013100 – Environment, Safety, and Health Requirements

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Acronyms and Abbreviations

ACGIH	American Conference of Governmental Industrial Hygienists
AHJ	Authority Having Jurisdiction
ANSI	American National Standards Institute
ASME	American Society of Mechanical Engineers
ASTM	American Society of Testing and Materials
CESHC	Construction, Environment, Safety, and Health Certificate
CFR	Code of Federal Regulation
CPR	Cardiopulmonary Resuscitation
dBA	Decibel A Scale
DOE	Department of Energy
EPA	Environmental Protection Agency
ESH or ES&H	Environment, Safety and Health
ESWP	Electrical Safe Work Permit
FFDG	Fermi Forward Discovery Group
Fermilab	Fermi National Accelerator Laboratory
FNAL	Fermi National Accelerator Laboratory
FESHM	Fermilab ES&H Manual
FD	Fire Department
GFCI	Ground Fault Circuit Interrupter
GHS	Globally Harmonized System
GINA	Genetic Information Nondiscrimination Act
HEPA	High Efficiency Particulate Air Filter
HIPAA	Health Insurance Portability Accountability Act
IDLH	Immediately Dangerous to Life or Health
JHA or HA	Job Hazard Analysis or Hazard Analysis
LBNF	Long-Baseline Neutrino Facility
LEL	Lower Explosive Limit
LOTO	Lock Out/Tag Out
MEWP	Mobile Elevated Work Platforms
NFPA	National Fire Protection Association
NISOH	National Institute for Occupational Safety and Health
NRTL	Nationally Recognized Testing Laboratory
ODH	Oxygen Deficiency Hazard
OSHA	Occupational Safety and Health Administration
PEL	Permissible Exposure Limit
PFAS	Personal Fall Arrest System
PPE	Personal Protective Equipment
SDS	Safety Data Sheets
SDSTA	South Dakota Science and Technology
SOP	Standard Operating Procedure
SURF	Sanford Underground Research Facility
SSESHP	Site-Specific Environment Safety and Health Plan
SSECP	Site-Specific Erosion Control Plan
SWPPP	Storm Water Pollution Prevention Plan
TLV	Threshold Limit Value
TWA	Time Weighted Average
USC	United States Code
VAC	Volts Alternating Current
WPC	Work Planning Controls

Part 1 General

1.1 Fermi Forward Discovery Group, LLC ES&H Policy

A. Fermi Forward Discovery Group, LLC (FFDG) holds safety and environmental protection as one of its highest and most important values. FFDG's policy is to protect the environment and the safety and health of all persons accessing the sites that FFDG manages, may they be facilities employees, subcontractor employees, scientific visitors, or visiting members of the public.

1.2 Summary

A. This Section describes the requirements, responsibilities, and expectations for environment, safety, and health (ES&H) aspects of Subcontractor's work.

B. Safety, as used in this document, encompasses environment, safety, and health, including pollution prevention and waste minimization.

C. The Subcontractor shall provide all labor, materials, equipment, services, occupational exposure monitoring, and supervision required to maintain work sites that meet the Subcontract ES&H requirements, all applicable federal, state, local regulations, and site-specific permits. In addition, the Subcontractor shall take all reasonable measures to protect the environment and the safety and health of its employees, the employees of its sub-tier subcontractors, sub-tier vendors, DOE's and FFDG's employees, and the public from bodily injury and damage to their property.

1.3 Applicable Codes and Regulations

The Subcontractor and sub-tier subcontractors shall comply with the following referenced codes and regulations. The codes, regulations, standards, rules, and DOE orders referenced herein are incorporated into and form a part of this Section.

A. Title 10 Code of Federal Regulations (CFR) Part 851 (10 CFR 851), Department of Energy (DOE) Worker Safety and Health Program

B. 10 CFR 820, Procedural Rules for DOE Nuclear Activities

C. 10 CFR 835, Occupational Radiation Protection

D. 10 CFR 860, Trespass to Land Owned & Leased by the US Government

E. 10 CFR 707, Workplace Substance Abuse Programs at DOE Sites

F. 10 CFR 708, DOE Contractor Employee Protection Program

G. 29 CFR 1904, Record Keeping Guidelines for Occupational Injuries and Illnesses

H. 29 CFR 1910, Occupational Safety and Health General Industry Standards

I. 29 CFR 1926, Occupational Safety and Health Standards for Construction

J. 40 CFR Protection of the Environment (USA EPA)

K. 49 CFR Transportation

L. South Dakota Rules of the Division of Motor Services

M. South Dakota Department of Environment & Natural Resources Codified Laws & Rules

N. DOE Order 442.1A, Department of Energy Employee Concerns Program

O. DOE Standard 1090, 2020 Hoisting and Rigging

P. National Fire Protection Association (NFPA) codes and standards

1. NFPA 70, National Electrical Code, 2017
2. NFPA 70E, Standard for Electrical Safety in the Workplace, 2015

Q. American Conference of Governmental Industrial Hygienists (ACGIH), Threshold Limit Values (TLV) for Chemical Substances and Physical Agents and Biological Exposure Indices", 2016. TLVs are lower than the Permissible Exposure Limits (PELs) in 29 CFR 1910 and 29 CFR 1926. TLVs shall be used in lieu of PELs.

R. American Society of Mechanical Engineers (ASME) Codes and Standards:

1. ASME Boilers and Pressure Vessel Codes (BPVC)
2. ASME B30 Series, Crane Safety; and
3. ASME B31 Standards of Pressure Piping

S. American National Standards Institute (ANSI) Standards:

1. ANSI Z136.1 Safe Use of Lasers.

1.4 Application and Enforcement of Tile 10 CFR Part 851 (10 CFR 851)

A. Subcontractor working on Fermilab site or DOE-leased space are subject to United States of America - Department of Energy (DOE) civil penalties or Subcontract fee reductions for noncompliance, in accordance with 10 CFR 851 "Worker Safety and Health Program" and 10 CFR 835 "Occupational Radiation Protection". Subcontractor shall also comply with 10 CFR 851 "Worker Safety and Health Program", which defines worker safety and health requirements for the Department of Energy contractors and their subcontractors. The Worker Safety and Health Program acknowledgment is part of the Construction ES&H Certification. Additional information can be found at: http://eshq.fnal.gov/worker-safety-health-for-subcontractors/.

1.5 Application and Enforcement of Tile 10 CFR Part 835 (10 CFR 835)

A. Subcontractors shall comply with 10 CFR 835 "Occupational Radiation Protection". This regulation defines the requirements pertinent to work where potential exposure to ionizing radiation hazards occurs. The protective measures to be taken where this hazard is present

shall be communicated to the Subcontractor through the FFDG Construction Coordinator or Task Manager. FFDG has an extensive level of expertise in management of ionizing radiation hazards that will be utilized to identify the work locations where such hazards are present and establish these protective measures.

1.6 Definitions

A. **ASME Owner-User**: An individual or designated entity that is responsible for ensuring that the pressure equipment is maintained and operated in compliance with relevant standards and regulations.

B. **Authority Having Jurisdiction (AHJ):** An organization, office, or individual responsible for enforcing the requirements of the code or standard, or for approving equipment, materials, equipment installations, or procedures. In DOE, the head f the field element is the AHJ. DOE has delegated routine AHJ authority for Electrical, Fire Safety, and Structural.

C. **Building Official**: The officer or other designated authority charged with the administration and enforcement of the building code, or a duly authorized representative.

D. **Competent Person**: One who is capable of identifying existing and predictable hazards in the surroundings or working conditions that are unsanitary, hazardous, or dangerous to employees, and who has authorization to take prompt corrective measures to eliminate the identified hazards. Duties related to ES&H shall take precedence over other duties.

E. **Construction**: The combination of erection, installation, assembly, demolition, or fabrication activities involved to create a new facility or to alter, add to, rehabilitate, dismantle, or remove an existing facility. It also includes the alteration and repair (including dredging, excavating, and painting) of buildings, structures, or other real property, as well as any construction, demolition, and excavation activities conducted as part of environmental restoration or remediation efforts.

F. **Construction Coordinator or Task (Installation) Manager (CC/TM) or Installation Manager**: An FFDG representative responsible for ensuring the work being performed conforms to the subcontract technical requirements and is responsible for the review and acceptance of work planning documentation, including hazard analyses. The FFDG CC/TM is the primary point of contact with the subcontractor. The term Construction Coordinator shall also mean Task Manager. These terms shall be interchangeable within the Subcontract Documents.

G. **Construction Environmental Safety & Health Certification (CESHC)**: An official, binding document prepared by the subcontractor, bearing the signature of a responsible manager of the Subcontractor, that defines the safety and health practices and responsibilities necessary to conduct operations on Fermilab, DOE Leased Space, or FFDG-leased property in a safe manner.

H. **Construction Manager (CM) or Installation Manager**: An individual or firm responsible for FFDG's administration of a construction project to confirm the construction contractor's compliance with construction project requirements.

I. **Construction Management Office (CMO)**: An FFDG office comprising of a Construction (Project) Manager, Construction Coordinator, Procurement Administrator, and ES&H Safety Coordinator. This office is responsible for supervising and administrating the construction project to ensure the construction subcontractor's compliance with technical specifications and ES&H requirements. An office member will serve as the primary liaison between the Subcontractor and FFDG.

J. **Construction Worksite**: The area designated and identified in the Subcontract Documents for the performance of the work, or if the boundaries are not designated in the Subcontract Documents, the portion of the Fermilab site necessary to perform the work described in this Subcontract.

K. **Definable Feature of Work**: Distinct: A distinct, separate task within a construction worksite that has its own unique quality control requirements, often identified by a specific trade or discipline.

L. **Design Coordinator or Project Engineer Lead**: An FFDG representative who is assigned to the construction project and works with the Construction (Project) Manager and Construction Coordinator to assist in the technical coordination of the construction work.

M. **Diagnostic Energized Work:** Describes all other activities within the Limited Approach Boundary, other than Manipulative, which typically involve making, tightening, or breaking electrical connections or the replacement/removal/addition of electrical or mechanical components.

N. **Energized Electrical Work**: Work is classified as either Diagnostic or Manipulative. . Diagnostic Energized Work activities are permitted only when it is not feasible to perform the work with the equipment in an Electrically Safe Work Condition. Manipulative Energized Work is prohibited at Fermilab unless it can be demonstrated that de-energization introduces additional or increased hazards or is infeasible due to equipment design or operational limitations. If justified, Manipulative Energized Work shall be performed by written permit only and subject to approval by the Fermilab Directorate.

O. **ES&H Representative**: An FFDG representative responsible for ES&H guidance, periodic construction visits, support for the CC/TM, and oversight of the Subcontractor's safety program to confirm that Subcontractor meets the Subcontract requirements. The ES&H Representative will review Hazard Analyses and training documentation for on-going work activities. Any deficiencies noted shall be brought to the attention of the CC/TM for follow up with the Subcontractor.

P. **Excavation**: Any human-caused cut, cavity, trench, or depression in an earth surface that is formed by earth removal. A trench is a narrow excavation (in relation to its length) made below the surface of the ground. In general, the depth of a trench is greater than its width, and the width (measured at the bottom) is not greater than 15 ft (4.6 m). If a form or other structure installed or constructed in an excavation reduces the distance between the form and the side of the excavation to 15 ft (4.6 m) or less (measured at the bottom of the excavation), the excavation is also considered to be a trench.

Q. **Exclusion Zone**: A zone designated on the surface using standard color-coded markings, which contains the width of the utility plus 18 inches on each side of the utility. The only excavation technique allowed withing exclusion zones is vacuum excavation

R. **Fermi Forward Research Discovery Group, LLC (FFDG)**: The entity that manages Fermi National Accelerator Laboratory (Fermilab) for the U.S. Department of Energy's Office of Science (DOE). Fermilab includes space leased by DOE at Sanford Underground Research Facility located in the Lead, South Dakota.

S. **Fermi Site Office (FSO)**: The United States Department of Energy (DOE) local site office.

T. **Field Superintendent**: Subcontractor employee who is responsible for managing the Subcontractor's day-to-day construction operations, controlling the short-term construction schedule, and coordinating quality control activities with sub-tier subcontractors and suppliers. The Field Superintendent's role is to run the day-to-day operations and control the short-term schedule. In addition, the Field Superintendent has important quality control and coordination responsibilities for the activities of sub-tier subcontractors/suppliers. The Field Superintendent's duties related to ES&H shall take precedence over other duties.

U. **(Job) Hazard Analysis**: The process of identifying and formally documenting hazards and controls for all anticipated phases of work. The result of a hazard analysis is the identification of the hazards presented with the scope of work and the mitigations to minimize the hazards.

V. **High Hazard Activities**: Entry into permit-required confined space or ODH classified facility/area; Entry into a radioactive or controlled work area; Work involving exposure to lead, asbestos, or beryllium; Work requiring the use of respiratory protection when potential exposure levels will be above established limits; Work requiring the use of fall protection; Work requiring Lockout/Tagout procedures; Electrical activities that require compliance with NFPA 70E; Work requiring the use of scaffolding; Excavation; Operating a crane; Rigging and acting as a signal person; Work using mobile elevating work platforms or powered industrial trucks.

W. **Imminent Danger**: A hazard which, if allowed to persist, is likely to cause an accident that will result in death, injury, significant property damage, or environmental impact.

X. **Immediately Dangerous to Life or Health (IDLH)**: An atmosphere that poses an immediate threat to life, would cause irreversible adverse health effects, or would impair an individual's ability to escape from dangerous atmosphere.

Y. **Integrated Safety and Environment Management (ISEM)**: A system for performing work safely and in an environmentally responsible manner. The term "integrated" is used to indicate that the Environment, Safety, and Health (ES&H) management systems are normal and natural elements of accomplishing work. The intent is to integrate the management of ES&H with the management of the other primary elements of construction: quality, scope, cost, and schedule. FFDG subscribes to the philosophy of Integrated Safety and Environment Management (ISEM) by following the program outlined in this section. The ISEM core

functions are implemented by robust daily work planning of construction activities. The ISEM core functions include:

1. Define the scope of work,
2. Identify and analyze the hazards,
3. Develop and implement hazard controls,
4. Perform work with controls, and
5. Provide feedback for continuous improvement.

Subcontractor and sub-tier subcontractors are required to implement ISEM.

Z. **Manipulative Energized Work**: Describes all activities within the Limited Approach Boundary, that involve making, tightening, or breaking electrical connections or the replacement/removal/addition of electrical or mechanical components.

AA. **Personal Protective Equipment (PPE)**: Refers to protective clothing, helmets, goggles, and other garments or equipment designed to protect the wearer's body from injury or infection. The hazards addressed by protective equipment include physical, electrical, heat, noise, chemicals, biohazards, and airborne particulate matter.

BB. **Procurement Specialist**: FFDG representative responsible for and specifically assigned to the Subcontract, who is responsible for negotiating and administering the Subcontract terms and conditions. All modifications to the Subcontract shall come from the Procurement Specialist or designee, in writing. The Procurement Specialist or designee is the sole entity who can modify the Subcontract or initiate change orders.

CC. **Qualified Person**: One who, by possession of a recognized degree, certification, or professional standing, or who by extensive knowledge, training, and experience, has successfully demonstrated his or her ability to solve or resolve problems relating to the subject matter, the work, or the project.

DD. **Safety Pause**: A definitive statement made openly to another individual that an imminent danger situation exists and therefore, all related work must stop immediately.

EE. **South Dakota Science and Technology Authority (SDSTA):** The entity that manages Sanford Underground Research Facility (SURF).

FF. **Sanford Underground Research Facility (SURF):** Underground research facility, located in Lead, South Dakota.

GG. **Subcontractor's ES&H Program**: Subcontractor's corporate company policies and procedures to ensure operations comply with applicable environmental, safety and occupational health laws and regulations, and protect the safety and health of employees and members of the public.

HH. **Subcontractor's Safety Officer/Representative**: Subcontractor representative responsible for managing Subcontractor's compliance with the Subcontract's ES&H requirements. They

will have completed the OSHA 30-hour construction safety course and have a minimum of 10 years of construction experience consistent with the type of activities included in the scope of work.

II. **Stop-Work Authority:** The responsibility and duty of all personnel to pause work activity or activities when an unsafe condition or act is observed that could affect the safety of personnel and/or environment, also reference Safety Pause.

JJ. **Stop-Work Order**: Written direction from FFDG under the Subcontract's General Terms and Conditions for Construction.

Part 2 Pre-Award and Post-Award

2.1 Submittals with Subcontract Proposal (Pre-Award)

Subcontractor must submit the following documents with its Proposal:

A. Attachment C, Construction Environmental Safety and Health Certification (CESHC), which includes acknowledgment that work will be performed under 10 CFR 851. The CESHC is found in Attachment A.

1. Subcontractor's CESHC shall encompass the work of all Sub-tier subcontractors involved in activities under this Subcontract.
2. Subcontractor's CESHC shall include the Subcontractor's methods to enforce the elements of the safety program for all personnel on the construction worksite.

B. FFDG Subcontractor Safety Information Questionnaire.

1. Subcontractor must provide Experience Modification Rating (EMR) Rates and Occupational Safety Health Administration (OSHA) 300 log for last three years.
2. The EMR must be less than one (1.0) and the Subcontractor must have a three-year safety record equal to or less than 85% of the most current U.S. Bureau of Labor Statistics General Construction statistics for Total Recordable Case Rate (TRC) and Days Away, Restricted, or Transferred (DART) Case Rate as reported in the BLS Occupational Injury and Illness Data.
   a. If an EMR is 1.0 or above, or the Subcontractor has less than three (3) years of ratings; or the three-year safety record is greater than 85% of the BLS general construction statistics, the Subcontractor shall provide explanation.
3. The Subcontractor shall submit one (1) electronic copy in Adobe portable document format (PDF) of the Subcontractor ES&H Program for review and acceptance.
4. Subcontractor shall submit upon request the resume of the Subcontractor's Safety Representative.

2.2 Submittals with Subcontract (Post-Award)

A. Site-Specific ES&H Plan

1. Subcontractor must submit the Site-Specific Safety Program to FFDG for review and acceptance. FFDG may require changes to the Program prior to Subcontract award. Once accepted by FFDG, the Subcontractor shall comply with the requirements set forth in their Program.

2. Within ten (10) business days after Subcontract award, the Subcontractor shall submit a Hazard Analysis (HA) for anticipated construction activities to FFDG for acceptance. At a minimum, the initial HA shall cover the work site, including mobilization, and identify the hazards and mitigations. The HA shall comply with the requirements for Work Planning and Hazard Analysis described in this Section. As work progresses, Subcontractor shall update HAs to identify each work step in completing the task, the hazards involved with each work step and the mitigations that will be used to reduce the risk of the hazards identified. HA Template can be found in Attachment B.

   a. The Hazard Analysis must be accepted by FFDG prior to commencing work.

   b. Hazards Analyses not sufficiently defined will be returned for revision and resubmission. Work will not proceed until the Hazard Analysis has been formally accepted. The time for performance of the Subcontract shall not be extended for delays resulting from Hazard Analyses that are returned for revision and resubmission.

B. The following submittals will also be required when applicable:

1. Individual Trade, Craft, or Task-Specific Hazard Analyses.

2. Subcontractor employee safety training records.

3. Global Harmonizing System, Safety Data Sheets (SDS).

4. Tabulation of On-site Work Hours on a Weekly basis as part of Weekly Progress Meetings (after commencement of work).

5. Incident Investigation Reports (after commencement of work).

6. Lift Plans, including critical lift plans as defined in DOE Standard 1090.

7. Welding Plans.

8. Environmental, Erosion Control Reports.

Part 3 Excavation Plans, ES&H Submittals Required after Award of Subcontract and before Commencement of Work

3.1 Required Submittals

A. Subcontractor's training records for workers having 30-hour OSHA training.

B. Subcontractor's training records for Competent Person training for:

1. Fall Protection.
2. Scaffolding.
3. Crane (mobile crane) operator
4. Excavation.
5. Confined Space Entry; and
6. Other High Hazard Activities as required by this Section.

C. Sub-tier subcontractor employee safety training records for High Hazard Activities as required by this Section.

D. Subcontractor Safety Information Questionnaire completed by Sub-tier subcontractors, including their Experience Modification Rating (EMR) Rates and Occupational Safety and Health Administration (OSHA) 300 logs for the last three years.

1. Completed questionnaires will be submitted to the FFDG CC/TM for review upon Subcontractor's selection of the Sub-tier subcontractor.
2. If an EMR is 1.0 or above, or the Sub-tier subcontractor has less than 3 years of ratings, the Sub-tier subcontractor shall provide explanation.

E. FFDG reserves the right to reject a Sub-tier subcontractor based on the submitted safety information. In this circumstance, the Subcontractor shall replace the Sub-tier subcontractor at no additional cost to FFDG.

Part 4 Training

4.1 Subcontractor Training

A. All Subcontractors and Sub-tier subcontractors performing work at SURF shall provide to their employees any necessary ES&H training as may be required by federal/state regulations and as appropriate for their Subcontract activities at SURF.

1. Subcontractor must maintain records onsite for all safety-related training received by each worker (including Sub-tier subcontractor workers), whether provided by Subcontractor or others.

2. Training records shall consist of a training certificate or other document that includes the training course title, instructor name/qualifications, training date, and training attendees.
3. Worker safety training records shall be available for FFDG to review at any time upon request.
4. Subcontractor must review the training records including sub-tier subcontractors for all workers performing High Hazard Activities to confirm that the workers are properly trained prior to exposing the worker to the hazard.
    a. Subcontractor must submit training records for workers performing High Hazard Activities to the CC/TM prior to exposing the workers to the hazard.

B. The Subcontractor is responsible for assuring that their employees and Sub-tier subcontractor employees understand all ES&H requirements. The Subcontractor must be able to communicate any necessary instructions to all employees, including those who do not speak English.

C. Subcontractors shall maintain on-site, and provide to FFDG upon request, all occupational safety and environmental records, such as erosion inspection documents. Such records include the records required to be maintained by federal/state regulation such as OSHA injury/illness logs, training records, inspection records, safety meetings, and incident investigations. Additional records appropriate for the Subcontractor's activities shall also be maintained and provided to FFDG upon request. Examples include inspection records and certifications as by applicable regulations required for:

1. Excavation.
2. Scaffolding.
3. Fall Protection.
4. Crane, mobile crane.
5. Confined Space.
6. Welding.
7. Crane operation training and inspections.
8. NFPA 70E.
9. Monitoring IH hazards, e.g., silica exposure; and
10. Written exposure monitoring program.

D. If the subcontractor intends to administer first aid or Cardiopulmonary Resuscitation (CPR), then the Subcontractor must comply with 29 CFR 1926.50 and have available the list of names of any employee who will administer first aid or CPR along with current certificates.

E. Subcontractor shall evaluate the work and require each worker to have training adequate to address the risks associated with their work. Examples of risks that require hazard-specific training are:

Additional Course Needs based on Task Scope of Work:
Asbestos Awareness Training
Asbestos Class II Operations Training
Asbestos Abatement Training, Class I & II (for workers)
Asbestos Abatement Training, Class I & II (for supervisors)
Lead Awareness Training
Lead Abatement Training (for workers)
Lead Abatement Training (for supervisors)
Hazardous Materials Awareness
Excavating & Trenching Competent Person
Hazardous Waste Site, Hazmat Training (for workers)
Hazardous Waste Site, Hazmat Training (for supervisors)
First Aid/CPR/AED Training
Fall Protection Training for Construction
Fall Protection Training for General Industry
Fall Protection Competent Person
Hazard Communication
Mobile Elevating Work Platform (MEWP)/Aerial Lift Training
Scaffold Awareness Training
Scaffold User Training
Scaffold User / Builder Training
Ladder Safety
Confined Space Entry Training
Lockout Tagout Training
Respiratory Protection Training

4.2 Fermi Forward Discovery Group - Provided Training

A. Orientation Training

1. All Subcontractors and Sub-tier subcontractors working at SURF shall attend Orientation training, which includes Surface and Underground Training with practical factors. Each orientation classes approximately 4.5 hours with 2.5 hours for practical factors. Scheduling of orientation training is done through the ES&H Representative.

2. Once completed, Orientation training is valid for a period of 2 years and does not need to be repeated for work on subsequent subcontracts within that period. Each worker who completes this training will receive a card that must be carried at all times while working at SURF.

3. Delivery personnel are not required to attend Orientation Training; however, leaving the cab of the delivery vehicle while on site, the delivery personnel must have the appropriate PPE.

B. Summary of Fermi Forward Discovery Group classes offered and general description of when training is required:

Course Description	***Who Must Take***	***Typ. Time***
Subcontractor Orientation with Practical Factors	All Subcontractor and sub-tiers workers	4.5 hours (Surface & underground) and 2.5 Hours Practical Factors
Guide Training (does not include First Aid/CPR)	All crew leads	4 hours
Oxygen Deficiency Hazard (Depending on Area)	Subcontractor workers who may be exposed to Oxygen Deficiency Hazard	2 hours
LOTO-II (Depending on Area)	Workers under Electrical Time and Materials Subcontracts and Heating and Ventilation Services Time and Materials Subcontracts	4 hours

4.3 Re-Training

If Subcontractor personnel are observed not following expectations that has been covered in training, FFDG may require that the Subcontractor provide retraining of the personnel and may require Subcontractor to submit records evidencing the retraining.

Part 5 Subcontractor's ES&H Program

5.1 Incident Reporting and Occupational Medicine Program

Subcontractor shall develop an incident reporting and occupational medical program specifically addressing the Subcontract work site, and it must include:

A. Identification of the activities on the construction worksite that will require employees to be under an occupational medical or exposure-monitoring program. Upon FFDG's request, the Subcontractor shall submit documentation of compliance.

B. Discussion of how medical personnel will be made available for advice and consultation on matters of occupational health.

C. An emergency response plan that sets forth the procedures to be followed upon the occurrence of serious injuries, illnesses, fatalities, fires, structure failures, or other emergencies, including procedures for the administration of first aid or other necessary medical treatment including:

1. Plan for provision of prompt medical treatment.
2. Process for reporting and investigating recordable injuries for possible cause and corrective action in accordance with 29 CFR 1904; and
3. Specific designation of management persons responsible for reviewing injury and illness reports.

D. Procedures for recording and reporting safety incidents and maintaining safety and health records in accordance with Occupational Safety and Health Administration (OSHA) and any the reporting requirements identified in this Section.

E. Procedures for the investigation of job-related incidents to determine cause and corrective action; and

F. Specific designation of management persons responsible for review of injury and illness reports.

5.2 Occupational Medicine Program

A. Subcontractor and sub-tier subcontractor workers on site for more than 30 days in a 12-month period or where workers are enrolled for any length of time in a medical or exposure monitoring program required by any rule or other obligation, shall establish and provide comprehensive occupational medicine services to workers on the site, as required in Appendix A.8 of 10 CFR 851.

B. Subcontractor's will develop a procedure to coordinate dissemination of industrial hygiene exposure data with a qualified occupational medical provider. The plan shall be a wholistic approach to industrial hygiene and the occupational medical program similar to below:

Identification of Hazards	Review work activities in detail, consult Safety Data Sheets, and identify occupational and environment hazards, such as NO_2 and Silica
Health Assessments	Symptoms review through employee evaluation questionnaire, potential clinical examination, and possible laboratory tests
Occupational History	Review job titles; description of work activities; nature of industry (excavation); duration of hours worked (includes over time and shift work); exposure to occupational hazards; provision and use of personal protective equipment; sickness absence

Post sickness absence review	Ensuring that the workforce has no residual effects from the cause of the sickness absence over 5 working days.
Medical Surveillance	Periodic medical assessment of workers exposed, with a view to protect and prevent occupationally related health issues

C. The Subcontractor and occupational medicine services provider is responsible for developing and maintaining a record, containing any medical, health history, exposure history, and demographic data collected for the occupational medicine purposes, for each employee for whom medical services are provided. All occupational medical records shall be maintained in accordance with Executive Order 13335, Incentives for the Use of Health Information Technology.

5.3 Subcontractor's Site-Specific Safety Program

A. If Subcontractor is required to provide a performance bond under the terms of the Subcontract, Subcontractor shall have an ES&H Program that is commensurate with the complexity and nature of the work. This ES&H Program will describe the Subcontractor's overall commitment to safety and measures that will be taken specific to this project work scope and site.

B. The ES&H Program shall describe the following:

1. Basic Safety and Health including Emergency Action/Response Plan, Accident Investigation Program, Recording and Reporting of Injuries, Housekeeping, Hazard Communication Plan, Personal Protective Equipment (PPE), and Fire Protection and Prevention.

2. Working Planning Controls including Hazard Analysis Process describing

   a. how hazards are identified and analyzed,

   b. preventive controls,

   c. the periodic inspection program,

   d. how workers are informed of hazards and protective actions,

   e. how objective evidence (i.e., monitoring results) will be used for establishing controls measure, including exposures assessments to verify adequacy of control, (e.g., verifying adequacy of hearing protection while monitoring equipment noise that is expected to be greater than 85dba exposure).

3. Waste Handling and Disposal including characterization of waste, packaging and labeling requirements, and assurance that appropriate transportation and handling facilities will be used.

4. Erosion Control and Environmental Protection including Storm Water Pollution Prevention Plan (SWPPP), when required, or Site-Specific Erosion Control Plan (SSECP).

5. Other Program components as dictated by the scope of this work:
    a. Control of Hazardous Energy (Lockout/Tagout).
    b. Confined Space.
    c. Concrete Cutting.
    d. Hearing Conservation.
    e. Ionizing Radiation.
    f. Nonionizing Radiation.
    g. Lead, Beryllium, or Other Hazardous Metals.
    h. Electrical (including Power Transmission and Distribution).
    i. Welding and Cutting.
    j. Scaffolds.
    k. Fall Protection.
    l. Excavations.
    m. Signs, Signals, and Barricades.
    n. Tools - Hand and Power.
    o. Ladders & Stairways.
    p. Commercial Diving Operations.
    q. Motor Vehicles, Mechanized Equipment, and Marine Operations.
    r. Cranes, Derricks, Hoists, Elevators, Powered Industrial Trucks, Moveable Platforms, and Conveyors.
    s. Concrete and Masonry Construction.
    t. Steel Erection.
    u. Underground Construction, Caissons, Cofferdams, & Compressed Air.
    v. Demolition; and

C. The ES&H Program will address the Subcontractor's commitment to each of the following Integrated Safety and Environment Management (ISEM) principals, including the following key elements:

1. <u>Line Management Responsibility for Safety</u>: Line management shall be responsible and accountable for the protection of the employees, the public, and the environment. Examples of expected items to support this statement are:

a. Statement of ES&H policy and goals.

b. Workforce accountability for strict compliance with Subcontractor's ES&H program.

c. Workplace substance abuse program that, at a minimum, aligns with the "Workplace Substance Abuse Program at DOE sites" (10 CFR 707) to maintain a drug and alcohol-free workplace. The program shall outline the following:

1.) Drug testing requirements, i.e., new hires, post occurrence/injury, random, reasonable suspicion.

2.) Drugs for which testing is performed (at a minimum marijuana; cocaine; opiates; phencyclidine; and amphetamines). When conducting reasonable suspicion or occurrence testing, the subcontractor should also include drugs listed in Schedule I or II of the Controlled Substances Act.

3.) Employee assistance, education, and training.

d. Policy statement concerning substance abuse on the construction worksite.

e. Process for progressive discipline.

f. Means of holding Sub-tier subcontractors accountable for compliance with ES&H requirements.

g. Evidence of worker participation.

h. Participation of management in safety meetings, inspection, and documentation.

i. Process for employees to identify and help resolve ES&H issues quickly, including pause and stop work authority.

j. Management support of safety without hint of retribution or harassment; and

k. On-going status and compliance verification reporting to FFDG.

2. Clear Roles and Responsibilities: The roles, responsibilities, and authority at all levels of the organization, including potential Sub-tier subcontractors are clearly identified. Examples of expected items to support this statement are:

a. ES&H and Quality Control (QC) responsibilities for principals, field superintendent, foremen, competent person, ES&H officer, and workforce are documented; and

b. Pause/Stop work authority.

3. Competence Commensurate with Responsibility: Personnel possess the experience, knowledge, skills, and abilities that are necessary to discharge their responsibilities. Examples of expected items to support this commitment are:

a. Identification of required training and experience of Field Superintendent, foremen, Competent Person, ES&H personnel, and workforce.

b. Identification of process for documenting completion of training.

c. Process for assuring Sub-tier subcontractors is adequately skilled to perform their work activities; and

d. Training for employees and Sub-tier subcontractor employees on Integrated Safety Management and hazard analysis.

4. Balanced Priorities: Resources are effectively allocated to address safety, programmatic, and operational considerations. Protecting the public, the workers, and the environment shall be a priority whenever activities are planned and performed. Examples of expected items to support this commitment are:

   a. Management commitment of resources to adequately implement their ES&H program.

   b. Selection process for Sub-tier subcontractors that include cost, quality, schedule adherence, and safety performance; and

   c. Process for the Subcontractor to authorize start of work by Sub-tier subcontractors.

5. Identification of Safety Standards and Requirements: Before work commences, the associated hazards are evaluated and an agreed upon set of safety standards and requirements are established which will provide adequate assurance that the public, the workers, and the environment are protected from adverse consequences. Examples of expected items to support this commitment are:

   a. Subcontractor ES&H Program.

   b. Subcontractor QC Program; and

   c. Hazard Analysis process that includes defining scope of work, analysis of hazards, identification of hazard controls, requirement to perform work within these controls, and means to provide feedback and improvement.

6. Hazard Controls Tailored to Work Being Performed: Administrative and engineering controls, tailored to the work being performed, are present to prevent and mitigate hazards. Examples of expected items to support this commitment are:

   a. Hazard Analysis process.

   b. Subcontractor ES&H Program.

   c. Planning and selection of appropriate and effective protective measures.

   d. Active regimen of workplace inspections and prompt abatement of identified hazards.

   e. Occupational exposure (industrial hygiene) monitoring to verify adequacy of controls and compliance with occupational exposure limits.

f. Inspections, assessment, and audits of sub-tier subcontractor's adherence to ES&H and QC program; and

g. Daily work planning and hazard reviews at the worker level documented using an example form found in Attachment C.

7. Operations Authorization: The conditions and requirements prior to commencement of operations are clearly established and understood by all. Examples of expected items to support this statement are:

a. Process to assure workers are informed of hazards and required protective measures before work is allowed to begin.

b. Process to assure workers, including Sub-tier subcontractors are appropriately trained to do their job safely.

c. Process to assure that when an incident occurs, the scene is secured until the incident investigation is complete.

d. Investigation process includes analysis, examination of trends and lessons learned, and a means to report to FFDG in a timely manner; and

e. Process to assure that applicable permits are in place prior to allowing work to commence.

D. Changes and Updates: The ES&H Program is a living program. Updates that reflect changes to processes and program shall be submitted as changes are made.

E. All Sub-tier subcontractors employed by the Subcontractor must agree in writing to follow the Subcontractor's ES&H Program unless the Sub-tier subcontractor submits its own ES&H Program and FFDG accepts the Sub-tier subcontractor's ES&H Program.

F. Documentation for all aspects of the ES&H program shall be complete and submitted prior to Subcontract close-out.

5.4 ES&H Inspections and Audits

A. The FFDG ES&H Division will conduct regular ES&H inspections and audits of a Subcontractor's ES&H Program.

B. An ES&H audit may occur at six (6) month intervals when subcontracts are scheduled to last more than 12 months. ES&H Division will coordinate these audits with the CC/TM and the Subcontractor Safety Representative.

5.5 Project Bulletin Board

A. Subcontractor is responsible for installing and maintaining a safety bulletin board or approved method by the CC/TM at the location where the majority of the Subcontractor's employees, Sub-tier subcontractors, and Sub-tier suppliers report to work. Information shall include:

1. DOE Worker Safety and Health Poster DOE-F 5480.2 (Worker Rights), furnished by FFDG. Spanish versions of the DOE Safety and Health Poster are also available from FFDG upon request.

2. DOE Occupational Safety and Health Complaint Form 5480.4, available on-line.

5.6 Temporary Drinking Water and Sanitary Systems

A. Unless specified in General Requirements, the subcontractor shall provide chemical portable toilets or comparable effective units with the service to periodically be emptied. The ratio of number of workers to number of toilets are:

Number of Workers	Number of Toilets
10 or less	1 toilet seat and 1 urinal
20 or less	2 toilet seats and 2 urinals
More than 20	2 toilet seats and 2 urinals per additional 15 workers

B. Unless specified in 010010 General Requirements, the subcontractor shall provide drinking water that is immediately nearby. The use of pails and dippers or a common drinking cup for dispensing drinking water is prohibited, reference 29 CFR 1910.141 and 29 CFR 1926.51.

Part 6 Safe Execution of the Work

6.1 Subcontractor Means and Methods

The Subcontractor is solely responsible for using safe means and methods. The Subcontractor shall ensure that Subcontractor's employees, Sub-tier subcontractor employees, FFDG workers, and other personnel or visitors are not exposed to safety hazards as a result of Subcontractor's work.

6.2 Subcontractor's Project Team & Personnel

A. Field Superintendent - The Subcontractor shall, at all times, provide a competent superintendent during the progress of the work. In addition, the following requirements for the Field Superintendent are described below:

1. The Subcontractor shall provide a competent Field Superintendent who is the Subcontractor's representative designated for the duration of the project and is responsible for running the day-to-day operations of the work, including safety, quality control, and Sub-tier subcontractor coordination responsibilities.

2. FFDG requires the Field Superintendent to have completed an OSHA 30-hour construction safety course.

3. The Field Superintendent shall have knowledge and experience of Occupational Safety and Health Administration (OSHA) and other related safety standards and have the authority to enforce such standards in the field.

4. The Field Superintendent or qualified designee must be present on the project site whenever work activities are ongoing.

a. In the absence of the designated Field Superintendent, the Subcontractor shall identify an alternate individual with similar qualifications acceptable to FFDG.

b. If more than one work shift be required during the performance of the work, the Subcontractor shall identify and assign a designated individual meeting the above requirements for each work shift.

5. In the event excavations are part of the Subcontract scope, the Subcontractor shall provide a Competent Person for excavation activities who meets the requirements of OSHA 29 CFR 1926.650 (b).

6. In the event scaffolding is be utilized during the execution of the Subcontract, the Subcontractor shall provide a Competent Person for scaffolding who meets the requirements of OSHA 29 CFR 1926.450 (b).

B. Subcontractor's Safety Representative - If a Subcontractor's Safety Representative is required in 010010 General Requirements, then the Subcontractor shall employ a Safety Representative who acts as the authorized agent of the Subcontractor and is responsible for safety activities of all work sites under this Subcontract.

1. Subcontractor's Safety Representative, or if no Subcontractor Safety Representative is required by the Subcontract, the Subcontractor's Field Superintendent shall interface with the CC/TM and FFDG ESH Representative on all safety matters, and will:

a. Act as the Competent Person.

b. Provide Input to Daily Task/Work Planning Meeting.

c. Interface with CC/TM on all safety matters.

d. Prepare and submit HAs including revisions and updates.

e. Review and accept Sub-tier subcontractor safety plans and hazard analyses.

f. Assure that all Sub-tier subcontractors have accepted the ES&H Plan or submitted their own plan that has been accepted by FFDG.

g. Update the ES&H Plan as required.

h. Maintain a list of Competent and Qualified Persons.

i. Assure that HAs been understood and signed by all workers.

j. Inspect work in progress.

k. Identify and reports and corrects deficiencies.

l. Assure that PPE is available.

m. Conduct toolbox meetings.

n. Maintain all safety records including minutes, training records, inspections, etc.

o. Maintain safety related signage.

p. Assure that equipment inspections are performed.

q. Attend weekly FFDG project construction meetings.

r. Coordinate permit applications with CC/TM; and

s. Investigate all incidents and supply reports to CC/TM.

2. The Subcontractor's Safety Representative, or if not required, the Field Superintendent shall be present at all meetings between the Subcontractor and FFDG at which changes in construction methodology are discussed. The Subcontractor's Safety Representative (or if not required, the Field Superintendent) shall approve these changes.

C. The Subcontractor shall ensure that workers comply with 10 CFR 851, OSHA, and 013100 requirements for physically fit and medically qualified personnel.

D. Drug and Alcohol-Free Workplace – All personnel of the Subcontractor and Sub-tier subcontractors are prohibited from being under the influence of alcohol, or being under the influence, or engaging in the unlawful manufacture, distribution, dispensing, possession, or use of, controlled and restricted substances while on duty. Controlled substances include those listed in Schedules I - V of the Controlled Substances Act, 21 U.S.C. § 812 and related federal regulations, 21C.F.R. §§ 1308.11-1308.15, as amended from time-to-time.

E. After damage to property, environmental release, or injury by the Subcontractor or Sub-tier subcontractor, associated personnel are subject to drug testing.

6.3 Job Site ES&H Inspections/Meetings

A. After the start of work and throughout the entire work period, the Subcontractor shall monitor and inspect the work area and operations, on a daily basis, for compliance with the Subcontractor's accepted ES&H Program, HAs, and CESHC. Subcontractor must conduct these inspections and correct any deficiencies found as expeditiously as reasonably possible.

B. Subcontractor shall document these inspections and maintain them on-site for the duration of the Subcontract work. Records shall be available for review upon request by FFDG.

C. Subcontractor must conduct the following Job Site ES&H meetings, and notify the CC/TM and ES&H Representative of the schedule to allow them to attend:

1. Daily Work Planning Meetings: Subcontractor's Field Superintendent shall conduct a daily planning meeting. All workers, including workers employed by Sub-tier subcontractors, who are working on site that day must attend. The daily planning meeting will discuss the planned work activities, review the applicable HAs, and allow for employee questions and feedback regarding the work activity. The daily work planning meeting shall be documented on the form of Attachment B and a copy provided to the CC/TM.

2. Weekly Toolbox Meetings: Each job foreman or superintendent of a specific craft shall conduct a weekly toolbox meeting of approximately five (5) minutes. These meetings shall emphasize the current construction operations and provide an opportunity for inspection of tools and PPE. The weekly toolbox meeting shall be documented, and a copy provided to the CC/TM.

6.4 Safety Color Coding

A. Hazard sign will be placed by the subcontractor or sub-tier subcontractor as delineated in the HA to alert and inform viewers.

1. Sign must be legible and must not be a distraction or create additional hazard.
2. Safety and fire equipment signs must be clearly visible in the immediate vicinity of the equipment.
3. Signs must be displayed with illumination or retro reflectiveness as needed for adequate legibility under normal operating conditions.

B. Color coding shall be in compliance with 29 CFR 1910.145 Appendix A – Recommended Color Coding.

6.5 Work Planning and Hazard Analysis

A. Hazard Communication

1. All Subcontractors will have a hazard communication program that complies with the requirements in OSHA 29 CFR 1926.59 (1926.1200).
2. Subcontractors will maintain and have available on-site the Safety Data Sheets (SDS) for each hazardous chemical being used on the construction site.
3. The Subcontractor will maintain all SDS for all hazardous chemicals used by Sub-tier subcontractors employed as part of the Subcontract.

B. Hazard Analysis

1. Subcontractor shall establish a clearly defined work planning and control process for each definable feature of work that demonstrably integrates requirements safety into work planning and execution process to protect the workers and public.
2. Subcontractor shall document its analysis of the hazards associated with each definable construction activity in a Hazard Analysis document (HA). The HA must detail the work steps, specific hazards associated with each step, and mitigating actions, including use of PPE, that the Subcontractor and Sub-tier subcontractors will take to reduce or eliminate the risk of injury while performing the work.
   a. HAs must identify silica exposure such as cutting masonry products, installing, cutting, or removing concrete, installation of or removal of sheet rock compound,

or dealing with other silica constraining products. Reference Attachment A for mitigations measures.

b. HAs must identify the PPE, appropriate to the task, to be required.

c. Safety Data Sheet (SDS) of products that may significantly impact the safety or environment of the site or Subcontractor personnel are to be submitted as part of the HA.

d. The names of Competent Persons shall be included on the HA and communicated to all affected workforces.

3. As the project progresses, a task-specific HA shall be prepared and submitted for each trade task. A link to the HA form can be found at http://eshq.fnal.gov/worker-safety-health-for-subcontractors/. The FFDG format shown in Attachment D shall be used unless otherwise approved by the CC/TM and FFDG ES&H representative. Each HA must be accepted by FFDG before Subcontractor starts the work described in the HA.

4. Prior to the start of subsequent new work activities, the Subcontractor shall review and revise the HA, or develop a new hazard analysis, as necessary to incorporate new hazards. Each revision must be submitted and accepted by FFDG before the associated element of work begins.

5. Prior to starting a task, Subcontractor must confirm completion of the following steps:

a. The HA has been submitted to FFDG, and FFDG has returned the submittal indicating acceptance.

b. The Field Superintendent or designee must perform a documented pre-job briefing for all workers who will perform the activity prior to the worker starting the work.

c. All Subcontractor and Sub-tier subcontractor employees are required to review and sign the analyses affecting their work to acknowledge their understanding of the task, hazards, and the mitigation activities.

1.) The completed HA form with the signature page must be posted at the jobsite. This can be accomplished through a variety of means, including use of the subcontractor's bulletin board or a clipboard. If posting is not feasible due to the location of the work, the HA shall be located in a place so that it is easily available to all affected employees (subcontractors, Sub-tier subcontractor's employees, FFDG employees). If the jobsite conditions are such that the HA could get destroyed, the original shall be saved off work site and a copy posted and replaced as needed.

2.) As the HA is updated, the changes will be initialed/dated by the Field Superintendent or designee. Affected Subcontractor and Sub-tier subcontractor employees shall be advised of the new information and re-

sign the modified document. The CC/TM shall be advised of the field changes to the HA.

3.) If a worker has been away from the site for more than 30 days, the applicable HAs must be reviewed and signed by the worker before re-starting work.

6. Subcontractor and Sub-tier subcontractor employees who are new to the project site shall receive a guided orientation in their specific work area as a component of the HA review prior to starting any work-related activities.

7. If Subcontractor is performing work in the vicinity of a separate subcontractor of FFDG, Subcontractor will coordinate with the CC/TM to resolve any conflicts between Subcontractor's HA and the HA of the separate subcontractor.

C. Build (Work Activity) Plans.

a. Work Activity Plans are task-specific documents that contain the relevant step-by-step installation instructions. They are intended for use by workers during installation to ensure that field operations are conducted safely and meet project requirements.

b. Key components of Build Plan

1.) Define Task

2.) Identify trained and/or qualified operators, when necessary.

3.) Step-by-step Instructions of each task in the order they must be performed

4.) List of training requirements.

5.) Quality checks, hold points.

6.) List of materials, tools, and equipment for the work activity.

D. The FFDG Construction Management Office may provide resources to assist Subcontractor and Sub-tier subcontractors in developing Has and Build Plans (Work Activity Plans) upon request.

6.6 Job Site Orientation

A. The Subcontractor shall ensure and demonstrate, through a documented job site orientation program, that Subcontractor and its Sub-tier subcontractor personnel are aware of the ES&H requirements of the jobsite.

6.7 Personal Protective Equipment (PPE)

A. All Subcontractors and Sub-tier subcontractors will furnish and require their personnel to wear appropriate PPE in all operations where there is an exposure to hazardous conditions

or where there is a need for using such equipment to reduce the hazards to their employees. The minimum acceptable PPE for work on the site is:

1. Clothing suitable for the work and weather conditions must be worn.
    a. In construction areas, the minimum is a short (1/4 length) sleeve shirt that covers the ball of the shoulder and long trousers.
    b. All personnel working on outside in the field shall wear a high visibility outer garment, minimum Class 2 Type R or P.
    c. When activities require heavy/motor equipment, minimum ANSI Class II reflective high visibility outer garments are required.
    d. Protective clothing and other protective devices appropriate for hazards such as welding, falls, traffic, and confined space.
2. PPE as required by OSHA and ANSI for specific Subcontract activities.
3. Eye, head, hand, and foot protection – All construction workers and other personnel on the construction worksite shall wear at all times eye, head, and foot protection that complies with the applicable ANSI Standards.
    a. The type of protective eyewear shall be selected as appropriate for the hazard. Hand protection shall be selected as appropriate for the hazard.
    b. Hard hats shall be furnished by the Subcontractor and shall be worn in the construction work areas. Hard hats must be worn with the brim facing forward or must be full brim style. Hard hats shall be Type II and meet the ANSI Z89.1 standard as required by 29 CFR 1926.100 and bear the “Z89.1” designation. High voltage exposure work requires hard hats that meet the ANSI Z89.2 standard and bear the “Z89.2a” designation.
    c. Safety glasses with side shields shall be furnished by the Subcontractor and shall be worn in the construction work areas. Eye protection shall meet the requirements of 29 CFR 1926.102 Safety glasses shall be ANSI approved and shall be marked with the ANSI “Z87.1” designation.
    d. Hard-sole, leatherwork boots providing ankle protection are required. In addition, any work that presents a greater hazard to the feet or toes requires the use of safety toed or metatarsal guards, meeting ASTM F2413. Canvas, tennis, or deck shoes are not permitted within the construction work area.
4. Construction personnel who perform welding and cutting, operate rotating machinery, or who are exposed to chemicals, fire, or other such hazards, must contain their hair so that there is no danger of their hair catching fire, dipping into toxic chemicals or acids, or being caught in rotating machinery.

B. The Subcontractor shall furnish additional PPE as required to reduce employee exposure to hazards when engineering and administrative controls are not feasible or effective in reducing hazard exposures.

C. Delivery personnel coming to construction sites are required to use PPE applicable to their own activities. When outside their vehicle, they must wear PPE as specified in the HA within the construction designated area. Subcontractors are responsible for notifying delivery personnel of PPE requirements and providing delivery personnel with the PPE required by the HA.

D. Minimum PPE requirements for visitors/non-workers include:

1. Closed toe shoes without heels (tennis or canvas shoes and sandals are not allowed to be worn on the construction site).
2. Long trousers.
3. ¼ length sleeve shirt which covers the ball of the shoulder.
4. Safety glasses; and
5. ANSI-compliant, Type II safety helmet (hard hat).
6. Underground Self-Rescue Escape Pack (such as Ocenco M20)

6.8 Fall Protection

A. All Subcontractor and Sub-tier subcontractor workers exposed to fall hazards equal to or greater than six (6) feet must utilize 100% fall protection. This includes work on scaffolding, steel erection, formwork, and working around excavations.

B. For work that requires the use of personal fall arrest equipment, the written HA shall identify the approved anchorage points that the workers will utilize.

C. A fall protection plan will be instituted for leading edge work or precast concrete erection work that makes conventional fall protection systems infeasible or creates a greater hazard. This equivalency analysis will be documented as part of the HA for this work activity.

D. Framework and Reinforcing steel, each worker on the face of formwork or reinforcing steel shall be protected from fall 6-feet (1.8 m) or more to lower levels by personal fall arrest system and positioning device systems. Dual lanyard climbing techniques is prohibited on formwork and reinforcing steel.

E. For any work requiring personal fall arrest equipment, a written fall rescue plan shall be developed and submitted to the CC/TM for review and acceptance.

F. For all personnel utilizing fall protection, Subcontractor will maintain individual worker training records on-site for all personnel utilizing fall protection sufficient to demonstrate that the workers have training that meets the requirements of the most applicable regulation or standard that establishes criteria for such training.

G. Subcontractor Fall Protection Competent Person shall perform regular observational safety checks of fall protection work activities, including inspections before use.

H. When work requires wearing a Fall Protection harness, a Working at Heights Permit must be completed, reference the below table for guidance.

Controls	Passive	Active	Working At Heights Permit Required	Fall Rescue Plan Required
Eliminate Hazard	X		No	No
Guardrails/Handrails/Hole Covers*	X*		No*	No
Working From MEWP**		X	Yes**	No
Fall Restraint		X	Yes	No
Fall Arrest		X	Yes	Yes
Administrative Controls		X	Yes	Yes

** Unless using articulating (aerial) lift, Fall Restraint and permit is required at a minimum*

*** Exception is scissor-lifts; the use of fall restraint or fall arrest equipment can be omitted if the scissor lift DOES NOT have a tie off provision.*

6.9 Advance Notice of Work Activities

A. By 7:00 a.m. on the day of the work and prior to initiating new work tasks, the Subcontractor Field Superintendent (or designee) must notify the assigned CC/TM with details of the work site location and the scope of work to be performed.

1. The following activities require the Subcontractor to provide written notification to the CC/TM a minimum of three (3) business days prior to the commencement of work involving the following:
2. Interruption of road traffic.
3. Closure of any roads.
4. Connection to or interruption of any existing underground utility.
5. Intended use from any water from hydrant.
6. Connection to temporary electric power sources.
7. Request for disablement of fire alarms or related safety devices.
8. Request for disablement of fire protection systems.
9. Intended activity beyond the specified construction limits.
10. Intended access to or work within a confined space.
11. Connection to or interruption of any existing power system.
12. Saw cutting or core drilling at manholes, foundations, and paved areas.

13. Excavation activities.
14. Backfilling of underground utilities; and
15. Delivery of a radioactive source on SURF site.

B. Subcontractor must receive FFDG's approval prior to proceeding on the above listed work activities.

6.10 Off-Hours High Hazard Work

A. The following work is categorized as High Hazard Work:

1. Chemical usage that presents significant safety or health hazards, potential hazardous material releases, releases to surface waters or sanitary systems, or requires special controls (e.g., respirator use, local ventilation) and has not been assessed and approved by the Industrial Hygiene Group.
2. Permit Required Confined Space Work.
3. Crane, Hoist, & Powered Industrial Truck for any operations that include the following: load tests at 100%-125% of rated capacity, critical lifts, or crane personnel basket/platform use.
4. Modifying or repair/maintenance of equipment or systems that contain cryogenic materials (Does not include normal filling of liquid nitrogen dewars or refilling liquid cryogenic containing tanks by vendors delivery drivers).
5. Electrical Work:
   a. Manipulative Energized Work.
   b. Diagnostic Energized Work including verifying that exposed conductors or circuit parts are in an Electrically Safe Work Condition (ESWC), where the following thresholds are exceeded:
      1.) AC power distribution systems: over 600 Volts nominal or the equipment has a calculated or tabular arc flash PPE category of 3 or higher.
      2.) DC power sources that both exceed 400 Volts and can deliver in excess of 500 Amperes, or the equipment has a calculated or tabular arc flash PPE category of 3 or higher.
      3.) Capacitors that can store over 10 kilojoules of energy at the maximum (peak) voltage normally applied to them.
      4.) Battery systems that operate at over 600 Volts, or can deliver over 30 kilowatts, or the equipment has a calculated or tabular arc flash PPE category of 3 or higher.

5.) Inductors that can store over 10 kilojoules of energy at the maximum (peak) current normally applied to them, unless system configuration absolutely prevents the energy from remaining.

c. Operation of equipment, circuit breakers, disconnect switches, contactors, and plugging/unplugging connectors that are not in a Normal Operating Condition as defined in Table 130.5(C) of NFPA 70E.

d. Operation of equipment, other than equipment that has been listed by a Nationally Recognized Testing Laboratory (NRTL) in accordance with the manufacturer's directions, unless the equipment has been approved by a NRTL or AHJ field inspection, or the installation has received an Operational Readiness Clearance (ORC).

e. Entry into an electrical distribution system manhole in which not all cables in the manhole have been verified to be in ESWC. (Confined Space requirements must be separately considered).

f. Coring or cutting into concrete, masonry, and walls, floors, and ceilings of any type of material where it cannot be proven in advance that there are no electrical circuits or equipment embedded in or located on the side of the concrete or building surface opposite the worker.

Note: Work on equipment that has been previously proven to be in an ESWC through zero voltage verification, with lockout / tagout or configuration control locks in place to maintain it in an ESWC is not high hazard work.

6. Excavation: Personnel working within an excavation that is greater than 4 feet deep.
7. Fall Exposure: Use of personal fall arrest systems. Erection or dismantling of scaffolding.
8. Hydraulic and Pneumatic Systems:
   a. Any work where a sudden uncontrolled release of pressure or fluids could result in injury.
   b. Operating hydraulic cutters (excludes hand pumped equipment).
   c. Transporting compressed gases in elevators occupied by personnel.
   d. Modifying or reconfiguring pressurized hydraulic or pneumatic systems.
9. Lasers: Working around/with unenclosed Class 3b or 4 lasers.
10. Machining: Hazardous materials like lead, uranium, beryllium.
11. Spark producing work: Welding, grinding, brazing, flame cutting.
12. Magnetic Fields:

a. Any situation where ferrous objects can be subject to magnetic forces causing sudden or unexpected movement into the magnetic field.

13. Radiation:

    a. High Radiation Area (HRA) work beyond inspection or placing equipment in a safe state.

    b. Work on or with Class 3-5 objects.

    c. Work with activated liquids (Excludes analytical lab work with volumes less than 1 liter and routine tritiated water management activities.)

    d. Work with depleted uranium (DU).

    e. Work in a contamination area.

    f. Work with non-interlocked radiation generating devices/neutron generators (Excludes XRF and SEM use).

    g. Pressure (vacuum/water) or stress testing of activated components.

    h. Destructive work (cutting, welding, grinding, etc.) on activated components.

    i. Radiography.

14. Hazardous Energy Release:

    a. Work on equipment where there is a potential for unexpected release of energy (hydraulic, pneumatic, thermal, potential, etc.) where LOTO is required.

High-risk work: Consider the risk factors below to determine high-risk activities. Please note, routine work may be deemed high hazard or high risk.

15. Resource limitations.

16. Personnel experience.

17. First-time or very infrequent work.

18. Work environment.

19. Significant impact to lab or mission (e.g., lifting “one of a kind” equipment).

20. Multiple work group coordination.

21. Personnel executing the task consider the work high risk.

B. All High-Hazard or High-Risk work must be done during normal Lab business hours of Monday through Friday, 6:00 a.m. to 6:00 p.m.

    1. When planning for High Hazard Work, adequate consideration must be given to the extent of such work that can be performed within those hours on any given day, as work will be stopped outside of those hours and the site placed in a “safe” condition.

2. High Hazard Work outside of normal Lab business hours requires the following planning and prior approval prior to starting the High Hazard Work:

    a. An adequate justification for such work outside of normal hours has been submitted to FFDG and approved. Such approval will only be granted by FFDG when it is in the interests of heightened safety at SURF.

    b. The Subcontractor shall submit the HA for high hazard work, along with the justification, for review a minimum of seven (7) days in advance of any such operations outside normal hours and receive specific and written approval.

    c. If such approval is granted, the Subcontractor shall conduct and document Pre- and Post job briefings on the work plan and safety mitigations included in the HA.

C. The performance of High Hazard work requires the presence of certain FFDG representatives, and in some cases, DOE Site office personnel. As a result, the performance of this work off-hours will be limited to the times the appropriate personnel are available.

6.11 Fire Protection

A. Fire Protection and prevention at the construction site will be in accordance with the following standards except where more stringent requirements are contained in the Subcontract Documents.

1. OSHA 29 CFR 1926, Subpart F – Fire Protection and Prevention.
2. OSHA 29 CFR 1926, Subpart J – Welding and Cutting, section 1926.352 and 1926.354.
3. NFPA 10, Standard for Portable Fire Extinguisher; and
4. International Fire Code, Chapter 33, Fire Safety During Construction and Demolition.

B. Subcontractor storage, handling, and fire protection for flammable and combustible liquids will comply with OSHA 1926.152.

C. The SDSTA Emergency Response Team may make periodic fire inspections of construction sites.

D. Temporary closures, dust partitions, or solid barriers constructed of combustible materials will conform to ASTM E84, Surface Characteristics, Class 1 (Class A) or NFPA 701 Standard Methods of Fire Tests for Flame Propagation of Textiles and Films.

6.12 Lasers

A. Class 1 laser systems incorporated into commercially available devices for use by the general public are exempt from these requirements unless opened, serviced, or modified. Laser equipment shall bear a conspicuously displayed label to indicate hazard classification.

B. Users of Class 1, Class 1M, Class 2, Class 2M, Class 3a, or Class 3R lasers shall read and abide by the safety documentation provided in the operator's manual. Only qualified and trained personnel may service, adjust, or repair laser equipment. Employees, when working in

areas in which a potentially hazardous exposure to direct or reflected laser radiation exists, shall be provided with anti-laser protection devices.

C. Class 3B and 4 laser equipment shall not be used without the express written permission of the CMO and FFDG Laser Safety Officer, coordinate with the CC/TM and ES&H Representative for approvals.

D. When lasers are in use, signage such as below will be posted for all lasers up to 3R.

E. Subcontractors working on site will be required to following the specific rules and regulations:

1. OSHA 29 CFR 1926.200 Signs, Signals, and Barricades
2. ANSI Z136.1-2014 American National Standard for safe Use of Lasers

6.13 Moveable Equipment

A. All cranes, derricks, hoists, elevators, powered industrial trucks, moveable platforms, or conveyors used in the performance of civil construction work on SURF site are subject to the following specific rules and regulations:

1. OSHA 29 CFR 1926, Subpart H – Materials Handling, Storage, Use and Disposal.
2. OSHA 29 CFR 1926, Subpart N – Helicopters, Hoists, Elevators, and Conveyors.
3. OSHA 29 CFR 1926.751, Subpart R – Steel Erection. See also specific provisions for Critical Lifts.
4. OSHA 29 CFR 1926, Subpart CC - Cranes and Derricks in Construction.
5. OSHA 29 CFR 1910, Subpart N – Materials Handling and Storage.
6. OSHA 29 CFR 1910, Subpart S – Electrical.
7. DOE-STD-1090-2020 - DOE Hoisting and Rigging.
8. ANSI/ASME B30 Series, Crane Safety.

B. The Subcontractor must inspect this heavy equipment before use on SURF site.

6.14 Industrial Hygiene

A. Subcontractors will maintain an effective Industrial Hygiene program covering health hazards associated with the Subcontract work.

B. The industrial hygiene program may address identification, protection, monitoring, and control of any potential health hazards. Such hazards may include physical and chemical hazards. Physical hazards may include extreme temperatures, physical exertion, and noise. Chemical hazards may include exposure to toxic chemical agents that may be inhaled, ingested, or absorbed through the skin.

C. The Subcontractor will perform monitoring as necessary to document employee exposures to chemical and industrial hygiene hazards, and to meet regulatory requirements. Negative exposure assessments are encouraged even when not specifically required by a substance-specific standard. The Subcontractor will notify workers of monitoring results within the applicable OSHA-specified timeframe.

D. The Subcontractor will incorporate a provision to prevent heat stress and cold stress into the project Hazard Analysis when hot or cold conditions may be expected. The Subcontractor will follow the Thermal Stress Threshold Value Limits the American Conference of Governmental Industrial Hygienists (ACGIH).

E. The Subcontractor Industrial Hygiene Program shall, at a minimum, address the following elements:

1. Noise
2. Hazardous Material
3. Dust control (silica)
4. Sanitation
5. Personal Exposure Monitoring
6. Temperature Extremes
7. Lighting and illumination
8. Ventilation
9. Lead
10. Lasers
11. Blood-Borne pathogens
12. Infectious disease pandemic

F. When eyewash/shower apparatus sis utilized, employees shall know where the nearest eyewash/shower apparatus is located and how to operate it. Weekly inspection of eyewash/shower apparatus shall be documented.

G. The subcontractor shall provide personnel adequately trained/qualified to manage and implement the industrial hygiene program to the level of the scope of work.

6.15 Jobsite Housekeeping

A. All work and clean-up operations shall comply with the Subcontractor's ES&H Plan.

B. Housekeeping shall be maintained on a daily basis. The Subcontractor shall plan, organize, layout, and maintain the worksite area in a manner to insure an environmentally healthful working area. The Subcontractor is responsible for the work areas of the Sub-tier subcontractors and will enforce similar conditions on them.

C. The Subcontractor will maintain access and egress to excavations, structures, and other areas for efficient use by personnel and equipment, paying special attention to routing of emergency equipment that may be needed at the work area.

D. The Subcontractor will maintain adequate portable toilet facilities for the crews at the site. These facilities must be anchored properly; reference OSHA 29 CFR 1926.151.

E. The Subcontractor will execute cleaning and sweeping in a manner that minimizes the contamination of the air with dust or particulate matter and addresses the requirements detailed in the silica guidance table. The Subcontractor will also maintain building entrances and openings to prevent or minimize the entry of vermin.

F. All areas of the worksite area shall be kept clear of debris, rubbish, and other materials that could cause tripping or falling conditions. Construction materials will be piled in orderly stacks, with safe heights and slopes; reference OSHA 29 CFR 1926.25.

G. The use of caution construction tape, barricades, and signage shall comply with ANSI Z535 series.

H. The Subcontractor is responsible for providing and implementing the necessary precautions to safeguard material and equipment at the project site.

I. In the event of theft or damage to Subcontractor, or Government property, the Subcontractor shall immediately notify the CC/TM.

6.16 Hazardous Materials

A. Any substance which by reason of being explosive, flammable, poisonous, corrosive, oxidizing, irritating, or otherwise harmful, is likely to cause death or injury, will be considered a hazardous material and its use in construction activities will be subject to the following standards:

1. OSHA 29 CFR 1910, Subpart H – Hazardous Materials
2. OSHA 29 CFR 1910, Subpart Z – Toxic and Hazardous Substances
3. OSHA 29 CFR 1926, Subpart D – Occupational Health and Environmental Controls

B. In the event of a spill of potentially toxic or hazardous material on any construction site, the first person to become aware of the spill must immediately call (605) 639-1184. Efforts to stop the spill and minimize the spread of spilled material may only be attempted if it does not endanger the health or safety of personnel at the scene.

6.17 Confined Space

A. The Subcontractor confined space program and associated work activities conducted in permit and non-permit required confined spaces shall be in accordance with the 29 CFR 1910.146 and 29 CFR 1926.1201.

B. If known at the time of contracting, FFDG will include information on the need for confined space entry in the request for proposal. FFDG will describe the confined space, whether it is permit-required or non-permit-required, the known hazards of the space, and the purpose for entry.

6.18 Existing Utilities, Equipment, and Structures

A. Surface Utility Identification and Location Only:

1. The Subcontractor shall protect from damage all existing infrastructure at or near the work site and on adjacent property of a third party, the locations of which are made known to or is known by the Subcontractor. The Subcontractor shall repair any damage to those facilities, including those that are the property of a third party, resulting from failure to comply with the requirements of this Subcontract or failure to exercise reasonable care in performing the work. If the Subcontractor fails or refuses to repair the damage promptly, FFDG may have the necessary work performed and charge the cost to the Subcontractor.

2. Structures and utilities shown on the drawings represent the best information available. Their number and exact locations are not guaranteed. Excavation during construction may reveal the presence of underground drainage tiles, culverts, utilities, and other obstructions. The Subcontractor shall request direction from FFDG for rerouting, sealing, or otherwise modifying underground obstructions not shown on the drawings.

3. Prior to beginning any excavation, Subcontractor shall request an Excavation Permit from the CC/TM. Utilities in the area to be excavated must be de-energized/de-pressured and locked-out/tagged-out, in accordance with Excavation Permit requirements. If the services cannot be de-energized/de-pressured, then vacuum excavation methods, consisting of air or water to break up the soil and a vacuum device to collect the soil, shall be used to locate fiber optic cables, electrical cables, duct banks, and gas lines prior to the excavation activity.

B. Work on Existing Utilities:

1. The Subcontractor will identify through drawings, notations, and field locates, the approximate location of known utilities and sub-surface structures and obtain locates

through obtaining an excavation permit through South Dakota 811 system. For underground construction conforming to OSHA 1926.800, contact the CC/TM to determine utility locate requirements.

2. No work shall be performed on existing in-service utility systems without prior approval and coordination of the system outage by the CC/TM.
3. Pressure shall be relieved on all piping systems before opening system and starting the work.
4. Lockout/Tagout shall be used by the Subcontractor for all valves, blank-offs, and relief lines.
5. "Hot Tap" connections on utility services shall not be permitted unless specified by the Subcontract Documents and specific procedures have been submitted to and accepted by FFDG.
6. Existing fire and life safety systems shall be re-activated at the end of each business workday. If systems are unable to be re-activated at the end of the business workday, the CC/TM must be notified.

C. Vacuum excavation to exposed buried utilities like fiber optic, natural gas, and power within 18-inches of the exclusion zone.

D. The Subcontractor shall provide "As-Conditions" record drawings of installed underground utilities to the CC/TM.

6.19 Soil Erosion and Sediment Control

A. Soil Erosion and Sediment Control Plan (SESCP) shall be employed on all projects involving excavations.

B. The following requirements apply to Soil Erosion and Sediment Control:

1. Subcontractor shall have all erosion control devices required by SSECP or SWPPP (if required) and as shown on the drawings in place prior to commencing any work for which they are required. If required, the Subcontractor shall install all erosion control in accordance with SESCP prior to the start of excavation activities.
2. As the work evolves, additional interim control structures may be required in order to protect waterways or comply with permit terms and conditions.
3. Costs for installation and maintenance of these structures shall be considered incidental to the project and included in the original proposal.
4. The Subcontractor shall install all such structures within 24 hours of notification by FFDG.
5. Maintenance of Erosion Control Structures:

a. Subcontractor must perform inspections of all control structures as specified in the drawings and SWPPP, and to maintain all control devices until final stabilization of all disturbed areas.

b. Subcontractor shall perform at a minimum, weekly erosion control inspections and after ½-inch or more precipitation events.

6. Temporary and Permanent Seeding and Stabilization

a. The Subcontractor is required to follow seeding dates and requirements as specified elsewhere in the Subcontract Documents.

b. The Subcontractor is responsible for providing appropriately vegetated surfaces as outlined in the technical specifications or specified on the drawings.

c. The Subcontractor is responsible for establishing sufficient final vegetation required for stabilization as accepted by FFDG prior to removing the erosion control structures. Any permanent seeding operations completed at the end of the growing season shall be carried out per dormant seeding requirements, reference the South Dakota Seed Law. Subcontractor is responsible for establishing final vegetation over all disturbed areas.

6.20 Lockout and Tagout (LOTO)

A. Controlling hazardous energy sources for personnel safety in construction activities is commonly termed “lockout and tagout”. A Lockout/Tagout procedure covers potential hazards associated with electrical circuits, pneumatic or hydraulic systems, presses, capacitors, batteries, mechanical movement levers, pump shafts, fan blades, and pressurized liquids or gases.

B. The lockout device shall be uniquely keyed lock with a body that is red in color. Red colored locks shall not be used for any purpose other than LOTO.

C. The tagout device shall be a tag imprinted with “Danger Do Not Operate”. The tag color shall be white, black, and red and a place for the workers name and contact information. The tag shall be able to accept a lock shackle of 0.25-inch diameter and able to sustain a continuous 50-lb pull without failing. The “Danger Do Not Operate” tags shall not be used for any purpose other than LOTO.

D. Prior to placing a tagout device, all subcontractor employees, including those of sub-tier subcontractors, shall complete the tagout device with the employee’s name, the name, and a contact phone number for their direct employer, all legibly written in permanent ink.

E. All actions required to control hazardous energy sources through a Lockout/Tagout (LOTO) procedure will comply with the applicable portions of the following standards:

1. OSHA 29 CFR 1910.147 – The Control of Hazardous Energy (Lockout/Tagout)

2. OSHA 29 CFR 1910 Subpart S – Electrical, Sections 1910.301 through 1910.399

3. OSHA 29 CFR 1926.417 – Construction Industry (Lockout/Tagout)
4. NFPA 70E, Electrical Safety in the Workplace, 2015 Edition

6.21 Ladders and Scaffolds

A. Walking and working surfaces including temporary flooring, scaffolds, platforms, roof surfaces, shoring, formwork, ladders, and stairs, must comply with the following:

1. OSHA 29 CFR 1926, Subpart L – Scaffolding Note: 6-foot fall protection rule applies to Scaffolding.
2. OSHA 29 CFR 1926, Subpart M – Floor and Wall Openings
3. OSHA 29 CFR 1926, Subpart Q – Concrete and Masonry Construction, Section 1926.703 (a), (b), and (c)
4. OSHA 29 CFR 1926, Subpart R – Steel Erection, Section 1926.750 in it's entirely. Note: 6-foot fall protection rule applies to Steel Erection.
5. OSHA 29 CFR 1926, Subpart X – Stairways and Ladders
6. ACI 347 – Guide to Formwork for Concrete
7. ANSI A10.1 - Safety Requirements for Concrete and Masonry Work.

B. The tree-points of contact safety rule shall be adhere to when ascending and descending either two hands and one foot or two feet and one foot on the ladder.

C. The Subcontractor will assign a Competent Person for scaffolding erection, dismantling, and inspection.

D. Subcontractor shall provide tags affixed to the scaffold and inspected per OSHA and ANSI. The color coding is as follows:

Scaffold Tag Color		Definition
Red		UNSAFE – Do Not Use
Yellow		Warning – Hazard Exists
Green		Ready to Use

6.22 Blasting

A. Blasting is not permissible on any construction project on site without prior approval of FFDG.

6.23 Visitors to the Construction Site

A. With the exception of DOE FSO personnel, all visitors, including FFDG personnel who are not directly involved with the Subcontract, entering a construction site must notify the CC/TM and Subcontractor's Field Superintendent.

B. All visitors must trained and escorted. All persons entering a construction site must wear the PPE identified in the HA and must possess the necessary training to safely enter the construction area.

Part 7 Specific Hazards and Elements of the Work

7.1 Protection of Existing Property

A. The Subcontractor shall preserve and protect all structures, equipment, and vegetation (such as trees, shrubs, and grass) on or adjacent to the work site, which are not to be removed and that do not unreasonably interfere with the work required under this Subcontract. The Subcontractor shall only remove trees when specifically authorized to do so and shall avoid damaging vegetation that will remain in place. If any limbs or branches of trees are broken during Subcontract performance, or by the careless operation of equipment, or by workers, the Subcontractor shall trim those limbs or branches with a clean cut and paint the cut with a tree-pruning compound as directed by FFDG.

B. Subcontractor shall protect pavement, including curbs and sidewalks, from damage. Unless the Subcontractor Documents provide otherwise, Subcontractor shall repair damage to pavement, including curbs and sidewalks, damaged in the course of its work. Dust, debris, mud, and litter on any roads caused by the Subcontractor's operations shall be cleaned by Subcontractor.

7.2 Waste Disposal/Recycling

A. Applicable statutes governing waste disposal include, but are not limited to, the Resource Conservation and Recovery Act, the Toxic Substances Control Act, the Hazardous Materials Transportation Act, the Environmental Protection Act/Solid and Special Waste Management Regulations, and the laws and regulations of any other state receiving regulated waste material generated during the performance of this Subcontract.

B. No trash burning, dumping, or disposal is permitted on SURF or DOE-leased property. Disposal of all trash and waste materials generated during the performance of this Subcontract is the responsibility of the Subcontractor and must be performed in compliance with all applicable federal, state, and local laws and regulations.

C. Off-site disposal of recycled materials, trash, debris, demolished material, pallets, crates, packing materials, rubbish, and all waste material is the responsibility of the Subcontractor.

D. The Subcontractor shall furnish all necessary dumpsters or containers to prevent dispersion of debris both within and outside of the construction site.

E. Recycling

1. The Subcontractor shall utilize a recycling waste hauler, obtain a report on percentage recycled by weight from the vendor, and submit the report to the CC/TM.

2. The goal for recycling construction and demolition waste is 80% based on weight, excluding metals restricted as described in the Subcontract Documents. The minimum

amount of recycled material is 50% as measured by weight, excluding certain metals restricted by the Subcontract Documents.

3. The Subcontractor shall submit a report that details the percentage, by weight, of recycled materials.

F. Regulated Waste:

1. Where regulated waste is generated, the Subcontractor shall immediately notify the FFDG Construction Representative; and

2. Unless otherwise specified in the Subcontract Documents, all regulated waste shall be disposed of in compliance with federal, state, and local regulations.

G. All construction waste shall be segregated for disposal and surveyed by the FFDG Radiation Safety group prior to leaving the site. Waste identified as radiological waste shall be stored at the railhead.

7.3 Pressurized Gas and Process Piping

A. The most common piping systems at SURF include Industrial Cooling Water, (ICW) Domestic Water System (DWS), Storm Sewer (SS), Heating Water (HW), Low Conductivity Water System (LCW), Chilled Water System (CHW), and Natural Gas (GAS). Other piping systems, such as Nitrogen, Helium, Argon, and pressurized air, are subject to specialized ES&H procedures and technical specifications coordinate those systems with the CC/TM.

B. Subcontractor must coordinate with the CC/TM for system outages for purposes of performing work on pressurized or process piping systems. Requests for outages must be made at least 48 hours in advance of the scheduled work.

1. Work on existing pressurized, in-service piping systems generally is not permissible. “Hot Tap” connections are not permissible unless: (1) the job specifies the need; and (2) the Subcontractor has submitted specific procedures and received FFDG approval.

C. Subcontractor shall relieve pressure on the entire piping system before opening it up and starting work. The Subcontractor will use LOTO procedures for all valves, blank-offs, and relief lines.

D. The Subcontractor will test new piping systems or additions in accordance with the drawings and technical specifications for the work.

1. The Subcontractor will review testing procedures with the CC/TM prior to the testing. Proper piping anchorage and support (e.g., thrust blocks, tie rods, retainers, and hangers) will be in place before the system test.

2. Upon test completion, the Subcontractor will follow the specified pipe cleaning procedures. The Subcontractor will also dispose of solvents and wash solutions according to the approved site-specific ES&H plan.

E. The piping system will be returned to service by reversing the above procedures of notification, inspection, system fill, and lock and tag.

7.4 Oxygen Deficient Hazards (ODH)

A. All Subcontractor and Sub-tier subcontractor personnel who must enter designated ODH areas must have and display a level of medical fitness acceptable to FFDG prior to entering those areas.

B. FFDG will assess the need for ODH training for Subcontractor personnel. If ODH training is necessary, FFDG will provide the trainer, free of charge.

C. Oxygen monitoring equipment will be supplied to the Subcontractor personnel as necessary. The Subcontractor is responsible for returning this equipment upon request or upon completion of the work.

D. FFDG will furnish emergency evacuation breathing equipment. Care, use, and the return of such equipment will be the responsibility of the Subcontractor.

7.5 Radiation Protection

A. When specified in the 010010 General Requirements, the CC/TM will advise the Subcontractor of the requirements and work practices if potential for radiation exposure affects the work scope.

1. If work is required within areas with a potential for radiation exposure, all Subcontractor and Sub-tier subcontractor workers accessing the affected area must receive FFDG radiological training in accordance with the FRCM and wear dosimetry monitoring badges or other devices as required.

2. FFDG will monitor excavations in areas suspected of radioactive soil conditions. The Subcontractor will allow access and time for these measurements. The Subcontractor will follow the prescribed procedures for material handling and segregation of designated material exactly as specified.

3. Workers will wear protective clothing when specified by the CC/TM. FFDG will furnish and collect this clothing.

4. CC /TM will guide and instruct the Subcontractor on procedures to wash-down and cleanup the Subcontractor's equipment. The Subcontractor will not remove equipment from site without prior inspection and approval by the ES&H Division.

B. Prescribed procedures for material handling and segregation shall be explicitly followed. Potentially radioactive material must be surveyed prior to removal from site. The CC/TM shall coordinate this survey.

C. The use of industrial radioactive testing sources is subject to monitoring and oversight by FFDG based on the following:

1. Nuclear density meters will be inspected at the construction site by FFDG ES&H personnel. Review for Department of Transportation compliance with survey and inspection requirements will be completed at that time.
2. When required by specification, Subcontractor use of radiography sources will require five (5) business days' advance notice to the FFDG Construction Coordinator. During this time, the Subcontractor shall submit to the FFDG Construction Coordinator documentation showing the Subcontractor's Nuclear Regulatory Commission or Agreement State license for the material.
3. When the source is brought to the SURF site, FFDG ES&H Representative will meet the Subcontractor, escort him/her to the construction site, and monitor the use of the source during the testing activity.
4. Any work with radiography will occur outside normal business hours.

7.6 Environmental Protection

A. All work on the SURF site shall comply with all applicable environmental Executive Orders, laws, regulations, and permits.

B. All Subcontractors and Sub-tier subcontractors shall conduct their activities in an environmentally sound manner that limits risks to the environment and protects the public health.

C. Prior to the start of earthwork, erosion controls will be in place where needed. Storm water diversions and erosion/sediment controls (including lined ditches, silt fences, and erosion matting) shall be installed per technical specifications or drawings.

1. Refer to SESC Plan requirements in this Section.
2. The Subcontractor will ensure that erosion control features comply with wetland/waterbody permits before excavating. The CC/TM will inform the Subcontractor if any wetlands are present in the work area and what protective measures are necessary.
3. Excavation at or adjacent to streams, tributaries, wetlands, or other surface waters shall be done only after notification to the CC/TM.
4. The Subcontractor will plan and sequence construction activities in conjunction with daily weather forecasts for the site. Excavation operations will not proceed beyond erosion control measures by more than 24 hours when severe or inclement weather is predicted.

D. Unexpected environmental impacts shall be immediately reported to the CC/TM and mitigated by the Subcontractor.

E. Storage of materials, plus maintenance and fueling areas used by the Subcontractor, shall be properly graded, and maintained, and shall be located a minimum of 100 feet away from a wetland or water body boundary so that adverse effects on the environment are eliminated.

1. Flammable or combustible liquids, fuels, and oils will not be stockpiled on the site beyond one-day usage unless approved by the CC/TM after consultation with the ES&H.
2. The Subcontractor shall make routine inspections to assure that all motorized equipment is free of leaks of petroleum and other toxic or hazardous materials. The Subcontractor shall keep sufficient cleanup supplies on hand (e.g., oil dry, absorbent booms, etc.) to contain/absorb any spill or leak of fuels, oils, etc. that could potentially leak from their equipment. If a spill or leak occurs, the Subcontractor shall immediately take appropriate steps to contain spills, move equipment out of sensitive areas (near wetland or water body) and immediately notify the CC/TM; and

F. At the close of each workday, the Subcontractor's Field Superintendent shall inspect the complete construction site to ensure that all erosion controls, drainage patterns, excavations, and staging areas are in environmentally sound condition for the weather conditions anticipated. This inspection will include the work of the Subcontractor as well as all the Sub-tier subcontractors. Any required correction will be immediate.

G. Notify CC/TM of products with known PFAS constituents.

7.7 Temporary Heating Devices

A. Open burning, fire barrels, coal or kerosene type salamanders, or open flame heating devices that have exposed fuel below the flame are not allowed on the SURF site.

B. Subcontractor shall provide spark arrestors on all stack or burning devices having forced drafts.

C. Only Nationally Recognized Testing Laboratory (NRTL) Approved temporary heating devices, vented to the outside, are permissible in any enclosed building room or structure.

D. Temporary heating devices shall be coordinated through the CC/TM.

7.8 Smoking

A. Smoking, including tobacco products and electronic smoking devices, are prohibited in locations where flammable or combustible materials are stored. "No Smoking" signs shall be posted in these areas.

B. Smoking, including electronic smoking devices, are prohibited in all SURF buildings, underground, and surface.

7.9 Fuel Storage Tanks

A. Above ground fuel storage tanks shall be double walled or provided with secondary containment. Location on SURF site shall be coordinated through the CC/TM. CC/TM shall coordinate location with ES&H.

1. Stationary, above-ground fuel storage tanks for construction vehicles are not permissible on the SURF site.
2. Fuel tanks mounted on vehicles are permissible as long as vehicle and fuel tank conform to the requirements of the South Dakota State Fire Marshal's Office and must be removed from the SURF site at the end of each workday. Refueling equipment while the equipment motor is running is prohibited.

B. Gasoline and propane are prohibited in the underground facilities.

C. Diesel fuel may be transported in approved containers underground for immediate refueling of vehicles.

D. Fuel tanks mounted on pick-up trucks shall be conform to state and local regulations.

E. The location preference of fuel storage tanks is to be staged on asphalt or concrete pavement whenever possible.

F. An emergency spill kit with sufficient quantities of absorbents and salvage drums must be available to control spill.

G. Call (630) 840-3131 immediately if spill or release occurs.

H. Refueling of equipment while the motor is running is prohibited.

I. During refueling from truck-mounted fuel tanks or with portable fuel cans, etc., a 10-pound (minimum) A-B-C dry chemical fire extinguisher must be present.

J. Smoking, open flames, or other sources of ignition shall be prohibited within 25-feet of dispensing area.

K. Maintenance and fueling areas used by the Subcontractor shall be properly graded and maintained and shall be located a minimum of 100 feet away from a wetland or water body boundary to avoid adverse effect on the environment.

7.10 Vehicles and Equipment

A. The Subcontractor shall comply with 29 CFR 1926.600, Subpart O.

B. Battery Safety Requirements for Underground Use: To limit the risk of uncontrolled fires, lithium-ion battery-powered equipment with battery capacity greater than 50 amp-hours is not permitted underground without prior approval from FFDG.

C. The following sets forth the minimum acceptable requirements for vehicles and equipment on SURF property:

1. All motor vehicles used to perform construction work (excluding cranes, earth moving equipment, and material handling equipment that are addressed below) are subject to all provisions of the South Dakota Vehicle Code and South Dakota Rules of the Road while operating on site. Operators must have an appropriate, valid driver's license

when operating vehicles on site. Seat belts are required to be provided and worn for the operators and passengers of all vehicles.

2. CC/TM will designate parking areas for motor vehicles used to perform Subcontract work.

3. Subcontractor shall coordinate with CC/TM for any interruption of normal traffic patterns or temporary road closings for movement of equipment or deliveries, and the Subcontractor shall use appropriate barricades and flagging. All roads shall remain open to emergency traffic at all times.

4. All equipment and vehicles shall be confined to operating along defined construction roads and approved access routes. Posted speed limit signs will be enforced.

5. All vehicles and mobile powered equipment, except automobiles and pickup trucks (unless required by Subcontractor), shall have reverse signal alarms (a.k.a. backup alarms) audible above the surrounding noise level. If backup alarms are not present on the equipment, a spotter (other than the driver of the vehicle) must be present to warn pedestrians and the drivers of other moving equipment.

6. If required by the equipment manufacturer, roll over protection structures shall be provided on vehicles.

7. Personnel lifts must be equipped with audible motion alarms. These alarms must be in operation and audible over the surrounding ambient noise when the lift is in use. Additionally, all lifts require two distinct actions in order to make the lift move in a forward or backward direction or in an upward or downwards direction. A foot pedal is considered one of the actions if independent of the other controls.

8. The equipment manufacturer must approve any modifications to equipment.

D. All hand and power tools must be checked prior to use on each shift to assure that they are maintained in a safe condition. Any deficiencies shall be repaired, or defective parts replaced, before continued use. FFDG CC/TM or ES&H Division may perform random inspections to verify compliance.

E. Earth Moving and Other Heavy Equipment

1. All earth moving and other heavy equipment used in the performance of construction work on site will be subject to the following regulations:

   a. OSHA 29 CFR 1926.600 – 1926.604 and 1926.606 – Motor Vehicles, Mechanized Equipment, and Marine Operations.

   b. All earth moving and other heavy equipment must have a back-up alarm.

2. Traffic on paved roads shall be restricted to rubber-tired vehicles. Where crawler mounted equipment is required to cross paved roads or areas, the pavement shall be suitably protected from damage to the satisfaction of the CC/TM.

3. Dust, debris, mud, and litter on any roads caused by the Subcontractor's operations shall be removed by the Subcontractor in a manner as indicated by the CC/TM.

F. Equipment inspection and modification.

1. The Subcontractor must inspect all heavy equipment before use on site, prior to use on each shift, and during use to make sure it is in safe operating condition. Defective equipment shall be removed from service.

2. The Subcontractor is to assure that regulatory inspection records are complete and up-to-date and that operating manuals are available.

3. In no case shall the original safety factor of the equipment be reduced.

4. All tools and equipment brought on site by the Subcontractor are subject to inspection by FFDG. Items found to be damaged or out of compliance shall be repaired or immediately removed from service and tagged out of service.

5. The Subcontractor shall not use custom fabrications (cylinder tank stand, material handling devices, lifting fixtures) unless Subcontractor submits appropriate certification by a licensed engineer to the FFDG CC/TM and receives FFDG approval prior to use.

7.11 Material Handling and Storage

A. All material handling and storage at the construction site will be subject to OSHA 29 CFR 1926 Subpart H – Materials Handling, Storage Use, and Disposal, Section 1926.250 through 252.

B. Subcontractor must submit certification by a licensed engineer to CC/TM, and obtain FFDG acceptance on the submittal, prior to Subcontractor's use of custom fabrications (cylinder tank stand, material handling devices, lifting fixtures.

7.12 Critical Lifts

A. A critical lift is based on DOE Standard 1090. A critical lift that meets any of the following:

1. Loss of control of the item being lifted would likely result in the declaration of an emergency.

2. The load or item is unique and, if damaged, would be irreplaceable or not repairable, and is vital to a system, facility, or project operation.

3. The cost to replace or repair the load item damaged would have a negative impact on facility, organizational, or DOE budgets to the extent that it would affect program commitments.

4. Lifts made with more than one crane/forklift. Exception: a tandem lift with synchronized overhead cranes that utilize one controller, as long as the item being lifted does not meet any other critical lift criteria.

5. Lifts made near electrical, ground, or overhead utilities.

6. Lift involves non-routine or technically difficult rigging arrangement.
7. Lifts over items that are considered critical to FFDG.
8. A lift shall be designated as a critical lift if:
    a. The lift exceeds 75% of the rated capacity of the crane, or
    b. The lift requires the use of more than one crane.
9. All lifting fixtures utilized in a critical lift will be required to be proof load tested per ASME B30.9, Section 9-6.6.2 titled Proof Load Requirements.

B. Subcontractor shall submit plans for critical lifts to the CC/TM for review. Subcontractor shall submit critical lift plans at least 1 week prior to the scheduled lift.

Part 8 Work Planning and Permits

8.1 General

A. For each separately definable construction activity (e.g., demolition, excavations, foundations, structural steel, roofing, electrical, mechanical, etc.) the Subcontractor shall develop at a minimum job Hazard Analysis (HA) prior to commencement of the associated work/definable feature. A definable work activity is a task which is separate and distinct from other tasks, has separate control requirements. A definable work activity may be identified by different trades or disciplines, or it may be work by the same trade in a different environment.

1. Hazard analysis documentation should include the requirement to develop critical lift plans for specific phases of demolition or installation activities. Within each definable work activity there may be other sub-phases of work which warrant separate HAs.
2. It will be the responsibility of the Subcontractor to determine the best break-down of separately definable activities and the subsequent work steps in order to produce clear, concise, and effective, HAs.
3. The Subcontractor HAs shall be kept at the worksite and available for review by FFDG Construction Coordinator ESH Coordinator.
4. The Subcontractor shall conduct an initial meeting that discusses the corresponding HA, the work tasks, and associated procedures and hazards with all affected parties to identify and coordinate logistics, controls, and communications required for the activity.
5. Each worker involved in that work must sign the HA before performing work.
6. If, while working, it is discovered that the controls addressed in the HA will not/do not provide adequate protection then the task at hand shall be stopped and not be continued until the hazards have been re-assessed, the HA updated, and adequate controls implemented. In these instances, the Subcontractor may make field changes

(i.e., red line, pen/ink changes) as needed to reflect changing conditions associated with the activity.

7. All affected Subcontractor personnel involved in the work being performed shall review each HA and subsequent updates/changes.

B. The CC/TM will identify all FFDG-required permits and will arrange for all necessary permits at no cost to the Subcontractor. Subcontractor shall request all permits (except for Excavation and Confined Space Permits) no less than two (2) working days prior to its need-by date.

C. FFDG also issues permits to perform certain work. Activities requiring FFDG-issued permits are:

1. Excavation.
2. Electrical work.
3. Existing Structure/Concrete Cutting and Coring.
4. Hot Work (Burning/Welding & Spark Producing).
5. Modification to drinking water, sanitary sewer systems, or Industrial Cooling Water.
6. Radioactive sources on site.
7. Working with/on radioactive material or working in radiation areas; and moving government- or FFDG-property off site

D. No work activity shall be performed without required permits.

E. The Subcontractor shall comply with all restrictions or provisions listed on permission/permits.

8.2 Excavation Permit

A. An Excavation Permit must be obtained before any displacement of ground surface, including excavating, digging, trenching, cutting, installing stakes or pins, etc. can begin at the construction site. No excavation shall proceed without an approved Excavation Permit, signed by the Subcontractor Competent Person and the CC/TM.

B. Excavation is defined as any man-made cut, cavity, trench, or depression in an earth surface, formed by earth removal. This includes directional drilling but does not include farm tillage operations.

1. A trench is a narrow excavation (in relation to its length) made below the surface of the ground. In general, the depth of a trench is greater than its width, and the width (measured at the bottom) is not greater than 15 ft (4.6 m).
2. If a form or other structure installed or constructed in an excavation reduces the distance between the form and the side of the excavation to 15 ft (4.6 m) or less

(measured at the bottom of the excavation), the excavation is also considered to be a trench.

C. The following requirements are associated with the Excavation Permit:

1. Subcontractor shall coordinate the preparation of the Excavation Permit application with the CC/TM.

2. Subcontractor shall designate an "Excavation Competent Person" as defined in OSHA 1926.650(b) prior to commencement of any excavation activities.

3. If the depth of the excavation is 20 feet or greater, Subcontractor must have an excavation plan prepared by a Qualified Person (i.e., licensed engineer). Subcontractor must submit the excavation plan to the CC/TM, and it must be accepted by FFDG.

   a. Subcontractor must protect edges of all unattended open excavations (including trenches) with barricades.

   b. Subcontractor must coordinate with the CC/TM to request that FFDG locate existing underground utilities.

4. Unless near accelerator operations, Excavation Permits must be requested no less than ten (10) working days before needed for areas less than one acre (208-ft x 208-ft). Excavation Permits near accelerator operations -- 100-ft from the center of the beamline -- must be requested no less than eighteen (18) working days prior to covered operations.

5. All soil is to be assumed Class C until proper testing methods (Plasticity, Thumb Penetration, or Pocket Penetrometer) have been used to classify the soil otherwise. These tests shall be documented by Subcontractor's Competent Person. Documentation of the soil tests shall be maintained with the associated Hazard Analysis.

8.3 Confined Space Permit

A. The minimum acceptable requirements for confined space work at SURF include:

1. The CC/TM shall identify all existing confined workspaces to the Subcontractor.

2. If Subcontractor is required to enter a permit-required confined space to perform Subcontract work, the Subcontractor shall submit the following information to the CC/TM at the pre-construction meeting or at least five (5) working days prior to entry:

   a. A written copy of the Subcontractor's safety program for work within confined spaces. The safety program must comply with:

      1.) ANSI Z117.1, Safety Requirements for Confined Spaces

      2.) OSHA 29 CFR 1910.146, 1926.21 (b) (6), and 1926.352 (g); 353 (b) and 1926 Subpart AA

b. Names of individuals who will perform specific functions for confined space entry including the authorized entrants and attendants, entry supervisor, and responders.

c. Training records for potential entrants, attendants, and Field Superintendent.

d. Evidence that all air monitoring equipment is properly calibrated within the calibration period specified by the Subcontractor's program or manufacturer's instructions. This may be in the form of a calibration log, certification indicator on the instrument, or other means. It is imperative that the equipment used by the Subcontractor be capable of monitoring for the contaminants associated with the confined space to be entered.

e. HA that includes:

1.) A list of PPE to be used in the confined space, such as lifelines, harnesses, respirators, tripods, and ventilators.

2.) All potentially hazardous energy sources within the confined space will be secured, relieved, disconnected, or restrained in accordance with the Subcontractor's LOTO Program and FFDG's LOTO program.

3.) SDSTA Emergency Response Team must be notified of when entry into confined space commences, coordinate through CC/TM.

B. It will be the Subcontractor's responsibility to provide all of their own PPE, such as lifelines, harnesses, respirators, tripods, ventilators, etc., as specified by the entry permit.

C. In addition to complying with the permit space requirements listed above, each Subcontractor performing confined space entry operations requiring a permit shall:

1. Obtain any available information regarding permit space hazards and entry operations from the CC/TM.

2. Coordinate entry operations with FFDG, when both FFDG personnel and Subcontractor personnel will be working in or near permit spaces.

3. Prior to entry, Subcontractor must:

a. Inform the CC/TM of the specific permit space procedures the Subcontractor will follow.

b. Inform the CC/TM prior to entering the space.

4. After entry, Subcontractor must:

a. Inform the CC/TM of any unanticipated hazards encountered during confined space entry.

b. Provide the TM/CC with a copy of the Subcontractor's confined space permit, confined space reclassification form, or written certification once the work has been completed.

D. Per OSHA 1910.146 (c) (5), if the subcontractor can demonstrate that continuous forced air ventilation alone is sufficient to maintain safe entry conditions, then the job specific confined space entry procedures can be modified by the CC/TM and ES&H Representative.

8.4 Hot Work (Burning, Welding, including Spark Producing) Permit

A. Hot work is a process that involves welding, soldering, brazing, cutting, grinding, drilling, and burning or melting metals or other substances such as glass. Use of open flame, sparks, or such ignition tools are considered hot work procedures. These types of work are fire hazards whether flammable material is present or not. Hot work procedures require a hot work permit.

B. The CC/TM will contact ES&H to secure the Hot Work Permit once the site has been prepared for the hot work.

1. Members of the ES&H will meet with the CC/TM and the Subcontractor's Field Superintendent and examine the proposed operation, prescribe the precautions, assure appropriate instructions are understood, and then issue a written Hot Work Permit.

2. The Subcontractor must arrange for fire watches during burning, welding, or other fire or spark generating work.

   a. The fire watch shall be trained to recognize the inherent hazards of the work site and hot work operations.

   b. The fire watch shall ensure safe conditions are maintained during hot work operations.

   c. The fire watch must have fire extinguisher equipment, at a minimum a 10-pound (minimum) A-B-C dry chemical fire extinguisher with a pressure gauge readily available and shall be trained in its use. The extinguisher must be located in clear sight and no farther than 50 feet from the work areas.

   d. Subcontractor shall verify that the fire extinguisher has current annual and monthly inspections, and the appropriate hydrostatic test as necessary, in accordance with NFPA 10.

   e. This fire watch must continue for a minimum of thirty minutes after work is complete. Subcontractor must verify appropriate training of the fire watch including fire extinguisher training.

3. All (Hot Work) welding, burning, brazing, flame cutting, or spark producing operations will comply with:

   a. OSHA 29 CFR 1910, Subpart O – Welding, Cutting, and Brazing

b. OSHA 29 CFR 1926, Subpart J Welding and Cutting

c. American Welding Society (AWS) Standard: Safety in Welding and Cutting, and Allied Process, ANSI/ASC Z49.1

d. NFPA 51B, Standard for Fire Prevention During Welding Cutting and Other Hot Work

4. NRTL listed check valves shall be installed on oxygen-fuel torch cutting equipment at the tanks.

5. If conditions related to the hot work activities change, the FFD must be contacted to review and reissue the Hot Work Permit.

6. Subcontractor shall not disable or shield a fire detection system to avoid accidental alarms activated by welding, burning, or brazing activities except as authorized in a Hot Work Permit.

8.5 Electrical Work

A. Manipulative energized work on electrical equipment is not allowed unless justified. If the energized work is justified by the CMO, the TM/CC will complete the Electrical Hazard Analysis / Work Permit and receive approvals prior to working on energized electrical equipment and obtain approval from the FFDG Directorate prior to the manipulative energized work commences.

1. Exemptions:

a. This excludes manipulative energized work on equipment source operating at 50 or less direct current or 50 volts alternating current or is unable to supply more than 0.005 amperes of current under normal or fault conditions.

b. Diagnostic energized work on electrical equipment is allowed when justified by the CMO and when performed by qualified persons. When performing such work, the worker shall be protected from any associated electrical hazards including shock and arc-flash.

B. The following sets forth the minimum acceptable requirements for work on non-energized electrical systems.

1. All electrical work shall be performed in accordance with NFPA 70E, Standard for Electrical Safety in the Workplace.

2. Subcontractor personnel must be trained in LOTO prior to participating in LOTO of hazardous energy sources and working on LOTO systems or equipment.

3. LOTO procedures will be used on ALL electrical systems to ensure personnel safety in accordance with NFPA 70E other than those exempted under 8.5.A.1.a.

C. Subcontractor shall provide ground fault circuit interrupter protection for electric hand-held tools, portable generators, temporary electrical extension cords and other wiring, etc. The assured equipment-grounding program is not an acceptable alternative at SURF.

1. All electrical tools and equipment brought onto the SURF site shall be listed by a Nationally Recognized Testing Laboratory (NRTL) and shall be used in accordance with their listings and manufacturer instructions.

2. Flexible cords must be rated for the hazard or extra hazard usage, in accordance with National Electrical Code, Table 400.5(A). Marking on such cords would be S, ST, SO, and STO. Appropriate markings for hard service are SJ, SJO, SJT, and SJTO.

3. Relocatable Power Taps (RPTs), also referred to as power strips, are prohibited in construction areas.

D. Ground Fault Circuit Interrupters (GFCIs) are the only accepted method to protect construction workers from an electrocution hazard when using handheld power tools. Subcontractors and their Sub-tier subcontractors will supply portable GFCIs for their workers to use if protected circuits are not available.

E. All temporary electrical distribution provided and installed on the construction site by the Subcontractor will comply with applicable sections of:

1. OSHA 29 CFR 1910, Subpart S – Electrical

2. OSHA 29 CFR 1926, Subpart K – Electrical

3. National Electrical Code (NFPA 70)

8.6 Existing Structure/Concrete Cutting and Coring

A. Subcontractor must coordinate with the CC/TM to request that FFDG locate existing utilities in concrete walls, floors, ceiling (deck).

B. Subcontractor must provide for silica monitoring, reference Attachment D for further guidance.

8.7 Modification to Drinking Water, Sanitary Sewer Systems, or Industrial Cooling Water

A. The Subcontractor must coordinate with the CC/TM to obtain the necessary approvals prior to modifications or extensions to the domestic drinking water, sanitary sewer systems, or industrial cooling water system.

8.8 Work with Radioactive Material or Radiation Areas

A. The subcontractor will diligently follow all special procedures described in the drawings and technical specifications relative to construction work in radioactive soil or at existing structures.

B. Unless specified in 010010 General Requirements, all workers will receive the FFDG Radiological Worker Training.

C. The Subcontractor will follow the prescribed procedures for material handling and segregation of designate material exactly as specified.

D. The Subcontractor will not remove equipment from site without prior inspection and approval of the Radiological Safety Officer coordinated through the CC/TM.

E. Any radiological equipment coming to site, such as geotechnical engineering tool containing a radiological source for such uses as an example soil density meter requires pre-approval from the Radiological Safety Officer coordinated through the CC/TM.

8.9 Moving Government-Owned or FFDG-Owned Property Off Site

A. The Subcontractor will not remove any government -owned or FFDG-owned property off-site unless approved by CMO.

Part 9 Emergencies, Incident Management, Investigations, and Reporting

9.1 Safety Pause/Stop Work Authority

A. If unsafe behavior or potential environmental release is observed, any FFDG or Subcontractor worker shall implement a Safety Pause of the task activity and inform the CC/TM and Subcontractor's Field Superintendent. If possible, Subcontractor shall take immediate action to remedy the issue in the field.

1. An example of an issue warranting a Safety Pause is two extension cords daisy-chained together.

2. The CC/TM is the only person with authority to re-start work after a Safety Pause.

B. If the hazard cannot be abated in a timely manner, the work activity shall be stopped through the use of a Stop Work Order issued by the FFDG PS in accordance with FFDG General Terms and Conditions for Construction.

1. Work shall not be permitted to continue until the hazardous situation has been eliminated and the FFDG PS has issued a Restart Work Order.

2. If the issue involves systemic issues with multiple work activities or an immediate danger to life, health, or the environment that cannot be corrected by immediate action in the field, FFDG may require Subcontractor to submit a written corrective action plan before issuing a Restart Work Order.

9.2 Reporting Requirements

A. Emergencies: All emergencies occurring at site must be reported immediately by dialing 911 if you're on the surface. If underground, dial the Duty Officer at 1-605-639-1184, or by Femco Pager Phone, or the Emergency Response Team at 1-605-722-4045. The types of emergencies to be reported include:

1. injury or illness requiring emergency care,

2. fire,
3. explosion,
4. security incident,
5. vehicle accident,
6. radiation incident,
7. utility failure,
8. tornado sighting, and
9. hazardous material spill or release.

After emergency is stabilized, contact the CC/TM.

B. Non-Emergencies (or All Other Incidents): All incidents, including any injury/illness, any non-emergency incident and near misses must be reported immediately to the CC/TM. FFDG shall determine if the incident scene shall be preserved and secured by the Subcontractor to enable FFDG and DOE to conduct any necessary investigations. After any necessary emergency response is made, notify the CC/TM. The scene shall be left unchanged and protected until the CC/TM releases the incident site for work to continue.

C. Investigation and Reporting:

1. Subcontractor will report and maintain an accurate record of all injuries/illnesses occurring on the SURF site. OSHA Form 300, 29 CFR 1904, will be used for this record.
2. The Subcontractor must investigate all injuries/illnesses and incidents (including near misses) to the CC/TM.
3. The Subcontractor shall submit a preliminary report to the CC/TM within 24 hours that includes the injured employee's name and Fermi ID number, project name, initial description of occurrence. The Subcontractor will use their internal accident/incident report forms found in their accepted ES&H Program.
4. The Subcontractor shall submit a final written report of an investigation within 72 hours of an incident. The investigation must include root causes, corrective actions, and preventive measures. If additional information is identified after submission, updated reports shall be provided to the CC/TM.

9.3 Fire

A. The CC/TM will designate a safe location for evacuation of Subcontractor personnel in the event of a fire.

B. All fires will be reported immediately by calling (911 if you're on the surface. If underground, dial the Duty Officer at 1-605-639-1184, or by Femco Pager Phone, or the Emergency Response Team at 1-605-722-4045.

9.4 Emergency Egress and Severe Weather

A. The following sets forth the minimum acceptable requirements for emergency egress and severe weather protection at SURF:

1. Severe weather shelter locations and specific evacuation procedures and routes will be provided by the CC/TM.

2. All emergency egress routes must be kept clear at all times.

B. The Subcontractor shall communicate egress routes and severe weather shelter to their employees and all Sub-tier subcontractors.

9.5 Concern Reporting Process

A. Whistleblower Protection for Subcontractor Employees

1. The Subcontractor shall comply with the requirements of the "DOE Contractor Employee Protection Program" at 10 CFR Part 708.

2. The Subcontractor shall insert or have inserted the substance of this clause, including this paragraph (b), in Sub-tier subcontracts, at all tiers, with respect to work performed on any construction worksite at a DOE-owned or leased facility, as provided for at 10 CFR part 708.

3. Concern Reporting Processes - Subcontractor employees on the worksite are entitled to use any of the means available to communicate concerns about ES&H conditions and practices. Information about concern reporting is available on ES&H bulletin boards throughout the job site and shall be included with FFDG-provided materials for the worksite postings for this construction subcontract. The options for reporting concerns include:

a. FFDG Concern Reporting System

Telephone: (866) 921-6714 (USA)
https://app.integritycounts.ca/org/fermilab

b. DOE Concern Reporting:

Telephone: (630) 840-3281
Email: EmployeeConcerns@science.doe.gov

9.6 Enforcement

A. Under 10 CFR 851 and 10 CFR 835, The United States Department of Energy has the authority to pursue enforcement actions and assess civil penalties against any Subcontractor or Sub-tier subcontractor who violates any requirements of the applicable regulations.

B. If any violation is a continuous violation, each day of the violation shall constitute a separate violation for the purpose of computing the civil penalty specified in the regulations.

END OF SECTION

ATTACHMENT A SILICA GUIDANCE

I. Purpose: To protect employees, subcontractors, sub-subcontractors, sub-tier contractors, the public, environment, and property from the detrimental effects of dust and respirable crystallinesilica generated by construction, restoration, and maintenance activities.

A. As required by 29 CFR 1926.1153, subcontractors must have a written silica exposurecontrol plan. The plan shall be submitted to Fermi Forward Discovery Group, LLC (FFDG) and include:

i. Tasks performed that involve exposure to respirable crystalline silica.

ii. Engineering controls, work practices and respiratory protection used to limitemployee exposure to respirable crystalline silica.

iii. Housekeeping measures used to limit employee exposure to respirable crystallinesilica.

iv. Procedures used to restrict access to work areas to minimize the number ofemployees exposed to respirable crystalline silica.

B. FFDG and its subcontractors are required by law, 10 CFR 851, to comply with the AmericanConference of Governmental Industrial Hygienists (ACGIH) threshold limit value (TLV) of 0.025 mg/m^3 for an 8-hour time-weighted average (TWA).

C. Subcontractors must comply with the requirements outlined in the Guidance for Silica Worktable at the end of this Appendix, unless the subcontractor has air monitoring data or other objective data sufficient to accurately characterize employee exposures to respirable crystalline silica.

II. Controls: In all cases, engineering controls that reduce dust at the source where it is being generated shall be the control of choice. The subcontractor must document how that determinedthat controls are valid.

A. Safety and Effectiveness of Dust Control Systems

i. Procedures shall be implemented to ensure that dust control systems maintain theireffectiveness for dust reduction throughout the work activity.

ii. Dust control system shall be installed, operated, and maintained in accordance withmanufacturer recommendations when there are such.

iii. When electrical tools are used with water as dust control system, it shall be done inaccordance with applicable requirements of electrical safety.

iv. Respirators shall be worn until effectiveness of dust control system are proventhrough industrial hygiene monitoring.

B. Dust Collection/Management

i. Dust shall be contained and disposed of in bags that can effectively hold dustwithout breaking.

ii. Work surfaces and clothing shall be cleaned with vacuums and not by dry sweepingor the use of compressed air.

iii. Respirators shall be worn when changing out bags or handling dust.

III. Evaluating the Effectiveness of Controls

A. As soon as possible after the beginning of cutting or grinding tasks, the subcontractor shallconduct personal air monitoring or workers performing the cutting/grinding work activities. An industrial hygienist shall perform the monitoring and must be consulted prior to the execution of work.

B. Once initial monitoring is performed to assure the effectiveness of controls, then workactivities can continue without additional monitoring.

C. The Subcontractor shall conduct daily visual inspections of the site for the presence of visible dust that appears during grinding and cutting work activities. The presence of suchdust is a sign that the controls are not performing as intended.

D. A copy of the monitoring results/report shall be submitted to FFDG.

IV. Training: Operations include using powered tools or equipment to cut, grind, core, or drillconcrete or masonry materials, and the following training is required:

A. Proper use and maintenance of dust reduction systems, including the safe handling anddisposal of waste materials collected with their use.

B. The importance of good personal hygiene and housekeeping practices when working inproximity to dust from concrete and masonry materials including not smoking tobacco products including e-cigarettes, appropriate methods of cleaning up before eating, and appropriate methods of cleaning clothes.

C. Have training, medical evaluation, and fit-test documentation/records on site for workers thatare using respirators.

GUIDANCE FOR SILICA WORK -				
Type of Work	**8-hour Duration/Scope**	**Location (general)**	**Required Controls***	**Notes**
Grout/mortar mixing	≤ 7 bags	Inside or Outside	D	Keep employees upwind of dustwhen outdoors.
Grout/mortar mixing	> 7 bags	Inside or Outside	A, C, D	
Shoveling sand	Any	Outside	B	Keep employee upwind of dustwhen outdoors
Hole drilling ≤ 1/4 in diameter	< 4 holes	Inside or outside	None	Use HEPA vacuum for housekeeping (no sweeping)
Hole drilling ≤ 1/4 in diameter	> 4 holes	Inside or outside	A or B	Use HEPA vacuum for housekeeping (no sweeping)
Hole drilling > 1/4 in diameter	Any	Inside or outside	A or B	B is for horizontal surfaces only
Coring	Any	Inside or Outside	B	Respirator required if using HEPAvacuum
Saw cutting - chop saw	Any	Inside or Outside	B, C, D	
Saw cutting - hand held saw	< 1 linear ft.	Outside	B, C, D	
Saw cutting - hand held saw	> 1 linear ft.	Outside	B, C, D	
Saw cutting - walk behind saw type equipment	Any	Outside	B, C, D	
Surface finish	Any	Inside or outside	A, C or B, C, & D	
Joint compound sanding	> 1 linear ft.	Inside or outside	A, C, D	Some new joint compounds aresilica free
Tuck Pointing/Grout repair - Hand tools	Any	Inside or outside	B, D	
Tuck Pointing/Grout repair - Power tools	Any	Inside or outside	A, C, D	
Jack Hammering	Any	Outside	B, C, D	
Concrete Demolition using Heavy Equipment (enclosed cab)	< 4 continuous hours	Outside	B, C	Sprayer must wear respirator or contact IH through ConstructionCoordinator
Concrete Demolition using Heavy Equipment (enclosed cab)	> 4 continuous hours	Outside	B, C	Sprayer and operator must wearrespirator or contact IH through Construction Coordinator
*Controls - NOTE: OTHER PPE WILL BE REQUIRED FOR ADDITIONAL HAZARDS				
A = Manufacturer's local exhaust ventilation on tool or HEPA Vacuum at Point of Operation				
B = Water to eliminate visible dust				
C = Respirator with P100 HEPA and face piece scaled for anticipated exposure				
D = First aid flush of eye contamination				
If work activity is not on this list, contact FFDG ES&H Coordinator and/or ConstructionCoordinator.				

ATTACHMENT B a.

Daily Work Planning

Project:_____
Subcontractor_____

Permits Required

- ☐ None
- ☐ Penetration Permit
- ☐ Excavation Permit
- ☐ Confined Space EntryPermit
- ☐ Hot Work Permit-Fire (flame or sparks)
- ☐ Radiological Work Permit
- ☐ Traffic Control Plan
- ☐ Hoisting and Rigging Plan
- ☐ Electrical Work Plan
- ☐ Energy Isolation Plan
- ☐ Elevated Surface WorkPlan
- ☐ Pressure Test Plan
- ☐ Other _____
- ☐ Other _____

b. Discussion & Review Checklist

- ☐ What activities will be performed today?
- ☐ Are there any modified or different activities or equipment being usedtoday?
- ☐ Do all workers have adequate PPE for working on the site and during their individual activities?
- ☐ Have high-hazard activities been identified and evaluated and have controls been established?
- ☐ Has relevant information from the HA(s) been included in today's work plan and discussion?
- ☐ Do all workers understand FFDG's safety expectations, including stop work?
- ☐ Is the construction area organized and free of trip hazards and debris?
- ☐ Have all work activities been identified and coordinated between allSub-subcontractors?
- ☐ Will weather conditions impact safety or any work being performed today?
- ☐ Are there any hazardous waste containers or bins needed for today's work?
- ☐ Are all required permits and plans submitted and approved for today'swork?
- ☐ Is access by non-construction personnel to all construction areascontrolled?
- ☐ Are all workers qualified for the tasks that they will perform today?
- ☐ Have first aid and emergency resources / procedures been identified?
- ☐ Do all workers understand the entire scope of work that will be performedon site today?
- ☐ Other: _____
- ☐ Other

c. _____

Required Inspections

- ☐ Excavation / shoring inspection
- ☐ Heavy equipment inspection
- ☐ Fall protection
- ☐ Scaffolding
- ☐ Rigging
- ☐ Other _____
- ☐ Other _____

d. Notes:

e.

f.

g.

Tasks for the Day	Potential Hazards	Controls

Attendance Sheet

Name (Please Print)	Initial	Company Name

Competent Subcontractor's Representative:_____ Date: _____

ATTACHMENT C – Construction Environmental, Safety, & Health Certification (CESHC)

INSTRUCTIONS

This Construction Environmental, Safety & Health Certification (CESHC) is required for each construction project at DOE's Fermi National Accelerator Laboratory site (Fermilab) or DOE Leased Space. See Technical Specification 013100 for further information.

This document is a template for the CESHC designed to assist construction subcontractors in describing project conditions and developing project-specific hazards and controls information. The CESHC template is available in electronic format to facilitate editing.

The prime subcontractor may *either* flow down this requirement to each of its subcontractors; or serve as a control and coordination point, requiring all subcontractors' activities to be conducted under the prime subcontractor's solitary CESHC.

Subcontractors must submit the completed CESHC to the FFDG Procurement Office, which will distribute the document for review and concurrence by the FFDG ES&H and Project Management teams prior to work commencing. The CESHC is intended to be a living document, which may be updated as necessary throughout a project as information changes or as the project progresses (e.g. – as additional Task/trade Hazard Analyses are developed, subcontractors added, etc.).

All of the sections in are required to be completed for each construction project, regardless of the size or complexity. Enter information in all of the fill-in blocks that are applicable. For those that are not applicable, enter "N/A" or other suitable explanation.

10 CFR 851 Acknowledgement

Because the space at South Dakota is Department of Energy site, your company must meet the Department of Energy requirements of Title 10, *Code of Federal Regulations*, Part 851, "Worker Safety and Health Program" (Link to 10 CFR 851). It is your responsibility to ensure you have read and understand the actual regulatory requirements. Specify medical surveillance and qualifications. This may include Occupational exposure monitoring.

Construction Environmental, Safety & Health Certification(CESHC)

ACKNOWLEDGMENT of 10 CFR 851			
As a subcontractor to FFDG, while your workers are physically located at SURF you must meet the requirements of Title 10, *Code of Federal Regulations*, "Energy", Part 851, "Worker Safety and Health Program" (10 CFR 851). As such, you must be aware of, and comply with, the requirements of this regulation. (Link to 10 CFR 851)			
Acknowledgment	I, (the author of this CEHSC), certify that that I have read the requirements of 10 CFR 851 and attest that my firm and its sub-tier contractors will comply with the requirements of 10 CFR 851.	Yes	No
		☐	☐
MEDICAL SURVEILLANCE AND QUALIFICATION			
Occupational Medicine	Will you have any employees that will work on-site at SURF for 30, eight-hour days in a 12-month period, or are enrolled for any length of time in a medical or exposure monitoring program required by federal, state, or local regulations (including hearing conservation, respiratory protection, lead exposure)?	Yes	No
		☐	☐
	If yes, you will need to: 1. Comply with the occupational medicine requirements of 10 CFR 851, Appendix A 2. Provide your occupational medicine provider contact information		

Clinic Information	Clinic Name & Address:	Enter telephone number:	Enter e-mail address:(Optional)

Required Medical Surveillance		**Task-specific medical testing**
DOT/Commercial Vehicle Hearing Conservation Fit for Duty Substance Abuse Testing	Blood Lead Respirator User Other(s) List other(s)	List specific task(s) requiring medical surveillance:

Signature (Subcontractor)	Dated	Signature (FFDG)	Dated

Attachment D – Sample Hazard Analysis

DUNE DEEP UNDERGROUND NEUTRINO EXPERIMENT	JOB HAZARD ANALYSIS	Document Control ID:	
		Date:	Revision #:
		Owner:	

HEADER: Title

Title:

WHERE: (Location, Access Points)

Area:

WHAT: Description of Work:

WHO:

PREPARED BY (Print Name):		**SIGNATURE:**	**AFFILIATION**	**DATE:**
ESH Reviewed By:	☐ ACCEPT ☐ REJECT	**SIGNATURE:**	**AFFILIATION**	**DATE:**
Rejection Reasons				
AUTHORIING SUPERVISOR (Print Name):	☐ ACCEPT ☐ REJECT	**SIGNATURE:**	**AFFILIATION**	**DATE:**
Rejection Reasons				

Emergency Contact #s: Underground: Duty Officer: 605-639-1184 Other #'s: ☒ Ross Hoist Op. 605-722-4881 ☐ Yates Hoist Op. 605-722-1037
☐ Surface: 911 if fire or medical emergency services are needed; otherwise: 605-639-1184 ☒ Duty Officer: 605-639-1184 Other #'s:

RISK ASSESSMENT SUMMARY

***Industrial Hazard*:**	
☐ Flammable Gas Areas	☐ Steel Erection
☐ Chemical Exposure (Chemical use, cleaners, solvents, adhesives, etc.)	☐ Fall Exposures > 4ft (>6ft for construction)
☐ Heat Stress / Cold Stress	☐ Powered Industrial Truck (e.g. forklift)
☐ Overhead Hazard (Working above others)	☐ Mobile Crane
☐ Overhead Crane	☐ Critical Crane Lift or Crane Personnel Basket
☐ Mobile Elevating Work Platform (MEWP)	☐ Rotating Equipment
☐ High Pressure air / fluids	☐ Ladder Use
☐ Welding / Cutting / Brazing / Grinding	☐ Scaffold Erection / Scaffold Use
☐ Confined Space	☐ Chemical Use (cleaners, solvents, adhesives, etc.)
☐ Silica (machining – concrete, grout, mortar, etc.)	☐ Ergonomics (overexertion, repetition, lifting)
☐ Radiation Work	☐ Loud Noise (continuous, instantaneous)
☐ Lasers	☐ Potential Oxygen Deficiency – ODH 1 or 2 areas
☐ Manipulative Energized Work (Requires Electrical Permit)	☐ Other Hazards not listed_____
☐ Diagnostic Energized Work (LOTO Verification)	
Environmental Hazard:	
☐ Impact or release to surface, sanitary, or ground water	☐ Use of Oil (> 55 gal) or new oil filled equipment
☐ Generation of regulated waste (hazardous, special, universal)	☐ Release of a chemical or use of a new chemical
☐ Impact to new or existing air emission sources, including equipment/generators	☐ Use of refrigerants
	☐ Impact to a naturally sensitive area or historical site

SAFETY MITIGATIONS - CONTROLS

☐ Danger or caution tape & signage	☐ Barricades – solid
☐ Barricades - soft (caution tape)	☐ Road Closure
☐ Soil/erosion control	☐ Site dust control
☐ Other Controls not listed here?	☐ Safety Barricade
☐ Construction Fence / Snow Fence	☐ Lock Out / Take Out
☐ Safety Data Sheet(s) (SDS)	☐ Hot Work Permit
☐ Eyewash	☐ Working from Heights Permit (Required when Body Harness is Used)
☐ Emergency Shower	☐ Fall Rescue Plan
☐ Temporary Lighting	☐ Electrical Work Permit (FESHM Chapter 9120)
☐ Confined Space Permit	☐ Temporary Ventilation

BODY MOTION: (Check all hazards that may exist)

☐ Lifting ☐ Grasping ☐ Pushing ☐ Pulling ☐ Bending ☐ Kneeling ☐ Reaching ☐ Squatting ☐ Standing ☐ Sitting ☐ Carrying ☐ Climbing
☐ Twisting ☐ Other _____

PERSONAL PROTECTIVE EQUIPMENT (Check all protective equipment required for the work task)

Head	☐ Hardhat with lanyard ☐ Safety Helmet with Chin Strap ☐ Camp Lamp
Eyes/Face/Neck	☐ Safety Glasses with Side Shields ☐ Safety Goggles ☐ Face Shield ☐ Welding Googles/Helmet
Respiratory	☐ Respirators (air purifying), cartridge half face mask – Specify type of cartridge _____ ☐ Respirators (air purifying), cartridge full face mask – Specify type of cartridge _____ ☐ Respirators - supplied air
Ears/Hearing	☐ Single Protection (Ear Plugs) ☐ Double Protection (Earmuffs with Ear Plugs)
Hands/Arms	☐ Gloves – leather ☐ Gloves - chemical ☐ Gloves – Anti-Static ☐ Gloves - electrical ☐ Gloves – Cryogenic ☐ Gloves – Nitrile ☐ Long Sleeve Shirts Arm - cut protection
Body	☐ Tyvek Coveralls ☐ High visibility clothing ☐ Long Sleeve Shirts ☐ Long Pants without Cuffs ☐ Apron – Cryogenic ☐ Leg - cut protection ☐ Whole body – electrical ☐ Whole body - Dust, chemical, heat ☐ Fall Protection
Feet	☐ Steel-toed boots ☐ Tyvek Boot Covers ☐ ESD (Anti-Static)

EQUIPMENT REQUIRED FOR THE JOB: (List the tools/equipment required to perform the job and any *special* requirements for use or storage of the equipment)

☐ Radio Communication ☐ Fire Extinguisher ☐ Fire Extinguisher ☐ Fire Blankets (Welding) Retardant Traps ☐ Lifeline ☐ Safety Cable ☐ Absorbent Panes ☐ Spill Kit
☐ Self-Retracting Lifeline w/ Leading Edge Protection ☐ Lock Out/Tag Out Devices ☐ Containment Pans ☐ Scissor Lift ☐ Aerial Lift (Working form height Permit Required)
☐ Hoisting Equipment ☐ Other _____

TRANSPORTATION AND HANDLING OF EQUIPMENT: (Describe how equipment/items will be transported to the location)

If use of a forklift or rail system is required, check the appropriate box ☐ Forklift ☐ Rail system ☐ Other:_____

IMPACT AND TESTS: (List any impacted area, systems, alarms, machines, tests, etc.)

HOW: (*Utilizing the format below, identify hazards and environmental aspects, and their corresponding safety precautions/procedures/controls to mitigate each hazard. Use as many sheets as necessary.)*

Step	Work Steps	Environmental, Safety or Health Hazards	Environmental, Safety or Health Precautions / Procedures / Controls
1			
2			
3			
4			
5			
6			
7			
8			
9			
10			

My supervisor has reviewed this hazard analysis with me and I understand the hazards and required precautionary actions. I understand that there are Environment, Health and Safety Professionals on staff if I need further assistance or clarification. By signing below, I agree to the following:

- *I agree to follow the work steps and implement the controls as written or notify my supervisor if I am unable to do so.*
- *I agree to stop work when conditions or hazards change or when I encounter unexpected conditions during the execution of work, or when work cannot be performed as written, or instructions become unclear during execution.*

I confirm that I am authorized, qualified, and fit to perform the work.

Print Name	Affiliation	Signature	Date

Attachment E – Sample Work Activity

DUNE DEEP UNDERGROUND NEUTRINO EXPERIMENT	WORK ACTIVITY PLAN	Document Control ID:	
		Date:	Revision #:
		Completed By:	

TASK: Title

Description:

OPERATIONAL STEPS FOR THIS BUILD PLAN

Step No.	General Step to Perform Task
1	
2	
3	
4	

LIFE CHANGING CATEGORIES	
☐	WORK FROM HEIGHTS
☐	LIFTING AND RIGGING
☐	CRANE(S)
☐	HUMAN EQUIPMENT INTERFACE
☐	UTILITIES
☐	ENERGY ISOLATION

GO TO WORK CHECKLIST	Yes	N/A
Job Hazard Analysis	☐	☐
Standard Operating Procedure	☐	☐
Hot Work Permit	☐	☐
Fall Protection Permit	☐	☐
Hold Points	☐	☐
Engineering Design(s)	☐	☐

REVIEWED / APPROVED BY:

	LBNF/DUNE ESH Coordinator	Lead	Installation Manager
Name:			
Date:			
Signature:			

SIX ELEMENTS OF WORK

EQUIPMENT

MATERIALS

TOOLS

ACCESS

PEOPLE (Crew size & Special Skills Required)

Day Shift

Evening Shift

TRAINING REQUIRED

SKETCH

STEP 1:

Description:

Critical Information:

List SOP and/or JHA
Include Hold Points when necessary

Attachment F – Working at Heights Permit

Working at Elevated Heights Permit

This Form to be Displayed at work activity area

Permit Requestor / Competent Person: 1) _____	2) _____
Others – Safety Standby / Rescue: 3) _____	4) _____
Specific Location: _____	Equipment _____
Description of Work: _____	Have alternative to using fall arrest been considered ☒ Yes ☐ No
Type of System being used (choose all that apply):	☐ Fall Arrest ☐ Fall Restraint ☐ Use of Dual Lanyards
Components used for Fall Arrest / Fall Restraint:	☐ 5 Point Harness Trauma Straps in use ☐ Yes ☐ No
☐ Self-Retracting Lifeline (SRL) ☐ Other _____	☐ Anchorage type: _____
Check additional forms required	

	Fall Arrest / Fall Restraint Considerations		Completed By
SECTION A	Has a written Job Hazard Analysis or Standard Operating Procedure been Completed?	☐ Yes ☐ No	
	Has a competent person surveyed the work area and reviewed the Job Scope?	☐ Yes ☐ No	
	Have all Anchor points been evaluated and been deemed capable of supporting 5,000 lbs. of shock load, or 1,000 lbs. for fall restraint?	☐ Yes ☐ No	
	Anchor points must be identified and documented in Work Activity Plans, JHAs, and SOPs.	☐ Yes ☐ No	
	Have all SRL and Connecting Device Lengths been selected such that the individual will not strike anything below in the event of a fall?	☐ Yes ☐ No ☐ N/A	
	If scaffold is being used, has it been properly erected, inspected, and tagged with the required information?	☐ Yes ☐ No ☐ N/A	
	Have all open holes larger than 1-ft x 1-ft been barricaded?	☐ Yes ☐ No ☐ N/A	
	Are personnel keeping safe distance from power cables?	☐ Yes ☐ No ☐ N/A	
	Rescue Plan (Required for Fall Arrest Only, Not Applicable for Fall Restraint)		
SECTION B	Have the most likely rescue scenarios been planned for and discussed?	☐ Yes ☐ No	
	Is a Safety Standby Person present to notify Rescue Personnel in the event of a fall?	☐ Yes ☐ No	Name:
	Is the required Fall Rescue equipment available, inspected and ready for use? ***If yes – check type*** ☐ Self-Rescue (*falls of less than 3-feet or with special gear*) ☐ Rescue Kit / rope & pulleys ☐ Mechanical Aerial Lifting Equipment (equipment type & #_____ ☐ Other _____	☐ Yes ☐ No	Location of Recuse Equipment:
	Is the record of inspection for Fall Protection and Rescue Equipment onsite?	☐ Yes ☐ No	
	Are anchorage points identified and available for Rescue personnel & equipment?	☐ Yes ☐ No	
	Is communication available to contact both on site and off site Rescue Personnel?	☐ Yes ☐ No	
	Have Landing Area, Rescue Obstructions, and other potential hazards been identified?	☐ Yes ☐ No	
	Note: *In the event of any fall the rescued worker must immediately be evaluated for any required medical attention. All components of the Fall Arrest System must be removed from Service and preserved for investigation and inspection.*		
	Approval and Acceptance		
SECTION C	**My signature indicates that I fully understand and will fully comply with all conditions and requirements of this working at Heights Form** **Permit Requestor / Competent Person:** _____ **Date:** _____/_____/_____ **My signature indicates that if all requirements & conditions of this Worker at Heights Form remain in effect the work can be performed safely** **Permit Approver: :** _____ **Date:** _____/_____/_____		