Brownfield Cleanup Program

Remedial Investigation Work Plan

Marine Drive Apartments East Site
Phase I – Parking Lot Area
Site No. C915398
Portion of 90 Erie Street
City of Buffalo, Erie County, New York

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Revision 2

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ACRONYM LIST

AAR	Alternatives Analysis Report
ACM	Asbestos-containing Material
ASP	Analytical Services Protocol
BGS	Below Ground Surface
BSA	Buffalo Sewer Authority
CAMP	Community Air Monitoring Plan
CPP	Citizen Participation Plan
DER	Department of Environmental Remediation
DUSR	Data Usability and Summary Report
EDD	Electronic Data Deliverable
ELAP	Environmental Laboratory Accreditation Program
HASP	Health and Safety Plan
IRM	Interim Remedial Measures
MS/MSD	Matrix Spike / Matrix Spike Duplicate
NYSDEC	New York State Department of Environmental Conservation
NYSDOH	New York State Department of Health
PAH	Polycyclic Aromatic Hydrocarbons
PID	Photo-ionization Detector
RI	Remedial Investigation
RI/AAR	Remedial Investigation / Alternative Analysis Report
RWP	Remedial Work Plan
SCO	Soil Cleanup Objectives
Site	Portion of 90 Erie Street, Buffalo, New York
SVOC	Semi-volatile Organic Compounds
U.S. EPA	United States Environmental Protection Agency
VOC	Volatile Organic Compounds

EXECUTIVE SUMMARY

This document presents the Remedial Investigation Work Plan for a portion of 90 Erie Street in Buffalo, New York (the Site). The project details are summarized below:

Contaminant Source and Constituents

Contamination in excess of end use soil cleanup objectives (SCO) associated with historic fill material (HFM) is located on the Site. Constituents in the fill requiring remediation include semi-volatile organic compounds (SVOCs) and metals. Groundwater at the Site also is impacted by SVOCs and metals.

Extent of Contamination

Analytical results indicate that contaminants are located within the HFM. Contaminant concentrations vary significantly both vertically and horizontally across the Site due to the heterogeneous nature of the material. Based on investigations conducted to date, the highest contaminant concentrations tend to be located from near the ground surface to approximately eight to nine feet below ground surface (bgs).

Proposed Site Redevelopment

The project will be the first phase in the replacement of an affordable housing complex. The first phase will consist of approximately 300 apartment units in three buildings and 325 parking spaces within a separate parking garage.

The target cleanup goal for this redevelopment is Track 1 (Unrestricted Use).

Remedial Investigation

To characterize site conditions and identify the appropriate remedy for the Site, a Remedial Investigation (RI) will be implemented. The RI will include the collection and analysis of HFM, native soil, and groundwater.

1 INTRODUCTION

This Remedial Investigation (RI) Work Plan provides a description of the procedures that will be implemented to characterize the nature and extent of contamination at a portion of 90 Erie Street (the Site) and the proposed methods to address that contamination. This Work Plan has been prepared in accordance with New York State Department of Environmental Conservation (NYSDEC) Division of Environmental Remediation "Technical Guidance for Site Investigation and Remediation" (DER-10). To effectively characterize the environmental conditions, this Work Plan discusses the following:

- Current and historic site conditions
- Contaminants of concern and the extent of the contamination
- Extent of RI activities
- Quality controls and protocols for analytical sampling
- Health and safety procedures to protect site workers and the local community
- Community participation activities

On July 6, 2023, Marine Drive JV LLC, (Applicant) acting as BCP Volunteer, submitted a BCP Application to remediate and develop a portion of 90 Erie Street in the City of Buffalo, New York. Investigative and remedial actions covered under this Work Plan will include the entire 2.447-acre BCP Site.

The current Marine Drive Apartments were originally constructed in 1950 as part of an urban renewal / slum clearance project. Originally labeled as Dante Place apartments, these seven high rise apartment building were constructed in an area on the Buffalo River that was at that time a somewhat abandoned industrial district of the City. Not unlike many other cities in the U.S. this formula was repeated for decades and proved to be unsuccessful due to problems with densification of poverty and poor planning. Many similar developments in the U.S. have been demolished because of the problems that resulted with deficiencies in planning of these developments.

The Marine Drive Redevelopment Project will consist of three phases of design and construction. When completed new construction of the three phases will include approximately 730 new affordable apartment units that will replace the existing 616 units that were constructed in 1950. The phasing of the project is necessary to avoid having to displace current residents to other housing sites. The Buffalo Municipal Housing Authority (BMHA) is committed to keeping the current residents within the Site and relocating them to the new buildings when they are completed. This limits the number of moves to just one for all tenants and avoids temporary relocation over the duration of construction.

The RI currently is limited to a portion of 90 Erie Street (Site), or Phase 1 of the overall project. Phase 1 includes approximately 300 apartment units in three buildings and 325 parking spaces within a parking garage structure. These buildings will be constructed

within an area of existing surface parking lot that serves the current Marine Drive Apartments.

An RI will be implemented to further evaluate the extent of the contaminated HFM and to aid in the preparation of an Alternatives Analysis Report (AAR). **Section 4 Remedial Investigation** describes the scope of the investigation during remediation. This document also described proposed remedial actions intended to address the contamination present at the Site.

1.1 Site Description

The Site is comprised of a portion of one parcel: 90 Erie Street (SBL: 111.17-15-1) and is approximately 2.447 acres.

The Site is located along the edge of the downtown corridor in the City of Buffalo. The parcel that comprises the BCP Site is approximately 3.29 acres and owned by BMHA. Directly adjacent to the Site is the Marine Drive Apartments complex to the west. The apartment complex consists of seven 12-story residential structures constructed in the late 1940s / 1950. Marine Drive separates the Site from the complex. Marine Drive also bounds the southern end of the Site, with the Canalside Site and the Buffalo River located just south of that. The elevated Buffalo Skyway roadway bounds the Site to the east and Erie Street bounds the Site to the north. Land uses immediately adjacent to the BCP Site include commercial, residential uses, and public recreation (Canalside).

Figure 1 shows the location of the Site and **Figure 2** shows the Project Area and Site Boundaries.

1.2 Site History

According to historical records and past assessments, the Site has been used for residential and light-industrial purposes from at least 1889 to 1950. Specific site uses in the area included foundries, machine shops, forge shops, and a tin shop. Industrial operations in the area typically included the use of hazardous materials including solvents and oils. Multiple automotive repair shops were once located at the Site which are known to utilize petroleum products.

Prior to the construction of the Marine Drive Apartments complex in 1950, the Site and surrounding parcels were associated with the "Canal District", which included a series of streets, canals, and tenement buildings. Included in this area were the former streets of Canal Street, Date Place, Peacock Street, Evans Street, Norton Street, Water Street, Fly Street, State Street, and Lecouteulx Street.

In 1936, a large natural gas explosion occurred in the area. Multiple structures in the area were affected. Following the explosion, the entire Site and surrounding area were razed which made way for the development of the area and the Marine Drive Apartments

complex. Construction of the seven 12-story towers commenced in the 1940s, with project completion in 1950. The proposed BCP Site is located within the asphalt parking lot associated with the apartment complex. Since 1950, features of the apartment complex generally have not changed. The structures still contain residential units, as they did in 1950. The parking lot has also generally not changed since 1950.

Contamination at the Site appears to be from the placement of historic fill material (HFM) throughout the years as property uses changed and buildings were built and / or demolished.

1.3 Site Geography, Geology, and Hydrogeology

Fill material identified onsite consists of any one or mixture of the following materials:

Crushed Rock	Lumber
Sand	Ash/Cinders
Silt	Ceramics
Clay	Bricks
Plastics	Metal
Construction Debris	

The soil borings generally contained approximately 0.2 feet of asphalt material at the top of each boring. Beneath that asphalt layer was approximately two feet of compacted crushed stone, likely associated with the construction of a sub-base fill layer beneath the parking lot. A geotextile fabric was observed in most of the borings at the bottom of that sub-base layer.

HFM was observed beneath the geotextile fabric. This fill material was present at depths down to eight to ten feet below ground surface (bgs). The HFM at the Site generally consisted of dark brown / black coarse sand, intermingled with crushed brick fragments and angular gravel.

Native soils were encountered around eight to ten feet bgs, down to at least 16 feet bgs. The material was generally a silty clay saturated material.

Based on limited onsite characterizations, groundwater was present at approximately 7.5 to 8.3 feet bgs. However, based our understanding of conditions at nearby properties, the principal groundwater-bearing zone is likely located within the sand and/or silt layer that is generally present between 9 to 10 feet bgs.

It is expected that groundwater flows to the west-southwest, toward the Buffalo River and Lake Erie.

2 SUMMARY OF ENVIRONMENTAL CONDITIONS

2.1 Environmental Reports

Site characterization efforts were recently conducted to assess contaminant concentrations at the Site, and the results are shown on **Figure 3**. This Site characterization is detailed in a June 2022 Pre-BCP Sampling Report and April 2023 Limited Environment Site Characterization. The BCP Application provides the previous reports.

Analytical results from the investigations are summarized in **Section 2.2** below.

2.2 Nature and Extent of Contamination

According to historical records and past assessments, the Site has been used for residential and light-industrial purposes from at least 1889 to 1950. Specific site uses in the area included foundries, former laundry, boiler shop, plating shop and auto garage. Industrial operations in the area typically included the use of hazardous materials including solvents and oils. Automotive repair shops were once located at the Site which are known to utilize petroleum products.

The approximate location of the former laundry, boiler shop, plating shop and auto garage are shown on **Figure 3.**

Contamination may be related to the placement of HFM throughout the years as property uses changed and buildings were built and / or demolished.

Subsurface Soil

Based on investigations conducted to date, the primary contaminants of concern in the subsurface soil include SVOCs / PAHs and metals. These contaminants are found in near surface soils (one to two feet) and the fill material to depths of eight to nine feet. SVOCs and metals with the highest exceedances in surface and subsurface soil were detected in the samples taken adjacent to or within the footprints of the former laundry, boiler shop, plating shop, and auto garage. SVOC and metals in subsurface soil were widespread, with the highest exceedances throughout the HFM.

SVOC concentrations exceed Residential Use, Restricted Residential Use, Commercial Use, and Industrial Use SCOs. The following SVOCs were detected:

- Benzo(a)anthracene concentrations exceeded the Restricted Residential Use (1 ppm) and Industrial Use (11 ppm) SCOs. Concentrations ranged from 1.9 ppm to 70 ppm.
- Benzo(a)pyrene concentrations exceeded the Industrial Use (1.1 ppm) SCO. Concentrations ranged from 1.9 ppm to 65 ppm.
- Benzo(b)fluoranthene exceeded the Restricted Residential Use (1 ppm) and Industrial Use (11 ppm) SCOs. Concentrations ranged 2.3 ppm to 76 ppm.

- Benzo(k)fluoranthene exceeded the Residential Use (1 ppm) and Restricted Residential Use (3.9 ppm) SCOs. Concentrations ranged from 1 ppm to 25 ppm.
- Chrysene concentrations exceeded the Residential Use (1 ppm), Residential-Restricted Use (3.9 ppm), and Commercial Use (56 ppm) SCOs. Concentrations ranged from 1.4 ppm to 63 ppm.
- Dibenzo(a,h)anthracene concentrations exceeded the Restricted Residential Use (0.33 ppm), Commercial Use (0.56 ppm), and Industrial Use SCOs (1.1 ppm). Concentrations ranged from 0.42 ppm to 9.4 ppm.
- Fluoranthene concentration exceeded Restricted Residential Use SCO (100 ppm) in one sample and was detected at 190 ppm.
- Phenanthrene concentration exceeded Restricted Residential Use SCO (100 ppm) in one sample and was detected at 170 ppm.
- Indeno(1,2,3-cd)pyrene exceeded the Restricted Residential Use (0.5 ppm), Commercial Use (5.6 ppm) and Industrial Use (11 ppm) SCOs. Concentrations ranged from 1.2 ppm to 36 ppm.
- Pyrene concentration exceeded Restricted Residential Use SCO (100 ppm) in one sample and was detected at 160 ppm.

SVOC contamination detected outside the BCP Site includes the following:

- Benzo(a)anthracene concentrations exceeded the Restricted Residential Use (1 ppm) and Industrial Use (11 ppm) SCOs. Concentrations ranged from 2 ppm to 20 ppm.
- Benzo(a)pyrene concentrations exceeded the Industrial Use (1.1 ppm) SCO. Concentrations ranged from 1.7 ppm to 15 ppm.
- Benzo(b)fluoranthene exceeded the Restricted Residential Use (1 ppm) and Industrial Use (11 ppm) SCOs. Concentrations ranged 2 ppm to 18 ppm.
- Benzo(k)fluoranthene exceeded the Restricted Residential Use (3.9 ppm) SCOs in one sample and was detected at 6.5 ppm.
- Chrysene concentrations exceeded the Residential Use (1 ppm) and Residential-Restricted Use (3.9 ppm) SCOs. Concentrations ranged from 1.8 ppm to 18 ppm.
- Dibenzo(a,h)anthracene concentrations exceeded the Industrial Use SCOs (1.1 ppm in one sample and was detected at 3.5 ppm.
- Indeno(1,2,3-cd)pyrene exceeded the Restricted Residential Use (0.5 ppm) and Commercial Use (5.6 ppm) SCOs. Concentrations ranged from 0.85 ppm to 8.9 ppm.

Metals are also widespread throughout the Site. The following is a list of the detection of metals exceeding Restricted Residential Use SCOs:

- Barium was detected at concentrations exceeding Commercial Use (400 ppm) SCO in one sample and was detected at 584 ppm.

- Cadmium concentration exceeded Commercial Use SCO (9.3 ppm) in one sample and was detected at 16.3 ppm.
- Lead was detected at concentrations exceeding Restricted Residential Use (400 ppm) SCOs. Concentrations ranged 456 ppm to 549 ppm.
- Manganese was detected at concentrations exceeding restricted Residential Use (2,000 ppm). Concentrations ranged 2,370 ppm to 5,680 ppm.
- Mercury was detected at concentrations exceeding Restricted Residential Use (0.81 ppm) SCOs. Concentrations ranged 1.16 ppm to 1.29 ppm.

Metal contamination detected outside the BCP Site includes the following:

- Barium was detected at concentrations exceeding Commercial Use (400 ppm) SCO in one sample and was detected at 805 ppm.
- Lead was detected at concentrations exceeding Restricted Residential Use (400 ppm) and Commercial Use (1,000 ppm) SCOs. Concentrations ranged 808 ppm to 2,060 ppm.
- Manganese was detected at concentrations exceeding restricted Residential Use (2,000 ppm) in one sample and was detected at 6,440 ppm.
- Zinc was detected at concentrations exceeding Residential Use (2,200ppm) SCOs in one sample and was detected at 2,290 ppm.

Groundwater

Based on limited characterization data, onsite groundwater was sampled for VOCs, SVOCs, and metals. Comparison of the groundwater analytical data to the Technical and Operational Guidance Series (TOGs) 1.1.1 Class GA Ambient Water Quality Standards (GWQS) indicates:

- No groundwater quality exceedances for VOCs.
- SVOCs were detected at concentrations exceeding GWQS. Compounds include:
    - Benzo(a)anthracene at 0.04 ppb (GWQS: 0.002 ppb)
    - Benzo(a)pyrene at 0.02 (GWQS: 0.002 ppb)
    - Benzo(b)fluoranthene at 0.03 ppb (GWQS: 0.002 ppb)
    - Benzo(k)fluoranthene at 0.01 ppb (GWQS: 0.002 ppb)
    - Chrysene at 0.02 ppb (GWQS: 0.002 ppb)
    - Indeno(1,2,3-cd)pyrene at 0.02 ppb (GWQS: 0.002 ppb).
- Metals were detected at concentrations exceeding GWQS. Contaminants include:
    - Iron at 2,650 ppb (GWQS: 600 ppb)
    - Sodium at 2,740,000 ppb (GWQS: 20,000 ppb)

All potable water used in the City of Buffalo is provided by a publicly-owned treatment facility. Use of groundwater for potable purposes is prohibited throughout the City of Buffalo.

Tables 1A – 1B and **Table 2** presents previous soil and groundwater sampling results.

3 OBJECTIVES, SCOPE AND RATIONALE

The objectives of the scope of work described in this Work Plan are to evaluate contaminant impacts and identify and evaluate appropriate remedial actions necessary to redevelop the Site. The investigation work will include evaluating the magnitude and extent of contaminant impacts, conducting a qualitative exposure assessment for actual or potential exposures to contaminants at the Site and/or emanating from the Site, and producing data that will support the development of an acceptable RI Report and subsequent Alternatives Analysis Report (AAR).

The RI is based on information previously gathered regarding historical operations conducted at the Site, the results of the limited site characterization, and the project objectives. The RI will include the following:

- Soil Evaluation – This task will consist of two primary elements: evaluation of HFM and underlying native soils.
    - The HFM will be characterized to identify the extent and magnitude of contamination. This material will also be the subject of waste characterization sampling because subsequent remedial activities would likely include the excavation and off-site disposal of the HFM.
    - The underlying native soils will be characterized to determine the depth of impacts from the overlying HFM and the depths at which remedial efforts may be terminated.
- Groundwater Evaluation – Subsequent to completing soil investigation tasks, groundwater monitoring wells will be installed. Although proposed well locations are shown on **Figure 5**, their final locations will be based on the results of the soil evaluation task and approved by NYSDEC.

The RI activities will be completed in general accordance with NYSDEC Division of Environmental Remediation: Technical Guidance for Site Investigation and Remediation dated May 2010 (DER-10).

4 REMEDIAL INVESTIGATION

Previous soil investigations encountered HFM at the Site that is impacted by SVOCs and metals at concentrations above NYSDEC SCOs. This part of the Work Plan describes the scope of investigative work necessary to collect sufficient data to determine the extent of contaminated fill material which will support subsequent remedial actions in achieving **Unrestricted Use SCOs**. This section of the Work Plan includes:

- Field Investigation
- Sampling Program
- Laboratory Analysis

4.1 Field Investigation

The RI intends to supplement the previous site characterization information by the advancement of soil borings, installation of monitoring wells, and collecting and analyzing soil and groundwater samples.

4.1.1 Subsurface Soil Program

Soil Borings

A direct-push soil boring study will be implemented at the Site. Each soil boring will be advanced into the HFM, up to 15 feet bgs, or at the discretion of the environmental engineer/scientist. Exploration locations will be mapped with a global positioning system or tape measured from existing site features.

Soils from the borings will be continuously assessed for visible or olfactory indications of impairment, and/or indication of detectable VOCs with a photoionization detector (PID). Positive indications from any of these screening methods are collectively referred to as "evidence of impairment." Soil boring logs will be completed and include soil description, PID readings, etc. The boring logs will be included in the RI Report.

A total of 35 soil borings will be advanced within the Site boundary and a total of 16 perimeter soil borings will be advanced on the Site boundary.

The proposed soil boring locations are shown in **Figure 4**.

Test Pits

A total of 15 test pits will be excavated.Test pits will be excavated with a conventional track-mounted excavator. Test pits will be excavated to a depth of ten feet bgs or to native soil and extend to a maximum of ten feet in length.

Soils from the test pits will be continuously assessed for visible or olfactory indications of impairment, and/or indication of detectable VOCs with a PID. Positive indications from any of these screening methods are collectively referred to as "evidence of impairment." Test pit logs will be completed and include soil description, PID readings, etc. The boring logs will be included in the RI Report.

The proposed test pit locations are shown in **Figure 4**.

HFM Sampling

HFM samples will be collected from the borings and test pits based on evidence of impairment and to provide characterization across the Site. In each of 10 locations, one HFM sample will be collected and analyzed for the following:

- TCL VOCs
- TCL SVOCs
- TCL pesticides
- Total polychlorinated biphenyls (PCBs)
- Target Analyte List (TAL) metals
- Total mercury
- Total cyanide
- Hexavalent chromium
- Silvex
- Per- and Polyfluoroalkl Substances (PFAS)
- 1,4-dioxane

Additionally, up to 20 samples will be collected from the HFM for waste disposal characterization (approximately half the potential volume to be removed). The waste characterization analysis will include:

- Toxicity Characteristic Leaching Procedure (TCLP) VOCs
- TCLP SVOCs
- TCLP Pesticides
- TCLP Herbicides
- TCLP RCRA metals
- PCBs
- Reactivity
- Corrosivity
- Ignitability
- pH
- Percent Solids
- Paint Filter

Native Soil Sampling

Native soil will be visually assessed and sampled in each of the 50 grid locations. In order to assess the impact of fill on the underlying native soil, a soil sample will be collected from the upper two feet of native material in each grid location. The 50 native soil samples will be collected and analyzed for:

- TCL VOCs
- TCL SVOCs
- TCL pesticides (from 10 of 50 samples only)
- Total PCBs (from 10 of 50 samples only)
- TAL metals
- Total mercury
- Total cyanide
- Hexavalent chromium (from 10 of 50 samples only)
- Silvex (from 10 of 50 samples only)
- Per- and Polyfluoroalkl Substances (PFAS)
- 1,4-dioxane

Based on the results, the **50 native soil samples will also serve as the final confirmatory samples** during the subsequent remedial activities.

In addition to collecting samples at the top of the native material, two additional samples will be collected at one-foot intervals below the first native soil sample. These deeper samples will be submitted to the laboratory but held until the uppermost native soil sample is analyzed. If any analytes exceed the respective SCOs, the next deeper sample will be analyzed for only those compounds that exceed the SCO. If the concentrations in that sample also exceeds the SCOs, the next lower sample will be analyzed and the results will be compared to the SCOs. The process will be repeated for the third sample, if necessary. The intent of this sampling scheme is to identify the depth of remedial investigation and use the sampling results as the confirmatory sample results for the RAWP.

Deep Native Soil Sampling

Additionally, up to five samples, one sample per location, will be collected from deeper native soils below the last confirmatory interval, outlined above, to a maximum depth of 15 feet below ground surface. The deep native soil characterization analysis will include:

- TCL VOCs
- TCL SVOCs
- TCL pesticides
- Total PCBs
- TAL metals
- Total mercury
- Total cyanide

- Hexavalent chromium
- Silvex
- Per- and Polyfluoroalkl Substances (PFAS)
- 1,4-dioxane

Groundwater Monitoring Wells
Four samples, one sample per monitoring well location, will be collected from center of the screened interval. The soil samples collected from monitoring wells analysis will include:

- TCL VOCs
- TCL SVOCs
- TCL pesticides
- Total PCBs
- TAL metals
- Total mercury
- Total cyanide
- Hexavalent chromium
- Silvex
- Per- and Polyfluoroalkl Substances (PFAS)
- 1,4-dioxane

4.1.2 Groundwater Monitoring

To characterize groundwater conditions at the Site, four new monitoring wells will be installed. The proposed new wells are located throughout the Site, as shown in **Figure 5**.

New overburden wells will be constructed to intersect the top of the water table. Each well will be completed with an appropriate length of 2-inch Schedule 40 0.010-slot well screen connected to schedule 40 PVC well riser to complete the well. The annulus will be sand packed with quartz sand to approximately two feet above the screened section, and one to two feet of bentonite chips or pellets above the sand. The remaining annulus will be grouted to ground surface. Each well will be completed with protective casing.

It is expected that groundwater monitoring wells will be installed to 20 feet bgs with 15 feet of screen and five feet of riser.

Following installation, the monitoring wells will be developed through the removal of up to ten well volumes using dedicated bailers or a peristaltic or submersible pump.

Sampling will be completed one week after well development to allow natural groundwater conditions to be re-established.

Groundwater sampling will be conducted using low-flow purging and sampling techniques. Before purging the well, water levels will be measured using an electric water level sounder capable of measuring to the 0.01 foot accuracy. Peristaltic or bladder

pumps using manufacturer-specified tubing will be used for purging and sampling groundwater. Calibration, purging and sampling procedures will be performed as specified by the USEPA[1] for low-flow sampling. Decontamination will be conducted after each well is sampled to reduce the likelihood of cross contamination. Calibration times, purging volumes, water levels and field measurements will be recorded in a field log and will be provided in the RI Report.

The groundwater samples will be analyzed for the following analyte list:

- TCL VOCs
- TCL SVOCs
- TCL pesticides
- Total PCBs
- TAL metals
- Total mercury
- Total cyanide
- Per- and Polyfluoroalkl Substances (PFAS)
- 1,4-dioxane

Historic uses and sampling performed to date does not indicate the Site will contain per- and poly-fluoroalkyl substances (PFOA / PFOS) and 1,4-dioxane. As a prerequisite screening of the Site, the NYSDEC requested the collection of one round of groundwater samples for the analysis of PFOA/PFOS and 1,4-dioxane on three groundwater monitoring wells upgradient of the fourth monitoring well. When sampling for PFAS compatible sampling equipment will be used.

A second round of groundwater sampling will be performed approximately four weeks after the first round. The second round of groundwater samples will be analyzed for the same analytes as in the first round (excluding PFOA/PFOS and 1,4-dioxane).

4.2 Sampling Plan and Laboratory Analysis

Table 3 summarizes the sampling program described in the sections above. Additionally, Quality Assurance/Quality Control (QA/QC) samples will be collected, and the following describes the minimum number of samples per media type.

- Soil samples (excluding waste characterization samples)
    - Blind duplicate – 5%
    - Matrix Spike/Matrix Spike Duplicate (MS/MSD) – 5%

- Groundwater samples
    - Trip blank – 1 per shipment

[1] U.S. EPA Region 1 Low Stress (low-flow) Purging and Sampling Procedure for the Collection of Groundwater Samples from Monitoring Wells, January 19, 2010.

- Blind Duplicate – 5%
- Matrix Spike/Matrix Spike Duplicate (MS/MSD) – 5%

C&S will utilize the services of an NYSDOH Environmental Laboratory Approval Program (ELAP) certified laboratory for analytical testing. The laboratory results for the samples will be reported in a Category B deliverables package to facilitate validation of the data, and a third party validator will review the laboratory data and prepare a Data Usability Summary Report (DUSR). The validator will evaluate the analytical results for the field samples and quality assurance/quality control samples and compare the findings to USEPA guidance to determine the accuracy and validity of the results.

Summaries of the RI activities will be submitted to the NYSDEC as monthly progress reports and will be included in the RI Report. All data submitted to the NYSDEC will be in approved electronic data deliverable (EDD) format.

4.3 Management of Investigation-Derived Waste

Investigation-derived wastes (IDW) (i.e., grossly-contaminated soil cuttings and purge water) will be containerized or stockpiled and staged on-site, pending proper disposal at an offsite facility. Soil cuttings with no apparent staining, odors, or elevated PID readings will be used to backfill boring holes except for backfilling monitoring wells. Soil to be disposed off-site will be placed in steel 55-gallon drums or on poly sheets. Decontamination fluids, if necessary, will be placed in steel 55-gallon drums with closed tops. Drums will be properly labeled, sealed, and characterized as necessary. If RI analytical data is insufficient to gain disposal facility acceptance, waste characterization samples will be analyzed for parameters that are typically required by disposal facilities. Additional sampling and analyses may be required based on the selected disposal facility.

Discarded personal protective equipment (PPE) (i.e., latex gloves, Tyvek, paper towels, etc.) and disposable sampling equipment (i.e., bailers or stainless-steel spoons) will be placed in sealed plastic garbage bags and disposed of as municipal solid waste.

Containerized or stockpiled material will be placed along the northeastern boundary within several designated parking spaces.

5 QUALITY ASSURANCE AND QUALITY CONTROL PROTOCOLS

To ensure that suitable and verifiable data results are obtained from the information collected at the Site, quality assurance procedures are detailed in this section.

5.1 Sampling Methods, Analytical Procedures and Documentation

5.1.1 Sampling Methods

Sampling procedures will be conducted in accordance with the NYSDEC *Sampling Guidelines and Protocols Manual*. Collection of representative samples will include the following procedures:

- Ensuring that the sample taken is representative of the material being sampled;
- Using proper sampling, handling and preservation techniques;
- Properly identifying the collected samples and documenting their collection in field records;
- Maintaining chain-of-custody; and
- Properly preserving samples after collection.

Soil Sampling

Soil sampling will be performed using two methods: (1) field screening using a PID; and (2) grab samples. Whether soil samples are collected from the excavator bucket, direct-push rig sleeves, or split-spoons, they will be collected as grab samples that are split and placed into jars supplied by the laboratory as well as into individual zip-lock bags for screening. Screening soil samples will be allowed to sit in sealed zip-lock bag for a short period of time (minimum of five minutes). Head space measurements will then be taken from each zip-lock bag. To prevent cross contamination, zip-lock bags will not be reused and will be properly disposed. Calibration of all electronic field screening equipment will be completed daily and will be done to manufacturer's specifications.

As detailed in the *Sampling Guidelines and Protocols Manual*, grab samples will be placed in 4-ounce and 8-ounce, wide-mouth, glass jars. Sample jars will immediately be placed on ice in a cooler.

Water Sampling

Groundwater sampling will be conducted in accordance with USEPA guidance for low-flow purging and sampling, as described in **Section 4**.

Groundwater sampling for PFAS will be conducted in accordance with NYSDEC's Sampling, Analysis and Assessment of Per- and Polyfluoroalky Substances April 2023.

Water samples will be collected in 40 ml and 1-liter glass jars and immediately placed on ice. The water will be analyzed for VOC, SVOC, PCBs, pesticides and metals on a standard turnaround time.

QA/QC Sampling

Duplicate samples will be collected from a minimum of 5% of the locations, and will be selected randomly.

Quality Assurance/Quality Control samples will not be collected and analyzed for the waste characterization sampling.

Table 6-1: Summary of Estimated QA/QC Sampling

Sample Type	***Estimated No. Locations***	***Purpose***
Soil		
Fill / Impacted Material	10	Characterization
Field Duplicate	1	QA/QC
Matrix Spike	1	QA/QC
Matrix Spike Duplicate	1	QA/QC
Native Soil	50	Characterization
Field Duplicate	3	QA/QC
Matrix Spike	3	QA/QC
Matrix Spike Duplicate	3	QA/QC
Deep Native Soil	5	Characterization
Field Duplicate	0	QA/QC
Matrix Spike	0	QA/QC
Matrix Spike Duplicate	0	QA/QC
Waste Characterization	20	Characterization
Groundwater		
Groundwater	6	Characterization
Field Duplicate	2	QA/QC
Matrix Spike	2	QA/QC
Matrix Spike Duplicate	2	QA/QC

5.1.2 Analytical Procedures

Laboratory Analysis

Laboratory analysis will be conducted by a third-party laboratory that is accredited by the NYSDOH Environmental Laboratory Accreditation Program (ELAP). Laboratory

analytical methods will include the most current NYSDEC Analytical Services Protocol (ASP).

Soil, groundwater and air samples sent to a certified laboratory will be analyzed in accordance with EPA SW-846 methodology for the following contaminants:

- VOCs (EPA Method 8260);
- SVOCs (EPA Method 8270C);
- Pesticides (USEPA 8081A);
- PCBs (USEPA 8082);
- Cyanide (USEPA Method 9010B);
- Mercury (USEPA Method 7471A);
- Hexavalent Chromium (USEPA Method 7196A);
- Silvex (USEPA Method 8151A);and
- Metals (EPA Method 6010B).
- 1,4 dioxane (EPA Method 8270SIM); and
- Per- and Poly-fluoroalkyl substances (EPA Method 537).

Category B deliverable will be requested to be used in a third-party data validation.

Data Usability

Data Usability Summary Report (DUSR) will be performed by a third-party data consultant using the most recent methods and criteria from the U.S. EPA. The DUSR will assess all sample analytical data, blanks, duplicates and laboratory control samples and evaluate the completeness of the data package. The waste characterization samples will not be validated.

5.1.3 Documentation

Custody Procedures

As outlined in NYSDEC *Sampling Guidelines and Protocols,* a sample is in custody under the following conditions:

- It is in your actual possession;
- It is in your view after being in your physical possession;
- It was in your possession and then you locked or sealed it up to prevent tampering; or
- It is in a secure area.

The environmental professional will maintain all chain-of-custody documents that will be completed for all samples that will leave the Site to be tested in the laboratory.

Air Monitoring

Air monitoring will be conducted to verify no impacts to ambient air. Air monitoring will be conducted during the soil boring program and installation of groundwater monitoring wells. Periodic monitoring may be conducted during non-intrusive activities. All records will be kept on-site during the investigation and will be made available for regulatory inspection. A daily air monitoring log will be maintained through the end of remedial investigation field activities. The specifics of the air monitoring procedures and criteria are detailed in the CAMP.

A CAMP is not generally required for investigation or delineation of site conditions, which are not considered intrusive. These activities include the collection of:

- Surface soil;
- Groundwater;
- Surface Water;
- Sediment;
- Ambient or indoor air; and/or
- Soil gas and sub-slab soil vapor (after the sampling ports have been installed).

6 HEALTH AND SAFETY

To verify the safety of the workers and the local community during the performance of the work, monitoring practices of the work environment will be in place during all phases of RI activities. A Health and Safety Plan (HASP) was prepared that details procedures for maintaining safe working conditions and minimizing the potential for exposure to contaminated material. The HASP is provided in **Appendix D**.

Air monitoring during RI activities will be conducted using PID. Details on air monitoring are provided in the Community Air Monitoring Plan (CAMP). The CAMP is provided in **Appendix C**.

7 FISH AND WILDLIFE RESOURCES IMPACT ANALYSIS

The Site and surrounding area consist of densely developed urban land in the City of Buffalo. The NYSDEC Online EAF Mapper was utilized to determine if there are significant natural communities, endangered species, or threatened species on the Site. The land approximately one-quarter of a mile in each cardinal direction from the Site was searched. According to the EAF Mapper, Lake Sturgeon and Peregrine Falcon may be present in the surrounding area of the Site. However, the habitats and that support these species are not present on the Site.

According to the NYSDEC Environmental Resource Mapper, there are no wetlands or significant natural communities on the Site.

Based on the above, there are no ecological resources present on the Site and, consequently, no fish and wildlife resource impacts have been identified.

Appendix F provides the Fish and Wildlife Resource Impact Analysis Checklist and figure showing wetland and endangered species on the Site.

8 REPORTING

At the request of the Department, field activity reports including a summary of CAMP data will be submitted daily.

Based on the results of the work described above, one report will be prepared to describe the methodologies and results of the RI. The report will also identify and evaluate additional remedial activities for the Site, if any. The RI portions of the Report will describe:

- Investigative methods;
- Observations and findings;
- Inspection/monitoring observations of the remedial measures;
- Results of the community air monitoring program; and
- Analytical results.

The Alternatives Analysis Report (AAR) portion of the Report will include the following elements:

- Description of remaining contamination, if any
- Identification of potential, additional remedial measures
- Evaluation of potential, additional remedial measures, including no action following the remediation
- Identification of recommended additional remedy

The documents will be submitted to the NYSDEC for review and approval.

9 SCHEDULE

It is assumed that NYSDEC will promptly review this RI Work Plan followed by a 45-day comment period. Below is an anticipated schedule of milestones for the remediation of the Site.

Anticipated Date	Milestone
~~*June 8, 2023*~~	~~*Brownfield Cleanup Program ("BCP") Application Submission*~~
~~*June 8, 2023*~~	~~*Remedial Investigation Work Plan ("RIWP") Submission*~~
~~*February 22, 2024*~~	~~*Brownfield Cleanup Agreement ("BCA") Executed*~~
Early April 2024	RIWP Approved
Early May 2024	Remedial Investigation Begins
Late June 2024	Remedial Investigation Ends
Mid July 2024	Remedial Investigation Report Submission
Mid July 2024	Remedial Action Work Plan Submission
Mid August 2024	Remedial Investigation Report Approval
Early October 2024	Decision Document
Spring 2025	Remedial Work Begins
Fall 2025	Remedial Work Ends
Winter 2025	Final Engineering Report ("FER") Submission
Winter 2026	FER Approved
Spring 2026	Certificate of Completion Issued

FIGURES

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Figure 1

Site Location

Brownfield Cleanup Program (BCP) Boundary

N

0 500 1,000 2,000 Feet

1 in. = 1,000 feet
When printed at 11 in. by 17 in.

Marine Drive Apartments East
Phase 1 Site
Brownfield Cleanup Program

Sources: . Created by C&S Engineers, Inc.

Figure 2

Site Detail

Brownfield Cleanup Program (BCP) Boundary

0 30 60 Feet

1" = 30'

When printed on 24 in. by 36 in.

Marine Drive Apartments East
Phase 1 Site
Brownfield Cleanup Program

Sources: Survey created by Niagara Boundary and Mapping Services

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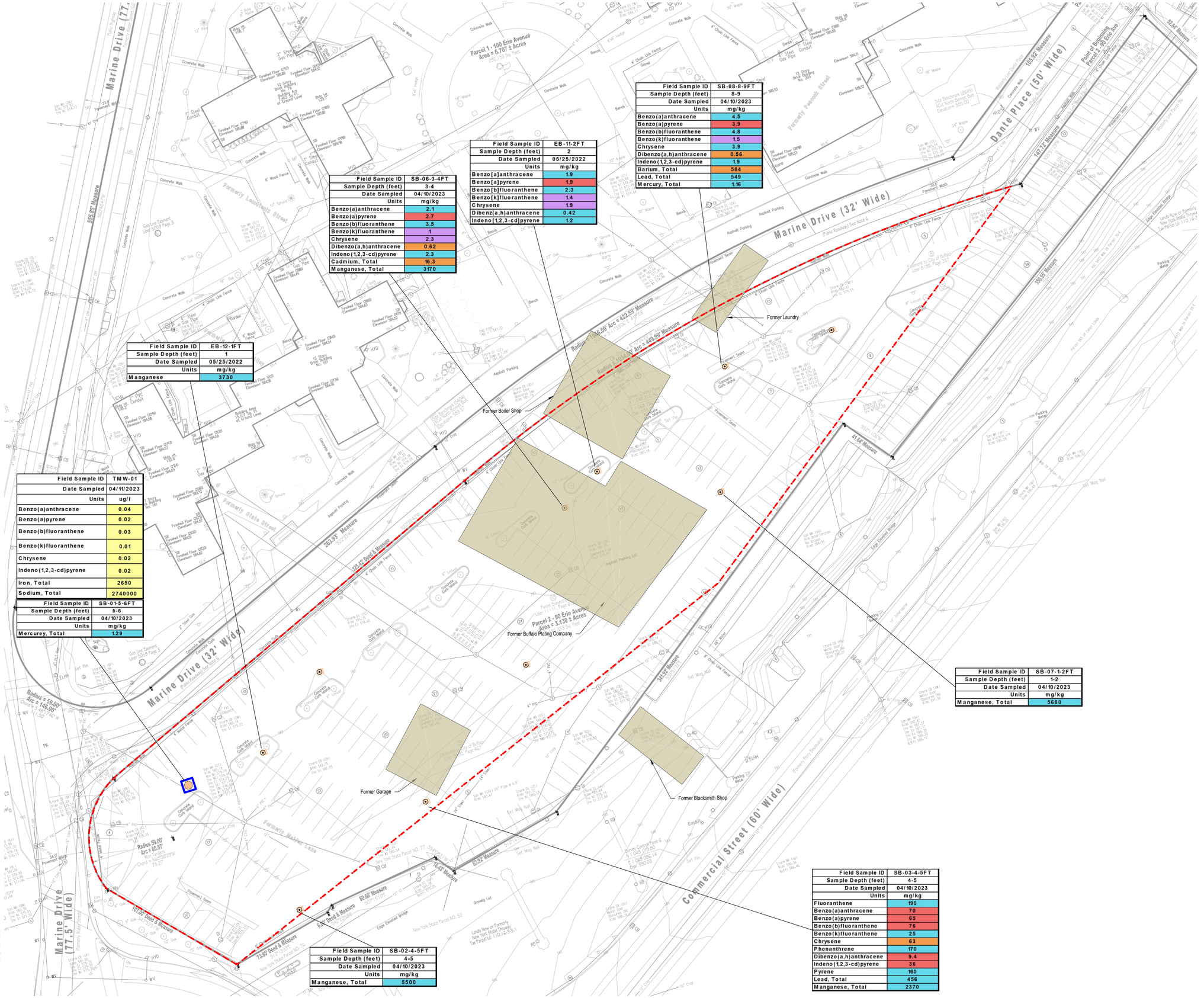

Field Sample ID	SB-06-3-4FT
Sample Depth (feet)	3-4
Date Sampled	04/10/2023
Units	mg/kg
Benzo(a)anthracene	2.1
Benzo(a)pyrene	2.7
Benzo(b)fluoranthene	3.5
Benzo(k)fluoranthene	1
Chrysene	2.3
Dibenzo(a,h)anthracene	0.62
Indeno(1,2,3-cd)pyrene	2.3
Cadmium, Total	16.3
Manganese, Total	3170

Field Sample ID	EB-11-2FT
Sample Depth (feet)	2
Date Sampled	05/25/2022
Units	mg/kg
Benzo[a]anthracene	1.9
Benzo[a]pyrene	1.9
Benzo[b]fluoranthene	2.3
Benzo[k]fluoranthene	1.4
Chrysene	1.9
Dibenz(a,h)anthracene	0.42
Indeno(1,2,3-cd)pyrene	1.2

Field Sample ID	SB-08-8-9FT
Sample Depth (feet)	8-9
Date Sampled	04/10/2023
Units	mg/kg
Benzo(a)anthracene	4.5
Benzo(a)pyrene	3.9
Benzo(b)fluoranthene	4.8
Benzo(k)fluoranthene	1.5
Chrysene	3.9
Dibenzo(a,h)anthracene	0.56
Indeno(1,2,3-cd)pyrene	1.9
Barium, Total	584
Lead, Total	549
Mercury, Total	1.16

Field Sample ID	EB-12-1FT
Sample Depth (feet)	1
Date Sampled	05/25/2022
Units	mg/kg
Manganese	3730

Field Sample ID	TMW-01
Date Sampled	04/11/2023
Units	ug/l
Benzo(a)anthracene	0.04
Benzo(a)pyrene	0.02
Benzo(b)fluoranthene	0.03
Benzo(k)fluoranthene	0.01
Chrysene	0.02
Indeno(1,2,3-cd)pyrene	0.02
Iron, Total	2650
Sodium, Total	2740000

Field Sample ID	SB-01-5-6FT
Sample Depth (feet)	5-6
Date Sampled	04/10/2023
Units	mg/kg
Mercurey, Total	1.29

Field Sample ID	SB-07-1-2FT
Sample Depth (feet)	1-2
Date Sampled	04/10/2023
Units	mg/kg
Manganese, Total	5680

Field Sample ID	SB-03-4-5FT
Sample Depth (feet)	4-5
Date Sampled	04/10/2023
Units	mg/kg
Fluoranthene	190
Benzo(a)anthracene	70
Benzo(a)pyrene	65
Benzo(b)fluoranthene	76
Benzo(k)fluoranthene	25
Chrysene	63
Phenanthrene	170
Dibenzo(a,h)anthracene	9.4
Indeno(1,2,3-cd)pyrene	36
Pyrene	160
Lead, Total	456
Manganese, Total	2370

Field Sample ID	SB-02-4-5FT
Sample Depth (feet)	4-5
Date Sampled	04/10/2023
Units	mg/kg
Manganese, Total	5500

Field Sample ID	
Sample Depth (feet)	
Date Sampled	
Units	
ANALYTE CONCENTRATION EXCEED PART 375 SOIL CLEANUP OBJECTIVES	Unrestricted Use
	Residential Use
	Restricted Residential Use
	Commercial Use
	Industrial Use

Field Sample ID	
Date Sampled	
Units	
ANALYTE	Analyte concentration exceed Technical and Operational Guidance Series (TOGs) 1.1.1 Class GA Ambient Water Quality Standards

Brownfield Cleanup Program (BCP) Boundary

Historic Buildings

Sample Location

Soil / Temporary Groundwater Sample Location

Soil Sample Location

N

0 30 60 Feet

1" = 30'

When printed on 24 in. by 36 in.

Figure 3

Environmental Concerns

Marine Drive Apartments East
Phase 1 Site
Brownfield Cleanup Program

Sources: Survey created by Niagara Boundary and Mapping Services

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Figure 4

Proposed Soil Sample Locations

- Brownfield Cleanup Program (BCP) Boundary
- Historic Buildings
- 50-foot x 50-foot Grid

Remedial Investigation Sample Locations

- Soil Boring (Subsurface) Sample Location
- Test Pit (Subsurface) Sample Location
- Perimeter Soil Boring (Subsurface) Sample Location

0 30 60 Feet

1" = 30'

When printed on 24 in. by 36 in.

Keynotes

1. Test pits will be excavated with a conventional track-mounted excavator. Test pits will be excavated to a maximum depth of ten feet bgs or to native soil and extend to a maximum of ten feet in length. From each test pit, five near surface soil samples will be collected from one to two feet bgs.

2. Each soil boring should be advanced into the fill material, up to 15 feet (ft) below the ground surface (bgs), or at the discretion of the environmental engineer/scientist.

   - Fill samples will be collected from the borings based on evidence of impairment and to provide characterization across the Site. In 10 locations, one urban fill sample will be collected
   - Up to 20 samples will be collected from the urban fill for waste characterization
   - Native soil will be visually assessed and sampled in each of the 50 grid locations. In order to assess the impact of fill on the underlying native soil, a soil sample will be collected from the top two feet of native material in each grid location.
   - In addition to collecting samples at the top of the native material, two additional samples will be collected at one-foot intervals below the first native soil sample.
   - Up to five samples, one sample per location, will be collected from deeper native soils below the last confirmatory interval, outlined above, to a maximum depth of 15 feet below ground surface.

Marine Drive Apartments East Phase 1 Site Brownfield Cleanup Program

Sources: Survey created by Niagara Boundary and Mapping Services

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Figure 5

Proposed Groundwater Monitoring Well Locations

- Brownfield Cleanup Program (BCP) Boundary
- Historic Buildings
- 50 foot x 50 foot Grid
- Groundwater Sample Location

0 30 60 Feet

1" = 30'

When printed on 24 in. by 36 in.

Keynotes

1. Four new monitoring wells will be installed. The proposed new wells are located throughout the Site. New Overburden wells will be constructed to intersect the top of the water table. Each well will be completed with 5 to 15 feet of 2-inch Schedule 40 0.010-slot well screen connected to an appropriate length of Schedule 40 PVC well riser to complete the well. The annulus will be sand packed with quartz sand to approximately 1 to 2 feet above the screened section, and 1 to 2 feet of bentonite chips or pellets above the sand. The remaining annulus will be grouted to the ground surface.

Marine Drive Apartments East
Phase 1 Site
Brownfield Cleanup Program

Sources: Survey created by Niagara Boundary and Mapping Services

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TABLES

TABLE 1A

MARINE DRIVE APARTMENTS EAST
90 ERIE STREET
BUFFALO, NEW YORK

Location ID	Unrestricted Use	Residential Use	Restricted Residential Use	Commercial Use	Industrial Use	EB-10-1FT	EB-11-2FT	EB-12-1FT
Sample Depth (feet)						1	2	1
Date Sampled						05/25/2022	05/25/2022	05/25/2022
Sample Matrix						SO	SO	SO
Units						mg/kg	mg/kg	mg/kg
SVOCs								
Biphenyl	NA	NA	NA	NA	NA	ND	ND	ND
bis (2-chloroisopropyl) ether	NA	NA	NA	NA	NA	ND	ND	ND
2,4,5-Trichlorophenol	NA	NA	NA	NA	NA	ND	ND	ND
2,4,6-Trichlorophenol	NA	NA	NA	NA	NA	ND	ND	ND
2,4-Dichlorophenol	NA	NA	NA	NA	NA	ND	ND	ND
2,4-Dimethylphenol	NA	NA	NA	NA	NA	ND	ND	ND
2,4-Dinitrophenol	NA	NA	NA	NA	NA	ND	ND	ND
2,4-Dinitrotoluene	NA	NA	NA	NA	NA	ND	ND	ND
2,6-Dinitrotoluene	NA	NA	NA	NA	NA	ND	ND	ND
2-Chloronaphthalene	NA	NA	NA	NA	NA	ND	ND	ND
2-Chlorophenol	NA	NA	NA	NA	NA	ND	ND	ND
2-Methylnaphthalene	NA	NA	NA	NA	NA	ND	ND	ND
2-Methylphenol	0.33	100	100	500	1000	ND	ND	ND
2-Nitroaniline	NA	NA	NA	NA	NA	ND	ND	ND
2-Nitrophenol	NA	NA	NA	NA	NA	ND	ND	ND
3,3'-Dichlorobenzidine	NA	NA	NA	NA	NA	ND	ND	ND
3-Nitroaniline	NA	NA	NA	NA	NA	ND	ND	ND
4,6-Dinitro-2-methylphenol	NA	NA	NA	NA	NA	ND	ND	ND
4-Bromophenyl phenyl ether	NA	NA	NA	NA	NA	ND	ND	ND
4-Chloro-3-methylphenol	NA	NA	NA	NA	NA	ND	ND	ND
4-Chloroaniline	NA	NA	NA	NA	NA	ND	ND	ND
4-Chlorophenyl phenyl ether	NA	NA	NA	NA	NA	ND	ND	ND
4-Methylphenol	0.33	34	100	500	1000	ND	ND	ND
4-Nitroaniline	NA	NA	NA	NA	NA	ND	ND	ND
4-Nitrophenol	NA	NA	NA	NA	NA	ND	ND	ND
Acenaphthene	20	100	100	500	1000	ND	ND	ND
Acenaphthylene	100	100	100	500	1000	ND	ND	ND
Acetophenone	NA	NA	NA	NA	NA	ND	ND	ND
Anthracene	100	100	100	500	1000	ND	**0.61 J**	ND
Atrazine	NA	NA	NA	NA	NA	ND	ND	ND
Benzaldehyde	NA	NA	NA	NA	NA	ND	ND	ND
Benzo[a]anthracene	1	1	1	5.6	11	**0.6 J**	**1.9 J**	ND
Benzo[a]pyrene	1	1	1	1	1.1	**0.6 J**	**1.9 J**	ND
Benzo[b]fluoranthene	1	1	1	5.6	11	**0.8 J**	**2.3**	ND
Benzo[g,h,i]perylene	100	100	100	500	1000	**0.36 J**	**1.1 J**	ND
Benzo[k]fluoranthene	0.8	1	3.9	56	110	**0.5 J**	**1.4 J**	ND
Bis(2-chloroethoxy)methane	NA	NA	NA	NA	NA	ND	ND	ND
Bis(2-chloroethyl)ether	NA	NA	NA	NA	NA	ND	ND	ND
Bis(2-ethylhexyl) phthalate	NA	NA	NA	NA	NA	ND	ND	ND
Butyl benzyl phthalate	NA	NA	NA	NA	NA	ND	ND	ND

TABLE 1A

MARINE DRIVE APARTMENTS EAST
90 ERIE STREET
BUFFALO, NEW YORK

Location ID	Unrestricted Use	Residential Use	Restricted Residential Use	Commercial Use	Industrial Use	EB-10-1FT	EB-11-2FT	EB-12-1FT
Sample Depth (feet)						1	2	1
Date Sampled						05/25/2022	05/25/2022	05/25/2022
Sample Matrix						SO	SO	SO
Units						mg/kg	mg/kg	mg/kg
Caprolactam	NA	NA	NA	NA	NA	ND	ND	ND
Carbazole	NA	NA	NA	NA	NA	ND	ND	ND
Chrysene	1	1	3.9	56	110	0.67 J	1.9 J	ND
Di-n-butyl phthalate	NA	NA	NA	NA	NA	ND	ND	ND
Di-n-octyl phthalate	NA	NA	NA	NA	NA	ND	ND	ND
Dibenz(a,h)anthracene	0.33	0.33	0.33	0.56	1.1	0.19 J	0.42 J	ND
Dibenzofuran	7	14	59	350	1000	ND	ND	ND
Diethyl phthalate	NA	NA	NA	NA	NA	ND	ND	ND
Dimethyl phthalate	NA	NA	NA	NA	NA	ND	ND	ND
Fluoranthene	100	100	100	500	1000	1.4	3.8	0.13 J
Fluorene	30	100	100	500	1000	ND	ND	ND
Hexachlorobenzene	0.33	0.33	1.2	6	12	ND	ND	ND
Hexachlorobutadiene	NA	NA	NA	NA	NA	ND	ND	ND
Hexachlorocyclopentadiene	NA	NA	NA	NA	NA	ND	ND	ND
Hexachloroethane	NA	NA	NA	NA	NA	ND	ND	ND
Indeno[1,2,3-cd]pyrene	0.5	0.5	0.5	5.6	11	0.37 J	1.2 J	ND
Isophorone	NA	NA	NA	NA	NA	ND	ND	ND
N-Nitrosodi-n-propylamine	NA	NA	NA	NA	NA	ND	ND	ND
N-Nitrosodiphenylamine	NA	NA	NA	NA	NA	ND	ND	ND
Naphthalene	12	100	100	500	1000	ND	ND	ND
Nitrobenzene	NA	NA	NA	NA	NA	ND	ND	ND
Pentachlorophenol	0.8	2	7	7	55	ND *+	ND *+	ND *+
Phenanthrene	100	100	100	500	1000	0.63 J	2.2	ND
Phenol	0.33	100	100	500	1000	ND	ND	ND
Pyrene	100	100	100	500	1000	1.1	3.4	0.11 J
Metals								
Aluminum	NA	NA	NA	NA	NA	14900	14900	24700
Mercury	0.18	0.81	0.81	2.8	5.7	0.11	0.057	0.014 J
Antimony	NA	NA	NA	NA	NA	0.96 J	0.69 J	ND F2 F1
Arsenic	13	16	16	16	16	5.7	6.2	2.9 F1
Barium	350	350	400	400	10000	82.4	80.5	273
Beryllium	7.2	14	72	590	2700	0.61	0.69	3.1 F1
Cadmium	2.5	2.5	4.3	9.3	60	0.79	0.67	0.26 F1
Calcium	NA	NA	NA	NA	NA	13000 B	20800 B	136000 B
Chromium	NA	NA	NA	NA	NA	21.9	20.0	13.7 F1
Cobalt	NA	NA	NA	NA	NA	8.1	7.8	3.8
Copper	50	270	270	270	10000	23.9	19.2	9.8 F1F2
Iron	NA	NA	NA	NA	NA	18900 B	19200 B	9480 F2B
Lead	63	400	400	1000	3900	73.0	62.7	13.5
Magnesium	NA	NA	NA	NA	NA	5030	6980	10200
Manganese	1600	2000	2000	10000	10000	419 B	449 B	3730 F2B
Nickel	30	140	310	310	10000	20.4	18.4	8.8
Potassium	NA	NA	NA	NA	NA	1680	2080	2290

TABLE 1A

MARINE DRIVE APARTMENTS EAST
90 ERIE STREET
BUFFALO, NEW YORK

Location ID	Unrestricted Use	Residential Use	Restricted Residential Use	Commercial Use	Industrial Use	EB-10-1FT		EB-11-2FT		EB-12-1FT	
Sample Depth (feet)						1		2		1	
Date Sampled						05/25/2022		05/25/2022		05/25/2022	
Sample Matrix						SO		SO		SO	
Units						mg/kg		mg/kg		mg/kg	
Selenium	3.9	36	180	1500	6800	ND		ND		**1.3**	**JF1**
Silver	2	36	180	1500	6800	ND		ND		**0.41**	**JF1**
Sodium	NA	NA	NA	NA	NA	**352**	**B**	**273**	**B**	**794**	**B**
Thallium	NA	NA	NA	NA	NA	ND		ND		**0.41**	**J**
Vanadium	NA	NA	NA	NA	NA	**28.3**		**29.9**		**15.7**	**F1**
Zinc	109	2200	10000	10000	10000	**126**	**B**	**109**	**B**	**28.9**	**F1B**

Analytical Data compared to Part 375 Standards and DER-10

ND indicates analyte was not detected.

Blank space indicates analyte was not analyzed for in that sample.

*+ - LCS and/or LCSD is outside acceptance limits, high biased.

B - Compound was found in the blank and sample.

F1 - MS and/or MSD recovery exceeds control limits.

F2 - MS/MSD RPD exceeds control limits

J - Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.

K - Benzo (b&k) fluoranthene are unresolved due to matrix, result is reported as Benzo(b)fluoranthene.

TABLE 1B

MARINE DRIVE APARTMENTS EAST
90 ERIE STREET
BUFFALO, NEW YORK

Location ID						SB-01-5-6FT	SB-02-4-5FT	SB-03-4-5FT	SB-05-4-5FT	SB-05-7-8FT	SB-06-3-4FT	SB-07-1-2FT	SB-08-8-9FT
Sample Depth (feet)						5-6	4-5	4-5	4-5	7-8	3-4	1-2	8-9
Date Sampled						4/10/2023	4/10/2023	4/10/2023	4/10/2023	4/10/2023	4/10/2023	4/10/2023	4/10/2023
Sample Matrix						SO	SO	SO	SO	SO	SO	SO	SO
Units	Unrestricted Use	Residential Use	Restricted Residential Use	Commercial Use	Industrial Use	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
VOCs													
Methylene chloride	0.05	51	100	500	1000	ND	ND	ND	ND	ND	ND	ND	ND
1,1-Dichloroethane	0.27	19	26	240	480	ND	ND	ND	ND	ND	ND	ND	ND
Chloroform	0.37	10	49	350	700	ND	ND	ND	ND	ND	ND	ND	ND
Carbon tetrachloride	0.76	1.4	2.4	22	44	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dichloropropane	NA	NA	NA	NA	NA	ND	ND	ND	ND	ND	ND	ND	ND
Dibromochloromethane	NA	NA	NA	NA	NA	ND	ND	ND	ND	ND	ND	ND	ND
1,1,2-Trichloroethane	NA	NA	NA	NA	NA	ND	ND	ND	ND	ND	ND	ND	ND
Tetrachloroethene	1.3	5.5	19	150	300	ND	ND	ND	ND	ND	ND	ND	ND
Chlorobenzene	1.1	100	100	500	1000	ND	ND	ND	ND	ND	ND	ND	ND
Trichlorofluoromethane	NA	NA	NA	NA	NA	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dichloroethane	0.02	2.3	3.1	30	60	ND	ND	ND	ND	ND	ND	ND	ND
1,1,1-Trichloroethane	0.68	100	100	500	1000	ND	ND	ND	ND	ND	ND	ND	ND
Bromodichloromethane	NA	NA	NA	NA	NA	ND	ND	ND	ND	ND	ND	ND	ND
trans-1,3-Dichloropropene	NA	NA	NA	NA	NA	ND	ND	ND	ND	ND	ND	ND	ND
cis-1,3-Dichloropropene	NA	NA	NA	NA	NA	ND	ND	ND	ND	ND	ND	ND	ND
Bromoform	NA	NA	NA	NA	NA	ND	ND	ND	ND	ND	ND	ND	ND
1,1,2,2-Tetrachloroethane	NA	NA	NA	NA	NA	ND	ND	ND	ND	ND	ND	ND	ND
Benzene	0.06	2.9	4.8	44	89	ND	ND	ND	ND	ND	ND	ND	ND
Toluene	0.7	100	100	500	1000	ND	ND	ND	ND	ND	ND	ND	ND
Ethylbenzene	1	30	41	390	780	ND	ND	ND	ND	ND	ND	ND	ND
Chloromethane	NA	NA	NA	NA	NA	ND	ND	ND	ND	ND	ND	ND	ND
Bromomethane	NA	NA	NA	NA	NA	ND	ND	ND	ND	ND	ND	ND	ND
Vinyl chloride	0.02	0.21	0.9	13	27	ND	ND	ND	ND	ND	ND	ND	ND
Chloroethane	NA	NA	NA	NA	NA	ND	ND	ND	ND	ND	ND	ND	ND
1,1-Dichloroethene	0.33	100	100	500	1000	ND	ND	ND	ND	ND	ND	ND	ND
trans-1,2-Dichloroethene	0.19	100	100	500	1000	ND	ND	ND	ND	ND	ND	ND	ND
Trichloroethene	0.47	10	21	200	400	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dichlorobenzene	1.1	100	100	500	1000	ND	ND	ND	ND	ND	ND	ND	ND
1,3-Dichlorobenzene	2.4	17	49	280	560	ND	ND	ND	ND	ND	ND	ND	ND
1,4-Dichlorobenzene	1.8	9.8	13	130	250	ND	ND	ND	ND	ND	ND	ND	ND
Methyl tert butyl ether	0.93	62	100	500	1000	ND	ND	ND	ND	ND	ND	ND	ND
p/m-Xylene	NA	NA	NA	NA	NA	ND	ND	ND	ND	ND	ND	ND	ND
o-Xylene	NA	NA	NA	NA	NA	ND	ND	ND	ND	ND	ND	ND	ND
cis-1,2-Dichloroethene	0.25	59	100	500	1000	ND	ND	ND	ND	ND	ND	ND	ND
Styrene	NA	NA	NA	NA	NA	ND	ND	ND	ND	ND	ND	ND	ND
Dichlorodifluoromethane	NA	NA	NA	NA	NA	ND	ND	ND	ND	ND	ND	ND	ND
Acetone	0.05	100	100	500	1000	ND	ND	ND	ND	0.29	ND	ND	ND
Carbon disulfide	NA	NA	NA	NA	NA	ND	ND	ND	ND	ND	ND	ND	ND
2-Butanone	0.12	100	100	500	1000	ND	ND	ND	ND	ND	ND	ND	ND
4-Methyl-2-pentanone	NA	NA	NA	NA	NA	ND	ND	ND	ND	ND	ND	ND	ND
2-Hexanone	NA	NA	NA	NA	NA	ND	ND	ND	ND	ND	ND	ND	ND
Bromochloromethane	NA	NA	NA	NA	NA	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dibromoethane	NA	NA	NA	NA	NA	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dibromo-3-chloropropane	NA	NA	NA	NA	NA	ND	ND	ND	ND	ND	ND	ND	ND
Isopropylbenzene	NA	NA	NA	NA	NA	ND	ND	ND	ND	ND	ND	ND	ND
1,2,3-Trichlorobenzene	NA	NA	NA	NA	NA	ND	ND	ND	ND	ND	ND	ND	ND
1,2,4-Trichlorobenzene	NA	NA	NA	NA	NA	ND	ND	ND	ND	ND	ND	ND	ND
Methyl Acetate	NA	NA	NA	NA	NA	ND	ND	ND	ND	ND	ND	ND	ND
Cyclohexane	NA	NA	NA	NA	NA	ND	ND	ND	ND	ND	ND	ND	ND
1,4-Dioxane	0.1	9.8	13	130	250	ND	ND	ND	ND	ND	ND	ND	ND
Freon-113	NA	NA	NA	NA	NA	ND	ND	ND	ND	ND	ND	ND	ND
Methyl cyclohexane	NA	NA	NA	NA	NA	ND	ND	ND	ND	ND	ND	ND	ND
SVOCs													
Acenaphthene	20	100	100	500	1000	ND	**0.056** J	**13**	ND	ND	**0.17**	**0.037** J	**0.54**
Hexachlorobenzene	0.33	0.33	1.2	6	12	ND	ND	ND	ND	ND	ND	ND	ND

TABLE 1B

MARINE DRIVE APARTMENTS EAST
90 ERIE STREET
BUFFALO, NEW YORK

Location ID	Unrestricted Use	Residential Use	Restricted Residential Use	Commercial Use	Industrial Use	SB-01-5-6FT	SB-02-4-5FT	SB-03-4-5FT	SB-05-4-5FT	SB-05-7-8FT	SB-06-3-4FT	SB-07-1-2FT	SB-08-8-9FT
Sample Depth (feet)						5-6	4-5	4-5	4-5	7-8	3-4	1-2	8-9
Date Sampled						4/10/2023	4/10/2023	4/10/2023	4/10/2023	4/10/2023	4/10/2023	4/10/2023	4/10/2023
Sample Matrix						SO	SO	SO	SO	SO	SO	SO	SO
Units						mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
Bis(2-chloroethyl)ether	NA	NA	NA	NA	NA	ND	ND	ND	ND	ND	ND	ND	ND
2-Chloronaphthalene	NA	NA	NA	NA	NA	ND	ND	ND	ND	ND	ND	ND	ND
3,3'-Dichlorobenzidine	NA	NA	NA	NA	NA	ND	ND	ND	ND	ND	ND	ND	ND
2,4-Dinitrotoluene	NA	NA	NA	NA	NA	ND	ND	ND	ND	ND	ND	ND	ND
2,6-Dinitrotoluene	NA	NA	NA	NA	NA	ND	ND	ND	ND	ND	ND	ND	ND
Fluoranthene	100	100	100	500	1000	ND	**1.4**	**190**	ND	ND	**4.7**	**0.86**	**10**
4-Chlorophenyl phenyl ether	NA	NA	NA	NA	NA	ND	ND	ND	ND	ND	ND	ND	ND
4-Bromophenyl phenyl ether	NA	NA	NA	NA	NA	ND	ND	ND	ND	ND	ND	ND	ND
Bis(2-chloroisopropyl)ether	NA	NA	NA	NA	NA	ND	ND	ND	ND	ND	ND	ND	ND
Bis(2-chloroethoxy)methane	NA	NA	NA	NA	NA	ND	ND	ND	ND	ND	ND	ND	ND
Hexachlorobutadiene	NA	NA	NA	NA	NA	ND	ND	ND	ND	ND	ND	ND	ND
Hexachlorocyclopentadiene	NA	NA	NA	NA	NA	ND	ND	ND	ND	ND	ND	ND	ND
Hexachloroethane	NA	NA	NA	NA	NA	ND	ND	ND	ND	ND	ND	ND	ND
Isophorone	NA	NA	NA	NA	NA	ND	ND	ND	ND	ND	ND	ND	ND
Naphthalene	12	100	100	500	1000	ND	**0.056** J	ND	ND	ND	**0.084** J	**0.026** J	**0.3**
Nitrobenzene	NA	NA	NA	NA	NA	ND	ND	ND	ND	ND	ND	ND	ND
NDPA/DPA	NA	NA	NA	NA	NA	ND	ND	ND	ND	ND	ND	ND	ND
n-Nitrosodi-n-propylamine	NA	NA	NA	NA	NA	ND	ND	ND	ND	ND	ND	ND	ND
Bis(2-ethylhexyl)phthalate	NA	NA	NA	NA	NA	ND	**0.082** J	ND	**0.093** J	ND	ND	ND	ND
Butyl benzyl phthalate	NA	NA	NA	NA	NA	ND	ND	ND	ND	ND	ND	ND	ND
Di-n-butylphthalate	NA	NA	NA	NA	NA	ND	ND	ND	ND	ND	ND	ND	ND
Di-n-octylphthalate	NA	NA	NA	NA	NA	ND	ND	ND	ND	ND	ND	ND	ND
Diethyl phthalate	NA	NA	NA	NA	NA	ND	ND	ND	ND	ND	ND	ND	ND
Dimethyl phthalate	NA	NA	NA	NA	NA	ND	ND	ND	ND	ND	ND	ND	ND
Benzo(a)anthracene	1	1	1	5.6	11	ND	**0.66**	**70**	ND	ND	**2.1**	**0.41**	**4.5**
Benzo(a)pyrene	1	1	1	1	1.1	ND	**0.66**	**65**	ND	ND	**2.7**	**0.4**	**3.9**
Benzo(b)fluoranthene	1	1	1	5.6	11	ND	**0.74**	**76**	ND	ND	**3.5**	**0.47**	**4.8**
Benzo(k)fluoranthene	0.8	1	3.9	56	110	ND	**0.28**	**25**	ND	ND	**1**	**0.17**	**1.5**
Chrysene	1	1	3.9	56	110	ND	**0.63**	**63**	ND	ND	**2.3**	**0.37**	**3.9**
Acenaphthylene	100	100	100	500	1000	ND	**0.07** J	**2.9**	ND	ND	**0.077** J	**0.036** J	**0.49**
Anthracene	100	100	100	500	1000	ND	**0.2**	**36**	ND	ND	**0.63**	**0.14**	**1.6**
Benzo(ghi)perylene	100	100	100	500	1000	ND	**0.38**	**40**	**0.042** J	ND	**2.5**	**0.23**	**1.9**
Fluorene	30	100	100	500	1000	ND	**0.057** J	**12**	ND	ND	**0.18** J	**0.041** J	**0.57**
Phenanthrene	100	100	100	500	1000	ND	**0.8**	**170**	**0.038** J	**0.046** J	**2.7**	**0.55**	**5.1**
Dibenzo(a,h)anthracene	0.33	0.33	0.33	0.56	1.1	ND	**0.1** J	**9.4**	ND	ND	**0.62**	**0.067** J	**0.56**
Indeno(1,2,3-cd)pyrene	0.5	0.5	0.5	5.6	11	ND	**0.33**	**36**	ND	ND	**2.3**	**0.22**	**1.9**
Pyrene	100	100	100	500	1000	ND	**1.2**	**160**	ND	ND	**3.5**	**0.72**	**7.6**
Biphenyl	NA	NA	NA	NA	NA	ND	ND	**0.88** J	ND	ND	ND	ND	**0.05** J
4-Chloroaniline	NA	NA	NA	NA	NA	ND	ND	ND	ND	ND	ND	ND	ND
2-Nitroaniline	NA	NA	NA	NA	NA	ND	ND	ND	ND	ND	ND	ND	ND
3-Nitroaniline	NA	NA	NA	NA	NA	ND	ND	ND	ND	ND	ND	ND	ND
4-Nitroaniline	NA	NA	NA	NA	NA	ND	ND	ND	ND	ND	ND	ND	ND
Dibenzofuran	7	14	59	350	1000	ND	**0.038** J	**7.6**	ND	ND	**0.11** J	**0.029** J	**0.37**
2-Methylnaphthalene	NA	NA	NA	NA	NA	ND	**0.048** J	2.6	ND	ND	**0.047** J	ND	**0.2** J
1,2,4,5-Tetrachlorobenzene	NA	NA	NA	NA	NA	ND	ND	ND	ND	ND	ND	ND	ND
Acetophenone	NA	NA	NA	NA	NA	ND	ND	ND	ND	ND	ND	ND	ND
2,4,6-Trichlorophenol	NA	NA	NA	NA	NA	ND	ND	ND	ND	ND	ND	ND	ND
p-Chloro-m-cresol	NA	NA	NA	NA	NA	ND	ND	ND	ND	ND	ND	ND	ND
2-Chlorophenol	NA	NA	NA	NA	NA	ND	ND	ND	ND	ND	ND	ND	ND
2,4-Dichlorophenol	NA	NA	NA	NA	NA	ND	ND	ND	ND	ND	ND	ND	ND
2,4-Dimethylphenol	NA	NA	NA	NA	NA	ND	ND	ND	ND	ND	ND	ND	ND
2-Nitrophenol	NA	NA	NA	NA	NA	ND	ND	ND	ND	ND	ND	ND	ND
4-Nitrophenol	NA	NA	NA	NA	NA	ND	ND	ND	ND	ND	ND	ND	ND
2,4-Dinitrophenol	NA	NA	NA	NA	NA	ND	ND	ND	ND	ND	ND	ND	ND
4,6-Dinitro-o-cresol	NA	NA	NA	NA	NA	ND	ND	ND	ND	ND	ND	ND	ND
Pentachlorophenol	0.8	2.4	6.7	6.7	55	ND	ND	ND	ND	ND	ND	ND	ND
Phenol	0.33	100	100	500	1000	ND	ND	ND	ND	ND	ND	ND	ND

TABLE 1B

MARINE DRIVE APARTMENTS EAST
90 ERIE STREET
BUFFALO, NEW YORK

Location ID						SB-01-5-6FT		SB-02-4-5FT		SB-03-4-5FT		SB-05-4-5FT		SB-05-7-8FT		SB-06-3-4FT		SB-07-1-2FT		SB-08-8-9FT	
Sample Depth (feet)						5-6		4-5		4-5		4-5		7-8		3-4		1-2		8-9	
Date Sampled						4/10/2023		4/10/2023		4/10/2023		4/10/2023		4/10/2023		4/10/2023		4/10/2023		4/10/2023	
Sample Matrix						SO		SO		SO		SO		SO		SO		SO		SO	
Units	Unrestricted Use	Residential Use	Restricted Residential Use	Commercial Use	Industrial Use	mg/kg		mg/kg		mg/kg		mg/kg		mg/kg		mg/kg		mg/kg		mg/kg	
2-Methylphenol	0.33	100	100	500	1000	ND		ND		ND		ND		ND		ND		ND		ND	
3-Methylphenol/4-Methylphenol	0.33	34	100	500	1000	ND		ND		ND		ND		ND		ND		ND		0.049	J
2,4,5-Trichlorophenol	NA	NA	NA	NA	NA	ND		ND		ND		ND		ND		ND		ND		ND	
Carbazole	NA	NA	NA	NA	NA	ND		0.1	J	18		ND		ND		0.7		0.048	J	0.55	
Atrazine	NA	NA	NA	NA	NA	ND		ND		ND		ND		ND		ND		ND		ND	
Benzaldehyde	NA	NA	NA	NA	NA	ND		ND		ND		ND		ND		ND		ND		ND	
Caprolactam	NA	NA	NA	NA	NA	ND		ND		ND		ND		ND		ND		ND		ND	
2,3,4,6-Tetrachlorophenol	NA	NA	NA	NA	NA	ND		ND		ND		ND		ND		ND		ND		ND	
PCBs																					
Aroclor 1016	0.1	1	1	1	25	ND		ND		ND		ND		ND		ND		ND		ND	
Aroclor 1221	0.1	1	1	1	25	ND		ND		ND		ND		ND		ND		ND		ND	
Aroclor 1232	0.1	1	1	1	25	ND		ND		ND		ND		ND		ND		ND		ND	
Aroclor 1242	0.1	1	1	1	25	ND		ND		ND		ND		ND		ND		ND		ND	
Aroclor 1248	0.1	1	1	1	25	ND		ND		ND		ND		ND		ND		ND		ND	
Aroclor 1254	0.1	1	1	1	25	ND		ND		ND		ND		ND		ND		ND		ND	
Aroclor 1260	0.1	1	1	1	25	ND		ND		ND		ND		ND		ND		ND		ND	
Aroclor 1262	0.1	1	1	1	25	ND		ND		ND		ND		ND		ND		ND		ND	
Aroclor 1268	0.1	1	1	1	25	ND		ND		ND		ND		ND		ND		ND		ND	
PCBs, Total	0.1	1	1	1	25	ND		ND		ND		ND		ND		ND		ND		ND	
Metals																					
Aluminum, Total	NA	NA	NA	NA	NA	3260		36200		17200		4630		2880		28400		33300		5120	
Antimony, Total	NA	NA	NA	NA	NA	0.577	J	1.44	J	0.464	J	ND		ND		ND		0.765	J	0.439	J
Arsenic, Total	13	16	16	16	16	4.16		3.52		8.39		3.53		4.32		4.6		4.07		3.78	
Barium, Total	350	350	400	400	10000	56.5		269		248		35.4		79.3		261		247		584	
Beryllium, Total	7.2	14	72	590	2700	0.184	J	4.66		1.92		0.269	J	0.152	J	3.44		4.23		0.466	
Cadmium, Total	2.5	2.5	4.3	9.3	60	ND		ND	U	0.197	J	ND		ND		16.3		ND		0.73	J
Calcium, Total	NA	NA	NA	NA	NA	30700		205000		148000		72600		65300		160000		183000		67400	
Chromium, Total	NA	NA	NA	NA	NA	4.34		8.44		27.7		6.12		8.17		1280		43.8		13.3	
Cobalt, Total	NA	NA	NA	NA	NA	2.55		ND	U	2.43		3.16		2.02	J	3.41		ND		1.35	J
Copper, Total	50	270	270	270	10000	24.4		5.48		16.6		16.7		10.4		56.2		5.25		44.5	
Iron, Total	NA	NA	NA	NA	NA	6280		19300		24900		7250		6000		10500		13200		4930	
Lead, Total	63	400	400	1000	3900	132		7.61		456		85		25.5		68.5		6.62		549	
Magnesium, Total	NA	NA	NA	NA	NA	7980		11400		11500		25600		12700		11400		12800		7190	
Manganese, Total	1600	2000	2000	10000	10000	188		5500		2370		273		141		3170		5680		601	
Mercury, Total	0.18	0.81	0.81	2.8	5.7	1.29		ND	U	0.085		0.311		0.099	J	0.524		ND		1.16	
Nickel, Total	30	140	310	310	10000	6.3		1.09	J	18.7		8.44		6.91		37.2		1.21	J	4.84	
Potassium, Total	NA	NA	NA	NA	NA	434		2060		1440		722		541		1670		2250		473	
Selenium, Total	3.9	36	180	1500	6800	0.243	J	1.54	J	0.709	J	ND		1.36	J	2.58		1.88		1.36	J
Silver, Total	2	36	180	1500	6800	ND		ND	U	ND		ND		ND		ND		ND		ND	
Sodium, Total	NA	NA	NA	NA	NA	1200		1390		1390		693		2370		1580		2070		1740	
Thallium, Total	NA	NA	NA	NA	NA	ND		ND	U	ND		ND		ND		ND		ND		ND	
Vanadium, Total	NA	NA	NA	NA	NA	7.51		8.58		17.8		8.53		9.16		8.31		35.9		6.53	
Zinc, Total	109	2200	10000	10000	10000	53.5		2.24	J	231		41.4		23.2		1600		29.1		397	

Analytical Data compared to Part 375 Standards and DER-10
ND indicates analyte was not detected.
Blank space indicates analyte was not analyzed for in that sample.
*+ - LCS and/or LCSD is outside acceptance limits, high biased.
B - Compound was found in the blank and sample.
F1 - MS and/or MSD recovery exceeds control limits.
F2 - MS/MSD RPD exceeds control limits
J - Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.
K - Benzo (b&k) fluoranthene are unresolved due to matrix, result is reported as Benzo(b)fluoranthene

TABLE 2

GROUNDWATER RESULTS
MARINE DRIVE APARTMENTS
PARKING LOT AREA
90 ERIE STREET
BUFFALO, NEW YORK

Location ID	NY-AWQS	NY-TOGS-GA	TMW-01		TMW-02	
Date Sampled			4/11/2023		4/11/2023	
Sample Matrix			GROUNDWATER		GROUNDWATER	
Units			ug/l		ug/l	
VOCs						
Methylene chloride	5	5	2.5	U	2.5	U
1,1-Dichloroethane	5	5	2.5	U	2.5	U
Chloroform	7	7	2.5	U	2.5	U
Carbon tetrachloride	5	5	0.5	U	0.5	U
1,2-Dichloropropane	1	1	1	U	1	U
Dibromochloromethane	50	50	0.5	U	0.5	U
1,1,2-Trichloroethane	1	1	1.5	U	1.5	U
Tetrachloroethene	5	5	0.5	U	0.5	U
Chlorobenzene	5	5	2.5	U	2.5	U
Trichlorofluoromethane	5	5	2.5	U	2.5	U
1,2-Dichloroethane	0.6	0.6	0.5	U	0.5	U
1,1,1-Trichloroethane	5	5	2.5	U	2.5	U
Bromodichloromethane	50	50	0.5	U	0.5	U
trans-1,3-Dichloropropene	0.4	0.4	0.5	U	0.5	U
cis-1,3-Dichloropropene	0.4	0.4	0.5	U	0.5	U
Bromoform	50	50	2	U	2	U
1,1,2,2-Tetrachloroethane	5	5	0.5	U	0.5	U
Benzene	1	1	0.5	U	0.5	U
Toluene	5	5	2.5	U	2.5	U
Ethylbenzene	5	5	2.5	U	2.5	U
Chloromethane			2.5	U	2.5	U
Bromomethane	5	5	2.5	U	2.5	U
Vinyl chloride	2	2	1	U	1	U
Chloroethane	5	5	2.5	U	2.5	U
1,1-Dichloroethene	5	5	0.5	U	0.5	U
trans-1,2-Dichloroethene	5	5	2.5	U	2.5	U
Trichloroethene	5	5	0.5	U	0.5	U
1,2-Dichlorobenzene	3	3	2.5	U	2.5	U
1,3-Dichlorobenzene	3	3	2.5	U	2.5	U
1,4-Dichlorobenzene	3	3	2.5	U	2.5	U
Methyl tert butyl ether	10	10	2.5	U	2.5	U
p/m-Xylene	5	5	2.5	U	2.5	U
o-Xylene	5	5	2.5	U	2.5	U
cis-1,2-Dichloroethene	5	5	2.5	U	2.5	U
Styrene	5	930	2.5	U	2.5	U
Dichlorodifluoromethane	5	5	5	U	5	U
Acetone	50	50	5	U	5	U
Carbon disulfide	60	60	5	U	5	U
2-Butanone	50	50	5	U	5	U
4-Methyl-2-pentanone			5	U	5	U
2-Hexanone	50	50	5	U	5	U
Bromochloromethane	5	5	2.5	U	2.5	U
1,2-Dibromoethane	0.0006	0.0006	2	U	2	U
1,2-Dibromo-3-chloropropane	0.04	0.04	2.5	U	2.5	U
Isopropylbenzene	5	5	2.5	U	2.5	U
1,2,3-Trichlorobenzene	5	5	2.5	U	2.5	U
1,2,4-Trichlorobenzene	5	5	2.5	U	2.5	U
Methyl Acetate			2	U	2	U
Cyclohexane			10	U	10	U
1,4-Dioxane			250	U	250	U
Freon-113	5	5	2.5	U	2.5	U
Methyl cyclohexane			10	U	10	U

TABLE 2

GROUNDWATER RESULTS
MARINE DRIVE APARTMENTS
PARKING LOT AREA
90 ERIE STREET
BUFFALO, NEW YORK

Location ID	NY-AWQS	NY-TOGS-GA	TMW-01		TMW-02	
Date Sampled			4/11/2023		4/11/2023	
Sample Matrix			GROUNDWATER		GROUNDWATER	
Units			ug/l		ug/l	
SVOCs						
Bis(2-chloroethyl)ether	1	1	2	U	2	U
3,3'-Dichlorobenzidine	5	5	5	U	5	U
2,4-Dinitrotoluene	5	5	5	U	5	U
2,6-Dinitrotoluene	5	5	5	U	5	U
4-Chlorophenyl phenyl ether			2	U	2	U
4-Bromophenyl phenyl ether			2	U	2	U
Bis(2-chloroisopropyl)ether	5	5	2	U	2	U
Bis(2-chloroethoxy)methane	5	5	5	U	5	U
Hexachlorocyclopentadiene	5	5	20	U	20	U
Isophorone	50	50	5	U	5	U
Nitrobenzene	0.4	0.4	2	U	2	U
NDPA/DPA	50	50	2	U	2	U
n-Nitrosodi-n-propylamine			5	U	5	U
Bis(2-ethylhexyl)phthalate	5	5	3	U	3	U
Butyl benzyl phthalate	50	50	5	U	5	U
Di-n-butylphthalate	50	50	5	U	5	U
Di-n-octylphthalate	50	50	5	U	5	U
Diethyl phthalate	50	50	5	U	5	U
Dimethyl phthalate	50	50	5	U	5	U
Biphenyl			2	U	2	U
4-Chloroaniline	5	5	5	U	5	U
2-Nitroaniline	5	5	5	U	5	U
3-Nitroaniline	5	5	5	U	5	U
4-Nitroaniline	5	5	5	U	5	U
Dibenzofuran			2	U	2	U
1,2,4,5-Tetrachlorobenzene	5	5	10	U	10	U
Acetophenone			5	U	5	U
2,4,6-Trichlorophenol			5	U	5	U
p-Chloro-m-cresol			2	U	2	U
2-Chlorophenol			2	U	2	U
2,4-Dichlorophenol	1	2	5	U	5	U
2,4-Dimethylphenol	50	2	5	U	5	U
2-Nitrophenol			10	U	10	U
4-Nitrophenol			10	U	10	U
2,4-Dinitrophenol	10	2	20	U	20	U
4,6-Dinitro-o-cresol			10	U	10	U
Phenol	1	2	5	U	5	U
2-Methylphenol			5	U	5	U
3-Methylphenol/4-Methylphenol			5	U	5	U
2,4,5-Trichlorophenol			5	U	5	U
Carbazole			2	U	2	U
Atrazine	7.5	7.5	10	U	10	U
Benzaldehyde			5	U	5	U
Caprolactam			10	U	10	U
2,3,4,6-Tetrachlorophenol			5	U	5	U

TABLE 2

GROUNDWATER RESULTS
MARINE DRIVE APARTMENTS
PARKING LOT AREA
90 ERIE STREET
BUFFALO, NEW YORK

Location ID	NY-AWQS	NY-TOGS-GA	TMW-01		TMW-02	
Date Sampled			4/11/2023		4/11/2023	
Sample Matrix			GROUNDWATER		GROUNDWATER	
Units			ug/l		ug/l	
SVOCs - SIM						
Acenaphthene	20	20	0.1	U	0.1	U
2-Chloronaphthalene	10	10	0.2	U	0.2	U
Fluoranthene	50	50	0.05	J	0.02	J
Hexachlorobutadiene	0.5	0.5	0.5	U	0.5	U
Naphthalene	10	10	0.1	U	0.1	U
Benzo(a)anthracene	0.002	0.002	0.04	J	0.04	J
Benzo(a)pyrene	0	0	0.02	J	0.1	U
Benzo(b)fluoranthene	0.002	0.002	0.03	J	0.01	J
Benzo(k)fluoranthene	0.002	0.002	0.01	J	0.1	U
Chrysene	0.002	0.002	0.02	J	0.1	U
Acenaphthylene			0.1	U	0.1	U
Anthracene	50	50	0.1	U	0.01	J
Benzo(ghi)perylene			0.02	J	0.1	U
Fluorene	50	50	0.1	U	0.1	U
Phenanthrene	50	50	0.04	J	0.1	U
Dibenzo(a,h)anthracene			0.1	U	0.1	U
Indeno(1,2,3-cd)pyrene	0.002	0.002	0.02	J	0.1	U
Pyrene	50	50	0.04	J	0.1	U
2-Methylnaphthalene			0.1	U	0.1	U
Pentachlorophenol	1	2	0.8	U	0.8	U
Hexachlorobenzene	0.04	0.04	0.8	U	0.8	U
Hexachloroethane	5	5	0.8	U	0.8	U
Metals						
Aluminum, Total		2000	1280		985	
Antimony, Total	3	6	40	U	4	U
Arsenic, Total	25	50	5.56		34.34	
Barium, Total	1000	2000	151		655.6	
Beryllium, Total	3	3	5	U	0.5	U
Cadmium, Total	5	10	2	U	0.2	U
Calcium, Total			313000		200000	
Chromium, Total	50	100	3.81	J	2.38	
Cobalt, Total			1.91	J	1.78	
Copper, Total	200	1000	15.28		3.08	
Iron, Total	300	600	2650		23000	
Lead, Total	25	50	20.39		207.6	
Magnesium, Total	35000	35000	30900		60900	
Manganese, Total	300	600	298.6		628.9	
Mercury, Total	0.7	1.4	0.2	U	0.2	U
Nickel, Total	100	200	20	U	3.96	
Potassium, Total			29200		27500	
Selenium, Total	10	20	50	U	5	U
Silver, Total	50	100	4	U	0.4	U
Sodium, Total	20000		2740000		1050000	
Thallium, Total	0.5	0.5	10	U	1	U
Vanadium, Total			50	U	8.93	
Zinc, Total	2000	5000	100	U	19.53	

* Comparison is not performed on parameters with non-numeric criteria.
NY-AWQS: New York TOGS 111 Ambient Water Quality Standards criteria reflects all addendum to criteria through June 2004.
NY-TOGS-GA: New York TOGS 111 Groundwater Effluent Limitations criteria reflects all addendum to criteria through June 2004.

J - Presumptive evidence of compound. This represents an estimated concentration for Tentatively Identified Compounds (TICs), where the identification is based on a mass spectral library search.
U - Not detected at the reported detection limit for the sample.

Matrix	Sample Type	Lab Analysis	No. Samples	Field Duplicates	Matrix Spike	Matrix Spike Duplicate	Trip Blank	Total
Soil	Fill Material	TCL VOC	10	1	1	1	--	13
		TCL SVOC	10	1	1	1	--	13
		TCL Pesticides	10	1	1	1	--	13
		Total PCB	10	1	1	1	--	13
		TAL Metals	10	1	1	1	--	13
		Cyanide	10	1	1	1	--	13
		Hexavalent Chromium	10	1	1	1	--	13
		Silvex	10	1	1	1	--	13
		PFAS	10	1	1	1	--	13
		1,4-Dioxane	10	1	1	1	--	13
	Native Soil	TCL VOC	50	3	3	3	--	59
		TCL SVOC	50	3	3	3	--	59
		TCL Pesticides	10	1	1	1	--	13
		Total PCB	10	1	1	1	--	13
		TAL Metals	50	3	3	3	--	59
		Cyanide	50	3	3	3	--	59
		Hexavalent Chromium	10	1	1	1	--	13
		Silvex	10	1	1	1	--	13
		PFAS	50	3	3	3	--	59
		1,4-Dioxane	50	3	3	3	--	59
	Deep Native Soil	TCL VOC	5	0	0	0	--	5
		TCL SVOC	5	0	0	0	--	5
		TCL Pesticides	5	0	0	0	--	5
		Total PCB	5	0	0	0	--	5
		TAL Metals	5	0	0	0	--	5
		Cyanide	5	0	0	0	--	5
		Hexavalent Chromium	5	0	0	0	--	5
		Silvex	5	0	0	0	--	5
		PFAS	5	0	0	0	--	5
		1,4-Dioxane	5	0	0	0	--	5
	Monitoring Well Soil	TCL VOC	4	0	0	0	--	4
		TCL SVOC	4	0	0	0	--	4
		TCL Pesticides	4	0	0	0	--	4
		Total PCB	4	0	0	0	--	4
		TAL Metals	4	0	0	0	--	4
		Cyanide	4	0	0	0	--	4
		Hexavalent Chromium	4	0	0	0	--	4
		Silvex	4	0	0	0	--	4
		PFAS	4	0	0	0	--	4
		1,4-Dioxane	4	0	0	0	--	4
	Waste Characterization	TCLP VOC	20	--	--	--	--	20
		TCLP SVOC	20	--	--	--	--	20
		PCB	20	--	--	--	--	20
		TCLP Metal	20	--	--	--	--	20
		Reactivity	20	--	--	--	--	20
		Corrosivity	20	--	--	--	--	20
		Ignitability	20	--	--	--	--	20
		pH	20	--	--	--	--	20
		Percent Solids	20	--	--	--	--	20
Water		TCL SVOC	8	2	2	2	0	14
		TCL Pesticides	8	2	2	2	0	14
		Total PCB	8	2	2	2	0	14
		TAL Metals	8	2	2	2	0	14
		Cyanide	8	2	2	2	0	14
		Hexavalent Chromium	3	1	1	1	0	6
		Silvex	3	1	1	1	0	6
		1,4 Dioxane	3	1	1	1	0	6
		PFOA/PFOS	3	1	1	1	0	6
Air	Soil Vapor	TO-15	0	0	0	0	--	0

APPENDICES

APPENDIX A

PREVIOUSLY COMPLETED ENVIRONMENTAL INVESTIGATIONS

See Brownfield Cleanup Program Application Attachment B

APPENDIX B

CITIZEN PARTICIPATION PLAN

NEW YORK STATE OF OPPORTUNITY. Department of Environmental Conservation

Brownfield Cleanup Program

Citizen Participation Plan
for
Marine Drive Apartments East

March 2024

90 Erie Street
City of Buffalo
Erie County, New York

Contents

* * * * *

Note: The information presented in this Citizen Participation Plan was current as of the date of its approval by the New York State Department of Environmental Conservation. Portions of this Citizen Participation Plan may be revised during the site's investigation and cleanup process.

Applicant: **Marine Drive JV LLC ("Applicant")**
Site Name: **Marine Drive Apartments East Site ("Site")**
Site Address: **90 Erie Street**
Site County: **Erie**
Site Number: **C915398**

1. What is New York's Brownfield Cleanup Program?

New York's Brownfield Cleanup Program (BCP) works with private developers to encourage the voluntary cleanup of contaminated properties known as "brownfields" so that they can be reused and developed. These uses include recreation, housing, and business.

A *brownfield* is any real property that is difficult to reuse or redevelop because of the presence or potential presence of contamination. A brownfield typically is a former industrial or commercial property where operations may have resulted in environmental contamination. A brownfield can pose environmental, legal, and financial burdens on a community. If a brownfield is not addressed, it can reduce property values in the area and affect economic development of nearby properties.

The BCP is administered by the New York State Department of Environmental Conservation (NYSDEC) which oversees Applicants who conduct brownfield site investigation and cleanup activities. An Applicant is a person who has requested to participate in the BCP and has been accepted by NYSDEC. The BCP contains investigation and cleanup requirements, ensuring that cleanups protect public health and the environment. When NYSDEC certifies that these requirements have been met, the property can be reused or redeveloped for the intended use.

For more information about the BCP, go online at: http://www.dec.ny.gov/chemical/8450.html .

2. Citizen Participation Activities

Why NYSDEC Involves the Public and Why It Is Important

NYSDEC involves the public to improve the process of investigating and cleaning up contaminated sites, and to enable citizens to participate more fully in decisions that affect their health, environment, and social well-being. NYSDEC provides opportunities for citizen involvement and encourages early two-way communication with citizens before decision makers form or adopt final positions.

Involving citizens affected and interested in site investigation and cleanup programs is important for many reasons. These include:

- Promoting the development of timely, effective site investigation and cleanup programs that protect public health and the environment

- Improving public access to, and understanding of, issues and information related to a particular site and that site's investigation and cleanup process

- Providing citizens with early and continuing opportunities to participate in NYSDEC's site investigation and cleanup process

- Ensuring that NYSDEC makes site investigation and cleanup decisions that benefit from input that reflects the interests and perspectives found within the affected community

- Encouraging dialogue to promote the exchange of information among the affected/interested public, State agencies, and other interested parties that strengthens trust among the parties, increases understanding of site and community issues and concerns, and improves decision making.

This Citizen Participation (CP) Plan provides information about how NYSDEC will inform and involve the public during the investigation and cleanup of the site identified above. The public information and involvement program will be carried out with assistance, as appropriate, from the Applicant.

Project Contacts

Appendix A identifies NYSDEC project contact(s) to whom the public should address questions or request information about the site's investigation and cleanup program. The public's suggestions about this CP Plan and the CP program for the site are always welcome. Interested people are encouraged to share their ideas and suggestions with the project contacts at any time.

Locations of Reports and Information

The locations of the reports and information related to the site's investigation and cleanup program also are identified in Appendix A. These locations provide convenient access to important project documents for public review and comment. Some documents may be placed on the NYSDEC web site. If this occurs, NYSDEC will inform the public in fact sheets distributed about the site and by other means, as appropriate.

Site Contact List

Appendix B contains the site contact list. This list has been developed to keep the community informed about, and involved in, the site's investigation and cleanup process. The site contact list will be used periodically to distribute fact sheets that provide updates about the status of the project. These will include notifications of upcoming activities at the site (such as fieldwork), as well as availability of project documents and announcements about public comment periods.
The site contact list includes, at a minimum:

- chief executive officer and planning board chairperson of each county, city, town and village in which the site is located;
- residents, owners, and occupants of the site and properties adjacent to the site;
- the public water supplier which services the area in which the site is located;
- any person who has requested to be placed on the site contact list;
- the administrator of any school or day care facility located on or near the site for purposes of posting and/or dissemination of information at the facility;
- location(s) of reports and information.

The site contact list will be reviewed periodically and updated as appropriate. Individuals and organizations will be added to the site contact list upon request. Such requests should be submitted to the NYSDEC project contact(s) identified in Appendix A. Other additions to the site contact list may be made at the discretion of the NYSDEC project manager, in consultation with other NYSDEC staff as appropriate.

Note: The first site fact sheet (usually related to the draft Remedial Investigation Work Plan) is distributed both by paper mailing through the postal service and through DEC Delivers, its email listserv service. The fact sheet includes instructions for signing up with the appropriate county listserv to receive future notifications about the site. See http://www.dec.ny.gov/chemical/61092.html .

Subsequent fact sheets about the site will be distributed exclusively through the listserv, except for households without internet access that have indicated the need to continue to receive site information in paper form. Please advise the NYSDEC site project manager identified in Appendix A if that is the case. Paper mailings may continue during the investigation and cleanup process for some sites, based on public interest and need.

CP Activities

The table at the end of this section identifies the CP activities, at a minimum, that have been and will be conducted during the site's investigation and cleanup program. The flowchart in Appendix D shows how these CP activities integrate with the site investigation and cleanup process. The public is informed about these CP activities through fact sheets and notices distributed at significant points during the program. Elements of the

investigation and cleanup process that match up with the CP activities are explained briefly in Section 5.

- **Notices and fact sheets** help the interested and affected public to understand contamination issues related to a site, and the nature and progress of efforts to investigate and clean up a site.

- **Public forums, comment periods and contact with project managers** provide opportunities for the public to contribute information, opinions and perspectives that have potential to influence decisions about a site's investigation and cleanup.

The public is encouraged to contact project staff at any time during the site's investigation and cleanup process with questions, comments, or requests for information.

This CP Plan may be revised due to changes in major issues of public concern identified in Section 3 or in the nature and scope of investigation and cleanup activities. Modifications may include additions to the site contact list and changes in planned citizen participation activities.

Technical Assistance Grant

NYSDEC must determine if the site poses a significant threat to public health or the environment. This determination generally is made using information developed during the investigation of the site, as described in Section 5.

If the site is determined to be a significant threat, a qualifying community group may apply for a Technical Assistance Grant (TAG). The purpose of a TAG is to provide funds to the qualifying group to obtain independent technical assistance. This assistance helps the TAG recipient to interpret and understand existing environmental information about the nature and extent of contamination related to the site and the development/implementation of a remedy.

An eligible community group must certify that its membership represents the interests of the community affected by the site, and that its members' health, economic well-being or enjoyment of the environment may be affected by a release or threatened release of contamination at the site.

As of the date the declaration (page 2) was signed by the NYSDEC project manager, the significant threat determination for the site had not yet been made.

To verify the significant threat status of the site, the interested public may contact the NYSDEC project manager identified in Appendix A.

For more information about TAGs, go online at http://www.dec.ny.gov/regulations/2590.html

Note: The table identifying the citizen participation activities related to the site's investigation and cleanup program follows on the next page:

Citizen Participation Activities	Timing of CP Activity(ies)
Application Process:	
• Prepare site contact list • Establish document repository(ies)	At time of preparation of application to participate in the BCP.
• Publish notice in Environmental Notice Bulletin (ENB) announcing receipt of application and 30-day public comment period • Publish above ENB content in local newspaper • Mail above ENB content to site contact list • Conduct 30-day public comment period	When NYSDEC determines that BCP application is complete. The 30-day public comment period begins on date of publication of notice in ENB. End date of public comment period is as stated in ENB notice. Therefore, ENB notice, newspaper notice, and notice to the site contact list should be provided to the public at the same time.
After Execution of Brownfield Site Cleanup Agreement (BCA):	
• Prepare Citizen Participation (CP) Plan	Before start of Remedial Investigation **Note:** Applicant must submit CP Plan to NYSDEC for review and approval within 20 days of the effective date of the BCA.
Before NYSDEC Approves Remedial Investigation (RI) Work Plan:	
• Distribute fact sheet to site contact list about proposed RI activities and announcing 30-day public comment period about draft RI Work Plan • Conduct 30-day public comment period	Before NYSDEC approves RI Work Plan. If RI Work Plan is submitted with application, public comment periods will be combined and public notice will include fact sheet. Thirty-day public comment period begins/ends as per dates identified in fact sheet.
After Applicant Completes Remedial Investigation:	
• Distribute fact sheet to site contact list that describes RI results	Before NYSDEC approves RI Report
Before NYSDEC Approves Remedial Work Plan (RWP):	
• Distribute fact sheet to site contact list about draft RWP and announcing 45-day public comment period • Public meeting by NYSDEC about proposed RWP (if requested by affected community or at discretion of NYSDEC project manager) • Conduct 45-day public comment period	Before NYSDEC approves RWP. Forty-five day public comment period begins/ends as per dates identified in fact sheet. Public meeting would be held within the 45-day public comment period.
Before Applicant Starts Cleanup Action:	
• Distribute fact sheet to site contact list that describes upcoming cleanup action	Before the start of cleanup action.
After Applicant Completes Cleanup Action:	
• Distribute fact sheet to site contact list that announces that cleanup action has been completed and that NYSDEC is reviewing the Final Engineering Report • Distribute fact sheet to site contact list announcing NYSDEC approval of Final Engineering Report and issuance of Certificate of Completion (COC)	At the time the cleanup action has been completed. **Note:** The two fact sheets are combined when possible if there is not a delay in issuing the COC.

3. Major Issues of Public Concern

This section of the CP Plan identifies major issues of public concern that relate to the site. Additional major issues of public concern may be identified during the course of the site's investigation and cleanup process.

The Site consists of a 2.447-acre portion of 90 Erie Street and is currently a parking lot for the Marine Drive Apartments.

Based upon investigations conducted to date, the primary contaminants of concern in the subsurface soil include SVOCs/PAHs and metals. These contaminants are found in near surface soils (one to two feet) and the fill material to depths of eight to nine feet. SVOCs and metals with the highest exceedances in surface and subsurface soil were detected in the samples taken adjacent to or within former laundry, boiler shop, plating shop and auto garage. SVOC and metals in subsurface soil were widespread, with the highest exceedances in identified vertically throughout the fill material.

The fill material appears to be a mixture of soil types (sand, silt and or clay), ash, coal, gravel and construction demolition debris. The native soil is a silt and clay.

The most SVOC concentrations exceed Residential Use, Restricted Residential Use, Commercial Use, and Industrial Use SCOs. The following SVOCs were detected:

- Benzo(a)anthracene concentrations exceeded the Restricted Residential Use (1 ppm) and Industrial Use (11 ppm) SCOs. Concentrations ranged from 1.9 ppm to 70 ppm.
- Benzo(a)pyrene concentrations exceeded the Industrial Use (1.1 ppm) SCO. Concentrations ranged from 1.9 ppm to 65 ppm.
- Benzo(b)fluoranthene exceeded the Restricted Residential Use (1 ppm) and Industrial Use (11 ppm) SCOs. Concentrations ranged 2.3 ppm to 76 ppm.
- Benzo(k)fluoranthene exceeded the Residential Use (1 ppm) and Restricted Residential Use (3.9 ppm) SCOs. Concentrations ranged from 1 ppm to 25 ppm.
- Chrysene concentrations exceeded the Residential Use (1 ppm), Residential-Restricted Use (3.9 ppm), and Commercial Use (56 ppm) SCOs. Concentrations ranged from 1.4 ppm to 63 ppm.
- Dibenzo(a,h)anthracene concentrations exceeded the Restricted Residential Use (0.33 ppm), Commercial Use (0.56 ppm), and Industrial Use SCOs (1.1 ppm). Concentrations ranged from 0.42 ppm to 9.4 ppm.
- Fluoranthene concentration exceeded Restricted Residential Use SCO (100 ppm) in one sample and was detected at 190 ppm.
- Phenanthrene concentration exceeded Restricted Residential Use SCO (100 ppm) in one sample and was detected at 170 ppm.

- Indeno(1,2,3-cd)pyrene exceeded the Restricted Residential Use (0.5 ppm), Commercial Use (5.6 ppm) and Industrial Use (11 ppm) SCOs. Concentrations ranged from 1.2 ppm to 36 ppm.
- Pyrene concentration exceeded Restricted Residential Use SCO (100 ppm) in one sample and was detected at 160 ppm.

SVOC contamination detected outside the BCP Site includes the following:

- Benzo(a)anthracene concentrations exceeded the Restricted Residential Use (1 ppm) and Industrial Use (11 ppm) SCOs. Concentrations ranged from 2 ppm to 20 ppm.
- Benzo(a)pyrene concentrations exceeded the Industrial Use (1.1 ppm) SCO. Concentrations ranged from 1.7 ppm to 15 ppm.
- Benzo(b)fluoranthene exceeded the Restricted Residential Use (1 ppm) and Industrial Use (11 ppm) SCOs. Concentrations ranged 2 ppm to 18 ppm.
- Benzo(k)fluoranthene exceeded the Restricted Residential Use (3.9 ppm) SCOs in one sample and was detected at 6.5 ppm.
- Chrysene concentrations exceeded the Residential Use (1 ppm) and Residential-Restricted Use (3.9 ppm) SCOs. Concentrations ranged from 1.8 ppm to 18 ppm.
- Dibenzo(a,h)anthracene concentrations exceeded the Industrial Use SCOs (1.1 ppm in one sample and was detected at 3.5 ppm.
- Indeno(1,2,3-cd)pyrene exceeded the Restricted Residential Use (0.5 ppm) and Commercial Use (5.6 ppm) SCOs. Concentrations ranged from 0.85 ppm to 8.9 ppm.

Metals are also widespread throughout the Site. The following is a list of the detection of metals exceeding Restricted Residential Use SCOs:

- Barium was detected at concentrations exceeding Commercial Use (400 ppm) SCO in one sample and was detected at 584 ppm.
- Cadmium concentration exceeded Commercial Use SCO (9.3 ppm) in one sample and was detected at 16.3 ppm.
- Lead was detected at concentrations exceeding Restricted Residential Use (400 ppm) SCOs. Concentrations ranged 456 ppm to 549 ppm.
- Manganese was detected at concentrations exceeding restricted Residential Use (2,000 ppm). Concentrations ranged 2,370 ppm to 5,680 ppm.
- Mercury was detected at concentrations exceeding Restricted Residential Use (0.81 ppm) SCOs. Concentrations ranged 1.16 ppm to 1.29 ppm.

Metal contamination detected outside the BCP Site includes the following:

- Barium was detected at concentrations exceeding Commercial Use (400 ppm) SCO in one sample and was detected at 805 ppm.
- Lead was detected at concentrations exceeding Restricted Residential Use (400 ppm) and Commercial Use (1,000 ppm) SCOs. Concentrations ranged 808 ppm to 2,060 ppm.

- Manganese was detected at concentrations exceeding restricted Residential Use (2,000 ppm) in one sample and was detected at 6,440 ppm.
- Zinc was detected at concentrations exceeding Residential Use (2,200ppm) SCOs in one sample and was detected at 2,290 ppm.

Based on limited characterization data, onsite groundwater was sampled for VOCs, SVOCs, and metals. Comparison of the groundwater analytical data to the Technical and Operational Guidance Series (TOGs) 1.1.1 Class GA Ambient Water Quality Standards (GWQS) indicates:

- No groundwater quality exceedances for VOCs.
- SVOCs were detected at concentrations exceeding GWQS. Compounds include:
    - Benzo(a)anthracene at 0.04 ppb (GWQS: 0.002 ppb)
    - Benzo(a)pyrene at 0.02 (GWQS: 0.002 ppb)
    - Benzo(b)fluoranthene at 0.03 ppb (GWQS: 0.002 ppb)
    - Benzo(k)fluoranthene at 0.01 ppb (GWQS: 0.002 ppb)
    - Chrysene at 0.02 ppb (GWQS: 0.002 ppb)
    - Indeno(1,2,3-cd)pyrene at 0.02 ppb (GWQS: 0.002 ppb).
- Metals were detected at concentrations exceeding GWQS. Contaminants include:
    - Iron at 2,650 ppb (GWQS: 600 ppb)
    - Sodium at 2,740,000 ppb (GWQS: 20,000 ppb)

All potable water used in the City of Buffalo is provided by a publicly-owned treatment facility. Use of groundwater for potable purposes is prohibited throughout the City of Buffalo.

The presence of the contamination is limiting the future use and re-investment opportunities on the Site.

Stakeholders in the remediation of the Site include the City of Buffalo, local residents and users of adjacent buildings.

4. Site Information

Appendix C contains a map identifying the location of the site.

Site Description

The Site is located along the edge of the downtown corridor in the City of Buffalo. The property that comprises the Site is approximately 3.29 acres and owned by Buffalo Municipal Housing Authority (BMHA). Directly adjacent to the Site is the Marine Drive Apartments complex to the west. The apartment complex consists of seven 12-story

residential structures constructed in the late 1940's/1950. Marine Drive separates the Site from the complex. Marine Drive also bounds the southern end of the Site, with the Canalside Site located just south of that. The elevated Buffalo Skyway roadway bounds the Site to the east and Erie Street bounds the Site to the north. Land uses immediately adjacent to the BCP Site include commercial, residential uses, and public recreation (Canalside).

History of Site Use, Investigation, and Cleanup

According to historical records and past assessments, the Site has been used for residential and light-industrial purposes from at least 1889 to 1950. Specific site uses in the area included foundries, machine shops, forge shops, and a tin shop. Industrial operations in the area typically included the use of hazardous materials including solvents and oils. Multiple automotive repair shops were once located at the Site which likely utilized petroleum products.

Prior to the construction of the Marine Drive Apartments complex in 1950, the Site and surrounding parcels were associated with the "Canal District", which included a series of streets, canals, and tenement buildings. Included in this area were the former streets of Canal Street, Date Place, Peacock Street, Evans Street, Norton Street, Water Street, Fly Street, State Street, and Lecouteulx Street.

In 1936 a large natural gas explosion occurred in the area. Multiple structures in the area were affected. Following the explosion, the entire Site and surrounding area were razed which made way for the development of the area and the Marine Drive Apartments complex. Construction of the seven 12-story towers commenced in the 1940s, with project completion in 1950. The proposed BCP Site is located within the asphalt parking lot associated with the apartment complex. Since 1950, features of the apartment complex generally have not changed. The structures still contain residential units, as they did in 1950. The parking lot has also generally not changed since 1950.

Contamination at the Site appears to be from the placement of historic fill material throughout the years as property uses changed and buildings were built and/or demolished.

Based on a review of NYSDEC data, the Site is not underlain by any mapped principal or primary aquifers. Groundwater at and in the vicinity of the Site is not used for public drinking water supply.

5. Investigation and Cleanup Process

Application

The Applicant has applied for and been accepted into New York's Brownfield Cleanup Program as a Volunteer. This means that the Applicant was not responsible for the disposal or discharge of the contaminants or whose ownership or operation of the site took place after the discharge or disposal of contaminants. The Volunteer must fully characterize the nature and extent of contamination onsite, and must conduct a "qualitative exposure assessment," a process that characterizes the actual or potential exposures of people, fish and wildlife to contaminants on the site and to contamination that has migrated from the site.

The Applicant in its Application proposes that the site will be used for unrestricted purposes.

To achieve this goal, the Applicant will conduct choose investigation and cleanup activities at the site with oversight provided by NYSDEC. The Brownfield Cleanup Agreement executed by NYSDEC and the Applicant sets forth the responsibilities of each party in conducting these activities at the site.

Investigation

The Applicant will conduct an investigation of the site officially called a "remedial investigation" (RI). This investigation will be performed with NYSDEC oversight. The Applicant must develop a remedial investigation workplan, which is subject to public comment.

The site investigation has several goals:

1) define the nature and extent of contamination in soil, surface water, groundwater and any other parts of the environment that may be affected;
2) identify the source(s) of the contamination;
3) assess the impact of the contamination on public health and the environment; and
4) provide information to support the development of a proposed remedy to address the contamination or the determination that cleanup is not necessary.

The Applicant submits a draft "Remedial Investigation Work Plan" to NYSDEC for review and approval. NYSDEC makes the draft plan available to the public review during a 30-day public comment period.

Interim Remedial Measures

An Interim Remedial Measure (IRM) is an action that can be undertaken at a site when a source of contamination or exposure pathway can be effectively addressed before the site investigation and analysis of alternatives are completed. If an IRM is likely to represent all or a significant part of the final remedy, NYSDEC will require a 30-day public comment period.

Remedy Selection

When the investigation of the site has been determined to be complete, the project likely would proceed in one of two directions:

1. The Applicant may recommend in its investigation report that no action is necessary at the site. In this case, NYSDEC would make the investigation report available for public comment for 45 days. NYSDEC then would complete its review, make any necessary revisions, and, if appropriate, approve the investigation report. NYSDEC would then issue a "Certificate of Completion" (described below) to the Applicant.

or

2. The Applicant may recommend in its investigation report that action needs to be taken to address site contamination. After NYSDEC approves the investigation report, the Applicant may then develop a cleanup plan, officially called a "Remedial Work Plan". The Remedial Work Plan describes the Applicant's proposed remedy for addressing contamination related to the site.

When the Applicant submits a draft Remedial Work Plan for approval, NYSDEC would announce the availability of the draft plan for public review during a 45-day public comment period.

Cleanup Action

NYSDEC will consider public comments, and revise the draft cleanup plan if necessary, before approving the proposed remedy. The New York State Department of Health (NYSDOH) must concur with the proposed remedy. After approval, the proposed remedy becomes the selected remedy. The selected remedy is formalized in the site Decision Document.

The Applicant may then design and perform the cleanup action to address the site contamination. NYSDEC and NYSDOH oversee the activities. When the Applicant completes cleanup activities, it will prepare a final engineering report that certifies that cleanup requirements have been achieved or will be achieved within a specific time frame. NYSDEC will review the report to be certain that the cleanup is protective of public health and the environment for the intended use of the site.

Certificate of Completion

When NYSDEC is satisfied that cleanup requirements have been achieved or will be achieved for the site, it will approve the final engineering report. NYSDEC then will issue

a Certificate of Completion (COC) to the Applicant. The COC states that cleanup goals have been achieved, and relieves the Applicant from future liability for site-related contamination, subject to certain conditions. The Applicant would be eligible to redevelop the site after it receives a COC.

Site Management

The purpose of site management is to ensure the safe reuse of the property if contamination will remain in place. Site management is the last phase of the site cleanup program. This phase begins when the COC is issued. Site management incorporates any institutional and engineering controls required to ensure that the remedy implemented for the site remains protective of public health and the environment. All significant activities are detailed in a Site Management Plan.

An *institutional control* is a non-physical restriction on use of the site, such as a deed restriction that would prevent or restrict certain uses of the property. An institutional control may be used when the cleanup action leaves some contamination that makes the site suitable for some, but not all uses.

An *engineering control* is a physical barrier or method to manage contamination. Examples include: caps, covers, barriers, fences, and treatment of water supplies.

Site management also may include the operation and maintenance of a component of the remedy, such as a system that pumps and treats groundwater. Site management continues until NYSDEC determines that it is no longer needed.

Appendix A

Project Contacts and Locations of Reports and Information

Project Contacts

For information about the site's investigation and cleanup program, the public may contact any of the following project staff:

New York State Department of Environmental Conservation (NYSDEC):

Veronica Kreutzer
Project Manager
NYSDEC Region 9
Division of Environmental Remediation
700 Delaware Avenue
Buffalo, NY 14209
716.851.7220

New York State Department of Health (NYSDOH):
Harolyn Hood
Project Manager
NYSDOH
Empire State Plaza
Corning Tower
Albany, NY 12237
518.473.4780

Locations of Reports and Information

The facilities identified below are being used to provide the public with convenient access to important project documents
:

Central Library
1 Lafayette Square
Buffalo, NY 14203
Attn: Carol Batt
Phone: 716.858.7180
Hours:

Sunday	12:00 PM - 05:00 PM
Monday	08:00 AM - 07:00 PM
Tuesday	08:00 AM - 07:00 PM
Wednesday	08:00 AM - 07:00 PM
Thursday	08:00 AM - 07:00 PM
Friday	09:00 AM - 05:00 PM
Saturday	09:00 AM - 05:00 PM

NYSDEC Region 9
700 Delaware Avenue
Buffalo, NY 14209
716.851.7220
Attn: Veronica Kreutzer
Phone: 716.851.7220
Hours: (call for appointment)

Appendix B

Site Contact List

Local Government – City of Buffalo
Byron W. Brown
City of Buffalo Mayor
201 City Hall, 65 Niagara Square
Buffalo, NY 14202

James Morrell
City of Buffalo Planning Board Chair
901 City Hall, 65 Niagara Square
Buffalo, NY 14202

Mark Poloncarz
Erie County Executive
95 Franklin Street
Buffalo, NY 14202

Thomas R. Hersey, Jr.
Erie County Commissioner of Environment and Planning
95 Franklin Street, 10th Floor
Buffalo, NY 14202

Residents, Owners and Occupants of Property and Property Adjacent to Site:

James Pellnat
180 North Pearl Street
Buffalo, NY 14202

3959 Main Street Inc.
3975 Main Street
Buffalo, NY 14226

Samuel Strassman
176 North Pearl Street
Buffalo, NY 14202

Daryl Nazareth
174 North Pearl Street
Buffalo, NY 14202

Patricia Justen
2176 East River Road
Grand Island NY 14072

Santa Maria Towers
c / o Delta Development of Western New York Inc.
525 Washington Street
Buffalo NY 14203

JDLA LLC
625 Delaware Avenue
Buffalo NY 14202

Pearl Equity Growth LLC
154 North Pearl Street
Buffalo NY 14202

David and Kristin Gilmet
150 North Pearl Street
Buffalo NY 14202

Erich Hager
146 North Pearl Street
Buffalo NY 14202

Kimberly Trent
142 North Pearl Street
Buffalo NY 14202

134 North Pearl LLC
32 Allen Street
Buffalo NY 14203

Local Media:

Local Newspaper:

Buffalo News
1 News Plaza
Buffalo NY 14240
(716) 849-3434
http://www.buffalonews.com/classifieds/

Local Television:

WGRZ – TV Channel 2
259 Delaware Avenue
Buffalo, NY 14202
(716) 849-2200
http://www.wgrz.com/news/default.aspx

WIVB – TV Channel 4
2077 Elmwood Avenue
Buffalo, NY 14207
(716) 874-4410

http://www.wivb.com/subindex/news

WKBW – TV Channel 7
7 Broadcast Plaza
Buffalo, NY 14202
(716) 840-7777
http://www.wkbw.com/

Radio:

WBEN 930 AM Radio
500 Corporate Parkway
Amherst, NY 14226
(716) 843-0600
http://www.wben.com

WBFO 88.7 FM Radio
3435 Main Street
Buffalo, NY 14214
(716) 829-6000
http://www.wbfo.org/

Local Water Supplier:

City of Buffalo Water Board/Division of Water
281 Exchange Street
Buffalo, NY 14204

Persons Requesting to be Placed on Contact List:

To Be Completed as Necessary

School and Day Care Facilities:

There are twelve schools or day care facilities located on or in the vicinity (1 mile) of the proposed BCP Site.

Health Sciences Charter School
1140 Ellicott Street
Buffalo, NY 14209
Administrator: Jaime Venning

PS 99 Stanley Makowski Early Childhood Center
1095 Jefferson Avenue
Buffalo NY 14208
Administrator: Dawn DiNatale

PS 195 City Honors
186 East North Street
Buffalo NY 14204
Administrator: William A. Kresse

PS 48@MLK
487 High Street
Buffalo NY 14211
Administrator: Miguel Medina

PS 37 Futures Academy
295 Carlton Street
Buffalo NY 14204
Administrator: Serena Restivo

Buffalo Academy of Science Charter School
190 Franklin Street
Buffalo NY 14202
Administrator: Unknown

Hutchinson Central Technical High School
256 South Elmwood Avenue
Buffalo, NY 14201
Administrator: Dr. Gabrielle Morquecho

PS 76 Herman Badillo Bilingual Academy
315 Carolina Street
Buffalo NY 14201
Administrator: Miguel A. Medina

Elmwood Village Charter School
40 Days Park
Buffalo NY 14201
Administrator: Danielle Bruno

PS 198 International Preparatory School
110 14th Street
Buffalo, NY 14213
Administrator: Ella Dunne

Toot-Toot Day Care

43 Northampton Street
Buffalo, NY 14209
Administrator: Unknown
Rainbow K
388 Franklin Street
Buffalo NY 14202
Administrator: Unknown

Westminster Early Childhood Program
724 Delaware Avenue
Buffalo NY 14209
Administrator: Unknown

Appendix C

Site Location Map

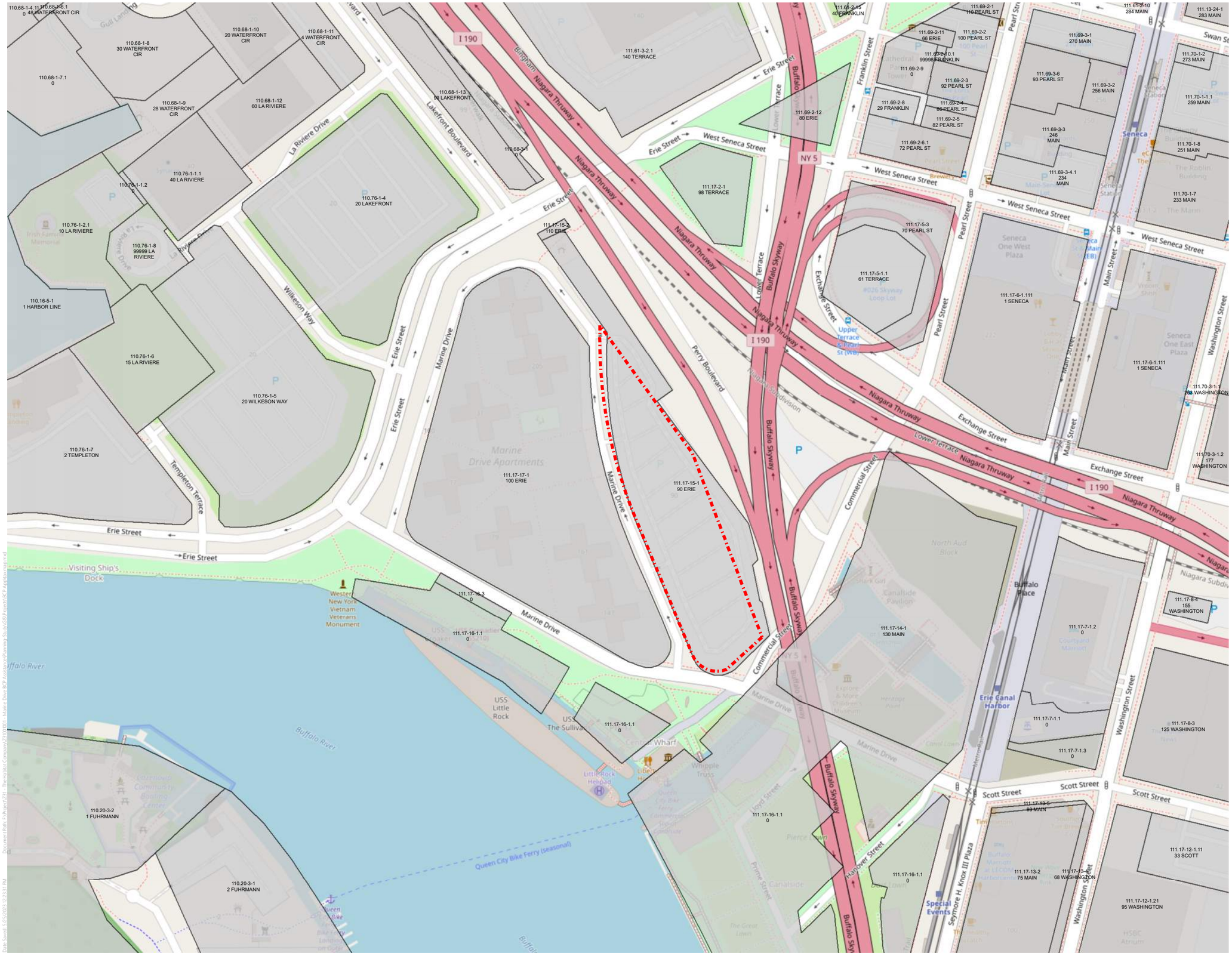


Figure 1

Site Location

Brownfield Cleanup Program (BCP) Boundary

Parcel Boundaries

N

0 100 200 400 Feet

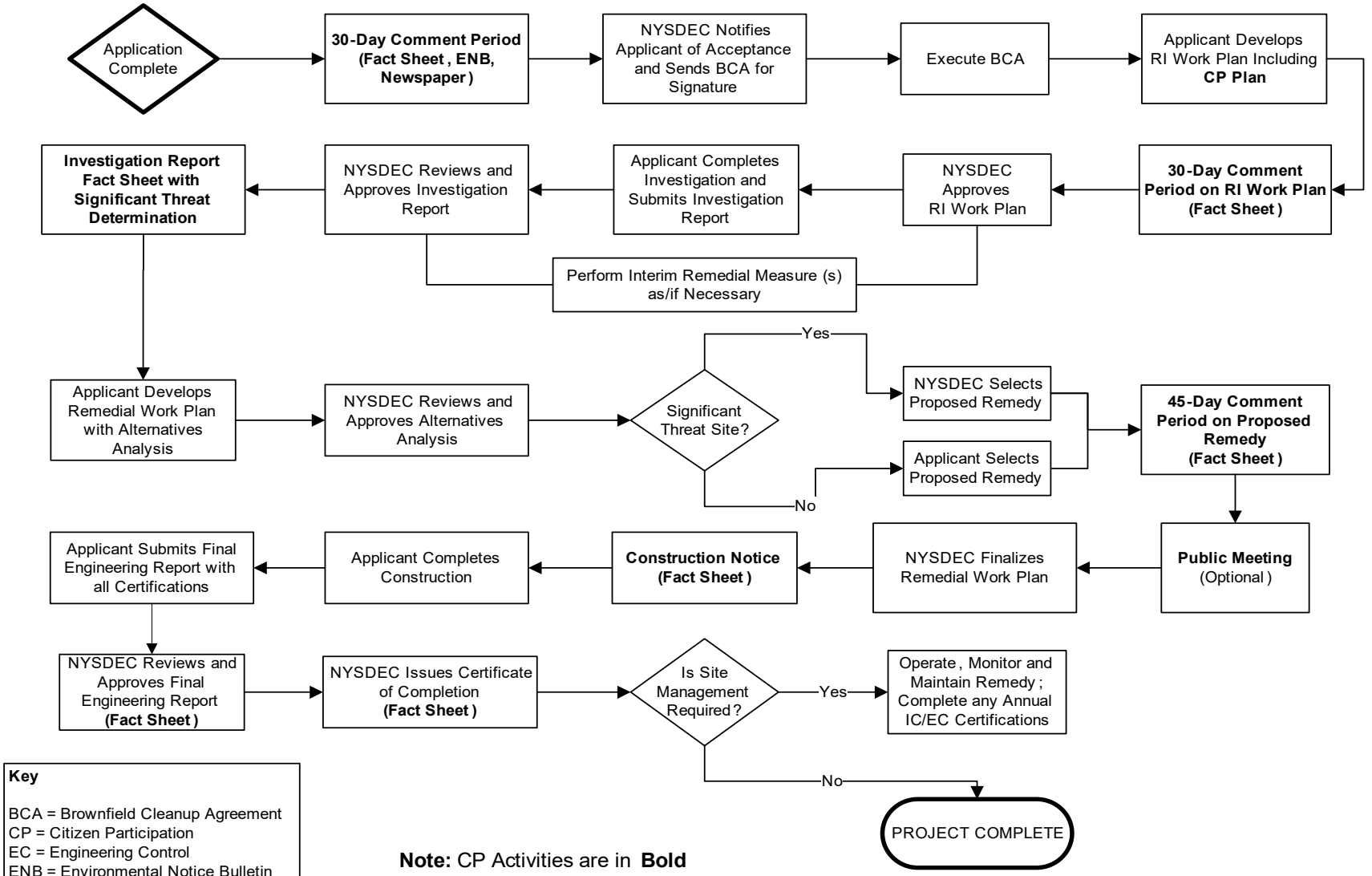
1 in. = 200 feet
When printed at 11 in. by 17 in.

Marine Drive Apartments East
Phase 1 Site
Brownfield Cleanup Program

Sources: . Created by C&S Engineers, Inc.

DocumentPath: P:\Projects\251 - The Halsted Company\251001 - Marine Drive BCP Assistance\Planning Study\GIS\Projects\BCP Applications.mxd
User Name: cmartin
Date Saved: 5/25/2023 10:23:51 PM

Appendix D– Brownfield Cleanup Program Process



Key

BCA = Brownfield Cleanup Agreement
CP = Citizen Participation
EC = Engineering Control
ENB = Environmental Notice Bulletin
IC = Institutional Control
RI = Remedial Investigation

Note: CP Activities are in **Bold**

APPENDIX C

COMMUNITY AIR MONITORING PLAN

Community Air Monitoring Plan

for

Marine Drive Apartments East Site
90 Erie Street
Buffalo, Erie County, New York

June 2023

Community Air Monitoring Plan

Overview

A Community Air Monitoring Plan (CAMP) requires real-time monitoring for volatile organic compounds (VOCs) and particulates (i.e., dust) at the downwind perimeter of each designated work area when certain activities are in progress at contaminated sites. The CAMP is not intended for use in establishing action levels for worker respiratory protection. Rather, its intent is to provide a measure of protection for the downwind community (i.e., off-site receptors including residences and businesses and on-site workers not directly involved with the subject work activities) from potential airborne contaminant releases as a direct result of investigative and remedial work activities. The action levels specified herein require increased monitoring, corrective actions to abate emissions, and/or work shutdown. Additionally, the CAMP helps to confirm that work activities did not spread contamination off-site through the air.

Depending upon the nature of known or potential contaminants at each site, real-time air monitoring for VOCs and/or particulate levels at the perimeter of the exclusion zone or work area will be necessary.

Continuous monitoring will be required for all ground intrusive activities and during the demolition of contaminated or potentially contaminated structures. Ground intrusive activities include, but are not limited to, soil/waste excavation and handling, test pitting or trenching, and the installation of soil borings or monitoring wells.

Periodic monitoring for VOCs will be required during non-intrusive activities such as the collection of soil and sediment samples or the collection of groundwater samples from existing monitoring wells. "Periodic" monitoring during sample collection might reasonably consist of taking a reading upon arrival at a sample location, monitoring while opening a well cap or overturning soil, monitoring during well baling/purging, and taking a reading prior to leaving a sample location. In some instances, depending upon the proximity of potentially exposed individuals, continuous monitoring may be required during sampling activities. Examples of such situations include groundwater sampling at wells on the curb of a busy urban street, in the midst of a public park, or adjacent to a school or residence.

<u>VOC Monitoring, Response Levels and Actions</u>

Volatile organic compounds (VOCs) must be monitored at the downwind perimeter of the immediate work area (i.e., the exclusion zone) on a continuous basis or as otherwise specified. Upwind concentrations should be measured at the start of each workday and periodically thereafter to establish background conditions, particularly if wind direction changes. The monitoring work should be performed using equipment appropriate to measure the types of contaminants known or suspected to be present. The equipment should be calibrated at least daily for the contaminant(s) of concern or for an appropriate surrogate, such as isobutylene. The equipment should be capable of calculating 15-minute running average concentrations, which will be compared to the levels specified below.

1. If the ambient air concentration of total organic vapors at the downwind perimeter of the work area or exclusion zone exceeds 5 parts per million (ppm) above background for the 15-minute average, work activities must be temporarily halted and monitoring continued. If the total organic vapor level readily decreases (per instantaneous readings) below 5 ppm over background, work activities can resume with continued monitoring.

2. If total organic vapor levels at the downwind perimeter of the work area or exclusion zone persist at levels in excess of 5 ppm over background but less than 25 ppm, work activities must be halted, the source of vapors identified, corrective actions taken to abate emissions, and monitoring continued. After these steps, work activities can resume provided that the total organic vapor level 200 feet downwind of the exclusion zone or half the distance to the nearest potential receptor or residential/commercial structure, whichever is less - but in no case less than 20 feet, is below 5 ppm over background for the 15-minute average.

3. If the organic vapor level is above 25 ppm at the perimeter of the work area, activities must be shutdown.

4. All 15-minute readings must be recorded and be available for State (DEC and NYSDOH) personnel to review. Instantaneous readings, if any, used for decision purposes should also be recorded.

<u>Particulate Monitoring, Response Levels, and Actions</u>

Particulate concentrations should be monitored continuously at the upwind and downwind perimeters of the exclusion zone at temporary particulate monitoring stations. The particulate monitoring should be performed using real-time

monitoring equipment capable of measuring particulate matter less than 10 micrometers in size (PM-10) and capable of integrating over a period of 15 minutes (or less) for comparison to the airborne particulate action level. The equipment must be equipped with an audible alarm to indicate exceedance of the action level. In addition, fugitive dust migration should be visually assessed during all work activities.

1. If the downwind PM-10 particulate level is 100 micrograms per cubic meter (mcg/m^3) greater than background (upwind perimeter) for the 15-minute period or if airborne dust is observed leaving the work area, then dust suppression techniques must be employed. Work may continue with dust suppression techniques provided that downwind PM-10 particulate levels do not exceed 150 mcg/m^3 above the upwind level and provided that no visible dust is migrating from the work area.

2. If, after implementation of dust suppression techniques, downwind PM-10 particulate levels are greater than 150 mcg/m^3 above the upwind level, work must be stopped and a re-evaluation of activities initiated. Work can resume provided that dust suppression measures and other controls are successful in reducing the downwind PM-10 particulate concentration to within 150 mcg/m^3 of the upwind level and in preventing visible dust migration.

3. All readings must be recorded and be available for State (DEC and NYSDOH) and County Health personnel to review.

Fugitive Dust and Particulate Monitoring

A program for suppressing fugitive dust and particulate matter monitoring at hazardous waste sites is a responsibility on the remedial party performing the work. These procedures must be incorporated into appropriate intrusive work plans. The following fugitive dust suppression and particulate monitoring program should be employed at sites during construction and other intrusive activities which warrant its use:

1. Reasonable fugitive dust suppression techniques must be employed during all site activities which may generate fugitive dust.

2. Particulate monitoring must be employed during the handling of waste or contaminated soil or when activities on site may generate fugitive dust from exposed waste or contaminated soil. Remedial activities may also include the

excavation, grading, or placement of clean fill. These control measures should not be considered necessary for these activities.

3. Particulate monitoring must be performed using real-time particulate monitors and shall monitor particulate matter less than ten microns (PM10) with the following minimum performance standards:

(a) Objects to be measured: Dust, mists or aerosols;
(b) Measurement Ranges: 0.001 to 400 mg/m3 (1 to 400,000 :ug/m3);
(c) Precision (2-sigma) at constant temperature: +/- 10 :g/m3 for one second averaging; and +/- 1.5 g/m3 for sixty second averaging;
(d) Accuracy: +/- 5% of reading +/- precision (Referred to gravimetric calibration with SAE fine test dust (mmd= 2 to 3 :m, g= 2.5, as aerosolized);
(e) Resolution: 0.1% of reading or 1g/m3, whichever is larger;
(f) Particle Size Range of Maximum Response: 0.1-10;
(g) Total Number of Data Points in Memory: 10,000;
(h) Logged Data: Each data point with average concentration, time/date and data point number;
(i) Run Summary: overall average, maximum concentrations, time/date of maximum, total number of logged points, start time/date, total elapsed time (run duration), STEL concentration and time/date occurrence, averaging (logging) period, calibration factor, and tag number;
(j) Alarm Averaging Time (user selectable): real-time (1-60 seconds) or STEL (15 minutes), alarms required;
(k) Operating Time: 48 hours (fully charged NiCd battery); continuously with charger;
(l) Operating Temperature: -10 to 50$_{o}$ C (14 to 122$_{o}$ F); and
(m) Particulate levels will be monitored upwind and immediately downwind at the working site and integrated over a period not to exceed 15 minutes.

4. In order to ensure the validity of the fugitive dust measurements performed, there must be appropriate Quality Assurance/Quality Control (QA/QC). It is the responsibility of the remedial party to adequately supplement QA/QC Plans to include the following critical features: periodic instrument calibration, operator training, daily instrument performance (span) checks, and a record-keeping plan.

5. The action level will be established at 150 ug/m3 (15 minutes average). While conservative, this short-term interval will provide a real-time assessment of on-site air quality to assure both health and safety. If particulate levels are detected in excess of 150 ug/m3, the upwind background level must be confirmed immediately. If the working site particulate measurement is greater than 100 ug/m3 above the background level, additional dust suppression techniques must be implemented to reduce the generation of fugitive dust and corrective action taken to protect site personnel and reduce the potential for contaminant migration. Corrective measures may include increasing the level of personal protection for on-site personnel and implementing additional dust suppression techniques (see paragraph 7). Should the action level of 150 ug/m3 continue to be exceeded work must stop and DER must be notified as provided in the site design or remedial work plan. The notification shall include a description of the control measures implemented to prevent further exceedances.

6. It must be recognized that the generation of dust from waste or contaminated soil that migrates off-site, has the potential for transporting contaminants off-site. There may be situations when dust is being generated and leaving the site and the monitoring equipment does not measure PM-10 at or above the action level. Since this situation has the potential to allow for the migration of contaminants off-site, it is unacceptable. While it is not practical to quantify total suspended particulates on a real-time basis, it is appropriate to rely on visual observation. If dust is observed leaving the working site, additional dust suppression techniques must be employed.

7. The following techniques have been shown to be effective for the controlling of the generation and migration of dust during construction activities:

(a) Applying water on haul roads;
(b) Wetting equipment and excavation faces;
(c) Spraying water on buckets during excavation and dumping;
(d) Hauling materials in properly tarped or watertight containers;
(e) Restricting vehicle speeds to 10 mph;
(f) Covering excavated areas and material after excavation activity ceases; and
(g) Reducing the excavation size and/or number of excavations.

Experience has shown that the chance of exceeding the 150ug/m3 action level is remote when the above-mentioned techniques are used. When techniques involving water application are used, care must be taken not to use excess water, which can result in unacceptably wet conditions. Using atomizing sprays will

prevent overly wet conditions, conserve water, and provide an effective means of suppressing the fugitive dust.

8. The evaluation of weather conditions is necessary for proper fugitive dust control. When extreme wind conditions make dust control ineffective, as a last resort remedial actions may need to be suspended. There may be situations that require fugitive dust suppression and particulate monitoring requirements with action levels more stringent than those provided above. Under some circumstances, the contaminant concentration and/or toxicity may require additional monitoring to protect site personnel and the public. Additional integrated sampling and chemical analysis of the dust may also be in order. This must be evaluated when a health and safety plan is developed and when appropriate suppression and monitoring requirements are established for protection of health and the environment.

APPENDIX D

HEALTH AND SAFETY PLAN

C&S Companies
Health and Safety Manual

C&S COMPANIES®

The publication date of this manual is 19 December 2022

This document supersedes all previous editions

C&S Companies

499 Col. Eileen Collins Blvd

Syracuse NY 13212

C&S Companies

Section I Policy Statements

C&S Companies
499 Col. Eileen Collins Blvd.
Syracuse, NY 13212
p: (315) 455-2000
f: (315) 455-9667
www.cscos.com

16 June 2016

MEMORANDUM FOR all C&S Companies
SUBJECT: Appointment of Corporate Health and Safety Manager

1. This memorandum serves as reference for the appointment of the Corporate Health and Safety Manager for C&S Companies including C&S Worldwide Holdings, Inc., and all affiliated C&S operating entities.

2. Effective the 27th of December, 2014, Brent Testut has been appointed to the Corporate Health and Safety manager position. This appointment gives the individual holder safety and health oversight for company operations, including OSHA recordkeeping and Workers Compensation management.

John Trimble
President & CEO
C&S Worldwide Holdings Inc.

John Spina
Sr Vice President & CAO
C&S Worldwide Holdings Inc.

Safety and Health Policy Statement

This Health & Safety Manual (H&S Manual) shall apply to all employees of C&S Worldwide Holdings, Inc., and all affiliated C&S operating entities, which are referred to herein collectively as “C&S Companies®” or “companies, and individually as “C&S” or “company.”.

It is our policy at C&S to provide a work environment that is inherently safe. The safety and health of our employees are of primary importance, as our employees are our most important resource. Safety takes a commitment from all personnel within our organization.

We have developed a comprehensive safety program that addresses our specific safety concerns and provides guidance for the performance of our individual job tasks within the framework of appropriate Occupational Safety & Health Administration (OSHA) standards.

All employees will receive interactive safety training using the information contained in this safety program. For this training, we may have safety meetings, on-the-job training, on-line courses, formal instruction, and/or any other relevant methods needed.

Safety training needs will be identified by continual reassessment of our work methods, equipment, and work stations, as well as by employee and management input.

Frequent and regular job site inspections will be conducted by supervisory personnel and/or other competent persons. Employees in violation of our established safety procedures will be subject to our disciplinary procedures. Observation of unsafe acts will be addressed immediately.

On every job site there will be a person who is competent, by virtue of training or experience, and will have the authority to stop work. Additionally, all employees have stop work authority for their immediate task if they are aware of a safety hazard that cannot be corrected immediately. If an employee stops work for an unresolved safety hazard, the supervisor will be contacted immediately.

Equipment manuals will be readily available and the safety procedures contained therein will be followed. Equipment will be inspected prior to use and, if defective, tagged out of service. Manufacturer’s warning labels on all equipment will not be removed, painted over, or defaced.

Emergency medical response will be available on every job site, either by an emergency rescue service within reasonable distance, by time, or an assigned emergency responder.

Safety requires not only that each person understands and performs individual tasks in a safe manner, but also that each individual is aware of his or her surroundings and is actively involved in the safety of others.

Each employee is encouraged to contact his or her supervisor immediately should a safety or health risk exist so that corrective action may be taken immediately.

C&S Companies

Section II General Policies & Procedures

Standards:

29 CFR 1926.16 - Rules of Construction
29 CFR 1926.20 - General Safety and Health Provisions
29 CFR 1926.21 - Safety Training and Education
29 CFR 1926.34 - Means of Egress
29 CFR 1926.35 - Employee Emergency Action Plans
PART 1904 - Recording and Reporting Occupational Injuries and Illnesses

Safety Program Overview

This comprehensive safety and health training program has been developed to address our specific safety concerns and to provide guidance for the performance of individual job tasks within the framework of appropriate Occupational Safety & Health Administration (OSHA) standards.

Safety demands a commitment from all personnel within our organization. C&S has an obligation to ensure that all of our employees are afforded the protection of an appropriate safety and health program.

This program contains policies and procedures to deal with common job site place hazards, specific job-related hazards, and potential hazards that may arise.

Hazard assessment, project pre-planning, and engineering controls, where feasible, will be the preferred method of providing a safe job site. Hazards that remain will be minimized or eliminated through training, which provides our employees with the ability to recognize job site hazards and to understand the proper procedural and/or personal protective equipment requirements.

Each C&S employee is encouraged to contact his or her supervisor immediately should a safety or health risk exist so that corrective action may be taken to eliminate the hazard entirely or deal with the hazard in a safe manner through modified work procedures, personal protective equipment (PPE), and/or other appropriate action.

On all job sites, at least one person will be designated a **"competent person"** by virtue of experience or training. This person will have the ability to identify work related hazards; will know the corrective procedures; and will have the responsibility, ability, and authority to stop work if the job site cannot be made safe.

The Safety Manager or the designated competent person will make routine and random job site inspections both to identify new hazards and to monitor the effectiveness of our safety and health program.

In the final analysis, the success of our safety effort depends upon all employees--from senior management to the newest hire--demonstrating a commitment to safety by working in a safe manner. Safe job performance is how our safety effort is ultimately

measured.

Accident/Injury Prevention

Our safety program is designed so that our employees do not work in conditions that are unsanitary, hazardous, or dangerous to their health or safety.

One lax moment in terms of safety may result in a lifetime of needless pain and suffering. Disregarding safety standards may even be fatal. While an accident may happen in an instant, the consequences may last for years.

Accident prevention requires a commitment from all C&S personnel to participate actively in our safety program. All C&S personnel should be aware of job site hazards and follow procedures to eliminate these hazards by using proper work methods, using PPE, and using tools and equipment properly. All C&S personnel are encouraged to ask questions about, and to make positive suggestions for, safety improvement.

Competent persons will be designated to provide job site expertise, as well as regular inspections of equipment, materials, and procedures.

Competent persons will have the authority to stop work if a safety hazard is identified and it cannot be corrected immediately.

All machinery, tools, materials, and equipment deemed unsafe will be taken out of service by physically removing, tagging, or locking controls to render the unsafe item or items inoperable.

Only persons qualified by training or experience will be allowed to operate equipment or machinery.

All tools and items of equipment will be used for the purpose for which they were designed. For example, a wrench is not a hammer, a ladder is not a horizontal plank, and a screwdriver is not a pry bar and so should not be used as such.

Never take chances or attempt any job without being aware of the proper procedures, the potential safety hazards, and the methods to reduce or eliminate risk.

C&S "Safety Seven" Program

C&S has identified seven program elements, some from the OSHA 10 most violated safety practices, which make up the C&S Safety 7 emphasis program. The C&S Safety Seven identified elements are covered throughout this document. Please refer to each section for more in-depth guidance about each element.

SAFETY 7

The C&S Safety Seven have been identified as our core safety program elements. The Safety Seven are highlighted to stress important programs and to make sure we are all safe and healthy at work.

Suspended Loads

No employeed may work or pass under a suspended load. Only qualified riggers will connect and disconnect loads to cranes.

Lockout Tagout

Prior to performing work on machines or equipment, employees shall identify all hazardous energy forms, place them in a zero energy state, and install a locking device with tags.

Fall Protection

Employees shall use fall protection when exposed to a fall hazard of six feet or more. Never improperly use ladders, lifts, or scaffolds, never work on rooftops without proper fall protection and a written fall protection plan.

Machine Guarding

Employees shall not tamper with or disable machine or equipment guarding. Never remove or bypass safety guards on moving machinery. Ensure all guards are re-installed properly after maintenance is complete.

Electrical Safety

Employees shall use ground-fault circuit interrupters on all portable tools and electrical devices, and powered hand tools. Extension cords will be inspected for damage before each shift. Damaged cords will be tagged and ends of cords cut and removed from job site.

Permit Required Confined Space (PRCS)

PRCS shall be identified and signs posted. Written procedures will be established and followed for entry. All employees will receive awarness training. All entrants and supervisors will receive PRCS specific training. ***Never perform these types of high-hazard work without proper training and a permit.***

Personal Protective Equipment (PPE)

Because of the nature of our work, engineering controls cannot always be implemented. The minimum PPE for all construction locations is: Hard hat, safety glasses, and safety toe footwear. Additional PPE may be required based on hazards.

Safety task analysis card (STAC) Program

Employees working outside of the office “in the field” are required to use the C&S **S**afety **T**ask **A**nalysis **C**ard, or **STAC**. The STAC is the C&S version of a job site analysis (JSA). The benefit of using this program is that you can identify hazards before work begins and so mitigate or minimize your exposure to those hazards.

The superintendent, lead person, foreman, or manager in charge will complete the STAC form

This person will identify the hazards associated with work tasks for the day. He or she will determine the required PPE to be used and any other special items that need to be mentioned.

Minimum PPE for any job is; hard hat, safety toe work boots, & safety glasses

The work crew along with the person that filled in the information will review the form in its entirety. If additional safety precautions are identified, they will be annotated on the STAC. After the work crew has reviewed the form, they will each print and sign their names in the designated area on the STAC.

The superintendent, lead person, foreman, or manager will then sign the form with the time and date.

During the course of the day, if the work environment changes or new tasks are started, the STAC will be modified to identify the changes or new tasks and what safety precautions need to be taken in response to them. The work crew will then review the changes and re-sign the STAC after going over the hazards and how to work safely.

The STAC electronic document is located on the SharePoint page at the following link.

http://cssharepoint/administrative/formsnew/Lists/Forms%20listed%20alphabetically%20new/Safety.aspx

Safety Manager

Our Safety Manager has overall responsibility for the implementation of our safety and health training program. The Safety Manager will oversee that employees have appropriate safety training. Additionally, the Safety Manager will oversee that a hazard assessment has been accomplished of our job functions to determine if hazards are present, or are likely to be present, which will necessitate the use of PPE.

Identified hazards which cannot be eliminated through engineering controls or changes in procedures will be addressed by the use of selected PPE.

While the responsibilities of the Safety Manager cannot be further delegated, most of the duties can be delegated to the competent persons by virtue of training or experience. The managers of the job location are responsible for making sure that C&S safety requirements are adhered to.

Supervisors

C&S job site supervisors are assigned to perform the following duties:

a. The actual training of personnel with regard to hazards at the job location;
b. Random inspections to verify adherence to safety rules and policies;
c. Completion of specific tasks identified within our OSHA compliance programs found in Section III of this safety program;
d. Hazard assessments; and
e. STAC program implementation

Employee Involvement

All C&S employees are encouraged to participate actively in our safety & health program. Do not hesitate to point out perceived safety deficiencies to your supervisor or the competent person – you may prevent an injury to yourself or a fellow worker. With the goal of providing a safer job site for all of us, employee suggestions for improving safety management are welcomed and encouraged. Never perform any task as to which you are not confident in your understanding of the safety procedures. If in doubt, ask your immediate supervisor for guidance.

Subcontractor Involvement & Responsibilities

It is our responsibility to review the safety efforts made by subcontractors who may be working with us.

Subcontractors will be pre-screened by the H&S Department before being selected for work. The pre-screening process will evaluate the subcontractor's capability of performing the work, financial ability, insurance requirements for the job, and its safety history and programs.

Prior to the start of work on multi-subcontractor job sites, a meeting will be held to explain to all subcontractors the protective measures we have determined to be appropriate. Input and suggestions from subcontractors will be solicited. Attention will be given to hazards one subcontractor may create and the measures it will take to prevent other subcontractors from these exposures. One measure that will always be taken is the sharing of appropriate Material Safety Data Sheet (MSDS) or Safety Data Sheet (SDS) information.

The four (4) major elements of safety management below apply to our operations and to all of our subcontractors:

1. Management commitment and employee involvement
2. Worksite analysis
3. Hazard prevention and control
4. Safety and health training

It is expected that our subcontractors work within the framework of the OSHA Standards.

Safe Office Practices

When C&S employees are working in areas such as offices, warehouses, storage areas,

garages, etc., compliance with all of the safety practices/procedures set forth below is mandatory. Supervisors will insist that these safety practices and procedures are observed and are expected to take disciplinary action against employees for non-compliance.

Employees must:

1. Report all unsafe conditions and equipment to their supervisor or H&S Manager.
2. Report all incidents, injuries, and illnesses to their supervisor or H&S Manager immediately.
3. Keep means of egress unblocked, well-lit, and unlocked during work hours.
4. Sound the alarm and evacuate in the event of fire.
5. Upon hearing a fire alarm, stop work and proceed to the nearest clear exit and then gather at the designated muster location.
6. **Do Not** attempt to respond to a fire or other emergency unless trained to do so.
7. Keep stairways clear of items that can be tripped over.
8. **Do Not** place or store combustibles under stairways that are egress routes.
9. **Do Not** store materials and equipment against doors or exits, fire ladders, or fire extinguisher stations.
10. Keep aisles clear at all times.
11. Maintain work areas in a neat, orderly manner. Place trash and refuse into proper waste containers.
12. Wipe up all spills promptly.
13. Store files and supplies in such a manner as to preclude damage to the file and supplies or injury to personnel when they are moved. The heaviest items should be stored closest to the floor and lightweight items should be stored above.
14. Ensure all electrical and other cords running into walk areas are taped down or inserted through rubber protectors to preclude them from becoming tripping hazards.
15. Never stack material precariously on top of lockers, file cabinets, or other high places.
16. Never leave desk or cabinet drawers or doors open so that they present a tripping hazard. Use care when opening and closing drawers and doors to avoid pinching fingers.
17. **Do Not** open more than one upper drawer at a time, particularly the top two 92) drawers on tall file cabinets.
18. Always use proper lifting techniques. Never attempt to lift or push an object which is too heavy for you to do so safely. Contact your supervisor when help is needed to move a heavy object.
19. Exercise caution when carrying material to ensure firm footing and clear line of sight.
20. Plug all electrical equipment into appropriate wall receptacles or into an extension cord for temporary power only until permanent power is available. Three (3)-pronged plugs should be used to ensure continuity of ground and employee safety. (Contact the building manager to have a permanent outlet installed if needed. If you don't know the building manager contact the H&S Manager)

21. Keep individual heaters at work areas clear of combustible materials such as drapes or waste from waste baskets. Only Heaters equipped with tip over shutoff safety switches should be used.
22. Keep appliances such as coffee pots and microwaves in working order and inspected for signs of wear, heat, or fraying of cords.
23. Ensure fans used in work areas are guarded. Guards must not allow fingers to be inserted through the mesh. All fans must be equipped with proper guards which have **openings of ½ inch or less**.
24. Use equipment such as scissors, staplers, etc, for their intended purposes only. They are not be used as hammers, pry bars, screwdrivers, etc. Misuse can cause damage to the equipment and possible injury to the user.
25. Store cleaning supplies away from edible items on kitchen shelves.
26. Store cleaning solvents and flammable liquids in appropriate containers.
27. Keep solutions that may be poisonous or not intended for consumption in well-labeled containers.
28. **Do Not** remove or deface equipment or product American National Standards Institute (ANSI) or other warning signs/symbols, and heed their warnings.
29. Ensure owner's manuals for office equipment are readily available.

MSDS or SDS for the company are readily available on line through Vived learnig systems or by contacting the 3E Company at 1-800-451-8346.
https://otis.osmanager4.com/cands#/chemical/righttoknow/collection?rtkid=5bb20af6-9893-4471-9d3a-6d4d7ced3de4&hv=44F0D28C46Z1EA816B37C9EB2A000302

The above list is not all-inclusive. Employees are encouraged to suggest additional safety ideas and/or procedures to the Safety Manager.

Access to Employee Medical Records & Exposure Records

29 Code of Federal Regulations (CFR) Section 1910.1020 - Access to employee exposure and medical records

All employee exposure records and medical records are under the control of our Safety Department.

- **Exposure records** must be retained for thirty (30) years
- **Medical records** must be retained for the duration of employment plus thirty (30) years

An employee's medical record means "a record concerning the health status of an employee which is made or maintained by a physician, nurse, or other health care personnel, or technician."

This includes:

a. Medical and employment questionnaires or histories (including job descriptions and occupational exposures).

b. The results of medical examinations (pre-employment, pre-assignment, periodic, or episodic) and laboratory tests (including chest and other X-ray examinations taken for the purpose of establishing a base-line or detecting occupational illnesses and all biological monitoring not defined as an "employee exposure record").

c. Medical opinions, diagnoses, progress notes, and recommendations.

d. First aid records.

e. Descriptions of treatments and prescriptions.

f. Employee medical complaints.

***Note: An employee's medical record does not include:**

a. Physical specimens (e.g., blood or urine samples) which are routinely discarded as a part of normal medical practice, or

b. Records concerning health insurance claims if maintained separately from the employer's medical program and its records, and not accessible to the employer by employee name or other direct personal identifier (e.g., Social Security number, payroll number, etc.).

c. Records created solely in preparation for litigation which are privileged from discovery under the applicable rules of procedure or evidence.

d. Records concerning participation in voluntary employee assistance programs (e.g., alcohol, drug abuse, or personal counseling programs) if maintained separately from the employer's medical program and its records.

Access to Employee Medical Records & Exposure Records

29 CFR 1910.1020 - Access to employee exposure and medical records

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Exposure records must be retained for 30 years.

Medical records must be retained for the duration of employment plus 30 years.

An employee's medical record means: "a record concerning the health status of an employee which is made or maintained by a physician, nurse, or other health care personnel, or technician."

This would include:

a. Medical and employment questionnaires or histories (including job description and occupational exposures).
b. The results of medical examinations (pre-employment, pre- assignment, periodic, or episodic) and laboratory tests (including chest and other X-ray examinations taken for the purpose of establishing a base-line or detecting occupational illnesses and all biological monitoring not defined as an "employee exposure record".
c. Medical opinions, diagnoses, progress notes, and recommendations.
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c. Records created solely in preparation for litigation which are privileged from discovery under the applicable rules of procedure or evidence.

d. Records concerning voluntary employee assistance programs (alcohol, drug abuse, or personal counseling programs) if maintained separately from the employer's medical program and its records.

An employee's employee **exposure record** means a record containing any of the following kinds of information:

a. Environmental (job site) monitoring or measuring of a toxic substance or harmful physical agent, including personal, area, grab, wipe, or other form of sampling, as well as related collection and analytical methodologies, calculations, and other background data relevant to interpretation of the results obtained.
b. Biological monitoring results which directly assess the absorption of a toxic substance or harmful physical agent by body systems (e.g., the level of a chemical in the blood, urine, breath, hair, fingernails, etc.) but not including results which assess the biological effect of a substance or agent or which assess an employee's use of alcohol or drugs.
c. Safety data sheets, indicating that the material may pose a hazard to human health.
d. In the absence of the above, a chemical inventory or any other record which reveals where and when used and the identity (e.g., chemical, common, or trade name) of a toxic substance or harmful physical agent.
e. Objective Data for Exemption from Requirement for Initial Monitoring.

Employee Information

Upon first entering into employment, and at least annually thereafter, each employee will be informed of the following:

a. The existence, location, and availability of any records covered by 29 CFR 1910.1020.
b. The person responsible for maintaining and providing access to records (H&S Department).
c. The employee's rights of access to his/her records.
d. That a copy of 29 CFR 1910.1020 and its appendices will be maintained in the Safety Department and made readily available upon request.

Informational materials concerning access to medical records received from or provided by the Assistant Secretary of Labor for Occupational Safety and Health will be distributed to all current employees.

Access to Records

Employees or their designated representatives will have access to their medical or exposure records within 15 working days of their request, or, if this is not possible, will provide, within 15 working days, the reason for the delay and provide a best estimate of when the records will be available.

Copies of employee medical or exposure records will be provided in a reasonable time, place, and manner and **at no cost to the employee**.

Upon request, H&S Department will provide access to representatives of the Assistant Secretary of Labor for Occupational Safety and Health employee exposure and medical records and to analysis using exposure or medical records.

Analysis Using Medical or Exposure Records

"Analysis using exposure or medical records" means any compilation of data or any statistical study based at least in part on information collected from individual employee exposure or medical records or information collected from health insurance claims records, provided that either the analysis has been reported to the employer or no further work is currently being done by the person responsible for preparing the analysis.

Before access is granted to an analysis using medical or exposure records, all personal identifiers must be removed that could reasonable directly identify the employee. Identifiers would include: name, SSN, address, etc. Identifiers that could indirectly identify the employee will also be removed. These would include date of hire, sex, job title, etc.

Confidentiality

Nothing in the OSHA standards is intended to affect existing legal and ethical obligations concerning the maintenance and confidentiality of employee medical information, the duty to disclose information to a patient/employee or any other aspect of the medical-care relationship, or affect existing legal obligations concerning the protection of trade secret information.

Transfer of Records

Should we cease to do business, the successor employer shall receive and retain all the above medical and exposure records.

Should we cease to do business and there is no successor employer to receive and retain the above medical and exposure records, they shall be transmitted to the Director of the National Institute for Occupational Safety and Health (NIOSH).

At the expiration of the retention period for the above medical records, we will notify the Director of the NIOSH at least 3 months prior to the disposal of such records and shall transmit those records to the Director of the NIOSH if he requests them within that period.

Potable Water

From a safety standpoint, you must not neglect your need for potable (drinkable) fluids. Water is not only the most abundant of all compounds found on the earth, but it is also the most abundant part of you – actually, about 65% of you is water.

On construction sites, exertion and heat dictate the need for plenty of water.

Potable water will be available on job sites. If portable containers are used, they will be clearly marked (Potable Water), capable of being tightly closed, and equipped with a tap. These containers will be used for no purpose other than supplying drinking water. Non-reusable (single service) cups in a sanitary container will be provided for drinking, as well as a receptacle for disposing of used cups. Employees are reminded of their need for adequate amounts of water. Disposable water bottles may also be supplied for employee consumption.

Non-Potable Water

Outlets of non-potable water should be clearly identified as such through appropriate signage, and non-potable water may never be used for drinking, washing, or cooking.

Toilets - toilets will be provided at job sites according to the below table:

Number of Employees	Minimum Number of Facilities
20 or fewer	1
20 or more	1 toilet seat and 1 urinal per 40 workers
200 or more	1 toilet seat and 1 urinal per 50 workers

Toilet facilities will include, unless prohibited by local law:

a. Privies (where their use will not contaminate ground or surface water)
b. Chemical toilets
c. Recirculating toilets
d. Combustion toilets

Washing FacilitiesAdequate washing facilities will be provided in near proximity to the job site if employees are working with contaminants that may be harmful to their health, such as paint, coatings, or other chemical products. Paper towels and cleansing agents will be provided.

Showers and changing rooms will be dictated by specific standards dealing with specific

toxic materials (e.g., lead, asbestos).

Eating and Drinking Areas

No employee will be allowed to consume food or beverages in any area exposed to toxic material.

Lifting, Pushing, and Pulling

Back injuries are often caused by the obvious, such as by putting excessive strain on the lower back by lifting an object that is too heavy or awkward, or by bending and/or twisting while lifting.

However, lifting injuries are also caused by less obvious reasons, such as:

a. Poor physical condition
b. Poor posture
c. Poor judgment (lifting, pulling, pushing an object that is obviously too heavy or awkward without seeking assistance or using a mechanical lifting device.)
d. Lack of exercise
e. Excessive body weight

Proper lifting techniques are important for employee safety. Below are lifting techniques that will reduce the likelihood of injury:

a. Lift objects comfortably, not necessarily the quickest or easiest way.
b. Lift, push, and pull with your legs, not your arms or back.
c. When changing direction while moving an object, turn with your feet, not by twisting at the waist.
d. Avoid lifting anything higher than your shoulder height.
e. When standing while working, stand straight.
f. When walking, maintain an erect posture; wear slip-resistant, supportive shoes.
g. When carrying heavy objects, carry them close to the body and avoid carrying them in one hand.
h. When heavy or bulky objects need to be moved, obtain help or use a mechanical aid such as a dolly, hand truck, forklift, etc.
i. When stepping down from a height of more than eight inches (8″) step down backwards, not forward.
j. Handle heavy objects close to the body – avoid reaching out.
k. Lift gradually and smoothly. Avoid jerky motions.
l. Maintain a clear line of vision.

Slips, Trips, and Falls

Slips, trips, and falls are among the most common job site accidents and they are easily preventable. Below are some of the causes of slips, trips, and falls:

a. Running on the job site.
b. Engaging in horseplay.
c. Working off a ladder that is not firmly positioned.
d. Carrying an object that blocks your line of vision.

e. Work boots not laced or buckled.
f. Working on a scaffold without safety rails.
g. Using ladders that have oil or grease on the rungs.
h. Not using a handrail on steps.
i. Messy work areas with debris strewn about.
j. Not paying attention to what one is doing.

This list can go on and on, but all of the above are easily preventable by adherence to common safety procedures, common sense, and awareness of potential hazards on the job site.

Drugs, Alcohol, & Prohibited Behaviors, Drug Free Job Sites

Because the type of work we perform can result in serious injury if employees are not capable of focusing not only on their job tasks but also on their surroundings and others with whom they work. It is C&S's policy to hire only persons free from any evidence of illegal use of controlled substances or other drugs, including alcohol.

Prohibited Behaviors

The use; bringing onto C&S property, facilities, or your job site; possession, concealment, transportation, promotion or sale of the following substances or items by any employee as well as by our subcontractors and their employees of the below items is prohibited:

a. Illegal drugs, unauthorized controlled substances, look-a-likes, designer drugs, synthetic drugs, or any other drug which may affect an employee's motor functions or alter an employee's working perception.
b. Prescription drugs/over-the-counter medication except under the following conditions:

    1. The employee shall inform his or her supervisor prior to using any over-the-counter medication.
    2. The prescription vial shall be labeled by the dispensing pharmacy and the label shall show the employee's name, physician, prescription number, date the prescription was filled, and the dosage rate.
    3. The over-the-counter medication will be in its original package or container.

c. Alcoholic beverages, not associated with C&S functions.
d. Firearms, weapons, explosives, and ammunition.
e. Unauthorized items, such as stolen property or drug paraphernalia.

Smoking

There shall be no smoking of tobacco products except in designated smoking areas. Under no circumstances will there be smoking during refueling of vehicles or within fifty feet (50) of flammable materials.

Accident Investigation

The purpose of Accident Investigation is to prevent the same type of accident from recurring. An accident investigation will begin immediately after the medical crisis is resolved. The competent person on the job site will complete a C&S Incident form as soon as feasible. The five (5) questions that must be answered are:

- **W**ho?
- **W**hat?
- **W**hen?
- **W**here?
- And, most importantly, **Why** did the accident happen?

Simple accidents may actually be caused by many complex reasons. Example: A worker is using a claw hammer on a working surface more than six feet (6′) above the ground. The hammer head breaks off and strikes a worker below who is not wearing a hard hat. Why did this accident happen? How could it have been prevented? With just the facts presented, the fault would seem to rest with the worker who was struck by the falling object.

The accident investigation may reveal other contributing factors by answering questions like:

a. Were hard hats required on the project, were they available, and was this policy enforced by the supervisors?

b. Were precautions taken to prevent objects from falling from above, such as a controlled access zone (CAZ)?

c. Did the worker inspect his hammer before use? Was he driving nails – the job for which a claw hammer is designed – or pounding metal beams?

After determining the cause of the accident, steps can be taken to prevent a recurrence. Near-miss mishaps--events which result in no injury or damage--should be investigated because even though the outcomes are different, the causes are the same.

Incident Reporting and Investigation

It is the policy of C&S that all accidents or incidents that result in either personal injury or illness, and/or damage to property shall be properly reported and investigated. Although accident/incident investigation is a reactive process, a comprehensive accident reporting and investigation process is a proactive measure that can effectively prevent or minimize future accidents/incidents.

This operating procedure establishes a systematic process to ensure that accidents are properly reported in a timely manner; that all causes (direct and contributory) are thoroughly identified; and that the appropriate corrective actions are taken

This operating procedure applies to the reporting and investigation of all incidents that result in:

a. A work-related injury and/or illness to any C&S employee

b. Personal injury and/or illness to non-C&S personnel while on or using C&S-owned property;

c. Damage to C&S-owned property; or

d. A near miss non-injury event that had the potential to cause harm or damage.

Responsibility

Management plays a key role in the reporting and corrective measures aspect of an incident. Managers are responsible for the following:

Ensuring that all accidents/incidents are properly reported and investigated in accordance with this operating procedure.

Ensuring that all corrective actions are promptly and completely carried out.

Employees are responsible for reporting any injury, illness, work-related accident, or non-injury incidents to their supervisor as soon as possible. All accidents and incidents must be reported as soon as possible and no later than the end of the employee's regular work shift. The employee will complete a C&S incident report form. If the injured worker is not able to complete the incident report form, then the supervisor will accomplish this requirement.

The C&S Health & Safety Department shall participate in accident investigations either directly or by review of the report, as deemed appropriate to the incident. The Health & Safety Department is responsible for administering the workers' compensation benefits program for work-related injuries or illnesses.

The following are how OSHA defines:

- **MAJOR ACCIDENT** - Any injury or illness-related accident that results in: Death; amputations involving the loss of bone tissue; loss of consciousness due to electrical shock, lack of oxygen, or chemical exposure; possible permanent functional impairment of a body part (excluding those resulting from a back strain); admission to a hospital (other than 24-hour observation, hernia repair, or back strain).
- **MULTIPLE INJURY ACCIDENT** - Accidents or incidents that result in an employees being admitted to a hospital or medical treatment facility.
- **OSHA RECORDABLE INCIDENT** - Any accident/incident that results in medical treatment other than first-aid (for example, treatment of an infection, sutures, second or third degree burns, etc.); restriction of normal work activities (reduced work activities, or reduced work days); days away from work (losttime); any occupational illness.
- **FIRST-AID ONLY** - Any accident/incident which results in a minor injury that can normally be treated or cared for by the employee and/or his or her supervisor, and does not result in any of the conditions identified in the previous Section. *Note: first-aid can be administered by a medical professional and not result in an OSHA-recordable incident (for example, application of a Band-Aid™ or antiseptic to a minor cut or scrape).
- **"NEAR MISS" INCIDENT** - An incident which does not result in personal injury or illness, or property damage, but had the potential to do so.

Deaths and/or Multiple Injuries

Any incident which results in deaths or multiple injuries shall be **immediately** reported to C&S's Health & Safety Department.

Investigation Guidelines

When possible, the accident scene should be preserved and disturbance of any physical evidence should be prevented until after the investigation. Unless necessary to prevent further damage or injury, clean up or repair activities should commence only after all pertinent information has been collected.

The person conducting the investigation shall identify and record the names of all individuals who witnessed the incident. Each witness shall be requested to provide a written statement identifying his or her account of the incident.

When feasible, photographs should be taken of the accident scene. All photographs and/or diagrams shall be forwarded to the Health & Safety Department for inclusion as part of the investigation record.

When questioning injured employees or witnesses, the person conducting the investigation shall stress that the purpose of the investigation is to identify facts and not to assign fault. At all times, it is important to ensure that proper medical treatment and care of any injuries is given priority over questioning of the personnel involved.

The investigation team shall identify and record the root and contributory causes of the incident. Upon completion of the investigation, the investigation team will identify the appropriate corrective actions and indicate the personnel responsible for implementing the actions.

First Report of Accident/Incident

Business unit heads, managers, and supervisors directly responsible for the employee(s) involved in an accident/incident shall complete all sections of the C&S Incident report form

The responsible manager should involve the injured employee and all identified witnesses in the accident investigation and corrective action processes.

The original report forms shall be completed and forwarded to the C&S Health &Safety Department within twenty-four (24) hours after the accident/incident has occurred. If additional time is required to complete the investigation, the manager/supervisor shall notify the Health & Safety Department.

Postings

On every job site there will be a prominently displayed bulletin board or area for postings. Every employee must be aware of this policy. Certain postings are required as a matter of law in all cases, and other postings are required depending upon the circumstances and the types of work being done.

In all cases, the following must be posted to meet OSHA requirements:

a. OSHA Form 3165:, *It's the law!*
b. During the period from 1 February through to April 30, OSHA Form 300A, *Summary of Work-Related Injuries and Illnesses*, must be posted for work-related injuries and illnesses which have occurred during the previous year.
c. Emergency phone numbers and site address for emergency response.

If appropriate, the following must be posted:

a. OSHA citations.
b. Notice of informal hearing conference.
c. Air or wipe sampling results.
d. Emergency action plan.

Recordkeeping: Injuries & Illnesses

OSHA Forms 300, 300A & 301

As a matter of law, all employers with eleven (11) or more employees **at any one time** in the previous year must maintain OSHA Form 300, *Log of Work- Related Injuries and Illnesses*; OSHA Form 301, *Injury and Illness Incident Report*; and OSHA Form 300A, *Summary of Work-Related Injuries and Illnesses*.

OSHA Forms 300 and 301 are used to record and classify occupational injuries and illnesses. The information on the OSHA Form 300 is related to employee health and must be used in a manner that protects the confidentiality of employees to the extent possible. Recordable injuries and illnesses must be entered on OSHA Forms 300 and 301 within seven (7) days of recordable injury or illness occurrence.

Retention of Forms

OSHA 300/ 300A Forms will be retained for five (5) years.

Items to be Recorded on OSHA Forms 300, 300A, and 301

Work-related injuries and illnesses and fatalities are to be recorded using the criteria found in 29 CFR Part 1904, *Recording and Reporting Occupational Injuries and Illnesses*.

Injuries and illnesses must be recorded if they result in death, days away from work, restricted work or transfer to another job, medical treatment beyond first aid, loss of consciousness, or if the injury or illness involves a significant injury diagnosed by a physician or licensed health care professional, even if it does not meet the forgoing conditions.

***Note: First aid (which is not reportable) is defined in 29 CFR 1904.7(b)(5)ii.**

Employee Involvement

As a matter of C&S policy, all work-related accidents and injuries are to be immediately reported to the competent person/supervisor on a job site who will complete an incident report form form. This form will be forwarded to the Safety Manager, who will extrapolate appropriate information for completion of the OSHA Form 300.

Catastrophic Reporting Requirements

Within eight (8) hours after the death of any employee from a work-related incident or the in-patient hospitalization of an employees as a result of a work-related incident, either in person or by telephone, the OSHA Area Office nearest to the site of the incident will be notified.

OSHA may be contacted for this purpose using a toll free telephone number that can be found at www.OSHA.gov.

Location of OSHA Forms 300 and 301

As a general rule, the OSHA Forms 300 and 301 will be maintained in the C&S H&S department.

Incident Rate

One indication of the success of our safety effort is our "incidence rate." When bidding a job, our incidence rate could be a determining factor in a successful bid. The incidence rate is determined by the following formula:

N/EH X 200,000 where:

N = number of injuries and/or illnesses

EH = total hours worked by all employees during the calendar year. 200,000 = base for 100 full-time equivalent workers (working 40 hours per week, 50 weeks per year).

To find the "Lost Workday Injury Rate" (LWDI), the following formula is used:

LWDI Rate = (# LWDI's X 200,000) / # employee hours worked

LWDI = sum of LWDIs in reference years

employee hours worked = sum of employee hours in reference years

200,000 = base for 100 full-time equivalent workers

(working 40 hours per week, 50 weeks per year)

When accidents and injuries occur, they have an immediate detrimental impact on those employees involved. Additionally, they have a potential lingering negative impact upon C&S and our ability to get work.

Safety Meetings

Scheduled safety meetings provide an opportunity for reinforcing the importance of general safety as well as specific work-related procedures applicable to the work at hand. Properly prepared safety meetings will focus on one or two topics and be direct and to the point. All safety questions will be addressed, and interactive participation is encouraged.

The C&S Health & Safety Department can supply literature, toolbox talks, and other aids to help in the facilitation of the meetings. Also, upon request, a representative from the C&S Health & Safety Department can help conduct the meetings or give specialized training during the meeting if needed.

Enforcement

It is expected that all C&S employees will abide by our safety rules and guidelines, not only to protect themselves, but also to protect their fellow workers from harm. Should a safety violation occur, the following steps will be taken by the employee's immediate supervisor.

a. **Minor Safety Violations**: Violations which would not reasonably be expected to result in serious injury.

1. The hazardous situation will be corrected.
2. The employee will be informed of the correct procedures to follow and the supervisor will ensure that these procedures are understood.
3. The supervisor will make a written report of the occurrence using our Enforcement Documentation Form and inform the employee that this documentation will be forwarded to the Safety Manager for a retention period of one (1) year in the employee's file.
4. A repeat occurrence of the same minor safety violation is considered substantially more serious than the first.

b. **Major Safety Violations**: Violations which would reasonably be expected to result in serious injury or death.

1. The hazardous situation will be corrected.
2. The employee will be informed of the correct procedures to follow and C&S will impress upon the individual the severity of the violation and the likely consequences should this type of violation be repeated. The employee's supervisor will ensure that the employee understands the correct procedures and will be cautioned that a recurrence could result in disciplinary action, up to and including discharge from employment.
3. The supervisor will make a written report of the occurrence using our Enforcement Documentation Form and inform the employee that this documentation will be forwarded to the Safety Manager for a retention period of one (1) year.

c. **Willful Major Safety Violations**: Intentional violation of a safety rule which would reasonably be expected to result in serious injury to the employee or a fellow worker.

1. The hazardous situation will be corrected.
2. The employee will be removed from the job site, the event will be documented and forwarded to the Safety Manager, and the employee may be discharged.

Employees are to understand that the primary purpose of documenting safety violations is to ensure that the important business of employee safety is taken seriously and that the potential for injury is reduced to the lowest possible level.

Schedule of Enforcement Actions
Violations Occurring Within a One
(1)-Year Period Minor Violation

Offense	Action	Repeat Same Offense	Action
1st	Written Notice	1st	1 Day Off
2nd	Written Notice	2nd	3 Days Off
3rd	1 Day Off	3rd	Possible Dismissal
4th	2 Days Off		
5th	3 Days Off		
6th	Possible Dismissal		

Major Violation

Offense	Action	Repeat Same Offense	Action
1st	Written Notice	1st	4 Days Off
2nd	2 Days Off	2nd	Possible Dismissal
3rd	4 Days Off		
4th	Possible Dismissal		

Section III Site/Job Specific Policies and Procedures

Site Specific Health & Safety Plan

A site specific health & safety plan (SSHASP) may be required for selected job locations. Site specific plans are generally created based on one (1) of the following:

1. The plan is required because of a contractual obligation
2. The client has additional health and safety requirements
3. The job was evaluated and specific procedures are required to ensure a safe job location
4. The nature of the work is highly hazardous
5. Subcontractor will be working on a C&S-controlled job location
    - The plan is used to convey the C&S safety program elements and health and safety expectations.

What is a Site Specific HASP?

The document outlines the basic site specific health and safety plan requirements for each jobsite. The SSHASP should identify all hazards associated with your scope of work and provide safe work practices and personnel protection methods specific to the work at your job location.

If you feel that your site requires a SSHASP, contact the Health & Safety Department.

Abrasive Blasting

When performing abrasive blasting operations, there are numerous hazards that must be addressed from a safety standpoint.

First and foremost are respiratory hazards. During blasting operations, dust hazards are created as the abrasive materials and the surface coatings are shattered and pulverized to particles of respirable size. The composition and **toxicity of the abrasive dust** as well as the coating must be known to determine the

a. Appropriate respirator to be selected to negate these hazards.

The many types of abrasive materials have varying degrees of hazard – silica sand being probably the most hazardous mineral abrasive used. Whenever possible, its use should be limited and, if possible, a substitute material used. Other types of abrasives include synthetic or natural mineral grains; metallic shot or hard grit (made of steel or chilled cast iron); and organic abrasives, such as ground corncobs and walnut shells. These and other engineering controls, such as containment and ventilation, are important for employee safety.

The hazards of steel or cast iron dust are relatively minimal; however, combustible organic abrasives may be pulverized fine enough to be capable of forming explosive mixtures with air.

The coatings that are being blasted may, for example, contain lead (in paints); arsenic (in furnaces); cadmium (plating); and even silica sand (embedded in the surface of castings). All these types of hazards require specific respiratory protection and are serious health hazards.

Surprisingly, construction standards do not address abrasive blasting as an "all-encompassing" topic; therefore, each hazard must be dealt with on its own.

In addition to respiratory hazards, the following safety concerns, which apply to both abrasive blasting workers and those who may be exposed to the hazards they create, depending upon the job, need to be addressed during abrasive blasting operations:

a. Protective clothing and equipment must provide protection to the eyes, face, and body of the operator.

   ***Note: Equipment for the protection of the eyes and face will be supplied to the operator when the respirator design does not provide such protection.**

a. Protective clothing and equipment must provide protection to the eyes, face, and body of all personnel working in the vicinity of abrasive blasting operations.

   ***Note: Equipment for the protection of the eyes and face will be supplied to any other personnel working in the vicinity of the abrasive blasting operation.**

b. Fall protection.

c. Scaffold and ladder safety.

d. Release of toxic dust.

e. **Potentially explosive mixtures**. The blast nozzle must be bonded and grounded to prevent the buildup of static charge.

   1. Organic abrasives which are combustible will only be used in automatic systems. Reference: NFPA 68-1954.

f. High pressure hoses and couplings.

g. Securing the work area to deny unauthorized entry.

h. Working in a permit-required confined space.

Injury from the blast itself. To reduce the likelihood of injury, the **blast cleaning nozzles must be equipped with an operating valve that must be held open manually**. A support will be provided on which the nozzle may be mounted when it is not in use.

Operational Procedures and General Safety

Dust will not be permitted to accumulate on the floor or on ledges outside of an abrasive-blasting enclosure, and dust spills will be cleaned up promptly. Aisles and walkways will be kept clear of steel shot or similar abrasive which may create a slipping hazard.

The PEL for particles not otherwise regulated is 5.0 mg/m³. The PEL for respirable dust containing crystalline silica is determined by the below formula:

PEL = 10 mg/m³ (%SiO_2+2), where %SiO_2+2 refers to the amount of crystalline silica measured in the sample.

Below the above threshold limits, no action is required; however, employees may wear dust masks for personal comfort.

As always, engineering controls are preferable to PPE for dealing with job site hazards. Therefore, local exhaust ventilation is a preferred method of maintaining atmospheres that have dust levels below the concentrations noted in the Dust Table, above.

If it is necessary to use respiratory protection equipment (for example, when effective engineering controls are not feasible or while they are being instituted) as defined in paragraph 1910.134(a) and (b), C&S will follow the provisions of our respiratory protection program, as defined as described in 1926.103. Respirators will be selected that prevent atmospheric contamination from harmful dust, fogs, fumes, mists, gases, smokes, sprays,

or vapors.

Per NIOSH:

Type CE abrasive-blast supplied-air respirators are the only respirators suitable for use in abrasive-blasting operations. * Currently, there are four (4) kinds of Type CE abrasive-blast respirators certified by NIOSH. These four (4) kinds of respirators and the NIOSH-recommended assigned protection factors (APF) are:

1. A continuous-flow respirator with a loose-fitting hood and an APF of 25;
2. A continuous-flow respirator with a tight-fitting face piece and an APF of 50;
3. A positive-pressure respirator with a tight-fitting half-mask face piece and an APF of 1000;
4. A pressure-demand or positive-pressure respirator containing a tight-fitting full face piece and an APF of 2000.

***Note: Air purifying and powered-air purifying respirators are not recommended for abrasive blasting operations, but may be suitable for auxiliary work, such as outside clean-up operations.**

Also per NIOSH:

1. Silica sand should NOT be used as an abrasive medium.
2. Respirators should not be used as the only means of preventing or minimizing exposures to airborne contaminants. Dust source controls, such as containment systems, local exhaust systems, and good work practices, should be implemented as the primary means of protecting workers. When dust source controls cannot keep exposures below the recommended exposure limits, then controls should be supplemented with the use of respiratory protection.
3. Environmental monitoring by trained personnel should be conducted in all abrasive-blasting applications. This is necessary to select the proper respirator (APF) and insure that workers are not overexposed (i.e., measured contaminant concentration is less than the exposure limit multiplied by the respirator APF).
4. Any time that environmental conditions, airborne contaminants, or their concentrations are highly variable or poorly defined, high level respiratory protection should be used, even if silica is not the abrasive agent.
5. If silica sand is used, despite its much greater hazard relative to other abrasive agents, then only the highest level protection respirators (i.e., respirators certified by NIOSH as pressure-demand or positive pressure and with NIOSH-recommended APFs of 1000 or 2000) should be used.
6. Respirators will only provide a satisfactory level of protection when they are selected, fitted, used, and maintained according to the manufacturer's written instructions, NIOSH approval limitations and guidelines, and OSHA regulatory requirements.

If a compressor is used for supplying breathable air by way of airline hoses to an abrasive blasting respirator, it will be a Type "C" system. The hose couplings used on these systems

must not be compatible with any other gas systems. Breathable air -- not pure oxygen -- is used in these systems. **By definition, this breathable air must and will be free from harmful quantities of dust, mist, and noxious gases**.

An abrasive-blasting respirator will be used which covers the wearer's head, neck, and shoulders to protect the wearer from rebounding abrasive.

All safety and standby devices will be maintained in working order, such as by having alarms to warn of compressor failure or overheating. Compressors will be located so that contaminated air does not enter the system and suitable in-line filters will be installed. A receiver of sufficient capacity to enable the respirator wearer to escape from a contaminated atmosphere in the event of a compressor failure shall be in place. If an oil lubricated system is used, it shall have a high temperature and carbon monoxide alarm. Additionally, ensure that compressed air does not have oxygen concentrations that are greater than 23.5%.

Compressors used to supply breathing air to respirators must be constructed and situated so as to:

1. Prevent entry of contaminated air into the air-supply system;
2. Minimize moisture content so that the dew point at 1 atmosphere pressure is 10 degrees F (5.56 deg.C) below the ambient temperature;
3. Have suitable in-line air-purifying sorbent beds and filters to further ensure breathing air quality. Sorbent beds and filters shall be maintained and replaced or refurbished periodically following the manufacturer's instructions.

4. Have a tag containing the most recent change date and the signature of the person authorized by the employer to perform the change. The tag shall be maintained at the compressor.

For compressors that are not oil-lubricated, ensure that carbon monoxide levels in the breathing air do not exceed 10 ppm.

For oil-lubricated compressors, use a high temperature or carbon monoxide alarm, or both, to monitor carbon monoxide levels. If only high-temperature alarms are used, the air supply will be monitored at intervals sufficient to prevent carbon monoxide in the breathing air from exceeding 10 ppm.

If cylinders are used to supply breathing air to respirators, they will meet the following requirements:

a. Cylinders will be tested and maintained as prescribed in the Shipping Container Specification Regulations of the Department of Transportation (49 CFR Parts 173 and 178);
b. Cylinders of purchased breathing air will have a certificate of analysis from the supplier that the breathing air meets the requirements for Grade D breathing air; and
c. The moisture content in the cylinder will not exceed a dew point of - 50 deg.F (-45.6 deg.C) at 1 atmosphere pressure.

***Note: Under no circumstances are employees to use compressed air for cleaning unless the pressure is reduced to less than 30 p.s.i. [10 p.s.i. in California]. Flying debris can injure the employee or a fellow worker.**

Symptoms of Silicosis

Silicosis (especially the acute form) is characterized by shortness of breath, fever, and cyanosis (bluish skin); it may often be misdiagnosed as pulmonary edema (fluid in the lungs), pneumonia, or tuberculosis. Severe mycobacterial or fungal infections often complicate silicosis and may be fatal in many cases.

Three (3) Types of Silicosis

1.	Chronic silicosis:	usually occurs after 10 or more years of exposure to crystalline silica at relatively low concentrations
2.	Accelerated silicosis:	results from exposure to high concentrations of crystalline silica and develops 5 to 10 years after the initial exposure
3.	Acute silicosis:	occurs where exposure concentrations are the highest and can cause

NIOSH Safety Recommendations

NIOSH recommends the following measures to reduce crystalline silica exposures in the workplace and prevent silicosis and silicosis-related deaths:

1. Prohibit the use of silica sand (or other substances containing more than 1% crystalline silica) as an abrasive blasting material and substitute less hazardous materials.
2. Conduct air monitoring to measure worker exposures.
3. Use containment methods, such as blast-cleaning machines and cabinets, to control the hazard and protect adjacent workers from exposure.
4. Practice good personal hygiene to avoid unnecessary exposure to silica dust.
    a. Wash hands and face before eating.
    b. No eating, drinking, or using tobacco products in the blasting area.
    c. Shower before leaving work site.
    d. Vehicles parked away from contaminated area.
5. Wear washable or disposable protective clothes at the worksite; shower and change into clean clothes before leaving the worksite to prevent contamination of cars, homes, and other work areas.
6. Use respiratory protection when source controls cannot keep silica

exposures below the NIOSH REL.

7. Provide periodic medical examinations for all workers who may be exposed to crystalline silica.
8. Post signs to warn workers about the hazard and to inform them about required PPE.
9. Provide workers with training that includes information about health effects, work practices, and protective equipment for crystalline silica.
10. Report all cases of silicosis to the state health department as well as OSHA.

Abrasive Wheels

29 CFR 1926.303 - Abrasive wheels and tools

An abrasive wheel is defined as a cutting tool consisting of abrasive grains held together by organic (resin, rubber, shellac or similar bonding agent) or inorganic bonds. Hazards that present themselves during abrasive wheel operations include physical contact with the rotating wheel; destruction of the wheel itself; inhalation of the bonding particles; and being struck by flying fragments. All of these hazards can be eliminated through adherence to appropriate machine guarding principles, appropriate PPE, and/or respiratory protection.

Immediately before mounting, wheels must be inspected and sounded (ring test) to ensure they have not been damaged. You must ensure that the spindle speed does not exceed the maximum operating speed noted on the wheel.

Ring Test

The wheel to be tested must be dry and free from sawdust. Wheels should be tapped gently with a light, nonmetallic implement, such as the handle of a screwdriver, or a wooden mallet for heavier wheels. If they sound cracked (dead), then the wheels may not be used. It should be noted that organic bonded wheels do not emit the same clear metallic ring as do vitrified and silicate wheels. Tap the wheels about 45° each side of the vertical centerline and about one or two inches from the periphery. Rotate the wheel about 45° and repeat the test. A sound, undamaged wheel will give a clear metallic tone.

Guarding: Abrasive Blades in Portable Circular Saws

It is important to distinguish between a saw and an abrasive blade because they have different guarding requirements. An abrasive wheel, as defined by 29 CFR 1910.211(b)(14) and American National Standards Institute (ANSI) B7.1-1970, is "a cutting tool consisting of abrasive grains held together by organic or inorganic bonds."

If a wheel is, for example, constructed with bonded steel fragments arranged in intermittent clusters around the periphery of a steel disc, then the steel fragments are too large and sharp to be considered abrasive grains. If these fragments remove material primarily by severing rather than by abrasion, then this would be considered a saw blade and the guarding requirements would be found in *General Requirements,* located at 29 CFR 1926.300.

If, in fact, cutting is done by the abrasive action of the abrasive grains, guarding requirements are found in *Abrasive Wheels and Tools,* located at 29 CFR 1926.303(b).

ANSI B7.1 requires the upper half of the abrasive blade to be guarded when abrasive wheels are installed on portable power driven circular saws.

Ariel Lifts

29CFR 1926.453 - Aerial lifts

Aerial lifts acquired for use which were manufactured on or after January 22, 1973, will have a placard or label affixed indicating that the lift is designed and constructed in accordance with ANSI standard A92.2-1969. Aerial lifts acquired for use prior to January 22, 1973, may not be used unless modified to meet this standard. Aerial lifts may be modified to perform other than originally designed tasks, provided that the modifications are certified by the manufacturer or a nationally recognized testing laboratory and that the aerial lift conforms with ANSI standard A92.2-1969 and is as safe as it was before the modifications.

Aerial lifts include the following types of vehicle-mounted aerial devices used to elevate personnel to jobsites above the ground:

a. Extensible boom platforms
b. Aerial ladders
c. Articulating boom platforms
d. Vertical towers
e. A combination of any of the above

Only authorized persons may operate an aerial lift.

Lift controls and equipment must be inspected and tested each shift and prior to use, to determine that they are in safe working order. The inspection must be documented.

When working from an aerial lift, you must stand firmly on the floor of the basket or cage, and **use (wear) an approved fall restraint system**. The fall restraint system must be attached to the boom or basket – it may not be attached to any adjacent pole, structure, or other equipment. You may not sit or climb on the edge of the basket; also, **do not** use planks, ladders, or other devices for a work position.

Load limits set by the manufacturer must never be exceeded.

The brakes must be set. When outriggers are used, they shall be positioned on pads or a solid surface.

Aerial lifts must not be moved with personnel in the basket unless it is designed for this type of operation. Aerial lifts designed as personnel movers must have controls that are clearly marked as to their use and the lower controls must be able to override the upper controls. Except in an emergency, the lower controls shall not be used unless permission has been granted by the persons in the lift.

It is required that the vehicle have a “reverse signal alarm” audible above the surrounding noise level **or** a ground-guide (spotter), using standard hand signals, when backing up. The vehicle will be backed up only when the spotter signals that it is safe to do so. Using a

ground-guide provides a substantially higher level of safety than a “reverse signal alarm” because the vehicle can be guided to an exact location with assurance that there is sufficient clearance from objects, and, most importantly, no person is in harm’s way. Special attention will be given to avoiding contact with electrical lines.

Permit-Required Confined Space Program for Construction

The purpose of this written Permit-Required Confined Space Program for Construction is to ensure safe practices are utilized prior to and during all construction work activities in permit-required confined spaces. Our program is designed to prevent personal injuries, illness, and fatalities in confined spaces. As an employer, C&S Companies has developed and implemented this document to meet the written program requirements specified in OSHA regulation 29 CFR 1926 Subpart AA, Confined Spaces in Construction Standard.

This overall program is intended to control and, where appropriate, to protect employees from permit space hazards and to regulate employee entry into permit spaces. Our written program provides the basis for construction-related permit space entry operations, as well as a reference for guiding supervisors and employees (including contract employees) that we direct as an "entry employer." It also serves to assign accountability for all functions related to permit space entry and will aid in avoiding mistakes and misunderstandings.

The elements contained in this Permit-Required Confined Space Program for Construction must be implemented and followed in all construction work situations where entry into permit spaces is necessary. Entry means the action by which any part of a person passes through an opening into a permit-required confined space. Entry includes ensuing work activities in that space and is considered to have occurred as soon as any part of the entrant's body breaks the plane of an opening into the space, whether or not such action is intentional or any work activities are actually performed in the space.

However, the program elements do not apply to construction work regulated by 29 CFR 1926 Subpart P, Excavations Standard; 29 CFR 1926 Subpart S, Underground Construction, Caissons, Cofferdams and Compressed Air Standard; nor 29 CFR 1926 Subpart Y, Diving Standard.

Please note that although OSHA calls for a permit space program to meet the requirements of §1926.1204, the agency allows employers to fulfill this obligation through a combination of the written permit space program and the entry permit itself. This gives us the opportunity to operate with a more "general" permit space program that covers numerous types of permit spaces and hazards, along with a "specific" entry permit that includes the unique hazards and practices applicable to each of those spaces. Our company has chosen to treat the permit as part of this written permit space program, when such a permit is required, in order to convey all the applicable information to employees at the required times.

The H&S Department has overall responsibility for this Permit-Required Confined Space Program for Construction and its review and revision. The Permit Space Program Administrator consults with affected employees and their authorized representatives on the development and implementation of all aspects of the program, in accordance with §1926.1212. All information required to be developed by 29 CFR 1926 Subpart AA is also available to affected employees and their authorized representatives.

This written program is made available prior to and during entry operations for inspection by employees and their authorized representatives. Refer to §1926.1202 for definitions to many of the technical terms used in this program.

We encourage all suggestions because we are committed to creating a safe place to work for all employees we direct. A clear and effective permit space program is a critical component of our overall safety and health efforts.

Combustible & Flammable Liquid Handling

29 CFR 1926.152 - Flammable and combustible liquids

Only approved containers and portable tanks will be used for storage and handling of flammable and combustible liquids. Approved safety cans or Department of Transportation approved containers will be used for handling and use of flammable liquids in quantities of 5 gallons or less.

Note 1: **The above does not apply to flammable liquid materials which are highly viscid (extremely hard to pour) which may be used and handled in their original shipping containers.**

Note 2: **For quantities of one gallon or less, the original container may be used for storage, use and handling.**

Flammable or combustible liquids may not be stored in areas used for exits, stairways, or normally used for the safe passage of people.

Inside a facility, no more than 25 gallons of flammable or combustible liquids may be stored in a room outside of an approved storage cabinet.

GASOLINE

General Information

Because most persons use or indirectly handle gasoline on a regular basis, from filling up automobiles to lawn mowers, the hazards presented by this product may have become obscure. Just because you are familiar with gasoline, never lose sight of the lethal hazards that it may contain.

Gasoline is a flammable liquid which means it has a flash point of less than 100ºF. The actual flash point – lowest temperature at which a liquid gives off enough vapor to form a flammable mixture with air – of gasoline is -45ºF. The auto-ignition temperature – the temperature at which, with sufficient oxygen, gasoline will ignite on its own and burn – is 536ºF.

Gasoline has a specific gravity – the weight of the gasoline compared to the weight of an equal volume of water – of 0.73. Further, gasoline has a negligible solubility in water. Basically, what the above means is that if water is used to extinguish a gasoline fire, it will only spread it because the gasoline will float on the water and continue to give off a vapor and form a flammable mixture with air. Gasoline fires must be fought with an extinguisher that is rated for Class B fires such as carbon dioxide, dry chemical, or foam. It should be noted that water spray may be used to cool containers that may be exposed to the heat of the fire to prevent an explosion.

1. Conditions to avoid: heat, flame, & sources of ignition
2. Materials to avoid: strong oxidizers
3. Health hazard information: routes of entry: inhalation, skin, ingestion
4. Signs & symptoms of overexposure: headache, nausea, drowsiness, breathlessness, fatigue, convulsions, loss of conscience, dermatitis

If there is a spill, notify emergency response personnel, evacuate area, remove ignition sources, and build a dike to contain flow – do not flush to sewer or open water. Pick up with inert absorbent and place in closed container for disposal.

Gasoline is a carcinogen – a cancer causing agent.

General rules: Post "No Smoking" signs around gasoline storage and ensure that it is enforced. Use only approved plastic or metal containers for portable gasoline carriers. They must not contain more than 5 gallons.

Double check with local ordinances for storage requirements.

Combustible Gas Indicators

The below information is extracted from OSHA Hazard Information Bulletin, dated, January 18, 1990, subject: *The Use of Combination Oxygen and Combustible Gas Detectors*.

In tank removal operations, it is common practice to purge a tank containing flammable vapors with either carbon dioxide or an inert gas, such as nitrogen. When the oxygen content falls to about 10% or below, a false combustible gas indicator reading can occur.

The combination oxygen and combustible gas meter is used to test atmospheres for sufficient oxygen content for life support and/or the presence of combustible gases or vapors posing a potential flammability/ explosion hazard. Common examples of locations where this instrument is used include storage tanks, confined spaces, manholes, tank cars, ships and shipyards, tunneling, pumping stations and hazardous waste sites.

The combustible gas indicator is designed to measure combustible gas or vapor content in air. This instrument is capable of detecting the presence of any gas or vapor which, when combined with oxygen in free air, presents a potential hazard due to flammability/explosion. The combustible gas indicator will not indicate the combustible gas content in atmospheres containing less than 10% oxygen.

Each instrument has its own set of operating procedures and instructions, however:

a. The instrument should not be used where oxygen concentration exceeds that of fresh air (oxygen enriched atmosphere) when sampling for gases like acetylene and hydrogen.
b. Certain materials such as silicon, silicates (such as in certain hydraulic fluids) and organic lead (such as in leaded gasoline) will poison the combustible gas sensor thereby giving erroneously low readings.
c. Combustible gas readings, either negative or greater than 100% LEL, may indicate an explosive concentration of gas beyond the accurate response range of the sensor.
d. Pressurized or low pressure samples will give erroneous oxygen percent readings.
e. Acid gases, such as carbon dioxide, will shorten the service life of the oxygen sensor.
f. The instrument will not indicate the presence of combustible airborne mists or dusts such as lubricating oils, coal dust or grain dust.

The safe and effective performance of any oxygen/combustible gas detector requires that the operator know the correct use of the instrument to detect explosive concentrations of combustibles. It is important that the instrument response be appraised in light of the limitations and guidelines given in the instrument manual. The instrument should be operated only after the instructions, labels, cautions and warnings, and all other literature accompanying the instrument are carefully read and understood.

Company Vehicles

At C&S, the personal safety of each employee is and always will be of primary importance. Safety is an overriding responsibility that demands attention from everyone at C&S. Safety is everyone's job.

The purpose of this policy is to ensure the safety of those individuals who drive company vehicles or use personal and/or rental vehicles for company business* and to provide guidance on the proper use of these vehicles. Vehicle accidents are costly to C&S but, more importantly, they may result in injury to C&S employees or others.

* *Company business is defined as driving at the direction, or for the benefit, of an employer. It does not include normal commuting to and from work.*

C&S expects each employee driving a company vehicle or driving a personal and/or rental vehicle on company business to drive in a safe and courteous manner in accordance with applicable laws and rules and pursuant to the following safety rules. The attitude you take when behind the wheel is the single most important factor in driving safely.

A. DRIVER CRITERIA/ REVOCATION OF DRIVING PRIVILEGES

- All drivers must have a valid driver's license with the proper class and appropriate endorsements for the vehicles they are operating.
- Drivers must not drive if their license has been suspended or revoked. If your license revoked or suspended you shall immediately notify the Human Resources Department by 9 a.m. Eastern time the next business day, and immediately discontinue operation of any vehicle on company business. Failure to do so may result in disciplinary action, including termination of employment.
- Drivers must report all accidents, moving violations within seventy-two (72) hours to their immediate supervisor and to the Health and Safety Department. A voicemail left does not constitute notification. Employees are responsible for all ticket violations received, including any non-moving or parking violations. Drivers must report all accidents per the Accident Reporting Procedures set forth below.

Motor Vehicle Records (MVRs) will be obtained on new drivers at the time of employment or when transitioning into a driving position. Drivers will be monitored on an ongoing basis. Management will determine the acceptability of a driver's MVR. Prospective employees must have an MVR that is CLEAR or ACCEPTABLE to be hired for positions requiring driving. Current drivers must have an MVR record that is CLEAR, ACCEPTABLE, or BORDERLINE. Management may restrict the driving privileges of individuals with

BORDERLINE MVR records or require drivers to receive additional training or monitoring. Drivers with POOR MVR records will be suspended from driving on organization business.

MINOR MOVING VIOLATIONS (Past 3 years)	PREVENTABLE ACCIDENTS (Past 3 years)			
	0	1	2	3+
0	CLEAR	ACCEPTABLE	BORDERLINE	POOR
1	ACCEPTABLE	ACCEPTABLE	BORDERLINE	POOR
2	ACCEPTABLE	BORDERLINE	POOR	POOR
3	BORDERLINE	POOR	POOR	POOR
4+	POOR	POOR	POOR	POOR
ANY MAJOR Violations (Past 3 years)	POOR	POOR	POOR	POOR

B. DRIVER GUIDELINES FOR COMPANY VEHICLES

1. C&S vehicles are to be driven by authorized employees only, except in case of repair testing by a mechanic.

2. Employees are responsible for returning C&S vehicles with a full tank of gas. Employees are to use a self-service fuel station when possible and to use regular unleaded gas only, unless otherwise specified. Employees should submit for reimbursement of any such expenses.

3. Copies of the Vehicle Registration, the Insurance Card, and a Vehicle Accident Report Packet must be kept in the vehicle at all times.

C. ACCIDENT PROCEDURES-COMPANY AND PERSONAL VEHICLES WHILE ON COMPANY BUSINESS

1. To minimize the results of an accident, the driver must prevent further damage or injuries and obtain all pertinent information and report it accurately.

    - Call for medical aid if necessary.

    - Call the police. **All accidents, regardless of severity, must be reported to the police**. If the driver cannot get to a phone, they should write a note giving their location to a reliable-appearing motorist and ask them to notify the police.

    - Do not discuss the accident with anyone at the scene except the police. Do not accept any responsibility for the accident. Don't argue with anyone.

2. All accidents in company vehicles, regardless of severity, must be reported to your immediate supervisor and the Health and Safety Department. A voicemail left does not constitute notification. Accidents are to be reported immediately (from the scene, during the same day, or as soon as practicable if immediate or same day reporting is not possible). Accidents in personal vehicles while on company business* ***must*** follow these same accident procedures. Failing to stop after an accident and/or failure to report an accident may result in disciplinary action, up to and including termination of employment.

    * *Company business is defined as driving at the direction, or for the benefit, of an employer. It does not include normal commuting to and from work.*

3. Use a camera or cell phone to record as much information as you can, and to take pictures of any damage and the accident scene. Try to take down as much information as possible including the names, addresses, and license numbers of other drivers; the names and addresses of witnesses, occupants of the other vehicles, and any medical personnel who may arrive at the scene; insurance company names and policy numbers of other vehicles; make, model, and year of other vehicles; date and time of accident; and overall road and weather conditions.

4. Provide the other party with your name, address, driver's license number, and insurance information.

D. SPECIAL PROCEDURES FOR RENTAL VEHICLES WHILE ON COMPANY BUSINESS

Before driving your vehicle off the rental company lot, note its appearance and condition (many rental agencies will assist you with this.) If possible, take photographs of any damage that you see.

In the event your vehicle suffers damage whether in an accident or otherwise:

- If there are injuries, call 911 immediately.
- If no injuries are suffered, contact the police, and explain that you need to file an accident report. All accidents, regardless of severity must be reported to the police. You must wait at the scene for an officer to respond. Insurance companies and rental car agencies require an accident report for investigative purposes and leaving the scene of an accident is considered a crime.
- Exchange information with all parties involved in the accident. Never admit fault.
- If you have a camera or camera phone, take pictures of the scene and the damage to the vehicle.
- Call the rental car agency.
- Contact your supervisor and Health and Safety to report the accident to C&S. Members can be reached on their cell numbers if the incident occurs after normal C&S business hours.
- Keep all paperwork related to your rental and the accident—No matter how insignificant.
- If the car must be towed to a garage, make note of the name and location of the towing company and garage.
- Make sure you remove all personal and company-owned belongings from the vehicle prior to it being towed.

E. DRIVER RULES

1. The use of a company vehicle or of a personal and/or rental vehicle while on company business while under the influence of intoxicants and other drugs (which could impair driving ability) is forbidden and is sufficient cause for discipline, up to and including termination of employment.

2. Cell phone use while driving should be kept to a minimum. For the safety of C&S employees and other drivers, and in compliance with applicable law, using any cell phone in a C&S vehicle is prohibited unless a hands-free device is being used. Drivers cannot text or send e-mail messages while driving. Attention to the road and safety should always take precedence over conducting business over the phone.

3. No driver shall operate a company vehicle or a personal and/or rental vehicle while on company business when his/her ability to do so safely has been impaired by illness, fatigue, injury, or prescription medication.

4. C&S recognizes that safety belts are an important effective item of personal protective equipment and that people needlessly die and are injured due to failure to use available safety belts. All drivers and passengers operating or riding in a C&S vehicle or in a personal vehicle being used for C&S business ***must*** wear seat belts, even if air bags are available.

5. No unauthorized personnel are allowed to ride in company vehicles or rental vehicles rented for company business.

6. Drivers are responsible for the security of company vehicles assigned to them. The vehicle engine must be shut off, ignition keys removed, and vehicle doors locked whenever the vehicle is left unattended.

7. Head lights must be used in accordance with the state laws which the vehicle is operating in. As a rule of thumb, head lights should be used sunset to sunrise, during inclement weather, and at any time when a distance of 1,000 feet ahead of the vehicle cannot be seen clearly.

8. All state and local vehicle and traffic laws must be obeyed.

9. No vehicle will be used for transporting any bulk material that protrudes from the trunk/cargo area or interior compartment (excluding company equipment).

10. Smoking is not permitted in any C&S vehicles.

11. Employees may not use a C&S vehicle for any livery activities including providing services with companies such as Uber or Lyft.

F. DEFENSIVE DRIVING GUIDELINES

- Drivers are required to maintain a safe following distance at all times. Drivers should keep a two second interval between their vehicle and the vehicle immediately ahead. During slippery road conditions, the following distance should be increased to at least four seconds.

- Drivers must yield the right of way at all traffic control signals and signs requiring them to do so. Drivers should also be prepared to yield for safety's sake at any time. Pedestrians and bicycles in the roadway always have the right-of-way.

- Drivers must honor posted speed limits. In adverse driving conditions, drivers should reduce speed to a safe operating speed that is consistent with the conditions of the road, weather, lighting, and volume of traffic. Tires can hydroplane on wet pavement at speeds as low as 40 mph.

- Radar detectors are strictly prohibited in C&S vehicles. Drivers are to drive at the speed of traffic but never to exceed the posted speed limit.

- Turn signals must be used to show where you are heading, while going into traffic, and before every turn or lane change.

- When passing or changing lanes, view the entire vehicle in your rear-view mirror before pulling back into that lane.

- Be alert to other vehicles, pedestrians, and bicyclists when approaching intersections. Never speed through an intersection on a caution light. When the traffic light turns green, look both ways for oncoming traffic before proceeding.

- When waiting to make left turns, keep your wheels facing straight ahead. If rear-ended, your vehicle will not be pushed into the lane of oncoming traffic.

- When stopping behind another vehicle, leave enough space so that you can see the rear wheels of the vehicle car in front of you. This allows room to go around the vehicle if necessary and may prevent you from being pushed into the car in front of you if you are rear-ended.

- Avoid backing-up where possible, but, when backing-up is necessary, keep the distance traveled to a minimum and be particularly careful.

- Check behind your vehicle before backing up.

- Back to the driver's side. Do not back around a corner or into an area of no visibility.

G. VEHICLE MAINTENANCE

It is the responsibility of every driver of a C&S vehicle to be aware of and report any defects in or malfunctions of the assigned vehicle to the following individuals:

- C&S Tech and Design Build Vehicles- Randy Tuthill
- Regional Office Vehicles- As designated by your supervisor

It is the responsibility of C&S to assess and correct, as necessary, those defects while also providing regular preventative maintenance to all company vehicles.

No vehicle will be operated that is not in safe mechanical condition

It is expected that the below safe vehicle operation/driving procedures will be followed at all times:

a. Seat belts will be worn by all occupants at all times while the vehicle is in motion
b. Safe distance (one vehicle length per 10 MPH) will be maintained
c. Posted speed limits will not be exceeded
d. Constant attention will be maintained by always being aware of road conditions and surrounding vehicles
e. Before backing up any vehicle, check behind for the safety of others

Compressed Air

29 CFR 1910.101 - Compressed gases (general requirements)
29 CFR 1910.242 - Hand and Portable Powered Tools and Other Hand-Held Equipment 29 CFR 1910.169 - Air Receivers
29 CFR 1926.302 - Tools - Power-operated hand tools 29 CFR 1926.306 - Air Receivers

Prior to using compressed air, employees will receive training in:

1. Safe use of compressed air.
2. Pneumatic power tools.
3. Inspection of compressed gas cylinders

Safe Use of Compressed Air

The below applies to compressed air receivers, and other equipment used in providing and utilizing compressed air for performing operations such as cleaning, drilling, hoisting, and chipping:

1. Air receivers shall be so installed that all drains, handholes, and manholes therein are easily accessible. Under no circumstances shall an air receiver be buried underground or located in an inaccessible place.
2. A drain pipe and valve shall be installed at the lowest point of every air receiver to provide for the removal of accumulated oil and water. Adequate automatic traps may be installed in addition to drain valves. The drain valve on the air receiver shall be opened and the receiver completely drained frequently and at such intervals as to prevent the accumulation of excessive amounts of liquid in the receiver.
3. Every air receiver shall be equipped with an indicating pressure gauge (so located as to be readily visible) and with one or more spring-loaded safety valves. The total relieving capacity of such safety valves shall be such as to prevent pressure in the receiver from exceeding the maximum allowable working pressure of the receiver by more than 10 percent.
4. No valve of any type shall be placed between the air receiver and its safety valve or valves.
5. Safety appliances, such as safety valves, indicating devices and controlling devices, shall be constructed, located, and installed so that they cannot be readily rendered inoperative by any means, including the elements.
6. All safety valves shall be tested frequently and at regular intervals to determine whether they are in good operating condition.

Compressed Gas Cylinders

29 CFR 1926.350 - Gas welding and cutting

Compressed Gas Cylinders Use

Compressed gas cylinders are used on many job sites – the most common being oxygen and acetylene for welding.

Failure to follow basic safety procedures could result in serious injuries such as:

a. Flash burn – due to explosion.
b. Fragment impalement – due to explosion.
c. Compression of the foot – due to mishandling of tanks.
d. Inhalation of hazardous gases – due to leakage.

Basic Safety Procedures for Compressed Gas Cylinders

a. Cylinders must remain upright and chained to a substantial support or cart when in use.
b. Wear appropriate personal protective equipment for the job – such as steel toed shoes, apron, goggles, gloves, helmet, etc.
c. Have appropriate fire extinguisher readily available
d. To release the gas, open the cylinder valve slowly – standing away from the face and back of the gage – and leave the opening tools in place (on the valve stem) for quick shut-off in the event of an emergency.
e. Ensure cylinders valves, regulators, couplings, and hose are free of oil and grease and ensure all connections are tight.
f. When using oxygen-fuel systems, use flashback arrestors and reverse-flow check valves to prevent flashback.
g. Keep cylinders away from open flames and sources of heat.
h. Cylinders are never allowed in confined spaces.
i. Do not alter or attempt to repair safety devices or valves.
j. Remove the regulators when: a) moving cylinders not in a cart; b) work is completed; and c) cylinders are empty.
k. Take care to prevent combustible materials from exposure to welding or cutting operations.

All employees who use compressed gas cylinders will be trained in their proper storage, handling, and use.

Specific requirements for compressed gas cylinders use include:

a. Compressed gas cylinders will be clearly marked to identify the gas contained therein. Gas identification must be stamped or stenciled on the gas cylinder or a label affixed. No gas cylinder will be accepted for use that does not legibly identify its content by name.
b. Visual or other inspections will be performed by the competent person on site to ensure the compressed gas cylinders are in a safe condition.
c. Compressed gas cylinders will be inspected to ensure they are equipped with the correct regulator. Before use, regulators and cylinder valves will be inspected to ensure they are free from oil, dirt, and solvents.
d. Compressed gas cylinders will have valve protectors in place when not in use **or** connected for use.
e. When a cylinder cap cannot be removed by hand, the cylinder will be tagged **"Do Not Use"** and returned to the designated storage area for return to the vendor.

f. The user of the compressed gas cylinders will use **only the tools supplied by the provider** to open and close cylinder valves.

g. Valves will be closed before the cylinder is moved, when the cylinder is empty, and at the completion of each job.

h. Leaking cylinders will be moved to an isolated, well-ventilated area, away from ignitions sources.

Note: Soapy water will be used to detect the exact location of the leak. If the leak is at the junction of the cylinder valve and cylinder, do not attempt to repair it. The supplier will be contacted and asked for proper response instructions.

i. Gasses may never be mixed in a cylinder. **Only professionals may refill gas cylinders.**

j. Hoses and connections will be inspected regularly for damage. Hoses should be stored in cool areas and protected from damage.

Compressed Gas Cylinders Storage

a. Cylinders must be secured at all times in such a way as to avoid them being knocked over or damaged. They must be stored in a vertical position. They must be segregated based on contents. 20 feet should be maintained between oxidizers and flammables or firewalls erected at least 5 feet high with a fire rating of 30 minutes.

b. Cylinders must be protected from damage, corrosion, sunlight.

c. Cylinders must be stored in well protected, well ventilated, dry locations away from sunlight. Cylinders will never be kept in unventilated enclosures such as lockers or cupboards.

d. Cylinders must be stored away from stairs, elevators, and gangways.

e. Clearly designated and labeled **separate storage area** will be provided for **full and empty** cylinders.

f. Empty cylinders that are no longer needed must be marked as “MT” and dated when empty. Empty cylinders must be handled as carefully as full cylinders.

g. Cylinders will be capped when they are not being used.

Transportation of Compressed Gas Cylinders

a. Compressed gas cylinders must be transported in a vertical secured position using a cylinder basket or cart.

b. Regulators must be removed and cylinders capped before movement.

c. Cylinders may never be rolled. Cylinders should not be dropped or permitted to strike violently.

d. Protective caps are not to be used to lift cylinders.

Inspection of compressed gas cylinders

We shall determine that compressed gas cylinders under our control are in a safe condition

to the extent that this can be determined by visual inspection. Visual and other inspections shall be conducted as prescribed in the Hazardous Materials Regulations of the Department of Transportation (49 CFR parts 171-179 and 14 CFR part 103).

Where those regulations are not applicable, visual and other inspections shall be conducted in accordance with Compressed Gas Association Pamphlets C-6-1968 and C-8-1962, which is incorporated by reference as specified in Sec. 1910.6.

Note: Compressed gas cylinders, portable tanks, and cargo tanks shall have pressure relief devices installed and maintained in accordance with Compressed Gas Association Pamphlets S-1.1-1963 and 1965 addenda and S-1.2-1963, which is incorporated by reference as specified in Sec. 1910.6.

Concrete and Masonry Construction

29 CFR 1926.701 - General requirements
29 CFR 1926.702 - Requirements for equipment and tools
29 CFR 1926.703 - Requirements for cast-in-place Concrete
29 CFR 1926.704 - Requirements for precast concrete
29 CFR 1926.705 - Requirements for lift-slab operations
29 CFR 1926.705 App - Lift Slab Operations
29 CFR 1926.706 - Requirements for masonry construction

Concrete and masonry construction, more so than most trades, are highly skilled activities that require numerous specialized abilities including, but not limited to, an understanding of chemistry, building techniques, specialized tools, and a unique language. The definitions below are extracted from OSHA standards; however they barely scratch the surface. Words and phrases such as: Adiabatic Curing, Hand Float, and Water- Cement Ratio are peculiar to these trades.

Definitions

Listed below are terms, with accompanying OSHA notes, which must be understood when dealing with concrete and masonry construction:

BULL FLOAT: A tool used to spread out and smooth concrete.

Note: Bull float handles that might contact energized electrical conductors must be constructed of nonconductive materials or insulated with a nonconductive sheath.

FORMWORK: The total system of support for freshly placed or partially cured concrete, including the mold or sheeting (form) that is in contact with the concrete as well as all supporting members including shores, re- shores, hardware, braces, and related hardware.

Note: Formwork must be designed, fabricated, supported, braced and maintained so that it will be capable of supporting without failure all vertical and lateral loads that may reasonably anticipated to be applied to the formwork.

Note: Drawings with all revisions for the jack layout, formwork (including shoring equipment), working decks, and scaffolds must be available at the job site.

LIFT SLAB: A method of concrete construction in which floor and roof slabs are cast on or at ground level and, using jacks, lifted into position.

LIMITED ACCESS: An area alongside a masonry wall, which is under construction, and

Zone, which is clearly demarcated to limit access by employees.

PRECAST CONCRETE: Concrete members (such as walls, panels, slabs, columns, and beams) which have been formed, cast, and cured prior to final placement in a structure.

RE-SHORING: The construction operation in which shoring equipment (also called re-shores or re-shoring equipment) is placed, as the original forms and shores are removed, in order to support partially cured concrete and construction loads.

Note 1: All Shoring equipment must be inspected prior to erection to determine that the equipment meets the requirements specified in the formwork drawings.

Note 2: Shoring equipment found to be damaged such that it is not capable of supporting without failure all vertical and lateral loads that may reasonably anticipated to be applied to them must not be used.

Note 3: Erected shoring equipment shall be inspected immediately prior to, during, and immediately after concrete placement.

Note 4: Shoring equipment that is found to be damaged or weakened after erection, such that its strength is reduced to the point where it is not capable of supporting without failure all vertical and lateral loads that may reasonably anticipated to be applied to them will be immediately reinforced.

Note 5: The sills for shoring must be sound, rigid, and capable of carrying the maximum intended load.

Note 6: All base plates, shore heads, extension devices, and adjustment screws must be in firm contact, and secured when necessary, with the foundation and the form.

Note 7: Eccentric loads on shore heads and similar members shall be prohibited unless these members have been designed for such loading.

Note 8: Whenever single post shores are used one on top of another (tiered), the below will apply:

- **a. The design of the shoring shall be prepared by a qualified designer and the erected shoring shall be inspected by an engineer qualified in structural design.**
- **b. The single post shores shall be vertically aligned.**
- **c. The single post shores shall be spliced to prevent misalignment.**
- **d. The single post shores shall be an adequately braced in two mutually perpendicular directions at the splice level. Each tier shall also be diagonally braced in the same two directions.**

Note 9: Adjustment of single post shores to raise form work will not be made after the placement of concrete.

Note 10: Re-shoring shall be erected, as the original forms and shores are removed, whenever the concrete is required to support loads in excess of its capacity.

SHORE: A supporting member that resists a compressive force imposed by a load

TREMIE: A pipe through which concrete may be deposited under water

Note: Sections of tremies and similar concrete conveyances must be secured with wire rope (or equivalent materials) in addition to the regular couplings or connections.

VERTICAL SLIP FORMS: Forms which are jacked vertically during the placement of concrete

JACKING OPERATION: The task of lifting a slab (or group of slabs) vertically from one location to another (e.g., from the casting location to a temporary location, or to its final location in the structure), during the construction of a building/ structure where the lift-slab process is being used

Rebar Protection

All protruding reinforcing steel bars which employees could fall onto or into, will be guarded to eliminate the hazard of impalement. Protection from impalement on protruding rebar is

primarily a function of fall protection when employees are working above rebar or other impalement hazards.

When working at the same grade as rebar protruding 4 to 6 feet, there is not, for all practical purposes, an impalement hazard. In these instances, acceptable rebar caps are appropriate to prevent cuts, abrasions or other minor injuries.

At grade, the lower the rebar sticks up, the greater the impalement hazard due to tripping. If there is any chance for impalement, acceptable rebar caps are mandatory.

Major Hazards

Both concrete and masonry construction require skilled, trained personnel to produce quality work performed in a safe manner. Serious accidents, including wall collapse, can happen in an instant due to premature removal or actual failure of the formwork. Additionally, failure to brace masonry walls, failure to support precast panels, overloading, etc., can cause serious mishaps.

No construction loads will be placed on a concrete structure unless our competent person determines, based on information received from a person who is qualified in structural design, that the structure or portion of the structure is capable of supporting the loads.

Prior to construction of a masonry wall, a limited access zone will be established as follows:

a. It must be equal to the height of the wall to be constructed plus 4 feet and it must run the entire length of the wall
b. On the side of the wall that will not have scaffolding, the limited access zone must be:

    1. Restricted to entry only by employees actively engaged in constructing the wall
    2. If the wall is 8 feet or less, the limited access zone will be kept in place until the wall is adequately supported to prevent overturning and collapse
    3. If the height of the wall is more than 8 feet and unsupported, the wall must be braced and the bracing must remain in place until permanent supporting elements of the structure are in place

Concrete and masonry work are performed in such a variety of circumstances and conditions – underground, over ground, on sides of structures, on top of structures, inside confined spaces, precast and cast in-place concrete, etc.. Each circumstance presents specific hazards which must be addressed. The competent person on site will point out unusual, specific hazards and means to deal with them.

Safety Procedures

The competent person will ensure that all equipment is inspected as required and defective equipment is removed from service.

The competent person will ensure the drawings or plans, with revisions, for all equipment and procedures to be used in concrete or masonry construction are available at the job site.

For the safety of all employees, the following safety rules are established:

a. Limited or controlled access zones will be restricted to employees who have actual job responsibilities within the established zones.
b. Employees will not work under concrete buckets while they are being elevated or lowered into position.

c. Employees, except those required for the job, are not allowed under precast concrete members while they are being lifted or tilted into position.
d. Personal protective equipment, determined by the competent person on the job site, will be used without exception. It should be noted that when cement is mixed with water, a highly alkaline solution is produced by the dissolution of calcium, sodium, and potassium hydroxides. Gloves should be worn to protect the skin. Hands should be washed after contact. OSHA requires head and face equipment for employees applying a mixture of cement, sand, and water through a pneumatic hose.
e. Employees will not be allowed to perform maintenance on any equipment where the unexpected activation of that equipment could cause harm without following the procedures in our Control of Hazardous Energy Program.
f. When fastening other materials to a concrete surface (such as a wooden 2" X 4"), only a fastener of 7/32-inch shank diameter or less will be driven in and it may be no closer than 2 inches from the unsupported edge or corner of the work surface.
g. Fasteners will not be driven directly into brick or concrete closer than 3" from the unsupported edge of corner unless a special guard, fixture, or jig is used.

Note: Exception to the above: Low-velocity tools may drive no closer than 2" from an edge in concrete.

h. Concrete mixers with one cubic yard or larger loading skips will be equipped with a:
    1. Mechanical device to clear the skip of materials
    2. Guardrail installed on each side of the skip

Note: Regardless of the size of the skip, point of operation guarding must be utilized.

Concrete Cutting

Only trained and authorized personnel will operate concrete cutting equipment. The following guidelines will be used during all concrete cutting operations.

Employees must follow the requirements of 29 CFR 1926.1153

a. Follow the manufacturer's recommendations for the safe use of the equipment.
b. Use the correct blade (size, type, speed) for the job, properly tightened. Inspect the blade and all equipment before use.
c. Ensure all safety guards are functioning properly.
d. Never operated a hand held saw above shoulder height.
e. Wear proper safety equipment including eye, hand and skin protection. Depending on the job, respiratory protection or dust masks may be required.
f. Establish a control zone and keep others out who are not directly involved with the work at hand.
g. Ensure there is adequate coolant/water when appropriate.
h. Never operate an internal combustion saw in a confined space.

Concrete Pumps and Placing Booms

OSHA has little to say about concrete pumping systems. Essentially, OSHA says that pumping systems using discharge pipes will be provided with pipe supports designed for

100% overload and compressed air hoses used on concrete pumping systems will be provided with positive fail-safe joint connectors to prevent separation of sections when pressurized.

Concrete pumping systems have the potential for serious mishaps due to the machinery, the weight, the set-up, and the operation. Coordination is required between all persons involved in concrete pumping operations.

Only qualified, authorized, employees may operate concrete pumps and place booms. The equipment owner/operator manual must be on site and readily available.

Prior to use, the equipment will be inspected per the manufacturer's instructions and defective equipment will be taken out of service.

Appropriate PPE must be worn including hard hats, face protection, and steel toed work boots.

Extreme care must be exercised in keeping the boom clear of electrical power lines. Safety distances from various electrical currents are found in *Power Line Safety*, located at 29 CFR 1926.1408.

If maintenance is required, and there is potential stored energy within the system, it will be performed under the provisions of *The Control of Hazardous Energy (Lockout/Tagout)*, located at 29 CFR 1910.147.

Delivery Crane Trucks

Note: The below information is applicable to the following crane types and operations:

1. **Articulating/knuckle-boom truck cranes that deliver material to a construction site when used to transfer materials from the truck crane to the ground, without arranging the materials in a particular sequence for hoisting.**
2. **Articulating/knuckle-boom truck cranes that deliver material to a construction site when the crane is used to transfer building supply sheet goods or building supply packaged materials from the truck crane onto a structure, using a fork/cradle at the end of the boom, but only when the truck crane is equipped with a properly functioning automatic overload prevention device. Such sheet goods or packaged materials include, but are not limited to: sheets of sheet rock, sheets of plywood, bags of cement, sheets or packages of roofing shingles, and rolls of roofing felt.**

Note: The above articulating/knuckle-boom crane exclusion does not apply when it is used to 1) hold, support or stabilize the material to facilitate a construction activity, such as holding material in place while it is attached to the structure; 2) when the material being handled is a prefabricated component such as precast concrete members or panels, roof trusses, prefabricated building sections such as, but not limited to: floor panels, wall panels, roof panels, roof structures, or similar items; and, 3) when the material being handled by the crane is a structural steel member (for example, steel joists, beams, columns, steel decking (bundled or unbundled) or a component of a systems-engineered metal building.

All other crane operations fall under *Subpart CC—Cranes and Derricks in Construction*, located here 29 CFR 1926.1400

Cranes, like all pieces of heavy equipment, if not properly operated, inspected and maintained, have a potential for causing major bodily injury or property damage. Care must be taken in all facets of crane operation.

Not only do cranes require a thorough annual inspection (a record of the dates and results of these inspections must be maintained) they require inspection prior to each use and even

during use by a competent person.

All rated load capacities, recommended operating speeds, and special hazard warnings or instructions must be readily visible to the operator of the crane.

While cranes easily have the lifting ability to hoist employees on a personnel platform, this is **absolutely prohibited** except in cases when the erection, use, and dismantling of conventional means of reaching the worksite would be more hazardous or is not possible because of structural design or worksite conditions. A conventional means would include: a personnel hoist, ladder, stairway, aerial lift, and elevating work platform or scaffold.

It is absolutely imperative that the possibility of electrocution be totally eliminated. This can be accomplished by adhering to the safe distances from various currents noted in *The Control of Hazardous Energy (Lockout/Tagout)*, located at 29 CFR 1910.147.

Dangers associated with cranes include numerous moving parts. These dangers can be minimized or eliminated by ensuring that all guards are in place and not tampered with.

Care must be taken to ensure that areas within the swing radius, of the rear of the rotating superstructure of the crane, are barricaded to prevent a person from being struck or crushed.

All employees must keep clear of loads that are about to be lifted as well as suspended loads.

When using slings made from alloy steel chain, wire rope, metal mesh, natural or synthetic fiber rope (conventional three strand construction), and synthetic web (nylon, polyester, and polypropylene), the following safe operating practices will be observed:

a. Slings shall not be shortened with knots or bolts or other makeshift devices.
b. Sling legs shall not be kinked.
c. Slings used in a basket hitch shall have the loads balanced to prevent slippage.
d. Slings shall be padded or protected from the sharp edges of their loads.
e. Hands or fingers shall not be placed between the sling and its load while the sling is being tightened around the load.

Hand signals used to guide the crane operator will be consistent with the ANSI standard for the type of crane in use and an illustration of the signals must be posted at the job site.

Care must be taken while actually operating the crane in hoisting applications as well as when relocating the crane superstructure.

The competent person on site will ensure that the flooring on which equipment may be placed is substantial enough to safely hold the weight of the load. If the strength of the floor is unknown and/or cannot be determined, a professional engineer will determine the pounds per square foot required and, if necessary, the appropriate shoring to be installed to sustain the weight.

Demolition

29 CFR 1926.850 - Preparatory operations
29 CFR 1926.851 - Stairs, passageways, and ladders
29 CFR 1926.852 - Chutes
29 CFR 1926.853 - Removal of materials through floor openings
29 CFR 1926.854 - Removal of walls, masonry sections, and chimneys
29 CFR 1926.855 - Manual removal of floors
29 CFR 1926.856 - Removal of walls, floors, and material with equipment

29 CFR 1926.857 - Storage
29 CFR 1926.858 - Removal of steel construction
29 CFR 1926.859 - Mechanical demolition
29 CFR 1926.860 - Selective demolition by explosives

General Requirements

1. Proper Permits shall be obtained prior to the commencement of any demolition activities.
2. Demolition Permits are to be readily available on site for review.
3. Protection of adjacent structures, property, and sidewalks is to be accomplished prior to commencement of demolition activities.
4. Proper personal protective equipment is to be worn throughout demolition process including but not limited to hard hats, work boots, glasses, and fall protection.
5. Dust control should be implemented to eliminate hazards where dust presents a health hazard, environmental hazard, damage to property.
6. Any entry point or gate openings are to be closed and secured during all demolition activities.
7. Demolition debris is not to remain on any portion of a roof top or sidewalk bridge structure. These areas are to be cleaned daily.

Preparatory Operations

1. Prior to permitting employees to start demolition operations, an engineering survey shall be made by a competent person, of the structure to determine the condition of the framing, floor, and walls, and possibility of unplanned collapse of any portion of the structure. Any adjacent structure where employees may be exposed shall also be similarly checked. Written evidence that such a survey has been performed should be available on the job site.
2. When employees are required to work within a structure to be demolished which has been damaged by fire, flood, explosion or other cause, the walls or floor shall be shored or braced.
3. All electric, gas, water, steam, sewer, and other service lines shall be shut off, capped, or otherwise controlled, outside the building line before demolition work is started. In each case, any utility company, which is involved, shall be notified in advance.
    a. If it is necessary to maintain any power, water or other utilities during demolition, such lines shall be temporarily relocated, as necessary, and protected.
    b. It shall also be determined if any type of hazardous chemicals, gases, explosive, flammable materials, or similarly dangerous substances have been used in any pipes, tanks, or other equipment on the property. When the presence of any such substances is apparent or suspected, testing and purging shall be performed and the hazard eliminated before demolition is started.
4. Where a hazard exists from fragmentation of glass, such hazards shall be removed.
5. Where a hazard exists to employees falling through wall openings, the opening

shall be protected to a height of approximately 42 inches.

6. When debris is dropped through holes in the floor without the use of chutes, the area onto which the material is dropped shall be completely enclosed with barricades not less than 42 inches high and not less than 6 feet back from the projected edge of the opening above. Signs, warning of the hazard of falling materials, shall be posted at each level. Removal shall not be permitted in this lower area until debris handling ceases above.
7. All floor openings, not used as material drops, shall be covered over with material substantial enough to support the weight of any load, which may be imposed. Such material shall be properly secured to prevent its accidental movement

ALL COVERS SHALL BE MARKED "HOLE"

8. Except for the cutting of holes in floors for chutes, holes through which to drop materials, preparation of storage space, and similar necessary preparatory work, the demolition of exterior walls and floor construction shall begin at the top of the structure and proceed downward. Each story of exterior wall and floor construction shall be removed and dropped into the storage space before commencing the removal of exterior walls and floors in the story next below.

9. Employee entrances to multi- story structures being demolished shall be completely protected by a sidewalk sheds or canopies, or both, providing protection from the face of the building for a minimum of 8 feet. All such canopies shall be at least 2 feet wider than the building entrances or openings (1 foot wider on each side thereof) and shall be capable of sustaining a load of 150 pounds per square foot.

Stairs, Passageways and Ladders

1. Only those stairways, passageways and ladders, designated as means of access to the structure of a building, shall be used. Other access ways shall be entirely closed at all times.
2. All stairs, passageways, ladders and incidental equipment thereto, which are covered by this section, shall be periodically inspected and maintained in a clean, safe condition.
3. In a multistory building, when a stairwell is being used, it shall be properly illuminated by either natural or artificial means, and completely and substantially covered over at a point not less than two floors below the floor on which work is being performed, and access to the floor where the work is in progress shall be through a properly lighted, protected and separate passageway.

Chutes

1. No material shall be dropped to any point lying outside the exterior walls of the structure.
2. All materials chutes or sections thereof, at an angle of more than 45 degrees from the horizontal, shall be entirely enclosed except for the openings equipped with closures at or about floor level for the insertion of materials. The openings shall not

exceed 48 inches in height measured along the wall of the chute. At all stories below the top floor, such openings shall be kept closed when not in use.

3. A substantial gate shall be installed in each chute at or near the discharge end. A competent employee shall be assigned to control the operation of the gate, and the backing and loading of trucks.
4. When operations are not in progress, the area surrounding the discharge end of a chute shall be securely closed off.
5. Any chute opening, into which workmen dump debris shall be protected by a substantial guardrail approximately 42 inches above the floor or other surface on which the men stand to dump the material. Any space between the chute and the edge of openings in the floors through which it passes shall be solidly covered over.
6. Where the material is dumped from mechanical equipment or wheel barrows, a securely attached toeboard or bumper, not less than four inches (4") thick and six inches (6") high, shall be provided at each chute opening.
7. Chutes shall be designed and constructed of such strength as to eliminate failure due to impact of materials or debris loaded therein.
8. Every chute used to convey material from a building shall be rigidly supported at its top and braced midway in its height.
9. All chutes constructed of combustible material shall be covered on the exterior with corrugate steel sheeting having a minimum thickness of 24 gauge through the entire height. Alternatively, chutes shall be constructed of non-combustible material.
10. All structural supports of material chutes shall be of noncombustible material.

Removal of Debris through Floor Openings

Any openings cut in a floor for the disposal of materials shall be no larger in size than 25 percent of the aggregate of the total floor area. Floors weakened or otherwise made unsafe by demolition operations shall be shored or braced to carry safely the intended imposed load from demolition operations.

Removal of Walls, Masonry Section and Chimneys

1. Masonry walls, or other sections of masonry, shall not be permitted to fall upon the floors of the building in such masses as to exceed the safe carrying capacities of the floors.
2. No wall section, which is more than one story in height shall be permitted to stand alone without lateral bracing, unless such wall was originally designed and constructed to stand without such lateral support, and is in a condition safe enough to be self-supporting. All walls shall be left in a stable condition at the end of each shift.
3. Employees shall not be permitted to work on the top of a wall when weather conditions constitute a hazard.
4. Structural or load supporting members on any floor shall not be cut or removed until all stories above such a floor have been demolished and removed. This provision shall not prohibit the cutting of floor beams for the disposal of materials or for the installation of equipment provided the terms addressed under manual

removal of floors [**Manual removal of floors. - 1926.855**] is followed.

5. Floor openings within 10 feet of any wall being demolished shall be planked solid, except when employees are kept out of the area below.
6. In building of "skeleton-steel" construction, the steel framing may be left in place during the demolition of masonry. Where this is done, all steel beams, girders, and similar structural supports shall be cleared of all loose material as the masonry demolition progresses downward.
7. Walkways or ladders shall be provided to enable employees to safely reach or leave any scaffold or wall.
8. Walls, which serve, as retaining walls to support earth or adjoining structures, shall not be demolished until such earth has been properly braced or adjoining structures have been properly underpinned.

Manual Removal of Floors

1. Openings cut in a floor shall extend the full span of the arch between supports.
2. Before demolishing any floor arch, debris and other material shall be removed from such arch and other adjacent floor area. Planks not less than two inches (2") by ten inches (10") in cross section, full size undressed, shall be provided for, and shall be used by employees to stand on while breaking down floor arches between beams. Such planks shall be so located as to provide a safe support for the workmen should the arch between the beams collapse. The open space between planks shall not exceed sixteen inches (16").
3. Safe walkways, not less than eighteen inches (18") wide, formed of planks not less than two inches (2") thick if wood or of equivalent strength if metal, shall be provided and used by workmen when necessary to enable them to reach any point without walking upon exposed beams.
4. Stringer of ample strength shall be installed to support the flooring planks and the ends of such stringers shall be supported by floor beams or girders, and not by floor arches alone.
5. Planks shall be laid together over solid bearings with the ends overlapping at least one foot (1').
6. When floor arches are being removed, employees shall not be allowed in the area directly underneath, and such an area shall be barricaded to prevent access to it.
7. Demolition of floor arches shall not be started until the, and the surrounding floor area for a distance of twenty feet (20'), have been cleared of debris and any other unnecessary materials.

Removal of Walls, Floor and Material with Equipment

1. Mechanical equipment shall not be used on floors or working surfaces unless such floors or surfaces are of sufficient strength to support the imposed load.
2. Floor openings shall have curbs or stop logs to prevent equipment from running over the edge.

Storage

1. The storage of waste material and debris on any floor shall not exceed the allowable

floor loads.

2. In buildings having wooden floor construction, the flooring boards may be removed from not more than one floor above grade to provide storage space for debris, provided falling material is not permitted to endanger the stability of the structure.
3. When wood floor beams serve to brace interior walls or free standing exterior walls, such beams shall be left in place until other equivalent support can be installed to replace them.

4. Floor arches, with an elevation of not more than twenty five feet (25') above grade, may be removed to provide storage area for debris; *provided, that such removal does not endanger the stability of the structure.*
5. Storage space into which material is dumped shall be locked off; except for openings necessary for the removal of material. Such openings shall be kept closed at all times when material is not being removed.
6. Storage spaces shall not interfere with access to any stairway or passageway.

Disposable Respirators

OSHA requires that employees who voluntarily use disposable respirators in situations where respiratory protection is not specifically required by OSHA standard (in atmospheres where exposures are below the permissible exposure limit) essentially for personal comfort or additional, though not required, respiratory protection be informed of 29 CFR 1910.134 Appendix D, printed below.

Standard Number: 1910.134 App D

Standard Title: (Mandatory) Information for Employees Using Respirators When Not Required Under Standard.

Respirators are an effective method of protection against designated hazards when properly selected and worn. Respirator use is encouraged, even when exposures are below the exposure limit, to provide an additional level of comfort and protection for workers. However, if a respirator is used improperly or not kept clean, the respirator itself can become a hazard to the worker. Sometimes, workers may wear respirators to avoid exposures to hazards, even if the amount of hazardous substance does not exceed the limits set by OSHA standards. If your employer provides respirators for your voluntary use, of if you provide your own respirator, you need to take certain precautions to be sure that the respirator itself does not present a hazard. You should do the following: 1. Read and heed all instructions provided by the manufacturer on use, maintenance, cleaning and care, and warnings regarding the respirators limitations. 2. Choose respirators certified for use to protect against the contaminant of concern. NIOSH, the National Institute for Occupational Safety and Health of the U.S. Department of Health and Human Services, certifies respirators. A label or statement of certification should appear on the respirator or respirator packaging. It will tell you what the respirator is designed for and how much it will protect you. 3. Do not wear your respirator into atmospheres containing contaminants for which your respirator is not designed to protect against. For example, a respirator designed to filter dust particles will not protect you against gases, vapors, or very small solid particles of fumes or smoke. 4. Keep track of your respirator so that you do not mistakenly use someone else's respirator.

[63 FR 1152, Jan. 8, 1998; 63 FR 20098, April 23, 1998]

All disposable respirators, such as Moldex, 3M, Wilson, North Safety, etc. must be marked with the manufacturer's name, the part number, the protection provided by the filter, and "NIOSH".

Disposable filters are actually negative pressure respirators. They protect the user by filtering particles out of the air breathed.

Though disposable filters cannot be fit-tested in the traditional sense, they must be fit-tested in accordance with the manufacturer's instructions.

Electrical Work - Workplace Safety

29 CFR 1910.332 - Training
29 CFR 1910.333 - Selection and use of work practices
29 CFR 1926.402 - Applicability
29 CFR 1926.403 - General requirements
29 CFR 1926.404 - Wiring design and protection
29 CFR 1926.408 - Special systems
29 CFR 1926.416 - General requirements
NFPA 70E - Standard for Electrical Safety in the workplace

No electrical work shall be performed on electric distribution circuits or equipment, except by a qualified person. Disconnecting devices shall be locked out and suitably tagged by the persons who perform such work, except that in cases where locking out is not possible, such devices shall be opened and suitably tagged by such persons. Locks or tags shall be removed only by the persons who installed them or, if such persons are unavailable, by persons authorized by the operator or his agent.

Only qualified or trained personnel may perform electrical work.

All electrical work will be done according to the latest adopted National Electrical Code as well as established local codes.

Only qualified persons may work on electric circuit parts or equipment that has not been de-energized. These persons must be made familiar with the use of special precautionary techniques, PPE, insulating & shielding materials and insulated tools.

Note: When dealing with safety related work practices to prevent electric shock or other injuries resulting from either direct or indirect electrical contacts, a Qualified Person is defined as one who: "is permitted to work on or near exposed energized parts" and who, at a minimum, has been trained in and is familiar with:

a. The skills and techniques necessary to distinguish exposed live parts from other parts of electric equipment, and

b. The skills and techniques necessary to determine the nominal voltage of exposed live parts

c. The clearance distances specified in 29 CFR 1910.333(c) and the corresponding voltages to which the qualified person will be exposed

APPROACH DISTANCES FOR QUALIFIED

EMPLOYEES - ALTERNATING CURRENT

Voltage range (phase to phase)	Minimum approach distance
300V and less	Avoid Contact
Over 300V, not over 750V	1 ft. 0 in. (30.5 cm).
Over 750V, not over 2kV	1 ft. 6 in. (46 cm).
Over 2kV, not over 15kV	2 ft. 0 in. (61 cm).
Over 15kV, not over 37kV	3 ft. 0 in. (91 cm).
Over 37kV, not over 87.5kV	3 ft. 6 in. (107 cm).
Over 87.5kV, not over 121kV	4 ft. 0 in. (122 cm).
Over 121kV, not over 140kV	4 ft. 6 in. (137 cm).

Note: When an unqualified person is working overhead lines, the location shall be such that the person and the longest conductive object he or she may contact cannot come closer to any unguarded, energized overhead line than the following distances:

For voltages to ground 50kV or below	**10 feet**
For voltages to ground over 50kV	**10 feet plus 4 inches for every 10kV over 50kV.**

Note: When an unqualified person is working on the ground in the vicinity of overhead lines, the person may not bring any conductive object closer to unguarded, energized overhead lines than the distances given above.

ELECTRICAL SAFETY MEASURES

a. Daily, prior to use, all electrical equipment – including extension cords – will be inspected and defective items will be tagged out of service and not used.

b. With the exception of double insulated tools (with UL approval), all electrical tools and equipment will be grounded.

c. Tools will not be hoisted by their flexible electrical cords.

d. Except in an emergency, load rated switches and circuit breakers will be used for the opening and closing of circuits under load conditions as opposed to fuses and splice connections.

e. While working on electrical equipment, unauthorized persons will be kept clear by barriers or other means of guarding.

f. Temporary wiring and extension cords will be kept off of walking working surfaces and vehicle traffic areas or covered to prevent tripping and vehicle damage.

   1. Electrical cords will not be suspended with staples, hung from nails, or suspended by wire.
   2. Worn or frayed electric cords or cables will not be used.

g. Hands will be dry when working on electrical equipment including plugging in extension cords.

h. Areas in which electrical work is to be done must be adequately illuminated and temporary lighting must:

   1. Have guards in place.
   2. Not be suspended by its cords unless specifically designed for such installation.

i. A competent person, before work commences, will inform all employees in the work

area of both exposed and concealed electrical hazards. If appropriate, warning tags will be used to prevent accidental contact with electrical energy.

j. When working around any electrical power circuit, employees will:
    1. Protect themselves by de-energizing the circuit and grounding it or by establishing insulation between themselves and the current.
    2. Ensure that any conductive materials and equipment that are in contact with any part of their body will be handled in a manner that will preclude contact with exposed energized conductors or circuit parts.
    3. Use portable ladders that have non-conductive siderails.
    4. Remove or insulate conductive articles of jewelry and clothing that might contact exposed energized parts.

k. All 15, 20, or 30 amp receptacle outlets that are not part of the permanent wiring of the building or structure and that are used by personnel shall have ground-fault circuit interrupter protection for personnel. GFCI pigtails may be used to meet this requirement if properly sized. Remember, extension cords are considered temporary wiring.
    1. Ground fault circuit interrupters will be tested before use.

l. Only qualified persons may perform testing work on electric circuits or equipment.

m. Sufficient access and working space must be maintained about all electric equipment to permit ready and safe operation and maintenance. This space must be kept clear, i.e., it cannot be used for storage.

n. If any work is to take place under overhead lines, the lines must be de-energized and grounded or other protective measures taken such as physically preventing approach such as using a barrier.

o. Portable ladders must have non-conductive side rails.

p. Conductive items of jewelry or clothing must not be worn around electricity unless rendered non-conductive by covering, wrapping, or other insulating means.

q. The dimension of the working space in the direction of access to live parts likely to required examination, adjustment, service, or maintenance must not be less that noted below:

Working Clearances Minimum clear distance for conditions[1]

Nominal voltage to ground	(a) Feet²	(b) Feet²	(c) Feet²
0-150	3	3	3
151-600	3	3 ½	4

Footnote[1] Conditions (a), (b), and (c) are as follows:

(a) Exposed live parts on one side and no live or grounded parts on the other side of the working space, or exposed live parts on both sides effectively guarded by insulating material. Insulated wire or insulated busbars operating at not over 300 volts are not considered live parts.

(b) Exposed live parts on one side and grounded parts on the other side.

(c) Exposed live parts on both sides of the workplace [not guarded as provided in condition with the operator between.

Minimum Depth of Clear Working Space in Front of Electric Equipment Conditions[1]

Nominal voltage to ground	(a) Feet[2]	(b) Feet[2]	(c) Feet[2]
601 to 2,500	3	4	5
2,501 to 9,000	4	5	6
9,001 to 25,000	5	6	9
25,001 to 75 kV	6	8	10
Above 75kV	8	10	12

Footnote[1] Conditions (a), (b), and (c) are as follows:

(a) Exposed live parts on one side and no live or grounded parts on the other side of the working space, or exposed live parts on both sides effectively guarded by insulating materials. Insulated wire or insulated busbars operating at not over 300 volts are not considered live parts.

(b) Exposed live parts on one side and grounded parts on the other side. Walls constructed of concrete, brick, or tile, are considered to be grounded surfaces.

(c) Exposed live parts on both sides of the workspace [not guarded as provided in Condition (a) with the operator between.

1. The importance of working clearances cannot be overstated. At any time, when working with live electrical systems, there is the possibility of an arcing fault causing an arc flash where the current explosively flows through ionized air at 35,000□F causing incurable burns, hearing loss collapsed lungs, or even death from the electricity of flying metal shrapnel.

2. As an electrical contractor working in a facility where the possibility of arc flash exists, check to see if an arc flash assessment has been performed on electrical equipment on which you will be working. If it has, follow that specific guidance. If it has not, perform (or have a qualified vendor perform) the arc flash assessment. Refer to NFPA 70E for specific guidance appropriate to the facility's specific electrical equipment.

Note: NFPA 70E is a National Consensus Standard which is incorporated by reference within the OSHA standards; specifically, Appendix A to Subpart S, 29 CFR 1910. Failure to comply with NFPA 70E is citable under the general duty clause.

Electrical Shock/Electrocution

When working near or on de-energized parts, they will be considered energized **unless** they are locked out or tagged out in accordance with 29 CFR 1910.147, *The Control of Hazardous Energy (Lockout/Tagout)*.

Electrical equipment and lines must be assumed to be energized until proven to be de-energized. Operating voltages of equipment and lines must be determined before working on or near energized parts.

One can avoid the hazards of electricity by:

Determining, prior to starting work, the voltages one will be working with, the condition of

equipment, de-energizing the line or equipment, wearing the appropriate PPE, maintaining the prescribed distance, and using the appropriate tools.

No employee is permitted to approach or take any conductive object without an approved insulating handle closer to exposed energized parts than shown below unless:

a. The employee is insulated or guarded from the energized part (gloves or gloves with sleeves rated for the voltage involved shall be considered insulation of the employee from the energized part), **or**

b. The energized part is insulated or guarded from the employee and any other conductive object at a different potential, **or**

c. The employee is isolated, insulated, or guarded from any other conductive object(s), as during live-line bare-hand work:

Alternating Current – Minimum Distances

Voltage range (phase to phase) (kilovolt)	*[1]Minimum working and clear hot stick distance*
2.1 to 15	2 ft. 0 in.
15.1 to 35	2 ft. 4 in.
35.1 to 46	2 ft. 6 in.
46.1 to 72.5	3 ft. 0 in.
72.6 to 121	3 ft. 4 in.
138 to 145	3 ft. 6 in.
161 to 169	3 ft. 8 in.
230 to 242	5 ft. 0 in.
345 to 362	[2] 7 ft. 0 in.
500 to 552	[2] 11 ft. 0 in.
700 to 765	[2] 15 ft. 0 in.

Footnote[1]: The minimum clear hot stick distance is that for the use of live-line tools held by linemen when performing live-line work.

Footnote[2]: For 345-362 kv, 500-552 kv, and 700-765 kv, minimum clear hot stick distance may be reduced provided that such distances are not less than the shortest distance between the energized part and the grounded surface.

When de-energizing lines and equipment operated in excess of 600 volts, and the means of disconnecting from electric energy is not visibly open or visibly locked out, a control of hazardous energy program will be implemented which, at the minimum, includes:

a. Clearly identifying and isolating all sources of voltage (hazardous energy).

b. Notification and assurance from the designated employee will be obtained assuring that:

   1. All switches and disconnectors through which electric energy may be supplied to the particular section of line or equipment to be worked have been de-energized.

   2. All switches and disconnectors are plainly tagged indicating that men are at

work and, if design allows, they are rendered inoperable.

3. After all designated switches and disconnectors have been opened, rendered inoperable, and tagged, visual inspection or tests shall be conducted to insure that equipment or lines have been de-energized.
4. Protective grounds shall be applied on the disconnected lines or equipment to be worked on.
5. Guards or barriers will be erected as necessary to adjacent energized lines.
6. When more than one independent crew requires the same line or equipment to be de-energized, a prominent tag for each such independent crew shall be placed on the line or equipment by the designated employee in charge.
7. Upon completion of work on de-energized lines or equipment, each designated employee in charge shall determine that all employees in his crew are clear, that protective grounds installed by his crew have been removed, and he shall report to the designated authority that all tags protecting his crew may be removed.

When a crew working on a line or equipment can clearly see that the means of disconnecting from electric energy are visibly open or visibly locked-out, then:

a. Guards or barriers will be erected as necessary to adjacent energized lines.
b. Upon completion of work on de-energized lines or equipment, each designated employee in charge of a crew will determine that all employees in the crew are clear, the protective grounds installed by the crew have been removed, and he/she will report to the designated authority that all tags protecting his crew may be removed.

All live-line tools shall be visually inspected before use each day. Prior to use, tools must be wiped clean. Tools with apparent hazardous defects must be tagged and removed from service until tested with portable or laboratory testing equipment.

All rubber insulating equipment will be visually inspected prior to use and an “air test” will be performed on rubber gloves prior to use.

Hard hats for those who have possible exposure to electrical shock or burns must be manufactured in accordance with the provisions of ANSI Z89.2-1971, Industrial Protective Helmets for Electrical Workers, Class B.

Tools, tape, straps, life lines, belts, hoses, and ladders must be non-conductive.

Only live-line tool poles having a manufacturer's certification to withstand the following minimum tests shall be used:

a. 100,000 volts per foot of length for 5 minutes when the tool is made of fiberglass
b. 75,000 volts per foot of length for 3 minutes when the tool is made of wood

When working on energized lines with live-line tools, insulating high voltage gloves must be worn (and other insulating protective equipment, as required) during the operation of switching, fusing, or disconnecting devices and energizing or de-energizing oil filled electrical equipment that is being worked on. Proper cross-arm extensions or ropes will be used to hold an energized conductor clear.

When ropes or blocks and ropes are used under strain, they must be securely tied off. When tied off to a vehicle, the vehicle must be chocked with the brakes set.

Portable electric hand tools will be:

a. Equipped with a three-wire cord having the ground wire permanently connected to the tool frame and means for grounding the other end, **or**

b. Of the double insulated type and permanently labeled as "Double Insulated", **or**

c. Connected to the power supply by means of an isolating transformer, or other isolated power supply

Pneumatic tools which are used on or around energized lines or equipment will have an accumulator on the compressor to collect moisture.

Provided the “on-off” switch may be activated by a single motion of the finger that turned it on, as hydraulic tools may, as drills and similar equipment, have a switch that has a lock-on control.

Chain saws, circular saws, and similar equipment will have switches that turn off when released.

Aerial lift trucks, when working near energized lines or equipment, must be grounded or barricaded and be considered as energized equipment, or the aerial lift truck must be insulated for the work being performed

Equipment or material shall not be passed between a pole or structure and an aerial lift while an employee working from the basket is within reaching distance of energized conductors or equipment that are not covered with insulating protective equipment.

Mechanical equipment, including derrick trucks, cranes, and other lifting equipment, unless certified for work on the proper voltage, must not operate any closer to energized line or equipment as stated in the “Alternating Current - Minimum Distances” chart unless:

a. An insulated barrier is installed between the energized part and the mechanical equipment, **or**

b. The mechanical equipment is grounded, **or**

c. The mechanical equipment is insulated, **or**

d. The mechanical equipment is considered as energized

In all cases, conductors and equipment shall be treated as energized until tested, or otherwise determined to be de-energized, or until grounded.
Ensure there is no possibility of induce voltages or contact with energized lines.

When attaching grounds, the ground end shall be attached first, and the other end shall be attached and removed by means of insulated tools or other suitable devices. When removing grounds, the grounding device shall first be removed from the line or equipment using insulating tools or other suitable devices. Grounds shall be placed between the work location and all sources of energy and as close as practicable to the work location. Grounds may be temporarily removed only when necessary for test purposes and extreme caution shall be exercised during the test procedures.

When grounding electrodes are utilized, such electrodes shall have a resistance to ground low enough to remove the danger of harm to personnel or permit prompt operation of protective devices.

Grounding to tower shall be made with a tower clamp capable of conducting the anticipated fault current.

A ground lead, to be attached to either a tower ground or driven ground, shall be capable of conducting the anticipated fault current and shall have a minimum conductance of No. 2 AWG copper.

Confined and Enclosed Spaces

When working in confined and/or enclosed spaces containing exposed energized parts, adequate illumination will be provided to ensure that work may be performed safely.

When working in confined and/or enclosed spaces containing exposed energized parts, employees will be protected from inadvertent contact with these parts with company provided protective shields, barriers, or other insulating materials.

Training (See NFPA 70E)

Elevated Work Platforms and Aerial Devices

Only trained and authorized employees may operate elevated work platforms and aerial devices.

Training

Employees who use elevated work platforms and aerial devices will be instructed by a qualified person in the safe use of the elevated work platforms and aerial devices in accordance with the manufacturer's operating instructions.

Additionally, training will include, for employees who erect, disassemble, move, operate, use, repair, maintain, or inspect elevating work platforms and aerial devices will include, but not be limited to, training in:

1. The provisions of elevated work platforms and aerial devices section.
2. The correct procedures for performing their assigned duties.
3. The nature of hazards associated with the equipment, including electrical hazards, fall hazards and falling object hazards in the work area and correct procedures for dealing with those hazards.
4. The safe operation and use of elevating work platforms and the proper handling of materials on the work platform.
5. The maximum load capacity of the work platform based upon installed configuration.

Note: Aerial lifts may be "field modified" for uses other than those intended by the manufacturer provided the modification has been certified in writing by the manufacturer or by any other equivalent entity, such as a nationally recognized testing laboratory, to be in conformity with all applicable provisions of ANSI A92.2-1969 and this section and to be at least as safe as the equipment was before modification.

Elevated Work Platforms

Elevating work platforms include such items as vertical towers, scissor lifts, and mast-climbing work platforms and are used to position employees and materials.

General Safety Requirements

1. The platform deck will be equipped with a guardrail or other structure around its upper periphery. C&S still requires employees to use fall protection in the form of a harness lanyard and approved anchor point when operating the equipment (to include driving the unit).
2. The platform will have toeboards at sides and ends.
3. No employee will ride, nor tools, materials, or equipment be allowed on a traveling elevated platform.
4. Units will not be loaded in excess of the design working load.

If the following information must be displayed on the elevated work platform:

1. Manufacturer's name, model, and serial number
2. Rated capacity at the maximum platform height and maximum platform travel height
3. Operating instructions
4. Cautions and restrictions

Elevated work platforms must be designed to applicable American National Standards Institute (ANSI) standards.

Aerial Devices

Aerial devices include such as cherry pickers and boom trucks, may be vehicle-mounted or self-propelled, and are used to position employees.

General safety requirements:

1. Only authorized persons may operate aerial devices
2. Aerial devices must not rest on any structure
3. Controls must be tested before use
4. Workers must stand only on the floor of the basket, no planks, ladders, or other means are allowed to gain greater heights.
5. A fall protection system must be worn and attached to manufactured anchor points.
6. Brakes must be set when employees are elevated.
7. An aerial lift truck must not be moved when an employee is on the elevated boom platform except when:
    a. The equipment is specifically designed for this type of operation.
    b. All controls and signaling devices are tested and are in good operating condition.
    c. An effective communication system will be maintained at all times between the basket or platform operator and where applicable, the vehicle operator.
    d. The route to be traveled is surveyed immediately prior to the work trip, checking for overhead obstructions, traffic, holes in the pavement, ground or shoulder, ditches, slopes, etc., for areas other than paved, a survey should be

made on foot.

e. The speed of the vehicle does not exceed three (3) miles per hour.

f. Only one employee is in the basket.

g. Both the driver and/or the elevated employee have been specifically trained for this type of work (towering) in accordance with the manufacturer's recommendations.

The following information must be displayed on the aerial device:

1. Manufacturer's name, model, and serial number.
2. Rated capacity at the maximum platform height and maximum platform travel height.
3. Operating instructions.
4. Cautions and restrictions.

Aerial devices must be designed to applicable American National Standards Institute (ANSI) standards.

Additional Aerial Device Operating Procedures

1. Aerial baskets or platforms will not be supported by adjacent structure(s) when workers are on the platform or in the basket while in an elevated position.
2. Lift controls will be tested in accordance with the manufacturer's recommendations or instructions prior to use to determine that such controls are in safe working condition.
3. Only authorized persons will operate an aerial device.
4. Tieing off to an adjacent pole, structure, or equipment while working from an aerial device will not be permitted.
5. Employees will not sit or climb on the edge of the basket or use planks, ladders or other devices to gain greater working height.
6. Boom and basket and platform load limits specified by the manufacturer will not be exceeded.
7. When elevating personnel with the vehicle stationary, the braking systems will be set.
8. Provided they can be safely installed, wheel chocks will be installed before using an aerial device on an incline.
9. When used, outriggers will be positioned on pads or a solid surface. All outriggers will be equipped with hydraulic holding valves or mechanical locks at the outriggers.
10. Climbers will not be worn while performing work from an aerial device.
11. When an insulated aerial device is required, the aerial device will not be altered in any manner that might reduce its insulating value.
    a. An aerial device truck will not be moved when the boom is elevated in a working position with employees in the basket or platform except when all of the following are complied with:
    b. The equipment is specifically designed for this type of operation in accordance with the provisions of Section 3638.
    c. All controls and signaling devices are tested and are in good operating

condition.

d. An effective communication system will be maintained at all times between the basket or platform operator and where applicable, the vehicle operator.

e. The route to be traveled is surveyed immediately prior to the work trip, checking for overhead obstructions, traffic, holes in the pavement, ground or shoulder, ditches, slopes, etc., for areas other than paved, a survey should be made on foot.

f. The speed of the vehicle does not exceed three (3) miles per hour.

g. Only one employee is in the basket.

h. Both the driver and/or the elevated employee have been specifically trained for this type of work (towering) in accordance with the manufacturer's recommendations.

12. Lower level controls will not be operated unless permission has been obtained from the employee in the device, except in case of emergency.
13. Before moving an aerial device for travel, the boom(s) will be inspected to see that it is properly cradled and outriggers are in stowed position.
14. An employee, while in an elevated aerial device, will be secured to the boom, basket or tub of the aerial device through the use of a safety belt, body belt or body harness equipped with safety strap or lanyard.

    a. A body harness may be used in a personal fall restraint, positioning or fall arrest system. When a body harness is used in a fall arrest system, the lanyard will be rigged with a deceleration device to limit maximum arresting force on an employee to 1,800 pounds and prevent the employee from hitting any levels or objects below the basket or platform, and will limit free fall to a maximum of 6 feet.

Additional Elevated Work Platform Procedures

1. No employee will ride, nor tools, materials, or equipment be allowed on a traveling elevated platform unless the following conditions are met:

    a. The travel speed at Maximum Travel Height does not exceed 3 feet per second.

    b. Self-propelled units will be equipped with electrical or other interlock means which will prevent driving them with the platform height greater than the Maximum Travel Height or at speeds greater than permitted at Maximum Travel Height.

    c. The surface upon which the unit is being operated is level with no hazardous irregularities or accumulation of debris which might cause a moving platform to overturn.

2. Units will be assembled, used, and disassembled in accordance with the manufacturer's instructions.
3. Units will be inspected for damaged and defective parts before use.
4. Units will not be loaded in excess of the design working load and will be taken out of service when damaged or weakened from any cause. They will not be used until repairs are completed.

5. Employees will not sit, stand or climb on the guardrails of an elevating work platform or use planks, ladders, or other devices to gain greater working height or reach.
6. Employees will not work on units when exposed to high winds, storms, or when they are covered with ice or snow (unless provisions have been made to ensure the safety of the employees).
7. Employees climbing or descending vertical ladders will have both hands free for climbing.

   Note: Employees should remove foreign substances, such as mud or grease from their shoes.

8. Where moving vehicles are present, the work area will be marked with warnings such as flags, roped off areas or other effective means of traffic control will be provided.
9. Unstable objects such as barrels, boxes, loose brick, tools, debris, will not be allowed to accumulate on the work level.
10. In operations involving production of small debris, chips, etc., and the use of small tools and materials, and where persons are required to work or pass under the equipment, screens will be required between toeboards and guardrails. The screen will extend along the entire opening and will consist of No. 18 gage U.S. Standard Wire 1/2 inch mesh, or equivalent.
11. Mast-climbing work platforms, will not be used as construction personnel hoists or material hoists.
12. Each unit will have a manual containing instructions for maintenance and operations. If a unit is able to be operated in different configurations, then these will be clearly described, including the rated capacity in each configuration.
    a. The required manual(s) will be maintained in a weather resistant storage location on the elevating work platform or aerial device.

Excavating, Trenching, & Shoring

29 CFR 1926.650 - Scope, application, and definitions applicable to this subpart
29 CFR 1926.651 - Specific Excavation Requirements
29 CFR 1926.652 - Requirements for protective systems
29 CFR 1926 - Subpart P App A Soil Classification
29 CFR 1926 - Subpart P App B Sloping and Benching
29 CFR 1926 - Subpart P App C Timber Shoring for Trenches
29 CFR 1926 - Subpart P App D Aluminum Hydraulic Shoring for Trenches
29 CFR 1926 - Subpart P App E Alternatives to Timber Shoring
29 CFR 1926 - Subpart P App F Selection of Protective Systems

Excavating involves any earth removal which creates a cut, cavity, trench, or depression in the earth's surface. A trench is a narrow excavation (in relation to its length) made below the surface of the ground. In general, the depth is greater than the width, but the width of a trench (measured at the bottom) is not greater than 15 feet. If forms or other structures are installed or constructed in an excavation so as to reduce the dimension measured from the forms or structure to the side of the excavation to 15 feet or less (measured at the bottom of the excavation), the excavation is also considered to be a trench.

Prior to excavating, obstructions that may create a hazard to employees will be removed or

supported and utility companies will be contacted, advised of the proposed work, and asked to establish the location of underground installations.

If the exact location of the underground installations cannot be determined, actual work may begin provided that:

a. Extreme caution is observed.
b. Detection equipment or other acceptable means are used to locate the approximate location of the utility installation.
c. As the approximate location is approached, the exact location will be determined by safe and acceptable means before proceeding.

In open excavations, underground installations will be protected, supported or removed as necessary to protect employees.

To ensure employee safety, the competent person will ensure that during excavating work in trenches there is:

a. Appropriate access and egress for personnel and/or equipment; such as stairs, ramps and ladders, so as to require no more than 25 feet of lateral travel for employees in trenches four (4) feet or more deep.
b. Employee protection for head injury. All employees must wear hard hats.
c. No spoil pile or equipment within two (2) feet of the edge of the excavation.
d. Employee protection from vehicular traffic such as barricades, ground guides for operators of equipment with a limited view, away sloping grades, etc.
e. No exposure to falling loads.
f. No danger to employees from water accumulation.
g. No danger from cave-in. Shoring, a structure such as a metal hydraulic, mechanical, or timber shoring system that supports the sides of an excavation, will prevent cave-ins.
    1. Shoring is not required for trenches less than five (5) feet deep if an examination by a competent person determines the soil has no potential for a cave-in. In this situation, vertical sides are allowed.
    2. Once a trench is over 20 feet deep, protective systems, which may include shoring, must be designed by a registered professional engineer.
    3. There are other methods of protection from cave-ins such as sloping or benching the adjacent ground according to specific criteria dependent on the soil conditions, weather, and adjacent structures.
    4. The total number of cave-in accidents is relatively small, however, the accidents which do occur are generally very serious and are much more likely to be fatal than other types of accidents in the construction industry.
h. A method to prevent mobile equipment from falling into the excavation such as barricades. Ground guides will be used if the equipment operator does not have a clear view of the edge. If possible, the grade should slope away from the excavation.

If the atmosphere is dangerous or likely to be dangerous, testing will be done as often as needed and emergency rescue equipment – such as breathing apparatus, safety harness and line, or a basket stretcher – must be available.

When a hazardous atmosphere does exist, appropriate respiratory protection will be used and a rescue plan developed which includes having an attendant outside the hazardous area with appropriate equipment and training.

PROTECTIVE SYSTEMS

Except when an excavation is made entirely in stable rock, or it is less than 5 feet in depth and a competent person finds no indication of potential cave-in, employees in an excavation will be protected from cave-in by protective systems designed in accordance with paragraphs (b) or (c) of *Requirements for Protective Systems*, found here 29 CFR 1926.652.

All employees involved with excavating are to review these standards and understand, in general terms:

a. The extensive degree of basic data, design, and knowledge that goes into employee protection during excavating projects.
b. The types of soils and how to identify them on the job site.
c. The soil condition – specifically moisture content – and how that impacts on stability during excavations.
d. The absolute need for a competent person to be on site at all times during excavating work to, visually and manually, test soil conditions as work progresses and to maintain a safe site.

DAILY INSPECTIONS

Prior to work and as needed throughout the shift, a competent person will conduct daily inspections of excavations, adjacent areas and protective systems to find evidence of a developing cave-in situation, failure of protective systems, hazardous atmosphere, or other hazardous conditions.

After every rainstorm or event which would affect the safety of employees within an excavation, an inspection will be made by a competent person.

FALL PROTECTION

Walkways must be provided where employees or equipment are required or permitted to cross over excavations. If these walkways are 6 feet or more above a lower level, guardrails must be used. Specific criteria for guardrails is found in *Fall Protection Systems Criteria and Practices*, located at 29 CFR 1926.502(b).

Extension Cords

29 CFR 1926.405 - Wiring methods, components, and equipment for general use
29 CFR 1926.416 - General requirements

Extension cords shall not replace permanent wiring and the following safety precautions will be adhered to:

a. Inspect the cord for cracks and cuts.

b. Cord must have a three prong plug for grounding.
c. Use the shortest continuous length of cord possible. Cords may not be spliced together.
d. Make certain the cord does not lay in water.
e. Ensure cord is properly rated for the job.
f. Secure and route cords out of the traffic flow to prevent tripping.
g. Defective cords will be tagged and removed from service.
h. Most importantly, an extension cord used on a job site MUST be used with a ground fault circuit interrupter (GFCI) unless used for temporary lighting.

Flagmen - Traffic Control

Manual on Uniform Traffic Control Devices, Millennium Edition

The primary function of traffic control procedures is to move vehicles and pedestrians safely and expeditiously through or around temporary traffic control zones while protecting on-site workers and equipment.

Construction areas will be posted with legible traffic signs at points of hazard. All traffic control signs or devices used for protection of construction workers must conform to Part VI of the *Manual on Uniform Traffic Control Devices, Millennium Edition*; 2009, revised May 2012.

For daytime work, the flagger's vest, shirt, or jacket will be orange, yellow, strong yellow-green, or fluorescent versions of these colors.

For nighttime work, similar outside garments will be retroreflective. The retroreflective material will be orange, yellow, white, silver, strong yellow-green, or a fluorescent version of one of these colors and will be visible at a minimum distance of 1,000 feet. The retroreflective clothing will be designed to identify clearly the wearer as a person and be visible through the full range of body motions.

Uniformed law enforcement officers may be used as flaggers in some locations, such as at an urban intersection, where enforcement of traffic movements is important. Uniformed law enforcement officers may also be used on freeways where traffic is channeled around work sites and it is necessary to assure that advisory and regulatory speeds are being enforced. For nighttime work and in low-visibility situations, a retroreflective garment as described above should be worn.

Hand-signaling devices, such as STOP/SLOW paddles, lights, and red flags, are to be used to control traffic through temporary traffic control zones. The STOP/SLOW paddle, which gives drivers more positive guidance than red flags, should be the primary hand-signaling device. The standard STOP/ SLOW sign paddle will be eighteen inches (18″) square with letters at least six inches (6) high. A rigid handle should be provided. This combination sign should be fabricated from light semi-rigid material, and have an octagonal shape. The background of the STOP face will be red with white letters and border. To be seen better, the STOP/SLOW paddles may be supplemented by one (1) or two (2) symmetrically positioned, alternately flashing, white high-intensity lamps on each side. The background of the SLOW face will be orange with black letters and border. When used at night, the STOP/ SLOW paddle will be retroreflectorized.

Flag use should be limited to emergency situations and at low-speed and/or low-volume

locations which can best be controlled by a single flagger. Flags used for signaling will be a minimum of twenty-four inches (24″) square, made of a good grade of red material, and securely fastened to a staff about three feet (3′) feet long. The free edge should be weighted so that the flag will hang vertically, even in heavy winds. When used at night, flags will be retroreflective red.

Glass & Glazing

From a safety standpoint, the handling and installation of glass presents potential hazards that are relatively easy to control through proper use of P P E ; adherence to safe lifting procedures; and compliance with ladder, scaffold, aerial and scissor lift safety procedures.

To prevent damage in the first place, glass, particularly on construction sites, should be stored, to the extent possible, in its original packing containers in a clean, dry, secure area away from other activities.

Never allow glass sheets from sliding against each other or allow tools or equipment to rest on the sheets. Permanent damage may result.

Extreme care must be exercised when moving panes of glass from storage to placement to prevent breakage and injury to others.

Eye protection and gloves designed for glass handling should be used. Additional PPE, such as steel-toed work boots or shoes and hard hats, will be dictated by the job site and the potential hazards present.

Specialized glass installation and carrying tools will be kept in good condition.

Broken glass will be cleaned up immediately.

Ground Fault Circuit Interrupters

29 CFR 1926.404 - Wiring design and protection

A ground fault circuit interrupter (GFCI) provides protection for all 120-volt, 15-, 20-, and 30-ampere (amp) receptacle outlets that are not a part of the permanent wiring by detecting lost current resulting from a short, overheating, and/or ground fault. It should be noted that an extension cord into which electrical devices are plugged is not part of the permanent wiring; therefore, GFCIs are required.

A GFCI will "trip" when the amount of current amperes going to an electrical device in the hot conductor and the amount of current returning from an electrical device differs by approximately five 5 milliamps. The GFCI can interrupt the current within as little as 1/40th of a second.

The current that is missing is being lost through a ground fault, whether it is in the actual grounding, a short in the equipment, or electricity going through the employee to the ground.

A GFCI will not protect an employee who comes in contact with two (2) hot wires or a hot wire and a neutral wire. A GFCI will provide protection against fires, overheating, damage to insulation, and the most common form of electrical shock hazard -- the ground fault. GFCIs must be tested before use.

Hand Trucks

Hand trucks will be loaded with the heaviest items on the bottom. Before actually moving a hand truck, ensure that the load is steady and unable to shift. If necessary to prevent its shifting, the load will be strapped to the hand truck.

Hand trucks should be loaded so that the weight of the load will be over the axles to the extent possible when in motion.

Hand trucks should be selected by taking into consideration the size of the load, the weight of the load, and the surface on which they are being used. Hard wheels roll better on hard surfaces, and soft wheels roll better on soft surfaces. Do not exceed a hand truck's capacity. If the hand truck has pneumatic tires, ensure that they are inflated to their proper pressure.

When you are using a ramp, the hand truck should be in front of you when going down and behind you when going up.

Ensure clear vision – do not stack the load above your line of sight. If circumstances require that a large item will hinder your line of sight, or if an item is possibly unstable in spite of using straps, a second truck operator will be used.

Hand trucks should be stored with their tongues under a pallet or table when not in use.

Hazardous Job Site Chemical Awareness and Exposure

Our employees may encounter various hazardous chemicals while performing their work duties. If employees have been properly trained on a particular hazard, they may continue work as required. If employees have not been trained on the hazard they encounter, then they are to stop work immediately and notify their supervisor.

Per *Hazard Communication*, located at 29 CFR 1910.1200, we will keep readily available MSDS or SDS for each chemical to which we may be exposed. This information will be accessible by company HAZCOM data base at SDS or contacting 3E Company at 1-800-451-8346.

Asbestos Awareness

NIOSH Pocket Guide to Chemical Hazards - Asbestos

On some job sites, employees may have potential exposure to asbestos if the precautionary steps noted below are not taken. Asbestos can be found in older tile flooring, pipe and mechanical equipment insulation, plaster, fireproofing, soundproofing, roofing materials, as well as in sprayed-on materials located on beams, in crawl spaces, and between walls. Asbestos is not a specific mineral, but rather a fibrous form of various minerals. It is a remarkable product, which has been serving mankind since the time of the ancient Greeks and Romans, because it is resistant to corrosive chemicals; it is a nonconductor of electricity; it has a high tensile strength (equal to that of steel wire); and it is resistant to heat (it will not burn, but will disintegrate at extremely high temperatures). Some forms of asbestos, such as chrysotile, can be spun into thread. In fact, one pound of chrysotile can produce 30,000 feet of thread
-- it is that fine. Other types of asbestos have fibers which cannot be spun, but are excellent for their frictional properties (brakes) and their insulation and sound-deadening properties. The actual elements found in asbestos include iron, magnesium, and silica.

Unfortunately, asbestos has a down side that has been discovered and statistically documented in recent years -- it is hazardous to your health.

There are two (2) types of asbestos, friable and non-friable.

Friable asbestos can be crumpled with hand pressure and is likely to emit minute fibers which can cause serious long term health effects. Fluffy sprayed-on materials used for fireproofing, insulation, or sound-proofing are considered to be friable.

Non-friable asbestos, undisturbed, poses no health risk. Vinyl-asbestos floor tile or roofing felt are considered to be non-friable if they are intact, and they generally do not emit airborne fibers unless subjected to sanding, sawing, and other aggressive operations. Asbestos-cement pipe or sheet can emit airborne fibers if the materials are cut or sawed or if they are broken.

The health hazards associated with asbestos are caused by the microscopic fibers which, when released, enter the deepest portion of the lung (past your natural defenses such as hairs, mucus, cilia, and macrophages). Scar tissues can develop and the lung stiffens, thus reducing gas exchange. This is called asbestosis. Another disease associated with asbestos is lung cancer. High exposure levels of asbestos increase one's chance of developing lung cancer by a factor of five. Mesothelioma, a disease caused primarily by exposure to amosite and crocidolite, can be fatal. Lastly, it is possible, although less likely, that a person exposed to friable asbestos may develop cancer of the stomach and colon.

The health hazards associated with asbestos are chronic and, as such, present themselves after a long period of time.

Asbestos Awareness Training is required for all employees who work in areas that contain or may contain asbestos. This training will be documented.

Steps to avoid asbestos exposure:

1. Under no circumstances will asbestos containing material (ACM) or presumed asbestos containing material (PACM) be disturbed during work activities.
2. If you believe that the materials you will be working with contain asbestos, do not disturb the materials and contact your supervisor.
3. Obey all asbestos warning signs and labels. ACM and PACM will not be disturbed.
4. If our employees are working on a multi-contractor worksite adjacent to a Class I asbestos abatement job and possible exposure occurs because of inadequate containment (an unlikely scenario because not only would the containment be faulty but the negative pressure system would have to fail), they are to remove themselves from the area immediately until the breach and containment systems are repaired.
5. All exposure to thermal system insulation (i.e., sprayed-on and troweled-on surfacing material) will be assumed to be asbestos exposure unless results of laboratory analysis show that the material does not contain asbestos.

Permissible exposure to airborne asbestos fibers may not exceed 0.1 fibers per cubic centimeter of air (0.1 f/cc) averaged over an eight (8)-hour workday, and 1 fiber per cubic centimeter of air (1.0 f/cc) averaged over a thirty (30)-minute work period.

Crystalline Silica Awareness

Silica, Crystalline (Respirable Size), NIOSH

Crystalline silica can be readily found in rocks, as well as in many concrete and masonry products, located on many job sites Crystalline silica can be released into the air when employees are performing such tasks as:

a. Chipping, hammering, drilling, crushing, or hauling rock.

b. Abrasive blasting.

c. Sawing, hammering, drilling, or sweeping concrete or masonry.

Unprotected respiratory exposure to crystalline silica may cause a lung disease called silicosis, as well as cancer and even death.

Occupational silica exposure is preventable through employee training; use of a silica substitute; use of engineering controls; improved work practices; and, lastly, use of PPE.

Employees who are potentially exposed to an environment containing airborne concentrations of silica will receive training prior to working with silica and receive periodic refresher training after work has started.

Silica training will include:

a. Exposure monitoring for respirable silica.

1. Full shift personal samples will be taken that are representative of the employee's regular, daily exposure to silica. A certified industrial hygienist will use a combination device, called a cyclone assembly, and a sampling pump to trap tiny respirable silica particles from the air in the work environment.
2. The cyclone assembly and sampling pump will be placed on an employee who will wear the device throughout the work shift for up to eight (8) hours.
3. Sampling requires that just a select few employees who are closest to the silica source be fitted. The industrial hygienist can help you determine who will be most appropriate.
4. At the end of the sampling period, the hygienist will de-activate the sampling pump and remove the filters, which will be sent to a certified laboratory for analysis.
5. Employee exposures to concentrations of silica must be kept below the permissible exposure limits found in 1910.1000 - Table Z-3, below:

6. **TABLE Z-3 Mineral Dusts**

Substance	***mppcf a***	***mg/m3***
Silica:		
Crystalline		
Quartz (Respirable)	*250b*	*10 mg/m3 e*
	%SiO2+5	*%SiO2+2*
Quartz (Total Dust)	*. . . . . .*	*30 mg/m3*
		%SiO2+2
Cristobalite: Use ½ the value calculated from the count or mass formulae for quartz.		
Tridymite: Use ½ the value calculated from the formulae for quartz.		
Amorphous, including natural diatomaceous earth	*20*	*80 mg/m3*
Substance	***mppcf a***	***mg/m3***
		%SiO2
Silicates (less than 1% crystalline silica):		
Mica	*20*	
Soapstone	*20*	
Talc (not containing asbestos)	*20c*	
Talc (containing asbestos) Use asbestos limit		
Tremolite, asbestiform (see 29 CFR 1910.1001)		
Portland cement . . .	*50*	
Graphite (Natural)	*15*	

Coal Dust:		
Respirable fraction less than 5% SiO2	*. . . . . .*	*2.4 mg/m3 e*
Respirable fraction greater than 5% SiO2	*. . . . . .*	*10 mg/m3 e*
		%SiO2+2
Inert or Nuisance Dust:		
Respirable fraction	*15*	*5 mg/m3*
Total dust	*50*	*15 mg/m3*

Note -- Conversion factors - mppcf X 35.3 = million particles per cubic meter = particles per c.c.

[a] **Millions of particles per cubic foot of air, based on impinger samples counted by light-field techniques.**

[b] **The percentage of crystalline silica in the formula is the amount determined from airborne samples, except in those instances in which other methods have been shown to be applicable.**

[c] **Containing less than 1% quartz; if 1% quartz or more, use quartz limit.**

[d] **All inert or nuisance dusts, whether mineral, inorganic, or organic, not listed specifically by substance name are covered by this limit, which is the same as the Particulates Not Otherwise Regulated (PNOR) limit in Table Z-1.**

[e] **Both concentration and percent quartz for the application of this limit are to be determined from the fraction passing a size-selector with the following characteristics:**

Aerodynamic diameter (unit density sphere)	Percent passing selector
2	90
2.5	75
3.5	50
5.0	25
10	0

The measurements under this note refer to the use of an AEC (now NRC) instrument. The respirable fraction of coal dust is determined with an MRE; the figure corresponding to that of 2.4 mg/m3 in the table for coal dust is 4.5 mg/m3.

The health hazards associated with respirable silica are silicosis, lung cancer, pulmonary tuberculosis and other airway diseases.

Silicosis is caused by exposure to respirable crystalline silica dust. Crystalline silica is a basic component of soil, sand, granite, and most other types of rock, and it is used as an abrasive blasting agent. Silicosis is a progressive, disabling, and often fatal lung disease. Smoking adds to the lung damage caused by silica.

Symptoms of Silicosis

Silicosis (especially the acute form) is characterized by shortness of breath, fever, and cyanosis (bluish skin); it may often be misdiagnosed as pulmonary edema (fluid in the lungs), pneumonia, or tuberculosis. Severe mycobacterial or fungal infections often complicate silicosis and may be fatal in many cases

Three Types of Silicosis:

7. Chronic silicosis: Usually occurs after ten (10) or more years of exposure to crystalline silica at relatively low concentrations

8. Accelerated silicosis: Results from exposure to high concentrations of crystalline silica and develops five (5) to ten (10) years after the initial exposure

9. Acute silicosis: Occurs where exposure concentrations are the highest and can cause lung cancer

a. The exposure limits for respirable silica. See 1910.1000 Table Z-3.

Permissible Exposure Limit (PEL) = Crystalline Quartz (respirable): 250 mppcf (millions of particles per cubic feet of air)/(%SiO2 +5); 10 mg/m3/(%SiO2 + 2); Quartz (total dust): 30 mg/m3 (milligrams per cubic meter of air)/(%SiO2 + 2); Cristobalite and Tridymite: Use 1⁄2 the value calculated from the count or mass formula for quartz

b. Acceptable substitutes for silica. The many types of abrasive materials have varying degrees of health hazards.Silica sand is probably the most hazardous mineral abrasive used.

c. Whenever possible, use of silica sand should be limited and, if possible, a substitute material should be used. Other types of abrasives include synthetic or natural mineral grains; metallic shot or hard grit (made of steel or chilled cast iron); and organic abrasives, such as ground corncobs and walnut shells. These and engineering controls, such as containment and ventilation, are important for employee safety.

d. Engineering controls. It is important to note that silica is only hazardous in its airborne form. Therefore, engineering controls include local exhaust ventilation and use of blasting cabinets, as well as establishing a clearly identified exposure area.

e. Work practice controls. Use of water sprays, wet methods for cutting, chipping, drilling, sawing, grinding, etc. Eating, drinking, or smoking near crystalline silica dust is prohibited. Employees will wash hands and face before eating, drinking or smoking away from silica exposure area.

f. PPE. The only health hazard from silica is respiratory; therefore, appropriate half-face or full face respirator will be used.

g. Up to 0.5 mg/m3 of airborne exposures to crystalline silica. Half-facepiece particulate respirators with N95 or better filters.

h. Up to 1.25 mg/m^3 of airborne exposures to crystalline silica. Any powered, air-purifying respirator with a high-efficiency particulate filter. Any supplied-air respirator operated in a continuous-flow mode.

i. Up to 2.5 mg/m3 of airborne exposures to crystalline silica. Any air-purifying, full-facepiece respirator with an N100, R100, or P100 filter. Any powered, air-purifying respirator with a tight-fitting facepiece and a high-efficiency particulate filter.

j. Up to 2.5 mg/m^3 of airborne exposures to crystalline silica. Any supplied-air respirator operated in a pressure-demand or other positive-pressure mode.

However, when working with respirable silica, there are many physical hazards and appropriate PPE will be worn to address the hazards presented by the work at hand:

1. Eye protection: Goggles; safety glasses with side shields
2. Head protection: Hard hat
3. Hand protection: Gloves
4. Foot protection: Steel-toed work boots or shoes
5. Body protection: Tyvek suits/coveralls

NIOSH Safety Recommendations

NIOSH recommends the following measures to reduce crystalline silica exposures at the job and prevent silicosis and silicosis-related deaths:

1. Prohibit use of silica sand (or other substances containing more than 1% crystalline silica) as an abrasive blasting material and substitute less hazardous materials.
2. Conduct air monitoring to measure worker exposures.
3. Use containment methods, such as blast-cleaning machines and cabinets, to control the hazard and protect adjacent workers from exposure.
4. Practice good personal hygiene to avoid unnecessary exposure to silica dust.
   a. Wash hands and face before eating.
   b. No eating, drinking, or using tobacco products in the blasting area.
   c. Shower before leaving work site.
   d. Park vehicles away from contaminated area.
5. Wear washable or disposable protective clothes at the job site; shower and change into clean clothes before leaving the job site to prevent contamination of cars, homes, and other work areas.
6. Use respiratory protection when source controls cannot keep silica exposures below the NIOSH REL.
7. Provide periodic medical examinations for all workers who may be exposed to crystalline silica.
8. Post signs to warn workers about the hazard and to inform them about required PPE.
9. Provide workers with training that includes information about health effects, work practices, and protective equipment for crystalline silica.
10. Report all cases of silicosis to the state health department.

Silica Exposure – In Construction

Overview

Our Silica program applies to all work place exposures to respirable crystalline silica. The only exception is when employee exposure will remain below 25 micrograms per cubic meter of air (25 µg/m3) as an 8-hour time-weighted average (TWA) under any foreseeable conditions.

Specified Exposure Control Methods

If any of our employees are engaged in a task identified on Table 1 below, we will fully and properly implement the engineering controls, work practices, and respiratory protection specified for the task.

Exception: We must assess and limit the exposure of our employees to safe levels of respirable crystalline silica using the alternative exposure control methods following Table 1.

Table 1: Specified Exposure Control Methods when Working with Materials Containing Crystalline Silica

Equipment / Task	Engineering and Work Practice Control Methods	Required Respiratory Protection and Minimum Assigned Protection Factor (APF)	
		≤ 4 hours /shift	> 4 hours /shift
Stationary masonry saws	Use saw equipped with integrated water delivery system that continuously feeds water to the blade. Operate and maintain tool in accordance with manufacturer's instructions to minimize dust emissions.	None	None
Handheld power saws (any blade diameter)	Use saw equipped with integrated water delivery system that continuously feeds water to the blade. Operate and maintain tool in accordance with manufacturer's instructions to minimize dust emissions.		
	− When used outdoors.	None	APF 10
	− When used indoors or in an enclosed area.	APF 10	APF 10
Handheld power saws for cutting fiber-cement board (with blade diameter of 8 inches or less)	For tasks performed outdoors only: Use saw equipped with commercially available dust collection system. Operate and maintain tool in accordance with manufacturer's instructions to minimize dust emissions. Dust collector must provide the air flow recommended by the tool manufacturer, or greater, and have a filter with 99% or greater efficiency.	None	None

Walk-behind saws	Use saw equipped with integrated water delivery system that continuously feeds water to the blade. Operate and maintain tool in accordance with manufacturer's instructions to minimize dust emissions.		
Walk-behind saws Drivable saws	− When used outdoors.	None	None
	− When used indoors or in an enclosed area.	APF 10	APF 10
	For tasks performed outdoors only: Use saw equipped with integrated water delivery system that continuously feeds water to the blade. Operate and maintain tool in accordance with manufacturer's instructions to minimize dust emissions.	None	None
Rig-mounted core saws or drills	Use tool equipped with integrated water delivery system that supplies water to cutting surface. Operate and maintain tool in accordance with manufacturer's instructions to minimize dust emissions.	None	None
Handheld and stand-mounted drills (including impact and rotary hammer drills)	Use drill equipped with commercially available shroud or cowling with dust collection system. Operate and maintain tool in accordance with manufacturer's instructions to minimize dust emissions. Dust collector must provide the air flow recommended by the tool manufacturer, or greater, and have a filter with 99% or greater efficiency and a filter-cleaning mechanism. Use a HEPA-filtered vacuum when cleaning holes.	None	None

Dowel drilling rigs for concrete	For tasks performed outdoors only: Use shroud around drill bit with a dust collection system. Dust collector must have a filter with 99% or greater efficiency and a filter-cleaning mechanism. Use a HEPA-filtered vacuum when cleaning hole	APF 10	APF 10

Vehicle-mounted drilling rigs for rock and concrete	Use dust collection system with close capture hood or shroud around drill bit with a low-flow water spray to wet the dust at the discharge point from the dust collector. OR	None	None
	Operate from within an enclosed cab and use water for dust suppression on drill bit.	None	None
Jackhammers and handheld powered chipping tools	Use tool with water delivery system that supplies a continuous stream or spray of water at the point of impact.		
	− When used outdoors.	None	APF 10
	− When used indoors or in an enclosed area.	APF 10	APF 10
	OR Use tool equipped with commercially available shroud and dust collection system. Operate and maintain tool in accordance with manufacturer's instructions to minimize dust emissions. Dust collector must provide the air flow recommended by the tool manufacturer, or greater, and have a filter with 99% or greater efficiency and a filter-cleaning mechanism.		
	− When used outdoors.	None	APF 10
	− When used indoors or in an enclosed area.	APF 10	APF 10

Handheld grinders for mortar removal (i.e., tuckpointing)	Use grinder equipped with commercially available shroud and dust collection system. Operate and maintain tool in accordance with manufacturer's instructions to minimize dust emissions. Dust collector must provide 25 cubic feet per minute (cfm) or greater of airflow per inch of wheel diameter and have a filter with 99% or greater efficiency and a cyclonic pre-separator or filter-cleaning mechanism.	APF 10	APF 25
Handheld grinders for uses other than mortar removal	For tasks performed outdoors only: Use grinder equipped with integrated water delivery system that continuously feeds water to the grinding surface. Operate and maintain tool in accordance with manufacturer's instructions to minimize dust emissions.	None	None
	OR Use grinder equipped with commercially available shroud and dust collection system. Operate and maintain tool in accordance with manufacturer's instructions to minimize dust emissions. Dust collector must provide 25 cubic feet per minute (cfm) or greater of airflow per inch of wheel diameter and have a filter with 99% or greater efficiency and a cyclonic pre-separator or filter-cleaning mechanism.		
	− When used outdoors.	None	None
	− When used indoors or in an enclosed area.	None	APF 10
Walk-behind milling machines and floor grinders	Use machine equipped with integrated water delivery system that continuously feeds water to the cutting surface. Operate and maintain tool in accordance with manufacturer's instructions to minimize dust emissions. OR	None	None

	Use machine equipped with dust collection system recommended by the manufacturer. Operate and maintain tool in accordance with manufacturer's instructions to minimize dust emissions. Dust collector must provide the air flow recommended by the manufacturer, or greater, and have a filter with 99% or greater efficiency and a filter-cleaning mechanism. When used indoors or in an enclosed area, use a HEPA-filtered vacuum to remove loose dust in between passes.	None	None
Small drivable milling machines (less than half-lane)	Use a machine equipped with supplemental water sprays designed to suppress dust. Water must be combined with a surfactant. Operate and maintain machine to minimize dust emissions.	None	None
Large drivable milling machines (half-lane and larger)	For cuts of any depth on asphalt only:		
	Use machine equipped with exhaust ventilation on drum enclosure and supplemental water sprays designed to suppress dust. Operate and maintain machine to minimize dust emissions For cuts of four inches in depth or less on any substrate: Use machine equipped with exhaust ventilation on drum enclosure and supplemental water sprays designed to suppress dust. Operate and maintain machine to minimize dust emissions. OR Use a machine equipped with supplemental water spray designed to suppress dust. Water must be combined with a surfactant. Operate and maintain machine to minimize dust emissions.	None None	NNone None
Crushing machines Heavy equipment	Use equipment designed to deliver water spray or mist for dust suppression at crusher and other points where dust is generated (e.g., hoppers, conveyers,	None	None

and utility vehicles used to abrade or fracture silica-containing materials (e.g., hoe-ramming, rock ripping) or used during demolition activities involving silica-containing materials	sieves/sizing or vibrating components, and discharge points). Operate and maintain machine in accordance with manufacturer's instructions to minimize dust emissions. Use a ventilated booth that provides fresh, climate-controlled air to the operator, or a remote control station.		
	Operate equipment from within an enclosed cab.	None	None
	When employees outside of the cab are engaged in the task, apply water and/or dust suppressants as necessary to minimize dust emissions.	None	None
	Apply water and/or dust suppressants as necessary to minimize dust emissions. OR	None	None
Heavy equipment and utility vehicles for tasks such as grading and excavating but not including: demolishing, abrading, or fracturing silica-containing materials	When the equipment operator is the only employee engaged in the task, operate equipment from within an enclosed cab.	None	None
Heavy equipment and utility vehicles used to abrade or fracture silica-containing materials (e.g., hoe-ramming, rock ripping) or used during demolition activities involving silica-containing materials		None	None

When implementing the control measures specified in Table 1, we must:

a. Provide a method of exhaust to minimize the accumulation of visible airborne dust for tasks performed indoors or in enclosed areas.
b. Apply water at flow rates sufficient to minimize release of visible dust for tasks performed using wet methods
c. If an enclosed cab or booth is used, we must ensure that it:
    1. Is maintained as free as practicable from settled dust;
    2. Has door seals and closing mechanisms that work properly;
    3. Has gaskets and seals that are in good condition and working properly;
    4. Is under positive pressure maintained through continuous delivery of fresh air;
    5. Has intake air that is filtered through a filter that is 95% efficient in the 0.3-10.0 µm range (e.g., MERV-16 or better); and
    6. Has heating and cooling capabilities.

If one of our employees performs more than one task on Table 1 during the course of a single work shift, the total time for all tasks will be considered. If it's more than 4 hours in total, the employees must use the respiratory protection specified in the > 4 hours/shift column. If combined it's less than four hours, employee will follow the guidelines in the ≤ 4 hours/shift column.

Alternative Exposure Control Methods

If we are unable to fully and properly implement the engineering controls, work practices, and respiratory protection described in Table 1, we must ensure the following requirements are in place.

Permissible Exposure Limit (PEL)

We must ensure that none of our employees are exposed to an airborne concentration of respirable crystalline silica in excess of 50 µg/m3, calculated as an 8-hour TWA.

Exposure Assessment

We have to assess the exposure of each employee who is or may reasonably be expected to be exposed to respirable crystalline silica at or above the action level. This can be accomplished using one of the following options:

Performance Option:

The performance option requires that we must assess the 8-hour TWA exposure for each employee on the basis of any combination of air monitoring data or objective data sufficient to accurately characterize employee exposures to respirable crystalline silica.

Scheduled Monitoring Option:

If we use the scheduled monitoring option, we have to have provide initial monitoring to assess the 8-hour TWA exposure for each employee on the basis of one or more personal breathing zone air samples that reflect the exposures of employees on each shift, for each job classification, and in each work area. Where several employees perform the same tasks on the same shift and in the same work area, we may sample a representative fraction of these employees. If we use representative sampling, we must sample the employees who are expected to have the highest exposure to respirable crystalline silica.

If initial exposure monitoring indicates that certain employee's exposures are below the action level, we may discontinue monitoring for those employees.

If the most recent exposure monitoring indicates that our employee's exposures are at or above the action level but at or below the PEL, we will ensure that the monitoring is repeated within six months of those results. If the most recent exposure monitoring indicates that our employee's exposures are above

the PEL, we will be sure to repeat the monitoring within three months of those results.
If the most recent exposure monitoring results (after the first round of monitoring) indicates that our employee's exposures are below the action level, then we will repeat the monitoring within six months of those results to determine if we need to continue monitoring.
If our repeat monitoring results indicate two consecutive measurements, taken seven or more days apart, are below the action level, we may discontinue monitoring for our employees whose exposures are represented by the monitoring.

Reassessment of Exposures:

It is our responsibility as the employer to provide a hazard free work place for our employees and if we have any reason to believe that new or additional exposures at or above the action level have occurred we will reassess employee exposures.
We will reassess exposures whenever we have a change in the production, process, control equipment, personnel, or work practices may reasonably be expected to result in new or additional exposures at or above the action level.

Methods of Sample Analysis:

We will ensure that all of our exposure monitoring samples are evaluated by a laboratory that analyzes air samples for respirable crystalline silica in accordance with the procedures in 1926.1153 - Appendix A.

Employee Notification of Assessment Results:

We will individually notify each affected employee in writing of the results of that assessment or post the results in an appropriate location accessible to all affected employees within five working days after completing an exposure assessment.
If an exposure assessment indicates that our employee's exposure is above the PEL, we will describe in the written notification the corrective action being taken to reduce employee exposure to or below the PEL.

Observation of Monitoring:

We will provide all affected employees, or their designated representatives, an opportunity to observe any monitoring of employee exposure to respirable crystalline silica.
When observation of monitoring requires entry into an area where the use of protective clothing or equipment is required for any workplace hazard, we must provide the observer with protective clothing and equipment at no cost and must ensure that the observer uses such clothing and equipment correctly.

Methods of Compliance

Engineering and Work Practice Controls:

We must use engineering and work practice controls to reduce and maintain employee exposure to respirable crystalline silica to or below the PEL, unless we can demonstrate that such controls are not feasible. Wherever such feasible engineering and work practice controls are not sufficient to reduce employee exposure to or below the PEL, we will still use them to reduce our employee's exposure to the lowest feasible level. We will then supplement those controls with the use of respiratory protection in accordance with our Respiratory Protection Program.

Abrasive Blasting:

We must also comply with other OSHA standards, in addition to the engineering and work practice controls previous discussed, if abrasive blasting is conducted using crystalline silica-containing blasting agents or if abrasive blasting is conducted on substrates that contain crystalline silica.

Respiratory Protection

Respiratory Protection Program

When respiratory protection is required by this section, we will provide each of our employee's an appropriate respirator that complies with the requirements of 29 CFR 1910.134 we will use our respiratory

protection program.
Respiratory Protection is required:

a. Where specified by Table 1 - Specified Exposure Control Methods when Working with Materials Containing Crystalline Silica.

b. For tasks not listed in Table 1, or where we do not fully and properly implement the engineering controls, work practices, and respiratory protection described in Table 1:

    1. Where exposures exceed the PEL during periods necessary to install or implement feasible engineering and work practice controls;

    2. Where exposures exceed the PEL during tasks, such as certain maintenance and repair tasks, for which engineering and work practice controls are not feasible; and

    3. During tasks for which we have implemented all feasible engineering and work practice controls and those controls are not sufficient to reduce exposures to or below the PEL.

Specified Exposure Control Methods

If we are able to fully and properly implement the engineering controls, work practices, and respiratory protection described in Table 1 - Specified Exposure Control Methods when Working with Materials Containing
Crystalline Silica, we will be considered to be in compliance with paragraph
(e)(1) of this section and the requirements for selection of respirators in 29 CFR 1910.134(d)(1)(iii) and (d)(3) with regard to exposure to respirable crystalline silica.

Housekeeping

We will not allow dry sweeping or dry brushing when it could contribute to employee exposure to respirable crystalline silica unless wet sweeping, HEPA-filtered vacuuming, or other methods that minimize the likelihood of exposure are not feasible.
Our employees are not permitted to use compressed air to clean clothing or surfaces when it could contribute to employee exposure to respirable crystalline silica unless:

a. The compressed air is used in conjunction with a ventilation system that effectively captures the dust cloud created by the compressed air; or

b. No alternative method is feasible.

Written Exposure Control Plan

We will establish and implement a written exposure control plan that contains at least the following elements:

a. A description of the tasks in the workplace that involve exposure to respirable crystalline silica such as sawing, drilling, jackhammering, and grinding concrete.

b. A description of the engineering controls, work practices, and respiratory protection used to limit employee exposure to respirable crystalline silica for each task;

c. A description of the housekeeping measures used to limit employee exposure to respirable crystalline silica; and

d. A description of the procedures used to restrict access to work areas, when necessary, to minimize the number of employees exposed to respirable crystalline silica and their level of exposure, including exposures generated by other employers or sole proprietors.

We will review and evaluate the effectiveness of the written exposure control plan at least annually and update it as necessary.
We will make the written exposure control plan readily available for examination and copying, upon request, to each employee covered by this program, their designated representatives, the Assistant Secretary, and the Director.
We will designate a competent person to make frequent and regular inspections of job sites, materials, and equipment to implement the written exposure control plan.

Medical Surveillance

We will make medical surveillance available to our employees at no cost and at a reasonable time and place for each who will be required under this program to use a respirator for 30 or more days per year.
We will ensure that all medical examinations and procedures required by this program are performed by a Physician or other licensed health care professional or PLHCP.

Initial Examination

We must make available an initial baseline medical examination within 30 days after initial assignment, unless the employee has received a medical examination that meets the requirements of this section within the last three years. The examination must consist of:

a. A medical and work history, with emphasis on: past, present, and anticipated exposure to respirable crystalline silica, dust, and other agents affecting the respiratory system; any history of respiratory system dysfunction, including signs and symptoms of respiratory disease (e.g., shortness of breath, cough, wheezing); history of tuberculosis; and smoking status and history;

b. A physical examination with special emphasis on the respiratory system;

c. A chest X-ray (a single posteroanterior radiographic projection or radiograph of the chest at full inspiration recorded on either film (no less than 14 x 17 inches and no more than 16 x 17 inches) or digital radiography systems), interpreted and classified according to the International Labour Office (ILO) International Classification of
Radiographs of Pneumoconioses by a NIOSH-certified B Reader;

d. A pulmonary function test to include forced vital capacity (FVC) and forced expiratory volume in one second (FEV1) and FEV1/FVC ratio, administered by a spirometry technician with a current certificate from a NIOSH-approved spirometry course;

e. Testing for latent tuberculosis infection; and

f. Any other tests deemed appropriate by the PLHCP.

Periodic Examinations

We will make medical examinations available that include the procedures described in paragraph (h)(2) of this section (except paragraph (h)(2)(v)) at least every three years, or more frequently if recommended by the PLHCP.

Information Provided to the PLHCP

We will ensure that the examining PLHCP has a copy of this standard, and must provide the PLHCP with the following information:

a. A description of the employee's former, current, and anticipated duties as they relate to the employee's occupational exposure to respirable crystalline silica;

b. The employee's former, current, and anticipated levels of occupational exposure to respirable crystalline silica;

c. A description of any personal protective equipment used or to be used by the employee, including when and for how long the employee has used or will use that equipment; and

d. Information from records of employment-related medical examinations previously provided to the employee and currently within the control of the employer.

PLHCP's Written Medical Report for the Employee

We must ensure that the PLHCP explains to our employee the results of the medical examination and provides them with a written medical report within 30 days of the medical examination performed. The written report must contain:

a. A statement indicating the results of the medical examination, including any medical condition(s) that would place the employee at increased risk of material impairment to health from exposure to respirable crystalline silica and any medical conditions that require further evaluation or treatment;

b. Any recommended limitations on the employee's use of respirators;

c. Any recommended limitations on the employee's exposure to respirable crystalline silica; and

d. A statement that the employee should be examined by a specialist (pursuant to paragraph (h)(7) of this section) if the chest X-ray provided in accordance with this section is classified as 1/0 or higher by the B Reader, or if referral to a specialist is otherwise deemed appropriate by the PLHCP.

PLHCP's Written Medical Opinion for the Employer

We must also obtain a written medical opinion from the PLHCP within 30 days of the medical examination. The written opinion shall contain **only** the following:

a. The date of the examination;

b. A statement that the examination has met the requirements of this section; and

c. Any recommended limitations on the employee's use of respirators.

If the employee provides written authorization, the written opinion can also contain either or both of the following:

a. Any recommended limitations on the employee's exposure to respirable crystalline silica;

b. A statement that the employee should be examined by a specialist (pursuant to paragraph (h)(7) of this section) if the chest X-ray provided in accordance with this section is classified as 1/0 or higher by the B Reader, or if referral to a specialist is otherwise deemed appropriate by the PLHCP.

We must ensure that each employee receives a copy of that written medical opinion within 30 days of each medical examination performed.

Additional Examinations

If the PLHCP's written medical opinion indicates that an employee should be examined by a specialist, we must make a medical examination by a specialist available within 30 days after receiving the PLHCP's written opinion.

We must ensure that the examining specialist is provided with all of the information that we provided to the PLHCP.

We must ensure that the specialist explains the results of the medical examination to the employee and provides them with a written medical report within 30 days of the examination that meets the

requirements of paragraph (h)(5) (except paragraph (h)(5)(iv)) of this section.
We will also obtain a written opinion from the specialist within 30 days of the medical examination that meets the requirements of paragraph (h)(6) (except paragraph (h)(6)(i)(B) and (ii)(B)) of this section.

Employee Information and Training

We will ensure that at least the following hazards are addressed: Cancer, lung effects, immune system effects, and kidney effects.
Additionally, we must ensure that our employees can demonstrate knowledge and understanding of at least the following:

a. The health hazards associated with exposure to respirable crystalline silica;

b. Specific tasks in the workplace that could result in exposure to respirable crystalline silica;

c. Specific measures the employer has implemented to protect employees from exposure to respirable crystalline silica, including engineering controls, work practices, and respirators to be used;

d. The contents of this section;

e. The identity of the competent person designated by the employer in accordance with paragraph (g)(4) of this section; and

f. The purpose and a description of the medical surveillance program required by paragraph (h) of this section.

We will make a copy of this section readily available and without cost to our employees covered by this program.

Recordkeeping

Air Monitoring Data

We will make and maintain an accurate record of all exposure measurements taken to assess employee exposure to respirable crystalline silica. This record will include at least the following information:

a. The date of measurement for each sample taken;

b. The task monitored;

c. Sampling and analytical methods used;

d. Number, duration, and results of samples taken;

e. Identity of the laboratory that performed the analysis;

f. Type of personal protective equipment, such as respirators, worn by the employees monitored; and

g. Name, social security number, and job classification of all employees represented by the monitoring, indicating which employees were actually monitored.

Objective Data

We will make and maintain an accurate record of all objective data relied upon to comply with the requirements of this section. This record will include at least the following information:

a. The crystalline silica-containing material in question;

b. The source of the objective data;

c. The testing protocol and results of testing;

d. A description of the process, task, or activity on which the objective data were based; and

e. Other data relevant to the process, task, activity, material, or exposures on which the objective data were based.

Medical Surveillance

We will make and maintain an accurate record for each employee covered by medical surveillance under paragraph (h) of this section. The record will include the following information about the employee:

a. Name and social security number;

b. A copy of the PLHCPs' and specialists' written medical opinions; and

c. A copy of the information provided to the PLHCPs and specialists.

Medical Record Retention

We will maintain medical records and make them available in accordance with 29 CFR 1910.1020, including that medical record for each employee be preserved and maintained for at least the duration of employment plus thirty (30) years.

Lead Hazard Awareness

Pure lead (Pb) is a heavy metal at room temperature and pressure, and is a basic chemical element. It can combine with various other substances to form numerous lead compounds.

OSHA standard 29 CFR 1926.62, addresses occupational exposure to lead in the construction industry. The word "lead" within this standard refers to elemental lead, all inorganic lead compounds, and a class of organic lead compounds called lead soaps. This standard does not apply to other organic lead compounds.

There may be times when employees are working within the vicinity of lead or lead-containing materials.

Under no circumstance will employees be exposed to lead above the action level which, for lead, is 30 micrograms of lead per cubic meter of air (30 μ/m^3), averaged over an eight (8)-hour workday. As a matter of interest, the permissible exposure limit (PEL) for lead is 50 micrograms of lead per cubic meter of air (50 μ/m^3), averaged over an 8-hour workday.

Lead found in paints, coatings, and compounds that are undisturbed poses no risk of hazard exposure, and work around these items does not require use of respirators, special clothing, or negative pressure enclosures.

Care will be taken by all employees not to abrade, remove, touch, or in any way disturb lead or lead containing compounds within the work area.

Contractors who actually abate lead do so under the provisions of the above-cited lead standard, which precludes lead from escaping into the surrounding areas by negative pressure enclosures and other methods.

As a point of interest, persons whom perform lead abatement have to have received special training, be licensed, and be part of medical surveillance program.

To drive home the point of the importance of leaving lead at the job site undisturbed and avoided, employees must be aware of the health hazards associated with lead exposure.

The below is excerpted from 29 CFR 1910.1025 App A, *Substance data sheet for occupational exposure to lead*:

II. HEALTH HAZARD DATA

A. "Ways in which lead enters your body." When absorbed into your body in certain doses, lead is a toxic substance. The object of the lead standard is to prevent absorption of harmful quantities of lead. The standard is intended to protect you not only from the immediate toxic effects of lead, but also from the serious toxic effects that may not become apparent until years of exposure have passed. Lead can be absorbed into your body by inhalation (breathing) and ingestion (eating). Lead (except for certain organic lead compounds not covered by the standard, such as tetraethyl lead) is not absorbed through your skin. When lead is scattered in the air as a dust, fume, or mist it can be inhaled and absorbed through your lungs and upper respiratory tract. Inhalation of airborne lead is generally the most important source of occupational lead absorption. You can also absorb lead through your digestive system if lead gets into your mouth and is swallowed. If you handle food, cigarettes, chewing tobacco, or make-up which have lead on them or handle them with hands contaminated with lead, this will contribute to ingestion. A significant portion of the lead that you inhale or ingest gets into your blood stream. Once in your blood stream, lead is circulated throughout your body and stored in various organs and body tissues. Some of this lead is quickly filtered out of your body and excreted, but some remains in the blood and other tissues. As exposure to lead continues, the amount stored in your body will increase if you are absorbing more lead than your body is excreting. Even though you may not be aware of any immediate symptoms of disease, this lead stored in your tissues can be slowly causing irreversible damage, first to individual cells, then to your organs and whole body systems.

B. "Effects of overexposure to lead" - (1) "Short term (acute) overexposure." Lead is a potent, systemic poison that serves no known useful function once absorbed by your body. Taken in large enough doses, lead can kill you in a matter of days. A condition affecting the brain called acute encephalopathy may arise which develops quickly into seizures, coma, and death from cardiorespiratory arrest. A short-term dose of lead can lead to acute encephalopathy. Short-term occupational exposures of this magnitude are highly unusual, but not impossible. Similar forms of encephalopathy may, however, arise from extended, chronic exposure to lower doses of lead. There is no sharp dividing line between rapidly developing acute effects of lead, and chronic effects which take longer to acquire. Lead adversely affects numerous body systems, and causes forms of health impairment and disease which arise after periods of exposure as short as days or as long as several years.

C. "Long-term (chronic) overexposure." Chronic overexposure to lead may result in severe damage to your blood - forming, nervous, urinary, and reproductive systems. Some common symptoms of chronic overexposure include loss of appetite, metallic taste in the mouth, anxiety, constipation, nausea, pallor, excessive tiredness, weakness, insomnia, headache, nervous irritability, muscle and joint pain or soreness, fine tremors, numbness, dizziness, hyperactivity, and colic. In lead colic, there may be severe abdominal pain. Damage to the central nervous system in general and the brain (encephalopathy) in particular is one of the most severe forms of lead poisoning. The most severe, often fatal, form of encephalopathy may be preceded by vomiting, a feeling of dullness progressing to drowsiness and stupor, poor memory, restlessness, irritability, tremor, and convulsions. It may arise suddenly with the onset of seizures, followed by coma,

and death. There is a tendency for muscular weakness to develop at the same time. This weakness may progress to paralysis, often observed as a characteristic "wrist drop" or "foot drop," and is a manifestation of a disease to the nervous system called peripheral neuropathy. Chronic overexposure to lead also results in kidney disease with few, if any, symptoms appearing until extensive and most likely permanent kidney damage has occurred. Routine laboratory tests reveal the presence of this kidney disease only after about two-thirds (2/3) of kidney function is lost. When overt symptoms of urinary dysfunction arise, it is often too late to correct or prevent worsening conditions, and progression to kidney dialysis or death is possible. Chronic overexposure to lead impairs the reproductive systems of both men and women.

D. Overexposure to lead may result in decreased sex drive, impotence, and sterility in men. Lead can alter the structure of sperm cells, raising the risk of birth defects.

E. There is evidence of miscarriage and stillbirth in women whose husbands were exposed to lead or who were exposed to lead themselves. Lead exposure also may result in decreased fertility and abnormal menstrual cycles in women. The course of pregnancy may be adversely affected by exposure to lead since lead crosses the placental barrier and poses risks to developing fetuses. Children born of parents either one of whom were exposed to excess lead levels are more likely to have birth defects, mental retardation, behavioral disorders, or die during the first year of childhood. Overexposure to lead also disrupts the blood - forming system, resulting in decreased hemoglobin (the substance in the blood that carries oxygen to the cells) and ultimately anemia. Anemia is characterized by weakness, pallor, and fatigability as a result of decreased oxygen carrying capacity in the blood.

F. "Health protection goals of the standard." Prevention of adverse health effects for most workers from exposure to lead throughout a working lifetime requires that a worker's blood lead level (BLL, also expressed as PbB) be maintained at or below forty micrograms per deciliter of whole blood (40 ug/dl). The blood lead levels of workers (both male and female workers) who intend to have children should be maintained below 30 ug/dl to minimize adverse reproductive health effects to the parents and to the developing fetus. The measurement of your blood lead level (BLL) is the most useful indicator of the amount of lead being absorbed by your body. Blood lead levels are most often reported in units of milligrams (mg) or micrograms (ug) of lead (1 mg=1000 ug) per 100 grams (100g), 100 milliliters (100 ml), or deciliter (dl) of blood. These three units are essentially the same. Sometime BLLs are expressed in the form of mg percent or ug percent. This is a shorthand notation for 100g, 100 ml, or dl. (References to BLL measurements in this standard are expressed in the form of ug/dl.)

   BLL measurements show the amount of lead circulating in your blood stream, but do not give any information about the amount of lead stored in your various tissues. BLL measurements merely show current absorption of lead, not the effect that lead is having on your body or the effects that past lead exposure may have already caused. Past research into lead - related diseases, however, has focused heavily on associations between BLLs and various diseases. As a result, your BLL is an important indicator of the likelihood that you will gradually acquire a lead - related health impairment or disease.

   Once your blood lead level climbs above 40 ug/dl, your risk of disease increases. There is a wide variability of individual response to lead; thus, it is difficult to say that a particular BLL in a given person will cause a particular effect. Studies have

associated fatal encephalopathy with BLLs as low as 150 ug/dl. Other studies have shown other forms of diseases in some workers with BLLs well below 80 ug/dl. Your BLL is a crucial indicator of the risks to your health, but one other factor is also extremely important. This factor is the length of time you have had elevated BLLs.

G. The longer you have an elevated BLL, the greater the risk that large quantities of lead are being gradually stored in your organs and tissues (body burden). The greater your overall body burden, the greater the chances of substantial permanent damage. The best way to prevent all forms of lead - related impairments and diseases -- both short- and long-term -- is to maintain your BLL below 40 ug/dl. The provisions of the standard are designed with this end in mind.

Heavy construction equipment would include

- Bulldozers
- Compactors
- Front-end loaders
- Graders
- Haulage Vehicles (Trucks/Dump Trucks)
- Scrapers
- Skid-Steer Machines
- Tractors

Bi-directional machines such as front-end loaders and bulldozers will have an audible alarm, distinguishable from the surrounding noise level.

Scissors points on all front-end loaders which may harm the operator, as well as all parts exposed to employees, such as belts, gears, pulleys, sprockets, spindles, drums, flywheels, chains, and other moving parts, will be guarded.

Equipment that is operated from the seated position will have roll over protection and seat belts, and their use is required. If there is no roll over protection or seatbelts, then the equipment will not be used.

All trucks into which earth is dumped will have protection for the driver of that vehicle or the driver must exit the vehicle before loading.

Vehicle operators will not operate heavy equipment on any access roadway or grade that is not suitable for the vehicle.

Bulldozer blades, loader buckets, dump bodies, and similar equipment will be fully lowered or blocked to prevent movement during maintenance or when not in use.

When equipment is parked, the parking brake will be set. Additionally, on inclines, wheeled vehicles will be chocked. Equipment left unattended at night, adjacent to either a highway or construction area in use, will be clearly visible with reflectors, lights, or illuminated (with reflectors or lights) barricades.

Safety Requirements for Heavy Construction Equipment

1. General repairs must not be made to powered equipment until workers are protected from movement of the equipment or its parts.
2. Before repairs are made, workers must comply with lock-out/tag-out requirements,

if applicable, of our Control of Hazardous Energy Program.

3. Wherever mobile equipment operation encroaches on a public thoroughfare, a system of traffic controls must be used.
4. Flaggers are required at all locations where barricades and warning signs cannot control the moving traffic.
5. Job-site vehicles must be equipped with the following, if so designed:
    a. Operable service, emergency, and parking brakes.
    b. Two (2) operable headlights and taillights for nighttime operation.
    c. Windshield wipers and defogging equipment as required.
    d. Seat belts if the vehicle has rollover protection structures.
    e. Fenders or mud flaps.
    f. Adequate seating if the vehicles are used to transport employees.
6. Vehicles and systems must be checked for proper operation at the start of each shift.
7. Vehicles operating when rear vision is blocked must be equipped with an automatic backup alarm or its equivalent.
8. Haulage vehicles in operation must be under operator control and must be kept in gear when descending grades.
9. Engines must be stopped during refueling

Heavy Equipment and Electrical Power Lines

Except where electrical distribution and transmission lines have been de-energized and visibly grounded at the point of work or where insulating barriers (not attached to the vehicle) have been erected to prevent physical contact with the lines, the following clearance – between any part of the equipment, load line, or load **and** the power line – will be observed:

Table A—Minimum Clearance Distances per 29 CFR 1926.1408

Voltage (nominal, kV, alternating current)	Minimum clearance distance (in feet)
up to 50	10
over 50 to 200	15
over 200 to 350	20
over 350 to 500	25
over 500 to 750	35
over 750 to 1,000	45
over 1,000	(As established by the utility owner/operator or registered professional engineer who is a qualified person with respect to electrical power transmission and distribution).

Note: The value that follows "to" is up to and includes that value. For example, over 50 to 200 means up to and including 200kV.

A ground guide will be designated to observe clearance of the equipment and give warning to the equipment operator in situations where it is difficult for the equipment operator to maintain the desired clearances by visual means.

An overhead wire will be considered energized unless the owner of the line, or the electrical utility authorities, indicates that it is not energized and it has been visibly grounded.

Hoists

29 CFR 1926.552 - Material hoists, personnel hoists, and elevators

A hoist is a useful mechanical device which gives one the ability to lift and move heavy objects – not people. No person is to ride on a hoist. As is true for all mechanical devices, improper use may lead to injury. You must know what you are doing and you must be careful.

Before use, hoists must be inspected for bent or damaged components. Particular attention should be paid to guarding. Fingers and loose clothing could be snagged in exposed mechanisms. Chains, cables, or rope slings must not be kinked, twisted, or frayed.

Loads must be properly rigged with hooks or slings, and they must never exceed the hoist's rated capacity.

Ensure that the area around the hoist is free from debris and, most importantly, people. Do not allow yourself or others to be under a hoisted load.

Ladders

29 CFR 1926.1050 - Scope, application, and definitions applicable to this subpart
29 CFR 1926.1051 - General requirements
29 CFR 1926.1053 - Ladders
29 CFR 1926.1060 - Training requirements

All employees using ladders are required by OSHA standard to receive training and understand proper procedures for ladder use before using a ladder in a work situation.

All ladders will be inspected periodically and defective ladders will be tagged and placed out of service.

American National Standards Institute (ANSI) and NIOSH approval labels should never be covered with paint or tape. Having ladders that are constructed to standard will help to prevent collapse and resultant falls.

Specific operational procedures for ladders directly relating to the elimination of fall hazards are listed below:

a. A stairway or a ladder will be provided at all personnel points of access where there is a break in elevation of nineteen inches (19″) or more.
b. Ladders will never be overloaded.
c. Ladder rungs, cleats, and steps must be parallel, level, and uniformly spaced when a ladder is in position for use.
d. Ladders will not be tied or fastened together unless they are so designed.
e. Portable ladders used for gaining access to an upper level will extend at least three feet (3′) above the upper landing surface or the ladder will be securedat its top.
f. Ladders must be free of oil, grease, or other slipping hazards.
g. Ladders must be used for the purpose for which they were designed.

h. Non-self-supporting ladders will be used at such an angle so that the horizontal distance from the top support to the foot of the ladder is approximately ¼ of the working length of the ladder.

i. Ladders will only be used on stable and level surfaces unless secured to prevent displacement.

j. Ladders shall not be used on slippery surfaces unless secured or provided with slip-resistant feet to prevent accidental displacement.

k. Ladders placed in any location where they can be displaced by job site activities or traffic will be secured to prevent accidental displacement, or a barricade will be used to keep the activities or traffic away from the ladder.

l. The area around the top and bottom of the ladder shall be kept clear.

m. Ladders shall not be moved, shifted, or extended while occupied.

n. The top step of a stepladder shall not be used as a step.

o. Portable ladders with structural defects will be immediately marked in a manner that readily identifies them as defective and removed from service until repaired.

p. When ascending or descending a ladder, you must face the ladder.

q. Employees must use at least one (1) hand to grasp the ladder when progressing up and/or down the ladder.

r. Employees are not to carry any object or load that could cause loss of balance and a resultant fall.

Fixed ladders where the length of climb is less than twenty-four feet (24′) but the top of the ladder is greater than twenty-four feet (24′) above the lower level must have cages, wells, ladder safety devices, or self-retracting lifelines.

Fixed ladders where the length of climb equals or exceeds twenty-four feet (24′) shall have at least one (1) of the following:

a. Ladder safety devices.

b. Self-retracting lifelines and rest platforms not exceeding one hundred fifty feet (150′).

c. A cage or well, and multiple ladder sections not exceeding fifty feet (50′) in length. At the maximum interval of fifty feet (50′), ladder sections will be offset on landing platforms.

LP - Gas Storage

29 CFR 1926.153 - Liquefied petroleum gas (LP-Gas)

Liquefied petroleum gas (LP-Gas) is sometimes used on job sites to provide fuel for temporary heating devices.

LP-Gas systems must have containers, valves, connectors, manifold valve assemblies, and regulators of an approved type. All cylinders must be DOT approved.

Rules for inside storage (under construction standards) are simple -- **it is not allowed!**

***Note: Under industry standards, up to three hundred pounds (300 lbs.) of LP-Gas may be stored, with adherence to specific safety procedures, is allowed.**

Rules for outside storage require that containers be in a suitable ventilated enclosure or otherwise protected against tampering. At least one (1) approved portable fire extinguisher

having a rating of not less than 20-B:C must be readily available.

The distances from buildings or groups of buildings at which containers must be stored are as follows:

Quantity of LP-Gas Stored	Distance in Feet
500 lbs. or less	0
501 to 6,000 lbs.	10
6,001 to 10,000 lbs.	20
over 10,000 lbs.	25

Storage must not be near building openings or vehicular traffic.

LP - Gas Temporary Heating

29 CFR 1926.153 - Liquefied petroleum gas (LP-Gas)

When LP-Gas is used for temporary heating on units that provide over 7,500 BTU per hour or use containers greater than 2.5 pounds maximum water capacity [nominal 1 pound LP-Gas capacity], the following will apply:

a. Container valves, connectors, regulators, manifolds, piping, and tubing must not be used as structural supports for the heaters.
b. The LP-Gas containers and all associated equipment including hoses must be located so as to minimize exposure to high temperatures or physical damage.
c. The maximum water capacity of individual containers must be 245 pounds [nominal 100 pound LP-Gas capacity].

Heaters that are not integral heater-container units, which are connected by hose to the LP-Gas, must be at least six feet (6′) from the container. Blower and radiation type heaters must not be directed towards the container or any other unit within twenty feet (20′). Heaters specifically designed for attachment to the container are permitted as long as the heat is not directed towards the LP-Gas container.

Machine Guarding

29 CFR 1926.307 - Mechanical power-transmission apparatus

Most injuries that occur when you are operating a machine happen at the point of operation – the point on a machine where the actual work (cutting, bending, and spinning) occurs. This is also the point where guards can protect fingers and hands exposed to that danger. Machine guarding also protects employees from other dangers, such as flying pieces of metal, sparks, gears, belts, and rotating parts.

The most common types of machines on job sites are power tools, which often have guards to prevent injury.

Accident prevention in this area is a function of machine design – engineering controls – and operator training. Types of machine guarding are almost as numerous as types of machines – the most common being a physical barrier to prevent accidental insertion of body parts. Guards are vital for safety reasons, and machine guards designed into a machine should never be altered or removed. The speed and tremendous forces involved in modern machines are such that severe injury or even death could occur without warning and without even slowing the machine down.

Training and proper work methods go a long way towards reducing machine accidents. Like all safeguards, there is generally a way to bypass safety features that are engineered into machines. This is sometimes done to increase speed or just to make one's job easier. This could result in a tragic, avoidable accident. The few seconds saved could cause a lifetime of grief. **Do not bypass safety systems.**

Operate all machines according to the instructor's manual and follow all safety procedures.

Machinery

Spinning, pounding, and moving – gears, pulleys, levers – electricity, fuel, and hydraulics – action, reaction, force: Danger! Machinery takes energy and performs a task or a multitude of tasks. Machinery, from a safety standpoint, is a collection of individual, simple machines (pulleys, gears, etc.) combined to work in harmony to accomplish a specific job.

The danger is obvious: the power, speed, movement, and momentum of machinery is not going to be altered by something as insignificant as an employee's finger, hand, or even body.

How do you deal with the dangers of machinery?

1. N**ever** operate any machinery until you have received proper training and you thoroughly understand safety procedures as well as procedures to follow for adjustments, power interruption, jamming, lubrication, and inspection.
2. Ensure that the guarding systems are in place, functioning properly, and have not been altered or removed.
3. If a hazard assessment of the machinery operation dictates the use of specific PPE, wear it!
4. From purely a safety standpoint, think of any power operated item with moving parts as machinery. This includes items as small as an electric drill and as large as an 80,000 pound tractor-trailer.

Material Storage

29 CFR 1926.250 - General requirements for storage

General Requirement for Storage

1. All materials stored in tiers shall be stacked, racked, blocked, interlocked, or otherwise secured to prevent sliding, falling, or collapse.
2. Maximum safe load limits of floors within buildings and structures, in pounds per square foot, shall be conspicuously posted in all storage areas, except for floor or slab on grade areas. Maximum safe loads shall not be exceeded.

3. Aisles and passageways shall be kept clear to provide for the free and safe movement of material handling equipment or employees. Such areas shall be kept in good repair.
4. When a difference in road or working levels exists, means such as ramps, blocking, or grading shall be used to ensure the safe movement of vehicles between the two (2) levels.
5. Material stored inside buildings under construction shall not be placed within six feet (6′) of any hoistway or inside floor openings, nor within ten feet (10′) of an exterior wall which does not extend above the top of the material stored.
6. Each employee required to work on stored material in silos, hoppers, tanks, and similar storage areas shall be equipped with personal fall arrest equipment meeting the requirements of Fall Protection specified by OSHA 1926 or 1910
7. incompatible materials shall be segregated in storage
    a. Bagged materials shall be stacked by stepping back the layers and cross-keying the bags at least every ten (10) bags high.
8. Materials shall not be stored on scaffolds or runways in excess of supplies needed for immediate operations.
9. Brick stacks shall not be more than seven feet (7′) in height. When a loose brick stack reaches a height of four feet (4′), it shall be tapered back two inches (2″) for every one foot (1′) of height above the four foot (4′) level.
10. When masonry blocks are stacked higher than six feet (6′), then the stack shall be tapered back one-half (1/2) block per tier above the six foot (6′) level.
11. Used lumber shall have all nails withdrawn before it is stacked.
12. Lumber shall be stacked on level and solidly-supported sills and shall be so stacked as to be stable and self-supporting.

NFPA 70Es Workplace

OSHA has adopted by reference NFPA 70E-2000, *Standard for Electrical Safety Requirements for Employee Workplaces.*

A national consensus standard, such as NFPA 70E-2009, can sometimes be relevant to a general duty clause citation in the sense that the consensus standard may be used as evidence of hazard recognition and the availability of feasible means of abatement. The general duty clause, Section 5(a)(1) of the OSH Act, is violated if an employer has failed to furnish a job site that is free from recognized hazards causing or likely to cause death or serious physical harm. The general duty clause is used where there is no standard that applies to the particular hazards involved.

All electrical work will be done in compliance with the National Electric Code (NEC), OSHA standards, and NFPA 70E. Both OSHA standards and NFPA 70E deal with worker safety, while the NEC deals with the design, installation, and inspection of electrical installations.

Training

All employees who face electrical hazards that are not reduced to a safe level by the applicable electrical installation requirements will be trained in safety-related work practices and procedural requirements as necessary to provide protection from the electrical hazards associated with the job assignments. Employees will be trained to identify and understand

the relationship between electrical hazards and possible injury.

Training will be in a classroom and/or on-the-job, and the degree of training will be determined by the risk to the employee.

Employees will receive training in emergency procedures, including methods of release from contact with exposed energized electrical conductors or circuit parts, methods of first aid, and CPR, if the duties warrant such training.

Training for Qualified Persons

***Note: A qualified person has skills and knowledge related to the construction and operation of the electrical equipment and installations and has received safety training to recognize and avoid the hazards involved.**

1. Qualified persons must be trained in and knowledgeable about the construction and operation of equipment or a specific work method and be able to recognize and avoid electrical hazards with respect to the equipment or work methods.
    a. Qualified persons will be familiar with the proper use of special precautionary techniques, PPE (including arc-flash, insulating, and shielding materials), and insulated tools and test equipment.

    ***Note: A person can be qualified with respect to certain equipment and methods but still be unqualified with respect to others.**

    b. Qualified persons will be permitted to work within the Limited Approach Boundary of exposed energized electrical conductors and circuit parts operating at 50 volts or more and will be trained in the following:
        1) The skills and techniques necessary to distinguish exposed energized electrical conductors and circuits parts from other parts of electrical equipment.
        2) The skills and techniques necessary to determine the nominal voltage of exposed energized electrical conductors and circuit parts.
        3) The approach distances specified in Table 130.2(c) and the corresponding voltages to which the qualified person will be exposed.
        4) The decision-making process necessary to determine the degree and extent of the hazard and the PPE and job planning necessary to perform the task safely.
    c. If a person undergoing on-the-job training has demonstrated, during the course of the training, an ability to perform duties safely under the direct supervision of a qualified person, this person will be considered qualified for the performance of these duties.
    d. Tasks performed less often than once per year will require retraining before performance of the work practices involved.
    e. Qualified persons will be trained to select an appropriate voltage detector and demonstrate how to use a device to verify the absence of voltage, including interpreting indications provided by the device. They will be trained to understand all limitations of each specific voltage detector that may be used.

Training for Unqualified Persons

Unqualified persons will be trained in and be familiar with any of the electrical safety-

related practices that are necessary for their safety.

***Note: Unqualified persons will not be permitted to enter spaces that are required to be accessible to qualified employees only unless the electric conductors and equipment involved are in an electrically safe work condition.**

Retraining

Retraining will be given when:

a. Supervisors or annual inspections indicate that the employee is not complying with the safety-related work practices.

b. New technology, new types of equipment, or changes in procedures necessitate the use of safety-related work practices that are different from those which the employee would normally use.

c. The employee must employ safety-related work practices that are not normally used during his or her regular job duties.

Training Documentation

The company will document that each employee has received the training above **after** the employee demonstrates proficiency in the work practices involved and will be maintained for the duration of the employee's employment. Training documentation will contain the employee's name and dates of training.

Host Employer Responsibilities

The host employer will inform contract employers of:

a. Known electrical hazards that are related to the contract employer's work that might not be recognized by the contract employer or its employees.

b. Information about the employer's installation that the contract employer needs to make assessments.

The host employer will report observed contract employer related violations (dealing with electrical work) to the contract employer.

Contract Employer Responsibilities

a. The contract employer will ensure that each of its employees is instructed in the hazards communicated to the contractor employer by the host employer. This instruction is in addition to the basic instruction required by NFPA 70E.

b. The contract employer will ensure that each of its employees follows the work practices required by NFPA 70E and safety- related work rules required by the host employer.

c. The contract employer will advise the host employer of:

   1) Any unique hazards presented by the contract employer's work.

   2) Any unanticipated hazards found during the contract employer's work that the host employer did not mention.

   3) The measures that the contractor took to correct any violations reported by the host employer and prevent such violations from recurring in the future.

Electrical Safety Program

The employer will implement and document an overall safety program that directs activity appropriate for the voltage, energy level, and circuit conditions.

Safety related work practices are only one (1) component of an overall electrical safety program.

Electrical Safety Program Procedures

The program will address safety related work practices for working within the Limited Approach Boundary. Program elements found in Annex E to NFPA 70E will be included, such as evaluations, anticipating unexpected events, electrical flash arc hazard analysis, and the fact that all electrical parts are considered live until proven otherwise.

Risk/Hazard Evaluation Procedures

Risk/hazard evaluation procedures are to be used before work is started within the Limited Approach Boundary of energized electrical conductors and circuit parts operating at 50 volts or more or where an electrical hazard exists. An example of Hazard/Risk Evaluation Procedures, as well an example of a Hazard Risk Analysis Evaluation Flow Chart, is found in Annex F to NFPA 70E. It will contain event severity, frequency, probability, and avoidance to determine the level of safe practices to be employed.

Pre-Job Briefings for Routine Work

Prior to performing routine work (routine work is not complicated or particularly hazardous and the employee should be able to recognize and avoid hazards presented), a job briefing will be held before each job and include all employees involved. Topics will include hazards associated with the job, work procedures involved, special precautions, energy source controls, and PPE requirements.

Test Instruments and Equipment

All test instruments, equipment, and their accessories will be rated for the circuits and equipment to which they will be connected. Further, they will meet the requirements of ANSI/ISA-66010-1, *Safety Requirements for Electrical Equipment for Measurement, Control, and Laboratory Use - Part 1: General Requirements*, for rating and design requirements for voltage measurement and test instruments intended for use on electrical systems of 1000 volts and below.

Operations Verification

When test instruments are used for the testing of the absence of voltage on conductors or circuit parts operating at 50 volts or more, the operation of the test instruments will be verified before and after an absence of voltage test is performed.

Insulating PPE Maintenance and Use

Electrical protective equipment will be maintained in a safe, reliable condition. Insulating equipment will be inspected for damage before each day's use and immediately following any incident that can reasonably be suspected of having caused damage. Insulating gloves will be given an air test along with the viual inspection.

Maximum test intervals for rubber insulating equipment will be in accordance with NFPA 70E Table 130(c) (6)(c). Timeframes for testing will include: 1) Blankets-before first issue/every twelve (12) months thereafter; 2) Gloves-before first issue and every six (6) months; and 3) Sleeves-before first issue and every twelve (12) months thereafter. Covers and line hose will be tested if their insulating value is suspect to be compromised.

Energized Electrical Work Permit

Reference Annex J to NFPA 70E. Energized Electrical Work Permits **are not** part of NFPA 70E. Within Annex J, however, are both an example of an Energized Electrical Work Permit and a Flow Chart to illustrate items to consider when determining the need for the permit.

In every case, if the voltage level is **≥** 50 volts **AND** there are exposed live parts, an Energized Electrical Work Permit is required.

Part I [to be completed by the Requester] of the Energized Electrical Work Permit will include:

1. Job/Work Order Number.
2. Description of the work to be done.
3. Justification of why the circuit/equipment cannot be de-energized or the work deferred until the next scheduled outage.
4. Requester's Name, Title, and Date.

Part II (to be completed by the Electrically Qualified persons ***doing*** the work) of the Energized Electrical Work Permit will include:

1. Detailed job description procedure to be used in performing the work detailed in Part I.
2. Description of the Safe Work Practices to be employed.
3. Results of the Shock Hazard Analysis.
4. Determination of the Shock Protection Boundaries.
5. Results of the Arc Flash Hazard Analysis.
6. Determination of the Arc Flash Protection Boundary.
7. Necessary PPE to perform the assigned task safely.
8. Means employed to restrict the access of unqualified persons to the work area.
9. Evidence of completion of a Job Briefing, including discussion of any job-related hazards.
10. A signed and dated agreement by each Electrical Qualified Person that the above work can be done safely.

Part III of the Energized Electrical Work Permit will include signed and dated approval(s) by persons such as:

1. Manufacturer Manager
2. Safety Manager
3. General Manager
4. Maintenance/Engineering Manager
5. Electrically Knowledgeable Person

Illumination of Work Areas

Employees will not enter spaces containing electrical hazards unless illumination is provided that enables the employees to perform the work safely. Where lack of illumination or an obstruction precludes observation of the work to be performed, employees will not perform any task with the Limited Approach Boundary of energized electrical conductors or circuit parts operating at 50 volts or more or where an electrical hazard exists.

Pipe Tie-Ins

Prior to a pipe tie-in, the flow of gas, steam, vapor, and liquid must be halted. It is absolutely vital to know the ramifications of halting the flow within the pipe, particularly in hazardous facilities such as chemical plants, refineries, and other facilities, which have a higher degree of hazard than do normal work sites. In these types of facilities, **prior** to any blocking of flow through pipes, permission will be obtained from the facility operator.
Failure to follow this specific rule could result in a major catastrophe.

Before actual tie-in is attempted, the original pipe that has been taken out of service (by positive means such as valve, block, or tag) will be purged of contaminants and gas tested, if appropriate.

At the completion of the tie-in, the facility operator will be notified **before** flow is restored to the pipe.

It is vital to know the chemical and physical properties of the material within the pipe so that an appropriate fire extinguisher can be selected and available. This information will also allow for hazard assessment and PPE selection.

Post-Tensioning Operations

29 CFR 1926.701 - General requirements

OSHA has little to say about post-tensioning operations other than what is found in 29 CFR 1926.701(c), which states that:

a. No employee (except those employees essential to the post-tensioning operations) shall be permitted to be behind the jack during tensioning operations.
b. Signs and barriers shall be erected to limit employee access to the post-tensioning area during tensioning operations.

However, by following the below guidelines and procedures, the hazards of post-tensioning operations can be controlled:

a. Concrete pre-stressing and post-tensioning operations should be done according to the specifications and instructions of a professional engineer, and a copy of these specifications and instructions will be available on site while the work is being done if required by the Safety Manager or General Contractor.

b. Stressing operations must be carried out under the direction of a competent person.

c. Employees involved in pre-stressing or post-tensioning must be instructed in and follow safe work procedures.

d. Appropriate eye protection must be worn by all employees involved in grouting, stressing, and cable trimming operations.

e. Tendons, including bars, strands, and wires, used for tensioning purposes must be protected against physical damage and corrosion during handling, transportation, and storage.

f. Strand couplers must not be reused until they have been inspected by a qualified person and determined to be safe for reuse.

g. Welding, burning, or other work is not permitted on any surface where strands have been strung or tensioned unless proper care is taken to protect the strands from sparks or other heat sources and from stray electric currents.

h. Visual or audible signaling devices must be provided and used in the area of tensioning operations to warn approaching employees.

i. Employees not directly involved in tensioning or de-tensioning operations must be kept clear of the danger area and must remain clear until operations are completed and the visual and/or audible warning signals are turned off or removed.

j. Strand elongation and strand deflection must be measured in a way that does not expose the employee to a risk of injury.

k. During pre-stressing operations, employees must be protected by guards or other suitable devices at the tensioning ends and anchoring points to contain the flying strands and the strand vises in the event of strand failure.

l. Guards must be fabricated from mild steel plate, not less than one-quarter inch (¼″) thick, or three-quarters inch (¾″”) thick or better plywood that provides at least equivalent strength.

m. Deflecting devices must be designed to prevent slip-out and to allow backing off of strands from the deflected position.

n. Written de-tensioning procedures should be prepared by a professional engineer and followed so that employees are not exposed to danger from equipment or strand failure or structural failure. These procedures will include methods to safeguard the operator and other employees from hazards while cutting strands.

o. Strand vises and hydraulic equipment and components must be used and maintained in accordance with the manufacturer's instructions.

p. Strand vises must not be reused until they have been inspected by a competent person and determined to be safe for reuse.

q. Damaged or worn vises and hydraulic equipment will be removed from service.

r. The supervisor or competent person must ensure that operators are given the maximum allowable values for both stretch of the tendon and hydraulic pressure at the pump.

s. If there is a significant difference between the expected value and the measured value for either stretch of a tendon or hydraulic pressure at the pump, the employees must stop operations on that particular tendon and consult with the professional engineer in charge to obtain instructions on how to proceed.

t. Each jack pressure gauge must be checked at frequent intervals against a master gauge, and the site engineer must be furnished with a calibration chart.

u. Only hydraulic pressure hoses with self-seating couplings should be used, and care must be taken to ensure that end connections are not subjected to bending stresses at any time.

v. Hydraulic equipment must have a bypass valve which is adjusted and maintained to limit the hydraulic pressure so that the tension exerted by the jack on the tendon does not exceed ninety percent (90%) of the minimum specified ultimate strength of the tendon.

w. Hydraulic hoses must be inspected for leaks or bubbles after each stressing operation and any damaged hoses should be immediately removed from service.

x. The hydraulic system must be regularly inspected for oil leaks and other damage and necessary corrective action taken.

y. Where adequate clearance exists, the platform width at jacking locations must be at least thirty-two inches (32″).

z. Each blowout must be reported to the structural design engineer, investigated and logged.

aa. A copy of the logged entry must be available on site for reference purposes.

bb. If there is risk of injury from handling coiled post-tensioning tendons, a suitable coil handling device must be used.

cc. All jacks must be secured to suitable anchors before they are installed on a cable for tensioning, and must not be unsecured before they are removed from the cable, if a falling jack could endanger employees.

Rigging for Material Handling

29 CFR 1926.251 - Rigging equipment for material handling

***Note: The below information is applicable to the following crane types and operations:**

Articulating/knuckle-boom truck cranes that deliver material to a construction site when used to transfer materials from the truck crane to the ground, without arranging the materials in a particular sequence for hoisting.

Articulating/knuckle-boom truck cranes that deliver material to a construction site when the crane is used to transfer building supply sheet goods or building supply packaged materials from the truck crane onto a structure, using a fork/cradle at the end of the boom, but only when the truck crane is equipped with a properly functioning automatic overload prevention device. Such sheet goods or packaged materials include, but are not limited to, sheets of sheet rock, sheets of plywood, bags of cement, sheets or packages of roofing shingles, and rolls of roofing felt.

***Note: The above articulating/knuckle-boom crane exclusion does not apply when it is used to 1) hold, support or stabilize the material to facilitate a construction activity, such as holding material in place while it is attached to the structure; 2) when the material being handled is a prefabricated component such as precast concrete members or panels, roof trusses, prefabricated building sections such as, but not limited to: floor panels, wall panels, roof panels, roof structures, or similar items; and, 3) when the material being handled by the crane is a structural steel member (for example, steel joists, beams, columns, steel decking (bundled or unbundled) or a component of a systems-engineered metal building.**

Other rigging requirements are found in the applicable provisions of Cranes and Derricks in Construction, found in Section III of this program, specifically, 1926.1401, 03, 04, 07, 08, 23, 27, 31, & 33.

Prior to use on each shift, rigging equipment, including slings and all fastenings and attachments, will be inspected for damage or defects by a qualified person. Additional inspections will be performed during sling use and where service conditions warrant to ensure that it is safe.
Defective/damaged equipment including slings and rigging will not be used and will be immediately removed from service.

Per 29 CFR 1926.251(a)(3), rigging equipment, when not in use, will be removed from the immediate work area and stored properly so as not to present a hazard to employees.

Under no circumstances may any employee be under a suspended load.

29 CFR 1926.251, *Rigging Equipment for Material Handling*, contains Tables H-1 to H-2 which indicate rated capacities for various types of slings and grommets, safe working loads for shackles, number and spacing of U- Bolt Wire Rope Clips, and maximum allowable wear at any point of link.

Welded alloy steel chain slings must have permanently-affixed, durable identification stating size, grade, rated capacity, and sling manufacturer. Of course, hooks, rings, oblong links, pear-shaped links, welded or mechanical coupling links, or other attachments, when used with alloy steel chains, will have a rated capacity at least equal to that of the chain.

Rigging equipment will **not be loaded in excess** of its recommended safe working load, and load identification will be attached to the rigging.

Specific requirements for use and inspection of alloy steel chains, wire rope, natural rope, and synthetic fiber, synthetic webbing, and shackles are found in the above standards.

Scissor-Lift Fall Protection

What type of fall protection is required for scissor-lifts? This apparently simple question has a relatively simple answer: At C&S, we require all of our employees and subcontractors to use a harness, lanyard, and anchor point when operating a scissor-lift.

Clearly, there is a hazard – falling from a height. However, fall protection while using a scissor-lift is not covered in the fall protection, scaffold and ladder fall protection, or aerial lift fall protection standards.

Section 5(a)(1) of the Occupational Safety and Health Act, commonly referred to as “the General Duty Clause” is a catch-all clause which states: "Each employer shall furnish to each of its employees employment and a place of employment which are free from recognized hazards that are causing or are likely to cause death or serious physical harm to his employees."

In the absence of a specific standard relating to a safety or health risk, the General Duty Clause is the reference to which OSHA will cite.

When assessing compliance efforts, OSHA considers the requirements of pertinent national

consensus standards. In the case of scissor-lifts, ANSI/SIA A92.6-1990, *Self-propelled Elevated Work Platforms*, and ANSI/SIA A92.3, *Manually Propelled Elevating Aerial Platforms*, are used.

Fall protection is provided by employees using the harness and lanyard, maintaining firm footing on the lift, and using guardrails. Under no circumstances are employees to place ladders or other items on the lift to extend their reach. Per ANSI/SIA standards, with which OSHA concurs, "Use of planks, ladders, or any other device on the aerial platform for achieving additional height or reach shall be prohibited." Use of these items negates the value of the guardrail system and may possibly exceed the scissor-lift's design limits for stability.

Furthermore, personnel are not to tie off to items adjacent to the lift. The most obvious reasons for this prohibition are: the anchorage point may not be sufficient and movement of the lift would pull the employee out of and off of the lift.

If, for some reason, guardrails are not being provided for specific operational conditions, then a personal fall protection system may be used, which will include an anchorage point, lanyard, and safety harness.

However, use of this option is severely limited because its design must be approved by a registered engineer, or the scissor-lift's manufacturer will have to approve the use of the lift as an anchorage.

Under ideal conditions, rarely found on a construction site, scissor-lifts may be moved with the lift extended. The lift must be lowered prior to movement if obstacles, debris, drop-offs, holes, depressions, ramps or other hazards are present.

Finally, if the employee leaves the safety of the scissor-lift platform while working at height, some sort of approved fall protection system must be employed.

Signs & Tags

29 CFR 1926.200 - Accident prevention signs and tags

When appropriate, signs and tags will be used to warn of specific hazards.

Signs are classified according to their use, and their design is regulated by OSHA standard. All the lift must be lowered prior to movement will be instructed in the meaning of the various types of signs. Sign usage includes:

a. Danger Signs (Red, Black & White): indicate immediate danger and denote that special precautions are necessary.
b. Caution Signs (Yellow Background): warn of a potential hazard or caution against an unsafe practice.
c. Safety Instruction Signs (White Background): used to provide general instructions and suggestions relative to safety measures.

The wording on a sign must be positive, clear, concise, and easy to understand or the sign loses its value.

Accident prevention tags are used to warn of hazardous or potentially hazardous conditions that are out of the ordinary, unexpected, or not readily apparent. They are not used where signs, guarding, or other positive means of protection are used.

All tags must have:

a. A signal word: “Danger,” “Caution,” “Warning,” “BIOHAZARD” (or its symbol), and a major message, and

b. A major message such as: “High Voltage” or “Do not start.” (Major messages indicate the specific hazardous condition.)

The color scheme for tags is basically the same as for signs:

red = danger, orange= caution, yellow = warning, fluorescent orange = biological hazard

a. Danger Tags: indicate an immediate hazard that presents a threat of death or serious injury.

b. Caution Tags: indicate a non-immediate hazard or unsafe practice that presents a lesser threat of injury.

c. Warning Tags: indicate a hazard between “Danger” and “Caution”.

d. BIOHAZARD Tags: indicate the actual or potential presence of a biological hazard and identify equipment, rooms, containers, etc. that may be contaminated.

Pay attention to signs and tags, and realize that they are in place for only one reason – your safety!

Steel Erection

29 CFR 1926.750 - Scope

29 CFR 1926.751 - Definitions
29 CFR 1926.752 - Site layout, site-specific erection plan and construction sequence
29 CFR 1926.753 - Hoisting and rigging
29 CFR 1926.754 - Structural steel assembly
29 CFR 1926.755 - Column anchorage
29 CFR 1926.756 - Beams and columns
29 CFR 1926.757 - Open web steel joists
29 CFR 1926.758 - Systems-engineered metal buildings
29 CFR 1926.759 - Falling object protection
29 CFR 1926.760 - Fall protection
29 CFR 1926.761 - Training
29 CFR Subpart R App A - Guidelines for establishing the components of a site-specific erection plan
29 CFR Subpart R App C - Illustrations of Bridging Terminus Points
29 CFR Subpart R App D - Illustration of the Use of Control Lines to Demarcate Controlled Decking Zones
29 CFR Subpart R App E - Training
29 CFR Subpart R App F - Perimeter Columns
29 CFR Subpart R App G - 1926.502 (b)-(e) Fall Protection Systems Criteria and Practices
29 CFR Subpart R App H - Double Connections: Illustration of a Clipped End Connection and a Staggered Connection

All affected personnel will have access to the above steel erection standards and be provided training, as appropriate, prior to working in steel erection activities.

Specific hazards that are identified include, but are not limited to, working under loads; hoisting, landing, and placing decking; column stability; double connections; loading and placing steel joints; and falls to lower levels.

Additionally, 29 CFR 1926.752, *Site layout, site-specific erection plan and construction sequence*, requires the controlling contractor to provide the steel erector with the following notifications:

a. Approval to begin steel erection. Before authorizing the commencement of steel erection, the controlling contractor shall ensure that the steel erector is provided with the following written notifications:

   1. The concrete in the footings, piers, and walls, and the mortar in the masonry piers and walls, have attained, on the basis of an appropriate ASTM standard test method of field-cured samples, either 75% of the intended minimum compressive design strength or sufficient strength to support the loads imposed during steel erection.
   2. Any repairs, replacements, and modifications to the anchor bolts were conducted in accordance with 29 CFR 1926.755(b), *Column anchorage*.

b. Commencement of steel erection. A steel erection contractor shall not erect steel unless it has received written notification that the concrete in the footings, piers, and walls, or the mortar in the masonry piers and walls, has attained, on the basis of an appropriate ASTM standard test method of field-cured samples, either 75% of the intended minimum compressive design strength or sufficient strength to support the loads imposed during steel erection.

c. Site layout. The controlling contractor shall ensure that the following are provided and maintained:

   1. Adequate access roads into and through the site for the safe delivery and movement of derricks, cranes, trucks, other necessary equipment, and the material to be erected, and means and methods for pedestrian and vehicular control. Exception: T his requirement does not apply to roads outside of the construction site.
   2. A firm, properly graded, drained area, readily accessible to the work with adequate space for the safe storage of materials and the safe operation of the erector's equipment.

d. Pre-planning of overhead hoisting operations. All hoisting operations in steel erection shall be pre-planned to ensure that the requirements of 29 CFR 1926.753(d), *Hoisting and rigging*, are met.

e. Site-specific erection plan. When we elect, due to conditions specific to a site, to develop alternate means and methods that provide employee protection in accordance with 29 CFR 1926.753(c)(5) and 29 CFR 1926.757(a)(4),(e)(4), a site-specific erection plan will be developed by a qualified person and be available at the work site. Guidelines for establishing a site-specific erection plan are contained in Appendix A to subpart R, *Steel Erection*.

Training

All training required by the steel erection standards will be provided by qualified person(s).

Fall hazard training may be accomplished using our Fall Protection Program with the following exception:

a. Each employee engaged in a steel erection activity who is on a walking/working surface with an unprotected side or edge more than fifteen feet (15') above a lower level must be protected from fall hazards by guardrail systems, safety net systems, personal fall arrest systems, positioning device systems, or fall restraint systems.

b. Perimeter safety cables. On multi-story structures, perimeter safety cables shall be installed at the final interior and exterior perimeters of the floors as soon as the metal decking has been installed.

c. Each connector will:

   1. Be protected from fall hazards of **more than two (2) stories or thirty feet (30') above a lower level, whichever is less**;
   2. Have completed connector training in accordance with 29 CFR 1926.761;and
   3. Be provided, at heights over fifteen feet (**15') and up to thirty feet (30') above a lower level**, with a personal fall arrest system, positioning device system, or fall restraint system and wear the equipment necessary to be able to be tied off.

d. A controlled decking zone (CDZ) may be established in that area of the structure **over fifteen feet (15') and up to thirty feet (30') above a lower level where metal decking is initially being installed and forms the leading edge of a work area**.

   1. Each employee working at the leading edge in a CDZ shall be protected from fall hazards of more than **two (2) stories or thirty feet (30 feet'), whichever is less**.
   2. Access to a CDZ shall be limited to only those employees engaged in leading edge work.
   3. The boundaries of a CDZ shall be designated and clearly marked. The CDZ shall not be more than ninety feet (90') wide and ninety feet (90') deep from any leading edge. The CDZ shall be marked by the use of control lines or the equivalent.
   4. Each employee working in a CDZ shall have completed CDZ training in accordance with 29 CFR 1926.761.
   5. Unsecured decking in a CDZ shall not exceed 3,000 square feet.
   6. Safety deck attachments shall be performed in the CDZ from the leading edge back to the control line and shall have at least two (2) attachments for each metal decking panel.
   7. Final deck attachments and installation of shear connectors shall not be performed in the CDZ.

Special Training Programs

In addition to the above, training will be provided to address the following issues:

1. Multiple lift rigging procedure: each employee who performs multiple lift rigging must be provided training in:

a) The nature of the hazards associated with multiple lifts; and

b) The proper procedures and equipment to perform multiple lifts required by 29 CFR 1926.753(e), printed below:

29 CFR 1926.753(e)

(1) A multiple lift shall be performed only if the following criteria are met:

(i) A multiple lift rigging assembly is used;

(ii) A maximum of five (5) members are hoisted per lift;

(iii) Only beams and similar structural members are lifted;

(iv) All employees engaged in the multiple lift have been trained in these procedures in accordance with 29 CFR 1926.761(c)(1); and

(iv) No crane is permitted to be used for a multiple lift where such use is contrary to the manufacturer's specifications and limitations.

(2) Components of the multiple lift rigging assembly shall be specifically designed and assembled with a maximum capacity for total assembly and for each individual attachment point. This capacity, certified by the manufacturer or a qualified rigger, shall be based on the manufacturer's specifications with a five to one (5:1) safety factor for all components.

(3) The total load shall not exceed:

(i) The rated capacity of the hoisting equipment, as specified in the hoisting equipment load charts;

(ii) The rigging capacity, as specified in the rigging rating chart.

(4) The multiple lift rigging assembly shall be rigged with members:

(i) Attached at their center of gravity and maintained reasonably level;

(ii) Rigged from top down; and

(iii) Rigged at least seven feet (7') feet apart.

(5) The members on the multiple lift rigging assembly shall be set from the bottom up.

(6) Controlled load lowering shall be used whenever the load is over the connectors.

2. Connector procedures: Each connector must be provided training in the following areas:

a) The nature of the hazards associated with connecting; and

b) The establishment, access, proper connecting techniques, and work practices required by 29 CFR 1926.756(c) and 29 CFR 1926.760(b),

29 CFR 1926.756(c)

(1) Double connections at columns and/or at beam webs over a column. When two (2) structural members on opposite sides of a column web, or a beam web over a column, are connected sharing common connection holes, at least one (1) bolt with its wrench-tight nut shall remain connected to the first member unless a shop-attached or field-attached seat or equivalent connection device is supplied with the member to secure the first member and prevent the column from being displaced (See Appendix H to this subpart for examples of equivalent connection devices).

(2) If a seat or equivalent device is used, the seat (or device) shall be designed to support the load during the double connection process. It shall be

adequately bolted or welded to both a supporting member and the first member before the nuts on the shared bolts are removed to make the double connection.

29 CFR 1926.760(b)

Connectors. Each connector shall:

(1) Be protected in accordance with paragraph (a)(1) of this section from fall hazards of more than two (2) stories or 30 feet (9.1 m) above a lower level, whichever is less;

(2) Have completed connector training in accordance with 29 CFR 1926.761;

(3) Be provided, at heights over 15 and up to 30 feet above a lower level, with a personal fall arrest system, positioning device system or fall restraint system and wear the equipment necessary to be able to be tied off; or be provided with other means of protection from fall hazards in accordance with paragraph (a)(1) of this section.

3. When controlled decking zone procedures (CDZs) are used, each affected employee will be training in the following areas:
   a) The nature of the hazards associated with work within a CDZ; **and**
   b) The establishment, access, proper installation techniques, and work practices required by 29 CFR 1926.760(c) and 29 CFR 1926.754(e), printed on the following pages:

29 CFR 1926.760(c):

Controlled Decking Zone (CDZ). A controlled decking zone may be established in that area of the structure over 15 and up to 30 feet above a lower level where metal decking is initially being installed and forms the leading edge of a work area. In each CDZ, the following shall apply:

(1) Each employee working at the leading edge in a CDZ shall be protected from fall hazards of more than two stories or 30 feet (9.1 m), whichever is less.

(2) Access to a CDZ shall be limited to only those employees engaged in leading edge work.

(3) The boundaries of a CDZ shall be designated and clearly marked. The CDZ shall not be more than 90 feet (27.4 m) wide and 90 (27.4 m) feet deep from any leading edge. The CDZ shall be marked by the use of control lines or the equivalent.
Examples of acceptable procedures for demarcating CDZ's can be found in Appendix D to this subpart.

(4) Each employee working in a CDZ shall have completed CDZ training in accordance with 29 CFR 1926.761.

(5) Unsecured decking in a CDZ shall not exceed 3,000 square feet (914.4 m^2).

(6) Safety deck attachments shall be performed in the CDZ from the leading edge back to the control line and shall have at least two attachments for each metal decking panel.

(7) Final deck attachments and installation of shear connectors shall not be performed in the CDZ.

29 CFR 1926.754(e):

Metal decking.

(1) Hoisting, landing and placing of metal decking bundles.

(I) Bundle packaging and strapping shall not be used for hoisting unless specifically designed for that purpose.

(ii) If loose items such as dunnage, flashing, or other materials are placed on the top of metal decking bundles to be hoisted, such items shall be secured to the bundles.

(iii) Bundles of metal decking on joists shall be landed in accordance with 29 CFR 1926.757(e)(4).

(iv) Metal decking bundles shall be landed on framing members so that enough support is provided to allow the bundles to be unbanded without dislodging the bundles from the supports.

(v) At the end of the shift or when environmental or jobsite conditions require, metal decking shall be secured against displacement.

(2) Roof and floor holes and openings. Metal decking at roof and floor holes and openings shall be installed as follows:

(i) Framed metal deck openings shall have structural members turned down to allow continuous deck installation except where not allowed by structural design constraints or constructability.

(ii) Roof and floor holes and openings shall be decked over. Where large size, configuration or other structural design does not allow openings to be decked over (such as elevator shafts, stair wells, etc.) employees shall be protected in accordance with 29 CFR 1926.760(a)(1).

(iii) Metal decking holes and openings shall not be cut until immediately prior to being permanently filled with the equipment or structure needed or intended to fulfill its specific use and which meets the strength requirements of paragraph (e)(3) of this section, or shall be immediately covered.

(3) Covering roof and floor openings.

(I) Covers for roof and floor openings shall be capable of supporting, without failure, twice the weight of the employees, equipment and materials that may be imposed on the cover at any one time.

(ii) All covers shall be secured when installed to prevent accidental displacement by the wind, equipment or employees.

(iii) All covers shall be painted with high-visibility paint or shall be marked with the word "HOLE" or "COVER" to provide warning of the hazard.

(iv) Smoke dome or skylight fixtures that have been installed, are not considered covers for the purpose of this section unless they meet the strength requirements of paragraph (e)(3)(i) of this section.

(4) Decking gaps around columns. Wire mesh, exterior plywood, or equivalent, shall be installed around columns where planks or metal decking do not fit tightly. The materials used must be of sufficient strength to provide fall protection for personnel and prevent objects from falling through.

(5) Installation of metal decking.

(i) Except as provided in 29 CFR 1926.760(c), metal decking shall be laid tightly and immediately secured upon placement to prevent accidental movement or displacement.

(ii) During initial placement, metal decking panels shall be placed to ensure full support by structural members.

(6) Derrick Floors.

(I) A derrick floor shall be fully decked and/or planked and the steel member connections completed to support the intended floor loading.

(ii) Temporary loads placed on a derrick floor shall be distributed over the underlying support members so as to prevent local overloading of the deck material.

***Note: Per Appendix E to Subpart R – *Training: Non-mandatory Guidelines for Complying with 29 CFR 1926.761*, the training requirements for steel erection activities will be deemed to have been met if employees have completed a training course on steel erection, including instruction in the provisions of the steel erection standards approved by the U.S. Department of Labor Bureau of Apprenticeship.**

Working Under Loads

a. All loads shall be rigged by a qualified rigger.

b. Routes for suspended loads will be pre-planned to ensure that no employee is allowed to work directly below a suspended load except for those engaged in the initial connection of the steel or those necessary for the hooking or unhooking of the load.

Hoisting

a. All the provisions of 29 CFR 1926.753 apply to hoisting and rigging **with the exception that cranes or derricks may be used to hoist employees on a personnel platform when performing steel erection activities in accordance with 29 CFR 1926.1431.**

b. A pre-shift visual inspection of cranes must be accomplished by a competent person, and the competent person must also observe cranes in operation. Remember, a competent person has the authority to stop work if an unsafe work practice is observed. Furthermore, a crane operator has the authority to stop work if an unsafe condition exists.

c. Cranes being used in steel erection activities must be visually inspected prior to each shift by a competent person and the inspection shall include observation for deficiencies during operation. At a minimum, this inspection shall include each of the following:

1. All control mechanisms for maladjustments.
2. Control and drive mechanism for excessive wear of components and contamination.
3. Crane safety devices.
4. Air, hydraulic, and other pressurized lines and systems for condition.
5. Hooks and latches for deformation, chemical damage, cracks, or wear.
6. Wire rope travel and attachment.
7. Electrical apparatus for malfunctioning, signs of excessive deterioration, dirt, or moisture accumulation.

8. Ground conditions.
9. Leveling.

d. Only a qualified person can inspect the rigging.

Tools - Hand

29 CFR 1926.300 - General requirements
29 CFR 1926.301 - Hand tools

All hand and power tools and similar equipment, whether furnished by the employer or the employee, shall be maintained in a safe condition.

Here are basic procedures for the use of hand tools:

1. Hand tools shall be used only for the purpose for which they are designed.
2. Hand tools will be kept clean and, where appropriate, oiled.
3. Hand tools which are damaged will not be used.
4. Hand held cutting tools will be kept sharp and will be sheathed or retracted when not in use.
5. When using a striking tool such as a hammer or chisel, safety glasses or safety goggles will be used.
6. Do not force tools.
7. If you are unfamiliar with the proper procedure for using a tool, ask your Supervisor for instruction.
8. Power tools may be operated only by those persons who are qualified by training or experience to operate them.
9. Do not alter guards on power tools; wear appropriate PPE.
10. Electrical tools must be grounded.In the absence of permanent wiring, a Ground Fault Circuit Interrupter (GFCI) must be used.
11. Electric tools will not be lifted by their cords and pneumatic tools will not be lifted by their hoses.

Tools - Pneumatic Powered

29 CFR 1926.102 - Eye and face protection
29 CFR 1926.300 - General requirements
29 CFR 1926.302 - Power-operated hand tools

Pneumatic powered tools must be safeguarded whenever there are hazardous employee exposures. This is especially important for point of operation guarding.

Three (3) specific hazards associated with pneumatic powered tools which are unique to their use are noise levels, tool retention, and air hose pressure.

Care must be taken to assure that noise levels are within acceptable limits (noise monitoring may be necessary) and, if required, engineering controls and/or ear protection will be employed.

Eye protection will be worn when using pneumatic powered tools in accordance with the owner/operator's manual.

1. Pneumatic power tools shall be secured to the hose or whip by some positive means to prevent the tool from becoming accidentally disconnected.
2. Safety clips or retainers shall be securely installed and maintained on pneumatic impact (percussion) tools to prevent attachments from being accidentally expelled.
3. All pneumatically driven nailer, staplers, and other similar equipment provided with automatic fastener feed, which operate at more than 100 p.s.i. pressure at the tool, shall have a safety device on the muzzle to prevent the tool from ejecting fasteners, unless the muzzle is in contact with the work surface.
4. Compressed air shall not be used for cleaning purposes except where reduced to less than 30 p.s.i., and then only with effective chip guarding and use of PPE which meets the requirements of 29 CFR 1926 Subpart E. This will include eye, face, hand, head, and foot protection. The 30 p.s.i. requirement does not apply for concrete form, mill scale, and similar cleaning purposes.
5. The manufacturer's safe operating pressure for hoses, pipes, valves, filters, and other fittings shall not be exceeded,
6. The use of hoses for hoisting or lowering tools shall not be permitted.
7. All hoses exceeding 1/2-inch (1/2 ") inside diameter shall have a safety device at the source of supply or branch line to reduce pressure in case of hose failure.
8. Airless spray guns of the type which atomize paints and fluids at high pressures (1,000 pounds or more per square inch) shall be equipped with automatic or visible manual safety devices which will prevent pulling of the trigger so as to prevent release of the paint or fluid until the safety device is manually released.

   ***Note: In lieu of the above, a diffuser nut which will prevent high pressure, high velocity release while the nozzle tip is removed, plus a nozzle tip guard which will prevent the tip from coming into contact with the operator, or other equivalent protection, shall be provided.**
9. Lastly, abrasive blast cleaning nozzles shall be equipped with an operating valve which must be held open manually. A support shall be provided on which the nozzle may be mounted when it is not in use.

Care must be taken to ensure that employees are not exposed to unsafe levels of respirable dust or crystalline silica.

The PEL for particles not otherwise regulated is 5.0 mg/m³. The PEL for respirable dust containing crystalline silica is determined by the below formula:

PEL = 10 mg/m³ (%SiO_2+2), where %SiO_2+2 refers to the amount of crystalline silica measured in the sample.

Our operations would not exceed these PELs and respiratory protection is not required.

Tools - Powder-Actuated

29 CFR 1926.102 - Eye and face protection
29 CFR 1926.300 - General requirements
29 CFR 1926.302 - Power-operated hand tools

A powder-actuated fastening tool propels a nail, pin, or fastener through an object to fasten it to another object. These tools, if misused, are extremely dangerous because they are essentially similar to a pistol or rifle.

The speed of the projectile may range from 300 ft./second to 1290 ft./second.

Only trained and authorized persons may operate a powder actuated tool and, for safety, these tools should be kept secured when not in use.

Prior to use, the tool must be inspected and tested according to the manufacturer's instruction manual which should be kept with the tool.

Defective tools must not be used and they must be taken out of service.

Use of appropriate PPE – including, at least, eye/face and ear protection – is required not only for the operator, but also for those employees in the vicinity of operation. PPE will be in accordance with the owner/operator's manual.

On the job site, each tool should be accompanied by: 1) its container; 2.) the operator's instruction & service manuals; 3) the tool inspection record; and 4) service tools & accessories.

Tools must not be loaded until just before firing, and under no circumstances are they to be pointed at any person. Hands must be kept clear of the open barrel end. A powder activated tool must never be left unattended – loaded or empty – for safety and security reasons.

Fasteners must not be driven into very hard or brittle materials, such as cast iron, glazed tile, surface-hardened steel, glass block, live rock, face brick, or hollow tile; easily penetrated materials, unless these materials are backed by a substance; or a damaged area caused by an unsatisfactory fastening. Of course, these tools must never be used in an explosive or flammable atmosphere.

Before fastening questionable material, the operator can determine its suitability by using a fastener as a center punch. If the fastener point does not easily penetrate, is not blunted, and does not fracture the material, then initial test fastenings will be made in accordance with the manufacturer's instructions.

The tool must be held perpendicular to the work surface. In the event of a misfire, the operator must hold the tool firmly against the work surface and follow, exactly, the manufacturer's instructions.

Tools must be used with the correct shield, guard, or attachments recommended by the manufacturer.

Because the case and load are color coded, it is imperative that the operator can distinguish the colors of brass and nickel as well as gray, brown, green, yellow and red and purple.

Ventilation

29 CFR 1926.57 - Ventilation

There may be times in the course of our work, such as when grinding, cutting, sawing, sanding, etc., that hazardous dusts are released into the atmosphere in excess of the concentrations specified in the *"Threshold Limit Values of Airborne Contaminants for 1970"* of the American Conference of Governmental Industrial Hygienists, listed below:

MINERAL DUSTS	
Substance	[a]**mppcf**
SILICA	
Crystalline Quartz	
Threshold Limited calculated from the formula	[b](250) ÷ (%SiO_2+5)
Cristobalite.	
Amorphous, including natural diatomaceous earth	20
SILICATES (Less than 1% crystalline silica)	
Mica	20
Portland Cement	20
Soapstone	20
Talc (non-asbestiform)	20
Talc (fibrous): use asbestos limit	
GRAPHITE (Natural)	15
INERT OR NUISANCE PARTICULATES Note 1 Covers all organic and inorganic particulates not otherwise regulated. Same as Particulates Not Otherwise Regulated. Note 2 Inert or Nuisance Dusts include all mineral, inorganic, and organic dusts as indicated by examples in TLV's Appendix D.	50 (or 15 mg/m³, which-ever is the smaller) of total dust <1% SiO Note 1 See Table above

a. Millions of particles per cubic foot of air, based upon impinger samples counted by lightfield techniques.

b. The percentage of crystalline silica in the formula is the amount determined from airborne samples, except in those instances in which other methods have been shown to be applicable.

Below these threshold limits, no action is required; however, employees may wear dust masks for personal comfort.

***Note: OSHA requires that employees who voluntarily use disposable respirators in situations where respiratory protection is not specifically required by OSHA standard (in atmospheres where exposures are below the permissible exposure limit) essentially for personal comfort or additional, though not required, respiratory protection be informed of 29 CFR 1910.134, Appendix D.**

Engineering controls are preferable to PPE to deal with job site hazards. Therefore, local exhaust ventilation is a preferred method of maintaining atmospheres that have dust levels below the concentrations noted in the Mineral Dusts Table above.

Local exhaust ventilation must be designed so that it prevents dispersions of dust in concentrations causing harmful exposure and so that dusts are not drawn through the work area of employees.

The dust collected by an exhaust or ventilating system will be discharged to the outside atmosphere.

If concentrations are so great that a dust separator is used, then the dust and refuse will be disposed of in such a manner as to not harm employees.

If the above ventilation procedures do not reduce the dust levels to acceptable limits, then respirators will be used.

Welding, Cutting & Brazing

29 CFR 1910.252 - General requirements
29 CFR 1910.253 - Oxygen-fuel gas welding and cutting
29 CFR 1910.254 - Arc welding and cutting
29 CFR 1926.350 - Gas welding and cutting
29 CFR 1926.351 - Arc welding and cutting
29 CFR 1926.352 - Fire prevention
29 CFR 1926.353 - Ventilation and protection in welding, cutting, and heating
29 CFR 1926.354 - Welding, cutting, and heating in way of preservative coatings
29 CFR 1926.1126 - Chromium (VI)
29 CFR - Table Z-1 – Limits for Air Contaminants

Employees assigned to operate arc welding, cutting, and oxygen-fuel welding and/or brazing equipment, **and their supervisors**, must be properly trained and instructed in the operation of such equipment. Proper PPE will be worn by all welders.

Before welding or cutting, the supervisor or competent person will inspect the area with emphasis on fire prevention, and authorize welding or cutting using a Hot Work Permit noting special precautions that must be taken.

An appropriate fire extinguisher and first aid equipment will be readily available for immediate use.

Compressed Gas Cylinders Use

Compressed gas cylinders are used on many job sites. The most common use of compressed gases involves is oxygen and acetylene for welding.

Failure to follow basic safety procedures could result in serious injuries, such as:

a. Flash burn – due to explosion.
b. Fragment impalement – due to explosion.
c. Compression of the foot – due to mishandling of tanks.
d. Inhalation of hazardous gases – due to leakage.

Below are basic safety procedures for gas cylinder use:

a. Cylinders must remain upright and chained to a substantial support or cart when in use.
b. Appropriate PPE shall be worn for the job – such as steel-toed shoes, apron, goggles, gloves, helmet, etc.
c. Read and understand the MSDS, or SDS, for the gas being used, and know the location of the MSDS, or SDS, in case of an emergency.
d. Have appropriate fire extinguisher readily available.
e. To release the gas, open the cylinder valve slowly – standing away from the face and back of the gauge – and leave the opening tools in place (on the valve stem) for quick shut-off in the event of an emergency.
f. Ensure cylinder valves, regulators, couplings, and hoses are free of oil and grease, and ensure that all connections are tight.
g. When using oxygen-fuel systems, use flashback arrestors and reverse-flow check valves to prevent flashback.
h. Keep cylinders away from open flames and other sources of heat.
i. **Cylinders are never allowed in confined spaces.**
    1. When welding or cutting in a confined space, the tanks must remain outside the confined space.
    2. Appropriate ventilation must be assured; portable equipment must be secured to prevent movement, if appropriate; and a rescue plan should be prepared.
    3. If the rescue plan involves pulling the person out, attachment of the lifelines should be done so that the person's body does not jam in the exit and prevent his or her extraction.
    4. If arc welding is suspended for a substantial period of time, then the electrodes must be removed to prevent accidental contact and the machine must be disconnected from the power source.
    5. If gas cylinder work is suspended, then the torch valves must be closed and the fuel-gas and oxygen supply must be positively shut off or disconnected outside the confined space.
    6. After welding operations are completed, the welder must mark the hot metal or provide some other means of warning other workers.
j. Do not alter or attempt to repair safety devices or valves.
k. Remove the regulators when: a) moving cylinders; b) work is completed; and/or c) cylinders are empty.

Compressed Gas Cylinders Will:

a. Have valve protectors in place when not in use or connected for use.

b. Be legibly marked to identify the gas contained therein.

c. Have the valves closed before the cylinder is moved, when the cylinder is empty, and at the completion of each job.

d. Be stored in areas away from intense heat, electric arcs, and high temperature lines.

e. Be secured upright (chained in portable dolly) in storage, and/or during transportation to prevent tipping, falling, rolling, and damage from passing or falling objects. Oxygen cylinders must be kept at least twenty feet (20') away from any flammable gases or petroleum products.

f. Be marked "EMPTY" when appropriate.

g. Be removed from service if the regulators or gauges are defective.

h. Be used only for the purpose for which they are designed -- for example, cylinders will not be used as rollers or supports.

i. Be kept away from stairs.

j. Workers in charge of oxygen or fuel-gas supply equipment (including distribution piping systems and generators) must be instructed and judged competent to perform such work.

Regulators and gauges will be inspected daily.

All cylinders, cylinder valves, couplings, regulators, hoses, and apparatus will be kept free of oily or greasy substances.

Operators of welding equipment will report any equipment defect or safety hazards and discontinue use of equipment until its safety has been assured. Repairs will be made only by qualified personnel.

Persons performing arc welding and cutting must be properly instructed and qualified to operated such equipment and, if performing gas shielded arc welding, must be familiar with *Recommended Safe Practices for Gas-Shielded Arc Welding*, A6.1-1966, American Welding Society, as well as with 29 CFR 1910.252.

Electric welders will be inspected daily before use with emphasis on the cables. All splicing of cables must maintain the insulated protection with no exposed metal parts. Cables in need of repair will not be used.

The competent person will ensure that ventilation within a confined space is adequate to negate the possibility of a respiratory or explosion hazard.

A fire watch will be assigned when there is potential for a fire to develop. Any person assigned to fire watch must have received training in the specific fire extinguishing equipment being used. When welding, cutting, or brazing an object near a fire hazard that is not readily movable, the fire hazard will be removed. If any fire hazards remain, shields will be used to confine the sparks, heat, and slag. If the provisions of this paragraph cannot be met, then welding and/or cutting **may not** take place. As a company policy, if welding cannot be conducted safely, then it may not be conducted at all.

Fire watchers are required in all locations where other than a minor fire might develop and any of the below conditions exist:

a. Appreciable amounts of combustible materials closer than thirty-five feet (35') to point of operation.

b. Appreciable combustibles are thirty-five feet (35') or more away but are easily ignited by sparks.

c. Wall or floor openings within a thirty-five foot (35') radius expose combustible material in adjacent areas, including concealed spaces in walls or floors.

d. Combustible materials are adjacent to the opposite side of metal partitions, ceilings, or roofs that are likely to be ignited by conduction or radiation.

The fire watch must be maintained for at least one half hour (1/2 hr.) after welding or cutting operations have ceased so as to detect, and extinguish, possible smoldering fires. Check with facility owner to determine if a fire watch is required for a longer time based upon company policy.

When performing operations capable of producing heat at chemical plants, refineries, or other facilities which have a higher degree of hazard than normal work sites, a hot work permit is generally required. Included in these types of operations are burning, cutting, heating, and welding.

Located with Hot Work Permit are fire safety instructions that must be read and understood by the persons identified on the permit.

Welding, cutting, and heating of metals of toxic significance (e.g., lead, zinc, cadmium, mercury, beryllium, or exotic metals or paints) in enclosed spaces will require either general mechanical ventilation of sufficient capacity and so arranged as to produce the number of air changes necessary to maintain welding fumes and smoke within safe limits **or** local exhaust ventilation consisting of freely movable hoods intended to be placed by the welder or burner as close as practicable to the work. This system shall be of sufficient capacity and so arranged as to remove fumes and smoke at the source and keep the concentration of them in the breathing zone within safe limits.

This would include inert-gas metal-arc welding performed on stainless steel to protect against dangerous concentrations of nitrogen dioxide.

When performing welding operations on stainless steel and there is exposure to airborne chromium (VI) above its action level of 2.5 micrograms per cubic meter of air (2.5 $\mu g/m^3$) calculated as an 8-hour time-weighted average (TWA), the provisions of 29 CFR 1926.1126 must be adhered to. The PEL is 5 $\mu g/m^3$. If air monitoring, as described in 29 CFR 1926.1126 is below .5$\mu g/m^3$, then the provisions of this standard do not apply.

C&S Companies

Section IV Specific Compliance Programs

Cranes and Derricks in Construction

29 CFR 1926 Subpart CC - Cranes & Derricks in Construction

Subpart CC, Cranes and Derricks in Construction, applies to power- operated equipment, and their attachments, that can hoist, lower and horizontally move a suspended load.

Note: Exclusions to this standard include, but are not limited to:

1. **Power-operated equipment that has been converted or adapted for a non-hoisting/lifting use.**
2. **Power shovels, excavators, wheel loaders, backhoes, loader backhoes, track loaders.**
3. **Machinery originally designed as vehicle-mounted aerial devices (for lifting personnel) and self-propelled elevating work platforms.**
4. **Powered industrial trucks (forklifts), except when configured to hoist and lower (by means of a winch or hook) and horizontally move a suspended load.**
5. **Articulating/knuckle-boom truck cranes that deliver material to a construction site when used to transfer materials from the truck crane to the ground, without arranging the materials in a particular sequence for hoisting.**
6. **Articulating/knuckle-boom truck cranes that deliver material to a construction site when the crane is used to transfer building supply sheet goods or building supply packaged materials from the truck crane onto a structure, using a fork/cradle at the end of the boom, but only when the truck crane is equipped with a properly functioning automatic overload prevention device. Such sheet goods or packaged materials include, but are not limited to: sheets of sheet rock, sheets of plywood, bags of cement, sheets or packages of roofing shingles, and rolls of roofing felt.**

   Note: The above articulating/knuckle-boom crane exclusion does not apply when it is used to 1) hold, support or stabilize the material to facilitate a construction activity, such as holding material in place while it is attached to the structure; 2) when the material being handled is a prefabricated component such as precast concrete members or panels, roof trusses, prefabricated building sections such as, but not limited to: floor panels, wall panels, roof panels, roof structures, or similar items; and, 3) when the material being handled by the crane is a structural steel member (for example, steel joists, beams, columns, steel decking (bundled or unbundled) or a component of a systems-engineered metal building.

The Safety Manager or the competent person on the job site will ensure that all persons involved with crane operations, with the exception of the exclusions above, are qualified and have received certification as noted below:

Qualifications

During the period **November 8, 2010 through November 9, 2014**, all operators must be competent to operate the equipment safely.

As **of November 10, 2014**, all operators must be certified or qualified. Riggers must be qualified.

Signal persons must be qualified.

Assembly/disassembly directors both are competent and qualified

Required Actions Prior to Assembly

Prior to assembly of a crane, care must be taken to ensure ground conditions are appropriate for the crane and other hazards, specifically, electrical hazards are eliminated.

Ground Conditions

Note: Ground conditions mean the ability of the ground to support the equipment (including slope, compaction, and firmness).

The controlling entity must ensure that the equipment is not assembled **or used** unless the ground conditions are firm, drained, and graded to a sufficient extent so that, in conjunction (if necessary) with the use of supporting materials, the equipment manufacturer's specifications for adequate support and degree of level of the equipment are met.

Note: The requirement for the ground to be drained does not apply to marshes/wetlands.

The controlling entity must inform the user of the equipment and the operator of the location of hazards beneath the equipment set-up area (such as voids, tanks, utilities) if those hazards are identified in documents (such as site drawings, as-built drawings, and soil analyses) that are in the possession of the controlling entity (whether at the site or off-site) or the hazards are otherwise known to that controlling entity.

Note: If there is no controlling entity for the project, the requirements above must be met by the employer that has authority at the site to make or arrange for ground preparations for crane operations.

If the Assembly/Disassembly director **or the operator** determines that ground conditions do not meet the above requirements, that person's employer **must** have a discussion with the controlling entity regarding the ground preparations that are needed so that, with the use of suitable supporting materials/devices (if necessary), the above requirements are met.

Electrical Hazards

Before assembling or disassembling equipment, the Assembly/ Disassembly director must determine if any part of the equipment, load line, or load (including rigging and lifting accessories) could get, in the direction or area of assembly/disassembly, closer than 20 feet to a power line during the assembly/disassembly process.

If so, the A/D director must meet the requirements in Option (1), Option (2), or Option (3), below:

Option (1) De-energize and ground:

Confirm from the utility owner/operator that the power line has been de- energized and visibly grounded at the job site.

Option (2) – 20 foot clearance:

Ensure that no part of the equipment, load line or load (including rigging and lifting

accessories), gets closer than 20 feet to the power line by implementing the measures found in "*preventing encroachment*", below.

Option (3) – Table A clearance:

1. Determine the line's voltage and the minimum clearance distance permitted under Table A

Table A – Minimum Clearance Distances	
Voltage (nominal, kV, alternating current)	Minimum clearance distance (feet)
up to 50	10
over 50 to 200	15
over 200 to 350	20
over 350 to 500	25
over 500 to 750	35
over 750 to 1000	45
over 1000	(as established by the power line owner/operator or registered professional engineer who is a qualified person with respect to electrical power transmission and distribution)

2. Determine if any part of the equipment, load line, or load (including rigging and lifting accessories), could get closer than the minimum clearance distance to the power line permitted under Table A.

   If so, the Assembly/Disassembly director must ensure that no part of the equipment, load line, or load (including rigging and lifting accessories), gets closer to the line than the minimum clearance distance.

Note: Voltage information. Where Option (3) of is used, the utility owner/operator of the power lines must provide the requested voltage information within two working days of our request.

Preventing Encroachment/Electrocution

Where encroachment precautions are required under Option (2), or Option (3), above, the following requirements must be met:

1. A planning meeting will be conducted with the Assembly/ Disassembly director, operator, assembly/disassembly crew and the other workers who will be in the assembly/disassembly area to review the location of the power line(s) and the steps that will be implemented to prevent encroachment/electrocution.
2. If tag lines are used, they must be nonconductive.
3. At least **one** of the following additional measures must be in place.

The measure selected from this list must be effective in preventing encroachment.

The additional measures are:

1. Use a dedicated spotter who is in continuous contact with the equipment operator. The dedicated spotter must:
    a. Be equipped with a visual aid to assist in identifying the minimum clearance distance. Examples of a visual aid include, but are not limited to: a clearly visible line painted on the ground; a clearly visible line of stanchions; a set of clearly visible line-of sight landmarks.
    b. Be positioned to effectively gauge the clearance distance.
    c. Where necessary, use equipment that enables the dedicated spotter to communicate directly with the operator.
    d. Give timely information to the operator so that the required clearance distance can be maintained.
2. A proximity alarm set to give the operator sufficient warning to prevent encroachment.
3. A device that automatically warns the operator when to stop movement, such as a range control warning device. Such a device must be set to give the operator sufficient warning to prevent encroachment.
4. A device that automatically limits range of movement, set to prevent encroachment.
5. An elevated warning line, barricade, or line of signs, in view of the operator, equipped with flags or similar high-visibility markings.

Additional Electrical Safety Measures

1. Assembly/disassembly below power lines is prohibited. No part of a crane/derrick, load line, or load (including rigging and lifting accessories), whether partially or fully assembled, is allowed below a power line unless the Assembly/Disassembly director has confirmed that the utility owner/ operator has de-energized and (at the job site) visibly grounded the power line.
2. Assembly/disassembly inside Table A clearance is prohibited. No part of a crane/derrick, load line, or load (including rigging and lifting accessories), whether partially or fully assembled, is allowed closer than the minimum approach distance under Table A to a power line unless the Assembly/Disassembly director has confirmed that the utility owner/operator has de-energized and (at the job site) visibly grounded the power line.

3. The Assembly/Disassembly director must assume that all power lines are energized unless the utility owner/operator confirms that the power line has been and continues to be de-energized and visibly grounded at the job site.
4. There must be at least one electrocution hazard warning clearly posted in the cab so that it is in view of the operator and (except for overhead gantry and tower cranes) at least two on the outside of the equipment.

Assembly/Disassembly

When assembling or disassembling equipment (or attachments), the Assembly/Disassembly Director must comply with all applicable manufacturer prohibitions and will select to use the manufacturer's procedures applicable to the equipment and/or attachments.

Assembly/disassembly must be directed by a person who meets the criteria for both a competent person and a qualified person, or by a competent person who is assisted by one or more qualified persons ("Assembly/ Disassembly Director").

Where the assembly/disassembly is being performed by only one person, that person must meet the criteria for both a competent person and a qualified person. This person will be considered the Assembly/Disassembly Director.

The Assembly/Disassembly Director must understand the applicable assembly/disassembly procedures.

The Assembly/Disassembly Director must review the applicable assembly/disassembly procedures immediately prior to the commencement of assembly/ disassembly unless the Assembly/Disassembly Director understands the procedures and has applied them to the same type and configuration of equipment (including accessories, if any).

Before commencing assembly/disassembly operations, the Assembly/Disassembly Director must ensure that the crew members understand all of the following:

1. Their tasks.
2. The hazards associated with their tasks.
3. The hazardous positions/locations that they need to avoid.

Note: If during assembly/disassembly operations, before a crew member takes on a different task, or when adding new personnel during the operations, the Assembly/Disassembly director must complete the above three (3) steps.

Before a crew member goes to a location that is out of view of the operator and is either in, on, or under the equipment, or near the equipment (or load) where the crew member could be injured by movement of the equipment (or load), the crew member must inform the operator that he/she is going to that location.

When the operator knows that a crew member went to a location noted above, the operator must not move any part of the equipment (or load) until the operator is informed in accordance with a prearranged system of communication that the crew member is in a safe position.

When pins (or similar devices) are being removed, employees must not be under the boom, jib, or other components, except where Assembly/ Disassembly Director demonstrates that site constraints require one or more employees to be under the boom, jib, or other components when pins (or similar devices) are being removed. The Assembly/ Disassembly Director must implement procedures that minimize the risk of unintended dangerous movement and minimize the duration and extent of exposure under the boom.

During all phases of assembly/disassembly, rated capacity limits for loads imposed on the equipment, equipment components (including rigging), lifting lugs and equipment accessories, must not be exceeded for the equipment being assembled/disassembled.

The Assembly/Disassembly director supervising the assembly/disassembly operation must address the hazards associated with the operation, which include:

1. Site and ground conditions must be adequate for safe assembly/disassembly operations and to support the equipment during assembly/disassembly.
2. The size, amount, condition, and method of stacking the blocking must be sufficient to sustain the loads and maintain stability.
3. When used to support lattice booms or components, blocking must be appropriately placed to:
    a. Protect the structural integrity of the equipment, and,
    b. Prevent dangerous movement and collapse.
4. When using an assist crane, the loads that will be imposed on the assist crane at each phase of assembly/disassembly must be verified in accordance with 29 CFR 1926.1417(o)(3) before assembly/disassembly begins.
5. The point(s) of attachment of rigging to a boom (or boom sections or jib or jib sections) must be suitable for preventing structural damage and facilitating safe handling of these components.
6. The center of gravity of the load must be identified if that is necessary for the method used for maintaining stability.

    Note: Where there is insufficient information to accurately identify the center of gravity, measures designed to prevent unintended dangerous movement resulting from an inaccurate identification of the center of gravity must be used.
7. The boom sections, boom suspension systems (such as gantry A- frames and jib struts), and components must be rigged or supported to maintain stability upon the removal of the pins.
8. Suspension ropes and pendants must not be allowed to catch on the boom or jib connection pins or cotter pins (including keepers and locking pins).
9. The potential for unintended movement from inadequately supported counterweights and from hoisting counterweights.
10. Each time reliance is to be placed on the boom hoist brake to prevent boom movement during assembly/disassembly the brake must be tested prior to such reliance to determine if it is sufficient to prevent boom movement. If it is not sufficient, a boom hoist pawl, other locking device/back-up braking device, or another method of preventing dangerous movement of the boom (such as blocking or using an assist crane) from a boom hoist brake failure must be used.

11. Backward stability before swinging the upperworks, travel, and when attaching or removing equipment components.
12. The effect of wind speed and weather on the equipment.

Additionally, the following must be addressed, if applicable:

1. Manufacturer limitations on the maximum amount of boom supported only by cantilevering must not be exceeded. Where these are unavailable, a registered professional engineer familiar with the type of equipment involved must determine in writing this limitation, which must not be exceeded.
2. The weight of each of the components must be readily available.
3. The selection of components, and configuration of the equipment, that affect the capacity or safe operation of the equipment must be in accordance with:
4. Manufacturer instructions, prohibitions, limitations, and specifications.

   b. Where these are unavailable, a registered professional engineer familiar with the type of equipment involved must approve, in writing, the selection and configuration of components; or

   a. Approved modifications that meet the requirements of 29 CFR 1926.1434, *Equipment modifications*.

5. Upon completion of assembly, the equipment must be inspected to ensure compliance with the above.

Post-assembly

Upon completion of assembly, the equipment must be inspected by a qualified person to assure that it is configured in accordance with manufacturer equipment criteria.

Where manufacturer equipment criteria are unavailable, a qualified person must:

a. Determine if a registered professional engineer (RPE) familiar with the type of equipment involved is needed to develop criteria for the equipment configuration. If an RPE is not needed, the employer must ensure that the criteria are developed by the qualified person. If an RPE is needed, the employer must ensure that they are developed by an RPE.

b. Determine if the equipment meets the criteria developed in accordance with the above paragraph.

Equipment must not be used until an inspection demonstrates that the equipment is configured in accordance with the applicable criteria.

Note: Reusable shipping pins, straps, links, and similar equipment must be removed. Once they are removed they must either be stowed or otherwise stored so that they do not present a falling object hazard.

Rigging

In addition to following the requirements in 29 CFR 1926.251, *Rigging equipment for material handling*, and other requirements in this and other standards applicable to rigging, when rigging is used for assembly/ disassembly, the employer must ensure that:

1. The rigging work is done by a qualified rigger.
2. Synthetic slings are protected from: abrasive, sharp or acute edges, and configurations that could cause a reduction of the sling's rated capacity, such as distortion or localized compression.

   Note: Requirements for the protection of wire rope slings are contained in 29 CFR 1926.251(c)(9).
3. When synthetic slings are used, the synthetic sling manufacturer's instructions, limitations, specifications and recommendations must be followed.

Hazard Assessments and Precautions Inside the Work Zone

Before beginning equipment operations, the qualified person must identify the work zone by either:

1. Demarcating boundaries (such as with flags, or a device such as a range limit device or range control warning device) and prohibiting the operator from operating the equipment past those boundaries, or
2. Defining the work zone as the area 360 degrees around the equipment up to the equipment's maximum working radius.

Determine if any part of the equipment, load line or load (including rigging and lifting accessories), if operated up to the equipment's maximum working radius in the work zone, could get closer than 20 feet to a power line.

If so, the qualified person must meet the requirements in Option (1), Option (2), or Option (3) as follows:

Option (1) De-energize and ground:

Confirm from the utility owner/operator that the power line has been de-energized and visibly grounded at the job site.

Option (2) – 20 foot clearance:

Ensure that no part of the equipment, load line or load (including rigging and lifting accessories), gets closer than 20 feet to the power line by implementing the measures found in "*preventing encroachment*", below.

Option (3) – Table A clearance:

1. Determine the line's voltage and the minimum clearance distance permitted under Table A

Table A – Minimum Clearance Distances	
Voltage (nominal, kV, alternating current)	Minimum clearance distance (feet)
up to 50	10
over 50 to 200	15
over 200 to 350	20
over 350 to 500	25
over 500 to 750	35
over 750 to 1000	45
over 1000	(as established by the power line owner/operator or registered professional engineer who is a qualified person with respect to electrical power transmission and distribution)

2. Determine if any part of the equipment, load line, or load (including rigging and lifting accessories), could get closer than the minimum clearance distance to the power line permitted under Table A.

   If so, the qualified person must ensure that no part of the equipment, load line, or load (including rigging and lifting accessories), gets closer to the line than the minimum clearance distance.

Note: Voltage information. Where Option (3) of is used, the utility owner/operator of the power lines must provide the requested voltage information within two working days of our request.

Preventing Encroachment/Electrocution

Where encroachment precautions are required under Option (2), or Option (3), above, the following requirements must be met:

a. A planning meeting will be conducted with the qualified person, operator, and the other workers who will be in the area of the equipment or load to review the location of the power line(s) and the steps that will be implemented to prevent encroachment/electrocution.

b. At least **one** of the following additional measures must be implemented:

   1. A proximity alarm set to give the operator sufficient warning to prevent encroachment.
   2. Use a dedicated spotter who is in continuous contact with the equipment operator. The dedicated spotter must:
      a. Be equipped with a visual aid to assist in identifying the minimum clearance distance. Examples of a visual aid include, but are not limited to, a clearly visible line painted on the ground, a clearly visible line of stanchions, and a set of clearly visible line-of sight landmarks.
      b. Be positioned to effectively gauge the clearance distance.
      c. Where necessary, use equipment that enables the dedicated spotter to communicate directly with the operator.

d. Give timely information to the operator so that the required clearance distance can be maintained.

3. A device that automatically warns the operator when to stop movement, such as a range control warning device. Such a device must be set to give the operator sufficient warning to prevent encroachment.
4. A device that automatically limits range of movement, set to prevent encroachment.
5. An insulating link/device (defined as "an insulating device listed, labeled, or accepted by a Nationally Recognized Testing Laboratory in accordance with 29 CFR 1910.7") installed at a point between the end of the load line (or below) and the load.

Additional Electrical Safety Measures

1. No part of the equipment, load line, or load (including rigging and lifting accessories) is allowed below a power line unless the qualified person has confirmed that the utility owner/ operator has de- energized and (at the job site) visibly grounded the power line.
2. The qualified person must assume that all power lines are energized unless the utility owner/operator confirms that the power line has been and continues to be de-energized and visibly grounded at the job site.
3. There must be at least one electrocution hazard warning conspicuously posted in the cab so that it is in view of the operator and (except for overhead gantry and tower cranes) at least two on the outside of the equipment.

Inspections

Note: Any part of a manufacturer's procedures regarding inspections that relate to safe operation (such as to a safety device or operational aid, critical part of a control system power plant, braking system, load-sustaining structural components, load hook, or in-use operating mechanism) that is more comprehensive or has a more frequent schedule of inspection than the requirements of 29 CFR 1926.1412 must be followed.

Note: All inspection documents must be available, during the applicable document retention period, to all persons who conduct inspections.

Modified Equipment Inspection

Equipment that has had modifications or additions which affect the safe operation of the equipment (such as modifications or additions involving a safety device or operational aid, critical part of a control system, power plant, braking system, load-sustaining structural components, load hook, or in-use operating mechanism) or capacity must be inspected by a **qualified person** after such modifications/additions have been completed, prior to initial use. The inspection must meet all the requirements of 1926.1412(a).

Repaired/adjusted Equipment Inspection

Equipment that has had a repair or adjustment that relates to safe operation (such as a repair or adjustment to a safety device or operator aid, or to a critical part of a control system, power plant, braking system, load- sustaining structural components, load hook, or in-use

operating mechanism), must be inspected by a **qualified person** after such a repair or adjustment has been completed, prior to initial use. The inspection must meet all the requirements of 29 CFR 1926.1412(b).

Post-assembly Inspection

Upon completion of assembly, the equipment must be inspected by a **qualified** person to assure that it is configured in accordance with manufacturer equipment criteria.

The inspection must meet all the requirements of 29 CFR 1926.1412(c).

Each Shift Inspection

A **competent person** must begin a visual inspection prior to each shift the equipment will be used, which must be completed before or during that shift. The inspection must consist of observation for apparent deficiencies. Taking apart equipment components and booming down is not required as part of this inspection unless the results of the visual inspection or trial operation indicate that further investigation necessitating taking apart equipment components or booming down is needed. Determinations made in conducting the inspection must be reassessed in light of observations made during operation. Some of the items include control mechanisms, pressurized lines, hooks and latches, wire rope, electrical apparatus, tires (when used), and ground conditions.

The inspection must meet all the requirements of 29 CFR 1926.1412(d).

Daily (each shift) inspections will be documented and include the following: items checked, results of the inspection, and name and signature of the inspector. Documentation of daily (each shift) inspections will be retained for 3 months.

Monthly Inspection

Per 29 CFR 1926.1412(e), each month the equipment is in service it must be inspected by a **competent person.** The inspection must meet all the requirements of 29 CFR 1926.1412(d). See "Each Shift" inspection, above.

Note: Documented monthly inspection is not required if the daily (each shift) inspection is documented and records are retained for 3 months.

Annual/Comprehensive Inspection

1. At least every 12 months the equipment must be inspected by a **qualified** person in accordance with 29 CFR 1926.1412(d) of this section (each shift) except that the corrective action set forth in 29 CFR 1926.1412(f)(4), (f)(5), and (f)(6) of this section must apply in place of the corrective action required by 29 CFR 1926.1412(d)(2) and (d)(3) of this section. The inspection must meet all the requirements of 29 CFR 1926.1412(f).
2. In addition, at least every 12 months, the equipment must be inspected by a qualified person. Disassembly is required, as necessary, to complete the inspection. The inspection must meet all the requirements of 29 CFR 1926.1412(f).

Documentation of Annual/Comprehensive Inspection

The following information must be documented, maintained, and retained for a minimum of 12 months, by the employer that conducts the inspection:

1. The items checked and the results of the inspection.
2. The name and signature of the person who conducted the inspection and the date.

Severe Service Inspection

Where the severity of use/conditions is such that there is a reasonable probability of damage or excessive wear (such as loading that may have exceeded rated capacity, shock loading that may have exceeded rated capacity, prolonged exposure to a corrosive atmosphere), the equipment will stop being used and a **qualified** person must inspect it The inspection must meet all the requirements of 29 CFR 1926.1412(g).

Equipment Not In Regular Use Inspection

Equipment that has been idle for 3 months or more must be inspected by a qualified person in accordance with the requirements of the Monthly inspection, above.

Wire Rope Inspection

A competent person must begin a visual inspection prior to each shift the equipment is used, which must be completed before or during that shift. The inspection must consist of observation of wire ropes (running and standing) that are likely to be in use during the shift for apparent deficiencies, including those listed in 29 CFR 1926.1413(a)(2). Untwisting (opening) of wire rope or booming down is not required as part of this inspection.

Daily (each shift) inspections will be documented and include the following: items checked, results of the inspection, and name and signature of the inspector. Documentation of daily (each shift) inspections will be retained for 3 months.

Wire Rope Monthly Inspection

Each month an inspection must be conducted in accordance with shift inspection from above, and 29 CFR 1926.1413(b).

Note: Documented monthly inspection is not required if the daily (each shift) inspection is documented and records are retained for 3 months.

Wire Rope Annual/Comprehensive Inspection

At least every 12 months, wire ropes in use on equipment must be inspected by a qualified person in accordance with shift inspection from above, and 29 CFR 1926.1413(c).

Documentation of Annual/Comprehensive Wire Rope Inspection

The following information must be documented, maintained, and retained for a minimum of 12 months, by the employer that conducts the inspection:

1. The items checked and the results of the inspection.
2. The name and signature of the person who conducted the inspection and the date.

Safety Devices

Note: accessible fire extinguisher must be on the equipment.

Operations must not begin unless all of the devices listed below are in proper working order. If a device stops working properly during operations, the operator must safely stop operations. If any of the devices listed in this section are not in proper working order, the equipment must be taken out of service and operations must not resume until the device is again working properly.

1. Crane level indicator.
    a. The equipment must have a crane level indicator that is either built into the equipment or is available on the equipment.
    b. If a built-in crane level indicator is not working properly, it must be tagged-out or removed. If a removable crane level indicator is not working properly, it must be removed.
    c. This requirement does not apply to portal cranes, derricks, floating cranes/derricks and land cranes/derricks on barges, pontoons, vessels or other means of flotation.
2. Boom stops, except for derricks and hydraulic booms.
3. Jib stops (if a jib is attached), except for derricks.
4. Equipment with foot pedal brakes must have locks.
5. Hydraulic outrigger jacks and hydraulic stabilizer jacks must have an integral holding device/check valve.
6. Equipment on rails must have rail clamps and rail stops, except for portal cranes.
7. Horn
    a. The equipment must have a horn that is either built into the equipment or is on the equipment and immediately available to the operator.
    b. If a built-in horn is not working properly, it must be tagged-out or removed. If a removable horn is not working properly, it must be removed.

Equipment Operations

Operators must comply with all manufacturer procedures applicable to the operational functions of equipment, including its use with attachments.

Operators must have access to procedures applicable to the operation of the equipment and these items must be readily available in the cab at all times for use by the operator. These items include: rated capacities (load charts), recommended operating speeds, special hazard warnings instructions, and operator's manual.

Note: Where rated capacities are available in the cab only in electronic form: in the event of a failure which makes the rated capacities inaccessible, the operator must immediately cease operations or follow safe shut-down procedures until the rated capacities (in electronic or other form) are available.

The operator must not engage in any practice or activity that diverts his/her attention while actually engaged in operating the equipment, such as the use of cellular phones (other than when used for signal communications).

The operator has the authority **and responsibility** to stop and refuse to handle loads whenever there is a safety concern. A qualified person, at this point, must determine that safety has been assured.

Signals

A signal person must be provided in each of the following situations:

1. The point of operation, meaning the load travel or the area near or at load placement, is not in full view of the operator.
2. When the equipment is traveling, the view in the direction of travel is obstructed.
3. Due to site specific safety concerns, either the operator or the person handling the load determines that it is necessary.

The requirements below apply where there are accessible areas in which the equipment's rotating superstructure (whether permanently or temporarily mounted) poses a reasonably foreseeable risk of:

1. Striking and injuring an employee; or
2. Pinching/crushing an employee against another part of the equipment or another object.

To prevent employees from entering these hazard areas, the below procedures will be accomplished:

1. Train each employee assigned to work on or near the equipment ("authorized personnel") in how to recognize struck-by and pinch/crush hazard areas posed by the rotating superstructure.
2. Erect and maintain control lines, warning lines, railings or similar barriers to mark the boundaries of the hazard areas. *Exception*: When the employer can demonstrate that it is neither feasible to erect such barriers on the ground nor on the equipment, the hazard areas must be clearly marked by a combination of warning signs (such as "Danger – Swing/Crush Zone") and high visibility markings on the equipment that identify the hazard areas. In addition, the employer must train each employee to understand what these markings signify.

Protecting Employees in the Hazard Area

Before an employee goes to a location in the hazard area that is out of view of the operator, the employee (or someone instructed by the employee) must ensure that the operator is informed that he/she is going to that location.

Where the operator knows that an employee went to a location within the swing area radius, the operator must not rotate the superstructure until the operator is informed in accordance with a prearranged system of communication that the employee is in a safe position.

Where any part of a crane/derrick is within the working radius of another crane/derrick, the controlling entity must institute a system to coordinate operations. If there is no controlling

entity, the employer (if there is only one employer operating the multiple pieces of equipment), or employers, must institute such a system.

Equipment Modifications

Modifications or additions which affect the capacity or safe operation of the equipment are prohibited except where below requirements are met.

1. **Manufacturer review and approval**
   a. The manufacturer approves the modifications/additions in writing.
   b. The load charts, procedures, instruction manuals and instruction plates/tags/decals are modified as necessary to accord with the modification/addition.
   c. The original safety factor of the equipment is not reduced.

2. **Manufacturer refusal to review request**

   The manufacturer is provided a detailed description of the proposed modification/addition, is asked to approve the modification/ addition, but it declines to review the technical merits of the proposal or fails, within 30 days, to acknowledge the request or initiate the review, and all of the following are met:

   a. A registered professional engineer who is a qualified person with respect to the equipment involved:
      1) Approves the modification/addition and specifies the equipment configurations to which that approval applies, and modifies load charts, procedures, instruction manuals and instruction plates/tags/decals as necessary to accord with the modification/addition.
   b. The original safety factor of the equipment is not reduced.

3. **Unavailable manufacturer**

   The manufacturer is unavailable and the below is met.

   a. The manufacturer approves the modifications/additions in writing.

4. The load charts, procedures, instruction manuals and instruction plates/tags/decals are modified as necessary to accord with the modification/addition. Manufacturer does not complete the review within 120 days of the request.

   The manufacturer is provided a detailed description of the proposed modification/addition, is asked to approve the modification/ addition, agrees to review the technical merits of the proposal, but fails to complete the review of the proposal within 120 days of the date it was provided the detailed description of the proposed modification/addition, and the below is met.

   a. The manufacturer approves the modifications/additions in writing.
   b. The load charts, procedures, instruction manuals and instruction plates/tags/decals are modified as necessary to accord with the modification/addition.

5. **Multiple manufacturers of equipment designed for use on marine job sites.**

   The equipment is designed for marine job sites, contains major structural components from more than one manufacturer, and the below is met.

   a. The manufacturer approves the modifications/additions in writing.

   b. The load charts, procedures, instruction manuals and instruction plates/tags/decals are modified as necessary to accord with the modification/addition.

Modifications or additions which affect the capacity or safe operation of the equipment are prohibited where the manufacturer, after a review of the technical safety merits of the proposed modification/addition, rejects the proposal and explains the reasons for the rejection in a written response.

Training

Operator Training, Qualification and Certification

Note: A state or local license is required if:

1. **Working within a state or locality that has licensing requirements, and**
2. **The licensing program meets the licensing and certification criteria listed in subpart CC.**
3. **A state or local license is valid for the period of time stipulated by the licensing office, but no longer than 5 years. It is portable only within the jurisdiction of the issuing agency.**

Written tests may be administered in a language understood by the operator candidate. When an operator's testing is based on a language other than English, it must be noted on the certificate.

All costs associated with training will be at no expense to the employee.

During the period November 8, 2010 through November 9, 2014, all operators must be competent to operate the equipment safely and are trained and evaluated on that training before operating the equipment.

As of November 10, 2014, all operators must be certified or qualified.

Accredited Crane Operator Testing Organization

An operator will be deemed qualified to operate a particular piece of equipment if the operator is certified for that type and capacity of equipment or for higher-capacity equipment of that type. If no accredited testing agency offers certification examinations for a particular type and/or capacity of equipment, an operator will be deemed qualified to operate that equipment if the operator has been certified for the type/capacity that is most similar to that equipment and for which a certification examination is available.

The operator's certificate must state the type/capacity of equipment for which the operator is certified.

To achieve the above qualification, the operator must have received certification by an **accredited crane operator testing organization**.

Certification issued by an accredited crane operator testing organization is both portable and valid for 5 years.

Audited Employer Program

Currently this option will not be used because:

1. It is not portable.
2. It is time and manpower consuming.
3. It requires monitoring and outside approvals.

If this is used in the future, it will be in accordance with 29 CFR 1926.1427(c).

Operator-in-Training

An employee who is not qualified or certified is permitted to operate equipment only as an operator-in-training and only where the below requirements are met:

1. The employer must provide each operator-in-training with sufficient training prior to operating the equipment to enable the operator-in- training to operate the equipment safely under limitations established by this section (including continuous monitoring) and any additional limitations established by the employer.
2. The tasks performed by the operator-in-training while operating the equipment must be within the operator-in-training's ability.
3. While operating the equipment, the operator-in-training must be continuously monitored by an individual ("**operator's trainer**") who meets all of the following requirements:
    a. The operator's trainer is our employee or agent.
    b. The operator's trainer is either a certified operator under this section or has passed the written portion of a certification test, and is familiar with the proper use of the equipment's controls.
    c. While monitoring the operator-in-training, the operator's trainer performs no tasks that detract from the trainer's ability to monitor the operator-in-training.
    d. For equipment other than tower cranes: the operator's trainer and the operator-in-training must be in direct line of sight of each other. In addition, they must communicate verbally or by hand signals.
    e. For tower cranes: the operator's trainer and the operator-in- training must be in direct communication with each other.

Rigger Training, Qualification and Certification

All costs associated with training will be at no expense to the employee.

Riggers must be qualified. A qualified person means a person who, by possession of a recognized degree certificate, or professional standing, or who by extensive knowledge, training and experience, successfully demonstrated the ability to solve/resolve problems relating to the subject matter, the work, or the project.

Signal Person Training, Qualification and Certification

All costs associated with training will be at no expense to the employee. Signal persons must be qualified by either:

1. A third party evaluator — Documentation is Portable, or
2. An employer qualified evaluator — Documentation is not Portable.

Upon completion of documented training which must include either a verbal or written test, PLUS a practical test.

Types of Signals

Hand Signals

Note: Hand signal charts must be either posted on the equipment or conspicuously posted in the vicinity of the hoisting operations. These charts will comply with the instructions found in 29 CFR Part 1926 Subpart CC App A, *Standard Hand Signals*.

1. When using hand signals, the Standard Method must be used (see Note, above). Exception: Where use of the Standard Method for hand signals is not feasible, or where an operation or use of an attachment is not covered in the Standard Method, non-standard hand signals may be used in accordance with paragraph 2, below:
2. Non-standard hand signals. When using non-standard hand signals, the signal person, operator, and lift director (where there is one) must contact each other prior to the operation and agree on the non- standard hand signals that will be used.

Signals – Radio, Telephone or Other Electronic Transmission of Signals

The device(s) used to transmit signals must be tested on site before beginning operations to ensure that the signal transmission is effective, clear, and reliable.

Signal transmission must be through a dedicated channel, except:

1. Multiple cranes/derricks and one or more signal persons may share a dedicated channel for the purpose of coordinating operations.
2. Where a crane is being operated on or adjacent to railroad tracks, and the actions of the crane operator need to be coordinated with the movement of other equipment or trains on the same or adjacent tracks.

The operator's reception of signals must be by a hands-free system.

New Signals

Signals other than hand, voice, or audible signals may be used where it may be demonstrated that:

1. The new signals provide at least equally effective communication as voice, audible, or Standard Method hand signals, or
2. The new signals comply with a national consensus standard that provides at least equally effective communication as voice, audible, or Standard Method hand signals.

Voice Signals

If voice signals are used, prior to beginning operations, the operator, signal person, and lift director (if there is one), must contact each other and agree on the voice signals that will be used. Once the voice signals are agreed upon, these workers need not meet again to discuss voice signals unless another worker is added or substituted, there is confusion about the voice signals, or a voice signal is to be changed.

Each voice signal must contain the following three elements, given in the following order: function (such as hoist, boom, etc.) direction, distance and/or speed, and function stop command.

The operator, signal person, and lift director (if there is one), must be able to effectively communicate in the language used.

Additional Signal Information

1. The signals used (hand, voice, audible, or new), and means of transmitting the signals to the operator (such as direct line of sight, video, radio, etc.) must be appropriate for the site conditions.
2. During operations requiring signals, the ability to transmit signals between the operator and signal person must be maintained. If that ability is interrupted at any time the operator must safely stop operations requiring signals until it is reestablished and a proper signal is given and understood.
3. If the operator becomes aware of a safety problem and needs to communicate with the signal person, the operator must safely stop operations. Operations must not resume until the operator and signal person agree that the problem has been resolved.
4. Only one person may give signals to a crane/derrick at a time, except in circumstances covered by the below:
   a. Anyone who becomes aware of a safety problem must alert the operator or signal person by giving the stop or emergency stop signal.

      NOTE: 29 CFR 1926.1417(y) requires the operator to obey a stop or emergency stop signal.
5. All directions given to the operator by the signal person must be given from the operator's direction perspective.

Where a signal person(s) is in communication with more than one crane/derrick, a system must be used for identifying the crane/derrick each signal is for, as follows:

1. For each signal, prior to giving the function/direction, the signal person must identify the crane/derrick the signal is for, or
2. Must use an equally effective method of identifying which crane/derrick the signal is for.

Exposure Control Plan for Bloodborne Pathogens & Other Infectious Material

29 CFR 1910.1030 - Bloodborne Pathogens

NOTE: Per CPL 2-2.69, *Enforcement Procedures for the Occupational Exposure to Bloodborne Pathogens*, the bloodborne pathogens standard does not apply to the construction industry. OSHA has not, however, stated that the construction industry is free from the hazards of bloodborne pathogens. Exposure to bloodborne pathogens would fall under Section 5(a)(1) of the OSH Act which states that "each employer shall furnish to each of his employees employment and a place of employment which is free from recognized hazards that are causing or are likely to cause death or serious physical harm to his employees."

Providing first aid or other medical assistance is not the primary job assignment of our designated first aid providers. Any first aid rendered by them is rendered only as a collateral duty, responding solely to injuries resulting from job site incidents and only at the job site where the incident occurred.

Recordkeeping: all work-related injuries from needle-sticks and cuts, lacerations, punctures and scratches from sharp objects contaminated with another person's blood or other potentially infectious materials (OPIM) are to be recorded on the OSHA 300 as an injury.

a. To protect the employee's privacy, the employees name may not be entered on the OSHA 300.
b. If the employee develops a bloodborne disease, the entry must be updated and recorded as an illness.

Note: Our first aid kits do not contain sharps or needles. However, a contaminated sharp, such as a broken pair of glasses, may trigger the above.

Policy Statement

This Exposure Control Plan has been developed to eliminate or minimize the risk of exposure to bloodborne pathogens and other potentially infectious materials. This Plan presents methods and procedures to eliminate and/or minimize the hazards associated with occupational exposure to bloodborne pathogens or other infectious materials.

As a matter of policy, universal precautions will be used.

Additional components of this Plan include exposure determinations by job classification, standard operating procedures to eliminate or reduce the likelihood of disease transmission, the methods of disease transmission, definitions of terms, post exposure procedures and follow-up, training documentation, and recordkeeping.

Compliance with this Plan not only fulfills the requirements of the Occupational Safety and Health Administration, more importantly, it fulfills our desire to maintain a safe working environment and safeguard the health of our employees.

All affected employees should feel free to review this Plan at any time and are encouraged to consult with our Exposure Control Plan Administrator to resolve any issues affecting its implementation. Our Plan is to be made available to the Assistant Secretary of Labor for Occupational Safety and Health or designated representative.

Definitions

All employees should know the "language" of this plan. Because some of the words and/or terms are not used in everyday life, each person must be aware of the definitions so that we are all "reading off the same page."

Below are OSHA definitions:

ASSISTANT SECRETARY: the Assistant Secretary of Labor for Occupational Safety and Health, or designated representative.

BLOOD: human blood, human blood components, and products made from human blood.

BLOODBORNE PATHOGENS: pathogenic microorganisms that are present in human blood and can cause disease in humans. These pathogens include, but are not limited to, hepatitis B virus (HBV) and human immunodeficiency virus (HIV).

CLINICAL LABORATORY: a workplace where diagnostic or other screening procedures are performed on blood or other potentially infectious materials.

CONTAMINATED: the presence, or the reasonably anticipated presence, of blood or other potentially infectious materials on an item or surface.

CONTAMINATED LAUNDRY: laundry which has been soiled with blood or other potentially infectious materials or may contain sharps.

CONTAMINATED SHARPS: any contaminated object that can penetrate the skin including, but not limited to, needles, scalpels, broken glass, broken capillary tubes, and exposed ends of dental wires.

DECONTAMINATION: the use of a physical or chemical procedure to remove, inactivate, or destroy bloodborne pathogens on a surface or item to the point where they are no longer capable of transmitting infectious particles and the surface or item is rendered safe for handling, use, or disposal.

DIRECTOR: the Director of the National Institute for Occupational Safety and Health, U.S. Department of Health and Human Services, or designated representative.

ENGINEERING CONTROLS: controls (e.g., sharps disposal containers, self-sheathing needles, safer medical devices, such as sharps with engineered sharps injury protections and needleless systems) that isolate or remove the bloodborne pathogens hazard from the work area.

EXPOSURE INCIDENT: a specific eye, mouth, other mucous membrane, non-intact skin, or parenteral contact with blood or other potentially infectious materials that results from the performance of an employee's duties.

HAND-WASHING FACILITIES: a facility providing an adequate supply of running potable water, soap, and single use towels or hot air drying machines.

LICENSED HEALTHCARE PROFESSIONAL: a person whose legally permitted scope of practice allows him or her to independently perform the activities required by 29 CFR 1910.1030(f), *Hepatitis B Vaccination and Post-exposure Evaluation and Follow-up*.

HBV: hepatitis B virus.

HIV: human immunodeficiency virus.

NEEDLELESS SYSTEMS: a device that does not use needles for:

a. The collection of bodily fluids or withdrawal of body fluids after initial venous or arterial access is established,

b. The administration of medication or fluids, or

c. Any other procedure involving the potential for occupational exposure to bloodborne pathogens due to percutaneous injuries from contaminated sharps.

OCCUPATIONAL EXPOSURE: reasonably anticipated skin, eye, mucous membrane, or parenteral contact with blood or other potentially infectious materials that may result from the performance of an employee's duties.

OTHER POTENTIALLY INFECTIOUS MATERIALS

a. The following human body fluids: semen, vaginal secretions, cerebrospinal fluid, synovial fluid, pleural fluid, pericardial fluid, peritoneal fluid, amniotic fluid, saliva in dental procedures, any bodily fluid that is visibly contaminated with blood, and all body fluids in situations where it is difficult or impossible to differentiate between body fluids;

b. Any unfixed tissue or organ (other than intact skin) from a human (living or dead); and

c. HIV-containing cell or tissue cultures, organ cultures, and HIV- or HBV-containing culture medium or other solutions, and blood, organs, or other tissues from experimental animals infected with HIV or HBV.

PARENTERAL: piercing mucous membranes or the skin barrier through such events as needle-sticks, human bites, cuts, and abrasions.

PERSONAL PROTECTIVE EQUIPMENT: is specialized clothing or equipment worn by an employee for protection against a hazard. General work clothes (e.g., uniforms, pants, shirts or blouses) not intended to function as protection against a hazard are not considered to be personal protective equipment.

PRODUCTION FACILITY: a facility engaged in industrial-scale, large- volume or high concentration production of HIV or HBV.

REGULATED WASTE: liquid or semi-liquid blood or other potentially infectious materials; contaminated items that would release blood or other potentially infectious materials in a liquid or semi-liquid state if compressed; items that are caked with dried blood or other potentially infectious materials and are capable of releasing these materials during handling; contaminated sharps; and pathological and microbiological wastes containing blood or other potentially infectious materials.

RESEARCH LABORATORY: a laboratory producing or using research- laboratory-scale amounts of HIV or HBV. Research laboratories may produce high concentrations of HIV or HBV but not in the volume found in production facilities.

SHARPS WITH ENGINEERED SHARPS INJURY PROTECTIONS: a non-needle sharp or a needle device used for withdrawing body fluids, accessing a vein or artery, or administering medications or other fluids, with a built-in safety feature or mechanism that effectively reduces the risk of an exposure incident.

SOURCE INDIVIDUAL: any individual, living or dead, whose blood or other potentially infectious materials may be a source of occupational exposure to the employee. Examples include, but are not limited to, hospital and clinic patients; clients in institutions for the developmentally disabled; trauma victims; clients of drug and alcohol treatment facilities; residents of hospices and nursing homes; human remains; and individuals who donate or sell blood or blood components.

STERILIZE: the use of a physical or chemical procedure to destroy all microbial life including highly resistant bacterial endospores.

UNIVERSAL PRECAUTIONS: is an approach to infection control. According to the concept

of Universal Precautions, all human blood and certain human body fluids are treated as if known to be infectious for HIV, HBV, and other bloodborne pathogens.

WORK PRACTICE CONTROLS: controls that reduce the likelihood of exposure by altering the manner in which a task is performed (e.g., prohibiting recapping of needles by a two-handed technique).

Exposure Control Plan

This Exposure Control Plan is provided for all personnel who, as a result of the performance of their duties, would have reasonably anticipated skin, eye, mucous membrane, or parenteral contact with blood or other potentially infectious materials.

This Plan will be reviewed and updated annually and whenever necessary as new or modified tasks and procedures are introduced which affect occupational exposure to bloodborne pathogens or other potentially infectious materials. The review and update of this plan will:

a. Reflect changes in technology that eliminate or reduce exposure to bloodborne pathogens.

b. Annually document consideration and implementation of appropriate commercially available and effective safer medical devices designed to eliminate or minimize occupational exposure.

First aid providers are employees responsible for direct trauma victim care, who are potentially exposed to injuries for contaminated sharps, will be asked for input on the identification, evaluation, and selection of effective engineering and work practice controls.

This Exposure Control Plan, with a copy of 29 CFR 1910.1030, *Bloodborne Pathogens*, will be made accessible to all employees as well as the Assistant Secretary and the Director (see definitions) who may examine and copy this plan.

Exposure Determination

Three (3) lists will be prepared and they will be maintained at the end of this exposure control plan for bloodborne pathogens & other infectious material, located **here.**

List I: A list of all job classifications in which all employees have occupational exposure.

List II: A list of job classifications in which some employees have occupational exposure.

List III: A list of all tasks and procedures, or groups of closely related tasks and procedures, in which occupation exposure occurs and are performed by employees in job classifications noted in List II.

Note: The above exposure determinations are to be made without regard to the use of personal protective equipment.

Methods of Compliance

Universal precautions will be used. We will treat all trauma victims' blood, bodily fluids, and other potentially infectious materials as if they are known to be infectious. Unfortunately, there is no immediate, practical way to determine if HIV, HBV, and other bloodborne pathogens are present so, to be safe, we will assume they are. Traditionally, isolation of infectious materials has been diagnosis-driven. This meant that if a person were diagnosed

to have HIV or HBV infection, for example, then isolation precautions would be taken. Because the infection status of each trauma victim cannot be immediately known, it makes sense to treat all trauma victims and their body fluids as if they were infected. The precautions to take depend on the procedures being performed. For example, if one's hands will be in contact with body substances, disposable gloves will be worn. If there is risk of one's eyes being splashed with body fluids, eye protection will be worn. An impermeable barrier must be placed between yourself and the potentially infectious bodily fluids. Overkill is not necessary. Cleaning up a minor spill on a counter top does not require a mask, eye protection, and plastic apron. It does, however, require disposable gloves.

All employees will strictly adhere to the below engineering and work practice controls to eliminate or reduce the possibility of occupational exposure to bloodborne pathogens or other potentially infectious materials. Specific controls and procedures, noted below, will be used to eliminate or minimize employee exposure.

If occupational exposure is:

Handwashing Equipment and Procedures

Hand-washing facilities are provided which are readily accessible to all employees.

Employees will wash their hands and any other skin area exposed to blood or other potentially infectious materials with soap and water immediately or as soon as feasible:

a. After removal of gloves or other personal protective equipment.
b. Following contact with blood or other potentially infectious materials.

Particular attention will be given to fingernails and between fingers and rings under which infectious material may lodge. Furthermore, one should be aware that rings and jewelry are a good hiding place for bloodborne pathogens and other potentially infectious materials.

Examples of situations where hand-washing is appropriate:

a. Before and after examining any trauma victim.
b. After handling any soiled waste or other materials.
c. After handling any chemicals or used equipment.

If for some reason hand-washing facilities are not functioning, appropriate antiseptic hand cleaner and clean cloth/paper towels (antiseptic towelettes) will be provided and used. If antiseptic hand cleaner and clean cloth/paper towels are used, hands will be washed with soap and water as soon as feasible.

Eating, Drinking, Smoking

There shall be no eating, drinking, smoking, applying cosmetics, lip balm, or handling contact lenses in areas where there is a likelihood of occupational exposure to bloodborne pathogens or other potentially infectious materials.

Furthermore, food and drink shall not be kept in refrigerators, freezers, shelves, cabinets, on countertops, or benches where blood or other potentially infectious materials are present.

Contaminated Needles & Other Contaminated Sharps

Contaminated needles will not be sheared or broken.

Furthermore, all contaminated needles and other contaminated sharps shall not be bent, recapped, or removed unless:

a. It can be demonstrated that no alternative is feasible or that it is required by a specific medical procedure.
b. Recapping or needle removal may be accomplished through the use of a mechanical device or a one-handed method. Contaminated **reusable** sharps will be placed in appropriate containers immediately or as soon as possible after use until properly reprocessed. These containers will:
    a. Be puncture resistant.
    b. Have warning labels affixed to containers potentially infectious material and contain the following legend:

Note: The above label will be fluorescent orange or orange-red or predominantly so, with lettering and symbols in a contrasting color. Labels shall be affixed as close as feasible to the container by string, wire, adhesive, or other method that prevents their loss or unintentional removal. Red bags or red containers may be substituted for labels.

    c. Be leak proof on the sides and bottom.

Reusable sharps that are contaminated with blood or other potentially infectious materials will not be stored or processed in a manner that requires employees to reach by hand into the containers where these sharps have been placed.

Contaminated **non-reusable** sharps will be discarded immediately or as soon as feasible and placed in containers that:

a. Are closable
b. Are puncture resistant
c. Are leak proof on sides and bottom
d. Have warning labels affixed that contain the following legend:

Note: The above label will be fluorescent orange or orange-red or predominantly so, with lettering and symbols in a contrasting color. Labels shall be affixed as close as feasible to the container by string, wire, adhesive, or other method that prevents their loss or unintentional removal. Red bags or red containers may be substituted for labels.

Contaminated **non-reusable** sharps shall not be stored or processed in such a manner that requires employees to reach by hand into the containers where these sharps have been placed.

During use, containers for contaminated sharps must be:

a. Easily accessible to our employees.
b. Located as close as feasible to the immediate area where sharps are used or can be reasonably anticipated to be found.
c. Maintained upright throughout use.
d. Replaced routinely and not be allowed to overfill.

If leakage is possible when removing a container of contaminated sharps, it shall be placed in a second container with the following container requirements:

a. It will be closable,
b. It will be constructed to contain all contents and prevent leakage during handling, storage, transport, or shipping, and;
c. Colored coded red or labeled as noted above.

Reusable containers shall not be opened, emptied, or cleaned manually or in any other manner which would expose employees to the risk of percutaneous (introduced through the skin such as a cut) injury.

Other Regulated Waste - Containment

The provisions that apply to contaminated sharps, above, apply to other regulated waste.

Disposal Of Contaminated Sharps & Other Regulated Waste

The actual disposal of all regulated waste shall be in compliance with applicable state laws.

Specimens Of Potentially Infectious Materials

Specimens of blood and potentially infectious materials shall be placed in a container which prevents leakage during collection, handling, processing, storage, transport, or shipping.

Splashing, Spraying Of Potentially Infectious Materials

All procedures involving blood or other potentially infectious materials shall be performed in such a manner as to minimize splashing, spraying, spattering, and the generation of droplets of these substances.

Mouth Pipetting

Mouth pipetting and mouth suction of blood or other potentially infectious materials is prohibited.

Exposure Control Plan Administrator

Our designated Exposure Control Plan Administrator will be knowledgeable in all aspects of this Plan as it relates to our operations and be available to answer questions raised by our first aid providers. The Exposure Control Plan Administrator may call upon professionals in the Medical Arts to field questions that are of technical nature outside of the Administrator's area of expertise.

The Exposure Control Plan Administrator will:

a. Ensure this Plan is kept current.
b. Ensure training is provided as required.
c. Maintain all records associated with this plan.

Designated First Aid Provider

Before one may be designated as a first aid provider, he/she must have a valid certificate in first aid training from the U.S. Bureau of Mines, the Red Cross, or equivalent training that can be verified by documentary evidence. No person is to administer any medical assistance for which they are not appropriately trained. It is noted that the rendering of first aid is not the primary job of our designated first aid providers.

Personal Protective Equipment (PPE)

In spite of work practice and engineering controls, there is a requirement for appropriate personal protective equipment to provide an impermeable barrier between potentially infectious materials and the employees work clothes, street clothes, undergarments, skin, eyes, mouth, or other mucous membranes under normal conditions of use and for the duration of time which the protective equipment will be used.

Employees will use appropriate personal protective equipment when there is a possibility of occupational exposure to bloodborne pathogens or other potential infectious materials.

Personal protective equipment will be provided in appropriate sizes and at no cost to the employees. Further, maintenance and replacement of personal protective equipment will be provided at no cost to the employee.

Personal protective equipment will be discarded immediately if its ability to function as a barrier is compromised.

Most importantly, employees must understand that personal protective equipment is useless unless it provides an impermeable barrier between bloodborne pathogens and other

potentially infectious materials and the employee's clothes, skin, eyes, mouth, or other mucous membranes.

Personal Protective Equipment is considered appropriate if it prevents potentially infectious materials from reaching work/street clothing or body surface when used under normal conditions.

Disposable Gloves

Disposable, single use gloves, such as surgical or examination gloves will be worn when it can be reasonably anticipated that the employee may have hand contact with blood or other potentially infectious materials and when handling or touching contaminated items or surfaces. Disposable gloves will always be used when there is a possibility of contact with bloodborne pathogens or other potentially infectious materials.

Disposable gloves shall never be washed, decontaminated, or reused.

Disposable gloves shall be replaced as soon as practical when contaminated or as soon as feasible if they are torn, punctured, or their ability to function as a barrier is compromised.

Should any employee be allergic to the normal gloves provided, an appropriate alternative (such as hypoallergenic and/or powderless gloves) will be provided in the proper size at no cost to the employee.

Utility Gloves

Utility gloves may be used for general cleanup (not for any trauma victim procedure) when there is anticipated exposure to bloodborne pathogens or other potentially infectious materials. Utility gloves may be decontaminated for re-use if the integrity of the gloves is not compromised. They will be discarded if they are cracked, peeling, torn, punctured, or exhibit signs of deterioration or when their ability to function as a barrier is compromised.

Eye and Respiratory Protection

Eye (goggles, glasses, face shield, etc.) and respiratory (mask, etc.) protection will be used when it can reasonably be expected that bloodborne pathogens or other potentially infectious materials may splash or spray in or around the eyes, nose, mouth, and general head area of the employee.

Protective Body Clothing

Protective body clothing such as gowns, aprons, lab coats, etc. will be worn as determined by the professional judgment of the employee in relation to task. The protective body clothing will certainly be worn where there can reasonably be expected exposure to bloodborne pathogens or other potentially infectious materials to the body area.

Laundry

Personal protective equipment will be cleaned, laundered, and disposed of at no cost to the employee.

Note: In rare and extraordinary circumstances, an employee, in her/his professional judgment, may decline to temporarily and briefly wear personal protective equipment if he/she deems that the equipment would prevent the delivery of health

care or would have increased the hazard of occupational exposure to the employee or his/her co-workers. Should this event occur, it will be documented, investigated, and procedures will be developed to prevent a reoccurrence.

Housekeeping

Housekeeping is an ongoing, never ending procedure which not only enhances our work environment but also eliminates health risk to our personnel. In the area of bloodborne pathogens and other hazardous materials, to ensure proper cleaning, decontamination, sterilization, and disinfecting of surfaces within our work area, cleaning will be accomplished only by employees who have received training in universal precautions and the provisions of this plan. The documented Housekeeping Schedule & Checklist is found at the end of this exposure control plan for bloodborne pathogens & other infectious material. This Schedule will be adhered to following an incident that results in the potential exposure to bloodborne pathogens or other potentially infectious materials.

Broken, potentially infected glassware should be picked up and disposed of using mechanical means such as a brush and dust pan or forceps.

All sharps will be stored in a manner that allows easy access and safe handling.

Infectious waste will be placed in containers that are color coded red. These containers will be decontaminated as soon as practical.

Subsequent to rendering any procedures, employees will ensure that all surfaces on which blood, body fluids, bloodborne pathogens, or other infectious materials may be present are cleaned with an appropriate disinfectant.

Hepatitis B Epidemiology

Hepatitis B (serum hepatitis) routes of infection include parenteral, oral, or direct contact. The virus can also spread by contact with the respiratory tract. Its sources include contaminated needles and surgical instruments as well as contaminated blood products. Hepatitis B virus has also been found in urine. Further, the hepatitis B virus can live for up to seven (7) days on a dry surface and can be easily be transmitted by a single needle stick. Its incubation period is quite lengthy generally between 45 and 180 days. It affects all age groups. Recovery from hepatitis B does provide immunity. Generally, one can expect a complete recovery from viral hepatitis; however, it is potentially fatal depending on many factors including the virulence (aggressiveness) of the virus, prior hepatic damage, and natural barriers to damage and disease of the liver. It is possible for viral hepatitis to lead to fulminating viral hepatitis and sub-acute fatal viral hepatitis both of which are fatal. Onset symptoms may include headache, elevated temperature, chills, nausea, dyspepsia, anorexia, general malaise, and tenderness over the liver. These types of symptoms will last about one (1) week, and then subside, and jaundice will occur. Jaundice is caused by damaged liver cells. The convalescent stage begins with the disappearance of the jaundice and may last several months. Recovery is expected in six (6) months.

Risk of Exposure

Per the Department of Human Services of the Center for Disease Control, below is the risk

of infection after occupational exposure:

HBV:

First aid providers who have received hepatitis B vaccine and have developed immunity to the virus are at virtually no risk for infection. For an unvaccinated person, the risk from a single needle-stick or cut exposure to HBV-infected blood ranges from 6-30% and depends on the hepatitis B e antigen (HBeAg) status of the source individual. In individuals who are both hepatitis B surface antigen (HBsAG) positive and HBeAg positive have more virus in their blood and are more likely to transmit HBV.

HCV:

Based on limited studies, the risk for infection after a needle-stick or cut exposure to HCV-infected blood is approximately 1.8%. The risk following a blood splash is unknown, but is believed to be very small; however, HCV infection from such an exposure has been reported.

HIV:

The average risk of HIV infection after a needle stick or cut exposure to HIV-infected blood is 0.3% (i.e., three-tenths of one percent, or about 1 in 300). Stated another way, 99.7% of needle-stick/cut exposures do not lead to infection.

The risk after exposure of the eye, nose, or mouth to HIV-infected blood is estimated to be, on average, 0.1% (1 in 1,000).

The risk after exposure of the skin to HIV-infected blood is estimated to be less than 0.1%. A small amount of blood on intact skin probably poses no risk at all. There have been no documented cases of HIV transmission due to an exposure involving a small amount of blood on intact skin (a few drops of blood on skin for a short period of time). The risk may be higher if the skin is damaged (for example, by a recent cut) or the contact involves a large area of skin or is prolonged (for example, being covered in blood for hours).

All employees with occupational exposure are encouraged to accept the hepatitis B vaccination.

Hepatitis B Vaccination

The hepatitis B vaccination series will be provided, at no cost, to all unvaccinated first aid providers as soon as possible (within 24 hours of initial exposure). All exposed first aid provider employees are encouraged to take this vaccination series unless they have previously received the complete hepatitis B vaccination series; antibody testing has revealed that the employee is immune; or the vaccine is contraindicated (not recommended) for medical reasons. Post-exposure evaluation, prophylaxis (prevention of or protection from disease), and follow-up will be provided at no cost to the employee.

The Hepatitis B vaccination will be performed under the supervision of a licensed physician or other licensed healthcare professional.

All laboratory tests will be conducted by an accredited laboratory at no cost to the employee.

Should routine booster dose(s) of hepatitis B vaccine (as recommended by the U.S. Public Health Service at a future date) be required, they will be provided at no cost as long as the employee remains a first aid provider.

An employee may decline the Hepatitis B vaccination and this declination shall not reflect unfavorably upon him/her; however this declination must be in writing. See the Hepatitis B Declination Form.

It is important to note that if a first aid provider initially declines the hepatitis B vaccination series, he/she may decide at a later date to accept the vaccination series and it will be provided at no cost assuming he/she is still occupationally exposed to bloodborne pathogens or other potentially infectious materials.

Sharps Injury Log

A Sharps injury log will be maintained for the recording of percutaneous injuries from contaminated sharps.

The information on the log will be recorded and maintained in such manner as to protect the confidentiality of the injured employee.

The sharps injury log will contain:

1. The type and brand of device involved in the incident.
2. The department or work area where the exposure incident occurred.
3. An explanation of how the incident occurred.

The sharps injury log shall be maintained for the period of five years.

First Aid Provider Input

As a matter of policy, all first aid providers who are responsible for first aid delivery as an additional job are encouraged to suggest methods to improve our engineering and job site controls. This input may be made verbally to the Plan Administrator at any time. Additionally, during the annual refresher training, suggestions will be solicited.

Plan Review

This plan will be reviewed, and if necessary, updated annually to reflect new or modified tasks and procedures which affect occupational exposure and to reflect new or revised employee positions with occupational exposure. As new medical devices are developed which reduce employee exposure, they will be introduced into our practice. A review of the "Sharps Log" will help identify problem areas and/or ineffective devices which may need replacement.

Post-Exposure Evaluation and Follow-Up

The information that has preceded *Post-Exposure Evaluation and Follow- up* has dealt with the methods to restrict occupational exposure to bloodborne pathogens and other infectious materials. Post-exposure evaluation and follow-up deals with the steps to take immediately following a potential exposure incident and the steps that will be taken over time to protect our employees from further health risk.

All incidents involving exposure to blood or other potentially infectious materials will be reported to the Exposure Control Plan Administrator, in writing, before the end of the shift in which the incident occurred using the Exposure Incident Report, located at the end of this exposure control plan for bloodborne pathogens & other infectious material.

This Report will be prepared regardless of whether or not there has been an "Exposure Incident" as defined in this Plan and in 29 CFR 1910.1030. A separate Exposure Incident Report will be completed for each employee who was occupationally exposed.

Information in this Report will include:

a. The date and time the incident occurred.
b. A brief description of the events leading up to the exposure (what happened).
c. The name of the individual exposed.
d. The route of exposure.
e. "Source individual" and "exposed individual" information, including the acceptance or rejection of hepatitis B vaccination series.
f. A determination of whether or not an actual "exposure incident" occurred. Refer to Definitions in this Plan or 29 CFR 1910.1030.

The Exposure Control Plan Administrator or his authorized representative will review the Exposure Incident Report and determine if methods or procedures may be altered to prevent a reoccurrence of the incident.

Further, an occupational bloodborne pathogens exposure incident which results in the recommendation for hepatitis B vaccination would be recorded on OSHA Form 300 as an injury. See Recordkeeping.

All unvaccinated employees who have assisted in any situation involving blood will be afforded the opportunity to receive the hepatitis B vaccination series as soon as possible but not later than twenty-four (24) hours after the situation.

A confidential medical evaluation and follow-up will be provided immediately, at no cost, to the employee. The healthcare professional evaluating an employee after an exposure incident will be provided a copy of 29 CFR 1910.1030.

Further, the healthcare professional will be provided a description of the exposed employee's duties as they relate to the exposure incident; documentation of the route(s) of exposure; the circumstances under which the exposure occurred; the results of the source individual's blood testing, if available; and all medical records relevant to the appropriate treatment of the employee including vaccination status which is maintained by our office. See Recordkeeping.

The confidential medical evaluation and follow-up will include:

a. Documentation of the route(s) of exposure.
b. The circumstances under which the exposure incident occurred.
c. The identification and documentation of the source individual, unless it can be established that the identification is not feasible or prohibited by state or local law.

d. The exposed employee's blood shall be collected as soon as feasible and tested after consent is obtained.

Note: If the employee consents to baseline blood collection, but does not consent at that time for HIV serologic testing, the sample shall be preserved for at least 90 days. If, within 90 days of the exposure incident, the employee elects to have the baseline sample tested, such testing shall be done as soon as feasible.

e. The source individual's blood shall be tested as soon as feasible to determine HBV and HIV infectivity unless it is already known, in which case this procedure is not necessary.

If consent to test the source individual's blood cannot be obtained the following will occur:

a. It will be established and documented that legally required consent cannot be obtained.
b. When the source individual's consent is not required by law, the source individual's blood shall be tested and the results documented.

The results of the source individual's testing shall be made available to the exposed employee and the employee shall be informed of applicable laws and the identity and infectious status of the source individual.

The employee shall be provided post-exposure prophylaxis, when medically indicated, and counseling.

The employee will be provided with a copy of the healthcare professional's written opinion within 15 days of the completion of the evaluation. The written opinion shall be limited to:

a. Whether Hepatitis B vaccination is indicated and if the employee has received such vaccination.
b. An indication that the employee has been informed of the results of the evaluation.
c. An indication that the employee has been told about any medical conditions resulting from exposure to blood or other potentially infectious materials which require further evaluation or treatment.

All other findings or diagnoses will remain confidential and will not be included in the written report.

Recordkeeping

Complete and accurate medical records will be maintained for each employee with occupational exposure. These records shall remain confidential and will not be disclosed or reported, without the employee's express written consent, to any person within or outside the job site, except as required by law.

Medical records will be maintained for at least the duration of employment plus 30 years.

Included in the employee's medical record will be:

a. The employee's name and social security number.
b. A copy of the employee's hepatitis B vaccination status including the date of all the hepatitis B vaccinations and any medical records relative to the employee's ability to receive vaccination.

- If the employee has declined to receive the hepatitis B vaccination series when appropriate, this declination will be included in the person's medical records.

c. A copy of all results of examinations, medical testing, and follow-up procedures as required following an exposure incident.

d. The employer's copy of the healthcare professional's written opinion following an exposure incident.

e. A copy of all information provided to the healthcare professional following an exposure incident.

All work-related injuries from needle-sticks and cuts, lacerations, punctures and scratches from sharp objects contaminated with another person's blood or other potentially infectious materials are to be recorded on the OSHA 300 as an injury.

a. To protect the employee's privacy, the employees name may not be entered on the OSHA 300.

b. If the employee develops a bloodborne disease, the entry must be updated and recorded as an illness.

Training

All of our first aid providers must have current certificates of first aid and CPR training on file. These records will be maintained by the Plan Administrator.

Initial training, training at the introduction of a new or altered task affecting exposure to bloodborne pathogens or other potentially hazardous materials, and annual training will be provided by a person knowledgeable in the subject matter contained in this Plan.

Training will be interactive between the instructor and employee. An opportunity to ask questions will be provided. Further, this Plan as well as 29 CFR 1910.1030, *Bloodborne Pathogens*, will be readily available for review.

All training will be documented using the forms found in our **Training Information and Documentation Program.** Training documentation will be maintained for a period of three (3) years from the date on which the training occurred.

Training will include, but not be limited to, the following topics and materials:

a. A complete review of our Exposure Control Plan and its accessibility.

b. An accessible copy of 29 CFR 1910.1030 and an explanation of its contents.

c. A general explanation of the epidemiology and symptoms of bloodborne diseases.

d. An explanation of the modes of transmission of bloodborne pathogens.

e. An explanation of the appropriate methods for recognizing tasks and other activities that may involve exposure to blood and other potentially infectious materials.

f. An explanation of the use and limitations of methods that will prevent or reduce exposure including appropriate engineering controls, work practices, and personal protective equipment.

g. Information on the types, proper use, location, removal, handling, decontamination and disposal of personal protective equipment.

h. An explanation of the basis for selections of personal protective equipment.

i. Information on the hepatitis B vaccine, including information on its efficacy, safety, method of administration, benefits of being vaccinated, and that the vaccine and vaccination will be offered free of charge.

j. Information on the appropriate actions to take and persons to contact in an emergency involving blood or other potentially infectious materials.

k. An explanation of the procedure to follow if an exposure incident occurs, including the method of reporting the incident and the medical follow-up that will be made available.

l. Information on the post-exposure evaluation and follow-up that is provided after an exposure incident.

m. An explanation of the color coding required by 29 CFR 1910.1030(g)(1).

n. A request for input from employees in the identification, evaluation, and selection of effective engineering and work practice controls.

Waste Management

Waste management, if necessary, will comply with State EPA standards regarding handling, storage, and shipping of medical wastes.

Summary

The whole thrust of the exposure control plan for bloodborne pathogens & other infectious material Plan is to provide an awareness of the dangers of bloodborne pathogens, provide a means of reducing the possibility of occupational exposure, and, should occupational exposure occur, provide a means of reducing health risk.

C&S Companies

Exposure Determination Form - List I

All job classifications in which all employees have occupational exposure.

1. First Aid Providers
2.
3.
4.
5.
6.

Note: The above exposure determinations are to be made without regard to the use of personal protective equipment.

Note: The primary job assignment of our designated first aid providers is not the rendering of first aid or other medical assistance. Any first aid rendered by them is rendered only as a collateral duty, responding solely to injuries resulting from job site incidents and only at the location where the incident occurred.

C&S Companies

Exposure Determination Form - List II

Job classifications in which some employees have occupational exposure:

1. None
2.
3.
4.
5.
6.

Note: The above exposure determinations are to be made without regard to the use of personal protective equipment.

Note: The primary job assignment of our designated first aid providers is not the rendering of first aid or other medical assistance. Any first aid rendered by them is rendered only as a collateral duty, responding solely to injuries resulting from job site incidents and only at the location where the incident occurred.

C&S Companies

Exposure Determination Form - List III

All tasks and procedures or groups of closely related tasks and procedures in which occupation exposure occurs and are performed by employees in job classifications noted in List II.

	Job Classification	Tasks
1.	None	
2.		
3.		
4.		

Note: The above exposure determinations are to be made without regard to the use of personal protective equipment.

Note: The primary job assignment of our designated first aid providers is not the rendering of first aid or other medical assistance. Any first aid rendered by them is rendered only as a collateral duty, responding solely to injuries resulting from job site incidents and only at the location where the incident occurred.

Housekeeping Schedule & Checklist

SCHEDULE

Following every incident where there is a possibility of the presence of residual bloodborne pathogens or other potentially infectious materials.

CHECKLIST

Only personnel who have had training in our Exposure Control will ensure that all surfaces are decontaminated and that cleaning materials are properly disposed of. Areas to consider include, but are not limited to:

	YES	NO
FLOORS	o	o
WALLS	o	o
EQUIPMENT	o	o
PRODUCT	o	o
WASTE CONTAINERS	o	o
TOOLS	o	o

Broken, potentially infected glassware should be picked up and disposed of using mechanical means such as a brush and dust pan or forceps.

All sharps will be stored in a manner that allows easy access and safe handling.

Infectious waste will be placed in containers that are color coded red. These containers will be decontaminated as soon as practical.

Subsequent to rendering any procedures, employees will ensure that all surfaces on which blood, body fluids, bloodborne pathogens, or other infectious materials may be present are cleaned with an appropriate disinfectant.

C&S Companies

Hepatitis B Declination Form

I understand that due to my occupational exposure to blood or other potentially infectious materials I may be at risk of acquiring hepatitis B virus (HBV) infection. I have been given the opportunity to be vaccinated with hepatitis V vaccine, at no charge to myself. However, I decline hepatitis B vaccination at this time. I understand that by declining this vaccine, I continue to be at risk of acquiring hepatitis B, a serious disease. If in the future I continue to have occupational exposure to blood or other potentially infectious materials and I want to be vaccinated with hepatitis B vaccine, I can receive the vaccination series at no charge to me.

_____
(WITNESS)

_____
(EMPLOYEES SIGNATURE)

_____
(PRINTED NAME)

_____
(DATE)

C&S Companies

Sharps Injury Log

Note: A sharps injury log will be maintained for the recording of percutaneous injuries from contaminated sharps.

The information on the log will be recorded and maintained in such manner as to protect the confidentiality of the injured employee.

This sharps injury log shall be maintained for the period of five years.

_____ _____

(Incident Date) (Employee SSN)

Type and brand of device involved in the incident:

_____

Work area where the exposure incident occurred:

_____

Explanation of how the incident occurred:

_____
_____
_____
_____
_____
_____
_____
_____
_____
_____
_____
_____
_____
_____
_____

_____

Supervisor

C&S Companies

Annual Exposure Control Plan Review

This Exposure Control Plan was prepared:

At least annually, this program will be reviewed and, if necessary, updated to reflect innovations in procedures and technological developments that eliminates or reduces exposure to bloodborne pathogens.

As part of the annual review, the below will be considered:

a. Employee Input
b. Sharps Injury Log
c. Exposure Incident Reports
d. Professional Journals

Date Reviewed:	Signature:	Title:

C&S Companies

Exposure Incident Report

ALL INFORMATION ON THIS FORM IS TO REMAIN CONFIDENTIAL

This Form Shall Be Completed As Soon As Feasible After An Exposure Incident But, Under No Circumstances, After The Shift On Which The Incident Occurred.

DATE: _ TIME: _

NAME OF EMPLOYEE: _

ROUTE OF EXPOSURE: _

SOURCE INDIVIDUAL'S NAME: _

a. Above individual did / did not consent to be tested for HBV or HIV.

b. Testing was done by: _

1. Results: _

EMPLOYEE WAS OFFERED AND ACCEPTED: **NO** **YES**

a. Hepatitis Vaccination Series. [Date(s)] O O

1. If "NO", written declination was signed.

b. Post Exposure Evaluation and follow-up. (Signature)

c. Employee consents to baseline blood collection. (Signature)

Description of events leading to this exposure incident:

_____

_____

_____

_____

Corrective Measures to Prevent a Reoccurrence:

_____

_____

_____

_____

_____ _____

(Exposure Control Plan Administrator Signature) **(Employee Signature)**

Fall Protection

29 CFR 1926 Subpart M – Fall Protection

Policy Statement Compliance with 29 CFR 1926.502(d)(20)

29 CFR 1926.502(d)(20) states: "The employer shall provide for prompt rescue of employees in the event of a fall or shall assure that employees are able to rescue themselves."

Per OSHA interpretation letters [J. Nigel Ellis (May 11, 1999) & Charles Hill (August 14, 2000)], the hazard being addressed by 29 CFR 1926.502(d)(20) is being suspended by the fall arrest system after an arrested fall.

Prompt rescue is not defined, but it does imply that rescue be performed quickly – in time to prevent serious injury to the suspended worker.

As a matter of policy, under no circumstances will our employees attempt to perform a self-rescue.

The rationale for this policy is as follows:

1. Expecting a suspended employee to perform self-rescue presupposes that the employee is:
   a. Of clear mind after the fall, and
   b. In excellent physical condition, and
   c. Has not sustained any injuries from the fall arrest, and
   d. Did not have a medical event that caused the fall in the first place (fainting, for example).
2. Because our employees are not professional rescue persons, in depth self-rescue training would be required and practice self-rescue exercises performed for each possible combination of fall scenarios.
3. Specialize self-rescue equipment and training on that equipment would be required.
4. Self-rescue is not required by 29 CFR 1926.502(d)(20).

Prompt Rescue Procedures

As a matter of policy, an employee performing work requiring a personal fall arrest system **will not work alone**. He/she will be in sight of another employee using a personal fall arrest system to ensure there is not a fall event that goes unnoticed.

Prior to performing work requiring a personal fall arrest system, the Safety Program Administrator, or designated competent person, will:

1. Assess the possible fall scenarios
2. Take inventory of in-house equipment that is readily available for possible rescue (ladders, mobile scaffold, etc.)
3. Be prepared to implement a plan of action utilizing our in-house equipment

should a fall occur

4. Call an emergency rescue service and give them:
    a. Our exact location.
    b. A quick synopsis of what happened.
    c. The height of the suspended person.
    d. Known or suspected injuries.

Overview

One of the most serious hazards faced by our employees is falls from heights. Our Fall Protection Program has been developed to prevent injury from falls of six (6) feet or more from a walking/working surface to a lower level, to prevent objects falling from above and striking persons below, and to prevent job site persons from falling into holes.

Within the context of this program, the term "fall hazard" does not refer to tripping and falling, which is addressed in our general safety & health program, nor does it apply to falling off a ladder or scaffold. Scaffold and ladder safety is addressed within its own program.

A copy of our Fall Protection **Program** can be found readily accessible to our employees on appropriate job sites.

A copy of our Fall Protection **Plan** will be found on every applicable job site.

On all job sites where fall hazards exist, there will be at least one competent person who has the training and ability to identify fall hazards and the authority to ensure that proper fall protection systems are properly implemented.

The following areas of concern are addressed by this Program:

a. The need to know where fall protection is required.
b. Selection of fall protection systems which are appropriate for given situations.
c. Construction and installation of safety systems.
d. Supervision of employees.
e. Implementation of safe work procedures.
f. Training in selection, use, and maintenance of fall protection systems.

Our Fall Protection Program may be reviewed at any time by our employees. Should a question arise concerning this Program, personnel are encouraged to consult with their supervisor or our Fall Protection Program Administrator.

Duties of the Program Administrator

The Fall Protection Program Administrator's duties include:

a. Training of personnel.
b. Maintenance of training records.
c. Random, unannounced job site inspections to assure compliance with both OSHA standards and company safety policies.
d. Resolution of specific problems that may present themselves regarding a particular job site situation.
e. Designating a competent (by training or experience) person at each applicable

job site who will ensure:

1. A copy of our fall protection program/plan is readily accessible on appropriate job sites.
2. Subcontractors with whom we may work are appropriately trained in fall protection.
3. A written certification record has been prepared documenting that employees who have potential exposure to fall hazards at the job site have received the required training in protection.
4. The fall protection system(s) utilized at the job site are appropriate for the hazard(s) present.
5. That, before any work is initiated, the walking/working surfaces at the job site are capable of supporting both our personnel and equipment.

The Fall Protection Program Administrator will be familiar with all applicable standards and will keep up-to-date of developments in the field of fall protection.

Pre-Project Planning

Fall protection requires a joint effort by our personnel, and the specialty subcontractors who may be working with us, to identify work situations in which fall hazards exist, determine the most appropriate fall protection system to be utilized, and to ensure that all persons understand the proper methods of utilizing the selected fall protection systems. A pre-construction survey by a competent person will often provide the information needed to make these determinations.

Fall protection system requirements may change during a project and the competent person on site will ensure that fall protection is maintained at all times. Care will be taken to assure that load limits are not exceeded on walking/working surfaces and attachment points and hardware is capable of withstanding (with the appropriate safety factor) the potential forces that may be generated during an actual fall incident.

Fall protection hardware and equipment owned, rented, or leased will be NIOSH/ANSI approved and it is assumed that the manufacturer's technical specifications and capabilities are accurate.

From the very inception of a potential project (pre-bid) to completion, fall protection needs and costs will be factored in.

Definitions

There are a number of terms and phrases, not common in everyday life, which must be understood. For those employees directly involved with this Program or affected by it, there are specific requirements and procedures which would be meaningless without an understanding of the "language" of our Fall Protection Program.

Note: Words used within the definitions which are themselves defined are printed in bold italic.

ANCHORAGE: a secure point of attachment for ***lifelines***, ***lanyards*** or ***deceleration devices***.

BODY HARNESS: straps which may be secured about the employee in a manner that will distribute the fall arrest over at least the thighs, pelvis, waist, chest, and shoulders with means for attaching it to other components of a ***personal fall arrest system***.

BUCKLE: any device for holding the ***body harness*** closed around the employee's body.

CARABINER: an oval metal ring with a snap link used to fasten a rope to the piton [a spike (attachment) with an eye to which a rope can be secured.]

CFR: Code of Federal Regulations.

COMPETENT PERSON: one who is capable of identifying existing and predictable hazards in the surroundings or working conditions which are unsanitary, hazardous, or dangerous to employees; and who has authorization to take prompt corrective measures to eliminate them.

CONNECTOR: a device which is used to couple (connect) parts of the ***personal fall arrest system*** and ***positioning device systems*** together. It may be an independent component of the system, such as a ***carabineer***, or it may be an integral component of part of the system (such as a ***buckle*** or d-ring sewn into a self-retracting ***lanyard***).

CONTROLLED ACCESS ZONE (CAZ): an area in which certain work (e.g., ***overhand bricklaying***) may take place without the use of ***guardrail systems***, ***personal fall arrest systems***, or safety net systems; access to the zone is controlled.

DANGEROUS EQUIPMENT: equipment (such as pickling or galvanizing tanks, degreasing units, machinery, electrical equipment, and other units) which, as a result of form or function, may be hazardous to employees who fall onto or into such equipment.

DECELERATION DEVICE: any mechanism, such as a ***rope grab***, rip- stitch ***lanyard***, specially-woven ***lanyard***, tearing or deforming ***lanyards***, automatic self-retracting ***lifelines***/***lanyards***, etc., which serves to dissipate a substantial amount of energy during a fall arrest, or otherwise limit the energy imposed on an employee during fall arrest.

DECELERATION DISTANCE: the additional vertical distance a falling employee travels from the point at which the ***deceleration device*** begins to operate before stopping, excluding ***lifeline*** elongation and ***free fall distance***. It is measured as the distance between the location of an employee's ***body harness*** attachment point at the moment of activation (at the onset of fall arrest forces) of the ***deceleration device*** during a fall, and the location of that attachment point after the employee comes to a full stop.

EQUIVALENT: alternative designs, materials, or methods to protect against a hazard which the employer can demonstrate will provide an equal or greater degree of safety for employees than the methods, materials or designs specified in the standard.

FAILURE: load refusal, breakage, or separation of component parts. Load refusal is the point where the ultimate strength is exceeded.

FREE FALL: the act of falling before a ***personal fall arrest system*** begins to apply force to arrest the fall.

FREE FALL DISTANCE: the vertical displacement of the fall arrest attachment point on the employee's ***body harness*** between onset of the fall and just before the system begins to apply force to arrest the fall. This distance excludes ***deceleration distance***, and ***lifeline***/***lanyard*** elongation, but includes any ***deceleration device*** slide distance of ***self-retracting lifeline/lanyard*** extension before they operate and fall arrest forces occur.

GUARDRAIL SYSTEM: a barrier erected to prevent employees from falling to ***lower levels***.

HOLE: a gap or void 2 inches (5.1 cm) or more in its least dimension, in a floor, ***roof***, or

other ***walking/working surface***.

INFEASIBLE: it is impossible to perform the construction work using a conventional fall protection system (i.e., ***guardrail system***, safety net system, or ***personal fall arrest system***) or that it is technologically impossible to use any one of these systems to provide fall protection.

LANYARD: a flexible line of rope, wire rope, or strap which generally has a ***connector*** at each end for connecting the ***body harness*** to a ***deceleration device***, ***lifeline***, or ***anchorage***.

LEADING EDGE: the edge of a floor, ***roof***, or formwork for a floor or other ***walking/working surface*** (such as the deck) which changes location as additional floor, ***roof***, decking, or formwork sections are placed, formed, or constructed. A leading edge is considered to be an "unprotected side and edge" during periods when it is not actively and continuously under construction.

LIFELINE: a component consisting of a flexible line for connection to an ***anchorage*** at one end to hang vertically (vertical lifeline), or for connection to ***anchorages*** at both ends to stretch horizontally (horizontal lifeline), and which serves as a means for connecting other components of ***personal fall arrest system*** to the ***anchorage*****.**

LOW-SLOPE ROOF: a ***roof*** having a slope less than or equal to 4 in 12 (vertical to horizontal).

LOWER-LEVELS: those areas or surfaces to which an employee can fall. Such areas or surfaces to include, but are not limited to, ground levels, floors, platforms, ramps, runways, excavations, pits, tanks, material, water, equipment, structures, or portions thereof.

MECHANICAL EQUIPMENT: all motor or human propelled wheeled equipment used for ***roofing work***, except wheelbarrows and mop carts.

OPENING: a gap or void 30 inches or more high and 18 inches or more wide, in a wall or partition through which employees can fall to a ***lower level***.

OVERHAND BRICKLAYING AND RELATED WORK: the process of laying bricks and masonry units such that the surface of the wall to be jointed is on the opposite side of the wall from the mason, requiring the mason to lean over the wall to complete the work. Related work includes mason tending and electrical installation incorporated into the brick wall during the overhand bricklaying process.

PERSONAL FALL ARREST SYSTEM: a system used to arrest an employee in a fall from a working level. It consists of an ***anchorage***, ***connectors***, a ***body harness,*** and may include a ***lanyard***, ***deceleration device***, ***lifeline***, or suitable combination of these. **The use of body belts for fall arrest is prohibited.**

POSITIONING DEVICE SYSTEM: a *body belt* or ***body harness*** system rigged to allow an employee to be supported on an elevated vertical surface, such as a wall, and work with both hands free while leaning.

QUALIFIED PERSON: one who, by possession of a recognized degree, certificate, or professional standing, or who by extensive knowledge, training, and experience, has successfully demonstrated his ability to solve or resolve problems relating to the subject matter, the work, or the project.

ROPE GRAB: a ***deceleration device*** which travels on a ***lifeline*** and automatically, by friction, engages the ***lifeline*** and locks so as to arrest the fall of an employee. A rope grab usually employs the principle of inertial locking, cam/level locking, or both.

ROOF: the exterior surface on the top of a building. This does not include floors or

formworks which, because a building has not been completed, temporarily become the top surface of a building.

ROOFING WORK: the hoisting, storage, application, and removal of roofing materials and equipment, including related insulation, sheet metal, and vapor barrier work, but not including the construction of the ***roof*** deck.

SAFETY-MONITORING SYSTEM: a safety system in which a competent person is responsible for recognizing and warning employees of fall hazards.

SELF-RETRACTING LIFELINE/LANYARD: a ***deceleration device*** containing a drum-wound line which can be slowly extracted from, or retracted onto, the drum under slight tension during normal employee movement, and which, after onset of a fall, automatically locks the drum and arrests the fall.

SNAPHOOK: a ***connector*** comprised of a hook-shaped member with a normally closed keeper of similar arrangement which may be opened to permit the hook to receive an object and, when released, automatically closes to retain the object. Snaphooks are generally one of two types:

(1) The locking type with a self-closing, self-locking keeper which remains closed and locked until unlocked and pressed open for connection or disconnection; or

(2) The non-locking type with a self-closing keeper which remains closed until pressed open for connection or disconnection. The use of a non-locking snaphook as part of ***personal fall arrest systems*** and ***positioning device systems*** is prohibited.

STEEP ROOF: a ***roof*** having a slope greater than 4 in 12 (vertical to horizontal).

TOEBOARDS: a low protective barrier that will prevent the fall of material and equipment to ***lower levels*** and provide protection from falls for personnel.

UNPROTECTED SIDES AND EDGES: any side or edge (except at entrances to points of access) of a ***walking/working surface***, e.g., floor, ***roof***, ramp, or runway where there is no wall or ***guardrail system*** at least 39 inches high.

WALKING/WORKING SURFACE: any surface, whether horizontal or vertical, on which an employee walks or works, including, but not limited to, floors, roofs, ramps, bridges, runway, formwork and concrete reinforcing steel; not including ladders, vehicles, or trailers on which employees must be located in order to perform their job duties.

WARNING LINE SYSTEM: a barrier erected on a ***roof*** to warn employees that they are approaching an unprotected ***roof*** side or edge, and which designates an area in which ***roofing work*** may take place **without** the use of a guardrail, ***body belt***, or safety net systems to protect employees in the area.

WORK AREA: that portion of a ***walking/working surface*** where job duties are being performed.

Where Fall Protection is Required

The "key" distance is six (6) feet. All employees must be aware that if there is a possibility of falling six (6) feet or more at least one (1) fall protection system will be implemented. Further, protection from being struck by falling objects from above will be provided on all job sites.

All areas identified by OSHA are included because, over time, most of these areas will

present themselves on job sites even if the exposures are the result of another contractor's work.

Below listed are specific situations where fall protection systems will be utilized.

Unprotected Sides and Edges

Each employee on a walking/working surface (horizontal and vertical surface) with an unprotected side or edge, which is 6 feet or more above a lower level, shall be protected from falling by the use of guardrail systems, safety net systems, or personal fall arrest systems.

Leading Edges

Each employee who is constructing a leading edge 6 feet or more above lower levels shall be protected from falling by guardrail systems, safety net systems, or personal fall arrest systems.

Hoist Areas

Each employee in a hoist area shall be protected from falling 6 feet or more to lower levels by guardrail systems or personal fall arrest systems.

If a guardrail system is utilized in a hoist area and portions of the system are removed to facilitate the hoisting operation, and an employee must lean through the access opening or out over the edge of the access opening, that employee must be protected by a fall arrest system.

Holes

Each employee on walking/working surfaces shall be protected from falling through holes (including skylights) more than 6 feet above lower levels by personal fall arrest systems, covers, or guardrail systems.

a. Each employee on a walking/working surface shall be protected from tripping in or stepping into or through holes (including skylights) **(regardless of height)** by covers.
b. Each employee on a walking/working surface shall be protected from objects falling through holes **(regardless of height)** by covers.

Formwork and Reinforcing Steel

Each employee on the face of formwork or reinforcing steel shall be protected from falling 6 feet or more to lower levels by personal fall arrest systems, safety net systems, or positioning device systems.

Ramps, Runways, and Other Walkways

Each employee on ramps, runways, and other walkways shall be protected from falling 6 feet or more to lower levels by guardrail systems.

Excavations

Each employee at the edge of an excavation 6 feet or more in depth shall be protected from falling by guardrail systems, fences, or barricades when the excavations are not readily seen because of plant growth or other visual barriers.

Further, each employee at the edge of a well, pit, shaft, and similar excavation 6 feet or more in depth shall be protected from falling by guardrail systems, fences, barricades, or covers.

Dangerous Equipment

Each employee **less than 6 feet** above dangerous equipment shall be protected from falling into or onto the dangerous equipment by guardrail systems or by equipment guards.

Each employee **6 feet or more** above dangerous equipment shall be protected from fall hazards by guardrail systems, personal fall arrest systems, or safety net systems.

Overhand Bricklaying and Related Work

Each employee performing overhand bricklaying and related work 6 feet or more above lower levels shall be protected from falling by guardrail systems, safety net systems, personal fall arrest systems, or shall work in a controlled access zone.

Each employee performing overhand bricklaying and related work who is required to reach more than 10 inches below the level of the walking/working surface on which he/she is working shall be protected from falling by a guardrail system, safety net system, or personal fall arrest system.

Roofing Work On Low-Sloped Roofs

Each employee engaged in roofing activities on low-sloped roofs with unprotected sides and edges 6 feet or more above lower levels shall be protected from falling by guardrail systems, safety net systems, personal fall arrest systems or a combination of a warning line system and a safety net system or a warning line system and a safety monitoring system.

NOTE: On roofs 50 feet or less in width, the use of a safety monitoring system alone (without the warning line system) is permitted.

Steep Roofs

Each employee on a steep roof with unprotected sides and edges 6 feet or more above lower levels shall be protected from falling by guardrail systems with toeboards, safety net systems, or personal fall arrest systems.

Precast Concrete Erection

Each employee, engaged in the erection of precast concrete members (including, but not limited to the erection of wall panels, columns, beams, and floor and roof "tee") and related operations such as grouting of precast concrete members, who is 6 feet or more above lower levels shall be protected from falling by guardrail systems, safety net systems, or personal fall arrest systems.

Residential Construction

Each employee engaged in residential construction activities 6 feet or more above lower

levels shall be protected by guardrail systems, safety net systems, or personal fall arrest systems.

Wall Openings

Each employee working on, at, above, or near wall openings (including those with chutes attached) where the outside bottom edge of the wall opening is 6 feet or more above lower levels and the inside bottom edge of the wall opening is less than 39 inches above the walking/working surface, shall be protected from falling by the use of a guardrail system, a safety net system, or a personal fall arrest system.

Walking/Working Surfaces Not Otherwise Addressed

Each employee on a walking/working surface 6 feet or more above a lower level that is not addressed in the preceding categories shall be protected from falling by a guardrail system, a safety net system, or a personal fall arrest system except when:

a. Working on scaffolds, fall protection requirements are covered by 29 CFR 1926 Subpart L.

b. Working on certain cranes and derricks, fall protection requirements are covered by 29 CFR 1926 Subpart N.

c. Performing steel erection work in buildings, fall protection requirements are covered by 29 CFR 1926 Subpart R.

d. Working on certain types of equipment used in tunneling operations, fall protection requirements are covered by 29 CFR 1926 Subpart S.

e. Engaged in the construction of electric transmission and distribution lines, equipment fall protection requirements are covered by 29 CFR 1926 Subpart V.

f. Working on stairways and ladders fall protection requirements are covered by 29 CFR 1926 Subpart X.

Note: On multi-employer work sites, employees of all contractors and subcontractors must understand the fall protection hazards that exist and be aware of the various methods of fall protection even if they are NOT directly exposed to fall hazards in their particular work area. For example, a contractor may have a controlled access zone in place and all persons on the job site, regardless of their employer, must understand the importance of remaining outside that CAZ.

Pre-Construction Survey

Prior to the initiation of any construction project, the job site will be surveyed by a competent/qualified person to determine:

a. If fall protection systems will be required.

b. If fall hazards exist, the types of conventional fall protection systems to be utilized.

   1. Particular attention will be given to anchorage points, location of warning lines, etc.

c. Rescue procedures to be used if a fall actually occurs.
d. The load-carrying capabilities of the walking/working surface.
e. Assuring that all personnel utilizing a fall protection system have training in that system.

This survey may be made without the use of fall protection because no work will be accomplished during this survey and installing fall protection systems would create a greater hazard.

If it is determined that certain areas within the overall worksite have fall hazards that cannot be addressed with conventional fall protection systems (those areas being limited to leading edge work, residential construction work, and precast concrete work), **then** a Fall Protection Plan must be prepared to specifically protect employees from these hazards.

Fall Protection Systems

Guardrail System

A guardrail system is a physical barrier erected to prevent employees from falling to lower levels.

Specific guardrail systems criteria are found in 29 CFR 1926.502(b) and we will erect guardrail systems that comply with the cited criteria.

The main advantage of a guardrail system is that it is a "passive" system which, once installed, requires no employee involvement in its function. A guardrail will stop an employee who inadvertently walks into it.

A guardrail system is an acceptable fall protection system in each of the OSHA designated work areas, except one: "Formwork and Reinforcing Steel."

Guardrail Systems At Hoisting Areas

When guardrail systems are used at hoisting areas, a chain, gate or removable guardrail section shall be placed across the access opening between the guardrail sections when hoisting operations are not taking place.

Note: If a portion of the guardrail system is removed at a hoisting area to facilitate the hoisting operations and an employee must lean out over the opening, then that employee must be protected by a personal fall arrest system. In this instance it is important to remember that the personal fall arrest system may not be attached to the guardrail system.

Guardrail Systems At Holes

Guardrail systems used at holes shall be erected on all unprotected sides of the edges of the hole.

When the hole is to be used for the passage of materials, the hole shall not have more than two sides provided with removable guardrail sections to allow the passage of materials. When the hole is not in use, it shall be closed over with a cover **or** protected with a guardrail system on all unprotected sides or edges.

Note: Guardrails need not be erected around holes while employees are working at the hole, passing materials through the hole, etc. When work is completed around the hole, the hole must be protected by guardrails on all sides of the hole or by covers.

Guardrail systems used around holes which are used as points of access (such as ladder ways) will be provided with a gate or be offset so that a person cannot walk directly into the hole.

Guardrail Systems on Ramps and Runways

Guardrail systems used on ramps and runways shall be erected along each unprotected side or edge. Ramps, runways, and other walkways on which employees need protection from falling 6 feet or more to a lower level must be protected by a guardrail system and only a guardrail system.

Personal Fall Arrest System

A personal fall arrest system is, as the name implies, a means of safely decelerating a falling body before a lower level is hit. The three (3) main components of a personal fall arrest system are the:

a. Anchorage point
b. Lanyard
c. Body harness

Note: Body belts <u>will not</u> be used in a personal fall arrest system.

Specific personal fall arrest systems criteria are found in 29 CFR 1926.502(d) and we will use personal fall arrest systems that comply with the cited criteria.

The tie-off attachment point must be at or above the connection point on the harness to prevent additional free fall distance.

As are guardrails, personal fall arrest systems are “passive” and require no employee involvement once they are properly rigged.

For all practical purposes, d-rings and locking type snaphooks shall have a minimum tensile strength of 5,000 pounds and lanyards and vertical lifelines shall have a minimum breaking strength of 5,000 pounds.
Anchorages must be capable of supporting 5,000 per employee.

Anchorages used in personal fall arrest systems must be independent of any anchorage being used to support or suspend platforms.

Note: Knots in a rope lanyard or lifeline can reduce its strength by as much as 50% and having a lanyard go over or around sharp edges can completely destroy its effectiveness.

With the exception that harnesses and components may be used as positioning device systems, personal fall arrest system components may not be used for purposes other than that for which they were designed.

Positioning device system components shall be inspected prior to each use for wear, damage, and other deterioration and defective components shall be removed from service.

Should a personal fall arrest system actually be used to stop a fall, it will be removed from service and not used again until inspected and determined to be undamaged and suitable for reuse by a competent person.

Safety Net System

Specific safety net systems criteria are found in 29 CFR 1926.502(c).

Safety nets will be installed as close as practical under the walking/ working surface on which employees are working and in no case shall they be more than 30 feet below such level.

Safety nets shall be inspected at least once per week and after an occurrence which could affect the integrity of the system. Defective nets will not be used.

All items that have fallen in a safety net will be removed as soon as possible and at least before the next work shift.

Safety nets will be drop-tested at the job site after initial installation and before being used as a fall protection system, whenever relocated, after major repair, and at six-month intervals if left in one place.

Note: If it is demonstrably unreasonable to perform a drop-test, a designated competent person shall prepare a certification in accordance with 29 CFR 1926.502(c) (4)ii.

Warning Line System

A warning line system is a barrier erected 6 feet from the roof to warn employees that they are approaching an unprotected roof side or edge, and which designates an area in which roofing work may take place without the use of guardrail, body harness, or safety net systems to protect employees in the area.

A warning line system is to be used only during roofing work on low-sloped roofs over 50-feet in width with unprotected sides and edges 6-feet or more above lower levels (on a simple rectangular roof, width is the lesser of the two primary overall dimensions. This is also the case with roofs which are sloped toward or away from the roof center). Most importantly, warning line systems must be used in conjunction with either a guardrail system, a safety net system, a personal fall arrest system, or a safety monitoring system.

Note: In the above scenario, either a guardrail system, a safety net system, or a personal fall arrest system alone provides adequate fall protection.

Specific warning line systems criteria are found in 29 CFR 1926.502(f) and we will use warning line systems that comply with the cited criteria.

As a general rule, warning line systems will be used in conjunction with a safety monitoring system.

A warning line made of ropes, wires, chains, and supporting stanchions will be flagged at no more than 6-feet intervals with high-visibility material. As the name implies, this line will only “warn” employees that they are approaching an unprotected side or edge. The horizontal resisting force of a warning line is 16 pounds versus 200 pounds for a guardrail system.

No personnel are allowed in the area between a roof edge and a warning line unless they are performing roofing work in that area.

Mechanical equipment on roofs shall only be used in areas that are protected by either a

warning line system, a guardrail system, or a personal fall arrest system.

The warning line shall be erected around all sides of the roof work area not less than 6-feet from the roof edge unless mechanical equipment is being used. In that case, the warning line shall be erected not less than 6-feet from the roof edge which parallels the mechanical operation and not less than 10 feet from the roof edge which is perpendicular to the direction of the mechanical operation.

Points of access, material handling areas, storage areas, and hoisting areas shall be connected to the work area by an access path formed by two warning lines. When the aforementioned areas are not in use, the warning line will be adjusted to completely seal off the work area so that a person cannot inadvertently enter the area.

Safety Monitoring System

Specific safety monitoring systems criteria are found in 29 CFR 1926.502(h) and we will use safety monitoring systems that comply with the cited criteria.

A safety monitoring system used in conjunction with a warning line system is not considered a "passive system" because it takes active employee involvement and, as such, both the Safety Monitor and the employee(s) being monitored must be alert for fall hazards.

A competent person will perform the duties of Safety Monitor. These duties include:

a. Recognizing fall hazards,
b. Warning the employee when it appears the employee is unaware of a fall hazard or is acting in an unsafe manner,
c. Remaining on the same walking/working surface and within visual sighting of the employee being monitored, and
d. Remaining close enough to communicate orally with the employee being monitored.

The Safety Monitor shall have no other responsibilities which could take the monitor's attention from the monitoring function.

Only the employee engaged in roofing work on low-sloped roofs or an employee covered by a fall protection plan [29 CFR 1926.502(k)] is allowed in the area being protected by the Safety Monitor.

When a safety monitoring system is being used, mechanical equipment will not be used or stored in that controlled zone.

Of course, the employee being monitored is required to comply promptly with the fall hazard warnings from the Safety Monitor.

Positioning Device System

A positioning device system consists of a body belt or body harness system rigged to allow an employee to be supported on an elevated vertical surface, such as a wall, and work with both hands free while leaning. It is used during formwork and steel reinforcing.

Specific positioning device systems criteria are found in 29 CFR 1926.502(e) and we will

use positioning device systems that comply with the cited criteria.

Positioning device systems must be inspected prior to each use for wear, damage, and other deterioration. Defective components must be removed from service. Components of positioning device systems must never be used for purposes other than that for which they were designed -- specifically fall protection and/or positioning on a vertical surface.

Controlled Access Zone (CAZ)

A controlled access zone is an area in which certain work activity may take place without the use of guardrail systems, personal fall arrest systems, or safety net systems and access to the zone is controlled.

Specific controlled access zone criteria are found in 29 CFR 1926.502(g). A controlled access zone will be created when appropriate.

Controlled access zones will only be used as part of a fall protection plan (reference 29 CFR 1926.502(k) and Fall Protection Plan, below) or when an employee is performing overhand bricklaying and related work. Persons performing overhand bricklaying or related work that requires reaching more than 10 inches below the walking/working surface may not be afforded fall protection by working in a controlled access zone.

Controlled access zones are work areas that have limited access to only authorized personnel by means of control lines or other means that restrict access.

Covers

Covers can prevent an employee from stepping into a hole, tripping over a hole, falling through a hole, or being injured by objects falling through a hole.

Note: When work is completed around a hole, the hole must be protected by guardrails on all sides of the hole or by covers.

Specific cover criteria are found in 29 CFR 1926.502(i) and we will use covers that comply with the cited criteria.

Covers must be capable of supporting, without failure, twice the weight of the employees, equipment, and/or materials that may be imposed upon them.

Covers, when used, must be secured to prevent accidental displacement by wind, equipment, or employees.

All covers must be color coded or marked with the word: "HOLE" or "COVER" to identify the hazard.

Note: The above does not apply to cast iron manhole covers or roadway steel grates.

Covers, and only covers, will be used on walking/working surfaces to protect employees from tripping or stepping into or through a hole (including skylights). This provision is **regardless of the height** of the hole above a lower surface.

Covers, and only covers, will be used to protect employees from objects falling through holes (including skylights). This provision is **regardless of the height** of the hole above a lower surface.

Protection From Falling Objects

Specific protection from falling objects criteria are found in 29 CFR 1926.502(j) and we will use that criteria to protect our employees from falling objects.

Covers are to be used to protect employees from objects falling through holes (including skylights) from upper surfaces regardless of heights.

Toeboards, used to prevent objects from falling on employees on a lower level must be at least 3½ inches high with not more than a ¼ inch clearance between the toeboard and the walking/working surface. When tools, materials, or equipment are piled higher than the top edge of the toeboard, paneling or screening will be erected from the top of the toeboard to the appropriate mid or top rail of the guardrail system to provide adequate protection to employees below.

Fall Protection Plan

The foregoing Fall Protection Program is not a Fall Protection Plan per se. However, implementing the preceding guidelines for conventional fall protection systems coupled with certified formal and hands-on training will provide appropriate fall protection for our employees.

There may be occasions where conventional fall protection systems just will not work. OSHA has determined that these occasions will be limited to:

a. Leading edge work

Note: Leading edge work involves construction which moves the location of the edge forward (backward). Working at the edge of a walking/working surface (such as a roof) is not leading edge work - it is (roofing) work at an unprotected side or edge.

b. Precast concrete construction work

c. Residential construction work

The criteria for determination that conventional fall protection systems are infeasible are:

1) it is impossible to perform construction work using conventional fall protection systems, or

2) it is technologically impossible to use conventional fall protection systems. Inconvenience and cost are not acceptable considerations.

Specific Fall Protection Plan criteria are found in 29 CFR 1926.502(k) and, if necessary, a Fall Protection Plan will be completed that complies with the cited criteria.

Fall Protection Plans must be prepared by a qualified person and developed specifically for the site where the work is to be performed. All changes to the Plan must be approved by a qualified person.

Note: A qualified person is one who, by possession of a recognized degree, certificate, or professional standing, or who by extensive knowledge, training, and experience, has successfully demonstrated his ability to solve or resolve problems relating to the subject matter, the work, or the project. OSHA has indicated that an employer may use the services of more than one qualified person to comply with these requirements as long as (1) those persons, collectively, are qualified to prepare the fall protection plan and approve any changes; and (2) the resulting plan complies with the applicable requirements of the standards.

Fall Protection Plans must be maintained at the job site and be up to date.

The implementation of the fall protection plan must be under the supervision of a competent person.

A Fall Protection Plan must document reasons why conventional fall protection systems are infeasible and/or offer a detailed explanation why conventional fall protection systems create a greater hazard in their use than non-use.

All measures taken to reduce or eliminate fall hazards (in lieu of conventional fall protection systems) such as the use of ladders or scaffolds shall be discussed.

In each area where a conventional fall protection system cannot be used, a safety monitoring system must be utilized that conforms to the requirements of 29 CFR 1926(h).

Either the names of the employees or some other means of employee identification (such as armbands or color coded hard hats) will be used to control access to the controlled access zone.

In the event an employee falls or a serious incident occurs, the circumstances will be investigated and changes to the Fall Protection Plan will be made to prevent a reoccurrence of a similar incident.

After completion of all work, and after all fall protection systems have been removed, a competent/qualified person may survey the work areas for inspection purposes without the use of fall protection systems. Care will be taken to assure solid footing and focused attention to potential fall hazards.

There are only two (2) instances where employees may be exposed to fall hazards without the use of fall protection systems. Those times are: pre- construction activities (inspecting, investigating, or assessing the job site) and post-construction activities. During these times, no actual construction work may take place.

Accidents and Near Accidents

Accidents and near accidents involving fall hazards will be investigated by the Fall Protection Program Administrator to determine the cause of the incident and a method of preventing a reoccurrence. Questions to be considered are:

a. Was the fall protection system selected appropriate for the hazard?
b. Was the system properly installed?
c. Was the person involved in the accident following proper procedures?
d. Were there contributing factors such as ice, wind, debris, etc.?
e. Is retraining or a change of the Fall Protection Plan required?

Training/Retraining

Training, which must be certified, will include the following topics:

a. The nature of fall hazards in the work area.
b. The correct procedures for erecting, maintaining, disassembling, and inspecting the fall protection to be used.

c. The use and operation of guardrail systems, personal fall arrest systems, safety net systems' warning line systems, safety monitoring systems' controlled access zones, and other protection to be used.
d. The limitations on the use of mechanical equipment during the performance of roofing work on low-sloped roofs.
e. The correct procedures for handling and storage of equipment and materials and the erection of overhead protection.
f. The role of employees in fall protection plans.

Training will be conducted by competent person(s) using the below listed items as resource materials:

a. This Fall Protection Program.
b. The manufacturer's instruction manuals that come with fall protection equipment.
c. OSHA standards pertaining to fall protection which are included in 29 CFR 1926 Subpart M.
d. The competent person's work experiences.

Should the competent person, a supervisor, or the Program Administrator suspect that an employee lacks the skills needed for proper fall protection, that employee will be retrained.

Changes in the job site, types of fall protection systems, and equipment will also necessitate retraining.

Only the latest Training Certificate will be kept on file.

Fall Protection at the Job Site

A quick glance through this Fall Protection Program may leave the reader with the impression that fall protection requires an inordinate amount of attention to small details which, in practice, would render the fall protection provisions of 29 CFR 1926 Subpart M unworkable in real work situations.

The opposite is true. OSHA has gone to great lengths to make subpart M user friendly by incorporating performance-oriented criteria (as opposed to specification-oriented criteria) into their standards. Following a hazard assessment, we will select the most advantageous fall protection system that is compatible with our task needs and our protection requirements.

Lastly, while time, equipment, training, and money are devoted to fall protection systems which either physically prevent persons from falling from height, control the rate of deceleration during an actual fall, prevent objects from falling onto persons below, or warn personnel of restricted areas, we must never forget that it is important not to fall in the first place.

Accidents are more likely to occur as we become "adjusted" to working at height. Most slips, trips and falls are preventable. Proper footwear, wearing hard hats when there is a possibility of falling objects, cleaning up of debris, and paying attention to footing, hand holds, and edges is as important as the fall protection systems themselves.

Residential Construction

Significant Changes from the Enhanced Enforcement Program (EEP)

This Instruction **cancels** OSHA Instruction STD 03-00-001, dated June 18, 1999, the Agency's interim enforcement policy on fall protection for specified residential construction activities, and replaces it with new compliance guidance.

Employers engaged in residential construction who wish to use alternative fall protection measures **must meet the requirements in 29 CFR 1926.501(b)(13) and 29 CFR 1926.502(k).**

Fall protection plans used to comply with 29 CFR 1926.501(b)(13) and 29 CFR 1926.502(k) must be documented and site-specific.

This instruction interprets "residential construction" for purposes of 29 CFR 1926.501(b)(13) to include two elements: (1) a residence requirement; and (2) a wood frame construction requirement.

ENFORCEMENT DATE: June 16, 2011

29 CFR 1926.501(b)(13)

Each employee engaged in residential construction activities 6 feet (1.8 m) or more above lower levels shall be protected by guardrail systems, safety net system, or personal fall arrest system unless another provision in paragraph (b) of this section provides for an alternative fall protection measure. Exception: When the employer can demonstrate that it is infeasible or creates a greater hazard to use these systems, the employer shall develop and implement a fall protection plan which meets the requirements of paragraph (k) of 1926.502.

> **Note: There is a presumption that it is feasible and will not create a greater hazard to implement at least one of the above-listed fall protection systems. Accordingly, the employer has the burden of establishing that it is appropriate to implement a fall protection plan which complies with 1926.502(k) for a particular job site situation, in lieu of implementing any of those systems.**

29 CFR 1926.502(k)

"Fall protection plan". This option is available only to employees engaged in leading edge work, precast concrete erection work, or residential construction work (See 29 CFR 1926.501(b)(2), (b)(12), and (b)(13)), who can demonstrate that it is infeasible or it creates a greater hazard to use conventional fall protection equipment. The fall protection plan must conform to the following provisions.

(1) The fall protection plan shall be prepared by a qualified person and developed specifically for the site where the leading edge work, precast concrete work, or residential construction work is being performed and the plan must be maintained up to date.

(2) Any changes to the fall protection plan shall be approved by a qualified person.

(3) A copy of the fall protection plan with all approved changes shall be maintained at the job site.

(4) The implementation of the fall protection plan shall be under the supervision of a

competent person.

(5) The fall protection plan shall document the reasons why the use of conventional fall protection systems (guardrail systems, personal fall arrest systems, or safety nets systems) are infeasible, or why their use would create a greater hazard.

(6) The fall protection plan shall include a written discussion of other measures that will be taken to reduce or eliminate the fall hazard for workers who cannot be provided with protection from the conventional fall protection systems. For example, the employer shall discuss the extent to which scaffolds, ladders, or vehicle mounted work platforms can be used to provide a safer working surface and thereby reduce the hazard of falling.

(7) The fall protection plan shall identify each location where conventional fall protection methods cannot be used. These locations shall then be classified as controlled access zones and the employer must comply with the criteria in 29 CFR 1926.502(g) of this section.

(8) Where no other alternative measure has been implemented, the employer shall implement a safety monitoring system in conformance with 29 CFR 1926.502(h).

(9) The fall protection plan must include a statement which provides the name or other method of identification for each employee who is designated to work in controlled access zones. No other employees may enter controlled access zones.

(10) In the event an employee falls, or some other related, serious incident occurs, (e.g., a near miss) the employer shall investigate the circumstances of the fall or other incident to determine if the fall protection plan needs to be changed (e.g. new practices, procedures, or training) and shall implement those changes to prevent similar types of falls or incidents.

C&S Companies

Fall Protection Plan

(Required when standard fall protection systems are not feasible)

With changes:

(If no changes, enter "None")

This Fall Protection Plan is specific for the following project: Project

Name:

Location of Job:

Date Plan Prepared:

Date Plan Modified:

Date Plan Modified:

Plan Approved by:

POLICY STATEMENT

Our Fall Protection Program has been developed to protect our employees from the easily identifiable danger associated with working at height: falling. While the general concept of Fall Protection is straight forward, those employees to whom this Program applies must have specific training applicable to their individual jobs. It is recognized that the nature of fall hazards may vary from project to project and even change during a specific project. Training will be on-going to reflect the various existing work situations.

Fall Protection Plan will be found on every applicable Job Site.

FALL PROTECTION SYSTEMS TO BE USED ON THIS JOB

All employees on this job/project will be protected from fall hazards by the use of one or more conventional fall protection systems. These systems include guardrail systems, safety net systems, personal fall arrest systems, positioning device systems, warning line systems, controlled access zones, safety monitoring systems, covers, and protection from falling objects.

Further, the conventional fall protection system used in each required circumstance will be in compliance with 29 CFR 1926.502 which addresses which systems are appropriate (allowed) for specific types of work.

Training

All our personnel working on this job/project have received training in our Fall Protection Program and are able to recognize fall hazards and understand procedures to minimize these hazards. Further, they have been trained, as necessary, by a competent person qualified in the following areas using both formal and hands on training:

a. The nature of fall hazards in the work area.

b. The procedures for erecting, maintaining, disassembling, and inspecting the fall protections to be used.

c. The use and operation of guardrail systems, personal fall arrest systems, safety net systems' warning line systems, safety monitoring systems' controlled access zones, and other protection to be used.

d. Their role in the safety monitoring system when this system is used.

e. The limitations on the use of mechanical equipment during the performance of roofing work on low sloped roofs.

f. The procedures for handling and storage of equipment and materials and the erection of overhead protection.

g. The roll of employees in fall protection plans.

Enforcement

Awareness of and respect for fall hazards, and compliance with all safety rules are of great importance. Appropriate disciplinary action will be taken should an employee disregard our safety guidelines.

Accident Investigation

All accidents that result in injury to employees, regardless of their nature, will be investigated and reported. It is important that documentation of accidents take place as soon as possible so that the cause may be determined and steps may be taken to prevent a reoccurrence.

Changes To This Plan

Changes to this plan, specifically a deviation from conventional fall protection systems, will be documented by a qualified person whose name appears on the front of this fall protection plan.

Changes will be limited to:

a. Leading edge work

Note: Leading edge work involves construction which moves the location of the edge forward (backward). Working at the edge of a walking/working surface (such as a roof) is not leading edge work - it is (roofing) work at an unprotected side or edge.

b. Precast concrete construction work

c. Residential construction work

The criteria for determination that a conventional fall protection is infeasible is that it is impossible to perform construction work with a conventional fall protection system or it is technologically impossible to use a conventional fall protection system. Inconvenience and cost are not acceptable considerations.

Specific Fall Protection Plan criteria are found in 29 CFR 1926.502(k) and we will, if necessary, create a Fall Protection Plans that comply with the cited criteria.

A separate change will be made for each situation where conventional fall systems cannot be used.

C&S Companies

Changes to Fall Protection Plan

CHANGE NUMBER:

This change to the Fall Protection Plan for the below listed project will be attached to the original Fall Protection Plan and a copy will be available at the job site.

Project Name:

Location of Job:

Date Change

Prepared Date

Change Modified:

Change Approved by:

Change Supervised by:

Changes to this Fall Protection Plan for this specific project are required for the following reason(s):

Specific work that requires fall protection other than conventional fall protection:

_____
_____
_____
_____
_____
_____
_____
_____
_____

Specific work areas where the above work will take place:

_____
_____
_____
_____
_____

Forklifts

29 CFR 1910.178 - Powered Industrial Trucks

Overview

This program has been developed to make our truck operators aware of the hazards associated with motorized truck use as well as to provide guidance for safe truck operations.

Persons will be authorized to operate our forklifts only after they have successfully demonstrated their understanding of proper procedures for truck inspection, use, and refueling/recharging. Operators will demonstrate their truck knowledge and abilities by passing a written test and performing designated truck maneuvers. All truck operators will be evaluated by the Forklift Program Administrator or a designated competent person.

Because of their power, weight, size, restricted visibility, and, often, high center of gravity, operation of industrial trucks takes skill and attention to detail. One moment of inattention can lead to a major mishap in an instant. Additionally, the load presents potential hazards if not properly secured, balanced, and/or properly placed on the truck.

In accordance with 29 CFR 1910.178(b)12, the Program Administrator or other competent person will determine whether the atmosphere or location in which our industrial trucks will operate is hazardous or non-hazardous and, after further assessing our needs, will determine which types of trucks are appropriate and allowed for our specific operations.

In the unlikely event that unsafe industrial motor truck operations are observed, retraining will be given with emphasis on correcting the improper behavior. To prevent the possibility of severe injury to the operator (or a bystander), our forklifts must be operated in a professional manner and anything less will not be tolerated.

All truck operators will have ready access to this program, appropriate OSHA standards, and the truck owner/operator manuals.

Forklifts

Forklifts are designed to move items quickly, safely, and cleanly. Forklift training would also apply to numerous types of powered industrial trucks such as: tractors, platform lift trucks, motorized hand trucks, and other specialized industrial trucks powered by electric motors or internal combustion engines.

While many safety features are designed into forklifts, accidents still happen and they are generally the result of operator error.

There is a general agreement among safety professionals, as well as OSHA, that requiring training for all persons (including part-time, seasonal, and temporary employees) who operate forklifts will significantly reduce the accident and injury rates.

General Requirements

All truck operators must be thoroughly familiar with the truck, itself. This includes knowing:

a. Instinctively, what each and every control does.

b. How to perform a truck safety check.

c. The truck's limitations such as maximum load, height and width, visibility, stability, and surface requirements.

d. The truck's stopping and turning ability and its effect on loads.

The below safety rules and guidelines to which one must adhere while operating a forklift have been established. These rules are designed to protect the operator and/or persons adjacent to truck operations.

Specifically:

1. No person shall operate one of our trucks unless authorized in writing.
   a. Prior to authorization, the operator will have read this program, received training, passed a quiz on truck operations, and been evaluated on operational skills.
   b. Authorization to operate one type of truck does not automatically authorize a person to operate all trucks. Different power sources, visibility restrictions, controls, and capacities may dictate, in the judgment of the Program Administrator, that a separate certification process may be required for a different type of truck. There may be instances where a new vehicle does not necessitate new training and a demonstration of proficiency. A newer model of a currently used truck may be identical to the truck the operator is qualified on as far as safety and operations are concerned. As a general rule, each **type** of truck has its own characteristics, limitations, and idiosyncrasies -- each **model** of a type of truck may or may not be unique.
2. No riders are allowed on our forklift unless:
   a. The truck is specifically designed for such use.
   b. The rider is authorized by the Program Administrator.
3. The Program Administrator will revoke the authority to operate a truck if unsafe acts are observed or it is apparent that the operator has not retained the knowledge and job skills necessary to safely perform truck operations.
   a. An operator who has lost his authorization to operate a truck will be retrained, reevaluated, and, if appropriate, re-certified.
4. At the beginning of each shift, the operator will inspect the truck using ourequipment Daily Checklist.
   a. If deficiencies relating to safety are found, the deficiencies will be noted on the Checklist and reported to the Program Administrator or other designated person. The vehicle will not be used until safety defects are repaired.
   b. If cosmetic damage is discovered during the daily check, it will be noted on the Checklist, but the truck may be used.

Hazards

The major personal safety hazards involved in truck operation include:

a. Physically hitting a person/object with the truck or load.

b. Having a load fall and hit the operator or other person.

c. Having the truck tip and crush the operator or other person.

d. Fire or explosion during refueling/recharging.

Below are rules and guidelines to control the hazards identified and reduce the likelihood of accident/injury. While some of the procedures may seem too obvious to mention or just plain common sense, remember this — serious, even fatal, accidents have occurred because for one split second an operator forgot or ignored a basic safety rule.

Falling/Hitting A Person/Object

a. Never drive up to a person standing in front of a fixed object.

b. When possible, stay within delineated travel lanes or aisles.

c. Be seen and/or heard.

d. Ensure that adequate lighting is available.

e. Maintain a clear view of travel. If the load blocks or restricts the view, the operator will drive with the load trailing (backwards).

f. Slow down, sound horn, and do not pass where vision is restricted.

g. Operate the truck at speeds that will allow it and the load to be stopped in a safe, smooth, manner.

h. Be aware of floor conditions. Remove loose objects that have found their way to the truck travel lanes. Operate the truck at slower speeds on wet or slippery floors.

i. Of course, stunt or reckless driving is prohibited.

j. Be aware of the height of the truck and, if equipped, its mast and load. Carelessness can damage ceiling, lights, pipes, etc.

k. Never allow anyone to stand or pass under an elevated portion of any truck at any time.

Falling Loads

a. Know your load – do not "over stack." Because practically all loads lifted or hauled by a forklift are not secured to the truck, ensure the load is properly stacked. Cartons generally should be interlaced or banded.

b. If lifting a load or pallet, get the forks (or other engaging means) as far under the load as possible.

c. Travel with the load in the lowest position for stability as well as prevention of hitting objects overhead. If using forks, tilt the load backward for stabilization.

d. Do not exceed the truck's rated capacity or stack loads too high.

e. Do not make "jerky" movements such as slamming the brakes or high speed turns.

f. A load backrest extension will reduce the possibility of part of the load falling rearward.

g. When using a fork lift, the forks may be tilted forward only for picking up or setting down a load.

Tipping

Forklifts are, by design, narrow allowing them greater access within the work setting.

Unfortunately, a narrow track offers less stability. Tipping or falling off an edge (or dock) is a preventable accident by following the guidelines below. If your truck tips, keep your body and limbs within the safety of the cage. Wear a seat belt if the truck is so equipped.

a. Stay within travel lanes.
b. If entering a trailer, ensure:
    1. The trailer brakes are engaged.
    2. The trailer is secured from movement by means of chocks and/or a locking mechanism.
    3. The tractor is either shut off or removed from the trailer.
    4. The trailer is squared up with the dock opening and dock plates are secure.
    5. The trailer floor is capable of supporting the forklift and its load.
    6. The lighting within the trailer is adequate.

    Note: Falling off a dock edge because a trailer has moved is invariably a serious accident. Do not count on the tractor-trailer driver to lock his brakes or even trust that his brakes work. Physically check and ensure that the trailer into which you are taking your forklift is flush against the dock. If possible, the trailer should be actually attached to the dock, but in all cases, it should be chocked.

c. Travel with the load in the lowest possible position and avoid sharp turns at higher speeds as well as abrupt truck movements.
d. Be aware of the surface on which you are traveling -- its traction, ability to hold weight, slope, and surface.

Fire/Explosion During Refueling/Recharging

Refueling accidents are not common experiences, however should they occur, they would be sudden and possibly catastrophic. Follow the manufacturer's owner's manual and local fire laws.

a. There is absolutely NO SMOKING or open flame during any portion of the refueling/recharging process.
b. Per 29 CFR 1910.110, *Storage and handling of liquefied petroleum gases*, paragraph (f)(7), at least one approved portable fire extinguisher having a minimum rating of 8-B, C must be readily available when refueling propane.
c. Facilities for quick drenching of the eyes and body must be readily available.

Other Concerns

The program deals primarily with the personal safety of our forklift operators. However, when discussing truck operations, we would be remiss if it were not pointed out that improper truck operations could also result in physical damage to products, trucks, and/or facilities. Proper truck operation will reduce personal injury accidents, and, as an added benefit, prevent general damage.

Operator Protection

A hazard assessment of forklift operations will be conducted by the Program Administrator. Particular attention will be given to hand, head, eye, and foot protection, as well as

environmental conditions such as atmospheres, heat, or cold. If the truck is equipped with a seat belt, it must be worn when the truck is moving.

Keep your limbs within the running lines of the truck and keep your hands and fingers away from moving parts -- particularly the mast on a fork lift truck.

The Program Administrator will perform a hazard assessment of our truck operations and determine what, if any, personal protective equipment (PPE) requirements are appropriate. If PPE (examples: steel toed boots, leather gloves, hard hat, eye protection, etc.) is required, it must be worn.

Forklift Operations

In addition to safety operating practices previously identified in this manual, the following will be considered general operating procedures:

a. Fire aisles, access to stairways, and fire equipment must be kept clear.

b. Operators leaving their trucks must ensure the load is fully lowered, controls neutralized, and brakes set. On an incline, the wheels must be blocked. If the operator is 25 feet or more from the truck or does not have a clear view of the truck, the power to the truck must be shut off.

c. A safe distance shall be maintained from the edge of ramps or platforms while on any elevated dock, platform, or freight car.

d. Trucks shall not be used for opening or closing freight doors.

    1. Trucks, like all items of equipment, will be used for the purpose for which they were designed.

e. Be aware that if the operator of a semi-trailer has placed the rear wheels in a far forward position, the trailer may act as a “teeter- totter” when a heavy forklift enters the trailer. When a trailer is not coupled to a tractor, fixed jacks may be necessary to support the semi-trailer during loading or unloading.

f. Be aware that the overhead guard (used as protection against falling objects) is designed to prevent injury from the impact of small packages, boxes, bagged material, etc. -- it is not necessarily designed to withstand the impact of a falling capacity load.

g. In the event persons are lifted by a truck, a lifting platform must be securely attached to the lifting mechanism and the persons on the safety platform must have means of shutting off power to the truck.

h. If more than one truck is operated, they must be separated by a safe distance (at least three truck lengths) and they may not pass each other in intersections, blind spots, or other dangerous locations. The right of way shall be yielded to other trucks in emergency situations.

i. Trucks traveling in the same direction shall not be passed at all.

j. Driving on grades:

    1. Grades shall be ascended or descended slowly.

    2. When ascending or descending grades in excess of 10 percent, loaded trucks shall be driven with the load upgrade.

k. Motorized hand trucks must enter confined areas with the load end forward.

Maintenance

While the operator is responsible for checking the truck before use, actual mechanical maintenance must be performed by an authorized person.

a. If at any time a forklift is found to be in need of repair, defective, overheating, or in any way unsafe, the truck shall be taken out of service until it has been restored to safe operating condition.

b. Forklifts should be kept reasonably clean and free of excess oil and grease.

Duties of the Forklift Administrator

The duties of the Forklift Program Administrator include:

a. Operator training and certification.

b. Hazard assessment of our truck operations.

c. Identification of truck operators who, through their performance have demonstrated a lack of retained knowledge or ability to safely operate a powered truck. These people will receive retraining.

d. Keeping up-to-date of developments in the materials handling field with an emphasis on safety.

Training

The Program Administrator will administer the training portion of this program.

Interactive training will be given by a competent (one with knowledge, training, and experience) person with ample opportunity to ask questions and clarify all aspects of truck operation relating to safety.

Prior to actual truck operation on the job, all truck operators will become familiar with the contents of this program as well as the operator's manual applicable to the specific powered truck they will operate. Each operator will demonstrate an understanding of truck operations and complete a driving test which will include truck inspection, maneuvering, and fueling/charging.

The Program Administrator will ensure that all truck operators have a complete understanding of the below listed topics:

Truck-Related Topics

a. Operating instructions, warnings, and precautions for the type of truck the operator will be authorized to operate.

b. Differences between the truck and the automobile.

c. Truck controls and instrumentation: where they are located, what they do, and how they work.

d. Engine or motor operation.

e. Steering and maneuvering.

f. Visibility (including restrictions due to loading).

g. Fork and attachment adaptation, operation, and use limitations.

h. Vehicle capacity.

i. Vehicle stability.

j. Any vehicle inspection and maintenance that the operator will be required to perform.

k. Refueling and/or charging and recharging of batteries.

l. Operating limitations.

m. Any other operating instructions, warnings, or precautions listed in the operator's manual for the types of vehicle that the employee is being trained to operate.

Work-Related Topics

a. Surface conditions where the vehicle will be operated.

b. Composition of loads to be carried and load stability.

c. Load manipulation, stacking, and unstacking.

d. Pedestrian traffic in areas where the vehicle will be operated.

e. Narrow aisles and other restricted places where the vehicle will be operated.

f. Hazardous (classified) locations where the vehicle will be operated.

g. Ramps and other sloped surfaces that could affect the vehicle's stability.

h. Closed environments and other areas where insufficient ventilation or poor vehicle maintenance could cause a buildup of carbon monoxide or diesel exhaust.

i. Other unique or potentially hazardous environmental conditions in the work area that could affect safe operation.

New truck operators may operate powered trucks in a training capacity:

a. When they are under the direct supervision of persons who have the knowledge, training, and experience to train and evaluate their competence.

b. Where such operation do not endanger themselves or others.

Refresher training will be given:

a. If unsafe truck operations are observed.

b. After an accident or near-accident.

c. If the operator is to be assigned to drive a different type of truck.

d. If work area changes could affect safe operation of the truck.

Hazard Communication

29 CFR 1910.1200 - Hazard Communication

Overview

Petroleum products, adhesives, sealants – even saw dust from treated wood! What do these typical job site products have in common? They are all chemicals and their properties may cause harm to an employee if inhaled, ingested, or absorbed into the skin. A common error is thinking that a hazard communication plan is not needed because there are no "hazardous" chemicals such as nitroglycerin or sulfuric acid on the job site. Hazard communication addresses the health and physical hazards associated with essentially all the chemical and chemical products found on the job site.

There may be a tendency to think of common everyday products such as hand cleaners as just that – hand cleaners. However, even these items are job site chemicals and, if misused, have a health hazard. What possible hazard could be associated with hand cleaner? Quick! Some gritty hand cleaner gets in your eye! What do you do?

This hazard communication plan is designed to make all employees aware that most, if not all, job site chemicals have a downside if improperly used, spilled, transferred, or stored. The hazard may be a physical hazard such as an explosion or a health hazard such as cancer.

Definitions

ARTICLE: A manufactured item which is formed to a specific shape or design during manufacture, has end use function(s) dependent in whole or in part upon its shape or design during end use, and does not release, or otherwise result in exposure to a hazardous chemical under normal conditions of use.

Note: Articles are exempt from the Hazard Standard Communication

HAZARDOUS CHEMICAL: any chemical that is a physical hazard or a health hazard.

PHYSICAL HAZARD: a chemical for which there is scientifically valid evidence that it is a combustible liquid, a compressed gas, explosive, flammable, an organic peroxide, an oxidizer, pyrophoric (will ignite spontaneously in air at a temperature of 130°F or below), unstable (reactive), or water-reactive.

HEALTH HAZARD: a chemical for which there is statistically significant evidence based on at least one study conducted in accordance with established scientific principles that acute or chronic health effects may occur in exposed employees.

To clarify the difference between acute and chronic; acute effects occur rapidly as a result of short term exposure and are of short duration and chronic effects occur as a result of long term exposure and are of a long duration. These terms can overlap. For example, a mild heart attack, with no pain severity, would be termed acute within the first two hours, yet if there were long term effects, it would be termed chronic.

Exempt from hazard communication are "articles." Note that a manufactured item that has

a downstream use is not an article. The below example from 29 CFR 1926.59(f)(2) illustrates this point:

> *For a solid metal (such as a steel beam or a metal casting) that is not exempted as an article due to its downstream use, the required label may be transmitted to the customer at the time of the initial shipment, and not be included with subsequent shipments to the same employer unless the information on the label changes. The label may be transmitted with the initial shipment itself, or with the material safety data sheet, or safety data sheets, that is to be provided prior to or at the time of first shipment. This exception to requiring labels on every container of hazardous chemicals is only for the solid metal itself and does not apply to hazardous chemicals used in conjunction with, or known to be present with the metal and to which employees handling the metal may be exposed (for example, cutting fluids or lubricants).*

Almost all chemicals are considered hazardous -- a steel beam or metal casting does not immediately come to mind as a hazardous chemical.
Without a material safety data sheet (MSDS), or safety data sheets (SDS) and/or a label, one cannot assume a chemical is safe.

Even filters for your equipment will have an MSDS, or SDS. This is because, until it is placed in your equipment, it still has a downstream use and therefore until it is used, it is not an article by definition.

Also exempt from the hazard communication standard are chemicals which are regulated by other government agencies such as hazardous waste, food, tobacco products. Also, normal consumer products that are used on the job site in the same manner, frequency, and duration as normal consumer use, and produces the same or less exposure as normal consumer use.

Chemical Types as they Relate to Health

Below is a list of categories of hazardous chemical types as they relate to health:

a. Carcinogen or potential carcinogen as determined by the International Agency for Research on Cancer (IARC) or a carcinogen or potential carcinogen as listed in the Annual Report on Carcinogens published by the National Toxicology Program (NTP), latest edition, or as regulated by OSHA as a carcinogen.

b. Corrosive: A chemical that causes visible destruction of, or irreversible alterations in, living tissue by chemical action at the site of contact. This is not to be confused with, and does not refer to, action on inanimate surfaces.

c. Highly Toxic: A chemical which is lethal to test animals under specific doses and time limits. Some tests require ingestion, some inhalation, some skin exposure, and some implantation.

d. Irritant: A chemical which is not a corrosive, but which causes a reversible inflammatory effect on living tissue by chemical action at the site of contact.

e. Sensitizer: A chemical that causes a substantial proportion of exposed people or animals to develop an allergic reaction in normal tissue after repeated exposure.

f. Toxic: A chemical which is lethal to test animals under specific doses and time limits. A toxic chemical has a greater dose per weight than a Highly Toxic chemical.

g. Target Organ Effects:

- **Hepatotoxins**: Chemicals which produce liver damage
- **Signs & Symptoms**: Jaundice, liver enlargement
- **Chemicals**: Carbon tetrachloride, nitrosamines
- **Nephrotoxins**: Chemicals which produce
- **Kidney damage Signs & Symptoms**: Edema, proteinuria
- **Chemicals**: Halogenated hydrocarbons, uranium
- **Neurotoxins**: Chemicals which produce their primary toxic effects on the nervous system
- **Signs & Symptoms**: Narcosis, behavioral changes, decreased motor function
- **Chemicals**: Mercury, carbon disulfide
- **Agents which act on the blood or hematopoietic system**: decrease hemoglobin function, deprive the body tissue of oxygen
- **Signs & Symptoms**: Cyanosis, loss of consciousness
- **Chemicals**: Carbon monoxide, cyanides

- **Agents which damage the lungs**: chemicals which irritate or damage the pulmonary tissue
- **Signs & Symptoms**: Cough; tightness in the chest; shortness of breath
- **Chemicals**: Silica; asbestos
- **Reproductive toxins**: Chemicals which affect the reproductive capabilities including chromosomal damage (mutations) and effects on fetuses (teratogenesis)
- **Signs & Symptoms**: Birth defects; sterility
- **Chemicals**: Lead; DBCP
- **Cutaneous hazards**: Chemicals which affect the dermal (skin) layer of the body
- **Signs & symptoms**: Defatting of the skin; rashes; irritation
- **Chemicals**: Ketones; chlorinated compounds
- **Eye hazards**: Chemicals which affect the eye or visual capacity
- **Signs & Symptoms**: Conjunctivitis; corneal damage
- **Chemicals**: Organic solvents; acids

The above is to illustrate the broad scope of health hazards.

Hazard Determination

The determination of chemical hazards is primarily the responsibility of the manufacturer and/or importer. It is performance-oriented and, surprisingly, there is no specific method required to determine if a chemical or chemical mixture is hazardous. Personal judgment of the evaluator is relied upon and it takes but one scientifically acceptable study to force a chemical onto the hazardous chemical list.

According to OSHA regulations, thousands of studies could indicate complete safety and one study indicate a hazard and the chemical will be deemed a hazard. We will rely on the evaluations of the chemical product's manufacturers or importers. Should hazard information be received from a source other than the manufacturer, it shall be placed in this Hazard Communication Plan.

Labels

A label is any written, printed, or graphic material displayed on or affixed to containers of hazardous chemicals.

All chemicals used in or on the job site will be properly labeled using the manufacturer's labeling system. Labels will not be removed or defaced. If a chemical is not labeled, it will not be used with the following exception which is quite common with contractors:

> *Portable containers into which hazardous chemicals are transferred from labeled containers need not be labeled if they are for immediate use of the employee who makes the transfer.*

To simplify the above, one may take a hazardous chemical (*example*: paint) out of a labeled container and put it into a smaller, unlabeled container (*example*: paint tray), for immediate use. OSHA defines "immediate use" as being under the control of and used only by the person who transfers it from a labeled container and only within the work shift in which it is transferred.

The label must clearly state:

a. The identity of the hazardous chemical(s).
b. The appropriate hazard warning.
c. The name and address of the manufacturer.

Appropriate hazard warnings would contain:

a. Instruction for proper and safe use. This would include obvious information such as, "do not ingest" or "do not spray in eyes" as well as less obvious information such as, "caustic, wear rubber gloves"
b. First aid instructions
c. Fire containment instructions
d. Storage
e. Disposal instructions

Treat empty containers of hazardous materials as if they were full. Proper disposal is a must!

Material Safety Data Sheets or Safety Data Sheets

It is required that material safety data sheets (MSDS), or safety data sheets (SDS), be maintained for all hazardous chemicals. The information contained on MSDS, or SDS, must be readily accessible to the individual(s) using the products and we will share that information with whom we may work. C&S uses the 3E Company to manage our MSDS/SDS date base. MSDS/SDS can be obtained by calling 1800-451-8346 or the icon located on C&S iPads.

Chemicals come in all forms of matter: liquid, solid, and gas; they can be found as sludge, vapor, mist, dust, etc.

How would one know what a chemical smelled or looked like? How would one be able to administer first aid quickly? Where would you find the proper procedure for cleaning up a spill? Where would you find a listing of symptoms caused by inadvertent exposure to a chemical or chemical mixture?
Where would you find firefighting procedures? These questions and many others are answered on Material Safety Data Sheets (MSDS), or safety data sheets (SDS).

Personnel utilizing a new chemical product will review the MSDS, or SDS, before initial use. New chemical products will be added to our List of Hazardous Chemicals.

While there is no specific format, the following information will be found on an MSDS, or SDS:

a. Identity (chemical or common name) which will be the same as on the label and on the required list of hazardous chemicals.
b. Hazardous chemical ingredients -- both the chemical and common name(s).

c. Physical and chemical characteristics such as boiling point, flash point, solubility in water, etc. Two of the most important items to be found in this category are appearance and odor. It is important to be able to identify chemicals rapidly and appearance and odor are of great value in initial determination.

d. Physical hazards which would include the potential for explosion, fire, and reactivity. Also included in this section are the flash point and auto ignition temperature. Special firefighting procedures are also noted and should be carefully studied by potential users.

e. Health hazards which include first aid procedures, signs and symptoms of exposure, medical dangers, exposure limits, routes of entry, precautions for safe handling, potential carcinogen information, and whether professional medical response is required after a mishap.

f. Chemical reactivity which includes stability, incompatibility with other chemicals, hazardous decomposition products and hazardous polymerization. Special conditions to avoid may also be included.

g. Spill and/or leak procedures which include approved waste disposal methods.

h. Special handling information which includes appropriate hygienic practices, protective equipment requirements, and needed ventilation.

i. Special precautions which would include applicable control measures known to the manufacturer and/or importer. Should it be determined there are special advisories that pertain to our company, the advisories will be placed in this section of the MSDS, or SDS.

j. The name, address and telephone number as well as the date of preparation or revision must be included.

Of course, you are not required to memorize nor are you expected to know all the information contained therein; however, you are expected to know where to find information when it is needed and you are expected to ask any questions to clear up any uncertainties that you may have concerning chemicals in the job site.

Particular attention should be paid to:

a. Identification/detection of a hazardous chemical. This would include odor and color as well as container labeling.

b. Physical hazards of the hazardous chemical. This information would include the potential for fire, explosion, and reactivity. Reactivity, in chemistry, is defined as "the reciprocal action of chemical agents upon each other; chemical change." The MSDS, or SDS, will indicate proper procedures for fire extinguishing, including special precautions, if needed.

c. The health hazards of the chemical. Routes of entry are noted. A chemical may enter the body through ingestion, inhalation, absorption, or injection. Signs and symptoms are indicated such as irritation of the skin, redness of the eyes, nausea, etc. Health hazards are defined as acute, chronic, or both. Carcinogenicity is indicated. First Aid procedures are explained as well as notes to a treating physician, if appropriate.

Methods to lessen or prevent exposure are explained. The need for protective equipment, such as rubber gloves, disposable suits, respirators, goggles, etc., is explained. Hygienic work practices are re-enforced; such as keeping the product away from food and washing hands after use.

The MSDS, or SDS, has a wealth of information which is to be made available to all employees and to anyone who wants to review them. There is nothing secret about an MSDS, or SDS; its whole purpose is the dissemination of information. It provides awareness.

Should an employee not be able to read English, the information contained on MSDS, or SDS, and labels (and any other warning sign) will be given orally or written in that employee's language. The actual labels, MSDS, or SDS, and all warning signs must be written in English.

Training and Documentation

The Safety Manager is responsible for employee training and will ensure that all new employees attend training on our Hazard Communication Plan prior to initial work assignment. Training shall include:

a. Methods and observations that may be used to detect the presence or release of a hazardous chemical in the work area. The primary method to detect the presence of a release is sight and smell. As mentioned above, the appearance and odor of a hazardous chemical can be found on the MSDS, or SDS, for that chemical.

b. Physical and health hazards of the chemicals on the job site. Again, this information is found on the appropriate MSDS, or SDS.

c. Measures to take to protect the employee from chemical hazards. This Hazard Communication Program, the specific MSDS, or SDS, as well as oral and hands-on training and instruction, provide the basis for measures to protect one's self. Where required, protective equipment will be provided. Never minimize the value of protective safety equipment. For example, the use of relatively inexpensive eye protection could easily save your eyesight.

Each employee will sign a form indicating that they have attended training and understand the above.

With the introduction of each new hazard, not necessarily each new chemical, training will be given with specific emphasis on emergency procedures as noted on the MSDS, or SDS. This training will include procedures for handling leaks and spills, personal protection equipment if required, decontamination procedures, etc.

Non-Routine Tasks

Prior to performing a non-routine task, an employee will be given information by a competent person or supervisor concerning the hazardous chemicals to which he may be exposed. This information will include:

a. Specific chemical hazards

b. Protective/safety measures the employee may take.

c. Measures taken to lessen the hazards including ventilation, respirators, presence of another employee, and emergency procedures.

Chemicals in Unlabeled Pipes

Should work activities be performed in areas where chemicals are transferred through unlabeled pipes, the employee shall be informed by the competent person or supervisor of:

a. The chemical in the pipes
b. Potential Hazards
c. Safety precautions to be taken

Sharing of Information

The competent person on the job site will inform those with whom we work of any hazardous chemical products we are using and will provide them with the appropriate MSDS, or SDS, for their review. MSDS, or SDS, for all chemical products used on the job site will be readily available.

Should we introduce a new chemical product to the job site that contains a physical or health safety hazard, the product's MSDS, or SDS, will accompany that product and, before use, employees will be given instruction on the products hazards. This information will be shared with other contractors with whom we may be working. Employees are to be kept informed of the chemical products being used by other contractors if they pose a safety hazard.

Globally Harmonized System

OSHA revised its Hazard Communication Standard (HCS) to align with the United Nations' Globally Harmonized System of Classification and Labeling of Chemicals (GHS). Two significant changes contained in the revised standard require the use of new labeling elements and a standardized format for Safety Data Sheets (SDS), formerly known as, Material Safety Data Sheets (MSDS).

The new label elements and SDS requirements will improve worker understanding of the hazards associated with the chemicals on their job site. To help companies comply with the revised standard, OSHA is phasing in the specific requirements over several years **(December 1, 2013 to June 1, 2016).**

The table below summarizes the phase-in dates required under the revised Hazard Communication Standard (HCS):

Effective Completion Date	Requirement(s)	Who
December 1, 2013	**Train employees on the new label elements and safety data sheet (SDS) format.**	**Employers**
June 1, 2015 **December 1, 2015**	**Compliance with all modified provisions of this final rule, except:** **The Distributor shall not ship containers labeled by the chemical manufacturer or importer unless it is a GHS label**	**Chemical manufacturers, importers, distributors and employers**
June 1, 2016	**Update alternative job site labeling and hazard communication program as necessary, and provide additional employee training for newly identified physical or health hazards.**	**Employers**
Transition Period to the effective completion dates noted above	**May comply with either 29 CFR 1910.1200 (the final standard), or the current standard, or both**	**Chemical manufacturers, importers, distributors, and employers**

Training Requirements under the revised Hazard Communication Standard (HCS):

Prior to December 1, 2013, all our employees will have been trained on the new label elements and the SDS format.

Specific Employee Information and Training

Each employee will be provided effective information and training on hazardous chemicals in their work area at the time of their initial assignment, and whenever a new chemical hazard the employee has not previously been trained about is introduced into his/her work area.

Information and training may be designed to cover categories of hazards (e.g., flammability, carcinogenicity) or specific chemicals. Chemical- specific information must always be available through labels and safety data sheets.

Additionally, employees shall be informed of the requirements of the Hazard Communication Standard; any operations in their work area where hazardous chemicals are present; and, the location and availability of the written hazard communication program, including the required list(s) of hazardous chemicals, and safety data sheets.

Note: Per 29 CFR 1910.1200(g)(8), "The employer shall maintain in the job site copies of the required safety data sheets for each hazardous chemical, and shall ensure that they are readily accessible during each work shift to employees when they are in their work area(s). (Electronic access and other alternatives to maintaining paper copies of the safety data sheets are permitted as long as no barriers to immediate employee access on each job site are created by such options.)"

Note: Per 29 CFR 1910.1200(g)(9), "Where employees must travel between job site during a work shift, *i.e.*, their work is carried out at more than one geographical location, the material safety data sheets may be kept at the primary job site. In this situation, the employer shall ensure that employees can immediately obtain the required information in an emergency."

Note: Per 29 CFR 1910.1200(g)(10), "Safety data sheets may be kept in any form, including operating procedures, and may be designed to cover groups of hazardous chemicals in a work area where it may be more appropriate to address the hazards of a process rather than individual hazardous chemicals. However, the employer shall ensure that in all cases the required information is provided for each hazardous chemical, and is readily accessible during each work shift to employees when they are in their work area(s)."

Employee training shall include at least:

1. Methods and observations that may be used to detect the presence or release of a hazardous chemical in the work area (such as monitoring conducted by the employer, continuous monitoring devices, visual appearance, or odor of hazardous chemicals when being released, etc.).
2. The physical, health, simple asphyxiation, combustible dust, and pyrophoric gas hazards, as well as hazards not otherwise classified, of the chemicals in the work area.
3. The measures employees can take to protect themselves from these hazards, including specific procedures the employer has implemented to protect employees from exposure to hazardous chemicals, such as appropriate work practices, emergency procedures, and personal protective equipment to be used.
4. The details of the hazard communication program developed by the employer, including an explanation of the labels received on shipped containers and the job site labeling system used by their employer, the safety data sheet, including the order of information, and how employees can obtain and use the appropriate hazard information.

Interactive training will be provided by a competent person so that a determination can be made that the new material is actually understood.

The trainer will use an OSHA Brief that provides a general overview of the label requirements in the Hazard Communication Standard (see 29 CFR 1910.1200(f) and 29 CFR 1910.1200 - Appendix C) as well an OSHA Brief that provides a general overview of the safety data sheet requirements in the Hazard Communication Standard (see 29 CFR 1910.1200(g) and 29 CFR 1910.1200 - Appendix D).

Additional training items provided by OSHA and other sources may be used. Training and retraining will be documented in our **Training Information and Documentation Program.**

The OSHA Briefs can be found at the following links: **Hazard Communication Standard: Labels and Pictograms & Hazard Communication Standard: Safety Data Sheets**

C&S Companies

Request for MSDS or SDS

TO:

_____
(Date)

_____
(Supplier)

_____
(PO Box/Street Address)

_____
(City, State, ZIP)

Dear Sir:

On _ , we received a shipment of ,
(Date) (Product Name)

reference invoice: .
(Invoice Number)

The above product was received without an accompanying Material Safety Data Sheet (MSDS) or Safety Data Sheet (SDS). Per 29 CFR 1926.59, we are unable to use this product without its MSDS, or SDS.

Please furnish the appropriate MSDS, or SDS, as soon as possible.

Thank you,

_____

Lockout/Tagout - Control of Hazardous Energy

29 CFR 1910.147 - The Control of Hazardous Energy (Lockout/Tagout) 29 CFR 1910.333 - Selection and Use of Work Practices

Overview

As a contractor, we would not be involved in normal production operations. We could, however, be involved in the constructing, installing, setting up, adjusting, inspecting, modifying, maintaining, or servicing with the possibility of injury due to the unexpected energization, start up or release of stored energy. During these situations, we will comply with the provisions of 29 CFR 1910.147, *The Control of Hazardous Energy (Lockout/Tagout)* and 29 CFR 1910.333, *Selection and Use of Work Practices,* the standards on which this program is based.

Coordination will be established between the client and, if appropriate, subcontractors to clearly indicate who is responsible for what function of the program, as well as the identifying characteristics of the lockout/tagout devices, shape, color, color codes for locks and tags, if used.

Coordination is required because – for example: our employee may complete lockout/tagout procedures and perform maintenance on a fixed piece of equipment while a client's employee is affected by that work.

All our employees affected by this program will be "authorized employees" by virtue of their work (see "Definitions" below.)

Definitions

There are a number of terms and phrases which must be understood by all employees to grasp the general thrust of this Program. For those employees directly involved with this Program or affected by it, there are specific requirements and procedures which would be meaningless without an understanding of the "language" of Control of Hazardous Energy.

AFFECTED EMPLOYEE: an employee whose job requires him/her to operate or use a machine or equipment on which servicing or maintenance is being performed under lockout or tagout, or whose job requires him/her to work in an area in which such servicing or maintenance is being performed.

AUTHORIZED EMPLOYEE: a person who locks out or tags out machines or equipment in order to perform servicing or maintenance on that machine or equipment. An affected employee becomes an authorized employee when that employee's duties include performing service or maintenance covered under 29 CFR 1910.147, *The Control of Hazardous Energy (Lockout/Tagout)*.

Note: An authorized employee is authorized to service only machines and equipment with which he/she is familiar by training and/or experience.

CAPABLE OF BEING LOCKED OUT: an energy isolating device is capable of being locked out if it has a hasp or other means of attachment to which, or through which, a lock can be affixed, or it has a locking mechanism built into it. Other energy isolating devices are capable of being locked out if lockout can be achieved without the need to dismantle, rebuild, or replace the energy isolating device or permanently alter its energy control capability.

ENERGIZED: connected to an energy source or containing residual or stored energy.

ENERGY ISOLATING DEVICE: a mechanical device that physically prevents the transmission or release of energy, including but not limited to the following: a manually operated electrical circuit breaker; a disconnect switch; a manually operated switch by which the conductors of a circuit can be disconnected from all ungrounded supply conductors, and, in addition, no pole can be operated independently; a line valve; a block; and any similar device used to block or isolate energy. Push buttons, selector switches and other control circuit type devices are not energy isolating devices.

ENERGY SOURCE: any source of electrical, mechanical, hydraulic, pneumatic, chemical, thermal, or other energy.

FIXED EQUIPMENT: equipment fastened in place or connected by permanent wiring methods.

HOT TAP: a procedure used in the repair, maintenance and service activities which involves welding on a piece of equipment (pipelines, vessels, or tanks) under pressure in order to install connections or appurtenances. It is commonly used to replace or add sections of pipeline without the interruption of service for air, gas, water, steam, and petrochemical distribution systems.

LOCKOUT: the placement of a lockout device on an energy isolating device, in accordance with an established procedure, ensuring that the energy isolating device and the equipment being controlled cannot be operated until the lockout device is removed.

LOCKOUT DEVICE: a device that utilizes a positive means such as a lock, either key or combination type, to hold an energy isolating device in a safe position and prevent the energizing of a machine or equipment. Included are blank flanges and bolted slip blinds.

NORMAL PRODUCTION OPERATIONS: the utilization of a machine or equipment to perform its intended production function.

OTHER EMPLOYEES: those employees whose work operations are or may be in an area where energy control procedures may be utilized.

SERVICING AND/OR MAINTENANCE: job site activities such as constructing, installing, setting up, adjusting, inspecting, modifying, and maintaining and/or servicing machines or equipment. These activities include lubrication, cleaning or unjamming of machines or equipment, and making adjustments or tool changes where the employee may be exposed to the unexpected energization or startup of equipment or release of hazardous energy.

SETTING UP: any work performed to prepare a machine or equipment to perform its normal production operation.

TAGOUT: the placement of a tagout device on an energy isolating device, in accordance with an established procedure, to indicate that the energy isolating device and the equipment being controlled may not be operated until the tagout device is removed.

TAGOUT DEVICE: a prominent warning device, such as a tag and a means of attachment, which can be securely fastened to an energy isolating device in accordance with an established procedure, to indicate that the energy isolating device and the equipment being controlled may not be operated until the tagout device is removed.

Applicability

The provisions of this program apply when there is a possibility of injury due to the unexpected energization, start up, or release of stored energy while constructing, installing, setting up, adjusting, inspecting, modifying, maintaining, or servicing fixed machinery. Stored energy in an electro/mechanical system can be found in rotating flywheels, weights and counter-weights, hydraulic and pneumatic pressure, thermal and chemical energy, springs, and unbalanced loads.

This program does not apply to:

a. Work on cord and plug connected electric equipment for which exposure to the hazards of unexpected energization or startup of the equipment is controlled by unplugging the equipment from the energy source and by the plug being under the exclusive control of the employee performing the servicing or maintenance.

b. Hot tap operations provided:

   1. Continuity of service is essential.
   2. Shut down of the system is impractical.
   3. Documented procedures are followed and special equipment is used which will provide proven effective protection for employees.

Procedures for Control of Hazardous Energy

The general procedures for lockout, tagout, or lockout and tagout are quite similar. Below are instructions which apply to all control of hazardous energy procedures. Exceptions and specific requirements for lockout without tagout; tagout without lockout; and lockout used in conjunction with tagout are noted in their own subchapters.

General Procedures

Note: Throughout this section, lockout/tagout refers to lockout without tagout; tagout without lockout; and lockout used in conjunction with tagout.

Purpose and Scope Effective hazardous energy control procedures will protect employees during machine and equipment servicing and maintenance where the unexpected energization, start up or release of stored energy could occur and cause injury. Further, effective hazardous energy control procedures will protect employees when working near or on exposed de-energized electrical conductors and parts of electrical equipment. Hazards being guarded against include, but are not limited to, being cut, struck, caught, crushed, thrown, mangled, and/or shocked by live electrical circuits caused by the unexpected release of hazardous energy.
One (1) piece of machinery can have more than one (1) real or potential source of hazardous energy that must be guarded against.

These procedures for the control of hazardous energy will ensure that machines and equipment are isolated properly from hazardous or potentially hazardous energy sources during servicing and maintenance and properly protected from re-energization as required by 29 CFR 1910.147.

While any employee is exposed to contact with parts of fixed electrical equipment or circuits which have been de-energized, the circuits energizing the parts will be locked out and/or tagged in accordance with the requirements of 29 CFR 1910.333 (b)(2).

Preparation for Shutdown: Prior to lockout/tagout, all energy isolating devices must be located which apply to the specific machine or system in question. **There may be more than one energy source**. While electrical is most common, other sources could be: hydraulic, pneumatic, chemical, thermal, rotational, spring, etc. All must be isolated. The Energy Source Evaluation Form and the Control Procedures Form must be completed prior to isolation. These forms must be completed by an authorized employee.
Once completed, it is recommended that these evaluations remain on file for future use. Any changes in design or energy hazard will require an update of these forms. Not only the energy source hazard, but its magnitude must be recorded on the Energy Source Evaluation Form. Example: Energy Source: Pneumatic. Magnitude: 125 psi.

Before an authorized or affected employee turns off the piece of equipment, the authorized employee must have knowledge of the type and magnitude of the energy to be controlled and the methods or means to control the energy. Refer to the Control Procedures Form for specific energy control procedures.

Machine or Equipment Shutdown: Before lockout/tagout controls are applied, all affected employees will be notified and given the reasons for the lockout/tagout.

If a machine or equipment is operating, it will be shut down by normal stopping procedures by either the affected or authorized employee.

Lockout/Tagout Device Application: Authorized employees will lockout/tagout the energy isolating devices with assigned individual locks. Locks or other lockout/tagout devices will be color coded and shall be used for no other purpose. Lockout/tagout devices will indicate the identity of the authorized employee applying the device.

Lockout/tagout devices will be durable and capable of withstanding the environment to which they are exposed for the maximum period of time that exposure is expected. They shall be standardized in color and be substantial enough to prevent their removal without the use of excessive force or unusual techniques such as bolt cutters or other metal cutting tools.

Tagout device attachments shall be non-reusable, attachable by hand, self-locking, and non-releasable with a minimum unlocking strength of no less than 50 pounds. The tagout attachment will have the general design and basic characteristics of, at a minimum, a one-piece, all environmental tolerant nylon cable tie.

Lockout/tagout devices will be applied so that they will hold the energy isolating devices in a "Neutral" or "Off" position. Protective materials and hardware shall be provided for isolating, securing or blocking of machines or equipment from energy sources. These protective materials and hardware include, but are not limited to, locks, tag chains, wedges, key blocks, adapter pins, self-locking fasteners, etc.

Release of Stored Energy: All stored energy will be blocked or dissipated. Types of stored energy include flywheels, springs, hydraulic or pneumatic systems, etc. Should there be a possibility of re-accumulation of stored energy, verification of isolation must be continued until servicing is complete.

Verification of Isolation: Prior to starting work on machines or equipment that have been locked out and after ensuring that no personnel are exposed to the release of hazardous energy, the authorized employee shall operate the normal operating controls to verify that the machine or equipment has been de-energized and that it will not operate.

After the above test, the operating controls will be returned to the "NEUTRAL" or "OFF" position.

At this point, the machine/equipment is now locked out. The work may proceed.

Release from Lockout/Tagout: Before the lockout/tagout devices are removed and energy is restored to the machine or equipment, the following procedures will be implemented to ensure the safety of everyone involved:

a. The work area will be inspected to ensure that nonessential items have been removed and to ensure that the machine or equipment components are operationally intact.
b. The work area will be checked to ensure that all employees have been safely positioned or removed.

After the lockout/tagout devices have been removed and before the machine or equipment is started, affected employees will be notified that the lockout/tagout devices have been removed.

Each lockout/tagout device must be removed by the authorized employee who applied it.

Note: The one exception to the above is when the authorized employee who applied the lockout/tagout device is not available to remove it. That device may be removed under the direction of the competent person provided that the below specific procedures are followed:

a. Verification by the competent person that the authorized employee who applied the lockout/tagout device is not at the job site.

b. All reasonable efforts will be made to contact the authorized employee to inform him/her that his/her lockout/tagout device has been removed.

c. Ensuring that the Authorized employee has been informed of the above before resuming work.

The person who removes the device must be an authorized employee.

Each type of control of hazardous energy procedure shall be documented using the Energy Source Evaluation Form and the Control Procedures Form **except** when all the below listed conditions exist:

a. The machine or equipment has no potential for stored or residual energy or re-accumulation of stored energy after shut down which could endanger employees; and
b. The machine or equipment has a single energy source which can be readily identified and isolated; and
c. The isolation and locking out of that energy source will completely de-energize and deactivate the machine or equipment; and

d. The machine or equipment is isolated from that energy source and locked out during servicing and maintenance; and

e. A single lockout device is under the exclusive control of the authorized employee performing the servicing and maintenance; and

f. The servicing and maintenance does not create hazards for other employees; and

g. No accidents have occurred involving the unexpected activation or re- energization of the machine or equipment during servicing or maintenance.

The above exceptions apply to documentation only. Whether using lockout, tagout, or lockout and tagout, the general procedures are the same.

Device Selection Criteria for Non-Electrical Hazardous Energy

A lock, color coded with either paint or tape and identifiable with the name of the employee who applied it, shall be placed on each energy-isolating device where feasible. Lockout is the primary means of non-electrical hazardous energy isolation and, where possible, will always be used in lieu of tagout. In the event a machine or piece of equipment will not accept a lock on its energy isolating device(s), it will be modified to do so whenever it is replaced, renovated, or undergoes a major repair.

There are occasions where lockout cannot be accomplished and in those instances, tagout alone may be used as long as it provides full employee protection as explained below:

a. A tag may be used without a lock if a lock cannot be physically applied. This procedure must be supplemented with at least one additional safety measure providing a level of safety equivalent to that obtained by the use of a lock. Examples of additional safety measures include, but are not limited to the:

    1. Removal of an isolating circuit element.
    2. Blocking of a controlling switch.
    3. Opening of an extra disconnecting device.

All affected persons must be fully aware of the fact that tags used in tagout procedures are essentially a warning device affixed to energy isolating devices. Unlike locks, tags do not physically restrain. Tags will:

a. Be capable of withstanding the environment to which they have been exposed for the maximum period of time that exposure is expected.

b. Be constructed and printed so that exposure to weather conditions or wet and damp locations will not cause the tag to deteriorate or the message on the tag to become illegible.

c. Be standardized in at least one (1) of the following:

    1. Color
    2. Shape
    3. Size

d. Be standardized in print and format.

e. In their method of attachment, be substantial enough to prevent inadvertent or accidental removal. Tagout device attachment methods and means shall be of a non-reusable type, attachable by hand, self-locking, and non-releasable with a minimum strength of no less than 50 pounds and have the general design and

basic characteristics of being at least equivalent to a one-piece, all- environment-tolerant nylon cable tie.

f. Indicate the identity of the employee applying the tag.

g. Warn against the hazardous conditions if the machine or equipment is energized and shall include a legend such as the following: *Do Not Start, Do Not Open, Do Not Close, Do Not Operate, etc.*

Control of Electrical Hazardous Energy on Fixed Equipment

Electrical hazards associated with fixed equipment present a special hazard class and, in each case, a determination must be made whether lockout, tagout, or lockout used in conjunction with tagout is to be utilized.

The guidelines for this determination are found in 29 CFR 1910.333. 29 CFR 1910.333 makes no mention of maintenance or servicing. Its provisions apply to any possible exposure to contact with fixed electrical equipment or circuits which have been de-energized. 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. Fixed equipment is defined as: "equipment fastened in place or connected by permanent wiring methods."

Before circuits and/or equipment are de-energized, safe procedures will be determined before the fact. At a minimum:

a. The circuits and equipment to be de-energized will be disconnected from all electric energy sources. Control circuit devices, such as push buttons, selector switches, and interlocks, may not be used as the sole means for de-energizing circuits or equipment. Interlocks for electric equipment may not be used as a substitute for lockout and tagging procedures.

b. Stored electric energy which might endanger personnel shall be released. Capacitors shall be discharged and high capacitance elements shall be short-circuited and grounded if the stored electric energy might endanger personnel. Be aware of the shock potential of capacitors and associated equipment. If they are handled in meeting this requirement (discharging), they shall be treated as energized until they have been totally discharged.

c. Stored non-electrical energy in devices that could reenergize electric circuit parts shall be blocked or relieved to the extent that the circuit parts could not be accidentally energized by the device.

Device Selection Criteria for Electrical Hazardous Energy

Note: When dealing with safety related work practices to prevent electric shock or other injuries resulting from either direct or indirect electrical contacts, a Qualified Person is defined as one who: "is permitted to work on or near exposed energized parts" and who, at a minimum, has been trained in and is familiar with:

a. The skills and techniques necessary to distinguish exposed live parts from other parts of electric equipment, and

b. The skills and techniques necessary to determine the nominal voltage of exposed live parts, and

c. The clearance distances specified in 29CFR 1910.333(c) and the corresponding voltages to which the qualified person will be exposed.

A lock and tag shall be placed on each disconnecting means used to de- energize circuits and equipment on which work is to be performed except:

a. A tag may be used without a lock if it can demonstrate that tagging procedures will provide a level of safety equivalent to that obtained by the use of a lock. This demonstration must be documented. This is an allowable, but not preferred, option. A tag may also be used without a lock, if a lock cannot be physically applied. Under either of the above two circumstances that a tag is used without a lock, the procedures must be supplemented with at least one additional safety measure that provides a level of safety equivalent to that obtained by the use of a lock. Examples of additional safety measures include:
    1. The removal of an isolating circuit element.
    2. The blocking of a controlling switch.
    3. The opening of an extra disconnecting device.
b. A lock may be used without a tag if, and only if:
    1. Only one circuit or piece of equipment is being de-energized, and
    2. The lockout period does not extend beyond the work shift, and
    3. Employees exposed to the hazards associated with re-energizing the circuit are familiar with this procedure -- utilizing a lock without a tag.

After electrical hazards are locked out, tagged out, or locked and tagged out, a Qualified Person must verify de-energization before work can proceed on de-energized equipment. Verification by the Qualified Person will include:

a. Operation of the equipment's operating controls, or otherwise verifying that the equipment cannot be restarted.
b. Using test equipment to test the circuit elements and electrical parts of equipment to which employees will be exposed and verifying that the circuit elements and equipment parts are de-energized.
c. Using test equipment to determine if any energized condition exists as a result of inadvertently induced voltage or unrelated voltage backfeed even though specific parts of the circuit have been de- energized and presumed to be safe.

Note: If the circuit to be tested is over 600 volts, the test equipment shall be checked for proper operation immediately before and immediately after this test.

Re-energizing Electrical Equipment

The process of re-energizing electrical equipment, even temporarily, must be accomplished as noted below in the order listed:

a. A Qualified Person shall conduct tests and visual inspections, as necessary, to verify that all tools, electrical jumpers, shorts, grounds, and other such devices have been removed, so that the circuit and equipment can be safely energized.
b. Employees exposed to the hazards associated with re-energizing the circuit or equipment shall be warned to stay clear of circuits and equipment.
c. Each lock and tag will be removed by the authorized employee (who must also be a Qualified Person when dealing with electrical hazards).

d. If the person who applied the lock or tag is absent from the job site, the competent person may designate another Qualified Person to remove the lock and/or tag provided that:
    1. It is assured that the Authorized Person who applied the lock or tag is not available at the job site, and
    2. It is assured that the Authorized Person who applied the lock and/or tag is aware that the lock and/or tag has been removed before he/she resumes work at the job site.
e. A visual determination shall be accomplished to ensure all employees are clear of the circuits energized.

Special Considerations

Whether using lockout, tagout, or lockout and tagout procedures, the below special considerations apply.

There may be special circumstances where, during a lockout procedure, a machine or equipment must be temporarily removed from the energy isolating device and the machine or equipment energized to test or position the machine or equipment or components thereof.

The below procedures will be followed to accomplish this task:

a. The machine or equipment will be cleared of tools and nonessential items and, if it is to be operated, all components will be operationally intact.
b. The work area will be checked to ensure that all employees have been safely positioned or removed.
c. The standard release from lockout procedures will be implemented.
d. The machine or equipment will be energized and testing or positioning will proceed.
e. After testing or positioning, de-energize all systems and reapply the energy control device following standard procedures.

Group Lockout and/or Tagout Procedures

In the event that servicing or maintenance is performed by more than one individual, the following shall be implemented:

a. One person will be designated as Group Leader and that person will have overall responsibility for a set number of employees working under his/her control.
b. The Group Leader will have exclusive control of a Master Group Lockout and/or Group Tagout device.
c. The Group Leader will ascertain the exposure status of individual group members with regard to the lockout and/or tagout of the machine or equipment.
d. Each authorized employee within the group shall affix his personal lockout/tagout device to a group lockout box or comparable device before beginning work and shall remove his/her personal lockout/ tagout device upon completion of work.

If there is more than one group of personnel working a machine or piece of equipment, an employee shall be designated to coordinate and take responsibility for all the individual groups.

Shift and/or Personnel Changes

In the event that Energy Control Procedures must extend into the next shift or if there are individual or group personnel changes, the procedures listed below will be implemented in the order listed:

a. If the energy isolation device **will** accept two lockout/tagout devices:
    1. The authorized employee coming on duty will place his personalized lockout/tagout device in place, and
    2. After the above step has been completed, the employee going off duty will remove his lockout/tagout device.

b. If the energy isolation device **will not** accept two lockout/tagout devices, both the incoming and outgoing authorized employees will:
    1. Ensure that all affected employees are aware that a lockout/tagout change is about to take place, then
    2. Ensure that the area is clear of tools and affected employees, then
    3. The outgoing authorized employee will remove his lockout/tagout devices and immediately the incoming authorized employee will install his lockout/tagout devices, and
    4. The incoming authorized employee will inform the affected employees that the change has been completed.

Following the above procedure will ensure the energy isolating device was never disturbed and that complete control of hazardous energy was maintained. The above procedure provides for continuing protection for both incoming and outgoing employees from the potential hazards of the unexpected release of hazardous energy and an orderly transfer of lockout/tagout responsibilities.

Periodic Inspections

The Safety Manager will conduct periodic inspections of this Control of Hazardous Energy Program at least annually to ensure that the procedures and requirements of 29 CFR 1910.147 are being followed. The information gleaned from the periodic inspection will be used to correct any deviations or inadequacies identified. These inspections will be documented and certification will be prepared to identify the machine or equipment on which an energy control procedure was utilized, the date of the inspection, the employees included in the inspection, and the name of the person performing the inspection. It should be noted that all periodic inspections shall be conducted by a competent person designated by the Safety Manager **other** than the person who actually used the energy control procedure being inspected.

Training

Control of Hazardous Energy training will be documented giving the name of the trainer, the name of the trainee, and the date. Authorized employees must be familiar with this program and will be trained in the following areas: recognition of all applicable hazardous energy sources, types and magnitude of energy sources, methods and means necessary for energy isolation and control, and changes to our program.

Retraining will be conducted when a periodic inspection reveals inadequacy in an authorized employee's knowledge, there has been a deviation from established policy or procedure, or our procedures are changed.

All training will be interactive with applicable standards readily accessible

Control Procedures Form

These Procedures must be accomplished in the order listed.

1. **PREPARATION FOR SHUTDOWN:** The Authorized Employee will be totally familiar with the first page of this form. The Affected Employees will be notified that the piece of equipment is about to be shut down and locked out.

Specific Instructions:

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2. **SHUTDOWN:** Affected Employees will be given the reason(s) for the lockout/tagout procedures. If the machine is running, it will be turned off using normal procedures. It may be shut down by either the Authorized Employee or the Affected Employee.

Specific Instructions

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3. **MACHINE ISOLATION:** All real or potential hazardous energy listed on the first page of this form will be isolated from their source. The location of the isolation devices and the methods used are also found on the first page of the form.

Specific Instructions:

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4. **LOCKOUT/TAGOUT DEVICE APPLICATION:** Authorized Employees will (circle appropriate procedure): [lockout] [tagout] [lockout and tagout] the energy isolating devices. Lock and tag devices will be color coded and they will contain the identity of the Authorized Employee actually performing this procedure. The lockout/tagout devices will be applied so that they hold the energy isolating device in a "Neutral" or "Off" position.

Specific Instructions:

4a. If a tag is used in lieu of a lock because the energy isolating device will not accept a lock, the following additional safety precautions will be taken [29 CFR 1910.147 c(3)(ii) & 29 CFR 1910.333(2)(b)(iii)((D)]: Specific Instructions:

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5. **RELEASE OF STORED ENERGY:** All stored energy will be blocked or dissipated. Reference page one (1) of this form to ensure real or potential stored energy in a system is identified and controlled.

Specific Instructions:

6. **VERIFICATION OF ISOLATION:** Prior to starting work on the piece of equipment and after ensuring that no personnel are exposed to the release of hazardous energy, the Authorized Employee shall operate the controls to verify that there has been de-energization and that the equipment will not operate. After this verification, the operating controls will be returned to the "Neutral" or "Off" position.

Specific Instructions:

7. **RELEASE FROM LOCKOUT/TAGOUT:** The Authorized Employee shall 1.) Ensure that all Employees have been safely positioned or removed and the work area will be cleared of non-essential items, 2.) Ensure the equipment or equipment components are operationally intact; 3.) Ensure machine guards have been replaced; 4.) Inform the Affected Employees that lockout and or tagout devices are going to be removed; 5.) Remove the lockout and or tagout devices including all energy restraints such as blocks; and 6.) Inform the Affected Employees that the equipment is ready for operation.

Group Leader Documentation Form

One (1) person shall be designated as Group Leader. The Group Leader will have overall responsibility for a set number of employees.

The Group Leader shall have exclusive control of a Master (Group) Lockout and/or Group Tagout device.

The Group Leader will ascertain the exposure status of individual group members with regard to the lockout and/or tagout of the machine or equipment.

Each individual authorized employee within the group shall affix his personal lockout/tagout device to a group lockout box or comparable device before beginning work and shall remove his/her personal lockout/tagout device upon completion of work.

If there is more than one group of personnel working on a machine or piece of equipment, an employee shall be designated to coordinate and take responsibility for all the individual groups.

NAME OF DESIGNATED GROUP LEADER: _

EQUIPMENT REQUIRING CONTROL OF HAZARDOUS ENERGY

NAME: _ SERIAL NUMBER: _

DATE: _ MODEL NUMBER: _

AUTHORIZED (QUALIFIED) EMPLOYEES OF THE GROUP

_____ (Name)	_____ (Signature)
_____ (Name)	_____ (Signature)
_____ (Name)	_____ (Signature)
_____ (Name)	_____ (Signature)

_____

SIGNATURE OF GROUP LEADER: _

Periodic Inspection Documentation Form

EQUIPMENT ON WHICH CONTROL OF HAZARDOUS ENERGY PROCEDURES WERE UTILIZED

NAME: _ SERIAL NUMBER: _

DATE: _ MODEL NUMBER: _

WERE ALL THE CORRECT PROCEDURES CORRECTLY APPLIED? YES NO

If yes, sign the form and return to the Safety Manager.
If no, complete the below section, sign the form and return to the Safety Manager.

EMPLOYEES PERFORMING THE PROCEDURE

(Name)	(Signature)
(Name)	(Signature)
(Name)	(Signature)
(Name)	(Signature)
(Name)	(Signature)
(Name)	(Signature)

IMPROPER PROCEDURES NOTED

(SIGNATURE OF INSPECTOR) (Date)

NOTE: If improper procedures are noted, the above employees must have retraining or the Program must be modified

Personal Protective Equipment - General

29 CFR 1926.28 - Personal Protective Equipment 29 CFR 1926.52 - Occupational Noise Exposure

29 CFR 1926.95 - Criteria for Personal Protective Equipment 29 CFR 1926.100 - Head Protection

29 CFR 1926.101 - Hearing Protection

29 CFR 1926.102 - Eye and Face Protection

29 CFR 1926.107 - Definitions Applicable to this Subpart 29 CFR 1910.132 - General Requirements

29 CFR 1910.133 - Eye and Face Protection 29 CFR 1910.135 - Head Protection

29 CFR 1910.136 - Occupational Foot Protection 29 CFR 1910.138 - Hand Protection

Overview

This Personal Protective Equipment (PPE) Program has been prepared to inform our employees of potential hazards on the job site and to identify the proper PPE to be used to reduce or eliminate these hazards. This Program relies on a cooperative effort by all personnel to understand the reasons for PPE and to protect themselves from harm.

The use of PPE does not lessen an employee's obligation to use safe work practices and procedures. Employees are expected to be aware of the hazards within their area of responsibility and properly use prescribed PPE.

Our operations, work methods, and individual job sites present specific hazards which must be identified, analyzed, and matched with the appropriate PPE through a continuing hazard assessment process. A Certificate of Hazard Assessment will be kept on the job site for inspection purposes.

Duties of the PPE Program Administrator

The primary duties of the Program Administrator include: hazard assessment; PPE selection; PPE training; and monitoring of our PPE Program. Certain types of PPE may require hands-on training before on the job use (primarily for sizing and fitting) and this training may be further delegated to competent persons.

Hazard Assessment and PPE Selection

A careful, systematic personal protective equipment selection process is used to identify what, if any, protection is required to reduce or eliminate the possibility of eye, hand, foot, limb, or head injury.

Hazard assessment, performed by the PPE Program Administrator or a designated competent person, starts with a thorough knowledge of our job sites, work procedures, and methods of operation as well as the hazards that may be created by other contractors working in the vicinity of our employees. The basic hazard categories are: impact, penetration, compression, chemical, heat, harmful dust, and light radiation.

Identifying the source of the above hazards allows for consideration of administrative or engineering controls to eliminate the hazard as opposed to providing protection against it. Examples would include: redirecting traffic flow, ventilation, temporary weather barriers, non-slip surfaces, etc.

Because administrative and engineering controls are passive – no employee involvement is required – they are preferable to PPE.

A PPE selection is made by analyzing the above information and evaluating the type of risk, the level of risk, the potential for injury and the possible seriousness of that injury. PPE, which is compatible with the above risks and work situation, is considered. Actual selection involves all the above factors plus an attempt to provide a level of protection greater than the minimum required.

In all situations where it has been determined that a particular type of PPE is to be used, it will be used. There will be no exceptions, by virtue of position or rank, to this policy. Within an area on a job site where the possibility of falling objects exists, hard hats will be worn. It follows that once an item of PPE (hard hat, in this case) is selected, it must be used by all persons in the identified area regardless of job title or function.

Having the PPE Program Administrator or designated competent person on a job site determine the PPE requirements allows for knowledgeable selection and consistency, and eliminates chaos that would result if each individual were to decide when, where, and if PPE should be used.

29 CFR 1910 Subpart I - Appendix B, *Non-mandatory Compliance Guidelines for Hazard Assessment and Personal Protective Equipment Selection*, provides excellent selection guidelines for eye and face protection, head protection, foot protection, and hand protection.

Dissemination of PPE Selection Information

Employees must understand when PPE is necessary and what type(s) of PPE are necessary.

All persons for whom PPE will provide a measure of safety will be given appropriate training on that item of PPE as well as an explanation of the importance of its use.

ANSI Standards and PPE

Most items of PPE are manufactured in accordance with a specific American National Standards Institute (ANSI) standard. For example, protective eye and face devices purchased after 07/05/94 must comply with ANSI standard ANSI Z87.1-1989, *American National Standard Practice for Occupational and Educational Eye and Face Protection*; protective helmets purchased after 07/05/94 must comply with ANSI standard ANSI Z89.1-1986, *American National Standard for Personnel Protection-Protective Headwear for Industrial Employees-Requirements.*

PPE safety products are tested to ensure they meet ANSI standards. Because products are tested in the manner in which they are designed to be used, ANSI certification is valid only if the user follows the manufacturer's instructions for proper sizing, fitting, wearing, and adjusting. A review of OSHA citations reveals that fines can be levied because employees were improperly using PPE. For example, a hard hat worn with the bill toward the rear may provide adequate protection from impact; however, because it is tested with the bill toward the front, this improper use is cause for a safety violation.

Prior to purchase, items of selected PPE will be checked to ensure they were manufactured in accordance with the proper ANSI standard.

The importance of hazard assessment takes on added significance when judgments are made matching the hazard to the protection desired in cases where ANSI certification is not available. What matters most is: does the selected PPE do what it is intended to do?

Employee owned PPE must be approved for use by the PPE Program Administrator. Further, such equipment must be properly maintained and cleaned in accordance with the manufacturer's instructions.

Sizing and Fitting

The word "personal" in the phrase "personal protective equipment" correctly implies that the equipment is for a specific person. As such, sizing and fitting are important for a variety of reasons.

a. Function: An improperly fitted piece of PPE may not do its job. For example, eye protection against dust must have an excellent face seal.

b. Comfort: The likelihood of continued use is increased if the PPE selected is comfortably fitted. Example: gloves that fit poorly and, over time, make a person's hands hot and clammy are likely to be removed exposing that person to the hazard for which the gloves were required in the first place.

c. Safety: Ill-fitting PPE may actually cause an accident. Example: loose hard hat may slip and block one's vision.

Most PPE come in a variety of sizes and within those size groups, adjustments may be made to affect a perfect fit. It is important to understand the procedures for donning, adjusting, using, and removing PPE. Each person who is required to use any type of PPE will be taught, before initial issue, the specific procedures for properly donning, adjusting, using, and removing the specific PPE. This instruction will generally be given by the employee's Supervisor. When available, the manufacturer's instructions will be issued with the PPE.

Care and Maintenance of PPE

PPE will be visually inspected before each use and if defects are noticed, it will not be used. Some types of PPE are expendable (cotton gloves) and have a limited life span after which they are discarded and new PPE is reissued.
Plastic safety glasses become scratched and they too must be exchanged for new ones when vision is impaired. Other types of safety equipment consist of both non-expendable and expendable components.

A hard hat is non-expendable, yet the head band does wear out and becomes expendable. PPE will be maintained in accordance with the manufacturer's instructions and, where appropriate, kept in a sanitary condition.

Cleanliness takes on an added importance when dealing with PPE designed to protect the eyes and face. Dirty or fogged lenses can impair vision and, rather than offer protection from a hazard, actually becomes a contributory factor in causing an accident.

Lastly, should PPE become contaminated with a chemical substance and decontamination is impossible, the PPE will be properly disposed of following the disposal instructions on the Material Safety Data Sheet, or Safety Data Sheet, for that substance.

Training

Affected employees will be given an understanding of:

a. When PPE is necessary.
b. What PPE is necessary.
c. How to properly put on, take off, adjust, and wear PPE.
d. The limitations of the PPE.
e. The proper care, maintenance, useful life and disposal of the PPE.

Retraining will be given in situations when changes in PPE requirements render the previous training obsolete or it is noticed that an employee is not following our PPE policies – specifically, not properly wearing the selected PPE in identified locations or work situations.

As a contractor, we are not required to have a PPE Program, per se, nor is the hazard assessment a *specific* requirement. In fact, there is no hand protection standard. Construction standards are short and to the point.
The complete standard for head protection is printed below:

Standard Number: 1926.100

Title: Head protection.

Applicable 1910 Standards 1910.135

(a) Employees working in areas where there is a possible danger of head injury from impact, or from falling or flying objects, or from electrical shock and burns, shall be protected by protective helmets.

(b) Helmets for the protection of employees against impact and penetration of falling and flying objects shall meet the specifications contained in American National Standards Institute, Z89.1-1969, Safety Requirements for Industrial Head Protection.

(c) Helmets for the head protection of employees exposed to high voltage electrical shock and burns shall meet the specifications contained in American National Standards Institute, Z89.2-1971.

Most PPE requirements are obvious and PPE wear is so simple that training is almost unnecessary.

What is important – vitally important – is actually using the proper PPE when it is required.

To ensure employee compliance with PPE requirements, we have opted to treat all employees as intelligent, responsible persons who, when reminded of what PPE actually protects, will enthusiastically endorse PPE use.

Eye and Face Protection

Eye protection is required when there is a possibility of eye injury. Eye injury is not confined to flying objects. Eye injury can be caused by bright light, dust, chemicals, heat, and, literally, anything that can reach them.Different hazards require different types of protection.Eye (and face) protection is required when one is exposed to flying particles, chemicals, or injurious light radiation. Types of eye protection include: impact resistant safety glasses, safety glasses with side shields, goggles, goggles with a face seal, face

masks, and shaded goggles with varying degrees of darkness.

Affected employees who wear prescription lenses will wear eye protection over the prescription lenses without disturbing the proper positioning of the prescription lenses, or will wear eye protection that incorporates their prescription into the design.

All prescription glasses should be made with impact-resistant lenses. Hardened lenses, through a tempering process, are extremely hard and resistant to impact and breakage. Safety lenses are similar to hardened lenses but are 1 mm thicker. Safety lenses are used in goggles where there is a danger of flying glass or chips of metal.

All employees who wear contact lenses must also wear appropriate eye and face protection in hazardous environments.

Welding helmets and face shields, if required, should be worn over primary eye protection (spectacles or goggles).

An inexpensive pair of safety glasses can save your priceless eyesight.

Head Protection

Talking about head protection is really talking about brain protection. Your brain, either through divine providence, evolution, or quirk of nature, is you. The brain, that soft mass of gray and white convoluted matter, is what you are all about. Destroy your brain and you no longer exist.

Your brain is naturally protected by a cranium. Your skull actually has many bones which protect your brain and support your face. Obviously, there are other parts to your head which need protecting such as your eyes, ears, nose, tongue, skin, etc., but your brain is the most important.

Head protection is required when there is a possibility of injury to the head from falling objects and when working near exposed electrical conductors which could contact the head.

Brain injury is the second most common cause of major neurologic deficits and causes more deaths than injury to any other organ.

When the skull receives an impact, it actually can indent and deform. A fracture may occur and the fracture may be distant from the point of impact. A direct blow to the head can cause the brain to actually move within the skull. Surprisingly, there is often a reverse correlation between skull damage and brain damage. Just because there is no external visible injury to the skull does not preclude the possibility of brain injury.

Wearing head protection (a hard hat) accomplishes two major objectives: it reduces the rate of energy transfer and spreads out the area of energy transfer. Just as your head should be checked out at a hospital after a head impact, so should your hard hat. A hard hat can absorb energy by destructing and this destruction may be unnoticeable.

A head injury may occur after a blow to the head and the following symptoms may be present: unconsciousness or disorientation, confusion, nausea, vomiting, and/or double vision. Get medical help immediately.

Cover open wounds lightly with sterile dressing. Keep victim still, warm, and reassured. DO NOT move the victim unless he/she would be in greater danger if you did not. DO NOT apply pressure to a head wound. DO NOT try to stop blood or clear fluid coming from ears, nose, or mouth.

Hearing Protection

Wherever it is not feasible to reduce the noise levels or duration of exposures to those specified in Table D-2, below, ear protective devices shall be provided and used.
Ear protective devices inserted in the ear shall be fitted or determined individually by competent persons.

Plain cotton is not an acceptable protective device.

Hearing damage is caused by noise level and duration of exposure to the noise. If, after using the formula below, the equivalent noise exposure exceeds unity (1), then a Hearing Conservation Program will be initiated.

F(e)=(T(1)divided by L(1))+(T(2)divided by L(2))+ ... + (T(n) divided by L(n)) where:

F(e) = The equivalent noise exposure factor.

T = The period of noise exposure at any essentially constant level.

L = The duration of the permissible noise exposure at the constant level (from Table D-2).

If the value of F(e) exceeds unity (1) the exposure exceeds permissible levels.

A sample computation showing an application of the formula in paragraph (d)(2)(ii) of this section is as follows. An employee is exposed at these levels for these periods:

110 db A 1/4 hour.

100 db A 1/2 hour.

90 db A 1 1/2 hours.

F(e) = (1/4 divided by 1/2)+(1/2 divided by 2)+(1 1/2 divided by 8)

F(e) = 0.500+0.25+0.188

F(e) = 0.938

Since the value of F(e) does not exceed unity, the exposure is within permissible limits.

Understanding some interesting facts about your hearing will emphasize the need for hearing protection.

Your outer ears on the side of your head are the least important part of your hearing system. Should you lose your ear, you would not necessarily lose your hearing. Your outer ear, made of cartilage, includes the external auditory canal which leads to the eardrum which is only 2/5" in diameter. The eardrum separates the outer ear from the middle ear. Within the middle ear are three (3) bones commonly called the hammer, anvil, and stirrup. The stirrup (stapes) is the smallest bone in your body -- thinner than a grain of rice. Also in the middle ear is the Eustachian tube which connects the middle ear to the back of the throat to maintain equal air pressure on both sides of the ear drum.

The inner ear, where sound waves are converted to electrical impulses, actually has a function unrelated to hearing. It contains the semicircular canals which completely control your balance. Also in the inner ear is the cochlea, a small spiral coil in which you would find the basilar membrane which has over 15,000 hair cells. These hair cells are the end of the auditory nerve which goes directly to the temporal lobe of the brain.

The hardest bone in your whole body is the temporal bone which protects two thirds of the auditory canal and all of the middle and inner ear. Nature, itself, seems to have placed a high priority on your hearing.

Protect your hearing. If you are issued hearing protection, use it!

Foot Protection

When purchasing new protective footwear, ensure that it complies with ASTM 2413, "American National Standard for Personal Protection, Protective Footwear."

Specific hazards require specific types of protective footwear. Certain types of footwear can offer traction, crush protection, penetration protection, electrical protection, chemical resistance, heat and/or fire resistance, dryness, cushion, or ankle-protection. Further, certain activities may require a combination of these features.

Your foot is a remarkable piece of engineering which is composed of 26 bones, muscles, fatty tissue, nerves, tendons, skin and joints. The foot itself can absorb a tremendous amount of punishment without damage. But there are limits and it would be a shame to lose a foot, or part of a foot, because of failure to wear the prescribed protective footwear.

Hand Protection

Your hand is composed of 20 muscles, 3 major nerves, 27 bones (14 of which are in your fingers) plus skin, fatty tissue, tendons, and joints. There are 15 muscles in your forearm which provide power to your hand. Your hand is your gateway to the world. It lets you do what you think. Its function is feeling and grasping.

Try to pick up something while holding your thumb still. It is very difficult. If the nerve to the small muscles of the thumb is severed, 80% of the total hand function is lost.

There are numerous types of hand protection (gloves) available -- each with a specific purpose. The most common are general purpose cotton work gloves which provide protection from minor skin abrasions and cold. However, there are many other types of gloves.

Hands need protection from chemicals, abrasions, cuts and lacerations, temperature extremes, germs, radiation, impact, punctures, electricity, and other hazards on the job site. Specific job requirements determine the type of hand protection needed. Proper hand protection must do more than protect your hand; it must allow you to accomplish your job assignment with efficiency as well as safety.

Wearing hand protection could prevent your hand and/or fingers from being severed, burned, crushed, punctured, lacerated, cut, or generally abused.

Respiratory Protection

Employees who, by nature of their work, are exposed to harmful aerosols, vapors, gases, contaminated air, or non-breathable air will be provided air purifying or air supplying respirators after training, medical evaluation, and fit testing per our Respiratory Protection Program. The one exception is dust masks worn solely for comfort and not for respiratory protection.

Miscellaneous Personal Protection

PPE immediately brings to mind eye, head, hand, and foot protective equipment. However, there may be other types of protective equipment which are readily available and which have the capability of protecting employees from identified hazards on the job site. Some of these items may not fall under a specific OSHA standard or may not be ANSI approved or disapproved; however, in the judgment of our PPE Program Administrator, they may be appropriate for use in our operations.

Summary

The true beneficiary of PPE utilization is the user. The whole thrust of this Program is to protect our employees from injury. This is accomplished by, among other things, explaining the process of hazard assessment, the reasons for PPE use, and the necessity of using the PPE selected.

What possible justification could there be for maiming, losing, or even slightly injuring a body part because available (and required) PPE was not used? "I forgot"; "I was in a hurry"; "I misplaced my PPE"; "I felt silly wearing PPE"; or "I really didn't believe PPE was necessary" will not undo what could be a lifetime of regret.

Personal Protective Equipment - Respiratory Protection

29 CFR 1910.134 - Respiratory Protection

29 CFR 1910.134 App C - OSHA Respirator Medical Evaluation Questionnaire

Overview

The best respiratory protection one can have is clean, breathable air. Engineering controls are our first line of defense against contaminated or oxygen deficient air. These controls include, but are not limited to, using measures such as enclosure or confinement to keep atmospheric hazards away from employees, general or local ventilation to exhaust hazardous atmospheres, and/or substitution of less toxic materials to avoid hazardous atmospheres in the first place. When effective engineering controls are not feasible, or during the time frame they are being instituted, appropriate respirators will be used.

The concept of respiratory protection is quite simple. Certain types of atmospheric hazards are simply particles that can be filtered out of the air, through the use of an air-purifying respirator. Air-purifying respirators force the harmful particles into a filter specifically designed for the hazard(s) where they are trapped or absorbed. The air reaching the employee's lungs is essentially free of the hazard.

a. If the action of inhalation causes the ambient air to be sucked through the filter, the respirator is considered a negative pressure respirator.
b. If the ambient air is forced through the respirator filter (with a blower, for example), the respirator is considered a positive pressure respirator.

A respirator that removes harmful contaminants is of no value in an oxygen deficient (less than 19.5% oxygen) or oxygen enriched (more than 23.5 % oxygen) atmosphere.

An atmosphere-supplying respirator will be used in oxygen deficient atmospheres or in atmospheres where a filter cannot reduce the particulate hazard to an acceptable level. This type of respirator provides clean, breathable air from a source independent of the ambient atmosphere.

Different types of respirators provide different levels of protection. **Never** may an air-purifying respirator be substituted for a required atmosphere- supplying respirator.

Unfortunately, respiratory protection is more complicated than it first appears. Because of the variety and severity of respiratory hazards, the types of respirators and their limitations, the methods for fitting and testing, and, most importantly, the detrimental ramifications of respirator misuse, this respiratory protection program is required.

Proper respirator selection and use can prevent occupational diseases caused by breathing air contaminated with harmful dusts, fogs, fumes, mists, gases, smokes, sprays, and vapors. In atmospheres that are immediately dangerous to life or health, proper respirator selection and use will save your life.

When required, employees will be supplied appropriate respirators and all incidental costs associated with respirator use (fit testing, repair parts, filters, medical examinations, cleaning supplies, etc.) will be borne by the company.

Duties of the Program Administrator

The Respiratory Protection Program Administrator will keep abreast of developments in the respiratory protection field and ensure that our personnel are provided safe respiratory working conditions.

Additionally, the Program Administrator will:

a. Measure, estimate, or review data on the concentration of airborne contaminants in the work area prior to respirator selection.
b. Select the appropriate type of respirator that will provide adequate protection from the airborne contaminants or provide clean, breathable air.
c. Maintain applicable records including:
    1. Fit test record
    2. Medical records
    3. Inspection records
    4. Evaluation records
    5. Training records

Definitions

There are a number of terms and phrases, not used in ordinary everyday life, which must be understood by affected employees.

AIR-PURIFYING RESPIRATOR: a respirator with an air-purifying filter, cartridge, or canister that removes specific air contaminants by passing ambient air through the air-purifying element.

ATMOSPHERE-SUPPLYING RESPIRATOR: a respirator that supplies the respirator user with breathing air from a source independent of the ambient atmosphere, and includes supplied-air respirators (SARs) and self- contained breathing apparatus (SCBA) units.

CANISTER OR CARTRIDGE: a container with a filter, sorbent, or catalyst, or combination of these items, which removes specific contaminants from the air passed through the container.

DEMAND RESPIRATOR: an atmosphere-supplying respirator that admits breathing air to the facepiece only when a negative pressure is created inside the facepiece by inhalation.

EMERGENCY SITUATION: any occurrence such as, but not limited to, equipment failure, rupture of containers, or failure of control equipment that may or does result in an uncontrolled significant release of an airborne contaminant.

EMPLOYEE EXPOSURE: exposure to a concentration of an airborne contaminant that would occur if the employee were not using respiratory protection.

END-OF-SERVICE-LIFE INDICATOR (ESLI): a system that warns the respirator user of the approach of the end of adequate respiratory protection, for example, that the sorbent is approaching saturation or is no longer effective.

ESCAPE-ONLY RESPIRATOR: a respirator intended to be used only for emergency exit.

FILTER OR AIR-PURIFYING ELEMENT: a component used in respirators to remove solid or liquid aerosols from the inspired air.

FILTERING FACEPIECE (DUST MASK): a negative pressure particulate respirator with a filter as an integral part of the facepiece or with the entire facepiece composed of the filtering medium.

FIT FACTOR: a quantitative estimate of the fit of a particular respirator to a specific individual, and typically estimates the ratio of the concentration of a substance in ambient air to its concentration inside the respirator when worn.

FIT TEST: the use of a protocol to qualitatively or quantitatively evaluate the fit of a respirator on an individual.

HELMET: a rigid respiratory inlet covering that also provides head protection against impact and penetration.

HIGH EFFICIENCY PARTICULATE AIR (HEPA) FILTER: a filter that is at least 99.97% efficient in removing monodisperse particles of 0.3 micrometers in diameter. The equivalent NIOSH 42 CFR 84 particulate filters are the N100, R100, and P100 filters.

HOOD: a respiratory inlet covering that completely covers the head and neck and may also cover portions of the shoulders and torso.

IMMEDIATELY DANGEROUS TO LIFE OR HEALTH (IDLH): an atmosphere that poses an immediate threat to life, would cause irreversible adverse health effects, or would impair an individual's ability to escape from a dangerous atmosphere.

LOOSE-FITTING FACEPIECE: a respiratory inlet covering that is designed to form a partial seal with the face.

NEGATIVE PRESSURE RESPIRATOR (TIGHT FITTING): a respirator in which the air pressure inside the facepiece is negative during inhalation with respect to the ambient air pressure outside the respirator.

OXYGEN DEFICIENT ATMOSPHERE: an atmosphere with an oxygen content below 19.5% by volume.

PHYSICIAN OR OTHER LICENSED HEALTH CARE PROFESSIONAL (PLHCP)**:** an individual whose legally permitted scope of practice allows him or her to independently provide, or be delegated the responsibility to provide, some or all of the health care services required medical evaluation.

POSITIVE PRESSURE RESPIRATOR: a respirator in which the pressure inside the respiratory inlet covering exceeds the ambient air pressure outside the respirator.

POWERED AIR-PURIFYING RESPIRATOR (PAPR): an air-purifying respirator that uses a blower to force the ambient air through air-purifying elements to the inlet covering.

PRESSURE DEMAND RESPIRATOR: a positive pressure atmosphere- supplying respirator that admits breathing air to the facepiece when the positive pressure is reduced inside the facepiece by inhalation.

QUALITATIVE FIT TEST (QLFT): a pass/fail fit test to assess the adequacy of respirator fit that relies on the individual's response to the test agent.

QUANTITATIVE FIT TEST (QNFT): an assessment of the adequacy of respirator fit by numerically measuring the amount of leakage into the respirator.

RESPIRATORY INLET COVERING: that portion of a respirator that forms the protective barrier between the user's respiratory tract and an air- purifying device or breathing air source, or both. It may be a facepiece, helmet, hood, suit, or a mouthpiece respirator with nose clamp.

SELF-CONTAINED BREATHING APPARATUS (SCBA): an atmosphere-supplying respirator for which the breathing air source is designed to be carried by the user.

SERVICE LIFE: the period of time that a respirator, filter or sorbent, or other respiratory equipment provides adequate protection to the wearer.

SUPPLIED-AIR RESPIRATOR (SAR) OR AIRLINE RESPIRATOR: an atmosphere-supplying respirator for which the source of breathing air is not designed to be carried by the user.

TIGHT-FITTING FACEPIECE: a respiratory inlet covering that forms a complete seal with the face.

USER SEAL CHECK: an action conducted by the respirator user to determine if the respirator is properly sealed to the face.

Respirator Selection

Respirators will be selected on the basis of hazards to which the employee will be exposed. Using an inappropriate respirator is just as bad, if not worse, than using no respirator at all because it can evoke a false sense of security while offering no protection to the hazard at hand.

All respirators will be NIOSH approved.

Work area surveillance will be made by the Program Administrator taking into consideration the actual work area conditions, the degree of exposure and employee stress.

Respirator selection will take into consideration the air quality, the contaminant, the amount of the contaminant, the time exposure to that contaminant, and the work area surveillance.

Oxygen-deficient atmospheres as well as atmospheres in which the respiratory hazard exposure cannot be determined are considered immediately dangerous to life or health and the use of one of the below listed respirators is required:

a. A full facepiece pressure demand SCBA certified by NIOSH for a minimum service life of thirty minutes, or
b. A combination full facepiece pressure demand supplied-air respirator (SAR) with auxiliary self-contained air supply.

Note: Respirators provided only for escape from IDLH atmospheres shall be NIOSH-certified for escape from the atmosphere in which they will be used.

Generally, but not always, work area atmospheres that require respiratory protection are not IDLH and in these cases respirator selection offers more options. The respirator selected will be adequate to protect the health of the employee and ensure compliance with all other OSHA statutory and regulatory requirements under routine and reasonably foreseeable emergency situations. Of course, the respirator selected will be appropriate for the chemical state and physical form of the contaminant.

For protection against gases and vapors, the respirator provided will be:

a. Atmosphere-supplying.
b. Air-purifying, provided that:
    1. It is equipped with an end-of-service-life indicator (ESLI) certified by NIOSH for the contaminant; or

2. If there is no ESLI appropriate for conditions in respiratory hazard area, a change schedule for canisters and cartridges will be used that is based on objective data that will ensure that canisters and cartridges are changed before the end of their service life.

The Program Administrator will rely on past experience and cartridge manufacturer recommendations. If the competent person on site or any respirator user notices that breathing becomes more strained, the change schedule will be modified.

For protection against particulates, the respirator provided will be:

a. Atmosphere-supplying; or
b. Air-purifying equipped with a filter certified by NIOSH under 30 CFR part 11 like HEPA filter; or

Note: Filters manufactured under 30 CFR part 11 standards may continue to be used, however, as of July 10, 1998, other than PAPR's, they are not to be purchased. Only 42 CFR part 84 type filters will be used.

c. Air-purifying equipped with a filter certified for particulates by NIOSH under 42 CFR part 84; or

Note: These respirators and filters, other than PAPR's are identified on the packaging with numbers that take the form: TC-84A-XXX.

a) Filters will have an "N", "R", or "P" designation followed by "100", "99" or "95." Examples: N100 or R99

1. "N" indicates the filter is for any solid or non-oil containing particulate contaminant.

2. "R" indicates the filter is for any particulate contaminant. If used for an oil containing particulate, a one shift use limit applies.

3. "P" indicates the filter may be used with any particulate contaminant.

b) The number indicates the filter efficiency -- the higher the number, the more efficient. 100 = 99.97% efficiency; 99 = 99% efficiency; and 95 = 95% efficiency.

1. Air-purifying equipped with any filter certified for particulates by NIOSH for contaminants consisting primarily of particles with mass median aerodynamic diameters (MMAD) of at least 2 micrometers.

Often, the permissible exposure limit (PEL) and suggested respirator is listed on an MSDS, or SDS. Published exposure limits for the contaminant at hand will assist in determining respirator selection.

The Program Administrator will select respirators based on:

a. The nature of the hazardous operation or process.
b. The type of respiratory hazard including permissible exposure limits.
c. The period of time for which respiratory protection must be worn.
d. The activities of workers in the hazardous area.
e. The respirator's characteristics, capabilities, and limitations.

Particulate Respirator Selection

Prior to respirator selection, the following factors must be known:

a. The identity and concentration of the particulates in the work area air.
b. The permissible exposure limit (PEL), the NIOSH recommended exposure limit (REL) or other occupational exposure limit.

c. The hazard ratio (HR). The (HR) is obtained by dividing the airborne particulate concentration by the exposure limit.

d. The assigned protection factor (APF) for the type of respirator to be used. The (APF) is the minimum anticipated level of protection provided by each type of respirator worn in accordance with an adequate respiratory protection program. For example, an APF of 10 means that the respirator should reduce the airborne concentration of a particulate by a factor of 10, or to 10% of the work area concentration.

e. The immediately dangerous to life or health (IDLH) concentration, including oxygen deficiency.

The APF should be greater than the HR and multiplying the occupational exposure limit by the APF gives the maximum work area concentration in which the respirator may be used.

All filters will have a 99.97% efficiency rating indicated by the number 100.

Service Life of Filters

If the selected filters have an end-of-service-life indicator (ESLI), the filters will be used until the indicator shows that it is time to be replaced.

In the absence of an ESLI, the following is our policy of service life of filters:

- All HEPA filters manufactured under 30 CFR part 11 (for PAPR's) will be replaced at least daily (once each work shift) or if breathing resistance becomes excessive or if the filter suffers physical damage (tears, holes, etc.) If PAPR filters become available under 42 CFR part 84 standards, they will be used and fall under the below schedule:
- All filters will be replaced whenever they are damaged, soiled, or causing noticeably increased breathing resistance.
- N-series filters may be used and reused subject only to considerations of hygiene, damage, and increased breathing resistance. If the competent person determines the work area to be exceptionally dirty, the filters will be changed each work shift.
- R-series filter will be changed every work shift if oil is present. If oil is not present, they may be used and reused subject only to considerations of hygiene, damage, and increased breathing resistance. If the competent person determines the work area to be exceptionally dirty, the filters will be changed each work shift.
- P-series filters will be used and reused in accordance with the manufacturer's time-use limitations when oil aerosols are present.
- P-series filters can be used and reused subject only to consideration of hygiene, damage, and increased breathing resistance if oil aerosols are not present.

Medical Approval for Respirator Use

Before respirator use – even before fit testing – it must be determined that one is physically capable to wear the type of respirator to be assigned.
Wearing negative pressure respirators can place an increased strain on one's respiratory system, and, depending on the task and the environmental conditions (especially heat and cold), respirators can put an additional strain on your whole body. Prior to respirator use, an employee must have a medical examination. The actual medical tests, if any, depend on the hazards involved, the condition of the employee, and the judgment of the physician or

other licensed health care professional (PLHCP). If respirators are used to prevent exposure to certain toxic and hazardous substances (for example, lead or asbestos), then additional medical tests and surveillance procedures are required appropriate for the hazard.

A PLHCP will be identified to perform medical evaluations using the medical questionnaire with this program. The PLHCP will be given a copy of this program as well as the appropriate standards.

A follow-up medical examination will:

a. Be given to an employee who gives a positive response to any question among questions 1 through 8 in Section 2, Part A of Appendix C, or whose initial medical examination demonstrates the need for a follow-up medical examination.

b. Include any medical tests, consultations, or diagnostic procedures that the PLHCP deems necessary to make a final determination.

The medical questionnaire and examinations will be given confidentially during normal working hours or at a time and place convenient to the employee. The employee will be given the opportunity to discuss the questionnaire and examination results with the PLHCP.

The PLHCP will be provided the following information to be used in determining an employee's ability to use a respirator:

a. The type and weight of the respirator to be used by the employee.

b. The duration and frequency of respirator use.

c. The expected physical work effort.

d. Additional protective clothing and equipment to be worn.

e. Temperature and humidity extremes that may be encountered.

An annual review of medical status is not required and additional medical evaluations are required only if:

a. An employee reports medical signs or symptoms that are related to ability to use a respirator.

b. A PLHCP, supervisor, or the respirator program administrator determines that the employee needs to be reevaluated.

c. Fit testing and work area program evaluation indicates a need.

d. A change occurs in work area conditions (e.g., physical work effort, protective clothing, and temperature) that may result in a substantial increase in the physiological burden placed on an employee.

A negative pressure respirator may place an undue burden on an employee's system and the PLHCP may recommend a PAPR be used instead.

Medical records will be retained for 30 years.

Once medical approval is received allowing the respirator use, fit testing may proceed. The employee will be provided with a copy of this determination.

Respirator Fit Test

There are various protocols for fit testing respirators and they can be found in 29 CFR 1910.134 App A. One (1) of the four (4) qualitative protocols listed below will be used:

Protocol/Fit Test Procedure	Appendix A to 29 CFR 1910.134
a. Isoamyl Acetate	Paragraph B2 Fit
Test Procedure	Paragraph B2(b)
b. Saccharin Solution Aerosol	Paragraph B3 Fit
Test Procedure	Paragraph B3(b)
c. BitrexTM Solution Aerosol	Paragraph B4 Fit
Test Procedure	Paragraph B4(b)
d. Irritant Smoke (Stannic Chloride)	Paragraph B5 Fit
Test Procedure	Paragraph B5(c)

The purpose of fit testing is to ensure that the respirator selected will actually do the job for which it was intended. Different manufacturers make different sizes of each model. Fit testing, following the OSHA approved protocols, will ensure that the specific make, model and size are appropriate for the user. An employee may only use the specific respirator(s) on which he/she has passed a fit test.

Eye glasses and contact lenses pose special problems when dealing with respirators. Contact lenses will not be worn during the fit test or during respirator use. Normal eye glasses, while they do not interfere with the skin to facepiece seal of a ½ face respirator, will prevent a proper seal on a full face respirator and thus will not be worn. If glasses are needed, special adapters can be provided to hold lenses within the respirator.

Upon successful completion of respirator fit testing, a Record of Respirator Fit Test form will be completed and maintained with the employee's records. Only the latest fit test record need be retained. The Respirator Fit Test will be repeated at least annually or when:

a. A different respirator facepiece (size, style, model or make) is used.
b. There has been a weight change of at least 20 pounds.
c. There has been significant facial scarring in the area of the face piece seal.
d. There has been significant dental changes; i.e., multiple extractions without prosthesis or acquiring dentures.
e. Reconstructive or cosmetic surgery.
f. Any other condition that may interfere with facepiece sealing.

As explained in the protocols, the fit tests shall not be conducted if there is any hair growth between the skin and the facepiece sealing surface.

Further, there shall not be mustaches that are so long as to interfere with the inlet or exhaust valves in the respirator. Of course, these requirements apply not only to fit testing procedures, but they also apply to actual on the job use where the seal between face and respirator must be maintained.

User Seal Check

A user seal check, performed in accordance with the manufacturer's instructions or 29 CFR 1910.134 App B, will be made prior to each use by the wearer of a tight-fitting respirator.

A user seal check is solely for respiratory protection of the employee and without this check there is no way of knowing if the selected respirator is actually working. Failure to perform a seal check may result in the use of a respirator which is of little or no value.

One would not be wearing a respirator in the first place if there were not some detrimental health consequences of non-use. Often, these consequences are chronic (long term) and immediately unnoticeable.

If respirator failure would lead to noticeable physical or mental impairment, then, in these situations, two (2) employees will be assigned in the same area and in view of each other. If one employee presents symptoms of physical or mental distress, the second employee will remove the first employee from the area. If there is not an immediate, total recovery, the affected employee will be provided medical care by emergency responders.

In the event work is being performed in an IDLH atmosphere, a safety harness and safety lines will be used so that the employee may be pulled to safety. Suitable rescue equipment will be available and a standby man or men with suitable self-contained breathing apparatus shall be at the nearest fresh air base for emergency rescue.

All personnel should be aware of the appropriate MSDS, or SDS, for the products they are working with, and particular attention should be given to health hazards; both acute and chronic, symptoms of overexposure, first aid measures, emergency procedures, and exposure limits.

Work Area Surveillance

The competent person at the work area where respirator use is required will maintain appropriate surveillance of work area conditions and degree of employee exposure or stress.

When there is a change in work area conditions or degree of employee exposure or stress that may affect respirator effectiveness, the Program Administrator or competent person will reevaluate the continued effectiveness of the respirator.

Employees are to leave the respirator use area:

a. To wash their face and respirator facepiece as necessary to prevent eye or skin irritation associated with respirator use.
b. If they detect vapor or gas breakthrough, changes in breathing resistance, or leakage of the facepiece.
c. To replace the respirator or the filter, cartridge, or canister elements.

Defective respirators will be repaired or replaced before returning to the respirator use area.

Air Quality

Atmosphere-supplying respirators, depending on the type (supplied-air or SCBA) use compressed air, compressed oxygen, liquid air or liquid oxygen. Compressed and liquid oxygen must meet the requirements of the United States Pharmacopoeia for medical or breathing oxygen. Compressed breathing air must meet the requirements of Grade "D" breathing air including: oxygen content (v/v) of 19.5-23.5%; hydrocarbon (condensed) content of 5 milligrams per cubic meter of air or less; carbon monoxide content of 10 ppm or less; carbon dioxide content of 1,000 ppm or less; and lack of noticeable odor. Compressed oxygen shall not be used in supplied-air respirators or open circuit self-contained breathing apparatus that have previously used compressed air. Oxygen must never be used with airline respirators.

Breathing air may be supplied to respirators from cylinders or air compressors. If cylinders are used, they will be tested and maintained as prescribed in the Shipping Container

Specification Regulations of the Department of Transportation (49 CFR part 178).

If a compressor is used for supplying breathable air by way of airline hoses to a respirator mask, it is a Type "C" system. The hose couplings used on these systems must not be compatible with any other gas systems.
Breathable air -- not pure oxygen -- is used in these systems. All safety and standby devices will be maintained in working order such as alarms to warn of compressor failure or overheating. Compressors will be located so that contaminated air does not enter the system and suitable in-line filters will be installed. A receiver of sufficient capacity to enable the respirator wearer to escape from a contaminated atmosphere in the event of a compressor failure shall be in place. If an oil lubricated system is used, it shall have a high temperature and carbon monoxide alarm.

Cleaning, Inspection, and Maintenance

Respirators issued for the exclusive use of one worker will be cleaned and disinfected after each day's use or more often, if necessary. A respirator used by more than one person will be cleaned and disinfected after each use by the employee who used it. Cleaning should be done using the manufacturer's recommendations or the guidelines in 29 CFR 1910.134 App B. Remove or protect the filters/cartridges before cleaning because moisture can defeat the effectiveness of a filter. During cleaning, an inspection of the respirator will be made to ensure it retains its original effectiveness.

Valves, straps, canisters, elasticity, facepiece, if applicable, will be inspected per the manufacturer's instructions. Defective parts will be replaced before reuse.

Employees who use respirators will be instructed in the replacement of parts as allowed by the manufacturer (such as valves and straps). Respirators that require a higher level of repair will be returned to the manufacturer. All replacement parts will be of the same manufacture as the respirator and all replacement parts will be NIOSH approved. Maintenance will be limited to replacing parts (straps, filters, valves, etc.) allowed by the manufacturer.
Only respirators in 100% working order will be used.

Cleaning supplies and replacement parts will be provided at no cost. In the event a respirator is not used for thirty (30) days, it will be inspected by a competent person. Particular attention will be paid to SCBA apparatus and Type "C" connections. SCBA apparatus shall be inspected monthly and air and oxygen cylinders will be fully charged according to the manufacturer's instructions. All warning devices will be checked to ensure they are properly functioning.

Maintenance of Emergency/Unassigned Respirators

Emergency and unassigned respirators (respirators used by more than one person) will be cleaned and inspected for defects every thirty (30) days and after each use. Particular attention will be given to the elasticity of the respirator and ensuring that the respirator is defect free. Only the latest record of this inspection will be maintained. A tag showing the name of inspector, the date, and condition of the respirators will be attached to the respirator.

Storage of Respirators

Respirators will be stored in a convenient, clean, and sanitary location in such a manner as to protect them from dust, heat, sunlight, extreme cold, excessive moisture, and damaging chemicals. In the work area, a plastic bag can help protect a respirator from

dust and moisture. Respirators will not be stored in lockers or tool boxes unless they are in cases or cartons. Respirators will be stored with the facepiece and exhalation valve resting in a normal position. This will also prevent the soft, pliable material of which respirators are made from setting in an abnormal position, changing shape, and reducing face to mask seal.

Program Evaluation

This Program will be evaluated on a continual basis and updated if the need arises. Reasons for upgrading would include new atmospheric hazards; new respiratory protection equipment; new or altered work procedures; the introduction of new engineering controls; the failure of employees to follow standard operating procedures.

Often, the effects of breathing contaminated atmospheres are chronic in nature and thus some employees may tend to become lax in using their respirators properly. Supervisors must be on alert for this tendency.

Employees must realize that they must use the provided respiratory protection in accordance with the instructions and training received.

Training

Training will be given by a competent person, prior to use, to ensure each affected employee can demonstrate knowledge of at least the following:

a. Why a respirator is necessary and how improper fit, usage, or maintenance can compromise the protective effect of the respirator.
b. What the limitations and capabilities of the respirator are.
c. How to use the respirator effectively in emergency situations, including situations in which the respirator malfunctions.
d. How to inspect, put on and remove, use, and check the seals.
e. The procedures for maintenance and storage of the respirator.
f. How to recognize medical signs and symptoms that may limit or prevent the effective use of respirators.
g. The general concepts of this program.

Retraining will be given annually and when:

a. Changes in the work area or the type of respirator render previous training obsolete.
b. Inadequacies in the employee's knowledge or use of the respirator indicate that the employee lacks the required understanding or skill.
c. A situation arises in which retraining appears necessary to ensure safe respirator use.

Dusk Masks – Use of Respirators When Not Required

The Program Administrator or competent person in the work area will determine when respirator use is **required**. Dust masks may be used at any time to reduce annoying particles in the air in the work area.

An employee who wants to wear an actual respirator in the work area for comfort or an additional level of safety that is **not required** for health reasons according to standards, must obtain medical approval for respirator use according to the procedures outlined in this program.

Additionally, that employee should read this program (formal training is not required) and:

a. Read and heed all manufacturers' instructions on use, maintenance, cleaning and care, and warnings regarding the respirator's limitations.
b. Choose a respirator certified for use to protect against the contaminant of concern. The respirator must be NIOSH approved.
c. Not wear the respirator into atmospheres containing contaminants for which your respirator is not designed to protect against. A respirator designed to filter dust particles will not protect you against gases, vapors, or very small solid particles of fumes or smoke.
d. Not interchange the respirator with another employee.

Disposable Respirators

OSHA requires that employees who voluntarily use disposable respirators in situations where respiratory protection is not specifically required by OSHA standard (in atmospheres where exposures are below the permissible exposure limit) essentially for personal comfort or additional, though not required, respiratory protection be informed of 29 CFR Appendix D.

All disposable respirators, such as Moldex, 3M, Wilson, North Safety, etc. must be marked with the manufacturer's name, the part number, the protection provided by the filter, and "NIOSH".

Disposable filters are actually negative pressure respirators. They protect the user by filtering particles out of the air breathed.

Though disposable filters cannot be fit-tested in the traditional sense, they must be fit-tested in accordance with the manufacturer's instructions.

Under no circumstances may any respirator other than the above disposable respirators be used without compliance with a respiratory protection program.

Appendix D to Sec. 1910.134
(Mandatory) Information for Employees Using Respirators When Not Required Under the Standard

Respirators are an effective method of protection against designated hazards when properly selected and worn. Respirator use is encouraged, even when exposures are below the exposure limit, to provide an additional level of comfort and protection for workers. However, if a respirator is used improperly or not kept clean, the respirator itself can become a hazard to the worker. Sometimes, workers may wear respirators to avoid exposures to hazards, even if the amount of hazardous substance does not exceed the limits set by OSHA standards. If your employer provides respirators for your voluntary use, or if you provide your own respirator, you need to take certain precautions to be sure that the respirator itself does not present a hazard.

You should do the following:

1. Read and heed all instructions provided by the manufacturer on use, maintenance, cleaning and care, and warnings regarding the respirators limitations.
2. Choose respirators certified for use to protect against the contaminant of concern. NIOSH, the National Institute for Occupational Safety and Health of the U.S. Department of Health and Human Services, certifies respirators. A label or statement of certification should appear on the respirator or respirator packaging. It will tell you what the respirator is designed for and how much it will protect you.
3. Do not wear your respirator into atmospheres containing contaminants for which your respirator is not designed to protect against. For example, a respirator designed to filter dust particles will not protect you against gases, vapors, or very small solid particles of fumes or smoke.
4. Keep track of your respirator so that you do not mistakenly use someone else's respirator.

C&S Companies

Respiratory Protection Program Evaluation Form

The Respiratory Protection Program Administrator or a designated competent person will conduct work area and administrative evaluations to ensure the provisions of our respiratory protection program are being properly implemented. Discrepancies noted will be immediately corrected.

A random sampling of affected personnel addressed the below listed concerns and the responses are indicated below:

	Yes	No
Is the respiratory protection program understood?	☐	☐
Problem areas: _		
Corrective action: _		
Do respirators fit without interfering with job performance?	☐	☐
Problem areas: _		
Corrective action: _		
Are respirators being properly maintained?	☐	☐
Problem areas: _		
Corrective action: _		
Are appropriate respirators selected for the hazard?	☐	☐
Problem areas: _		
Corrective action: _		

_____ _____

(Signature of Person performing evaluation) (Date)

C&S Companies

Record of Inspection
EMERGENCY/UNASSIGNED RESPIRATORS

All emergency and unassigned respirators were inspected and cleaned on the date indicated. Any defects found were corrected or the respirator was removed from service. This inspection was performed after each use and/or monthly.

DATE	SIGNATURE OF INSPECTOR	NOTES

Note: Only the latest record must be retained.

Prevention of Heat and Cold Stress

Cold related work illness is a real threat to our employees who work outside during months of cold weather. In order to lessen this threat, this program has been prepared.

All current employees will be given instruction in this program prior to working outside where the possibility of frostbite and hypothermia exist.

On days when applicable environmental conditions exist (**temperatures or wind chill factors equal to or less than 30 degrees F**), the site supervisor will, before the morning shift starts, remind workers of the danger of frostbite and hypothermia, the procedures to lessen its impact, and, in the worst case, the procedure for medical response.

All persons should recognize the symptoms of cold related illness.

Frostbite

(Sensations of coldness; tingling, stinging or aching feeling of the exposed area followed by numbness of ears, fingers, toes, cheeks, and noses. Frostbitten areas appear white and cold to the touch). Seek medical assistance immediately. Frostbitten parts should be covered with dry, sterile gauze or soft, clean cloth bandages.

DO NOT massage frostbitten tissue

Take measures to prevent further cold injury.

GENERAL HYPOTHERMIA

(Shivering, an inability to do complex motor functions, lethargy, and mild confusion)

a. Conserving remaining body heat.
b. Providing additional heat sources.
c. Seek medical assistance for persons.

SEVERE HYPOTHERMIA

(Unresponsive and not shivering) Seek medical attention immediately.
Reduce heat loss by:

1. Obtaining shelter.
2. Removal of wet clothing.
3. Adding layers of dry clothing, blankets, or using a pre- warmed sleeping bag.

The four environmental conditions that cause cold-related stress are low temperatures, high/cool winds, dampness and cold water. Wind chill, a combination of temperature and velocity, is a crucial factor to evaluate when working outside. For example, when the actual air temperature of the wind is 40°F (4°C) and its velocity is 35 mph, the exposed skin receives conditions equivalent to the still-air temperature being 11°F. A dangerous situation of rapid heat loss may arise for any individual exposed to high winds and cold temperatures.

The purpose of this program is to take definitive measures prior to the onset of cold related illnesses so that medical response will not be necessary. If the above conditions do present themselves, the supervisor, who will always have access to a mobile phone, will follow our standard emergency procedures.

Definitive measures to prevent cold related illness include:

1. ## Personal Protective Clothing

   Personal Protective Clothing is the most important step in fighting the elements is providing adequate layers of insulation from them. Wear at least three layers of clothing:

   a. An outer layer to break the wind and allow some ventilation (like Gore-Tex® or nylon);
   b. A middle layer of wool or synthetic fabric (Qualofil or Pile) to absorb sweat and retain insulation in a damp environment. Down is a useful lightweight insulator; however, it is ineffective once it becomes wet.
   c. An inner layer of cotton or synthetic weave to allow ventilation.

   Pay special attention to protecting feet, hands, face, and head. Up to 40% of body heat can be lost when the head is exposed.
   Footgear should be insulated to protect against cold and dampness. Keep a change of clothing available in case work garments become wet.

2. ## Engineering Controls

   Engineering Controls help reduce the risk of cold-related injuries.

   a. Use an on-site source of heat, such as air jets, radiant heaters, or contact warm plates.
   b. Shield work areas from drafty or windy conditions.
   c. Provide a heated shelter for employees who experience prolonged exposure to equivalent wind-chill temperatures of 20°F or less.
   d. Use thermal insulating material on equipment handles when temperatures drop below 30°F.

3. ## Safe Work Practices

   Safe Work Practices, such as changes in work schedules and practices, are necessary to combat the effects of exceedingly cold weather. Possible workable safe practices include:

   a. Allowing a period of adjustment to the cold before embarking on a full work schedule.
   b. Permitting employees to set their own pace and take extra work breaks when needed.
   c. Reducing, as much as possible, the number of activities performed outdoors. When employees must brave the cold, selecting the warmest hours of the day and minimize activities that reduce circulation.
   d. Ensuring that employees remain hydrated.
   e. Establishing a buddy system for working outdoors.
   f. Educating employees to the symptoms of cold-related stresses, heavy shivering, uncomfortable coldness, severe fatigue, drowsiness, or euphoria.

Provision of Water

Employees will have access to adequate quantities of potable drinking water.

Where the supply of water is not plumbed or otherwise continuously supplied, water will be provided in sufficient quantity. Supervisor will provide frequent reminders to employees to drink frequently, and, if needed, more water breaks will be provided.

Drinking water will be dispensed in containers with a tight sealing lid and labeled as Drinking Water. Drinking water containers are to be cleaned daily. Water containers will be placed as close as possible to the workers.

Supervisors will monitor water consumption and water supply and ensure adequate levels are available to last the whole shift.

Disposable/single use drinking cups will be provided to employees.

Supervisors will remind employees that personal military style canteens may be worn containing water. In cold weather conditions, employees are encouraged to drink warm, sweet beverages (sugar water, sports- type drinks). They should avoid drinks with caffeine (coffee, tea, or hot chocolate). Employees are cautioned, however, that sharing water from a personal canteen is forbidden and, because of the health hazard to the user and the person with whom it is shared, disciplinary action will be taken against both employees if they drink out of the same container.
This disciplinary action will be documented using our disciplinary enforcement form.

Training

All employees will read this program and be given interactive training in its provisions. A copy of this program will be kept at the work area during applicable periods of cold weather.

All supervisors will read the below informational items prior to utilization of this program and have an opportunity for discussion and clarification with our Safety Manager.

Prevention of Heat Stress

Heat related work illness is a real threat to our employees who work outside during months of high heat and humidity. In order to lessen this threat, this program has been prepared.

All current employees will be given instruction on this program prior to working in heat illness inducing environments or other severe environmental conditions.

On days when applicable environmental conditions exist - periods of hot weather (equal to or greater than 85ºF and 40% Relative Humidity) -the site supervisor will, before the morning shift starts, remind workers of the danger of heat illness, the procedures to lessen its impact, and, in the worst case, the procedure for medical response.

All persons should recognize the symptoms of heat related illness.

Heat Exhaustion

(Fatigue; weakness; profuse sweating; normal temperature; pale clammy skin; headache; cramps; vomiting; fainting)

- Remove from hot area.
- Have victim lie down and raise feet. Apply cool wet cloths.

- Loosen or remove clothing.
- Allow small sips of water if victim is not vomiting.

Heat Stroke

(Dizziness; nausea; severe headache; hot dry skin; confusion; collapse; delirium; coma and death)

- Call for immediate medical assistance. Remove victim from hot area.
- Remove clothing. Have victim lay down.
- Cool the body (shower, cool wet cloths)
- **Do not** give stimulants.

The purpose of this program is to take definitive measures prior to the onset of heat exhaustion and heat stroke so that medical response will not be necessary. If the above conditions do present themselves, the supervisor, who will always have access to a mobile phone, will follow our standard emergency procedures.

Definitive measures to prevent heat related illness include:

1. Provision of water
2. Provision of shade
3. Provision of rest (recovery period)
4. Modified work procedures

Provision of Water

Water is a key preventive measure to minimize the risk of heat related illnesses. Employees will have access to adequate quantities of potable drinking water.

Where the supply of water is not plumbed or otherwise continuously supplied, water will be provided in sufficient quantity at the beginning of the work shift to provide one quart per employee per hour for drinking for the entire shift.

Supervisors will encourage the frequent drinking of water. The supervisor or a designated person will monitor water consumption every 30 minutes. Employees are encouraged to report bad tasting water or low levels of water immediately so the situation can be corrected.

Supervisor will provide frequent reminders to employees to drink water, and, if needed, more water breaks will be provided.

Every morning during conditions where this program is applicable, there will be short tailgate meetings to remind workers about the importance of frequent consumption of water throughout the shift. Drinking water will be dispensed in containers with a tight sealing lid and labeled as Drinking Water. Drinking water containers are to be cleaned daily. Water containers will be placed as close as possible to the workers.

Supervisors will monitor water consumption and water supply and ensure adequate levels are available to last the whole shift

Disposable/single use drinking cups will be provided to employees

During extreme conditions, the supervisor will blow an air horn to remind workers to take a water break.

Supervisors will remind employees that personal military style canteens may be worn containing water. Employees are cautioned, however, that sharing water from a personal canteen is forbidden and, because of the health hazard to the user and the person with whom it is shared, disciplinary action will be taken against both employees if they drink out of the same container. This disciplinary action will be documented using our disciplinary enforcement form.

As a reminder of the importance of water to the human system, the following information is supplied:

Fluids

If you heard in advance that this safety meeting was on fluids, you may well have thought that the meeting would focus on the storage, use, clean-up, and possible emergency procedures involved with the liquid chemical products used on or near work areas. You'd be wrong. While the above are important topics and questions related to them should be addressed to the competent person, this safety meeting is about **your** bodily fluids.

From a safety standpoint, you must not neglect your need for potable (drinkable) fluids. Water is not only the most abundant of all compounds found on the earth, it is the most abundant part of you – actually about 65% of you is water.

Drink fluids! From a life process standpoint, what fluid intake is doing is keeping you healthy by allowing your body to maintain its core body temperature at its appropriate level. When your brain senses that cooling action is needed, your body circulates blood to your skin to allow it to cool with the outside temperature. If the water used for sweat is not replaced, a water deficit starts to occur. The millions of chemical reactions taking place in your body at every moment can only occur in the presence of water. The fluids in your body transport nourishment, gases, and waste.

Imagine your body as a water based chemical factory that functions only within a narrow temperature range. An average, healthy person, at rest, has an oral temperature of between 98.6ºF and 100.4ºF. If your body temperature reaches 105.8ºF, convulsions may occur. Your whole central nervous system is impaired when your body temperature raises 9ºF above normal.

At 106.0ºF, the thermoregulatory center in your brain fails and, because of damage to your central nervous system, the sweating (cooling) mechanism cuts off when you need it most. It is a vicious circle – the hotter you get, the more heat you generate through metabolism. In fact, at 107.6ºF, cellular metabolism is 50% higher than at normal temperatures.

Without getting too graphic, here are some of the problems associated with extreme water loss: cells will shrink; the skin will lose its elasticity; skin and mucous membrane cells will dry out; eyeballs will become soft; weight loss will occur; the body temperature will rise; apprehension, restlessness, and even coma may occur; urine will become concentrated; renal shutdown will occur; red blood cells will shrink; **death**. Stay healthy! Drink water! Water is truly the stuff of life.

Provision of Shade

The supervisor will ensure that employees have access to shade to minimize the risk of heat related illnesses. If natural shade is not available, the supervisor will ensure that sun umbrellas or portable canopies are provided in adequate number. These umbrellas or canopies will be place in close proximity to the work activity (i.e., no more than 50- 100 yards).

Ideally, if available, employees will be allowed to get out of the sun by entering an air conditioned structure such as a building or job trailer. This not only provides shade, it provides a cool, less humid, atmosphere. Any employee who feels the need for shade will protect himself/herself from the sun for a period of not less than 5 minutes.

Lastly, but importantly, persons must provide personal shade in the form of shirts (preferably light colored to reflect the sun). Shirts are required to prevent sunburn, another health hazard.

Provision of Rest (Recovery Period)

While shade and rest often go hand in hand, they are two distinct activities. Any employee who, due to heat, humidity, or exertion under the provisions of this program, may rest for a period of not less than 5 minutes if that employee believes a preventative recovery period is required.

Modified work procedures

The supervisor will make every effort, consistent with our effort to properly perform our job tasks, to modify work procedures. Example would include performing work requiring heavy exertion during the cooler hours of the day, assigning more persons to a job task to lessen the effort required of each, and the use of machinery in lieu of physical effort.

All employees, but new employees in particular, should be allowed to acclimate to hotter weather. It takes a body four to fourteen days to acclimate to hotter weather. Reduced workloads and careful attention to new employees may be required.

Training

All employees will read this program and be given interactive training in its provisions. A copy of this program will be kept at the work area during applicable periods of heat and humidity.

All supervisors may wish to read the below informational items prior to utilization of this program and have an opportunity for discussion and clarification with our Safety Manager.

The American Red Cross Health & Safety Tips, Heat Related Illness CAL OSHA Heat Illness Prevention etool

Scaffolds

29 CFR 1926.450 - Scope, Application and Definitions Applicable to this Subpart
29 CFR 1926.451 - General Requirements
29 CFR 1926.452 - Additional Requirements Applicable to Specific Types of Scaffolds
29 CFR 1926.454 - Training Requirements
29 CFR 1926 Subpart L App A - Scaffold Specifications
29 CFR 1926 Subpart L App D - List of Training Topics for Scaffold Erectors and Dismantlers
29 CFR 1926 Subpart L App E - Drawings and Illustrations

Overview

Scaffolds are everyday items on most construction sites and their use presents specific hazards – the most common being electrical shock, falls, and falling objects. This program addresses these hazards and provides safety rules for the use of this type of equipment.

Affected individuals must be aware of the specific hazards applicable to their work situation and the proper safety procedures for avoiding these hazards.

All scaffold applications require knowledge of: equipment inspection, load capacities, ground conditions, effects of weather, fall protection, potential electrical hazards, and protection from falling objects. It is expected that all personnel understand how to perform work in a safe manner while on a scaffold, recognize unsafe work situations, and effectively deal with them. If you are aware of a scaffold hazard (or any safety hazard), immediately bring it to the attention of your immediate Supervisor or the competent person on the job site.

Scaffold Safety

A scaffold, by definition, is any temporary elevated platform and its supporting structure used for supporting employees or materials or both. Because of the numerous types of scaffolds, the infinite possible combinations of uses, the various surface features on which the scaffold may rest, and the varying conditions in which scaffolds may be used, it would be impossible to detail what to do in every situation. The goal of any safety program – including scaffold safety – is to eliminate the possibility of harm to employees while they are performing their duties.

Only safety harnesses, not belts, will be used in fall protection.

Leading causes for scaffold accidents and injuries are plank slippage, being struck by falling objects, and the actual collapse of the support structure or plankage.

Definitions

There are a number of terms and phrases which must be understood by all employees when dealing with scaffolds. Below are listed important definitions to aid in the understanding of this Program, however they are not all-inclusive. A complete list of definitions, including the many types of scaffolds and their individual components is found in 29 CFR 1926.450:

BODY HARNESS: a design of straps which may be secured about the employee in a manner to distribute the fall arrest forces over at least the thighs, pelvis, waist, chest, and shoulders with means for attaching it to other components of a personal fall arrest system.

COMPETENT PERSON: one who is capable of identifying existing and predictable hazards in the surrounding or working conditions which are unsanitary, hazardous, or dangerous to employees, and who has authorization to take prompt corrective measures to eliminate them.

EXPOSED POWER LINES: electrical power lines which are accessible to employees and which are not shielded from contact. Such lines do not include extension cords or power tool cords.

FAILURE: load refusal, breakage, or separation of component parts. Load refusal is the point where the ultimate strength is exceeded.

GUARDRAIL SYSTEM: a vertical barrier consisting of, but not limited to, toprails, midrails, and posts erected to prevent employees from falling off a scaffold platform or walkway to lower levels.

LANDING: a platform at the end of a flight of stairs.

LIFELINE: a component consisting of a flexible line that connects to an anchorage at one end to hang vertically (vertical lifeline), or that connects to anchorages at both ends to stretch horizontally (horizontal lifeline), and which serves as a means for connecting other components of a personal fall arrest system to the anchorage.

LOWER LEVELS: areas below the level where the employee is located and to which an employee can fall. Such areas include, but are not limited to, ground levels, floors, roofs, ramps, runways, excavations, pits, tanks, materials, water, and equipment.

MAXIMUM INTENDED LOAD: the total load of all persons, equipment, tools, materials, transmitted loads, and other loads reasonably anticipated to be applied to a scaffold or scaffold component at any one time.

OPEN SIDES AND ENDS: the edges of a platform that are more than 14 inches away horizontally from a sturdy, continuous, vertical surface (such as a building wall) or a sturdy, continuous, horizontal surface (such as a floor), or a point of access. Exception: For plastering and lathing operations, the horizontal threshold distance is 18 inches.

PERSONAL FALL ARREST SYSTEM: a system used to arrest an employee's fall. It consists of an anchorage, connectors, a body harness and may include a lanyard, deceleration device, lifeline, or combinations of these.

PLATFORM: a work surface elevated above lower levels. Platforms can be constructed using individual wood planks, fabricated planks, fabricated decks, and fabricated platforms.

QUALIFIED PERSON: one who, by possession of a recognized degree, certificate, or professional standing, or who by extensive knowledge, training, and experience, has successfully demonstrated his/her ability to solve or resolve problems related to the subject matter, the work, or the project.

RATED LOAD: the manufacturer's specified maximum load to be lifted by a hoist or to be applied to a scaffold or scaffold equipment.

SCAFFOLD: any temporary elevated platform (supported or suspended) and its supporting structure (including points of anchorage) used for supporting employees or materials or both.

UNSTABLE OBJECTS: items whose strength, configuration, or lack of stability may allow them to become dislocated and shift and therefore may not properly support the loads imposed on them. Unstable objects do not constitute a safe base support for scaffolds, platforms, or employees.

Examples include, but are not limited to, barrels, boxes, loose brick and concrete blocks.

Guidelines for Scaffold Use

ALL SCAFFOLDS

Employees who work on any type of scaffold must follow the below listed guidelines:

a. Scaffolds and scaffold components shall not be loaded in excess of their maximum intended loads or rated capacities, whichever is less.

b. Scaffolds and scaffold components will be inspected for visible defects by a competent person before each work shift and after any occurrence which could affect a scaffold's structural integrity.

c. Damaged or weakened parts will be immediately replaced.

d. Scaffolds shall be erected, moved, dismantled, or altered only under the supervision and direction of a competent person qualified in scaffold erection, moving, dismantling, or alteration. Such activities shall be performed only by experienced and trained employees selected for such work by the competent person.

e. Work on or from scaffolds is prohibited during storms or high winds unless a competent person has determined that it is safe for employees to be on the scaffold and these employees are protected by a personal fall arrest system or wind screens.

f. Personnel may not work on scaffolds covered with snow, ice or other slippery material except to remove the material with extreme care.

g. Where swinging loads are being hoisted onto or near scaffolds such that the loads might contact the scaffold, tag lines or equivalent measures to control the loads shall be used.

h. Debris shall not be allowed to accumulate on platforms.

i. Make-shift devices on top of scaffold platforms shall not be used to increase the working level height of employees.

j. Guardrails should have smooth surfaces to prevent puncture, laceration, or snagging injuries.

k. Make-shift parts will not be used. A nail is not a substitute for a pin.

SUPPORTED SCAFFOLDS

Employees who work on supported scaffolds must follow the below listed rules and guidelines. These guidelines cover most, but not all situations. The competent person will address unusual situations.

a. Each platform unit on all working levels of a scaffold shall be fully planked or decked between the front uprights and the guardrail supports and each platform unit shall be installed so that the space between adjacent units and the space between the platform and the uprights is no more than 1 inch wide (where feasible.)

b. Supported scaffolds must have a height to base (including outrigger supports, if used) width ratio of no more than 4:1 unless restrained from tipping by guying, tying, bracing, or equivalent means. The competent person will direct the procedures for prevention of tipping.

c. Supported scaffold poles, legs, posts, frames, and uprights must rest on **base plates AND** mud sills or other adequate firm foundation.

Note: Base plates must always be used on supported scaffolds

1. Footings must be level, sound, rigid, and capable of supporting the loaded scaffold without settling or displacement.
2. Unstable objects cannot be used to support scaffolds or platform units.
3. Unstable objects shall not be used as working platforms.
4. Front-end loaders and similar pieces of equipment shall not be used to support scaffold platforms unless they have been specifically designed by the manufacturer for such use.
5. Fork-lifts shall not be used to support scaffold platforms unless the entire platform is attached to the fork and the fork-lift is not moved horizontally while the platform is occupied.

d. Supported scaffold poles, legs, posts, frames, and uprights shall be plumb and braced to prevent swaying and displacement.

e. Scaffolds shall not be moved horizontally while employees are on them unless they have been designed by a registered professional engineer specifically for such movement or, in the case of mobile scaffolds:

1. The surface on which the scaffold is being moved is within 3 degrees of level and free of pits, holes, and obstructions.
2. The height to base width ratio of the scaffold during movement is two to one or less.
3. Outrigger frames, when used, are installed on both sides of the scaffold.
4. When power systems are used, the propelling force is applied directly to the wheels and does not produce a speed in excess of 1 foot per second.
5. No employee is on any part of the scaffold which extends outward beyond the wheels, casters, or other supports.
6. Before the scaffold is moved, each employee on the scaffold must be made aware of the move.

SUSPENDED SCAFFOLDS

Employees who work on suspended scaffolds must follow the below listed rules and guidelines. These guidelines cover most, but not all situations. The competent person will address unusual situations.

a. All suspension scaffold devices shall rest on surfaces capable of supporting at least 4 times the load imposed on them by the scaffold operating at the rated load of the hoist (or at least 1.5 times the load imposed on them by the scaffold at the stall capacity of the hoist, whichever is greater).

b. Direct connections on suspension scaffolds must be evaluated before use by a competent person who shall confirm that the supporting surfaces are capable of supporting the loads to be imposed.

c. Counterweights shall be made of non-flowable material. Sand, gravel and similar materials that can be easily dislocated may not be used as counterweights.

1. Only items specifically designed as counterweights shall be used as counterweights. Construction material shall not be used as counterweights.
2. Counterweights shall not be removed from an outrigger beam until the scaffold is disassembled.

d. The use of repaired wire rope as suspension rope is prohibited.

e. Wire ropes shall not be joined together except through the use of eye splice thimbles and secured by eye splicing or equivalent means.

f. Wire ropes shall be inspected for defects by a competent person prior to each work shift and after every occurrence which could affect a wire rope's integrity. Wire ropes will be **replaced** if any of the following conditions exist:
   1. Any physical damage which impairs the function and strength of the rope.
   2. Kinks that might impair the tracking or wrapping of rope around the drum(s) or sheave(s).
   3. Six randomly distributed broken wires in one rope lay or three broken wires in one strand in one rope lay.
   4. Abrasion, corrosion, scrubbing, flattening or peeling causing loss of more than one third of the original diameter of the outside wires.
   5. Heat damage caused by a torch or any damage caused by contact with electrical wire.
   6. Evidence that the secondary brake has been activated during an overspeed condition and has engaged the suspension rope.

g. Gasoline-powered equipment and hoists shall not be used on suspension scaffolds.

h. Gears and brakes of power-operated hoists used on suspension scaffolds shall be enclosed.

i. Manually operated hoists shall require a positive crank force to descend.

Guidelines for the Control of Electrical Hazards

To prevent the possibility of electrical shock, neither the scaffold nor any conductive material handled on the scaffold shall come closer to exposed and energized power lines as noted below:

INSULATED POWER LINES

Voltage	Minimum Distance	Alternatives
Less than 300 volts	3 feet	
300 volts to 50 kv	10 feet	
More than 50 kv	10 feet plus 0.4" for each 1 kv over 50 kv	2 X's the length of the line insulator, but never less than 10 feet

UNINSULATED POWER LINES

Voltage	Minimum Distance	Alternatives
Less than 50 kv	10 feet	
More than 50 kv	10 feet plus 0.4" for each 1 kv over 50 kv	2 X's the length of the line insulator, but never less than 10 feet

Scaffolds may be closer to power lines if it is necessary to accomplish the work, but only after the utility company or electrical system operator has been notified of the need to work closer, and the utility company or electrical system operator has de-energized or relocated the lines or installed protective coverings to prevent accidental contact with the lines.

When using 110 volt electrical power tools or lights, ground fault circuit breakers must be used. Electrical extension cords must be inspected for cuts or cracks in the insulation before use.

Guidelines for the Control of Fall Hazards

Each employee working on a scaffold more than 10 feet above a lower level must be protected from falling to that lower level as noted below:

SCAFFOLD TYPE	FALL PROTECTION REQUIREMENTS
Boatswains' Chair Catenary Scaffold Float Scaffold Needle Beam Scaffold Ladder Jack Scaffold	Personal Fall Arrest System
Single-Point Adjustable Suspension Scaffold Two-Point Adjustable Suspension Scaffold	Personal Fall Arrest System and a Guardrail System
Crawling Board	Personal Fall Arrest System;

(Chicken Ladder)	*Guardrail System or a ¾" diameter grabline or equivalent handhold securely fastened beside each crawling board.
Self-Contained Adjustable Scaffold	*Guardrail System when the platform is supported by the frame structure; by both a Personal Fall Arrest System and a *Guardrail System when the platform is supported by ropes.
Walkway Located within Scaffold	*Guardrail System installed within 9½" of a and along at least one side of the Walkway.
Supported Scaffolds used Overhand Bricklaying	Personal Fall Arrest System or a *Guardrail System (except at the side next to the wall while performing being laid.)
All Other Scaffolds not specified above	Personal Fall Arrest System or a *Guardrail System

*Guardrail Systems must have a minimum 200 pound toprail capacity.

Special Precautions for the Prevention of Falling

Planking Requirements

Plank slippage causes falls and falls cause injuries. Below are requirements for platforms and/or planks used on scaffolds and walkways:

A. Each platform unit (e.g., scaffold plank, fabricated plank, fabricated deck, or fabricated platform) shall be installed so that the space between adjacent units and the space between the platform and the uprights is no more than 1 inch wide.
   1. Exceptions to the above:
      a. When a wider space is necessary (for example, to fit around uprights when side brackets are used to extend the width of the platform). In this instance, the platform must be planked or decked as fully as possible and the remaining open space between the platform and the uprights shall not exceed 9½", or when planking or decking is used solely for walkways or solely for use by personnel erecting or dismantling the scaffold. In these instances, only the planking the competent person establishes as necessary to provide safe working conditions is required.

B. Each scaffold platform and walkway shall be at least 18 inches wide.
   1. Exceptions to the above:
      a. Each ladder jack scaffold, top plate bracket scaffold, roof bracket scaffold, and pump jack scaffold shall be at least 12 inches wide.
      b. There is no minimum width for boatswain's chairs.
      c. Where working areas are so narrow that platforms and walkways cannot be at least 18 inches wide, the platforms and walkways shall be as wide as feasible. In these instances, personnel shall be protected from fall hazards by the use of guardrails and/or personal fall arrest systems regardless of the height.

C. The front edge of all platforms shall not be more than 14 inches from the face of the work unless guardrail systems are erected along the front edge and/or fall arrest systems are used.
   1. Exceptions to the above:
      a. For outrigger scaffolds, the maximum distance from the face of the work shall be 3 inches.
      b. For plastering and latching operations, the maximum distance from the face of the work shall be 18 inches.

D. Each end of a platform unless cleated or otherwise restrained by hooks or equivalent means, shall extend over the centerline of its support by at least 6 inches and not more than:

   1. Twelve (12) inches for a platform 10 feet or less in length unless the platform is designed and installed so that the cantilevered* portion of the platform is able to support personnel and/or material without tipping, or has guardrails which block access to the cantilevered end.

2. Eighteen (18) inches for a platform greater than 10 feet in length unless it is designed and installed so that the cantilevered* portion of the platform is able to support personnel without tipping or has guardrails which block access to the cantilevered end.

***Note: Cantilevered portion of the platform is the portion of the platform which extends beyond the support by 12 or 18 inches.**

E. On scaffolds where scaffold planks are abutted to create a long platform, each abutted end shall rest on a separate support surface. The use of common support members such as "T" sections to support abutting planks or hook on platforms designed to rest on common support is acceptable.

F. Where platforms are overlapped to create a long platform, the overlap shall occur only over supports and shall not be less than 12 inches unless the platforms are nailed together or otherwise restrained to prevent movement.

G. At points of a scaffold where the platform changes direction, such as turning a corner, any platform that rests on a bearer at an angle other than a right angle shall be laid first; platforms which rest at right angles over the same bearer shall be laid second on top of the first platform.

H. With the exception that the edges may be marked for identification, wood platforms shall not be covered with opaque finishes. Platforms may be coated with wood preservatives, fire-retardant finishes, and slip-resistant finishes as long as the coatings allow the actual wood to be seen. This is so the wood platforms may be inspected for damage and/or deterioration.

I. Scaffold components manufactured by different manufacturers cannot be intermixed unless the components fit together without force and the scaffold's structural integrity, as determined by a competent person, is maintained.

J. Scaffold components made of dissimilar metals shall not be used together unless a competent person has determined that galvanic action will not reduce the strength of any component below acceptable levels.

Fall Protection During Erection & Dismantling of Supported Scaffolds

Supported Scaffolds: The competent person must determine the feasibility and safety of providing fall protection for employees erecting and dismantling supported scaffolds.

Suspended Scaffolds: Fall protection for those erecting and dismantling suspended scaffolds is possible because the anchorage points used for supporting the scaffold would certainly support a fall protection system. Therefore, fall protection will be utilized for personnel erecting or dismantling suspended scaffolds.

Guidelines for the Control of Falling Objects

All personnel working on a scaffold must wear hard hats. Further protection from falling objects will be provided, if needed, by toeboards*, screens, or guardrail systems; or through the erection of debris nets, catch platforms, or canopy** structures that contain or deflect the falling objects.

Objects that are too heavy or massive to be prevented from falling by the above measures will be kept away from the edge of the scaffold and secured as necessary to prevent their falling.

Where there is a possibility of falling objects (tools, materials, or equipment), the below safeguards must be implemented:

a. The area below the scaffold to which objects can fall shall be barricaded and employees shall not be permitted to enter the hazard area, **or**
b. A toeboard will be erected along the edge of platforms more than 10 feet above lower levels for a distance sufficient to protect employees below.

When tools, material, or equipment are piled to a height higher than the top edge of the toeboard, the below listed safeguards must be implemented:

a. Paneling or screening extending from the toeboard or platform to the top of the guardrail shall be erected for a distance sufficient to protect employees below, **or**
b. A guardrail system shall be installed with openings small enough to prevent passage of potential falling objects, **or**
c. A canopy structure, debris net or catch platform strong enough to prevent passage of potential falling objects shall be erected over the employees below.

***Note: Toeboards must be capable of withstanding, without failure, a force of at least 50 pounds applied in any downward or horizontal direction and be at least 3½" high from the top edge of the walking/working surface. Further, toeboards must be secured to the outermost edge of the platform and not have more than ¼" clearance above the walking/working surface. Toeboards must either be solid or have openings not over 1" in the greatest dimension.**

****Note: Canopies used for falling object protection must be installed between the falling object hazard and the employees below.**

Access

Two feet – 24 inches – is the height at which some sort of access is required to reach a scaffold platform. When a scaffold platform is two (2) feet above or below the point of access (often the ground level), portable ladders, hook-on ladders, ramps, walkways, ladder stands, etc. must be used. Never use a crossbrace as a means of getting on or off a scaffold.

Hook-on and attachable ladders must:

a. Be positioned so they do not tip the scaffold.
b. Have the bottom rung within 24 inches of the supporting level.
c. Have rest platforms at least at 35-foot vertical intervals when used on supported scaffolds.
d. Be designed for use with the scaffold being used.
e. Have a minimum spacing between rungs of 16 ¾ inches and a minimum rung length of 11 ½ inches.

Stairway type ladders have essentially the same requirements except that:

a. The rest platforms must be at the 12 foot (maximum) vertical level.
b. The minimum step width is 16 inches (mobile scaffold stairway-type ladders: 11 ½ inches).
c. Slip-resistant treads are required on all steps and landings.

Stair towers, if used, must have the bottom step within 24 inches of the supporting level and have:

a. A toprail and midrail (stair rail) on each side.

b. A landing platform at least 18 inches by 18 inches at each level.
c. A width of 18 inches between stair rails.
d. Resistant surfaces on treads and landings.

Employees must be able to safely get on and off a scaffold platform and at 24 inches, you will need a specific method of access.

General Versus Specific Scaffold Safety Guidelines

General safety guidelines apply to all situations. In all situations, employees must be aware of:

a. Potential electrical hazards, fall hazards, and falling object hazards and how to eliminate them.
b. The proper use of scaffolds and the proper handling methods of materials on the scaffold being used.
c. The maximum intended load and the load-carrying capacities of the scaffold being used and never exceeding these limits.

Within the broad categories of suspended and supported scaffolds, there are many specific types of scaffolds – each with its own limitations and special characteristics. Each job site has its own unique ground composition on which a supported scaffold is erected, or unique attachment points for suspended scaffolds. The competent person on the job site will instruct affected employees on any unusual or unique items that must be known about a specific circumstance.

Training

Interactive training will be given to all employees who will be performing work on scaffolds by a competent person; it will focus on the hazards associated with the type(s) of scaffolding used on our job site, as well as the methods to minimize or eliminate those hazards.

For those employees who will be erecting, disassembling, moving, operating, repairing, inspecting, or maintaining our scaffolds, the competent person will provide additional training applicable to their job requirements.

Retraining

Retraining will be provided should new types of scaffolding be introduced, conditions change, standards change, or on-the-job performance indicate that a particular employee has not retained the required proficiency in scaffold safety.

Additionally, retraining will be conducted when changes at the job site present a hazard about which an employee has not been previously trained; when changes in fall protection, falling objects protection, or equipment present a hazard which an employee has not been previously trained.

APPENDIX E

FIELD LOG TEMPLATES

C&S Engineers, Inc.
141 Elm Street, Suite 100
Buffalo, New York 14203
Phone: 716-847-1630
Fax: 716-847-1454

TEST PIT

Test Pit No.					
Sheet 1 of:					
Project No.:					
Project Name:				***Start Date:***	
Location:		***Operator:***		***Finish Date:***	
Client:		***Equipment:***		***Inspector:***	

Depth (ft)	Sample No.	Symbol	Exc. Depth	MATERIAL DESCRIPTION (c - coarse, m - medium, f - fine; a - and - 35-50%, s - some - 20-35%, l - little - 10-20%, t - trace - 0-10%; S - Sand, $ - Silt, G - Gravel, C - Clay, cly - clayey)	COMMENTS (e.g., caving of sidewalls, excavation difficulties, PID readings)
1					
2					
3					
4					
5					
6					
7					
8					
9					
10					
11					
12					
13					
14					
15					

C&S Engineers, Inc.
141 Elm Street, Suite 100
Buffalo, New York 14203
Phone: 716-847-1630
Fax: 716-847-1454

Well Sampling Field Data Sheet

Well Casing Unit Volume (gal/l.f.)		
1¼" = 0.08	2" = 0.17	3" = 0.38
4" = 0.66	6" = 1.5	8" = 2.6

Client Name: _____
Site Name: _____
Project No.: _____
Field Staff: _____

WELL DATA

Date									
Well Number									
Diameter (inches)									
Total Sounded Depth (feet)									
Static Water Level (feet)									
H_2O Column (feet)									
Pump Intake (feet)									
Well Volume (gallons)									
Amount to Evacuate (gallons)									
Amount Evacuated (gallons)									

FIELD READINGS

Date	Stabilization Criteria								
Time									
Volume Extracted	gallons								
Static Water Level (feet)	NA								
pH (Std. Units)	+/-0.1								
Conductivity (mS/cm)	3%								
Turbidity (NTU)	10%								
D.O. (mg/L)	10%								
Temperature (ºC) (ºF)	3%								
ORP[3](mV)	+/-10 mv								
Appearance									
Free Product (Yes/No)									
Odor									
Comments:									

C = Clear T = Turbid ST = Semi Turbid VT = Very Turbid

SAMPLE DATA

Sample Date									
Sample Time									
Sampler Initials									
Sample ID									
	EXAMPLES: MW-01, MW-101								
Dupe Collected?	Yes	No		ID:					
MS Collected?	Yes	No		ID:					
MSD Collected?	Yes	No		ID:					
Trip Blank Collected?	Yes	No		ID:					
Equip. Blank Collected?	Yes	No		ID:					
	EXAMPLES: Dupe-01, MS-01, MSD-01, TB-01, EB-01								

C&S COMPANIES	**C&S Engineers, Inc.** 141 Elm Street, Suite 100 Buffalo, New York 14203 Phone: 716-847-1630 Fax: 716-847-1454	**BORING LOG**	***Boring No.***
			Sheet 1 of:
			Project No.:

Project Name:	Hope on Main BCP							***Surface Elev.:***	
Location:	954 and 1000 Main Street							***Datum:***	
Client:	SAB Hope LLC							***Start Date:***	
Drilling Firm:	NW Contracting							***Finish Date:***	
Groundwater	***Depth***	***Date & Time***	***Drill Rig:***					***Inspector:***	
While Drilling:			***Casing:***		***Rock Core:***		***Undist:***		
Before Casing Removal:			***Sampler:***		***Other:***				
After Casing Removal:			***Hammer:***						

(N -- No. of blows to drive sampler 12" w/140 lb. hammer falling 30" ASTM D-1586, Standard Penetration Test)

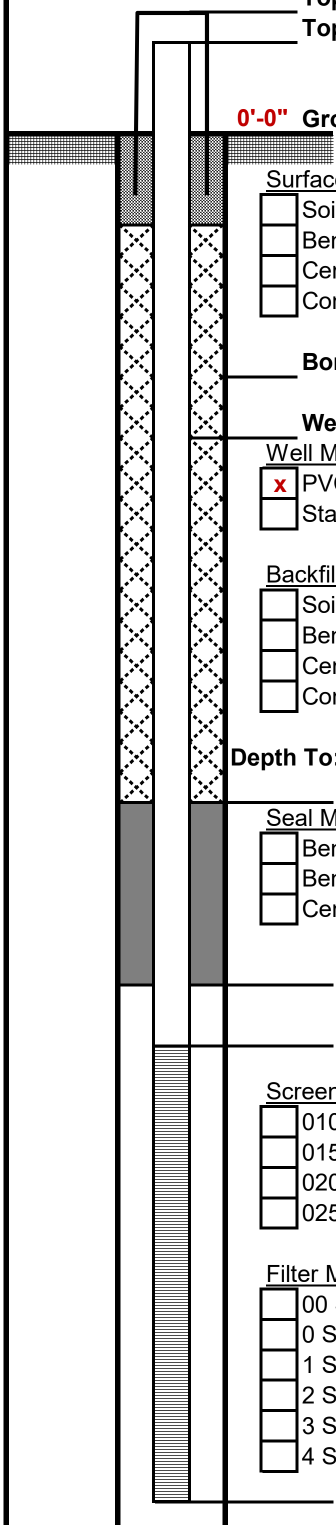
Depth (ft)	Sample No.	Symbol	Blows on Sampler per 6"	c - coarse m - medium f - fine **MATERIAL DESCRIPTION** S - Sand, $ - Silt, G - Gravel, C - Clay, cly - clayey a - and - 35-50% s - some - 20-35% l - little - 10-20% t - trace - 0-10%	**COMMENTS** (e.g., N-value, recovery, relative moisture, core run, RQD, % recovered)
1					
2					
3					
4					
5					
6					
7					
8					
9					
10					
11					
12					
13					
14					
15					
16					
17					
18					
19					
20					
21					
22					
23					

C&S Engineers, Inc.
141 Elm Street, Suite 100
Buffalo, New York 14203
Phone: 716-847-1630
Fax: 716-847-1454

GROUNDWATER OBSERVATION WELL CONSTRUCTION LOG

		Well No.	
		Project No.:	
		Surface Elev.:	
Project Name:		***Datum:***	
Location:		***Start Date:***	
Client:		***Finish Date:***	
Drilling Firm:		***Inspector:***	
Drill Rig:		***Casing:***	

Notes: (provide description of observation well location, method of construction, development method and any other information)



Top Protective Casing

Top of Riser

0'-0" **Ground Surface**

Surface Backfill Material
- [ ] Soil Cuttings
- [ ] Bentonite Slurry
- [ ] Cement/Bentonite Grout
- [ ] Concrete

Bore Hole Diameter

Well Diameter

Well Material
- [x] PVC
- [ ] Stainless Steel

Backfill Material
- [ ] Soil Cuttings
- [ ] Bentonite Slurry
- [ ] Cement/Bentonite Grout
- [ ] Concrete

Depth To:

Top of Seal

Seal Material
- [ ] Bentonite Chips/Pellets
- [ ] Bentonite Slurry
- [ ] Cement/Bentonite Grout

Top of Filter Pack

Top of Screen

Screen Slot Size
- [ ] 010 in
- [ ] 015 in
- [ ] 020 in
- [ ] 025 in

Filter Material
- [ ] 00 Sand Pack
- [ ] 0 Sand Pack
- [ ] 1 Sand Pack
- [ ] 2 Sand Pack
- [ ] 3 Sand Pack
- [ ] 4 Sand Pack

Bottom of Screen

Bottom of Bore Hole

Groundwater Measurement Data

Date	Time	Depth to Water	Water Elevation	Tide Status

APPENDIX F

FISH & WILDLIFE RESOURCE IMPACT ANALYSIS CHECKLIST

Appendix D

FWIA Checklist

Step I Site Description

A. Site Maps

Did you include:

1. Topographic map?
2. Covertype map?
3. Drainage map?
4. Are maps legible?

B. Description of Fish and Wildlife Resources

1. Are covertypes adequately described?
2. Are typical species associated with the site identified?
3. Have areas of stress been identified?

C. Description of Fish and Wildife Resource Value

1. Is a qualitative assessment of habitat value included?
2. Is an assessment of the value of fish and wildlife resources to humans included?

D. Identification of Applicable Fish and Wildlife Regulatory Criteria

1. Are any of the following NYS laws, rules,regulations and criteria applicable?

   a. **Environmental Conservation Law - Chapter 43-B of the Consolidated Laws**

      Article 11, Fish and Wildlife

      § 11-0503. Polluting streams prohibited.

      § 11-0515. Licenses to collect,possess, or sell for propagation, scientific or exhibition purposes.

      §11-0535. Endangered and threatened species.

Article 15, Water Resources

Title 5	Protection of Water
Title 27	Wild, Scenic and Recreational Rivers System

Article 24, Freshwater Wetlands

Article 25, Tidal Wetlands

b. **New York Codes, Rules and Regulations(6 NYCRR)**

Part 182	Endangered and Threatened Species of Wildlife; Species of Special Concern
Part 608	Use and Protection of Waters
Part 661	Tidal Wetlands - Land Use Regulations
Part 662	Freshwater Wetlands - Interim Permits
Part 663	Freshwater Wetlands Permit Requirements
Part 664	Freshwater Wetlands Maps and Classification
Part 665	Local Government Implementation of the Freshwater Wetlands Act and Statewide Minimum Land - Use Requlations for Freshwater Wetlands
Part 666	Administration and Management of the Wild, Scenic and Recreational Rivers System in New York State Excepting the Adirondack Park
Part 701	Classifications - Surface Waters and Groundwaters
Part 702	Derivation and Use of Standards and Guidance Values
Part 703	Surface Water and Groundwater Quality Standards and Groundwater Effluent Standards
Part 704	Criteria Governing Thermal Discharges
Part 800 ff.	Classes and Standards of Quality and Purity Assigned to Fresh Surface and Tidal Salt Waters

c. **Criteria and Guidelines**

Technical Guidance for Screening Contaminated Sediment, November 1993, NYSDEC Division of Fish and Wildlife.

Division of Water Technical and Operational Guidance Series 1.1.1.,Ambient

Water Quality Standards and Guidance Values. November 15, 1991, NYSDEC.

2. Have all appropriate federal laws, rules and criteria pertaining to fish and wildlife been identified?

Step II - Contaminant-Specific Impact Assessment

A. Pathway Analysis

Are resources, contaminants, sources of contaminants and pathways identified?

B. Criteria-Specific Analysis

1. Are numerical criteria identified?

2. If possible, are criteria derived when none exist?

3. Are comparisons made with site contaminant data?

C. Toxic Effect Analysis

1. Are toxicity information sources identified?

2. Are endangered, threatened or rare species evaluated if present?

Step III - Ecological Effects of Remedial Alternatives

A. Evaluation and Comparison of Remedial Alternatives.

1. Are contaminant related effects of alternatives compared?

2. Are non-contaminant effects of alternatives weighed?

B. Ecological Considerations in Selecting a Preferred Alternative.

1. Is the remedial alternative that best restores or maintains the productivity and biodiversity identified?

2. Is the weight of ecological concerns in selecting a preferred alternative discussed?

C. Conceptual Monitoring Program

1. Is the selected remedy evaluated to determine if a monitoring program is required?

2. Can the monitoring program determine if:

   a. remedial measures minimize risk to fish nd wildlife?

   b. remedial measures remain effective?

Step IV - Fish and Wildlife Requirements for Implementation of Remedial Actions.

A. Delineation of Affected Resources

Is a need for delineating resources identified?

B. Methods of Protection for Fish and Wildlife Resources

Are siltation and erosion controls placed on engineering drawings?

C. Restoration/Replacement of Resources

Should plans be presented for restoration or replacement of habitat?

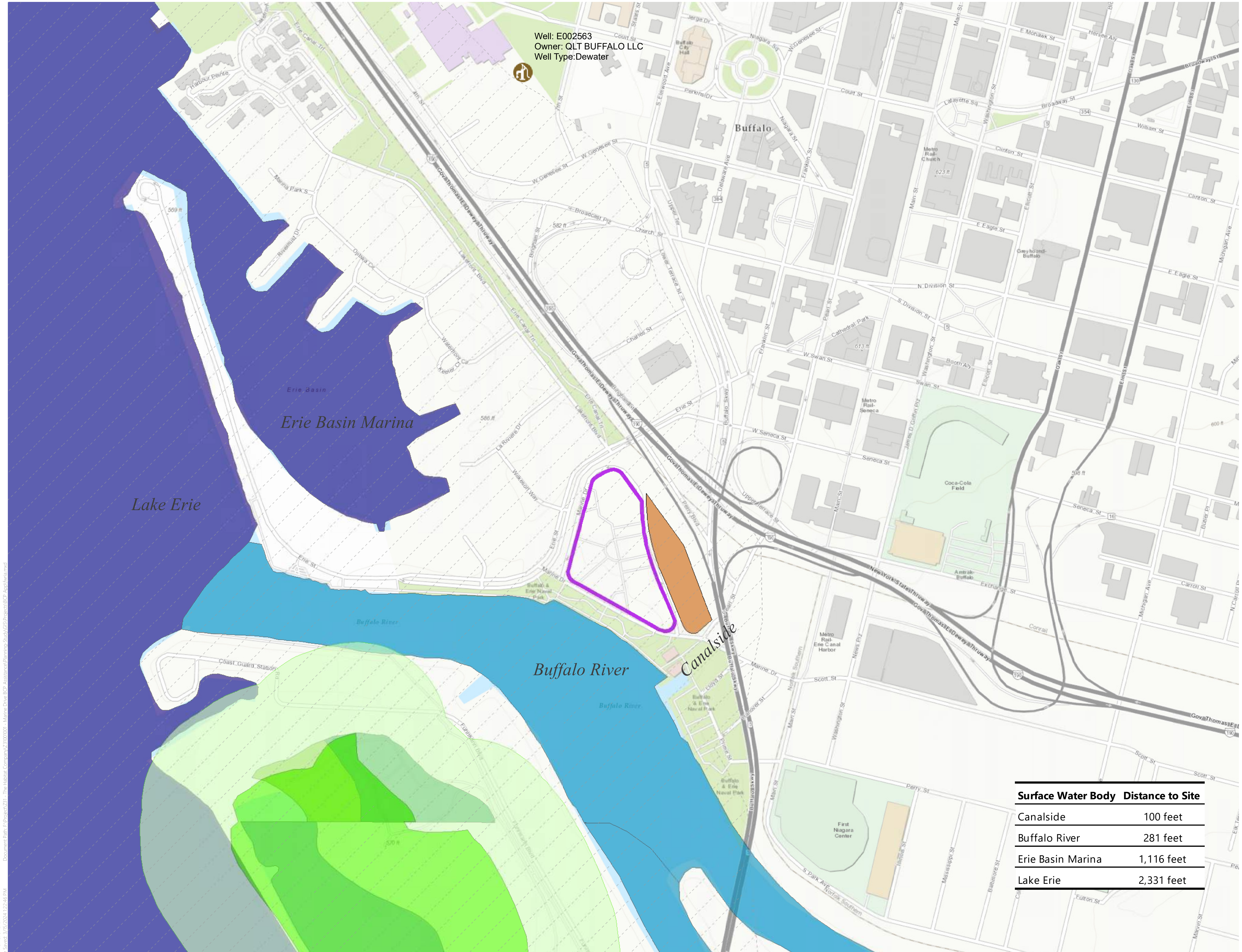
Step V - Monitoring Program

A. Design Compliance

Is a plan developed to insure that implementation complies with design specifications?

B. Remedial Action Effectiveness

Is the monitoring program capable of determining the remedial alternative's effectiveness?



Surface Water Body	Distance to Site
Canalside	100 feet
Buffalo River	281 feet
Erie Basin Marina	1,116 feet
Lake Erie	2,331 feet

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Figure 1

Fish & Wildlife Resources Impact Analysis

- Brownfield Cleanup Program (BCP) Boundary
- Apartments
- Vicinity of Lake

NYS Registered Water Wells

- NYS Registered Water Wells

State Regulated Freshwater Wetlands

- State Regulated Freshwater
- State Regulated Freshwater Wetlands Checkzone

Wetlands

- Estuarine and Marine
- Estuarine and Marine
- Freshwater Emergent
- Freshwater Forested/Shrub
- Freshwater
- Lake
- Other
- Riverine

N

0 250 500 1,000 Feet

1 in. = 500 feet
When printed at 11 in. by 17 in.

Marine Drive Apartments East
Phase 1 Site
Brownfield Cleanup Program

Sources: . Created by C&S Engineers, Inc.