing removal without the use of excess force or special tools
- Use locking devices identified with a hazard warning tag with a legend, such as *Do Not Start*, or *Do Not Operate*. The tag shall also contain the employee's company name, employee's name, foreman contact, pager number or phone number, and date.

14.6 Requirements and Responsibilities

Any authorized ***OSC*** employee or subcontractor is responsible for following and applying the requirements and responsibilities noted below before proceeding with work on any machine. The foreman supervising the worker performing the work shall utilize the following safety measures, in the order they are listed.

Note: "Hot work" on electrical circuits should be performed only as a last resort, and ONLY BY a TRAINED, COMPETENT individual.

14.6.1 Application of Lockout/Tagout Device

When initiating application of the lockout device:

- Become familiar with the types and magnitudes of energy, the hazards of the energy, and the means to control the energy of the circuit, tool or equipment.
- Notify all affected personnel before shutting down, and ensure the proper shutdown procedure is used for that piece of equipment/machine. The shutdown process must be orderly, to avoid any additional hazards to the employee resulting from equipment stoppage.
- Identify and locate the specific circuit tool or equipment on which work is to be performed.
- Affix lockout/tagout devices in a manner that will hold the energy-isolating device in the open (OFF) position. Place a hazard warning identification tag on the lockout device.
- When using a tagout device with and energy isolating device that was designed to be locked, the tag shall be affixed to the same point where the lock would have been attached.
- When a tagout device cannot be attached to the energy isolating device directly, the tag will need to be located as close to the device as possible and in a position that is easily regarded by any person that may want to use the device.

- Relieve, disconnect, and restrain all potentially hazardous stored energy following application of locking devices, until rendered safe.

- Verify that isolating and deactivation of the equipment have been accomplished effectively, prior to starting work on any circuit tool or equipment that has been locked out. Check electrical circuits with a voltmeter.

- The foreman, or an authorized employee, must verify the isolation of the equipment. The authorized person must operate the machine away from all energy sources to control the energy to the machine or equipment.

- Equip each circuit breaker with a lockout device and hazard tag, as described above, when installing circuit breakers in distribution boards for constructing circuits.

- Equip each Bus Plug with a hazard tag, as described above, when installing Bus Plug circuit breakers into power bus for construction or circuits to new tools or equipment.

- De-install existing tools, lighting or equipment by disconnecting or breaker serving the tool, fixture or equipment with a hazard tag as described above.

- Lock out circuits that are to be installed or worked on that are powered from breaker located in sub-panels with lockable door fronts by installing a breaker handle locking clamp and hazard tag on the breaker involved.

14.6.2 Removal of Lockout Device

When the work is completed and the circuit, tool or equipment is ready to return to normal operating condition, the following steps shall be taken:

- Check the machine and the immediate area to ensure all tools, equipment, and nonessential items have been removed and the machine components are operational.

- Check the work area to ensure all personnel have been safely positioned and informed that the machine is about to become operational.

- Verify the controls are in neutral.

- Remove the lockout devices from the equipment. The locking device shall be removed ONLY by the employee who installed it.

- Notify affected personnel that the equipment is energized and ready to operate.

14.7 Removal of Locks

Each lock shall be removed from energy-isolating devices, **only** by the employee who installed it. When the employee is not available to remove his/her locks, the locks may be removed under the direct supervision of the field supervisor and a Client EHS (Environmental Health and Safety) representative, provided the field supervisor has:

- Positively verified that the employee who applied the lock is not at the facility.

- Thoroughly examined the machine and surrounding area to ensure removal of work tools, materials, and equipment and that the machine components are operational.
- Made every reasonable effort to contact and inform the employee that the lock is being removed.
- Taken positive steps to ensure the employee is made aware of the lock removal before returning to work.
- Inspected all work that was performed to insure completion and that the equipment can be re-energized.

14.8 Shift Changes

In cases where equipment must remain locked out between shifts for the protection of other personnel, the field supervisor will assure that the lockout remains in place on the isolating device.

When equipment will be out of service for an extended period of time, there will be multiple shifts working or other extenuating circumstances, the field supervisor in charge may develop an alternate lockout procedure for that equipment. The alternate lockout procedure must be approved by the safety department, discussed fully with each crew member, and documented prior to the beginning of work.

14.9 Client Lockout and Tagout Procedures

Clients may have lockout and tagout procedures more or less stringent than the procedure described above. Employees are required to comply with the provisions of this program at a minimum. It is the responsibility of the field supervisor to communicate with client's representative and agree on which rules of lockout and tagout will prevail.

14.10 Employee Training, Information and Compliance

Employers are responsible for informing and training employees of the appropriate section of this program. In particular, employees shall be trained on the following:

- Sources, types, and magnitudes of hazardous energy available at the equipment where work will take place
- Purpose, means, methods and procedures of energy isolation and control
- Work of other trades nearby may also require lockouts and tagouts; attempts to restart or re-organize machines locked or tagged by others in strictly prohibited.

Training shall take place at the following times:

- Repeated bi-annually or at the weekly safety meetings.
- Whenever starting a job on new equipment that will require lockout and tagout.

Training of each employee shall be documented and kept on file. Employees failing to comply with the requirements of this and other safety programs and rules are subject to disciplinary action, including termination.

The safety coordinator shall conduct a periodic inspection/review of the program to ensure that all requirements and responsibilities are being followed and that all employees are trained and informed. When necessary, the program will be revised to correct deficiencies and to enhance its effectiveness.

14.11 Electrical Hot Work Safety Policy

The purpose of the Electrical Hot Work Safety Policy is to prohibit an employee from working in such proximity to any part of an electric power circuit that the employee could contact the electric power circuit in the course of work, unless the employee is protected against electric shock by de-energizing the circuit and grounding it or guarding it effectively by insulation or by other means. See the Electrical Hot Work Plan Form in Appendix A for a detailed description.

14.11.1 Objectives

OSC objectives for the Electrical Hot Work Safety Policy are:

- To protect personnel from burn or electric shock
- To outline the procedures that are to be followed around hot work

14.11.2 Important Points

When working with or near electrical hot work***, OSC*** employees and subcontractors should be aware of the following two elements:

- The primary means of protection are de-energizing the circuit in conformance with the project lockout/tagout policy and procedure.
- No person shall work on energized circuits or work inside or penetrate a hot panel without prior written authorization from the designated Client and ***OSC*** representatives. If energized circuits must be worked, then only journeymen with current CPR and first-aid cards shall perform the installation. The written electrical hot work request/plan shall include the means of insulation and personal protection. A means of contacting Client security must be readily available.

14.11.3 Procedures

Safety related work practices shall be employed to prevent electrical shock or other injuries resulting from either direct or indirect electrical contacts when work is performed near or on equipment or circuits which are or may be energized. The specific safety-related work practices will be consistent with the nature and extent of the associated electrical hazards.

De-energized parts, live parts to which an employee may be exposed shall be de-energized before the employee works on or near them, unless the employer can demonstrate that de-energizing introduces additional or increased hazards or is unfeasible due to the equipment design or operational limitations. Live parts that operate at less than 50 volts to ground need not be de-energized if there will be no increased exposure to electrical burns or to explosion due to electric arcs.

Examples of increased or additional hazards include interruption of life support equipment, deactivation of emergency alarm systems, and shutdown of hazardous location ventilation equipment.

Examples of work that may be performed on or near energized circuit parts because of unfeasibility due to equipment design or operational limitations include testing for electrical circuits that can only be performed with the circuit energized and work on circuits that form an integral part of a continuous process that would otherwise need to be completely shut down in order to permit work on one circuit or piece of equipment.

14.11.4 Energized Parts

If exposed live parts are not de-energized (i.e. for reasons of increased or additional hazards or unfeasibility) other safety-related work practices will be used to protect employees who may be exposed to the electrical hazards involved. Such work practices shall protect employees against contact with energized circuit parts directly with any part of their body or indirectly through some other conductive object. The work practices that are used shall be suitable for the conditions under which the work is to be performed and for the voltage level of the exposed electric conductors or circuit parts.

Hot panel procedures are listed, as follows:

- All panel hot work will require a hot work permit.
- No hot panel will be left open and unattended unless an evacuation takes place.
- **When hot work is performed, there will be a minimum of two journeymen assigned.**
- All panel hot work will require pylons and chain in place to properly secure the work area.
- Proper signage shall be in place.

Procedures for penetrating hot panels are as follows:

- When the panel cover is removed, all hot sections of the panel will be properly isolated.
- All penetrations will be made by step bits and knockout cutters; the drilled hole should be no larger than ½ inch to minimize metal filings. Hole saws shall not be used.
- When the penetrations are made, the connectors will be installed and sealed by means of a bushing with either a cardboard or plastic insert. This insert will not be removed until the wire is pulled. Once the connectors and seals have been installed and the cover replaced, a hot work permit will not be required to install the conduit.

Procedures for pulling wire into hot panels include:

- Isolating all hot sections of the panel when the panel cover is removed
- Prohibition of metal fish tapes when pulling wire into hot panels.

Procedures for terminating hot panels include:

- Properly isolating all hot sections of the panel when the panel cover and dead front are removed to prevent the accidental contact by personnel or materials.

14.11.5 De-energized Parts

Conductors and parts of electric equipment that have been de-energized, but have not been locked out or tagged, shall be treated as energized parts.

While any employee is exposed to contact with parts of fixed electric equipment or circuits which have been de-energized, the circuits energizing the parts shall be locked out and tagged in accordance with the project lookout and tagout procedures.

Section 15
OSHA Inspections

Site superintendents with projects that are run in compliance with the procedures contained in this Health and Safety Manual have little to fear from an OSHA inspection. In addition, site superintendents knowing what to expect from an OSHA inspection can comfortably and appropriately handle the inspection procedure should it be necessary. This section contains information needed to prepare for an OSHA inspection. Please refer to OSHA Inspection Report Form in Appendix A for details.

Site superintendents with projects that are run in compliance with the procedures contained in this Health and Safety Manual have little to fear from OSHA inspections.

15.1 Reasons for OSHA Inspections

OSHA inspections may be triggered by specific factors or may be random in nature. Deaths, multiple injuries, or employee complaints will result in an OSHA inspection in almost all cases. Random inspections or target inspections may also be the reason for an OSHA inspection. Target inspections are inspections conducted of high hazard industries or operations, such as construction and hazardous waste sites. Most ***OSC*** projects involve both construction and hazardous waste operations and are, therefore, more likely to be subject to an OSHA inspection. OSHA does not provide advance notice of inspections except in certain rare circumstances.

Compliance officers often inspect sites where spills or releases have occurred. High visibility sites, such as those with press coverage, EPA or other government agency involvement, can also increase the likelihood of an OSHA inspection.

During an OSHA inspection:

- ***Be courteous, accommodating, and honest to the inspector.***
- ***Explain OSC role on site.***
- ***Document the inspection.***
- ***Take pictures during the inspection.***
- ***Correct any violations immediately during the inspection.***
- ***Have relevant documents available for the inspector's review.***
- ***Make sure all appropriate personnel are present during the inspection, such as the project manager, superintendent, and safety personnel***

During the closing conference, ask the inspector for a copy of his/her inspection notes.

15.2 Inspection Procedures

It is ***OSC*** policy to cooperate fully with OSHA inspectors. Site superintendents should receive the inspector with courtesy and accommodate the inspection procedure as efficiently as possible without unreasonably affecting job site operations. Be honest!

Note: Contact the CHSED immediately upon arrival of the OSHA inspector.

15.2.1 Explain the Site Organization

Often, ***OSC*** is the general contractor on site, with one or two ***OSC*** employees providing oversight of one or more subcontracting firms performing construction activities. Explain the site organization to the compliance officer, especially areas where ***OSC*** is providing oversight services only. ***OSC*** role as general contractor carries responsibility for all site conditions. ***OSC*** is usually not responsible, however, for specialty subcontractors hired for expertise in areas such as asbestos removal.

Tell the compliance officer how many ***OSC*** employees are on site and how many employees are on site from each subcontracting firm. Compliance officers usually want to inspect the firms operating the equipment, installing the pipelines, cleaning the tanks, and building the structures. When the inspection is the result of an employee complaint, the compliance officer will want to inspect that particular person's employer and not necessarily all firms working on the site. When the inspection is the result

of deaths or injuries or is a random or target inspection, the compliance officer may want to inspect all firms involved, all firms on site or just the responsible firm(s). Site superintendents should explain ***OSC*** site responsibilities to avoid unnecessary inspection.

If the compliance officer performs an inspection of ***OSC*'s** work, it is important to explain the ***OSC***'s role of throughout the duration of the inspection. To assess site conditions accurately, the compliance officer needs to know which firm(s) are responsible for each area or task being performed.

If the compliance officer determines that the inspection will not include ***OSC***, the site superintendent should turn the inspection over to the supervisor(s) of the firm(s) being inspected. ***OSC*** site superintendent should accompany the inspection team, documenting the inspection for the client and reminding the compliance officer of the site organization as necessary. Compliance officers unclear of site responsibilities may cite several firms expecting that the firms not responsible will contest the citations.

15.2.2 Opening Conference

If the compliance officer decides to inspect ***OSC***, the site superintendent should follow the guidelines in this section. Site superintendents, or ***OSC*** person on site of highest responsibility, should be notified immediately of the arrival of an OSHA compliance officer and should manage the inspection from beginning to end.

Upon arrival to the site, compliance officers are required to:

- Present their credentials
- Explain the nature and purpose of the inspection
- Indicate generally the scope of the inspection and the records they wish to review

If the inspection resulted from an employee complaint, the site superintendent should receive a copy of the complaint, and the inspection should pertain only to investigating the complaint. In the case of employee complaint, the inspections should not be "wall to wall".

The site superintendent should be sure to receive and document the above listed information. The exchange of this information is termed the "opening conference" and is required by law. After the opening conference, the site superintendent should notify the project manager and the CHSED of the inspection, the reason for the inspection and the scope of the inspection. The CHSED or project manager may want to be present for the inspection and it is not unreasonable to request the compliance officer wait 20 to 30 minutes while another person travels to the site. The CHSED should be notified to provide guidance on handling the inspection and to arrange for support in case health and safety documentation needs to be faxed to the site.

15.2.3 The Inspection Process

The compliance officer will want to tour the site. If the inspection is the result of a complaint, ask the compliance officer which areas he/she wants to inspect and tour those areas only. Violations can be cited regardless of why they are observed so only tour those areas necessary.

Note the following in the logbook the:

- Name, address, and telephone number of the compliance officer
- Names of those present at the opening conference and during the tour

- Statements made by all present on the tour
- Areas toured, operations taking place in toured areas, employees working in toured areas
- Comments made by the compliance officer if violations are observed

Take pictures! Take pictures whenever possible, especially of areas where violations exist or where the compliance officer takes pictures. Pictures provide insight if citations are issued and can assist in contesting citations.

Immediately correct violations whenever possible. If any definite violations are noted, such as uncapped stored cylinders, immediately correct them (i.e., cap the cylinder in front of the compliance officer). This is good policy and may reduce proposed penalties.

The compliance officer may want to take air samples, talk to employees, and review documentation. The OSHA 300 Log is requested on almost all inspections and the compliance officer will check the site trailer for the OSHA poster, if employees report directly to the site.

15.2.4 Closing Conference

At the conclusion of the inspection, the compliance officer will hold a closing conference. Only when the inspection is fully completed will the closing conference be held. For example, if the compliance officer wishes to return to observe a particular task or speak to a particular person, that is considered part of the inspection. The closing conference will be held after the inspection is fully completed.

During the closing conference, the compliance officer will inform all contractors of violations disclosed during the inspection. Ask the compliance officer for a copy of the inspection notes; he/she may or may not agree. Document all statements made during the closing conference and note references to documents, such as the OSHA 300 Log.

After the closing conference, immediately note your thoughts regarding the alleged violations. Take pictures of the alleged violations and obtain statements from appropriate employees. Strictly avoid asking questions of employees regarding their interview with the inspector. Inquiring what information employees supplied to the compliance officer can leave open the possibility for a discrimination lawsuit.

Be honest about the inspection findings.

15.3 Citations

Citations can be contested and usually are. OSHA will meet with employers wishing to contest a citation during an "informal conference" and may reduce the severity of the citation or the fine. If a citation is issued, it must be posted at the job site for three days or until the violation is corrected, whichever is longer.

Citations consist of the following types:

- **Non-serious Violation.** This includes an incident that would not result in serious injury. Fine is up to $7,000.
- **Serious Violation**. This incident has a substantial probability for death or serious injury. Serious violations may be the grouping of several non-serious violations. Fine is up to $10,000.

- **Repeated**. This is violation of a previously cited standard. Preceding citations can be from any job throughout ***OSC***, as well as repeated citations on the same job site. Fine is up to $70,000 maximum.
- **Willful**. This is a violation with high penalties alleging the violation by the employer was deliberate and intentional and constituted a known disregard. Willful violations are often repeat violations. Fine is $25,000 minimum.
- **Egregious**. This is a violation with very high penalties and is the result of repeated citations for the same violation. It is usually $70,000 times the number of exposed employees [ex: 7 employees X $70,000 = $490,000 fine]
- **Failure to Abate**. This is a violation(s) still existing past the abatement date. Fine is $7,000 per day maximum.
- **Criminal**. OSHA cannot impose criminal penalties but can recommend to the local District Attorney, or the Justice Department, cases for prosecution. Monetary and jail penalties can be issued. The number of cases referred for criminal prosecution is increasing and fines and penalties are increasing as well.

  The fines can be up to $250,000 for an individual and $500,000 for a company, plus prison time commensurate with the charges AND this can include company officers.

Section 16
Safety Discipline Policy

16.1 Purpose

The purpose of ***OSC*** Safety Discipline Policy is to establish a system of guidelines for the administration of discipline for employees committing safety infractions.

16.2 Objective

Several objectives exist to describe the goals of ***OSC*** Safety Discipline Policy, including:

- Deterring unsafe acts and behaviors and thereby preventing injuries to employees, impacts to the environment, and damage to equipment
- Ensuring that discipline and disciplinary actions are administered in a fair and consistent manner

16.3 Procedure

It is recognized that a well-disciplined organization is essential for a company to achieve desired results in terms of safety, morale, quality, production and low cost. The primary authority for the administration of discipline and the responsibility for initiating disciplinary action, including discharge, rest with the employee's supervisor and Superintendent, Project Manager, Health and Safety Coordinator, Health and Safety Director and President, as applicable.

Therefore, all supervisors shall administer disciplinary measures wisely, justly, and fairly with consistent application of the guidelines and policy.

16.4 Definitions

When discussing the firm's Safety Discipline Policy, all involved persons should be aware of the meaning of the following terms.

- **Discipline**. A disciplined person is one who, through proper training, knows what to do and how to do it in a given situation and exhibits self-control, rules prescribing conduct.
- **Violation/infraction**. A violation or infraction is a flagrant act in which an employee can injure him/herself or others.
- **Near Miss**. A near miss is an incident that has the potential to cause serious harm.
- **Minor Injury**. A minor injury is one requiring onsite First Aid.
- **Non-Life Threatening Injury**. A non-life threatening injury is one requiring medical attention by either a doctor or a nurse offsite.
- **Major Incident/Injury**. A major incident or injury is one that requires emergency medical transportation and/or involves three or more injuries.

- **Warning Letter**. A warning letter is a letter informing the employee of the infraction, see the Notice of Safety Infraction and Warning Form in Appendix A; or a letter informing subcontractor or vendor of the infraction, see the Notice of Safety Infraction and Warning to Subcontractor or Vendor in Appendix A.

16.5 Progressive Disciplinary Program

Any safety violation or infraction observed by any other employee will be written up by the project foreman and submitted to the project superintendent, Health and Safety Coordinator, Health and Safety Director, Project Manager or President. The project foreman did not have to witness the violation. ***OSC*** upper management (Site Superintendent, Project Manager, SHSO, Corporate HSE Director and/or President) will discuss the problem with the employee, inform him of the rule that was violated and of the actions that will be taken. Any employee may report an unsafe practice, behavior or condition to his/her direct supervisor at any time. It is important to take immediate action if a serious hazard has been identified.

Guidelines for Disciplinary Action include the following categories and descriptions:

A serious offense may result in immediate termination. If an employee receives two or more written safety warning letters, termination of employment may result. All letters will be placed in personnel files.

- **Near Miss**. Minor offenses that did not cause serious injury, but had potential to cause serious injury.
- **Type I Offense**. A verbal warning and/or notice of warning letter.
- **Minor Injury**. A moderate offense that did not result in serious injury.
- **Type II Offense**. A notice of warning letter.
- **Non-Life Threatening Injury**. Serious offense or negligence on the employee's part.
- **Type III Offense**. A notice of warning letter, one day off without pay, and possible termination of employment
- **Major Incident/Injury**. A serious offense or negligence on employee's part that placed employee or co-worker(s) in danger.
- **Type IV Offense**. A notice of warning letter, minimum of one day off without pay, and possible termination of employment.

The purpose of the Safety and Discipline Policy is to deter unsafe acts and behaviors and thereby prevent injuries to employees, impact to the environment or damage to equipment, and to ensure that discipline and disciplinary actions are administered in a fair and consistent manner.

Determination of the severity of the violations will be left to the discretion of either, or both, the Health and Safety Director or Project Manager, with a final determination made by the President.

APPENDIX A

Forms

OSC

Subcontractor Designation of Competent Person

OSHA Standard	**Standard**	**29 CFR**	**Name of Employee:**	**Name of Company:**
Sub part C	General Safety	1926.20		
Sub part D	Health & Environments	1926.53-1926.59		
Sub part E	PPE	1926.101		
Sub part H	Material Handling	1926.251		
Sub part J	Welding & Cutting	1926.354		
Sub part K	Electrical	1926.404		
Sub part L	Scaffolding	1926.451		
Sub part M	Floors &Wall Openings	1926.500		
Sub part N	Cranes	1926.550		
Sub part O	Motor Vehicles	926.601		
Sub part P	Excavating	1926.651		
Sub part Q	Concrete & Masonry Const.	1926.703		
Sub part R	Steel Erection	1926.752		
Sub part S	Tunnels	1926.800		
Sub part T	Demolition	1926.850		
Sub part U	Blasting	1926.900		
Sub part V	Power Transmissions	11926.955		
Sub part X	Stairways & Ladders	1926.1053		

Injury/Illness Report

(Not to be used for Motor Vehicle Accident/Damage Reporting – If employee was injured as a result of the accident enter that injury information here).

PROJECT NAME, NUMBER and LOCATION:
_____
_____

****NOTE : SUPERVISOR MUST FILL OUT AND *SIGN* THE REPORT BEFORE SUBMITTING**

Information about Injured, Ill, or Involved Employee

First Name:_____ Middle Initial: _____ Last Name:_____

Address: _____ Married ___ Yes ___ No

Date of Birth: _____ Sex: _____ Age: _____ Telephone No:_____

Employee Number: _____ Date of Hire: _____

Employee Status: ☐Employee. ☐ Subcontractor

Name of Subcontractor Firm: _____

Address and Phone No.: _____

Employment Category:	Length of Employment:		Time in Occupation:	
☐Regular full-time	☐In training	☐3 – 5 years	☐In training	☐3 – 5 years
☐Regular part-time	☐< 6 months	☐5 – 10 years	☐< 6 months	☐5 – 10 years
☐Temporary	☐6 mos. – 1 year	☐10 – 20 years	☐6 mos. – 1 year	☐10 – 20 years
☐Non-employee	☐1 - 3 years	☐20+ years	☐1 - 3 years	☐20+ years

Information about Accident/Injury/Illness

Date of Accident: _____ Time: ____

Specific Project or Location of Accident:

_____

Witness(es) to the Accident/Injury: _____

Employee's Usual Occupation: _____

Occupation at Time of Accident: _____

Injury or Illness: ☐Injury ☐Illness

Property Damage: ☐ Yes ☐ No

Vehicle Involved? ☐ Yes ☐ No

Supervisor: _____

Injury/Illness Severity:	**OSHA Illness Code:**
☐ First Aid Only	☐ Occupational Skin Diseases or Disorders
☐ Medical Treatment	☐ Dust Diseases of the Lungs
☐ Lost Workdays – Restricted Activity	☐ Respiratory Conditions Due to Toxic Agents
☐ Lost Workdays – Away from Work	☐ Poisoning
☐ Fatality Date: _____	☐ Disorders Due to Physical Agents
☐ Total Number of Lost Days: _____	☐ Disorders Associated with Repeated Trauma
	☐ All Other Occupational Illnesses

Phase of Employee's Workday at Time of Injury:

☐ Performing Work Duties

☐ During Meals

☐ During Rest Period

☐ Entering or Leaving Workplace

☐ Other _____

General Type of Task Being Performed at Time of Injury/Illness: _____

_____

Specific Activity Being Performed at Time of Injury/Illness: _____

_____

Employee Was Working:

☐ Alone ☐ With a Crew or Fellow Worker ☐ Other Crew size: _____

Supervision at Time of Accident:

☐ Directly Supervised ☐ Indirectly Supervised ☐ Not Supervised ☐ Supervision Not Feasible

Name, Address, and Phone Number of Attending Physician: _____

_____

_____

Name and Address of Hospital: _____

_____

_____

Body Part Affected (circle all that are applicable):

Abdomen	Ear	Head	Multiple	Thigh
Ankle	Elbow	Heart	Musc. Skel.	Toe
Arm	Eye	Hips	Neck	Wrist
Back	Face	Kidneys, Intest.	Nervous Sys.	Other _____
Brain	Finger	Knee	Scalp	Unknown
Chest	Foot	Leg	Shoulder	
Digestive	Hand	Lungs	Skull	

Injury Type (circle all that are applicable):

Amputation	Contusion	Elec. Shock	Heat Stroke	Poisoning
Asphyxia	Crush/Bruise	Fracture	Infect. Disease	Radiation
Burn/Chemical	Cut/Puncture	Freezing	Inflammation	Scratch
Burn/Heat	Dermatitis	Hearing Loss	Multiple	Sprain/Strain
Concussion	Dislocation	Hernia	Occ. Disease	Other _____
Unknown				

Injury Source (circle all that are applicable):

Air Pressure	Clothing	Heat	Noise	Soaps
Animals	Coal/Petroleum	Hoists	Paper	Silica
Animal Product	Cold	Infectious	Particles	Scrap/Debris
Body Motion	Drugs &	Agents	Plants	Steam
Boilers	Medicines	Ladders	Plastics	Textiles
Boxes/	Electricity	Liquids	Power Tools	Vehicles/
Containers	Fire/Smoke	Machines	Power Trans.	Forklifts
Buildings/	Food Products	Molten Metal	Apparatus	Wood
Structures	Furniture	Miner/Metallic	Pumps	Working Surfaces
Ceramics	Glass	Minerals/	Radiating	Other _____
Chemicals	Hand Tool	Nonmetallic	Substances	Unknown

Accident Type Code (circle all that are applicable):

Struck Against Fall on Same Level Rub/Abrasion Temp. Extremes Motor Vehicle

Struck By Bodily Reaction Radiations/Caustics Electrocution Other ___

Fall From Elevation Caught In/Between Overexertion Public Transport

Unknown

Hazardous Conditions (circle all that are applicable):

Defects in Dress/Apparel Inadequately Placement Hazards Other _____

Environmental Hazards Guarded Work Public Hazards Unknown

Hazardous Procedures Environment None

Accident Part Code (circle all that are applicable):

Parts of Boilers Parts of Conveyors Hand Tools Parts of Vehicles None

Parts of Buildings Parts of Hoists Power Tools Machines

Other _____

Description of Accident: _____

_____

_____

_____

_____

_____

Possible Causes of Accident/Injury/Illness

Place a check in the box of each factor that applies to this incident.

EQUIPMENT - Was a Hazardous Condition a Contributing Factor?

- ☐ Defect in Equipment/Tools
- ☐ Hazardous Condition Not Recognized
- ☐ Hazardous Condition Not Reported
- ☐ Employee Not Informed/Job Procedure Not Specified
- ☐ No Equipment Inspection Procedure
- ☐ Inspection Procedure Failed to Detect Hazard
- ☐ Correct Equipment/Tools Not Used
- ☐ Correct Equipment Not Available
- ☐ Employee Not Informed of Correct Equipment
- ☐ Substitute Equipment
- ☐ Equipment Design Contributed to Operator Stress/Error
- ☐ Design/Quality of Tool Contributed to Hazardous Condition
- ☐ Other/Unknown _____

ENVIRONMENT - Was the Location/Position of Equipment, Materials, or Employee a Contributing Factor?

- ☐ Location/Position Contributed to a Hazardous Condition
- ☐ Hazardous Condition Not Recognized
- ☐ Hazardous Condition Not Reported
- ☐ Employee Not Informed of Correct Job Procedure for Hazard
- ☐ Employee Did Not Belong in the Area
- ☐ Hazardous Condition Not Visible to Employee
- ☐ Insufficient Workspace
- ☐ Poor Environmental Control
- ☐ Uncontrolled Release of Hazardous Material
- ☐ Other/Unknown _____

PEOPLE - Was the Job Procedure(s) a Contributing Factor

- ☐ Aggravation of a Pre-existing Condition
- ☐ No Written/Known Procedure
- ☐ Job Procedure Inadequate
- ☐ Employee Not Trained on Proper Job Procedure
- ☐ Employee Deviated from Proper Job Procedure
- ☐ Employee Not Physically/Mentally Capable of Performing Job
- ☐ Job Procedure Too Difficult

☐ Job Procedure Encourages Deviation
☐ Other/Unknown _____

PERSONAL PROTECTIVE EQUIPMENT

☐ Employee not using PPE
☐ PPE Not Specified for Task
☐ PPE Unavailable
☐ Employee Not Advised of PPE
☐ Employee Not Properly Trained in PPE
☐ PPE Used Incorrectly
☐ PPE Inadequate
☐ Emergency Equipment Not Specified (Shower, Eyewash, Etc)
☐ Emergency Equipment Not Available
☐ Emergency Equipment Not Used
☐ Emergency Equipment Malfunctioned
☐ Other/Unknown _____

MANAGEMENT - Was a Management Defect a Contributing Factor?

☐ Supervisor Failed to Detect/Anticipate/Report Hazardous Condition
☐ Supervisor Failed to Detect/Correct Deviations from Job Procedure
☐ No Supervisor Review of Hazards and Job Procedures
☐ Supervisor Responsibility Not Defined/Understood
☐ Supervisor Not Trained in Accident Prevention
☐ Failure to Initiate Corrective Action for Known Hazard
☐ Other/Unknown _____

OCCUPATIONAL HEALTH - Was a Chemical or Physical Agent a Contributing Factor?

Physical Agent:

☐ Noise, Vibration
☐ Temperature Extremes
☐ Ionizing Radiation - X, Gamma, Beta, or Alpha Radiation
☐ Non-ionizing Radiation - Microwave, Laser, Ultraviolet, or Radio Frequency
☐ Ergonomic - Repetitive Motion Trauma, Inappropriate Lighting, Glare, Incorrect
☐ Insufficient Tooling, Benches, Seating

Chemical Agent:

☐ Solvents Solvent Name _____
☐ Acid, Bases Acid or Base Name _____
☐ Particulates Particulate Name _____
☐ Other Toxic Chemicals Chemical Name _____

Biological Agent:

☐ Microorganism — Microorganism _____

☐ Insect — Insect's Name _____

☐ Animal — Animal Species _____

☐ Allergens — Allergen Name _____

CORRECTIVE ACTION REQUIRED: _____

_____

_____

Signatures:

Immediate Supervisor _____ **Date** _____

Site H&S Coordinator _____ **Date** _____

Project Mgr. _____ **Date** _____

Corp. H&S Director _____ **Date** _____

For Office Use Only:	
Case Numbers of Others Injured, Ill, or Involved in the Same Accident:	
Case No.:	OSHA Recordable? ☐ Yes ☐ No
Region:	Address:
Project No.:	Accident or Diagnosis Date:

Photos Relating to Accident/Injury

(Make copies of this page as necessary.)

Insert photos here.

Witness Statement

(Make copies of this page as necessary.)

Name: _____ **Employer:** _____

Address: _____ **Position/Craft:** _____

Phone: _____

This statement is in reference to: _____

Site of accident (job name, location): _____

Date of accident: _____

Describe what you know about the accident, what you saw or heard, what you were doing before the accident, what you did after the accident (Use additional pages as necessary):

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

This statement is true to the best of my knowledge and memory.

_____ _____

Signature *Date:*

OSC Daily Activity Plan

This is your "pre-work" or "pre-task" planning tool. Prepare for the following day's activities by working through this form (note multiple sheets, for multiple crews, may be used if necessary).

Job Name:_____ **Job Number:**_____

Supervisor:_____ **Date:**_____

Planned Work Activities: **Crew Leader:**_____

Labor (Crew) Needed:

Labor (Crew) Needed:

Small Tools and Equipment needed:

- ☐ Power tools (Saws, drills, roto hammer)
- ☐ Digging equipment (Shovel, pick, prybar)
- ☐ Small tools (Screwdrivers, pipe wrench, sockets)
- ☐ Hammer (sledge, ball peen)
- ☐ _____

Other Tools and Equipment needed:

- ☐ _____
- ☐ _____
- ☐ _____
- ☐ _____
- ☐ _____

Materials Needed:

Materials Needed:

Daily Checklist	Competent Person (Name) (Name(Name):	Yes	No	Initials
Lockout/Tagout				
Trench/Excavation				
Hot Work Permit				
PPE				
Rigging Inspection				
Crane Inspection				
Environ. Permits				

Hazards	Yes	No
Eye/Face*		
Hand/Finger*		
Fall Protection*		
Housekeeping		
Confined Space		
Scaffolding		
Chemical		
Fall Protection*		
Housekeeping		
Confined Space		
Scaffolding		
Chemical		

* **See checklist below**

Hazard(s) Identified in Planned Work Activity:

Hand Protection

- ☐ Sharp Edges/Objects
- ☐ Pinch/Crush Point
- ☐ Punctures (Splinter/tie wire/nails/shavings)
- ☐ Chemical & Burn Causing Substances
- ☐ (Poison ivy, oak, sumac, chemicals)

Eye/Face Hazard

- ☐ Cutting/Grinding
- ☐ Welding
- ☐ Hot Work (Welding/Burning/Cutting)
- ☐ Dermatitis/Skin Disorders

Electrical

- ☐ High Voltage
- ☐ Low Voltage
- ☐ GFCI
- ☐ Lockout/Tagout

Fall Hazard

- ☐ Working above 6 feet
- ☐ No Fall Arrest (Harness/Lanyard)
- ☐ No Fall Restraint (Perimeter Cable)

Biohazards

- ☐ Bloodborne Pathogens
- ☐ Waste
- ☐ Other

Ergonomics

- ☐ Repetitive Motion
- ☐ Bending Stooping

Weather

- ☐ Cold Weather (Outside Work)
- ☐ Hot Weather

Housekeeping

- ☐ Debris
- ☐ Slippery Surface

CHECK ALL THE APPROPRIATE PERSONAL PROTECTIVE EQUIPMENT NEEDED (other than hardhats, safety glasses, leather gloves, long pants, shirt with sleeves, and sturdy leather shoes which are mandatory on all)

Gloves

- ☐ Leather
- ☐ Cotton
- ☐ High Voltage
- ☐ Low Voltage
- ☐ Cold Temperature
- ☐ Neoprene
- ☐ Polyethylene
- ☐ Rubber

Fall Protection

- ☐ Full Body Harness
- ☐ Lanyard
- ☐ Body Belt -For Positioning Only
- ☐ Horizontal Lifeline
- ☐ Retractable Lifeline
- ☐ Guardrail System
- ☐ Safety Monitoring System

Respiratory

- ☐ Pulmonary Function Test*****
- ☐ Fit Test*****
- ☐ Half Face Air Purifying Respirator
- ☐ Supplied Air Respirator
- ☐ Full Face Air Purifying Respirator
- ☐ Self Contained Breathing Apparatus (SCBA)

Eye/Face

- ☐ Safety Glasses w/ Sideshields
- ☐ Goggles
- ☐ Face Shield
- ☐ Welding Shield

***** Required for use of equipment

Special Safety Requirements:

_____

_____

_____

Crew Sign-off (before work begins)

I have been informed of the hazards and necessary precautions that are required to complete today's work.

_____ _____

_____ _____

_____ _____

OSC

Project Safety Checklist for Project Closeout

Documents required prior to site work may include:

- Site-specific health and safety plan (HASP)
- ***OSC***'s Health, Safety and Environmental Manual with applicable hazard modules
- Subcontractor's Health and Safety Agreement [Protocol for Subcontractors]
- Subcontractor's Safety Manual
- Subcontractor's HASP [They can also agree to abide by ***OSC***'s HASP exclusively and must sign the agreement in the HASP]

The following documents, generated on site, are required in the project files:

- Toolbox Safety Meetings documentation
- Site-specific training records
- Site safety assessment reports
- HASP signature sheet with ALL site personnel signatures including Subcontractors.
- Injury reports and accident investigation documentation
- Site orientation signature sheet
- Hazard Communication Program documentation
- Material Safety Data Sheets (MSDS) location
- Documentation required by state, federal and local regulations

Project Planning for Safety Costs

Completed by: _____ Date: _____

	Dollar Value
Levels of Protection ***(list tasks)***	
Level D: _____	$_____
Level C: _____	$_____
Level B: _____	$_____
Supplies ***(consider # of employees, task duration)***	
Suits (usually 2/day, level C or B)	$_____
Tyvek, Polytyvek, Saranex, PVC, other	$_____
Disposable overboots, PVC steel toe boots	$_____
Hard hats, safety glasses, gloves	$_____
Cartridge respirators and SCBAs	$_____
Respirator cartridges	$_____
Hard hat and glove liners	$_____
Misc. (duct tape, harnesses, ear plugs)	$_____
Decontamination *(consider trailer, decon pad, rinsate collection, brushes, buckets, alconox, storage containers)*	$_____
Rescue and Emergency *(consider first aid kits, eye wash, body drench, fire extinguishers)*	$_____
Air Monitoring Instruments	
Respirators: organic vapor air purifying (OVA), organic vapor dust (OVD)	$_____
Photo ionization detector (PID)	$_____
Explosimeter	$_____
Quad Meter (Hydrogen Sulfide, Oxygen, LEL, CO)	$_____
Drager Pump & Tubes: specify tubes	$_____
Personal monitoring: specify pumps, media, analytical	$_____
Other: _____	$_____
Personnel Time for Safety Activities *(allow time to break from cold stress, heat stress, and additional time if wearing Level C or B protection)*	$_____
Safety Orientations	$_____
Toolbox Safety Meetings	$_____

	Dollar Value
Site safety auditing and follow-up	$_____
Confined Space Entry Procedures	$_____
Other Costs *(consider fall protection, shoring, trench boxes, ladders, radios, spill supplies such as sorbents, lights, intrinsically safe lights, evacuation alarms, walkways and working surfaces, insect repellent, warning signs, street signs and caution tape)*	$_____
Total Planned Safety Costs	$_____

Project Planning for Safety Staff

Completed by: _____ Date: _____

	Yes	No	N/A	Notes
Partners for the Buddy System	❑	❑	❑	
Staff for Special Tasks (i.e., excavations, confined space, asbestos, demolition, lead, other: _____)	❑	❑	❑	
Subcontractor Site H&S Coordinator				
Full-time, resume reviewed?	❑	❑	❑	
Part-time? If yes, list reason	❑	❑	❑	
Subcontractor Supervision				
Full-time?	❑	❑	❑	
Part-time?	❑	❑	❑	
Rescue Personnel				
Confined space	❑	❑	❑	
First aid/CPR	❑	❑	❑	
Fire standby (i.e., hot work)	❑	❑	❑	
Fire department	❑	❑	❑	
Hospital available and notified	❑	❑	❑	
Site Security	❑	❑	❑	
Decontamination/Supply Person	❑	❑	❑	
Site Staff to Perform Air Monitoring	❑	❑	❑	

Hot Work Permit

Project Name: _____ Project #: _____

Date Written: _____ Expiration Date: _____

NOTE: Read instructions on page 2 before completing this permit.

Type of Hot Work: ❑ Internal Combustion Engines ❑ Hot Tapping

❑ Sparking ❑ Work on Live Equipment ❑ Welding/Burning ❑ Other

Scope of Work: _____

What equipment preparation is required? (i.e., lockout/tagout, blinding pipes)

_____

Is any area cleanup required? _____ Explain: _____

_____

Is work area ventilation required? _____ What Type? _____

Is fire equipment required? _____ What Type? _____

What methods are to be employed to control sparks? _____

What type of firewatch is required, if any? _____

What periodic air/gas testing is required? _____

What continuous air/gas testing is required? _____

What instruments are required? _____

Where should the continuous air monitor(s) be placed? _____

What PPE is required? _____

Who must be notified each time work commences? _____

Special Instructions: _____

_____

Signatures: Site Supervisor: _____

Site Safety Officer: _____

Client Representative (if required): _____

Instructions

Hot Work will occur by permit only and is considered to be any of the following:

1. Use of Internal Combustion Engines (gasoline or diesel).

2. Use of Powered Tools that produce sparks in drilling, grinding, chipping, etc.

3. Any high temperature work such as welding, burning, soldering, stress relieving, and use of open flames.

4. Work on live equipment (requires supplemental documentation - see supervisor) involving any high temperature work done on equipment still in operation or known to contain flammable material.

5. Hot Tap (requires supplemental documentation - see supervisor) involving cutting into a piece of equipment known to contain flammable material.

A written permit, prepared and signed by authorized individuals, must be issued prior to any hot work in any area not specifically designated as a "free burning area".

Abbreviated Areas

The site superintendent or his designee will arrange via the Hot Work Permit to:

1. Ensure the work is necessary and can be done safely.

2. Determine the period in which the permit is valid.

3. Specify which type(s) of hot work is approved.

4. Describe exact work to be done and by whom.

5. Prepare equipment and/or area for work. Verify all requirements have been satisfied before issuing the permit.

6. Isolate equipment when required.

7. Clear area of combustible/flammable material (50 ft. radius, minimum).

8. Specify fire protection and equipment necessary for the work.

9. Specify if additional methods or equipment is necessary to control sparks (fire blanket, water sprays, etc.)

10. Specify duties of the firewatch, if firewatch is mandated.

11. Specify and perform types of air/gas tests that are required initially, continually and/or periodically. At a minimum, tests shall be performed for explosive gases and oxygen levels. If levels of combustible gases exceed 20 percent of the LEL or if levels of oxygen exceed 25 percent, work shall stop immediately.

12. Determine number and placement of continuous air/gas monitors where necessary.

13. Identify the authorized person to approve hot work start-up.

14. Secure appropriate signatures.

15. Distribute, post, and file necessary copies of the permit and gas test results.

Electrical Hot Work Plan

PLAN#:

Date work to commence: _____ Date work complete: _____

Contractor: _____

Equipment description: _____

Work Description: _____

_____

Can this equipment be shut down? ☐ Yes ☐ No

If "No", why not? _____

Does this equipment have a disconnect? ☐ Yes ☐ No

Is a utility shutdown required? ☐ Yes ☐ No

Write a step-by-step procedure you would use if this work were done while still energized (use the back or additional sheets if necessary):

_____

_____

_____

Name of individuals who will perform work:

1. _____ 2. _____

3. _____ 4. _____

Name of individuals who will be present with a valid First Aid/CPR card:

1. _____ 2. _____

Emergency Procedures: notify security

Company Superintendent (name and phone #): _____

List all safety equipment that will be required: _____

_____

Attach a sketch of the layout and setup if necessary.

Submitted By: _____ Journeyman

Approved By: _____ General Foreman

Approved By: _____ Client Representative

Approved By: _____ ***OSC*** Representative

Work Completed By: _____ Journeyman

Signed off by: _____ ***OSC*** Representative

Confined Space Entry Permit

Project Name: _____ **Project #:** _____

Permit Number: _____ **Permit Expiration Date/Time:** _____

District/Location: _____ **Department:** _____

Confined Space to be entered: _____

Description of Work to be performed: _____

_____

Nature of Hazards in Confined Space:

- ❑ Oxygen deficiency (less than 19.5% at sea level)
- ❑ Flammable gases or vapors (greater than 10% of the lower flammable limit or greater than 23.5% oxygen at sea level)
- ❑ Toxic gases or vapors (greater than the permissible exposure limit)
- ❑ Mechanical hazards
- ❑ Electrical shock
- ❑ Materials harmful to the skin
- ❑ Engulfment
- ❑ Other: _____

Pre-Entry Preparation:

- ❑ Notify affected departments of service interruption
- ❑ Isolate - blanked or double valve, with lock and tag
- ❑ Energy sources neutralized
- ❑ Cleaned, drained, washed, and purged
- ❑ Ventilation to provide fresh air
- ❑ Emergency response team available
- ❑ Employees informed of specific confined space hazards
- ❑ Operating and rescue procedures reviewed and available to each employee
- ❑ Atmospheric Test in compliance
- ❑ Attach hot work permit
- ❑ Other: _____

Equipment Required for Entry and Work:

- ❑ Respirator
- ❑ Lifeline and safety harness
- ❑ Protective clothing
- ❑ Hearing protection
- ❑ Other: _____

Electrical Equipment/Tools:

- ❑ Low voltage
- ❑ Ground-fault current interrupters
- ❑ Approved for hazardous locations

Respiratory protection (specify): _____
Communication aid (specify): _____
Rescue equipment (specify): _____

Authorized Entrants:

_____
_____

Authorized Attendants:

_____

_____

Problems Encountered:

_____

_____

_____

Atmospheric Monitoring:

Test	Acceptable Limit	Check if Required	Time: Results	Time: Results	Time: Results	Time: Results	Time: Results	Time: Results
Oxygen – minimum%	>19.5%							
Oxygen – maximum%	22.0%							
Flammability	10% LEL							
H_2S	10 ppm							
Toxic:								
SO_2	0.2 ppm							
Carbon Monoxide	30ppm							
Other:								

Name of employee conducting atmospheric monitoring: _____

Entry Supervisor Authorization:

I certify that all required precautions have been taken and necessary equipment is provided for safe entry and work in this confined space.

Name: _____ Signature: _____

Date: _____ Time: _____

Reviewer Name (print): _____ Reviewer Signature: _____

Non Permit Required Confined Space Entry

Project Name: _____ **Project #:** _____

Permit Number: _____ **Permit Expiration Date/Time:** _____

District/Location: _____ **Department:** _____

Confined Area/Space to be Entered: _____

Description of Work to be Performed: _____

_____

Nature of Hazards in Confined Space: **(Initial Survey required)**

- ❑ Oxygen deficiency **(if less than 19.5% space is PERMIT REQUIRED)**
- ❑ Flammable gases or vapors **(greater than 10% of the lower flammable limit or greater than 23.5% oxygen, space is PERMIT REQUIRED))**
- ❑ Toxic gases or vapors **(greater than the permissible exposure limit, space is PERMIT REQUIRED)**
- ❑ Mechanical hazards (neutralized)
- ❑ Electrical shock (LOTO instituted)
- ❑ Materials harmful to the skin **(if "YES" space is PERMIT REQUIRED**
- ❑ Engulfment
- ❑ Other: _____

Pre-Entry Preparation:

- ❑ Notify affected departments of service interruption
- ❑ Isolate - blanked or double valve, with lock and tag
- ❑ Energy sources neutralized
- ❑ Cleaned, drained, washed, and purged
- ❑ Ventilation to provide fresh air
- ❑ Emergency response team available
- ❑ Operating and rescue procedures reviewed and available to each employee
- ❑ Atmospheric Test in compliance
- ❑ Attach hot work permit
- ❑ Other: _____

Equipment Required for Entry and Work:

- ❑ Protective clothing
- ❑ Hearing protection
- ❑ Other: _____

Electrical Equipment/Tools:

- ❑ Low voltage
- ❑ Ground-fault current interrupters

Communication aid (specify): _____

Authorized Entrants:

_____

Authorized Attendants:

_____

Problems Encountered:_____

Test	Acceptable Limit	Check if Required	Time: Results	Time: Results	Time: Results	Time: Results	Time: Results	Time: Results
Oxygen – minimum%	19.5%	Initial check only						
Oxygen – maximum%	22.0%							
Flammability	10% LEL	Initial check only						
H_2S	10 ppm	Initial check only						
Toxic:		Initial check only						
SO_2	0.2 ppm							
Carbon Monoxide	30ppm							
Other:								

Atmospheric Monitoring:

Name of employee conducting atmospheric monitoring: _____

Entry Supervisor Authorization:

I certify that all required precautions have been taken and necessary equipment is provided for safe entry and work in this confined space.

Name: _____ Signature: _____

Date: _____ Time: _____

Reviewer Name (print): _____ Reviewer Signature: _____

Daily Crane Inspection Report

Contractor: _____ Date: _____
Crane Type: _____ Hours: _____
Make/Model: _____ Serial #: _____
Boom Length: _____ Jib Length: _____
Other Comments: _____

Inspection (Check all that apply)

General:

- ☐ Capacity Chart
- ☐ Controls Marked
- ☐ Operators Manual
- ☐ Signal Horn
- ☐ Back Up Alarm
- ☐ Tail Swing Protection
- ☐ Fire Extinguisher (5BC rating)
- ☐ Boom Angle Indictor
- ☐ Load Moment Device
- ☐ First Aid Kit
- ☐ Proximity Signs
- ☐ Telescoping Length Indicator
- ☐ Load Indicators
- ☐ Cab
- ☐ Ladder/Hand holes (access)
- ☐ Levels
- ☐ Machinery Guards
- ☐ Exhaust Pipes
- ☐ Fuel Filter
- ☐ Appearance/housekeeping
- ☐ Instrument Check
- ☐ Safety Glass

Machinery:

- ☐ Controls Operational
- ☐ Brakes
- ☐ Drum Guards
- ☐ Power Boom Hoist
- ☐ Boom Hoist Pawl
- ☐ Boom Hoist Kick out
- ☐ Power Load Lowering
- ☐ Safety Brake
- ☐ Check Valves
- ☐ Swing Mechanism
- ☐ Swing Brake
- ☐ Travel Mechanism
- ☐ Travel Brake
- ☐ Air Leaks
- ☐ Pressure Settings
- ☐ Car Body/Carrier
- ☐ Gantry
- ☐ Turntable Mounting

Attachments:

- ☐ Boom
- ☐ Anti Two Blocking Device
- ☐ Point Sheaves
- ☐ Outriggers
- ☐ Hook
- ☐ Counterweight
- ☐ Jib
- ☐ Rope Sockets
- ☐ Cable Clamps
- ☐ Jib Stop
- ☐ Tires/Tracks
- ☐ Block

Exceptions: _____

Date Annual Inspection was Conducted: _____

Inspection Conducted by: _____ Date: _____

Medical Authorization Form

Employee: _____

Type of Exam: _____ **Date of Exam:** _____

The individual identified above has completed a medical surveillance examination. Review of the data from this examination resulted in the following conclusions:

Medical and Safety Restrictions

Medical and Safety Recommendations

Appraisal of Lifting Capacity

Clearance for Work with Hazardous Materials

In compliance with 29 CFR 1910.120 (f), medical clearance □ is □ is not issued for individual to work with hazardous materials.

Use of Respiratory Equipment

In compliance with 29 CFR 1910.134, medical clearance □ is □ is not issued for unrestricted use of respiratory protective equipment.

Exposure to Temperature Extremes

Exposures to temperature extremes □ are □ are not acceptable providing that reasonable precautions are taken.

Physician's Signature: _____ Date: _____

Preliminary Hazard Analysis

Location: _____ Date(s) job will be conducted:_____ Job Location: __ Building: _____

Room: _____ Other: _____

Employee(s) or Contractor[s] Performing Work:_____

Supervisor Responsible for Safety: _____

Required PPE: ☒ Hard Hat: ☒ Safety Shoes ☐ Safety Glasses: ☐ Goggles:

☒ Ear Plugs: ☐ Respirator: ☐ High Voltage: ☐ Fall Protection:

☐ Level A ☐ Level B ☐ Level C ☐ Level D

*☐ Other: **Level "B, C or D" is dependent on the type and level of the hazard/contaminant**

Are General Housekeeping required?	☐Yes	☐No	☐N/A
Will emergency procedures established?	☐ Yes	☐No	☐N/A
Will spark/flame producing devices be used?			
(Hot Work Permit)	☐Yes	☐No	☐N/A
Will confined space entry be required?			
(Confined Space Permit)	☐Yes	☐No	☐N/A
Is a hazardous atmosphere possible?	☐Yes	☐No	☐N/A
Is an oxygen deficient atmosphere possible?	☐Yes	☐No	☐N/A
Will chemicals be used? (List)	☐ Yes	☐No	☐N/A
Is asbestos present?	☐ Yes	☐No	☐N/A
Will excavation be more than 5 feet in depth?	☐Yes	☐No	☐N/A
Will walls, ceiling, or floor be penetrated?	☐Yes	☐No	☐N/A
Will work above 6 feet be required?	☐Yes	☐No	☐N/A
Will scaffolding be used?	☐Yes	☐No	☐N/A
Will Ladders be used?	☐Yes	☐No	☐N/A
Will work platforms or man lifts be used?	☐Yes	☐No	☐N/A
Will roof work be required?	☐Yes	☐No	☐N/A
Will a crane be required?	☐Yes	☐No	☐ N/A
Will a forklift be required?	☐Yes	☐No	☐N/A
Will lockout/tagout (LOTO) be required?	☐Yes	☐No	☐N/A
Will energized electrical work be required?	☐Yes	☐No	☐N/A
Will pneumatic power tools be used?	☐Yes	☐ No	☐N/A
Is work on natural gas systems required?	☐Yes	☐No	☐N/A
Is work on high pressure systems required?	☐Yes	☐No	☐N/A
Will explosives be used or present?	☐ Yes	☐No	☐N/A
Will biohazards be present?	☐Yes	☐No	☐N/A
Will machine tools be used?	☐Yes	☐No	☐N/A
Will vehicle/pedestrian traffic be disrupted?	☐Yes	☐No	☐N/A
Will barricades/access control required?	☐Yes	☐No	☐N/A
Will lasers be used?	☐Yes	☐No	☐N/A
Is the project located on a hazardous waste site?	☐Yes	☐No	☐N/A
Will work be in a radiological area?			
(Radiological Permit)	☐Yes	☐No	☐N/A
Have workers received RAD worker training?	☐Yes	☐No	☐N/A
Will the contractor be on site more than 30 days?	☐Yes	☐No	☐N/A
Have employees received training?	☐Yes	☐No	☐N/A
(40 hr HAZWOPER required?)			
OTHER HAZARDS?	☐Yes	☐No	☐N/A

Please List:_____

Completed By :_____ Title: _____ Date:_____

Approved By: _____ Title: _____ Date:_____

Is a (HASP) Required?☐Yes ☐ No ☐ N/A Is a Safe Work Plan required? ☐ Yes ☐No ☐ N/A

Additional Comments _____

Guidelines for Classification of Medical Treatment

Nature of Injury/Illness	Medical Treatment (Recordable)	First Aid
Abrasions, Blister, Lacerations, Splinters, Puncture wounds	Sutures (stitches), butterfly closure	Cosmetic Closure, bandaging, and/or application of a protective cap
	Debridement (surgical removal of lacerated, devitalized, or contained tissue)	Cleaning or soaking of wound
	Probing and /or removal of embedded foreign material requiring the skill of a physician	Removal of foreign bodies from the wound by tweezers or other simple techniques
	X- ray to locate foreign body with positive results	One time application of prescription medication on the initial visit to prevent infection. Application of antiseptic and/or non-prescription medication
	Treatment of infection	One time prescription of orally administered painkilling medication
	Use of prescription drugs	Tetanus immunization given merely as a preventative measure
Bruise and contusions	Multiple soaking due to severity or extent	Single soaking or application of hot or cold compress for minor bruises or contusions
	Use of prescription drugs	One time prescription of orally administered painkilling medication
	Draining of collected fluids or blood requiring special skills	One time Draining of collected blood beneath a finger or toenail within 24 hours of trauma
Eye Injury	Removal of foreign objects and/or material requiring the skill of a physician	Irrigation and/or removal of foreign material not embedded in the eye
	Use of prescription drugs	Application of non-prescription medication and/or eye patch
	Precautionary visit (special) examination by physician	
Sprains, strains and dislocations	Application of a cast or other professional means of immobilizing injured body part	Use of an elastic (ace) bandage
	Whirlpool or diathermy treatment prescribed by a physician	Application of hot or cold compress; non-prescription heat or whirlpool treatment
Fracture	Where X-rays results are positive	Where X- ray taken as a precaution is negative for fracture
Inhalation of toxic corrosive	Treatment rendered by a physician	Treatment limited to removal to fresh air or one time administration of oxygen.

Nature of Injury/Illness	Medical Treatment (Recordable)	First Aid
gases/vapor/fumes		Use of non-prescription cough syrup and/or throat lozenges
Heat Disorders; rash, fatigue, cramps, exhaustion, stroke	Intravenous fluid therapy	Oral fluid replacement
	Hospitalization	Period of rest and/or cooling
	Use of prescription drugs	Treatment for heat rash/fatigue
Burns: Thermal or Chemical	All second and third degree burns	One time prescription of orally administered painkilling medication
	Use of prescription drugs	One time application of prescription medication on the initial visit to prevent infection. Application of antiseptic and/or non-prescription medication
	Treatment of infection	Cleaning or flushing the surface
	Debridement (surgical removal of lacerated, devitalized, or contained tissue)	Application of cold Compress
	Multiple soaking due to severity or extent	

Site-Specific Training Record

Presenter: _____

Date: _____

Job Number: _____

Location: _____

Training Topic: _____

Employee Name: **Employee Signature:**

Daily Excavation Checklist

Client		Date	
Project Name		Approx. Temp.	
Project Location		Approx. Wind Dir.	
Job Number		*H&S Coordinator*	
Excavation Depth & Width		*Soil Classification*	
Protective System Used			
Activities In Excavation			
Competent Person			

Excavation > 4 feet deep? ___Yes ___No If ***YES,*** fill out a Confined Space Permit ***PRIOR*** to ***ANY*** person entering the excavation where contaminants, methane, hydrogen sulfide or oxygen levels below 19.5% are or could be present.

NOTE: Trenches over 4 feet in depth are considered excavations. Any items marked ***NO*** on this form ***MUST*** be remediated prior to any employees entering the excavation.

Yes	No	N/A	DESCRIPTION
GENERAL			
			Employees protected from cave-ins & loose rock/soil that could roll into the excavation by Sloping, Benching, Trench Boxes or Shoring?
			Spoils, materials & equipment set back at least 2 feet from the edge of the excavation
			Engineering designs for sheeting and/or manufacturer's data on trench box capabilities on site
			Adequate signs posted and barricades provided
			Training (toolbox meeting) conducted w/ employees prior to entering excavation
			Other:
UTILITIES			
			Utility company contacted & given 24 hours notice &/or utilities already located & marked
			Overhead lines located, noted and reviewed with the operator
			Utility locations reviewed with the operator, & precautions taken to ensure contact does not occur
			Utilities crossing the excavation supported, and protected from falling materials
			Underground installations protected, supported or removed when excavation is open
WET CONDITIONS			

			Precautions taken to protect employees from water accumulation (continuous dewatering)
			Surface water or runoff diverted /controlled to prevent accumulation in the excavation
			Inspection made after every rainstorm or other hazard increasing occurrence
HAZARDOUS ATMOSPHERES			
			Air in the excavation tested for oxygen deficiency, combustibles, other contaminants
			Ventilation used in atmospheres that are oxygen rich/deficient &/or contains hazardous substances
			Ventilation provided to keep LEL below 10 %
			Emergency equipment available where hazardous atmospheres could or do exist
			Safety harness and lifeline used
			Supplied air necessary (if yes, contact safety department)
ENTRY & EXIT			
			Exit (i.e. ladder, sloped wall) no further than 25 feet from ANY employee
			Ladders secured and extend 3 feet above the edge of the trench
			Wood ramps constructed of uniform material thickness, cleated together @ the bottom
			Employees protected from cave-ins when entering or exiting the excavation

Request for Medical Records

Ontario Specialty Contracting, Inc.
Corporate Health and Safety Director
333 Ganson Street
Buffalo, NY 14203

This document authorizes ***OSC*** to obtain copies of my medical records from:

Physician Name: _____

Address: _____

City: _____

State, Zip: _____

I understand that no X-rays will be sent as part of this record. I also understand that there is no charge for this service and the records requested will be mailed within 15 days of receipt of this request.

(Please Print)

Employee Name: _____

Social Security No.: _____

Employee Number: _____

Division/Office: _____

Signature: _____ Date: _____

Employee Signature Authorizes Release

Appendix “B”

Health and Safety Protocol for Subcontractors

OSC
Health and Safety Protocol for Subcontractors

The Project Health and Safety Program is designed to coordinate the overall Health and Safety effort during construction. The Project Health and Safety Program does not relieve a contractor of his contract responsibilities for health and safety, or any applicable governmental regulations.

Contractors shall be responsible for the health and safety of all persons and property affected by their performance of the work, including work performed by their subcontractors. This requirement shall apply continuously during the entire contract period and shall not be limited just to normal working hours.

Contractors shall be responsible for the implementation of a written Health and Safety Program (Subcontractors' Safety Program) to prevent their employees from working under conditions that are unsanitary or dangerous to their health and safety. Contractors' conformance with the requirement to initiate and maintain such a program is mandatory under the provisions of their construction contract.

Contractors shall designate a qualified safety representative to be responsible for the administration of the Contractors' Safety Programs and the Project Health and Safety Program. Contractors shall also be responsible for the administration of the Contractors' Safety Programs and the Project Health and Safety Program for their subcontractors.

1.0 Program Requirements

The Contractors' Safety Program shall meet the minimum applicable requirements of the Occupational Health and Safety Act of 1970 as amended. The following additional requirements are a mandatory part of each contractor's Safety Program to meet the minimum requirements of the Project Health and Safety Program:

- Deliver one copy of the contractor's Safety Program to ***OSC*** for review.
- Submit to ***OSC***, as part of the Safety Program, a Designation of Competent Person form that designates a competent person for each area listed that is applicable to their work. OSHA defines a competent person as, "One who, through training and experience, 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." Contractors' competent persons shall be the competent person for each subcontractor unless otherwise indicated.
- Participation in the weekly Toolbox Safety Meetings.
- Cooperation with ***OSC***; as well as, federal, state, and local agencies concerning health and safety and property damage matters as they concern.
- Participation in the implementation of fire control measures as may be appropriate for the protection of individuals and property.
- Provide training and education, and the documentation thereof, to the contractor's employees in the recognition, avoidance, and prevention of unsafe working conditions and unsafe work practices and emergency procedures.

- Maintain accurate health and safety records and statistics, as required, and making available such records to ***OSC*** upon request, for their periodic review.
- A system to ensure that reports required by the Project Health and Safety Program are submitted to ***OSC*** in a timely manner.
- Conduct daily work area health and safety inspections with written reports submitted weekly to ***OSC***. Included in the reports shall be deficiencies detected and corrective action taken.
- A system for immediately reporting all injuries, accidents, illnesses, fires, hazardous material spills, and unsafe conditions and procedures to the contractor's safety representative or designee.
- Systems of weekly Toolbox Safety Meetings are to be held and documented for all contractors' employees. A copy of the Weekly Safety Meeting Report must be submitted to ***OSC***. Weekly toolbox report forms can be obtained from ***OSC***.
- Provide a system to prevent the use of unsafe or defective equipment, tools, materials, or machinery, which includes procedures for tagging and/or lockout to render such unsafe items inoperable.
- Provide a system to ensure that only employees who are qualified by training or experience are allowed to operate equipment, tools, and machinery.
- Provide appropriate first aid/medical coverage for all of its employees and provide ***OSC*** with weekly first aid logs.
- Develop, document, and implement evacuation/emergency plans.
- Adhere to ***OSC*** Activity Hazard Analysis (AHA) Policy.
- Designate a qualified representative to be responsible for rigging and heavy lifting. A report must be submitted to, and approved by, ***OSC*** prior to any lifts over 20 tons. The following items shall be included in the report:

    1. Make and model number of cranes or hoist
    2. Lift radius, boom angle, and boom length, if applicable
    3. Lifting capacity of crane or hoist for the particular configuration
    4. Size and capacity of all rigging
    5. Weight of object being lifted and associated rigging
    6. Diagram of lift layout

Documented programs related to health and safety that are required by contractors include:

- Hazard Communication Program for the protection of employees who are required to handle or use flammable liquids, gases, toxic materials, poisons, caustics, and other harmful substances. The objectives of the program will be to create an employee awareness of potential hazards of such substances, the recommended personal hygiene for those exposed to those hazards, the personal protective measures and devices required, and the emergency notification procedures to be used in the event of an accident.

- Confined Space Entry Program for employees who are required to enter confined or enclosed spaces. Instructions shall include the nature of the hazards involved, the necessary precautions to be taken, and the proper use of required protective and emergency equipment.
- Personnel Protective Equipment Program for employees who require the use of personal protective equipment because of the hazards of the work being performed.
- Equipment Inspection Guidelines. A program that provides for periodic documented inspections of all equipment in accordance with applicable federal, state, and local regulations.
- Lockout/Tagout Procedures. A copy of the project tagging procedures provided to each employee, and training of all employees to reasonably assure their understanding of these procedures.
- Written Orientation Program that includes the following: job hazard analysis, emergency communication procedures, and disciplinary procedures; Project Health and Safety Program requirements; and OSHA requirements. Records of such training shall be maintained onsite by the contractor and made available upon request for inspection by ***OSC***..

2.0 Surveillance Policy and Procedures

Contractors are responsible for the enforcement of their respective Safety Programs and the Project Health and Safety Program. ***OSC***. will provide surveillance of contractors' activities to observe whether such activities are in compliance with the Project Health and Safety Program and contractors' Safety Programs.

2.1 Violation Notification Procedures

In the event of an apparent violation of a safety or health standard, ***OSC***. will advise the contractor of the violation and direct that the violation be corrected. If there is a conflict between Project Health and Safety Rules, contractors' Safety Program rules, and governmental regulations, the most restrictive rules shall apply.

2.1.1 Occupational Health and Safety Violation Notice

The contractor will be informed of identified violations of health and safety standards by means of Risk Control Survey. This survey will be delivered by the most expeditious method to the contractor's onsite construction office. The contractor will receive an original plus one copy of each violation notice.

The contractor shall take corrective action within the abatement period shown on the violation notice or propose an alternate solution within the abatement period given. If corrective action is not taken within the abatement period, work shall stop in the respective location, and/or the affected equipment shall not be used until the cited violation is corrected.

When corrective action has been completed, the contractor shall state in writing the corrective action taken, date and sign the original notice, and return it to ***OSC***.

There are four types of violations:

- **Serious.** Any condition or practice which is causing or likely to cause death or serious physical harm to any person.
- **Non-serious.** Any condition or practice which is not likely to cause death or serious physical harm to any person.
- **Stop Work/Imminent Danger.** The existence of any condition or practice, which would reasonably be expected to cause death or serious physical harm before such condition, or practice can be corrected. This is

a stop work situation. All persons shall be withdrawn from the affected area, and no one shall be allowed in such area except those people deemed necessary to correct the condition or practice.

- **Stop Work Noncompliance.** A violation (serious or non-serious) described in a notice, which has not been totally corrected within the noted abatement time, and the abatement time should not be extended. This is a stop work situation. All persons shall be withdrawn from the affected area, and no one shall be allowed in such area except those people deemed necessary to correct the condition or practice.

2.1.2 Imminent Danger Notification

If ***OSC***. considers a violation to be immediately dangerous to life, limb, or property, the contractor's representative at that location will be directed to immediately cease work in that area. The imminent danger condition shall be corrected to the satisfaction of ***OSC***. before work is allowed to continue.

2.1.3 Repeated Violations

In addition to the above notification procedures, ***OSC***. will notify the contractor's corporate office if a particular violation is repeated or the contractor's field supervisor is not cooperative. Such notification to the contractor's corporate office may be either by telephone or in writing; however, telephone notifications will be followed up with written notification.

Repeated nonconformance with the Project Health and Safety Program and repeated failure to comply with correction directives may result in removal of contractor management from the project site or termination of the contract.

2.2 Abatement

In the event that the safety or health hazards noted on the Occupational Safety/Health Violation Notice is not abated within the time period specified and no alternate solution has been proposed by the contractor, ***OSC***. will initiate steps to correct the violation and back-charge such expenses to the contractor.

2.3 Notice to Employee of Health and Safety Violation

For contractor employees who knowingly violate the Project Health and Safety Program, a Health and Safety Personal Notice of Violation will be issued. If any one employee should receive three personal notices of violation, disciplinary action will result which may include termination of employment. Employees who knowingly or willfully violate Project Health and Safety Program rules shall be subject to discharge without prior warning.

When a Personal Notice of Violation is issued to an employee, a copy will be forwarded to their employer. Personal Notice of Violation may be issued to contractor supervisor for not enforcing the Project Health and Safety Program rules with the employees under their supervision. Employees terminated for violation of Project Health and Safety Rules shall not be eligible for rehire for the duration of the project.

3.0 Tagging Equipment Out of Service

The tagging and clearance procedures for placing defective equipment, tools, or cords out of service at the construction project shall be strictly adhered to. In the event that a health and safety hazard is recognized by ***OSC***., the affected equipment will be tagged with a ***Danger*** tag, immediately taken out of service, and will remain out of service until the defect is corrected.

The contractor representative shall remove the ***Danger*** tag from the equipment after corrective action has been completed. The contractor shall state in writing on the tag the corrective action taken, date and sign the tag, and return it to ***OSC***. Anyone removing this tag before corrective action has been completed shall be subject to immediate termination of employment.

4.0 Project Health and Safety Program Operation

OSC will distribute to all contractors copies of the Project Health and Safety Plan [HASP]. The contractors will ensure that all of their employees and subcontractors are familiar with and abide by the contents of this manual, including any changes promulgated and distributed by ***OSC***.

OSC will schedule project safety meetings as needed. The purpose of the meetings will be to discuss health and safety concerns as they relate to all construction projects, provide for two-way communication between the contractor's safety representatives and ***OSC***, and, in general, further the Project Health and Safety Plan. All contractors are required to have their safety representative in attendance.

4.1 Accident/Incident Reporting

All injuries, occupational illnesses, accidents, and unsafe conditions are to be investigated by the contractor's safety representative. The safety representative shall complete an Injury/Illness Investigation Report form. The safety representative shall submit the completed report to the ***OSC***. Site Health and Safety Officer along with any supportive information such as photographs, witness statements, etc., within two working days after the accident happens. Reports shall be dated and signed by the contractor's safety representative.

In the event of a serious injury, fatality, property damage accident, or any damaging fire, ***OSC***. shall be immediately notified regardless of the day or hour. This reporting requirement is in addition to the requirements outlined in the above paragraph.

5.0 OSHA Inspection Procedures

A representative from ***OSC***. shall accompany OSHA during inspections of the construction site. Also, as required by OSHA, each contractor will require his employees to select a representative(s) to accompany the OSHA compliance officer during site inspections.

The ***OSC***. Site Health and Safety Officer shall examine the compliance officer's credentials prior to the start of any onsite inspection. At all times while onsite, the OSHA representative shall be treated courteously and given full cooperation.

6.0 Fire Protection

Each contractor shall be responsible for fire protection throughout all phases of construction as required by the National Fire Protection Code and OSHA Standard 29 CFR 1926 Subpart F.

Only work procedures which minimize fire hazards to the extent practical shall be used. Fuels, solvents, and other volatile or flammable materials shall be stored in the project's fuel storage area as defined by ***OSC***.. Good housekeeping is essential to fire prevention and shall be practiced by all site contractors.

Unless otherwise specified, untreated canvas, paper, plastic, and other flammable flexible materials shall not be used on the project site for any purpose. If such materials are on equipment or materials, which arrive at the project site, they shall be removed and replaced with an acceptable covering before storing or moving into the construction area.

All fires, regardless of size, shall be reported immediately to ***OSC***..

7.0 Safety Policy Memoranda

From time to time, as the need is identified, ***OSC***. will issue safety policy memoranda that affect the entire project. Safety policy memoranda will be identified by a number and a specific safety subject, such as *Safety Policy Memorandum 1* (Scaffolding). Safety policy memoranda will be issued to all persons who have received a Project Health and Safety Manual. They are to be inserted at the end of this manual.

The person responsible for the receipt and maintenance of the manual shall also be responsible for informing his firm's employees and subcontractors of the contents of the safety policy memoranda.

Safety policy memoranda will have an effective date and an expiration date. Prior to the expiration date, the Site Health and Safety Officer will review the memorandum and either re-issue or direct that the memorandum be removed from the manual.

8.0 Housekeeping

Contractors shall, at all times, maintain the premises free from accumulations of waste material, trash, and debris caused by their work. Each work area shall be cleaned and swept each day, if applicable, by the contractor or as often as necessary to remove fire and safety hazards discovered through regularly scheduled inspections. All tools, scaffolding, and materials shall be removed from the work area at the completion of the work. All scrap, waste material, and rubbish shall be removed from the work area daily.

Pre-job planning shall include consideration of housekeeping plans and will include methods and equipment or tools necessary. The contractor's supervisors shall be instructed by the contractor to maintain good housekeeping.

All recommendations for improved housekeeping from ***OSC***. shall be acted upon immediately. Refusal or negligence in maintaining good housekeeping can result in the following:

- Back charges to the contractor for removal of trash, rubbish, and waste materials from the work area. Also, back charges for clearing aisles, walk-ways, and work areas of tools, material, and equipment
- Reports to ***OSC***. of inadequate contractor performance
- Suspension of the work until a proper level of housekeeping is achieved

9.0 Ground Fault Protection

Ground fault circuit interrupters **shall be** used with all power tools and cords. These shall be used regardless of the power source, including portable and wheel mounted generators. The ground fault circuit interrupter shall be tested before each use.

10.0 Crane Inspections

All cranes in use on the project shall be inspected on a monthly basis by a competent person. Inspection results shall be recorded on a Crane Inspection Report form, which must be submitted to the ***OSC***. Site Health and Safety Officer by the fifth working day of each month.

Additionally, the contractor shall submit a current annual crane inspection report to the ***OSC***. Site Health and Safety Officer for each crane used on the project. Annual crane inspection reports **shall be** submitted **prior to**

placing the crane in service. The annual inspection shall be performed by a competent person or by a government or private agency recognized by the U.S. Department of Labor. The contractor shall maintain a record of the dates and the results of inspections for each hoisting machine and piece of equipment.

Failure to submit the above inspection report will result in a violation notice, which will stop the use of the crane in violation until the required reports are submitted. Whoever knowingly makes any false statement, representation, or certification either a monthly or an annual crane inspection report shall be subject to immediate discharge and will be barred from the project.

The above policy shall in no way eliminate any requirements for crane inspection set forth in the OSHA Standard 1926.550.

11.0 Hazardous Material Program

It is the contractor's sole responsibility to implement and maintain a written Hazard Communication Program as stated in OSHA Standard 29 CFR 1910.1200. Contractors shall submit a copy of their written Hazard Communication Program to the ***OSC***. Site Health and Safety Officer prior to beginning work onsite.

Contractors shall submit a Material Safety Data Sheet to the ***OSC***. Site Health and Safety Officer for any and all hazardous material they bring onsite or are responsible for. The Material Safety Data Sheet shall be submitted prior to the material arriving onsite.

If a contractor's work with a hazardous material could affect the health and safety of other contractors' employees, the contractor shall coordinate the work with the other contractors to ensure the health and safety of the contractors' employees.

Contractors shall be responsible for the safe storage, use, and disposal of all hazardous material they bring onsite or are responsible for. Contractors shall conspicuously label all containers of hazardous material they are responsible for with their company name.

If the contractor or any of his subcontractors or any of their representatives or employees encounters or has reason to believe contaminated soil or groundwater exists during excavations for project facilities, the contractor shall immediately notify the ***OSC*** Site Health and Safety Officer. The ***OSC*** Site Health and Safety Officer or his representative shall inspect the work area and determine if work can proceed. If after inspection of the work area, the ***OSC*** Site Health and Safety Officer deems there is a hazard to continuing work in the area, the ***OSC***. Site Health and Safety Officer will issue a stop work order. Removal of contaminated materials and implementation of the appropriate health and safety plan shall be the responsibility of the contractor, with assistance from local, state, or federal agencies as appropriate.

12.0 Onsite Storage and Dispensing of Flammable and Combustible Liquids

Applicable sections of 29 CM Parts 1926.152 and 1926.153, *Health and Safety Regulations for Construction*, of the Occupational Health and Safety Act shall be strictly adhered to. The location of out-of-doors storage tanks shall be approved by ***OSC***. prior to installation.

13.0 Fall Protection

OSHA Fall Protection Standards 29 CFR 1926 Subpart M shall be strictly adhered to. No person or work operation is exempt from the standard on this project. This includes structural steel erection operations and scaffold erectors. Fall protection is required 100 percent of the time, whether climbing, traveling, or working.

Prior to starting work operations that require fall protection, the contractor shall submit to ***OSC***. Site Health and Safety Officer a Fall Protection Plan. The fall protection plan shall include, but not be limited to, the following:

- Name of the qualified person in charge of the operation and a description of work operation
- List of fall exposures
- Description of fall protection methods used to eliminate the fall exposures
- Training and enforcement methods used to ensure employee compliance with the plan

13.1 Full Body Harnesses, Lifelines, and Lanyards

Full body harnesses, lanyards, and lifelines shall be used in accordance with OSHA Standard 1926.502 (d), with the following exceptions:

- Full body harnesses shall be used in lieu of safety belts on this project.
- Only lanyards with shock absorbers and locking type snaphooks shall be used.
- At least two lanyards shall be used to provide 100 percent fall protection when moving around obstructions, connection points, or other similar items.

13.2 Safety Nets and Flooring Requirements

Falling hazards to the interior and exterior of buildings shall be governed by the following principles:

- In the structural steel construction of tiered buildings, full body harnesses shall be used in situations in which employees are exposed to falls of six to 25 feet, in accordance with OSHA Standard 1926.28(a).
- In structural steel construction of tiered buildings, safety nets shall be used when employees are exposed to falls of more than 25 feet above the ground or water surface, or other surfaces where the use of ladders, scaffolds, catch platforms, temporary floors, safety lines, or full body harnesses is impractical, in accordance with OSHA Standard 1926.105(a).
- In the steel construction of tiered buildings, a tightly planked and substantial floor shall be maintained within two stories or 30 feet, whichever is less, below and directly under that portion of each tier of beam on which work is being performed. Where such floors are not practicable, safety nets shall be installed, in accordance with OSHA Standard 1926.750(b)(2)(I).
- In all other types of construction, OSHA Standard 1926.28(a) shall be applicable when employees are exposed to falls of 6 to 25 feet. For fall hazards of more than 25 feet, OSHA Standard 1926.105(a) shall be applicable.

13.3 Guardrail Systems

Guardrail systems and their use shall comply with OSHA Standard 1926.502(b), with the following exception:

- Manila, plastic, or synthetic rope shall not be used as guardrails.

13.4 Training

The contractor shall provide a training program for each employee who might be exposed to fall hazards. The training program shall be taught by a competent person and shall meet the requirements specified in OSHA Standard 1926.503.

14.0 Scaffold Tagging Procedures

The intent of the scaffold tagging procedure is to assure that personnel perform their work from a scaffold that is complete and constructed in accordance with Project Health and Safety Rules and OSHA regulations. If there is a conflict between Project Health and Safety Rules, contractor's Safety Program rules, and governmental regulations, the most restrictive rules shall apply. It is the policy of ***OSC*** that all onsite personnel shall comply with this scaffold tagging procedure. Scaffolds not displaying a signed scaffold tag shall not be used.

In addition to the procedures contained in this scaffold tagging procedure, all employees are subject to the OSHA scaffold requirements contained in 29 CFR 1926.451.

Requirements include:

- Contractors are responsible to ensure their subcontractors tag their scaffolds in accordance with the project scaffolding tagging policy.
- Scaffold tags shall be provided by the contractor and shall conform to the following color codes.
- All scaffolds shall be marked with one of the following tags:
  - **Green Tag**. This scaffold was built to meet federal OSHA scaffold regulations; it is safe to use.
  - **Yellow Tag**. This scaffold does not meet federal OSHA scaffold regulations; safety belts shall be worn.
  - **Red Tag**. Warning: This scaffold is not complete. DO NOT USE.
- The foreman whose crew constructed the scaffold shall inspect the scaffold for compliance with project and OSHA requirement (1926.451), and shall sign his name to the tag.
- All scaffolds that cannot be equipped with standard top rail, midrail, and toeboard because of interferences with structures or equipment shall be marked with a yellow tag stating that "Body Harness Must Be Used."
- Scaffolds being constructed, torn down or incomplete shall be marked with a red tag.

Responsibilities include:

- The foreman who constructs the scaffold or has the scaffold constructed is responsible to ensure that the scaffold is built to project and OSHA standards.
- Contractor personnel shall periodically monitor all scaffolds. The audit shall ensure that all scaffolds are properly tagged and in compliance with project and OSHA standards.
- In the event that a foreman wishes to use another contractor's or crew's scaffold, the foreman shall obtain permission to use the scaffold and shall inspect and tag the scaffold before use.
- Any employee working from a scaffold that does not have a scaffold tag or any supervisor assigning employees to work on an untagged scaffold shall be subject to disciplinary action.

15.0 Confined Space Entry Procedure

A confined space can be defined as a tank, vessel, silo, vault, pit, open topped space more than 4 feet (1.2 m) deep, pipeline, duct, sewer, or tunnel having limited means of access/egress or not designed for continuous employee occupancy or having one or more of the following characteristics:

- Less than 19.5 percent oxygen
- Flammable/combustible/explosive atmospheres present or able to be generated or enter into an area
- Toxic atmospheres present or able to be generated or enter into an area
- Areas not protected against entry of water, gas, sand, gravel, ore, grain, coal, radiation, corrosive chemicals, or any other substance which could possibly trap, suffocate, or harm a person
- Poor ventilation
- Restricts entry for rescue purposes

The intent of the Confined Space Entry Procedure is to assure that personnel who perform work in a confined space are in compliance with Project Safety and governmental regulations. If there is a conflict between Project Health and Safety Rules, contractor's Safety Program rules, and governmental regulations, the most restrictive rules shall apply.

It is the policy of ***OSC***. that all onsite personnel shall comply with this Confined Space Entry Procedure. All confined spaces shall be authorized for entry by means of a permit. No personnel shall enter a confined space prior to compliance with all permit criteria.

Procedures include:

- Confined Space Entry Permit forms can be obtained from the ***OSC***. Site Health and Safety Officer. The entry permit shall be a three-part form. Contractors shall fill the permit out in full, except the last line, and post the white and blue copies of the forms in a conspicuous location at the entrance to the confined space. Contractors shall retain the copy for their records. If there is more than one entrance to the confined space, all entrances shall be posted with a copy of the permit.
- Prior to entry into the confined space, all persons entering the space shall be given a briefing as to the precautions that must be taken.
- When the work in the confined space is completed, the person authorizing entry into the confined space shall verify that all persons have exited the confined space and that it is safe to remove the permit. The authorizing person shall then sign, date, and write in the time the permit was removed.
- Contractors shall retain the blue copy for their records and shall submit the original copy to the ***OSC***. Site Health and Safety Officer.

16.0 Trenching and Excavation Notice

Before contractors commence work on any trench or excavation, they shall first submit a completed Trenching and Excavation Notice to the ***OSC*** Site Health and Safety Officer. The notice shall be submitted far enough in advance to allow the ***OSC*** Site Health and Safety Officer ample time to verify the contractor's submittal. When the ***OSC*** Site Health and Safety Officer has verified the information, they shall sign the notice and return a copy of it to the contractor. When the contractor receives the signed notice, he may commence work.

The contractor shall appoint a competent person as defined in OSHA Standard 29 CFR 1926 Subpart P to fill out the permit and monitor all trench and excavation work.

The signature by the ***OSC***. Site Health and Safety Officer in no way changes the contractor's responsibility for locating all underground utilities and repair of damaged utilities as required by the contract. T he ***OSC***. Site Health and Safety Officer shall not be held responsible for the safety requirements for the trench or excavation.

The contractor's competent person shall be responsible for all safety requirements as stated in OSHA Standard 29 CFR 1926 Subpart P.

17.0 Barrier Tape Identification System

In order to identify particular hazards on the construction site uniformly, a barrier tape identification system has been developed for use by all the contractors working on the construction. The identification system has been developed so that any employee working on the site, regardless of employer, can recognize and avoid a hazard when properly marked.

The following barrier tape identification system shall be used:

- **General Purpose.** Multicolor triangular flagging. Used for open manholes, trenches, excavations, etc. Use caution when crossing.
- **General.** Red tape (may have black in it). Danger. Do not cross.
- **Electrical**. Yellow (may have black in it). Open wiring, switchgear, etc. Caution do not cross.
- **Radiation**. Yellow and magenta (purple) tape. Possible radiation hazard, X-ray, etc. Do not cross.

The contractor erecting the barrier tape shall hang a tag on the tape that indicates the hazard, name of contractor, and name of person erecting the tape.

The barriers shall be erected far enough back from the hazard to allow for adequate warning and protection from the hazard. The barrier shall be constructed so that it will stand against adverse weather conditions and construction traffic. If the hazard is of a magnitude which requires additional protection, it shall be the contractor's responsibility to provide additional protection as well as the barrier tape. It will be the responsibility of the contractor erecting the barrier tape to maintain it as long as the hazard is present.

18.0 Crane-Suspended Work Platform

The use of a crane or derrick to hoist employees on a personnel platform is prohibited, except when the erection, use, and dismantling of conventional means of reaching the worksite, such as a personnel hoist, ladder, stairway, aerial lift, elevated work platform or scaffold, would be more hazardous or is not possible because of structural design or worksite conditions.

The suspended personnel platform design criteria, platform specifications, platform loading, rigging trial lift, inspection and proof testing, work practices, traveling, and pre-lift meeting shall comply with OSHA Standard 29 CFR 1926.550(g).

19.0 Welding and Cutting

Contractors shall obtain a Hot Work Permit from ***OSC***. prior to welding, cutting, grinding, or performing any other hot work.

The contractor requesting the permit shall address each item listed on the permit and resolve any problems prior to starting the work. ***OSC***. shall issue the permit to the contractor upon satisfactory completion of all items.

The contractor shall maintain a copy of the permit in the work area until the work is completed. Upon completion of the work, and once it is determined that no fire hazards exist, the contractor shall return the permit to ***OSC***. for filing.

20.0 Lockout/Tagout Clearance Procedures

Whenever service, maintenance, or inspection is performed on machines, equipment, or electrical circuits, it must be done with the machine, equipment, or electrical circuit stopped and isolated from all sources of energy. The energy isolation device(s) for that machine, equipment, or electrical circuits must be locked out and tagged out in accordance with a documented procedure. ***OSC***. lockout/tagout procedure shall be followed when required. Employees involved in the energy control program must be given training. When contractor employees are performing work within a plant or facility, they must coordinate with ***OSC***. and any other employer to ensure that no employees are endangered. When a group of employees is performing a service, maintenance, or inspection activity, each employee must be afforded protection equivalent to the utilization of individual lockout/tagout.

20.1 Control of Hazardous Energy Procedure (Lockout/Tagout)

This procedure establishes the minimum requirements for the lockout/tagout of energy isolating devices whenever maintenance, servicing, or inspection is done on machines, equipment, or electrical circuits. It shall be used to ensure that the machine, equipment, or electrical circuit is stopped, isolated from all potentially hazardous energy sources, and locked out before employees perform any servicing, maintenance, or inspection where the unexpected energization or startup of the machine, equipment, or electrical circuit or release of stored energy could cause injury.

All contractors are required to comply with the restrictions and limitations imposed upon them during the use of lockout/tagout. The authorized employees are required to perform the lockout in accordance with this procedure. All employees, upon observing a machine or piece of equipment, which is locked out to perform servicing, maintenance, or inspection, shall not attempt to start, energize, or use that machine or equipment. Failure to follow the control of hazardous energy procedure will result in disciplinary action.

20.2 Sequence of Lockout

- First, notify all affected employees that servicing, maintenance, or inspection is required on a machine, equipment or electrical circuit and that the machine, equipment, or electrical circuit must be shut down and locked out to perform the servicing, maintenance, or inspection.
- Second, the authorized employee shall refer to any and all sources to identify the type and magnitude of the energy that the machine, equipment, or electrical circuit utilizes, shall understand the hazards of the energy, and shall know the methods to control energy.
- Third, if the machine, equipment, or electrical circuit is operating, shut it down by normal stopping procedure (depress stop button, open switch, close valve, etc.).
- Fourth, deactivate the energy isolation device(s) so that the machine, equipment, or electrical circuit is isolated from all energy sources
- Fifth, lock out the energy isolation device(s) with assigned individual lock(s).

- Sixth, stored or residual energy (such as that in capacitors, springs, elevated machine members, rotating flywheels, hydraulic systems, and air, gas, steam, or water pressure, etc.) must be dissipated or restrained by methods such as grounding, repositioning, blocking, bleeding down, etc.
- Seventh, ensure that the equipment is disconnected from the energy source(s) by first checking that no personnel are exposed, then verifying the isolation of the equipment by operating the push button or other normal operating control(s) or by testing to make certain the equipment will not operate**. CAUTION: Return operating control(s) to neutral or off position after verifying the isolation of the equipment.**
- **Eighth,** the machine, equipment, or electrical circuit is now locked out. The employee(s) that installed the lock shall apply tag(s) identifying who locked the piece out, the date, and the time.

20.3 Restoring Equipment to Service

When the servicing, maintenance, or inspection is complete and the machine, equipment, or electrical circuit is ready to return to normal operating condition, the following steps shall be taken, in the following order:

- Check the machine, equipment, or electrical circuit and the immediate area around the machine, equipment, or electrical circuit to ensure that nonessential items have been removed and the machine, equipment, or electrical circuit components are operationally intact.
- Check the work area to ensure that all employees have been safely positioned or removed from the area.
- Verify that the controls are in neutral.
- Remove the lockout/tagout devices and re-energize the machine, equipment, or electrical circuit. **NOTE: The removal of some forms of blocking may require re-energization of the machine before safe removal.**
- Notify affected employees that the servicing, maintenance, or inspection is complete and the machine, equipment or electrical circuit is ready to use.

21.0 Site Security

The following steps should be taken to assure site security:

- Company vehicles shall be the only vehicle brought on the construction site.
- Employees and subcontractors employees will be provided designated parking.
- Employees are subject to search at any time while leaving the construction site.
- An entrance will be available for all subcontractor and employees to use.
- A security fence will be place around the construction site for security reasons.
- ***OSC*** is not liable for lost or stolen material and equipment.
- The use of illegal drug or alcohol is prohibited on all ***OSC*** projects.

22.0 Monthly Reporting

Each month, each subcontractor may be required to submit a Monthly Man-hour Summary Report to the ***OSC*** Project Manager. In turn, the Project Manager will report the Summary Report to ***OSC***'s Corporate Health & Safety Director. This report contains statistical data on all first aid cases, recordable incidents, and lost time accidents. The report in general will provide frequency rates and incident rate as well as severity.

OSC

SUBCONTRACTOR'SACKNOWLEDGMENT Of
Subcontractor Safety Protocol Requirements

I have read and understand the foregoing ***OSC*** Safety Protocol. By signing I agree to abide by these requirements and the Site Specific HASP. *

Company Name:

Sub-Contractor Company Representative Signature: Date:

OSC Representative Signature Date:

* Note: If the Company wishes to abide by its own Company Safety Plan, it must be submitted to the Health, Safety and Environmental Director of ***OSC*** for approval.

THIS IS TO BE FILED IN THE MAIN OFFICE JOB FOLDER AND MAIN OFFICE FOLDER.

Health and Safety Audit Criteria

The purpose of the health and safety audit is to provide ***OSC*** and subcontractors leading indicators to verify field compliance with health and safety practices and procedures and feed this information back to improve field practices on all construction projects.

Methodology

Field auditors will audit general practices and procedures using these specific criteria.

- Whenever possible, auditors shall be accompanied by ***OSC*** health and safety personnel assigned to the specific area being audited.
- Feedback will be given to health and safety field personnel in a timely fashion. **NOTE: If a serious problem is noted, the information will be relayed to a Health and Safety Coordinator immediately.**
- Whenever possible, audits will note the subcontractor performing the work.
- Observations sheets will be scored and data accumulated for a particular general practice or procedure.
- Results of the audits will be fed back to the appropriate personnel or subcontractor in order to achieve timely and consistent improvement in a general practice or procedure.

Audit Criteria

Specific criteria for each of the general practices/procedures to be audited can be found on the attached sheets. These specific criteria outline areas that field auditors should be focusing on in the field and are the basis for determining if an observation is in or out of compliance.

- Fall Protection
- Personal Protective Equipment
- Ladder and Lift Use
- Hazardous Materials
- Confined Space
- Lockout/Tagout and Electrical Hot Work
- Electrical (grounding, etc.)/Fire Protection and Hot Work
- Scaffolding

Fall Protection Audit Criteria

A fall protection system is used whenever work is being performed at a height above 6 feet. The feet of a worker comprise the point of measurement for the 6-foot rule. Fall protection may be accomplished by use of the following systems:

- Ladders, lift units, and scaffolding qualify as fall protection as long as the body of the worker remains in the plane of the equipment/structure and the equipment/structure is properly set up and secured.
- Guardrails, static lines, anchor points, nets, and vertical lines must be properly located, constructed and anchored. Documentation is required for static line installations.

- Personal protective equipment including lanyards and full body harnesses is approved and in good condition.
- Positive fall protection is effectively utilized to ensure that no more than six feet of free-fall can occur. An example of where more than six feet of free fall can occur is when a worker walks out their retractable over six feet. **Exception: When working within the plane of a properly installed ladder, fall protection is not required.**

Work practices are listed below:

- Lanyards are not looped.
- Ends of rebar are capped where impalement cannot occur (below five feet).

Ladder and Lift Audit Criteria

Ladders

- Commercial grade ladders only, with exception of wood gang ladders.
- Structural defects are repaired immediately or *DO NOT USE* label attached conspicuously.
- Secured against accidental movement by:

  1. Access ladders tied off
  2. Set on a stable base
  3. Set at safe climbing angle: 4:1 ratio or 70 degrees
  4. Worker retains three points of contact with ladder
  5. Tools and equipment are not carried while climbing
  6. Body remains in plane of ladder
  7. Top two rungs not used

- Gang ladders shall not be used to access areas higher than 20 feet.

Forklifts

- Platforms are approved and secured to unit.
- Operator remains at controls.

Manbaskets and Cranes

- Critical Lift Plan has been filed with ***OSC***. Critical lift is when 85%, or more, of the crane capacity is used.
- Annual crane inspection available
- Daily maintenance logs

Aerial Lifts

- Personnel are trained and authorized.
- Equipment is in good operating condition, meaning that no leaks occur and operations are smooth.
- All equipment and controls will be tested at the beginning of each shift to assure that the controls, breaks and operating system are all in working condition.
- If the equipment needs to be utilized for a task that was not intended by the manufacturer, field modifications may be completed onsite only with written approval from the manufacturer.
- Travel is in lowered position when possible or overhead obstructions are taken into account.
- When electrical lines 50 kV. or below are present, employees will ensure that there is at least 10 feet between the lines and any part of the equipment/load.
- Load is under maximum rating.
- Guardrails and toeboards in place and used; gate secured.
- When the equipment is in use, employees will have their feet planted firmly on the floor of the basket and will not climb on the edge of the basket or extended the platforms height through use of ladders, platforms, planks or other devices.
- All equipment will have a reverse signal alarm that can be heard above surrounding noise. If the reverse signal is not present an employee will act as a "spotter" to guide the operator when in reverse.
- Full body harness and lanyard used (boom-extended lifts only).
- Fueling performed with engine off.
- Battery recharge occurs in clean, well ventilated, flame free area.
- Housekeeping on platforms adequate to prevent slips and falls and material falling on workers below.

Personal Protective Equipment Audit Criteria

Eye Protection

- Safety glasses or goggles meeting the ANSI Z87.1 standard must be worn in all construction zones.
- Sideshields shall be fixed and meet ANSI Z87.1 requirements.
- High eye injury potential work (welding, grinding, cutting brick or steel, etc.) requires additional eye and face protection such as a face shield or welders goggles.

Foot Protection

- Work boots must meet the ANSI Z41.1 requirement.
- Leather boots reaching above the ankles are required in construction zones.
- Rubber boots are acceptable for concrete work only.

Head Protection

- Approved hard hats are required in the construction zone. (ANSI Z89.1)
- Hard-hats may not be worn backwards.

Hand Protection

- Heavy gloves are worn when handling materials that present a cut hazard.

Hazardous Materials Audit Criteria

Storage

- Materials are stored in approved areas and within secondary containment. Exceptions are granted for pending use materials of low environmental toxicity, such as latex paint, upon the discretion of the ***OSC*** Site Health and Safety Officer.

- Incompatible materials are separated.
- Leaks and drips are not apparent.
- A responsible individual is identified on signage in each major area.

Use

- Workers are using appropriate personal protection equipment.
- Engineering controls, such as ventilation, or administrative controls are implemented where necessary.
- Lids and caps are secured on containers when not in immediate use.
- Leaks and drips are not apparent.

Training, Labeling and Material Safety Data Sheets (MSDSs)

- All containers are clearly labeled for contents and hazards.
- MSDSs are on site or at the subcontractor's office area.
- Workers have attended the ***OSC*** Hazcom/Environmental training class.
- *No Smoking* signs are posted and observed around flammable and combustible materials.

Confined Space Audit Criteria

- Confined spaces, including manholes, tanks, rooms under construction, excavations, etc., have been evaluated and classified as permit or non-permit required.
- A Confined Space Entry Plan form has been completed and is current.
- When chemicals are planned for use as part of the entry, the ***OSC*** project superintendent has approved and signed approval.
- Lockout/tagout procedures are used where required and a double valve system is used to protect workers in the confined space.
- Confined spaces are signed as such indicating *Danger* and *Entry by Permit Only*.

Lockout/Tagout & Electrical Hot Work Audit Criteria

- Any system posing a risk of a hazardous energy (electrical, hydraulic, chemical, pneumatic, mechanical, etc.) shall be locked out and tagged prior to maintenance, servicing, adjusting, cleaning or additional construction.

- A ***OSC*** Lock-Out/Tagout Plan has been completed and is current for work being performed.
- Subcontractors are following a lockout/tagout procedure that is written and compliant and at least as stringent as ***OSC*** plan.
- Locks and tags remain on the lockout device until the job is completely finished and all potential of the release hazardous energy is removed.
- One lock and tag per worker working on the job is installed on the lockout device. Each lock is under the exclusive control of a worker and tags are identified with the worker's name, photo, and date of work.

Electrical/Fire Protection & Hot Work Audit Criteria

Electrical

- Maintenance of electrical equipment shall be achieved in one of two of the following ways:

  1) Through the use of an Assured Equipment Grounding Program **[IF USED IN PLACE OF "GFCI"].** Tested equipment shall be color coded as follows:

     White January through March

     Green April through June

     Red July through September

     Orange October through December

  2) Through the use of Ground Fault Circuit Interrupters (GFCIs)

- Defective equipment shall be tagged and removed from service.
- Only construction grade extension cords are used.
- Cords are strung overhead, using a non-conductive material.

Fire Protection & Hot Work

- Fire extinguishers are provided throughout the area and locally in specific hot work areas.
- A current hot work permit has been issued and posted.
- A fire watch is being performed if so required by the permit.
- Combustible and flammable materials do not provide fuel to a potential fire.
- Welding shields are in place.

Scaffolding Audit Criteria

- A Scaffold Plan has been filled out for any scaffolding exceeding 20 feet and a ***OSC*** health and safety staff person prior to use shall approve all scaffolding.
- Scaffolding is constructed on firm and level ground.
- Adequate sills and base plates are provided.
- Scaffold use is greater than 10 feet from power lines.

- The ***OSC*** superintendent for the area has approved use by multiple contractors and each contractor inspects scaffold prior to use.
- A competent person performs daily inspections on scaffolds.
- Damaged equipment is tagged and put out of use.
- Access ladders should not exceed 20 feet without a break.
- Cross braces shall not be used for climbing.
- Suspension scaffolds require an independent safety line for each employee who shall wear a full body harness.
- Planks, guardrails, and toeboards are installed in compliance with OSHA requirements and in good condition.
- Loads do not exceed ratings, meaning that light loads use 25 lb./sq. ft. and medium loads use 50 lb./sq. ft. and heavy loads use 75 lb./sq. ft.
- Scaffolds are braced at appropriate ratios (i.e. 4:1 for metal, 3:1 for aluminum).
- Tower scaffolds will not exceed four times the smallest base dimension.
- Scaffolding will be secured to structures every 30 feet horizontally and every 26 feet vertically.
- Personnel shall not ride rolling scaffolds.

Appendix “C”

Forklift Inspection Forms

Daily Inspection Checklist

For Yard Forklift Truck/Rough Terrain Forklift Truck

Key Off Procedures

- The vehicle inspection

  - [ ] Overhead guard
  - [ ] Hydraulic cylinders and hoses
  - [ ] Mast assembly
  - [ ] Boom assembly
  - [ ] Lift chains and rollers
  - [ ] Forks
  - [ ] Tires
  - [ ] LPG tank and locator pin
  - [ ] LPG tank hose
  - [ ] Gas gauge

- Check the engine oil level
- Examine the battery
- Inspect the hydraulic fluid level
- Check the engine coolant level

Key On Procedures

- Test the standard equipment

  - [ ] Front, tail, brake lights and four-way flashers
  - [ ] Fuel gauge (if diesel)
  - [ ] Windshield wiper
  - [ ] Heat

Engine Running Procedures

- Check the gauges
  - ☐ Oil pressure indicator lamp
  - ☐ Ammeter indicator lamp
  - ☐ Ammeter
  - ☐ Hour meter
  - ☐ Water temperature gauge
- Test the standard equipment
  - ☐ Steering
  - ☐ Brakes
  - ☐ Horn/Back-up warning device
  - ☐ Safety seat (if equipped)
  - ☐ Seat belts
- Check the operation of the load-handling attachments
- Check the transmission fluid

Daily Inspection Checklist: Supplemental Guide

Look for:
Overhead Guard

- Are there broken welds, missing bolts, or damaged areas?

Hydraulic Cylinders/Hoses

- Is there leakage or damage on the lift, tilt, and attachment functions of the cylinders or hoses?

Mast Assembly

- Are there broken welds, cracked or bent areas, and worn or missing stops?

Lift Chains and Rollers

- Is there wear, damage or kinks, signs of rust, or any sign that lubrication is required?
- Is there squeaking?

Forks

- Are the forks cracked or bent, worn, or mismatched?
- Is there excessive oil or water on the forks?
- Are the forks or attachments altered? If so, did the manufacturer OK?

Tires

- What do the tires look like?
- Are there large cuts that go around the circumference of the tire?
- Are there large pieces of rubber missing or separated from the rim?
- Are there missing lugs?
- Is there bond separation that may cause slippage?
- Are the tire pressures equal and in the proper range?

Battery Check

- Are the cell caps and terminal covers in place?
- Are the cables missing insulation?
- Is the battery secured in place?

Hydraulic Fluid

- Check level?

Gauges

- Are they all properly working?

Steering

- Is there excessive free play?
- If power steering, is the pump working?

Brakes

- If pedal goes all the way to the floor when you apply the service brake, that is the first indicator that the brakes are bad. Brakes should work in reverse, also.
- Does the parking brake work? The truck should not be capable of movement when the parking brake is engaged.

Lights

- If equipped with lights, are they working properly?

Horn

- Does the horn and the back up warning horn work?

Safety Seat

- If the truck is equipped with a safety seat is it working?

Load Handling Attachments

- Is there hesitation when hoisting or lowering the forks, when using the forward or backward tilt, or the lateral travel on the side shift?
- Is there excessive oil on the cylinders?

Propane Tank

- Is the tank guard bracket properly positioned and locked down?

Propane Hose

- Is it damaged? It should not be frayed, pinched, kinked, or bound in any way.
- Is the connector threaded on squarely and tightly?

Propane Odor

- If you detect the presence of propane gas odor, turn off the tank valve and report the problem.

Engine Oil

- Check levels.

Engine Coolant

- Visually check the level. Note: Never remove the radiator cap to check the coolant level when the engine is running or while the engine is hot. Stand to the side and turn your face away. Always use a glove or a rag to protect your hand.

Transmission Fluid

- Check levels?

Windshield Wipers

- Do they work properly?

Seat Belts

- Do they work?

Safety Door (found on stand-up rider models)

- Is it in place?

Safety Switch (found on stand-up riding tow tractors)

- Is it working?

Hand Guards (stand up riding tow tractors, walking pallet trucks, walking trans-stackers)

- Are they in place?

Tow Hook

- Does it engage and release smoothly?
- Does the safety catch work properly?

Control Lever

- Does the lever operate properly?

Safety Interlock (found on order pickers)

- If the gate is open, does the vehicle run?

Gripper Jaws (found on order pickers)

- Do the jaws open and close quickly and smoothly?

Work Platform (found on order pickers)

- Does the platform raise and lower smoothly?

Operator's Daily Report

For Battery-Powered Lift Trucks

Company _____ Jobsite _____

Truck # _____ Make _____

Date _____

Hour Meter Reading: Start _____ ***End*** _____ ***Total*** _____

CHECK EACH ITEM If OK, write "OK"	**SHIFT** Start	 End	Explain below if not OK or any other action taken
1. Battery plug connection			
2. Battery charge			
3. Battery load test			
4. Brakes service and seat brake			
5. Lights-head, tail and warning			
6. Horn			
7. Hour meter			
8. Steering			
9. Tires			

10. Hydraulic controls			
11. Other conditions			

Remarks and additional explanation or suggestions: _____

_____

_____

_____

_____

Operator's Signature: _____

Industrial Truck Inspection and Maintenance Log

Truck No.	Make	Work Done		Work Description or Remarks	Cost
		Date	Hour Meter		

Appendix “D”

Industrial Lead Abatement Compliance Program and Procedures

OSC

Industrial Lead Abatement Compliance Program and Procedures

July 30, 2010

(Revised)

By Stephen M. Robinson CSS, CST, CIPS

INDUSTRIAL AND STEEL STRUCTURES
LEAD ABATEMENT SAFETY, HEALTH AND COMPLIANCE PROGRAM

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APPENDICES

1. Site-Specific Compliance Plan

CHAPTER ONE
LEAD PAINT ABATEMENT/CONTACT ACTIVITIES

INTRODUCTION

This program focuses on those workplace activities which disturb lead-based paint. This includes the activities of abatement workers, building owners, maintenance workers, workers engaged in structural steel or concrete work such as laborers and painters or demolition crews, those who supervise such work, and the contractors that employ them. This program does not address others associated with lead-based paint issues such as inspectors, designers/planners, risk assessors, and other professionals.

A. Pre-Job Activities

The following pre-job activities are essential elements for any job involving leaded paint, to assure the protection of workers, the public, and the environment. Each project may have specific and often different elements which must be addressed.

Inspection: The surfaces involved in the work must be determined or assumed to be lead-based paint in the absence of positive information to the contrary.

Design: The work addressed in this program which involves contact with lead-based paint is varied in both potential risk and scope. In order to conduct work in a particular activity which involves disturbance of lead-based paint it is important that the work be planned from the perspective of recognition and job specific control of the lead hazard.

Specifications: It is essential that contract specifications contain requirements related to worker protection requirements, including training. All applicable environmental regulations should also be referenced in the contract.

Pre-Bid Conference: Contractors interested in bidding on work involving contact with or abatement of lead-painted structures must be required to attend a pre-bid conference. At this meeting, contractors should be fully apprised of the scope of the project, including measures required for the protection of workers, public health, and the environment.

Bid Selection: Only contractors with lead paint experience or related experience who have included an effective worker and environmental protection program in their bid response should be awarded this type of work.

Pre-Job Conference: After award and prior to engagement of work, a pre-job conference is a useful mechanism for the contractor and owner to assure that all issues regarding the work are understood and that any unique requirements such as special permits have been addressed and are in order.

Hazard Evaluation: A hazard evaluation specific to the actual work is an important element in assuring that proper worker protection decisions have been made and that those decisions remain valid over the course of the job. A pre-job hazard evaluation is essential to preparation of the bid, although evaluations are also an ongoing activity during the course of the job (triggered, for example, by review of worker blood lead test results or when change orders are issued). A post-job hazard evaluation is appropriate in providing assurances that clearance levels have been

achieved, debris has been properly disposed of, and the facility is safe for re-occupancy.

Site Safety and Health Plan: Site-specific worker protection plans are important components in construction jobs in general, and especially for those jobs involving hazardous exposures, materials, or activities. Such plans provide a basis for consideration of common abatement hazards such as heat stress and electrical safety; as well as common work practices like air monitoring, means of engineering and work practice controls. This compliance program will be revised and updated regularly and supplemented as necessary by a site-specific safety plan for special job hazards.

Training: All personnel engaged in any aspect of lead-based paint work must have pre-job and annual medical exams with particular emphasis on baseline blood level and ability to wear respiratory protective devices, on-going medical surveillance, and an exit examination upon termination of the job. These are outlined in the Medical Surveillance section of this document and the OSHA standard under 29 CFR 1926.62.

B. Lead-Based Paint Abatement

The following are major elements of abatement work which must be addressed after pre-job activities:

Workplace Set-up: Containment, decontamination and other safety accommodations appropriate to the worksite must be specified. Examples are enclosures for highway bridge work or sealing off a single room in a residence.

Engineering Controls: The engineering controls to be used on the job as a means of reducing exposures to workers, the public, and the environment must be specified. Examples can include ventilated negative pressure enclosures, HEPA vacuum equipped tools, wet-blasting, vacuum blasting and exhaust ventilation.

Work Practices and Procedures: The practices and procedures to be used on the job must be specified, particularly when based upon identified work practices and procedures.

Worker Protection Procedures: The worker protection procedures for the specific job must be established based on the nature of the work, the practices and procedures being employed, the hazard analysis, the OSHA Lead standard, and relevant EPA, state or local requirements.

Prohibited Practices: Practices or procedures which are prohibited by local or state authorities, Federal regulations, or which place workers at high risk of harm must be identified. As examples dry sanding, solvent stripping and open flame torch removal in residential units is prohibited; torching a steel beam without prior stripping of the leaded paint in the cut zone prohibited. All such practices may result in high lead exposures.

Secondary Exposures: Potential exposures to bystanders or persons in other areas of a large public or commercial building, or drift of contaminated dust into a schoolyard are examples of secondary exposures which must be prevented during the course of the job. Procedures to ensure that lead is not carried home with workers must also be followed, to prevent exposures to the families of these workers.

Environmental Issues: Containment of the environment in the immediate vicinity of the job, proper collection and disposal of contaminated debris, air-testing outside of containment, and post abatement clearance testing are some of the items that must be addressed.

C. Other Related Construction Activities

There is a wide range of construction activities involving contact with lead-based paint. Examples include bridge renovation/repair, water tank renovation, and industrial facility demolition. Many of these activities can result in airborne lead exposures which are extremely high, in tens of thousands of micrograms per cubic meter. These activities present a very real health threat to workers, the public and the environment, and therefore must be carefully planned, monitored and supervised.

CHAPTER TWO
MEDICAL CONSIDERATIONS

A. History

Lead is a heavy metal used since ancient times for its corrosion resistance and malleability. For almost as long, various compounds of lead have been used as pigments in paint. In the first century A.D., lead poisoning was described among shipbuilders using lead-based paint. Lead's popularity stems from its chemical, corrosion-resistant properties as well as from its physical properties. The rich color imparted by the various lead pigments made it the preferred indoor paint of those who could afford it. Lead paint is particularly useful for outdoor metal structures, because it protects against corrosion, and expands and contracts with the substrate.

Epidemics of lead-paint poisoning occurred among inner city children from the 1940's onwards, coinciding with urban demographic shifts that placed large numbers of poor children into once-elegant but deteriorating housing stock. It is estimated that 13 million children live in lead painted housing in the United States, and that 90,000 bridges are coated with lead-containing paint. Lead paint has long been a significant source of lead poisoning in painters and among the urban poor. As background population lead levels have declined following the removal of lead in gasoline and the resultant decrease in air pollution, attention has once more focused on paint as a source of poisoning.

B. Physiology

Inorganic lead enters the body through ingestion or inhalation. Children will absorb lead more efficiently from the gut than will adults, and lead absorption is enhanced in the presence of iron or calcium deficiency. Nutritional deficiencies are common among children and pregnant and lactating women in general, and among poor women and children in particular.

Although lead paint is not directly absorbed through the skin, children are exposed to lead dust through play and constant hand-to-mouth activity. High dust lead levels, due to paint deterioration over years, may be increased through traditional abatement procedures, with a concurrent rise in children's blood lead levels.

Additional sources of lead dust include automobile exhaust and factory emissions. Lead deposited over decades remains available in soil for childhood hand-to-mouth ingestion exposure. Although adults absorb a smaller fraction of ingested lead, contaminated food, drink and cigarettes at the worksite may contribute to exposure levels. The principal route of entry during occupational lead exposure is through inhalation. Natural respiratory defenses effectively trap the larger particles over ten microns in diameter, which are then coughed and spit or swallowed.

However, processes that generate fine droplets (painting/spray-painting), fine dust (sanding/grinding), or fumes (burning/torch work) will generate large clouds of respirable particles capable of bypassing the lung's protective defense mechanisms and reaching the airsacs. Once in the airsacs, small lead particles may pass into the bloodstream. Depending on exertion levels and breathing patterns, an individual exposes a cross-sectional area of lung membrane the size of a

tennis court with 10,000 to 20,000 liters of air daily. The potential for inhalation exposure is enormous.

Once absorbed, lead travels with the red blood cells, and can be measured in the blood within a few days of exposure. Blood lead will remain elevated after exposure ceases for the life of the red cell, or about three months, after which levels decline. During the time lead is in circulation, distribution to various soft tissues, including the brain and kidneys occurs, and lead is transferred to the hard tissues (bone).

While lead in circulation is excreted primarily through the kidneys, bony stores become progressively more tightly bound and create long-term deposits. Adults have nearly 95% of their total body lead in bony storage, while for children the figure is around 70%. The half-life of lead in skeletal storage is about 30 years. X-ray fluorescence (XRF), a technique used to sample paint for metal content, has been adapted to provide a direct reading of lead content in bone.

C. Pathology

This bony lead storage represents a third potential source of exposure. In persons with past and present levels of exposure, bony storage remobilization probably reflects about one third of the circulating blood lead level. For persons with prior overexposures, this can actually be much higher, particularly during times of increased bone turnover. Women mobilize bony stores during pregnancy, lactation, and menopause. Workers with many years of lead exposure may maintain chronically elevated blood lead levels.

Although serious lead poisoning has been recognized for two thousand years, more subtle adverse health effects of lower levels of exposure are still being discovered. Classic lead poisoning - with colic, lethargy, coma or seizures, anemia, nerve palsy, and renal disease - may occur at levels generally above 80 ug/dl in adults, although there is wide variability. Some individuals may be a symptomatic at levels which would be lethal to others. Most adults will begin to experience lethargy, fatigue, irritability, forgetfulness, and either constipation or diarrhea and/or abdominal pain at levels above 50-60 ug/dl. These symptoms are non-specific, and in adults with blood lead levels less than 40 ug/dl alternative explanations must be sought (even in patients with high body stores). Men may experience impotence and poor sperm quality at these levels.

There is some evidence that the wives of lead workers have increased rates of spontaneous abortions. Lead acetate was used historically as an abortifacient, and reports from the last century describe adverse reproductive effects on female lead workers. Lead freely crosses the placenta and is excreted in breast milk.

There are several types of renal disease caused by lead. Early on a reversible proximal tubular defect occurs. After many years of high level poisoning, irreversible interstitial nephritis occurs. End stage renal disease causing hypertension and increased deaths from stoke occur with high level chronic poisoning. Lead also impairs renal uric acid excretion, causing "saturnine gout."

Until the first wave of lead prevention programs were instituted in the early 1970's, thousands of cases of childhood lead poisoning were reported annually, with hundreds of deaths. There is strong evidence for adverse central nervous system and blood pressure effects across large populations at very low exposure levels. Downward shifts in I.Q. and upward blood pressure

shifts at this level are not measurable or treatable in the individual patient, but are problems of enormous societal and public health importance.

D. Medical Surveillance

Medical surveillance for lead workers, who have been exposed above action levels for more than 30 days, has two purposes: to make sure the worker has no contraindication to lead exposure, and to detect poisoning early and remove the worker from further exposure. Medical clearance for respirator use is part of the first goal. The new OSHA standard for construction requires medical surveillance when airborne exposure reaches 30 ug/$m^{3,}$ and this involves a physician evaluation to include history and physical examination and general laboratory testing for anemia or renal dysfunction. Sperm tests are to be available on request, although interpretation of abnormalities in these tests remains difficult. The worker is to have baseline blood lead levels and ZPP levels with analysis performed by OSHA listed laboratory (list available from 801-524-4270), and these are to be monitored in a follow-up. The lead level permitted is high: one sample over 50 ug/dl. Return to exposure is permitted when the lead level has fallen below 40 ug/dl. Frequency of testing is determined by air sampling and biological monitoring results, but is no more often than every two months for employees working with lead (monthly for those out on removal protection). Neither blood lead levels nor ZPP provides information about cumulative skeletal lead stores.

Evidence suggests that reproductive effects in both sexes, may occur at 30ug/dl blood lead levels. A state-of-the-art protection program should consider this as an internal removal level and 20 ug/dl as an internal "return-to-work" level. Additionally, 15 ug/m^3 has been suggested as a state-of-the-art eight-hour TWA, internal Permissible Exposure Limit. Monthly or semi-monthly biological monitoring is recommended for state-of-the-art protection of lead abatement workers.

All medical surveillance is to be performed by/supervised by a licensed professional, at no cost to the employee.

E. Other Medical Concerns

Lead abatement workers face safety and health problems common to all construction workers, with additional burdens imposed by hazardous materials handling. Solvents and caustics used in the removal process may cause skin irritation or sensitization as well as eye/nose/throat and upper respiratory irritation. Acute neurotoxicity from solvent exposure may increase safety hazards, and various solvents have hepatotoxic effects as well. Heat effects are magnified by use of protective gear, increasing cardiovascular and respiratory work loads. Heat cramps, heat exhaustion, and heat stroke must be anticipated, recognized and prevented.

CHAPTER THREE
PROTECTIVE WORK PRACTICES
Lead-Based Paint Abatement on Structures and in Industrial Facilities

A. Purpose

Lead-based paints can be found on various substrates in commercial and industrial structures. Lead-based paint removal or disturbance from wood, dry wall, or plaster substrate should follow the guidelines recommended for work in steel structures and commercial facilities in Appendix 2. The unique aspect of industrial lead paint is its presence on steel and concrete structures. Abrasive blasting, welding, or torch cutting - processes likely to be used on lead painted steel - create worker exposure hazards that are likely to greatly exceed those encountered in residential work. This chapter discusses the occupational lead hazard as it relates to work on structural steel, concrete, and other surfaces.

B. Factors Affecting Abatement

Construction works engaged in repair, renovation, maintenance, and demolition of lead-painted steel structures, concrete, and other surfaces are at risk of extremely high lead exposures. Even as the scientific community debates the effects of low level lead exposure in adults and as the blood lead intervention level in children is lowered, construction workers with acute lead poisoning are being seen in hospitals and clinics throughout the country.

Among other things, the national health goals embodied within the Department of Health and Human Services (DHHS) *Healthy People 2000* report aim to reduce blood lead levels among workers to that of the general population as an overall goal, but no greater than 25 ug/dl of whole blood as a specific goal.

Construction activities on lead-painted structures also contribute to potential community and environmental contamination. For instance, abrasive blasting of water tanks in residential communities has led to contamination of homes and schools. While this document does not specifically addresses this issue, work practices and contractor requirements are necessary to protect the environment and the community.

1. Use of Lead-Based Paints on Industrial Structures.

   The use of red lead (lead tetraoxide) on steel structures has been common practice for several decades. Lead-based paints are easily applied, penetrate and adhere well to surfaces, and prevent corrosion. The importance of using an anti-corrosive coating on metal structures was dramatically emphasized with the collapse of the Wynch Bridge over the River Tees in England. Built in 1741, the Wynch Bridge was the first iron bridge ever built. Corrosion of the bridge's chains caused its collapse after only 60 years of use. The collapse of

Connecticut's Mianus Bridge in 1983 serves as a reminder that steel bridges still demand regular maintenance in order to preserve their structural integrity.

In the late 1960's to 1970's, basic lead silico chromate (BLSC), began to replace red lead systems and is now the most common type of leaded paint used on steel structures. BLSC is 47% lead oxide, 48% silica, and 5% chromic acid. Other leaded paints that have been used in industrial applications to a lesser extent are blue lead (78% basic lead sulfate, 10% lead sulfide, and 4% lead sulfide + zinc oxide and carbon), lead suboxide, and zinc yellows.

Lead-based paints have served as a durable and economical anti-corrosive over the years. These attributes have led to their use on hundreds of thousands of steel structures such as bridges, water and fuel storage tanks, and transmission towers. Based on a 1991 Steel Structures Painting Council (SSPC) survey, approximately 35-40% of all structural steel is coated with lead-based paints. For those structures that are built to withstand exposure to moisture, such as storage tanks and bridges, the percentage coated with lead paint is considerably greater. Today, it is estimated that 90,000 bridges in the U.S. are coated with lead-based paints. Approximately 80% of the bridges that were repainted in the U.S. between 1985 and 1989 were found to have lead coatings.

While the use of lead in consumer paints has been banned, there are no similar restrictions on the lead content of industrial paints. Most experts agree, however, that the use of lead pigments is no longer necessary from a materials engineering perspective. Concentrations of lead pigment as high as 60-70% have been used in industrial paint. Voluntary elimination of lead-based paints by manufacturers, contractors, and specifiers has led to a gradual decline in their use in recent decades. Virginia Department of Transportation (DOT) found that 23 out of 40 states responding still specify the use of lead-based paint on bridge and elevated highways. Another study, however, funded by the Federal Highway Administration (FHWA) in 1988, indicated a significant decline in the use of lead-containing coatings by states between 1983 and 1988.

In some instances states may specify use of "lead-free" paints and simultaneously specify paint systems that contain lead pigment, such as that present in zinc-rich systems. For example, ANSI Safety Red, ANSI International Orange, and FAA Orange are all usually leaded unless the specific order requires them to be "lead-free." Lead-based paints are often used for maintenance of structures already coated with leaded paint. Many states use this approach to defer large scale abatement and renovation work.

Paints marketed as "lead-free" may still contain lead driers in very small amounts (less than 1%). However, air lead concentrations greater than OSHA's Permissible Exposure Limit have resulted when paints containing as little as 0.2% were removed using a power sander.

The deteriorating state of the nation's infrastructure and the Surface Transportation Act passed in late 1991 are expected to fuel a surge in bridge and elevated highway repair and renovation projects in the coming years. Lead paint abatement on bridges and water tanks has received considerable attention because the proximity of these projects increases their potential risk to the community or the environment. However, workers may encounter lead-

painted steel surfaces in a number of settings. Plant process equipment, utility transmission towers, marine vessels, railroad cars and road vehicles may all contain lead paint. The SSPC estimates 38% of steel in industrial facilities is covered with lead paint.

2. Processes Generating Lead Exposures and Exposed Populations

Although the source of lead paint exposure may vary with the structure, the processes that create a lead exposure hazard fall into three general categories:

a. Surface preparation (abrasive blasting, chemical stripping, etc.)
b. Welding, burning, and torch cutting
c. Other processes that mechanically disturb lead (e.g. demolition, grinding, etc.)

A great deal of research and investment in new technology has been directed at reducing lead exposure in the area of surface preparation. There is an urgent need for more research addressing other processes which generate lead exposure. Workers who are involved or are near any of these processes when they are occurring on a lead-painted structure are at risk of lead exposure.

Generally, these types of processes are carried out by construction workers. Examples of workers who are exposed include: painters and laborers (pot tenders) who commonly blast, sand or chemically strip lead-painted surfaces before applying fresh paint; ironworkers, pipe fitters, laborers, and other crafters who may weld or cut (using oxyacetylene torches) lead-coated steel; carpenters responsible for scaffold erection; and laborers responsible for cleaning up debris, thereby being exposed to lead dust. Workers who are ancillary to lead work, such as DOT inspectors and flag-persons, may also be exposed to lead dust generated from bridge and elevated highway projects.

Not only are workers themselves at high risk of lead exposure, so too are their families. Construction workers spend their work day in an environment that is extremely dusty. Their duties often require kneeling, sitting, or laying on contaminated surfaces to gain access to hard to reach places. Unlike most workers, construction workers often have limited access to soap and water on the job. On many jobs, clean drinking water may not even be available, let alone facilities for hand washing. Given these conditions, it is not surprising that construction workers serve as carriers of lead particulate into the home and the family car.

C. Working on Lead-Coated Surfaces

1. Contract Specifications and Pre-Bid Conferences:

Working safely on lead-containing structures is a complex task. It involves compliance with a number of environmental regulations designed to prevent pollution of air and water and to prevent reckless disposal of hazardous waste. This plan is designed to protect workers from lead and other hazards likely to be encountered during the course of the project.

Bidding opportunities should be presented only to contractors determined to be qualified, based on experience and past performance with regard to protection of worker health and the environment. SSPC Certification, bond rating, OSHA 300 logs, and previous OSHA citations are examples of criteria that could be reviewed for pre-qualification. Only licensed contractors and certified workers should be permitted to work on structures involving disturbance of lead. A system to enforce licensure and certification requirements shall be in place.

Because of the complexity of leaded structural steel projects, contractors must be fully informed of the full scope of the project and contractor responsibilities **before** the bid process begins. A pre-bid conference shall be scheduled to inform contractors of the potential for lead exposure and to discuss worker and environmental protection measures that must be incorporated into projects. Contract specifications should clearly delineate these measures. These measures must be explicitly stated in contract specifications in order to level the economic playing field and ensure that the responsible contractor will not be consistently underbid by a contractor who does not provide such protection. This is critical to the actual implementation of all protective measures outlined in this chapter. The NIOSH Alert: *Preventing Lead Poisoning in Construction Workers*, issued in revised form in April, 1992, as Publication No. 91-116a, may also be helpful in writing specification requirements.

2. Surface Preparation:

Proper surface preparation is necessary to prevent failure of paint systems. Old paint coatings, rust, and mill scale must be removed. A roughened texture is necessary in order to get sufficient adhesion of new paint. There are a variety of methods that can be used for surface preparation. Historically, open sand blasting has been commonly used because it was effective, inexpensive, and fast. Unfortunately, this method inflicts a massive toll to workers who may become disabled with silicosis, and it pollutes air, soil and waterways with tons of lead-contaminated debris. Today, the selection of a surface preparation method involves consideration not only of efficacy and efficiency, but also the potential impact on workers and the environment. Other methods of surface preparation are blasting, power tool cleaning (sanding, grinding, chipping), hand tool cleaning (sanding, wire brushing), and chemical stripping. Individual surface preparation methods are discussed below.

Abrasive Blasting - This process involves the use of sand, slag, metallic shot, or organic materials (e.g., ground corn cobs or nut shells) directed at surfaces under high pressure to remove paint, scale, and rust or to provide texture to surfaces. Sand or slag products (e.g., "Black Beauty") are the most common non-recyclable abrasives in use. Recyclable abrasives are used to a lesser extent but are becoming more popular since lead-contaminated waste is minimized. Water may be added into or in front of the blasting to form a misting action over abrasives hitting the painted surfaces. This reduces dust significantly; however, large volumes of lead-contaminated waste are generated with this method. Therefore, exposure to lead via ingestion is not eliminated, since surfaces will still be contaminated with lead.

Hydro/wet Blasting - High pressure water jetting is a hydro-blasting method that does not use abrasives. Highly pressurized water is held in close proximity to work surfaces to remove paint. this method does not remove mill scale. Dust is minimized, thereby reducing inhalation exposures. However, the presence of large volumes of lead-contaminated water creates the potential for exposure by ingestion. Wet blasting is sometimes impractical, however, for surfaces involving carbon steel due to the inherent tendency to flash rusting or problems with long term service life of the new coatings when corrosion inhibitors are used. When wet blasting is employed, steps must be taken to collect, transport, and dispose of water as well as solid waste.

Vacuum Blasting - Vacuum blasting may also be employed, although it is usually not appropriate for large structures or irregular surfaces. At all times when vacuum blasting, the shroud must be kept tightly sealed to the surface. The weight of the vacuum head coupled with the opposing force of the blast can only be managed by a worker for a limited amount of time. Vacuum blasting floors can be done for longer periods of time since the weight of the unit assists in maintaining the edge seals.

See specific guidelines on the specific type and features of containment required for meeting environmental regulations using a certain type of surface preparation technology (SSPC Guide 61(CON)): *Guide for Containing Debris Generated During Paint Removal Operations,* 1992).

Power Tool Cleaning - Pneumatic tools and electric power equipment such as grinding wheels, power sanders and wire brushes, power chippers, and needle guns are used to remove paint coatings through mechanical disturbance.

Hand Tool Cleaning - Hand sanding, wire brushing, and scraping may be used to remove loose paint or rust.

Chemical Stripping - Chemical strippers are troweled or sprayed on, allowed to set for several hours, and then scraped off. The type of stripper used depends on the type of paint being removed. Lead dust is minimized; however, contaminated debris is still a problem.

It should be noted that chemical strippers are not 100% effective in removing lead. Final blasting of chemical residue may therefore result in lead exposure.

Welding, Burning, and Torch Cutting - Lead melts at 328^{o} C, and boils at 1,740^{o} C. Thermal processes, such as welding and torch cutting, involve temperatures sufficiently high to generate extremely high levels of lead fume. Welding, burning, and cutting lead-painted surfaces should be prohibited wherever it is not physically possible to remove paint at least 6" from either side of the point of operation.

Welding is a process used for the joining of metals. Base metals are heated to temperatures ranging from approximately 5,000^{o} C for shielded metal arc welding to 20,000^{o} C for plasma arc welding.

Shielded metal arc welding or stick welding is exceptionally high. Table 3-11 lists exposures

exposures to less than 30 ug/m^3. Investigations conducted in the 1980s confirm that exposures below the current PEL of 50 ug/m^3 may cause 2,200-4,200 ug/m^3 during welding.

Oxyacetylene torches are commonly used to cut and bend steel. Oxyacetylene torches reach between 3,000 and 3,500^o C. Ironworkers may use torches to soften steel prior to breaking old rivets on bridges. Steel sections must be cut in sections during demolition work. Exposures measured during demolition of a water purification system produced a time weighted average exposure (TWA) of 21,330 +/- 11,440 ug/m^3 for six cutters. Studies reported the hospitalization of 11 out of a 12 member crew of oxy-burners for lead poisoning from exposures received during demolition of a railway station when metal beams coated with several coats of lead paint (up to 20% lead by weight/0.1% cadmium) had to be cut in short sections for removal.

Other Processes That Mechanically Disturb Lead - Renovation, repair, and demolition of industrial structures involve several activities that may create mechanical disturbance of lead paint and dust. Ironworkers may use pneumatic chipping hammers to break rivet (rivet busters), laborers may break up asphalt or concrete using jack hammers, and carpenters may use power saws to cut scaffold boards coated with lead paint or debris.

D. Compliance Hierarchy

1. Engineering and work practice controls
   a. Where any employee is exposed to lead above the PEL for more than 30 days per year, we will implement engineering and work practice controls (including administrative controls) to reduce and maintain employee exposure to lead, except to the extent that the we can demonstrate that such controls are not feasible. Wherever the engineering and work practice controls which can be instituted are not sufficient to reduce employee exposure to or below the permissible exposure limit, we will nonetheless use them to reduce exposures to the lowest feasible level and shall supplement them by the use of respiratory protection which complies with the requirements of Section E of this chapter.
   b. Where any employee is exposed to lead above the PEL, but for 30 days or less per year, we will implement engineering controls to reduce exposures to 200 µg/m^3, but thereafter may implement any combination of engineering, work practice (including administrative controls), and respiratory controls to reduce and maintain employee exposure to lead at or below 50 υg/m^3.

2. Respiratory Protection

   Where engineering and work practice controls do not reduce employee exposure to or below the PEL, we will supplement these controls with respirators in accordance with Section L., below.

E. Engineering Controls

Weak regulatory protection, competitive bidding markets, and highly mobile work settings have delayed development and use of engineering controls in construction work. While it has always been a fundamental principle of industrial hygiene to control exposures at the source, there are additional reasons unique to lead-painted steel projects that accentuate the need for this approach. These reasons include: exposures that outstrip the protective capacity of respirators, safety hazards related to respirator use, a toxicity level that makes ingestion of even small amounts of lead hazardous, and the need to minimize hazardous waste. Engineering controls shall be designed into the project specifications, in-so-far as feasible.

Exposures associated with work on lead-painted steel may be exceptionally high. Exposures to abrasive blasters and torch burners have been documented as high as 29,400 and 22,400 ug/m^3, respectively. Personal protective equipment should be selected to reduce exposures to less than 30 ug/m^3. Investigations conducted in the 1980s confirm that exposures below the current PEL of $50ug/m^3$ may cause adverse reproductive, cardiovascular, and neurological effects. No employee will be exposed to concentrations of lead greater then the $50ug/m^3$ PEL limit per 8 hour time frame. Given these criteria, abrasive blasters would require respirators with a protection factor greater than 1,000. This would exclude all respirators other than self contained breathing apparatus (SCBAs) or pressure demand full-face supplied air respirators (SARs).

Reaching working surfaces can be a major task as well. Fall protection designed by a qualified person must be provided. Decontamination facilities are likely to be remote from these work surfaces. Workers should not remain isolated in contaminated areas for extended periods without the ability to safely remove respirators to smoke, get a drink of water, or seek relief from the discomfort of a respirator.

Manual lifting and precise placement of heavy materials rely on extensive use of teamwork or special equipment. Noisy equipment and working together across large distances make effective communication difficult. Respirator use makes communication more difficult, requiring special communication devices, hand signals, and pre-planned coordination.

The Resource Conservation and Recovery Act (RCRA) requires that wastes containing leachable levels of lead greater than 5 mg/liter ppm be handled as hazardous waste. As a generator of hazardous waste, contractors are subject to the "cradle-to-grave" provisions of this act. The cost of transporting and disposing hazardous wastes is a strong incentive to reduce the quantities of hazardous waste generated. Paint removal methods that lack measures to capture contaminants at the point of generation (such as open abrasive blasting with non-recyclable abrasives) generate large volumes of lead-contaminated debris, which raises the cost of the project. Caution is also required in the use of additives which minimize the leaching characteristics of the waste. Worker exposure to fine chemical dusts from additives shall be recognized and controlled.

A site safety and health officer with sufficient training and authority to stop work shall be designated to customize and enforce this written site safety and health plan.

F. Protective Work Practices

Exposure levels are dependent on the way a given task is performed. Some work practices limit the amount of contaminant generated, such as removing lead paint 6 inches from the cutting or welding point. Other practices, such as staying upwind of blasting operations, reduce exposures without controlling generation rates. To protect workers and the environment, work practices that reduce generation of contaminants are more effective.

Worker training is essential to proper implementation of work practice controls. Such training shall include the sources and health effects of lead, measures that can be taken to reduce exposures including engineering controls; hygiene and work practices; the limitations, proper selection and use of respirators; the need for and description of a medical surveillance and medical removal program; and an explanation of chelation treatments and their general prohibition by OSHA.

Recommended work practices for specific operations are detailed in the tables in Appendix 2. Workers shall avoid activities that generate dust. When possible, spray debris with a light water mist before disturbing. When working in containment structures ventilated by forced air flow, devices for worker protection shall be positioned in such a way that air currents continually transfer contaminants away from the work area. It must be recognized that this air flow may not always be adequate. Workers shall be instructed on the proper use of ventilation equipment, including maximum distances between the source of contaminant and local exhausts and the minimum fresh air supply requirements for individual enclosures.

G. Specific Engineering, Work Practice and Administrative Controls

1. Any dust control measures will utilize HEPA vacuum methods and avoid any mechanical disturbance.
2. Work must always be performed to minimize the necessity of the employee bending into the dust being generated by the operations.
3. Work must always be positioned to minimize the necessity of the employee bending into the fume plume.
4. Whenever infeasible to avoid generation of excess dust, mechanical ventilation will be provided for exhaust and make-up.
5. Exclusion of other employees in a 25 foot radius of the work and 50 feet downwind. This will be considered the "Regulated Area" and will be demarcated with signs, in accordance with paragraph (m)(2) of OSHA's Lead standard. A "Regulated Area" will be established wherever an employee's exposure to airborne concentrations of Lead is, or can be reasonably expected to be in excess of the exposure limit (PEL). Access to Regulated Areas shall be limited to authorized persons only, who are wearing appropriate respiratory protection.
6. Work must always be positioned to allow wind (airflow) at 90deg. angle to the work surface.
7. Shortened shifts to take advantage of OSHA’s variable PEL formula based on hours worked in a day.

H. Housekeeping

1. All surfaces shall be maintained, as free as possible, of accumulations of lead.
2. Cleaning floors.
   a. Floors and other surfaces where lead accumulates may not be cleaned by the use of compressed air.
   b Shoveling, dry or wet sweeping, and brushing may be used only where vacuuming or other equally effective methods have been tried and found not to be effective.
3. Where vacuuming methods are selected, the vacuums shall be equipped with High Efficiency (HEPA) filters. They shall be used and emptied in a manner which minimizes the reentry of lead into the workplace.
4. Cleaning and Replacement of Protective Clothing and Equipment
   a. We will provide the protective clothing in a clean and dry condition at least weekly, and daily to employees whose exposure levels, without regard to a respirator, are over 200 $\upsilon g/m^3$ of lead as an 8-hour TWA.
   b. We will provide for the cleaning, laundering, and/or disposal of protective clothing and equipment.
   c. We will repair or replace required protective clothing and equipment as needed to maintain their effectiveness.
   d. We will assure that all protective clothing is removed at the completion of a work shift only in change rooms provided for that purpose as prescribed in Section F. of the previous chapter.
   e. We will assure that contaminated protective clothing which is to be cleaned, laundered, or disposed of, is placed in a closed container in the change-room which prevents dispersion of lead outside the container.
   f. We will inform in writing any person who cleans or launders protective clothing or equipment of the potentially harmful effects of exposure to lead.

I. Hygiene Practices and Facilities

1. We will assure that in areas where employees are exposed to lead above the PEL, without regard to the use of respirators, food or beverage is not present or consumed, tobacco products are not present or used, and cosmetics are not applied, except in lunchrooms, or other areas where concentrations of airborne lead is below the AL.
2. Change rooms
   a. We will provide clean change rooms for employees who work in areas where their airborne exposure to lead is above the PEL, without regard to the use of respirators.
   b. We will assure that change rooms are equipped with separate storage facilities for protective work clothing and equipment, and for street clothes, to prevent cross-contamination.
3. Showers

a. We will assure, where required, that employees who work in areas where their airborne exposure to lead is above the PEL, without regard to the use of respirators, shower at the end of the work shift.
b. We will provide shower facilities, where required, in accordance with OSHA 1910.141 (d)(3).
c. We will assure that employees who are required to shower do not leave the workplace wearing any clothing or equipment worn during the work shift.

4. Lunchrooms
   a. We will provide lunchroom facilities for employees who work in areas where their airborne exposure to lead is above the PEL, without regard to the use of respirators.
   b. We will assure that lunchroom facilities have airborne concentrations of lead below the AL, and are readily accessible to employees.
   c. We will assure that employees who work in areas where their airborne exposure to lead is above the PEL, without regard to the use of a respirator, wash their hands and face prior to eating, drinking, smoking, chewing gum or tobacco, or applying cosmetics.
   d. We will assure that employees do not enter lunchroom facilities with protective work clothing or equipment.

J. Prohibited Practice

1. We will prohibit the removal of lead from protective clothing or equipment by blowing, shaking, or any other means which disperses lead into the air.
2. We will assure that employees who are required to shower do not leave the workplace wearing any clothing or equipment worn during the work shift.
3. Floors and other surfaces where lead accumulates may not be cleaned by the use of compressed air.
4. Shoveling, dry or wet sweeping, and brushing may be used only where vacuuming or other equally effective methods have been tried and found not to be effective.

K. Industrial Hygiene

Because of the extreme variability in the construction environment, potential work exposure to lead is not easily characterized by traditional industrial hygiene approaches. In particular, personal air monitoring can be unreliable predictor of worker exposure as explained below. There are a number of factors which can be useful to determine the magnitude of exposure. The most important of these are: the particular task being performed (e.g. abrasive blasting, torch cutting, pneumatic hammering); the quantity of paint remaining on the surface and the lead concentration in the paint; meteorological conditions; effectiveness of ventilation controls; and the location in which work is being performed (e.g., in the open or partially or totally enclosed). These conditions and consequently worker exposures - are subject to change on a daily or even hourly basis.

Another variable affecting industrial hygiene characterization of structural steel maintenance, rehabilitation, and demolition sites is the nature of the workforce itself. The ability of structural

steel workers, in particular blaster-painters, to protect themselves through appropriate work practices and protective equipment varies enormously. On one end is the sophisticated unionized iron worker who is trained in safety and health, wears appropriate protective clothing and respirator, and is under medical surveillance. On the other end is a migratory, non-English speaking painter/blaster with little or no training, no personal protective clothing or respirator, and no medical surveillance. The exposures of these two workers can reasonably be expected to vary considerably.

At present there are only limited data which correlate worker exposure to such variables as those mentioned above.

In addition to characterizing worker exposure to lead by airborne monitoring and biological monitoring of blood lead levels has been shown to be an accurate indicator of recent worker exposure. However variable the conditions determining exposure might be, lead absorption by a worker indicates that a problem exists and intervention is necessary. For structural steel maintenance, rehabilitation, and demolition workers, the blood lead level, determined frequently, is a better indicator of exposure than airborne monitoring.

Our outline below, for the industrial hygiene characterization of lead exposure at lead-painted structural steel sites is based on the recognition that this work is performed in a lead-rich environment, where multiple exposures exist via inhalation or ingestion.

1. Biological monitoring:

   The basic indicator of excessive worker exposure is the blood lead level, which includes baseline levels and subsequent levels measured at time intervals designed to detect potential increases. Increases in blood lead level of 6 ug/dl (micrograms per deciliter) or more are a signal that industrial hygiene intervention and review of work practices are necessary.

2. Air monitoring:

   a. If personal air monitoring is to be used to characterize worker exposures, the sampling strategy shall be designed by an industrial hygienist experienced in working at such sites with an engineer or other site supervisor who is familiar with the full range of work to be performed at the site. The sampling strategy will be based on full shift employee samples to ensure an accurate representation of the workers “regular” day. If initial air monitoring reveals that an employee’s exposure is at or above the action level but below the permissible exposure limit, ***OSC*** will repeat the air monitoring every six months until two successive results are received below the action level. The monitoring must be completed at least one week apart from the prior measurements. All employees that receive air monitoring will be notified, in writing, of their results within 15 days of the measurement. If the measurement surpasses the permissible exposure limit the written notice to the employee will state the corrective actions to be taken.

   b. Air monitoring within the blasting helmet of workers engaged in blasting operations, which can generate very high levels of lead exposure, can be very useful in detecting excessive lead dust exposures in the workers' breathing zone. This is of additional importance considering that blasting exposures are very high, but because the typical type CE abrasive blasting helmet/respirator is not as effective as the newer full-face, tight

fitting, positive-pressure abrasive blasting respirator.

3. Periodic reviews:

   A crucial aspect of industrial hygiene characterization is review of existing programs, worker training, and frequent inspection of personal protective equipment use, hygiene facilities and practices (including change areas) and work practices. Detailed checklists are necessary to both characterize the site and to intervene in a timely and effective manner when required (for instance, due to increases in blood lead levels).

4. Equipment Decontamination:

   Equipment used in tasks involving exposure to lead, such as blasting equipment and tools, shall be decontaminated before being removed from the work area in order to prevent contamination of other work areas or different jobsites.

L. Respiratory Protection

We will provide and enforce use of respirators when exposure to lead is not controlled below the PEL by other means. We will pay the cost of the respirator. Whenever requested a respirator will be provided even if air exposures do not exceed the PEL, for example, when an employee receives medical advice that their lead absorption should be decreased, or if an employee intends to have children in the near future, and wants to reduce the level of lead in the body to minimize adverse reproductive effects. While respirators are the least satisfactory means of controlling exposure, they are capable of providing significant protection if properly chosen, fitted, worn, cleaned, maintained, and replaced.

We will select respirators from the types listed in the Table below. Any respirator chosen must be approved by the National Institute for Occupational Safety and Health (NIOSH). This table enables us to choose a type of respirator which will give the proper amount of protection based on airborne lead exposure. We may select a type of respirator that provides greater protection than that required by the standard. We may provide a powered air purifying respirator (PAPR) to ease the burden of having to wear a respirator for long periods of time. We will provide any employee a PAPR upon request, if it is sufficiently protective.

We have a Respiratory Protection Program which includes written procedures for the proper selection, use, cleaning, storage, and maintenance of respirators. We provide annual training in the use of respirators, how to wear a respirator, to know why it is needed, and to understand its limitations.

We will assure that respirator facepieces fits properly. Proper fit of a respirator facepiece is critical. Obtaining a proper fit on each employee may require that we make available two or three different mask types. In order to assure that respirators fit properly and that facepiece leakage is minimized, we will provide a qualitative fit test or a quantitative fit test.

We will test the effectiveness of respirators initially and at least every twelve months thereafter with a fit test. If there is appreciable leakage another size or brand must be selected, until the test

is passed. If a protection factor of over 10 is required we will use qualitative fit tests.

Workers will be given an opportunity to change the filter elements whenever an increase in breathing resistance is detected, and be permitted to periodically leave the work area to wash their face and respirator facepiece to prevent skin irritation. If an employee has difficulty breathing during a fit test or while using a respirator, we will provide a medical evaluation to determine whether you can safely wear a respirator.

Airborne concentration of lead or condition of use	Required Respirator (1)
Not in excess of 0.5 mg/m^3 (10X PEL)	Half-mask, air-purifying respirator equipped with high efficiency (HEPA) filters.
Not in excess of 2.5 mg/m^3 (50X PEL)	Full facepiece, air-purifying respirator with high efficiency filters.
Not in excess of 50 mg/m^3 (1000X PEL)	(1) Any powered, air-purifying respirator with high efficiency filters(3); or (2) Half-mask supplied-air respirator operated in positive-pressure mode(2).
Not in excess of 100 mg/m^3 (2000X PEL)	Supplied-air respirators will full facepiece, hood, helmet, or suit, operated in positive pressure mode.
Greater than 100mg/m^3, unknown concentration or fire fighting	Full-facepiece, self-contained breathing apparatus operated in positive-pressure mode.

Footnote (1) —Respirators specified for high concentrations can be used at lower concentrations of lead.

Footnote (2) —Full facepiece is required if the lead aerosols cause eye or skin irritation at the use concentrations.

Footnote (3) —A high efficiency particulate filter means 99.97 percent efficient against 0.3 micron size particles.

M. Medical Surveillance

Aggressive and effective medical surveillance is an essential component of a successful strategy for protecting workers from lead poisoning. The OSHA Lead Standard (1926.62) provides a valuable starting point for developing a medical surveillance protocol for the construction industry. However, because of certain important and unique characteristics of the industry, medical surveillance provisions for construction workers necessarily differ in some respects from the general industry model.

1. Nature of Exposure:

   Existing data reveal that exposures to lead in both blasting and burning/welding activities may be extremely high - i.e., greater than the permissible exposure limit. Exposure data confirms that almost any type of work that disturbs paint on lead-based painted bridges will lead to exposures above the existing action level for lead in the OSHA Standard (29 CFR 1926.62). Daily exposures are extremely difficult to predict because many uncontrollable and unpredictable variables may directly and significantly affect exposure levels.

2. Mobility of Workforce:

   Another consideration impacting the design of a medical surveillance system to protect the construction worker from lead poisoning is the mobility of the workforce. Workers may be

shifted from job to job or employer to employer within a given state or area on a day-to-day basis or may move from state to state as the availability of work changes. This workforce mobility poses major challenges to the medical community and others involved in the management of blood lead and other medical data since medical information/records may not be readily available to practitioners, medical testing may be duplicated or appropriate medical interventions may not be carried out. To minimize these possibilities, we agree to assist physicians and other employers when they request information.

3. Guides for Developing Medical Surveillance Standards:

   Medical Examination Issues: Because of the special character of the construction industry, and the nature of work, our medical surveillance program differs from the existing industry model. First, there shall be no minimum number of days of exposure for workers prior to entering the program. Secondly, air level monitoring shall not be the trigger for engaging the medical surveillance network. The nature of exposures in bridge rehabilitation work are such that as little as one month of work can lead to severe lead poisoning of exposed workers. Further, because of the potential for extremely high exposures. the unpredictability, and the unusual variability of these exposures, medical monitoring must be frequent.

   At a minimum, medical monitoring should include full physical examinations, including approval for respirator wear, at least annually and when blood lead levels exceed a value such as 25 ug/dl. A full physical focusing upon the potential for lead-related illness shall be required. Blood lead monitoring shall occur at least monthly. At the inception of a project or when the character of work changes significantly, monitoring after the first 10 to 14 days may be needed to identify instances where engineering controls, personal protective equipment, and work practices are not effectively protecting workers from exposure.

4. Biological Markers:

   Medical and other research suggests that evidence of lead-related disease can be identified in exposed workers at levels once thought to be "safe." The OSHA Construction Standard (1926.62), for example, allows exposures to reach blood levels of 50 ug/100 grams whole blood, and return to work occurs at levels less than 40 ug/m3. A reasonable goal for the "acceptable maximum blood lead level" might be 25ug/dl. If the employee's blood level is unacceptable, then the employee must be notified in writing within five days. This goal would be linked to periodic reassessment (every 6 months) procedures so that the level would be revised downward as technical and other changes make more strict standards attainable.

   Although the ZPP measurement has proven a mainstay in medical surveillance for lead-exposed workers, its role should be carefully evaluated in the construction industry. The ZPP levels continues to be invaluable for medical decision-making under certain limited circumstances, but whether this justifies its ongoing application to large groups of lead-exposed workers remain unclear.

5. Medical Removal Issues:

   The OSHA Lead Standard (1926.62) establishes a comprehensive program for medical removal protection for lead-exposed workers. Additional protection for workers shall be incorporated into the lead control programs for the construction industry. Workers who attain elevated blood lead levels with a former employer and are then deemed unemployable by a prospective employer should not be punished for the "sins" of their former employer. The offer of employment shall not be contingent on an individual's blood lead level.

6. Data Management Issues:

   The workers mobility inherent in the construction industry renders conventional mechanisms for data management ineffective. Presently, evaluation of trends in individuals, so that a comprehensive approach to lead level management might be coordinated is dependent upon mutual cooperation of competing employers.

7. Summary:

   Extremely high, unpredictable, and variable lead exposures combined with the transient character of the workforce demand a new and progressively designed medical surveillance program. Frequent medical monitoring triggered not by air monitoring or days of exposure but required for all workers on lead-containing bridge sites is needed.

N. Administrative Aspects

1. Recordkeeping
   a. Exposure monitoring
      I. We will establish and maintain an accurate record of all monitoring.
      ii. This record shall include:
         - The date(s), number, duration, location and results of each of the samples taken, including a description of the sampling procedure used to determine representative employee exposure where applicable;
         - A description of the sampling and analytical methods used and evidence of their accuracy;
         - The type of respiratory protective devices worn, if any;
         - Name, social security number, and job classification of the employee monitored and of all other employees whose exposure the measurement is intended to represent; and
         - The environmental variables that could affect the measurement of employee exposure.
      iii. We will maintain these monitoring records for at least 40 years or for the duration of employment plus 20 years, whichever is longer.

b. Medical surveillance

i. We will establish and maintain an accurate record for each employee subject to medical surveillance.

ii. This record shall include:

- The name, social security number, and description of the duties of the employee;
- A copy of the physician's written opinions;
- Results of any airborne exposure monitoring done for that employee and the representative exposure levels supplied to the physician; and
- Any employee medical complaints related to exposure to lead.

iii. We will keep, or assure that the examining physician keeps, the following medical records, for at least 40 years or for the duration of employment plus 20 years, whichever is longer:

- A copy of the medical examination results including medical and work history;
- A description of the laboratory procedures and a copy of any standards or guidelines used to interpret the test results or references to that information; and
- A copy of the results of biological monitoring.

c. Medical removals

i. We will establish and maintain an accurate record for each employee removed from current exposure to lead.

ii. Each record shall include:

- The name and social security number of the employee;
- The date on each occasion that the employee was removed from current exposure to lead as well as the corresponding date on which the employee was returned to his or her former job status;
- A brief explanation of how each removal was or is being accomplished; and
- A statement with respect to each removal indicating whether or not the reason for the removal was an elevated blood lead level.

iii. We will maintain each medical removal record for at least the duration of an employee's employment.

d. Availability

i. We will make available, upon request, all records required to be maintained, to OSHA personnel, for examination and copying.

ii. Monitoring, medical removal, and medical records shall be provided upon request to employees, designated representatives, and the OSHA personnel, in accordance with OSHA'S Recordkeeping standard, 29 CFR 1910.20 (a)-(e) and (2)-(i). Medical removal records shall be provided in the same manner as air monitoring records.

e. Transfer of records

i. Whenever the employer ceases to do business, the successor employer shall receive and retain all records required to be maintained.

ii. Whenever the employer ceases to do business and there is no successor employer to receive and retain the records required to be maintained by this section for the prescribed period, these records shall be transmitted to the Director of OSHA.

iii. At the expiration of the required retention period for the records, we will notify the Director at least 3 months prior to the disposal of such records and shall transmit those records to the Director, if requested, within the period.

iv. We will also comply with any additional requirements involving transfer of records set forth in OSHA 29 CFR 1910.20(h).

2. Program Evaluation and Update

This program shall be revised and updated at least every 12 months, to reflect the current status our operations.

CHAPTER FOUR
GENERAL SAFETY

A. Application and Responsibility

1. Application of Safety Rules

   Possession - Each supervisor at each work location will be given a copy of this compliance program. It is each supervisor's responsibility to ensure that his employees are thoroughly familiar with the procedures.

   Interpretation - If an employee is called upon to perform work which is hazardous and not properly protected, he must bring the matter to the attention of his supervisor before starting work. If questions arise, the final interpretation will rest with the supervisor.

   Note: For the purpose of these rules, the term "supervisor" shall mean any person directly in charge of the work; OSHA's "Competent Person."

   Emergencies - These rules represent minimum requirements and are only intended to cover average conditions. Since it is impracticable to cover all conditions and emergencies, the cooperation of all employees and their supervisors is required in meeting conditions not provided for in these rules.

2. Employee's Responsibility for Safety

   Ability - Before proceeding with a job, the employee must satisfy himself that he can perform the work without injury. If he is not qualified to perform the work, he/she should call this to the attention of his supervisor.

   Understanding - Before starting a job, each employee must thoroughly understand the work to be done, his/her part in it and the safety rules which apply.

   Hazard Recognition - It is every employee's duty to recognize and report safety and health hazards to their supervisor immediately. It is the supervisor's responsibility to correct the hazardous condition immediately.

   Compliance with OSHA - All supervisors and workers have a thorough familiarity with OSHA standards and other regulatory requirements. Standards and requirements that pertain to the job specifications must also be adhered to. Top management assures periodic training, certification, and recertification of supervisors and workers.

   It is the supervisor's responsibility to see that the job site meets or exceeds Federal safety requirements as set by the Occupational Safety and Health Administration (OSHA), and any applicable state or local requirements.

All employees must be cooperative to any state or local Department of Health or Department of Labor (OSHA) compliance officer that appears on any job and properly identifies themselves.

3. Reporting Employee Injury

Injuries, no matter how slight, must be reported immediately to the person in charge.

All minor injuries must be properly treated and report made to the employee's supervisor, who shall observe and inquire about such injuries until they are healed. The supervisor shall observe and inquire about such injuries until they are healed. The supervisor shall also complete, on the same day as the accident occurs, a field report of the accident. This report will then be turned in to his reporting office where a detailed accident report will be completed for the insurance carrier, Workers' Compensation and OSHA recordkeeping requirements.

When the services of a physician are necessary, a physician designated by the Company shall be used whenever possible. In case of a serious accident, when transporting the injured person to the Company physician would cause serious time delay, the closest physician, emergency care clinic, or hospital should be contacted.

In case of fatal or serious accidents to employees or to others, the injured shall be attended to immediately, then the accident must then be reported immediately to the supervisor involved.

Practical jokes - Practical jokes or "horse play" are strictly forbidden on any jobs or operations of any kind. This includes the shop area(s) as well as on a job site.

B. General Precautions

1. Protecting the Public:

It is the responsibility of each employee to protect the public from hazardous conditions when work is in progress. Signs, fences, cones, barricades, lights, and personal warnings may be required to safeguard a work area.

Appropriate lights, signs, cones, flags, or flagman must be used when Company trucks and other equipment are engaged in work along public streets and highways.

When hauling equipment, debris or waste, all laws shall be complied with regarding transporting such items on public streets and highways.

When an employee observes a hazardous condition which may cause and injury of property damage or possible injury to the general public, regardless of where it exists, he should report it promptly to the people involved, and when necessary, guard it.

2. Taking Chances:

Before commencing any work which may be hazardous, care should be taken to establish a

safe procedure. When more than one employee is engaged in the same job, all employees concerned must understand the procedures to be followed.

Employees must always be careful to place themselves in a safe and secure position. Risk taking is officially discouraged and may result in disciplinary action.

3. Guards (Equipment):

   No guards shall be removed from a machine or piece of equipment while it is in operation.

   Machines and power tools should not be operated with guards removed unless temporary protection is provided. If it is necessary to place temporary guards on any equipment, they shall be of substantial construction, suitable for the purpose intended, and shall be replaced by permanent guards as soon as possible.

4. Warnings:

   Warning signs must be heeded. Persons seen in a dangerous situation should be warned without being startled. Employees not required to be in dangerous situations or work zones must keep away from them.

5. General:

   Any employee engaged in transporting, storing and using chemicals or fuel shall do so in accordance with all safety rules associated with those fuels and or chemicals.

C. Personal Protective Equipment

Suitable personal protective clothing and equipment must be worn whenever required by instruction or whenever it would provide greater safety.

1. Hard Hats:

   All employees shall wear a hard hat at all times whenever they are at work. The only exceptions to this rule would be when employees are riding in a vehicle or are within an office building. This rule applies to all Company personnel whether they are just watching or are actually performing work.

2. Work Gloves:

   Work gloves must be worn when handling materials, tools, and equipment when such handling may cause blisters, cuts, burns or puncture type injuries. Supervisors must assure that all employees use the type of protective gloves appropriate for the work being performed.

3. Eye Protection:

   Suitable eye protection equipment, such as goggles and face shields shall be worn to prevent eye injuries. Some jobs requiring the use of eye protection equipment include vacuuming dry materials, chemicals, grinding, welding, water blasting and other cleaning methods.

4. Confined Space Entry:

   No work will be performed inside any vessel or enclosure where ventilation or an adequate supply of oxygen cannot be assured, the atmosphere may be contaminated with toxins, there is limited opening for egress, the area was not designed for continuous occupancy or any other safety or health hazards exist. The host employer must be in full compliance with OSHA 1910.146 "Permit-Required" Confined Space and cross-train our personnel as to the specifics of their programs before any entry may be made. Any confined space entry must be coordinated with the site safety and health officials of both companies.

5. Respiratory Protection:

   When working around toxic, sensitizing, irritating, or corrosive materials, or in areas where there is an abnormal amount of dust, approved respiratory protection equipment must be worn. The supervisor will assign appropriate respiratory equipment before starting to work.

6. Safety Harness/Fall Protection:

   When entering a confined space of any type, an approved safety harness must be worn with appropriate safety lines attached and properly attended. Rescue equipment and trained rescuers must be available and on call for fast response. Fall protection devices must be utilized in accordance with OSHA, state, or local requirements, as appropriate for the situation.

7. Life Jackets:

   When there is work over a body of water and possibility of falling, employees must wear approved life jackets. Fall protection and safety harnesses may also be required, as appropriate for the situation.

8. Safety Vests:

   All flagmen or other employees, when exposed to traffic, must wear a bright orange vest, or markings for visibility.

D. Hand and Power Tools

1. General

   Hand tools which have sharp edges or that are broken shall not be used until repaired.

   Tools that must be raised or lowered from one elevation to another must be placed in an approved container or firmly attached to hand lines.

   Tools must not be thrown from place to place or from person to person under any circumstances.

   Tools may not be left lying around where they could cause tripping or stumbling.

   Tools must never be placed unsecured on elevated places, when working on or above open grating or boards, care should be taken not to place tools on walkways lest they be knocked

off, causing injury to people beneath.

Portable electric tools should be grounded at all times when connected to a power source. The insulation on hand tools must not be depended upon to prevent shock.

2. Use of Tools:

Any tool which is damaged or defective may not be used. This includes wrenches with sprung or damaged jaws; mushroomed chisels, drills, punches; split handles and other defects.

Pipes must be used only for the purpose for which they were designed.

Tools must be used only for the purpose for which they were designed.

Before making adjustments or changing air tools, unless equipped with quick change connectors, the air shall be shut off at the air supply valve ahead of the hose. The hose shall be bled at the tool before breaking the connection.

Practical jokes with compressed air are strictly forbidden. Compressed air entering or blown against the body can result in serious injury or death.

3. Care of Tools:

All tools, regardless of ownership, must be of an approved type, maintained in first class condition and be subject to inspection at any time. The supervisor has the responsibility to condemn defective tools. Tools with sharp edges must be stored and handled that they may not be damaged or cause injury or damage. They must not be carried in clothing pockets.

Sharp tools such as chisels, punches, drills, etc., that become cracked or mushroomed, must be dressed, repaired or replaced before further use.

E. Hoisting and Hauling Materials

1. By Hand

Employees should always obtain assistance in lifting heavy objects or use powered material handling equipment whenever available.

When two or more persons carry a heavy object that is to be lowered or dropped, there must be a prearranged signal when all are to let go.

2. By Mechanical Means

Cranes and other material handling mechanisms may be operated only by authorized personnel.

No employee is allowed on or under a suspended load, inside the angle of a winch line, nor stand or work near a cable, chain or rope under tension unless the nature of his work requires it. No employee may ride on a cable, ball chain, sling or any other hoisting attachment or on a material being moved by means of an winch line, crane, hoist or truck.

F. Welding and Cutting

1. General:

   The primary hazards during welding are:

   - electric shock,
   - burns,
   - radiant energy,
   - toxic fumes,
   - fires and explosions.

   Adequate precautions must be taken to guard against these hazards. Only trained, competent persons assigned to the task may use welding, cutting, or torch equipment.

   Safety shields or barricades must be placed around welding jobs where needed to protect others from direct rays of electric arc.

   Oil and grease must be kept away from oxygen systems. Gauges, connections, valves, etc., must not be lubricated with oil or grease.

   Suitable fire extinguishing equipment must be immediately available at all times where welding and cutting is in progress. A fire watch must be posted during welding or cutting where a 25 foot radius clear of combustibles may not be established.

   Adequate ventilation or approved respiratory equipment must be used while welding in poorly ventilated areas or when cutting or welding zinc, brass, copper, chromium-plated, cadmium-plated, galvanized or lead-coated materials.

   To protect eyes, face and body, employees engaged in electric welding shall wear an approved helmet, proper protective gloves and long sleeves or welder's sleeves.

   When transporting cylinders, gauges must be dismantled and valves closed. Cylinders must be rigidly secured to prevent moving and in an upright position.

2. Electrical Welding:

   No electric arc welding machine, either AC or DC, shall be operated until the machine is properly grounded.

   Proper eye protection shall be used to guard against flying particles or scale when the helmet is raised.

   A welder, unless working behind a screen, may not strike an arc with an electrode until nearby workers, who may be exposed to the arc are given ample warning. This is particularly true when working in public areas.

G. Fire Prevention

1. Fire Prevention - Housekeeping

   Good housekeeping must be maintained at all work areas and vehicles.

Combustible materials, such as oil soaked rags, wastes and shaving must be kept in metal containers with self-closing lids or in an area far removed from any other flammable materials. All containers should be emptied as soon as possible.

Paper and other combustible material shall not be allowed to accumulate. Weeds and other vegetation shall not be permitted to grown in or around equipment storage areas.

Flammable liquids such as gas, kerosene, benzene, naphtha, paints, lacquer thinner, or solvents may not be used for cleaning purposes unless approved methods are employed for their safe use.

All solvents and flammable liquids must be kept in listed-type, properly labeled, safety cans.

When pouring or pumping gasoline or other flammable fuels/solvents from one container to another, metallic contact shall be maintained between the receiving and pouring containers at all times, or bond with a bonding wire connected to each. When refueling, engines must be cut off.

Employees shall not smoke in close proximity to flammable liquids, gases or explosives, either on property occupied by the Company or elsewhere. Smoking must be designated areas only.

No smoking is allowed in areas designated as no smoking areas. All lighters, and matches should be left in the truck to avoid the unconscious accidental usage while in a hazardous atmosphere. Smoking in designated "no-smoking" areas is subject to disciplinary action.

2. Fire Protection - Extinguisher

Properly selected and maintained fire fighting equipment is an essential part of fire prevention. Extinguishers must be located at easily accessible places and each employee must know how to operate each extinguisher. Fire extinguishers must be regularly inspected, refilled, and weighed, with inspections in accordance with the manufacturer's recommendations and OSHA requirements. All fire extinguishers are subject to an annual maintenance check.

H. Operations of Motor Vehicles and Other Mobile Equipment

1. General

Only those persons specifically authorized, insured, and who possess valid license pertaining to the particular type of vehicle they are operating, may operate Company equipment or personally owned vehicles on Company business.

Drivers must not permit unauthorized persons to drive, operate or ride in or on a Company vehicle.

Drivers must know and obey all state and local motor vehicles laws.

Where seat belts are provided, they must be used.

Employees may not allow anyone to ride on the running boards, fenders or any part of a motorized vehicle except on the seat or inside the body walls. Passengers must not stand in

moving vehicles.

2. Inspection

   All brakes must be tested by the driver at the start of each day. Drivers are responsible to report any defects which may have developed during the day. If brakes are not working safely, they must be inspected, adjusted or repaired before the vehicle is put in operation.

   Lights and other signaling devices must be inspected daily. If found defective, they must be repaired before the vehicle is placed in operation. No vehicle may be operated at night, unless properly equipped with headlights, taillights, and other necessary safety devices, as required by law.

   Engine oil, radiator, tires, transmission and safety devices must be checked on a daily basis by the driver.

3. Operation

   Drivers must keep a sharp lookout for children, especially in school zones or where they are playing, and be prepared for an immediate stop.

   Drivers following other vehicles must stay a safe distance behind so they can stop in the clear distance ahead.

   Drivers must be prepared to stop and the right of way must be yielded in all instances where necessary to avoid an accident.

   Trucks and/or trailers stopped on any public roadway must be protected by red flags, proper warning lights or reflectors in accordance with legal requirements.

   Before backing a vehicle, the driver must determine that the space he needs is clear, and then back slowly, keeping a constant lookout the entire time he is backing.

   No piece of equipment may be left running when parked in an area where the general public might tamper with the equipment.

   No alcohol or drugs are permitted on company property or in company vehicles at any time. Any employee caught drinking or using drugs, while working or driving on company time will be terminated immediately. The driving privileges of each employee will be terminated unless the driving violation charge is dropped.

I. First-Aid and Medical Treatment

Employees should be proficient in first-aid, including and especially the treatment of traumatic shock, application of artificial respiration and the control of bleeding. Detailed instruction for first-aid treatment is not included in this booklet as such information is readily available from other sources, such as the American Red Cross textbook on first-aid training.

First-aid supplies have been furnished based on recommendation by the company physician, that are easily accessible when required. The first-aid kit consist of supplies in a weather-proof container, with individually sealed packages. The contents of the kit should be inventoried by the

supervisor before being sent out on each job and at least weekly on each job to ensure that the used items are replaced. Each employee shall learn to use this equipment so that he can render treatment when needed. Except for minor injuries, the services of a physician shall be obtained.

On all remote locations, it is the responsibility of the job supervisor to locate the nearest emergency room facility and notify employees of its location.

J. Accident Reporting and Investigation

1. Auto/Truck Accidents:

   Should a company vehicle become involved in an auto accident, no matter how minor, the following procedures must be followed:

   - Stop at once and investigate.
   - Fill out in detail the accident package which is stored in the glove compartment of the vehicle. The important things to record are name, address, telephone number, driver license number, vehicle license number and insurance carrier of the party with which you are involved. Also, obtain the names, addresses and phone numbers of any witnesses who might have seen the accident.
   - If anyone is injured, call a doctor.
   - Protect the scene from any further collision or damage by the general public.
   - Render any first-aid, if trained, which is necessary or needed at the scene.
   - Make no statements to anyone other than the police officer and the person with whom you are involved. NEVER ADMIT TO ANY FORM OF GUILT OR LIABILITY.
   - Do not discuss the accident in detail with anyone but the investigating police officer.
   - Call the office for instructions concerning what to do with your vehicle.
   - Take the completed accident package to office within twelve (12) hours or mail immediately, so that a detailed accident report may be made and sent to the insurance carrier.

2. Personal Injury Accidents:

   Determine the extent and nature of the injuries. See that proper first-aid is applied.

   If the injury requires a doctor’s attention, render first-aid to prevent shock, bleeding, etc., all ambulance or doctor immediately.

   Have someone accompany the injured employee to the doctor if shock is apparent or if injured is not in condition to drive along.

   Complete the Supervisor's Report of injury. In case of fatality, notify the office immediately. Forward the original copy of the Supervisor's Report of Injury to the office.

   Determine the cause of the accident and the corrective action to prevent reoccurrence.

   Know which members of the crew have had first-aid training and use them when needed.

   Replenish first-aid kit supplies after usage.

Advise the office when the injured employee returns to work. Request a doctor's release before permitting a return. Be sure the employee is capable of resuming his normal work.

3. Public Liability Accidents:

These accidents are those which have occurred on or near the Company's job and which involve the Company's equipment, work area or procedures, injuring the general public.

If a person is injured, record their name, address, and telephone number accurately.

If it involves the property of another person, obtain their name, address and telephone number, and get a full description of the property, including serial number, identification numbers, model, make, condition, etc.

Assist management personnel and/or insurance claims adjusters in the completion of a detailed report.

K. Sanitation

1. Drinking Water:

Portable water must be provided to employees at all job locations.

If containers are used the container used for drinking water must be clearly marked as to its contents and may not be used for any other purpose.

Common sense must be used in handling of the ice placed into the container, for reasons of hygiene.

When containers must be used, they should be sanitized on a weekly basis with a strong chlorine bleach solution, then triple-rinsed.

2. Sanitizing Personal Protective Equipment and Hygiene:

It shall be the duty of the supervisor to see that all personal reusable safety devices, such as respirators, ear plugs, protective suits be decontaminated or disinfected before re-issuing to another employee.

3. Personal Hygiene:

Impermeable gloves are to be worn when working with or around chemicals. Also after working around or with chemicals, remove the gloves and wash thoroughly. If soap and water is not available, waterless soap should be used.

Open cuts and sores should be "disinfected" immediately and covered with a bandage. The bandage should be changed as often as necessary to avoid contamination.

L. Temperature-Related Stress Protection

1. Introduction

Adverse weather conditions are important considerations in planning and conducting site operations. Hot weather can cause physical discomfort, loss of efficiency and personal injury.

2. Heat Stress

Heat stress may result when protective clothing decreases natural body ventilation and can occur even when temperatures are moderate. One or more of the following recommended actions can help reduce heat stress:

- Provide plenty of liquids to replace body fluids (water and electrolytes) lost due to sweating.
- Provide cooling devices to aid natural body ventilation. These devices, however, add weight, and their use should be balanced against worker efficiency.
- Long cotton underwear acts as a wick to help absorb moisture and protect the skin from direct contact with heat-absorbing protective clothing. It should be the minimum undergarment worn.
- Install mobile showers and/or hose-down facilities to reduce body temperature and cool protective clothing, if necessary.
- In extremely hot weather, conduct non-emergency response operations in the early morning or evening. Ensure that adequate shelter is available to protect personnel against heat, cold, rain, snow, or other adverse weather conditions which decrease physical efficiency and increase the probability of accidents.
- In hot weather, rotate workers wearing protective clothing.
- Good hygienic standards must be maintained by frequent change of clothing and daily showering. Clothing should be permitted to dry during rest periods. Workers who notice skin problems should immediately consult medical personnel.

These recommendations should be implemented, as appropriate to site conditions, to reduce heat stress.

3. Effects of Heat Stress

If the body's physiological processes fail to maintain a normal body temperature because of excessive heat, a number of physical reactions can occur. They can range from mild reactions such as fatigue, irritability, anxiety, and decreased concentration, dexterity, or movement to death. Medical help must be obtained for the more serious cases of heat stress.

Heat-related problems include:

- Heat Rash: Caused by continuous exposure to heat and humid air and aggravated by chafing clothes.
- Heat Cramps: Caused by profuse perspiration with inadequate fluid intake and chemical replacement, especially salts. Signs include muscle spasm and pain in the extremities and abdomen. The victim should be given water and firm pressure with warm, wet towels placed over the cramped area.
- Heat Exhaustion: Caused by increased stress on various organs to meet increased demands to cool the body. Signs include shallow breathing, pale, cool, moist skin;

profuse sweating; and dizziness and lassitude. The victim should be allowed to rest and be given cool liquids.

- Heat Stroke: The most severe form of heat stress. Body must be cooled immediately to prevent severe injury and/or death. Signs include red, hot, dry skin; no perspiration; nausea; dizziness and confusion; strong, rapid pulse; and possibly, coma. Quickly cool the victim by any available means and seek medical help immediately.

4. Heat Stress Monitoring

To monitor the body's recuperative ability to excess heat, one or more of the following techniques should be used as a screening mechanism. Monitoring of personnel wearing protective clothing should begin when the ambient temperature is 70 degrees Fahrenheit (F) or above. Frequency of monitoring should increase as the ambient temperature increases or if slow recovery rates are indicated. When heavy physical activity is performed and temperatures exceed 80 degrees F, workers should be monitored for heat stress after every 30 minute work period. A site safety officer should be present under these circumstances to conduct periodic monitoring.

- Heart rate (HR) should be measured by the radial pulse for 30 seconds as early as possible in the resting period. The HR at the beginning of the rest period should not exceed 110 beats per minute. If the HR is higher, the next work period should be shortened by 10 minutes (or 33 percent), while the length of the rest period stays the same. If the pulse rate is 100 beats per minute at the beginning of the next rest period, the following work cycle should be shortened by 33 percent.
- Body temperature should be measured orally with a clinical thermometer as early as possible in the resting period. Oral temperature (OT) at the beginning of the rest period should not exceed 99 degrees F. If it does, the next work period should be shortened by 10 minutes (or 33 percent), while the length of the rest period stays the same. However, if the OT exceeds 99 degrees F at the beginning of the next period, the following work cycle should be further shortened by 33 percent. OT should be measured again at the end of the rest period to make sure that it has dropped below 99 degrees F. If not, the individual should be removed from duty until the OT drops below 99 degrees F.

5. Cold Exposure

Persons working outdoors in temperatures at or below freezing may suffer from cold exposure. During prolonged outdoor periods with inadequate clothing, effects of cold exposure may even occur at temperatures well above freezing. Cold exposure may cause severe injury by freezing exposed body surfaces (frostbite) or result in profound generalized cooling, possibly causing death. Areas of the body which have high surface area-to-volume ratios such as fingers, toes, and ears are the most susceptible to frostbite.

Two factors influence the development of a cold injury: ambient temperature and the velocity of the wind. Wind chill is used to describe the chilling effect of moving air in combination with low temperature. For instance, 10 degrees F with a wind of 15 miles per hour (mph) is

equivalent in chilling effect to still air at -18 degrees F. Cold exposure is particularly a threat to the hazardous waste site worker as the body cools suddenly when chemical-protective equipment is removed and the clothing underneath is perspiration soaked. The presence of wind greatly increases the rate of cooling.

Local injury resulting from cold is included in the generic terms frostbite. There are several degrees of damage. Frostbite of the extremities can be categorized into:

- Frost nip or incipient frostbite: characterized by sudden blanching or whitening of skin.
- Superficial frostbite: skin has a waxy or white appearance and is firm to the touch, but tissue beneath is resilient.
- Deep frostbite: tissues are cold, pale, and solid; extremely serious injury.

First aid for frostbite is to bring the victim indoors and re-warm the areas quickly in warm (not hot) water between 30 degrees C and 40.5 degrees C. Warm fluids such as water or soup should be given. The victim should not smoke. After soaking the area for 30 minutes, it should be elevated and wrapped with sterile gauze. Medical help should be sought immediately.

Systemic hypothermia is caused by exposure to freezing or rapidly dropping temperature. Its symptoms are usually exhibited in five stages: (1) shivering, (2) apathy, listlessness, sleepiness, and (sometime) rapid cooling of the body to less than 95 degrees F; (3) unconsciousness, glassy stare, slow pulse, and slow respiratory rate; (4) freezing of the extremities; and (5) death. Hypothermia victims should be warmed and medical help should be obtained.

APPENDIX “E”

Asbestos Safety, Health and Compliance
Program and Procedures

OSC

ASBESTOS SAFETY, HEALTH AND COMPLIANCE PROGRAM and PROCEDURES

July 30, 2010
(Revised)

Stephen M. Robinson CSS, CST, OHST

ASBESTOS SAFETY, HEALTH AND COMPLIANCE PROGRAM

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REFERENCES:

1. **OSHA 29 CFR 1926.1101 - Asbestos in Construction Standard**
2. **EPA 40 CFR Part 61 - Asbestos NESHAP**
2. **OSHA 1910 & 1926**

CHAPTER ONE
ASBESTOS ABATEMENT/CONTACT ACTIVITIES

INTRODUCTION

This program focuses on those workplace activities which disturb **Asbestos Containing Material (ACM).** This includes the activities of abatement workers, building owners, maintenance workers, workers engaged in structural steel or concrete work such as laborers and painters or demolition crews, those who supervise such work, and the contractors that employ them. This program does not address the conduct of other professionals associated with asbestos containing building materials such as inspectors, project designers, management planners, air monitoring technicians, and other professionals. Federal and state regulations generally require licensed professionals perform all functions related to hazard abatement project.

A. Pre-Job Activities

The following pre-job activities are essential elements for any job involving ACM, to assure the protection of workers, the public, and the environment. Each project may have specific and often different elements which must be addressed.

Inspection: The insulation materials and surfaces involved in the work should be determined to be ACM or presumed to be asbestos containing materials (PACM) in the absence of scientific evidence to the contrary. Bulk sampling and analytical methods should be performed to determine the content by fiber type and percentage. Use sampling and analytical protocols prescribed by EPA rules under AHERA or NESHAP, as appropriate.

Design: The work addressed in this program which involves contact with ACM is varied in both potential risk and scope. In order to conduct work in a particular activity which involves removal, encapsulation, enclosure, or disturbance of ACM, the work should be planned by experienced, competent, licensed professionals using job-specific hazard identification and controls.

Specifications: Contract specifications should contain requirements related to worker protection requirements, including training, certification and licensing. All applicable environmental and occupational safety and health regulations shall be referenced in the contract.

Pre-Bid Conference: Contractors bidding on work involving contact with, disturbance or abatement of ACM hazards should be required to attend a pre-bid conference. At this meeting, contractors should be fully apprised of the scope of the project, including measures required for the protection of workers, public health, and the environment.

Bid Selection: Only contractors with asbestos hazard abatement training, licensing and experience and have included an effective worker and environmental protection program in their bid response should be awarded this type of work.

Pre-Job Conference: After award and prior to engagement of work, a pre-job conference should be held between the contractor and owner to assure that all issues regarding the work are understood and that any unique requirements such as special hazards or permits have been addressed and are in order.

Hazard Evaluation: A hazard evaluation specific to the actual work operations and job-site conditions shall be performed to assure that proper worker protection decisions have been made and that those decisions remain valid over the course of the job. A pre-job hazard evaluation is essential to preparation of the bid, although evaluations should be an ongoing activity during the course of the job. A post-job hazard evaluation should be performed to provide assurances that airborne fiber clearance levels have been achieved, debris has been properly disposed of, and the facility is safe for re-occupancy.

Site Safety and Health Plan: Site-specific worker protection plans are important components in construction jobs in general, and especially for those jobs involving hazardous exposures, materials, or activities. This compliance program will be supplemented as necessary by a site-specific safety plan for special job hazards.

Training: All personnel engaged in any aspect of asbestos work must have pre-job medical exams with particular emphasis on respiratory health and ability to wear respiratory protective devices, on-going medical surveillance, and an exit examination upon termination of the job. These are outlined in the Medical Surveillance section of this document and the OSHA standard under 29 CFR 1926.1101.

B. Asbestos Hazard Abatement

The following major elements of abatement work shall be addressed by a competent person, when removing, enclosing or encapsulating ACM or PACM:

Workplace Set-up: Containment, decontamination and other safety accommodations appropriate to the worksite must be specified. Examples are enclosures of rooms with polyethylene sheeting to create a negative-pressure abatement envelope, and construction of hygiene facilities and change rooms.

Engineering Controls: The engineering controls to be used on the job as a means of reducing exposures to workers, the public, and the environment must be specified. Examples can include negative air with HEPA filtration systems, HEPA vacuums, and specially equipped tools, with HEPA exhaust ventilation.

Work Practices and Procedures: The practices and procedures to be used on the job must be specified, particularly when based upon identified work practices and procedures. Wet methods are an important work practice control specified by worker and environmental safety regulations. When dry

methods are required due to other safety and health concerns, regulatory permission shall be obtained with supplemental hazard controls implemented and documented by a competent person.

Worker Protection Procedures: The worker protection procedures for the specific job must be established based on the nature of the work, the practices and procedures being employed, the hazard analysis, the OSHA Asbestos standard, and other relevant OSHA, EPA, state or local requirements.

Prohibited Practices: Practices or procedures which are prohibited by local or state authorities, Federal regulations, or which place workers at high risk of harm must be identified. As examples dry stripping and drilling are prohibited, in the absence of supplemental controls designed and implemented by a competent person. All such practices may result in dangerously high asbestos exposures.

Secondary Exposures: Escape of contaminated dust resulting in asbestos exposures to persons in other areas of a building, or pollution of outside air must be prevented. Procedures to ensure that asbestos is not carried home with workers shall be followed, to prevent exposures to the families of these workers.

Environmental Issues: Containment of the environment in the immediate vicinity of the job, proper collection and disposal of contaminated debris, air-testing outside of containment, and post-abatement clearance testing are some of the items that must be addressed.

C. Operations and Maintenance (O&M) Activities

O&M activities are defined as those involving incidental contact with and/or limited disturbance of surfaces or materials coated with ACM. Examples include repair of a damaged section of a wall, replacement or installation of an electrical conduit, or repair of an asbestos insulated pipe. These activities are often considered as in-place management tasks within the framework of the overall O&M program in facilities containing asbestos.

Others refer to in-place management as those activities which involve practices such as containment or encapsulation. These latter activities are addressed, but for purposes of this document are not considered O&M activities. Special procedures are important so as to avoid spreading asbestos contamination in the immediate work environment.

Major points to consider in an O&M program are:

Identification: The presence of asbestos in building materials (ACM) must be qualified and quantified, or in the absence of test data, presumed to be present (PACM).

Practices and Procedures: Specific procedures must be established with the objective of assuring the protection of the worker engaged in the O&M activity and to prevent creation of an asbestos hazard resulting from the O&M activity. The *EPA "Green Book"*[(1)] serves as an example of such practices and procedures. These guidelines are written to help avoid creating asbestos dust/debris during the course of the work and using clean-up procedures to effectively remove any asbestos-containing dust/debris that might have been created.

Clean-up/Clearance: In order to avoid creating a potential asbestos hazard, adding to an existing one, or compromising an ongoing asbestos hazard management program, asbestos dust/debris created by other activities must be properly and promptly cleaned-up. The specified cleaning procedures shall be supervised and enforced. **Dry sweeping** of asbestos containing dust/debris *assures contamination* of a larger area and **is prohibited**. Verification that proper procedures for clean-up are used and a visual inspection are required supervisory control measures.

D. Other Related Construction Activities

There is a wide range of construction activities involving potential contact with or disturbance of ACM. Examples include building renovation/repair, boiler system repair, and industrial facility demolition. Many of these activities can result in airborne asbestos exposures which are extremely high. These activities present a very real health threat to workers, the public and the environment, and therefore must be carefully planned, monitored and supervised.

CHAPTER TWO
MEDICAL CONSIDERATIONS

A. History

The word asbestos is derived from a Greek adjective meaning inextinguishable. The "miracle mineral" as it was referred to by the Greeks, was admired for its soft and pliant properties, as well as its ability to withstand heat. Asbestos was spun and woven into cloth in the same manner as cotton. It was also utilized for wicks in sacred lamps. Romans likewise recognized the properties of asbestos and it is thought that they cleaned asbestos tablecloths by throwing them into the flames of a fire.

From the time of the Greeks and Romans in the first century until its re-emergence in the eighteenth century, asbestos received little attention or use. It was not available in large amounts until extensive deposits were discovered in Canada in the nineteenth century (late 1800's). Following this discovery, asbestos emerged as an insulating component in thermal insulation for boilers, pipes and other high temperature applications and as a reinforcement material for a variety of products.

Asbestos is a naturally occurring mineral. It is distinguished from other minerals by the fact that its crystals form long, thin fibers. Deposits of asbestos are found throughout the world. The primary sites of commercial production are: Canada, the Soviet Union and South Africa. Asbestos is also mined commercially in the United States.

Asbestos has been used in literally hundreds of products. Collectively, these are frequently referred to as asbestos-containing material (ACM). Asbestos gained wide spread use because it is plentiful, readily available and low in cost. Because of its unique properties -- fire resistant, high tensile strength, poor heat and electric conductor, and generally impervious to chemical attacks, asbestos proved well-suited for many uses in the construction trades.

Asbestos is added to a variety of building materials to enhance strength. It is found in concrete and concrete-like products. Asbestos-containing cement products generally contain Portland cement, aggregate, and chrysotile fibers. The asbestos content may vary up to 50 percent by weight depending on the use of the product. Asbestos cement products are used as siding and roofing shingles; as wallboard; as corrugated and flat sheets for roofing, cladding, and partitions; and as pipes. Asbestos has also been added to asphalt, vinyl and other materials to make products like roofing felts, exterior siding, floor tile, joint compounds and adhesives.

B. Health Effects Associated With Asbestos Exposure

The adverse health effects associated with asbestos exposure have been extensively studied for many years. Results of these studies and epidemiologic investigations have demonstrated that inhalation of asbestos fibers may lead to increased risk of developing one or more diseases. Exactly why some people develop these diseases and others do not remains a mystery. In this discussion, each of the major diseases associated with asbestos will be examined, along with the risk and how that risk can be minimized.

It is important to recognize that the majority of people who have died as a result of asbestos exposure were asbestos workers. These workers were frequently exposed to high concentrations of asbestos fibers each working day with little or no protection. The asbestos abatement worker of today follows specific work practices and wears appropriate protection, including respirators, to minimize the risk of exposure.

Since the primary health effects due to asbestos exposure act on the lung, it is necessary to gain a brief understanding of the respiratory system. Air which is breathed into the body, passes through the mouth and nose into the windpipe or trachea. The trachea splits into two smaller airways called the bronchi. Each bronchus divides into smaller and smaller tubes which terminate into air sacs called alveoli. It is in these air sacs that oxygen is absorbed into small blood vessels and waste gases, such as carbon dioxide, pass out of the blood. (See Figure II)

The lung itself is divided into two halves and sits in the pleural cavity. This cavity and the outside of the lung itself have a membrane lining (called pleura) which looks somewhat like Saran-wrap. These linings are in contact with each other and are very moist. Just like two panes of glass with a drop of water between them, these linings slide easily across each other, but are difficult to pull apart. Accordingly, as the chest cavity expands, the lungs expand and air rushes in. If these linings were to become damaged, inhalation could not occur properly.

The body has several mechanisms by which it "filters" the air it breathes. First, very large particles are removed in the nose and mouth. Many smaller particles impact on the mucous-coated walls of the airways and are caught. These airways have a hair like lining (ciliated cells) which constantly beat upward. Accordingly, particles caught in the mucous are swept up into the back of the mouth. From here it is swallowed or expelled. **Unfortunately, cigarette smoking temporarily paralyzes these ciliated cells inhibiting one of the body's natural defenses against unwanted dust. During the night, in absence of smoke, the hair-like cells start working again and carry large amounts of mucous into the back of the mouth. This causes the so-called "smoker's hack" in the morning. After the first cigarette or two, the cleansing mechanism is paralyzed again and the coughing stops. It should now be evident why cigarette smokers who are exposed to asbestos appear to be at greater risk. Other reasons will also be discussed later in this section.**

Even with the above-mentioned natural defenses of the body, some dust particles inevitable reach the tiny air sacs. When this occurs, large cells (called macrophages) attempt to engulf the particle and "digest" it. However, because asbestos is a mineral fiber, the macrophages are often not successful. When this occurs, these cells deposit a coating on the fiber and may begin forming scar tissue around it. This is just another natural defense mechanism the body uses against unwanted dust and debris in the lung. If many asbestos fibers are inhaled and much scar tissue is formed, a condition develops known as asbestosis.

C. Pathology

Asbestosis is a disease characterized by fibrotic scarring of the lung. This is a restrictive lung disease which reduces the capacity of the lung. The common symptom is shortness of breath. Asbestosis is prevalent among workers who have been exposed to large doses of asbestos fibers over a long period of time. Accordingly, there is a clear dose-response relationship between asbestos

exposure and developing this disease. This means the greater asbestos exposure, the more likely asbestosis will develop. All forms of asbestos have demonstrated the ability to cause asbestoses. Like all diseases associate with asbestos exposure, it may take many years for the disease to show up. The typical latency period for asbestosis is 15-30 years.

Even after exposure to asbestos has ceased, scar tissue will continue to form around existing scar tissue and fibers in the lung. Limiting exposure will reduce the amount of new scar tissue since additional fibers entering the lung will be reduced. The current Occupational Safety and Health Administration (OSHA) Asbestos Standards (29 CFR 1910.1001 and 29 CFR 1926.58) were promulgated to greatly reduce asbestosis among asbestos workers by reducing their daily dose of asbestos.

There are many causes of lung cancer, of which asbestos is only one. While employees exposed to industrial concentrations of asbestos in years past have an increased risk of getting lung cancer (5X), their risk is not as great as the cigarette smoker (10X). However, together, a cigarette smoker who also works with asbestos is more than 50 times more likely to contract lung cancer than the normal non-smoking population. Like asbestos, there exists a long lag time between initial exposure and the occurrence of lung cancer, typically 30 years. There appears to be a dose-response relationship between asbestos exposure and lung cancer, although no safe-level" has yet been determined. It should be noted, however, that several research papers published in the mid-1980's suggest there may exist an exposure level for certain forms of asbestos, below which, the occurrence of lung cancer related to asbestos exposure will not exceed that of the general population.

The disease of greatest concern regarding asbestos in buildings is probably mesothelioma. Fortunately, it is also the rarest. Mesothelioma is a cancer of the chest cavity lining (mesothelium). Mesothelioma can also occur in the lining of the abdominal cavity. If it occurs in the chest cavity, it is called pleural mesothelioma; in the abdominal cavity, it is known as peritoneal mesothelioma. This type of cancer spreads very rapidly and is always fatal. The exact mechanism of this disease remains unknown. There does not appear to be any increased risk of getting mesothelioma for smokers nor does there appear to be a dose-response relationship between asbestos exposure and mesothelioma. Cases have been recorded where the person's asbestos exposure has been limited, such as Steve McQueen, the actor. Like the other diseases of asbestos, mesothelioma often takes as much as 30-40 years after initial exposure, if it occurs.

Several other diseases are found more often among persons exposed to asbestos than the normal population. These include cancer of the esophagus, stomach, colon, and pancreas, pleural plaques, pleural thickening, and pleural effusion. The importance of using the proper work practices and respiratory protection cannot be overemphasized to minimize the occurrence of these diseases due to unnecessary asbestos exposure.

Asbestos is known to be hazardous based on studies of asbestos workers and laboratory animals. However, the risks associated with low level, non-occupational exposure (for example, as an occupant of a building containing ACM) are not well established. Attempts have been made to estimate low level risks by extrapolation from occupational exposure data. This is not a straightforward process and its validity is questionable.

Based on a thorough review of the health effects literature, EPA concludes -- there is no level of exposure below which the risks of contracting an asbestos related disease are zero. That is, there is no threshold level of exposure.

Asbestos fibers accumulate in the lungs. As exposure increases, the risk of disease likewise increases. Measures to minimize exposure and consequently minimize the accumulation of fibers, reduces the risk of adverse health effects.

D. Medical Surveillance

We have established an ongoing medical surveillance program for several reasons. The three major areas of concern are:

1. The safety and health of workers
2. Regulatory requirements
3. Other legal liability concerns

We will provide a medical surveillance program for employees that are exposed to airborne asbestos fibers at or above the OSHA "Permissible Exposure Limit" (PEL) of 0.1 f/cc or "Excursion Limit" (EL) of 1.0 f/cc for more than 30 days per year or if they wear negative pressure respirators. For these employees, a medical surveillance program is used to determine their baseline health status (health status before beginning work), to monitor their health for the duration of their employment/project, and also to provide documentation of their health status along with their work history upon completion of their employment/project.

We will provide medical examinations relative to our employees' exposure to asbestos that comply with OSHA's strictest requirements. Our medical surveillance program includes pre-placement, annual and termination examinations. We will comply with OSHA requirements for maintaining medical records on each employee, and providing access to employees and their designated representatives.

Our pre-placement examinations take place before the employee starts the asbestos job. Comprehensive medical evaluations are performed. These include, as a minimum, a medical history to determine the presence of any possible respiratory diseases and pulmonary function tests including forced vital capacity (FVC the maximum amount of air that can be expired form the lung after full inhalation), and forced expiratory volume at one second ($FEV_{1.0}$ the amount of air forcibly expired in one second after full inhalation). A chest X-ray (posterior-anterior-14 x 17 inches) is optional at the discretion of the physician; however, it is strongly recommended for the initial examination in order to establish baseline medical data for the employee.

The results of this examination are used as the employee's baseline health status. **Also, the physical exam is used to determine whether an employee is capable of safely working while wearing a respirator. The physician's report is then furnished for our confidential medical files. The physician must provide to the employee a statement that the employee has been informed by the physician of the results of the medical examination. The physician shall not reveal in the written opinion given to the employer, specific findings or diagnoses unrelated to occupational exposure to asbestos. We provide a copy of the physician's written opinion to the affected**

employee within 30 days of its receipt. We maintain the results of the examination on file for the duration of employment plus 40 years.

In addition to the medical reports, we will request that the physician provide a statement indicating whether or not an employee is capable of wearing a respirator. This statement should make reference to any lung restrictions that would prevent respirator usage as well as any other limitations associated with their use.

The physician shall compare the annual examinations with the pre-placement evaluations to determine if there are any changes in an employee's health status. If there are noticeable changes, the employer and the employee shall both be notified since the situation may require immediate action (i.e., transfer to another job, discontinue respirator use, etc.).

Within 30 calendar days before or after the termination of an employee we require that each employee exposed to asbestos receive a medical examination. There must be a history to determine the presence of any respiratory diseases, pulmonary function testing including FVC and $FEV_{1.0}$, and a chest x-ray under some circumstances as outlined in the OSHA standard 1910.1001 (l)(4). Records of these exams shall be retained by our personnel department for a minimum period of 40 years from termination, to provide documentation of the health status of the employee.

E. Other Medical Concerns

Asbestos abatement workers face safety and health problems common to all construction workers, with additional burdens imposed by hazardous materials handling. Solvents and caustics used in the removal process (floor tile) may cause skin irritation or sensitization as well as eye/nose/throat and upper respiratory irritation. Acute neurotoxicity from solvent exposure may increase safety hazards, and various solvents have kidney effects as well. Heat effects are magnified by use of protective gear, increasing cardiovascular and respiratory work loads. Heat cramps, heat exhaustion, and heat stroke must be anticipated, recognized and prevented.

CHAPTER THREE
STANDARD OPERATING PROCEDURES FOR ASBESTOS HAZARD ABATEMENT ACTIVITIES

A. Temporary Facilities

1. General

DESCRIPTION OF REQUIREMENTS

The Owner shall provide temporary connection to existing building utilities or provide temporary facilities as required herein or as necessary to carry out the Work.

SUBMITTALS

We will submit the following to the Engineer for review before the start of Work. We will not begin work until these submittals are returned with Engineer's action stamp indicating that the submittal is returned for unrestricted use or final-but-restricted use.

Scaffolding: We will submit list of rolling and fixed scaffolding intended for use on the project, in sufficient detail to indicate compliance with applicable worker safety regulations or other requirements.

Hot Water Heater: We will submit manufacturers name, model number, size in gallons, heating capacity, power requirements.

Decontamination Unit Sub-Panel: We will submit product data.

Ground Fault Circuit Interrupters (GFCI): We will submit product data.

Lamps and Light Fixtures: We will submit product data.

Temporary Heating Units: We will submit product data.

Temporary Cooling Units: We will provide product data and installation instructions.

Self-Contained Toilet Units: We will provide product data and name of sub-contractor to be used for servicing self-contained toilets. We will submit method to be used for servicing.

First Aid Supplies: We will provide list of contents of first aid kit. We will submit in form of checklist.

Fire Extinguishers: We will provide product data. We will submit schedule indicating location at job site.

2. Products

MATERIALS AND EQUIPMENT

We will provide new or used materials and equipment that are undamaged and in serviceable condition. We will provide only materials and equipment that are recognized as being suitable for the intended use, by compliance with appropriate standards.

LADDERS AND SCAFFOLDING

We will provide all scaffolding, ladders and/or staging, etc. as necessary to accomplish the execution of work. Scaffolding may be of suspension type or standing type such as metal tube and coupler, tubular welded frame, pole, outrigger or cantilever type. The type, erection and use of all scaffolding shall comply with all applicable OSHA provisions.

We will equip rungs of all ladders, etc. with an abrasive non-slip surface. We will use no metal or otherwise conductive ladders.

We will provide a non-skid surface on all scaffold surfaces subject to foot traffic. We will provide toe boards, guardrails, footing and tie-offs in accordance with OSHA construction standards.

WATER SERVICE

Temporary Water Service Connection: All connections to the Owner's water system shall include backflow protection. Valves shall be temperature and pressure rated for operation of the temperatures and pressures encountered. After completion of use, connections and fittings shall be removed without damage or alteration to existing water piping and equipment. Leaking or dripping valves shall be piped to the nearest drain or located over an existing sink or grade where water will not damage existing finishes or equipment.

Water Hoses: We will employ heavy-duty abrasion-resistant hoses with a pressure rating greater than the maximum pressure of the water distribution system to provide water into each work area and to each work area isolation structure. We will provide fittings as required to allow for connection to existing wall hydrants or spouts, as well as temporary water heating equipment, branch piping, showers, shut-off nozzles and equipment.

Hot Water may be secured from the building hot water system, provided backflow protection is installed at point of connection as described above.

Hot Water Heater: If hot water is not available from the building hot water system, we will provide UL raged 40-gallon electric hot water heater to supply hot water for the work area isolation structure. We will provide with relief valve compatible with water heater operation; pipe relief valve

down to drip pan on floor with type L copper. Wiring of the hot water heater shall be in compliance with NEMA, NECA and UL standards.

ELECTRICAL STANDARDS

General: We may utilize the Owner's electrical service provided he complies with applicable NEMA, NECA and UL standards and governing regulations for materials and layout of temporary electric service.

Ground Fault Protection: We will provide receptacle outlets equipped with ground-fault circuit interrupters, reset button and pilot light, for plug-in connection of power tools and equipment.

Electrical Power Cords: We will use only grounded extension cords; use "hard-service" cords where exposed to abrasion and traffic. We will use single lengths or use waterproof connectors to connect separate lengths of electric cords, if single lengths will not reach areas of work.

Lamps and Light Fixtures: We will provide general service incandescent lamps of wattage indicated or required for adequate illumination. We will protect lamps with guard cages or tempered glass enclosures, where fixtures are exposed to breakage by construction operations. We will provide exterior fixtures where fixtures are exposed to the weather or moisture.

FIRST AID

We will comply with governing regulations and recognized recommendations within the construction industry.

FIRE EXTINGUISHERS

We will provide Type "A" fire extinguishers for temporary offices and similar spaces where there is minimal danger of electrical or grease-oil-flammable liquid fires. In other locations we will provide type "ABC" dry chemical extinguishers, or a combination of several extinguishers of NFPA recommended types for the exposures in each case.

SELF-CONTAINED TOILETS

We will provide single-occupancy self-contained toilet units of the chemical type, properly vented and fully enclosed with a glass fiber reinforced polyester shell or similar on-absorbent material.

TEMPORARY HEAT

We will provide temporary heating units that have been tested and labeled by UL or another recognized trade association related to the fuel being consumed. We will stem or hot water radiant heat where available, and where not available use electric resistant fin radiation supplied from a branch circuit with ground fault circuit interrupter. Under no circumstances will we use forced air or fan type units inside a work area.

3. Execution of the Work

SCAFFOLDING

During the erection and/or moving of scaffolding, care will be exercised so that the polyethylene floor covering is not damaged.

We will clean as necessary debris from non-slip surfaces.

INSTALLATION, GENERAL

We will use qualified tradesman for installation of temporary services and facilities. We will locate temporary services and facilities where they will serve the entire project adequately and result in minimum interference with the performance of the Work.

We will relocate, modify and extend services and facilities as required during the course of work so as to accommodate the entirety of the work for this project.

WATER SERVICE

Water connection (without charge) to Owner's existing potable water system is limited to one 3/4" pipe-size connection, and a maximum flow of 10 gallons per minute (gpm) each to hot and cold water supply. Hot water shall be supplied at a minimum temperature of 100 degrees F.

We will maintain hose connections and outlet valves in leak proof condition. Where finish work below an outlet might be damaged by spillage or leakage. We will provide a drip pan of suitable size to minimize the possibility of water damage. We will drain water promptly from pan as it accumulates.

ELECTRICAL SERVICES

General: As necessary, we will provide a weatherproof, grounded temporary electric power service and distribution system of sufficient size, capacity, and power characteristics to accommodate performance of Work during the construction period. We will install temporary lighting adequate to provide sufficient illumination for safe work and traffic conditions in every area of Work. We will perform all electrical work in accordance with the NEC.

Power Distribution System: As necessary, we will provide circuits of adequate size and proper characteristics for each use. In general we will run wiring overhead, and rise vertically where wiring will be at least exposed to damage from construction operations.

Temporary Wiring in the work area shall be type UF non-metallic sheathed cable located overhead and exposed for surveillance. We will not wire temporary lighting with plain, exposed (insulated) electrical conductors. We will provide liquid tight enclosures or boxes for wiring devices.

a. We will provide overload-protected disconnect switch for each temporary circuit located at the power distribution center.

b. For power hand tools and task lighting, we will provide a temporary 4-gang (4 outlets per circuit) outlet in the equipment room of each work area isolation structure. Provide a separate 110-120 volt, 20 Amp circuit for each 4-gang outlet.

TEMPORARY LIGHTING

We will provide the following where natural lighting or existing building lighting does not meet the required light level:

We will provide one, 200-watt incandescent lamp per 1,000 square feet of floor area, uniformly distributed, for general construction lighting, or equivalent illumination of a similar nature. In corridors and similar traffic areas, we will provide one 100-watt incandescent lamp minimum per story, located to illuminate each landing and flight. We will provide sufficient temporary lighting to ensure proper workmanship everywhere; by combined use of daylight, general lighting, and portable plug-in task lighting.

We will provide lighting in the work area isolation structure as required to supply a 50 foot-candle minimum light level

FIRE EXTINGUISHERS

We will comply with the applicable recommendations of NFPA Standard 10 "Standard for Portable Fire Extinguishers". We will locate fire extinguishers where they are most convenient and effective for their intended purpose, but provide not less than one extinguisher in each work area in equipment room and one outside work area in clean room.

SANITARY FACILITIES

We will provide one self-contained chemical toilet unit in the Work Area for each 30 workers. Facilities shall be maintained throughout the Work. At the end of the job, facilities shall be decontaminated in accordance with these specifications.

TEMPORARY HEAT

We will provide temporary heat where indicated or needed for performance of the Work. Maintain a minimum temperature of 50 degrees F. in the work area at all times during the project.

B. Asbestos Hazard Abatement - Removal Work

1. General

RELATED DOCUMENTS

Drawings and general provisions of Contract Documents, including General Conditions and Supplementary Conditions and Contract Specifications also apply to Execution of Work.

OWNER'S AGENT'S RESPONSIBILITIES

The Owner's Agent will remove movable furniture and equipment from the work areas, unless designated otherwise, prior to commencement of asbestos hazard abatement work by us.

The Owner's Agent will coordinate and control HVAC operation and balance as necessary to assist us in attaining and maintaining static pressure differential in the work areas.

The Owner's Agent will assist us in the identification of electrical circuits within the work areas and for installation of temporary power service from outside the work areas.

EMPLOYEE EXPOSURE MONITORING REQUIRED BY OSHA

We will perform exposure monitoring in compliance with OSHA regulations for his employees.

We will keep a log of exposure monitoring activities he performs, and an updated copy of the log will be submitted to the Engineer at the end of each work week. A complete log of air samples and results will be submitted to the Engineer at the completion of the Project.

We will furnish and maintain exposure monitoring equipment required, and bear costs in connection with exposure monitoring and reporting.

AIR MONITORING OF WORK AREA AND WORK AREA ISOLATION

The Engineer may procure personal air samples measure work area exposures. If the air monitoring in the work area indicates a fiber concentration above one tenth of a fiber per cubic centimeters (0.1 f/cc) TWA8 or one fiber per cubic centimeter (1.0 f/cc) for a thirty-minute period, we will implement appropriate engineering controls in an attempt to reduce concentrations to or below this level. In most cases, such controls will already have been implemented due to OSHA requirements based on the class of work.

The Engineer may perform air monitoring outside of, and adjacent to, the work areas. If these measurements indicate contamination outside the work area from asbestos hazard abatement work, the Engineer may notify the Owner's Agent to direct ***OSC*** employees to immediately cease operations until the presence of contamination is verified and the cause of the contamination is identified and corrected, if necessary, to the satisfaction of the Engineer. We will resume asbestos operations only after he receives written authorization from the Owner's Agent.

We will facilitate and cooperate fully with air monitoring performed per this document or the contract specifications, and we will take no action intended to distort or falsify measurements of the fiber concentrations and will not interfere with these air monitoring activities. In the event that we fail to comply with these provisions, the Engineer may notify the Owner's Agent to direct the us to stop work.

Sampling and analytical work performed by the Engineer or by us will be in conformance with NIOSH Method 7400 for work area monitoring.

Copies of records of air monitoring performed by the Engineer will be submitted to us weekly.

It is the Engineer's responsibility to furnish and maintain air monitoring equipment and supplies in connection with monitoring, testing and reporting they perform. The Owner's Agent will bear costs in connection with air sampling and reporting required except to the extent that air monitoring indicates contamination by our work.

AIR SAMPLING FOR COMPLIANCE WITH CLEARANCE STANDARD

At the completion of work area decontamination, or as otherwise specified, the Engineer will aggressively procure air samples for clearance in accordance with OSHA, EPA, Department of Health rules, or AHERA, as applicable. Aggressive sampling may include, but is not limited to the use of leaf blowers, oscillating fans, and brooms.

If analysis of clearance samples indicate that the concentration of fibers in a minimum of one sample procured from within the work area(s) exceeds the applicable clearance standard, we will continue to air and surface clean the work area interior until applicable clearance criteria have been met.

We will provide at least two, 20-amp, 120 VAC electrical circuits for Engineer's use during clearance sampling.

Copies of records of air monitoring performed will be submitted to us.

The Owner's Agent will bear costs in connection with the clearance air sampling and reporting required.

SUBMITTALS

Worker Qualification Form: We will submit completed Worker Qualification Forms to the Engineer for each employee who performs asbestos hazard abatement work on the project. No worker will be permitted to work on this project unless a properly documented Worker Qualification Form has been submitted for him.

Asbestos Disposal Form: We will submit an original, signed Asbestos Disposal Form to the Engineer for each disposal of asbestos-containing or contaminated material.

PERSONNEL AND FACILITY PROTECTION

Protection Instruction: We will provide and post, in the clean room(s) and the equipment room(s), the decontamination and work procedures to be followed by the workers.

Protective Clothing: We will comply with OSHA regulations for protective clothing.

Respiratory Protection Equipment:

a. We will comply with OSHA regulations for a respiratory protection program.

b. Workers performing work area preparation, stripping, removal, enclosure encapsulation, handling disposal containers outside the work area, and final decontamination activities will wear, at minimum, negative pressure, half facepiece, air-purifying respirators. ***OSC*** will provide, at no cost, HEPA type filters labeled with NIOSH Certification for 99.97% efficiency, tested in accordance with 42 CFR Part 84 and color coded in accordance with ANSI Z88.2. In addition, a chemical cartridge section may be added, if required, for solvents, or other chemicals in use. In this case, we will provide cartridges that have each section of the combination canister labeled with the appropriate color code and NIOSH/MSHA Certification. Respirator cartridges must be discarded as contaminated waste upon exiting from the work area unless the filter intake port is sealed to provide an airtight closure.

Hygiene Facilities and Practices:

a. We will comply with OSHA regulations concerning hygiene facilities and practices.

b. Those workers intending to re-wear contaminated protective clothing stored in the equipment room will pass through the shower room wearing only their respirator. Disposable clothing will not be re-worn in the work areas

c. Each worker should be allowed adequate time for this decontamination sequence at the end of each work period, and not be required or permitted to bypass hygiene practices except for bona fide emergencies.

d. Workers will not eat, drink, smoke or chew gum or tobacco in a work area.

e. Workers removing, loading, unloading, or otherwise handling contaminated waste disposal containers from a work area will wear respirators and protective clothing.

f. Workers will be protected with respirators and protective clothing during installation of barriers, decontamination structures, etc., prior to commencing stripping and removal and during dismantling of barriers and decontamination structures after the clearance standard is achieved.

g. Workers will wear respirators and protective clothing during disposal activities at disposal landfills.

Emergency Precautions:

a. Contingency Plan: We will prepare a contingency plan for emergencies including fire, accident, power failure, failure of any pressure differential system, supplied air system failure, or any other event that may require modification or abridgment of decontamination or work area isolation procedures. The plan will include specific procedures for decontamination or work area isolation. Nothing in this plan should impede safe exiting or providing of adequate medical attention in the event of an emergency. Copies of this contingency plan will be provided to the local fire, police, and other emergency services.

b. We will notify local medical emergency personnel, including ambulance crews and hospital emergency room staff, prior to commencement of removal operations as to the possibility of treating contaminated workers who may be injured, and will be advised on the safe decontamination of these personnel, as appropriate. This notification is to include emergency entry and exit locations or other information needed by agencies providing emergency services. In addition, we will notify local fire and police departments prior to the commencement of removal operations as to the dangers of entering the work area. We will make every effort to assist these agencies form plans of action should their personnel need to enter a contaminated area.

c. We will establish emergency and fire exits from the work area. All emergency exits will be equipped with two (2) full sets of protective clothing and respirators at all times.

d. We will be prepared to administer first aid to injured personnel after decontamination.

Seriously injured personnel will be treated immediately or evacuated without delay for decontamination. When an injury occurs, we will immediately stop work and implement fiber reduction techniques (e.g., water spraying or negative air) until the

injured person has been removed from the work area. We will immediately notify the Engineer or Owner's Agent by telephone in the event of any emergency.

e. We will post the telephone numbers and locations of emergency services including but not limited to fire, ambulance, doctor, hospital, police, and power company in conspicuous locations near each clean area. The Engineer and Owner's Agent notification telephone numbers will be posted with these emergency telephone numbers.

f. We will notify our personnel and our Subcontractors that any individual at the job site may notify emergency service agencies if necessary.

Facility Security:

a. ***OSC*** will comply with OSHA and EPA regulations concerning signage and labeling.

b. ***OSC*** will comply with Contract Specifications concerning access to work, and security measures required.

Building Protection:

a. Existing facilities and functions in adjacent areas may remain in use throughout the asbestos hazard abatement process. Existing services to these adjacent areas will be maintained throughout this period. Existing fire protection and alarm systems, both within and without the work area, will be maintained in proper working order throughout the asbestos hazard abatement project.

b. We will protect existing furniture and equipment, existing building finishes that are to remain, and existing systems and functions from damage during asbestos hazard abatement work. Extra precautions will be taken in protecting: wood floors, doors and trim; permanent ceiling and wall appurtenances (such as bells, speakers, fire protection equipment, etc.);

windows; floor tile; carpet; furniture; HVAC ductwork, equipment and controls; etc.

c. If an area of the building or an area outside the building is contaminated by our activities (except the isolated work areas after asbestos hazard abatement work commences and the disposal landfill), we will bear expenses for determination of the contamination and necessary decontamination as determined by the Owner's Agent.

Equipment and Tool Decontamination:

a. Equipment and tools brought from the work area will be decontaminated in the shower room by a water spray or wet cleaned to remove visible contamination. Workers in the shower room, who are wearing respirators, will then pass the cleaned equipment or tools through the curtained doorway to other workers in the uncontaminated area, or carry the equipment or tools with them after they have also decontaminated.

b. Alternative cleaning procedures may be proposed for the Engineer's approval for cameras, air sampling equipment and other delicate items which are susceptible to rust or water damage.

2. Execution of the Work

SEQUENCE OF EXECUTION

a. Prepare work area.
b. Strip asbestos-containing materials.
c. Remove and dispose of the contaminated waste generated by work area preparation and stripping activities. The removal and disposal will be performed concurrently with the stripping.
d. Encapsulate building surfaces and equipment, and other materials.
e. Decontaminate work area and clean site.

WORK AREA PREPARATION

Work Area Isolation: The following isolation procedures will be performed in the order in which they are presented for each work area, except for work areas with strippable coatings.

a. Demarcate work area.
b. Turn off fans in the work area and isolate or shut down HVAC systems (supply and return) to prevent contamination and fiber dispersal, and to enable the attainment of a static pressure differential, in coordination with the Owner.
c. Disconnect existing lighting and electrical circuits, except for operating alarm systems, within the limits of the work area.
d. Provide safe installation of temporary power service from outside the work area utilizing ground fault protection devices and using, as required by electrical code requirements, a licensed electrician for this installation. This power service will not violate the integrity of area isolation. Auxiliary lighting used in the work area will be moisture proof.
e. Install and operate AFDs [Air Filtration Devices] per previous.
f. Seal openings from the work area, including but not limited to: doorways, windows; diffusers, return and relief grilles, and other HVAC openings; and other penetrations with polyethylene film sealed with tape. (This seal along with the floor and wall polyethylene will form a double seal at penetrations).
g. Pre-clean fixed or immovable objects and contaminated furniture and materials (such as built-in cabinetry, shelving, lockers, water fountains, listening booths, chalk boards,

bleacher seats, etc.) within the work area using HEPA-equipped vacuums or wet cleaning methods as appropriate, and enclose with polyethylene film and seal with tape.

h. Pre-clean movable contaminated furniture and materials (such as desks, chairs, files, bookcases, cabinets, etc.) within the work area using HEPA-equipped vacuums or wet cleaning methods as appropriate. Remove the decontaminated furniture and materials from the work area and store or discard as directed by the Engineer.

i. Where the work area terminates either in a corridor which is in use, or is adjacent to other occupied areas of the building, neither of which is separated from the work area by existing building construction (e.g., doors, walls, etc.), we will construct two 6 mil polyethylene barriers, each air tight and at least 3 feet apart. In addition to these plastic barriers, we will construct temporary framed partition(s) consisting of full height wood studs and 1/2" plywood to prohibit access to the contaminated work area, except through the approved decontamination system(s). If the barriers will abut asbestos-containing material, then the barriers will be installed after installation of the work area decontamination structure.

j. Cover floor surfaces with polyethylene film sealed with tape. Cover floors and apply anti-slip materials to steps so that the polyethylene film can be firmly anchored to avoid shifting layers of sheeting. Install floor polyethylene a minimum of 4" up the walls.

k. Introduce scaffolding and other large equipment that will not pass through the work area decontamination structure.

l. Set up the work area decontamination structure as specified in subsequent paragraphs and in accordance with OSHA requirements. Once these systems are installed, they will be utilized in the specified manner for the entrance and exit of personnel and equipment, except in emergency situations.

m. Cover wall surfaces with polyethylene film sealed with tape. Where appropriate, provide support for the wall polyethylene to reduce tension on tape and ensure that the sheeting joints at the intersection of wall and floor surfaces and at opening such as doors and windows.

n. Remove ceiling and wall mounted appurtenances as specified in subsequent paragraphs.

o. Strip suspended ceiling materials as specified, where applicable, to access asbestos-containing materials above.

Layout and Construction of Work Area Decontamination Structures:

Work area decontamination structures consisting of three areas will be set-up as follows:

a. The **equipment room** will be an area of sufficient size to accommodate at least one worker (allowing enough room to remove protective clothing), a 6 mil disposal bag and container, and equipment which will be stored when not in use.

b. The **shower room** will have two curtained doorways of opaque polyethylene film, one to the work area and one to the uncontaminated area. At least one shower with shower head supplied with hot and cold water or warm water will be installed in this room for personnel decontamination. This room will also be equipped with high pressure, low volume sprays to be used for the decontamination of disposal containers and equipment. The shower room will be constructed so that waste water is collected and pumped through a five (5) micron filter system. Install a freely draining floor at the level of the top of the shower pan. Filtrate will be disposed of as contaminated waste. From the filter, wastewater will be drained to a sanitary wastewater system. The shower will be watertight, and no leakage will be permitted. We will supply and maintain soap, shampoo and disposable towels at all times in the shower area.

c. The **clean room** will be of sufficient size to accommodate at least one worker. The clean room will be in the uncontaminated area.

d. Provide storage facilities (such as lockers, hangers or hooks) for workers and Engineer's personnel in or immediately adjacent to the clean room.

e. If the decontamination structure fails to prevent air flow out of the work area during personnel or equipment movement through the decontamination structure additional air locks will be installed until air flow is eliminated. (Alternatively, additional AFD units may be installed to eliminate air flow out of the work area.)

f. The work area decontamination structure will be airtight. Where joining separate sheets of polyethylene is necessary, taping alone will not be sufficient. The sheets of polyethylene will be overlapped at least 3 inches and joined with an unbroken line of adhesive in such a manner as to prohibit air movement; tape will then be used to further seal the joint on both the inside and outside of the chamber.

g. The work area decontamination structure will be constructed to prohibit passers-by from casually observing activities within the work area decontamination structure or dressing areas in the uncontaminated area. The clean room, shower room and equipment room will be constructed to permit an individual to privately dress and undress.

h. Other work area decontamination structures will be considered as long as they maintain the intended integrity of this system. Proposed changes will be submitted in writing (with drawings) prior to commencement of work and must be approved in writing by the Engineer.

Maintenance of Decontamination Structures and Barriers:

a. Visually inspect enclosures at the beginning of each work period, and intermittently thereafter.

b. Ensure that barriers are effectively sealed and taped. Repair damaged barriers and remedy defects immediately upon discovery.

c. Engineer will test effectiveness of barriers, decontamination structures, etc.

Static Pressure Differential; Air Circulation; Local Exhaust and Ventilation:

We will install air filtration devices (AFDs) and other equipment in the work areas to reduce fiber levels, and exhaust clean air so that a static pressure differential relative to adjacent spaces is continuously maintained, and to provide local exhaust and ventilation. The equipment will perform as follows:

a. A static pressure differential will be continuously maintained in work areas from the time a static pressure differential is first established per previous paragraph until final clearance tests are accepted. The static pressure differential will be maintained 24 hours a day, 7 days per week. We will not allow air to flow from the work area (including periods when asbestos hazard abatement work is not in progress) except through an AFD exhausting HEPA-filtered air outside the building.

b. We will provide local exhaust and ventilation within the work area during stripping and removal activities.

   1) Local Exhaust and Ventilation (LEV) means to extract contaminated air from the immediate vicinity of workers, or to ventilate the immediate vicinity of the workers with uncontaminated air, to reduce the workers' exposure to concentrations of airborne fiber during the work.

   2) LEV devices are the equipment and apparatus used to provide LEV, such as AFDs, the ducted opening of intakes to AFDs, dust collection shrouds and hoods, etc.

c. The static pressure differential system will maintain a minimum pressure differential of minus 0.02 inches of water column relative to adjacent uncontaminated areas once decontamination structures and isolation barriers are installed.

d. In work areas an air change rate of twelve (12) or more air changes per hour will be maintained until final clearance standards are attained.

e. Sufficient static pressure differential will be maintained so that passage of equipment, waste containers or workers through the work area decontamination structure does not cause air flow out of the decontamination structure.

f. Exhaust air will be discharged outside the building to the atmosphere away from pedestrian ways and such that it cannot re-enter the building.

g. We will anchor the exhaust duct from AFD(s) discharging outside the building in a wood frame within the opening utilized to place the AFD exhaust (e.g., window). The exhaust duct will be protected at its discharge point with galvanized hardware cloth.

h. At least one AFD will be placed opposite the work area decontamination structure.

i. Sufficient AFDs and LEV devices will be utilized and situated to eliminate "dead air" in the work area.

j. Sufficient air circulation will be maintained to provide appropriate drying conditions for encapsulants.

k. Sufficient air circulation will be maintained to provide healthful work environment temperatures.

l. The Engineer may test the AFD unit (s) and LEV devices to determine proper functioning. If units are found to be malfunctioning (e.g., HEPA filter is missing or being bypassed, asbestos fiber is being discharged out of doors, etc.) we will discontinue all work until either the malfunction is corrected or the malfunctioning unit(s) or devices are replaced.

m. We will provide sufficient back-up AFD units to maintain the standards set forth in this section; at least one back-up unit will be at each building for the duration of asbestos hazard abatement work.

n. We will coordinate with the Owner's Agent building HVAC operation as necessary to achieve and maintain the specified static pressure differential.

o. No intake ductwork from AFDs may pass through an uncontaminated area outside of a work area; only exhaust ductwork may pass through such areas.

Removal of Ceiling and Wall Appurtenances:

Remove ceiling and wall appurtenances shown on the Drawings specified herein, or as required to facilitate the removal of asbestos-containing materials, as applicable.

a. No removal of appurtenances on, or adjacent to, asbestos-containing materials will be permitted until work area isolation has been completed, and personnel are protected by approved and specified respiratory equipment.

b. Electrical equipment will be removed and re-installed by a licensed electrician if required by code. Only the fire alarm system will be removed from the ceiling and left in working order during asbestos hazard abatement activities. Once the alarms are removed from the ceiling they will be protected by polyethylene sheeting.

c. Drapery and curtains in the work area will be removed, HEPA vacuumed, enclosed in 6 mil polyethylene film, labeled, removed from the work areas and stored or disposed of as directed by the Engineer.

d. Remove other appurtenances necessary to complete the work, such as, but not limited to: smoke alarm systems; heating and ventilating grilles, registers, and ductwork; and miscellaneous signs.

e. Clean appurtenances not intended to be discarded, using HEPA-equipped vacuum cleaners or wet cleaning methods, as appropriate. Provide an identity label for each item, including its former location. We will remove such appurtenances from the work area, store in an uncontaminated area of the building (identified by Owner's Agent) and protect with transparent polyethylene dust cover, as directed by the Engineer.

f. Appurtenances to be discarded will be disposed of as contaminated waste.

g. Enclose duct openings with two layers of polyethylene film. Seal each layer to the duct with tape.

Stripping and Disposal of Suspended Ceiling Materials (Beneath Areas of Asbestos-Containing Materials):

We will strip suspended ceiling materials necessary to access asbestos-containing materials as follows:

a. Enclose duct openings resulting from disassembly of diffusers and grilles with two layers of polyethylene film sealed with tape.

b. Progressively strip ceiling mounted objects such as lights, speakers, diffusers, etc. as the ceiling materials are stripped. Clean and store these objects per previous paragraph.

c. Strip suspended ceiling material including tile, panels and suspension systems and treat as contaminated waste unless otherwise noted.

d. The ceiling and fallout material will be treated with amended water or removal encapsulant to reduce fiber release during stripping.

STRIPPING OF ASBESTOS-CONTAINING OR CONTAMINATED MATERIALS

General:

a. Spray the asbestos-containing material with amended water or removal encapsulant.

1) When using amended water, apply using low pressure spray equipment capable of providing a "mist" application to reduce the release of fibers. Saturate the material sufficiently to wet it to the substrate without causing excess dripping. Spray the asbestos-containing material 4 hours prior to stripping and repeatedly during work process to maintain wet condition and to minimize asbestos fiber dispersion. This spraying operation will be performed such that the material is

not eroded or abraded. If paint film barrier, ACM density or thickness, or other condition prohibits adequate saturation of the asbestos-containing material, it will be wetted continuously during the stripping process.

2) When using a removal encapsulant instead of amended water, the removal encapsulant will be applied as directed by the manufacturer.

b. Asbestos-containing materials in the areas specified will be stripped to the substrate except where specified otherwise, using appropriate tools and methods. Asbestos-containing or asbestos-contaminated materials will be handled carefully and deliberately. Unnecessary agitation of the material will be strictly prohibited. Unwrapped or unbagged asbestos-containing material will not be allowed to fall or drop to a lower surface. Bagged material will be carefully lowered from scaffolding to the floor for removal in accordance with this Section. **The use of high RPM power equipment, pressure washers, or hydro-blasters will not be used**. The substrate and adjacent materials, including lath and plaster, will be left structurally sound.

c. After completion of stripping work, surfaces from which asbestos-containing material has been removed will be brushed or wet cleaned to remove visible material. During this work the surfaces being cleaned will be kept **wet**. One hundred percent stripping of visible asbestos-containing material is required.

Stripping of Asbestos-Containing Mechanical Insulation:

a. Strip asbestos-containing pipe and mechanical insulation materials from those areas designated in the Work Order and from those areas shown on the Drawings including that material in wall and floor sleeves.

b. Spray the insulation material with amended water or removal encapsulant.

1) If amended water is used, it will be applied using low pressure spray equipment capable of providing a "mist" application to reduce the release of fibers. Saturate the material sufficiently to wet it without causing excess dripping, opening the jacket (with minimum disturbance to the ACM) to access the insulation material as necessary. Spray the asbestos-containing material prior to stripping and repeatedly during the work process to maintain wet condition and to minimize asbestos fiber dispersion.

2) When using a removal encapsulant instead of amended water, the removal encapsulant will be applied as directed by the manufacturer and in accordance with these specifications.

c. The asbestos material will be removed in small sections. Asbestos contaminated materials will be handled carefully and deliberately. Unnecessary agitation of the material will be strictly prohibited.

d. For asbestos-containing insulating cement on pipe fittings, strip the adjacent non-asbestos insulation a minimum of 6" from the cement-insulation joint.

e. After completion of stripping work, surfaces from which asbestos has been removed will be brushed or wet cleaned to remove visible material. During this work the surfaces being cleaned will be kept **wet**. One hundred percent stripping of asbestos-containing mechanical insulation is required except in those areas where insulation penetrates inaccessible areas under slabs, etc. Where the insulation becomes inaccessible, neatly trim the insulation flush and enclose the insulation end with re-wettable cloth.

f. With permission of the Engineer, insulation may be stripped using glove bags.

Decontamination of Asbestos-Contaminated Pipe Chases:

a. Decontaminate pipe chases as designated in the Work Order or from which asbestos-containing materials have been removed.

b. In areas of asbestos-containing debris and contamination, the we will wet the asbestos-containing debris with amended water or removal encapsulant, pick up the pieces of gross debris and dispose of them as contaminated waste.

c. Asbestos-containing debris and contamination on the pipe chase floor will be removed and disposed of prior to the start of other removal activities in the pipe chase.

Decontamination of Asbestos-Contaminated Crawl Spaces:

a. Decontaminate crawl space as designated in the Work Order or from which asbestos-containing materials have been removed.

b. Decontaminate soil working toward the AFDs. In areas of asbestos-containing debris and contamination, we will wet the asbestos-containing debris with amended water or removal encapsulant, pick up the pieces of gross debris and dispose of them as contaminated waste. Carefully rake the loose soil to a maximum depth of 4" to reveal asbestos-containing debris.

c. Asbestos-containing debris and contamination on the crawl space floor will be removed and disposed of after removal activities in the crawl space.

Removal of Contaminated Soil:

a. Remove soil as designated in the Work Order.

b. Remove insulation debris from soil per previous paragraph.

c. Remove soil working toward the AFDs. Wet soil with amended water or remove encapsulant to control dust and fiber release. Remove soil to a depth directed by the Engineer.

Removal of Interior and Exterior Non-Friable Asbestos-Containing Materials: The following paragraphs describe the requirements for removal of interior and exterior non-friable ACM. A non-friable ACM is any material that contains more than 1% asbestos and that cannot be pulverized under hand pressure, such as intact floor tile and mastic, intact "transite" (if encountered), and built-up roofing materials (such as tar).

a. Removal of non-friable ACM may be completed without enclosure providing we submit documentary evidence of prior project experience and methods with air sampling documentation which assures the prevention of the release of asbestos fibers, and the removal includes the following requirements:

b. Floor Tile and Mastic:

1) We will conduct a demonstration test by first constructing a normal Work Area containment area without negative air pressure system in accordance with the previous paragraphs. We will equip all personnel inside the containment at a minimum with half mask respirators with HEPA cartridges and full protective clothing. Floor tile and underlying mastic will be removed by means known as "Compliant Work Practices," as established by agreement between OSHA and the Resilient Flooring Institute and disposed as ACM debris. The Engineer will collect two Work Area and at least two personal breathing zone samples during the test removal. Area samples will be collected such that the sample sensitivity meets or exceeds 0.01 f/cc of air. The containment area will remain in place until all air sampling results are received.

2) If the analytical results indicate airborne asbestos fiber levels at or below background levels or detection limits, this will constitute a demonstration of the our ability to remove floor tiles and mastic without the release of asbestos fibers, and the we will be permitted to conduct the removal of all remaining floor tile in all Work Areas without containment and negative pressure ventilation but with all the worker protection specified in the previous paragraphs, or other portions of these specifications.

3) If the analytical results indicate airborne asbestos fiber levels above background levels, we will follow the containment and removal specifications for friable ACM contained in the following section of these specifications.

c. Exterior Built-Up Roofing Materials:

1) Built-up roofing materials containing asbestos are generally considered non-friable since the asbestos is encapsulated or bound by asphalt that cannot be crumbled by hand pressure, and generally would not release asbestos when crumbled. These built-up roofing materials will not require removal prior to demolition unless the conditions outlined in the following paragraph, are met.

2) We will be responsible for inspecting the built-up roofing materials on buildings identified in the specifications and the drawings, and determining the friability of these built-up roofing materials to meet the removal and compliance requirements of the USEPA, OEPA, and OSHA. We will identify any built-up roofing materials as being "friable", those materials will be removed in accordance with the paragraphs below.

Removal of Exterior Friable Asbestos-Containing Materials:

This section describes the general requirements for the removal of exterior friable ACMs. A friable ACM is any material that contains more than 1% asbestos and can be crumbled by hand pressure or impact; therefore causing the asbestos fibers to become airborne. Examples of friable ACMS are shingles and felts identified on the drawings, or any built-up roofing materials determined by us to be friable in accordance with the paragraph above.

a. We will be responsible for the control of any visible emissions in accordance with USEPA requirements. We will also be responsible for meeting all OSHA requirements for enclosure and personal protection during removal.

b. We will perform air monitoring during all removal work of exterior friable ACM. The results of all samples collected during this period will be reported to the Engineer within 24 hours of sample collection. If any of the area sample results are above background levels, we will be required to erect additional barriers and implement additional work practices to minimize the potential for asbestos fiber release. We will use all feasible dust suppression and handling precautions necessary to maintain the integrity of the removed materials including, but not limited to, wet removal techniques, covered conveyance chutes for lowering materials to covered ground storage units, or other such work practices which will minimize the potential for asbestos fiber release.

REMOVAL AND DISPOSAL OF ASBESTOS-CONTAINING MATERIALS AND CONTAMINATED WASTE

Removal Activities:

a. As the asbestos-containing material and contaminated waste accumulates, it will be kept wet and promptly placed in disposal containers.

b. Actual configuration of disposal containers will vary with local Ohio EPA District and landfill requirements, but as a minimum disposal containers will be either:

   1) two 6 mil polyethylene bags (one inside the other, both separately sealed); or

   2) one sealed 6 mil polyethylene bag inside an air and water tight drum.

c. **We will not allow asbestos-containing materials to dry out or collect on surfaces.**

d. Polyethylene film, tape, cleaning material, and other disposable material or items used in the work area will be treated as contaminated waste.

e. As disposal containers are filled, they will be sealed and moved to a staging area adjacent to the work area decontamination structure. We will remove waste materials from within the work area on a regular basis, and not permit accumulation of disposal containers to obstruct work progress or building exit ways. Disposal containers may be temporarily stored at the site, outside the work area. If inside a building, containers will be stored in an area locked and completely lined with polyethylene film. If outside, containers will be stored in a van-type or semi-trailer truck completely lined with polyethylene film, including a curtained doorway at the opening and will be locked. A similarly sealed, enclosed and locked container is also acceptable.

f. Disposal containers will not be loaded to make handling unduly difficult or unsafe, or threaten the integrity of the container, polyethylene barriers or building structures.

g. Warning labels, having waterproof print and permanent adhesive, will be affixed to the sides of the disposal containers (unless the containers have pre-printed labels). Warning labels will be conspicuous and legible, and they will be in accordance with EPA, OSHA and DOT regulations.

h. Waste disposal containers will be decontaminated and removed from the work area before final cleanup is started and the isolation barrier is taken down.

i. The exterior surfaces of disposal containers will be decontaminated as follows:

   1) Workers at the staging area will check seals, vacuum gross debris from containers, and load them into the shower room of the work area decontamination structure.
   2) In the shower room, surfaces of the disposal container will be sprayed with water or wet cleaned to remove visible contamination. Workers in the shower room, who are wearing respirators, will then pass the cleaned containers (through the curtained doorway) to other workers in the uncontaminated area, who are also wearing approved respiratory equipment.
   3) If polyethylene bags are used as disposal containers, the outside bag will be installed on the clean room side of the shower.

j. After decontamination, we will promptly transport the disposal containers to the disposal site, or secure them from unauthorized personnel.

k. No contaminated waste will be transported from the contaminated work area, except in approved disposal containers which have been properly decontaminated.

Disposal Activities:

a. We will determine current waste handling, transportation, and disposal regulations for the work site and for each waste disposal landfill. We will comply fully with these regulations and DOT and EPA requirements.

b. Once a shipment of disposal containers has accumulated, we will promptly transport them to the disposal site.

c. Disposal containers will be transported to the disposal site in a van-type or semi-trailer truck that is completely enclosed and securely lined with polyethylene film.

d. The polyethylene liner will be disposed with each shipment of disposal containers.

e. The contaminated waste material will be covered with six (6) inches of non-asbestos material within 24 hours of delivery to the disposal site, per EPA regulations.

e. We will document each actual disposal of asbestos-contaminated waste at the designated landfill by completing the state required Waste Disposal Record and forwarding the original to the Engineer.

ENCAPSULATION

General:

a. Areas from which asbestos-containing materials have been stripped, contaminated and inaccessible area, surfaces, objects and equipment exposed to the contaminated atmosphere of the work area which cannot be adequately wet sponged or HEPA vacuumed clean, polyethylene film protective sheeting, and objects and equipment which will not be cleaned and removed through the equipment work area decontamination structure will be encapsulated with residual encapsulant as herein specified.

b. Prior to encapsulation, we will remove polyethylene drop cloths to facilitate clean-up. We will remove visible accumulations of asbestos-containing material and debris. If needed, wet clean surfaces within the work area. Using a low pressure airless sprayer, wash dust from polyethylene wall and floor barriers as directed by the Engineer.

c. Prior to work area decontamination and site cleanup, the Engineer will conduct an inspection of encapsulating work to insure proper application procedure, extent of coverage, and bonding effectiveness.

Preparation and Application of Encapsulant:

a. The encapsulant will be prepared and applied according to the manufacturer's specifications, using airless spraying equipment. Because application by spraying could cause dissemination of residual fibers, the encapsulant must be applied with as much caution and at as low a nozzle pressure as possible.

b. The encapsulant will be applied such that its penetrating agents bind tightly to the substrate.

c. The encapsulant will be applied with a minimum of two coats to specified surfaces. Each encapsulant coat may be reduced with proper thinning agent (as specified by the manufacturer) to a 50 percent solution. Individual coats may be required to be color coded by tinting, with manufacturer's approved dyes, as directed by the Engineer. Drying times will be as specified by the manufacturer, but not less than four hours between coats

DECONTAMINATION OF WORK AREA AND SITE CLEANUP

Work Area Decontamination: The following decontamination procedures will be performed in the order in which they are presented:

a. At the completion of encapsulation activities, equipment, machinery, scaffolding, tools, etc., no longer needed in the work area will be removed from the work area and cleaned with amended water in the work area decontamination structure. Equipment, machinery, tools, scaffolding, etc., not removable through the decontamination structure will be wet cleaned with amended water and immediately sealed in polyethylene sheeting.

b. Remove the polyethylene film and spray-applied strippable coatings from walls and floors only. The windows, doors, and HVAC vents, and other barriers will remain sealed and AFDs, static pressure differential systems, and work area decontamination structures will remain in service.

c. Remove visible debris using a HEPA-equipped vacuum.

d. Clean surfaces in the work area and other contaminated areas with water or with HEPA vacuum equipment (as appropriate), or in the case of carpeting and similar materials, steam clean. Equipment, tools, scaffolding, etc., which is no longer needed will be sealed in polyethylene sheeting. After completion of the cleaning operation, we will perform a complete visual inspection of the work area to ensure that it is dust-free.

e. The accessible interiors of ductwork, air handlers, unit ventilators and radiation units in the work areas, or otherwise specified, will be thoroughly HEPA vacuumed or wet cleaned.

Disposable-type filters in HVAC devices in the work areas, or otherwise specified, will be removed and disposed of as contaminated waste.

Non-disposable type filters in HVAC devices in the work areas, or otherwise specified, will be HEPA vacuumed or washed as appropriate, wrapped in polyethylene bags, labeled, and stored in an uncontaminated area of the building as directed by the Engineer.

No asbestos-containing dust, materials or deposits will remain in accessible parts of the HVAC system cleaned as directed in this Specification.

Duct insulation materials will be properly decontaminated; if necessary, damaged duct insulation materials will be stripped and disposed of as contaminated waste.

f. Equipment and disposal containers used in the work area will be included in the cleanup and will be removed from the work area, via the work area decontamination structure, at an appropriate time in the cleaning sequence, but;

g. If the Engineer finds accumulations of dust in the work area, we will repeat the wet cleaning until the work area is visibly dust-free. The Engineer may utilize white and black glove testing to determine adequate cleaning.

h. Once the Engineer determines that the work area is free of visible dust, they will perform aggressive air cleaning. They will direct the air flow from a leaf blower to areas from which asbestos-containing materials have been stripped, inaccessible areas, and surfaces, objects and equipment within the work area, including polyethylene film protective sheeting. Working toward AFDs or LEV devices, we will direct the leaf blower from the ceiling downward. Dust and debris disturbed by the air blower will be cleaned from surfaces by HEPA vacuum. After completion of the air cleaning operation, they will perform a complete visual inspection of the work area to ensure that it is dust-free. If the Engineer finds dust in the work area, we will repeat work area decontamination.

i. Once the Engineer determines that the work area is free of visible dust, and upon our request, the Engineer will perform air sampling in accordance with the previous paragraphs. In no case will clearance testing be performed by the Engineer until at least 12 air changes have occurred after the Engineer determines that the work area is free of visible dust. If the measured asbestos fiber level exceeds the levels set in that paragraph, we will continue surface and air cleaning until the specified level is reached. When the asbestos fiber concentration in the work area is below the specified level the Engineer will authorize continuation of decontamination operations.

j. The work are decontamination structure will be removed, the area occupied by the structure thoroughly wet cleaned, and materials from the equipment room and shower room disposed of as contaminated waste. The remaining barriers between contaminated and clean areas and seals on openings into the work area and fixtures will be removed and disposed of as contaminated waste. We will decontaminate, using HEPA vacuum or wet cleaning methods, surfaces where dust or debris remains as a result of dismantling operations.

k. After equipment, tools, barriers, etc., have been removed the Engineer may conduct additional final testing. If the asbestos fiber level exceeds the limits specified, we will continue surface and air cleaning until the specified level is reached.

l. Remove demarcation devices.

C. Asbestos Hazard Abatement - Removal Work Using Glove bag (OSHA Class I)

1. General

RELATED DOCUMENTS

Drawings and general provisions of Contract Documents, including General Conditions and Supplementary Conditions and contract Specifications sections also apply to Execution of Work.

OWNER'S AGENT'S RESPONSIBILITIES

The Owner's Agent will remove movable furniture and equipment from the work areas, unless designated otherwise, prior to commencement of asbestos hazard abatement work by us.

The Owner's Agent will coordinate and control HVAC operation and balance as necessary to assist the us in attaining and maintaining static pressure differential in the work areas.

The Owner's Agent will assist us in the identification of electrical circuits within the work areas and for installation of temporary power service from outside the work areas.

EMPLOYEE EXPOSURE MONITORING REQUIRED BY OSHA

We will perform exposure monitoring in compliance with OSHA regulations for his employees.

We will keep a log of exposure monitoring activities he performs, and an updated copy of the log will be submitted to the Engineer at the end of each work week. A complete log of air samples and results will be submitted to the Engineer at the completion of the Project.

It is the our responsibility to furnish and maintain exposure monitoring equipment required, and bear costs in connection with exposure monitoring and reporting.

AIR MONITORING OF WORK AREA AND WORK AREA ISOLATION

The Engineer may procure personal air samples to measure work area exposures. If the air monitoring in the work area indicates a fiber concentration above one tenth of a fiber per cubic centimeters (0.1 f/cc) TWA8 or one fiber per cubic centimeter (1.0 f/cc) for a thirty-minute period, we will implement appropriate engineering controls in an attempt to reduce concentrations to or below this level. In most cases, such controls will already have been implemented due to OSHA requirements based on the class of work.

The Engineer may perform air monitoring outside of and adjacent to the work areas. If these measurements indicate contamination outside the work area from asbestos hazard abatement work, the Engineer may notify the Owner's Agent to direct us to immediately cease operations until the presence of contamination is verified and the cause of the contamination is identified and corrected, if necessary, to the satisfaction of the Engineer. We will resume asbestos operations only after he receives written authorization from the Owner's Agent.

We will facilitate and cooperate fully with air monitoring performed per this document or the contract specifications and we will take no action intended to distort or falsify measurements of the

fiber concentrations and will not interfere with these air monitoring activities. In the event that we fail to comply with these provisions, the Engineer may notify the Owner's Agent to direct us to stop work.

Sampling and analytical work performed by the Engineer or by us will be in conformance with NIOSH Method 7400 for work area monitoring.

Copies of records of air monitoring performed by the Engineer will be submitted to us weekly.

It is the Engineer's responsibility to furnish and maintain air monitoring equipment and supplies in connection with monitoring, testing and reporting they perform. The Owner's Agent will bear costs in connection with air sampling and reporting required, except to the extent that air monitoring indicates contamination by our work.

AIR SAMPLING FOR COMPLIANCE WITH CLEARANCE STANDARD

At the completion of work area decontamination, or as otherwise specified, the Engineer will aggressively procure air samples for clearance in accordance with OSHA, EPA, Department of Health rules, or AHERA, as applicable. Aggressive sampling may include, but is not limited to the use of leaf blowers, oscillating fans, and brooms.

If analysis of clearance samples indicate that the concentration of fibers in a minimum of one sample procured from within the work area(s) exceeds the applicable clearance standard, we will continue to air and surface clean the work area interior until applicable clearance criteria have been met.

We will provide at least two, 20-amp, 120 VAC electrical circuits for Engineer's use during clearance sampling.

Copies of records of air monitoring performed will be submitted to us weekly.

The Owner's Agent will bear costs in connection with the clearance air sampling and reporting required.

SUBMITTALS

Worker Qualification Form: We will submit completed Worker Qualification Forms to the Engineer for each employee who performs asbestos hazard abatement work on the project. No worker will be permitted to work on this project unless a properly documented Worker Qualification Form has been submitted for him.

Asbestos Disposal Form: We will submit an original, signed Asbestos Disposal Form to the Engineer for each disposal of asbestos-containing or contaminated material.

PERSONNEL AND FACILITY PROTECTION

Protection Instruction: We will provide and post, in the clean room(s) and the equipment room(s), the decontamination and work procedures to be followed by the workers.

Protective Clothing: We will comply with OSHA regulations for protective clothing.

Respiratory Protection Equipment:

a. We will comply with OSHA regulations for his respiratory protection program.

b. Workers performing work area preparation, stripping, removal, enclosure, encapsulation, handling disposal containers outside the work area, and final decontamination activities will wear at minimum, negative pressure, half facepiece, air-purifying respirators. We will provide HEPA type filters labeled with NIOSH Certification for 99.97% efficiency, tested in accordance with 42 CFR Part 84 and color coded in accordance with ANSI Z88.2. In addition, a chemical cartridge section may be added, if required, for solvents or other chemicals in use. In this case, we will provide cartridges that have each section of the combination canister labeled with the appropriate color code and NIOSH/MSHA Certification. Respirator cartridges must be discarded as contaminated waste upon exiting from the work area unless the filter intake port is sealed to provide an airtight closure.

Hygiene Facilities and Practices:

a. We will comply with OSHA regulations concerning hygiene facilities and practices.

b. Those workers intending to re-wear contaminated protective clothing stored in the equipment room will pass through the shower room wearing only their respirator. Disposable clothing will not be re-worn in the work area.

c. Each worker should be allowed adequate time for this decontamination sequence at the end of each work period, and not be required or permitted to bypass hygiene practices except for bona fide emergencies.

d. Workers will not eat, drink, smoke or chew gum or tobacco in a work area.

e. Workers removing, loading, unloading, or otherwise handling contaminated waste disposal containers from a work area will wear respirators and protective clothing.

f. Workers will be protected with respirators and protective clothing during installation of barriers, decontamination structures, etc., prior to commencing stripping and removal and during dismantling of barriers and decontamination structures after the clearance standard is achieved.

g. Workers will wear respirators and protective clothing during disposal activities at disposal landfills.

Emergency Precautions:

a. Contingency Plan: We will prepare a contingency plan for emergencies including fire, accident, power failure, failure of any pressure differential system, supplied air system failure, or any other event that may require modification or abridgment of

decontamination or work area isolation procedures. The plan will include specific procedures for decontamination or work area isolation. Nothing in this plan should impede safe exiting or providing of adequate medical attention in the event of an emergency. Copies of this contingency plan will be provided to the local fire, police, and other emergency services.

b. We will notify local medical emergency personnel, including ambulance crews and hospital emergency room staff, prior to commencement of removal operations as to the possibility of treating contaminated workers who may be injured, and will be advised on the safe decontamination of these personnel, as appropriate. This notification is to include emergency entry and exit locations or other information needed by agencies providing emergency services. In addition, we will notify the local fire and police departments prior to the commencement of removal operations as to the dangers of entering the work area. We will make every effort to assist these agencies form plans of action should their personnel need to enter a contaminated area.

c. We will establish emergency and fire exits from the work area. All emergency exits will be equipped with two (2) full sets of protective clothing and respirators at all times.

d. We will be prepared to administer first aid to injured personnel after decontamination. Seriously injured personnel will be treated immediately or evacuated without delay for decontamination. When an injury occurs, we will immediately stop work and implement fiber reduction techniques (e.g., water spraying or negative air) until the injured person has been removed from the work area. We will immediately notify the Engineer or Owner's Agent by telephone in the event of any emergency.

e. We will post the telephone numbers and locations of emergency services including but not limited to fire, ambulance, doctor, hospital, police, and power company in conspicuous locations near each clean area. The Engineer and Owner's Agent notification telephone numbers will be posted with these emergency telephone numbers.

f. We will notify our personnel and our Subcontractors that any individual at the job site may notify emergency service agencies if necessary.

Facility Security:

a. We will comply with OSHA and EPA regulations concerning signage and labeling.

b. We will comply with Contract Specifications concerning access to work, and security measures required.

Building Protection:

a. Existing facilities and functions in adjacent areas may remain in use throughout the asbestos hazard abatement process. Existing services to these adjacent areas will be

maintained throughout this period. Existing fire protection and alarm systems, both within and without the work area, will be maintained in proper working order throughout the asbestos hazard abatement project.

b. We will protect existing furniture and equipment, existing building finishes that are to remain, and existing systems and functions from damage during asbestos hazard abatement work. Extra precautions will be taken in protecting: wood floors, doors and trim; permanent ceiling and wall appurtenances (such as bells, speakers, fire protection equipment, etc.); windows; floor tile; carpet; furniture; HVAC ductwork, equipment and controls; etc.

c. If an area of the building or an area outside the building is contaminated by our activities (except the isolated work areas after asbestos hazard abatement work commences and the disposal landfill), we will bear expenses for determination of the contamination and necessary decontamination as determined by the Owner's Agent.

Equipment and Tool Decontamination:

a. Equipment and tools brought from the work area will be decontaminated in the shower room by a water spray or wet cleaned to remove visible contamination. Workers in the shower room, who are wearing respirators, will then pass the cleaned equipment or tools through the curtained doorway to other workers in the uncontaminated area, or carry the equipment or tools with them after they have also decontaminated.

b. Alternative cleaning procedures may be proposed for the Engineer's approval for cameras, air sampling equipment and other delicate items which are susceptible to rust or water damage.

2. Execution of the Work

SEQUENCE OF EXECUTION

1. Prepare work area.
2. Strip asbestos-containing materials.
3. Remove and dispose of the contaminated waste generated by work area preparation and stripping activities. The removal and disposal will be performed concurrently with the stripping.
4. Encapsulate building surfaces and equipment, and other materials.
6. Decontaminate work area and clean site.

WORK AREA PREPARATION

Some of the tasks in this sub-section may not be required for glove-bag activities meeting OSHA's definition of "short-duration/small scale" project. Such projects are exempt from paragraphs in the standard relating to establishment of a negative-pressure enclosure in the work area.

Work Area Isolation: The following isolation procedures will be performed in the order in which they are presented for each work area, except for work areas with strippable coatings:

a. Demarcate work area.

b. Turn off fans in the work area and isolate or shut down HVAC systems (supply and return) to prevent contamination and fiber dispersal, and to enable the attainment of a static pressure differential, in coordination with the Owner.

c. Provide safe installation of temporary power service from outside the work area utilizing ground fault protection devices and using, as required by electrical code requirements, a licensed electrician for this installation. This power service will not violate the integrity of area isolation. Auxiliary lighting used in the work area will be moisture proof.

d. Install and operate AFDs.

e. Seal openings from the work area, including but not limited to: doorways; windows; diffusers, return and relief grilles, and other HVAC openings; and other penetrations with polyethylene film sealed with tape.

f. Pre-clean fixed and immovable, contaminated furniture and materials (such as built-in cabinetry, shelving, lockers, water fountains, listening booths, chalk boards, bleacher seats, etc.) within the work area using HEPA-equipped vacuums or wet cleaning methods as appropriate, and enclose with polyethylene film and seal with tape.

g. Pre-clean moveable contaminated furniture and materials (such as desks, chairs, files, bookcases, cabinets, etc.) within the work area using HEPA-equipped vacuums or wet cleaning methods as appropriate.

h. Where the work area terminates either in a corridor which is in use, or is adjacent to other occupied areas of the building, neither of which is separated from the work area by existing building construction (e.g., doors, walls, etc.), we will construct temporary framed partition(s) consisting of full height woods studs and 1/2" plywood to prohibit access to the contaminated work area, except through the approved decontamination system(s). If the barriers will abut asbestos-containing material, then the barriers will be installed after installation of the work area decontamination structure.

i. Introduce scaffolding and other large equipment that will not pass through the work area decontamination structure.

j. Set up the work area decontamination structure as specified in subsequent paragraphs and in accordance with OSHA requirements. Once these systems are installed, they will be utilized in the specified manner for the entrance and exit of personnel and equipment, except in emergency situations.

k. Cover wall surfaces with polyethylene film sealed with tape. Where appropriate, provide support for the wall polyethylene to reduce tension on tape and ensure that the sheeting joints at the intersection of wall and floor surfaces and at opening such as doors and windows.

l. Remove ceiling and wall mounted appurtenances where applicable.

m. Strip suspended ceiling materials where applicable, to access asbestos-containing materials above.

Layout and Construction of Work Area Decontamination Structures:

Work area decontamination structures consisting of three areas will be set-up as follows:

a. The **equipment room** will be an area of sufficient size to accommodate at least one worker (allowing enough room to remove protective clothing), a 6 mil disposal bag and container, and equipment which will be stored when not in use.

b. The **shower room** will have two curtained doorways of opaque polyethylene film, one to the work area and one to the uncontaminated area. At least one shower with shower head supplied with hot and cold water or warm water will be installed in this room for personnel decontamination. This room will also be equipped with high pressure; low volume sprays to be used for the decontamination of disposal containers and equipment. The shower room will be constructed so that waste water is collected and pumped through a five (5) micron filter system. Install a freely draining floor at the level of the top of the shower pan. Filtrate will be disposed of as contaminated waste. From the filter, wastewater will be drained to a sanitary wastewater system. The shower will be watertight, and no leakage will be permitted. We will supply and maintain soap, shampoo and disposable towels at all times in the shower area.

c. The **clean room** will be of sufficient size to accommodate at least one worker. The clean room will be in the uncontaminated area.

d. Provide storage facilities (such as lockers, hangers or hooks) for workers and Engineer's personnel in or immediately adjacent to the clean room.

e. If the work area decontamination structure fails to prevent air flow out of the work area during personnel or equipment movement through the decontamination structure additional air locks will be installed until air flow is eliminated. (Alternatively, additional AFD units may be installed to eliminate air flow out of the work area.)

f. The work area decontamination structure will be airtight. Where joining separate sheets of polyethylene is necessary, taping alone will not be sufficient. The sheets of polyethylene will be overlapped at least 3 inches and joined with an unbroken line of adhesive in such a manner as to prohibit air movement; tape will then be used to further seal the joint on both the inside and outside of the chamber.

g. The work area decontamination structure will be constructed to prohibit passers-by from casually observing activities within the work area decontamination structure or dressing areas in the uncontaminated area. The clean room, shower room and equipment room will be constructed to permit an individual to privately dress and undress.

h. Other work area decontamination structures will be considered as long as they maintain the intended integrity of this system. Proposed changes must be submitted in writing (with drawings) prior to commencement of work and must be approved in writing by the Engineer.

Maintenance of Decontamination Structures and Barriers:

a. Visually inspect enclosures at the beginning of each work period, and intermittently thereafter.

b. Ensure that barriers are effectively sealed and taped. Repair damaged barriers and remedy defects immediately upon discovery.

c. Engineer will test effectiveness of barriers, decontamination structures, etc.

Static Pressure Differential; Air Circulation; Local Exhaust and Ventilation: We will install air filtration devices (AFDs) and other equipment in the work areas to reduce fiber levels, and exhaust clean air so that a static pressure differential relative to adjacent spaces is continuously maintained, and to provide local exhaust and ventilation. The equipment will perform as follows:

a. A static pressure differential will be continuously maintained in work areas from the time a static pressure differential is first established in the above paragraphs until final clearance tests are accepted. The static pressure differential will be maintained 24 hours a day, 7 days per week. We will not allow air to flow from the work area (including periods when asbestos hazard abatement work is not in progress) except through an AFD exhausting HEPA-filtered air outside the building.

b. We will provide local exhaust and ventilation within the work area during stripping and removal activities.

1) Local Exhaust and Ventilation (LEV) means to extract contaminated air from the immediate vicinity of workers, or to ventilate the immediate vicinity of the workers with uncontaminated air, to reduce the workers' exposure to concentrations of airborne fiber during the work.

2) LEV devices are the equipment and apparatus used to provide LEV, such as AFDs, the ducted opening of intakes to AFDs, dust collection shrouds and hoods, etc.

c. The static pressure differential system will maintain a minimum pressure differential of minus 0.02 inches of water column relative to adjacent uncontaminated areas once decontamination structures and isolation barriers are installed.

d. In work areas an air change rate of twelve (12) or more air changes per hour will be maintained until final clearance standards are attained.

e. Sufficient static pressure differential will be maintained so that passage of equipment, waste containers or workers through the work area decontamination structure does not cause air flow out of the decontamination structure.

f. Exhaust air will be discharged outside the building to the atmosphere away from pedestrian ways and such that it cannot re-enter the building.

g. We will anchor the exhaust duct from AFD(s) discharging outside the building in a wood frame within the opening utilized to place the AFD exhaust (e.g., window). The exhaust duct will be protected at its discharge point with galvanized hardware cloth.

h. At least one AFD will be placed opposite the work area decontamination structure

i. Sufficient AFDs and LEV devices will be utilized and situated to eliminate "dead air" in the work area.

j. Sufficient air circulation will be maintained to provide appropriate drying conditions for encapsulants.

k. Sufficient air circulation will be maintained to provide healthful work environment temperatures.

l. The Engineer may test the AFD unit (s) and LEV devices to determine proper functioning. If units are found to be malfunctioning (e.g., HEPA filter is missing or being bypassed, asbestos fiber is being discharged out of doors, etc.) we will discontinue all work until either the malfunction is corrected or the malfunctioning unit(s) or devices are replaced.

m. We will provide sufficient back-up AFD units to maintain the standards set forth in this section; at least one back-up unit will be at each building for the duration of asbestos hazard abatement work.

n. We will coordinate with the Owner's Agent building HVAC operation as necessary to achieve and maintain the specified static pressure differential.

o. No intake ductwork from AFDs may pass through an uncontaminated area outside of a work area; only exhaust ductwork may pass through such areas.

Stripping and Disposal of Suspended Ceiling Materials (Beneath Areas of Asbestos-Containing Materials): We will strip suspended ceiling materials necessary to access asbestos-containing materials as follows:

a. Enclose duct openings resulting from disassembly of diffusers and grilles with two layers of polyethylene film sealed with tape.
b. Progressively strip ceiling mounted objects such as lights, speakers, diffusers, etc. as the ceiling materials are stripped. Clean and store these objects using HEPA-equipped vacuum cleaners or wet cleaning methods, as appropriate.
c. Strip suspended ceiling material including tile, panels and suspension systems and treat as contaminated waste unless otherwise noted.
d. The ceiling and fallout material will be treated with amended water or removal encapsulant to reduce fiber release during stripping.

STRIPPING OF ASBESTOS-CONTAINING OR CONTAMINATED MATERIALS

General:

a. Spray the asbestos-containing material with amended water or removal encapsulant.
   1) When using amended water, apply using low pressure spray equipment capable of providing a "mist" application to reduce the release of fibers. Saturate the material sufficiently to wet it to the substrate without causing excess dripping. Spray the asbestos-containing material 4 hours prior to stripping and repeatedly during work process to maintain wet condition and to minimize asbestos fiber dispersion. This spraying operation will be performed such that the material is not eroded or abraded. If paint film barrier, ACM density or thickness, or other condition prohibits adequate saturation of the asbestos-containing material, it will be wetted continuously during the stripping process.
   2) When using a removal encapsulant instead of amended water, the removal encapsulant will be applied as directed by the manufacturer.
b. Asbestos-containing materials in the areas specified will be stripped to the substrate except where specified otherwise, using appropriate tools and methods. Asbestos-containing or asbestos-contaminated materials will be handled carefully and deliberately. Unnecessary agitation of the material is strictly prohibited. Unwrapped or unbagged asbestos-containing material will not be allowed to fall or drop to a lower surface. Bagged material will be carefully lowered from scaffolding to the floor for removal in accordance with this Section. **The use of high RPM power equipment, pressure washers, or hydro-blasters will not be used**. The substrate and adjacent materials, including lath and plaster, will be left structurally sound.
c. After completion of stripping work, surfaces from which asbestos-containing material has been removed will be brushed or wet cleaned to remove visible material. During this work the surfaces being cleaned will be kept **wet**. One hundred percent stripping of visible asbestos-containing material is required.

Stripping of Insulation Materials Using Glove Bags:

a. No stripping using glove bags may be performed without the approval of the Engineer.

b. The sequence of execution for glove bag stripping will be as follows:

1) Isolate the glove bag work area.

2) Cover horizontal surfaces within five feet of glove bag work with drop cloths; these drop cloths will be disposed of as contaminated waste; they cannot be slipped along the surface as glove bag work progresses nor can they be reused. Enclose asbestos-containing pipe insulation within 20 lineal feet of the work and on the same run of piping with polyethylene film sealed with tape.

3) Prepare the glove bag for use. If necessary the glove bag may be modified to accommodate unusual mechanical fittings or pipe insulation lengths. Put tools in the tool pouch.

4) Install the glove bag around the material to be removed. Tape seams so that the bag is airtight. Test for air leaks using a smoke tester. Use additional tape to seal leaks.

5) Cut jacketing (if present) and wet the material to be stripped thoroughly with amended water using a garden-type sprayer.

6) Strip the material from the pipe or fitting

7) Spray the inside of the bag thoroughly with amended water to clean the interior surfaces of the bag.

8) Evacuate the air from the bag using a HEPA-equipped vacuum; continue this process until glove bag has been removed from pipe.

9) Seal the tools in one of the attached gloves which has been pulled inside out. Cut the glove with tools from the bag, leaving the glove and bag tightly sealed. If the tools are to be reused, place the glove with tools inside a new glove bag.

10) Isolate the asbestos-containing debris and contaminated water in the bottom of the bag.

11) Carefully remove the glove bag from around the pope. Put the glove bag in a 6 mil disposal bag and seal.

12) Remove and dispose of the contaminated waste, including drop cloths, and wet clean horizontal surfaces within ten feet of the glove bag work. The accessible interiors of ductwork, air handlers, unit ventilators and radiation units within ten feet of the work, or otherwise specified, will be thoroughly HEPA vacuumed or wet cleaned. Disposable-type filters in HVAC devices in the work areas, or otherwise specified, will be removed and disposed of as contaminated waste; non-disposable type filters in HVAC devices in the work areas, or otherwise specified, will be HEPA vacuumed or washed as appropriate, wrapped in polyethylene bags, labeled, and stored in an uncontaminated area of the building as directed by the Engineer.

c. The asbestos material will be removed in small sections. Asbestos contaminated materials will be handled carefully and deliberately. Unnecessary agitation of the material is strictly prohibited.

d. For asbestos-containing insulating cement on pipe fittings, strip the adjacent non-asbestos insulation a minimum of 6" from the cement-insulation joint.

e. After completion of stripping work, surfaces from which asbestos has been removed will be brushed or wet cleaned to remove visible material. During this work the surfaces being cleaned will be kept **wet**. One hundred percent stripping of asbestos-containing mechanical insulation is required except in those areas where insulation penetrates inaccessible areas under slabs, etc. Where the insulation becomes inaccessible, neatly trim the insulation flush and enclose the insulation end with re-wetable cloth.

REMOVAL AND DISPOSAL OF ASBESTOS-CONTAINING MATERIALS AND CONTAMINATED WASTE

Removal Activities:

a. As the asbestos-containing material and contaminated waste accumulates, it must be kept wet and promptly placed in disposal containers.

b. Actual configuration of disposal containers will vary with local Ohio EPA District and landfill requirements, but as a minimum disposal containers will be either:

   1) two 6 mil polyethylene bags (one inside the other, both separately sealed); or
   2) one sealed 6 mil polyethylene bag inside an air and water tight drum.

c. **We will not allow asbestos-containing materials to dry out or collect on surfaces.**

d. Polyethylene film, tape, cleaning material, and other disposable material or items used in the work area will be treated as contaminated waste.

e. As disposal containers are filled, they will be sealed and moved to a staging area adjacent to the work area decontamination structure. We will remove waste materials from within the work area on a regular basis, and not permit accumulation of disposal containers to obstruct work progress or building exit ways. Disposal containers may be temporarily stored at the site, outside the work area. If inside a building, containers will be stored in an area locked and completely lined with polyethylene film. If outside, containers will be stored in a van-type or semi-trailer truck completely lined with polyethylene film, including a curtained doorway at the opening and will be locked. A similarly sealed, enclosed and locked container is also acceptable.

f. Disposal containers will not be loaded to make handling unduly difficult or unsafe, or threaten the integrity of the container, polyethylene barriers or building structures.

g. Warning labels, having waterproof print and permanent adhesive, will be affixed to the sides of the disposal containers (unless the containers have pre-printed labels). Warning labels will be conspicuous and legible, and they will be in accordance with EPA, OSHA and DOT regulations.

h. Waste disposal containers will be decontaminated and removed from the work area before final cleanup is started and the isolation barrier is taken down.

i. The exterior surfaces of disposal containers will be decontaminated as follows:

   1) Workers at the staging area will check seals, vacuum gross debris from containers, and load them into the shower room of the work area decontamination structure.

   2) In the shower room, surfaces of the disposal container will be sprayed with water or wet cleaned to remove visible contamination. Workers in the shower room, who are wearing respirators, will then pass the cleaned containers (through the curtained doorway) to other workers in the uncontaminated area, who are also wearing approved respiratory equipment.

   3) If polyethylene bags are used as disposal containers, the outside bag will be installed on the clean room side of the shower.

j. After decontamination, we will promptly transport the disposal containers to the disposal site, or secure them from unauthorized personnel.

k. No contaminated waste will be transported from the contaminated work area, except in approved disposal containers which have been properly decontaminated.

Disposal Activities:

a. It is our responsibility to determine current waste handling, transportation, and disposal regulations for the work site and for each waste disposal landfill. He must comply fully with these regulations and DOT and EPA requirements.

b. Once a shipment of disposal containers has accumulated, We will promptly transport them to the disposal site.

c. Disposal containers will be transported to the disposal site in a van-type or semi-trailer truck that is completely enclosed and securely lined with polyethylene film.

d. The polyethylene liner will be disposed with each shipment of disposal containers.

e. The contaminated waste material will be covered with six (6) inches of non-asbestos material within 24 hours of delivery to the disposal site, per EPA regulations.

f. We will document each actual disposal of asbestos-contaminated waste at the designated landfill by completing the state required Waste Disposal Record and forwarding the original to the Engineer.

ENCAPSULATION

General:

a. Areas from which asbestos-containing materials have been stripped will be encapsulated with residual encapsulant as herein specified.

b. Prior to work area decontamination and site cleanup, the Engineer will conduct an inspection of encapsulating work to insure proper application procedure, extent of coverage, and bonding effectiveness.

Preparation and Application of Encapsulant:

a. The encapsulant will be prepared and applied according to the manufacturer's specifications.

b. The encapsulant will be applied such that its penetrating agents bind tightly to the substrate.

c. The encapsulant will be applied with a minimum of two coats to specified surfaces. Each encapsulant coat may be reduced with proper thinning agent (as specified by manufacturer) to a 50 percent solution. Individual coats may be color coded by tinting, with manufacturer's approved dyes, as directed by the Engineer. Drying times will be as specified by the manufacturer, but not less than four hours between coats.

DECONTAMINATION OF WORK AREA AND SITE CLEANUP

Work Area Decontamination: The following decontamination procedures will be performed in the order in which they are presented:

a. At the completion of encapsulation activities, equipment, machinery, scaffolding, tools, etc., no longer needed in the work area will be removed from the work area and cleaned with amended water in the work area decontamination structure. Equipment, machinery, tools, scaffolding, etc., not removable through the decontamination structure will be wet cleaned with amended water and immediately sealed in polyethylene sheeting.

b. Once the Engineer determines that the work area is free of visible dust, and upon our request the Engineer will perform air sampling in accordance with this section. In no case will clearance testing be performed by the Engineer until at lest 12 air changes have occurred after encapsulation. If the measured asbestos fiber level exceeds the levels set forth in this section, we will continue surface and air cleaning until the specified level is reached. When the asbestos fiber concentration in the work area is below the specified level the Engineer will authorize continuation of decontamination operations.

c. The work area decontamination structure will be removed, the area occupied by the structure thoroughly wet cleaned, and materials from the equipment room and shower room disposed of as contaminated waste. The remaining barriers between contaminated and clean areas and seals on openings into the work area and fixtures will be removed

and disposed of as contaminated waste. We will decontaminate, using HEPA vacuum or wet cleaning methods, surfaces where dust or debris remains as a result of dismantling operations.

d. After equipment, tools, barriers, etc., have been removed the Engineer may conduct additional final testing. If the asbestos fiber level exceeds the specified limits, continue surface and air cleaning until the specified level is reached.

f. Remove demarcation devices.

CHAPTER FOUR
GENERAL SAFETY

A. Application and Responsibility

1. Application of Safety Rules

Possession - Each supervisor at each work location will be given a copy of this compliance program. It is each supervisor's responsibility to ensure that his employees are thoroughly familiar with the procedures.

Interpretation - If an employee is called upon to perform work which is hazardous and not properly protected, he must bring the matter to the attention of his supervisor before starting work. If questions arise, the final interpretation will rest with the supervisor.

Note: For the purpose of these rules, the term "supervisor" shall mean any person directly in charge of the work; OSHA's "Competent Person."

Emergencies - These rules represent minimum requirements and are only intended to cover average conditions. Since it is impracticable to cover all conditions and emergencies, the cooperation of all employees and their supervisors is required in meeting conditions not provided for in these rules.

2. Employee's Responsibility for Safety

Ability - Before proceeding with a job, the employee must satisfy himself that he can perform the work without injury. If he is not qualified to perform the work, he/she should call this to the attention of his supervisor.

Understanding - Before starting a job, each employee must thoroughly understand the work to be done, his/her part in it and the safety rules which apply.

Hazard Recognition - It is every employee's duty to recognize and report safety and health hazards to their supervisor immediately. It is the supervisor's responsibility to correct the hazardous condition immediately.

Compliance with OSHA - All supervisors and workers have a thorough familiarity with OSHA standards and other regulatory requirements. Standards and requirements that pertain to the job specifications must also be adhered to. Top management assures periodic training, certification, and recertification of supervisors and workers.

It is the supervisor's responsibility to see that the job site meets or exceeds Federal safety requirements as set by the Occupational Safety and Health Administration (OSHA), and any applicable state or local requirements.

All employees must be cooperative to any state or local Department of Health or Department of Labor (OSHA) compliance officer that appears on any job and properly identifies themselves.

3. Reporting Employee Injury

Injuries, no matter how slight, must be reported immediately to the person in charge.

All minor injuries must be properly treated and report made to the employee's supervisor, who shall observe and inquire about such injuries until they are healed. The supervisor shall observe and inquire about such injuries until they are healed. The supervisor shall also complete, on the same day as the accident occurs, a field report of the accident. This report will then be turned in to his reporting office where a detailed accident report will be completed for the insurance carrier, Workers' Compensation and OSHA recordkeeping requirements.

When the services of a physician are necessary, a physician designated by the Company shall be used whenever possible. In case of a serious accident, when transporting the injured person to the Company physician would cause serious time delay, the closest physician, emergency care clinic, or hospital should be contacted.

In case of fatal or serious accidents to employees or to others, the injured shall be attended to immediately, and then the accident must be reported immediately to the Supervisor involved.

Practical jokes - Practical jokes or "horse play" are strictly forbidden on any jobs or operations of any kind. This includes the shop area as well as on a job site.

B. General Precautions

1. Protecting the Public

It is the responsibility of each employee to protect the public from hazardous conditions when work is in progress. Signs, fences, cones, barricades, lights, and personal warnings may be required to safeguard a work area.

Appropriate lights, signs, cones, flags, or flagman must be used when Company trucks and other equipment are engaged in work along public streets and highways.

When hauling equipment, debris or waste, all laws shall be complied with regarding transporting such items on public streets and highways.

When an employee observes a hazardous condition which may cause and injury of property damage or possible injury to the general public, regardless of where it exists, he should report it promptly to the people involved, and when necessary, guard it.

2. Taking Chances

Before commencing any work which may be hazardous, care should be taken to establish a safe procedure. When more than one employee is engaged in the same job, all employees concerned must understand the procedures to be followed.

Employees must always be careful to place themselves in a safe and secure position. Risk taking is officially discouraged and may result in disciplinary action.

3. Guards (Equipment)

No guards shall be removed from a machine or piece of equipment while it is in operation.

Machines and power tools should not be operated with guards removed unless temporary protection is provided. If it is necessary to place temporary guards on any equipment, they shall be of substantial construction, suitable for the purpose intended, and shall be replaced by permanent guards as soon as possible.

4. Warnings

Warning signs must be heeded. Persons seen in a dangerous situation should be warned without being startled. Employees not required to be in dangerous situations or work zones must keep away from them.

5. General

Any employee engaged in transporting, storing and using chemicals or fuel shall do so in accordance with all safety rules associated with those fuels and or chemicals.

C. Personal Protective Equipment

Suitable personal protective clothing and equipment must be worn whenever required by instruction or whenever it would provide greater safety.

1. Hard Hats

All employees shall wear a hard hat at all times whenever they are at work. The only exceptions to this rule would be when employees are riding in a vehicle or are within an office

building. This rule applies to all Company personnel whether they are just watching or are actually performing work.

2. Work Gloves

Work gloves must be worn when handling materials, tools, and equipment when such handling may cause blisters, cuts, burns or puncture type injuries. Supervisors must assure that all employees use the type of protective gloves appropriate for the work being performed.

3. Eye Protection

Suitable eye protection equipment, such as goggles and face shields shall be worn to prevent eye injuries. Some jobs requiring the use of eye protection equipment include vacuuming dry materials, chemicals, grinding, welding, water blasting and other cleaning methods.

4. Confined Space Entry

No work will be performed inside any vessel or enclosure where ventilation or an adequate supply of oxygen cannot be assured, the atmosphere may be contaminated with toxins, there is limited opening for egress, the area was not designed for continuous occupancy or any other safety or health hazards exist. The host employer must be in full compliance with OSHA 1910.146 "Permit-Required" Confined Space and cross-train our personnel as to the specifics of their programs before any entry may be made. Any confined space entry must be coordinated with the site safety and health officials of both companies.

5. Respiratory Protection

When working around toxic, sensitizing, irritating, or corrosive materials, or in areas where there is an abnormal amount of dust, approved respiratory protection equipment must be worn. The supervisor will assign appropriate respiratory equipment before starting to work.

6. Safety Harness/Fall Protection

When entering a confined space of any type, an approved safety harness must be worn with appropriate safety lines attached and properly attended. Rescue equipment and trained rescuers must be available and on call for fast response. Fall protection devices must be utilized in accordance with OSHA, state, or local requirements, as appropriate for the situation.

7. Life Jackets

When there is work over a body of water and possibility of falling, employees must wear approved life jackets. Fall protection and safety harnesses may also be required, as appropriate for the situation.

8. Safety Vests

All flagmen or other employees, when exposed to traffic, must wear a bright orange vest, or markings for visibility.

D. Hand and Power Tools

1. General

- Hand tools which have sharp edges or that are broken shall not be used until repaired.
- Tools that must be raised or lowered from one elevation to another must be placed in an approved container or firmly attached to hand lines.
- Tools must not be thrown from place to place nor from person to person under any circumstances.
- Tools may not be left lying around where they could cause tripping or stumbling.
- Tools must never be placed unsecured on elevated places, when working on or above open grating or boards, care should be taken not to place tools on walkways lest they be knocked off, causing injury to people beneath.
- Portable electric tools should be grounded at all times when connected to a power source. The insulation on hand tools must not be depended upon to prevent shock.

2. Use of Tools

- Any tool which is damaged or defective may not be used. This includes wrenches with sprung or damaged jaws; mushroomed chisels, drills, punches; split handles and other defects.
- Pipes must be used only for the purpose for which they were designed.
- Tools must be used only for the purpose for which they were designed.
- Before making adjustments or changing air tools, unless equipped with quick change connectors, the air shall be shut off at the air supply valve ahead of the hose. The hose shall be bled at the tool before breaking the connection.
- Practical jokes with compressed air are strictly forbidden. Compressed air entering or blown against the body can result in serious injury or death.

3. Care of Tools

- All tools, regardless of ownership, must be of an approved type, maintained in first class condition and be subject to inspection at any time. The supervisor has the responsibility to condemn defective tools. Tools with sharp edges must be stored and handled that they may not be damaged or cause injury or damage. They must not be carried in clothing pockets.
- Sharp tools such as chisels, punches, drills, etc., that become cracked or mushroomed, must be dressed, repaired or replaced before further use.

E. Hoisting and Hauling Materials

1. By Hand

Employees should always obtain assistance in lifting heavy objects or use powered material handling equipment whenever available.

When two or more persons carry a heavy object that is to be lowered or dropped, there must be a prearranged signal when all are to let go.

2. By Mechanical Means

Cranes and other material handling mechanisms may be operated only by authorized personnel.

No employee is allowed on or under a suspended load, inside the angle of a winch line, nor stand or work near a cable, chain or rope under tension unless the nature of his work requires it.

No employee may ride on a cable, ball chain, sling or any other hoisting attachment or on a material being moved by means of an winch line, crane, hoist or truck.

F. Welding and Cutting

1. General

The primary hazards during welding are:

- electric shock,
- burns,
- radiant energy,
- toxic fumes,
- fires and explosions.
- Adequate precautions must be taken to guard against these hazards. Only trained, competent persons assigned to the task may use welding, cutting, or torch equipment.
- Safety shields or barricades must be placed around welding jobs where needed to protect others from direct rays of electric arc.
- Oil and grease must be kept away from oxygen systems. Gauges, connections, valves, etc., must not be lubricated with oil or grease.
- Suitable fire extinguishing equipment must be immediately available at all times where welding and cutting is in progress. A fire watch must be posted during welding or cutting where a 25 foot radius clear of combustibles may not be established.

- Adequate ventilation or approved respiratory equipment must be used while welding in poorly ventilated areas or when cutting or welding zinc, brass, copper, chromium-plated, cadmium-plated, galvanized or lead-coated materials.
- To protect eyes, face and body, employees engaged in electric welding shall wear an approved helmet, proper protective gloves and long sleeves or welder's sleeves.
- When transporting cylinders, gauges must be dismantled and valves closed. Cylinders must be rigidly secured to prevent moving and in an upright position.

2. Electrical Welding

- No electric arc welding machine, either AC or DC, shall be operated until the machine is properly grounded.
- Proper eye protection shall be used to guard against flying particles or scale when the helmet is raised.
- A welder, unless working behind a screen, may not strike an arc with an electrode until nearby workers, who may be exposed to the arc are given ample warning. This is particularly true when working in public areas.

G. Fire Prevention

1. Fire Prevention - Housekeeping

- Good housekeeping must be maintained at all work areas and vehicles.
- Combustible materials, such as oil soaked rags, wastes and shaving must be kept in metal containers with self-closing lids or in an area far removed from any other flammable materials. All containers should be emptied as soon as possible.
- Paper and other combustible material shall not be allowed to accumulate. Weeds and other vegetation shall not be permitted to grown in or around equipment storage areas.
- Flammable liquids such as gas, kerosene, benzene, naphtha, paints, lacquer thinner, or solvents may not be used for cleaning purposes unless approved methods are employed for their safe use.
- All solvents and flammable liquids must be kept in listed-type, properly labeled, safety cans.
- When pouring or pumping gasoline or other flammable fuels/solvents from one container to another, metallic contact shall be maintained between the receiving and pouring containers at all times, or bond with a bonding wire connected to each. When refueling, engines must be cut off.

- Employees shall not smoke in close proximity to flammable liquids, gases or explosives, either on property occupied by the Company or elsewhere. Smoking must be designated areas only.
- No smoking is allowed in areas designated as no smoking areas. All lighters, and matches should be left in the truck to avoid the unconscious accidental usage while in a hazardous atmosphere. Smoking is designated "no-smoking" areas is subject to disciplinary action.

2. Fire Protection - Extinguisher

Properly selected and maintained fire fighting equipment is an essential part of fire prevention. Extinguishers must be located at easily accessible places and each employee must know how to operate each extinguisher. Fire extinguishers must be regularly inspected, refilled, and weighed, with inspections in accordance with the manufacturer's recommendations and OSHA requirements.

H. Operations of Motor Vehicles and Other Mobile Equipment

1. General

- Only those persons specifically authorized, insured, and who possess valid license pertaining to the particular type of vehicle they are operating, may operate Company equipment or personally owned vehicles on Company business.
- Drivers must not permit unauthorized persons to drive, operate or ride in or on a Company vehicle.
- Drivers must know and obey all state and local motor vehicles laws.
- Where seat belts are provided, they must be used.
- Employees may not allow anyone to ride on the running boards, fenders or any part of a motorized vehicle except on the seat or inside the body walls. Passengers must not stand in moving vehicles.

2. Inspection

- All brakes must be tested by the driver at the start of each day. Drivers are responsible to report any defects which may have developed during the day. If brakes are not working safely, they must be inspected, adjusted or repaired before the vehicle is put in operation.
- Lights and other signaling devices must be inspected daily. If the vehicle is found defective, it must be repaired before it can be placed back in operation. No vehicle may be operated at night, unless properly equipped with headlights, taillights, and other necessary safety devices, as required by law.

- Engine oil, radiator, tires, transmission and safety devices must be checked on a daily basis by the driver.

3. Operation

- Drivers must keep a sharp lookout for children, especially in school zones or where they are playing, and be prepared for an immediate stop.
- Drivers following other vehicles must stay a safe distance behind so they can stop in the clear distance ahead.
- Drivers must be prepared to stop and the right of way must be yielded in all instances where necessary to avoid an accident.
- Trucks and/or trailers stopped on any public roadway must be protected by red flags, proper warning lights or reflectors in accordance with legal requirements.
- Before backing a vehicle, the driver must determine that the space he needs is clear, and then back slowly, keeping a constant lookout the entire time he is backing.
- No piece of equipment may be left running when parked in an area where the general public might tamper with the equipment.
- No alcohol or drugs are permitted on company property or in company vehicles at any time. Any employee caught drinking or using drugs, while working or driving on company time will be terminated immediately. The driving privileges of each employee will be terminated unless the driving violation charge is dropped.

I. First-Aid and Medical Treatment

Employees should be proficient in first-aid, including and especially the treatment of traumatic shock, application of artificial respiration and the control of bleeding. Detailed instruction for first-aid treatment is not included in this booklet as such information is readily available from other sources, such as the American Red Cross textbook on first-aid training.

First-aid supplies have been furnished based on recommendation by the company physician, and are easily accessible when required. The first-aid kits consist of supplies in a weather-proof container, with individually sealed packages. The contents of the kit should be inventoried by the supervisor before being sent out on each job and at least weekly on each job to ensure that the used items are replaced. Each employee shall learn to use this equipment so that he can render treatment when needed. Except for minor injuries, the services of a physician shall be obtained.

On all remote locations, it is the responsibility of the job supervisor to locate the nearest emergency room facility and notify employees of its location.

J. Accident Reporting and Investigation

1. Auto/Truck Accidents

Should a company vehicle become involved in an auto accident, no matter how minor, the following procedures must be followed:

- Stop at once and investigate.
- Fill out in detail the accident package which is stored in the glove compartment of the vehicle. The important things to record are name, address, telephone number, driver license number, vehicle license number and insurance carrier of the party with which you are involved. Also, obtain the names, addresses and phone numbers of any witnesses who might have seen the accident.
- If anyone is injured, call a doctor.
- Protect the scene from any further collision or damage by the general public.
- Render any first-aid which is necessary or needed at the scene.
- Make no statements to anyone other than the police officer and the person with whom you are involved. NEVER ADMIT TO ANY FORM OF GUILT OR LIABILITY.
- Do not discuss the accident in detail with anyone but the investigating police officer.
- Call the office for instructions concerning what to do with your vehicle.
- Take the completed accident package to office within twelve (12) hours or mail immediately, so that a detailed accident report may be made and sent to the insurance carrier.

2. Personal Injury Accidents

- Determine the extent and nature of the injuries. See that proper first-aid is applied.
- If the injury requires a doctor's attention, render first-aid to prevent shock, bleeding, etc., all ambulance or doctor immediately.
- Have someone accompany the injured employee to the doctor if shock is apparent or if injured is not in condition to drive along.
- Complete the Supervisor's Report of injury. In case of fatality, notify the office immediately. Forward the original copy of the Supervisor's Report of Injury to the office.
- Determine the cause of the accident and the corrective action to prevent reoccurrence.
- Know which members of the crew have had first-aid training and use them when needed.

- Replenish first-aid kit supplies after usage.
- Advise the office when the injured employee returns to work. Request a doctor's release before permitting a return. Be sure the employee is capable of resuming his normal work.

3. Public Liability Accidents

- These accidents are those which have occurred on or near the Company's job and which involve the Company's equipment, work area or procedures, injuring the general public.
- If a person is injured, record their name, address, and telephone number accurately.
- If it involves the property of another person, obtain their name, address and telephone number, and get a full description of the property, including serial number, identification numbers, model, make, condition, etc.
- Assist management personnel and/or insurance claims adjusters in the completion of a detailed report.

K. Sanitation

1. Drinking Water

- Portable water must be provided to employees at all job locations.
- If containers are used the container used for drinking water must be clearly marked as to its contents and may not be used for any other purpose.
- Common sense must be used in handling of the ice placed into the container, for reasons of hygiene.
- When containers must be used, they should be sanitized on a weekly basis with a strong chlorine bleach solution, then triple-rinsed.

2. Sanitizing Personal Protective Equipment and Hygiene

It shall be the duty of the supervisor to see that all personal reusable safety devices, such as respirators, ear plugs, protective suits be decontaminated or disinfected before re-issuing to another employee.

3. Personal Hygiene

Impermeable gloves are to be worn when working with or around chemicals. Also after working around or with chemicals, remove the gloves and wash thoroughly. If soap and water is not available, waterless soap should be used.

Open cuts and sores should be "disinfected" immediately and covered with a bandage. The bandage should be changed as often as necessary to avoid contamination.

L. Temperature-Related Stress Protection

1. Introduction

Adverse weather conditions are important considerations in planning and conducting site operations. Hot weather can cause physical discomfort, loss of efficiency and personal injury.

2. Heat Stress

Heat stress may result when protective clothing decreases natural body ventilation and can occur even when temperatures are moderate. One or more of the following recommended actions can help reduce heat stress:

- Provide plenty of liquids to replace body fluids (water and electrolytes) lost due to sweating.
- Provide cooling devices to aid natural body ventilation. These devices, however, add weight, and their use should be balanced against worker efficiency.
- Long cotton underwear acts as a wick to help absorb moisture and protect the skin from direct contact with heat-absorbing protective clothing. It should be the minimum undergarment worn.
- Install mobile showers and/or hose-down facilities to reduce body temperature and cool protective clothing, if necessary.
- In extremely hot weather, conduct non-emergency response operations in the early morning or evening. Ensure that adequate shelter is available to protect personnel against heat, cold, rain, snow, or other adverse weather conditions which decrease physical efficiency and increase the probability of accidents.
- In hot weather, rotate workers wearing protective clothing.
- Good hygienic standards must be maintained by frequent change of clothing and daily showering. Clothing should be permitted to dry during rest periods. Workers who notice skin problems should immediately consult medical personnel.

These recommendations should be implemented, as appropriate to site conditions, to reduce heat stress.

3. Effects of Heat Stress

If the body's physiological processes fail to maintain a normal body temperature because of excessive heat, a number of physical reactions can occur. They can range from mild reactions such as fatigue, irritability, anxiety, and decreased concentration, dexterity, or movement to death. Medical help must be obtained for the more serious cases of heat stress.

Heat-related problems include:

- **Heat Rash**: Caused by continuous exposure to heat and humid air and aggravated by chafing clothes.

- **Heat Cramps**: Caused by profuse perspiration with inadequate fluid intake and chemical replacement, especially salts. Signs include muscle spasm and pain in the extremities and abdomen. The victim should be given water and firm pressure with warm, wet towels placed over the cramped area.
- **Heat Exhaustion**: Caused by increased stress on various organs which are trying to meet the increased demands to cool the body. Signs include shallow breathing, pale, cool, moist skin; profuse sweating; and dizziness and lassitude. The victim should be allowed to rest and be given cool liquids.
- **Heat Stroke**: The most severe form of heat stress. Body must be cooled immediately to prevent severe injury and/or death. Signs include red, hot, dry skin,; no perspiration; nausea; dizziness and confusion; strong, rapid pulse; and possibly, coma. Quickly cool the victim by any available means and seek medical help immediately.

4. Heat Stress Monitoring

To monitor the body's recuperative ability to excess heat, one or more of the following techniques should be used as a screening mechanism. Monitoring of personnel wearing protective clothing should begin when the ambient temperature is 70 degrees Fahrenheit (F) or above. Frequency of monitoring should increase as the ambient temperature increases or if slow recovery rates are indicated. When heavy physical activity is performed and temperatures exceed 80 degrees F, workers should be monitored for heat stress after every 30 minute work period. A site safety officer should be present under these circumstances to conduct periodic monitoring.

- Heart rate (HR) should be measured by the radial pulse for 30 seconds as early as possible in the resting period. The HR at the beginning of the rest period should not exceed 110 beats per minute. If the HR is higher, the next work period should be shortened by 10 minutes (or 33 percent), while the length of the rest period stays the same. If the pulse rate is 100 beats per minute at the beginning of the next rest period, the following work cycle should be shortened by 33 percent.
- Body temperature should be measured orally with a clinical thermometer as early as possible in the resting period. Oral temperature (OT) at the beginning of the rest period should not exceed 99 degrees F. If it does, the next work period should be shortened by 10 minutes (or 33 percent), while the length of the rest period stays the same. However, if the OT exceeds 99 degrees F at the beginning of the next period, the following work cycle should be further shortened by 33 percent. OT should be measured again at the end of the rest period to make sure that it has dropped below 99 degrees F. If not, the individual should be removed from duty until the OT drops below 99 degrees F.

5. Cold Exposure

Persons working outdoors in temperatures at or below freezing may suffer from cold exposure. During prolonged outdoor periods with inadequate clothing, effects of cold exposure may even occur at temperatures well above freezing. Cold exposure may cause severe injury by freezing

exposed body surfaces (frostbite) or result in profound generalized cooling, possibly causing death. Areas of the body which have high surface area-to-volume ratios such as fingers, toes, and ears are the most susceptible to frostbite.

Two factors influence the development of a cold injury: ambient temperature and the velocity of the wind. Wind chill is used to describe the chilling effect of moving air in combination with low temperature. For instance, 10 degrees F with a wind of 15 miles per hour (mph) is equivalent in chilling effect to still air at -18 degrees F. Cold exposure is particularly a threat to the hazardous waste site worker as the body cools suddenly when chemical-protective equipment is removed and the clothing underneath is perspiration soaked. The presence of wind greatly increases the rate of cooling.

Local injury resulting from cold is included in the generic terms frostbite. There are several degrees of damage. Frostbite of the extremities can be categorized into:

- **Frost nip or incipient frostbite:** characterized by sudden blanching or whitening of the skin.
- **Superficial frostbite:** skin has a waxy or white appearance and is firm to the touch, but tissue beneath is resilient.
- **Deep frostbite:** tissues are cold, pale, and solid; extremely serious injury.

First aid for frostbite is to bring the victim indoors and re-warm the areas quickly in warm (not hot) water between 30 degrees C and 40.5 degrees C. Warm fluids such as water or soup should be given. The victim should not smoke. After soaking the area for 30 minutes, it should be elevated and wrapped with sterile gauze. Medical help should be sought immediately.

Systemic hypothermia is caused by exposure to freezing or rapidly dropping temperature. Its symptoms are usually exhibited in five stages: (1) shivering, (2) apathy, listlessness, sleepiness, and (sometime) rapid cooling of the body to less than 95 degrees F; (3) unconsciousness, glassy stare, slow pulse, and slow respiratory rate; (4) freezing of the extremities; and (5) death. Hypothermia victims should be warmed and medical help should be obtained.

APPENDIX “G”

OSC Trenching and Excavation Program

Ontario Specialty Contracting, Inc.

Written Excavation Safety Program

FOR

By: Stephen M. Robinson

Revised - 08/24/2010

1926, Subpart P
Excavation Safety Program

The following excavation safety program is provided as a guide to assist in complying with the requirements of OSHA's Excavation Standard, 29 CFR 1926, Subpart P, as well as to provide other helpful information. It is not intended to supersede the requirements of the standard [1926.650, .651 & .652]. Each Project Manager and/or Superintendent should review the standard for particular requirements which are applicable to their individual situation and make adjustments to this program that are specific to their project.

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Excavation Safety Program

Ontario Specialty Contracting, Inc.
Excavation Safety Program

I. OBJECTIVE

This Excavation Safety Program has been developed to protect employees from safety hazards that may be encountered during work in trenches and excavations. This program is intended to assure that:

1.2 Employees who perform work in excavations are aware of their responsibilities and know how to perform the work safely.

1.3 ***OSC*** has appointed one or more individuals within the company to assure compliance with the requirements of this program.

1.4 The responsibilities of each Site Health and Safety Officer (SHSO), and workers, are clearly detailed.

1.5 All persons involved in excavation and trenching work have received appropriate training in the safe work practices that must be followed when performing this type of work.

II. ASSIGNMENT OF RESPONSIBILITY

A. Ontario Specialty Contracting, Inc. (***OSC***)

In administering the Excavation Safety Program, ***OSC*** will:

1. Monitor the overall effectiveness of the program.
2. Provide atmospheric testing and equipment selection as needed.
3. Provide personal protective equipment as needed.
4. Provide protective systems as needed.
5. Provide training to affected employees and supervisors.
6. Provide technical assistance as needed.
7. Preview and update the program on at least an annual basis, or as needed.

B. Program Manager

The acts as the competent person for ***OSC*** in reference to this project plan/ program, and must assure that:

1. The procedures described in this program are followed.

2. Employees entering excavations or trenches are properly trained and equipped to perform their duties safely.

3. All required inspections, tests, and recordkeeping functions have been performed.

C. Employees

All employees, including contractor personnel, who work in or around excavations, must comply with the requirements of this program. Employees are responsible for reporting hazardous practices or situations to ***OSC*** management, as well as, reporting incidents that cause injury to themselves or other employees to the SHSO.

III. TRAINING

A. Training Schedule

1. All personnel involved in trenching or excavation work shall be trained in the requirements of this program by the SHSO, with assistance from the appropriate supervisors.

2. Training shall be performed before employees are assigned duties in excavations.

3. Retraining will be performed when work site inspections indicate that an employee does not have the necessary knowledge or skills to safely work in or around excavations, or when changes to this program are made.

4. Training records will be maintained by the Corporate Health, Safety and Environmental Director (CHSED) with copies kept in the project files, and shall include:

a. date of the training program;
b. name(s) of the instructor(s) who conducted the training;
c. a copy of the written material presented; and
d. name(s) of the employee(s) who received the training

B. Training Components

The training provided to all personnel who perform work in excavations shall include:

1. The work practices that must be followed during excavating or working in excavations.

2. The use of personal protective equipment that will typically be required during work in excavations, including but not limited to safety shoes, hardhats and, if required, fall protection devices.

3. Procedures to be followed if a hazardous atmosphere exists, or could reasonably be expected to develop, during work in an excavation.

4. The OSHA Excavation Standard, 29 CFR 1926, Subpart P.

5. Emergency and non-entry rescue methods and the procedure for calling rescue services.

6. ***OSC*** policy on reporting incidents that cause injury to employees.

C. Training and Duties of Program Manager

The Program Manager (CHSED) and SHSO shall receive the training detailed in this program as well as training on the requirements detailed in the OSHA Excavation Standard. The Program Manager or SHSO shall:

1. Coordinate, actively participate in, and document the training of all employees affected by this program.

2. Ensure on a daily basis, or more often as detailed in this program, that worksite conditions are safe for employees to work in excavations.

3. Determine the means of protection that will be used for each excavation project.

4. Ensure, if required, that the design of a protective system has been completed and approved by a registered professional engineer before work begins in an excavation.

5. Make available a copy of this program and the OSHA Excavation Standard to any employee who requests it.

IV. EXCAVATION REQUIREMENTS

A. Utilities and Pre-Work Site Inspection

Prior to excavation, the site shall be thoroughly inspected by the ***Site Superintendent, Project Manager and/or SHSO*** to determine if special safety measures must be taken.

B. Surface Encumbrances

All equipment, materials, supplies, permanent installations (i.e., buildings or roadways), trees, brush, boulders, and other objects at the surface that could present a hazard to employees working in the excavation shall be removed or supported as necessary to protect employees and reduce "surcharge loading" on the Excavation/Trench edge[s].

C. Underground Installations

1. The location of sewer, telephone, fuel, electric, water, or any other underground installations or wires that may be encountered during excavation work shall be determined and marked prior to opening an excavation. Arrangements shall be made as necessary by the ***Site Superintendent and/or SHSO*** with the appropriate utility entity

for the location, protection, removal, shutdown, or relocation of underground installations.

2. If the utility company does not respond within 24 hours and it is not possible to establish the exact location of these installations, the work may proceed with caution if detection equipment or other safe and acceptable means are used to locate the utility. ****[Hand digging may be required].***

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3. Excavation shall be done in a manner that does not endanger the underground installations or the employees engaged in the work. Utilities left in place shall be protected by barricades, shoring, suspension, or other means as necessary to protect employees.

D. Protection of the Public

Barricades, walkways, lighting and posting shall be provided as necessary for the protection of the public prior to the start of excavation operations.

1. Guardrails, fences, or barricades shall be provided on excavations adjacent to walkways, driveways, and other pedestrian or vehicle thoroughfares. Warning lights or other illumination shall be maintained as necessary for the safety of the public and employees from sunset to sunrise.

2. Wells, holes, pits, shafts, and all similar hazardous excavations shall be **effectively barricaded or covered and posted** as necessary to prevent unauthorized access. All temporary excavations of this type shall be backfilled as soon as possible.

3. Walkways or bridges protected by standard guardrails shall be provided where employees and the general public are permitted to cross over excavations that are 6 feet or more in depth. Where workers in the excavation may pass under these walkways or bridges, a standard guardrail and toeboard shall be used to prevent the hazard of falling objects. Information on the requirements for guardrails and toeboards may be obtained by contacting the ***SHSO***.

E. Protection of Employees

Stairs, ladders, or ramps shall be provided at excavation sites where employees are required to enter trench excavations over four (4) feet deep. The maximum distance of lateral travel (along the length of the trench) from the point of work necessary to reach the means of egress shall not exceed 25 feet in either lateral direction.
(ie: If a Trench is 200 feet long and work is being done at the 100 foot or center location, a ladder is needed on both sides of the work area at a distance of 25 feet).

1. Structural Ramps **(used only on specific projects)**

a. Structural ramps used solely by employees as a means of access or egress from excavations shall be designed by a competent person. Structural ramps

used for access or egress of equipment shall be designed by a person qualified in structural design, and shall be constructed in accordance with the design.

b. Ramps and runways constructed of two or more structural members shall have the structural members connected together to prevent movement or displacement.

c. Structural members used for ramps and runways shall be of uniform thickness.

d. Cleats or other appropriate means used to connect runway structural members shall be attached to the bottom of the runway or shall be attached in a manner to prevent tripping.

e. Structural ramps used in place of steps shall be provided with cleats or other surface treatments on the top surface to prevent slipping.

2. Ladders

a. When portable ladders are used, the ladder side rails shall extend a minimum of three (3) feet above the upper surface of the excavation.

b. Ladders shall have nonconductive side rails if work will be performed near exposed energized equipment or systems.

c. Two or more ladders, or a double-cleated ladder, will be provided where 25 or more employees will be conducting work in an excavation where ladders serve as the primary means of egress, or where ladders serve two-way traffic.

d. Ladders will be inspected prior to use for signs of damage or defects. Damaged ladders will be removed from service and marked with "Do Not Use" until repaired or destroyed.

e. Ladders shall be used only on stable and level surfaces unless secured from movement. Ladders placed in any location where they can be displaced by workplace activities or traffic shall be secured, or barricades shall be used to keep these activities away from the ladders.

f. Non self-supporting ladders [extension ladders] shall be positioned so that the foot of the ladder is one-quarter of the working length away from the support.

g. Employees are not permitted to carry any object or load while on a ladder that could cause them to lose their balance and fall.

F. Exposure to Vehicular Traffic

Employees exposed to vehicular traffic shall be provided with, and shall wear; warning vests or other suitable garments marked with or made of reflective or high-visibility material. Warning

vests worn by flagmen shall be Lime Green, and shall be reflective material if worn during night work. Emergency lighting, such as spotlights or portable lights, shall be provided as needed to perform work safely.

G. Exposure to Falling Loads

No employee is permitted underneath loads being handled by lifting or digging equipment. Employees are required to stand away from any vehicle being loaded or unloaded to avoid being struck by any spillage or falling materials. Operators may remain in the cabs of vehicles being loaded or unloaded when the vehicles provide adequate protection for the operator during loading and unloading operations.

H. Warning System for Mobile Equipment

A warning system shall be used when mobile equipment is operated adjacent to the edge of an excavation **if the operator** does not have a clear and direct view of the edge of the excavation. The warning system shall consist of barricades, hand or mechanical signals, or stop logs. If possible, the grade should be away from the excavation.

I. Hazardous Atmospheres

The ***SHSO*** will test the atmosphere in excavations over four (4) feet deep **if** a hazardous atmosphere exists or could reasonably be expected to exist. A hazardous atmosphere could be expected, for example, in excavations in landfill areas, areas where hazardous substances are stored nearby, or near areas containing gas pipelines.

1. Adequate precautions shall be taken to prevent employee exposure to atmospheres containing less than 19.5 percent oxygen and other hazardous atmospheres. These precautions include providing proper respiratory protection or forced ventilation of the workspace.

2. Forced ventilation or other effective means shall be used to prevent employee exposure to an atmosphere containing a flammable gas in excess of ten (10) percent of the lower flammability limit of the gas.

3. When controls are used that are intended to reduce the level of atmospheric contaminants to acceptable levels, continuous air monitoring will be performed by the **SHSO or their designee**. The device used for atmospheric monitoring shall be equipped with an audible and visual alarm.

4. Atmospheric testing will be performed using a properly calibrated direct reading gas monitor. Direct reading gas detector tubes, Quad meter or other acceptable means may also be used to test potentially toxic atmospheres.

5. Each atmospheric testing instrument shall be calibrated by the ***SHSO*** on a schedule and in the manner recommended by the manufacturer. In addition:

    a. Any atmospheric testing instrument that has not been used within 30 days shall be recalibrated prior to use.

b. Each atmospheric testing instrument shall be calibrated at least every six (6) months.

6. Each atmospheric testing instrument will be field checked immediately prior to use to ensure that it is operating properly.

J. Personal Protective Equipment

1. All employees working in trenches or excavations shall wear approved hardhats and steel-toed shoes or boots.

2. Employees exposed to flying fragments, dust or other materials produced by drilling, sawing, sanding, grinding, and similar operations shall wear approved safety glasses with side shields.

3. Employees performing welding, cutting, or brazing operations, or are exposed to the hazards produced by these tasks, shall wear approved spectacles or a welding faceshield or helmet, as determined by the ***SHSO***.

4. Employees entering bell-bottom pier holes or other similar deep and confined footing excavations shall wear a harness with a lifeline securely attached to it. The lifeline shall be separate from any line used to handle materials and shall be individually attended at all times while the employee wearing the lifeline is in the excavation.

5. Employees shall wear, as determined by the SHSO, approved gloves or other suitable hand protection as required by the work and/or potential exposure.

6. Employees using, or working in, the immediate vicinity of hammer drills, pile/sheeting drivers, masonry saws, jackhammers, or similar high-noise producing equipment shall wear suitable hearing protection, as determined by ***the SHSO and outlined in the Site HASP***.

7. Each employee working at the edge of an excavation six (6) feet or more deep shall be protected from falling. Appropriate Fall Protection may include guardrail systems, fences, barricades, covers, or a tie-back system meeting OSHA requirements, as determined by the ***SHSO***.

8. Emergency rescue equipment, such as a breathing apparatus, a safety harness and line and a basket stretcher, shall be readily available **where hazardous atmospheric conditions <u>may</u> exist or develop during work in an excavation.** This equipment shall be attended when in use. Only personnel who have received approved training and have appropriate equipment shall attempt retrieval that would require entry into a hazardous atmosphere. If entry into a known hazardous atmosphere must be performed, then the ***SHSO*** shall be given advance notice so that the hazards can be evaluated and rescue personnel placed on standby **<u>if</u>** necessary.

K. Walkways and Guardrails

Walkways shall be provided where employees or equipment are permitted to cross over excavations. Guardrails shall be provided, to provide protection from falling hazards, where walkways, accessible only to on-site project personnel, are six (6) feet or more above lower levels.

L. Protection from Water Accumulation Hazards

1. Employees are not permitted to work in excavations that contain or are accumulating water unless precautions have been taken to protect them from the hazards posed by water accumulation. Precautions may include special support or shield systems [Trench Boxes] to protect from cave-ins, water removal to control the level of accumulating water, or use of safety harnesses and lifelines.

2. If water is controlled or prevented from accumulating by the use of water removal equipment, the water removal equipment and operation shall be monitored by a person trained in the use of that equipment.

3. If excavation work interrupts the natural drainage of surface water (such as streams), then diversion ditches, dikes, or other suitable means shall be used to prevent surface water from entering the excavation. Precautions shall also be taken to provide adequate drainage of the area adjacent to the excavation. Excavations subject to runoff from heavy rains or freeze-thaw cycles shall be re-inspected by the ***SHSO*** after each rain incident to determine if additional precautions, such as special support or shield systems to protect from cave-ins, water removal to control the level of accumulating water, or use of safety harnesses and lifelines, should be used. ***LOGS OF EVERY INSPECTION MUST BE KEPT**

4. The ***SHSO*** shall inform affected workers of the precautions or procedures that are to be followed if water accumulates or is accumulating in an excavation.

M. Stability of Adjacent Structures

The SHSO, Project Engineer, Superintendent or Project Manager will determine if the excavation work could affect the stability of adjoining buildings, walls, sidewalks, or other structures.

1. Support systems (such as shoring, bracing, or underpinning) shall be used to assure the stability of structures and the protection of employees where excavation operations could affect the stability of adjoining buildings, walls, or other structures.

2. Excavation below the level of the base or footing of any foundation or retaining wall that could be reasonably expected to pose a hazard to employees shall not be permitted, except when:

a. a support system, such as underpinning, is provided to ensure the safety of employees and the stability of the structure;

b. the excavation is in stable rock;

c. a registered professional engineer has approved the determination that the structure is sufficiently removed from the excavation so as to be unaffected by the excavation activity; or

d. a registered professional engineer has approved the determination that such excavation work will not pose a hazard to employees.

3. Sidewalks, pavements, and appurtenant structures shall not be undermined unless a support system or other method of protection is provided to protect employees from the possible collapse of such structures.

4. Where review or approval of a support system by a registered professional engineer is required, the ***SHSO*** shall secure this review and approval in writing before the work begins.

N. Protection from Falling Objects and Loose Rocks or Soil

1. Adequate protection shall be provided to protect employees from loose rock or soil that could pose a hazard by falling or rolling from an excavation face. Such protection shall consist of:

a. scaling to remove loose material;

b. installation of protective barricades, such as wire mesh or timber, at appropriate intervals on the face of the slope to stop and contain falling material; or

c. benching sufficient to contain falling material.

2. Excavation personnel shall not be permitted to work above one another where the danger of falling rock or earth exists.

3. Employees shall be protected from excavated materials, equipment, or other materials that could pose a hazard by falling or rolling into excavations.

4. **Protection shall be provided by keeping such materials or equipment at least two (2) feet from the edge of excavations**, by use of restraining devices that are sufficient to prevent materials or equipment from falling or rolling into excavations, or by a combination of both if necessary.

5. Materials and equipment may, as determined by the ***SHSO***, need to be stored further than two (2) feet from the edge of the excavation if a hazardous **"Surcharge" loading condition is created on the face of the excavation.**

6. Materials piled, grouped, or stacked near the edge of an excavation must be stable and self-supporting and not produce excessive surcharge loading.

O. Inspection by Program Manager

1. The Corporate Health, Safety and Environmental Director (Program Manager) or the **SHSO** shall conduct daily inspections of excavations, adjacent areas, and protective systems for evidence of a situation that could result in possible cave-ins, failure of protective systems, hazardous atmospheres, or other hazardous conditions. An inspection shall be conducted by the ***SHSO*** prior to the start of work and as needed throughout the shift. Inspections shall also be made after every rainstorm or other hazard-increasing occurrence. These inspections are only required when the trench will be, or is, occupied by employees and **a Log of EVERY inspection must be kept.**

2. Where the ***SHSO*** finds evidence of a situation that could result in a possible cave-in, failure of protective systems, hazardous atmosphere, or other hazardous conditions, exposed employees shall be removed from the hazardous area until precautions have been taken to assure their safety.

3. The ***SHSO*** shall maintain a written log of all inspections conducted. This log shall include the date, work site location, results of the inspection, and a summary of any action taken to correct existing hazards.

V. PROTECTIVE SYSTEM REQUIREMENTS

A. Protection of Employees

1. Employees in an excavation shall be protected from cave-ins by using either an adequate sloping and benching system or an adequate support or protective system (ie: Trench Boxes or Shoring). The only exceptions are:

a. excavations made entirely in stable rock; or

b. excavations less than five (5) feet in depth where examination of the ground by the ***SHSO*** provides no indication of a potential cave-in.

2. Protective systems shall be capable of resisting all external loads that could reasonably be expected to be applied to the system.

B. Design of Sloping and Benching Systems

The slope and configuration of sloping or benching systems shall be selected and constructed by the ***SHSO*** or other Competent Person in accordance with the following options:

1. Allowable configurations and slopes

a. Excavations shall be sloped at an angle no steeper than one and one-half (1 ½) horizontal to one (1) vertical (34 degrees measured from the horizontal) which is Type C soil, unless one of the options listed below is used.

b. Slopes shall be properly excavated depending on soil type as shown in 29 CFR 1926, Subpart P, Appendix B.

2. Determination of slopes and configurations using 29 CFR 1926, Subpart P, Appendices A and B

The maximum allowable slopes and allowable configurations for sloping and benching systems shall meet the requirements set forth in these appendices.

3. Designs using other tabulated data

The design of sloping or benching systems may be selected from, and shall be constructed in accordance with, other tabulated data, such as tables and charts. The tabulated data used must be in written form and include the following:

a. Identification of the factors that affect the selection of a sloping or benching system.

b. Identification of the limits of the use of the data, including the maximum height and angle of the slopes determined to be safe.

c. Other information needed by the user to make correct selection of a protective system.

d. **At least one copy of the tabulated data that identifies the registered professional engineer who approved the data shall be maintained at the jobsite during construction of the protective system.** After that time, the data may be stored off the jobsite, and shall be maintained by the ***SHSO or CHSED***.

4. Design by a registered professional engineer

a. Sloping or benching systems designed in a manner other than those described in the preceding three options shall be approved by a registered professional engineer.

b. Designs shall be in written form and shall include at least the following information:

i. the maximum height and angle of the slopes that were determined to be safe for a particular project; and

ii. the identity of the registered professional engineers who approved the design.

c. At least one copy of the design shall be maintained at the jobsite while the slope is being constructed. After that time, the design may be stored off the jobsite, and shall be maintained by the ***SHSO or CHSED***.

C. Design of Support, Shield, and Other Protective Systems

The design of support systems, shield systems, and other protective systems shall be selected and constructed by ***the SHSO, Registered Engineer, Project Superintendent or other Competent Person*** in accordance with the following requirements:

1. Designs using 29 CFR 1926, Subpart P, Appendices A, C and D

    a. Timber shoring in trenches shall be designed in accordance with the requirements of the OSHA guidelines.

    b. Any Excavation 20 feet or more in depth requires a Registered Engineers design and/or approval regardless of the system selected for use

    c. Aluminum hydraulic shoring shall be designed in accordance with the manufacturer's tabulated data or the requirements of the OSHA guidelines.

2. Designs using manufacturer's tabulated data

    a. Support systems, shield systems, and other protective systems designed from manufacturer's tabulated data shall be constructed and used in accordance with all specifications, recommendations, and limitations issued or made by the manufacturer.

    b. Deviation from the specifications, recommendations, and limitations issued or made by the manufacturer shall be allowed only after the manufacturer issues specific written approval.

    c. Manufacturer's specifications, recommendations, and limitations, as well as the manufacturer's written approval to deviate from the specifications, recommendations, and limitations, shall be kept in written form at the jobsite during construction of the protective system(s). After that time, the information may be stored off the jobsite, and shall be maintained by the ***CHSED or SHSO***.

3. Designs using other tabulated data

Designs of support systems, shield systems, and other protective systems shall be selected from and constructed in accordance with tabulated data, such as tables and charts.

    a. The tabulated data shall be in written form and shall include all of the following:

        i. identification of the factors that affect the selection of a protective system drawn from such data;

        ii. identification of the limits of the use of such data; and

iii. information needed by the user to make a correct selection of a protective system from the data.

b. At least one written copy of the tabulated data, which identifies the registered professional engineer who approved the data, shall be maintained at the jobsite during construction of the protective system. After that time, the data may be stored off the jobsite, and shall be maintained by the ***CHSED or SHSO***.

4. Design by a registered professional engineer

Support systems, shield systems, and other protective systems designed in a manner other than the preceding three options shall be approved by a registered professional engineer.

a. Designs shall be in written form and shall include:

i. a plan indicating the sizes, types, and configurations of the materials to be used in the protective system; and

ii. the identity of the registered professional engineer who approved the design.

b. At least one copy of the design shall be maintained at the jobsite during construction of the protective system. After that time, the design may be stored off the jobsite, and shall be maintained by the ***CHSED or SHSO***.

D. Materials and Equipment

1. Materials and equipment used for protective systems shall be free from damage or defects that might affect their proper function.

2. Manufactured materials and equipment used for protective systems shall be used and maintained in accordance with the recommendations of the manufacturer, and in a manner that will prevent employee exposure to hazards.

3. When materials or equipment used for protective systems are damaged, the ***SHSO or Superintendent*** shall ensure that these systems are examined by a competent person to evaluate suitability for continued use. If the competent person cannot assure that the material or equipment is able to support the intended loads or is otherwise suitable for safe use, then such material or equipment shall be removed from service. The material or equipment shall then be evaluated and approved by a registered professional engineer before being returned to service.

E. Installation and Removal of Supports

1. General

a. Members of support systems shall be securely connected together to prevent sliding, falling, kick-outs, or other potential hazards.

b. Support systems shall be installed and removed in a manner that protects employees from cave-ins, structural collapses, or from being struck by members of the support systems.

c. Individual members of the support systems shall not be subjected to loads exceeding those that they were designed to support.

d. Before temporary removal of individual support members begins, additional precautions shall be taken as directed by the ***SHSO, Superintendent or Engineer*** to ensure the safety of employees (i.e., the installation of other structural members to carry the loads imposed on the support system).

e. Removal of support systems shall begin at, and progress from, the bottom of the excavation. Members shall be released slowly. If there is any indication of possible failure of the remaining members of the structure or possible cave-in of the sides of the excavation, the work shall be halted until it can be examined by the ***SHSO, Superintendent, Engineer or other Competent Person***.

f. Backfilling shall progress in conjunction with the removal of support systems from excavations.

2. Additional Requirements

a. Excavation of material to a level no greater than two (2) feet below the bottom of the members of a support system is allowed, but only if the system is designed to resist the forces calculated for the full depth of the trench. There shall be no indications of a possible loss of soil from behind or below the bottom of the support system while the trench is open.

b. Installation of a support system shall be closely coordinated with the excavation of trenches.

F. Sloping and Benching Systems

Employees are not permitted to work above other employees in the faces of sloped or benched systems, except when employees at lower levels are protected from the hazards of falling, rolling, or sliding material or equipment.

G. Shield Systems

1. General

a. Shield systems shall not be subjected to loads that are greater than those they are designed to withstand.

b. Shields shall be installed in a manner that will restrict lateral or other hazardous movement of the shield and could occur during cave-in or unexpected soil movement.

c. Employees shall be protected from the hazard of cave-ins when entering or exiting the areas protected by shields. ****THEY MUST ENTER BY MEANS OF A LADDER THAT IS PLACED INSIDE THE TRENCH BOX(ES)***

d. Employees are not permitted in trenches when shields are being installed, removed, or moved vertically.

2. Additional Requirements

a. Excavation of material to a level no greater than two (2) feet below the bottom of the shield system is allowed, but only if the system is designed to resist the forces calculated for the full depth of the trench.

b. There shall be no indications of a possible loss of soil from behind or below the bottom of the shield system while the trench is open.

VI. ACCIDENT INVESTIGATIONS

All incidents that result in injury to workers, as well as near misses, regardless of their nature, shall be reported and investigated. Investigations shall be conducted by the ***SHSO*** as soon after an incident as possible to identify the cause and means of prevention to eliminate the risk of reoccurrence.

In the event of such an incident, the Excavation Safety Program shall be reevaluated by the ***SHSO*** to determine if additional practices, procedures, or training are necessary to prevent similar future incidents.

VII. CHANGES TO PROGRAM

Any changes to the Excavation Safety Program shall be approved by ***CHSED, Project Manager or Engineer,*** and shall be reviewed by a qualified person as the job progresses to determine additional practices, procedures, or training needs necessary to prevent injuries. Affected employees shall be notified of procedure changes, and trained if necessary. A copy of this program shall be maintained at the jobsite by the ***SHSO***.

VIII. GLOSSARY

Accepted engineering practices: the standards of practice required by a registered professional engineer.

Aluminum hydraulic shoring: a manufactured shoring system consisting of aluminum hydraulic cylinders (crossbraces) used with vertical rails (uprights) or horizontal rails (wales). This system is designed to support the sidewalls of an excavation and prevent cave-ins.

Bell-bottom pier hole: a type of shaft or footing excavation, the bottom of which is made larger than the cross section above to form a bell shape.

Benching system: a method of protecting employees from cave-ins by excavating the sides of an excavation to form one or more horizontal steps, usually with vertical or near-vertical surfaces between levels.

Cave-in: the movement of soil or rock into an excavation, or the loss of soil from under a trench shield or support system, in amounts large enough to trap, bury, or injure and immobilize a person.

Competent person: a person who has been trained to identify hazards in the workplace, or working conditions that are unsafe for employees, and who has the authority to have these hazards corrected.

Cross braces: the horizontal members of a shoring system installed from side to side of the excavation. The cross braces bear against either uprights or wales.

Excavation: any man-made cut, cavity, trench, or depression in an earth surface formed by earth removal.

Faces or sides: the vertical or inclined earth surfaces formed as a result of excavation work.

Failure: the movement or damage of a structural member or connection that makes it unable to support loads.

Hazardous atmosphere: an atmosphere that is explosive, flammable, poisonous, corrosive, oxidizing, irritating, oxygen deficient, toxic, or otherwise harmful, that may cause death, illness, or injury.

Kickout: the accidental movement or failure of a cross brace.

Program Manager: the individual within the company who oversees excavation work and is responsible for assuring compliance with this program.

Protective system: a method of protecting employees from cave-ins, from material that could fall or roll from an excavation face into an excavation, or from the collapse of adjacent structures. Protective systems include support systems, sloping and benching systems, shield systems, and other systems that provide the necessary protection.

Ramp: an inclined walking or working surface that is used to gain access to one point from another. A ramp may be constructed from earth or from structural materials such as steel or wood.

Sheeting: the members of a shoring system that retain the earth in position and in turn are supported by other members of the shoring system.

Shield system: a structure used in an excavation to withstand cave-ins and which will protect employees working within the shield system. Shields can be permanent structures or portable units moved along as work progresses. Shields used in trenches are usually referred to as **trench boxes** or **trench shields**.

Shoring system: a structure that is built or put in place to support the sides of an excavation to prevent cave-ins.

Sides: see **faces**.

Sloping system: sloping the sides of an excavation away from the excavation to protect employees from cave-ins. The required slope will vary with soil type, weather, and surface or near surface loads that may affect the soil in the area of the trench (such as adjacent buildings, vehicles near the edge of the trench, etc.).

Stable rock: natural solid mineral material that can be excavated with vertical sides that will remain intact while exposed.

Structural ramp: a ramp built of steel or wood, usually used for vehicle access. Ramps made of soil or rock are not considered structural ramps.

Support system: a structure used as underpinning, bracing or shoring, which provides support to an adjacent structure, underground installation, or the sides of an excavation.

Tabulated data: tables and charts approved by a registered professional engineer and used to design and construct a protective system.

Trench: a narrow excavation (in relation to its height) made below the surface of the ground.

Trench box or trench shield: see **shield**.

Uprights: the vertical members of a trench shoring system placed in contact with the earth and usually positioned so the individual members do not contact each other. Uprights placed so that individual members are closely spaced, in contact with or interconnected to each other, are often called **sheeting**.

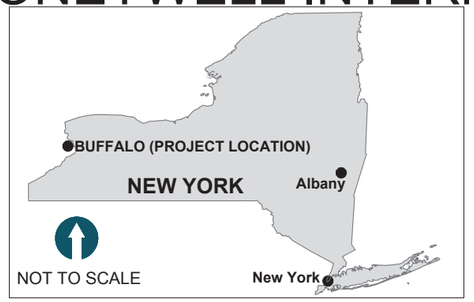
Wales: horizontal members of a shoring system placed in the direction of the excavation face whose sides bear against the vertical members of the shoring system or earth (the uprights or sheeting).

APPENDIX F: BATHYMETRIC SURVEYS AND DREDGE PLANS

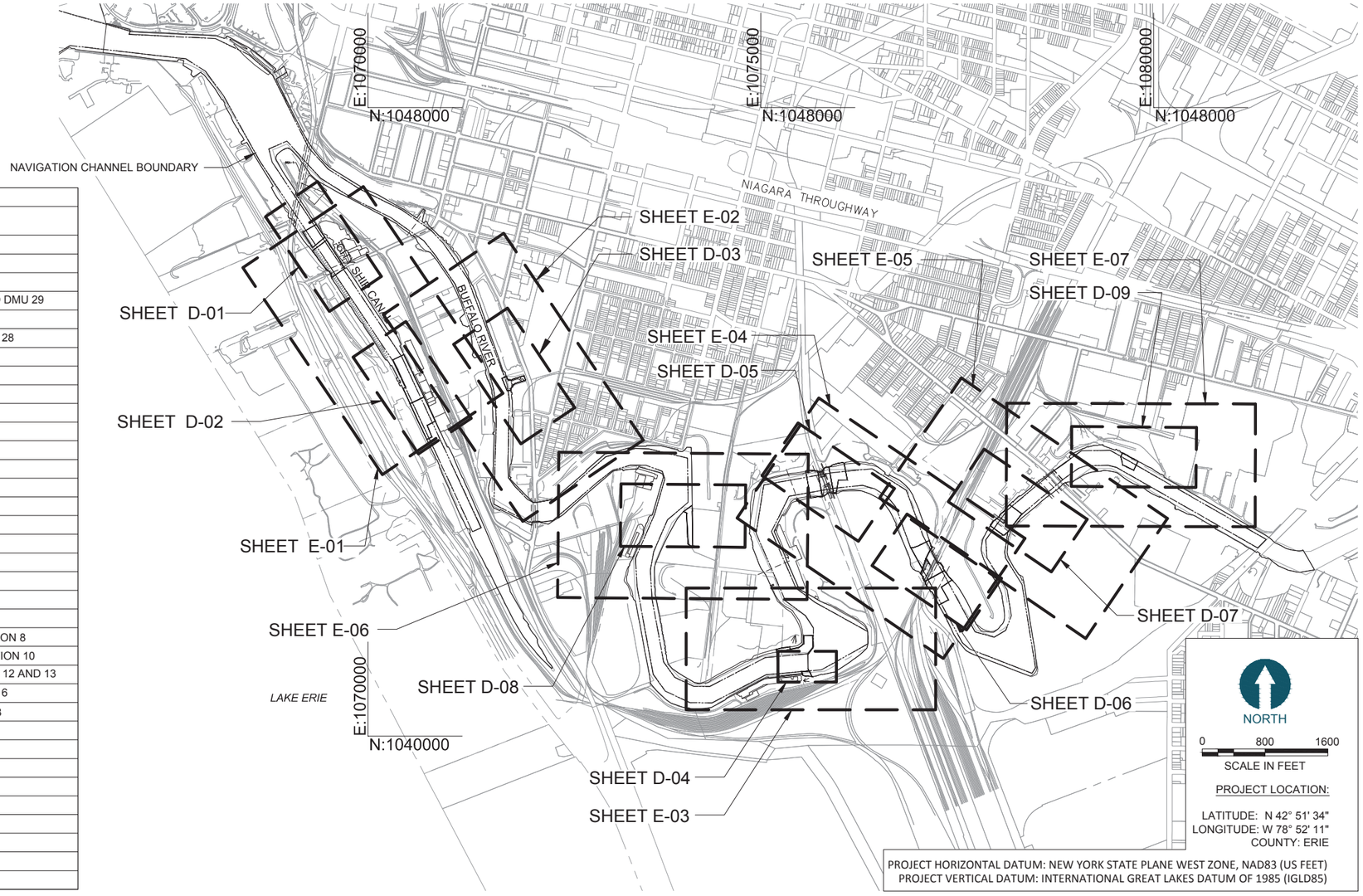
CONSTRUCTION DRAWINGS

BUFFALO RIVER AOC 2015 ADDITIONAL DREDGING

HONEYWELL INTERNATIONAL INC.



Sheet List		
Sheet Number	Sheet Name	Sheet Title
1	T-01	COVER SHEET
2	G-01	GENERAL NOTES AND LEGEND
3	E-01	EXISTING CONDITIONS - DMU 1, DMU 2, DMU 5 AND DMU 6a
4	E-02	EXISTING CONDITIONS DMU 17, DMU 18, DMU 19, DMU 27, DMU 28 AND DMU 29
5	E-03	EXISTING CONDITIONS - DMU 38a
6	E-04	EXISTING CONDITIONS - DMU 17, DMU 18, DMU 19, DMU 27, DMU 28
7	E-05	EXISTING CONDITIONS - DMU 9 AND DMU 10
8	E-06	EXISTING CONDITIONS - DMU 101
9	E-07	EXISTING CONDITIONS - DMU 8b, DMU 9 AND DMU 10
10	D-01	PROPOSED CONDITIONS - DMU 5 AND DMU 6a
11	D-02	PROPOSED CONDITIONS - DMU 1 AND DMU 2
12	D-03	PROPOSED CONDITIONS - DMU 44e
13	D-04	PROPOSED CONDITIONS - DMU 38a
14	D-05	PROPOSED CONDITIONS - DMU 27, DMU 28 AND DMU 29
15	D-06	PROPOSED CONDITIONS - DMU 17, DMU 18 AND DMU 19
16	D-07	PROPOSED CONDITIONS - DMU 9 AND DMU 10
17	D-08	PROPOSED CONDITIONS - DMU 101
18	D-09	PROPOSED CONDITIONS - DMU 8b
19	D-10	SECTIONS - DMU 6a CROSS SECTIONS 1 AND 2
20	D-11	SECTIONS - DMU 5 CROSS SECTIONS 3 AND 4
21	D-12	SECTIONS - DMU 2 CROSS SECTIONS 5 AND 6
22	D-13	SECTIONS - DMU 1 CROSS SECTION 7 AND DMU 44e CROSS SECTION 8
23	D-14	SECTIONS - DMU 44e CROSS SECTION 9 AND DMU 101 CROSS SECTION 10
24	D-15	SECTIONS - DMU 101 CROSS SECTION 11 AND DMU 38a CROSS SECTIONS 12 AND 13
25	D-16	SECTIONS - DMU 9 AND DMU 10 CROSS SECTIONS 14, 15 AND 16
26	D-17	SECTIONS - DMU 27 AND DMU 28 CROSS SECTIONS 17 AND 18
27	D-18	SECTIONS - DMU 27 AND DMU 28 CROSS SECTION 19
28	D-19	SECTIONS - DMU 18 AND DMU 19 CROSS SECTION 20
29	D-20	SECTIONS - DMU 17 AND DMU 19 CROSS SECTION 21
30	D-21	SECTIONS - DMU 18 CROSS SECTION 22
31	D-22	SECTION - DMU 19 CROSS SECTION 23
32	D-23	SECTIONS - DMU 8b CROSS SECTIONS 24 AND 25
33	D-24	TYPICAL COVER SECTIONS
34	S-01	SHEET PILE DESIGN DETAILS PLAN
35	S-02	SHEET PILE DESIGN DETAILS



ONE INCH AT FULL SIZE, IF NOT ONE INCH SCALE ACCORDINGLY

ANCHOR QEA

REVISIONS				
REV	DATE	BY	APP'D	DESCRIPTION

DESIGNED BY: S. BAGNULL
DRAWN BY: B. HURRY
CHECKED BY: M. REEMTS
APPROVED BY: R. MOHAN
SCALE: AS NOTED
DATE: NOVEMBER 6, 2015

BUFFALO RIVER AOC 2015 ADDITIONAL DREDGING

COVER SHEET

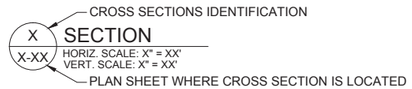
T-01

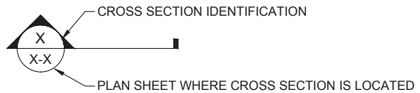
SHEET NO. 1 OF 35

Nov 06, 2015 4:40pm bhurry H:\Syracuse1\CAD Projects\130287 - Buffalo River\Construction Plans\0287-T-01.dwg 0287 - T01

LEGEND

- EXISTING CONTOUR MAJOR (5 FT)
- EXISTING CONTOUR MINOR (1 FT)
- PROPOSED CONTOUR MAJOR (5 FT)
- PROPOSED CONTOUR MINOR (1 FT)
- EXISTING PROPERTY LINE
- EXISTING SHORELINE
- EXISTING MUDLINE
- REQUIRED DREDGE LINE
- NAVIGATION CHANNEL
- ROAD
- DREDGE MANAGEMENT UNIT BOUNDARY
- PROPOSED REMAINING GLLA PROJECT DREDGING LIMITS





- GLLA DMU DREDGING AREA COMPLETED BY OTHERS
- HABITAT SUBGRADE RESTORATION COMPLETED BY OTHERS
- NO DREDGE AREA - 25 FT OFFSET FROM UTILITIES
- NO DREDGE AREA - 25 FT OFFSET FROM IN -WATER STRUCTURES AND OPERATIONALLY LIMITED DREDGE AREAS
- BACKFILL
- SAND COVER MATERIAL
- ARMOR STONE

GENERAL NOTES:

1. THIS PROJECT INCLUDES ENVIRONMENTAL DREDGING IN SELECTED AREAS OF THE BUFFALO RIVER AND CITY SHIP CANAL.
2. DRAWINGS E-01 THROUGH E-06 SHOW EXISTING BATHYMETRIC CONTOURS AND DRAWINGS D-01 THROUGH D-08 SHOW DREDGE CUT LINE CONTOURS.
3. DREDGE CUT LINE CONTOURS ARE BASED ON EVALUATION OF TILL ELEVATION OBSERVATIONS MADE AT TEST BORING LOCATIONS AND SEDIMENT THICKNESS POLING LOCATIONS.
4. LOCATIONS OF NAVIGATION CHANNEL AND STATIONING IN PROJECT AREA PROVIDED BY USACE.
5. DREDGE MANAGEMENT UNITS (DMUs) WERE DELINEATED BASED ON THE 2010 FEASIBILITY STUDY (ENVIRON INTERNATIONAL CORPORATION, MACTEC ENGINEERING AND CONSULTING INC., LINMOTECH. 2010 DRAFT FINAL FEASIBILITY STUDY FOR THE BUFFALO RIVER, NEW YORK, PREPARED ON BEHALF OF BUFFALO RIVER GREAT LAKES LEGACY ACT PROJECT COORDINATION TEAM, NOVEMBER 2010), AND FURTHER DEFINED DURING DISCUSSIONS WITHIN THE PROJECT COORDINATION TEAM.
6. LOCATIONS DISPLAYED FOR EXISTING CONDITIONS SUCH AS SHORELINES, STRUCTURES AND UTILITIES ARE APPROXIMATE.
7. IF AN UNDERWATER SHORELINE STRUCTURE (E.G., RIPRAP, CONCRETE BOAT RAMPS, ECT.) IS ENCOUNTERED IN ANY AREA WHERE NONE IS INDICATED, CONTRACTOR SHALL NOTIFY ENGINEER FOR A DECISION ON HOW TO PROCEED.
8. THE CONTRACTOR IS RESPONSIBLE FOR MAINTAINING A NEAT AND ORDERLY SITE, YARD AND GROUNDS. REMOVE AND DISPOSE OFF SITE ALL RUBBISH, WASTE MATERIALS, LITTER, AND ALL FOREIGN SUBSTANCES, REMOVE PETRO-CHEMICAL SPILLS, STAINS AND OTHER FOREIGN DEPOSITS IN ACCORDANCE WITH LOCAL, STATE, AND FEDERAL REGULATIONS.
9. THE OWNER OR OWNER'S REPRESENTATIVE SHALL BE NOTIFIED IN WRITING OF ANY CONDITIONS THAT VARY FROM THOSE SHOWN ON THE DRAWINGS. THE CONTRACTOR'S WORK SHALL NOT VARY FROM THE DRAWINGS WITHOUT THE EXPRESSED APPROVAL OF THE OWNER OR OWNER'S REPRESENTATIVE.
10. THE CONTRACTOR SHALL RESTORE ALL PUBLIC OR PRIVATE PROPERTY INCLUDING MARINE STRUCTURES DAMAGED OR REMOVED TO AT LEAST AS GOOD OF CONDITION AS BEFORE DISTURBED AS DETERMINED BY THE OWNER OR OWNER'S REPRESENTATIVE.
11. THE CONTRACTOR SHALL COMPLY WITH ALL REQUIRED PERMITS.
12. MAINTAIN OPEN ACCESS FOR SHIPPING AND OTHER OPERATIONS.
13. DETAILS SHOWN ARE TYPICAL; SIMILAR DETAILS APPLY TO SIMILAR CONDITIONS UNLESS OTHERWISE NOTED.
14. THESE DRAWINGS DO NOT INCLUDE NECESSARY COMPONENTS FOR CONSTRUCTION SAFETY.
15. NON-CONFORMING MATERIALS OR CONDITIONS SHALL BE REPORTED TO THE CLIENT PRIOR TO CORRECTIVE ACTION. ANY SUCH ACTION SHALL REQUIRE APPROVAL.
16. EACH CONTRACTOR SHALL COOPERATE WITH THE OWNER'S REPRESENTATIVE, AND COORDINATE HIS WORK WITH THE WORK OF OTHERS.
17. TO THE EXTENT UTILITIES OR OVERHEAD LINES ARE PRESENT AT THE SITE, THEY ARE NOT SHOWN ON THESE DRAWINGS. CONTRACTOR SHALL DETERMINE THE PRESENCE OF ALL UTILITIES IN THE FIELD.
18. CONTRACTOR SHALL FIELD VERIFY SEDIMENT PHYSICAL PROPERTIES, LOCATIONS OF SITE STRUCTURES, LOCATION OF IDENTIFIED DEBRIS, SHORELINE AND OTHER SITE FEATURES.
19. CONTRACTOR SHALL PERFORM A PRE-CONSTRUCTION SURVEY WHICH WILL SERVE AS THE BASELINE SURVEY FOR PAYMENT. THE PRE-CONSTRUCTION SURVEY IS SUBJECT TO REVIEW AND APPROVAL BY THE OWNER.

PROJECT INFORMATION:

PROJECT LOCATION:	BUFFALO RIVER BUFFALO, ERIE COUNTY, NEW YORK
CLIENT:	HONEYWELL INTERNATIONAL
ENGINEER OF RECORD:	ANCHOR QEA ENGINEERING, PLLC 290 ELWOOD DAVIS ROAD LIVERPOOL, NY 13088 CONTACT: RAM MOHAN, P.E.

SURVEY NOTES:

1. TOPOGRAPHIC DATA, BATHYMETRIC DATA, UTILITY LOCATION INFORMATION, AND BASE MAP DATA FROM CH2MHILL AND ECOLOGY AND ENVIRONMENT ENGINEERING FINAL DESIGN DRAWING SET TITLED "SEDIMENT REMEDIATION DESIGN BUFFALO RIVER AREA OF CONCERN". THE BATHYMETRIC CONTOURS SHOWN ON THE EXISTING CONDITIONS SHEETS ARE BASED ON BATHYMETRIC SURVEY DATA PROVIDED BY CH2MHILL (2012), USACE (2013) AND AQUATIC SCIENCES (2013, 2014). EXISTING CONDITIONS DRAWINGS ARE NOT POST DREDGE DRAWINGS AND ACTUAL SITE TOPOGRAPHY AND BATHYMETRY MAY VARY. THE LOCATIONS OF PIERS, OUTFALLS, RAMPS AND OTHER IN-WATER STRUCTURES ARE AS NOTED IN CH2MHILL AND ECOLOGY AND ENVIRONMENT ENGINEERING FINAL DESIGN DRAWING SET. CONTRACTOR SHALL FIELD VERIFY THESE LOCATIONS FOR ACCURACY, AS APPLICABLE.
2. CONTRACTOR SHALL CONFIRM ACTUAL BATHYMETRY PRIOR TO CONSTRUCTION.
3. HORIZONTAL DATUM IS NEW YORK STATE PLANE WEST, NAD83, US FEET.
4. VERTICAL DATUM IS INTERNATIONAL GREAT LAKES DATUM OF 1985 (IGLD85).

ABBREVIATIONS

ABB.	TERM
ABB.	ABBREVIATION
AC.	ACRES
ADM	ARCHER DANIELS MIDLAND
CY	CUBIC YARD
DIA.	DIAMETER
DMU	DREDGE MANAGEMENT UNIT
EA.	EACH
EL.	ELEVATION
EX	EXISTING
FT.	FOOT OR FEET
GLLA	GREAT LAKES LEGACY ACT
IN.	INCH OR INCHES
LOC.	LOCATION
LWD	LOW WATER DATUM
MAX.	MAXIMUM
MIN.	MINIMUM
N/A	NOT APPLICABLE
NTS	NOT TO SCALE
O.C.	ON CENTER
P.E.	PROFESSIONAL ENGINEER
QTY.	QUANTITY
SF	SQUARE FOOT OR FEET
SPEC.	SPECIFICATION(S)
SY	SQUARE YARD
TYP.	TYPICAL
WSEL	WATER SURFACE ELEVATION

ONE INCH
AT FULL SIZE, IF NOT ONE INCH SCALE ACCORDINGLY

ANCHOR QEA

REVISIONS

REV	DATE	BY	APP'D	DESCRIPTION

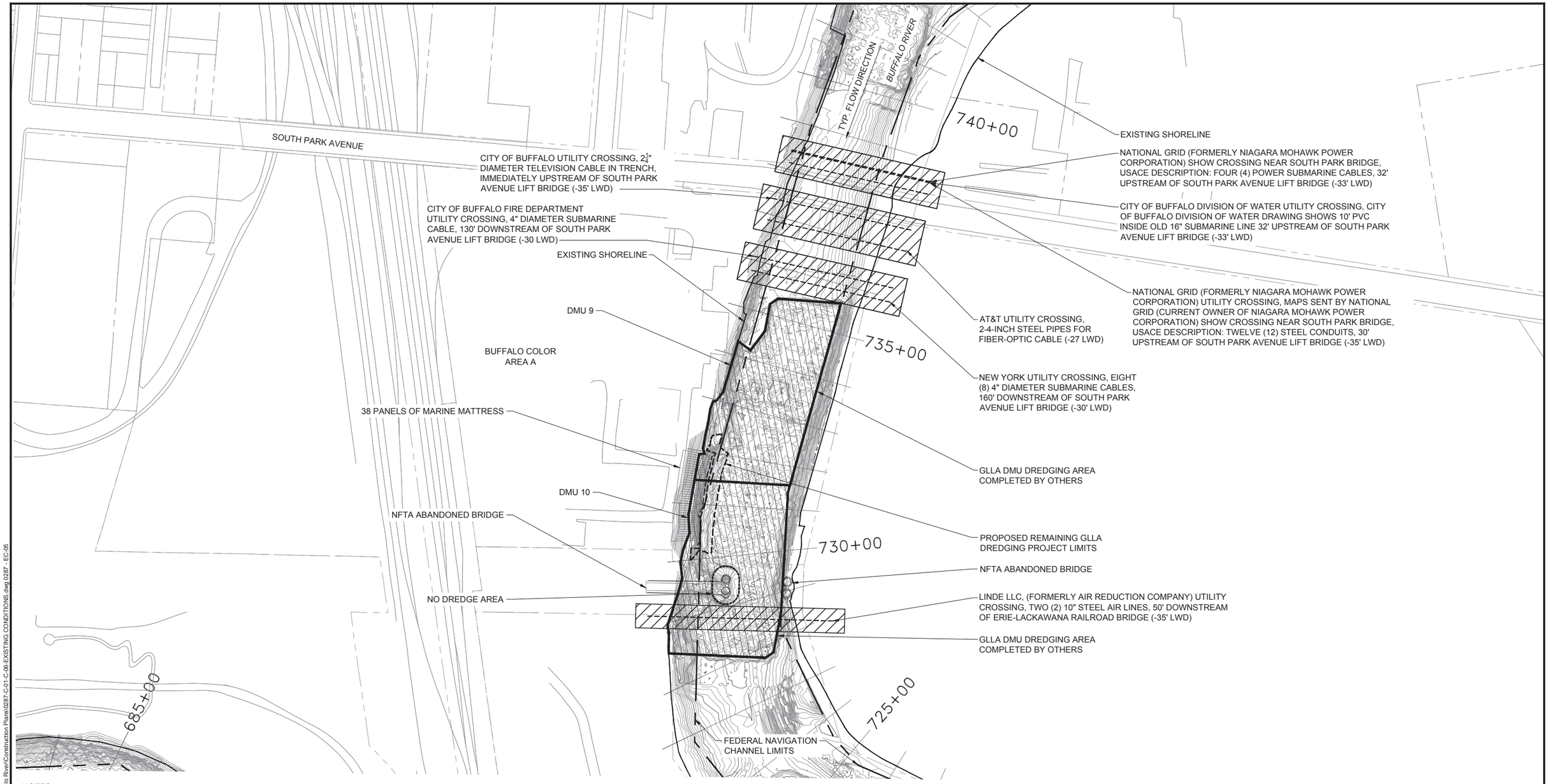
DESIGNED BY: S. BAGNULL
DRAWN BY: B. HURRY
CHECKED BY: M. REEMTS
APPROVED BY: R. MOHAN
SCALE: AS NOTED
DATE: NOVEMBER 6, 2015

BUFFALO RIVER AOC 2015 ADDITIONAL DREDGING

GENERAL NOTES AND LEGEND

G-01

SHEET NO. 2 OF 35



NOTES:

1. CONTRACTOR SHALL CONFIRM ACTUAL BATHYMETRY AND UTILITIES IN OR AFFECTED BY THE WORK PRIOR TO CONSTRUCTION.

SOURCE: Basemap from CH2MHill. Bathymetry from CH2MHill (2012), USACE (2013), Ocean Surveys, Inc. (2014) and Aquatic Sciences (2013, 2014)
HORIZONTAL DATUM: New York State Plane West, NAD83, U.S. Feet.
VERTICAL DATUM: International Great Lakes Datum of 1985 (IGLD85).

NORTH

0 100 200
SCALE IN FEET

ONE INCH
AT FULL SIZE, IF NOT ONE INCH SCALE ACCORDINGLY

ANCHOR QEA

REVISIONS				
REV	DATE	BY	APP'D	DESCRIPTION

DESIGNED BY: S. BAGNULL
DRAWN BY: B. HURRY
CHECKED BY: M. REEMTS
APPROVED BY: R. MOHAN
SCALE: AS NOTED
DATE: NOVEMBER 6, 2015

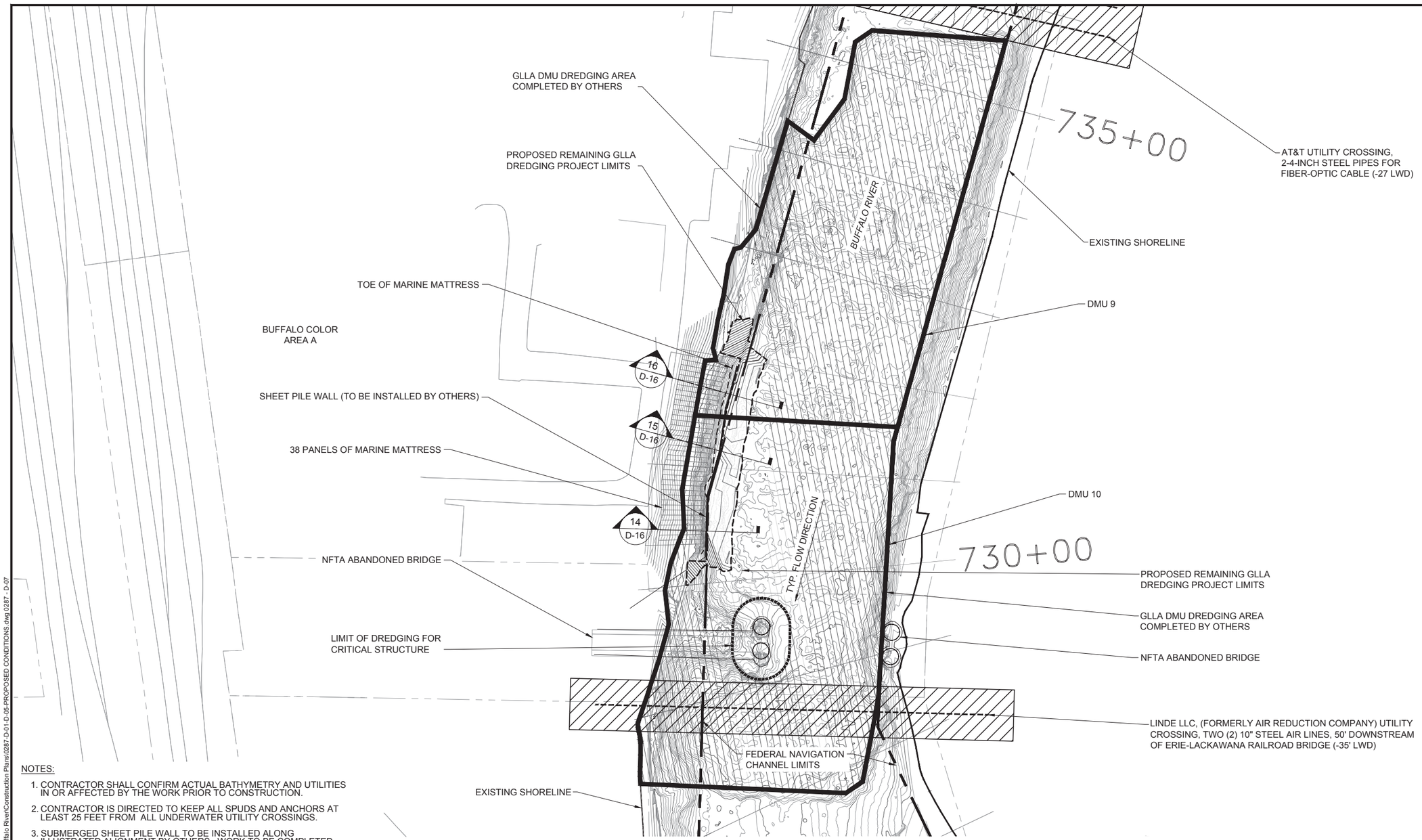
BUFFALO RIVER AOC 2015 ADDITIONAL DREDGING

EXISTING CONDITIONS - DMU 9 AND DMU 10

E-05

SHEET NO. 7 OF 35

Nov 06, 2015 4:42pm bhurry H:\Syracuse1\CAD Projects\130287 - Buffalo River\Construction Plans\0287-C-01-C-06-EXISTING CONDITIONS.dwg 0287 - EC-05



NOTES:

1. CONTRACTOR SHALL CONFIRM ACTUAL BATHYMETRY AND UTILITIES IN OR AFFECTED BY THE WORK PRIOR TO CONSTRUCTION.
2. CONTRACTOR IS DIRECTED TO KEEP ALL SPUDS AND ANCHORS AT LEAST 25 FEET FROM ALL UNDERWATER UTILITY CROSSINGS.
3. SUBMERGED SHEET PILE WALL TO BE INSTALLED ALONG ILLUSTRATED ALIGNMENT BY OTHERS. WORK TO BE COMPLETED PRIOR TO START OF DREDGING. TOP OF SHEETING ANTICIPATED TO RANGE FROM 550.0 TO 555.0 FT, ACTUAL ALIGNMENT AND ELEVATION TO BE FIELD VERIFIED BY CONTRACTOR PRIOR TO DREDGING.

SOURCE: Basemap from CH2MHill. Bathymetry from CH2MHill (2012), USACE (2013), Ocean Surveys, Inc. (2014) and Aquatic Sciences (2013, 2014)
HORIZONTAL DATUM: New York State Plane West, NAD83, U.S. Feet.
VERTICAL DATUM: International Great Lakes Datum of 1985 (IGLD85).

NORTH

0 50 100
SCALE IN FEET

ONE INCH AT FULL SIZE, IF NOT ONE INCH SCALE ACCORDINGLY

ANCHOR QEA

REVISIONS				
REV	DATE	BY	APP'D	DESCRIPTION

DESIGNED BY: S. BAGNULL
DRAWN BY: B. HURRY
CHECKED BY: M. REEMTS
APPROVED BY: R. MOHAN
SCALE: AS NOTED
DATE: NOVEMBER 6, 2015

BUFFALO RIVER AOC 2015 ADDITIONAL DREDGING

PROPOSED CONDITIONS - DMU 9 AND DMU 10

D-07

SHEET NO. 16 OF 35

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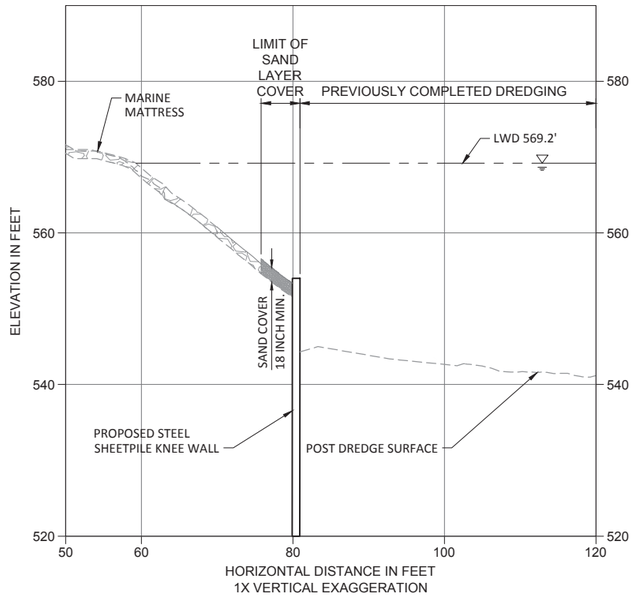

14a / D-16 DETAIL - DMU 9 AND 10 COVER

HORIZ. SCALE: 1" = 10'
VERT. SCALE: 1" = 10'

DMU 9 AND 10 COVER DETAIL NOTES:

1. SAND COVER LAYER SHALL BE INSTALLED TO MINIMUM 18 INCH LAYER BETWEEN PROPOSED SHEET PILE WALL (INSTALLED BY OTHERS) AND EXISTING MARINE MATTRESS.
2. INSTALLATION OF SAND COVER LAYER TO OCCUR FOLLOWING DREDGING ACTIVITIES IN DMUs 9 AND 10.
3. MATERIAL SHALL BE PLACED IN THIN, CONTROLLED LIFTS TO REDUCE DISTURBANCE OF UNDERLYING SEDIMENTS.
4. NO MATERIAL SHALL BE PLACE OUTSIDE SHEETPILE WALL OR WITHIN NAVIGATION CHANNEL EXTENTS.

NOTES:

1. CONTRACTOR SHALL CONFIRM ACTUAL BATHYMETRY AND UTILITIES IN OR AFFECTED BY THE WORK PRIOR TO CONSTRUCTION.

LEGEND

- EXISTING MUDLINE
- REQUIRED DREDGE LINE
- FEDERAL NAVIGATION CHANNEL
- DMU BOUNDARY
- PREVIOUS BOUNDARY OF NO DREDGE AREA
- ALLOWABLE OVERDREDGE LINE

SOURCE: Basemap from CH2MHill. Bathymetry from CH2MHill (2012), USACE (2013), Ocean Surveys, Inc. (2014) and Aquatic Sciences (2013, 2014)
HORIZONTAL DATUM: New York State Plane West, NAD83, U.S. Feet.
VERTICAL DATUM: International Great Lakes Datum of 1985 (IGLD85).

0 10 20
SCALE IN FEET

ONE INCH
AT FULL SIZE, IF NOT ONE INCH SCALE ACCORDINGLY

ANCHOR QEA

REVISIONS

REV	DATE	BY	APP'D	DESCRIPTION

DESIGNED BY: S. BAGNULL
DRAWN BY: B. HURRY
CHECKED BY: M. REEMTS
APPROVED BY: R. MOHAN
SCALE: AS NOTED
DATE: NOVEMBER 6, 2015

BUFFALO RIVER AOC 2015 ADDITIONAL DREDGING

TYPICAL COVER SECTIONS

D-24

SHEET NO. 33 OF 35

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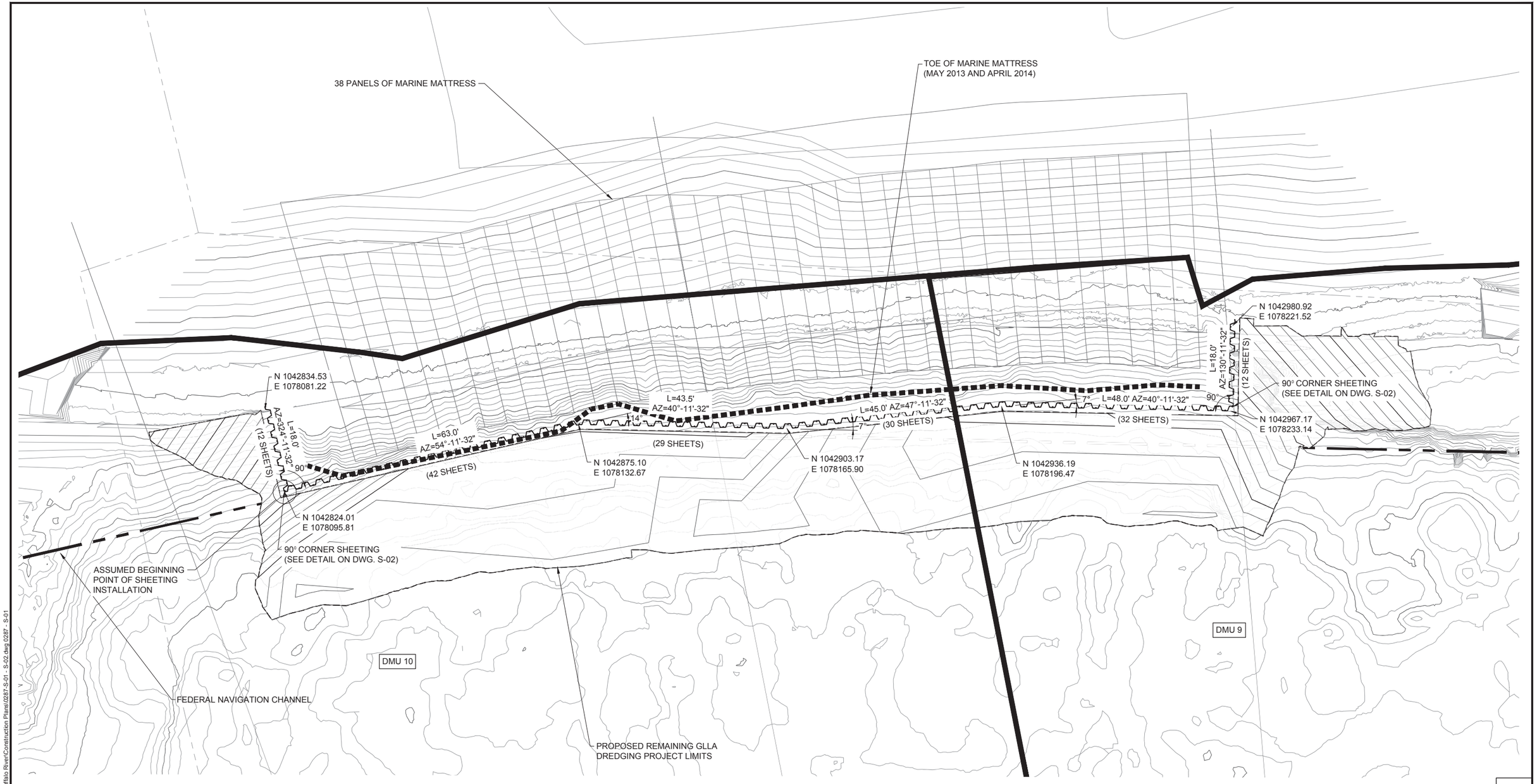


SOURCE: Basemap from CH2MHill. Bathymetry from CH2MHill (2012), USACE (2013), Ocean Surveys, Inc. (2014) and Aquatic Sciences (2013, 2014)
HORIZONTAL DATUM: New York State Plane West, NAD83, U.S. Feet.
VERTICAL DATUM: International Great Lakes Datum of 1985 (IGLD85).

NORTH

0 10 20
SCALE IN FEET

ONE INCH
AT FULL SIZE, IF NOT ONE INCH SCALE ACCORDINGLY

Barton & Loguidice, D.P.C.
BARTON & LOGUIDICE, D.P.C.
290 ELWOOD DAVIS ROAD
LIVERPOOL, NY 13088

ANCHOR QEA
ANCHOR QEA ENGINEERING, PLLC
290 ELWOOD DAVIS ROAD
LIVERPOOL, NY 13088

CLIENT: HONEYWELL INTERNATIONAL

REVISIONS				
REV	DATE	BY	APP'D	DESCRIPTION

DESIGNED BY: M. PATTERSON
DRAWN BY: J.CLARK
CHECKED BY: M. SCHOOLEY
APPROVED BY: M. SCHOOLEY
SCALE: AS NOTED
DATE: NOVEMBER 6, 2015

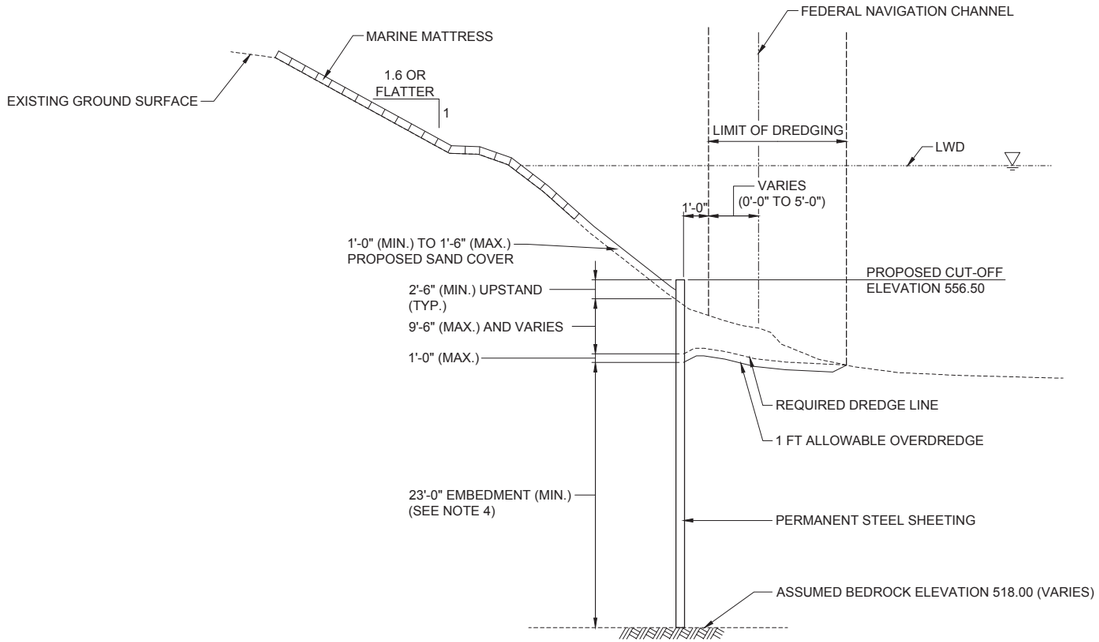
BUFFALO RIVER AOC 2015
ADDITIONAL DREDGING

SHEET PILE DESIGN
DETAILS PLAN

S-01

SHEET NO. 34 OF 35

Nov 06, 2015 4:51pm bhurry H:\Syracuse1\CAD Projects\130287 - Buffalo River\Construction Plans\0287-S-01 - S-02.dwg 0287 - S-01

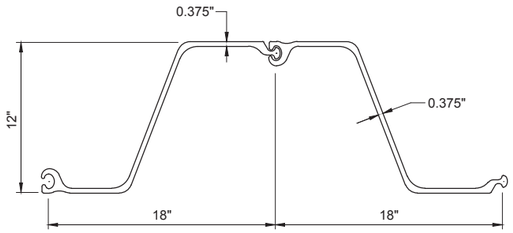


PERMANENT STEEL SHEETING SECTION

NOT TO SCALE

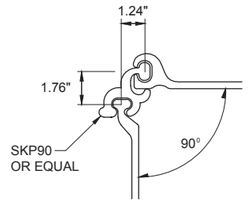
NOTES:

1. PERMANENT STEEL SHEETING SHALL CONFORM TO NYSDOT STANDARD SPECIFICATION ITEM 552.11.
2. PERMANENT STEEL SHEETING SHALL BE PZ27 OR EQUAL (MINIMUM Sx = 30.2 in³ /ft.).
3. PERMANENT STEEL SHEETING SHALL HAVE A MINIMUM YIELD STRENGTH OF 36 ksi.
4. PERMANENT STEEL SHEETING SHALL HAVE A MINIMUM EMBEDMENT OF 23'-0" BEYOND THE ANTICIPATED DREDGE LINE (INCLUDING OVERDREDGE). HOWEVER, ALL SHEETING SHALL BE DRIVEN TO REFUSAL / BEDROCK.
5. DREDGING EQUIPMENT SHALL NOT BE OPERATED WITHIN 1'-0" OF THE FRONT FACE OF THE PERMANENT STEEL SHEETING.
6. ALL COST ASSOCIATED WITH THE METHOD AND MEANS OF THE CONTRACTOR'S OPERATION TO INSTALL SHEETPILING BELOW WATER SURFACE (I.E. TORCH CUTTING VS. SHEET PILING TEMPLATE, ACCESS BARGES, ETC.) AS SHOWN SHALL BE INCLUDED UNDER STEEL INSTALLATION BID ITEM.
7. SHEETPILING INSTALLATION AS SHOWN ON PLAN, DWG. S-01 MUST BE MAINTAINED WITH NO MORE THAN A 6" TOLERANCE OR DEVIATION FROM POINT OF BEGINNING TO END. THE CONTRACTOR SHALL USE METHOD AND MEANS APPROVED BY E.I.C. TO MAINTAIN THE TOLERANCE. ALL COST ASSOCIATED WITH THE CONTRACTOR'S METHOD AND MEANS (I.E. TEMPLATE MATERIAL) TO MAINTAIN THE SHEETPILING LAYOUT AS SHOWN ON THE PLAN, DWG. S-01 SHALL BE INCLUDED IN STEEL INSTALLATION BID ITEM.
8. CONTRACTOR SHALL VERIFY TOE OF MARINE MATTRESS PRIOR TO INSTALLATION TO PREVENT DAMAGE. ANY DAMAGE TO MARINE MATTRESS SHALL BE REPAIRED BY THE CONTRACTOR AT NO COST TO THE OWNER.



PZ27 SHEETING DETAIL

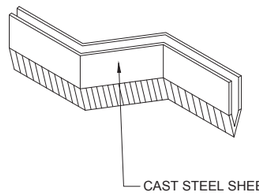
NOT TO SCALE



90° CORNER SHEETING DETAIL

NOT TO SCALE

NOTE:
CONTRACTOR MAY USE AN EQUIVALENT SYSTEM.



SHEET PILE SHOES

NOT TO SCALE

NOTE:
CONTRACTOR MAY USE AN EQUIVALENT SYSTEM.

ONE INCH AT FULL SIZE, IF NOT ONE INCH SCALE ACCORDINGLY

BARTON & LOGUIDICE, D.P.C.
290 ELWOOD DAVIS ROAD
LIVERPOOL, NY 13088

ANCHOR QEA ENGINEERING, PLLC
290 ELWOOD DAVIS ROAD
LIVERPOOL, NY 13088

CLIENT: HONEYWELL INTERNATIONAL

REVISIONS

REV	DATE	BY	APP'D	DESCRIPTION

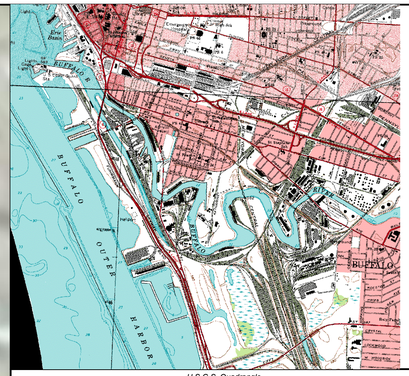
DESIGNED BY: M. PATTERSON
DRAWN BY: J. CLARK
CHECKED BY: M. SCHOOLEY
APPROVED BY: M. SCHOOLEY
SCALE: AS NOTED
DATE: NOVEMBER 6, 2015

BUFFALO RIVER AOC 2015 ADDITIONAL DREDGING

SHEET PILE DESIGN DETAILS

S-02

SHEET NO. 35 OF 35



U.S.G.S. Quadrangle
Buffalo SE, New York

Proposed Remaining Dredging Limits

Submerged Sheet Pile Wall

Federal Navigation Channel Limits

DMU 10

DMU 9

Buffalo River

General Notes:

1. This survey is referenced horizontally to the North American Datum of 1983, 2007 adjustment (NAD83/2007) and projected on the New York State Plane Coordinate System (West Zone) and vertically the International Great Lakes Datum of 1985 (IGLD85).
2. North arrow as shown indicates Grid North referenced to NAD83/2007 and projected on the New York State Plane Coordinate System (West Zone).
3. The reference horizontal and vertical control station is a Federal Base Network Control Station designated as "906 3020 H" (PID AH9234). 906 3020 H was established by GPS observations and adjusted by the National Geodetic Survey in February 2007. Elevation = 578.95 feet (IGLD85).
4. Elevations and contours shown reference the IGLD85.
5. Location of spot elevation is indicated by the tick "+" mark located adjacent to the elevation.
6. Contours shown hereon were generated from a Digital Terrain Model utilizing Autodesk Civil 3D Surveying and Engineering software.
7. The bathymetric information shown hereon was collected utilizing multi beam acoustical methods.
8. The bathymetric survey was completed on December 10, 2015.
9. The water surface elevation at the time of the survey was 571.2 feet.

Reference Drawings:

1. Titled "Map Showing Existing Bathymetric Conditions, Canal Cap Area, Buffalo River", dated December 10, 2010, prepared by Thew Associates PE-LS, PLLC, and distinguished as Project No. CK8135-10-10.

Legend:

- 550 — Major Contour Line
- 551 — Minor Contour Line
- Proposed Remaining Dredging Limits
- Federal Navigation Channel Limits
- Submerged Sheet Pile Wall

GRAPHIC SCALE

10 0 5 10 20 40

(IN FEET)

1 inch = 10 ft.

REV	DESCRIPTION	DATE

PROJECT NUMBER: CK3566-07-14

DRAWN:

CHECKED:

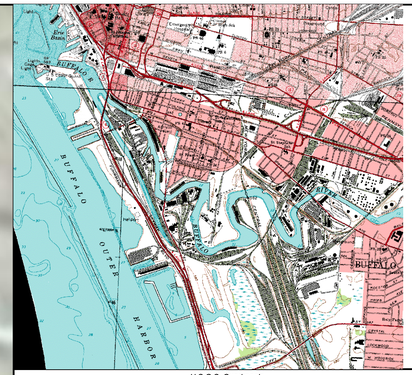
SCALE: 1" = 10'

DATE: 12.10.2015

Map Showing Post Cap Bathymetric Conditions DMU 9 and DMU 10 Buffalo River

City of Buffalo
County of Erie
State of New York

Thew Associates
LAND SURVEYORS
www.ThewAssociates.com
P.O. Box 463
6431 US Highway 11
Canton, New York 13617
T: 315/386-2776
F: 315/386-1012
9478 River Road
Marcy, New York 13403
T: 315/733-7278
F: 315/797-1957



U.S.G.S. Quadrangle
Buffalo SE, New York

Proposed Remaining Dredging Limits

Submerged Sheet Pile Wall

DMU 10

Federal Navigation Channel Limits

DMU 9

Proposed Remaining Dredging Limits

Buffalo River

General Notes:

1. This survey is referenced horizontally to the North American Datum of 1983, 2007 adjustment (NAD83/2007) and projected on the New York State Plane Coordinate System (West Zone) and vertically the International Great Lakes Datum of 1985 (IGLD85).
2. North arrow as shown indicates Grid North referenced to NAD83/2007 and projected on the New York State Plane Coordinate System (West Zone).
3. The reference horizontal and vertical control station is a Federal Base Network Control Station designated as "906 3020 H" (PID AH9234). 906 3020 H was established by GPS observations and adjusted by the National Geodetic Survey in February 2007. Elevation = 578.95 feet (IGLD85).
4. Elevations and contours shown reference the IGLD85.
5. Location of spot elevation is indicated by the tick "+" mark located adjacent to the elevation.
6. Contours shown hereon were generated from a Digital Terrain Model utilizing Autodesk Civil 3D Surveying and Engineering software.
7. The bathymetric information shown hereon was collected utilizing multi beam acoustical methods.
8. The bathymetric survey was completed on December 8, 2015.
9. The water surface elevation at the time of the survey was 571.2 feet.

Reference Drawings:

1. Titled "Map Showing Existing Bathymetric Conditions, Canal Cap Area, Buffalo River", dated December 10, 2010, prepared by Thew Associates PE-LS, PLLC, and distinguished as Project No. CK8135-10-10.

Legend:

- Major Contour Line
- Minor Contour Line
- Proposed Remaining Dredging Limits
- Federal Navigation Channel Limits
- Submerged Sheet Pile Wall
- Underdredged Area
- Overdredged Area

GRAPHIC SCALE

10 0 5 10 20 40

(IN FEET)

1 inch = 10 ft.

REV	DESCRIPTION	DATE

PROJECT NUMBER: CK3566-07-14

DRAWN:

CHECKED:

SCALE: 1" = 10'

DATE: 12.08.2015

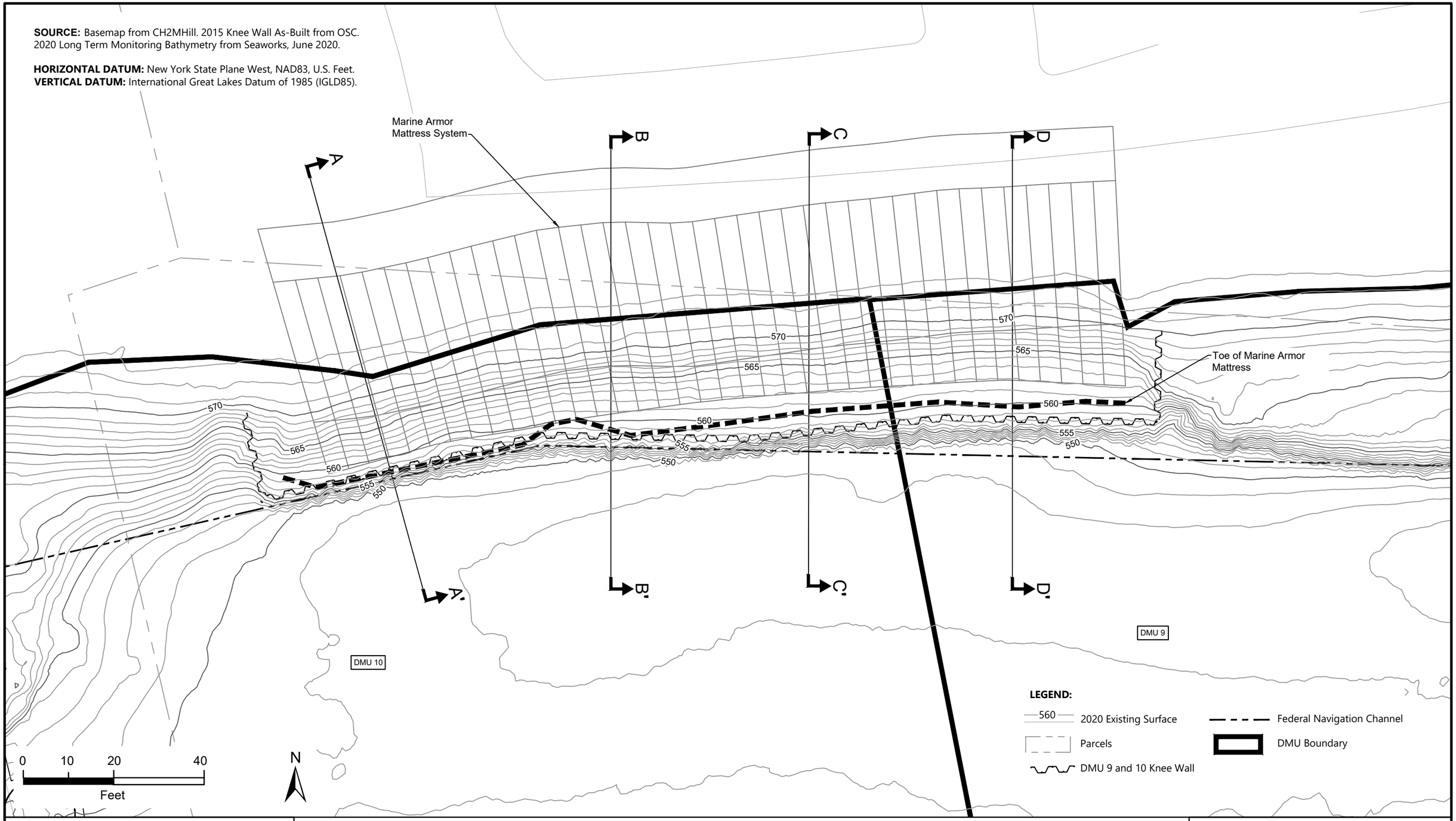
Map Showing
Post Dredge Bathymetric Conditions
DMU 9 and DMU 10
Buffalo River

City of Buffalo
County of Erie
State of New York

Thew Associates LAND SURVEYORS
www.ThewAssociates.com
P.O. Box 463
6431 US Highway 11
Canton, New York 13617
T: 315/386-2776
F: 315/386-1012
9478 River Road
Marcy, New York 13403
T: 315/733-7278
F: 315/797-1927

SOURCE: Basemap from CH2MHill. 2015 Knee Wall As-Built from OSC. 2020 Long Term Monitoring Bathymetry from Seaworks, June 2020.

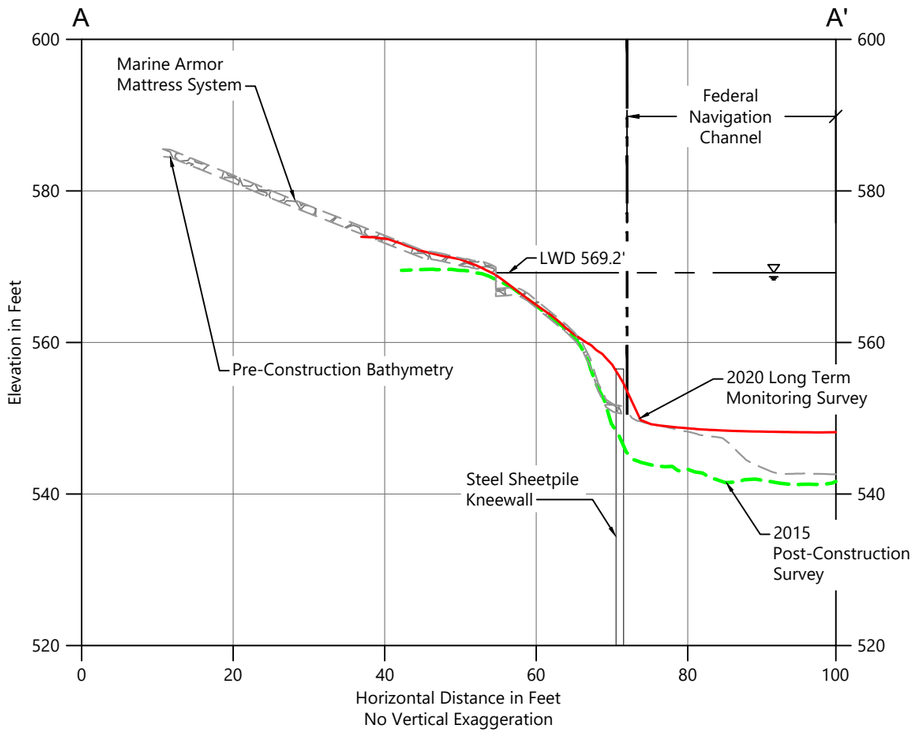
HORIZONTAL DATUM: New York State Plane West, NAD83, U.S. Feet.
VERTICAL DATUM: International Great Lakes Datum of 1985 (IGLD85).

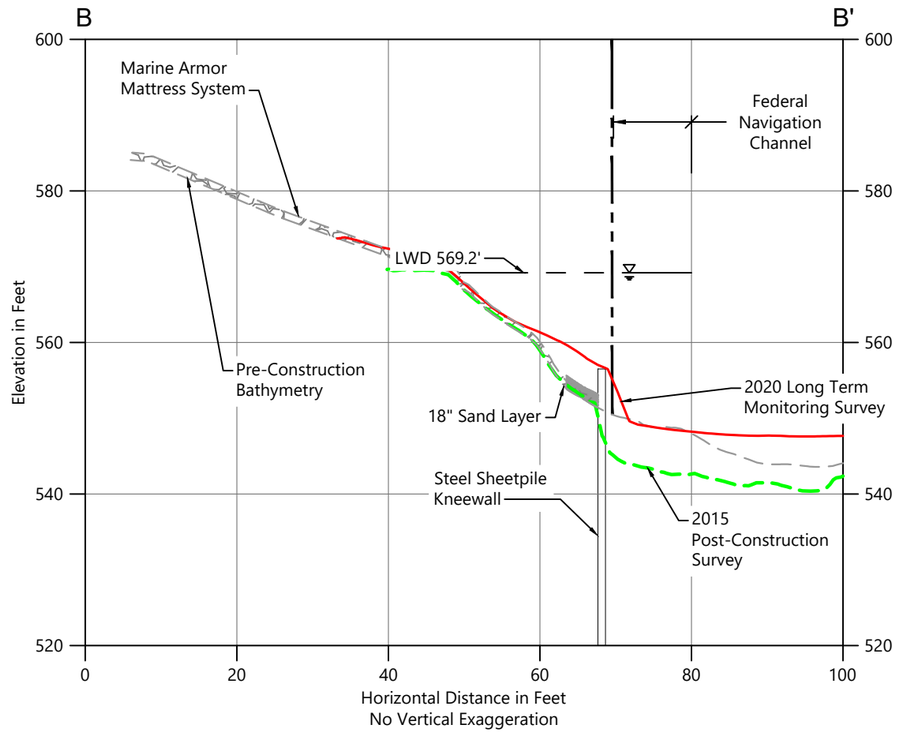


DRAFTED BY: BDH | DATE: 12/21/2020

DMUs 9 and 10 Long Term Monitoring Survey
Year 5 Verification Monitoring Results for the Buffalo River, NY

Figure
2-3A





SOURCE: Basemap from CH2MHill.Pre-Construction Bathymetry from OSI 2014. 2015 Post-Construction Survey from Sevenson Environmental Services. 2020 Long Term Monitoring Survey from Seaworks, June 2020.

HORIZONTAL DATUM: New York State Plane West, NAD83, U.S. Feet.

VERTICAL DATUM: International Great Lakes Datum of 1985 (IGLD85).

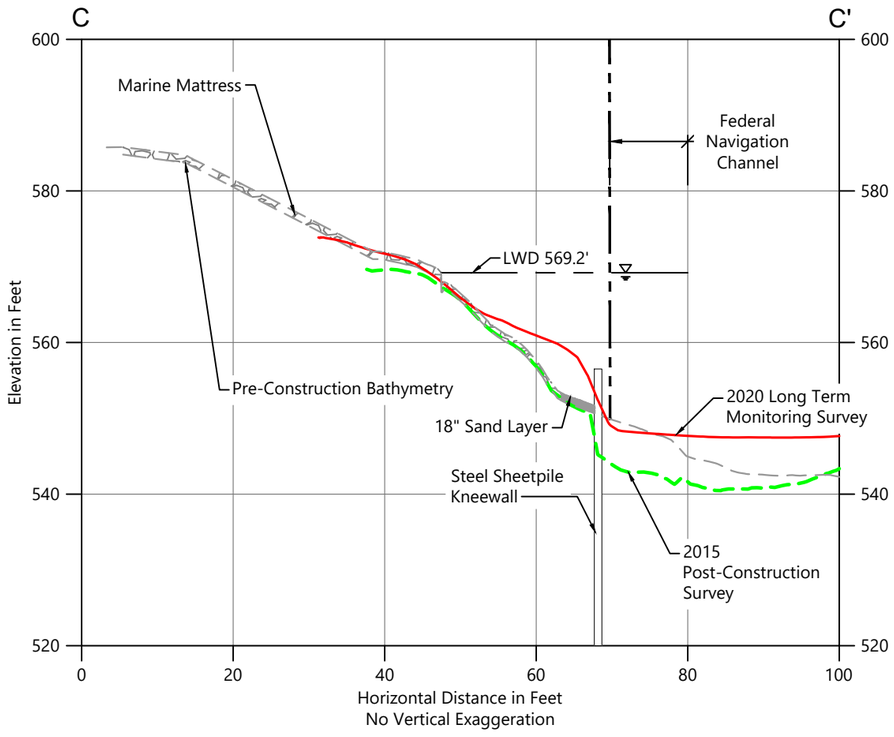
LEGEND:

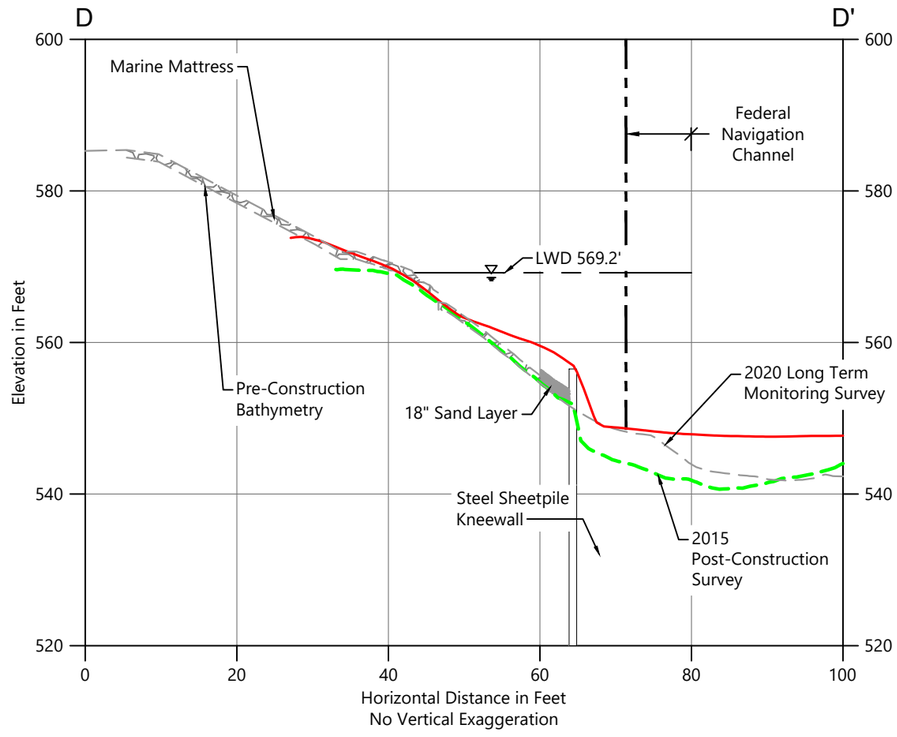
- Pre-Construction Bathymetry
- Federal Navigation Channel
- 2015 Post-Construction Survey
- 2020 Long Term Monitoring Survey

DRAFTED BY: BDH | DATE: 12/21/2020

DMUs 9 and 10 Long Term Monitoring Survey
Year 5 Verification Monitoring Results for the Buffalo River, NY

Figure
2-3B





SOURCE: Basemap from CH2MHill.Pre-Construction Bathymetry from OSI 2014. 2015 Post-Construction Survey from Sevenson Environmental Services. 2020 Long Term Monitoring Survey from Seaworks, June 2020.

HORIZONTAL DATUM: New York State Plane West, NAD83, U.S. Feet.

VERTICAL DATUM: International Great Lakes Datum of 1985 (IGLD85).

LEGEND:

- Pre-Construction Bathymetry
- Federal Navigation Channel
- 2015 Post-Construction Survey
- 2020 Long Term Monitoring Survey

DRAFTED BY: BDH | DATE: 12/21/2020

DMUs 9 and 10 Long Term Monitoring Survey
Year 5 Verification Monitoring Results for the Buffalo River, NY

Figure
2-3C

APPENDIX G – SITE MANAGEMENT FORMS

Buffalo Color Corporation Area A and B Off-Site Area / DMU 9 and 10 Knee Wall Area

Description of Project Area

1. A submerged steel sheet pile knee wall was installed along DMU 9 and 10 shoreline to facilitate removal of sediments.
2. Backfill was placed in narrow (approximately 5 feet wide) area between knee wall and marine armor mattress

General Inspection Information

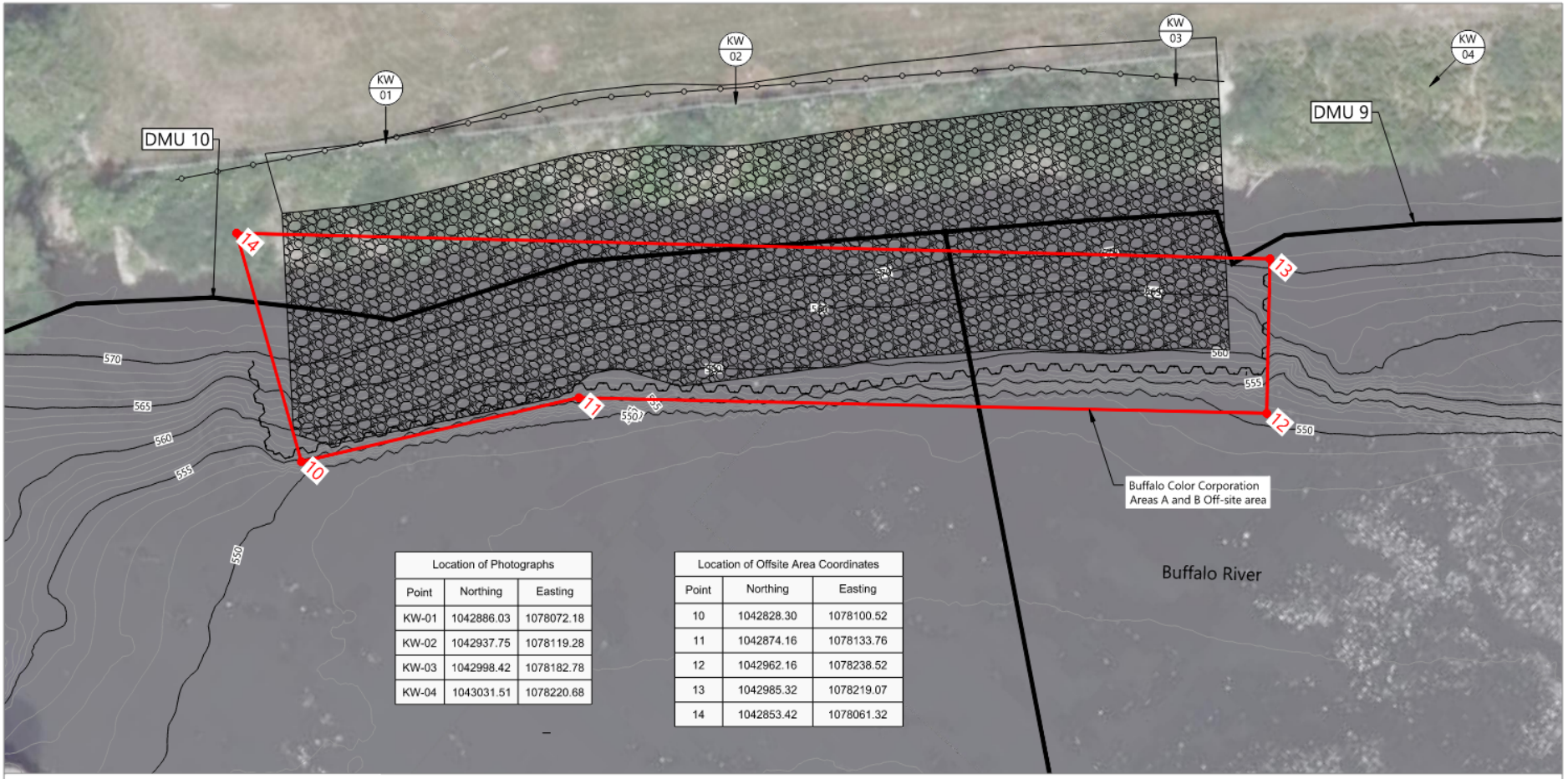
Date of Annual Visual Inspection:	
Staff Inspecting (Last name, First Name):	
Affiliation:	
Current Weather Conditions:	
Precipitation in last 48 Hours?):	Yes or No
Water Clarity (Estimated Depth of Visibility):	

Site Feature Conditions

Signs of significant erosion?	Yes or No
Comments (Erosion along shoreline? Note what/where, photo ID):	
Has Navigational Dredging occurred in or near the DMU?	Yes or No
Comments on confirmation of recent dredging activities with USACE personnel (See References and Supporting Information Sheet)	
Are large (>100 square foot) accumulations of floating debris present?	Yes or No
Comments (Natural materials, anthropogenic materials, photo ID):	
Was accumulated debris removed?	Yes or No
Comments (date removed; if not removed, reason not removed):	
Installation of shoreline or nearshore structures?	Yes or No
Comments on Installation of shoreline or nearshore structures (e.g., piling, piers, armoring, fill placement, sheeting, mooring, boat ramp, etc.):	

Presence of petroleum sheen on water surface?	Yes or No
Comments on color and size (square feet) of sheen area. Contact USCG if source is identifiable.	
Photographs from set points?	Yes or No
Photo IDs (file names) and locations. If set points for reference photos have not been identified, identify them and provide coordinates for future monitoring	
Other Photographs?	Yes or No
Photo IDs (file names), locations, and notes	
Other Comments:	

Site Figure



Location of Photographs		
Point	Northing	Easting
KW-01	1042886.03	1078072.18
KW-02	1042937.75	1078119.28
KW-03	1042998.42	1078182.78
KW-04	1043031.51	1078220.68

Location of Offsite Area Coordinates		
Point	Northing	Easting
10	1042828.30	1078100.52
11	1042874.16	1078133.76
12	1042962.16	1078238.52
13	1042985.32	1078219.07
14	1042853.42	1078061.32

SOURCE: Bathymetric Survey from Seaworks Group, June, 2020. Aerial provided by Bing Maps.

HORIZONTAL DATUM: New York State Plane West, NAD83, U.S. Feet.

VERTICAL DATUM: International Great Lakes Datum of 1985 (IGLD85).

LEGEND:

- 570 — 2020 Existing Contours (1' and 5')
- DMU Boundary
- Knee wall As-Built Location
- Long-term Monitoring Photograph Location and Direction
- Marine Mattress
- Buffalo Color Corporation Areas A and B Off-site area

0 20 Feet

Publish Date: 2021/10/25 4:53 PM | User: bhurry
Filepath: K:\Projects\0287-Honeywell International Inc\Buffalo River Site Strategy & Eng Sup\0287-RP-090 Off Site Area 20211025.dwg Figure 1

Figure 1
DMU 9 and 10 Knee Wall Area

DMU 9 and 10 Knee Wall Area
Buffalo River, Buffalo, NY

References and Supporting Information	
Observed Chemical or Oil Spill Response Contacts	
U.S. Coast Guard Contact (Non-Emergency)	(716) 843-9315
NYSDEC Region 9 Spill Response	(716) 851-7220
U.S. Army Corps of Engineers - Buffalo District Navigational Dredging Information	
USACE - Buffalo District - Civil Works	(716) 879-4410 buffalo-civilworks@usace.army.mil
USACE - Buffalo District - NY District 26 Buffalo Harbor and River Navigational Fact Sheets	https://www.lrb.usace.army.mil/Missions/Civil-Works/Program-and-Project-Fact-Sheets/New-York/New-York-26/
USACE - Buffalo District - Navigational Dredging News Releases	https://www.lrb.usace.army.mil/Media/News-Releases/