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SLAB DEMOLITION AND SOIL EXCAVATION WORK PLAN

BUILDING 320B

Former IBM East Fishkill Facility
Hopewell Junction, New York

Prepared for Whiting-Turner Contracting Corporation
File No. 4757.00
June 2020

SANBORN HEAD ENGINEERING
Building Trust. Engineering Success.

Jessica LaClair
New York State Department of Environmental Conservation
Division of Environmental Remediation
Remedial Bureau E, 12th Floor
625 Broadway
Albany, New York 12233-7014

June 15, 2020
File No. 4757.00

Re: Slab Demolition and Soil Excavation Work Plan
Global Foundries Building 320B
Former IBM East Fishkill Facility
Hopewell Junction, New York
NYSDEC Site No. 314054

Dear Ms. LaClair:

On behalf of the Whiting-Turner Contracting Corporation under contract to Global Foundries (Global), Sanborn Head Engineering, P.C. is submitting this slab demolition and soil excavation work plan (hereinafter referred to as work plan) for a building modification project to be completed in the southwest portion of Building 320B (B320B) at the former IBM East Fishkill property. Note that Whiting Turner has contracted with a separate firm to conduct the work described herein. Sanborn Head is not responsible for implementation of this work plan, including, but not limited to, oversight of the work, soil screening / sampling, air monitoring, or implementation of engineering controls.

B320B is owned by Global Foundries (Global), and the proposed work is intended to support a building modification project further described below. The location of B320B and the property subdivision lines are shown on Figure 1.

The purpose of this work plan is to document the steps that will be taken by Global and its contractors to maintain compliance with the requirements of the site's Draft Interim Site Management Plan[1] (SMP), specifically the Intrusive Activities Work Plan[2] (IAWP) included as Appendix C to the Interim SMP. The work plan also serves as notification to the New York State Department of Environmental Conservation (NYSDEC) of the intrusive activities, as required by Section 1.0 of the IAWP. As required by the IAWP, this notification includes the following components:

1. A detailed description of the work to be performed;
2. A summary of environmental conditions anticipated in the work areas;
3. A schedule for the work;

[1] "Draft Interim Site Management Plan, Hudson Valley Research Park (Former IBM East Fishkill Facility), 2070 Route 52, Hopewell Junction, NY", dated August 2017.

[2] "Appendix C, Draft Intrusive Activities Work Plan, Hudson Valley Research Park (Former IBM East Fishkill Facility), 2070 Route 52, Hopewell Junction, NY", dated August 2017.

4. A summary of the applicable components of the IAWP;
5. A statement that the work will be performed in compliance with this IAWP and 29 CFR 1910.120;
6. Contractor's health and safety plan (HASP);
7. Identification of disposal facilities for potential waste streams; and
8. Identification of sources of anticipated backfill, along with all required chemical testing results.

Each of these components is described below.

1. A detailed description of the work to be performed

B320B is located at the northern edge of the B322 Groundwater Area of Concern (AOC) (Operable Unit 7 [OU7]), and is in the western portion of IBM's Area A Property Use Restriction Area as shown on Sheet UR1 of the IAWP.

The north-central and eastern portions of Building 320B house clean room manufacturing areas and labs. The western portion of the building is a former manufacturing area and is currently vacant. The interior and exterior areas of the building where the slab demolition and excavation work are proposed are located within and just outside the south-central portion of the building, as shown on Figures 1 and 2.

Global is proposing to construct a new penthouse over a portion of B320B to house mechanical equipment associated with expanded semiconductor manufacturing operations. The project will involve intrusive work activities to be completed below the floor slab and exterior pavement, including improvements to the existing foundation system, installation of a new loading dock, and utility relocation.

A Solid Waste Management Unit (SWMU) Closure Work Plan[3] that covers the closure of belowground utilities is being submitted to IBM and NYSDEC concurrent with this work plan. The floor slab demolition will be completed simultaneously with SWMU closure, and the soil excavation project will commence once the SWMU closure of subsurface pipes in the excavation area has been completed. In addition, a preliminary exploratory test pit may be conducted inside the building to assess the depth of existing footings.

The interior construction area is located in a contractor equipment and materials storage and staging area that is not routinely occupied and will be made inaccessible for that purpose during the work. Clean rooms are located to the north and east of the interior work area, the vacant former manufacturing area is located to its west, and a hallway and the exterior excavation area are located to its south.

The interior work will consist of the removal of the building floor slab over an area of approximately 12,000 square feet (sf) to be conducted simultaneously with SWMU closure

[3] "Work Plan for Decontamination/Closure of Building 320B Solid Waste Management Units (SWMUs), GlobalFoundries U.S. 2 LLC – Fab 10, Hopewell Junction, New York", prepared by D&B Engineers and Architects, P.C., Woodbury, NY, dated May 2020.

activities, followed by excavation to a depth of approximately 5 feet to construct new foundation elements. The work will be conducted in stages in order to decrease the potential entry of VOC-impacted soil vapor into the building space. The exterior excavation is proposed to cover an area of approximately 3,500 sf excavated to a depth of approximately 5 feet to relocate utilities and construct a new loading dock. Assuming 20% soil volume expansion upon excavation, the interior and exterior soil excavations will generate approximately 2,700 cubic yards (CY) and 800 CY of soil, respectively, for a total of approximately 3,500 CY of soil.

If an exploratory test pit is conducted, the existing floor slab will be removed over an area of approximately 50 sf, and soil will be excavated to a depth of between 5 and 10 feet below the floor slab. It is estimated that between approximately 10 and 20 CY of soil will be generated during excavation of the exploratory test pit.

Soil management procedures are described under Section 4 of this work plan. The excavated soil will either be re-used elsewhere on-Site or transported and disposed of off-Site, depending on the results of the environmental soil characterization completed in accordance with the "Drilling Work Plan" dated April 20, 2020, which was approved by NYSDEC on May 5, 2020. The excavations will either be backfilled with structural fill imported from an off-Site source, or soil that has been approved for on-Site reuse. The excavations will be restored with the pre-excavation surface material (i.e., concrete floor slab inside the building, and pavement or topsoil outside the building) upon completion of the project. If an exploratory test pit is conducted, a temporary, unreinforced concrete slab may be poured over the structural fill to serve as a direct contact and vapor barrier until foundation construction begins.

2. A summary of environmental conditions anticipated in the work areas

Historical Data

Previous environmental sampling work completed in the proposed work area of B320B included the collection of 8-hour indoor air samples by the former building owner, IBM, in 2010 and 2012 as part of its Vapor Intrusion RCRA Facility Investigation[4] (VI RFI). In that sampling, trichloroethene (TCE) and vinyl chloride (VC) were detected in indoor air at concentrations of up to 0.76 and 0.43 µg/m^3, respectively. Tetrachloroethene (PCE) was not detected above the laboratory reporting limit. Other compounds detected and their highest concentrations included CFC 11 (5.0 µg/m^3), CFC 12 (3.0 µg/m^3), CFC 113 (12 µg/m^3), toluene (7.3 µg/m^3) m,p-xylene (11 µg/m^3), o-xylene (2.2 µg/m^3), ethylbenzene (3.8 µg/m^3), carbon tetrachloride (0.72 µg/m^3), and acetone (55 µg/m^3).

Low levels of PCE, TCE, cis-1,2-dichloroethene (DCE), and CFC 113 (i.e., less than 5 µg/L each) were detected in overburden groundwater just to the south of B320B in 2018.[5]

[4] "Work Plan, RCRA Facility Investigation (RFI), VOC Source Assessment, IBM East Fishkill Facility, Hopewell Junction, New York", prepared by Sanborn Head Engineering, PC, dated June 2009.

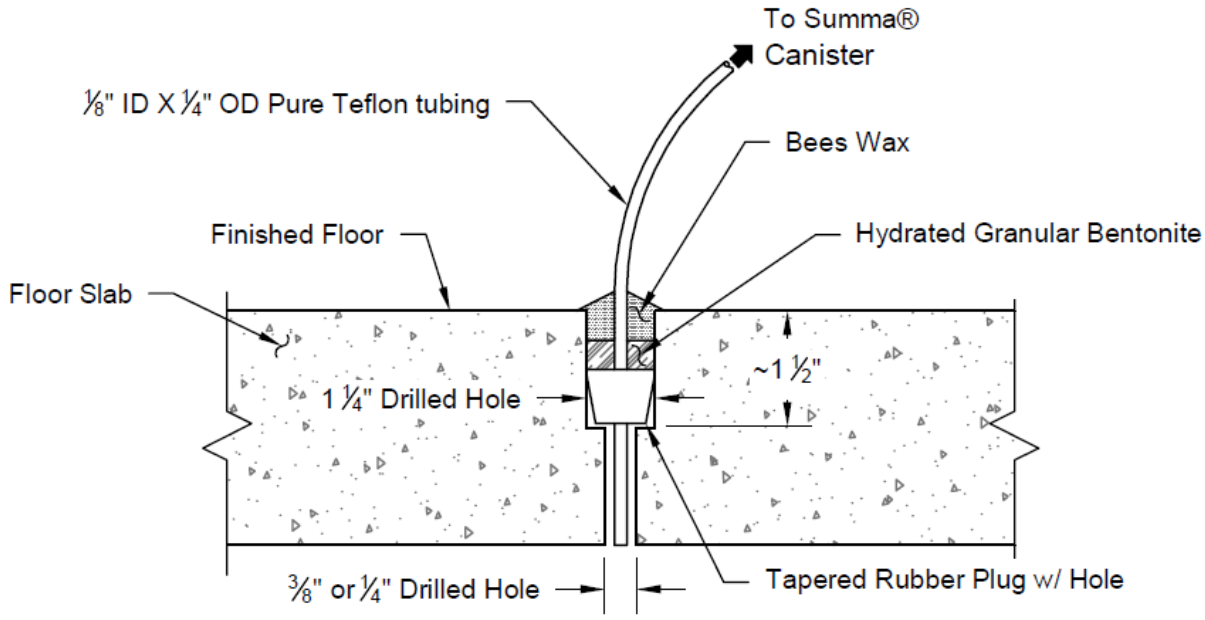
[5] "2018 Annual Corrective Action Status Report", prepared by Groundwater Sciences Corporation, dated May 30, 2019.

Subslab Vapor Sampling

Sanborn Head collected subslab vapor (SSV) samples from within the proposed work area on February 25, 2020 to assess the types of engineering controls that may need to be implemented during slab removal and soil excavation work to be protective of workers and building occupants. Four temporary SSV monitoring ports were installed at the locations shown on Figure 2 to sample subslab vapor in the area of the exploratory test pit (SSVB320B-001), as well as the larger interior excavation area for future foundation construction (SSVB320B-002 through -004). The results are presented below and have been incorporated into the procedures described in the applicable sections of this work plan.

The temporary SSV port locations were scanned for utilities by Underground Surveying of Brookfield, CT prior to installation. The temporary SSV ports were installed using a hammer drill, and an industrial vacuum equipped with a HEPA-filter was used to collect concrete chips and dust generated during the installation. The SSV ports consisted of ¼-inch-diameter Teflon tubing and were sealed at the slab surface with a layer of hydrated bentonite and beeswax. Refer to Exhibit 2.1 for construction details of the temporary SSV ports.

Exhibit 2.1 – Temporary Subslab Vapor Monitoring Port Schematic



The breathing zone was screened for the presence of total volatile organic compounds (VOCs) using a photoionization detector (PID) during concrete drilling and port installation. Total VOCs were not detected above the instrument reporting limit.

Subslab vapor samples were collected from the temporary SSV ports into 1-L SUMMA® canisters equipped with 1-hour flow controllers. Samples were submitted to Eurofins Air Toxics, Inc. (EATI) of Folsom, California for analysis of the site-specific list of VOCs established as part of the VI RFI using USEPA Method TO-15.

Subslab vapor was screened for total VOCs using a photoionization detector (PID) after the subslab vapor samples had been collected. Total VOCs were detected at concentrations of up to 4.1 parts per million by volume (ppmv) with the PID.

Subslab vapor analytical results are presented in Table 1, and laboratory analytical reports are provided in Appendix A. The compounds detected and their highest detected concentration are as follows: CFC-113 at 110,000 µg/m^3; tetrachloroethene (PCE) at 780 µg/m^3; trichloroethene (TCE) at 3,100 µg/m^3; cis-1,2-dichloroethene (cis-1,2-DCE) at 580 µg/m^3; toluene at 3,600 µg/m^3; and acetone at 2,000 µg/m^3.

The above results do not suggest the presence of grossly contaminated soil beneath the floor slab. To estimate the potential indoor air VOC concentrations that may arise from the open excavation, a simple mass-balance was calculated using the average subslab vapor concentrations, an assumed soil gas flow rate from the excavation, and room air exchange rate (assuming no additional fans) using Equation 1 below.

Equation 1 $C_1 * Q_1 = C_2 * Q_2$; or $C_2 = (C_1 * Q_1)/Q_2$

C_1 = SSV concentration (µg/m^3) – see Table 1
Q_1 = Soil gas flow rate from excavation into the room (m^3/hr)[6]
C_2 = Estimated indoor air concentration (µg/m^3) – see Table 2
Q_2 = Room ventilation rate (m^3/hr)[7]

The estimated indoor air VOC concentrations are provided in Table 2, and are compared to USEPA's Vapor Instruction Screening Level (VISL) target indoor air concentrations for commercial buildings, assuming a target hazard quotient (THQ) of 1.0 and a target risk (TR) of 1E-6. Estimated indoor air concentrations are also compared to the New York State Department of Health (NYSDOH) guidelines for PCE and TCE for continuous, lifetime exposure.[8]

With the exception of TCE, the average concentration of VOCs detected in soil gas resulted in estimated indoor air VOC concentrations well below the VISLs and NYSDOH guidelines (if available) with the full slab removed during construction. However, under this condition, the estimated TCE concentration exceeded both the VISLs and NYSDOH guidelines. Therefore, the slab demolition and foundation construction activities will be staged to decrease the amount of exposed soil at any given time. In addition, engineering controls will be implemented to draw the VOC-containing soil vapor outside the building, and to introduce fresh air into the room during the excavation, as further described in Section 4.

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6 Conservatively assumed a value of 5 m^3/min (300 m^3/hr), which is 1000 times higher than the default soil gas flow rate into a residential structure with coarse-grained soil for the Johnson and Ettinger model (0.005 m^3/min or 5 L/min).

7 Conservatively assumed an air exchange rate of 0.5 air exchanges per hour, which results in a room ventilation rate of 2,204 m^3/hr.

8 "Trichloroethene (TCE) in Indoor and Outdoor Air Fact Sheet", NYSDOH, August 2015 and "Tetrachloroethene (Perc) in Indoor and Outdoor Air Fact Sheet", NYSDOH, September 2013.

Based on the soil vapor screening results, it is unlikely that grossly contaminated soil will be encountered during the test pit excavation. However, it is noted that various types of subslab piping including solvent waste, industrial waste, fluoride waste, and acid drains, are present in the area of the test pit. Field screening will be completed during construction for visual indicators of gross contamination as well as PID screening for VOCs.

3. Schedule

Construction is tentatively scheduled to begin in late June 2020. It is anticipated that the interior and exterior construction is expected to take approximately three months to complete, including backfilling the excavations and placing a permanent or temporary floor slab inside the building, and replacement of existing ground covering (e.g., pavement, topsoil) outside the building.

4. Summary of the applicable components of the IAWP

Community Air Monitoring Plan – A Community Air Monitoring Plan (CAMP) that describes required particulate and vapor monitoring to protect the neighboring community is attached as Appendix B to this work plan. The CAMP includes procedures and practices outlined under the NYSDOH Generic Community Air Monitoring Plan provided as Appendix 1A of DER-10, dated May 2010, as well as special requirements for working within an occupied building.

Continuous monitoring for VOCs and particulates will be conducted during concrete slab removal, SWMU closure, and interior and exterior ground intrusive activities.

In accordance with the special requirements for work areas within occupied structures, the continuous monitoring locations for VOCs and particulates will be situated next to the nearest potentially exposed building occupants.

There are no return air system intakes within the area of B320B where the excavation is occurring. Potential air pathways relative to adjoining rooms were not identified during a site reconnaissance. However, if pathways are identified in the future, the monitoring locations will be adjusted accordingly.

As discussed in subsequent sections, engineering controls will be used to create negative air pressure within the building space and will be vented outside the building. In addition, outside makeup air will be brought into the room to increase air exchange.

Prior to beginning the concrete slab removal, VOC background readings will be collected using a PID within adjacent occupied areas. In addition, daily VOC and particulate background readings will be collected at the established monitoring stations prior to the beginning of intrusive work.

Refer to Appendix B for a description of CAMP procedures and action levels. NYSDEC and NYSDOH will be notified by the end of the same day if VOCs reach the action levels specified in the CAMP, which results in work being suspended or shut down.

Engineering Controls (VOCs) – Based on the results of subslab vapor sampling, we expect limited VOC impacts to indoor air during slab removal and soil excavation. Air monitoring will be completed in accordance with the special requirements CAMP. The following engineering controls will be implemented for added protection.

- The room will be exhausted to provide negative pressure within the work area and to vent VOC vapors outside the building. The exhaust fan(s) will be operated 24/7 to decrease the potential for increased levels of VOCs in the building space at the beginning of the workday.

- Outside air will be actively introduced into the room. The fan(s) will be operated 24/7 to decrease the potential for increased levels of VOCs in the building space at the beginning of the workday.

- Fans will be set-up throughout the room to circulate air and create a larger mixing volume.

- Soil excavated from the building interior will be placed in a soil roll-off container at an exterior location to limit the potential for off-gassing inside the building. If small quantities of soil need to be temporarily stockpiled inside the building, the soil will be covered with plastic sheeting and secured to reduce the potential for off-gassing.

Engineering Controls (Dust) – Dust suppression will be conducted by wetting the concrete and excavation area with water as needed based on the results of the CAMP dust monitoring. In addition, power tools with integrated dust collection features will be used for cutting the floor slab if needed.

Soil Screening and Characterization – Visual, olfactory and instrument-based soil screening will be completed during soil excavation activities. In accordance with the IAWP, soils that do not exhibit evidence of environmental impact and are segregated for reuse as subgrade fill at depths greater than three feet below ground surface (in this case, below an impervious surface) will not undergo analytical characterization and may be re-used within the original excavation.

Soil will be screened for the presence of total VOCs using a PID during soil excavation activities. It is anticipated that the excavated material will be placed into roll-off containers and either transported to an on-Site soil stockpile for reuse, or sampled for off-Site disposal, depending on the results of the pending soil characterization sampling. If soil is encountered that appears to be significantly more impacted than surrounding soil based on visual observations and PID readings, the impacted soil may be segregated.

Stockpile Methods – Excavated soil will either be placed in roll-off containers or a soil stockpile, both of which would be located outside the building. Roll-offs and soil stockpiles will be covered with tarps or other suitable covers and secured. Stockpiles would also be placed on plastic.

If stockpiles are generated, they will be encircled with a berm and/or silt fence, straw bales, or other erosion control devices as needed near catch basins, surface waters and other discharge points. Stockpiles will be inspected at a minimum once each week and after every storm event of 0.5 inches or more.

Materials Excavation and Load-Out / Transportation / Disposal – Soil will be excavated using a hydraulic excavator with its exhaust directed through a scrubber and vented outside the building. Excavated soil will be transported directly to an exterior staging area. The floor slab will be cut using a concrete circular saw with integrated dust collection features with its exhaust directed to a scrubber.

If soil requires off-Site transportation and disposal, it will be managed in accordance with Sections 7.0 through 9.0 of the IAWP.

Materials Re-Use – Soil that remains on-Site for reuse will be managed in accordance with Section 10.0 of the IAWP.

Fluids Management – Groundwater is not anticipated to be encountered in the excavation based on water levels collected at nearby monitoring wells; therefore, excavation dewatering is not anticipated. However, if groundwater is unexpectantly encountered, dewatering fluids will by managed in accordance with Section 11.0 of the IAWP.

Cover System Restoration – Upon completion, the floor slab will be replaced in the building interior. The existing ground surface cover system will be replaced in exterior areas (e.g., pavement, topsoil). If an exploratory test pit is conducted, a temporary, unreinforced concrete slab will be placed over the structural fill to serve as a cover until the full-scale construction begins.

Backfill from Off-Site Sources – The excavations will either be backfilled with structural fill imported from an off-Site source, or soil that has been approved for on-Site reuse. Material from industrial sites, spill sites, or other environmental remediation sites or potentially contaminated sites will not be imported to the Site. Solid waste will not be imported to the Site.

All imported soils will meet the backfill and cover soil quality standards established in 6NYCRR 375-6.7(d). Imported backfill will meet the lower of protection of groundwater or the protection of public health restricted industrial soil cleanup objectives set forth in Table 375-6.8(b) of 6NYCRR Part 375.

Unless the material meets the gradation and source requirements for "material other than soil" specified in DER-10 Section 5.4(e)(5), imported material will be sampled and tested in accordance with DER-10 Section 5.4(e).

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

Stormwater Pollution Prevention – A SWPPP will not be required since the area of exterior soil disturbance and stockpiled on-Site and off-Site material will cover a footprint of less than one acre.

Contingency Plan – In accordance with Section 15.0 of the IAWP, appropriate sampling and notification procedures will be followed if unidentified contaminant sources are encountered. In addition, the excavation work will be suspended as needed until the situation can be adequately and safely addressed.

Odor Control Plan – Although not anticipated, if nuisance odors originating from the excavation are identified at the site boundary, or if odor complaints are received, work will be suspended and the source of odors will be identified and corrected. Potential engineering controls would include: (a) limiting the area of the open excavation and size of soil stockpiles; and (b) shrouding the open excavation with a tarp when active excavation is not occurring. In addition, soil stockpiles will be covered with tarps or other covers in accordance with the IAWP.

5. **A statement that the work will be performed in compliance with this IAWP and 29 CFR 1910.120**

The work performed under this work plan will be completed in accordance with the IAWP and 29 CFR 1910.120 (OSHA Hazardous Waste Operations and Emergency Response).

6. **Contractor's health and safety plan (HASP)**

Site-specific HASPs prepared by the contractor performing slab demolition and SWMU closure (Stryker Demolition & Environmental Services, LLC) and the consultant performing CAMP monitoring (D&B Engineers and Architects, P.C.) are included in Appendix C. The soil excavation portion of the project is in the bidding process. Once a contractor has been selected, the contractor's HASP will be submitted under separate cover.

7. **Identification of disposal facilities for potential waste streams**

Appropriate disposal facilities for the soil generated during excavation work will be evaluated by Whiting-Turner or its designee if needed based on the pending environmental characterization analytical results.

8. **Identification of sources of any anticipated backfill, along with all required chemical testing results.**

It is anticipated that structural fill from an off-Site source will be imported to backfill the excavation. The source of the fill material will be provided to NYSDEC prior to the material being transported to the Site. Alternatively, soil that has previously been approved for reuse on-Site may be used as backfill.

Please contact us if you have any questions.

Very truly yours,
SANBORN, HEAD ENGINEERING, P.C.

Jennifer H. Sanborn
Project Director

David Shea, P.E.
Sr. Vice President

JHS/DS:

Encl.	Figure 1	Building Location Plan
	Figure 2	Exploration Location Plan
	Table 1	Summary of Subslab Vapor Sample Analytical Results
	Table 2	Estimated Concentrations of VOCs in Indoor Air
	Appendix A	Analytical Laboratory Report
	Appendix B	Community Air Monitoring Plan w/Special Requirements
	Appendix C	Health and Safety Plans

cc:	Julia Kenney	NYSDOH	(w/enclosure via e-mail)
	Gary Marone	Global Foundries	(w/enclosure via e-mail)
	James Gorham	Whiting-Turner	(w/enclosure via e-mail)
	Brian Rotondo	Whiting-Turner	(w/enclosure via e-mail)

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FIGURES

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Figure 1

Building Location Plan

B320B Excavation Work Plan

Former IBM East Fishkill Facility
Hopewell Junction, New York

Drawn By: E. Wright
Designed By: J. Sanborn
Reviewed By: D. Shea
Project No: 4757.00
Date: June 2020

Figure Narrative

This figure shows the buildings at the former IBM East Fishkill facility. Building B320B is outlined. The general area of proposed excavation work is shaded. Refer to Figure 2 for additional details.

Legend

- Property Line
- Unlabeled features include wastewater treatment tanks, pump houses, trailers, and other structures and features not intended for human occupancy
- B320B — Indicates building number
- Indicates the location of B320B
- General area of proposed soil excavation work

GlobalFoundries
- Lot 1 GlobalFoundries U.S 2 LLC
- Lot 5 GlobalFoundries U.S 2 LLC

i.Park
- Lot 2 i.Park East Fishkill I LLC
- Lot 3 i.Park East Fishkill I LLC
- Lot 4 i.Park East Fishkill LLC
- Lot 6 i.Park East Fishkill LLC
- Lot 7 i.Park East Fishkill LLC
- Lot 8 i.Park East Fishkill LLC

- Subdivision (GlobalFoundries U.S. 2 LLC)
- Subdivision (i.Park East Fishkill LLC)
- Subdivision (i.Park East Fishkill I LLC)

N W E S

200' 100' 0 200' 400' Feet

SANBORN HEAD ENGINEERING

File:P:\2900s\2999.00\Graphics Files\CAD\B320B\Excavation WP\B320B_BldLocationPlan.dwg Plot Date: 3-6-20

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Last Edited By: ewright

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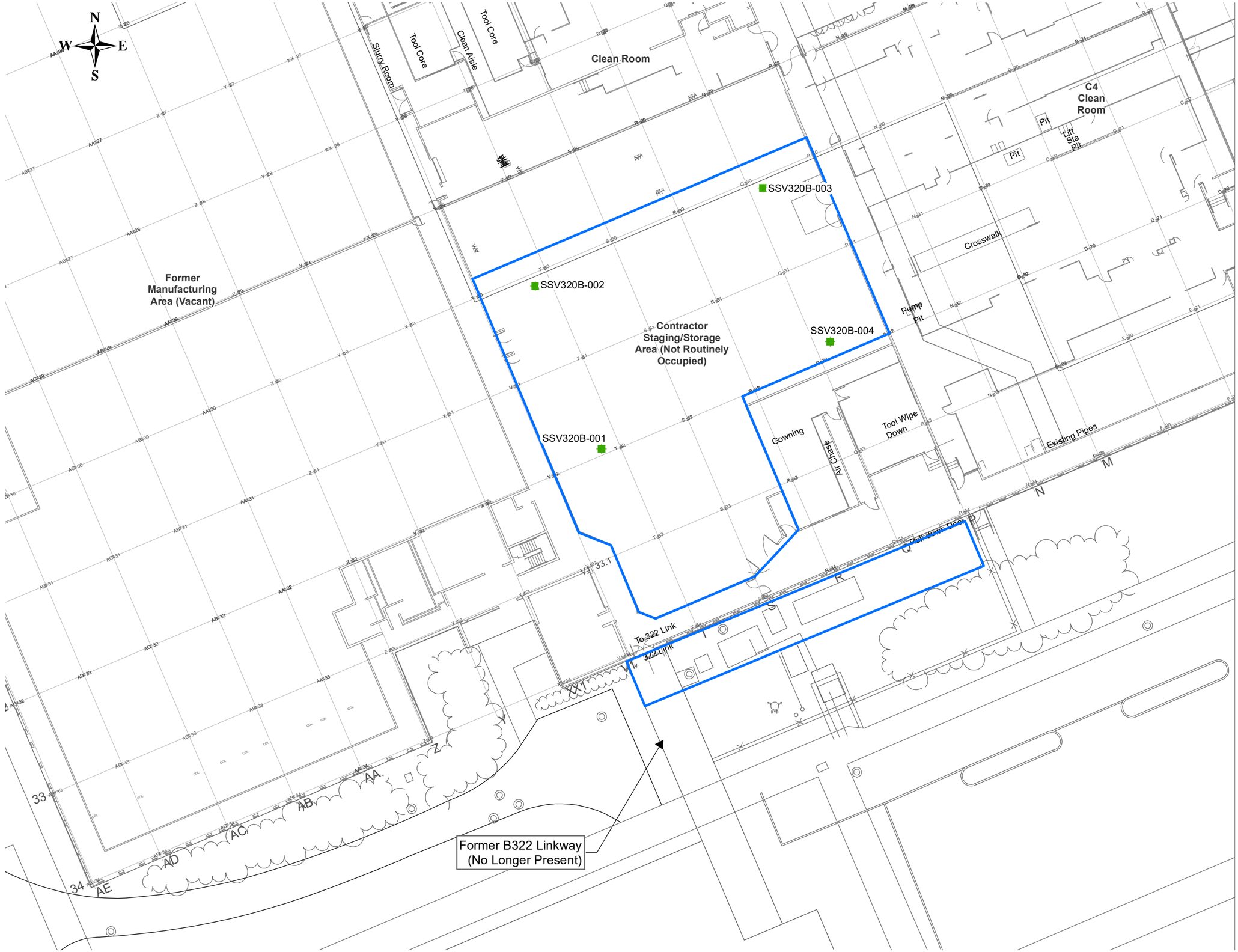

Figure 2

Excavation Location Plan

B320B Excavation Work Plan

Former IBM East Fishkill Facility

Hopewell Junction, New York

Drawn By:	E. Wright
Designed By:	J. Sanborn
Reviewed By:	J. Sanborn
Project No:	4757.00
Date:	June 2020

Figure Narrative

This figure shows the approximate proposed excavation areas in the interior and exterior areas of Building 320B. The figure also shows the locations of temporary soil vapor ports that were installed, sampled, and removed by Sanborn Head on February 25, 2020. The ports were sampled using 1-L Summa canisters over a period of approximately 1 hour.

Legend

- Temporary subslab vapor port
- Approximate area of proposed soil excavation

15 7.5 0 15 30 Feet

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TABLES

TABLE 1
Summary of Subslab Vapor Sample Analytical Results
Building 320B
Former IBM East Fishkill Facility
Hopewell Junction, New York

Analyte	Sample Location	SSVB320B-001	SSVB320B-002	SSVB320B-003	SSVB320B-004
	Collection Date	2/25/2020	2/25/2020	2/25/2020	2/25/2020
Acetone	µg/m³	2,000	<580	260	<290
Benzene	µg/m³	<240	<78	<6.5	<39
Carbon tetrachloride	µg/m³	<470	<150	<13	<77
CFC113 (Ethane, 1,1,2-trichloro-1,2,2-trifluoro-)	µg/m³	110,000	63,000	450	22,000
Chlorobenzene (Monochlorobenzene)	µg/m³	<340	<110	<9.3	<56
Dichlorobenzene (1,2-)	µg/m³	<450	<150	<12	<74
Dichlorobenzene (1,3-)	µg/m³	<450	<150	<12	<74
Dichlorobenzene (1,4-)	µg/m³	<450	<150	<12	<74
Dichlorodifluoromethane (CFC12)	µg/m³	<370	<120	<10	<60
Dichloroethene (1,1-)	µg/m³	<300	<96	<8.0	<48
Dichloroethene (cis-1,2-)	µg/m³	<300	180	580	<48
Ethylbenzene	µg/m³	<320	<100	<8.8	<53
Methylene Chloride (Dichloromethane)	µg/m³	<2600	<840	<70	<420
Tetrachloroethene (PCE)	µg/m³	680	780	380	350
Toluene	µg/m³	3,600 CN	<92	<7.6	<46
Trichlorobenzene (1,2,4-)	µg/m³	<2200	<720	<60	<360
Trichloroethane (1,1,1-)	µg/m³	<410	<130	<11	<67
Trichloroethene (TCE)	µg/m³	600	1,900	3,100	540
Trichlorofluoromethane (CFC11)	µg/m³	<420	<140	<11	<69
Vinyl chloride	µg/m³	<190	<62	<5.2	<31
Xylene (m,p-)	µg/m³	<320	<100	<8.8	<53
Xylene (o-)	µg/m³	<320	<100	<8.8	<53

Notes:

1. Samples were collected by Sanborn Head on the dates indicated in Summa canisters over an approximately 1-hour sampling period. The samples were analyzed by Eurofins Air Toxics, Inc. (EATI) of Folsom, California for the project-specific list of volatile organic compounds (VOCs) by United States Protection Agency (USEPA) Method TO-15 in the full scan mode.

2. Samples were collected from temporary subslab vapor monitoring ports that were removed after the samples were collected.

3. Results are presented in micrograms per cubic meter (µg/m³).

4. "<" indicates the analyte was not detected above the indicated reporting limit.
"CN" indicates high concentrations of VOCs required an off-line dilution using a Tedlar bag. Toluene is a common contaminant in Tedlar bags. Certification of the Tedlar bag lot indicates artifact concentrations of 5.8 ppbv (22 µg/m³) for Toluene. A CN-flag was applied to the Toluene concentration to indicate a high bias.

TABLE 2
Estimated Concentrations of VOCs in Indoor Air
Building 320B
Former IBM East Fishkill Facility
Hopewell Junction, New York

Analyte	Sample Location	SSVB320B-001		SSVB320B-002	SSVB320B-003	SSVB320B-004	Average SSV Concentration	Estimated IA Concentration with Full Slab Removal (µg/m³) - Note 2	VISL Output (µg/m³) - Note 3	NYSDOH Guidelines (µg/m³) - Note 4
	Collection Date	2/25/2020		2/25/2020	2/25/2020	2/25/2020				
Acetone	µg/m³	2,000		<580	260	<290	674	92	135,000	NE
CFC113 (Ethane, 1,1,2-trichloro-1,2,2-trifluoro-)	µg/m³	110,000		63,000	450	22,000	48,863	6,700	21,900	NE
Dichloroethene (cis-1,2-)	µg/m³	<300		180	580	<48	234	32	NE	NE
Tetrachloroethene (PCE)	µg/m³	680		780	380	350	548	75	47.2	30
Toluene	µg/m³	3,600	CN	<92	<7.6	<46	918	120	21,900	NE
Trichloroethene (TCE)	µg/m³	600		1,900	3,100	540	1,535	210	2.99	2

Notes:

1. Refer to Table 1 for additional notes.

2. Estimated indoor air concentrations (C_2) were calculated using the following equation: $C_1*Q_1 = C_2*Q_2$

Where:
C_1 = Average SSV concentration (µg/m³), including 1/2 reporting limit for non-detects
Q_1 = Vapor flow rate from excavation (m³/hr)
C_2 = Estimated indoor air concentration (µg/m³)
Q_2 = Room ventilation rate (m³/hr)
Refer to work plan text for definitions and assumptions.

3. VISL = USEPA Vapor Intrusion Screening Level. Commercial Use, target hazard quotient (THQ) of 1.0 and a target risk (TR) of 1E-6 for a worker exposed over a duration of 25 years.

4. NYSDOH Guideline Values are from "Trichloroethene (TCE) in Indoor and Outdoor Air Fact Sheet", NYSDOH, August 2015 and "Tetrachloroethene (Perc) in Indoor and Outdoor Air Fact Sheet", NYSDOH, September 2013.

5. NE = Not Established

APPENDIX A

LABORATORY REPORTS

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3/2/2020

Ms. Jennifer Sanborn

Sanborn, Head & Associates

20 Foundry Street

Concord NH 03301

Project Name:

Project #: 4757.00

Workorder #: 2002680

Dear Ms. Jennifer Sanborn

The following report includes the data for the above referenced project for sample(s) received on 2/26/2020 at Air Toxics Ltd.

The data and associated QC analyzed by TO-15 are compliant with the project requirements or laboratory criteria with the exception of the deviations noted in the attached case narrative.

Thank you for choosing Eurofins Air Toxics Inc. for your air analysis needs. Eurofins Air Toxics Inc. is committed to providing accurate data of the highest quality. Please feel free to contact the Project Manager: Ausha Scott at 916-985-1000 if you have any questions regarding the data in this report.

Regards,

Ausha Scott

Project Manager

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WORK ORDER #: 2002680

Work Order Summary

CLIENT:	Ms. Jennifer Sanborn Sanborn, Head & Associates 20 Foundry Street Concord, NH 03301	**BILL TO:**	Accounts Payable Sanborn, Head & Associates 20 Foundry Street Concord, NH 03301
PHONE:	603-229-1900	**P.O. #**	
FAX:	603-229-1919	**PROJECT #**	4757.00
DATE RECEIVED:	02/26/2020	**CONTACT:**	Ausha Scott
DATE COMPLETED:	03/02/2020		

FRACTION #	NAME	TEST	RECEIPT VAC./PRES.	FINAL PRESSURE
01A	SSVB320B-001_20200225	TO-15	4.7 "Hg	15.1 psi
02A	SSVB320B-002_20200225	TO-15	4.7 "Hg	15.5 psi
03A	SSVB320B-003_20200225	TO-15	4.9 "Hg	15.3 psi
04A	SSVB320B-004_20200225	TO-15	5.3 "Hg	15 psi
05A	Lab Blank	TO-15	NA	NA
06A	CCV	TO-15	NA	NA
07A	LCS	TO-15	NA	NA
07AA	LCSD	TO-15	NA	NA

CERTIFIED BY: Heidi Hayes DATE: 03/02/20

Technical Director

Certification numbers: AZ Licensure AZ0775, FL NELAP – E87680, LA NELAP – 02089, NH NELAP - 209218, NJ NELAP - CA016, NY NELAP - 11291, TX NELAP - T104704434-18-13, UT NELAP – CA009332019-11, VA NELAP - 460197, WA NELAP - C935
Name of Accreditation Body: NELAP/ORELAP (Oregon Environmental Laboratory Accreditation Program)
Accreditation number: CA300005-011, Effective date: 10/18/2019, Expiration date: 10/17/2020.
Eurofins Air Toxics, LLC certifies that the test results contained in this report meet all requirements of the NELAC standards

This report shall not be reproduced, except in full, without the written approval of Eurofins Air Toxics, LLC.

180 BLUE RAVINE ROAD, SUITE B FOLSOM, CA - 95630
(916) 985-1000 . (800) 985-5955 . FAX (916) 351-8279

LABORATORY NARRATIVE
EPA Method TO-15
Sanborn, Head & Associates
Workorder# 2002680

Four 1 Liter Summa Canister samples were received on February 26, 2020. The laboratory performed analysis via EPA Method TO-15 using GC/MS in the full scan mode.

Receiving Notes

The Chain of Custody contained incorrect method information. EATL proceeded with the analysis as per the original contract or verbal agreement.

Analytical Notes

Dilution was performed on samples SSVB320B-001_20200225, SSVB320B-002_20200225, SSVB320B-003_20200225 and SSVB320B-004_20200225 due to the presence of high level target species.

High concentrations of VOCs in sample SSVB320B-001_20200225 required an off-line dilution using a Tedlar bag. Toluene is a common contaminant in Tedlar bags. Certification of the Tedlar bag lot indicates artifact concentrations of 5.8 ppbv for Toluene. A CN-flag was applied to the Toluene concentration to indicate a high bias.

Definition of Data Qualifying Flags

Ten qualifiers may have been used on the data analysis sheets and indicates as follows:

B - Compound present in laboratory blank greater than reporting limit (background subtraction not performed).
J - Estimated value.
E - Exceeds instrument calibration range.
S - Saturated peak.
Q - Exceeds quality control limits.
U - Compound analyzed for but not detected above the reporting limit, LOD, or MDL value. See data page for project specific U-flag definition.
UJ- Non-detected compound associated with low bias in the CCV
N - The identification is based on presumptive evidence.
M - Reported value may be biased due to apparent matrix interferences.
CN - See Case Narrative.

File extensions may have been used on the data analysis sheets and indicates as follows:

a-File was requantified
b-File was quantified by a second column and detector
r1-File was requantified for the purpose of reissue

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Summary of Detected Compounds
EPA METHOD TO-15 GC/MS FULL SCAN

Client Sample ID: SSVB320B-001_20200225

Lab ID#: 2002680-01A

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Freon 113	75	14000	570	110000
Acetone	750	840	1800	2000
Trichloroethene	75	110	400	600
Toluene	75	960 CN	280	3600 CN
Tetrachloroethene	75	100	510	680

Client Sample ID: SSVB320B-002_20200225

Lab ID#: 2002680-02A

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Freon 113	24	8200	190	63000
cis-1,2-Dichloroethene	24	44	96	180
Trichloroethene	24	350	130	1900
Tetrachloroethene	24	120	160	780

Client Sample ID: SSVB320B-003_20200225

Lab ID#: 2002680-03A

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Freon 113	2.0	59	16	450
Acetone	20	110	48	260
cis-1,2-Dichloroethene	2.0	140	8.0	580
Trichloroethene	2.0	580	11	3100
Tetrachloroethene	2.0	56	14	380

Client Sample ID: SSVB320B-004_20200225

Lab ID#: 2002680-04A

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Freon 113	12	2900	94	22000
Trichloroethene	12	100	66	540
Tetrachloroethene	12	51	83	350

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Client Sample ID: SSVB320B-001_20200225

Lab ID#: 2002680-01A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**j022810**	**Date of Collection: 2/25/20 2:03:00 PM**	
Dil. Factor:	**150**	**Date of Analysis: 2/28/20 02:57 PM**	

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Freon 12	75	Not Detected	370	Not Detected
Vinyl Chloride	75	Not Detected	190	Not Detected
Freon 11	75	Not Detected	420	Not Detected
Freon 113	75	14000	570	110000
1,1-Dichloroethene	75	Not Detected	300	Not Detected
Acetone	750	840	1800	2000
Methylene Chloride	750	Not Detected	2600	Not Detected
cis-1,2-Dichloroethene	75	Not Detected	300	Not Detected
1,1,1-Trichloroethane	75	Not Detected	410	Not Detected
Carbon Tetrachloride	75	Not Detected	470	Not Detected
Benzene	75	Not Detected	240	Not Detected
Trichloroethene	75	110	400	600
Toluene	75	960 CN	280	3600 CN
Tetrachloroethene	75	100	510	680
Chlorobenzene	75	Not Detected	340	Not Detected
Ethyl Benzene	75	Not Detected	320	Not Detected
m,p-Xylene	75	Not Detected	320	Not Detected
o-Xylene	75	Not Detected	320	Not Detected
1,3-Dichlorobenzene	75	Not Detected	450	Not Detected
1,4-Dichlorobenzene	75	Not Detected	450	Not Detected
1,2-Dichlorobenzene	75	Not Detected	450	Not Detected
1,2,4-Trichlorobenzene	300	Not Detected	2200	Not Detected

CN =See Case Narrative explanation

Container Type: 1 Liter Summa Canister

Surrogates	%Recovery	Method Limits
Toluene-d8	104	70-130
1,2-Dichloroethane-d4	104	70-130
4-Bromofluorobenzene	110	70-130

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Client Sample ID: SSVB320B-002_20200225

Lab ID#: 2002680-02A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**j022809**	**Date of Collection:**	**2/25/20 2:13:00 PM**
Dil. Factor:	**48.7**	**Date of Analysis:**	**2/28/20 02:31 PM**

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Freon 12	24	Not Detected	120	Not Detected
Vinyl Chloride	24	Not Detected	62	Not Detected
Freon 11	24	Not Detected	140	Not Detected
Freon 113	24	8200	190	63000
1,1-Dichloroethene	24	Not Detected	96	Not Detected
Acetone	240	Not Detected	580	Not Detected
Methylene Chloride	240	Not Detected	840	Not Detected
cis-1,2-Dichloroethene	24	44	96	180
1,1,1-Trichloroethane	24	Not Detected	130	Not Detected
Carbon Tetrachloride	24	Not Detected	150	Not Detected
Benzene	24	Not Detected	78	Not Detected
Trichloroethene	24	350	130	1900
Toluene	24	Not Detected	92	Not Detected
Tetrachloroethene	24	120	160	780
Chlorobenzene	24	Not Detected	110	Not Detected
Ethyl Benzene	24	Not Detected	100	Not Detected
m,p-Xylene	24	Not Detected	100	Not Detected
o-Xylene	24	Not Detected	100	Not Detected
1,3-Dichlorobenzene	24	Not Detected	150	Not Detected
1,4-Dichlorobenzene	24	Not Detected	150	Not Detected
1,2-Dichlorobenzene	24	Not Detected	150	Not Detected
1,2,4-Trichlorobenzene	97	Not Detected	720	Not Detected

Container Type: 1 Liter Summa Canister

Surrogates	%Recovery	Method Limits
Toluene-d8	99	70-130
1,2-Dichloroethane-d4	104	70-130
4-Bromofluorobenzene	85	70-130

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Client Sample ID: SSVB320B-003_20200225

Lab ID#: 2002680-03A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**j022807**	**Date of Collection:**	**2/25/20 2:09:00 PM**
Dil. Factor:	**4.06**	**Date of Analysis:**	**2/28/20 01:41 PM**

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Freon 12	2.0	Not Detected	10	Not Detected
Vinyl Chloride	2.0	Not Detected	5.2	Not Detected
Freon 11	2.0	Not Detected	11	Not Detected
Freon 113	2.0	59	16	450
1,1-Dichloroethene	2.0	Not Detected	8.0	Not Detected
Acetone	20	110	48	260
Methylene Chloride	20	Not Detected	70	Not Detected
cis-1,2-Dichloroethene	2.0	140	8.0	580
1,1,1-Trichloroethane	2.0	Not Detected	11	Not Detected
Carbon Tetrachloride	2.0	Not Detected	13	Not Detected
Benzene	2.0	Not Detected	6.5	Not Detected
Trichloroethene	2.0	580	11	3100
Toluene	2.0	Not Detected	7.6	Not Detected
Tetrachloroethene	2.0	56	14	380
Chlorobenzene	2.0	Not Detected	9.3	Not Detected
Ethyl Benzene	2.0	Not Detected	8.8	Not Detected
m,p-Xylene	2.0	Not Detected	8.8	Not Detected
o-Xylene	2.0	Not Detected	8.8	Not Detected
1,3-Dichlorobenzene	2.0	Not Detected	12	Not Detected
1,4-Dichlorobenzene	2.0	Not Detected	12	Not Detected
1,2-Dichlorobenzene	2.0	Not Detected	12	Not Detected
1,2,4-Trichlorobenzene	8.1	Not Detected	60	Not Detected

Container Type: 1 Liter Summa Canister

Surrogates	%Recovery	Method Limits
Toluene-d8	103	70-130
1,2-Dichloroethane-d4	104	70-130
4-Bromofluorobenzene	94	70-130

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Client Sample ID: SSVB320B-004_20200225

Lab ID#: 2002680-04A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**j022808**	**Date of Collection: 2/25/20 2:11:00 PM**	
Dil. Factor:	**24.5**	**Date of Analysis: 2/28/20 02:06 PM**	

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Freon 12	12	Not Detected	60	Not Detected
Vinyl Chloride	12	Not Detected	31	Not Detected
Freon 11	12	Not Detected	69	Not Detected
Freon 113	12	2900	94	22000
1,1-Dichloroethene	12	Not Detected	48	Not Detected
Acetone	120	Not Detected	290	Not Detected
Methylene Chloride	120	Not Detected	420	Not Detected
cis-1,2-Dichloroethene	12	Not Detected	48	Not Detected
1,1,1-Trichloroethane	12	Not Detected	67	Not Detected
Carbon Tetrachloride	12	Not Detected	77	Not Detected
Benzene	12	Not Detected	39	Not Detected
Trichloroethene	12	100	66	540
Toluene	12	Not Detected	46	Not Detected
Tetrachloroethene	12	51	83	350
Chlorobenzene	12	Not Detected	56	Not Detected
Ethyl Benzene	12	Not Detected	53	Not Detected
m,p-Xylene	12	Not Detected	53	Not Detected
o-Xylene	12	Not Detected	53	Not Detected
1,3-Dichlorobenzene	12	Not Detected	74	Not Detected
1,4-Dichlorobenzene	12	Not Detected	74	Not Detected
1,2-Dichlorobenzene	12	Not Detected	74	Not Detected
1,2,4-Trichlorobenzene	49	Not Detected	360	Not Detected

Container Type: 1 Liter Summa Canister

Surrogates	%Recovery	Method Limits
Toluene-d8	103	70-130
1,2-Dichloroethane-d4	107	70-130
4-Bromofluorobenzene	93	70-130

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Client Sample ID: Lab Blank

Lab ID#: 2002680-05A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**j022806a**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 2/28/20 12:12 PM**	

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Freon 12	0.50	Not Detected	2.5	Not Detected
Vinyl Chloride	0.50	Not Detected	1.3	Not Detected
Freon 11	0.50	Not Detected	2.8	Not Detected
Freon 113	0.50	Not Detected	3.8	Not Detected
1,1-Dichloroethene	0.50	Not Detected	2.0	Not Detected
Acetone	5.0	Not Detected	12	Not Detected
Methylene Chloride	5.0	Not Detected	17	Not Detected
cis-1,2-Dichloroethene	0.50	Not Detected	2.0	Not Detected
1,1,1-Trichloroethane	0.50	Not Detected	2.7	Not Detected
Carbon Tetrachloride	0.50	Not Detected	3.1	Not Detected
Benzene	0.50	Not Detected	1.6	Not Detected
Trichloroethene	0.50	Not Detected	2.7	Not Detected
Toluene	0.50	Not Detected	1.9	Not Detected
Tetrachloroethene	0.50	Not Detected	3.4	Not Detected
Chlorobenzene	0.50	Not Detected	2.3	Not Detected
Ethyl Benzene	0.50	Not Detected	2.2	Not Detected
m,p-Xylene	0.50	Not Detected	2.2	Not Detected
o-Xylene	0.50	Not Detected	2.2	Not Detected
1,3-Dichlorobenzene	0.50	Not Detected	3.0	Not Detected
1,4-Dichlorobenzene	0.50	Not Detected	3.0	Not Detected
1,2-Dichlorobenzene	0.50	Not Detected	3.0	Not Detected
1,2,4-Trichlorobenzene	2.0	Not Detected	15	Not Detected

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method Limits
Toluene-d8	100	70-130
1,2-Dichloroethane-d4	105	70-130
4-Bromofluorobenzene	90	70-130

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Client Sample ID: CCV

Lab ID#: 2002680-06A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**j022802**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 2/28/20 08:58 AM**	

Compound	%Recovery
Freon 12	99
Vinyl Chloride	90
Freon 11	92
Freon 113	96
1,1-Dichloroethene	94
Acetone	99
Methylene Chloride	108
cis-1,2-Dichloroethene	100
1,1,1-Trichloroethane	102
Carbon Tetrachloride	102
Benzene	100
Trichloroethene	97
Toluene	102
Tetrachloroethene	102
Chlorobenzene	102
Ethyl Benzene	104
m,p-Xylene	108
o-Xylene	103
1,3-Dichlorobenzene	105
1,4-Dichlorobenzene	105
1,2-Dichlorobenzene	107
1,2,4-Trichlorobenzene	111

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method Limits
Toluene-d8	105	70-130
1,2-Dichloroethane-d4	105	70-130
4-Bromofluorobenzene	102	70-130

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Client Sample ID: LCS

Lab ID#: 2002680-07A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**j022803**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 2/28/20 09:23 AM**	

Compound	%Recovery	Method Limits
Freon 12	104	70-130
Vinyl Chloride	94	70-130
Freon 11	96	70-130
Freon 113	97	70-130
1,1-Dichloroethene	97	70-130
Acetone	100	70-130
Methylene Chloride	106	70-130
cis-1,2-Dichloroethene	96	70-130
1,1,1-Trichloroethane	103	70-130
Carbon Tetrachloride	102	70-130
Benzene	100	70-130
Trichloroethene	99	70-130
Toluene	102	70-130
Tetrachloroethene	102	70-130
Chlorobenzene	102	70-130
Ethyl Benzene	107	70-130
m,p-Xylene	108	70-130
o-Xylene	110	70-130
1,3-Dichlorobenzene	104	70-130
1,4-Dichlorobenzene	102	70-130
1,2-Dichlorobenzene	104	70-130
1,2,4-Trichlorobenzene	106	70-130

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method Limits
Toluene-d8	105	70-130
1,2-Dichloroethane-d4	102	70-130
4-Bromofluorobenzene	104	70-130

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Client Sample ID: LCSD

Lab ID#: 2002680-07AA

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**j022804**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 2/28/20 09:48 AM**	

Compound	%Recovery	Method Limits
Freon 12	102	70-130
Vinyl Chloride	92	70-130
Freon 11	94	70-130
Freon 113	96	70-130
1,1-Dichloroethene	97	70-130
Acetone	100	70-130
Methylene Chloride	106	70-130
cis-1,2-Dichloroethene	93	70-130
1,1,1-Trichloroethane	102	70-130
Carbon Tetrachloride	102	70-130
Benzene	100	70-130
Trichloroethene	96	70-130
Toluene	102	70-130
Tetrachloroethene	100	70-130
Chlorobenzene	102	70-130
Ethyl Benzene	106	70-130
m,p-Xylene	108	70-130
o-Xylene	104	70-130
1,3-Dichlorobenzene	102	70-130
1,4-Dichlorobenzene	104	70-130
1,2-Dichlorobenzene	103	70-130
1,2,4-Trichlorobenzene	102	70-130

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method Limits
Toluene-d8	102	70-130
1,2-Dichloroethane-d4	100	70-130
4-Bromofluorobenzene	100	70-130

APPENDIX B

COMMUNITY AIR MONITORING PLAN

APPENDIX B
Community Air Monitoring Plan (CAMP) with Special Requirements
B320B Excavation Activities
Former IBM East Fishkill Facility
Hopewell Junction, New York

Introduction

This document summarizes the Community Air Monitoring Plan (CAMP) associated with the Building 320B soil excavation project being undertaken by Global Foundries at the former IBM East Fishkill Facility in Hopewell Junction, New York. Note that Sanborn Head is not responsible for implementing the air monitoring program described herein, which has been contracted to D&B Engineers and Architects, P.C. by Whiting Turner, who is under contract to Global Foundries.

The CAMP was developed in general accordance with the Generic Community Air Monitoring Plan (Generic CAMP) provided as Appendix 1A of DER-10 "Technical Guidance for Site Investigation and Remediation", dated May 2010, prepared by the New York State Department of Environmental Conservation (NYSDEC). Special requirements have also been included for intrusive work within an occupied building.

Overview

The 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), as well as building occupants for indoor work, 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.

Special requirements have been included in the CAMP since a portion of the work will be conducted within an occupied building. The requirements were prepared in consultation with the New York State Department of Health (NYSDOH).

Reliance on the CAMP should not preclude simple, common-sense measures to keep VOCs, dust, and odors at a minimum around the work areas.

Community Air Monitoring Plan

The following sections outline the CAMP requirements for the project. Refer to the Slab Demolition and Excavation Work Plan to which this CAMP is attached for a description of

engineering controls to be employed for VOC and dust control during slab removal and soil excavation activities.

Special Requirements

When work areas are within occupied structures, the continuous monitoring locations for VOCs and particulates must reflect the nearest potentially exposed individuals and the location of ventilation system intakes (e.g., outdoor air and return air) for the subject structure and nearby structures. The use of engineering controls such as vapor/dust barriers, temporary negative-pressure enclosures, or special ventilation devices should be considered to prevent exposures related to the work activities and to control dust and odors. Consideration should be given to implementing the planned activities when potentially exposed populations are at a minimum, such as during weekends or evening hours in non-residential settings.

Additionally, the location of all exhaust vents in the room and their discharge points, as well as potential vapor pathways (openings, conduits, etc.) relative to adjoining rooms, should be understood and the monitoring locations established accordingly. In these situations, it is strongly recommended that exhaust fans or other engineering controls be used to create negative air pressure within the work area during remedial activities.

- If total VOC concentrations opposite the walls of occupied structures or next to intake vents exceed 1 part per million (ppm), monitoring should occur within the occupied structure(s). Depending upon the nature of contamination, chemical-specific colorimetric tubes of sufficient sensitivity may be necessary for comparing the exposure point concentrations with appropriate pre-determined response levels (response actions should also be predetermined). Background readings in the occupied spaces must be taken prior to commencement of the planned work. Any unusual background readings should be discussed with NYSDOH prior to commencement of the work.

- If total particulate concentrations opposite the walls of occupied structures or next to intake vents exceed 150 micrograms per cubic meter (mcg/m^3), work activities should be suspended until controls are implemented and are successful in reducing the total particulate concentration to 150 mcg/m^3 or less at the monitoring point.

VOC Monitoring, Response Levels, and Actions

Continuous monitoring for VOCs will be conducted during concrete slab removal, solid waste management unit (SWMU) closure, and interior and exterior ground intrusive activities during which subsurface soil is exposed.

During interior intrusive activities, continuous monitoring will be conducted at designated locations selected in accordance with the Special Requirements provided above. In addition, background concentrations will be measured at each of the designated locations at the start of each workday before intrusive work begins.

During exterior intrusive activities, continuous monitoring will be conducted at a downwind location. Upwind concentrations will be measured at the start of each workday and periodically thereafter to establish background conditions, particularly if wind direction changes.

Periodic monitoring of VOCs will be conducted during sampling of the soil stockpile or roll-off container (if needed). Periodic monitoring will generally consist of taking an instantaneous reading prior to beginning the work, at least once during the work when potentially-contaminated material is being sampled or handled, and after the work is complete. Periodic readings will either be collected at the location of the work being conducted to represent a worst-case scenario, or at the downwind perimeter of the immediate work area.

The monitoring work will be conducted using a photoionization detector (PID), which will be calibrated at the beginning of each day using an isobutylene standard. The PID will be capable of calculating 15-minute running average concentrations, which will be compared to the levels specified below. In the case of interior monitoring, the term perimeter refers to the selected monitoring locations which will be selected based on the Special Requirements section above. In the case of exterior monitoring, the term perimeter refers to the downwind perimeter of the work area or exclusion zone.

1. If the ambient air concentration of total organic vapors at the perimeter of the work area or exclusion zone exceeds 5 ppm above background for the 15-minute average, work activities will 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 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 will 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 away from of the exclusion zone or half the distance to the nearest potential receptor, 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 will be shutdown.

4. All 15-minute readings will be recorded and be available for NYSDEC and NYSDOH personnel to review upon request. Instantaneous readings, if any, used for decision purposes will also be recorded.

NYSDEC and NYSDOH will be notified by the end of the same day if VOCs reach the action levels specified above, which results in work being suspended or shut down.

Particulate Monitoring, Response Levels, and Actions

Continuous monitoring for particulates will be conducted during concrete slab removal, SWMU closure, and interior and exterior ground intrusive activities during which subsurface soil is exposed.

During interior intrusive activities, particulate concentrations will be monitored continuously at the perimeter of the exclusion zone at temporary particulate monitoring stations at the locations selected in accordance with the Special Requirements above. Background concentrations will be measured at each of the designated locations at the start of each workday before intrusive work begins.

During exterior intrusive activities, particulate concentrations will be monitored continuously at the upwind and downwind perimeters of the exclusion zone at temporary particulate monitoring stations. Background concentrations will be measured at each of the designated locations at the start of each workday before intrusive work begins.

The particulate monitoring will 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 will be equipped with an audible alarm to indicate exceedance of the action level. In addition, fugitive dust migration will be visually assessed during all work activities. In the case of interior monitoring, the term perimeter refers to the selected monitoring locations which will be selected based on the Special Requirements section above. In the case of exterior monitoring, the term perimeter refers to the downwind perimeter of the work area or exclusion zone.

1. If the perimeter PM-10 particulate level is 100 mcg/m^3 greater than background 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 perimeter PM-10 particulate levels do not exceed 150 mcg/m^3 above background and provided that no visible dust is migrating from the work area.

2. If, after implementation of dust suppression techniques, perimeter PM-10 particulate levels are greater than 150 mcg/m^3 above background, 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 perimeter PM-10 particulate concentration to within 150 mcg/m^3 of the background level and in preventing visible dust migration.

3. All readings must be recorded and available for NYSDEC, NYSDOH, and County Health personnel to review upon request.

APPENDIX C

HEALTH AND SAFETY PLAN

LIMITED SCOPE SITE-SPECIFIC HEALTH AND SAFETY PLAN

This limited scope Site-Specific Health and Safety Plan (HASP) provides relevant site and project-specific information to supplement the requirements of D&B Engineers and Architects, P.C.'s (D&B's) Corporate HASP. In the event that D&B's Health and Safety Officer (HSO), or designee, determines that this limited scope Site-Specific HASP is not adequately protective of D&B employees, based on a change in the anticipated site conditions and/or work activities, site work will be halted and a Comprehensive Site-Specific HASP will be drafted for the project in which additional site and task-specific information will be identified.

Background:

Project Name/Address:	GLOBALFOUNDRIES U.S. 2 LLC
	Hudson Valley Research Park, 2070 Route 52
	Hopewell Junction, Hopewell Junction,
	SWMU Closure B320B
Date of HASP Preparation	June 9, 2020

LIMITED SCOPE SITE-SPECIFIC HEALTH AND SAFETY PLAN

Project Organization:

	Name	Telephone
D&B Project Director:	Brian Veith	516-364-9890
D&B Project Manager:	Keith Brower	516-364-9890
D&B Corporate Health and Safety Officer (HSO):	David Zaremsky	914-467-5300
D&B Site Safety Representative (SSR):	Alex Pugliese	516-364-9890
Field Subcontractor(s):	Whiting Turner	914-696-0003

Medical Assistance:

Physician Name/Address:	Sara Mendelsohn 800 Woodbury Road, Unit K, Woodbury, NY 11797
Physician Telephone No.:	516-682-9142
Hospital Name/Address:	Vassar Brothers Medical Center 45 Reade Place Poughkeepsie, NY 12601
Telephone:	845-454-8500
Route to Hospital: (see attached Figure, provided as Attachment A)	Head NE on Development Dr towards West Dr. Turn right onto West Dr. Continue onto Palen Rd. Turn left onto NY-82 S. Turn right onto Old Hopewell Rd. Turn right onto US 9 N. Take Columbia Street exit toward

LIMITED SCOPE SITE-SPECIFIC HEALTH AND SAFETY PLAN

Rinaldi Blvd. Turn right onto Columbia St. Turn right
toward Reade Place. Turn left onto Reade Place.
Medical Center will be on the right.

Emergency Contacts:

Agency/Facility	Telephone	Emergency Telephone
Ambulance	911	911
Police Department	845-221-2111	911
Fire Department	845-226-1652	911
Hospital	845-454-8500	911
Poison Control Center	[redacted]	1-800-222-1222

Hazard Analysis:

Several chemical and physical hazards may be encountered at the site during completion of the above-defined scope of work. A task-specific hazard analysis is provided in Attachment B.

Personal Protective Equipment Requirements:

The level of protection required for this project will not exceed Level D, which consists of the following:

- Work coveralls or Tyvek®, as needed (for nuisance contamination only).

- Gloves, as needed.
- Appropriate steel-toe work boots.
- Hardhat and safety vest, if required on-site.
- Safety glasses, as needed.

COVID-19 Requirements:

Due to potential exposure to COVID-19 during the completion of project activities, a COVID-19 Best Practices guidance document is provided in Attachment C.

LIMITED SCOPE SITE-SPECIFIC HEALTH AND SAFETY PLAN

D&B Standard Operating Procedures:

Select Corporate Standard Operating Procedures (SOPs), applicable to the above-defined scope of work, are provided as Attachment D. Applicable work to be completed at the Site will be completed per the provisions of the Corporate SOPs.

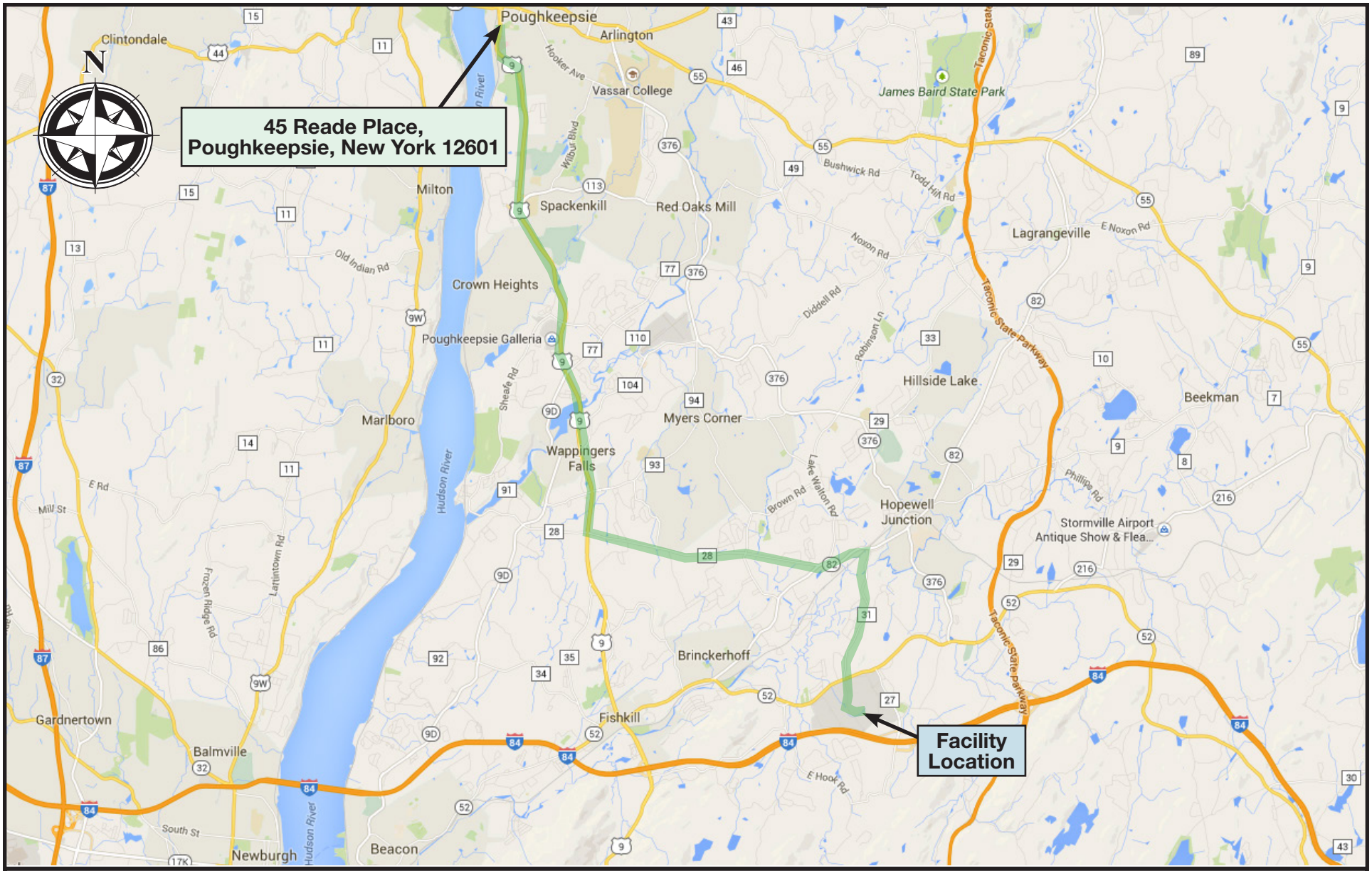
Additional Pertinent Site-Specific Information:

Additional site or project-specific health and safety-related information (including site controls, waste storage and disposal, decontamination area location, specific engineering controls, etc.) is provided below:

GLOBALFOUNDRIES is planning renovations of an existing space within Building 320B. The project will involve the demolition of portions of the existing slab and will expose existing transfer piping beneath the slab that has been abandoned in-place. Based on the review of construction drawings for the building, it is believed that the transfer pipes are located within separate sand-filled concrete trenches. The existing transfer pipes in Building 320B have been identified on the SWMU Table in the Permit for the site as "inaccessible" and therefore require proper identification, notification and reporting to the NYSDEC in order be properly closed. The purpose of this project is to oversee the removal of the piping, assess any potential impacts the piping may have had to the subsurface soil through the collection and analysis of samples. These activities will then be documented in a report to the NYSDEC to allow the removal of the transfer piping from the SWMU list contained in the Corrective Action Module of the facility's Part 373 Permit.

ATTACHMENT A

ROUTE TO HOSPITAL MAP



D&B Engineers and Architects, P.C.

GLOBALFOUNDRIES U.S. 2 LLC
HOPEWELL JUNCTION, NEW YORK

HOSPITAL ROUTE MAP

ATTACHMENT A

PV8659 - Hospital Route HASP.indd (01/25/17 - 9:16 AM)

ATTACHMENT B

TASK-SPECIFIC HAZARD ANALYSIS

ATTACHMENT B

TASK-SPECIFIC HAZARD ANALYSIS

Potential Hazard	Site Inspection	Contractor Oversight	Sample Collection	Waste Handling (drill cuttings, groundwater)	Equipment Decon
Inhalation of volatiles	low	low	low to moderate	low to moderate	low
Skin & eye contact	low	low	moderate to high	moderate to high	moderate to high
Ingestion	low	low	low	low	low to moderate
Inhalation of dust	low	Low to moderate	low	low	low to moderate
Heat stress	depends on weather conditions (temperature, humidity, etc.)	depends on weather conditions (temperature, humidity, etc.)	depends on weather conditions (temperature, humidity, etc.)	depends on weather conditions (temperature, humidity, etc.)	depends on weather conditions (temperature, humidity, etc.)
Cold stress	depends on weather conditions (temperature, wind speed, etc.)	depends on weather conditions (temperature, wind speed, etc.)	depends on weather conditions (temperature, wind speed, etc.)	depends on weather conditions (temperature, wind speed, etc.)	depends on weather conditions (temperature, wind speed, etc.)
Heavy equipment	moderate to high	moderate to high	low	low	low to moderate
Noise	moderate	moderate	low	low	moderate
Tripping	moderate	moderate	low	low	low
Utilities	low	low	low	low	low
Other physical hazards	moderate	moderate	moderate	moderate	moderate
Biological hazards	low	low	low	low	low
Flammable hazards	low	low	low	low	low

JOB HAZARD ANALYSIS WORKSHEET

JOB HAZARD ANALYSIS	JOB: SWMU Closure sampling/oversight	DATE: 6/9/2020	Page 1 of 1 pages	☒ NEW ☐ REVISED
Instructions on Reverse Side	Title of Person Who Does Job: Environmental Scientist	Supervisor: Brian Veith	Completed By: Alex Pugliese	

Recommended Personal Protective Equipment:
Hard Hat, Gloves, Safety Glasses, Work Uniform, Tyvek (if needed), PID

SEQUENCE OF BASIC JOB STEPS	POTENTIAL HAZARDS	RECOMMENDED HAZARD CONTROL
Cutting through concrete slab to expose pipes in trench	Spills, sips, trips, falls, inhalation, ventilation	Don proper PPE, Use appropriate wet cutting methods to minimize silica exposure and inhalation risks, Properly delineate work area.
Excavate pipes and field screen surrounding sand/soil with PID	Slips, trips, falls, inhalation, liquid in the trench, ventilation, vapors	Don proper PPE, Ventilate the area, Properly delineate work area, Use caution tape around open excavation to prevent fall hazards.
Visually inspect and sample transfer piping and surrounding soil/sand in trench	Slips, trips, liquid in the trench, ventilation, vapors, build up on transfer piping	Don proper PPE, Ventilate the area, Ensure workers are properly trained to decontaminate transfer piping

INSTRUCTIONS FOR COMPLETING JOB HAZARD ANALYSIS FORM

Job Hazard Analysis (JHA) is an important accident prevention tool that works by finding hazards and eliminating or minimizing them before the job is performed, clarification and hazard awareness, as a guide in new employee training, for periodic contracts, and for retraining of senior employees, as a refresher on jobs which run infrequently, as an accident investigation tool, and for informing employees of specific job hazards and protective measures.

Set priorities for doing JHAs: Jobs that have a history of many accidents, jobs that have produced disabling injuries, jobs with high potential for disabling injury or death, and new jobs with no accident history.

Here is how to do each of the three parts of a Job Hazard Analysis:

SEQUENCE OF BASIC JOB STEPS

Break the job down into steps. Each of the steps of a job should accomplish some major task. The task will consist of a set of movements. Look at the first set of movements used to perform a task, and then determine the next logical set of movements. For example, the job might be to move a box from a conveyor and putting it on a hand truck is one logical set of movements, so it is one job step. Everything related to that one logical set of movements is part of that job step.

The next logical set of movements might be pushing the loaded hand truck to the storeroom. Removing the boxes from the truck and placing them on the shelf is another logical set of movements. And finally, returning the hand truck to the receiving area might be the final step of this type of job.

Be sure to list all the steps in a job. Some steps might not be done each time – checking the casters on a hand truck for example. However, that task is a part of the job as a whole, and should be listed and analyzed.

POTENTIAL HAZARDS

Identify the hazards associated with each step. Examine each step to find and identify hazards-actions, conditions, and possibilities that could lead to an accident.

It is not enough to look at the obvious hazards. It is also important to look at the entire environment and discover every conceivable hazard that might exist.

Be sure to list health hazards as well, even though the harmful effect may not be immediate. A good example is the harmful effect of inhaling a solvent or chemical dust over a long period of time.

It is important to list all hazards. Hazards contribute to accidents, injuries, and occupational illnesses.

In order to do part three of a JHA effectively, you must identify potential and existing hazards. That is why it is important to distinguish between a hazard, an accident, and an injury. Each of these items has a specific meaning.

HAZARD – A potential danger. Oil on the floor is a hazard.

ACCIDENT – An unintended happening that may result in injury, loss, or damage. Slipping on the oil is an accident.

INJURY – the result of an accident. A sprained wrist from the fall would be an injury.

Some people find it easier to identify possible accidents and illnesses and work back from them to the hazards. If you do that, you can list the accident and illness types in parentheses following the hazard. But be sure you focus on the hazard for developing recommended actions and safe work procedures.

RECOMMENDED ACTION

Using the first two columns as a guide, decide what actions are necessary to eliminate or minimize the hazards that could lead to an accident, injury, or occupational illness.

Among the actions that can be taken are:

1) engineering the hazard out; 2) providing personal protective equipment; 3) job instruction training; 4) good housekeeping; and 5) good ergonomics (positioning the person in relation to the machine or other elements in the environment in such a way as to eliminate stresses and strains).

List recommended safe operating procedures on the form, and also list required or recommended personal protective equipment for each step of the job.

Be specific. Say exactly what needs to be done to correct the hazard, such as, “lift using part of your leg muscles.” Avoid general statements like “be careful.”

Give a recommended action or procedure for every hazard.

If the hazard is a serious one, it should be corrected immediately. The JHA should then be changed to reflect the new conditions.

ATTACHMENT C

COVID-19 BEST PRACTICES FOR FIELD PROJECTS AND EXTERNAL GUIDANCE

COVID-19 Best Practices for Field Projects and External Guidance

In response to the COVID-19 pandemic, D&B Engineers and Architects, P.C. (D&B) has issued safety-related updates to office policies through memoranda from the President and the Human Resources Department. In addition to providing guidance to staff working within D&B offices, they also provide outlines for best practices when working on field projects. Due to the diverse nature of activities and potential for exposure to COVID-19 in the field, the general practices discussed below should be reviewed on a site-specific basis and tailored for each project based on the scope of work and site conditions; however, it is important to have a common set of guidelines for employees to reference when in the field. *Employees are required to coordinate with their Project Manager prior to scheduling and undertaking field work.*

D&B employees are provided access to various guidance documents issued by local, state, and federal agencies as well as D&B's HASP which are maintained on D&B's network. Additionally, D&B provides employees with links to where they can find updates regarding COVID-19. It is vital for D&B employee health to stay informed of current health-related policies regarding COVID-19. Employees are required to be familiar with corporate Health and Safety policies related to the work that they perform in the field as well as federal, state, and local requirements.

D&B COVID-19 Best Practices for Conducting Fieldwork

- **Prior to Arrival On-Site**
  - Discuss site conditions and exposure risks with the project manager and site contacts. Many facilities will have their own site-specific safety policies in-place for COVID-19 that you are required to be aware of and abide by.
  - Under no circumstances should D&B employees report for field work with potential symptoms of COVID-19. Symptoms can include: Coughing, Fever, Shortness of breath, Myalgia (body aches), Headaches, Fatigue, Sore Throat, Loss of Taste or Smell, Diarrhea, Nausea, or Vomiting.
  - If you do experience any symptoms of COVID-19, inform your immediate supervisor, and contact your personal healthcare provider.
  - Some facilities may require you to fill out a health assessment form and/or take a body temperature reading before you are permitted entry.
  - Do not carpool with other employees and avoid public transportation if possible.

- **General Worksite Practices**
  - Do not share a common water cooler or break areas if possible.
  - Take meal breaks in isolation, for example in your personal vehicle.
  - Avoid touching high-contact objects such as door handles, bathrooms, handrails, computers, worksite equipment, cell phones, etc.
  - Disinfect high-contact surfaces regularly, wear gloves and/or perform hand-hygiene after coming in contract with them.

- **Face-coverings**
  - Executive Orders 202.16 and 202.17 require employers to provide face-coverings for any employee when in direct contact with the public, and for all New York residents to wear a face-covering when not socially distancing in public places.
  - D&B maintains a supply of ear-loop surgical masks available for all employees. You can also wear a personal face-covering (N95, KN95, Surgical Mask, etc.) if you choose so.
  - Face-coverings should fit snugly against the sides of the face and nose and should be secured with ear-loops or straps.
  - They should not be re-used if you or someone you encounter have any visible symptoms of COVID-19.
  - They can be re-used if they do not get saturated or physically damaged.
  - If you re-use a face-covering it should preferably be kept in a breathable paper bag, or a plastic Ziplock bag if a paper bag is not available. Wear gloves when donning and doffing a previously used face-covering.
  - Never share a face-covering with someone else.

- **Social Distancing**
  - Try to maintain a minimum distance of 6-feet between yourself and other people.
  - Limit access to the worksite to essential personnel only.
  - Try to limit the size of any on-site meetings. When meetings are necessary try to conduct them remotely online or by phone. If meetings must be done in person, they should be conducted outside and with a 6-foot buffer between attendees, avoid meetings in small rooms.
  - Perform work in shifts instead of working in proximity to one another when possible. If you are on-site to preform an inspection, do so after the contractor has left the area if possible.

- **Hand and Respiratory Hygiene**
  - Wash hands frequently with soap and water for at least 20 seconds or use a hand sanitizer containing at least 60% ethanol (ethyl alcohol) or 70% isopropanol (isopropyl alcohol), when soap and water not available.
  - Avoid touching your mouth, nose, and eyes.
  - Cover coughs and sneezes with a tissue or the inside of your elbow.
  - Wash your hands or use a hand sanitizer after coughing, sneezing, or blowing your nose.

- **Personal Protective Equipment (PPE)**
  - A supply of nitrile gloves, ear-loop surgical masks, and hand sanitizer is available for employees.
  - Do not share PPE with anyone.
  - Ensure PPE is disposed of properly.

Pathfile for Guidance Documents:

J:_HazWaste\Guidance and Regs\COVID

State Guidance

- NYS Executive Orders – https://www.governor.ny.gov/executive-orders
- NYS Department of Health (DOH) - https://coronavirus.health.ny.gov/home

Federal Guidance

- Occupational Safety and Health Administration (OSHA) - https://www.osha.gov/SLTC/covid-19/
- Centers for Disease Control and Prevention (CDC) - https://www.cdc.gov/coronavirus/2019-nCoV/index.html

Local Guidance

- NYC DOH - https://www1.nyc.gov/site/doh/covid/covid-19-main.page
- Nassau County DOH - https://www.nassaucountyny.gov/4963/COVID-19-INFORMATION
- Suffolk County DOH - https://suffolkcountyny.gov/Departments/Health-Services/Health-Bulletins/Novel-Coronavirus/SCDHS-COVID19-Guidance-and-Services
- Westchester County DOH - https://health.westchestergov.com/2019-novel-coronavirus

ATTACHMENT D

APPLICABLE CORPORATE STANDARD OPERATING PROCEDURES

HAZARD COMMUNCATION GUIDELINES

Table of Contents

HAZARD COMMUNCATION GUIDELINES

1.0 PURPOSE

To provide guidance for the implementation of a comprehensive Hazard Communication Program in order to effectively communicate the chemical hazards to be encountered at D&B office and project locations.

2.0 SCOPE

Applies to all D&B sites.

3.0 DEFINITIONS

Affected Employees - an employee who may be exposed to hazardous chemicals under normal operating conditions or in foreseeable emergencies.*

HAZARD COMMUNCATION GUIDELINES

* Note that Hazard Communication standards apply to any employee working with or exposed to chemicals, whether they are hazardous or not.

4.0 RESPONSIBILITIES

Health and Safety Officer (HSO) - The HSO is responsible for the implementation of the Hazard Communication Program and compliance with the OSHA 29 CFR 1910.1200 and 29 CFR 1926.59.

On-Site Health and Safety Representative (HSR) - The HSR is responsible for maintaining and updating site-specific chemical inventory list, verifying labeling is adequate, obtaining and maintaining SDS, notifying D&B personnel of the hazards associated with specific assignments and reviewing areas with D&B personnel where a potential hazard may be encountered.

D&B Employees - Observe label warning and adhere to established safety procedures.

5.0 GUIDELINES

HAZARD COMMUNCATION GUIDELINES

5.1 Introduction

These guidelines should be used to communicate chemical hazards to be encountered at D&B work sites, provide personnel access to information on chemical hazards, and familiarize them with procedures for the safe handling of hazards in the workplace. A written plan shall be present at each worksite where chemicals are in use.

5.2 Hazard Determination

Hazard assessment of chemicals used by D&B are made by the suppliers and manufacturers of these chemicals and communicated to D&B via Safety Data Sheets (SDS).

5.3 Chemical Inventory List

A list of potentially hazardous materials will be maintained in each office, included with the site-specific HASP and other applicable project documents and will contain, at a minimum, the following:

- Product names.

- Hazardous components.
- Manufacturer's identification.
- Location used.

After the initial determination, the Hazard Communication inventory list will be updated annually. New chemicals will be added to the lists when received.

5.4 Labels

5.4.1 Incoming Products

Products arriving from chemical manufacturers and/or distributors will be inspected by receiving personnel to confirm that:

- The labels and warnings are appropriate, legible, in English and prominently displayed on each container.
- The existing labels have not been removed or defaced.

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The HSO or HSR must be notified if a container arrives without a label, the label is illegible or the label does not identify the chemical, supply the name and address of the manufacturer or list hazard warnings.

This practice is to be completed before the product is used so that its contents may be assessed and labeled appropriately or returned to the supplier.

5.4.2 Transfer Containers

When a hazardous chemical is transferred from its primary container to a new one, the transfer container must be adequately labeled. At a minimum, the identity of the chemical and appropriate hazard information must be included on the label.

5.5 Safety Data Sheets

Copies of safety data sheets (SDSs) for hazardous chemicals being used on each site will be accessible to employees working at that site. Each SDS will be in English and will contain the following information:

- Manufacturer's name, addresses and telephone number.

HAZARD COMMUNCATION GUIDELINES

- Name and signature of sheet's preparer.
- The date of preparation or revision of the SDS.
- Product identification using chemical, common and trade names (must include the same name on the label).
- Chemical Abstract Service (CAS) Number.
- Chemical formula.
- Chemical family.
- Hazardous ingredients of products as defined by OSHA according to toxicity, flammability and reactivity. If the hazardous chemical has not been tested as a whole, the chemical and common name(s) of all ingredients which have been determined to be a health hazard and which comprise 1% or greater of the composition will be listed (except the chemicals identified as carcinogens will be listed if the concentration is 0.1% or greater).

HAZARD COMMUNCATION GUIDELINES

- Physical data including vapor pressure, flash point, specific gravity and boiling point.

- Fire and explosion data including flammable limits in air, auto-ignition temperature, specific recommendations on the types of fire extinguisher(s) to be used and/or avoided and special fire fighting procedures.

- Health hazard information including the primary route(s) of exposure, established exposure limits (listed as the permissible exposure limit (PEL) or the threshold limit value [TLV]), potential adverse health effects of exposure, signs and symptoms of exposure, and medical conditions aggravated by exposure and whether the chemical is listed as a carcinogen by the National Toxicology Program (NTP), the International Agency for Research on Cancer (IARC) or by OSHA.

- Precautions for safe handling and use including appropriate hygienic practices, protective measures during repair and maintenance of contaminated equipment, and procedures for cleanup of spills and leaks.

- Control measures including engineering controls, work practices and personal protective equipment (PPE).

- Emergency and first aid procedures.

Requests for copies of SDS by any employee will be honored within 72 hours.

SDS's will be maintained for 30 years but chemicals no longer in use may be placed in an archive file.

5.6 Training

D&B employees who may be exposed to chemicals during their work tasks or foreseeable emergencies will be trained regarding the characteristics and safe handling of hazardous chemicals in the workplace at the time of initial assignment, periodically thereafter, prior to assignment of non-routine tasks and whenever a new hazard, chemical, or operation is introduced into the workplace environment.

The following information will be provided in the training course:

- Requirements of OSHA 29 CFR 1910.1200.

- Location and availability of the D&B Hazard Communication Program.

HAZARD COMMUNCATION GUIDELINES

- Details of the D&B Hazard Communication Program including:
  - An explanation of the labeling system and how to read labels.
  - An explanation of the SDS and how to obtain and use them to find the appropriate hazard information.
  - The location of hazardous chemicals to which employees may be exposed.
  - The name(s) of hazardous chemicals present in the work area including generic, chemical, common and trade names.
  - The physical and chemical properties of hazardous chemicals to which employees may be exposed.
  - Definition of terms (e.g., exposure, TLV, PEL, etc.).
  - Health effects of exposure to the hazardous chemicals.
  - Symptoms of exposure.

HAZARD COMMUNCATION GUIDELINES

- Methods and observations that may be used to detect the presence or release of a hazardous chemical in the workplace (such as monitoring conducted by the employer, continuous monitoring devices, visual appearance or odor of hazardous materials when released).

- Safe handling of hazardous chemicals.

- Emergency procedures to follow if exposed to hazardous chemicals.

- How to lessen or prevent exposure to hazardous chemicals through safe work practices and PPE.

5.7 Non-Routine Tasks

In the event that an employee may be required to perform tasks that are not part of normal duties, the employee will be given information about hazardous chemicals involved with such activities. This information will include:

- Specific chemical hazards.

- Protective measures the employee can take.

- Measures that D&B has taken to lessen the hazards including ventilation, respirators, presence of another employee and emergency procedures.

5.8 Recordkeeping

The following records must be maintained:

- A record of Hazard Communication Employee Training Program and attendance.
- The chemical inventory list.
- SDS locations.
- This SOP.

5.9 Informing Contractors and Subcontractors

Each contractor and subcontractor will be provided with the following information:

HAZARD COMMUNCATION GUIDELINES

- List of hazardous chemicals they may encounter while on the job.

Each contractor and subcontractor will be informed of:

- Hazardous chemicals to which they may be exposed. SDS for each chemical on the list is available at their request.
- Measures that may be taken to lessen the possibility of exposure.
- Transfer container labeling system.

The contractor and subcontractor will sign a statement confirming that they have reviewed the above information. The Contractor Sign-off form is located in Appendix A of this SOP.

Contractors and subcontractors should provide SDS for any chemicals brought into a D&B site and should confirm that chemical containers are appropriately labeled. D&B employees will be informed of any potential hazards with which they might be exposed due to contractor or subcontractor operations.

HAZARD COMMUNCATION GUIDELINES

5.10 Informing Visitors

Visitor access will be restricted. Visitors are required to check in with the appropriate authority. Visitors should be provided with any necessary PPE and the following information:

- Hazardous chemicals to which he/she may be exposed.
- Measures the visitor may take to lessen the possibility of exposure including the proper use of the PPE.
- D&B policies and procedures to be followed to reduce the risks.
- Emergency procedures.

6.0 REFERENCES

- OSHA 29 CFR 1910.1200.
- OSHA 29 CFR 1926.59.

APPENDIX A – CONTRACTOR SIGN-OFF FORM

Project/Name:_____

Date:_____

I, _____, as an authorized representative of

_____ have received a copy of the following information from the D&B project representative:

1. List of hazardous substances that may be encountered while on the job.

The D&B project representative has informed me of:

1. Hazardous chemicals to which I may be exposed.
2. SDSs for each chemical on the list is available on request.
3. Measures I may take to lessen the possibility of exposure.
4. First aid/emergency procedures.

I will confirm that the other representatives from our company receive this information before beginning work on the project.

If I bring any chemicals onto the D&B project site, I will verify SDSs are available on site and that the appropriate labels are affixed to containers. I will alert any D&B employees working with me of the potential hazards if there is a chance that they will come into contact with such hazards.

Name_____

Title_____

Signature_____

INCIDENT INVESTIGATION AND REPORTING GUIDELINES

Table of Contents

1.0 PURPOSE

To prevent the occurrence or reoccurrence of accidents on D&B work sites and to establish a procedure for investigation and reporting of incidents occurring during, or related to D&B work activities.

2.0 SCOPE

Applies to all incidents related to D&B work activities.

3.0 DEFINITIONS

Incident - Any work or site-related occurrence that results in, or could potentially result in, the need for medical care or property damage. Such incidents will include lost time, illness,

INCIDENT INVESTIGATION AND REPORTING GUIDELINES

medical treatment cases, unplanned exposure to hazardous or toxic materials or any other significant occurrence resulting in property damage or in "near misses."

Lost Time Accident - Illness or accident caused or related to a work activity that prevented or would prevent the injured individual from reporting to and performing full, regular work activity on one or more days following the incident.

Medical Treatment - Illness or accident caused by or related to a work activity that required professional medical treatment.

Near Miss - An incident which, if occurring at a different time or in a different personnel or equipment configuration, would have resulted in an accident. These may result from unsafe behaviors, unsafe conditions, where a safety barrier is challenged, or where injury, property damage or environmental damage could have occurred but did not.

4.0 RESPONSIBILITIES

Employees - D&B employees are responsible for reporting all incidents as soon as possible to the Health and Safety Officer, regardless of the severity, unless the incident prevents the employee from reporting (i.e., Hospitalization), whereupon the incident shall be reported by the PM or designee.

Health and Safety Officer (HSO) - The HSO is responsible for investigating and preparing an appropriate report of accidents, illnesses and incidents occurring on or related to D&B work sites. The HSO may use the form attached in Appendix A for the investigation.

Project Managers (PM) - PM's are responsible for promptly correcting identified deficiencies in personnel, training, actions or site or equipment deficiencies that were determined to cause or contribute to the incident investigated.

INCIDENT INVESTIGATION AND REPORTING GUIDELINES

5.0 GUIDELINES

5.1 Incident Investigation

Immediately (or as soon as possible) report the incident or near miss to the HSO.

Upon receiving a report of an incident, the HSO will immediately investigate the circumstances surrounding the incident and will make appropriate recommendations to prevent recurrence.

Although D&B is exempt from the requirements of OSHA 29 CFR 1904 (Recording and Reporting Occupational Incidents and Injuries), except for reporting fatalities and multiple hospitalization accidents, a record of incidents meeting the OSHA criteria of "OSHA recordable" incidents will be maintained. OSHA recordable occupational injuries or illnesses are any occupational injuries or illnesses that result in:

- Fatalities, regardless of the time between the injury and death, or the length of the illness.
- Lost workday cases, other than fatalities, that result in lost workdays.
- Nonfatal cases without lost workdays which result in:
    - Transfer to another job.
    - Termination of employment.
    - Require medical treatment.
    - Involve loss of consciousness or restriction of work or motion. This category also includes any diagnosed occupational illnesses that are reported to the employer but are not classified as fatalities or lost workday cases.

5.2 Incident Report

Details of the incident should be documented by the HSO on the Incident Report Form (form attached in Appendix A may be used). This form will be maintained by the HSO for

at least five years for OSHA recordable cases. This form serves as an equivalent to the OSHA 301 form. Workers' compensation insurance incident forms may also be used.

5.3 Incident Follow-up Report/Root Cause Analysis

The Incident Follow-Up Report (form attached in Appendix B may be used) should be distributed with the Incident Report within one week of the incident.

5.4 Reporting of Fatalities or Multiple Hospitalization Accidents

An incident that results in a fatality must be reported to OSHA verbally within 8 hours of receiving information on the incident. Within 24 hours, all work-related hospitalizations, amputations or losses of an eye must be reported. The person reporting should be the most senior member of the D&B staff at the site, or their designee. The report can be made to either the OSHA office nearest to the site of the incident, or by calling the OSHA toll-free central telephone number: 1-800-321-OSHA (1-800-321-6742). When contacting OSHA, the following information must be provided:

- The employer's name and establishment name.
- The location of the incident.
- The time of the incident.
- The number of fatalities or hospitalized employees.
- The names of any injured employees.
- The employer's contact person and his or her phone number.
- A brief description of the incident.

6.0 REFERENCES

- OSHA 1904.

APPENDIX A – INCIDENT REPORT AND INVESTIGATION

TYPE OF INCIDENT – CHECK ALL THAT APPLY			
❑ INJURY/ILLNESS	❑ VEHICLE DAMAGE	❑ PROPERTY DAMAGE	❑ FIRE
❑ SPILL	❑ AIR EMISSION	❑ HIGH LOSS POTENTIAL	❑ OTHER

GENERAL INFORMATION

OFFICE/DEPARTMENT:_____ REPORT # _____
DATE OF INCIDENT: _____ TIME (AM/PM) _____
SUPERVISOR ON DUTY: _____AT SCENE OF INCIDENT? Y__N__
DAY OF WEEK _____
LOCATION OF INCIDENT: _____
WEATHER CONDITIONS: _____
ADEQUATE LIGHTING AT SCENE?: Y____ N ___ N/A

DESCRIBE WHAT HAPPENED

(Attach additional sheet if necessary)

AFFECTED EMPLOYEE INFORMATION

NAME: _____ D&B EMPLOYEE ? Y__N ___
HOME ADDRESS:_____
SOCIAL SECURITY NUMBER:_____ AGE _____
HOME PHONE NUMBER: (_____)_____
JOB CLASSIFICATION: _____YEARS IN THAT JOB _____
YEARS WITH D&B: _____
NUMBER OF HOURS WORKED PRIOR TO INCIDENT (that day): _____
DID INCIDENT RELATE TO ROUTINE TASK FOR JOB CLASSIFICATION? Y ___ N

INJURY/ILLNESS INFORMATION

NATURE OF INJURY OR ILLNESS: _____
_____
OBJECT/EQUIPMENT/SUBSTANCE CAUSING HARM: _____
_____
FIRST AID PROVIDED?: ___ Y ___ N
IF YES, WHERE WAS IT GIVEN: (ON SITE, OTHER) _____
IF YES, WHO PROVIDED FIRST AID? _____
WILL THE INJURY/ILLNESS RESULT IN:
__ RESTRICTED DUTY __ LOST TIME ___ UNKNOWN
_____

MEDICAL TREATMENT INFORMATION

WAS MEDICAL TREATMENT PROVIDED? ____ Y ____ N
IF YES, WAS MEDICAL TREATMENT PROVIDED:
__ON SITE ___DR.'S OFFICE___HOSPITAL
NAME OF PERSON(S) PROVIDING TREATMENT: _____
ADDRESS WHERE TREATMENT WAS PROVIDED: _____

TYPE OF TREATMENT _____
_____
_____

VEHICLE AND PROPERTY DAMAGE INFORMATION

VEHICLE/PROPERTY DAMAGED: _____
DESCRIPTION OF DAMAGE: _____
_____
_____
_____

SPILL AND AIR EMISSIONS INFORMATION

SUBSTANCE SPILLED OR RELEASED: _____
ESTIMATED QUANTITY/DURATION: _____IS THIS A REPORTABLE QUANTITY? Y__N_____
RESPONSE ACTION TAKEN: _____
_____
_____
_____

ADDITIONAL INFORMATION (e.g., witnesses)

_____
_____
_____
_____
_____
_____

NOTIFICATIONS:

NAME(S) OF D&B PERSONNEL NOTIFIED: _____
_____
_____
_____

PERSONS PREPARING REPORT

EMPLOYEE NAME: (PRINT) _____SIGN: _____
EMPLOYEE NAME: (PRINT) _____SIGN: _____
SUPERVISOR'S NAME: (PRINT) _____SIGN: _____

APPENDIX B – FOLLOW-UP INVESTIGATION REPORT/ROOT CAUSE ANALYSIS

DATE OF INCIDENT: _____ DATE OF INVESTIGATION REPORT: _____

INCIDENT COST: ESTIMATED: $_____ ACTUAL: $_____

OSHA RECORDABLES: ___ Y ___ N
RESTRICTED DAYS _____ # DAYS AWAY FROM WORK _____

ROOT CAUSE ANALYSIS

IMMEDIATE CAUSES **–** ACTIONS AND CONDITIONS THAT CONTRIBUTED TO THIS EVENT

BASIC CAUSES – SPECIFIC PERSONAL OR JOB FACTORS CONTRIBUTED TO THIS EVENT

ACTION PLAN

WHAT HAS AND/OR SHOULD BE DONE TO CONTROL THE CAUSES LISTED? INCLUDE MANAGEMENT PROGRAMS FOR CONTROL OF INCIDENTS IF APPLICABLE.

ACTION	PERSON RESPONSIBLE	TARGET DATE

PERSONS PERFORMING INVESTIGATION

INVESTIGATOR'S NAME: (PRINT) _____ SIGN: _____ DATE: _____

INVESTIGATOR'S NAME: (PRINT) _____ SIGN: _____ DATE: _____

MANAGEMENT REVIEW

Project Manager: (PRINT)_____ SIGN: _____DATE: _____
COMMENTS: _____

HSC: (PRINT) _____ SIGN: _____ DATE: _____
COMMENTS: _____

NOTE: Attach additional information as necessary

EXAMPLES OF IMMEDIATE CAUSES

SUBSTANDARD ACTIONS	SUBSTANDARD CONDITIONS
1. Operating equipment without authority	1. Guards or barriers
2. Failure to warn	2. Personal protective equipment
3. Failure to secure	3. Tools, equipment, or materials
4. Operating at improper speed	4. Congestion
5. Making safety devices inoperable	5. Warning system
6. Removing safety devices	6. Fire and explosion hazards
7. Failure to use PPE properly	7. Noise exposure
8. Using defective equipment	8. Exposure to hazardous materials
9. Improper loading	9. Poor housekeeping
10. Improper lifting	10. Extreme temperature exposure
11. Improper position for task	11. Illumination
12. Improper placement	12. Ventilation
13. Servicing equipment in operation	13. Visibility
14. Under influence of alcohol/drugs	
15. Horseplay	

EXAMPLES OF BASIC CAUSES

PERSONAL FACTORS	JOB FACTORS
1. Capability	1. Supervision
2. Knowledge	2. Engineering
3. Skill	3. Purchasing
4. Stress	4. Maintenance
5. Motivation	5. Tools/equipment
	6. Work standards
	7. Wear and tear
	8. Abuse or misuse

MANAGEMENT PROGRAMS FOR CONTROL OF INCIDENTS

1. Leadership and administration	10. Health control
2. Management training	11. Program audits
3. Planned inspections	12. Engineering controls
4. Task analysis and procedures	13. Personal communications
5. Task observation	14. Group meetings
6. Emergency preparedness	15. General promotion
7. Organizational rules	16. Hiring and placement
8. Accident/Incident analysis	17. Purchasing controls
9. Personal protective equipment	

HEALTH AND SAFETY PROGRAM EVALUATION

Table of Contents

1.0 PURPOSE

To establish guidelines to evaluate D&B field personnel compliance with the Corporate Health and Safety Program.

2.0 SCOPE

Applies to D&B field personnel.

3.0 RESPONSIBILITIES

Principal in Charge of Health and Safety (PIC) - The PIC or designee, is responsible for performing the H&S evaluations as outlined in this guideline.

HEALTH AND SAFETY PROGRAM EVALUATION

4.0 EVALUATION GUIDELINES

4.1 General

Health and Safety (H&S) Program evaluations will be periodically conducted to confirm D&B employees are abiding by the requirements of the D&B Corporate H&S Program. The evaluation may be performed at any D&B work site and will include an announced and/or unannounced H&S evaluation of D&B work activities. Prime responsibility for conducting evaluations will rest with the PIC, or designee. The PIC or a designee can perform unannounced H&S evaluations as frequently as deemed necessary.

A copy of the evaluation report will be sent to the Project Director (PD) and Project Manager (PM). Copies of reports for evaluation activities will be forwarded to the Health and Safety Officer (HSO). If deficiencies in the H&S procedures are identified, the PM or the Field Operations Manager (FOM) will implement corrective action. In each instance, corrective actions of deficiencies identified in the evaluation will be described in a written report and sent to the HSO.

4.2 Areas of Evaluation

The H&S evaluation of programs in use will include, at a minimum, an annual review of the following programs, as per OSHA 29 CFR 1910.147, 1910.134, 1910.146 and 1910.120:

- Lockout/Tagout (inspections required).
- Respiratory Protection.
- Confined Space Program (for Permit Required Confined Spaces).
- Site Specific Health and Safety Plans.

4.3 Subcontractors

In addition to evaluating D&Bs HASP, D&B may also, as appropriate, perform evaluations of subcontractor EHS performance during and following the conclusion of the project. Similar criteria will be evaluated as above

HEALTH AND SAFETY PROGRAM EVALUATION

5.0 REFERENCES

- OSHA 29 CFR 1910.147, 1910.134 and 1910.120, 1910.146.

EMERGENCY ACTION GUIDELINES

Table of Contents

1.0 PURPOSE

This guideline establishes procedures on how to respond to emergencies encountered at D&B work sites as pursuant to OSHA regulations 29 CFR 1926.35 and 1910.38.

2.0 SCOPE

This is a general Emergency Action Guideline that applies to all D&B work sites. Each Site-Specific HASP will provide the specifics of the Emergency Action Plan for the site as needed.

3.0 RESPONSIBILITIES

Health and Safety Officer (HSO) - The HSO is responsible for reviewing the Emergency Action Plan to be developed by each Project Director and/or Project Manager (PD and/or PM).

EMERGENCY ACTION GUIDELINES

Health and Safety Representative (HSR) - The HSR is responsible for implementing the Emergency Action Plan including evacuation, emergency treatment, emergency transport of site personnel and notification of emergency response units.

D&B Employees - D&B employees on the site will be familiar with the emergency response procedures for the work site and for abiding by those procedures through site orientation and drills.

4.0 GUIDELINES

Emergency situations can be characterized as a fire, explosion, serious weather conditions, a hazardous environmental release or accident or injury to personnel.

4.1 Emergency Action Plan

The Emergency Action Plan must be written for each project site (unless the client site has its own), and be implemented for the conditions listed above in Section 4.0. It includes the following:

- Emergency escape procedures and designated emergency escape routes, including muster points.
- Duties and procedures to be followed by D&B employees who must remain to operate critical operations before they evacuate.
- Procedures to account for employees after emergency evacuation has been completed.
- Emergency rescue procedures including emergency phone numbers, contact people and routes of entry for emergency vehicles.
- A chain of command list, including each person's name, title and phone number.
- The signal to notify employees of an emergency and the nature of the emergency.

EMERGENCY ACTION GUIDELINES

4.2 Emergency Action Procedures

4.2.1 Notification

It is important to rapidly and accurately transfer information to appropriate personnel in the event of an emergency situation. Personnel on site are made aware during site training to initiate emergency response procedures if they witness or discover an emergency (release, injury, accident, etc.). When calling police, fire department or medical emergencies the following information should be provided to the dispatcher:

- Caller's full name.
- The nature of the incident (i.e., "fire").
- The location of the incident. (i.e., "street location and nearest intersection"). The more specific the better.
- What you need (i.e. "fire department and first aid").
- If you are able, where you will meet emergency responders (i.e. at end of West Street, near train tracks).
- If applicable, a call back number or your pager number (e.g., "I'll be at the scene; my pager number is 123-4567").
- Status of the situation (e.g., is the situation stabilized or "I have the fire under control").
- If anyone is injured or in need of emergency assistance (e.g., "a mechanic working on a pump was burned").
- The HSR will cede control of site safety to outside emergency responders (fire, police).

4.2.2 Evacuation

In the event of an emergency situation, personnel in both the restricted and non-restricted areas will evacuate and assemble at a pre-designated location identified in the Site-Specific Emergency Action Plan. The HSR or a designee will have authority to initiate proper action if outside services are required. No unauthorized person will be allowed to enter the site once the emergency evacuation signal has been given. The HSR

or a designee will confirm that access for emergency equipment is provided and that unnecessary apparatus (e.g., operating machinery) has been shut down once the signal has been given. Once the safety of personnel is established the Fire Department and other emergency response groups will be notified by telephone of the emergency.

4.2.3 Personnel Injury

The potential for toxic and hazardous chemical exposures and hazardous situations that cause injuries and illnesses will vary from site to site. Medical treatment may range from bandaging of minor cuts and abrasions to life-saving techniques. In many cases, essential medical help may not be immediately available. If necessary, personnel with required training and certification may apply first aid treatment techniques. If possible, move or assist the injured to a "safe" area, decontaminate and transport the individual to the nearest medical facility, if needed. If immediate first aid is supplied at the site, consult the SDS for treatment procedures for the specific chemical exposure.

The ambulance/rescue squad will be contacted for transport as necessary. Some situations may require transport of an injured party by automobile. Maps and directions indicated the best route to the hospital are to be provided in the Site-Specific HASP. The PM will complete an incident report for the accident or injury.

4.3 Fire

In the event of a fire, personnel in both restricted and non-restricted areas will evacuate and assemble at a pre-designated location identified in the Site-Specific Emergency Action Plan. Portable fire extinguishers will be available on the job site as required by OSHA 29 CFR 1926. 150(a)(1), if there is a potential fire hazard. Personnel who may be directed to use fire extinguishers will be trained.

4.4 Chemicals Spills

Releases may involve gases, liquid or solids. The spill area should be confined to avoid the spread of the spilled material and contact with shoes, clothing or vehicle tires. Minor chemical spills may be cleaned up by appropriately trained D&B personnel utilizing the appropriate absorbents and PPE. If the spill is major or of highly toxic nature, only trained qualified personnel may address the emergency. If a major spill occurs, D&B personnel will evacuate and the spill response team, identified in the Site-Specific HASP, will be contacted.

EMERGENCY ACTION GUIDELINES

4.5 Serious Weather Conditions

If dangerous weather conditions are expected, the following should be considered prior to work initiation:

- Check the extended forecast for the work area to prepare for possible severe weather situations.
- Coordinate with the local authorities to determine safe areas or public severe weather storm shelters that can be used in an emergency.
- Use an AM/FM radio, NOAA Weather Radio or telephone to get updated information on storms in the area.
- Contact the local National Weather Service office or American Red Cross chapter for updates on storm conditions.
- Keep a lookout for signs of approaching severe weather, such as increasing wind, flashes of lightning and sound of thunder.

If serious weather conditions (tornados, thunderstorms) develop, personnel will proceed to the designated shelters.

5.0 TRAINING

6.0 REFERENCES

- 29 CFR 1910.38 Emergency Action Plans.
- 29 CFR 1926.35 Construction - Employee Emergency Action Plans.
- NFPA 101-2000, Life Safety Code.

RECORD KEEPING GUIDELINES

Table of Contents

1.0 PURPOSE

To establish guidelines for the retention of H&S records.

2.0 SCOPE

RECORD KEEPING GUIDELINES

Applies to all D&B work sites.

3.0 RESPONSIBILITIES

Health and Safety Officer (HSO) - The HSO is responsible for reviewing and approving generated documents and confirming that the records are complete.

Health and Safety Coordinator (HSC) – Maintains training records and fit test results

Human Resources (HR) – Maintains employee medical records, and records of illnesses and injuries.

4.0 RECORDS AND REPORTS

4.1 General

H&S related records and reports are required to document and monitor program compliance to company policy and procedures. The H&S records and reports include:

- Site-Specific Health and Safety Plan.
- Accident/Incident Reports.
- H&S training records.
- Audit reports and related corrective action documentation.
- Medical Surveillance Program and personal monitoring records.
- Instrument calibration records.

4.2 Site-Specific H&S or Project H&S Checklist

RECORD KEEPING GUIDELINES

A Site-Specific HASP will be developed prior to the beginning of field activities for each project and reviewed by the HSO. The original of each completed Site-Specific HASP will be placed in the project file. A copy should accompany the field team and be readily available at the work site. Copies of the Site-Specific HASP will be made available to D&B employees when site-specific training is provided.

4.3 Incident Reports

D&B is exempt from the requirements of OSHA 29 CFR 1904.2 (Recording and Reporting Occupational Injuries and Illnesses, OSHA 300 log), except for reporting fatalities and multiple hospitalization accidents. However, a record of incidents meeting the OSHA criteria of "OSHA recordable" incidents will be maintained.

OSHA recordable occupational injuries or illnesses are any occupational injuries or illnesses that result in:

- Fatalities, regardless of the time between the injury and death, or the length of the illness.
- Lost workday cases, other than fatalities, that result in lost workdays.
- Nonfatal cases without lost workdays, which result in:
  - Transfer to another job or restricted work assignment.
  - Termination of employment.
  - Required medical treatment.
  - Loss of consciousness or restriction of work or motion. This category also includes any diagnosed occupational illnesses that are reported to the employer but are not classified as fatalities or lost workday cases.

An Incident Report should be completed within 24 hours by the Project Manager (PM) or a designee for every personal injury, accidental damage to property or near miss,

which could have resulted in personal injury or illness. The original Incident Report and Investigation Findings are placed in the Project File. Please see Appendix D and E for appropriate forms.

4.4 Personnel Training Records

Personnel training records are required to document personnel qualifications and capabilities and to determine compliance to D&B training requirements. Each training session should be documented by a Training Attendance Sheet. The Instructor should prepare the report and include the date of training, location, a list of attendees, their signatures and a description of the material covered. The original report should be filed in the project file and a copy sent to the HSO.

4.5 Health and Safety Audit Reports

The H&S Audit Report must include details on each deficiency, even if the deficiency is corrected immediately during the audit, and a proposed or implemented solution. The HSO will approve and implement the solution. The Audit Report will be dated and signed by the Auditor and HSO. The original report will be placed in the Program File with copies sent to the HSO and PM.

4.6 Medical Surveillance Reports

The employer will maintain the original medical record and employee monitoring records with a copy maintained by the medical consultant. OSHA 29 CFR 1910.1020 requires retention of these records to termination of employment plus 30 years. The firm's Human Resources Department should maintain a copy of the employee's Disclosure Agreement and Physician's Statement. These records are maintained in a confidential file. Only the employee or their assigned representative may access these files.

4.7 Instrument Calibration Records

RECORD KEEPING GUIDELINES

A maintenance and calibration program is essential to verify the continued proper operation of used instrumentation. The three elements of this program are: (1) normal upkeep of equipment, (2) service and repair (when required) and (3) recordkeeping, documenting maintenance and repair activities.

Field personnel using monitoring or sampling equipment are responsible for performing the required maintenance and calibrations. Field personnel should also maintain and transfer records of calibration to the appropriate equipment custodian and report any instances of malfunctioning or improperly calibrated or used equipment to the PM and the HSO.

Records of calibration will be retained by the equipment custodian for the life of the monitoring or sampling equipment. Records of calibration should be filed in the project file at end of project. Please see Appendix F for Calibration Logs.

5.0 REFERENCES

- OSHA 29 CFR 1910.120.
- OSHA 29 CFR 1910.1020.

APPENDIX A – PHYSICIAN'S STATEMENT

For Employee or Applicant of D&B

Participant Name:_____ Date of Exam:_____

Date of Birth:_____ Social Security Number:_____

Type of exam: (baseline, annual, or other):_____

The individual named above has:

1. undergone a physical examination and has been found medically
   ( ) qualified for hazardous waste site work
   ( ) not qualified for hazardous waste work
   and
2. undergone a physical examination as per OSHA 29 CFR 1910.134 and has been found medically
   ( ) qualified to use a respirator
   ( ) not qualified to use a respirator

Physician's Signature_____

Printed Name of Physician_____

Physician's Address_____

Physician's Telephone Number_____

Physician's State License Number_____

Note: Copies of test results are maintained and available at

_____

OSHA 1910.134 (b)(10) states that persons should not be assigned to tasks requiring use of respirators unless it has been determined that they are physically able to perform the work and use the equipment.

The local physician will determine what health and physical conditions are pertinent. The respirator user's medical status should be reviewed periodically (for instance, annually).

If it is the opinion of the examining physician that an examinee is unqualified to perform hazardous waste site work or to wear a respirator, the physician should append a further report to this statement which details reasons for this opinion.

SUMMARY PROFILE

Employee Name: _____ Exam Date: _____

The Examining Physician and/or Medical Consultant has reviewed the medical information regarding the aforementioned employee, and the following has been established:

A ( ) There is no medical abnormality which will interfere with the duties of the individual.

B ( ) Medical condition exists which will not interfere with job responsibilities. The individual has been advised of this finding.

C ( ) The examination disclosed a medical abnormality which may require special consideration by the company.

D ( ) Deferred pending further evaluation. Employee will need outside medical records or additional subspecialty evaluation before a final determination can be made.

_____
Signature of Reviewing Physician

APPENDIX B – INCIDENT REPORT AND INVESTIGATION

TYPE OF INCIDENT – CHECK ALL THAT APPLY

☐ INJURY/ILLNESS ☐ VEHICLE DAMAGE ☐ PROPERTY DAMAGE ☐ FIRE
☐ SPILL ☐ AIR EMISSION ☐ HIGH LOSS POTENTIAL ☐ OTHER

GENERAL INFORMATION

OFFICE/DEPARTMENT:_____ REPORT # _____
DATE OF INCIDENT: _____ TIME (AM/PM) _____
SUPERVISOR ON DUTY: _____AT SCENE OF INCIDENT? Y ☐ N ☐
DAY OF WEEK _____
LOCATION OF INCIDENT: _____
WEATHER CONDITIONS: _____
ADEQUATE LIGHTING AT SCENE?: Y ☐ N ☐ N/A ☐

DESCRIBE WHAT HAPPENED

(Attach additional sheet if necessary)

AFFECTED EMPLOYEE INFORMATION

NAME: _____D&B EMPLOYEE ? Y ☐ N ☐
HOME ADDRESS:_____
SOCIAL SECURITY NUMBER:_____ AGE _____
HOME PHONE NUMBER: (_____)_____
JOB CLASSIFICATION: _____YEARS IN THAT JOB _____
YEARS WITH D&B: _____
NUMBER OF HOURS WORKED PRIOR TO INCIDENT (that day): _____
DID INCIDENT RELATE TO ROUTINE TASK FOR JOB CLASSIFICATION? Y ☐ N ☐

INJURY/ILLNESS INFORMATION

NATURE OF INJURY OR ILLNESS: _____

_____

OBJECT/EQUIPMENT/SUBSTANCE CAUSING HARM: _____

_____

FIRST AID PROVIDED?: Y ☐ N ☐
IF YES, WHERE WAS IT GIVEN: (ON SITE, OTHER) _____
IF YES, WHO PROVIDED FIRST AID? _____
WILL THE INJURY/ILLNESS RESULT IN:
RESTRICTED DUTY ___ LOST TIME ___ UNKNOWN

_____

MEDICAL TREATMENT INFORMATION

WAS MEDICAL TREATMENT PROVIDED? Y ☐ N ☐
IF YES, WAS MEDICAL TREATMENT PROVIDED:
___ON SITE ___DR.'S OFFICE___HOSPITAL
NAME OF PERSON(S) PROVIDING TREATMENT: _____
ADDRESS WHERE TREATMENT WAS PROVIDED: _____

TYPE OF TREATMENT _____

_____

_____

VEHICLE AND PROPERTY DAMAGE INFORMATION

VEHICLE/PROPERTY DAMAGED: _____
DESCRIPTION OF DAMAGE: _____

_____

_____

_____

SPILL AND AIR EMISSIONS INFORMATION

SUBSTANCE SPILLED OR RELEASED: _____
ESTIMATED QUANTITY/DURATION:_____
IS THIS A REPORTABLE QUANTITY?_____

RESPONSE ACTION TAKEN: _____

_____

_____

_____

ADDITIONAL INFORMATION (e.g., witnesses)

_____

_____

_____

_____

_____

_____

NOTIFICATIONS:

NAME(S) OF D&B PERSONNEL NOTIFIED: _____

_____

_____

_____

PERSONS PREPARING REPORT

EMPLOYEE NAME: (PRINT) _____SIGN: _____
EMPLOYEE NAME: (PRINT) _____SIGN: _____
SUPERVISOR'S NAME: (PRINT) _____SIGN: _____

APPENDIX C – FOLLOW-UP INVESTIGATION REPORT

DATE OF INCIDENT: _____ DATE OF INVESTIGATION REPORT: _____

INCIDENT COST: ESTIMATED: $_____ ACTUAL: $_____

OSHA RECORDABLES: Y ☐ N ☐
RESTRICTED DAYS _____ # DAYS AWAY FROM WORK _____

CAUSE ANALYSIS

IMMEDIATE CAUSES **–** ACTIONS AND CONDITIONS THAT CONTRIBUTED TO THIS EVENT

BASIC CAUSES, – SPECIFIC PERSONAL OR JOB FACTORS CONTRIBUTED TO THIS EVENT

ACTION PLAN

WHAT HAS AND/OR SHOULD BE DONE TO CONTROL THE CAUSES LISTED? INCLUDE MANAGEMENT PROGRAMS FOR CONTROL OF INCIDENTS IF APPLICABLE.

ACTION	PERSON RESPONSIBLE	TARGET DATE

PERSONS PERFORMING INVESTIGATION

INVESTIGATOR'S NAME: (PRINT) _____ SIGN: _____DATE:_____

INVESTIGATOR'S NAME: (PRINT) _____ SIGN: _____DATE:_____

MANAGEMENT REVIEW

Project Manager: (PRINT)_____ SIGN: _____DATE: _____
COMMENTS: _____

_____

HSC: (PRINT) _____ SIGN: _____DATE: _____
COMMENTS: _____

_____

NOTE: Attach additional information as necessary

EXAMPLES OF IMMEDIATE CAUSES

SUBSTANDARD ACTIONS	SUBSTANDARD CONDITIONS
1. Operating equipment without authority	1. Guards or barriers
2. Failure to warn	2. Personal protective equipment
3. Failure to secure	3. Tools, equipment, or materials
4. Operating at improper speed	4. Congestion
5. Making safety devices inoperable	5. Warning system
6. Removing safety devices	6. Fire and explosion hazards
7. Failure to use PPE properly	7. Noise exposure
8. Using defective equipment	8. Exposure to hazardous materials
9. Improper loading	9. Poor housekeeping
10. Improper lifting	10. Extreme temperature exposure
11. Improper position for task	11. Illumination
12. Improper placement	12. Ventilation
13. Servicing equipment in operation	13. Visibility
14. Under influence of alcohol/drugs	
15. Horseplay	

EXAMPLES OF BASIC CAUSES

PERSONAL FACTORS	JOB FACTORS
1. Capability	1. Supervision
2. Knowledge	2. Engineering
3. Skill	3. Purchasing
4. Stress	4. Maintenance
5. Motivation	5. Tools/equipment
	6. Work standards
	7. Wear and tear
	8. Abuse or misuse

MANAGEMENT PROGRAMS FOR CONTROL OF INCIDENTS

1. Leadership and administration	10. Health control
2. Management training	11. Program audits
3. Planned inspections	12. Engineering controls
4. Task analysis and procedures	13. Personal communications
5. Task observation	14. Group meetings
6. Emergency preparedness	15. General promotion
7. Organizational rules	16. Hiring and placement
8. Accident/Incident analysis	17. Purchasing controls
9. Personal protective equipment	

APPENDIX D – INSTRUMENTATION CALIBRATION LOG

Client:_____ Project Location:____

Date:_____ Project Number:____

Weather: Temperature range ___^{O}F to ___^{O}F. Relative Humidity:

Low	Moderate	High

_____
_____

Personnel/Trades:_____
_____

INSTRUMENT CALIBRATION

Time	Instrument	ID Number	Calibration Media	Initial Reading	Calibration Reading	Initials

Signature:_____

APPENDIX E – RESPIRATORY PROGRAM EVALUATION CHECKLIST/QUESTIONNAIRE

Employee Name _____
Title _____

Description of Work Activities:

1. What jobs/activities require the use of respiratory protection?

2. Is respiratory protection used every time that it is required?

3. What type of respiratory protection is used?

4. Where is the respiratory protection stored?

5. How is the respiratory protection cleaned and maintained?

6. What was the date of the last fit test?

7. When did employee last receive respiratory protection training?

8. Are other employees that are required to use respiratory protection using it properly/effectively?

List any problems/concerns/comments:

LADDER SAFETY GUIDELINES

Table of Contents

1.0 PURPOSE

These guidelines have been established to protect D&B employees from injuries that could result from improper use of ladders on work sites.

2.0 SCOPE

These guidelines apply to D&B work sites where ladders are used.

LADDER SAFETY GUIDELINES

3.0 DEFINITIONS

A-Frame ladder – A portable ladder that opens into an "A" shape, made by two similarly-sized beams, arranged in a 45 degree or less angle, attached at the top.

Cleat - A ladder crosspiece of rectangular cross section placed on edge upon which a person may step while ascending or descending a ladder.

Competent Person - A person 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.

Extension trestle ladder - A self-supporting portable ladder, adjustable in length consisting of a trestle ladder base and a vertically adjustable extension section, with a suitable means for locking the ladders together.

Fixed-ladder - A ladder that cannot be readily moved or carried because it is an integral part of a building or structure.

Individual-rung/step ladders - A ladder without a side rail or center rail support. Such ladders are made by mounting individual steps or rungs directly to the side or wall of the structure.

Job-made ladder - A ladder that is fabricated by employees and is not commercially manufactured.

LADDER SAFETY GUIDELINES

Point of access - Areas used by employees for work related passage from one area or level to another.

Portable ladder - A ladder that can be readily moved or carried.

Side-step fixed ladder - A fixed ladder that requires a person getting off at the top to step to the side of the ladder side rails to reach the landing.

Through fixed ladder - A fixed ladder that requires a person getting off at the top to step between the side rails of the ladder to reach the landing.

4.0 RESPONSIBILITIES

Health and Safety Officer (HSO) - The HSO is responsible for developing and revising guidelines on use of ladders, in accordance with OSHA 29 CFR 1926.1053, and confirming that training is available for each D&B employee who will use ladders at work sites.

On-Site Health and Safety Representative (HSR) - the HSR or a designee is responsible for verifying that ladders are used correctly, in accordance with this guideline, by D&B employees at the site.

LADDER SAFETY GUIDELINES

5.0 GUIDELINES FOR LADDER SAFETY

5.1 General

According to regulations OSHA 29 CFR 1926.1053, a ladder will be provided at work points of access where there is a break in elevation of 19 inches (48 cm) or more, and no ramp, runway, sloped embankment or personnel hoist is provided.

Ladders will be capable of supporting the following loads without failure:

- Self-supporting portable ladder should be able to support at least four times the maximum intended load, except that each extra-heavy-duty type 1A metal or plastic ladder will sustain at least 3.3 times the maximum intended load.
- Portable ladder that is not self-supporting should support at least four times the maximum intended load, except that each extra-heavy-duty type 1A metal or plastic ladders will sustain at least 3.3 times the maximum intended load.
- Fixed ladder should be able to support at least two loads of 250 pounds (114 kg) each, concentrated between any two consecutive attachments (the number and position of additional concentrated loads of 250 pounds (114 kg) each, determined from anticipated usage of the ladder, will also be included), plus anticipated loads caused by ice buildup, winds, rigging, and impact loads resulting from the use of ladder safety devices. Each step or

rung will be capable of supporting a single concentrated load of at least 250 pounds (114 kg) applied in the middle of the step or rung.

- Ladders will not be loaded beyond the maximum intended load for which they were built, or beyond their manufacturer's rated capacity.

5.2 Portable Ladders

The following requirements apply to the use of portable ladders, including job-made ladders:

- When portable ladders are used for access to an upper landing surface, the ladder side rails should extend at least 3 feet (.9 m) above the upper landing surface to which the ladder is used to gain access.
- Ladder should be secured at its top to a rigid support that will not deflect, if a 3-feet extension is not possible because of the ladder's length.
- Non-self-supporting ladders will be used at an angle such that the horizontal distance from the top support to the foot of the ladder is approximately one-quarter of the working length of the ladder (the distance along the ladder between the foot and the top support).
- Wood job-made ladders with spliced side rails will be used at an angle such that the horizontal distance is one-eighth the working length of the ladder.
- Rungs must be uniformly spaced, parallel and level.

LADDER SAFETY GUIDELINES

- Ladders will be used only on stable and level surfaces unless secured to prevent accidental displacement.
- Ladders will not be used on slippery surfaces unless secured or provided with slip-resistant feet to prevent accidental displacement.
- Ladders placed in any location where they can be displaced by workplace activities or traffic, such as in passageways, doorways, or driveways, will be secured to prevent accidental displacement, or a barricade will be used to keep the activities or traffic away from the ladder.
- The area around the top and bottom of ladders will be kept clear.
- The top of a non-self-supporting ladder will be placed with the two rails supported equally unless it is equipped with a single support attachment.
- Portable ladders with structural defects, will either be immediately marked in a manner that readily identifies them as defective, or be tagged with "Do Not Use" or similar language, and will be withdrawn from service until repaired.

5.3 Fixed Ladders

The following requirements apply to the use of fixed or permanent ladders:

Fixed ladders at their point of access/egress will have a step-across distance of not less than 7 inches (18 cm) nor more than 12 inches (30 cm) as measured from the centerline of the steps or rungs to the nearest edge of the landing area. If the normal

LADDER SAFETY GUIDELINES

step-across distance exceeds 12 inches (30 cm), a landing platform will be provided to reduce the distance to the specified limit.

- Fixed ladders will be used at a pitch no greater than 90 degrees from the horizontal, as measured to the back side of the ladder.
- Fixed ladders without cages or wells will have a clear width to the nearest permanent object of at least 15 inches (30 cm) on each side of the centerline of the ladder.
- Fixed ladders will be provided with cages, wells, ladder safety devices, or self-retracting lifelines where the length of climb is less than 24 feet (7.3 m) but the top of the ladder is at a distance greater than 24 feet (7.3 m) above lower levels.
- Where the total length of a climb equals or exceeds 24 feet (7.3 m), fixed ladders will be equipped with one of the following:
    - Ladder safety devices.
    - Self-retracting lifelines, and rest platforms at intervals not to exceed 150 feet (45.7 m).
    - A cage or well, and multiple ladder sections with each ladder section not to exceed 50 feet (15.2 m) in length. Ladder sections will be offset from adjacent sections, and landing platforms will be provided at maximum intervals of 50 feet (15.2 m).

LADDER SAFETY GUIDELINES

- The side rails of through or side-step fixed ladders will extend 42 inches (1.1 m) above the top of the access level or landing platform served by the ladder.

- For through-fixed-ladder extensions, the steps or rungs will be omitted from the extension and the extension of the side rails will be flared to provide not less than 24 inches (61 cm) nor more than 30 inches (76 cm) clearance between side rails. Where ladder safety devices are provided, the maximum clearance between side rails of the extensions will not exceed 36 inches (91 cm).

- For side-step fixed ladders, the side rails and the steps or rungs will be continuous in the extension.

- Individual-rung/step ladders, except those used where their access openings are covered with manhole covers or hatches, will extend at least 42 inches (1.1 m) above an access level or landing platform either by the continuation of the rung spacing as horizontal grab bars or by providing vertical grab bars that will have the same lateral spacing as the vertical legs of the rungs.

5.4 General Work Practices

The following are basic work practices that should be adhered to by employees when using ladders:

- When ascending or descending a ladder, the user will face the ladder.

LADDER SAFETY GUIDELINES

- Each employee will use at least one hand to grasp the ladder when progressing up and/or down the ladder.
- An employee will not carry any object or load that could cause the employee to lose balance and fall.
- Ladders will be maintained free of oil, grease and other slipping hazards.
- Ladders will be used only for the purpose for which they were designed.
- Ladders will be inspected by a competent person for visible defects on a periodic basis.
- Ladder repairs will restore the ladder to a condition meeting its original design criteria, before the ladder is returned to use.
- Refrain from working from the ladders themselves; use work platforms or other means to accomplish tasks.

5.5 Training

Each employee using ladders on a site should be trained by a competent person to recognize hazards related to ladders and minimize these hazards. Training should include as applicable:

- The nature of fall hazards in the work area.
- The correct procedures for erecting, maintaining and disassembling the fall protection systems to be used.

LADDER SAFETY GUIDELINES

- The proper construction, use, placement and care in handling of ladders.
- The maximum intended load-carrying capacities of ladders.

Retraining will be provided for each employee as necessary so that the employee maintains the understanding and knowledge of safe procedures when using ladders.

6.0 REFERENCES

- OSHA 29 CFR 1926 Subpart X – Ladders.

HEAVY EQUIPMENT/HAND & POWER TOOLS GUIDELINES

Table of Contents

1.0 PURPOSE

These guidelines have been established to protect D&B employees from injuries that could result from working on sites with or near heavy equipment, such as earth moving equipment, excavation equipment and drill rigs. D&B employees are not expected to be working with the equipment.

2.0 SCOPE

These guidelines are provided to D&B employees on work sites where heavy equipment will be used, to aid in hazard recognition.

3.0 RESPONSIBILITIES

Health and Safety Officer (HSO) – The HSO is responsible for developing and revising guidelines for employees working with or near heavy equipment.

HEAVY EQUIPMENT/HAND & POWER TOOLS GUIDELINES

On-Site Health and Safety Representative (HSR) – The HSR or a designee is responsible for confirming D&B employees' adherence with safe work practices when working with or near heavy equipment at the sites.

D&B Employees – D&B employees are responsible for adhering to the safety policies on site and maintaining vigilance when working around heavy equipment.

4.0 GUIDELINES FOR HEAVY EQUIPMENT SAFETY

4.1 General

The type of heavy equipment that D&B employees may encounter on the job sites will typically include material handling and earth moving equipment, such as front loaders, backhoe, bulldozers, excavators, drill rigs and similar equipment. The following are general rules that apply to heavy equipment on the sites when not in operation:

- Equipment left unattended at night, adjacent to a highway in normal use, or adjacent to construction areas where work is in progress, will have appropriate lights or reflectors.
- Heavy machinery, equipment, or parts thereof, which are suspended or held aloft by use of slings, hoists, or jacks will be substantially blocked or cribbed to prevent falling or shifting before employees are permitted to work under or between them.
- Bulldozer and scraper blades, end-loader buckets, dump bodies, and similar equipment, will be either fully lowered or blocked when being repaired or when not in use and controls in a neutral position, with the motors stopped and brakes set.
- Whenever the equipment is parked, the parking brake will be set.
- Equipment parked on inclines will have the wheels chocked and the parking brake set.

HEAVY EQUIPMENT/HAND & POWER TOOLS GUIDELINES

4.2 Overhead Power Lines

When working or moving heavy equipment in the vicinity of power lines or energized transmitters, the following must be observed, except where electrical distribution and transmission lines have been de-energized and visibly grounded at point of work:

- Contact the electrical utility company or licensed electrician to determine the voltage of overhead power lines.
- For lines rated 50 kV or below, the minimum clearance between the lines and any part of the equipment or load will be 10 feet, unless client-specific clearance requirements are more stringent.
- For lines rated over 50 kV, the minimum clearance between the lines and any part of the equipment or load will be 10 feet plus 0.4 inch for each 1 kV over 50 kV, or twice the length of the line insulator (connecting the power line to the tower), but never less than 10 feet, unless client-specific clearance requirements are more stringent.
- For cranes in transit with no load and boom lowered, the equipment clearance will be a minimum of 4 feet for voltages less than 50 kV, and 10 feet for voltages over 50 kV, up to and including 345 kV, and 16 feet for voltages up to and including 750 kV, unless client-specific clearance requirements are more stringent.
- A person will be designated to observe clearance of the equipment and give timely warning for operations where it is difficult for the operator to maintain the desired clearance by visual means, unless client-specific clearance requirements are more stringent.

4.3 Operations

Following is a summary of basic safety requirements when working with or near the heavy equipment identified in Section 4.1:

HEAVY EQUIPMENT/HAND & POWER TOOLS GUIDELINES

- Heavy equipment will be equipped with seat belts.
- Operators will wear seat belts when operating equipment.
- No employer will move or cause to be moved construction equipment or vehicles upon any access roadway or grade, unless the access roadway or grade is constructed and maintained to accommodate safely the movement of the equipment and vehicles involved.
- Earthmoving equipment will have a service braking system capable of stopping and holding the equipment fully loaded.
- Bi-directional machines, such as rollers, front-end loaders, bulldozers, and similar equipment, will be equipped with a horn, distinguishable from the surrounding noise level, which will be operated as needed when the machine is moving in either direction.
- Earthmoving or compacting equipment which has an obstructed view to the rear will not be used in reverse gear, unless the equipment in operation has a reverse signal alarm distinguishable from the surrounding noise level or an employee signals that it is safe to do so.
- Scissor points on front-end loaders should be guarded during normal operation.
- Heavy equipment shall have functioning backup alarms. Those working at the site shall listen for the backup alarms and be aware of their surroundings.

5.0 HAND & POWER TOOLS

D&B personnel may employ hand and power tools during their work tasks, as well as work around contractors using them. The following are guidelines when working with or around hand and power tools:

- All cords and tools must be maintained in good condition.
- The grounding plug must not be removed from the plug.

HEAVY EQUIPMENT/HAND & POWER TOOLS GUIDELINES

- Do not pull plugs by the cord, or carry tools by the cord.
- Ensure guarding is in place, where appropriate for use and when not in use.
- Use the right tool for the task.
- Ensure that proper PPE is worn with tools, where appropriate. This includes, but is not limited to, gloves, respirators and safety glasses.
- Remove from service any tools that are not in proper working condition. If they cannot be repaired on site, tag them or lock them out as necessary.

6.0 REFERENCES

- OSHA 29 CFR 1926 Subpart O – Motor Vehicles, Mechanized Equipment, and Marine Operations.
- OSHA 29 CFR 1926 Subpart CC – Cranes & Derricks in Construction.

ELECTRICAL SAFETY GUIDELINES

Table of Contents

1.0 PURPOSE

These guidelines have been established to protect D&B employees from injuries that could result from electrical hazards at various project sites.

2.0 SCOPE

These guidelines apply to all D&B work sites where electrical equipment and installations that provide electric power and light are used.

ELECTRICAL SAFETY GUIDELINES

3.0 DEFINITIONS

Arc Flash - An arc flash is a phenomenon where a flashover of electric current leaves its intended path and travels through the air from one conductor to another, or to ground. The results are often violent and when a human is in close proximity to the arc flash, serious injury and even death can occur.

Refer to Attachment A for further information on arc flash.

Ground-Fault Circuit Interrupters (GFCI) - Fast-acting circuit breaker which senses approximately 5 mA circuit imbalance, and automatically stops the flow of power from the circuit.

4.0 RESPONSIBILITIES

Health and Safety Officer (HSO) - The HSO must confirm that ground-fault protection procedures are developed and that the GFCI or Assured Equipment Grounding Conductor Program are available for the work sites.

On-Site Health and Safety Representative (HSR) - The HSR, or a designee, will be responsible for the implementation of general electrical safety and Ground-Fault Protection guidelines as specified in this guideline.

Authorized Employees - D&B Authorized Employees, if designated, are responsible to be knowledgeable in Ground-Fault Protection.

5.0 GUIDELINES FOR ELECTRICAL SAFETY

5.1 General

OSHA 29 CFR 1926.404 through 408 requires that employers must provide either GFCI or an Assured Equipment Grounding Conductor Program to employees to protect them from ground-fault hazards at work sites. These requirements are in addition to any other requirements for equipment grounding conductors.

ELECTRICAL SAFETY GUIDELINES

Electrical equipment must be selected following the provisions of the National Electric Code (NEC).

Electrical equipment to be used in hazardous locations (explosive, flammable or combustible atmospheres) will be selected based on Articles 500 through 503 of the current version of the National Electric Code. These articles include both wiring components and equipment, including portable equipment operated with batteries.

5.2 Ground-Fault Circuit Interrupters

GFCI can be used successfully to reduce electrical hazards on the sites. GFCIs monitor the current-to-the load for leakage to ground. When this leakage exceeds 5 mA ± 1 mA, the GFCI interrupts the circuit.

120-volt, single-phase 15- and 20-ampere receptacle outlets on construction sites, which are not a part of the permanent wiring of the building or structure must have approved GFCI.

Receptacles on a two-wire, single-phase portable or vehicle-mounted generator rated not more than 5 kW, where the circuit conductors of the generator are insulated from the generator frame and all other grounded surfaces, need not be protected with GFCI.

5.3 Assured Equipment Grounding Conductor Program

An Assured Equipment Grounding Conductor Program on construction sites covers cord sets, receptacles which are not a part of the building or structure, and equipment connected by cord and plug which are available for use or used by employees. This program should comply with the following minimum requirements:

- A written description of the program included in the Site-Specific HASP.
- At least one competent person to implement the program.

- Daily visual inspections of extension cords and equipment connected by cord-and-plug for external defects, such as deformed or missing pins or insulation damage and for indications of possible internal damage.
- Two tests as required by OSHA:
  - Continuity tests of equipment grounding conductors, performed on receptacles, extension cords and cord-and-plug connected equipment.
  - Test receptacles and plugs to confirm that the equipment grounding conductor is connected to its proper terminal.

The required tests must be performed before the first use, after any repairs, after suspected damage and at 3-month intervals. Equipment found damaged or defective will not be used until repaired or replaced.

Performed tests should be recorded. This test record will identify each receptacle, cord set, and cord- and plug-connected equipment that passed the test and will indicate the last date it was tested or the interval for which it was tested. This record will be kept by means of logs, color coding, or other effective means and will be maintained by a designated individual until replaced by a more current record.

5.4 Temporary Lighting

Below are the general requirements for temporary lighting:

- Light bulbs for general illumination must be protected from breakage and metal shell sockets must be grounded.
- Temporary lights must not be suspended by their cords, unless they are so designed.
- Portable lighting used in wet or conductive locations, such as tanks or boilers, must be operated at no more than 12 volts or must be protected by GFCI.

Illumination must be provided if D&B personnel are working in areas with energized electrical parts

5.5 Extension Cords and Adapters

Only three wire adapters should be used. Adapters should have a wide neutral blade, and be grounded to the tab under the cover screw on the bottom of the adapter and not with a flexible pigtail (a single piece of electrical wire that is used to connect two or more wires).

Generally, extension and flexible cords should:

- Be of the three-wire type.
- Be designed for hard or extra hard usage (e.g., types S, ST, and SO) when used with temporary lights.
- Not be fastened with staples, hung from nails, or suspended by wire.
- Not be used if worn or frayed.
- Be protected by GFCI.
- Be approved by the Underwriters Laboratories.

5.6 Working on or near exposed energized parts

There are many hazards associated with working on or near exposed energized equipment. In addition to contact with energized parts, arc flash hazards may exist, which can kill or seriously injure anyone working nearby such equipment.

The following guidelines have been established for D&B employees working on or near energized parts:

ELECTRICAL SAFETY GUIDELINES

- Only qualified employees may work on or with exposed energized lines or parts of equipment.
- Only qualified employees may work in areas containing unguarded, uninsulated energized lines or parts of equipment operating at 50 volts or more.
- Electric lines and equipment shall be considered and treated as energized unless they have been deenergized and tested in accordance with § 1926.961.
- Utilize a buddy system. No one should be working alone.
- Do not take any conductive object near exposed energized parts unless you are insulated (rubber insulating gloves/gloves and sleeves).
- Do not wear clothing that can melt onto skin or that could ignite and continue to burn when exposed to flames or heat energy. Generally, natural materials, such as cotton and wool, are best. Only wear non-conductive apparel unless covered or otherwise insulated.
- If D&B personnel will be in confined spaces (refer to SOP 25) or enclosed areas with live electrical components, protective shields, protective barriers or insulating materials shall be used, as necessary.
- Practice safe digging procedures for below grade utilities. This includes calling 811 or 1-800-DIG-SAFE to locate underground utilities.
- Utilize hand cleaning/digging when working within approximately two (2) feet of the underground utility. Also rely on geophysical survey and other resources that can delineate the location of underground utilities.
- If working on ladders, the ladders shall have non-conductive sides.
- When working near overhead utilities, perform work at least 10 feet away from energized power lines of up to 50,000 volts (50 kV). For power lines exceeding 50 kV, maintain distances of at least 15 feet. This includes personnel and equipment Refer to Table S5 on approach distances.

5.7 General Work Practices

Hazards are created when cords, cord connectors, receptacles and cord and plug-connected equipment are improperly used and maintained. Work spaces, walkways and similar locations should be clear of cords. Receptacles, cord sets, and cord- and plug-connected equipment should be protected from contact with water. Listed, labeled or certified equipment should be installed in accordance with instructions included in the labeling or certification. Cords with missing ground prongs shall be removed from service. Cords that feel hot should not be used. Cords with exposed insulation or wires should be taken out of service.

Observe the guidelines listed in Section 5.6 when working on or near energized parts.

6.0 REFERENCES

- OSHA 29 CFR 1926.403 through 408.
- OSHA 29 CFR 1926.960.

APPENDIX A – UNDERSTANDING ARC FLASH

Understanding "Arc Flash"

Simply put, an arc flash is a phenomenon where a flashover of electric current leaves its intended path and travels through the air from one conductor to another, or to ground. The results are often violent and when a human is in close proximity to the arc flash, serious injury and even death can occur.

Arc flash can be caused by many things including:

- Dust
- Dropping tools
- Accidental touching
- Condensation
- Material failure
- Corrosion
- Faulty Installation

Three factors determine the severity of an arc flash injury:

- Proximity of the worker to the hazard
- Temperature
- Time for circuit to break

Because of the violent nature of an arc flash exposure when an employee is injured, the injury is serious – even resulting in death. It's not uncommon for an injured employee to never regain their past quality of life. Extended medical care is often required, sometimes costing in excess of $1,000,000.

Typical Results from an Arc Flash

- Burns (Non FR clothing can burn onto skin)
- Fire (could spread rapidly through building)
- Flying objects (often molten metal)
- Blast pressure (upwards of 2,000 lbs. / sq.ft)
- Sound Blast (noise can reach 140 dB – loud as a gun)
- Heat (upwards of 35,000 degrees F)

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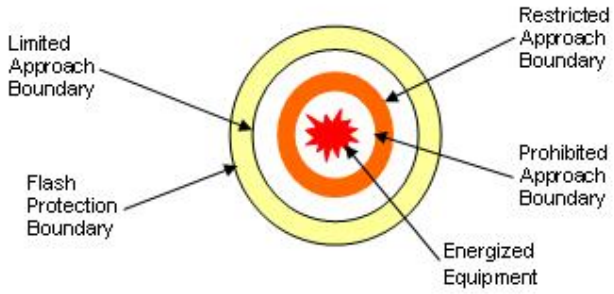
Approach / Protection Boundaries
The National Fire Protection Association (NFPA) has developed specific approach boundaries designed to protect employees while working on or near energized equipment. These boundaries are:



- Flash Protection Boundary (outer boundary)
- Limited Approach
- Restricted Approach
- Prohibited Approach (inner boundary)

Flash Protection Boundary (outer boundary): The flash boundary is the farthest established boundary from the energy source. If an arc flash occurred, this boundary is where an employee would be exposed to a curable second degree burn (1.2 calories/cm^2). The issue here is the heat generated from a flash that results in burns.

Limited Approach: An approach limit at a distance from an exposed live part where a shock hazard exists.

Restricted Approach: An approach limit at a distance from an exposed live part which there is an increased risk of shock.

Prohibited Approach (inner boundary): A distance from an exposed part which is considered the same as making contact with the live part.

This distance is not common between equipment. Some equipment will have a greater flash protection boundary while other equipment will have a lesser boundary.

Ways to Protect the Workers
There exists a number of ways to protect workers from the threat of electrical hazards. Some of the methods are for the protection of qualified employees doing work on electrical circuit and other methods are geared towards non-qualified employees who work nearby energized equipment.

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Here are a few of the protective methods:

- De-energize the circuit
- Work Practices
- Insulation
- Guarding
- Barricades
- Ground Fault Circuit Interrupters (GFCI)
- Grounding (secondary protection)

If You Must Work on Energized Circuits
If it has been determined that deenergizing a circuit is not feasible and the employee must work "hot", the employer shall develop and enforce safety-related work practices to prevent electric shock or other injuries resulting from either direct or indirect electrical contacts.

The specific safety-related work practices shall be consistent with the nature and extent of the associated electrical hazards.

These safety related work practices could include:

- Energized Electrical Work Permit
- Personal Protective Equipment
- Insulated Tools
- Written Safety Program
- Job Briefing

Fast Fact: The most effective and fool-proof way to eliminate the risk of electrical shock or arc flash is to simply deenergize the equipment.

Understanding the Arc Flash Warning Labels
Each piece of equipment operating at 50 volts or more and not put into a deenergized state must be evaluated for arc flash and shock protection. This evaluation will determine the actual boundaries (i.e. prohibited, limited, restricted etc) and will inform the employee of what PPE must be worn.

Once the evaluation is complete an Arc Flash Hazard warning label must be affixed to the equipment and readily accessible to employees who may work on the energized equipment.

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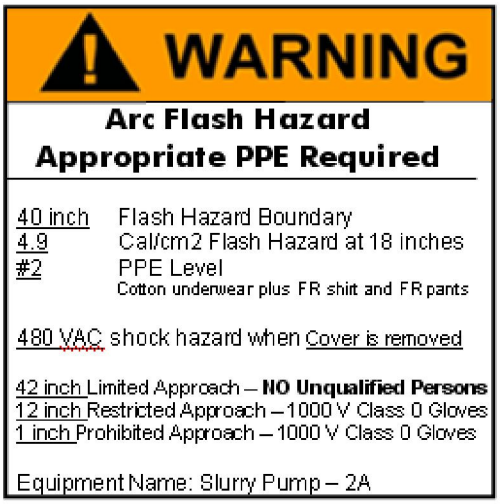
Minimum arc flash label example



Detailed (preferred) arc flash label example

The Employees Obligation

Employees must follow the requirements of the Arc Flash Hazard label by wearing the proper personal protective equipment (PPE), use of insulated tools and other safety related precautions. This includes not working on or near the circuit unless you are a "qualified" worker.

Qualified person: One who has received training in and has demonstrated skills and knowledge in the construction and operation of electric equipment and installations and the hazards involved.

Additional requirements for qualified persons. Qualified persons (i.e. those permitted to work on or near exposed energized parts) shall, at a minimum, be trained in and familiar with the following:

- The skills and techniques necessary to distinguish exposed live parts from other parts of electric equipment.
- The skills and techniques necessary to determine the nominal voltage of exposed live parts, and
- The clearance distances specified in 1910.333(c) and the corresponding voltages to which the qualified person will be exposed.

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HEAT STRESS PREVENTION GUIDELINES

Table of Contents

1.0 PURPOSE

To establish procedures for the implementation and monitoring of a heat stress prevention program.

To describe symptoms which characterize excessive exposure to heat. Recognition of these symptoms necessitates prompt corrective action to prevent injury or death.

2.0 SCOPE

This guideline applies to D&B personnel who may be exposed to environments which may contribute to heat stress, especially when PPE is required.

HEAT STRESS PREVENTION GUIDELINES

3.0 DEFINITIONS

Acclimatization - Acclimatization is the process of the body becoming accustomed to extremes in temperature.

ACGIH TLV Heat Stress and Heat Strain - Heat Stress TLV is intended to protect workers from the severest effects of heat stress and injury and to describe exposures to hot working conditions under which it is believed that nearly all workers can be repeatedly exposed without adverse health effects. The TLV objective is to prevent the deep body core temperature from exceeding 38°C (100.4°F).

Work-Rest Regimen - This is a ratio of time spent working versus time spent resting. The ratio applies to one-hour periods. For example, a work-rest regimen of 75% work, 25% rest corresponds to 45 minutes work and 15 minutes of rest each hour.

4.0 RESPONSIBILITIES

Health and Safety Officer (HSO) - The HSO is responsible for establishing procedures to identify heat stress conditions and prevent heat related injuries.

Site Personnel - Site personnel must be alert to signs and symptoms of heat stress for themselves or those working with them. Personnel must also be aware of appropriate emergency corrective actions.

5.0 GUIDELINES

Acclimatization to heat involves a series of physiological and psychological adjustments that occur in an individual during the first weeks of exposure to hot environmental conditions.

5.1 Effects of Heat Stress

Hot weather can cause physical discomfort, a decrease in work efficiency, and personal injury. Wearing personal protective equipment puts a worker at considerable risk of developing heat stress since protective clothing increases retention of heat within the body.

HEAT STRESS PREVENTION GUIDELINES

A number of interacting factors, including environmental conditions, clothing, workload, and the individual characteristics of the worker contribute to heat stress. Heat stress is one of the most common (and potentially serious) illnesses at hazardous waste sites. Therefore, heat stress evaluation procedures, including regular monitoring and other preventive measures, is essential to the H&S of personnel conducting field work.

Early symptoms of heat stress may include fatigue, irritability, anxiety, and decreased concentration, dexterity or movement. If not recognized or treated, heat stress may become a serious medical condition.

Heat-related problems include:

- Heat Rash: Caused by continuous exposure to hot and humid air and aggravation of the skin by chafing clothes. This decreases the ability to tolerate heat as well as being a nuisance.

- Heat Cramps: Caused by profuse perspiration with inadequate fluid intake and chemical replacement (especially salts). Signs: muscle cramps and pain in the extremities and abdomen.

- Heat Exhaustion: Caused by increased stress on various organs to meet increased demands for body cooling. Signs: shallow breathing; pale, cool, moist skin; profuse sweating; dizziness; or fatigue.

- Heat Stroke: Heat stroke, the most severe form of heat stress, is considered a life threatening condition and, as such, must be treated as an emergency. Any person suffering from heat stroke must be cooled down immediately and brought to a hospital. Decontamination procedures, if warranted, should not be implemented prior to treatment. Signs and symptoms are: red, hot, dry skin; no perspiration; nausea; dizziness and confusion; strong, rapid pulse; or coma.

It is important to note that individuals vary in their susceptibility and their reactions to heat-related conditions. Factors that may predispose someone to a heat condition include:

- Lack of physical fitness.

- Lack of acclimatization.

- Age.

- Dehydration.

- Obesity.
- Alcohol and drug use.
- Infection.
- Sunburn.
- Diarrhea.
- Chronic disease.

5.2 First Aid/Medical Treatment

The following first aid and medical treatments are recommended:

- Heat Rash: Apply mild drying lotions and recommend wearing clean, dry clothing between heat exposures.
- Heat Cramps: Administer commercially available electrolyte-balanced liquids (e.g., Gatorade). Seek medical attention if serious.
- Heat Exhaustion: Remove to cooler environment, rest in reclining position. Drink plenty of fluids.
- Heat Stroke: Immediate and rapid cooling by immersion in water with massage, or wrapping in a wet sheet and fanning. Avoid overcooling. These steps are to be taken while waiting for emergency response to arrive, or while transporting the victim to an emergency medical facility. This is a ***LIFE-THREATENING*** situation.

5.3 Heat Stress Prevention

One or more of the following can help prevent or reduce heat stress:

- Drinking water will be available to the workers to encourage frequent small drinks, i.e., one cup every 15-20 minutes (about 150 ml or 1/4 pint).

- The water will be kept reasonably cool (55-60°F) and will be stored outside any suspected or identified contaminated areas.

- Workers will be encouraged to maintain well balanced diets. If workers are unacclimatized, a commercially available product such as Gatorade® or Exceed® may be used for electrolyte replacement.

- Cooling devices may be used to aid natural body ventilation. These devices, however, add weight, and their use should be balanced against worker efficiency.

- Provide air-conditioned shelter or shaded areas to protect personnel during rest periods.

- Install mobile showers and/or hose-down facilities to reduce body temperature and cool protective clothing.

- Conduct operations in the early morning or evening.

- Rotate shifts of workers.

- Add additional personnel to work teams to allow for work-rest regimes.

- Mandate work slowdowns in extreme heat conditions.

5.4 Heat Stress Monitoring

In some cases where employees may be required to wear PPE that will increase the potential for heat related illnesses, heat index measurements or biological monitoring, such as body temperature or weight monitoring, may be needed. In these cases, a heat alert will be developed and written into the site-specific HASP for the project. The specifics of the plan will be described in the HASP since each site will have specific needs.

The HSO is responsible for determining the monitoring methods, coordinating the monitoring, and setting appropriate action levels for heat stress prevention.

HEAT STRESS PREVENTION GUIDELINES

6.0 Training

The workers will be instructed in hot weather procedures. The orientation program will include as a minimum, instruction in:

- Proper cooling procedures and appropriate first aid treatment.
- Proper clothing practices.
- Proper eating and drinking habits.
- Recognition of impending heat exhaustion.
- Recognition of signs and symptoms of impending heat stroke.
- Safe work practices.

7.0 REFERENCES

- ACGIH TLV Booklet.

COLD STRESS PREVENTION GUIDELINES

Table of Contents

1.0 PURPOSE

To establish procedures for the implementation and monitoring of a cold stress prevention program and to describe symptoms which indicate excessive exposure to cold temperatures.

2.0 SCOPE

These guidelines apply to D&B personnel who may be exposed to environments which could create cold stress injuries.

COLD STRESS PREVENTION GUIDELINES

3.0 DEFINITIONS

ACGIH TLV Cold Stress - Cold Stress Threshold Limit Values (TLVs) are intended to protect workers from the most severe effects of cold stress and cold injury and to describe exposures to cold working conditions under which it is believed that nearly all workers can be repeatedly exposed without adverse health effects. The TLV objective is to prevent the deep body core temperature from falling below 36°C (96.8°F) and to prevent cold injury to body extremities.

Deep Body Temperature - The core temperature of the body as determined by rectal temperature measurements. For a single, occasional exposure to a cold environment a drop in core temperature to no lower than 35°C (95°F) is permissible.

Equivalent Chill Temperature (ECT) - An index describing the effect of the cooling power of moving air on exposed flesh, commonly referred to as "wind chill." The effect of wind velocity at a certain temperature is expressed as the equivalent cooling effect of a lower temperature with still air.

Frostbite - Local tissue damage caused by exposure to cold temperatures. Severe occurrence may lead to deep tissue damage, gangrene or possible loss of the affected area.

Hypothermia - Lowering of the body core temperature due to exposure to cold. Severe hypothermia may result in death.

4.0 RESPONSIBILITIES

Health and Safety Officer (HSO) - The HSO or his/her designee is responsible for establishing procedures to identify cold stress conditions and determining control methods to prevent cold-related injuries.

Site Personnel - Site personnel will be alert to signs of development of cold stress symptoms in themselves and in those working with them, and will be aware of emergency corrective action.

COLD STRESS PREVENTION GUIDELINES

5.0 GUIDELINES

5.1 Introduction

If properly protected, personnel can work efficiently in cold environments. Cold injuries are classified as either localized, as in frostbite or generalized, as in hypothermia. Physical conditions that worsen the effects of cold include allergies, vascular disease, excessive smoking and drinking and specific drugs and medications.

5.2 Contributing Factors

Factors contributing to cold injury include exposure to humidity and high winds, duration of exposure, contact with wetness or metal, inadequate clothing, age and general health of the individual, including circulation and diet. Wind-chill temperature or the combination of wind speed and air temperature is a better indicator of thermal condition than temperature alone. The wind increases the rate of cooling. The table below shows the cooling power of wind on exposed flesh.

Wind Speed (mph)	Actual Temperature Reading (°F)											
	50	40	30	20	10	0	-10	-20	-30	-40	-50	-60
	Equivalent Chill Temperature (ECT) (°F)											
0	50	40	30	20	10	0	-10	-20	-30	-40	-50	-60
5	48	37	27	16	6	-5	-15	-26	-36	-47	-57	-68
10	40	28	16	4	-9	-24	-33	-46	-58	-70	-83	-95
15	36	22	9	-5	-18	-32	-45	-58	-72	-85	-99	-112
20	32	18	4	-10	-25	-39	-53	-64	-82	-96	-110	-121
25	30	16	0	-15	-29	-44	-59	-74	-88	-104	-118	-133
30	28	13	-2	-18	-33	-48	-63	-79	-94	-109	-125	-140
35	27	11	-4	-20	-35	-51	-67	-82	-98	-113	-129	-145
40	26	10	-6	-21	-37	-53	-69	-85	-100	-116	-132	-148
	LITTLE DANGER				INCREASING			GREAT DANGER				

COLD STRESS PREVENTION GUIDELINES

Wind speed greater than 40mph have little additional effect	in <1 hr with dry skin. Maximum danger of false sense of security	DANGER Danger from freezing of exposed flesh within one minute	Flesh may freeze within 30 seconds
	Trenchfoot and immersion foot may occur at any point on this chart		

The greatest incremental increase in wind chill occurs when a wind of 5 mph increases to 10 mph. In addition, water conducts heat 240 times faster than air; thus, the body cools suddenly when chemical-protective equipment is removed and the clothing underneath is wet from perspiration.

5.3 Frostbite

Local injury resulting from the cold is called frostbite. Frostbite of the extremities can be categorized by degrees of damage:

- Frostnip or incident frostbite - This condition is characterized by a sudden blanching or a whitening of the skin.
- Superficial frostbite - The skin has a waxy or white appearance and is firm to the touch, but the tissue beneath is resilient.
- Deep frostbite - Tissues are cold, pale, and solid; extremely serious injury.

Factors that contribute to frostbite include handling solvents, tight footwear, use of alcohol, wet clothing, high altitudes and race. African-Americans are three to six times more likely to get frostbite than Caucasians.

The skin of a potential frostbite victim should never be rubbed. The rubbing action can result in permanent tissue damage. For frostnip, the skin should be warmed by applying firm pressure with a hand or other warm body part.

Professional medical help should be sought for frostbite cases since it is difficult to assess the degree of damage. First aid responders can begin to warm the affected part by skin to skin contact or by submerging in warm water. Care

should be taken, because the skin is easily burned due to loss of feeling in the affected part. It is important to note that pain will occur when the thawing begins.

5.4 Hypothermia

Hypothermia is the general lowering of the body temperature. It can occur from exposure to conditions well above freezing. This condition can occur when a worker is immersed in cold water or is exposed to cool, high winds. Individuals who are in a state of physical exhaustion, or have had insufficient food are particularly susceptible to hypothermia.

The first symptoms of hypothermia are uncontrollable shivering and the sensation of cold. The heartbeat then slows and sometimes becomes irregular, the pulse weakens and the blood pressure changes. Other symptoms are slurred and slow speech, memory lapses, incoherence, drowsiness, poor judgment, mental confusion and apparent exhaustion. See table below for additional clinical symptoms of hypothermia.

Core Temperature		**Clinical Signs**
°C	°F	
37.6	99.6	"Normal" rectal temperature
37	98.6	"Normal" oral temperature
36	96.8	Metabolic rate increases in an attempt to compensate for heat loss
35	95.0	Maximum shivering
34	93.2	Victim conscious and responsive, with normal blood pressure
33	91.4	Severe hypothermia below this temperature
32 31	89.6 87.8	Consciousness clouded; blood pressure becomes difficult to obtain; pupils dilated but react to light; shivering ceases
30 29	86.0 84.2	Progressive loss of consciousness; muscular rigidity increases; pulse and blood pressure difficult to obtain; respiratory rate decreases
28	82.4	Ventricular fibrillation possible with myocardia irritability
27	80.6	Voluntary motion ceases; pupils nonreactive to light; deep tendon and superficial reflexes absent
26	78.8	Victim seldom conscious
25	77.0	Ventricular fibrillation may occur spontaneously

COLD STRESS PREVENTION GUIDELINES

24	75.2	Pulmonary edema
22 21	71.6 69.8	Maximum risk of ventricular fibrillation
20	68.0	Cardiac standstill
18	64.6	Lowest accidental hypothermia victim to recover

When a person is mildly hypothermic, he/she should be moved indoors where it is warm, wet clothing removed and a warm beverage provided. The body must be rewarmed slowly. In a more severe case, emergency medical services should be requested immediately. While transporting the person, or awaiting the arrival of the emergency unit, the following steps should be taken to try to prevent further heat loss:

Actions to take:

- Keep the person dry, remove wet clothing.
- Apply external heat.
- Have person breathe warm moist air.
- Handle the person gently.
- Remain alert of any complications.

Actions to avoid:

- Do not give hot liquids.
- Do not allow person to exercise.

6.0 COLD STRESS PREVENTION

The best protection against hypothermia and frostbite is prevention. Prevention includes proper work practices, protective clothing and proper diet.

COLD STRESS PREVENTION GUIDELINES

6.1 Work Procedures

The following is recommended to prevent cold related injuries:

- Temperature and wind monitoring at the site.
- Work periods with frequent breaks for rewarming.
- Supply of warm beverages.
- Bare skin should not contact metal objects.
- The buddy system should always be in use.
- Clothing that becomes damp or wet should be changed.
- Shelter when working outside for prolonged periods.

If work is performed continuously at 20°F ECT or below, heated warming shelters should be made available for use by employees during warm-up breaks. A work-warming regimen can be established using the TLV booklet. This table assumes that workers are properly clothed for periods of work at temperatures below freezing.

For work at or below 10°F ECT, the following should apply:

- The worker will be under constant protective observation (buddy system or other direct supervision).
- The work rate should not be so high as to cause sweating that will result in wet clothing; if heavy work must be done, rest periods must be taken in heated shelters and the opportunity for changing into dry clothing will be provided.
- Provisions will be made to allow employees to become accustomed to the required protective clothing as well as to their working environment.

COLD STRESS PREVENTION GUIDELINES

- The working conditions and weight and bulkiness of clothing will be included in estimating the required work performance and weights to be lifted by the worker.

- The work will be arranged in such a way that sitting still or standing still for long periods is minimized. Unprotected metal chair seats will not be used. The worker should be protected from drafts to the greatest extent possible.

6.2 Personal Protective Equipment Requirements

Clothing should be worn loosely, in layers, and selected for the type of work to be performed. The loose clothing and layers provide maximum protection because layers of warm air are trapped between the clothing layers. This method of dressing also allows the outer layer to be removed during heavy manual work, or if the weather warms up. The layer closest to the skin should keep the skin dry and allow the perspiration to escape.

The outer layers of clothing are for insulation and should be made of wool, goose down, or synthetic fiber-filled materials. Wool absorbs significant amount of body moisture before losing its ability to insulate, making it preferable to cotton. Gore-Tex® and polypropylene are often recommended for use next to the skin.

If clothing becomes damp or wet from the work activity or perspiration, it should be changed. Waterproof outerwear should be worn if there is precipitation.

Up to 50% of heat loss occurs through the head, ears and back of the neck. For this reason, appropriate head covering are an important clothing item.

Hands should be protected. The hands and fingers are susceptible to frostbite if unprotected.

Footwear should be waterproof and reach well up the leg when working outside

in snow or wet areas. The soles and upper part of the boots should provide good insulation as well. A combination of working boots and rubber overboots is a cost-effective method of providing insulation. The footwear should not be too constricting and the socks should allow evaporation of perspiration.

7.0 TRAINING

The workers will be instructed in cold weather procedures. The training program will include at a minimum instruction in:

- Proper rewarming procedures and appropriate first aid treatment.
- Proper clothing practices.
- Proper eating and drinking habits.
- Recognition of impending frostbite.
- Recognition of signs and symptoms of impending hypothermia or excessive cooling of the body even when shivering does not occur.
- Safe work practices.

8.0 REFERENCES

- ACGIH TLV Booklet.

FALL PROTECTION GUIDELINES

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FALL PROTECTION GUIDELINES

1.0 PURPOSE

This Fall Protection Standard Operating Procedure (SOP) serves as a guideline to protect D&B personnel from injuries associated with falls from elevations, pursuant to OSHA 29 CFR 1926.500, 1926.502 and 1926.503. Protection from fall hazards is achieved using a combination of fall hazard elimination, fall prevention and personal fall arrest systems.

2.0 SCOPE

This SOP applies to D&B personnel who are exposed to fall hazards of six feet or greater. Fall elimination, prevention, or protection is also required at heights less than six feet if work or activities are performed above dangerous equipment such as open vessels, moving equipment, or objects which pose hazards. This SOP applies to construction work activities only. It does not apply to non-construction work activities, work on scaffolds, or the use ladders.

3.0 DEFINITIONS

Aerial Lifts - Mechanical devices such as articulated boom personnel lifts, manlifts, scissor lifts and bucket trucks used for access to heights.

Anchorage - A secure point of attachment for lifelines, lanyards or deceleration devices.

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Body Harness - Multiple straps which are secured about the wearer in a manner which distributes the fall arrest forces over the thighs, pelvis, waist, chest and shoulders, with a means for attaching it to other components of a personal fall arrest system.

Buckle - Any device for holding the body belt or body harness closed around the employee's body.

Connector - A device which is used to couple (connect) parts of the personal fall arrest system and positioning device system together. It may be an independent component of the system, such as a carabiner, or it may be an integral component of part of the system (such as a buckle or D-ring sewn into a body belt or body harness or a snap-hook spliced or sewn to a lanyard or self-retracting lanyard).

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 the authority to take prompt corrective measures to eliminate the hazard.

Controlled Access Zone - An area in which certain work may take place without the use of guardrail systems, personal fall arrest systems or safety net systems, and access to the zone is controlled.

Dangerous Equipment - Equipment 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, self-retracting lifelines, etc.,

FALL PROTECTION GUIDELINES

which serve to slow the fall and limit the amount of force experienced by an employee during a fall arrest.

Deceleration Distance - The vertical distance a falling person travels, excluding lifeline elongation and free-fall distance, from the point at which the deceleration device begins to operate until the fall is stopped. It is measured as the distance between the location of a person's body belt or body harness attachment point at the moment of activation and the location of the attachment point after the person comes to a complete stop.

Designated Access Zone - An area or space which is defined by a perimeter barrier erected to warn employees when they approach an unprotected side or edge, and serves to designate areas where work may be performed without additional fall protection.

Different Level Fall - An accident in which an employee falls below the level on which he/she was standing or walking on (e.g., a fall below foot level).

D-Ring - Attachment point(s) on a belt or harness for a device or lanyard.

Fall Arrest System - A system of anchorage, body support (body harness) and connecting means (lanyard, lifeline, harness) that are designed and tested to function together in preventing injuries or deaths from falls. Fall arrest systems generally assume a maximum weight of 310 pounds per person, including tools and equipment.

Fall Elimination - Planning a task or activity in a manner which avoids exposure to heights and fall hazards.

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Fall Prevention - The provision of same-level barriers, such as guardrails and warning lines, which prevent falls from occurring.

Free Fall - The act of falling prior to activation of the personal fall arrest system.

Free Fall Distance - The vertical distance between the body harness attachment point at the time of a fall and the attachment point at activation of the personal fall arrest system.

Guardrail System - A barrier erected to prevent employees from falling to lower levels.

Hole - a gap or void of two inches or more in its least dimension, in a floor, roof or other walking/working surface.

Infeasible - Work that it is impossible to perform 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 has a connector at each end for connecting the body harness to a deceleration device, lifeline or anchor point. A shock-absorbing lanyard has a "built-in" deceleration device.

Leading Edge - The edge of a floor, roof, or framework for a floor or other walking/working surface which changes location as additional floor, roof, or decking is constructed. The leading edge is considered to be an unprotected side and edge during periods when it is not actively and continuously under construction.

FALL PROTECTION GUIDELINES

Lifeline - A flexible line for connection to an anchor point at one end which hangs vertically (vertical lifeline) or for connection to anchorage's at both ends to stretch horizontally (horizontal lifeline), which serve as a means for connecting other components of a personal fall arrest system to the anchorage.

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.

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 combinations of these.

Positioning Device System - A 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. A positioning device cannot be used for fall protection.

Qualified Person - 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 the ability to solve or resolve problems relating to fall protection.

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.

Safety Monitoring System - A safety system in which a competent person is responsible for recognizing and warning employees of fall hazards.

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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.

Slip - A same level fall caused by inadequate friction between the foot or footwear and the walking/working surface.

Snap Hook - A self-closing connecting device with a gatekeeper latch or similar arrangement that will remain closed until manually opened. May be single action or double action.

Toeboard - A low protective barrier that will prevent the fall of materials 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 (1.0 m) 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, runways, formwork and concrete reinforcing steel but 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 guardrail, body belt or safety net system to protect employees in the area.

Work Area - Portion of a walking/working surface where job duties are being performed.

4.0 RESPONSIBILITIES

Health and Safety Officer (HSO) - The HSO has overall responsibility for the D&B Fall Protection Program. The HSO will be responsible for revising the Fall Protection Program to include new OSHA updates. The HSO is also responsible for confirming that Fall Protection training is available for D&B Authorized Personnel. The HSO may conduct site inspections to verify that D&B personnel employ Fall Protection measures, as required.

Health and Safety Representative (HSR) - The HSR has primary responsibility for the implementation of the Fall Protection Program, as required at each project. The HSR should be able to identify different types of fall hazard situations associated with the job site and maintain the appropriate supply of fall arrest equipment and hardware and confirm that authorized personnel correctly use fall control methods when required.

Authorized Personnel - Authorized Personnel perform tasks which expose them to fall hazards and are therefore authorized to use personal fall arrest systems. Authorized Personnel will be able to identify types of fall hazards associated with each project, be knowledgeable in the methods used to eliminate, prevent and arrest falls and be knowledgeable in the use of personal fall arrest equipment.

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D&B Personnel - D&B Personnel are responsible for keeping aisleways, work platforms, and other working surfaces in their work areas in orderly condition, clean and dry, and kept free from holes and loose materials.

5.0 GUIDELINES

5.1 Circumstances Which Require Fall Protection

Once it has been determined that the walking/working surface on which the employees are to work has the strength and structural integrity to support employees safety, the HSO, HSR or a designee must evaluate the walking/working surface to determine whether there is a fall hazard. D&B requires either a guardrail system or personal fall arrest system in the following circumstances where the employee will be working six feet or higher above a lower level:

- Unprotected sides and edges.
- Leading edges.
- Hoist areas.
- Holes (if the hole creates a tripping hazard, a cover should be used).
- Open sides of ramps, runways and other walkways.
- Excavations.
- Wall openings.

- Situations where the employee is working above dangerous equipment and has the potential to fall into the machine.

5.2 Fall Protection Systems and Practices

To assess the fall hazards at D&B project locations and to implement preventive measures, the HSO, HSR or a designee can use the Fall Hazard Assessment Checklist, presented in Appendix A. Fall Hazard Control Analysis Guide, presented in Appendix B, can be used to outline the engineering, administrative and personal protective controls that are designed to protect D&B personnel exposed to fall hazards.

The following fall protection systems may be used, as determined by the HSO, HSR or a designee.

5.2.1 Protection from Falling Objects

When employees are exposed to falling objects, D&B requires that each employee wear a hard hat. One of the following measures could also be implemented, as determined by the HSO or HSR:

- Erect toeboards, screens or guardrail systems to prevent objects from falling from higher levels.
- Barricade the area where the falling object hazard may exist, prohibit employees from entering the area, and keep objects far enough away from the edge on the higher level so that they will not go over the edge

FALL PROTECTION GUIDELINES

5.2.2 Guardrail Systems

The top edge of the guardrail must be 42 inches (+ or – 3 inches) above the walking/ working surface. When there is not a wall at least 21 inches high, there must also be a midrail, screen, mesh or intermediate vertical member (not more than 19 inches apart). At the bottom is a toe board at least 3 1/2 inches in vertical height, with no more than ¼ inch clearance above the floor level. Construction and load-testing of the guardrail system must be according to the specifications outlined in OSHA 29 CFR 1926.502(b).

5.2.3 Personal Fall Arrest Systems

Personal fall arrest system may consist of anchorage, connectors, body harnesses, deceleration device and lifelines. The system must not allow an employee to free-fall more than six feet or contact a lower level. The personal fall arrest system must be inspected prior to each use for wear, damage and other deterioration. The attachment point of the body harness should be in the center of the wearer's back near shoulder level or above the wearer's head. The components of a fall arrest system may not be used as for hoisting materials. Required strengths, tolerances, and testing requirements for personal fall arrest systems are specified in OSHA 29 CFR 1926.502(d).

5.2.3.1Rescue Plan

There must be a plan in place for prompt rescue of employees in the event of a fall. This plan must include the needed equipment and personnel to affect a rescue. This plan should be documented in the Site-Specific HASP or the H&S Checklist, as appropriate.

Note: Body belts are not permitted to be used as fall arrest system.

5.3 Inspection Checklists

To verify that each piece of equipment used for fall protection is properly maintained and ready for use, inspections must be performed and documented. Equipment Inspection Checklist is presented in Appendix D.

5.4 Fall Protection Plan

Where it has been demonstrated that it is infeasible or creates a greater hazard to use conventional fall protection as described in section 5.2 (during leading edge work or precast concrete erection work), a Fall Protection Plan (FPP) can to be used. FPP must be prepared and implemented to meet the requirements of OSHA 29 CFR 1926.502(k), and the requirements listed below:

- The FPP must be developed specifically for the site where the work is being performed and must be updated to reflect current conditions.
- Any changes to the FPP must be approved by a qualified person.
- A copy of the FPP and approved changes must be kept at the job site.
- The implementation of the FPP must be supervised by the HSO, HSR or a designee.
- The FPP must document the reasons why conventional fall protection is infeasible or why their use would create a greater hazard.

- The FPP must include a written discussion of other measures taken to reduce or eliminate fall hazards for those employees who are not protected by conventional fall protection systems.
- Where no other measures to reduce or eliminate fall hazards have been implemented, a Safety Monitoring System must be used (see Section 5.5).
- The FPP must identify each location where conventional fall protection methods cannot be used. These locations must then be classified as controlled access zones.
- The FPP must identify, by name, the employees who are designated to work in controlled access zones. No other employees may enter controlled access zones.
- In the event of a fall or some other related, serious incident, D&B will investigate the circumstances to determine if new practices, procedures or training need to be incorporated into the FPP.

5.5 Safety Monitoring System

When conventional fall protection systems are not feasible as described in section 5.4, D&B employees will be protected using a Safety Monitoring System. The Safety Monitoring System must comply with the following requirements:

- The HSO, HSR or a designee will monitor the safety of site personnel.
- The HSO, HSR or a designee will warn the personnel when it appears that they are unaware of a fall hazard or acting in an unsafe manner.

- The HSO, HSR or a designee will be on the same walking/working surface and within visual sighting distance of the employee being monitored.
- The HSO, HSR or a designee will be close enough to communicate orally with the employee.
- The HSO, HSR or a designee will not have other responsibilities which could take the monitor's attention from the monitoring function.
- Areas where a Safety Monitoring System is in use is a controlled access zone.

5.6 Training Requirements

D&B employees who might be exposed to fall hazards must have adequate training which will enable them to recognize the hazards of falling and will train them in the procedures to be followed to minimize these hazards. The training must be conducted by a competent person qualified in the following areas:

- The nature of fall hazards in the work area.
- Correct procedures for erecting, maintaining, disassembling and inspecting the fall protection systems to be used.
- The use and operation of guardrail systems, personal fall arrest systems, safety nets, warning lines, safety monitoring systems, controlled access zones and other protection.
- The role of each employee in the Safety Monitoring System.

- The limitations on the use of mechanical equipment during work on sloped walking/working surfaces.
- Correct procedures for handling and storage of equipment and materials and erection of overhead protection.
- The roles of employees in the FPP.

Employees should be retrained when:

- Inadequacies in the employee's knowledge or use of fall protection systems or equipment indicate that he/she has not retained the requisite understanding or skill.
- There are changes at the worksite which render previous training obsolete.
- Changes in the types of fall protection systems or equipment used renders previous training obsolete.

Employees must be trained prior to operating manlifts or aerial lifts. Training must be specific to the type of manlift used.

6.0 REFERENCES

- OSHA 29 CFR 1926, Subpart M.

Performed by:_____

Date:_____

APPENDIX A – FALL HAZARD ASSESSMENT CHECKLIST

Use the following checklist to identify potential fall hazard situations at the site. If a listed hazard is present at your facility, mark "yes" on the checklist and describe the location(s) where the hazard is identified. Attach additional sheets if necessary if there is not enough space on the checklist to note all locations of a particular identified fall hazard. If a listed hazard is not present at your site, mark "no" on the checklist and proceed to the next item.

NOTE: When filling out this checklist, you must consider both ***routine and non-routine tasks*** (maintenance or repair of equipment, troubleshooting, inspections, etc.).

Potential Fall Hazard	Yes	No	Location(s)
General			
Fall hazards from open pits, tanks, vats, ditches, etc. OSHA 29 CPR [1910.22(c)].			
Floor and Wall Openings and Holes			
1. Stairway floor openings OSHA 29 CPR [1910.23(a)(1)].			
2. Ladderway floor opening or platform OSHA 29 CPR [1910.23(a)(2)].			
3. Hatchway and chute floor openings OSHA 29 CPR [1910.23(a)(3)].			

Potential Fall Hazard	Yes	No	Location(s)
4. Skylight floor openings OSHA 29 CPR [1910.23(a)(4)].			
5. Pit and trapdoor floor openings OSHA 29 CPR [1910.23(a)(5)].			
6. Manhole floor openings OSHA 29 CPR [1910.23(a)(6)].			
7. Temporary floor openings OSHA 29 CPR [1910.23(a)(7)].			
8. Floorholes into which persons can accidentally walk OSHA 29 CPR [1910.23(a)(8)].			
9. Doors or gates which open directly into a stairway OSHA 29 CPR [1910.23(a)(10)].			
10. Wall openings with drops of more than 4 feet OSHA 29 CPR [1910.23(b)(1)].			
11. Chute wall openings with drops of more than 4 feet OSHA 29 CPR [1910.23(b)(2)].			
12. Window wall opening at stairway landings, floors, platforms, or balconies from which there is a drop of more than 4 feet and where the bottom of the opening is less than 3 feet above the platform or landing OSHA 29 CPR [1910.23(b)(3)].			
13. Temporary wall openings OSHA 29 CPR [1910.23(b)(4)].			

Potential Fall Hazard	Yes	No	Location(s)
14. Hazard of material falling through a wall hole, and the lower edge of the near side of the hole is less than 4 inches above the floor and the far side of the hole is more than 5 feet above the next lower level OSHA 29 CPR [1910.23(b)(5)].			
15. Open-sided platforms 4 feet or more above the adjacent floor or ground level OSHA 29 CPR [1910.23(c)(1)].			
16. Runways with open sides 4 feet or more above the floor or ground level OSHA 29 CPR [1910.23(c)(2)].			
17. Open-sided floors, walkways, platforms, or runways above or adjacent to dangerous equipment regardless of heights OSHA 29 CPR [1910.23(c)(3)].			
18. Flights of stairs with 4 or more risers OSHA 29 CPR [1910.23(d)(1)].			

Fixed Industrial Stairs

1. Exposed (open sides) stairways and stair OSHA 29 CPR platforms [1910.24(h)].			
2. Enclosed stairways OSHA 29 CPR [1910.24(h)].			

Potential Fall Hazard	Yes	No	Location(s)
Fixed Ladders			
1. Ladders of more than 20 feet to a maximum unbroken length of 30 feet OSHA 29 CPR [1910.27(d)(1)(ii)].			
2. Ladder landings OSHA 29 CPR [1910.27(d)(1)(iii)].			
3. Landing platforms OSHA 29 CPR [1910.27(d)(2)(ii)].			
4. Ladders of more than 20 feet in unbroken length on towers, water tanks, and chimneys OSHA 29 CPR [1910.27(d)(5)].			
Scaffolding			
1. Scaffolding with open sides more than 10 feet above the ground or the floor OSHA 29 CPR [1910.28(b)(15)].			
2. Crawl boards or chicken ladders OSHA 29 CPR [1910.28(t)(2)].			
Mobile Ladder Stands			
1. Mobile ladder stands with more than 5 steps or 60 inches vertical height to the top step OSHA 29 CPR [1910.29(f)(4)].			
Powered Platforms for Building Maintenance			
1. Work performed on roofs during building maintenance OSHA 29 CPR [1910.66(e)(3)].			
2. Elevated track system 4 feet or more above a safe surface and traversed by carriage supported equipment OSHA 29 CPR [1910.66(e)(6)].			

Potential Fall Hazard	Yes	No	Location(s)
3. Working platforms of suspended units OSHA 29 CPR [1910.66(f)(5)(i)(G)].			
4. Working platforms suspended by 2 or more wire ropes where the failure of 1 rope will cause the platform to upset OSHA 29 CPR [1910.66(f)(5)(ii)(M)].			
5. Employees on working platforms OSHA 29 CPR [1910.66(j)].			

Permit-Required Confined Spaces

1. Entrance covers removed where an employee could fall into a confined space OSHA 29 CPR [1910.146(c)(5)(ii)(B)].			
2. Use of tripod and winch to lower employees into confined spaces OSHA 29 CPR [1910.146(d)(4)(ix)].			

Other

1. Any other walking/working surface with an unprotected side or edge 6 feet or more above a lower level OSHA 29 CPR [1926.501(b)(1)].			
2. Hoist areas 6 feet or more above a lower level OSHA 29 CPR [1926.501(b)(3)].			
3. Excavations 6 feet or more in depth which are not readily seen because of plant growth or other visual barriers.			

Other(s):_____

_____

APPENDIX B – FALL HAZARD CONTROL ANALYSIS GUIDE

Fall Hazard	Engineering Controls	Administrative Controls	Personal Protective Equipment
Working on top of vertical or horizontal tanks.	1. For new construction, the access areas on horizontal or vertical tanks (both operation and maintenance) should be identified and located for easy access during the design phase. If employees must access the top of a tank, then an appropriate guardrail should be specified in the design. 2. Existing tanks should be evaluated to determine if access points, such as vents, openings, motors, piping, etc, which are routinely accessed are protected by an adequate guardrail. If not currently protected, then personnel working in the unprotected area must use fall protection equipment. The facility should evaluate the situation to determine if a guardrail is appropriate.	1. Personnel accessing the top of tanks must be instructed on fall protection prior to access according to the guidelines established in this manual. Training should include knowing when they need PPE and when they do not. 2. Personal fall protection equipment will be inspected prior to and after use. Inspection must be documented using the Fall Protection Equipment Inspection Checklist provided as Appendix D.	1. When accessing the top of tanks and the nature of work will be outside of a protective guardrail, a fall arrest system must be used.

	3. When safety harnesses and lanyards are to be utilized, the appropriate anchor point will be predetermined and marked.		

Fall Hazard	Engineering Controls	Administrative Controls	Personal Protective Equipment
Working on an elevated pipe or conduit Rack or Chase.	1. Where routine maintenance or regular access is required, elevated work platforms should be installed with a standard guardrail with access by either a ladder or stair.	1. Personnel must be properly trained in the use of fall protection equipment prior to use according to the guidelines established in this program. 2. Personal fall protection equipment will be inspected prior to and after use. Inspection must be documented using the Fall Protection Equipment Inspection Checklist provided as Appendix D.	1. Provide a personal fall arrest. 2. Should a horizontal lifeline system not be appropriate, a designated anchor point meeting the OSHA requirements, as outlined in this program, should be available to attach a shock-absorbing lanyard. 3. Fall protection equipment must be selected from the equipment list contained in this program or equivalent to the equipment specified.

Fall Hazard	Engineering Controls	Administrative Controls	Personal Protective Equipment
Open Sided Roof or Platform.	1. Material and personnel access points to elevated platforms must be equipped with guarding. When material access points are not used, either a fixed or movable guardrail must be used. The guardrails must be capable of withstanding a 200-pound force. 2. When material access points are being utilized and a guardrail has been removed, an evaluation to determine if operators are required to be in the fall hazard zone should be conducted. If personnel can operate the material hoist from outside the zone, they are not required to wear fall protective equipment.	1. Personnel required to work in the fall hazard area must be trained prior to the work according to the training guidelines established by this program. 2. Personal fall protection equipment will be inspected prior to and after use. Inspection must be documented using the Fall Protection Equipment Inspection Checklist provided as Appendix D.	1. Personnel required to be in a fall hazard zone must wear a body harness and shock-absorbing lanyard of appropriate length but not longer than 6 feet attached to an approved and designated anchor point. 2. Fall protective equipment must be selected from the equipment list contained in this program or equivalent to the equipment specified.

Fall Hazard	Engineering Controls	Administrative Controls	Personal Protective Equipment
Using Manlifts or Mobile Personnel Lifting Equipment.	1. Purchase, lease or rent lifts that have personal cage areas conforming to OSHA requirements.	1. Any associate who operates a powered platform or manlift, must have been instructed and have demonstrated proficient operating ability before being allowed to operate in the facility. 2. Prior to operation, the powered platform/manlift must be inspected to verify that safety features of the lift are working properly, including brakes, access gates, etc. A checklist must be completed prior to usage according to the checklist provided as Appendix D. 3. Personal Protective Equipment will be inspected prior to and after use. Inspection must be documented using the Fall Protection Equipment Inspection	1. While working from a telescoping boom platform or manlift, personnel must wear a safety harness with a shock-absorbing lanyard of appropriate length but not longer than 6 feet. The lanyard must attach to an approved and designated anchor point at the same height as the D-ring on the harness. The midrail should never be used as the anchor point. 2. Fall protective equipment must be selected from the Fall Protection Equipment Inspection Checklist provided as Appendix D or equivalent to the equipment specified.

		Checklist provided as Appendix D.	

No. 5

Fall Hazard	Engineering Controls	Administrative Controls	Personal Protective Equipment
Entry or exit from a vertical confined space.	1. Reconfigure the confined space to allow access at the level of the work to be performed.	Confined Space training is mandatory for entering a confined space. Awareness training is not acceptable.	1. During entry and exit an approved tripod and combination hoist mechanism rated for fall protection must be used. 2. Fall protective equipment must be selected from the Fall Protection Equipment Inspection Checklist provided as Appendix D or equivalent to the specified equipment.

APPENDIX C – GUIDELINES FOR ANCHOR POINTS

An anchor point is a secure point of attachment for a personal fall arrest system. It must be independent from the means supporting or suspending a worker.

Anchor points:

- Must be able to support a weight of at least 5,000 pounds of force for each worker attached.
- Should be located at a height that reduces free fall to 6 feet or less. Factors to consider are deceleration distance (shock-absorbing lanyard) and elongation lanyard stretching.
- Should be located so that if a free fall occurs, and attached worker will not collide with equipment or structure or contact any lower level.

The lanyard is connected to an anchor point using a self-locking snap hook or to a tie-off strap. The tie-off point should be at or above the D-ring on the back of the worker's harness. This will limit the free fall distance to the length of the lanyard.

Anchoring plan:

Every anchor point must pass each of the following nine tests for safe usage:

1. Height
   - ✓ Does the anchor point height reduce free fall to the shortest distance possible?
   - ✓ Is the anchor point away from possible collisions with the body or the head?

- ✓ Is the anchor point unaffected by the local environment, or contamination such as paint over-spray?

2. Location
   - ✓ Is swing fall reduced to a reasonably safe minimum in order to reduce the potential for collision injury and to allow for self-recovery?
   - ✓ Is the anchor point continuous by design, to accomplish the task without intermittent fall hazards?
   - ✓ Is the anchorage reachable, to permit connection without a hazard?
3. Shape
   - ✓ Is the anchor point compatible with the attachment method of the deceleration device? Many shapes are not attachable with snap hooks, including certain eyebolt shapes.
   - ✓ Will the likely method of attachment cause damage or failure to the deceleration device? Looping a lanyard around an angle iron could cut the lanyard in a fall.
   - ✓ Will the likely method of attachment be to a bolt hole? Snap hooks can detach from slotted bolt holes with as little as 2 pounds of steady force.
   - ✓ Can the attachment method allow sliding-down falls or permit cutting the line?
   - ✓ Will the attachment method of a lanyard to a flanged edge without closure of the snap hook gate be prohibited?
4. Strength
   - ✓ Has the anchor point been identified by a competent person for its intended use?
   - ✓ Is the anchor point still reliable after long exposure to the elements, such as salt air?

- ✓ Will a tie-back point prevent any additional free fall if a primary anchor point fails?

5. Usage
   - ✓ How many workers can be safely attached to the same common anchor point? This is an engineering question, if the answer is more than one worker.
   - ✓ Are the load-bearing suspension line and the lifeline attached to separate support systems?
   - ✓ Is trying knots prohibited for providing anchor point attachments? Knots aren't reliable without a strict worker training system and an approved method of tying them.
   - ✓ Has wrapping a line around a typical structural member such as an I-beam been tested by the company for sufficient strength?
   - ✓ Is it prohibited to attach snap hooks to each other or to a lifeline or lanyard? Doing so results in hazards such as roll-out and loss of strength.
   - ✓ Will the snap hook be used for attaching to the structure or for pulling back?
   - ✓ Will the method of use cause workers to disconnect themselves at heights because they can't reach their task?
6. Stability
   - ✓ Has attachment to the lip of an I-beam been prohibited? A snap hook may slip off with an angled pull and cause system failure.
   - ✓ Has attaching a lifeline to a projection been prohibited? The lifeline can detach by movement off the end.
7. Independence
   - ✓ Are the anchor points independent? The independence of each anchor point from the main work-positioning anchor support is an important

principle. Where tripods, building, or structure itself are concerned, it is important to address the kind of failure that would likely produce an injury. Anchor point design should address all predictable scenarios.

8. Protection while moving
   - ✓ If horizontal lifelines are sued to allow protected movement, have they been engineered for this purpose? A horizontal line may be intended as a hand line or perimeter cable. Termination of lines or butting them with mechanical clips can be dangerous under dynamic conditions.
   - ✓ Do the horizontal lines allow enough sag under the dynamic conditions of a fall to permit the worker to avoid colliding with an obstruction or the ground?
   - ✓ A horizontal life line must be designed by a qualified person.
9. Labeling
   - ✓ Can the anchor point be marked for future recognition and limited specific use? Anchor points for a specific activity should be identified on the Maintenance Job Procedure for that task.

Inspector:_____

Inspection Date:_____

APPENDIX D – EQUIPMENT INSPECTION CHECKLIST

Type	Manufacturer	Model No.	Serial No.
Harness			
Lanyard			
Anchor Strap			
Carabiner			

Inspection of fall protective equipment must be conducted before and after each use. This checklist is designed to document and confirm that components have been inspected as required and that no defective or damaged components have been found. Should defective or damaged parts be found, the entire piece of fall protective equipment must be removed from service and tagged "OUT OF SERVICE - DO NOT USE" until the components can be either repaired or discarded.

Part	Condition	Acceptable	Unacceptable
Personal fall arrest systems (*Harness, buckles, D-rings, straps, keepers, etc.*)	Metal connectors, snap hooks, D-rings etc., must not show signs of damage, including: broken, distorted, sharp edges, burrs, cracks, worn parts, or corrosion. *Note: Make sure buckles work freely.*		

	The harness and straps must not show signs of damage including: frayed, cut or broken fibers; tears, abrasions, mold, burns, or discoloration, pulled or cut stitches, knots, excessive soiling or paint buildup. *Note: Broken stitches or exposed fall indicator stitching may be an indication the harness has been shock-loaded during a fall and must be discarded.*		
	The harness must have an original label indicating the manufacturers intended load capacity.		
Shock-absorbing lanyards	The lanyards must not show signs of damage or stress or shock loading including: rust or staining, chemical or heat damage, or degradation. The lanyard must also have complete and legible labels including the manufacturer name and rated capacity. *Note: Broken stitches or exposed fall indicator stitching may be an indication the harness has been shock loaded in a fall and must be discarded.*		

Inspector:_____

Inspection Date:_____

Vehicle Mounted Platforms and Manlifts

Type	Manufacturer	Model No.	Serial No.

Inspection of vehicle mounted platforms must be completed prior to operation each day or each shift. The inspection must be documented using this form. If any condition is found to be defective or damaged, then the vehicle mounted platform or manlift may

not be used until the defective or damage component has been repaired or replaced. During the time when the platform or lift is being repaired or waiting repair, the unit is to be tagged "OUT OF SERVICE - DO NOT USE". Safety harnesses and lanyards used in conjunction with unit operation must be inspected according to the Fall Protection Equipment Checklist.

Part	Condition	Acceptable	Unacceptable
Tires	Tires are in good condition and are not flat or loosely attached to unit.		
Hydraulic System	There are no visible hydraulic leaks or hydraulic fluid on ground around unit.		
Controls	The controls are labeled clearly and correct. The controls work as intended.		
Guardrails	The guardrails and toeboards around the personnel platform area are intact, secure and welds not cracked or broken.		
Platform Gate	The gate is self-closing and works properly. Latching mechanism works and securely fastens gate.		
Outriggers (if equipped)	The outriggers are free from recognized damage and move easily. The support pads are intact and not damaged.		
Brakes	The brakes have been tested and work properly.		
Horn	The horn is functional and can be heard over nearby operating equipment		

Inspector:_____

Inspection Date:_____

Horizontal Lifeline Systems

Location:_____

Inspection of the horizontal lifeline system must be conducted before and after each use. The checklist is designed to document and confirm that components have been inspected as required and that no defective or damaged components have been found. Should defective or damaged parts be found the piece must be removed and replaced with new part. The damaged or defective piece must be made unusable and discarded. If the wire rope is damaged, the entire horizontal lifeline should be tagged "OUT OF SERVICE - DO NOT USE". The inspection of safety harnesses and lanyard must be documented using the Fall Protection Equipment Checklist.

Part	Condition	Acceptable	Unacceptable
Hardware *(Hardware includes: end anchors, links, terminals, brackets and connectors)*	Hardware items must not show signs of damage, including: broken, distorted, sharp edges, burrs, cracks, worn parts, or corrosion.		
Wire Rope	Wire rope must not be damaged, including: six (6) or more broken wires in one rope lay or three (3) or more broken wires in one strand, corrosion, permanent kinks, burn marks, bird caging or exposed core.		

PERSONAL PROTECTIVE EQUIPMENT GUIDELINES

Table of Contents

PERSONAL PROTECTIVE EQUIPMENT GUIDELINES

1.0 PURPOSE

To establish guidelines for selection and use of Personal Protective Equipment (PPE) for use at D&B work sites.

2.0 SCOPE

Applies to decisions regarding PPE selection and use by D&B personnel during D&B project field tasks.

3.0 DEFINITIONS

Degradation - The loss of or change in the fabric's chemical resistance or physical properties due to exposure to chemicals, or ambient conditions (e.g., sunlight).

Penetration - The movement of chemicals through zippers, stitched seams or imperfections (e.g., pinholes) in a protective clothing material.

Permeation - The process by which a chemical dissolves in and/or moves through a protective clothing material on a molecular level.

4.0 RESPONSIBILITIES

Health and Safety Officer (HSO) - The HSO is responsible for confirming that training is provided to applicable D&B employees in proper use of PPE. The HSO may conduct site inspections to confirm that D&B personnel use proper PPE. The HSO will use these guidelines in conducting PPE assessments and selecting PPE for job tasks.

Health and Safety Representative (HSR) - The HSR has the responsibility for verifying that employees use appropriate PPE correctly, as required at each project. The HSR should be able to identify different types of hazards associated with the job site and maintain adequate supply of appropriate PPE.

PERSONAL PROTECTIVE EQUIPMENT GUIDELINES

D&B Employee - Employee is responsible for wearing the appropriate PPE, as determined by the HSO or HSR.

5.0 GUIDELINES

A certified hazard assessment will be completed for each job. Efforts will be made to reduce or eliminated exposure to on-site hazards, through employment of engineering and/or administrative controls. Use of PPE should be a last resort. When engineering and administrative controls are not feasible, not effective or cannot be used in lieu of PPE due to regulations, appropriate PPE will be used. Employees should also wear PPE when it is reasonably expected that the use of the PPE would prevent injury. Specific clients may have their own PPE requirements for working on their sites. According to OSHA Standards 29 CFR 1910 and 29 CFR 1926, the following body areas require special protection:

- Eyes and face.
- Head.
- Ears.
- Skin.
- Hands, arms, and feet.
- Respiratory system.

The use of PPE itself can create worker hazards, such as heat stress, physical and psychological stress, impaired vision and impediment in mobility and communication. For any given situation, equipment and clothing should be selected to provide protection. Over-protection as well as under-protection can be dangerous and should be avoided.

D&B will provide all necessary PPE to its employees at no cost, with the following exceptions:

- Non-specialty prescription safety eyewear that are worn off of project sites
- Non-specialty safety-toe protective footwear that are worn off of project sites
- Replacement PPE if lost or intentionally damaged by the employee

5.1 Types of PPE

The following types of PPE form the basis for the protective clothing:

- Head Protection - Regulated by OSHA 29 CFR 1910.135 and 1926.100; specified in ANSI Z89.1, Safety Requirements for Industrial Head Protection. Head protection equipment includes hard hats, hard hat liners, hoods and protective hair coverings.

- Eye and Face Protection - Regulated by OSHA 29 CFR 1910.133(a) and 1926.102; specified in ANSI Z87.1, Eye and Face Protection. Eye and face protection equipment includes face shields, safety glasses, splash hoods, goggles and sweatbands.

- Ear Protection - Regulated by OSHA 29 CFR 1910.95 and 1926.101; specified in 41 CFR Part 50-204.10. Ear protection equipment includes earplugs and earmuffs.

- Foot Protection - Regulated by OSHA 29 CFR 1910.136 and 1926.96; specified in ASTM F2413-05 Safety Toe Footwear and ASTM 2413-11 and 2412-11. Foot protection equipment includes safety boots and overboots.

- Hand (and Arm) Protection - Not specifically regulated. Hand and arm protection equipment includes inner disposable gloves, overgloves and sleeves.

- Protective Clothing - Not specifically regulated. Protective clothing equipment includes fully encapsulating suits, non-encapsulating suits, aprons,

leggings, sleeve protectors, blast and fragmentation suits, radiation contamination protective suits, flame/fire retardant coveralls, flotation gear and cooling garments.

- Safety vests – Regulated by ANSI-107. Used primarily during roadwork, some clients require safety vests on their sites for all construction work.

Note: **Respiratory protection is addressed in a separate SOP: D&B Corporate No. C23**. **Safety vests are also discussed in SOP C08.**

5.1.1 Foot Protection

Foot protection will be required when there is a reasonable probability of injury without the protection, and conform to the following:

- Shoes shall be Class 75 for men, equivalent to Class 50 for women, and shall meet the specifications of American National Standard for Safety Toe Footwear, ANSI Z41.1-1967. The class, which defines the minimum requirements for compression and impact, shall be stamped by the manufacturer on the shoe interior.

- Specifically constructed shoes may be required for specific work environments. For example, reinforced soles, inner soles of flexible metal, or steel shanks are to be used for construction work and other work with the potential for protruding hazards.

- Overboots may be required for chemical protection.

5.1.2 Eye and Face Protection

Eye protection equipment includes protection against impact, penetration, molten metal splashes, chemical splashes, dusts, glare, and injurious light radiation (infrared and

ultraviolet). It does not include the special protection required to prevent damage from x-rays, gamma rays, and high energy particulate radiation such as alpha, beta or neutron.

- Eye and face protective equipment must meet the standard established by the Occupational Safety and Health Act as detailed in the American National Standard for Eye and Face Protection, ANSI Z87.1.

- The protective equipment must be appropriately selected for the hazard.

- Employees requiring correction (prescription) lenses should be provided with glasses with the sideshields. The HSO should be consulted regarding the prescription safety glasses.

- Employees who do not require corrective lenses should be provided with plain safety glasses with safety shields.

Note: As adopted by the American Optometric Association concerning the use of contact lenses in industrial environments, contact lenses may be worn in some hazardous environments with appropriate covering safety eyewear. Contact lenses of themselves do not provide eye protection in the industrial sense. Ocular hazards are greater in some environments than others and workers should be concerned as to the advisability of wearing the lenses in a given environment.

5.1.3 Head Protection

Head protection (hard hats) is required where employees are subject to head injuries from falling of flying or moving objects, from splashing hazardous chemicals and other liquids, from limited electric shock and burns, and from bumps caused by working in limited space where the head may come in contact with equipment or objects or when other individuals are working above them.

- The hardhat suspension will be changed when it shows signs of wear and will be kept in clean and sanitary condition.

- The protective equipment must be appropriately selected for the hazard.

- Head protection equipment must meet the standard established by the Occupational Safety and Health Act as detailed in the American National Standard for Safety Requirements for Industrial Head Protection, ANSI Z89.1.

- Head protection, when not assigned to an individual, will be sanitized after each use or disposable head covering will be utilized.

5.1.4 Hearing Protection

Adequate hearing protection should be used when personnel is exposed to a noise level of/or greater than 90 dBA as an 8-hour time-weighted average.

Hearing protectors should be worn according to manufacturer's specifications and as trained. Procedures should be implemented to assure proper cleaning, maintenance and use. See D&B SOP No. 18 for additional information.

5.1.5 Hand Protection

Hand protection should be used when there is a potential for skin absorption of harmful substances, cuts or lacerations, abrasions, punctures, chemical burns, thermal burns and temperature extremes.

The hand protection must be appropriately selected for the type of hazard that may be encountered. The selection process should include an evaluation of the tasks to be performed, conditions, duration of hand protection to be used and the identified hazards.

5.1.6 Safety Vests

While required on all roadway projects (refer to SOP C08 for roadway work requirements), safety vests are also required to be worn on projects not involving roadway work. D&B primarily requires lime green Class 2 safety vests. However, some clients require standard or site-specific orange Class 2 vests. Those D&B personnel requiring specific vests other than the Class 2 lime green vests shall speak with their supervisor and the HSO to ensure that they have the proper vest.

5.2 Chemical Protective Clothing

Chemical protective equipment is used to minimize or eliminate chemical contact. The selection depends on accurate assessment of the hazardous conditions, cost, availability, compatibility with other equipment and performance.

5.2.1 Chemical Protection Selection Criteria

The most important factor in selecting PPE is determining the chemicals to which D&B employees are likely to be exposed. Once the chemical(s) have been identified and the type of work to be performed has been considered, the most appropriate clothing should then be selected.

Garments are selected for use by their resistance to permeation, degradation, and penetration. No material protects against all chemicals and combinations of chemicals, or is an effective barrier to prolonged chemical exposure.

Charts are available from most manufacturers indicating the resistance of their products to degradation, permeation or penetration. When permeation tables are available, they should be used in conjunction with degradation tables.

Limited permeation data for mixtures is currently available. Chemical mixtures can be significantly more aggressive towards PPE materials than any single component alone.

PERSONAL PROTECTIVE EQUIPMENT GUIDELINES

Even small amounts of a rapidly permeating chemical may provide a pathway that accelerates the permeation of the chemicals.

Selection should be based upon the most hazardous chemicals, potential for skin contact and absorption, and expected concentrations. Sometimes layering of several different types of protective materials or using a material laminated of two or more materials affords the best protection.

When selecting PPE, the following criteria should be evaluated:

- Concentration of the chemical.
- Physical State - The physical state of a chemical determines the exposure route and potential for toxicity.
- Length of Exposure - The length of time a material is exposed to a chemical increases the probability of breakthrough. It should be kept in mind that during permeation testing, usually a pure (100% composition) liquid is placed in direct contact with the material producing a worst-case situation.
- Abrasion - The use of leather gloves and a heavy apron over regular protective clothing will prevent damage to the PPE and protect against exposures during manual material handling.
- Dexterity required performing necessary tasks.
- Ability to decontaminate.
- Climatic Conditions - Protective clothing add a burden of additional weight, restriction of movement, as well as limiting natural cooling, contributing to heat stress. Some material act differently when they are very hot or very cold.

PERSONAL PROTECTIVE EQUIPMENT GUIDELINES

5.2.2 Types of Protective Material

The following materials are generally used in protective garments:

- Cellulose or paper.
- Natural and synthetic fibers:
  - Tyvek.
  - Nomex.
- Elastome:
  - Polyethylene.
  - Saran.
  - Polyvinyl chloride.
  - Neoprene.
  - Butyl rubber.
  - Chlorapel.
  - Viton.

5.3 Use of PPE

The proper use of PPE includes the following:

- The protective equipment must be appropriately selected for the chemical hazard.

- Protective clothing should be inspected for wear, tears, etc. before each use.
- Chemical protective clothing must be adequately decontaminated after each use.

5.3.1 Donning and Doffing

Exact procedures for removing PPE ensembles must be established, practiced and followed in order to prevent damage, reduce or eliminate migration from the work area and a transfer of contaminants to the wearer and/or others.

5.4 Training

Training in PPE use is necessary. This training:

- Allows the user to become familiar with the equipment in a non-hazardous situation.
- Instills confidence of the user in the equipment.
- Makes the user aware of the limitations and capabilities of the equipment.
- Increases the efficiency of operations performed by workers wearing PPE.

Training should be completed prior to PPE use in a hazardous environment and repeated as necessary (changing conditions, not using or not using properly). All training will be documented.

At a minimum, the training program should include:

- The proper use and maintenance of selected PPE, including capabilities and limitations.
- The nature of the hazards and the consequences of not using the PPE.
- The human factors influencing PPE performance.
- Hands on instruction in inspecting, donning, checking, fitting and using PPE.
- Wearing PPE in a test atmosphere to evaluate its effectiveness.
- The user's responsibility for decontamination, cleaning and maintenance of PPE.
- Emergency procedures and self-rescue in the event of PPE failure.

5.5 Inspection

An effective PPE inspection program includes the following:

- Inspection and operational testing of equipment received from the factory or distributor.
- Inspection of equipment as it is issued to workers.
- Inspection after use or training and prior to maintenance.
- Periodic inspection of stored equipment.

Detailed inspection procedures, where appropriate, are usually available from the manufacturer.

PERSONAL PROTECTIVE EQUIPMENT GUIDELINES

Records should be kept of inspection procedures. Individual identification numbers should be assigned to reusable equipment and records should be maintained by that number. Each inspection should record the ID number, date, inspector, and any unusual conditions or findings. Periodic review of these records should be conducted to identify potential weaknesses in the PPE program.

5.6 Storage

PPE must be stored properly to prevent damage or malfunction due to exposure to dust, moisture, sunlight, damaging chemicals, extreme temperatures, and impact.

- Potentially contaminated clothing should be stored in an area separate from regular clothing.
- Potentially contaminated clothing should be stored in a well-ventilated area.
- Different types and materials of clothing and gloves should be stored separately to prevent issuing the wrong material by mistake.
- Protective clothing should be folded or hung in accordance with manufacturers' recommendations.

5.7 Additional Considerations

- If hard hats are necessary, chinstraps or lanyards should be used if the tasks may cause the hard hat to fall off.
- In cold temperatures, natural material clothing should be worn under the protective clothing. Protective clothing should be removed prior to allowing a person "to get warm." Applying heat, such as a space heater, is not recommended as the heat may drive the contaminants through.

PERSONAL PROTECTIVE EQUIPMENT GUIDELINES

- In hot weather, cotton undergarments should be worn to absorb perspiration.
- Body protection should be taped to the boots to prevent contaminants from running into the boot. Gloves should be taped to prevent substances from entering the top of the glove. Aprons should be taped across the back for added protection.
- Atmospheric conditions such as precipitation, temperature, wind direction, wind velocity and pressure effect the behavior of air contaminants or the potential for volatile material becoming airborne.
- Levels of protection should be selected based on the job function.
- Defective equipment will be taken out of service and replaced.

6.0 DECONTAMINATION

All D&B personnel wearing PPE will undergo a decontamination procedure which varies according to the chemicals encountered, concentrations, level of PPE (A, B, C or D). A specific procedure is established for a projects requiring employee decontamination. This procedures details decontamination of non-permeable clothing and other reusable PPE, and disposal of used disposable PPE along with procedures for employee decontamination. No employee entering a contaminated area will be permitted to leave the area without first following the decontamination procedure and being properly decontaminated. All disposable PPE will be properly disposed of during the decontamination process. Showers and changing rooms will be available if necessary under the decontamination procedures. All non-authorized personnel will be prohibited in the decontamination/changing areas.

These procedures will be monitored by a site health and safety representative.

PERSONAL PROTECTIVE EQUIPMENT GUIDELINES

7.0 REFERENCES

- Subpart O (OSHA 29 CFR 1926.600 through 1926.606).
- ANSI-107

APPENDIX A – Construction and Hazardous Waste PPE Requirements

CONSTRUCTION

PPE required for construction services will be specific to each site. Personnel should be provided with a hard hat, steel toe safety shoes, safety glasses or other PPE, as appropriate. The Site-Specific HASP to be developed for each project should be referred to in determining the type of protection that is necessary.

HAZARDOUS WASTES

Protection Levels

Protection levels are generally based on the levels defined by EPA, such as Levels A, B, C and D, as described below. Each ensemble should be tailored to the specific situation. The type of equipment used and the overall level of protection should be reevaluated periodically. Provisions should be made to upgrade or downgrade levels of protection.

Reasons to upgrade:

- New information indicating presence of dermal hazards.
- Occurrence or likely occurrence of gas or vapor emission.
- Change in work task that will increase contact or potential contact with hazardous materials.
- Request of the individual performing the task.

Reasons to downgrade:

- New information indicating that the situation is less hazardous than was originally thought.
- Change in site conditions that decrease the hazard.

- Change in work task that will reduce contact with hazardous materials.

Level A Protection

The following conditions suggest a need for Level A protection:

- Confined facilities where probability of skin contact is high.
- Sites containing known hazards which are absorbed through the skin.
- Sites with insufficient information to rule out hazards which are absorbed through the skin.
- Atmospheres immediately dangerous to life and health including skin absorption route.
- Site exhibiting signs of acute mammalian toxicity (e.g., dead animals, illnesses associated with past entry into site by humans).
- Sites at which sealed drums of unknown materials must be opened.
- Total atmospheric readings on the PID, FID and similar instruments indicate 500 ppm to 1,000 ppm of unidentified substances.
- Extremely hazardous substances (e.g., cyanide compounds, concentrated pesticides, DOT Poison "A" materials, suspected carcinogens, and infectious substances) are known or suspected to be present, and skin contact is probable.

Level A protection minimally consists of the following items:

- Open circuit, pressure-demand SCBA or pressure-demand supplied air respirator with egress cylinder.
- Totally encapsulated suit.
- Gloves, inner (surgical type).

- Gloves, outer (chemical protective).
- Boots, chemical protective, steel toe and shank.
- Communication system.

Level B Protection

Level B protection is selected when the highest level of respiratory protection is needed, but conditions do not warrant Level A.

The following conditions suggest a need for Level B protection:

- The type and concentration of substances has been identified and requires the highest level of respiratory protection, but exposure to the few unprotected areas of the body (i.e., the back of the neck) is unlikely.
- IDLH atmospheres, but the substance or concentration does not present a severe skin hazard.
- The type and concentrations of substances that do not meet the selection criteria permitting the use of air purifying respirators.
- It is unlikely that the work being done will generate high concentrations of vapors, gases or particulates that will affect the skin or result in skin contact.

Personal Protective Equipment for Level B minimally includes:

- Open circuit, pressure-demand SCBA or pressure-demand supplied air respirator with egress cylinder.
- Chemical protective overalls and long-sleeved jacket or coveralls.
- Gloves, inner (surgical type).
- Gloves, outer (chemical protective).

- Boots, chemical protective, steel toe and shank.
- Communication system.

Level C Protection

Level C is selected when air purifying respirators offer adequate respiratory protection and skin contact is unlikely.

Personal Protective Equipment for Level C minimally includes:

- Full face piece air-purifying respirator.
- Emergency escape respirator (carried, optional).
- Chemical protective overalls and long-sleeved jacket or coveralls.
- Gloves, inner (surgical type).
- Gloves, outer (chemical protective).
- Boots, chemical protective, steel toe and shank.

Level D Protection

Level D is the basic work uniform.

Personal Protective Equipment for Level D includes:

- Coveralls.
- Safety boots/shoes.
- Safety glasses with side shields.
- Hard hat with optional face shield.

Level E Protection

Level E protection is used when radioactivity above 10 mR/hr is encountered on a hazardous waste site. Procedure is to immediately evacuate to a safe distance (2 mR/hr level). A health physicist must be consulted to determine personal protective clothing.

EXCAVATION/TRENCHING OPERATIONS GUIDELINES

Table of Contents

1.0 PURPOSE

To establish safe operating procedures for D&B employees working in or near excavation or trenching operations at D&B work sites.

2.0 SCOPE

Applies to D&B employees exposed to excavation or trenching hazards at D&B work sites.

3.0 DEFINITIONS

Adjacent Area - The horizontal surface area surrounding the excavation, which extends outward from the excavation edge up to a distance that is half the depth of the excavation.

EXCAVATION/TRENCHING OPERATIONS GUIDELINES

Competent Person - A competent person is 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 the authority to take prompt corrective measures to eliminate the hazard.

Excavation - Any manmade cavity or depression in the earth's surface, including its sides, walls or faces, formed by earth removal and producing unsupported earth conditions by reasons of the excavation.

Protective System - A method of protecting employees from cave-ins, from material that could fall or roll from the excavation face or into an excavation from above, or from collapse of adjacent structures. These include shoring, shielding, sloping or equivalent.

Trench - A narrow excavation made below the earth's surface. In general, the depth is greater than the width, but the width of a trench is not greater than 15 feet.

4.0 RESPONSIBILITIES

Health and Safety Officer (HSO) - The HSO is responsible for revising the Trenching and Excavation program to include new OSHA updates. The HSO is also responsible for confirming that trenching and excavation training is available for applicable D&B employees. The HSO or a designee may conduct site inspections of trenching and excavations that D&B employees may be exposed to.

Site Personnel - D&B personnel must follow these procedures when working in or around an excavation or trench.

5.0 GUIDELINES

D&B personnel may be providing oversight on projects where excavation and trenching operations are being undertaken. ***D&B personnel will never be placed in the role of the designated "competent person," making decisions on the safety conditions and procedures of the excavation and trenching operations***. D&B personnel should identify the contractor/subcontractor/sub-consultant "Competent Person." D&B personnel will also understand the basic H&S requirements for excavating and trenching to protect themselves and other D&B personnel.

EXCAVATION/TRENCHING OPERATIONS GUIDELINES

D&B site personnel will ensure that the contractor has contacted "Call Before You Dig", to assist in identifying the type and location of any underground utilities.

D&B site personnel will also ensure that the contractor's competent person has classified the soil type prior to trenching/excavation work, and determined the most effective means to protect personnel working inside.

5.1 Hazards Associated With Excavation/Trenching

The principle hazards associated with excavation/trenching are:

- Suffocation, crushing or other injury from falling material.
- Damage/failure of installed underground services and consequent hazards.
- Tripping, slipping or falling. Housekeeping in and around excavations will reduce slip, trip fall hazards. Guardrails will be installed if personnel need to cross the trench/excavation.
- No one is permitted underneath overhead loads or where digging may cause loads to fall onto personnel beneath.
- Possibility of explosive, flammable, toxic or oxygen-deficient atmosphere in excavation. Air monitoring will be conducted in the trench/excavation to ensure the safety of personnel. Refer to Section 6 of the HASP.
- In some cases, trenches/excavations will be made in the vicinity of traffic. D&B and contractor personnel will ensure that the trench/excavation and personnel are protected from traffic and that traffic is protected from the construction activities.

5.2 Requirements for Protective Systems

Excavation Protective Systems will be employed when:

- There is a potential for cave-in.

- The excavation is 5 or more feet in depth, as determined by the competent person, pursuant to OSHA 29 CFR Part 1926.652.
- The excavation is less than 5 feet deep but is made in unstable soil.

Protective systems may not be required for excavations made entirely in stable rock, as determined by the competent person.

5.3 Inspections

The designated "competent person" from the contractor/subcontractor/sub-consultant will perform inspections pursuant to OSHA 29 CFR 1926.651 k(1) when any of the below employee exposure to hazards are reasonably anticipated:

- Each day before employees enter the excavation.
- After every rainstorm.
- As needed throughout the shift.
- As soil conditions change.

During the inspection the "competent person" must:

- Verify the protective system is adequate for the soil classification and the external loads placed on the adjacent area.
- Evaluate the excavation, the adjacent area and the protective system, for the following:
  - Hazardous atmosphere.
  - Potential situations that could lead to cave-in.
  - Indications of failure of a protective system.
  - Cracks in the ground parallel to the top of the excavation.

EXCAVATION/TRENCHING OPERATIONS GUIDELINES

- Accumulation of water, from rain or groundwater infiltration.
- Any other hazardous conditions.

- Verify that ladders or other means of access/egress to excavations are provided at:
  - Maximum spacing of 100 feet on the perimeter of open excavations.
  - Maximum spacing of 25 feet for trench excavations greater than 4 feet in depth.

5.4 Entering the Excavation

D&B employee will ***NOT*** enter an excavation unless the D&B site supervisor has coordinated with the contractor/subcontractor/sub-consultant competent person to verify that the excavation has been inspected and is safe.

6.0 TRAINING

Employees who are potentially exposed to the hazards of excavation and trenches should be provided with appropriate training to identify hazards and proper control methods.

7.0 REFERENCES

- OSHA 29 CFR 1926 Subpart P – Excavations.

SAFE DRIVING GUIDELINES

Table of Contents

1.0 PURPOSE

To establish procedures for the implementation of a safe driving program for D&B employees.

2.0 SCOPE

SAFE DRIVING GUIDELINES

This policy applies to D&B employees while operating a company vehicle or a personal vehicle on company business.

3.0 DEFINITIONS

Company Vehicle - A vehicle owned, leased or rented by D&B and provided to a D&B employee for use.

Personal Vehicle - A vehicle owned or leased by a D&B employee for their personal transportation that may be used for company business.

4.0 RESPONSIBILITIES

Health and Safety Officer (HSO) - The HSO will at least annually review the driver's qualifications for compliance with this program, as appropriate.

D&B Employees - D&B employees will follow these guidelines while driving a company vehicle or while driving a personal vehicle on company business.

5.0 GUIDELINES

5.1 Pre-trip Inspection

The following checklist is provided to promote safety and proper vehicle maintenance:

- Ensure that the vehicle has valid registration and inspection.
- Confirm the headlights, taillights and turn signals are working properly.
- Check the fuel, oil and engine coolant levels.
- Check tire pressure and condition, make sure hubcaps are tight, if so equipped.

SAFE DRIVING GUIDELINES

- If pulling a trailer, check the trailer hitch and safety chain in addition to the trailer lights and tires.
- Confirm equipment is secured.
- Verify that the windshield and side windows are clean and that rear view mirror is clean and adjusted for proper vision.
- Start the engine and observe instruments, gauges and indicating lights for proper operation.
- Check the brake system for proper operation.
- Check windshield wipers and horn.
- Fasten the seat belt.

5.2 Vehicle Operation Standards

The standards of operation are designed to prevent vehicle accidents, comply with federal, state, and local regulations, prevent injury to employees and the public and reduce vehicle operating and repair costs.

5.2.1 Proper Vehicle Usage

- Only authorized persons may operate or ride in D&B vehicles.
- Vehicles, drivers and operation must comply with local, state and federal regulations.
- Driver and all passengers will always wear seat belts.
- Proper vehicle usage is the responsibility of the driver.

SAFE DRIVING GUIDELINES

5.2.2 Safe Operation

The principle causes of accidents are excessive speed, following too closely, not keeping your eyes on the road, and backing. Most accidents occur in intersections. Tips to avoid accidents at intersections include:

- Look to the left, then the right and again to the left before crossing intersections.
- Establish eye contact with other drivers or pedestrians.
- Watch out for traffic lights that have been green for some time. Anticipate the change.
- No texting while driving. D&B discourages the use of handless phone conversations as well, as this can cause distracted driving. As per D&B policy, use of cell phones is prohibited while operating company vehicles. No business shall be conducted while operating personal vehicles.

5.2.3 Fueling Operation

Do not refuel the vehicle with the engine running. The vehicle must be attended during the fueling operation.

5.2.4 Driver Qualifications

Drivers must meet the following qualifications:

- Vehicle operators must have a valid driver's license, which is appropriate for the type of vehicle being driven.
- Operating a vehicle under the influence of drugs or alcohol is strictly prohibited.

SAFE DRIVING GUIDELINES

5.3 Vehicle Maintenance

Vehicles must be maintained in good working condition. Preventative maintenance will be conducted in accordance with the vehicle manufacturer's recommendation.

5.4 Accidents

Report accidents to the HSO as soon as possible.

5.5 Parking

When parked along a public street, warning triangles or cones should be placed in front of and behind the vehicle. The parking brake should be set.

5.6 Bicycling

Some personnel may use bicycles to get to and from their job sites. All bicyclists must adhere to the same rules of the road that apply to cars, and must additionally wear helmets. Ensure that lights, reflectors, tires, brakes and other parts of the bicycle are in proper working order, that all loads are secured and to take care that cuffs do not get caught in the bicycle chain. Use hand signals when negotiating turns.

5.7 Chemical Transportation

If chemicals are transported, DOT regulations requiring placarding must be observed. Appropriate spill response materials should be available.

6.0 REFERENCES

- Subpart O (OSHA 29 CFR 1926.600 through 1926.606).

HEARING CONSERVATION GUIDELINES

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1.0 PURPOSE

To provide general guidelines on hearing protection for D&B employees when working in a high noise environment.

2.0 SCOPE

HEARING CONSERVATION GUIDELINES

These guidelines apply to D&B employees who may be exposed to the hazards associated with high noise levels when working on D&B work sites.

3.0 DEFINITIONS

Decibel (dB) - A unit for measuring the sound (sound pressure level).

dB(A) - This is a unit for measuring the sound level based on a frequency weighted average that simulates the sensitivity of the human ear.

Threshold of pain - This is the greatest sound pressure that can be perceived without pain. This typically equals to approximately 135 dB(A).

4.0 RESPONSIBILITIES

Health and Safety Officer (HSO) - The HSO is responsible for coordination of training regarding proper hearing protection procedures for applicable D&B employees. The HSO will use these guidelines in assessing procedures and revise them as necessary.

Health and Safety Representative (HSR) - The HSR has primary responsibility for the employees' correct use of the appropriate hearing protection, as required at each project.

D&B Employees - D&B employees working on sites are responsible for using the appropriate hearing protection, as determined by the HSO or HSR.

5.0 GUIDELINES

5.1 Introduction

Excessive noise can impair the ability to hear, and also put stress on other parts of the body. The damage done by noise depends mainly on loudness and length of exposure. There is no cure for hearing loss from excessive noise exposure, so prevention of

exposure to excessive noise exposure is the only way to avoid hearing loss from this cause.

5.2 Classes of Noise

Noise is classified as continuous, intermittent, or impact. Continuous noise has a constant level with duration of greater than one second. Intermittent noise may be the result of periodic equipment operation or traveling in and out of high noise areas. Impact (also called impulsive) noise has a short duration, one second or less, with an interval greater than 1 second. Hammer blows or explosions fit this description.

5.3 Regulations

The applicable regulation for this SOP is the General Industry Occupational Noise Exposure Standard (OSHA 29 CFR 1910.95 – "The OSHA Standard"). Unless otherwise specified, the requirements quoted in this SOP are taken from The Standard.

The Standard specifies that:

- Protection against the effects of noise exposure shall be provided when the sound levels and duration exceed those shown in Table 1 when measured on the A-scale of a standard sound level meter at slow response setting.
- When employees are subjected to sound levels exceeding those listed in Table 1, feasible engineering and/or administrative controls shall be utilized. If such controls fail to reduce sound levels within the levels of the table, personal protective equipment shall be provided and used to reduce sound level exposures within the levels of the table.
- If the variations in noise level involve maximum loudness "peaks" at intervals of 1 second or less, it is to be considered continuous.
- Where the sound levels exceed the values shown in Table 1, a continuing, effective hearing conservation program shall be administered.

The OSHA Standard states that if exposures are greater than or equal to 85 dB(A) for an 8-hour TWA, a continuing, effective hearing conservation program must be

implemented. The elements of a hearing conservation program are discussed in Section 5.5 of this document.

Table 1 lists the OSHA Permissible noise levels for continuous and intermittent noise. Exposures at or above the limits require implementing engineering controls and/or hearing protection.

Table 1
OSHA Permissible Noise Exposures

Hours/day	dB(A)
8	90
6	92
4	95
3	97
2	100
1.5	102
1	105
0.5	110
≤ 0.25	115

Exposure to impulsive or impact noise should not exceed 140 dB(A) peak sound pressure level.

5.4 Noise Measurements

Sound levels are measured in units of decibels (dB). Most instruments have slow and fast response settings. OSHA regulations require sound level measurements to be taken at the slow response setting. Table 2 gives examples of typical sound levels.

Table 2
Examples of Typical Sound Levels

Surrounding	Sound level (dB(A))

HEARING CONSERVATION GUIDELINES

Quiet office	40
Average residence	50
Conversational speech at 3 feet	60
Very noisy restaurant	80
Drill rig - idling	85
Subway	90
Drill rig - accelerating	90
Foundry Cast shake out	110
Jet plane	140

Sound is comprised of varying frequencies that have different effects on the ear. Instruments that are used to measure sound levels have frequency responses that resemble human hearing and provide readings based on the frequency weighted average.

5.5 Hearing Conservation Program

An effective hearing conservation program contains at least the following elements (dB(A) levels are for an 8 hour TWA):

- Monitoring employees for noise exposure.
- For employees exposed to 85 dB(A) or greater, the following requirements apply:
  - Employee notification of exposure.
  - Audiometric testing.
  - Engineering and/or administrative controls.
  - Hearing protectors made available.
  - Employee training.
  - Recordkeeping.

HEARING CONSERVATION GUIDELINES

5.5.1 Monitoring Employees for Noise Exposure

Noise measurements are focused on determining the duration of employee exposure to various noise levels. Noise dosimeters are a version of a sound meter that can measure and calculate the daily noise dose over a work shift. A noise-monitoring program should be considered whenever the following conditions exist:

- Difficulty communicating by speech with two persons facing each other at a distance of 2 feet.
- Complaints of ringing in the ears after working in a noise area for several hours.
- A temporary loss of hearing that has the effect of muffling speech after several hours of exposure to the noise.

The basic approach to noise monitoring can contain the following steps:

- Identify noise sources.
- Identify workers that will potentially be exposed to the elevated noise level and estimate the length of time they'll be exposed to these levels.
- Perform an A-weighted sound level measurements in the hearing zone of affected employees.
- Use a dosimeter to calculate the daily noise dose based on a full work shift (optional).
- Include individuals with TWA's values of greater than those shown in Table 1 in a Hearing Conservation Program.
- Develop noise control procedures.

HEARING CONSERVATION GUIDELINES

5.5.2 Engineering and/or Administrative Controls

There are three places to control noise: at the source, in the path, and at the receiver.

Engineering Controls - This is the first alternative to consider when addressing sound level issues. Engineering control at the source usually is the best solution, but usually the most difficult to accomplish. Techniques to reduce noise at the source include vibration isolation, dynamic balance, improved maintenance, dampening and reduction of the area of the vibrating surface.

Reduction in the noise path can be accomplished by shields and partial or total barriers. The best sound barrier is one that contains absorbing materials to prevent reflection and attenuating materials to prevent penetration.

Administrative Controls - Control at the receiver can be accomplished by administrative controls used in conjunction with engineering controls. Administrative controls are measures taken to limit the amount of time that an employee is exposed to excessive noise levels. This typically is done by rotating or moving employees between areas of high and low noise exposure, and/or controlling the operating time of equipment producing the excessive noise levels.

5.5.3 Hearing Protection (Personal Protective Equipment)

When the feasible engineering and administrative controls fail to reduce an employee's noise exposure to acceptable levels, personal protective equipment in the form of hearing protection devices must be used and will be provided to D&B personnel at no cost to them. Decisions on the proper hearing protection requirements can be affected by the employee's audiometric test results.

Hearing protectors can be either plugs or earmuffs. Earplugs are small conical or cylindrical devices made of a soft pliable material to fit into and seal the ear canal against the entrance of sound. An earmuff must seal over the ear to attain good protection. Proper fit is important with both plugs and earmuffs.

HEARING CONSERVATION GUIDELINES

The effectiveness of a hearing protector can be evaluated from its noise reduction rating (NRR). The manufacturer of the hearing protectors provides the NRR. To determine the protected A-weighted sound level, the effective NRR is subtracted from the A-weighted sound level plus 7 dB.

5.5.4 Employee Training

OSHA 29 CFR 1910.95 requires all employees who are included in a hearing conservation program to be trained annually and as PPE requirements or work tasks change. This training includes instruction on the following:

- The effects of noise on hearing.
- The purpose of hearing protection devices, and various types available, selection, fitting, use and care of protection devices.
- The purpose of audiometric testing and an explanation of test procedures.

5.5.5 Audiometric Monitoring

OSHA 29 CFR 1910.95 requires annual audiometric testing for all employees working in areas where the 8 hour TWA equals or exceeds 85 dB(A). A baseline audiogram should be done within six months of the employee's first exposure at or above this level. It should be preceded by at least 14 hours without exposure to workplace noise.

Annual audiograms are compared to the baseline to determine if the audiogram is valid and if a standard threshold shift has occurred. A standard threshold shift is a change in hearing threshold relative to the baseline audiogram of an average of 10 dB or more at 2000, 3000, and 4000 Hertz in either ear.

If an annual audiogram indicates a standard threshold shift has occurred, the employee shall be notified in writing within 21 days of the determination. A retest may be performed within 30 days to confirm the standard threshold shift. When a standard threshold shift occurs and is determined to be occupationally related, the employee must wear hearing protection and be reevaluated.

5.6 Recordkeeping

Records of employee's exposure measurements, audiometric tests, types of hearing protection required, documentation of employee training should be maintained by the HSO. Noise exposure measurement record shall be retained for two years. Audiometric test records shall be retained for the duration of the affected employee's employment.

6.0 REFERENCES

- OSHA 1910.95.
- OSHA 1926.52.

SITE CONTROL AND WORK ZONE GUIDELINES

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1.0 PURPOSE

The purpose of these guidelines is to provide general reference information regarding the establishment of site control procedures and work zones for hazardous waste sites.

2.0 SCOPE

These guidelines are applicable to D&B activities at hazardous waste sites. Additional precautions may be identified during the development of the Site-Specific HASP.

SITE CONTROL AND WORK ZONE GUIDELINES

3.0 DEFINITIONS

Contaminated Materials - Contaminated materials are defined as any by-products of a field investigation that are suspected or known to be contaminated with hazardous substances. These by-products include such materials as decontamination solutions, disposable equipment and clothing, drilling muds, well-development fluids and spill-contaminated materials.

Contamination Reduction Zone - Zone located between the exclusion zone and the support zone that provides a transition between contaminated and clean zones.

Exclusion Zone - Zone that contains or may contain contamination.

Support Zone - A non-contaminated or clean part of the site.

4.0 RESPONSIBILITIES

Health and Safety Officer (HSO) - The HSO is responsible for verifying that these guidelines are incorporated in the Site-Specific HASP and that training is available to D&B site personnel in delineation of work zones.

Health and Safety Representative (HSR) - The HSR or a designee is responsible for implementing/enforcing/designating zones on-site.

D&B Employees - D&B employees working at the site and visitors must comply with the requirements of the site zones, such as proper PPE and limited personnel access, as determined by the HSO or HSR.

SITE CONTROL AND WORK ZONE GUIDELINES

5.0 GUIDELINES

5.1 WORK ZONES

5.1.1 Introduction

To reduce the accidental spread of hazardous substances by workers from the contaminated areas to non-contaminated or clean areas, work zones for specific types of operations should be delineated, and the flow of personnel and equipment among the zones should be controlled. Properly established work zones help protect personnel and equipment from the hazards present outside of their work area(s), confine work activities and contamination to appropriate areas and assist with the location and evacuation of personnel in an emergency. Hazardous waste sites may be divided into as many zones as needed to meet operational and safety objectives. The typical work zones found at hazardous waste site are:

- Exclusion or Hot Zone - The contaminated or potentially contaminated area.
- Contaminant Reduction Zone - The area where decontamination takes place.
- Support Zone - The non-contaminated area where workers should not be exposed to site contaminants.

5.1.2 Exclusion Zone

The exclusion or hot zone contains or may contain contamination. The outer boundary of the Exclusion Zone is called the Hotline. If established, it will be based on the following considerations:

- The location of hazardous substances and surface drainage.
- The data from the initial site survey.

- The results of soil and water sampling.
- The physical area necessary for site operations.
- Meteorological conditions and the potential for contaminants to be carried by wind from the contaminated area.

The Hotline should be clearly marked by lines, placards, hazard tape, or signs and should be enclosed by physical barriers such as chains, fences or ropes. Access control points on the periphery of the Exclusion Zone regulate the flow of personnel and equipment from zone to zone and ensure that proper procedures for entering and exiting the site are followed. Separate entrances and exits help to segregate movement into and out of the Exclusion Zone.

The Exclusion Zone can be subdivided into different areas of contamination based on known or anticipated hazard type and degree, or the compatibility of waste streams. Such subdivision allows flexibility in H&S requirements, operations, decontamination procedures and use of resources. The level of PPE required in each subdivision may vary, as may the level of PPE required for different job assignments within a subdivision. The level of protection must be specified and posted for each job assignment with each subdivision. When appropriate, different levels of PPE within the Exclusion Zone promote flexibility, effective and cost-effective operation while maintaining a higher degree of H&S.

5.1.3 Contaminant Reduction Zone

The Contaminant Reduction Zone (CRZ) or Decontamination Zone is the transition area between the contaminated and clean areas. The distance between the Exclusion and Support Zones provided by the CRZ and the proper decontamination of workers and equipment, limit the physical transfer of hazardous substances into the clean areas.

Decontamination procedures take place in a designated area within the CRZ, called the Contamination Reduction Corridor (CRC) that begins at the Hotline. Two

SITE CONTROL AND WORK ZONE GUIDELINES

decontamination areas may be set up within the CRC, one for personnel and small equipment and the other for heavy equipment. Access into and out of the CRZ and to and from the Exclusion Zone is through specified Access Control Points.

The boundary between the Support Zone and the CRZ is called the Contamination Control Line. This boundary separates the possibly low contamination area from the clean or non-contaminated Support Zone. Access to the CRZ from the Support Zone can be achieved through two Access Control Points: one for personnel and one for equipment. Personnel entering the CRZ must wear personnel protective clothing and equipment, as required by the Site-Specific HASP. To re-enter the Support Zone, workers should remove protective clothing and equipment and exit through the designated Access Control Point.

The CRZ must be designed to accommodate the following activities:

- Decontamination of equipment, personnel and samples.
- Emergency response, such as transport for injured personnel (safety harness, stretcher), first-aid equipment (bandages, blankets, eye wash, splints, water, etc.), containment equipment (absorbent, fire extinguisher, etc.).
- Equipment resupply, such as air tanks, personnel protective clothing and equipment (booties, gloves, chemical suits, etc.), sampling equipment (bottles, soil augers, coolers, drum thieves, etc.) and tools.
- Sample packaging and preparation for on-site and off-site analysis.
- Worker temporary rest area, including toilet facilities, benches, chairs, liquids, shade and/or shelter. Water and other potable liquids should be clearly marked and stored properly. Glasses and cups will be stored such that they remain clean and uncontaminated. Wash facilities should be located near drinking facilities to allow employees to wash before drinking. Drinking, washing, and toilet facilities should be located in a safe area where protective clothing can be removed. Facilities should be cleaned and inspected regularly. Maintenance workers should take appropriate protective measures.

- Drainage of water and other liquids used during decontamination.

5.1.4 Support Zone

The Support Zone is the location in which administrative and other support functions essential to site operations are conducted. Project functions that need not or cannot be performed in a hazardous or potentially hazardous area are performed here. Personnel may wear normal work clothes within this zone.

Support Zone personnel must alert the proper agency in the event of an emergency. Emergency telephone numbers, change for telephones (if necessary), evacuation route maps, hospital route maps and vehicle keys should be kept in an accessible location within the Support Zone.

Facilities located in the Support Zone should be placed after considering factors such as:

- Accessibility (topography, open space available, location of highways and rail-road tracks, ease of access for emergency vehicles).
- Resources (adequate roads, power lines, telephones, shelter and water).
- Visibility (line-of-sight to activities in the Exclusion Zone).
- Wind direction (upwind of Exclusion Zone, if possible).
- Distance (as far from the Exclusion Zone as practical).

5.2 SITE SECURITY

Effective site security prevents the exposure of unauthorized/unprotected people to site hazards, protects against increased risk from vandals or persons illegally abandoning waste on the site, prevents theft and promotes safe working procedures.

SITE CONTROL AND WORK ZONE GUIDELINES

Site security during working hours may address the following:

- Maintain security in the Support Zone and at Access Control Points.
- Establish an identification system to identify authorized persons and limitations to their approved activities.
- Assign responsibility for enforcing authority for entry and exit requirements.
- Erect a fence or other physical barrier around the site, if possible.
- If the site is not fenced, post signs around and have guards patrol the perimeter. Guards must be fully apprised of the hazards involved and be trained in emergency procedures.
- Approve visitors to the site. Make sure each has a valid purpose for entering the site. Have trained site personnel accompany site visitors at all times and provide them with appropriate PPE.

Site security after hours may address the following:

- If possible, assign trained in-house technicians for site surveillance. They should be familiar with the site, the nature of work, the site's hazards and respiratory protection techniques.
- If necessary, use security guards to patrol the site boundaries. Such personnel may be less expensive than trained technicians, but may require additional training in safety procedures relative to hazardous waste sites.
- Enlist public enforcement agencies, such as the local police department if the site presents a significant risk to local H&S.
- Secure equipment.

SITE CONTROL AND WORK ZONE GUIDELINES

5.3 SITE CONTROL METHODS

When site hazards and/or work activities may potentially create exposure to site workers and the public, control measures should be implemented. Control measures should be initiated when air monitoring indicates the potential for migration of emissions off-site or outside the immediate work area. The procedures should be designed to control emissions before off-site migration, through implementation of engineering and work practice controls, as well as defensive measures. Listed below are examples of such control measures:

- Limit the area of open excavation or intrusive activities.
- Areas excavated are backfilled or covered with a minimum 6 mil impermeable membrane.
- Working face of excavation is a moderate slope in compliance with excavation regulations.
- Exposed sides of excavation or intrusive activities where work is not conducted are covered.
- Use potable water mist to keep down dust as well as VOCs.
- Keep haul distance of excavated materials to as short a distance as possible.
- Immediately cover excavated material stockpile.

6.0 REFERENCES

- OSHA 29 CFR1910.120.
- OSHA 29 CFR 1926.65.

CONTAINER HANDLING GUIDELINES

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1.0 PURPOSE

To provide general guidelines on proper safety procedures when inspecting, opening and handling containers at D&B work sites.

2.0 SCOPE

These guidelines apply to D&B employees who may be required to inspect, open or handle containers found at D&B work sites.

CONTAINER HANDLING GUIDELINES

3.0 DEFINITIONS

Overpack Drums - Larger drums in which leaking or damaged drums are placed for storage or shipment.

4.0 RESPONSIBILITIES

Health and Safety Officer (HSO) - The HSO is responsible for verifying that training is available for applicable D&B employees in proper container handling procedures. The HSO will use these guidelines in assessing procedures and revise them as necessary.

Health and Safety Representative (HSR) - The HSR has primary responsibility for confirming that employees safely handle containers, as required at each project.

D&B Employees - D&B employees working on the sites are responsible for using the correct container handling procedures, as determined by the HSO or HSR.

5.0 GUIDELINES

5.1 Introduction

Hazards associated with containers such as drums, aboveground tanks, underground tanks, compressed gas cylinders or other containers existing at work sites may include detonations, fires, explosions, vapor generation, exposure to radiation and physical injury. These hazards may be a result of moving heavy containers by hand, working around stacked drums, use of heavy equipments, and deteriorated containers. In order to work with or around containers encountered at a site, thoroughly and carefully planned techniques and procedures must be used prior to the beginning of work.

CONTAINER HANDLING GUIDELINES

5.2 Planning

Every step of the container handling operations should be carefully planned, based upon the information available at the time. Prior to starting work, available information should be obtained to assess the potential hazards and materials that may be encountered. Sources of background information include:

- Owner, EPA or other government agencies' historical files.
- Site records.
- Local authorities.
- Historical aerial photographs.

The preliminary records review may be used to determine if hazards are present and the appropriate response.

5.3 Inspection

Before work is conducted, the containers should be visually inspected to assess their contents and condition. The following should be inspected:

- Symbols, words, or other marks on the container indicating whether its contents are hazardous, e.g., radioactive, explosive, corrosive, toxic, flammable.
- Symbols, words, or other marks on the drums or containers that may indicate whether it contains discarded laboratory chemicals, reagents, or other potentially dangerous materials in small-volume individual containers.
- Signs of deterioration such as corrosion, rust and leaks.
- Signs to determine whether the container is under a pressure, such as swelling and bulging.

- Drum type.
- Configuration of the drumhead.

Conditions in the immediate vicinity of the containers may provide information about container contents and their associated hazards. Monitoring should be conducted around the containers using instruments such as gamma radiation survey instruments, organic vapor monitors and combustible gas meters.

As a precautionary measure, personnel should assume that unlabeled containers contain hazardous materials, until their contents are characterized.

5.4 Container Handling

Containers should be handled only if necessary.

Sometimes, containers may be deteriorated from prolonged exposure to weather, in which case, leaks and spills during handling becomes a concern. Overpack drums and an adequate volume of absorbent should be kept near areas where minor spills may occur. Where major spills may occur, a containment berm adequate to contain the entire volume of liquid in the drums or other containers should be constructed, before handling takes place. Personnel trained in spill response should isolate and contain the spill.

Drums may be moved manually or several types of equipment may be employed, such as a drum grappler attached to a hydraulic excavator, a small front end loader, forklift or a drum cart.

The following container categories require special procedures when such containers need to be handled:

CONTAINER HANDLING GUIDELINES

5.4.1 Radioactive

If a container is labeled with a radiation sign or suspected to contain radioactive material, immediately contact the HSO. Do not handle containers that are suspected or determined to be radioactive.

5.4.2 Explosive or Shock-Sensitive

If a container is suspected of containing explosive or shock-sensitive materials (as determined by visual examination), immediately contact the HSO. Do not handle containers that are suspected to contain explosive or shock-sensitive materials.

5.4.3 Bulging

Pressurized containers are extremely dangerous and caution must be exercised when working with or near them. Whenever possible, do not move containers that may be under internal pressure, as evidenced by bulging or swelling. Venting or carefully loosening the small bung may relieve container pressure. When the container heads are distended and swollen, relief of the over pressure must be done very carefully. If a pressurized container has to be moved, handle the container with a grappler unit constructed for explosive containment. Move the bulged container only as far as necessary to allow seating on firm ground.

5.4.4 Leaking, Open or Deteriorated

If a container with liquid cannot be moved without rupture, consult the HSO for the proper transfer method of its contents to another container. Leaking, open or deteriorated containers should be placed in overpack drums using appropriate equipment as soon as possible, as determined by the HSO. Overpack drums are designed to accommodate damaged or deteriorated standard drums. The most common size is the 85-gallon overpack drum designed to hold a 55-gallon standard drum.

CONTAINER HANDLING GUIDELINES

If necessary, as determined by the HSO, repairs to drums may be made using plugs or patches, or a combination of the two. Plugs can be made from wedges of wood, screws with washers, tubeless tire plugs, toggle bolts with washers and expandable plugs.

5.5 Opening Containers

Containers are usually opened and sampled in-place during site investigations. To enhance the efficiency and safety of personnel, the following guidelines should be instituted (assuming that the contents are unknown):

- Contact the HSO prior to sampling containers or drums.
- Proper respiratory protection should be used.
- Non-essential personnel should be moved to a safe distance away, upwind, if possible.
- Personnel involved with the opening process should have explosion-resistant shields between them and the container opening equipment.
- Monitor continuously during the opening with sensors as close to the container opening as safely possible.
- The following remote-controlled devices can be used for opening containers:
    - Pneumatically operated impact wrench to remove drum bungs or bands.
    - Hydraulically or pneumatically operated drum piercers.
    - Backhoes equipped with bronze spikes for penetrating container tops in large-scale operations.
- Do NOT use picks or chisels to open containers

- If the container shows signs of bulging or swelling, perform steps slowly. Relieve excess pressure prior to opening and, if possible, from a remote location. If pressure must be relieved manually, place a barrier such as an explosive resistant shield between the workers and bung to deflect gases, liquids, or solids that may be expelled as the bung is loosened.
- Do NOT open or sample individual containers within laboratory packs.
- Reseal open bungs as soon as possible with plugs.

5.6 Sampling

Container sampling can be one of the most hazardous activities to worker H&S because it often involves direct contact with unidentified wastes. Before collecting samples, develop a sampling plan:

- Research background information about the wastes.
- Determine which drums should be sampled.
- Select the appropriate sampling device(s) and container(s).

The HSO, HSR or a designee should determine the appropriate personal protection to be used during the sampling.

When sampling a drum, the following safety procedures should be followed:

- Keep sampling personnel at a safe distance while drums are being opened.
- Do NOT lean over other drums to reach the drum being sampled.
- Cover drum tops with plastic sheeting or other suitable uncontaminated materials to avoid excessive contact with the drum top.
- Never stand on drums.

CONTAINER HANDLING GUIDELINES

- Obtain samples with either glass rods or vacuum pumps.

6.0 REFERENCES

- NIOSH – Occupational Safety and Health Guidance Manual for Hazardous Waste Site Activities.

CONTAINMENT AND DISPOSAL OF CONTAMINATED MATERIAL

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1.0 PURPOSE

The objective of these guidelines is to provide general reference information regarding the control and disposal of contaminated materials generated during site investigation activities.

2.0 SCOPE

Applies to D&B work sites where contaminated materials will be generated.

3.0 DEFINITIONS

Contaminated Materials - Contaminated materials are defined as any by-products of field operations that are known or suspected to be contaminated with hazardous substances. These by-products include materials such as decontamination solutions, disposable

CONTAINMENT AND DISPOSAL OF CONTAMINATED MATERIAL

equipment and clothing, drilling debris, well-development fluids and spill-contaminated materials.

4.0 RESPONSIBILITIES

Health and Safety Officer (HSO) - The HSO is responsible for revising these guidelines to include new OSHA updates. The HSO is also responsible for confirming that proper training is available to D&B employees regarding proper disposal procedures and that a Site-Specific HASP incorporates these guidelines.

Health and Safety Representative (HSR) - The HSR or his/her designee (such as a Field Operations Manager) is responsible for the correct implementation of these procedures in the field.

5.0 GUIDELINES

Field investigation activities often result in the production or movement of contaminated material that must be properly managed to protect field personnel, the public and the environment. These guidelines address the proper management of this material.

5.1 General

As a general policy, site investigation methods that minimize the generation of contaminated material will be utilized. Until sample analysis is complete, it must be assumed that all produced material suspected to be contaminated would require containment. The Site-Specific HASP will include control procedures for contaminated material. It should address the type of contamination, estimated amounts that would be produced, containment equipment and procedures and storage or disposal methods.

5.2 Sources of Contaminated Material and Containment Methods

Contaminated materials usually consist of water, soil, disposable tools used in sampling and used PPE.

CONTAINMENT AND DISPOSAL OF CONTAMINATED MATERIAL

5.2.1 Decontamination Solutions

Decontamination solutions and rinses must be assumed to contain hazardous chemicals associated with the site, unless there is analytical or other data to the contrary. The solution volumes could vary from a few gallons to several hundred gallons in some cases.

The decontamination solutions are typically generated from:

- Personnel decontamination.
- Sampling equipment decontamination.
- Large equipment decontamination.

Depending upon site conditions, contamination type and site requirements, the decontamination solutions may be allowed to be drained back into the contaminated portion of the site. In some situations the decontamination solutions must be disposed of off site. The Site-Specific HASP must include whether the fluids from personnel and equipment decontamination activities should be contained and disposed of off site, contained and left on the site for future disposal, or allowed to be drained back into the soil.

Only DOT-approved drums should be used for the transportation of decontamination fluids.

5.2.2 Disposable Equipment and Clothing

Disposable equipment that could be contaminated during the site investigation typically includes protective suits, gloves, boots, broken sample containers, paper towels, and spent respirator cartridges. These items can be temporarily stored in plastic bags and transferred to 55-gallon drums (with lids) at the end of the day. These containers will be secured at the end of each workday.

5.2.3 Drilling Fluids and Well Development Fluids

Drilling, well development and well evacuation fluids are generated during or as a result of groundwater monitoring, well installation and sampling activities. Since these fluids are

potentially contaminated, they are also required to be contained for eventual treatment or disposal.

The volumes of drilling, well development and well evacuation fluids depend on the well diameter and depth, groundwater characteristics, geologic formations and drilling methods utilized. There are no simple mathematical formulas available to accurately predict these volumes. It is best to rely on the experience of reputable well drillers familiar with local conditions and the selected well installation techniques.

Drilling fluid (mud) is stored in a container commonly referred to as a mud pit. This mud pit consists of a suction section from which drilling fluid is pumped to the drill pipe and back to the settling section of the mud pit. In the settling section, the well cuttings are allowed to settle. If the mud pit is lined to prevent leaks, it can also be used to contain possibly contaminated drilling fluids. Spent drilling fluids can then be pumped directly from the mud pit to 55-gallon drums for treatment and/or disposal. The sediments that accumulate in the settling section are transferred into drums or other similar containers.

If ground pits are used, they will not extend into the natural water table. They should be lined with a bentonite-cement mixture followed by a layer of flexible impermeable material such as plastic sheeting compatible with the wastes. Depending on site conditions and the size of the pit, it may be advantageous to excavate the entire pit for disposal and backfill the excavation with clean fill.

When the aboveground tank or the inground pit is used, a reserve tank or pit should be located at the site as a backup system in the event of leaks, spills, and overflows. In addition, surface drainage will be planned so that leaks, spills, and overflows can be controlled within the immediate area of the drill site.

The containment procedure for well development fluids is similar to that for drilling fluids. The volume of contaminated fluid will be determined by the method of development. Bailing a new well usually generates less fluid volume than processes using backwashing. When bailing, the removed fluids can be directly placed in drums. For backwashing, a T-section can be fitted on the well casing to direct the overflow to the drums.

5.2.4 Soil Cuttings

Contaminated soil cuttings, generated while performing field investigation activities, typically consist of cuttings from borings, test pit excavations, and discarded soils from

sampling activities. These soils should be contained in drums for further treatment or disposal.

5.2.5 Spill-Contaminated Materials

A spill is always possible when a site investigation involves opening and moving containers of liquids. Contaminated sorbents and soils resulting from spills must be containerized for disposal. Small quantities of spill-contaminated materials are typically contained in drums, while larger quantities can be placed in lined pits or other impermeable structures. In some cases onsite containment may not be feasible, in which case, the immediate transport to an approved disposal site will be required.

5.3 Disposal of Contaminated Materials

Actual disposal techniques for contaminated material are the same as those for any hazardous substance: incineration, landfill, treatment, etc. All involved parties must agree on determining who is responsible for disposal before the fieldwork starts. Without a previous agreement, the contractor must provide for the disposal of wastes resulting from field activities. Therefore, the contractor is responsible for subcontracting with reputable waste transporters and for verifying compliance with RCRA requirements whenever it is necessary to containerize and remove hazardous wastes. To expedite the disposal process, the following should be completed prior to field activities:

- Identify authorized, permitted facilities for proper treatment, storage, and/or disposal of wastes.
- Obtain generator identification numbers.
- Prepare the required manifests.

Another consideration in selecting disposal methods for contaminated materials is whether the disposal can be incorporated into subsequent site cleanup activities. In this case, the contaminated material generated during the investigation activities can be stored at the site for future disposal with other contaminated site materials. If the contaminated material will be stored onsite, then containment suitable for long-term storage must be provided. On site storage must include protection from sunlight and hot

or cold temperatures. Site conditions, such as surface drainage, security and soil type as well as meteorological conditions must be considered to design proper storage.

RESPIRATORY PROTECTION GUIDELINES

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RESPIRATORY PROTECTION GUIDELINES

1.0 PURPOSE

This guideline provides necessary information to:

- Establish a Respiratory Protection Program for employees whose project activities may require the use of a respirator.
- Define project activities which may require respiratory protection.
- Implement the Respiratory Protection Program.

2.0 SCOPE

This guideline applies to D&B employees whose project activities may require the use of a respirator.

2.1 Permissible Practice

When feasible, employee exposures to a hazardous atmosphere will be controlled by accepted engineering and/or administrative controls. When engineering and administrative controls are not feasible or are not effective, appropriate respirators will be used. D&B will provide the respirators suitable for the purpose intended. These respirators will be utilized by employees as defined by the Site-Specific HASP, Health & Safety Officer (HSO) or a designee, and provided to the employee at no cost to them.

3.0 DEFINITIONS

Air Purifying Respirator - A respirator which is designed to remove air contaminants (i.e., dust, fumes, mists, gases, vapors or aerosols) from the ambient air as the air enters the respirator.

Approved Respirator - A respirator which has been tested, found to meet established performance criteria, and listed as being approved by an authority such as MSHA (Mine Safety and Health Administration) or NIOSH (National Institute of Occupational Safety and Health).

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Atmosphere Supplying Respirator - A respirator which supplies the wearer with air or oxygen from a source independent of the immediate ambient atmosphere. This includes supplied-air respirators and self-contained breathing apparatus (SCBA) units.

Buddy System - A system of organizing employees into work groups in such a manner that each employee of the work group is designated to observe the activities of and remain in communication with at least one other employee in the work group. In some cases, an employee, outfitted with a SCBA unit and other necessary emergency equipment is stationed outside the work area in full view of others in the group and ready to react to any potential emergencies.

End–of-Service Life Indicator (ESLI) - An indicator on a respirator cartridge that warns the respirator user of the approach of the end of adequate respiratory protection.

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.

Immediately Dangerous to Life or Health (IDLH) - An atmospheric concentration of any toxic, corrosive or asphyxiating substance that poses an immediate threat to life or would cause irreversible or adverse health effects or would interfere with an individual's ability to escape from a dangerous atmosphere. D&B discourages its personnel from working in IDLH conditions.

Maximum Use Concentration (MUC) - The maximum concentration of an air contaminant in which a particular respirator can be used, based on the respirator's assigned protection factor. The MUC cannot exceed the use limitations specified on the NIOSH/MSHA approval label for the cartridge, canister, or filter.

Negative Pressure Respirator - A respirator in which the air pressure inside the facepiece is negative during inhalation in respect to the ambient air pressure outside the respirator.

Oxygen Deficient Atmosphere - An atmosphere with an oxygen content of less than 19.5% by volume (an IDLH atmosphere).

Positive Pressure Respirator - A respirator in which the pressure inside the respiratory inlet covering exceeds the ambient air pressure outside the respirator.

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Powered Air Purifying Respirator (PAPR) - An air purifying respirator which uses a blower to deliver air through the air purifying element to the inlet covering.

Protection Factor - The value regarded as applicable for an achievable ratio of average ambient concentration of an air contaminant in a workplace to the average concentration of the contaminant measured inside the respirator facepiece for a specific class of respirators.

Qualitative Fit Test - A pass/fail fit test to assess the adequacy of a respirator fit that relies on the individual's response to the test agent.

Quantitative Fit Test - An assessment of the adequacy of a respirator fit by numerically measuring the amount of leakage into the respirator.

Respirator - Any device worn by an individual and intended to provide the wearer with respiratory protection against inhalation of airborne contaminants or oxygen-deficient air.

Self Contained Breathing Apparatus (SCBA) - An atmosphere supplying respirator for which the source of air or oxygen is carried by the wearer.

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 - A respirator which receives breathable air through an air line or hose from a portable or stationary source of compressed air.

4.0 RESPONSIBILITIES

Respiratory Program Administrator - The Respiratory Program Administrator is a designated qualified person who is responsible for administrating and overseeing the Respiratory Protection Program and conducting the required evaluations of program effectiveness (required by 29 CFR 1910.134).

Health and Safety Officer (HSO) - The HSO is responsible for confirming that the proper respiratory protection is available, that the employees have been properly trained and medically qualified for respirator use, that facilities are provided for the cleaning and storage of respirators, and that operating procedures reflect the required use of respirators.

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Health and Safety Representative (HSR) - The HSR is responsible for confirming proper use and maintenance of respirators.

D&B Employees - D&B employees are responsible for using the provided respiratory protection in accordance with this program and the training received. The employee must check the facepiece seal each time the respirator is worn. The employee must inspect the respirator as instructed, protect it from damage, and report malfunctions.

5.0 RESPIRATOR SELECTION

Respirators certified by the National Institute for Occupational Safety and Health (NIOSH) must be selected and used in compliance with the conditions of its certification. Respirators must be selected on the basis of the respiratory hazard(s) at the workplace and user factors that affect respirator performance and reliability. Respirator selection criteria include:

- General use conditions, including determination of contaminants, oxygen deficiency or IDLH atmospheres.
- Physical, chemical, and toxicological properties of the contaminant(s).
- Warning properties of the contaminant(s).
- Exposure Limits (PELs, TLVs).
- Assigned Protection Factors.
- Maximum Use Concentrations.
- Eye irritation potential.
- End of service life determination.
- Location of "safe" area.
- Duration of respirator use.

RESPIRATORY PROTECTION GUIDELINES

6.0 RESPIRATOR TRAINING

Employees required to wear respirators must be trained before wearing a respirator. Training must be comprehensive and understandable. It must be performed prior to requiring the employee to use a respirator and annually thereafter.

The following, as a minimum, will be included in the training:

- Why the respirator is necessary and how improper fit, usage, or maintenance can compromise the protective effect of the respirator.
- How to identify the limitations and capabilities of the respirator.
- How to use the respirator effectively in emergency situations, including situations in which the respirator malfunctions.
- How to inspect, put on and remove, use, and check the seals of the respirator.
- Respirator maintenance and storage procedures.
- How to recognize medical signs and symptoms that may limit or prevent the effective use of respirators.
- The general requirements of the Respiratory Protection Standard.

7.0 RESPIRATOR FITTING

Below are the requirements for the fit testing:

- Each employee required to wear a respirator will be fit tested using accepted fit test methods as described in OSHA 29 CFR 1910.134.
- Qualitative or Quantitative fit testing must be performed prior to initial use of respirators and thereafter at least annually.
- A qualified person must administer fit testing. The person performing the fit testing will provide documentation of the fit test protocol(s) used.
- Fit tests will be performed using the same make, model and size of respirator to be worn.

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- A user seal test following OSHA 29 CFR 1910.134 must be performed immediately after donning and adjusting the respirator, each time a respirator is used.

8.0 RESPIRATOR MAINTENANCE AND CARE

Respirators will be properly maintained and be in working order. Respirators that are not functioning properly will be removed from use.

8.1 Inspection

Respirators must be inspected as follows:

Routine use:	Before each use and during cleaning.
Emergency use:	At least monthly and before and after each use.
Emergency-escape : (SCBA):	Before being carried into the workplace for use. Monthly. Air and oxygen cylinders must be maintained in a fully charged state and will be recharged when the pressure falls to 90% of the manufacturer's recommended pressure level.

The inspection must include a check of respirator function, tightness of connections, and the condition of the various parts of the respirator, including a check of the elastomeric parts for pliability.

8.2 Cartridge/Filter Changing/Replacement

Filters/cartridges used on air-purifying respirators must be replaced when one of the following occurs:

- Change is scheduled according to cartridge replacement schedule created by the HSO, or designee.
- A resistance/break-through during breathing is noted.

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- Indicated on end-of-service-life indicator.
- Employees will leave the area to wash, when changing cartridges or if breakthrough or resistance is encountered.

8.3 Cleaning and Disinfecting

Respirators will be properly cleaned and disinfected after each use in accordance with OSHA 29 CFR 1910.134. The respirators will be cleaned and disinfected at the following intervals:

- Respirators issued for the exclusive use of an employee will be cleaned and disinfected as often as necessary to be maintained in a sanitary condition.
- Respirators issued to more than one employee will be cleaned and disinfected before being worn by different individuals.
- Respirators maintained for emergency use will be cleaned and disinfected after each use.
- Respirators used in fit testing and training will be cleaned and disinfected after each use.

8.4 Repair

Respirators that fail an inspection or are otherwise found to be defective are removed from service, and are discarded or repaired as follows:

- Repairs or adjustments are made only by individuals that have been appropriately trained for such repairs.
- Only manufacturer's NIOSH-approved parts are used.
- Repairs are only conducted according to manufacturer recommendations and specifications.

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- Reducing and admission valves, regulators, and alarms must be adjusted or repaired only by the manufacturer or a technician trained by the manufacturer.

8.5 Proper Respirator Storage

Respirators must be stored to protect them from damage, contamination, dust, sunlight, extreme temperatures, excessive moisture and damaging chemicals. They must be stored to prevent deformation of the facepiece and exhalation valve.

Storage for emergency respirators must meet the above requirements, plus:

- Be kept accessible to the work area.
- Stored in compartments or in covers that are clearly marked as containing emergency respirators.
- Stored in accordance with the manufacturer recommendations.

9.0 MEDICAL SURVEILLANCE

Employees assigned to tasks requiring the use of respirators will be medically evaluated to determine if they are physically able to wear respirators. These determinations must be made prior to any use, including fit-testing, and must be completed by a physician. In some states a Licensed Health Care Professional (LHCP) other than a physician may conduct the evaluation. These medical evaluations will be reviewed periodically as deemed appropriate by the physician or Respiratory Program Administrator or if there are medical reasons to evaluate the employee.

The following information must be provided to the physician before a medical determination can be made:

- Type and weight of respirator that is to be used.
- Duration and frequency of respirator use.
- Expected physical work effort.

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- Additional protective clothing and equipment to be worn.
- Temperature and humidity extremes that may be encountered.
- Written copy of this Respiratory Protection Program.

A written recommendation must be obtained from the physician. The recommendation will provide information on any limitations on respirator use. Additional medical evaluations must be provided if any of the following occurs:

- An employee reports medical signs or symptoms that are related to ability to use a respirator.
- A LHCP, supervisor or the Respirator Program Administrator informs the employer that an employee needs to be reevaluated.
- Information from the Respiratory Protection Program, including observations made during fit testing and program evaluation, indicates a need for employee reevaluation.
- A change occurs in workplace conditions that may result in a substantial increase in the physiological burden placed on an employee.

10.0 RECORDKEEPING

Records of employee exposure, monitoring, medical surveillance, training, respiratory protection use, inspection and maintenance will be kept in the project file.

11.0 FIT TESTS

Records of qualitative and/or quantitative fit tests will be maintained until the employee's next fit test. The records must include the name and identification of employee, type of fit test performed, make, model, style, and size of respirator tested, date of fit test, and fit test results.

12.0 PROGRAM EVALUATION

RESPIRATORY PROTECTION GUIDELINES

The Respiratory Program Administrator will conduct periodic evaluations of the Respiratory Protection Program. The Respiratory Program Administrator should:

- Consult with users to determine program acceptance.
- Conduct inspections of respirator use.
- Review required records.

13.0 SPECIAL CONSIDERATIONS IN RESPIRATOR USE

13.1 Facial Hair

Respirators will not be worn when conditions prevent a good respirator facepiece-to-face seal. Persons with facial hair that interferes with the facepiece-to-face seal or the operation of the inhalation or exhalation valves will not be permitted to wear or be fitted with a respirator until such conditions are corrected.

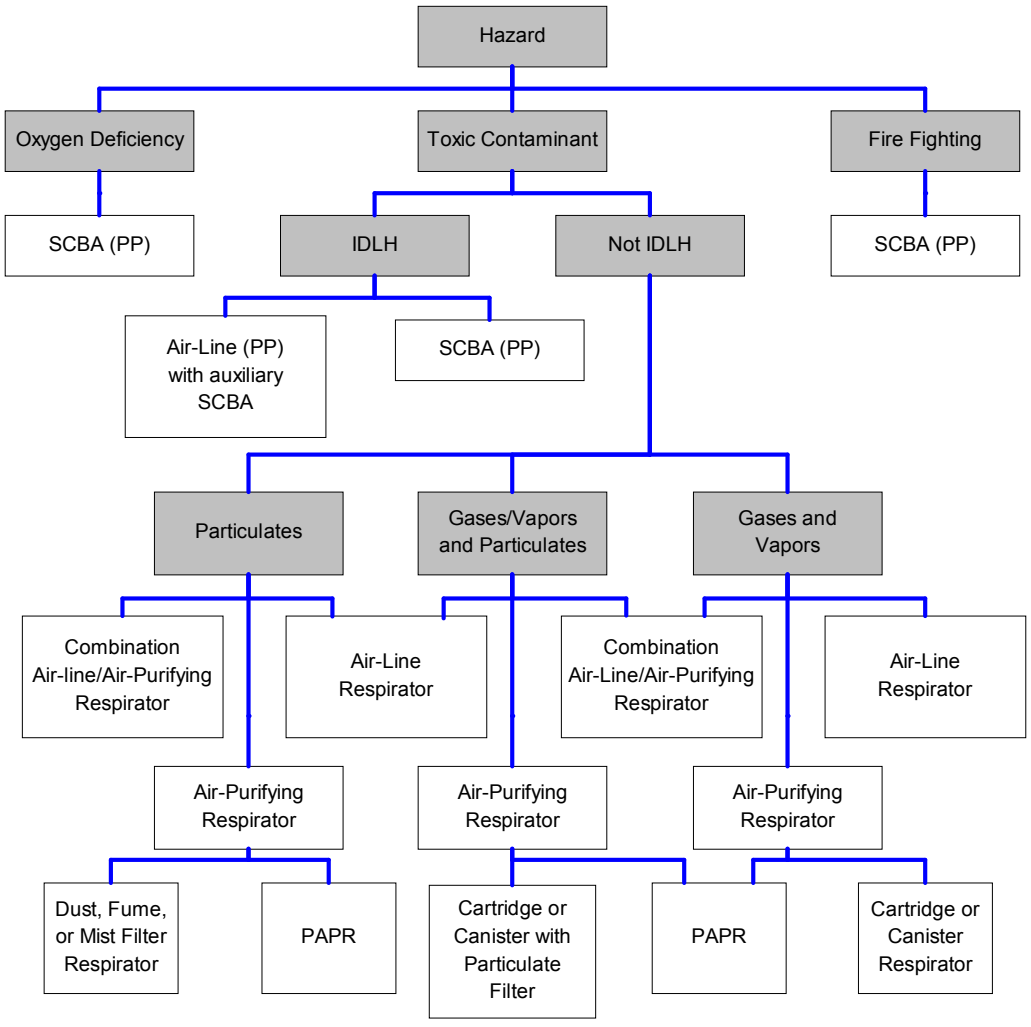
13.2 Corrective Lenses

- Employees with eyeglass temple pieces which interfere with the facepiece-to-face seal of the respirator will not be permitted to wear or be fitted with a respirator until such conditions are corrected.
- If corrective lenses are required, contact lenses or special lens holding devices which do not interfere with the facepiece-to-face seal may be utilized.

14.0 REFERENCES

- OSHA 29 CFR 1910.134.
- OSHA 29 CFR 1926.103.

APPENDIX A – Respiratory Protection Selection Diagram



APPENDIX B – Program Evaluation Checklist/Questionnaire

RESPIRATOR USE

Employee Name _____
Identification _____
Position _____

Description of Work Activities:

---

1. What jobs/activities require the use of respiratory protection?

2. Is respiratory protection used every time that it is required?

3. What type of respiratory protection is used?

4. Where is the respiratory protection stored?

5. How is the respiratory protection cleaned and maintained?

6. What was the date of the last fit test?

7. When did employee last receive respiratory protection training?

8. Are other employees that are required to use respiratory protection using it properly/effectively?

List any problems/concerns/comments.

CONFINED SPACE OPERATIONS GUIDELINES

Table of Contents

CONFINED SPACE OPERATIONS GUIDELINES

1.0 PURPOSE

To establish safe procedures for employees of D&B who have the potential to be exposed to the hazards of a confined space as detailed in OSHA 29 CFR 1910.146 (General Industry) and 29 CFR 1926.1200 (Construction).

2.0 SCOPE

Applies to the activities of D&B personnel exposed to the hazards of a confined space.

3.0 DEFINITIONS

CONFINED SPACE OPERATIONS GUIDELINES

Attendant - A trained individual stationed outside the confined space who monitors the Authorized Entrant.

Authorized Entrant - A trained individual whose name is listed on the entry permit and who is authorized by the employer to enter a confined space.

Confined Space - A space that:

- Is large enough and so configured that an employee's entire body can enter and perform assigned work (e.g., storage tanks, stacks, pits, basements, silos, boilers, ventilation and exhaust ducts, manholes, sewers, tunnels, underground utility vaults, etc.).

- Has limited or restricted means for entry or exit.

- Is not designed for continuous employee occupancy.

Emergency - Any occurrence or event internal or external to the permit space that could endanger entrants.

Engulfment - The surrounding and effective capture of a person by a liquid or finely divided (flowable) solid substance that can be aspirated to cause death by filling or plugging the respiratory system or that can exert enough force on the body to cause death by strangulation, constriction or crushing.

CONFINED SPACE OPERATIONS GUIDELINES

Entry - The act of intentionally passing through an opening into a confined space. Entry occurs as soon as any part of the entrant's body breaks the plane of the opening into the space.

Entry Permit - A written or printed document provided by the employer that authorizes the confined space entry and identifies acceptable conditions for entry into a confined space. At a multi-employer site, each affected employers must be in agreement regarding who will issue a Permit.

Entry Supervisor - The person responsible for determining if acceptable entry conditions are present at a permit space where entry is planned for authorizing entry, overseeing entry operations and for terminating the confined space entry.

Hazardous Atmosphere - An atmosphere that may expose employees to the risk of death, incapacitation, impairment of ability to self-rescue, injury or acute illness from one or more of the following causes:

- Flammable gas, vapor, or mist in excess of 10% of its lower flammable limit (LFL).
- Airborne combustible dust at a concentration that meets or exceeds its LFL.
- Atmospheric oxygen concentration below 19.5% or above 23.5%.
- Atmospheric concentration of any substance for which a dose or a permissible exposure limit (PEL) is published in OSHA 1919 Subpart Z, Toxic and

CONFINED SPACE OPERATIONS GUIDELINES

Hazardous Substances, which could result in employee exposure in excess of its dose or PEL.

- Any other atmospheric condition that is immediately dangerous to life or health.

Hot Work Permit - The employer's written authorization to perform operations (e.g., welding, cutting, burning and heating) capable of providing a source of ignition.

Immediately Dangerous to Life or Health (IDLH) - Any condition that poses an immediate or delayed threat to life or that would cause irreversible adverse health effects or that would interfere with an individual's ability to escape unaided from a permit required confined space.

Isolation - The process by which a permit space is removed from service and completely protected against the release of energy and material into the space by such means as: blanking or blinding, blocking, bleeding and lockout/tagout of all sources of energy.

Line Breaking - The intentional opening of a pipe, line, or duct that is or has been carrying flammable, corrosive, or toxic material, an inert gas, or any fluid at a volume, pressure or temperature capable of causing injury.

Oxygen Deficient Atmosphere - An atmosphere containing less than 19.5 % oxygen.

Oxygen Enriched Atmosphere - An atmosphere containing greater than 23.5 % oxygen.

CONFINED SPACE OPERATIONS GUIDELINES

Permit Required Confined Space (PRCS) - A confined space that has one or more of the following characteristics:

- Contains or has potential to contain a hazardous atmosphere.
- Contains a material with the potential for engulfment of an entrant.
- Has inwardly converging walls or floors that could trap or asphyxiate an entrant.
- Contains any other recognized serious safety or health hazard.

Permit System - The employer's written procedure for preparing and issuing permits for entry and for returning the permit space to service following termination of entry.

Prohibited Condition - Any condition in a permit system that is not allowable by the permit during the period when entry is authorized.

Rescue Service - The personnel designated to rescue employees from permit required spaces.

Retrieval System - The equipment used for non-entry rescue of persons from permit required spaces.

CONFINED SPACE OPERATIONS GUIDELINES

Testing - The process by which the hazards that may confront entrants of a permit space are identified and evaluated. Testing includes specifying the tests that are to be performed in the permit space.

4.0 RESPONSIBILITIES

Health and Safety Coordinator (HSO) - The HSO is responsible for:

- Coordinating training for personnel designated as an Authorized Entrant, Attendant or Entry Supervisor.
- Reviewing and updating this program annually to include new revisions by OSHA.
- Conducting annual field audits of this program.

On-Site Health and Safety Representative (HSR) - The HSR is responsible for:

- Confirming that the Permit requirements are implemented.
- Reporting incidents or PRCS guidelines deficiencies.
- Making on-site H&S decisions related to field operations.
- HSR may take on an Entry Supervisor's responsibilities, if assigned.

CONFINED SPACE OPERATIONS GUIDELINES

Entry Supervisor - The entry supervisor is responsible for:

- Knowing the hazards that may be faced during entry, including information on the mode, signs or symptoms, and consequences of the exposure.
- Completing the Entry Permit, verify that requirements of the Permit have been met and equipment specified in the permit is in place before endorsing the permit and allowing entry to begin.

Authorized Entrant - The Authorized Entrant is responsible for:

- Knowing the hazards and understanding the consequences of exposure.
- Maintaining contact with the Attendant.
- Understanding and utilizing the provided personal protective equipment.
- Exiting the permit space if evacuation is ordered by the Attendant.
- Alert the Attendant whenever:
    - The entrant recognizes any warning sign or symptom of exposure to a dangerous situation.
    - The entrant detects a prohibited condition.

CONFINED SPACE OPERATIONS GUIDELINES

- Exit from the permit space as quickly as possible whenever:
    - An order to evacuate is given by the Attendant or the entry supervisor.
    - The entrant recognizes any warning sign or symptom of exposure to a dangerous situation.
    - The entrant detects a prohibited condition.
    - An evacuation alarm is activated.

Attendant - The Attendant is responsible for:

- Knowing the hazards that may be faced during entry, including information on the mode, signs or symptoms, and consequences of the exposure.
- Continuously maintaining an accurate count and identity of Authorized Entrants in the permit space.
- For remaining outside the permit space until relieved by another Attendant.
- Maintaining continuous communication with all Authorized Entrants.
- Monitoring activities inside and outside the space to determine if it is safe for entrants to remain in the space and ordering the Authorized Entrants to evacuate the permit space immediately under any of the following conditions:
    - If the Attendant detects a prohibited condition of the entry.

- If the Attendant detects the behavioral effects of hazard exposure in an Authorized Entrant.
- If the Attendant detects a situation outside the space that could endanger the Authorized Entrants.
- If the Attendant cannot effectively and safely perform all of his or her required duties.

- Summoning rescue or emergency services as soon as the Attendant determines that Authorized Entrants may need assistance to escape from PRCS hazards. The client may have its own rescue services. If outside rescue services are employed, they are to be notified ahead of time as to the PRCS entry so as to be prepared. They may also visit the site prior to the entry, to understand the logistics and scope of work.
- Perform non-entry rescue as specified in the rescue procedure.
- The attendant is not allowed multiple confined spaces at the same time.

5.0 GUIDELINES

D&B will use these guidelines for any entry into a PRCS for testing, maintenance, inspection or repair activities.

CONFINED SPACE OPERATIONS GUIDELINES

5.1 General

In general, the HSO or HSR should evaluate the workplace and identify the number, type and location of confined space areas within the site that personnel may need to enter to perform work. Once the confined spaces have been identified, as defined in Section 3.0, a determination must be made if the space(s) requires an Entry Permit.

If a confined space has been defined as a PRCS, the HSO, HSR or his/her designee must inform site personnel of the existence, location and danger posed by the space. This can be accomplished by posting a danger sign with appropriate language (e.g. DANGER – PERMIT REQUIRED CONFINED SPACE). *NO ENTRY INTO A PRCS WILL OCCUR WITHOUT A PERMIT.*

5.2 Reclassifying Permit-Required Confined Spaces

PRCS can be temporarily reclassified as either a Non-Permit Confined Space or Alternate Space, providing the following is met:

5.2.1 Reclassification to a Non-Permit Confined Spaces

Some identified confined spaces are classified PRCS based solely upon the space containing hazards which can effectively be eliminated through lockout/tagout procedures. For a PRCS to be temporarily reclassified as a non-permit space, there must be no potential for the space to contain other hazards. The permit space may be reclassified as a non-permit confined space for as long as the hazards remain

eliminated. Measures for eliminating hazards within the space should be documented and reviewed by the HSO. Upon work completion and after the control measures have been removed, the space must be reclassified as a PRCS.

5.2.2 Reclassifying PRCS to Alternate Space

If the only hazard in a PRCS is a hazardous atmosphere, then it is possible to potentially reclassify the space as an Alternate Space. In order to consider such spaces as non-permit spaces, all atmospheric hazards must be eliminated without entry into the space. Monitoring and inspection data, collected during routine entry operations, must show that the atmospheric hazards were effectively abated through the use of ventilation equipment. The HSO or HSR will verify an evaluation of designated Alternate Spaces. Although an Entry Permit is not required for entrance into an Alternate Space, the following precaution must be followed:

- Entrants must be trained in the potential hazards of the space.
- Continuous ventilation will be established and maintained throughout the entry period. The ventilation must be sufficient to maintain the space safe for entry.
- Prior to entry, the space must be tested for oxygen content, flammable gases and vapors, potential toxic air contaminants.
- Entrants and other personnel involved in the entry may review equipment calibration and air monitoring data at any time during the entry process.

- If a hazardous atmosphere is detected, entrants must evacuate the space and the space then becomes a PRCS.

5.3 Hazard Identification

The Hazard Assessment Form in Appendix A can be used to assess the hazards of each confined space prior to entry.

Other hazards may be present in the vicinity of the confined space, such as traffic, pedestrians and heavy equipment. Provisions are to be made to protect the confined space entry team as well as those outside. This can be addressed in the JHA.

5.4 Entry Permit

The Entry Permit (Appendix B) is a checklist designed to ensure that the proper precautions are implemented prior to entry.

All blocks on the permit must be completed. If an item is not applicable then "N/A" must be written in the space. NO blank spaces are to appear on the permit. The permit must be signed by the Entry Supervisor and posted at the entrance to the confined space until the entry is completed or the work shift ends. The permit is applicable for a single work shift. The entry permit will serve as a safety briefing outline before entry and will be available for review by all affected employees.

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The entry permit will identify:

- The location of the confined space, a description of the entry task, date of entry and duration of permit.
- Known and potential hazards that may be encountered during the confined space entry.
- Mechanical apparatus within the confined space such as agitators and pumps, which if activated could injure the worker.
- Isolation procedures to be implemented, consisting of:
    - Blanking and/or disconnecting of lines.
    - Electrical lockout and tagout.
    - Mechanical isolation and tagout.
    - Mechanical ventilation (volumes).
- Safety and protective equipment required (specify routine and emergency requirements), consisting of:
    - Level of respiratory protection.
    - Personal protective equipment.

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- Safety harness and/or lifelines.
- Extraction devices.
- Tools and equipment to be taken into the confined space by the entrant.

- Pre-entry atmospheric monitoring and acceptable levels of contaminants, consisting of:
  - Oxygen level (19.5 – 23.5 %).
  - Combustible gas/vapor level (< 10% LEL).
  - Toxic substances level less than established TLV, PEL. (for Hydrogen sulfide – 10 ppm; for chlorine – 0.5 ppm).

- Provisions for continuous atmospheric monitoring, identifying:
  - Equipment.
  - Evacuation criteria.

- Equipment/procedures to maintain acceptable atmospheric conditions identifying procedures for purging, ventilation, flushing and inerting.

- Identification of entry team (authorized and eligible), consisting of:
  - Personnel to make entry (Authorized Entrant).

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- Personnel on stand-by (Attendant).

- Emergency procedures and first aid, identifying the following:
  - Communication procedures.
  - Equipment location.
  - Rescue team.

- Training required (specifics beyond Section 5.8 should be noted) for the following employees:
  - Authorized Entrant, Attendant and Entry Supervisor.
  - Non-entry rescue.
  - Respirator use.
  - PPE.

- The permit must be closed out following the completion of confined space activities.

- The permit may be cancelled if all conditions for entry are not met, or if worksite conditions change.

CONFINED SPACE OPERATIONS GUIDELINES

5.5 Work Practices

5.5.1 Pre-Entry

As part of the pre-entry procedure, the Entry Supervisor, HSO or HSR will review the entry permit with each Authorized Entrants and Attendants. The Entry Supervisor, HSO or HSR must confirm that the necessary steps have been taken to establish that conditions within the space are safe prior to issuing an entry permit. These steps include:

- Pre-entry briefing.
- Preparation of the Entry Permit including:
  - Initial Atmospheric Testing will be completed for oxygen deficiency or enrichment, combustible gases and toxic gases and vapors.
  - Hazard Control/Elimination will be completed as necessary to properly control/eliminate hazards.
  - Space Preparation will be completed and Site Controls will be employed to prevent unauthorized personnel from impacting the entry operation, allow necessary entry equipment to be staged effectively, maintain adequate housekeeping at the entry location

and in the space itself, and enable rescue services to locate and access the entry space as needed.

- Training will have been completed and documented for each employee involved with the entry.

- Emergency Rescue Procedures identifying the level and type of emergency services required for the entry.

- Equipment and Instrumentation required for monitoring, hazard control, safety and rescue.

5.5.2 Purging and Ventilation

All confined space enclosures containing a hazardous atmosphere will be subject to purging and continuous ventilation prior to an entry, and as needed. Continuous ventilation may not be required if the confined space meets all of the following criteria:

- No oxygen deficiency or enrichment (19.5 - 23.5 %).

- Lower Explosive Limits (LEL) measurements are less than 10%.

- Toxicity measurement is less than 10% of the established IDLH of the airborne contaminant present.

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5.5.3 Isolation/Lockout and Tagging

Except for such confined spaces as manholes, sewers, and tunnels, where complete isolation is not physically possible, confined spaces will be completely isolated from other systems by such means as lockout/tagout, double block and bleed, or physical disconnection of lines into the confined space.

5.5.4 Buddy System

Tasks involving confined space entry will be performed by a team of not less than two employees with specific duties as described in Section 4.0 Responsibilities.

5.5.5 Communication

The Authorized Entrants and the Attendant must maintain continuous communication with each other during the entire confined space entry. If visual contact and/or verbal communication cannot be maintained, the following code may be used which utilizes the lifeline:

Person Outside Confined Space	Person In Confined Space
1 Pull - Come out	1 Pull - Send help
2 Pulls - Back out	2 Pulls - Keep slack out of line
3 Pulls - Advance	3 Pulls - I am going ahead
4 Pulls - Are you okay?	4 Pulls - I am okay

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If the person inside the confined space does not respond to the pull code, assume that there is trouble and begin effecting emergency procedures.

In addition, a means of communication will be available to summon outside help.

5.5.6 Testing and Monitoring

When preparing for an entry into a PRCS, appropriate initial testing must be conducted to confirm that the atmosphere in the confined space is safe. Monitoring will be conducted for oxygen content, combustible gases/vapors, toxic contaminants, and any other contaminants identified. Air monitoring should be conducted continuously while personnel are within the confined space.

Entry into a confined space without proper personal protective equipment will not be permitted under the following conditions:

- Oxygen concentrations less than 19.5% or greater than 23.5%, or 148 mm Hg and 178 mm Hg, respectively, based on atmospheric pressure of 760 mm Hg at sea level.

- Flammability measurements greater than 10% of the LEL.

- Toxicity measurements indicating an IDLH atmosphere's existence in the confined space.

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Initial atmospheric samples will be drawn while outside the confined space at the following locations: outside the entry point(s), immediately inside the entry point(s) and every four feet from the entrance. Initial-monitoring results will be recorded on the entry permit. In addition, D&B employees may request that additional monitoring be conducted. The request will be evaluated by the HSO.

5.5.7 IDLH Conditions

D&B personnel will not be permitted into confined spaces during IDLH conditions.

5.6 Equipment

Equipment necessary for safe entry, including testing, monitoring, communication, and personal protective equipment must be available prior to entry. Personnel using the equipment must be trained in proper use and maintenance of such equipment.

5.6.1 Safety Equipment

Additional safety equipment such as safety belts, body harnesses, or wristlets with lifelines will be provided and used for each confined space entry, as determined by the Entry Supervisor, HSO or HSR. If necessary, lifelines will be attached to a mechanical extraction device outside the confined space so the Attendant can perform non-entry rescue.

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5.6.2 Illumination

Illumination must be provided, as necessary, pursuant to OSHA 29 CFR 1910.120(m).

5.6.3 Equipment Requirements

Tools and other equipment, including monitoring instruments, for use in PRCS will be inspected for compliance with the following requirements:

- Tools and equipment will be kept clean and in a good state of repair.
- Electrical equipment including portable tools, lighting, and power cords should meet approvals in accordance with OSHA 29 CFR 1910 subpart S, including provisions for ground fault circuit interruption.
- Only explosion proof temporary lighting listed by the Underwriters Laboratory should be used during PRCS entry and be equipped with required guards.
- Air activated tools must be used where flammable liquids are present and be bonded to the confined space.
- Compressed gas cylinders, except those that are part of SCBA or resuscitation equipment, will never be allowed inside a confined space. Cylinders used to supply compressed gases to a confined space will be turned off at the cylinder valve when not in use and the supply lines will be removed.

- Ladders, scaffolding and staging will be adequately designed and secured in conformance with OSHA 29 CFR 1910 subpart D.

- Equipment or instrumentation subject to use in a confined space where flammable atmospheres may occur will be listed as explosion proof or intrinsically safe by a recognized testing laboratory.

5.7 Rescue

If it becomes necessary to remove a worker from a confined space, the Attendant should act in accordance with the predetermined emergency rescue plan as follows:

- The Attendant will communicate through the predesignated communication network and request assistance. The following information should be given:

  - The location of the confined space.
  - Request for emergency oxygen supply and first-aid kit.
  - Request for self-contained air supply with full-face mask, safety harness and lifeline.
  - Call for professional medical assistance.

- The Attendant will only attempt a non-entry rescue. At no time will the Attendant place himself/herself inside the confined space to perform an in-space rescue.

- If the person within the confined space is secured to a winch, begin hauling him/her out. This procedure must be performed at a speed that will not further injure the person.

- If the lifeline is not secured to a winch, the Attendant will secure lifeline.

5.8 Employee Information and Training

Prior to assignment, employees will be trained to recognize confined spaces, the hazards of working in a confined space, and demonstrate understanding, knowledge, and skills necessary for the safe performance of their assigned duties during any confined space entry. The HSO will also confirm that employees are properly trained before an employee is assigned the duties of Entrant, Attendant or Entry Supervisor. Training will also be conducted if there are changes in duties, hazards or other circumstances. All training will be documented through sign-in sheets and certificates.

Training will include:

- Hazard recognition associated with confined space operations.

- Emergency entry and egress procedures.

- Respiratory protection.
- First aid.
- Cardiopulmonary resuscitation.
- Lockout/Tagout procedures.
- Personal Protective Equipment.
- Rescue operations.
- Permit system.
- Work practices (see Section 5.5).

5.9 Subcontractors

Subcontractors will be provided with available information on existing confined spaces, their hazards, necessary permits (if applicable) and any other workplace hazards, safety rules and emergency procedures necessary to complete the task safely.

CONFINED SPACE OPERATIONS GUIDELINES

5.10 Recordkeeping

Copies of the entry permits and personnel exposure record will be maintained by the HSO as required under OSHA 29 CFR 1910.20.

6.0 REFERENCES

- ANSI Z117.1-1989 "Safety Requirements for Confined Space."
- OSHA 29 CFR 1910.146, Permit Required Confined Spaces (general industry).
- OSHA 29 CFR 1926.1200, Permit Required Confined Spaces (construction).
- OSHA 29 CFR 1910.120(m) Hazardous Waste Operations (Illumination).
- OSHA 29 CFR 1910 Subpart S (Electrical).
- OSHA 29 CFR 1910 Subpart D (Walking-Working Surfaces).

APPENDIX A – HAZARD ASSESSMENT FORM

CONFINED SPACE ENTRY CLASSIFICATION AND HAZARD ASSESSMENT FORM

Location of Space:
_____

Description of Space:
_____

_____

1. Can an employee enter the space and perform assigned work within the space? Yes ____ No ____

2. Are there limited or restricted means of entry and/or exit? Yes ____ No____

3. Was the space designed for continuous human occupancy? Yes ____ No____

If you answered "no" to #1 or #2 or you answered "yes" to #3, this space is not a confined space as defined by OSHA 29 CFR 1910.146 Confined Space Standard. Please sign here and complete the classification section at the end of this form.

_____	_____	_____	_____
Name	Title	Signature	Date

For all spaces classified as confined spaces please complete the following hazard assessment.

4. Can the space be oxygen deficient or enriched? Yes ____ No ____

   Explain: _____
   _____

5. Can the space contain a flammable atmosphere? Yes ____ No ____

   Explain: _____
   _____

6. Can the space contain a toxic atmosphere? Yes ____ No____

   Explain: _____
   _____

7. Is there material in the space which could engulf an entrant?

7a. If yes, can the material be removed prior to entry?

   If "no" to 7a, space is a permit required confined space.
   If "yes" to 7a, explain:_____

8. Are there hazards on the walking/working surfaces which could cause entrants to trip or slip or fall while in the confined space? Yes ____ No ____

Appendix A – Hazard Assessment Form

D&B SOP No. C25

8a. If "yes" can these hazards be removed prior to entry? Yes ____ No ____

If "no" to 8a, space is permit required confined space.
If "yes to 8a, explain:_____
_____

9. Does the space have inwardly converging walls? Yes ____ No ____

10. Does the space contain an energy source? Yes ____ No ____

10a. If "yes" can the energy source be de-energized and locked out prior to entry? Yes ____ No ____

If "no" to 10a space is a permit required confined space.
If "yes" to10a, explain:_____
_____

11. Does the space contain moving machinery or equipment? Yes ____ No ____

11a. If "yes", can it be secured from outside the space? Yes ____ No ____

If "no" to 11a, the space is permit required confined space.
If "yes" to 11a, explain:_____
_____

12. Is there process piping connected to the space? Yes ____ No ____

12a. If "yes" can the piping be blanked off, disconnected or isolated using a double block valve and bleeder system? Yes ____ No ____

If "no" to 12a, space is a permit required confined space
If "yes" to 12a, identify the material in the piping:_____
_____

I certify that the above is a true and accurate assessment of the hazards or potential hazards associated with entry into the specified confined space.

_____	_____	_____	_____
Name	Title	Signature	Date

Confined Space Classification
Based on the above assessment this classifies the space as:

_____	Not a confined space	
_____	Non-permit required confined space.	Answered "No" to all questions #4 through #12
_____	Permit required confined space	Answered "Yes" to any question #7 through #12
_____	Alternate confined space	Answered "Yes" to any question #4 through #6 but "No" to all questions #7 through #12

_____	_____	_____	_____
Name	Title	Signature	Date

APPENDIX B – ENTRY PERMIT CHECKLIST

PERMIT – REQUIRED CONFINED SPACE-SAFE WORK PERMIT

Section 1-Work Assignment -TO BE COMPLETED BY PERMIT INITIATOR			
PERMISSION IS GRANTED TO (NAME & ORGANIZATION)		LOCATION (BUILDING, FLOOR, ROOM)	
WORK ORDER No.	DESCRIBE WORK/TASK (BE SPECIFIC)	PERMIT TYPE (CHECK ALL THAT APPLY) □ CONFINED SPACE □ HOT WORK WILL BE PERFORMED	
PERMIT IS VALID FOR THIS LOCATION/TASK/DATE ONLY AND FOR THE TIME PERIOD INDICATED- NOT TO EXCEED ONE SHIFT (12 HOURS)	DATE	WORK TO BEGIN AT	PERMIT EXPIRES AT

SECTION 2-HAZARD CONTROL CHECKLIST			
HAZARD CONTROL MEASURES	YES OR N/A	HAZARD CONTROL MEASURES	YES OR N/A
NOTIFIED PERSON(S) IN AFFECTED WORK AREA		REQUIRE CONTINUOUS ATMOSPHERIC (OXYGEN/LEL/CONTAMINANT) REQUIRED- IF YES, CIRCLE TYPE AND COMPLETE SECTION 3	
ALL AFFECTED PERSONNEL ADVISED OF WORK HAZARDS, PRECAUTIONS AND EMERGENCY PROCEDURES		REQUIRE VISUAL/RADIO CONTACT WITH ENTRY TEAM	
IDENTIFIED PROPER MEANS OF EGRESS		REQUIRE FORCED AIR VENTILATION IN PLACE 15 MINUTES PRIOR AND DURING CONFINED SPACE ENTRY	
REQUIRED PERSONAL PROTECTIVE EQUIPMENT- IF YES COMPLETE SECTION 4		REQUIRE SAFETY HARNESS/TRIPOD AND WINCH/FALL PROTECTION REQUIRED	
CONDUCTED HAZARD COMMUNICATION		REQUIRE 2-WAY RADIO CONTACT WITH	

Appendix B – Entry Permit Checklist

D&B SOP No. C25

REVIEW AND IDENTIFIED HAZARDOUS (MSDS AVAILABLE)		COMMAND CENTER REQUIRED AT ALL TIMES (CELL TELEPHONE OR OTHER)	
ALL PERSONNEL ADVISED/TRAINED IN PROPER PROCEDURES AND EQUIPMENT OPERATION FOR WORK ASSIGNMENT		IF HOT WORK WILL BE PERFORMED COMPLETE ALL THAT APPLY BELOW	
PROTECTED WORK AREA WITH APPROPRIATE BARRICADES AND CAUTION SIGNS		FIRE PROTECTION SYSTEM IN SERVICE. PROPER SIZE/TYPE FIRE EXTINGUISHERS/FIRE HOSE AVAILABLE AT WORK SITE	
ENTRY SUPERVISOR TO INSPECT WORK AREA BEFORE STARTING WORK		MOVED ALL COMBUSTIBLES 30-40 FEET AWAY OR PROTECTED WITH APPROVED MATERIALS	
IDENTIFIED AND PROPERLY SECURED ALL IONIZING/NON-IONIZING RADIATION SOURCES		SWEPT CLEAN AND WET DOWN FLOORS AND SURROUNDING AREAS	
IDENTIFIED ALL HAZARDOUS ENERGY SOURCES		PROTECTED/COVERED ALL FLOOR, WALL OPENINGS INCLUDING DRAIN AND SEWER OPENINGS, AND BELOW ROOF OPENINGS	
LOCKED AND TAGGED OUT ELECTRICAL/MECHANICAL EQUIPMENT AT DISCONNECTS		DRAINED/SECURED ALL PUMPS/PIPING AND REMOVED ALL CONTAINERS OF FLAMMABLE/COMBUSTIBLE LIQUIDS	
DISCONNECTED AND BLANKED ALL APPROPRIATE LINES AND VESSELS		INSPECT BURNING, WELDING OR HOT WORK EQUIPMENT	
RELIEVED PRESSURIZED EQUIPMENT AND PIPING TO ZERO ENERGY STATE OR VENTED TO ATMOSPHERE		WELDING EQUIPMENT PROPERLY GROUNDED TO STRUCTURAL BUILDING STEEL OR GROUND VERIFIED BY ELECTRICIAN	
LOCK AND TAGOUT ALL APPROPRIATE VALVES		REPORTED HOT WORK PERMIT TO SAFETY	
DRAINED, PURGED, AND CLEANED EQUIPMENT OF CONTAMINANTS		CHECKED ALL AREAS INCLUDING FLOORS ABOVE AND BELOW WHERE EXPOSED FOR 30 MINUTES AFTER HOT WORK IS COMPLETED	
INSPECTED PIPING & EQUIPMENT FOR ASBESTOS CONTAINING MATERIALS		SCREENS SET UP TO PROTECT OTHERS FROM WELDING FLASHES	
STOPPED HAZARDOUS WORK IN AREA		FIREWATCH/STANDBY PERSONNEL ASSIGNED FOR HOT WORK	
REQUIRE INTRINSICALLY SAFE/NON-		BAGGED SMOKE DETECTOR/SHUTDOWN FIRE	

Appendix B – Entry Permit Checklist

D&B SOP No. C25

SPARKING INSTRUMENTS		PROTECTION SYSTEM	
IMPLEMENT PRECAUTIONS FOR CHEMICAL/BIOLOGICAL DECONTAMINATION		DUCT OR CONVEYOR SYSTEMS EXPOSED TO SPARKS ARE SHUTDOWN OR COVERED	
ADDITIONAL PRECAUTIONS:			

SECTION 3- ATMOSPHERIC TESTING

FLAMMABLE VAPOR						
TIME						
%LEL						
TESTER INITIALS						
OXYGEN						
TIME						
%LEL						
TESTER INITIALS						
TOXIC VAPORS						
TIME						
%LEL						
TESTER INITIALS						

SECTION 4- PERSONAL PROTECTIVE EQUIPMENT

(Check all that may be required)

EYE PROTECTION: · SAFETY GLASSES · FACE SHIELD · GOGGLES

HEARING PROTECTION: · PLUGS · MUFFS

RESPIRATORY PROTECTION: · AIR PURIFYING TYPE

□ SELF CONTAINED BREATHING APPARATUS (SCBA)

□ AIR LINE · OTHER (specify)

PROTECTIVE CLOTHING: · DISPOSABLE CLOTHING · STERILE GARMENT · WELDING/BURRING VEST/SLEEVES · BOOTS · HARD HAT · GLOVES- · IMPERVIOUS CHEMICAL SPLASH OUT SUIT- TYPE · SPLASH APRON · OTHER (specify)

SECTION 5- PRE-ENTRY

CONFINED SPACE ENTRY CHECKLIST- The following must exist prior to any entry:

· Lower Explosive Limit (LEL) <10% · Oxygen Content 19.5-23.5% · Toxic Vapor <TLV/PEL

List potential hazards of entry:	List materials last known to be in space:

Appendix B – Entry Permit Checklist

D&B SOP No. C25

LIST ENTRANTS/(NAMES)	TIME		TIME		TIME	
	IN	OUT	IN	OUT	IN	OUT
LIST ATTENDANTS/(NAMES)						

SECTION 6- APPROVALS (Signatures indicates inspection of work area and review of aforementioned precautions)			
I HAVE BEEN PROPERLY INSTRUCTED IN APPLICABLE PERMIT PROCEDURES, PRECAUTIONS AND UNDERSTAND MY DUTIES AND EMERGENCY RESPONSIBILITIES.			
"OK TO PROCEED"	PRINT NAME	SIGNATURE	PHONE/PAGER
Permit Initiator			
Competent Ops. Person			
Entry Supervisor			
Attendant			
Attendant			
Other (when required)			

APPENDIX C – AIR MONITORING DATA SHEET

DATE: _____

PROJECT #: _____

SITE LOCATION: _____

TIME	SAMPLING LOCATION*	CO (ppm)	O2 (%)	LEL (%)	H2S (ppm)	

* at entrance, #feet down, bottom, what room, etc

HOT WORK SAFETY GUIDELINES

Table of Contents

1.0 PURPOSE

To provide guidelines when work processes may create sparks or flames. When this occurs, a Hot Work Permit will be required, to enable the work to proceed safely and reduce or eliminate the risk of fire or explosion.

2.0 SCOPE

These guidelines apply to D&B personnel whose work activities (or those of the D&B contractor) may involve the creation of sparks or flames.

HOT WORK SAFETY GUIDELINES

3.0 DEFINITIONS

ANSI – American National Standards Institute.

Hot Work – Any work involving burning, welding, grinding or similar operations that may create sparks, flames or fires, or cause explosions.

Hot Work Permit (HWP) – A document issued by the authority having jurisdiction (D&B PM, designee or the client) for the purpose of authorizing performance of hot work activities. A copy of the HWP is located in Attachment A. The client may have their own that they require be used on their sites.

NFPA – National Fire Protection Association.

Permit Authorizing Individual (PAI) – The individual designated by management to authorize hot work.

RCNY – Rules of the City of New York.

Welder/Welding Operator – Any operator of electric or gas welding and cutting equipment.

Welding and Allied Processes – Processes such as arc welding, oxy-fuel gas welding, open-flame soldering, brazing, thermal spraying, oxygen cutting and arc cutting

4.0 RESPONSIBILITIES

D&B Employees - All D&B employees will adhere to the provisions of this program.

Health and Safety Officer (HSO) - The HSO has overall responsibility for the Hot Work Program.

HOT WORK SAFETY GUIDELINES

Program Manager (PM) – D&B's PM will ensure, along with PAI, that all workers completing any hot work activities have the certifications necessary to perform hot work. This includes Certificates of Fitness by FDNY (if work performed in the five boroughs), training on the equipment to be used, extinguisher training, etc. The PM must also recognize when a HWP must be issued.

PAI – The PAI is designated by the D&B PM to authorize the hot work activities, issuing a hot work permit, and cannot be the person conducting the hot work. Refer to the Hot Work Decision Tree, located in Attachment B. Responsibilities of the PAI also include:

- Conduct site inspections to verify that safeguards are in place.
- Work with crew to identify flammable materials, hazardous processes or other potential fire hazards present or likely to be present at the site.
- Remove or protect vulnerable equipment and materials that may catch fire or explode during hot work, or to coordinate to move the hot work process to a less vulnerable area, if possible.
- Ensure that fire protection/extinguishing equipment are present at the site. Require a fire watch, if necessary.
- Complete the HWP.
- Not allow any hot work that cannot be supported by a HWP.
- Where a fire watch is not necessary, checking the area 30 minutes after the completion of the hot work to detect and extinguish smoldering fires.
- Keep a copy of the HWP in the project files for at least 30 days.

Person Performing Hot Work – The person performing the hot work is usually a contractor, but may be a D&B employee. This person must adhere to the following:

HOT WORK SAFETY GUIDELINES

- Obtain a HWP before starting hot work operations.
- Use all required PPE.
- Ensure that all equipment to be used is in proper working order.
- Cease hot work operations if an unsafe condition is detected.
- Have the HWP at the site during hot work operations.

Fire Watch – The Fire Watch is a person or team, whose responsibility is to watch for fires following the conclusion of hot work. Please refer to Attachment C for a Fire Watch Decision Tree. Fire Watch personnel are responsible for the following:

- Having fire extinguisher training.
- Having a Certificate of Fitness from the FDNY (when required) and being knowledgeable about the hot work procedure and the use of fire suppression equipment.
- Being familiar with the possible fire hazards in the area.
- Maintaining fire extinguishing equipment and using it when necessary.
- Stopping work if an unsafe condition occurs.
- Maintaining constant observation of the hot work activities and adjacent areas to detect the presence of fire or possible ignition sources.
- Remaining in the area at all times while hot work is in progress and for the designated period of time after work is completed (usually 30 minutes), to detect and extinguish any smoldering fires.

5.0 GUIDELINES

5.1 GENERAL

The following rules apply to hot work and the HWP:

- All hot work must be conducted according to this D&B SOP, unless the specific client has more stringent guidelines that it requires of its contractors.
- A task-specific hazard analysis must be created for each task requiring hot work and must be included in the site-specific HASP.
- A HWP is valid for up to 24 hours, and may not be renewed for more than seven (7) days.

5.2 Engineering and work practice controls

Engineering and work practice controls will be utilized to minimize or eliminate exposure to hazardous conditions for D&B employees. Hot work must performed in an area free of flammable and explosive materials. Hot work should be scheduled at a time when potentially dangerous processes are not in progress.

5.3 Other Considerations

In addition to fire and explosion hazards, other conditions may exist during hot work procedures. If hot work is conducted inside a confined space, confined space procedures must also be followed. Ventilation may be necessary, to purge the space of harmful gases and fumes. Gas cylinders must remain outside the space and secured. Air monitoring is mandatory, to determine if combustible atmospheres exist.

5.4 Prohibited activities

Hot work is prohibited in the following conditions:

- In unauthorized areas.
- In facilities requiring sprinklers, where the sprinklers are impaired or inoperable.
- In the presence of combustible atmospheres or a potential for combustible atmospheres.
- In proximity to large quantities of exposed, readily ignitable materials (e.g. baled paper, chemicals, cloth/rag storage, etc).
- On used drums, barrels, tanks or other containers until they have been cleaned thoroughly enough to ensure that there are no flammable materials present or substances such as grease, tar or acids or other materials which, when subjected to heat, might produce flammable toxic vapors.
- On hollow spaces, cavities or containers until they have been vented to permit the escape of air or gases. Purging with inert gas (such as nitrogen) is recommended.

6.0 TRAINING

Only those employees who have received training in this SOP will engage in hot work procedures. Only those who have received fire extinguisher training shall use a fire extinguisher.

HOT WORK SAFETY GUIDELINES

7.0 REFERENCES

- OSHA 29 CFR 1926.350-354.
- OSHA 29 CFR 1910.252-255.
- ANSI Z49.1-1967.
- RCNY Title 2 §25-01(2).
- NFPA 51B.

Appendix A – Hot Work Permit

D&B SOP No. C29

INSTRUCTIONS

Permit Authorizing Individual (PAI): Verify precautions listed at right (or do not perform the hot work). Complete this permit and retain for 30 days in job files.

Person performing work: Follow all safety precautions to prevent stray sparks and flames. Post this permit in the work area for the duration of the hot work.

Fire Watch: Prior to leaving area, perform final inspection, sign permit and notify PAI.

(Refer to checklist to determine if fire watch is needed.)

Permit Issue Date:
Location of Work:
Type of Hot Work to be performed (grinding, cutting, welding/burning, heating, brazing/soldering or other):
Description of work being performed and materials being worked on:
Fire watch required? (Refer to checklist) Yes ☐ No ☐

Time started: _____AM/PM

Time ended: _____AM/PM

I verify that the above location has been examined, the precautions checked on the checklist to the right, and permission is given to perform the work.

_____
Printed Name/Signature of PAI

_____
Printed Name/Signature of person performing work

The work area & all adjacent areas to which sparks & heat might have spread were inspected during the fire watch period and were found to be fire safe.

_____
Printed Name/Signature of fire watch

REVALIDATION

Date: _____ By: _____
Time Started: _____AM/PM
Time Ended: _____AM/PM

HOT WORK CHECKLIST

Yes		N/A
☐	Sprinklers and other fire suppression in service.	☐
☐	Hot Work equipment in good working order.	☐
☐	Multi-purpose fire extinguisher available.	☐
☐	Person performing HW has Certificate of Fitness from FDNY (if in 5 boroughs).	☐

REQUIREMENTS WITHIN 35 FEET OF WORK

☐	Dust, lint, debris, flammable liquids and oily materials removed and floors swept clean.	☐
☐	Flammable materials covered if not removable.	☐
☐	Explosive atmosphere eliminated.	☐
☐	Flammable vapor sources removed or tested and below LEL.	☐
☐	Combustible floors (wood, tile, carpeting, etc.) properly wetted, covered with damp sand or fire blankets.	☐
☐	Combustible walls/ceilings/partitions/roofing properly shielded.	☐
☐	Lower levels (work/pedestrian access) shielded.	☐

WORK ON WALLS OR CEILINGS

☐	Combustibles have been removed from adjacent walls	☐
☐	Danger from conduction of heat to adjacent rooms eliminated.	☐

WORK IN CONFINED SPACES

☐	Space cleaned of all combustible materials.	☐
☐	Containers purged of flammable liquids/vapors.	☐

FIRE WATCH/AREA MONITORING

☐	Required for: (1) combustibles within 35'; (2) combustibles >35' but easily ignitable; (3) wall/floor openings that expose adjacent/ Concealed combustibles; (4) conduction through metal that can ignite other side; (5) potential for more than minor fire; and (6) all use of torches.	☐
☐	Provided for 30 minutes after work completed.	☐
☐	Fire watch has operational multi-purpose fire extinguisher available.	☐
☐	Fire watch trained in use of fire extinguisher.	☐

OTHER PRECAUTIONS

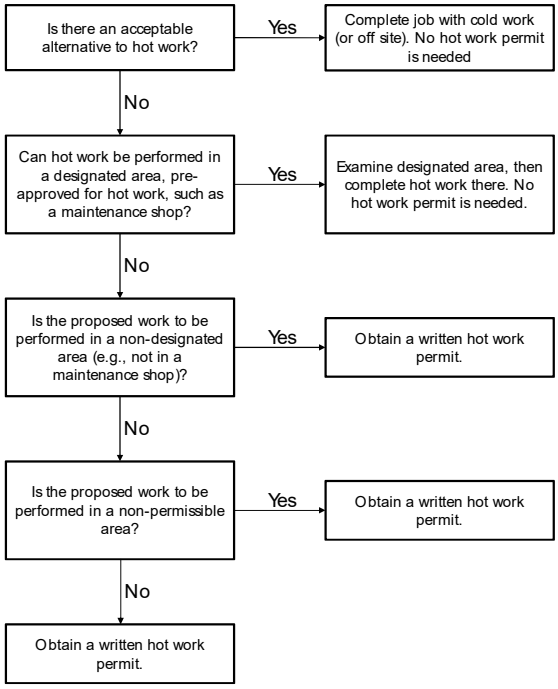
☐	Ample ventilation exists or provisions made to remove smoke/vapor from work area.	☐
☐	If applicable, proper LOTO or confined space procedures are followed.	☐
☐	Proper PPE is worn by those performing work as determined by JHA.	☐

(for hot work continuing beyond one day)

Date: _____ By: _____
Time Started: _____AM/PM
Time Ended: _____AM/PM

Appendix B – Hot Work Decision Tree
D&B SOP No. C29

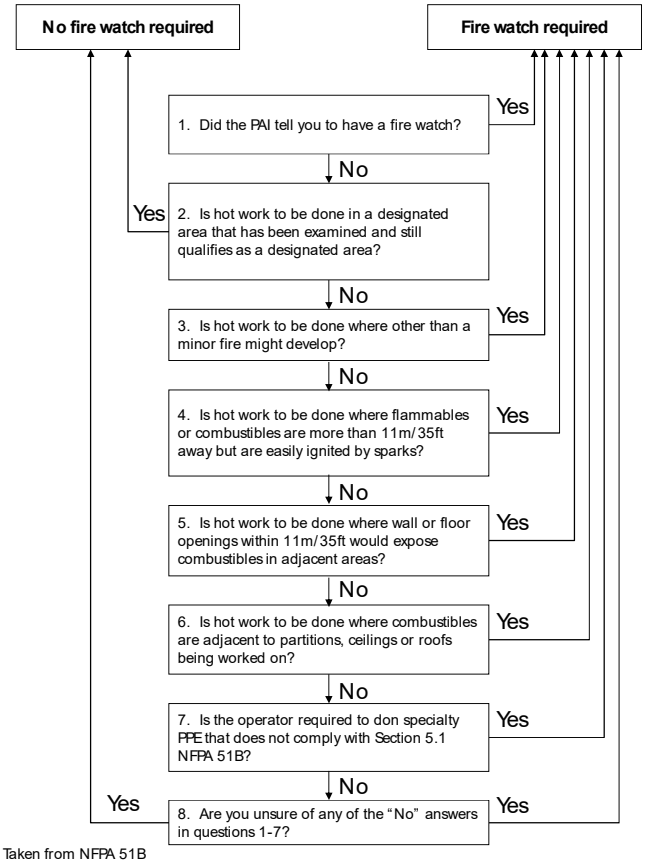
APPENDIX B – HOT WORK DECISION TREE



Taken fro NFPA 51B

Appendix C – Fire Watch Decision Tree
D&B SOP No. C29

APPENDIX C – FIRE WATCH DECISION TREE



Taken from NFPA 51B

♦0020\NN08271403_NO. C29

FIRE SAFETY GUIDELINES

Table of Contents

1.0 PURPOSE

To provide guidelines to D&B personnel in preventing fires in their office/field workplaces, and what to do in case of fire. Also reference applicable portions of SOP 29 (Hot Work Safety Guidelines).

2.0 SCOPE

These guidelines apply to all D&B personnel in preventing and reporting fires, in the office or at job sites.

FIRE SAFETY GUIDELINES

3.0 DEFINITIONS

Class A Fire Extinguishers – Are for fires associated with wood, paper, rags, cloth or trash. Contents: water, water base, foam and loaded stream or multipurpose dry chemical.

Class B Fire Extinguishers – Are for fires associated with oil, gasoline, paint, solvents or grease. Contents: carbon dioxide, foam or dry chemicals.

Class C Fire Extinguishers – Are for electrical fires. Contents: Carbon dioxide or dry chemical. Note: Never use water for electrical fires.

HSR – Health and Safety Representative

Incipient - In an initial stage; beginning to happen or develop. An incipient fire is one that just started or may be starting.

OSHA – Occupational Safety and Health Administration.

SDS – Safety Data Sheet (formerly MSDS – Materials Safety Data Sheet).

4.0 RESPONSIBILITIES

Health and Safety Officer (HSO) - The HSO has overall responsibility for the Fire Safety Program.

D&B Employees - All D&B employees will adhere to the provisions of this program.

5.0 GUIDELINES

FIRE SAFETY GUIDELINES

5.1 General

The following rules apply to fire safety:

5.1.1 Office

- All D&B employees should know the escape routes and locations of fire exits. See maps for Woodbury and White Plains in Appendix A.
- All exits must be unobstructed, unlocked and marked.
- Fire extinguishers are inspected at least annually to ensure that they are adequately charged and facilities inspected to identify and eliminate fire hazards. Fire extinguisher locations should be properly marked. See Appendix A for locations of extinguishers.
- Smoking is not permitted inside office locations.

5.1.2 Job Sites

- Turn off vehicles/equipment when refueling. Allow time for engine to cool. Move at least 25 feet from refueling site before restarting portable tools/equipment with gasoline engines.
- No smoking/open flames permitted in refueling areas.
- No smoking is permitted near the use and storage of flammable/combustible chemicals/substances, including gasoline, benzene, paper or compressed gases such as oxygen and acetylene.
- Use only approved marked safety containers for storing and transporting flammable materials.

FIRE SAFETY GUIDELINES

- Allow space for fuel expansion in fuel tanks and containers.
- Employees should know the location of and how to use fire extinguishers. This information should be discussed as part of the daily safety tailgate meetings prior to the start of work.
- Fire extinguishers will be readily available wherever flammable chemicals are used or stored.

5.2 Evacuation Plans

All work sites, whether an office or job site, should have an evacuation plan. The plan should identify escape routes out of the site and muster points. Drills should be held as necessary.

5.3 Fire Extinguishers – Inspection/Maintenance

D&B facilities generally use Combination ABC fire extinguishers. Working and maintained fire extinguishers, which meet applicable regulations, should be accessible at D&B's offices and various job sites. They will be visually inspected monthly by D&B's HSO or designee and an annual maintenance check by D&B's.

5.4 In Case of Fire

In the event of a fire, call 911 immediately and try to utilize the proper fire extinguisher to put out the fire if it is safe to do so. If not, alert all personnel in the facility and evacuation should take place.

FIRE SAFETY GUIDELINES

6.0 TRAINING

D&B employees will receive training on the evacuation procedures at their work location as necessary. Fire extinguisher training will be provided at initial start of the project and annually thereafter. Training will include fire extinguisher use and incipient firefighting (including hazards).

7.0 REFERENCES

- OSHA 29 CFR 1910.150.
- OSHA 29 CFR 1910.157.
- OSHA 29 CFR 1910 1910.35-39.
- OSHA 29 CFR 1926.150.

Appendix A – EXITS & FIRE EXTINGUISHER MAPS FOR WOODBURY & WHITE PLAINS
D&B SOP No. C30

APPENDIX A – EXITS & FIRE EXTINGUISHER MAPS FOR WOODBURY & WHITE PLAINS

STRYKER DES
Demolition & Environmental Services

Site Specific Health & Safety Plan

For

Global Foundries
Hopewell Junction, NY

Selective Demolition - Building 320B

June 3, 2020

Stryker Demolition & Environmental Services, LLC
992 Old Eagle School Road – Suite 910
Wayne, PA 19087

1.0 INTRODUCTION

Stryker Demolition & Environmental Services, LLC (Stryker DES) has developed this Site-Specific Health and Safety Plan (SSHASP) for the work being performed at the GlobalFoundries Fab 10 Plant in Hopewell Junction, NY. The Scope of Work for this project includes the saw cutting and removal of concrete flooring and trenches in GlobalFoundries Building 320B.

The intent of this plan is to provide the minimum safety requirements and general procedures to be met by Stryker DES personnel. All Stryker DES personnel will follow all applicable Federal/State rules and regulations including but not limited to:

- NY ICR 56 New York Asbestos Code Rule 56
- 29 CFR 1910 Lockout/Tagout
- 29 CFR 1926.1153 Respirable Crystalline Silica
- 1926 Subpart E PPE and Life Saving Equipment
- 1926 Subpart G Signs Signals and Barricades
- 1926 Subpart J Welding & Cutting
- 1926 Subpart K Electrical
- 1926 Subpart M Fall Protection
- 1926 Subpart T Demolition
- 1926 Subpart X Ladders

Applicable Stryker DES Standard Operating Procedures including but are not limited to:

- 7-2 Hazard Communication Program
- 7-1 Respiratory Protection Program
- 9-1 Medical Surveillance Guidelines
- 8-1 Lockout/Tag-out Policy
- 7-4 Heat Stress Program
- 8-15 Fall Protection Program
- 8-19 Powered Aerial Work Platforms
- 8-16 Powered Industrial Trucks (Forklifts)
- 10-5 Crystalline Silica Guidelines

In the event of conflicting procedures, personnel will follow the more stringent and those, which afford the highest protection.

The health and safety of the public and site personnel and the protection of the environment will take precedence over cost and schedule considerations for all project work. Stryker DES will self-perform all aspects of the implementation of this Health & Safety Plan.

2.0 ORGANIZATIONAL STRUCTURE

This Section of the Health & Safety Plan (HASP) describes lines of authority, responsibility and communication for health & safety at this site. This section also identifies other contractors and

subcontractors involved in work operations. The organizational structure of this HASP is consistent with requirements in 29 CFR 1926.1101.

2.1 Roles & responsibilities

All personnel and visitors to this site must comply with the requirements of this HASP. The specific responsibilities and authority of management, safety and health, and other personnel on the site are detailed below. ALL workers and visitors have the authority to stop any work being performed on the site.

2.1.1 Project Manager

The Project Manager has responsibility and authority to direct all work operations. The PM is responsible for ensuring that the project is properly executed with respect to schedule and customer satisfaction. The PM coordinates safety and health functions with the site Safety and Health Officer (SSHO), has the authority to oversee and monitor the performance of the SSHO and bears ultimate responsibility for the proper implementation of this HASP. He coordinates between office, field personnel, and subcontractors, as well as manages the administrative requirements of both the HASP and Work Plan. The specific duties of the PM are:

- preparing and coordinating the site work plan
- providing site supervisor(s) with work assignments and overseeing their performance
- coordinating safety and health efforts with the SSHO
- ensuring effective emergency response through coordination with the Emergency Response Coordinator (ERC)
- serving as primary site liaison with public agencies and officials and site contractors.

2.1.2 Site Safety and Health Officer

The SSHO has full responsibility and authority to develop and implement this HASP and to verify compliance. The SSHO reports to the Project Manager. The SSHO is on site and readily accessible to the site during all work operations and has the authority to halt site work if unsafe conditions are detected. The SSHO will establish operating standards in conjunction with the Stryker DES Project Manager to coordinate safety and health activities for the work site. The SSHO will review project plans and revisions to assure that safety and health procedures are incorporated through all of the work phases.

The specific responsibilities of the SSHO are:

- assuring that a complete copy of the HASP is at the site prior to the start of work activities and that all workers are familiar with it.

- conducting on-site health and safety training and briefing sessions.
- ensuring the availability, use, prior maintenance and decontamination of personal protective equipment and other safety or health equipment.
- maintaining a high level of safety awareness among workers and communicating pertinent safety and health matters to them promptly.
- assuring that all activities are performed in a manner consistent with the Stryker DES standard operating procedures and the HASP.
- monitoring for dangerous conditions during field activities.
- initiating immediate corrective actions in the event of an emergency or unsafe condition.
- promptly notifying the Project Manager of any emergency, unsafe condition, problem encountered or needed exception to this HASP.
- recommending improvements in safety and health measurements as may be appropriate.
- conducting safety and health performance and system audits.

The SSHO has the authority to:

- suspend activities or otherwise limit exposures if the health or safety of any person appears to be endangered.
- implement corrective action to ensure work practices that are properly protective of personnel and the environment.
- suspend an individual from work for violation of the requirements of this HASP or Stryker DES Procedures.

2.1.3 Emergency Response Coordinator

The Emergency Response Coordinator (ERC) is responsible for assessing site conditions and detecting and controlling emergency response activities and personnel in accordance with the site Emergency Response Plan. The ERC reports to the Project Manager. The ERC will ensure the evacuation, emergency transport, and treatment of site personnel and will notify the appropriate emergency response personnel and management staff in accordance to the emergency response plan of the HASP. Specific ERC duties include:

- developing and reviewing the emergency response plan
- conducting emergency response drills
- coordinating emergency response functions with the SSHO
- ensuring effective emergency response
- ensuring effective evacuation
- integrating emergency response plans with local, state and federal response agencies

2.1.4 Site Supervisor

The Site Supervisor is responsible for field operations and reports to the project manager (PM). The Site Supervisor is responsible for all Stryker DES field activities, ensures the implementation of this HASP and Stryker DES SOP's in the field and serves as primary site contact with the Client. The specific responsibilities of the Site Supervisor are:

- Executing the work plan
- Coordinating with the SSHO on safety and health
- Ensuring site work complies with the requirements of this HASP
- Ensuring site work complies with Stryker DES SOP's

TABLE 2-1 KEY STRYKER PERSONNEL

Job Function	Name	Telephone	Cell
Sr. Project Manager	Ralph Rutland	484-581-7428	225-305-8880
Site Supervisor	Chris White	484-581-7428	267-887-1279
SSHO	Chris White	484-581-7428	267-887-1279
ERC	Ralph Rutland	484-581-7428	225-305-8880

3.0 SITE CHARACTERIZATION AND JOB SAFETY ANALYSIS

3.1 Site Description

The project consists of the controlled selective removal on concrete flooring and trenches in Building 320B.

The removal project includes:

- Saw cutting of concrete floor and trenches
- Removal utilizing electric mobile equipment
- Small exploratory excavation

3.2 Job Safety Analysis

Job Safety Analysis will be conducted on each specific job task and used in employee training. The applicable JSA will be reviewed and updated, if needed, each day before work begins during the morning safety briefing. The following sections address known job hazards.

3.2.1 Silica

Crystalline Silica is found is a basic component of soil, sand, granite, and many other

minerals. Respirable crystalline silica will be generated while saw cutting any concrete material including the floor and trenches. The primary route of exposure is inhalation. Signs and symptoms of exposure may include eye and upper respiratory irritation and shortness of breath (dyspnea), weakness and weight loss. Repeated exposure may result in Silicosis. Inhalation of silica dust causes the formation of scar tissue reducing the lungs ability to take in oxygen.

3.2.2 Nuisance Total & Respirable Dust

Respirable and Total Dust will be generated during the demolition phases of this project. OSHA's Permissible exposure limit (general industry) for nuisance dust is 15 mg/m^3 for total dust and 5 mg/m^3 for respirable dust. ACGIH's TLV for nuisance dust is 10 mg/m^3 for total dust and 3 mg/m^3 for respirable dust.

3.2.3 Slips and Falls

Slip and fall hazards exist during demolition phases due to slippery surfaces caused by the dust suppression methods.

3.2.4 Electrical Hazards

Electrical hazards may be encountered due to the use of electric powered mobile equipment and hand tools on site.

3.2.5 Noise

Excessive noise may be present due to the use of power tools and concrete saws.

3.2.6 Confined Space

Confined spaces include, but are not limited to such items as vaults, excavations, dust collectors, manholes, bins, containments, boilers, pits, catch basins, tanks, silos or tunnels. When in doubt, contact your safety officer so that a field determination can be made by qualified safety personnel. Stryker DES management will inquire as to the method of identification that is being used by GlobalFoundries at the Fab 10 facility.

3.2.7 Elevated Work

Falls while performing elevated work can result in severe injury and possible death.

3.2.8 Aerial/Scissor Lifts

The hazards associated with aerial/scissor lifts are: falls, electrocution, tip over, struck by and struck against and caught between. Employees will use scissor lifts to install/remove the dust containment in the work area.

3.2.9 Ladders

Improper use of ladders can lead to falls which may result in injury or and possible death.

3.2.10 Fire Hazards

Fire hazards may exist when Hot Work is being performed.

3.3 Hazard Control

3.3.1 Silica

Silica hazards will be controlled by following Stryker DES's Crystalline Silica Guidelines in section 10-5 of the Corporate Health and Safety Program. Employees will comply with the engineering and respiratory protection requirements outlines in Table 1 of OSHA's Silica Standard.

3.3.2 Slips and Falls

Slip and fall hazards will be addressed during job hazard analysis and tailgate training. Keep all work areas clean and orderly.

3.3.3 Electrical Hazards

Electrical hazards will be controlled by following Stryker DES's Lockout Procedure. All electrical piping must be air-gapped and tested prior to demolition.

3.3.4 Noise

Noise hazards will be abated by the use of hearing protection as necessary. Noise levels in work area will be tested with sound level meters on a frequent basis.

3.3.5 Confined Space

Whenever possible, management should investigate the possibility of doing the work outside the confined space to avoid exposing Stryker DES employees to the hazards inherent in confined space entry. All Stryker DES employees required to enter confined spaces shall be instructed as to the nature of the hazards involved, the necessary precautions to be taken, and in the use of protective and emergency equipment required. At least one Stryker DES competent person for confined space entry must be present at all times to identify and notify workers of any potential confined space hazards.

3.3.6 Elevated Work

The hazards of elevated work will be controlled by the use of fall protection. Fall protection will be worn for all work above 6 feet. All Stryker DES employees are training in fall protection and identification of fall hazards. A Stryker DES competent person for fall protection must be onsite at all times.

3.3.7 Aerial Lifts

The hazards associated with aerial/scissor lifts will be address through training and the use of a personal fall arrest system whenever on an aerial or scissor lift. Any employee

operating any lift must be trained/certified.

3.3.8 Ladder Hazards

Ladder Hazards will be controlled by following OSHA regulations and Stryker DES's SOP for the use of ladders.

3.3.9 Fire Hazards

Fire hazards will be controlled by following Stryker DES's Hot Work Procedure. All employees performing hot work must be trained by Stryker DES in hot work procedures.

3.3.10 Construction/Demolition Job Site Hazards

Job Sites hazards will be addresses during daily toolbox training. Demolition will be performed in Compliance with 29CFR 1926.850 and all applicable OSHA regulations and Stryker DES SOP's.

3.4 Employee Notification of Hazards

The information contained in this section will be presented during HASP training for all employees who could be affected by it prior to the time they begin their work activities. Modifications to this information are communicated during daily safety meetings.

Consistent with OSHA's Hazard Communication standard, we also inform other contractors and subcontractors about the nature and level of hazardous substances at this site, and likely degree of exposure to workers who participate in site operations. The SSHO is responsible for providing site characterization information, this HASP, and modifications to it to other contractors and subcontractors working on this site.

4.0 SITE CONTROL

Site control is designed to reduce the spread of hazardous materials from contaminated areas to clean areas, to identify and isolate contaminated areas of the site, to facilitate emergency evacuation and medical care, to prevent unauthorized entry to the site, and to deter vandalism and theft. The site control program includes the elements specified in 29CFR 1926.1101(g). The SSHO and Site Supervisor are responsible for evaluating site conditions and for verifying that the site control program functions effectively. The site control program is updated regularly to reflect current site conditions, work operations and procedures.

4.1 Site Access

Access to the work area is restricted to reduce the potential for exposure to its safety and health hazards. Entry and exit is monitored by the SSHO and/or the Site Supervisor.

Visitors to the site register with the site supervisor, be briefed on site hazards, review and sign the JSA, and be escorted at all times. Visitors are expected to comply with the requirements of

this HASP. Visitors who want to enter contaminated areas of the site must provide documentation that they have the required training and medical evaluation and must receive a site-specific briefing about protecting themselves from site hazards, recognizing site zones demarcations, and following emergency evacuation procedures prior to entry. PPE for visitors is provided by the SSHO and/or the Site Supervisor.

4.2 Site Security

Security at this site is maintained during both working hours and non-working hours to prevent unauthorized entry; removal of contaminated material from the Regulated Area; exposure of unauthorized, unprotected people to site hazards; and increased hazards due to vandalism and theft.

GlobalFoundries is responsible for general site security. Security is maintained to ensure only authorized entrants access the site by Stryker DES's SSHO and/or Site Supervisor. Their duties include limiting access to the site to authorized personnel, oversight of the project equipment and materials.

4.3 Site Work Zones

The site is divided into two (2) well-delineated zones. These zones are characterized by the presence or absence of hazards and the activities performed within them. Zones include a demolition area marked with a boundary of red danger tape, and a support zone outside of the red danger tape. Zone boundaries are clearly marked at all times and the flow of personnel between zones is controlled. The site is monitored for changing conditions that may warrant adjustment of zone boundaries. Zone boundaries are adjusted as necessary to protect personnel and clean areas. Whenever boundaries are adjusted, zone markings are changed and workers are immediately notified of the change.

4.4 Buddy System

While working in the Regulated Area, site workers use the buddy system. The buddy system means that personnel work in pairs and stay in close visual contact to be able to observe one another and summon rapid assistance in case of an emergency. The responsibilities of workers using the buddy system include:

- remaining in close visual contact with partner,
- providing partner with assistance as needed or requested,
- observing partner for signs of heat stress or other difficulties,
- periodically checking the integrity of partner's PPE, and
- notifying the supervisor or other site personnel if emergency assistance is needed.

4.5 Site Communications

The following communication equipment is used to support on-site communications:

Mobile Phones/Two-Way Radios
The Project Manager, the Site Supervisor, decon personnel, spotters and each entry team will

carry two-way radios or mobile phones.

Emergency Contact Info
Emergency Contact information will be posted in the job site trailer and at the entry point in the Support Zone.

Other Communication Equipment
Air horns will be located in the Support Zone to be used as emergency notification.

Site personnel are trained to recognize and use hand signals when visual contact is possible but noise or PPE inhibit voice communication. These hand signals are listed below in Table 4-1.

TABLE 4-1 SITE COMMUNICATION – HAND SIGNALS

Signal	Meaning
Hand gripping throat	Out of air, can't breathe
Grip partner's wrist of both hands around waist	Leave area immediately
Hands on top of head	Need assistance
Thumbs up	OK; I am all right; I understand
Thumbs down	No; negative

5.0 TRAINING PROGRAM

The site-training program is designed to ensure that workers receive the training they need to work safely. Site safety and health training requirements are based on the job hazard assessments contained in Section 3.0 of this HASP and relevant OSHA regulations. At this site the SSHO oversees the implementation of this training program and is responsible for ensuring that employees are adequately and currently trained for all tasks they are asked to perform. Employees who have not been trained to a level required by their job function and responsibility are not permitted to participate in or supervise field activities.

- initial training for site workers & supervisors
- exceptions to initial training requirements
- site briefings for visitors and workers
- refresher training
- qualification of trainers
- training certification
- emergency response training

5.1 Initial Training for Site Workers and Supervisors

Personnel at this site have successfully completed a Stryker DES safety training and Whiting

Turner / Global Foundries site orientation.

5.2 Qualification of Trainers

Qualified instructors have either completed a training program for the subjects they are expected to teach, or have the academic credentials and instructional experience necessary for teaching these subjects.

5.3 Training Certification

This site maintains written certification of the successful completion of applicable training requirements for all personnel. Training records are maintained up-to-date and are retained onsite at the site office. Employees and supervisors receive a written certificate when they complete necessary training and field experience. Any person who has not been so certified or who does not meet the requirements of equivalent training is prohibited from engaging in the clean-up operations on this site.

5.4 Exceptions to Initial Training

All employees at this site have training consistent with what is described in Section 5.1. There are no exceptions.

5.5 Site-Specific Briefings for Visitors and Workers

A site-specific briefing is provided to all individuals, including site visitors, who enter the site beyond the initial point of access, located at the site office in the Support Zone.

5.5.1 Visitors

For visitors, the site-specific briefing provides information about site hazards, use of PPE, the site lay-out including work zones and places of refuge, the emergency alarm system and emergency evacuation procedures, and other pertinent safety and health requirements as appropriate. Visitors must also be briefed on and sign any applicable JSA.

5.5.2 Workers

Site-specific information shall be provided to each employee before beginning work on the site. Personnel will be briefed by the SSHO as to the site-specific potential hazards to be encountered. Topics will include:

- Availability of this HASP.
- Stop Work Authority.
- Site specific standard operating procedures and applicable JSA.
- Selection, use, testing and care of the personal protective equipment to be worn, with the limitations of each.
- General site hazards and physical hazards in the work areas including review of the SDS's for all hazardous substances

- Work practices by which the employee can minimize risks from these potential hazards.
- Delineation between work zones and their significance.
- Review on-site communications and appropriate hand signals between personnel working in the Demolition Zone and the Support Zone.
- Use of the buddy system.
- Discussion and recognition of symptoms associated with exposure to hazards.
- Decontamination procedures for personnel, their personal protective equipment and other equipment used on the site according to the site-specific decontamination zones as outlined in Section 10.
- Site specific Lockout / Tagout procedures – if applicable.
- Emergency response procedures and requirements as outlined in Section 11.
- Emergency alarm systems and other forms of notification and evacuation routes to be followed and rally points.
- Methods to obtain emergency assistance and medical attention.
- Location of SDS Book, first aid kit, eye wash and fire extinguishers on site.

Documentation of this Stryker DES personnel training, as well as medical monitoring records will be maintained on-site by the SSHO and will be made available to Whiting Turner / GlobalFoundries.

Project Supervisors will complete the Stryker DES Daily JSA form and review with all site personnel on a daily basis at the morning pre-work safety meeting.

5.6 Additional Training

All Workers will be trained in aerial lift/scissor lift safety, fall protection, respiratory protection, hazard communication, lead awareness and any other OSHA regulations requiring training for work at this site.

5.7 Emergency Response Training

Emergency response training is addressed in Section 11 of this HASP.

6.0 MEDICAL SURVEILLANCE

The medical surveillance section of the HASP describes how worker health status is monitored at this site. Medical surveillance is used when there is the potential for worker exposure to harmful levels of hazardous substances. The purpose of a medical surveillance program is to medically monitor worker health to ensure that personnel are not adversely affected by site hazards. The provisions for medical surveillance at this site are based on the site characterization and job hazard analysis found in Section 3 of this HASP. They are consistent with OSHA training requirements in 29 CFR 1910.134 and 1926.1101

6.1 Site Medical Surveillance Program

All personnel who enter regulated areas of this site are covered by Stryker DES's medical

surveillance program. In addition, all workers assigned to tasks requiring the use of respirators receive medical evaluations in accordance with 29 CFR 1910.134(e) to ensure they are physically capable to perform the work and use the equipment.

Personnel within the medical surveillance program receive medical examinations on the following schedule:

- Prior to assignment: personnel covered by the medical surveillance program are medically examined prior to commencing work in contaminated areas of the site.
- On an annual basis: personnel within the medical surveillance program receive medical exams at least every 12 months to provide for ongoing assessment of a worker's health
- At termination or reassignment: personnel are offered the opportunity for a medical examination upon their termination of employment or reassignment to work where the worker is not exposed to hazardous materials or required to wear a respirator
- Post-injury/illness: any worker who is injured, becomes ill, or develops signs or symptoms of possible over-exposure to hazardous substances or health hazards, receives a medical examination as soon as possible after the occurrence, with follow-up examinations provided as required by the attending physician.
- All medical examinations and procedures are performed by or under the supervision of a licensed physician and are provided to workers free of cost, without loss of pay, and at a reasonable time and place.

6.2 Medical Recordkeeping

Corporate medical recordkeeping procedures are consistent with the requirements of 29 CFR 29 CFR 1910.134 and are described in the company's overall safety and health program. A copy of that program is available at the Stryker DES site office.

6.3 Program Review

The medical program is reviewed annually to ensure its effectiveness. Gregory Klotzbach, Corporate EHS Manager, is responsible for this review. At a minimum this review consists of:

- review of accident and injury records and medical records to determine whether the causes of accidents and illness are promptly investigated and whether corrective measures are taken wherever possible,
- evaluation of the appropriateness of required medical tests on the basis of site exposures, and
- review of emergency treatment procedures and emergency contacts list to ensure they are site-specific, effective, and current.

7.0 PERSONEL PROTECTIVE EQUIPMENT

This is the site Personal Protective Equipment (PPE) program. This Section of the HASP describes how PPE is selected and used to protect workers from exposure to hazardous substances and hazardous conditions on this site. Exposure hazards from the demolition process, potential fire hazard, and physical

hazards associated with equipment use and site conditions are considered. The SSHO has overall responsibility for implementing the PPE program on site.

7.1 PPE Selection Criteria

PPE selection is based on the hazards present at the site. PPE ensembles for each activity can be found in Table 7-1.

The SSHO has the authority to upgrade or downgrade PPE to respond to changing site conditions and to protect worker health and safety. Routine evaluation of the PPE program is conducted.

7.2 PPE Usage

Site-specific PPE ensembles and materials are identified below in Table 7.1 are used in accordance with manufacturers' recommendations, and in conjunction with Stryker DES, Standard Operating Procedures**.** The SSHO identifies task-specific work duration based on the following:

- physiological requirements of the task
- PPE level for the task
- ambient temperature and humidity
- respiratory protection capacity (air supply or cartridge change requirements)
- chemical protective clothing capacity (permeation rate of on-site materials), and
- acclimatization of the work force to site and task conditions.

The SSHO will communicate the task-specific work duration during daily pre-entry briefings.

7.3 Training

Employees receive general training regarding proper selection, use and inspection of PPE during initial training (or equivalent) and subsequent refresher training. Site-specific PPE requirements, including task specific PPE, ensemble components, and inspection procedures are communicated as identified in Section 7 and STRYKER DES SOP's. Section 5; Training, and Appendix C; Standard Operating Procedures, may include additional information regarding PPE training requirements.

7.4 Fall Protection

Fall protection consisting of a full-body harness with attachment D-ring at center back attached to a self-retractable lifeline attached to an attachment point that complies with OSHA regulations shall be worn at all times for work above 6 feet and when on aerial lifts and scissor lifts.

7.5 Respiratory Protection

Stryker DES has a respiratory protection program and policy, which will be followed in all work activities at this site. Stryker DES's Standard Operating Procedures are compliant with the recently revised 29 CFR 1910.134. Stryker DES's respiratory protection program consists of the following:

- Stryker DES personnel required to wear respiratory protection will have an assigned respirator face piece

- Stryker DES employees have been trained utilizing the designated PPE.

- All Stryker DES personnel will have been fit tested and qualified in the use of the appropriate respirator within the past 12 months.

- All Stryker DES personnel must, within the past year, be medically certified as being capable of wearing a respirator. Documentation of the medical certification must be provided to the field coordinator prior to commencement of work activities

- Only properly cleaned, maintained, NIOSH approved respirators are to be used in the work zones

- Contact lenses (soft or hard) are not to be worn when a respirator is being used

- All site personnel will be clean-shaven in the area of the face to respirator face piece seal.

- Respirators will be inspected and a positive/negative pressure test will be performed prior to each use

- After each use, the respirator will be wiped with a disinfectant cleansing wipe

- When used, the respirator will be thoroughly cleaned at the end of the work shift and will be stored in a clean plastic bag.

- Documentation of fit testing must be provided to the field coordinator prior to the commencement of site activities.

- All respiratory equipment will be sanitized throughout the duration of the project.

7.5.1 Other

Respiratory protection for all other contaminates will be chosen according to 1910.134 and the NISOH decision Logic.

7.6 Hearing Conservation

Consistent with 1910.95, hearing protection is required when noise exposures equal or exceed an 8-hour time-weighted average sound level of 85 dBA. The OSHA Permissible Exposure Limit for noise is 90 dBA, 8-hr TWA. Where noise exposure meets or exceeds this level, noise is listed as a physical hazard in the job hazard analysis for the tasks/operation, and hearing protection is included as one of the control measures (PPE).
Hearing protection is also required for any employees who have not yet had a baseline

audiogram or who have experienced a standard threshold shift and are exposed to an 8-hour time weighted average sound level $\geq$ 85 dBA.
Employees exposed to an 8-hr TWA sound level $\geq$ 85 dBA participate in a Hearing Conservation Program.

7.7 PPE Maintenance & Storage

In order to ensure that PPE continues to provide the anticipated protection, this site uses specific procedures for PPE inspection, cleaning, maintenance, and storage. At this site PPE will be maintained in sealed storage containers. Adherence to these procedures is tracked with written inspection records. The Site Supervisor is responsible for overseeing PPE maintenance & storage procedures and for maintaining the inspection record. Defective or damaged equipment is not used and is reported to the Site Supervisor so that the equipment can be repaired or discarded. Spent and disposable PPE is discarded in the manner specified in Section 10 on Decontamination. After decontamination, reusable PPE is properly stored, according to the manufacturers' recommendations and the site decontamination plan mentioned above and in HASP Section 12, Standard Operating Procedures.

7.8 Evaluation of PPE Program

Assessment of PPE performance occurs throughout site activities in response to air monitoring data collected. Modifications to initially selected PPE are determined by the SSHO and affected employees are informed immediately. Section 3 of the HASP, Job Hazard Analysis, is with updated information about job hazards and selected controls.

TABLE 7-1 REQUIRED PPE

Activity	Level	Ensemble Description
Mobilization	D	Work clothes, safety glasses, hard hat; work gloves, safety boots, reflective vest, facemask (COVID-19)
Set-up & Site Training	D	Work clothes, safety glasses, hard hat; work gloves, safety boots, reflective vest, facemask (COVID-19)
Demolition	C	Work clothes, Tyvek coveralls with booties or equivalent; initial PAPR use, & ½ face respirator equipped with combination acid gas and vapor cartridge with P100 HEPA filter, if required, safety glasses, hard hat, work gloves, safety boots, reflective vest
Clean-up	D	Work clothes, safety glasses, hard hat, work gloves, safety boots, facemask (COVID-19)
Demobilization	D	Work clothes, safety glasses, hard hat; work gloves, safety boots, facemask (COVID-19)

8.0 SITE SAFETY

Stryker DES SOP'S will be adhered to at all times while on the site. Any employee violating the conditions of this HASP or Stryker DES SOP's will be asked to leave the site.

8.1 General Site Safety Practices

The following practices will be observed during all work activities:

- Site Supervisors will complete the Stryker DES Daily JSA form and review with all site personnel during the daily safety meeting held each day before work begins. The planned task for the day along with the applicable activity hazard analysis will be reviewed and revised if necessary.
- At least one copy of this HASP shall be available at the project area, in a location readily available to all personnel, including visitors.
- Site Specific SDS Book will be located in the Stryker DES site office.
- Contaminated protective equipment, such as respirators, hoses, boots, etc. shall not be removed from the area of potential contamination until it has been cleaned or properly packaged and labeled.
- Legible and understandable precautionary labels which comply with the hazard communication standard shall be affixed prominently to all containers of contaminated scrap, waste, debris, and clothing.
- Removal of contaminated solids from protective clothing or equipment by blowing, shaking, or any other means that disperses contaminants into the air is prohibited.
- No food or beverage shall be present or consumed in the project area.
- No tobacco products shall be present or used in the project area.
- Designated smoking areas will be identified with signage, sealed ash tray/butt cans and a fire extinguish
- Emergency equipment shall be located outside storage areas in readily accessible locations that will remain minimally contaminated in an emergency.
- All crew personnel in the work zone shall use the "buddy system" (working in pairs or team teams). If protective equipment or noise levels impair communication, then prearranged hand signals shall be used. Visual contact shall be maintained between crewmembers at all times and crewmembers must observe each other for signs of fatigue, heat stress, and symptoms of exposure to hazards identified in section 3.

8.2 COVID-19 Prevention

Stryker DES is following the guidance of global health experts at the World Health Organization

(WHO) and U.S. Centers for Disease Control (CDC) on preventing the spread of the COVID-19 virus.
At job sites and offices around the country, Stryker DES has implemented the following work practices to help prevent the spread of the virus:

- Educating employees on the commonly reported symptoms of the virus, including fever, dry cough, and shortness of breath.
- Actively encouraging employees with any symptoms to stay home.
- Separating sick employees that arrive to work and sending immediately home.
- Avoiding personal contacts and greetings (e.g.: shaking hands, hugging, etc.)
- Emphasizing respiratory etiquette and hand hygiene by all employees, including:
- Instructing employees to clean their hands often by washing their hands with soap and water for at least 20 seconds, or with at least 60% alcohol-based hand sanitizer if soap and water are not available.
- Instructing employees to cough or sneeze into tissues or their upper sleeve (not their hands), if they do not have a tissue.
- Performing routine cleaning and disinfecting of all frequently touched surfaces in the workplace, including desks, countertops, doorknobs, hand tools, power tools, and heavy equipment.
- Limiting safety meeting size to ensure that all participating employees can remain at least 6 ft apart from each other.
- Encouraging employees to limit any non-essential trips when not working.

8.3 Stop Work Authority

All personnel shall have the right, obligation, authority and responsibility to suspend/stop/or refuse to perform work that is perceived as being unsafe, or could result in injury to coworkers, damage to equipment, damage to property or may lead to an environmental release or excursion without fear of reprisal by management or coworkers.

Stryker DES managers and supervisors are to communicate Stop Work Authority expectation at the site kick-off meetings and at safety orientation meetings.

Stop work events shall be reported to on-site Whiting Turner / GlobalFoundries management in real time when possible and communicated through the chain of command appropriately. Upper management and client involvement maybe required to develop solutions during high-risk stop work situations.

8.4 Personal Hygiene

All personnel performing or supervising work activities within potentially contaminated work areas, or exposed or subject to exposure to potentially contaminated materials, shall observe and adhere to the personal hygiene-related provisions of this section. A sufficient quantity of potable water shall be supplied for the washing of personnel under the personal hygiene protocol. All personnel shall adhere to the following hygiene requirements:

- All prescribed safety equipment shall be worn by all on-site personnel involved in work activities;

- At the end of each shift, all disposable outer wear shall be placed inside containers provided for disposal purposes;

- Soiled disposable outer wear shall be removed shall be removed prior to cleansing hands and prior to eating;

- All on-site personnel shall thoroughly wash their hands, face and neck area prior to eating, smoking or leaving the site;

- Consumption of food, drink and smoking is prohibited in the Regulated Area. Smoking and eating is prohibited in the work area

8.5 Fire Prevention

Fire prevention will be accomplished by:

- Good housekeeping shall be maintained in all work areas.
- Accumulation of flammables is prohibited
- ABC-type dry chemical portable fire extinguishers will be provided on all motorized field equipment at the work location and in the immediate area where flammable/combustible materials are located
- Regular inspections will be made by the SHSO to assure that fire extinguishers, hoses, reels and hydrants are in good working order
- A clear access to all fire protection equipment will be maintained
- Smoking will only be permitted in designated areas
- Areas will be clearly marked with sealed cigarette butt cans and a readily available fire extinguisher

8.6 Confined Space Entry

Injuries and fatalities may occur if certain essential precautionary measures are not taken when entering a confined space. Section 8-2 of Stryker DES's Corporate Health & Safety Program is provided to make Stryker DES management and all employees aware of Confined Space Entry requirements. The detailed requirements to be met by all personnel involved with confined space entry are contained in this procedure. It covers most Confined Space Entry situations. Those, which present unique conditions, will be addressed by management and the Safety Department as required.

Whenever possible, management should investigate the possibility of doing the work outside the confined space to avoid exposing Stryker DES employees to the hazards inherent in confined space entry. All Stryker DES employees required to enter confined spaces shall be instructed as to the nature of the hazards involved, the necessary precautions to be taken, and in the use of protective and emergency equipment required.

For Stryker DES, confined spaces include, but are not limited to such items as vaults, excavations, dust collectors, manholes, bins, containments, boilers, pits, catch basins, tanks, silos or tunnels. When in doubt, contact your safety officer so that a field determination can be made by qualified safety personnel. Each facility in which Stryker DES works will likely employ differing methods of identifying confined spaces. Stryker DES management must inquire as to the method of identification that is being used at a specific facility.

8.7 Aerial Lifts

All employees will receive safety training as well as model specific / site specific training on any aerial and scissor lifts to be used prior to use. The Site Supervisor and/or the SSHO will monitor equipment use and retrain if there is a near miss related to aerial or scissor lift use or an employee is observed operating equipment in a manner inconsistent with training.

8.8 Equipment Safety

All employees will receive training on any equipment to be used prior to use. The Site Supervisor and/or the SSHO will monitor equipment use and retrain if there is a near miss related to equipment use or an employee is observed operating equipment in a manner inconsistent with training.

9.0 MONITORING PROGRAM

This section of the HASP describes how levels of hazardous substances and physical hazards, and worker exposures to them, are monitored at this site. This exposure-monitoring program provides project-specific information about:

- monitoring procedures to detect the presence of hazardous substances
- monitoring procedures to determine worker exposures to hazardous substances and physical hazards
- action levels and required responses for known and expected hazardous substances and physical hazards

calibration and maintenance procedures for monitoring equipment

The SSHO is responsible for implementing this exposure-monitoring program.

For work tasks that generate respirable crystalline silica dust, Stryker DES will first follow engineering controls and respiratory protection outlined in OSHA's Table 1. If those requirements do not reduce visible dust to the levels required in the OSHA silica standard, Stryker DES will implement air sampling for respirable crystalline silica as outlined below.

9.1 Respirable Crystalline Silica Dust Air Monitoring

9.1.1 Initial Exposure Monitoring

Stryker DES work crews expected to come in contact/work with silica containing materials where there is a risk of exposure through inhalation of dust will work with Stryker DES Corporate EHS to develop an exposure monitoring program.

Initial exposure monitoring should be conducted by Stryker DES Corporate EHS or a Stryker DES Competent Person to quantitatively evaluate the exposure to airborne respirable crystalline silica dust.

Exposure monitoring should be conducted on at least one employee per work task / work area to ensure sample results are fully representative.

9.1.2 Periodic Exposure Monitoring

Whenever silica exposure levels are greater than, or equal to the Permissible Exposure Limit for respirable crystalline silica (50µg/m3), periodic exposure monitoring is required within three months of the most recent monitoring. It is the responsibility of Stryker DES Corporate EHS to develop a periodic exposure monitoring schedule.

Exposure monitoring is required for at least one employee per work task / work area to ensure sample results are fully representative.

9.1.3 Termination of Exposure Monitoring

If initial monitoring indicates that employee exposures are below the action level; Stryker DES may discontinue monitoring for those employees whose exposures are represented by such monitoring.

Periodic exposure monitoring may be discontinued if results from two consecutive sampling periods taken at least 7 days apart, within six months of the most recent monitoring, show that employee exposure is below the PEL.

9.2 Inert or Nuisance Dust – Respirable Fraction

9.2.1 Exposure Monitoring

Stryker DES will perform personal air sampling for the respirable fraction of nuisance dust. Stryker DES will use 37mm 3-piece air sampling filter cassette preloaded with 5.0 micron PVC filters that are pre-weighed to within 0.00001g in conjunction with a 37mm aluminum cyclone when sampling for the respirable fraction of dust in the breathing zone.

9.3 Multigas Monitoring

9.3.1 Exposure Monitoring

Stryker DES will utilize MSA Altair 4X or 5X multigas meters to monitor the air for the presence of combustible gases, oxygen-deficient / oxygen-rich atmospheres, hydrogen sulfide and carbon monoxide. Hazardous concentrations of these gases are not anticipated due to the use of primarily electric equipment. Alarm thresholds are set at 10 ppm for H2S, 25 ppm for CO, 10% LEL and a concentration outside of 19.5% - 23% for O2.

9.4 Organic Compounds

9.4.1 Exposure Monitoring

Stryker DES will utilize a RAE Systems MiniRAE 3000 PID with 10.6 eV lamp for continuous real-time monitoring of volatile organic compounds in the work area. Local ventilation will be established in the work area to mitigate any VOCs present. If VOC concentrations are detected by the PID, work will be stopped. The correction factor for known VOCs will be applied to the reading and will be compared to established permissible exposure limits to determine what level of respiratory protection is required for personnel prior to resuming work. The PID will be used to monitor the work area over the course of the project.

9.5 OSHA PEL/AL

Respirable Crystalline Silica Dust

The OSHA Permissible Exposure Limit for respirable crystalline silica is a concentration of airborne respirable crystalline silica of 50 µg/m3, calculated as an 8-hour time weighted average (TWA). The Action Limit is a concentration of airborne respirable crystalline silica of 25 µg/m3, calculated as an 8-hour time weighted average (TWA).

Nuisance Dust

The OSHA Permissible Exposure Limit for the respirable fraction of inert or nuisance dust is 5 mg/m^3, calculated as an 8-hour time weighted average (TWA).

Volatile Organic Compounds

Exposure limits for volatile organic compounds vary for each individual compound. Stryker DES will utilize Technical Note TN-106 to determine the correction factor and TWA PEL concentration for each known compound present in the soil.

Noise

Noise shall be kept below the dBA levels listed below or hearing protection provided to reduce mitigate the levels.

Hours/ Day	**dBA slow response**
8	90
6	92
4	95
3	97
2	100
1.5	102
1	105
0.5	110
0.25	115

9.5.1 Instrument calibration

All field instrument(s) will be calibrated according to manufacturer specifications or on a daily basis, and the calibration data recorded in a daily log.

9.6 Physical Hazards

Job Safety Analysis will be conducted prior to commencement of work activities. A job hazard evaluation will also be conducted if new hazards are introduced due to:

- a change to existing tasks
- addition of new job tasks
- the introduction of new equipment

10.0 SITE SPECIFIC EMERGENCY RESPONSE PLAN (See Emergency Action Plan)

This chapter of the HASP describes potential emergencies at this site, procedures for responding to those emergencies, roles and responsibilities during emergency response, and training that workers must receive in order to follow emergency procedures. This chapter also describes the provisions this site has made to coordinate its emergency response planning with other contractors on site and with off-site emergency response organizations.
This emergency response plan is consistent with the requirements of paragraph (l) of HAZWOPER and provides the following site-specific information:

- pre-emergency planning
- on-site emergency response equipment and PPE
- emergency maps: evacuation routes and route to nearest hospital
- emergency roles and responsibilities
- emergency alerting and evacuation procedures
- emergency response procedures
- emergency decontamination, medical treatment and first aid
- response critique and plan updates
- emergency response training

10.1 Pre-emergency Planning

This site has been evaluated for potential emergency occurrences, based on site hazards, the tasks within the work plan, the building layout, and the ventilation system design and operation. The results of that evaluation are shown in Table 11-1 below.

TABLE 11-1 POTENTIAL SITE EMERGENCIES		
Type of Emergency	**Source of Emergency**	**Response**
Fire	Combustible Material	Use fire extinguishers if this can be done without endangering employees If out of control sound air horn & notify GlobalFoundries Dial 911
Injured employee	Work Site related injury	Perform first-aid as necessary Take employee to hospital if necessary Notify GlobalFoundries Dial 911 to summon ambulance if injury severe
Spill	Hazardous substance	Consult SSHO for proper PPE Don proper PPE Absorb spill if liquid with pillows, or other material. Put in proper container and label. If solid shovel material into proper container. Label. Dispose of according to RCRA regulations Notify GlobalFoundries

10.2 On-Site Emergency Response Equipment

Emergency procedures may require specialized equipment to facilitate worker rescue, contamination control and reduction, or post-emergency clean-up. Emergency response equipment stocked on this site is listed in Table 11-2. The equipment inventory and storage locations are based on the potential emergencies described in Table 11-1. This equipment inventory is designed to meet on-site emergency response needs and any specialized equipment needs that off-site responders might require because of the hazards at this site.
Emergency response equipment is inspected at regular intervals and maintained in good working order. The equipment inventory is replenished as necessary to maintain response capabilities.

TABLE 11-2 EMERGENCY RESPONSE EQUIPMENT	
Specific Type	**Location Stored**
Fire Extinguisher	Regulated Area
Fire Extinguisher	Support Zone
Spill Supplies	Each Active Area
First Aid Supplies	Support Zone

10.3 Roles and Responsibilities for On-Site and Off-Site Personnel

This section outlines the roles and responsibilities during an Emergency. The first step in any response to an emergency condition is to notify the Emergency Coordinator. The Emergency Coordinator will assess the situation and will contact the appropriate Client contact.

10.3.1 Emergency Coordinator

The Emergency Coordinator has the authority to stop work operations to correct dangerous working conditions and shall consult with all appropriate parties on how to prevent additional hazardous situations. The Emergency Response Coordinator is responsible for implementing the emergency response plan and coordinates emergency response activities on this site. He/she provides specific direction for emergency action based upon information available regarding the incident and response capabilities and initiates emergency procedures, including protection of the public and notification of appropriate authorities.
In the event of an emergency, site personnel are evacuated and do not participate in emergency response activities, except as indicated below.

10.3.2 Site Safety & Health Officer

The Site Safety & Health Officer has the authority to stop work operations to correct dangerous working conditions and shall consult with all appropriate parties on how to prevent additional hazardous situations. The Site Safety & Health Officer is responsible for all initial inquiries into accidents, emergencies, or any near-miss incidents that occur and are reported by personnel employed on this project.

10.3.3 Site Workers

Site Workers has the authority to stop work operations to correct dangerous working conditions and shall consult with all appropriate parties on how to prevent additional hazardous situations. All project personnel are required to immediately notify the Site Safety & Health Officer and Emergency Response Coordinator if an emergency or hazardous situation arises. Project personnel shall obey all direction from the Site Safety & Health Officer.

10.4 Limited On-Site Emergency Response Activities

- Fire
- Injured employee
- Rescue of injured employee

The site also relies on the off-site emergency response organizations listed in Table 11-4, Emergency Contact Information, to respond to site emergencies that will not be addressed by site personnel. These organizations have been provided a copy of the site HASP; have been thoroughly briefed on site

operations, hazards, and potential emergencies; have participated in a site walk-through if necessary; and are appropriately trained, staffed, and equipped to provide emergency response to this site. These organizations are contacted at least semi-annually or when changes in operations or new potential hazards are introduced on site to verify the accuracy of phone numbers and contact names and to ensure that current points of contact are aware of site operations and hazards.

EMERGENCY CONTACT INFORMATION		
SITE PERSONNEL		
Title	**Contact**	**Telephone**
EMERGENCY	**Global Foundries Emergency Services**	**4-3333 (internal phone)** **845-894-3333 (from cell)**
Stryker DES Project Manager	**Mark Klotzbach, Sr.**	**610-247-6891**
Stryker DES Supervisor	**Christopher White**	**267-887-1279**
Stryker DES Safety	**Gregory Klotzbach**	**610-724-8336**
Whiting-Turner Project Manager	**Brian Rotondo**	**860-733-5850**
Whiting-Turner Superintendent	**Ryan Hammond**	**914-882-6608**

10.4.1 Injured Employee

All employee injuries must be promptly reported to the Site Safety & Health Officer. The Site Safety & Health Officer will ensure that the injured employee receives prompt first aid and medical attention, ensure that the appropriate Whiting Turner / GlobalFoundries contact is promptly notified, and initiate an investigation of the incident with the Stryker DES Project Manager.

In the event of a personal injury accident, the Site Safety & Health Officer will assess the nature and seriousness of the injury. In the case of serious or life threatening injuries, normal decontamination procedures may be bypassed. Less serious injuries such as strains, sprains, minor cuts, and contusions may be treated only after the employee has been decontaminated. Accident reports will be due no later than the beginning of the next shift.

Following decontamination, a project team member qualified in first aid and CPR will administer suitable first aid. The Site Safety & Health Officer will then, if necessary,

arrange transport to the appropriate medical facility.

10.4.2 Fire

Dial 4-3333 in the event of a fire at the GlobalFoundries facility. Fire response will depend on the size and source of the fire. If fire or explosion appear imminent or have occurred, all related site activities will cease. The SHSO will assess the severity of the situation and decide whether the emergency event is or is not readily controllable with existing fire suppression equipment on hand. Firefighting will not be done if the risk to operating personnel appears high.

10.5 Emergency Alerting and Evacuation

Upon discovering an emergency situation, personnel notify the Stryker DES Emergency Coordinator, who will evaluate available information and initiate an appropriate response. Stryker DES's Emergency Coordinator will notify the Client contact. Site workers are alerted to emergencies through the use of an employee alarm system. The employee alarm systems at this site are listed in Table 11-5.

TABLE 11-5 EMPLOYEE ALARM SYSTEMS

Type of Alarm	Location	How Alarm is Used
Air Horn	Entrance to work area, Stryker DES office area	Three One Second Blasts - all employees will exit Regulated Area and decon if possible and report to Rally Point. Emergency Coordinator will direct employees in response

This alarm system meets the requirements of 29 CFR 1910.165 and is tested weekly under normal site operating conditions to ensure that it is in good working order and can effectively alert all persons on-site.

If an evacuation notice is given, site workers leave the worksite with their respective buddies, if possible, by way of the nearest exit. Emergency decontamination procedures detailed in Section 10 (Decontamination) of this HASP are followed to the extent practical without compromising the safety and health of site personnel.

Appropriate primary and alternate evacuation routes and assembly areas have been identified and are shown on the Emergency Response Map. The routes and assembly area will be determined by conditions at the time of evacuation based on the location of the hazard source and other factors as determined by rehearsals and inputs from emergency response organizations.
If any work will be done outside, wind direction indicators will be located so that workers can determine a safe up wind or cross wind evacuation route and assembly area if not informed by the Emergency Response Coordinator at the time the evacuation alarm sounds.

Personnel exiting the site gather at a designated assembly point. To determine that everyone has

successfully exited, personnel will be accounted for by the Site Supervisor. If any worker cannot be accounted for, notification is given to the Emergency Response Coordinator and or the SSHO so that appropriate action can be initiated.

Stryker DES has coordinated their and that source(s) of potential emergencies are recognized, alarm systems are clearly understood, and evacuation routes are accessible to all personnel relying upon them.

10.6 Emergency Response

The Stryker DES Emergency Response Coordinator will investigate the incident and reviewing relevant information to determine the level of response required for containment, rescue, medical care, and clean-up. The appropriate emergency response team (on-site or off-site) will be mobilized to the incident with sufficient personnel, PPE, and emergency equipment.

10.7 Emergency Decontamination, Medical Treatment and First Aid

Site provisions for medical services and first aid are consistent with 1910.151 as well as HAZWOPER regulations.

Site personnel who are contaminated and need medical treatment will be decontaminated before treatment is provided and/or before being transported to a medical facility if decontamination does not delay life-saving treatment, interfere with essential treatment, or aggravate the injury.

When emergency decontamination is performed, contaminated protective clothing and equipment is washed, rinsed and/or cut off. If an emergency victim is grossly contaminated with extremely toxic or corrosive material, the victim will be wrapped in blankets, plastic, or rubber before any first aid or medical treatment is performed to reduce potential exposure to other personnel.
Personnel who provide first aid and offsite medical treatment will be alerted to the chemicals and hazards to which a victim has been potentially exposed. This will be done by sending relevant SDS's and other applicable hazard data with the victim or by having the victim accompanied by personnel who are familiar with the incident and the hazards.

10.8 Emergency Response Critique and Plan Updates

After every emergency incident or evacuation of this site, the Emergency Response Coordinator (or designee) will evaluate the quality and safety of response activities. Any deficiencies in response actions will be included in a specific follow-up plan and corrected.

This emergency response plan is evaluated periodically throughout site operations and updated for accuracy. Changes made to emergency response procedures as the result of rehearsals or actual response incidents are recorded in this Plan. Site workers receive notification and training on changes to the Plan during daily toolbox training.

10.9 Emergency Response Training

All persons who enter this worksite, including visitors, receive a site-specific briefing about

anticipated emergency situations and the emergency procedures.
Prior to the commencement of work and in accordance with Section 5, Training, site personnel are trained in the contents of this emergency response plan, including potential emergencies, personnel roles and responsibilities, evacuation routes and procedures, and the location of medical assistance.
Site personnel designated as emergency responders are trained how to respond to expected emergencies safely.

The site maintains written up-to-date certification of the successful completion of applicable training requirements of each worker. Training records are maintained at the Stryker DES site office.

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