

General Construction Safety Provisions

Owner
Controlled
Insurance
Program

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Bureau of
Environmental
Services

Portland
Water
Bureau



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SECTION 1 GENERAL CONSTRUCTION SAFETY PROVISIONS

1.1 INTRODUCTION

- 1.1.1 The City of Portland (City) Bureau of Environmental Services (BES) and Portland Water Bureau (PWB) are committed to maintaining public safety and a safe and productive working environment for all its employees, contractors and others who do business with these Bureaus. The General Construction Safety Provisions (GCSP) provide supplementary information to Contractors on the requirements and procedures for incident prevention, safety, and loss control for the BES and PWB Capital Improvement Projects (CIP) enrolled in the Owner Controlled Insurance Program (OCIP). The City's safety goal is to be incident-free on all CIP construction projects. Refer to Project Specifications for additional Site Specific Health and Safety requirements.
- 1.1.2 Contractors are charged with the ultimate responsibility for conducting their operations in a manner that shall ensure safe working conditions at all times for all employees and subcontractor employees, and for the protection of the public and all others who may come in contact with, or be exposed to, any operations related to the CIP. Compliance with the requirements of these Provisions will not relieve any Contractor or Subcontractor of the obligations assumed by the Contractor or Subcontractor under the Provisions of the Contract with the Owner or as required by law.
- 1.1.3 Safety will be an integral part of the work. Full participation, cooperation and support are required to ensure the safety and health of all persons and protection of property involved in any CIP.

1.2 PURPOSE

- 1.2.1 The purpose of these Provisions is to establish Mandatory Standards that promote safety, and eliminate/control hazards and risks associated with the construction of the CIP. The following safety provisions are not to be considered as "all inclusive". Where any portion of these Provisions is in conflict with, or less stringent than, any applicable State or local statutory safety regulations, the more stringent regulation shall take precedence.

1.3 SCOPE

- 1.3.1 Prior to project commencement, the Contractor shall conduct a thorough survey of the site conditions to determine the predictable hazards to employees and subcontractors, and the extent of safeguard necessary to execute the work in a safe manner in accordance with applicable State and local laws and regulations and the GCSP.
- 1.3.2 The minimum standards set forth in these Provisions are applicable to all activities required of Contractors and Subcontractors of any tier, and all other people authorized to be on any CIP Site.

1.4 OBJECTIVES

- 1.4.1 The objectives of the GCSP require the active participation and cooperation of the Contractor's project managers, superintendents, supervisors, and employees and the coordination of their efforts with the Owner in achieving the following:
- a. Plan all work to prevent personal injury, property damage, and loss of productive time.
 - b. Comply with all applicable State and local laws, ordinances, and regulations, industry standards, and GCSP.
 - c. Maintain a system of prompt detection and correction of unsafe practices and conditions.
 - d. Establish and conduct an educational program to stimulate and maintain interest and cooperation of all employees through safety meetings and safety training programs, and distribution of resource material.
 - e. Require the use of personal protective equipment.
 - f. Institute prompt notification and immediate investigation of all incidents or near-misses to determine the causes and to take necessary corrective action.

1.5 STATUTORY REQUIREMENTS

- 1.5.1 The Contractor is contractually obligated to comply with all rules, regulations and standards outlined in the GCSP, and other appropriate safety requirements specified in the Contract. All required Contractor submittals shall be complete. Submittals which do not have all the information required are not acceptable and will be returned without review.
- 1.5.2 The Contractor shall not receive additional payment of reimbursement for compliance with safety items and procedures which have been identified as required by the GCSP, the contract documents, and all applicable laws, regulations and orders, including any new standard or regulation mandated by the Oregon Occupational Safety and Health Administration (OR-OSHA).

1.6 DEFINITIONS

- 1.6.1 The following definitions apply for the purposes of the GCSP. Refer to Contract Specifications for additional definitions.
- a. *ACTS OF GOD OR NATURE* - Refer to Contract Specifications.
 - b. *APPROVED* - Refer to Contract Specifications.
 - c. *AUTHORIZED PERSON* - A person approved or assigned by the employer to perform a specific type of duty or to assume a specific responsibility.
 - d. *CAPITAL IMPROVEMENT PROJECTS (CIP)* - BES or PWB projects enrolled in the OCIP.

- e. *CATASTROPHE* - An incident in which one or more employees are fatally injured or three or more involved employees are admitted for hospitalization in excess of 24 hours other than for observation.
- f. *CERTIFIED OR LICENSED* - One who possesses a license or certificate issued by a recognized authority, attesting that they have been trained and/or tested in and is competent and qualified in a specific field of endeavor.
- g. *CITY* - Refer to Contract Specifications.
- h. *CLEARANCE* - A statement with documentation from an authorized source declaring that specific electrical, hydraulic, pneumatic, mechanical equipment, and/or facilities has been de-energized and/or isolated from hazardous sources of energy.
- i. *COMPETENT PERSON* - A person who by training and/or experience is capable of performing specifically assigned duties and responsibility. Further, is capable of recognizing existing and predictable hazards or conditions which are unsanitary, hazardous, or dangerous, and is authorized to initiate prompt corrective action, and/or stop work progress. Refer to Contract Specifications, Safety, Health and Sanitation Provisions.
- j. *CONTAMINANT* - Any material which by nature of its composition or reaction with other materials is potentially capable of causing injury, death, illness, damage, or loss.
- k. *CONTRACTOR* - Refer to Contract Specifications.
- l. *COORDINATED SAFETY COMMITTEE* - A committee consisting of the Owner's Construction Safety Manager (Chairman), the Owner's Representative, the Contractor's Designated Program Manager and Primary Safety Representative, Insurance Administrator's Safety Representative, and the Insurance Carrier's Safety Representative(s).
- m. *COVERED EMPLOYEE* - An employee of the Contractor or Subcontractor, including independent Contractors and owner/operators retained by the Contractor or a Subcontractor, who is engaged in the performance of work on a CIP Site.
- n. *DANGER* - A term denoting liability or potential to cause injury, death, illness, damage, or loss.
- o. *DEFECT* - Refers to any characteristic or condition which tends to weaken or reduce the strength of a material or object of which it is a part.
- p. *DESIGNATED PERSON* - Synonymous with "authorized person".
- q. *EMPLOYEE* - Synonymous with "covered employee."
- r. *EMERGENCIAS* - Emergencies are classified as follows:
 1. Any serious incident involving one or more workers.
 2. Medical treatment of an employee, beyond First Aid.

3. Any other occurrence which would require immediate protection of life or property.
 4. Collapse of a substantial part of any permanent structure on the Project Site (i.e., reservoir, tank, building, trench and/or tunnel).
 5. Collapse of equipment used in the course of construction.
 6. A fire requiring the response of the local fire department.
- s. *FIRST AID* - Any one-time treatment and subsequent observation of minor scratches, cuts, burns, splinters, or similar injuries, which do not ordinarily require medical care. Such one-time treatment is considered first aid even though provided by a physician or registered professional personnel.
 - t. *HAZARD* - A dangerous condition, potential or inherent, which can bring about an interruption or interfere with the expected orderly progress of an activity.
 - u. *HAZARDOUS CONDITION* - A physical condition or circumstance which is casually related to incident occurrence.
 - v. *HAZARDOUS SUBSTANCES*- Substances or materials defined as hazardous in Oregon law. Examples include hazardous wastes, as defined in ORS 466.005, any substance defined as a hazardous substance pursuant to Section 101(14) of the federal comprehensive Environmental Response, Compensation and Liability Act (CERCLA), oil, and any substance designated as hazardous by the State Environmental Quality Commission.
 - w. *HIGH VOLTAGE* - Refers to all voltages of 600 volts or greater, unless otherwise defined in the text of this manual.
 - x. *IMMINENT DANGER* - A condition, practice or act which could reasonably be expected to cause death or serious physical harm immediately, or before such danger can be eliminated.
 - y. *INCIDENT* - An unplanned event that disrupts the orderly progress of the production activity or process, which may or may not include bodily injury and/or property damage.
 - z. *INSPECTOR* - Refer to Contract Specifications.
 - aa. *JOB SAFETY ANALYSIS (JSA)* - Synonymous with Job Hazard Analysis (JHA). Refer to Contract Specifications, Safety, Health and Sanitation Provisions.
 - bb. *LONGSHORING OPERATIONS* - The loading, unloading, moving, or handling of construction materials, equipment, and supplies, etc. into, in, on, or out of any vessel from a fixed structure or shore-to-vessel, vessel-to-shore, or fixed structure or vessel-to-vessel.
 - cc. *LOST TIME INCIDENT* - Injury/illness that precludes employee from work activity.

- dd. *LOST WORKDAYS* - The actual number of days after, but not including, the day of injury or illness during which the employee would have worked, but could not perform all or any part of their normal assignment during all or any part of the employee's next regular workday or shift because of the occupational injury or illness.
- ee. *MEDICAL TREATMENT* - Treatment administered by a physician or by registered professional personnel under the standing orders of a physician. Medical treatment does not include first aid treatment even though provided by a physician or registered professional personnel, nor does it include treatment ordinarily considered diagnostic or preventative in nature.
- ff. *NEAR MISS* - Incident that could have potentially resulted in a serious injury/illness or property damage expense.
- gg. *OWNER CONTROLLED INSURANCE PROGRAM (OCIP)* - Refer to Contract Specifications.
- hh. *OREGON SAFE EMPLOYMENT ACT (OSEA)* - An act to assure as far as possible, safe and healthful working conditions, for every working man and woman in Oregon through the development, administration and enforcement of safety and health laws and standards in accordance with the Federal Occupational Safety and Health Act of 1970.
- ii. *OWNER* - Refer to Contract Specifications.
- jj. *OWNER'S REPRESENTATIVE* - Refer to Contract Specifications.
- kk. *PERMISSIBLE EXPOSURE LIMIT* - The concentration of airborne contaminants to which an average person may be exposed to without harmful effects.
- ll. *PROJECT* - Refer to Contract Specifications.
- mm. *PROJECT LOCATION* - Synonymous with "project site".
- nn. *PROJECT SITE* - Refer to Contract Specifications.
- oo. *QUALIFIED PERSON* - Refers to one who, by possession of a recognized degree, certificate, or professional standing, or who by extensive knowledge, training, and experience has successfully demonstrated ability to solve or resolve problems relating to the subject matter, the work, or the project.
- pp. *REPORTABLE OCCUPATIONAL INJURIES OR ILLNESSES* - For the purpose of this project, a reportable incident shall be one which requires more than one visit to the first aid facility, or which requires one or more trips to a doctor, clinic or hospital.
- qq. *SAFE* - Means relatively free from danger or hazard that could cause or result in injury, illness, or damage.
- rr. *PROJECT SAFETY COMMITTEE* - A committee consisting of members representing the Owner's, Contractor, Insurance Administrator, and

Insurer that reviews overall safety progress for all CIP's.

- ss. *SERIOUS INCIDENT* - Any occurrence of a Project Site related nature, which results in:
 - 1. Hospitalization of any person.
 - 2. Medical treatment of an employee requiring surgery, reduction of fractions or dislocations, electrical shock, second degree burns, or injury or illness due to toxic materials or harmful physical agents.
 - 3. An employee or supplier suffering death.
 - 4. Fire requiring response by the local fire department.
 - 5. An unplanned collapse of equipment or any part of a structure.
 - 6. Injuries to the public, which require medical treatment.
 - 7. Property damage in excess of \$10,000.00.
- tt. *SITE SPECIFIC SAFETY AND HEALTH PLAN (SSSHP)* - Refer to Contract Specifications.
- uu. *STOP/ SUSPEND WORK* - Immediate suspension of work on the project, wholly or in part, as directed by the Owner's Representative or Authorized Representative, for reasonable periods of time as the Owner's Representative or Authorized Representative may deem necessary, when conditions are unsuitable for satisfactory performance of the work.
- vv. *SUBCONTRACTOR* - Refer to Contract Specifications.
- ww. *THRESHOLD LIMIT VALUES* - The limit below that the effects of airborne substances cease to be perceptible and dangerous to employees who may be repeatedly exposed, day after day.
- xx. *TOXIC* - Of, pertaining to, or caused by poison: poisonous, harmful.
- yy. *OWNER INSURANCE ADMINISTRATORS* - Owner's Authorized Agents for insurance coverage and the administration of the Owner Controlled Insurance Program.
- zz. *UNSAFE ACT* - Any action by an employee, Supervisor, Manager that violates established Safety Policies or Procedures.
- aaa. *UNSAFE CONDITION* - Any physical state which deviates from that which is acceptable or correct in terms of its potential for personal injury, illness, and/or damage to property. Also, any physical state, which contributes to a reduction in the degree of safety normally present.
- bbb. *WORK* - Refer to Contract Specifications.
- ccc. *WORKER* - Synonymous with "covered employee".

1.7 ABBREVIATIONS

- 1.7.1 The following abbreviations apply for the purposes of the GCSP. Refer to Contract Specifications for additional abbreviations.

ACGIH - American Conference of Governmental Industrial Hygienists
AEGP - Assured Equipment Grounding Program
ATF - Alcohol Tobacco & Fire Arms
CIH - Certified Industrial Hygienist
CIP - Capital Improvement Projects
CPR - Cardiopulmonary Resuscitation
DOT - Department of Transportation
FOPS - Falling Object Protective Structures
GC/MS - Gas Chromatography/Mass Spectrometry
GCSP - General Construction Safety Provisions
GFCI - Ground Fault Circuit Interrupters
IDLH - Immediate Danger to Life and Health
JHA - Job Hazard Analysis
LEL - Lower Explosive Limit
MSDS - Material Safety Data Sheet
MSHA - Mine Safety and Health Administration of the Department of Labor
NIOSH - National Institute for Occupational Safety and Health
OSEA - Oregon Safe Employment Act
PEL - Permissible Exposure Limit
PPE - Personal Protective Equipment
ROPS - Rollover Protective Structures
SEA - Safe Explosives Act
TBM - Tunnel Boring Machine
TLV - Threshold Limit Value
USACE - U.S. Army Corps of Engineers
USDOT - United States Department of Transportation
UST - Underground Storage Tank

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SECTION 2 ORGANIZATION AND ADMINISTRATION

2.1 INTRODUCTION

This Section establishes the minimum safety and health responsibilities and requirements of the Owner, Contractors and subcontract tiers performing Work on all CIPs enrolled in the OCIP.

2.2 OWNER'S RESPONSIBILITIES

2.2.1 Owner's Representative

- a. The Owner's Representative will be overseeing and mandating Contractor compliance with the GCSP, and approving the Site Specific Safety and Health Plan (SSSHP).

2.2.2 Owner Provided Services

- a. The Owner will provide the following services:
 1. Assist with Safety Training and Education.
 2. Regular Site Safety Inspections.
 3. Provide Incident related information.
 4. Prepare and distribute Safety Steering Committee Agenda and Minutes.
 5. Participate in Incident Investigation as appropriate.
 6. Provide technical assistance as needed.
 7. Review all required Contractor submittals. Submittals which do not have all the information required to be submitted are not acceptable and will be returned without review.
 8. Conduct periodic audits of the SSSHP.

2.3 CONTRACTOR SAFETY RESPONSIBILITIES

2.3.1 The Contractor has ultimate responsibility for the safety and health of all employees, subcontractor tiers, and the protection of the General Public. This ultimate safety responsibility cannot be delegated to subcontractors or other persons or agencies.

2.3.2 General

- a. Be responsible for initiating, maintaining, and supervising all safety and health procedures and programs in connection with the work.
- b. Take all safety and health precautions, and provide the necessary protection to prevent damage, injury, or loss to:
 1. Persons engaged in the performance of work on or adjacent to the

Project Site, whether employed by the Contractor or otherwise, and other persons and organizations that may be affected thereby.

2. The work, materials, and equipment to be incorporated therein, whether in storage on or off the Project Site.
 3. Other property at the Project Site or adjacent thereto, including trees, shrubs, lawns, walks, pavements, roadways, structures, utilities, and underground facilities not designated for removal, relocation, or replacement in the course of Work.
- c. Continually monitor and audit its compliance and adherence with the safety and health program in accordance with all applicable Federal, State and local safety and health regulations, and the GCSP.
 - d. Protect the health and safety of employees, subcontractors, the public and other persons; prevent damage to property, materials supplies, and equipment.

2.3.3 Regulations, Standards and Requirements

- a. Comply with all Federal, State and local safety and health regulations and laws including, but not limited to:
 1. Oregon Revised Statutes - ORS 654
 2. Oregon Administrative Rules - OAR 437
 3. Oregon Safe Employment Act (OSEA)
 4. Oregon Occupational Safety and Health Administration (OR-OSHA):
 - i. Division 1 - General Administrative Rules
 - ii. Division 2 - General Occupational Safety and Health Rules
 5. Subdivision A – General
 6. Subdivision B - Adoption and Extension of Established Federal Standards
 7. Subdivision C - Access to Employee Exposure and Medical Records
 8. Subdivision D, E, F - Walking/Working Surfaces, Means of Egress, Powered Platforms
 9. Subdivision G - Occupational Health and Environmental Controls
 10. Subdivision H - Hazardous Materials
 11. Subdivision I - Personal Protective Equipment
 12. Subdivision J - General Environmental Controls
 13. Subdivision K - Medical and First Aid
 14. Subdivision L - Fire Protection

15. Subdivision M - Compressed Gas and Air Equipment
 16. Subdivision N - Material Handling and Storage
 17. Subdivision O - Machinery and Machine Guarding
 18. Subdivision P - Hand and Portable Powered Tools and Other Hand-Held Equipment
 19. Subdivision Q - Welding, Cutting and Brazing
 20. Subdivision S - Electrical
 21. Subdivision Z - Toxic and Hazardous Substances (air contaminants, asbestos, benzene, blood borne pathogens, cadmium, ethylene oxide, formaldehyde, lead, MDA)
 - i. Division 3 – Construction
 - ii. Division 5 - Maritime Activities
 22. 30 CFR Parts 1 to 199 - Mine Safety and Health Standards
 23. Safe Explosives Act (SEA)
- b. Plan and execute all Work to comply with the stated objectives and safety requirements contained in the GCSP and Specifications.
 - c. Prepare and submit within fifteen (15) calendar days after the Preconstruction Conference a written interim Project SSSHP which complies with the requirements of the Specifications and requirements of the GCSP. The interim plan shall address all on-site activities anticipated within the first ninety (90) calendar days of the Contract time.
 - d. Prepare and submit within thirty (30) calendar days after issuance of Notice To Proceed a written project SSSHP which covers all work and which complies with the requirements of the Specifications and GCSP.
 - e. Submittals which do not have all the information required to be submitted are not acceptable and will be returned without review. The Contractor is responsible for the review of the specific requirements of the Contract, for the analysis of planned methods of operation, and for the incorporation of any additional specific or unique safety requirements in the written plan.
 - f. NOTE: Generic Safety and Health Plans will NOT be accepted. Safety and Health Plans must be Project Site specific and address the means and methods for Eliminating or Controlling hazards, exposures and risks.
 - g. A SSSHP shall be required of subcontractors of any tier on the Project.
 - h. A subcontractor may prepare its own SSSHP or utilize the Contractor's SSSHP. If the subcontractor prepares their own Plan it must be approved by both the Contractor and the Owner and shall be subject to the requirements of the GCSP.

2.3.4 Minimum Requirements/Obligations

- a. Develop a SSSHP that acknowledges the Contractor is ultimately responsible for compliance with all OR-OSHA requirements and other applicable rules and orders, which requires employers to provide a safe healthy workplace. The Plan shall address the minimum requirements specified in the GCSP and the Specifications.
- b. Outline administrative responsibilities for implementing the incident prevention program; identification and accountability of personnel responsible for incident prevention including the name of the Contractor's Primary Safety Representative, delineating their authority to direct work stoppage and elimination or correction of hazardous conditions.
- c. Establish performance objectives for all line supervisors in the achievement of the Project goal of zero incidents. Incidents include but are not limited to employee injuries, equipment and property damage, fires, and injury to the public. All personnel will be held accountable for meeting the objectives as outlined in the Contractor's Safety and Health Plan.
- d. Establish the means for coordinating and controlling work activities of contractors, subcontractors, and suppliers; responsibilities of subcontractors in implementing the requirements of the GCSP.
- e. Establish the systems for on-going safety inspections of Project Sites, material, and equipment to ensure compliance with the incident prevention plan and the GCSP.
- f. The SSSHP shall include: means for recording, inspection reports, identified safety and health deficiencies and the measures, timetable, and individual responsible for their correction; procedures for follow-up inspections. All inspection records will be maintained in the Contractor's Field Office and made available to the Owner for review.
- g. Define responsibilities for investigating and reporting incidents; reporting exposure; maintaining incident and exposures data, reports, and logs.
- h. Establish a written Personal Protective Program as required by OAR 437, Division 3, Subdivision E, 1926.100-107 and Section 4.3 of these Provisions.
- i. Establish a written Hazard Communication Program as required by OAR 437, Division 3, Subdivision D, 1926.59 and Section 4.5 of these Provisions.
- j. Establish a Fire Prevention Plan complying with OAR 437, Division 3, Subdivision C, 1926.24, and NFPA standards and Section 4.1 of these Provisions. Include a layout drawing showing storage and volume of all flammable and/or combustible liquids, gases or other hazards.
- k. Establish a written visitor hazard control and protection program.

- l. Develop a written Tunnel Safety & Emergency Plan, if applicable.
- m. Develop a written Reservoir Safety & Emergency Plan, if applicable.
- n. Establish a written Substance Abuse Program.
- o. Establish a written Emergency Response Plan.
- p. Establish a written Modified Duty /Transitional Work Program
- q. Establish a written Project Security Plan.
- r. Establish a written Marine Construction Plan, if applicable.
- s. Participate with the Owner in the development of a Safety Incentive Program.
- t. Establish a hearing conservation program.
- u. The Contractor shall establish a hearing/audiometric baseline on all enrolled employees prior to starting work. The Owner will accept hearing/audiometric baselines of tests conducted up to three months prior to starting work.
- v. Establish a medical surveillance program.
- w. Establish an Infectious Disease Program to protect employees against the biological and disease-producing organisms that may be encountered around live sewage. The program shall include personal hygiene practices, personal protective equipment, and if determined to be necessary, inoculations/vaccines.
- x. Develop a Job Safety Analysis (JSA) for all operations prior to their commencement and discuss all JSAs with the employees involved. JSAs will be comprehensive documents that systematically address all potential hazards and the specific systems that will be used to reduce or eliminate those hazards. Generic JSAs will not be accepted. Copies of the analysis are to be kept on file at the Contractor's Field Office and made available for review as requested by the Owner's Representative. The Owner's Representative will maintain discretion to require Contractor and Subcontractor tiers to submit for approval JSAs for designated portions of the Work.
 - 1. Contractor shall require subcontractors of any tier to develop a JSA for all of their operations on the Project and to comply with the requirements stated above.
 - 2. If a JSA is not completed prior to commencement of work, the Owner's Representative may suspend portions of that work until a JSA is completed.
- y. Implement any additional measures that the Owner's Representative determines to be reasonably necessary to ensure project safety.
- z. Designate a Competent Person for each shift of work, for each Project

location. The Competent Person shall meet OSHA OAR 437, Division 3, Subdivision P, 1926.650.

- aa. Designate a Primary Safety Representative for each Project location. The Primary Safety Representative shall be responsible for the administration of the SSSHP. If more than 25 workers (including subcontractors) at any one project location, the Primary Safety Representative will have no other duties on or beyond the Project. The Primary Safety Representative will supervise second/third shift Competent Persons. Comply with these Provisions.
- bb. Submit a resume of the experience and qualifications for all proposed Contractor's Safety Representatives 15 days prior to the start of any Work on the Project. The resume(s) will be reviewed by the Owner, and personnel interviews may be required. Only qualified personnel will be approved as a Contractor's Safety Representative. The Contractor's Safety Representative will meet the following minimum qualifications:
 - 1. Civil and Systems Construction
 - i. The Representative must have at least three (3) years full-time construction safety experience, and be knowledgeable in construction occupational safety and health by virtue of training and experience.
 - ii. The Representative must be currently certified in American Red Cross Standard First Aid and Adult CPR or its equivalent.
 - iii. The Representative must report to the Contractor's Project Manager or to a level of management that is higher in the contractor's organization and will be dedicated to this contract.
 - 2. Tunnel and Shaft Construction
 - i. The Safety Representative must possess at least six (6) years of tunnel safety experience, four (4) of which must be at a supervisory level. The Representative must be trained and experienced to perform atmospheric gas and ventilation testing, and be able to calibrate the test equipment.
 - ii. The individual must be certified in tunnel fire rescue and have equivalent training and certification to American Red Cross Advanced First Aid and Adult CPR.
 - iii. This Safety Representative will report to the Contractor's Project Manager or to a level of management that is higher in the contractor's organization and will be dedicated to this Contract.
 - 3. Marine Construction
 - i. The Representative must demonstrate significant and relevant professional experience and formal training in marine construction, general construction, subcontractor management,

regulatory compliance (OSHA, EPA, Coast Guard, etc.), and employment relations.

- ii. This Safety Representative will report to the Contractor's Project Manager or to a level of management this is higher in the contractor's organization and will be dedicated to this Contract.

4. Reservoir Construction

- i. The Safety Representative must possess at least five (5) years of reservoir safety experience, three (3) of which must be at a supervisory level. The Representative must be trained and experienced to perform atmospheric gas and ventilation testing, and be able to calibrate the test equipment.
 - ii. This Safety Representative will report to the Contractor's Project Manager or to a level of management that is higher in the contractor's organization and will be dedicated to this Contract.
- cc. Submit a written job description for all Safety Representatives, indicating responsibility and authority.
 - dd. Maintain initial and annual orientation programs for employees which will include as a minimum a review of:
 - 1. Hazards present in the area in which they will be working.
 - 2. The PPE and apparel the workers will be required to use or wear as specified under OR-OSHA and Section 4.4 of these Provisions.
 - 3. Incident reporting.
 - 4. Location of approved medical clinics.
 - ee. Conduct safety "tool box" meetings on a weekly basis. Documentation of topics discussed and attendees must be maintained in the Contractor's Field Office.
 - ff. Notify the Owner's Representative immediately of inspections to be conducted by OR-OSHA or any other State or county safety/health or environmental organization/agency at the Project Site. The Contractor must furnish the Owner's Representative with copies of all citations and/or warnings of safety violations within 24 hours upon their receipt.
 - gg. The Contractor must post the following at a Project Site location visible to all personnel:
 - 1. Emergency procedures
 - 2. Emergency phone numbers
 - 3. Job safety and health poster
 - 4. Notice of Workers' Compensation Compliance
 - 5. OSHA 300 Summary (during February each year)

- hh. The Contractor must conduct training classes on safety, first aid, fire prevention, and other safety areas. The Contractor can seek assistance with these classes through the Owner's Representative, or OR-OSHA's Training Department. Special requirements for tunnel and shaft Contractors and reservoir Contractors are addressed in the other sections of these Provisions.
- ii. The Contractor must take steps to minimize fatigue related exposures due to excessive work hours. Work performed by employees of all tiers shall be scheduled to ensure the following:
 1. Work shifts limited to no more than 14 hours
 2. At least 8 hours off work between shifts
 3. A limit of 72 hours worked in any seven day period
 4. No more than six consecutive days of work
- jj. Ensure that all of its subcontractors and suppliers are provided with a copy of Contractor's SSSHP and are informed of their obligations with regard to safety.
- kk. When directed by the Owner's Representative the Contractor will transmit any safety related documents referenced by these Provisions or required by OSHA standards.
- ll. Whenever deficiencies are noted the Owner's Representative will give the Contractor written notice to correct the deficiency. Noted deficiencies must be corrected immediately upon observation or notification. Where deficiencies cannot be corrected immediately, the Contractor will develop a corrective action plan outlining the procedures and schedule for completion.
- mm. When directed by the Owner's Representative, a visitors log with information as to visitor's name, name of the visitor's representative, the time in and time out with visitors initials on each entry. The log shall be maintained at the Contractor's Field Office or a single designated location.

2.3.5 Non-Compliance

- a. If the Owner's Representative becomes aware of any non-compliance with these GCSP the Owner's Representative or their designee will:
 1. Notify the Contractor of the non-compliance and of the corrective action required. This notice, when delivered to the Contractor or the Contractor's representative at the Project Site, will be deemed sufficient notice of the non-compliance to immediately implement corrective action.
 2. Exercise the right to issue a Suspend Work Order suspending all or part of the Work if the Contractor fails or refuses to take corrective action within the time specified in the notice. The order will remain

in effect until satisfactory corrective action has been taken.

3. Deny any claim or request from the Contractor for equitable adjustment for additional time or money on any Suspend Work Order issued under these safety hazard circumstances.
 4. Require the immediate removal of any employee or equipment from the Project Site deemed by the Owner's Representative to be unsafe.
- b. The Contractor's Competent Person or other personnel will be replaced by the Contractor at the direction of the Owner's Representative for their non-performance of their safety/security duties at no additional cost to the Contract.
 - c. If the Contractor fails to correct any safety deficiency or property damage within the time specified on a notice of non-compliance or suspension of Work Order issued, the Owner's Representative will have the right to reduce or decline progress payments in accordance with the Specifications.
 - d. Willful or repeated non-compliance may result in an employee or contractor being removed for failing to perform work properly as per the Specifications.
 - e. No corrective order provided by the Owner's Representative is intended to relieve the Contractor of its obligations, under any applicable law, but to provide a safe workplace and to comply with safety regulations, and the Contractor is obligated to provide whatever additional measures may be required to meet the needs of the existing circumstances.

2.3.6 Project Superintendent

- a. Contractor will assign Project Superintendent(s) to the project who have the knowledge, skills and abilities to perform their safety related duties, and will ensure that their Project Superintendent(s) understand and fulfill their safety related responsibilities. Contractor(s) must submit a resume of the experience and qualifications for all proposed Project Superintendents 15 days prior to the start of any Work on the Project Site. The Project Superintendent is the direct representative of the Contractor and will be responsible for the following:
 1. Ensure the Contractor's responsibilities set forth in the GCSP are fully complied with.
 2. Plan and execute all work in accordance with the stated objectives of the GCSP and all published safety standards as required by law.
 3. Ensure cooperation with Owner's Representative and Owner's Safety Representatives.
 4. Take immediate action to correct unsafe or unhealthy work practices or conditions.
 5. Review and implement administrative actions required to maintain

complete and accurate safety records as specified by the GCSP.

6. Conduct safety meetings as required by the Owner's Representative and the Provisions herein.
7. Assure that appropriate first aid plans and facilities are established and implemented.
8. Ensure that all subcontractors comply with the GCSP, all local and State regulations, standards, ordinances or rules relating to the safety of persons or property.
9. Provide Supervisors with material and updated safety manuals suitable for use of information in conducting weekly "tool box" safety meetings and periodically audit "tool box" meetings through attendance.
10. Review safety meeting reports to ensure adequacy of training, as well as subject matter and the conduct of the safety meetings.
11. Assist in incident investigations and preparation of required reports.
12. Establish and implement a safety training program for Supervisors and Employees as applicable to their specific jobs.
13. Attend safety meetings held by the Owner's Representative or Owner's Risk Services Division.
14. Ensure that every employee receives first aid treatment for all injuries, and ensure that a written log of first aid treatment is maintained.
15. Make available all safety related documentation to the Owner's Representative.
16. Respond to all Owners' Representative requests.
17. Adhere to the Owner's Safety Training requirements in Section 3 of these Provisions.

2.3.7 Contractor's Primary Safety Representative

- a. Every Project shall have a Primary Safety Representative assigned to it who shall be responsible for the administration of the SSSHP.
- b. The Primary Safety Representative shall have no other duties on or beyond the Project if there are more than 25 workers, including subcontractor tiers, working on the Project Site. If the Project has regularly scheduled second and third work shifts, additional Shift Safety Representatives shall be designated. The Primary Safety Representative shall supervise the second/third Shift Safety Representatives.
- c. Subcontractors who have more than 25 employees working under their portion of Work, including employees of all subcontractor tiers, shall assign a full-time Primary Safety Representative in accordance with this

Provision.

- 2.3.8 The Contractor's designated Primary Safety Representative shall at a minimum:
- a. Make ongoing shift safety inspections of the Project Site(s) and public areas, and take necessary and timely corrective action(s) to eliminate unsafe acts and/or conditions. Record observations as directed using the Inspection Check List (Appendix A).
 - b. Review Supervisors' incident and investigation reports as required assuring timely submission and initiating corrective action to prevent recurrence.
 - c. Ensure that all employees, including employees of all subcontractor tiers, vendors and service providers, comply with Project Site safety rules and regulations, and ensure that the subcontractor's reports are completed according to the rules and regulations stated in the Contractor's SSSHP and according to the requirements of the applicable regulatory agencies.
 - d. Have the authority to immediately correct unsafe conditions and unsafe practices with the authority to suspend work until the unsafe condition or practice is corrected and meets the safety requirements.
 - e. When the contract involves tunneling operations, the Contractor's Safety Representatives shall have the following added responsibilities:
 1. Provide for control, availability, and use of safety equipment, including employee personal protective equipment. All safety equipment used in tunnels or underground work shall meet requirements of MSHA and/or acceptable by OR-OSHA.
 2. Ensure that the "No Smoking" restrictions in hazardous areas are strictly enforced.
 3. Ensure that timely and accurate records are kept of atmospheric testing. These records shall be available at the Contractor's Field Office and transmitted upon request.
 4. Perform environmental testing on items including but not limited to, noise, air flow and air quality. Written records of such tests shall be completed at the specific time of testing, filed and made available upon request. It is the Safety Representative's responsibility to ensure that the Contractor complies with all pollution and environmental control requirements.
 5. The Primary Safety Representative shall supervise second/third shift Competent Persons.
 6. Adhere to the Owner's Safety Training Requirements of these Provisions.
 - f. During any period when the contract involves marine/water-based operations, the Contractor's Safety Representatives shall have the following added responsibilities:

1. Have no other duties or job assignments on or beyond this Project, regardless of whether there are more than 25 workers on the Project.
2. Provide for control, availability, and use of safety equipment, including employee PPE.
3. The Primary Safety Representative shall supervise second/third shift Competent Persons.
4. Be available and on-call to Owner on a 24-hour basis via pager and cellular telephone.
5. Adhere to the Owner's Safety Orientation Requirements of these Provisions.

2.3.9 Contractor's Competent Person

- a. The Contractor and all subcontractor tiers must have a Competent Person who will be assigned to and be readily available to address safety issues at every active Work location. Competent Persons must have the knowledge, resources and authority to meet applicable regulatory and contractual requirements for the tasks they are performing. Each Contractor will name a Competent Person who is qualified by:
 1. Training, experience, and proven knowledge to detect safety hazards associated with the specific Project Site.
 2. Authority to take prompt corrective measures to eliminate existing and predictable hazards.
 3. Authority to stop the portion of unsafe work when required.
 4. Trained in First Aid/CPR.
- b. The Contractor must make available to the Owner's Representative necessary documentation indicating the Competent Person has competency to identify, evaluate and control hazardous conditions.
- c. The Competent Person shall at a minimum:
 1. Inspect the Project Site, materials, and equipment daily.
 2. Inspect often enough to assess changing conditions and upon worker request.
 3. Be readily available in the event of an OR-OSHA field inspection.
 4. Be referenced in the Contractor's SSSHP.

2.3.10 Construction Supervisors

- a. The Contractor's SSSHP must define the safety responsibilities of Construction Supervisor(s). At a minimum, the Construction Supervisor shall:
 1. Provide and require the use of proper PPE and suitable tools for the job.

2. See that their assigned crew is properly instructed in safe work practices when they first arrive on the job and "pre-qualifies" employees operating any heavy equipment for safe operations prior to any full-time operation of equipment.
3. Investigate all incidents, per Section 9.1.2 of these Provisions, under their direct control to determine facts necessary for corrective action to prevent recurrence.
4. Adhere to the Owner's Safety Orientation Requirements of these Provisions.

2.4 SAFETY COMMITTEES

2.4.1 The Contractor will be required to participate in monthly Project Safety Committee meetings conducted by the Owner. The Contractor is required to have key project personnel participate on this committee, including but not limited to the Contractor's Designated Program Manager, Superintendent, and Primary Safety Representative. The Owner may also require participation of Subcontractors of any tier. Meetings will be scheduled and agendas developed by the Owner's Representative and/or designee. When deemed appropriate by the Owner, safety committee business will be conducted during weekly progress meetings and separate formal committee meetings may not be held. Additional safety meetings may be required on large complex projects. Safety Steering Committee meetings on such project may be organized as follows:

- a. Executive Safety Committee:
 1. Executive Safety Committee will focus on the overall project in terms of risk, safety, and loss control performance. Each segment of the project will be discussed as well as issues and concerns that affect the entire project. The Contractor's Designated Program Manager and Primary Safety Representative shall represent the Contractor. The Owner's Representative, OCIP Manager and Construction Safety Manager will represent the Owner.
- b. Segment Safety Committees:
 1. Segment Safety Committees will focus on specific Owner designated segments of the project and the specific segment's safety and loss control activities. At a minimum, the segment's Contractor's Superintendent and the Contractor's Primary Safety representative will represent the Contractor. The Owner's Representative and/or designee and the Construction Safety Manager will represent the Owner. The Owner reserves the right to require additional Contractor and Subcontractor representatives' participation.

2.4.2 Contractor's Safety Committee

- a. The Contractor shall establish a Project Site safety committee comprised of hourly employees and managerial personnel as mandated by OR-

OSHA, OAR Chapter 437-001-0760 (2).

- b. Compliance with all provisions of OAR Chapter 437-001-0760 (2) shall be mandatory.

END OF SECTION 2

SECTION 3 INSTRUCTIONS AND TRAINING

3.1 GENERAL

- 3.1.1 The Contractor shall institute a thorough written safety education program which assures that contractor and subcontractor employees at all tiers are informed of:
- a. Contractor's SSSHP.
 - b. Hazards involved in the Project.
 - c. Individual responsibilities.
 - d. Specific requirements of the GCSP, Oregon Safe Employment Act (OSEA), and local safety rules and regulations.
- 3.1.2 The Owner reserves the right to request the Contractor and subcontract tiers to participate in refresher safety training when:
- a. Non-compliance with the GCSP.
 - b. New processes, procedures or equipment are introduced that are not set forth in the GCSP.
 - c. As requested by the Owner's Representative based on incident frequency.

3.2 SAFETY TRAINING

- 3.2.1 Newly employed, or personnel transferred into a CIP enrolled in the OCIP shall be fully instructed in the Contractor's Safety and Health Plan, and the safety requirements and practices of the CIP. A standard training checklist will be developed for each Project Site and submitted with the SSSHP. Safety training instruction shall include, but is not limited to the following:
- a. Site specific hazards.
 - b. Personal protective equipment requirements.
 - c. Procedures for reporting unsafe conditions.
 - d. Procedures for reporting accidents or incidents.
 - e. Site specific safety procedures.
 - f. Tailgate meeting requirements.
 - g. Emergency procedures.
 - h. Safety related disciplinary program details.
 - i. Procedures for obtaining information from SSSHP and other safety related documents.
 - j. Explanation of the OCIP safety program.
 - k. Applicable JSA.

- 3.2.2 The Contractor shall provide each employee access to written information of the safety requirements outlined in the Contractor's Safety and Health Plan.
- 3.2.3 Within 30 days of starting work on the Project Site, all Project Superintendents, Contractor's Primary Safety Representatives, Construction Supervisors and Competent Persons must attend, a minimum of safety and health related training to include, but not be limited to the following:
 - a. A three-hour safety training provided by the OCIP workers' compensation carrier. Attendance is required, at a minimum, once every three years.
 - b. For projects with durations longer than three months, attend a minimum one additional hour of training for each month beyond the initial three months. Training shall be sponsored or approved by the Owner. First aid training will not fulfill this requirement.
- 3.2.4 Supervisors must also receive specific training in safety practices including but not limited to safety inspections, incident investigations, incident reporting procedures, and safe work practices specific to their work assignment.
- 3.2.5 Each time an employee is assigned to a new work task or Project Area they must be briefed on all potential hazards. The supervisor will ensure that each employee has the appropriate knowledge to safely perform the tasks they are assigned.
- 3.2.6 Owner's Representative will have the discretion to require individuals to attend additional safety related training at no additional cost to the Owner if an individual demonstrates that they lack appropriate knowledge to perform their duties safely.
- 3.2.7 Failure of employees to attend classes will be considered grounds for relieving individuals from all or part of their duties and removed from the Project Site if necessary. This will not result in additional cost to the Owner and/or delay of the Work.

3.3 TRAINING DOCUMENTATION

- 3.3.1 The Contractor will develop a system to document that all employees on the Project Site, including those of all Subcontract tiers, have attended the required safety training. Documentation will be kept in Contractor's Field Offices and include employees' signatures attesting to attendance. Contractor will transmit copies of such documentation to the Owner's Representative upon request, and will remove all employees that have not received the required safety training and/or who lack the proper training documentation from the Project Site.
- 3.3.2 Documentation shall include at a minimum the following:
 - a. Employee Name
 - b. Job title
 - c. Type of training

- d. Content of training
- e. Date of training

3.4 SAFETY “TOOLBOX” MEETINGS

- 3.4.1 *Supervisors:* The Contractor must conduct regularly scheduled supervisory safety meetings at least monthly for all levels of job supervision. An outline report containing subject matter and signature of all attendees will be maintained by the Contractor and transmitted upon request.
- 3.4.2 *Employees:* A minimum of one "on-the-job" or "toolbox" safety meeting will be conducted weekly (Monday mornings) by each field supervisor or foreman and will be attended by all employees under their supervision.
- 3.4.3 A record of each meeting, including topic of discussion and signatures of attendees, must be maintained in the Contractor’s Field Office and transmitted upon request.
- 3.4.4 Meeting schedules will be made available for review, and the meetings shall be open to the Owner to attend.

3.5 UNDERGROUND SAFETY TRAINING

- 3.5.1 The Contractor must develop site specific underground safety training when projects involve underground construction operations. The training will cover all applicable elements of OSHA standards as well as Sections 5 and 7 of these Provisions, and shall be provided to all persons authorized by the Owner to enter the underground environment.

END OF SECTION 3

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SECTION 4 LOSS PREVENTION AND SAFETY REQUIREMENTS

4.1 GENERAL

- 4.1.1 The Contractor shall develop a policy to limit the use of personal portable electronic devices (i.e. cell phones, music player, etc.) on the work site and shall submit to the Owner for review in the Site Specific Safety Plan.
- 4.1.2 The use of these portable electronic devices by equipment operators and drivers shall be prohibited unless the device is being used for the task at hand.

4.2 FIRE PREVENTION/FIRE PROTECTION

- 4.2.1 The Contractor shall comply with the recommendations of the National Fire Protection Association and applicable regulations of the Cities and Counties Standards and OR-OSHA, OAR Chapter 437, Division 3, Subdivision F, 1926.150.
- 4.2.2 The Contractor's Competent Person shall make fire hazard inspections of the entire project on a weekly basis. Immediate correction of substandard conditions is mandatory.
- 4.2.3 Develop designated smoking areas.
- 4.2.4 When welding or cutting is conducted, the surrounding area shall be protected with fire retardant blankets, and an adequate number of approved fire extinguishers shall be immediately available. After welding and cutting are completed, a periodic hourly fire watch shall be instituted for 4 hours following the work.
- 4.2.5 The operation and maintenance of temporary heating equipment shall create no fire hazards. Clothing shall not be dried by placing on or near heaters.
- 4.2.6 All flammable and combustible materials shall be stored, piled and handled with regard to their fire characteristics.
 - a. Flammable liquids shall be stored in an approved manner, and dispensed only in acceptable safety containers.
 - b. Welding gases shall be stored, secured and segregated by type of gas.
 - c. Lumber shall be stacked in small piles that are interspersed with wide aisles.
- 4.2.7 Rubbish and debris shall not be allowed to accumulate on any CIP site.
- 4.2.8 Fire extinguishers shall be located throughout the work area (Project Site) as required by the Portland Fire Bureau (PFB) or governing regulatory agency and OR-OSHA (OAR Chapter 437, Division 3, 1926.150). A fire extinguisher, rated not less than 2A, shall be provided for each 3,000 square foot of protected building area. Travel distance from any point of the protected area to the nearest fire extinguisher shall not exceed 100 feet. The fire extinguishers shall be checked at least once each month and records kept as to service and

maintenance.

4.2.9 The Contractor shall coordinate their Fire Prevention/Protection Plan with the Portland Fire Bureau or governing regulatory agency.

4.2.10 Wildfire Prevention

- a. When directed by the owner's representative the contractor shall submit a wildlife fire protection plan.
- b. If governing fire protection authority imposes fire danger restrictions, Contractor's work may be restricted.
- c. Contractor shall develop a wildfire prevention and response plan.
- d. All tools and equipment refueling shall be performed in designated areas free from combustible vegetation and material.
- e. Fire watch protection shall be performed with all spark/flame emitting hot work in order to ensure that no fire hazard potential exists throughout the duration of hot work. All hot work shall be subsided no less than 1 hour before the end of each shift. Fire watch protection shall be provided for no less than 1 hour beyond the completion of all hot work.
- f. All undergrowth vegetation shall be trimmed to a height of no more than 4 inches.
- g. All conifer trees shall be trimmed in order to ensure that all low lying branches are no closer than 6 feet from ground level.
- h. All trees, shrubs, and brush shall be removed within 30 feet from all material and tool lay down area, and all work zones.
- i. Removal of vegetation and trees shall be in accordance with the City Land Use requirements, land disturbance limits, and the specifications.
- j. Consultation coordination with Portland Fire Bureau's Wildfire Division shall occur during the first 30 days of construction to ensure adequate fire prevention measures take place. Upon Portland Fire Bureau's Wildfire Divisions' consultation, if deemed recommended, a perimeter fire break shall be established by means of plowing or equipment blade for the perimeter of the construction site at a width of between 10 to 15 feet, exposing bare mineral soil. Fire breaks may be utilized as perimeter access roads.
- k. Designated smoking areas shall be only provided in areas with no exposure to flammable hazards or combustible vegetation and material. Designated smoking areas shall contain non flammable means of ash and cigarette disposal and an available fire extinguisher.

4.3 PROTECTION OF THE PUBLIC AND PROPERTY

4.3.1 For the purpose of this section, "public" will be construed as including all persons not employed by the Contractor, Subcontractor, Consultant, or the

Owner. Employees not directly involved with the Project, facilities or other related construction contracts will be considered members of the public.

4.3.2 The Contractor shall comply with the Specifications in addition to the requirements outlined below:

- a. The Contractor shall take all necessary action to prevent injury to the public or property damage.
- b. Work shall not be performed in any area occupied or in use by the public unless specifically permitted by the Contract or in writing by the Owner's Representative.
- c. When it is necessary to maintain public use of work areas involving sidewalks, entrances to buildings, lobbies, corridors, aisles, stairways, and vehicular roadways, the Contractor shall protect the project and public with appropriate guardrails, barricades, temporary fences, signs and postings, and adequate visibility. Such protection shall guard against harmful radioactive rays or particles, flying materials, falling or moving materials and equipment, hot or poisonous materials, explosives and explosive atmospheres, flammable or toxic liquids and gases, open flames, energized electric circuits, or other harmful exposures.
- d. Sidewalks, entrances to buildings, aisles, doors, or exits that remain in use by the public shall be kept clear of obstructions to permit safe ingress and egress of the public at all times.
- e. Appropriate barricades, warnings, and instructional safety signs shall be conspicuously posted where necessary. In addition, a flagger shall control the moving of motorized equipment in areas where the public might be endangered.
- f. A temporary 6-foot perimeter fence shall be provided around the perimeter of above-ground operations adjacent to public areas unless otherwise approved by the Owner's Representative. Fences may be constructed of wood or metal frame and sheathing, wire mesh or a combination of both as provided in contract documents. When the fence is adjacent to a sidewalk near a street intersection, at least the upper section of the fence shall be open wire mesh from a point not over 4 feet above the sidewalk and extending at least 25 feet in both directions from the corner of the fence. Contractor shall install signs that state "Construction Zone - Authorized Personnel Only", "No Trespassing", "Keep Out" or similar language on each side of perimeter fencing at intervals of at least 250 feet and adjacent to each project gate or point of access.
- g. Warning signs and lights, meeting the Owner's requirements, shall be maintained from dusk to sunrise along the guardrails, barricades, temporary sidewalks, and at every obstruction to the public. They shall be placed at both ends of such protection or obstructions and not over 20 feet apart alongside of such protection or obstructions.

- h. Temporary sidewalks shall be provided when a permanent sidewalk is obstructed by the Contractor's operations. They shall be in accordance with the Specifications. Guardrails or concrete barricades shall be provided on both sides of temporary sidewalks adjacent to the work, traffic, and/or elevated walkways. When it is necessary to route temporary utility lines, such as sewer by-pass lines on sidewalks or other public access ways the contractor shall provide temporary ramps and/or bridges that are compliant with the provisions of the Americans with Disabilities Act.
- i. Guardrails shall comply with OAR 437, Division 3, Subdivision M, Fall Protection - 1926.502 (b).
- j. Barricades shall be provided where sidewalk sheds, fences or guardrails are not required between work areas and pedestrian walkways, roadways or occupied buildings. Barricades shall be secured against accidental displacement and shall be maintained in place except where temporary removal is necessary to perform the work. When a barricade is temporarily removed, an attendant shall be placed at all openings.
- k. Fuel-burning types of lanterns, torches, flares, or other open-flame devices are prohibited.
- l. Steel plates used to cover excavations in streets and sidewalks shall be securely stationed and shall have slip free surfaces to lessen the chance of slips, falls and incidents.
- m. All steel plates shall be installed with temporary paving (i.e. cold patch) to eliminate the abrupt edge of the plate.

4.4 PERSONAL PROTECTIVE EQUIPMENT

- 4.4.1 The Contractor must provide appropriate personal protective equipment that meets or exceeds the most current OSHA and ANSI requirements to all their employees and ensure that all subcontractor tiers provide such equipment to their employees. The Contractor shall also ensure that personal protective equipment is used and maintained properly. The minimum requirements are listed below.
- 4.4.2 *Head Protection:* Approved hard hats shall be worn on all Project Sites. Hard hats shall meet the requirements of the American National Standards Institute (ANSI) Z89.1 or ANSI Z89.2 as appropriate, as specified by OR-OSHA, OAR Chapter 437, Division 3, Subdivision E, 1926.100. Metallic (metal) hard hats shall not be worn on any CIP. Hard hats shall be worn properly with the bill forward unless the wearing of eye protection prevents this, as in the case of welders. If a welder's cap is worn under the hard hat it must be fire resistant.
- 4.4.3 *Eye Protection:* Eye and face protection shall be worn at all Project Sites where hazards or exposures exist. Eye and face protection shall meet the requirements of ANSI Z87.1 as specified by OR-OSHA, OAR Chapter 437, Division 3,

Subdivision E, 1926.102.

- 4.4.4 *Respiratory Protection:* Respiratory protection devices approved by the National Institute of Occupational Safety and Health (NIOSH) shall be supplied by the Contractor and/or Subcontractors. Respirators shall be worn by all employees when exposed to hazardous concentrations of toxic or noxious dust, fumes or mists as required by OR-OSHA regulations, OAR Chapter 437, Division 3, Subdivision E, 1926.103. Where respiratory protection is required, the Contractor shall incorporate into their Safety Plan a written respiratory protection program which includes a medical evaluation by a physician to determine respiratory fitness.
- 4.4.5 *Hearing Protection:* Approved hearing protection shall be made available by Contractors and/or Subcontractors, and such protection shall be worn by all employees and personnel exposed to sound levels in excess of 85 dB.
- 4.4.6 *Full-Body Harnesses:* Full-Body harnesses meeting OAR 437, Division 3, Subdivision M, Appendix C, 1926.500 shall be provided by the Contractor and/or Subcontractor and shall be worn by all employees exposed to falls of six foot or greater.
- 4.4.7 *Work Boots:* The Contractor shall assure that its employees and subcontractors wear suitable work shoes, which may include steel toes or metatarsal guards, depending on work duties.
- 4.4.8 *Clothing:* Full length pants without excessive length or flared bottoms shall be required. Shirts shall cover the entire mid-section and the sleeves shall cover the entire shoulder. Sleeveless shirts, tank-tops, net shirts, halter tops, loose clothing, etc., shall not be worn on the construction site.
- 4.4.9 *Maintenance:* Personal protective equipment shall not be altered in any manner. Altered equipment shall be tagged, taken out of service, repaired or destroyed. Personal protective equipment that makes contact with the wearer's skin or hair and which has been worn or used previously shall not be reissued to another employee until the article has been cleaned and sanitized.
- 4.4.10 *Retro-reflective Garments:* Brightly colored retro-reflective vests, coats, or shirts, shall be worn when working around heavy equipment, underground, or in traffic. These garments shall be appropriate for traffic and lighting conditions and shall be at a minimum meet the criteria for ANSI Class II garments.

4.5 FIRST AID AND MEDICAL FACILITIES

- 4.5.1 Prior to the start of Work, the Contractor must arrange for facilities to provide prompt medical attention to injured employees.
- 4.5.2 A telephone shall be made available at the Project Site(s) before Work begins. Telephone numbers and locations of emergency facilities including, but not limited to hospitals, physicians, fire and medical services, and police shall be posted in visible locations at the Project Sites and at all telephone locations.
- 4.5.3 First aid kits will be available at all work locations. Kits will contain supplies as

required by OSHA standards but at a minimum will contain the following:

- a. 8 gauze pads (at least 3" x 3")
- b. 2 gauze pads (approximately 8" x 10")
- c. 1 box of adhesive bandages
- d. 1 roll gauze bandage (at least 2" wide)
- e. 1 pair scissors
- f. 1 blanket or equivalent (what size at least 48" X 60")
- g. 2 pair latex gloves (or equivalent)
- h. 1 cardiopulmonary resuscitation (CPR) mouth barrier with 1 way valve
- i. Soap water solution or moistened towelettes

4.5.4 Kits will be of adequate size or number so that this minimal supply list is available at a ratio of one (1) supply list for every ten (10) workers. Kits shall be restocked on a regular basis to ensure that an adequate amount of supplies are maintained.

4.5.5 The Contractor shall ensure at least one person is available at all times on each Project Site, who has a valid certificate in First Aid/CPR training from the American Red Cross, Medic First Aid, or an equivalent training program that can be verified. A minimum ratio of one (1) such qualified person for every ten (10) employees at the Project Sites shall be maintained throughout the course of Work. Certified persons shall affix suitable emblems of training on both sides of their hard hats for identification. The Project Site bulletin board shall display a current list of first aid trained rescue personnel.

4.5.6 First aid shall only be dispensed by trained, certified personnel.

4.6 HAZARDOUS SUBSTANCES, AGENTS AND ENVIRONMENTS

4.6.1 General

- a. The Contractor will comply with the requirements for chemicals and hazardous materials in the Specifications.
- b. Exposure to any chemical or physical agent via inhalation, ingestion, skin absorption, or physical contact in excess of the acceptable limits specified in the American Conference of Governmental Industrial Hygienists (ACGIH) "Threshold Limit Values and Biological Exposure Indices" is prohibited.
- c. Wherever feasible, engineering controls (vent hoods, spill containment areas, limited access areas, splash guards, etc.) will be utilized to reduce or eliminate hazards to all employees.
- d. In the event of conflicts between ACGIH and other standards or regulations, such as OR-OSHA (OAR Chapter 437, Division 3, Subdivision Z, 1926.1101-1127), the more stringent shall prevail.
- e. The Contractor shall comply with all applicable standards and regulations to reduce contaminant concentration levels to legal limits.

4.6.2 Hazard Evaluation

- a. All operations and materials shall be evaluated to determine the presence of hazardous environments or if hazardous or toxic agents may be released into the work environment.
- b. Operations and materials involving potential exposure to hazardous substances, agents, or environments shall be evaluated by a Certified Industrial Hygienist. A Hazard Control Program shall be developed to control against potential exposures (i.e., lead, asbestos, PCB, coal tar enamel, etc.), and coordinated with the Owner's Representative prior to the start of the operations.
- c. The Contractor shall identify all substances, agents, and environments which present a hazard and recommend actions for their control.
- d. Records of all testing and monitoring shall be maintained in the Contractor's Field Office and shall be made available to the Owner's Representative.

4.6.3 Testing and Monitoring

- a. Approved and calibrated testing devices will be provided for the measurement of hazardous substances, agents, or environments.
- b. Individuals performing testing and monitoring (i.e., Certified Industrial Hygienist) shall be trained in testing and monitoring procedures and hazards. Testing devices shall be used, inspected and maintained in accordance with the manufacturer's instructions, a copy of which shall be maintained with the devices or place of storage. Testing and monitoring training records/ certifications shall be maintained in the Contractor's Field Office and be made available upon request by the Owner's Representative.
- c. Concentrations of, and hazards from, hazardous substances, agents, and environments will be evaluated during initial startup and as frequently as necessary to ensure the safety and health of the work environment.

4.6.4 Hazard Communication

- a. A hazard communication program shall be implemented in accordance with OAR 437, Division 3, Subdivision D, 1926.59. Prior to bringing hazardous substances onto the Project Site, all employees including the Owner's Representatives who may be exposed to such substances shall be advised of information in the Material Safety Data Sheet (MSDS) for the substances. All MSDS will be located at the Contractor's Field Office and readily accessible.
- b. When any hazardous substance is procured, used, stored or disposed of, MSDS for the substances must be readily available to all potentially exposed employees or Owner's Representative at each Project Site.
 1. Information contained in the MSDS will be incorporated in the Job

Safety Analysis (JSA) for the activities on which the material will be used and shall be followed in using, storing, and disposing of the material as well as in the selection of hazard control and emergency response measures. New materials shall not be introduced into the work area until a MSDS has been received.

2. All employees using, storing, or disposing of hazardous substances shall receive training in the information contained in the MSDS for the substance as well as any general safety and health instruction required for them to fully understand this information. All training shall be documented per Section 3 of these Provisions.
3. No Container or hazardous substances shall be released for use unless the Container is correctly labeled and the label is legible.
4. Required personal protective equipment and sanitary facilities shall be provided and used when hazardous substances are transported, used, or stored and when engineering or work practice controls are not feasible or insufficient.
 - i. When irritants or hazardous substances may contact skin or clothing, sanitary facilities and protective equipment shall be provided and used.
 - ii. When the eyes or body of any person may be exposed to injurious substances, eye wash stations and showers must be provided within the work area for immediate emergency use.
 - iii. All storage of hazardous substances shall be in accordance with the recommendations of the manufacturer and MSDS requirements, and accessible only to authorized persons.
 - iv. Stored hazardous substances shall be accessible only to authorized personnel.

4.6.5 Abrasive Blasting

- a. Standard operating procedures shall be developed for abrasive blasting operations. Signs warning of sand blasting activity shall be posted. Control of all dust and fumes shall be maintained to prevent exposure to other personnel and/or equipment (i.e., motors, electronic devices, etc.). Respirable dusts and fumes will be monitored while blasting work is performed.
- b. No employee shall be allowed to work in abrasive blasting operations unless he/she has met the medical requirements for respirator usage, has the training and experience, and has been provided the personal protective equipment, specified by OAR Chapter 437-02-382.
- c. Verification of employees meeting the medical requirements shall be made available to the Owner upon request by the Owner's Representative.

- d. Pressurized systems and components shall be inspected, tested, certified, and maintained.
- e. Abrasive blasting operations shall be evaluated by a Certified Industrial Hygienist (CIH) to determine composition and toxicity of the abrasive and the dust or fume generated by the blasted material, including surface coatings. The CIH shall document findings on the activity hazard analysis developed for the abrasive blasting activity.
- f. The concentration of respirable dust and fumes in the breathing zone or persons exposed to the blasting operation shall be maintained in accordance with acceptable limits established by the ACGIH and OR-OSHA (OAR Chapter 437-02-382).
- g. When silica levels are in excess of permissible exposure limits, a silica control program shall be implemented.
- h. Blast cleaning enclosures shall be exhaust ventilated in such a way that a continuous inward flow of air will be maintained at all openings in the enclosure during the blasting operation.
 - 1. All air inlets and access openings shall be baffled or so arranged that by the combination of inward air flow and baffling the escape of abrasive or dust particles into an adjacent work area will be minimized and visible spurts of dust will not be observed.
 - 2. The rate of exhaust shall be sufficient to provide prompt clearance of the dust laden air within the enclosure after cessation of the blasting.

4.7 CONFINED SPACE

- 4.7.1 Every enclosed space shall be evaluated and classified as a confined space if it has the following:
 - a. Large enough to bodily enter.
 - b. Limited means of entry or exit (i.e., underground manholes).
 - c. Is not designed for continuous human occupancy.
- 4.7.2 A Confined Space shall be considered a Permit Required Confined Space when one or more of the following conditions exist:
 - a. Contains, or has a known potential to contain a hazardous atmosphere or any other recognized serious safety or health hazard.
 - b. Contains a material with the potential for engulfment.
 - c. Has an internal configuration such that an entrant could be trapped or asphyxiated by inwardly converging walls, or has a floor that slopes downward and tapers to a smaller cross-section.
 - d. Contains any other serious safety or health hazards.
- 4.7.3 An Entry Permit Program shall be developed and implemented for ensuring

safe entry, work and exit in all confined spaces. The Program shall meet the following requirements:

- a. Contractor shall establish a written permit system for the proper preparation, issuance, and implementation of entry permits.
- b. An Entry Permit identifying all conditions that must be satisfied prior to confined space entry shall be prepared.
- c. Contractor shall identify and evaluate, including the severity of, each hazard of the permit space.
- d. Tests for oxygen content and air contaminants (i.e., CO, H₂S, LEL) shall be made prior to and during the entry into the confined space. Tests for oxygen content shall be made before tests for air contaminants.
- e. Contractor shall establish and implement the means, procedures, and practices by which permit spaces can be safely entered.
- f. The individual authorizing the entry shall sign the permit before the entry begins but not until all actions and conditions necessary for safe entry have been performed.
- g. Entry Permits are valid only for the duration of a Single Shift or until a Crew Change occurs.
- h. When work has been completed and all entrants have exited from the confined space, the individual authorizing the entry shall terminate the permit. Permits shall be maintained for 1 year in the Contractor's Field Office and be made available upon request by the Owner's Representative.

4.7.4 Facilities operated by the Owner: Entry authorization will be issued by the Owner for facilities in use and managed by the Owner.

4.7.5 Signs shall be posted near permit spaces to notify employees what hazards may be present and that only authorized entrants may enter the permit spaces.

4.7.6 Barriers shall be erected to protect entrants from external hazards such as pedestrians and vehicles.

4.7.7 An attendant shall be stationed outside the work space at all times during confined space entry, work, and exit. The attendant's sole function shall be attending to the confined space entrants and shall not be assigned other duties or responsibilities.

4.7.8 All necessary equipment (including testing, monitoring, communication, and personal protective equipment) shall be provided and maintained to ensure safe entry procedures and work conditions.

4.7.9 The Contractor shall provide information on the permitted space entry program and its enforcement to employees under the control of a Subcontractor who are required to enter the confined space.

4.7.10 Employees shall be trained so that they can safely work in and around the

permit space. Training shall include:

- a. HAZARDS (including recognition of exposure signs and symptoms and the consequences of exposure) which may be encountered while entering, working in, or exiting the confined space.
- b. Personal protective equipment (i.e. retrieval lines, respirators, air monitoring equipment, clothing, etc.) needed for safe entry, work, and exit.
- c. External barriers, and their proper use, needed to protect entrants from external hazards.
- d. Emergency procedures for evacuating or rescuing workers.
- e. Training documentation per Section 3 of these Provisions.

4.7.11 Individuals authorizing, or in charge of (supervising), confined space entry shall receive training in, and perform their assigned duties in accordance with the following:

- a. Prior to authorizing entry, determine that the Entry Permit contains all the necessary information and that the procedures, practices, and equipment for safe entry, work, and exit are in effect.
- b. Determine, at appropriate intervals, that entry operations remain consistent with the terms of the entry permit and that the confined space conditions are acceptable.
- c. Cancel the entry authorization and terminate entry whenever confined space conditions are not acceptable.
- d. Take actions necessary to conclude an entry operation once the work and exit is complete.

4.7.12 Individuals empowered to authorize (supervise) entry may also serve as authorized entrants or attendants.

4.7.13 Procedures and equipment necessary for the rescue of entrants shall be provided and procedures for rescue implemented.

4.7.14 An on-site rescue team or pre-arranged outside rescue team services shall be provided to respond to requests for rescue services.

- a. If on-site rescue is used, the Emergency Procedures shall be coordinated with the PFB or governing regulatory agency.
- b. Rescue Teams shall complete a training drill quarterly (4 times/yr), using mannequins or personnel in a simulation of the confined space.

4.7.15 At least one member of the rescue team shall maintain current certification in First Aid and CPR. All personnel assigned to an on-site rescue team shall:

- a. Receive the training required of entrants.
- b. Be provided with and trained in the proper use of personal protective

equipment, including rescue equipment.

- c. Be trained to perform the assigned rescue functions.

4.8 HAZARDOUS/TOXIC WASTE ACTIVITIES

- 4.8.1 Comply with all the requirements with regard to hazardous/toxic waste activities in the Specifications.

4.9 TRAFFIC CONTROL AND SIGNALING

- 4.9.1 Comply with all the requirements with regard to traffic control and traffic plans in the Specifications.
- 4.9.2 All traffic control devices should be checked daily and their exact location documented.
- 4.9.3 The Contractor's documentation should include:
 - a. Starting and ending times of work.
 - b. Location of work.
 - c. Types of traffic control devices used.
 - d. Changes in temporary or permanent regulatory devices.
 - e. Drawings of traffic control that includes all devices.

4.10 SIGNS, TAGS AND BARRICADES

- 4.10.1 When potential exposures exist, signs and symbols will be posted to warn employees or public against the potential hazards. Signs and symbols must remain in place until the hazard(s) has been controlled or eliminated.
- 4.10.2 Tags shall be used as a temporary means of warning employees or public of an existing hazard, such as defective tools, equipment, etc. They shall not be used in place of, or as a substitute for incident prevention signs.
- 4.10.3 For protection of employees, barricades shall conform to the portions of the American National Standards Institute (ANSI) D-6.1 Manual on Traffic Control Devices for streets and highways, relating to barricades.

4.11 HOUSEKEEPING

- 4.11.1 During the course of Work, work areas, passageways and stairs, in and around buildings, structures and railroads, shall be kept clear of debris. Construction materials will be stored in an orderly manner. Storage areas and walkways on the site will be maintained free of depressions, obstructions and debris.
- 4.11.2 Materials, tools, equipment, cords and electric lines must be stored in an orderly and secure manner.
- 4.11.3 Trash receptacles shall be placed at appropriate locations for the disposal of

rubbish and debris.

- 4.11.4 Trash and waste materials shall be promptly removed and disposed.
- 4.11.5 Air and water lines, and welding and burning leads, and extension power cords shall be located to eliminate tripping hazards.
- 4.11.6 Any protruding nails, etc. shall be immediately removed or completely bent over.
- 4.11.7 Oil, grease and water spills shall be cleaned up immediately or covered with approved absorbent materials.
- 4.11.8 All tools, scaffolding, rubbish and materials shall be removed from the work area at the completion of the work.
- 4.11.9 All reinforced steel and rebar shall be either: bent over or flat; use steel reinforcing caps; use wooden troughs; or provide other engineering controls that eliminate exposure to exposed reinforced steel. NOTE: Mushroom Caps will not be allowed.
- 4.11.10 Spillage of earth, dusty materials, boulders, and mud on roads located on right-of-way, and private property is not permitted. If spillage cannot be prevented, the Contractor must provide an hourly patrol to monitor and sweep such area throughout the work day, and at the conclusion of each work day. Any paved roads located in the right-of-way or on private properties which have been used by the Contractor shall be cleaned to the satisfaction of the Owner's Representative. Cleaning/sweeping of paved roads shall be in accordance with the City of Portland Erosion Control Manual.

4.12 ELECTRICAL

4.12.1 General

- a. All electrical work, installation, wire capacities, and personal protective equipment shall be in accordance with the pertinent provisions of the National Electrical Safety Code (NESC), National Electrical Code (NEC), OR_OSHA, OAR Chapter 437, Division 3, Subdivision K 1926.400-450, and National Fire Protection Association 70 E (NFPA 70E).
- b. All switches shall be enclosed, grounded and installed to minimize the possibility of accidental operation. Panel boards shall have provisions for closing and locking the main switch and fuse box compartment, and shall be labeled with voltage.
- c. Electric wire and flexible cords passing through work areas shall be covered or elevated to protect them from damage; to eliminate tripping hazards; and when such material is passing through walls it shall be protected by bushings or fittings.
- d. Electrical wire, conduit, apparatus and equipment shall be listed by the Underwriters Laboratories, Inc. or Factory Mutual Laboratories, for the

specific application for which it is to be used.

- e. Energized electrical conductors and circuit parts to which a contractor might be exposed shall be put into an electrically safe work condition before that contractor works within the Limited Approach Boundary of those conductors or parts, unless work on energized components can be justified by means of creating a greater hazard, infeasibility, or the exposure is to less than 50 volts. When work performed on energized electrical conductors or circuit parts are justified not to be placed in an electrically safe work condition work to be performed shall be considered energized electrical work and shall be performed under written permit only.
- f. Work on electrical circuits and equipment shall be performed only by qualified licensed electricians familiar with the code requirements and qualified to perform the particular type of work to which they are assigned.
- g. Temporary lighting strings shall consist of non-conductive lamp sockets and connections permanently molded to the connector insulation. Bulbs attached to festoon lighting strings and extension cords shall be protected by lamp guards, unless deeply recessed in a reflector. Broken bulbs shall be promptly replaced.
- h. Suitable means shall be provided for identifying all electrical equipment and circuits, especially when two or more voltages are used on the same job. All circuits shall be marked for the voltage and the area of service they provide.
- i. Live parts of wiring or equipment shall be effectively guarded to protect all personnel or objects from coming in contact.
- j. Contractors performing electrical work shall implement and document an overall electrical safety program that directs activity appropriate for the voltage, energy level, and circuit conditions that adheres to the electrical standards set forth in the National Fire Protection Association 70 E (NFPA 70E) 110.7.
- k. Semi-portable equipment, floodlights, and work lights shall be grounded by a Ground Fault Circuit Interrupter (GFCI) and meet the requirements of Section 4 these Provisions, and be maintained during moving unless supply circuits are de-energized.

4.12.2 Flexible Cords

- a. Flexible cord sets used on construction sites or in damp locations must contain the number of conductors required for the service, plus a GFCI.
- b. Electric wire and flexible cord passing through work areas must be protected from damage; flexible cords and cables passing through holes shall be protected by bushings or fittings.

- c. Flexible cord will be used only in continuous lengths without splice or tap, except hard service flexible cords No. 12 or larger. Flexible cords No. 12 or larger with molded or vulcanized splices may be used if the splices are made by a qualified electrician, the insulation is equal to the cable being spliced, and wire connections are soldered.
- d. Patched, oil-soaked, worn, or frayed electric cords or cables shall be tagged and removed from service immediately.
- e. Extension cords or cables shall not be secured with staples, hung from nails, suspended by bare wire or any other conductive material.
- f. Flexible cords are to be inspected daily and/or as required by the manufacturer.

4.12.3 Isolation

- a. Before work begins, a qualified person (i.e., electrical license) shall conduct an electrical hazard survey to ascertain whether any part of an electric power circuit, exposed or concealed, is located such that the performance of work could bring any person, tool, or machine into physical or electrical contact with it.
- b. Whenever possible, all equipment as well as circuits to be worked on shall be de-energized before work is started and personnel protected by clearance procedures and grounding. Comply with Section 4 of these Provisions.
- c. Live parts of wiring or equipment shall be guarded to protect all persons or objects from harm.
- d. When it is necessary to work on energized lines or equipment, rubber gloves and other protective equipment or hotline tools meeting the provisions of ANSI/ASTM standards shall be used.
- e. In the following situations, at least two qualified workers will be assigned to work together. One worker shall be trained to recognize electrical hazards, be First Aid/CPR trained and delegated to watch the movements of the others doing the work so that they can warn them if they get dangerously close to live conductors or perform other unsafe acts, and so he/she can assist in case of an incident.
 1. Work on energized overhead lines.
 2. Work in substations and power plants where the wiring is congested.
 3. Work at remote or isolated locations.
 4. Work at night or during inclement weather.
 5. Work involving handling energized conductors or apparatus.
- f. Insulated gloves or tongs shall be used to handle energized trailing electric power cables. If insulated gloves are used they will be tested every 30 days for leakage, and test documentation records must be kept in

Contractor's Field Office. Gloves will be identified by marking, and a log of inspections of all such gloves will be maintained.

4.12.4 Safe Clearance

- a. Every effort must be made to isolate and lock out electrical sources prior to work being performed on them. Contractor shall submit an electrical hot work policy if work is performed on any energized electrical component, and the work will be performed under the provisions of this policy. A written safety check list shall be included for all hot work performed. Such records shall be maintained on file at the Contractor's Field Office and provided to the Owner's Representative upon request.
- b. Transformer banks and high voltage equipment shall be protected from unauthorized access; entrances not under constant observation shall be kept locked; metallic enclosures shall be grounded; and signs warning of high voltage and prohibiting unauthorized entrance shall be posted at entrances.
- c. Enclosure gates or doors shall swing outward or provide clearance from installed equipment.

4.12.5 Assured Equipment Grounding Program (AEGP)

- a. An assured equipment grounding conductor program is required, and the following provisions shall be adhered to:
 1. Provide a written description of the program, including type of electrical equipment and wiring and safety precautions. The written description of the program shall be included in the Contractor's Safety and Health Plan.
 2. The program shall apply to all cord sets, receptacles, and equipment connected by cord and plug which are available for use by employees.
 3. Designate one or more qualified persons familiar with the Code requirements to supervise the installation of the program.
 4. Each cord set, attachment cap, plug and receptacle or cord sets, and any equipment connected by cord and plug, except cord sets and receptacles which are fixed and not exposed to damage, shall be visually inspected before each day's use for external defects such as deformed or missing pins or insulation damage, or for indication of possible internal damage. Equipment found to be defective or damaged shall be removed from service immediately and not used until repaired.
- b. The following test shall be made on all cord sets and receptacles which are used for Work operations:
 1. All equipment grounding, conductors, and receptacle outlets shall be tested for continuity and shall be electrically continuous.

2. Each receptacle and attachment cap or plug shall be tested for correct attachment of the equipment grounding conductor and to insure that the grounding conductor is connected to its proper terminal.
 3. Tests shall be performed before first use, before equipment is returned to service following repairs, before equipment is used following an incident which could have damaged the grounding system, and at intervals not to exceed three months or the appropriate calendar quarter. Intervals may be six months for cord sets and receptacles, which are fixed and not exposed to damage.
- c. A color coding system or other system shall be implemented. The Contractor shall maintain a written record of tests and inspections and such record shall indicate the last date it was tested or the interval for which it was tested. This record shall be kept by means of log and color coding or other effective means. All records shall be kept in the Contractor's Field Office and made available upon request by the Owner's Representative.
- d. Assured Equipment Grounding Program Color Code
1. White (Winter) January, February, March
 2. Green (Spring) April, May, June
 3. Red (Summer) July, August, September
 4. Orange (Fall) October, November, December
- e. In underground operations, ground fault circuit interrupters (GFCI) shall be used in conjunction with an assured grounding program for all underground construction operations.

4.12.6 Ground Fault Circuit Interrupters (GFCI) Protection

- a. All equipment (electric saws, drills, extension cords, etc.) capable of being plugged into a 110-volt receptacle and/or generators 5KV or larger and welding machines not grounded and used for electrical power shall have a GFCI device provided prior to the tool and/or extension cord/tool.
- b. All GFCI devices shall be tested by an electrically qualified person. The test will be done by introducing a ground fault into the circuit using a commercially available GFCI tester. Test buttons for the circuit may trip the device but may not provide the protection intended if the breaker is faulty or incorrectly wired. A record of testing shall be kept, identifying the following:
 1. Serial number of unit.
 2. Date of purchase.
 3. Brand.
 4. Model number.

5. Date of initial testing done before placing into service by using GFCI tester.
6. Date of inspection.

4.13 ILLUMINATION

4.13.1 General

- a. Construction areas, ramps, runways, corridors, offices, shops, and storage areas will be lighted to not less than the minimum illumination intensities listed in OR-OSHA Chapter 437, Subdivision D, 1926.56 - Illumination. **NOTE:** For areas or operations not covered in above section and table, comply with the American National Standard A11.1-1065, R1970, Practice for Industrial Lighting, for recommended values of illumination.
- b. Periodic testing of project illumination will be performed to ensure compliance with the published illumination standards.
- c. The Following Illumination Table will be followed for the areas indicated:
- d. Table A-Minimum Illumination Intensities in Foot Candles

Foot Candles	Area or Operation
5	General Condition area lighting.
3	General Construction area, concrete placement, excavation and waste areas, access ways, active storage areas, loading platforms, refueling, and field maintenance areas.
5	Indoors: warehouses, corridors, hallways, and exits.
5	Tunnel, shafts, reservoirs, tanks, vaults and general underground work areas. (Exception: minimum of 10 foot-candles is required at tunnel and shaft heading during drilling, mucking, and scaling. Bureau of Mines approved cap lights shall be acceptable for use in the tunnel heading.)
10	General construction plant and shops (e.g., batch plants, screening plants, mechanical and electrical equipment rooms, carpenter shops, rigging lofts and active store rooms, mess halls and indoor toilets and workrooms.)
30	First Aid stations, infirmaries, and offices.

4.13.2 Underground

- a. All, tunnels, shafts, reservoirs, tanks, vaults, and inclines, except as required by “loading explosives general” shall be adequately illuminated by an electric lighting system or natural light, and shall be equivalent to at

least five-foot-candles intensity at the tunnel floor and ten-foot-candles at the heading area.

- b. Each Worker underground will have a portable permissible hand light or permissible cap lamp available for emergency use unless natural light or emergency lighting systems are adequate for escape.
- c. Automatic emergency lighting shall be provided in the heading area.

4.14 LOCKOUT/TAGOUT PROCEDURE

- 4.14.1 The Contractor will develop a procedure intended to provide a controlled method for rendering any energy source systems (including mechanical or piped) inactive when equipment or systems are down for any reason. Such as, maintenance, repair, removal or replacement of equipment and installation of new equipment. The procedure shall comply with OR-OSHA OAR 437, Division 2, 1910.154, and the Owner's Energy Lockout/Tag out Policy and Procedures.
- 4.14.2 The procedure shall also include provisions for:
 - a. Shutting down equipment.
 - b. Repairing, servicing and installing equipment.
 - c. Start-up of equipment.
- 4.14.3 Lockout/tag out procedures will be reviewed and accepted by the Owner's Representative.
- 4.14.4 There will be no group/crew locks unless a lock box system is provided. All locks shall be individually keyed, and every person exposed working on the system will place their own lock and tag.
- 4.14.5 A survey will be performed on each piece of equipment to be de-energized, and a specific procedure (i.e., JSA) completed and communicated to all employees.
- 4.14.6 When the Contractor or a Subcontractor of any tier needs to shut down any energy source that is part of an existing system, the Contractor shall coordinate the shut down with the Owner of the energy source. When it is a BES or PWB energy source, the Contractor shall follow the procedures detailed in the BES or PWB Lockout/Tag out Policy, including requesting that the Owner's Representative initiate the process by completing an "Outage Request Form".

4.15 MATERIAL HANDLING AND STORAGE

- 4.15.1 Material Handling
 - a. Contractor and subcontractor employees will be instructed to use proper lifting techniques.
 - b. Whenever heavy or bulky material is to be moved, the material handling needs will be evaluated in terms of weight, size, distance, and path of move. The following considerations shall be followed in selecting a

means for material handling:

1. Elimination of material handling need by engineering.
 2. Movement by mechanical device (e.g., lift truck, overhead crane, or conveyor).
 3. Movement by manual means with handling aid (e.g. dolly or cart).
- c. Materials shall not be moved over or suspended above personnel unless precautions have been taken to protect against falling objects.
 - d. Where the movement of materials may be hazardous to persons, taglines or other devices shall be used to control the loads being handled by hoisting equipment. These devices shall be non-conductive when used near energized lines.

4.15.2 Material Storage

- a. All material in bags, containers, bundles, or stored in tiers must be stacked, blocked, interlocked, and limited in height so that it is stable and secured against sliding or collapse.
- b. Material will be stacked as low as practical and in no case higher than 20 feet unless otherwise specified.
- c. Material stored inside buildings under construction will not be placed within 6 feet of any hoist way or floor opening, or within 10 feet of an exterior wall which does not extend above the material stored.
- d. Access ways must be kept clear. All persons shall be in a safe position while materials are being loaded or unloaded from trucks, or other material carriers.
- e. Material shall not be stored on scaffolds or runways in excess of needs for normal placement operations, or in excess of safe load limits.
- f. Non-compatible materials shall be segregated in storage.
- g. Lumber shall be supported on stable sills and shall be stacked level, stable, and self-supporting.
 1. Lumber piles shall not exceed 20 feet in height. Lumber to be handled manually shall not be stacked more than 16 feet high.
 2. Reusable lumber shall have all nails withdrawn before it is stacked for storage.
- h. Bagged materials shall be stacked by stepping back the layers and cross-keying the bags at least every 10 bags high.
- i. Brick shall be stacked on an even, solid surface.
 1. Brick stacks shall not be more than 7 feet high. When stacked loose brick reaches a height of 4 feet, it shall be tapered back 2 inches in every foot of height above the 4 foot level.

2. Unitized brick (brick securely gathered into large standard packages and fastened with straps) shall not be stacked more than 3 units high.
- j. Blocks shall be stacked in tiers on solid, level surfaces.
- k. When masonry blocks are stacked higher than 6 feet, the stack shall be tapered back one-half block per tier above the six-foot level.
- l. Reinforcing steel shall be stored in orderly piles away from walkways and roadways.
- m. Structural steel shall be securely piled to prevent members sliding off or the pile toppling over.
- n. All round stock including but not limited to structural steel, poles, pipe, bar stock, and other cylindrical materials, unless racked, shall be stacked and blocked to prevent rolling, spreading or tilting.
 1. Either a pyramid or battened stack shall be used.
 2. Where a battened stack is used, the outside pile or pole shall be securely chocked. Battened stacks shall be tapered back at least one pile or pole in each tier.
 3. Unloading of round material shall be done so that no person is required to be on the unloading side of the carrier after the tie wires have been cut or during the unlocking of the stakes.
 4. No person is allowed on the blind side of any unloading operation.

4.16 ROPES, SLINGS, CHAINS, AND ACCESSORIES

- 4.16.1 The most recent standards published for rigging equipment by ANSI will be the resource documents used to determine whether the Contractors' rigging equipment and practices are considered safe.
- 4.16.2 The use of ropes, slings, and chains will be in accordance with the safe usage recommendations of the equipment manufacturer.
- 4.16.3 The safe working load of ropes, slings, chains, accessories, and rigging equipment will be determined prior to use. The safe working load shall be observed and shall not be exceeded. Safe working loads for specified types and sizes of ropes, slings, chains, and accessories shall be as set forth in this section. For items of rigging used in combination, the safe working load shall be that of the weakest item.
- 4.16.4 Use of job-fabricated rigging hardware is prohibited unless designed and certified by a licensed Professional Engineer and tested at 125 percent of the rated safe working load. All tests shall be documented, and kept at the Contractor's Field Office.
- 4.16.5 The installation, maintenance, and repair of ropes, chains, and slings and rigging accessories must be performed only by the manufacturer or in accordance with the manufacturers written instruction and tested at 125 percent

of their rated load prior to use. All tests will be documented, and kept at the Contractor's Field Office.

4.16.6 Rigging used for material handling shall be inspected prior to use on each shift to ensure that it is in good repair and safe to use. A Competent Person shall inspect monthly all rigging devices. Documentation of the inspection shall be located in the Contractor's Field Office and made available upon request. Defective equipment shall be immediately removed from service.

4.16.7 Alloy Steel Chains

- a. The safe working load must not exceed the rated capacities as set forth by the manufacturer.
- b. Only heat-treated alloy steel chains stamped with an "A" on each link will be used in hoisting operations.
- c. Welded alloy steel chain slings must have permanently affixed durable identification tags stating size, grade, rated capacity, and sling manufacturer.
- d. Hooks, rings, links, or other attachments when used with alloy steel chains must have a rated capacity at least equal to that of the chain. Job-made hooks, links, or makeshift fasteners, formed from bolts, rods, etc. shall not be used.
- e. Chains must not be subjected to impact loading or jerking.
- f. Whenever wear at any point in any chain link exceeds that of manufacturer's specifications, it will be removed from service.
- g. Knots in chains are prohibited.

4.16.8 Wire Rope

- a. Wire rope slings must not exceed the rated capacities set forth by the manufacturer.
- b. Only commercial wire rope fittings will be used. Wire rope clips must be installed as specified by manufacturer.
- c. Protruding ends of strands in splices on slings and bridles must be covered or blunted.
- d. Except for end fasteners, wire rope used in hoisting, lowering, or pulling loads must consist of one continuous run without knots or splices.
- e. Eyes in wire rope bridle slings or bull wires must not be formed by wire clips or knots.
- f. Wire rope must be correctly over-wound or under-wound from right to left or left to right in accordance with the lay to avoid twisting, spreading, or overlapping on winch drums.
- g. The ratio between the rope diameter and the drum or sheave diameter shall not be less than specified by the equipment manufacturer. When not

so specified, the ratio shall be in accordance with the more stringent of the rope manufacturer's recommendations or appropriate ANSI standards requirements. Drums, sheaves and pulleys shall be smooth and free of defects which could damage the rope.

- h. Sheave groove tolerances shall be as recommended by the manufacturer of the sheave, block, drum, or pulley.
- i. Wire rope shall be lubricated with manufacturer approved lubricants at intervals warranted by the type of service.
- j. Wire rope with one or more of the following defects must be tagged and removed from hoisting or load carrying service immediately.
 - 1. Corrosion resulting from acids or alkalis.
 - 2. Rust film which has not resulted in pitting or loss of more than one-third of the original wire diameter must be removed and the rope lubricated.
 - 3. Broken wire: (1) one or more valley breaks (a valley break is a wire break occurring in the valley between two adjacent strands), and (2) six randomly broken wires in one wire rope lay or three broken wires in one strand in any one lay.
 - 4. Abrasion, scrubbing, flattening, or peeling resulting in loss of more than one-third the original diameter of the outside wires.
 - 5. Kinking, crushing, bird caging, or other damage resulting in distortion of the rope structure.
 - 6. Evidence of heat damage resulting from a torch, excessive friction, or contact with electrical wires.
 - 7. Reductions from nominal diameter or more than 3/64 inch for rope diameters up to and including 3/4 inch, or more than 1/16 inch for diameter 7/8 to 1-1/8 inches and of more than 3/32 inch for rope diameters 1-1/4 to 1-1/2 inches.
- k. When two or more wires are broken, or rust and/or corrosion are found adjacent to a socket or end fitting, the wire rope shall be re-socketed or removed from service.
- l. Wire rope removed from service due to defects shall be cut up and discarded, or plainly marked as being unfit for load bearing service.
- m. Running lines of stationary hoisting equipment located within 8 feet of the ground or working level shall be guarded, or the hazardous area enclosed or barricaded.

4.16.9 Slings

- a. The safe working loads of slings must not exceed the rated capacities set forth in manufacturer's specifications. The manufacturer's recommended safe working load for the specific angle of loading shall be followed

provided that a minimum safety factor of 5 is maintained, unless a higher factor of safety is required elsewhere.

- b. Slings shall be protected from sharp, rough, or square corners by appropriate means in order to prevent damage to the strands, wires or links. Proper storage shall be provided for slings when not in use to ensure against damage that would impair their strength.
- c. Chain, wire rope, fiber, synthetic webbing, Kevlar, metal mesh slings, and sling hooks shall be routinely inspected and removed from service when wear exceeds that set forth in manufacturer's specifications, "Removal of Slings from Service".

4.16.10 Manila and Synthetic Fiber Rope

- a. The safe working loads for manila and synthetic fiber rope and slings shall not exceed the rated capacities as set forth by the manufacturer.
- b. Only non-conductive synthetic fiber rope shall be used in the proximity of energized conductors or equipment, including hand lines for work on electrical facilities.
- c. Proper care shall be given fiber ropes to maintain them in safe condition. Fiber ropes that have been subjected to acids, alkalis, freezing, or excessive heat shall not be used for load carrying purpose. Fiber rope must be protected from abrasion by padding when it is drawn over square corners, or sharp or rough surfaces.
- d. Synthetic web slings must be marked or coded to indicate manufacturer's name, type of material, and the rated capacity for the type of hitch. Synthetic web slings must be protected from abrasion and cutting by padding when they are drawn over square corners, or sharp/rough edges.

4.16.11 Shackles and Hooks

- a. Safe working load as determined by manufacturer must be used to determine the safe working loads of shackles. Higher safe working loads recommended by the manufacturer is acceptable for specific identifiable products if a minimum safety factor of five, or the more stringent safety factors specified elsewhere in these standards, are maintained.
- b. Shackles used for hoisting must be of forged alloy steel, and shall be of the locking or secured-pin type.
- c. Shackles that are bent, distorted, or worn in the crown or pin by more than 10 percent of their original diameter must be removed from service.
- d. Manufacturing, testing, inspecting, and use of hooks must conform to the more stringent requirements contained in ANSI B30.10, "Hooks", or manufacturer specifications and recommendations for these standards.
- e. The manufacturer's recommendation shall be followed in determining the safe working load for the specific size and type of hook used. Hooks for which no manufacturer's recommendation is available, shall be tested at

twice the intended safe working load prior to use. The Contractor shall maintain a record of the dates and results of the tests. The previously referenced rigging manual shall be consulted for indication of safe loads for unusual hook configuration.

- f. Hoisting hooks, as opposed to sling and choker hooks, must be of forged alloy steel, and must be stamped with their safe working loads. Hoisting hooks shall preferably be used with swivels and headache balls, and shall be equipped with safety keepers.

4.17 HOISTING EQUIPMENT, PILE DRIVERS AND CONVEYORS

4.17.1 General

- a. The Contractor shall comply with the more stringent of these regulations and the manufacturer's recommendations for rated load capacity, specifications and limitations applicable to installation, operation, maintenance, inspection and testing of all temporarily installed cranes, derricks, cableways, and other hoisting equipment. When information is not available from a manufacturer, it shall be developed and/or determined by a licensed Professional Engineer, competent in the aforementioned areas.
- b. All manufacturer's and/or engineer's information, including operating, inspecting and testing instructions, must be reduced to written form and provided to the Owner's Representative through the Contractor. No equipment shall be used or installed until the licensed Professional Engineer's and/or manufacturer's data have been accepted by the Owner's Representative.
- c. Hoisting equipment, including attachments, shall be installed, inspected, tested, and/or operated in strict conformance with the manufacturer's or Professional Engineer's specifications, ratings, limitations, operation and maintenance requirements and these standards.
- d. All permanently installed personnel or material hoisting equipment to be used by the Contractor for Work purposes, must, as a minimum, be inspected, tested, and certified in accordance with these and referenced standards prior to initial use and annually thereafter.
- e. All elevators, personnel and material hoisting systems must be certified by the State agency having jurisdiction or an independent entity acceptable to the State agency.
- f. Rated load capacities, operating speeds, special warnings, and all other information required by the manufacturer and/or professional engineer and applicable ANSI standard, shall be posted where clearly visible to the operator(s) of the hoisting equipment. The load capacities and instructions shall be reviewed with and strictly adhered to by the operator of the equipment. Except for testing, hoisting equipment shall not be

loaded in excess of posted maximum loads considering boom angle, outrigger support, and other limiting factors.

- g. All reciprocating or rotating parts of machinery which expose employees to injury shall be posted and physically guarded.
- h. The swing radius at the rear of the crane superstructure shall be physically guarded (i.e. barricaded) along with signs as required by OAR 437, Division 3, Subdivision N, 1926.550-556.
- i. Fire extinguishing equipment shall be mounted in or near cab or operator's stations.
- j. Booms shall be equipped with a boom angle indicator and approved boom stops. Boom heads, load blocks and hooks shall be painted with high visibility paint.
- k. A braking system capable of stopping, lowering, and holding a load of at least 110 percent of the rated maximum capacity shall be provided on all hoisting equipment.
- l. Load drums on load-hoisting equipment shall be equipped with dogs, pawls, or other positive holding devices. At least 3 full wraps of line shall be maintained on hoisting drums and manufacturer's recommendations shall be followed.
- m. Cranes or derricks with cable-supported booms, except draglines, shall have a device attached between the gantry or A-frame and boom cords to limit the elevation of the boom. The device shall control the vertical motions of the boom with gradually increasing resistance from 83 degrees or less, until completely stopping the boom at not over 87 degrees above the horizontal.
- n. Hoisting ropes must be installed and maintained in accordance with the manufacturer's recommendations. Rot-resistant and fiber core ropes shall not be used for hoisting unless specified by the manufacturer and then only in accordance with instructions and increased design safety factors required by the manufacturer and/or respective National standards.
- o. Hooks and shackles used on hoisting equipment shall meet requirements of manufacturer. Hooks shall be equipped with approved safety keepers. Shackles used on slings or hoist lines shall be of the locking type or pin secured.
- p. Hoisting equipment with telescopic or extendable booms shall have an indicator that shows the boom length from minimum to maximum and is visible to the operator from their position at the controls. Cranes with telescoping booms manufactured after 1975 shall have anti-two block devices installed.
- q. Where necessary to increase stability, cranes, except crawler cranes and boom type excavators, shall be equipped with outriggers of a design and

strength suitable for the work being performed. Outriggers shall be used in accordance with the manufacturer's instructions.

4.17.2 Inspection

- a. Prior to initial on-site operation, at 12-month intervals, following major repairs or modification, and when required by the Owner's Representative, power cranes, aerial lifts, derricks, cableways, and other hoists and hoisting systems must be thoroughly inspected and satisfactorily complete a performance test that demonstrates the equipments' ability to safely handle and maneuver rated loads. At a minimum, the following shall occur:
 1. Initial and monthly performance inspections and tests will be conducted on-site after the crane hoist or hoisting system has been assembled or reassembled and rigged for operation. Manufacturers, Contractor, or Owner offsite inspections and tests will not be substituted for on-site inspections and tests.
 2. Crawler, locomotive, and weld-mounted cranes shall be performance inspected and tested by the Contractor and/or Owner in accordance with the more restrictive requirements of the manufacturer.
 3. All other cranes, hoists, derricks, cableways, specialized hoisting equipment, installations and systems described in this section shall be on-site performance inspected and tested under the direct supervision of the manufacturer and/or responsible design engineer or their designee. The inspection(s) and test(s) must conform to the more restrictive requirements of the manufacturer or referenced standards. Following inspection(s) and test(s) shall include:
 - i. A comprehensive report detailing the initial performance and testing procedure, findings and recommendations.
 - ii. A copy of recommended periodic inspection, testing and maintenance requirements, and operating and rigging instructions.
 - iii. A written certification that the inspected and tested equipment and system(s) meet or exceed the specific requirements of this section and referenced standards and the equipment and system(s) are capable of safely performing the intended service.
 - iv. All records of the inspection(s) and test(s) shall be located at the Contractor's Field Office and made available upon request.
- b. Hoisting equipment must be inspected prior to use at the start of each shift by a competent person(s) to determine whether or not it is in safe operating condition. Any damage or deficiencies shall be corrected prior to use. Provisions shall be made for routine lubrication and maintenance of all hoisting equipment. Written records of all inspections, deficiencies, and repairs will be available for review by the Owner's Representative or

others as needed.

- c. Hooks, wire rope, bearings, gears, friction clutches, chain drives and other parts subject to wear will be inspected at regular intervals and repaired or replaced as required. Records of such inspections must be maintained by the Contractor, at the Contractor's Field Office.
- d. Any crane over three tons manufacturer's rated capacity shall be inspected per OAR 437, Division 3, Subdivision N, 1926.550.
- e. Modifications, Additions or Repairs.
- f. Modifications, additions or repairs which affect the structural competence, capacity or safe operation of the equipment or system shall not be made without the manufacturer's written approval and/or by a professional engineer competent in the field.
- g. When such modifications, additions, or repairs are made, the equipment will be subjected to another performance test and the posted load capacities revised to reflect the changes. Modification for purpose of performance test requirements are further defined as:
 - 1. Re-rigging of hoisting and support systems.
 - 2. Adding or removing of jibs, boom sections, boom extensions, auxiliary boom noses or similar attachments. Exceptions to this latter requirement may be granted by the Owner's Representative if the hoisting equipment and/or system are tested in accordance with manufacturer's specifications prior to use and annually thereafter in the configuration attributable to the adding or removing of the attachment or component. Further, whenever an attachment or component described herein is added or removed that could affect the crane's structural competence, the crane is given a cursory performance test prior to the first on-site lift: such test consisting of lifting the intended load a few inches above its resting surface; rotating it right and left through a number of degrees required to assure structural competence and returning it to the original resting place. Such test lifts shall not endanger structures, personnel or equipment.
 - 3. Repairs to critical structural components.
 - 4. Removing or adding counterweights.
- h. All written correspondence with the manufacturer, test results, and modifications must be kept in the Contractor's Field Office and made available upon request.

4.17.3 Operation of Hoisting Equipment

- a. Operators of cranes, cableways, and other hoisting equipment described in this section shall be examined and provided with a physician's certificate stating that they are physically qualified to safely operate the

hoisting equipment to which they are assigned. At least once a year, they must undergo a physical examination and obtain a physicians certificate of physical fitness. A copy of the certificate must be kept in the Contractor's Field Office, and made available to the Owner's Representative upon request. Also, every newly hired operator of hoisting equipment described in this section shall be individually checked out by an experienced operator or supervisor to determine if he/she is capable of safely operating the equipment. Furthermore, operators shall not work or be at the Project Site over 10 hours in any 24-hour period.

- b. Only qualified employees, meeting OR-OSHA Regulations Chapter 437-03-081(5) shall be permitted to operate each type and capacity of crane equipment assigned.
- c. Operators are responsible for the safe operation of their equipment. Operators must immediately report unsafe conditions, including defects in the machine, to their supervisor.
- d. No person shall be permitted to ride loads, blocks, buckets, hooks, scaffolding, boatswain chairs, cages, or other type devices attached to hoist lines, booms or attachments of any crane, derrick, or material hoist. The following exceptions are subject to prior approval of the Owner's Representative: (1) authorized designated personnel may ride in enclosed cages on approved-type manskips rigged to cableways or highlines; and (2) designated maintenance personnel may ride the carriage service platform of a cableway to perform inspection testing or maintenance operations.
- e. Prior to any crane setup, the ground shall be inspected to determine if it is sufficiently strong and stable to take static and dynamic loads.
- f. When setting any mobile crane in place to make a lift, the outriggers shall be fully extended before any boom extension or movement.
- g. Outrigger floats must rest on firm, level, smooth surfaces which will support the load placed on them. Holes, rocks, and soft ground shall be avoided.
- h. If soft ground is encountered, mats, steel plates, timber pads, etc., must be used to distribute loads under the crane to insure that the bearing strength of the ground is not exceeded. The presence of existing utilities should be investigated in locations of outriggers and cribbing for crane set-up.
- i. Unless barricaded, adequate clearance shall be maintained between moving and rotating parts of a crane and other fixed objects in order to permit safe passage of persons.
- j. Outrigger floats or load distribution materials shall be checked before and during operation for settling into ground. Such materials shall be reset as necessary.
- k. When hoisting equipment is in operation and while a load is suspended in

the air, the operator will not be permitted to perform any other work nor leave the operator's position.

- l. When the operator leaves its machine or repairs are being made, it is their responsibility to set the brakes, secure the boom, take the machine out of gear and turn off the engine.
- m. All overhead electrical lines shall be considered as high voltage lines, and no crane or any part of a crane shall be permitted to work within 10 feet of an overhead electrical line. Specific requirements pertaining to operation of cranes and other equipment near high-voltage lines are as set forth under OR-OSHA Standards, OAR Chapter 437, Division 3, 1926.550(a).
- n. A person must be designated to observe clearance of boom, load, or load lines whenever the crane is within boom length of the safe approach limits to energized equipment or lines.
- o. Worker, vehicular, and/or pedestrian traffic will not be allowed to pass beneath the boom or load of any crane. When the boom of a crane must be placed over a street or pedestrian walkway, the traffic, vehicular and/or pedestrian, must be stopped or re-routed.
- p. Loads shall be safety rigged by a competent person and it is the joint responsibility of the Operator and the Rigger to see that all hitches are secure and that all loose material is removed before the loads are lifted. "Christmas Treeing" of materials is prohibited.
- q. Safety hooks must be used on all operations where loads are being handled. Suspended loads must be controlled by tag lines.
- r. A uniform signal system must be used in the operation of cranes, derricks, and hoists. Hand signals must conform to OAR 437, Division 3, Subdivision N, 1926.550.
- s. When making a lift, the operator will take operational signals only from the worker authorized to give them. An emergency stop signal, given by anyone, will be acted upon by the operator.
- t. On any underground project, all crane operators shall comply with the requirements of OAR 437, Division 3, Subdivision N, 1926.550.

4.17.4 Critical Lifts

- a. A critical lift plan (check list) must be prepared and submitted to the Owner's Representative by the Contractor for any lift where the load exceeds 75% of the load chart capacity for the crane or derrick, or where the lift involves the use of 2 or more cranes.
 1. No lifts meeting the above criteria shall be made without prior submission of a Critical Lifts Plan/Check List and Drawing.
 2. Prior to making the lift, the conditions shown on the critical lift plan and drawing submitted shall be verified by the Contractor's Safety

Representative at the Project Site. Any deviations from the erection drawing submitted shall be reviewed and verified as safe by the Contractor's Competent Person or designee.

4.17.5 Personnel Platforms

- a. The use of a crane or derrick to hoist employees on a personnel platform is prohibited, except when the use of a personnel hoist, ladder, stairway, aerial lift, elevating work platform or scaffold, would be more hazardous, or is not possible because of structural design or Project Site conditions.
- b. Whenever personnel platforms are utilized, the design, rigging, operation and procedure shall comply with OAR 437, Division 3, Subdivision N, 1926.550(g)(2). A crane suspended personnel platform check list and a pre-lift meeting report for crane suspended personnel platforms shall be completed prior to any use of such platforms suspended by cranes and maintained on file at Contractor's Field Office, and made available for review upon request. A pre-lift of the personnel platform is to be performed using the expected maximum weight prior to being used by personnel.

4.17.6 Pile Driver Safety

- a. Guys, outriggers, thrust-outs or counter balance shall be used to stabilize the pile driver (not to exceed the manufacturer's recommendations).
- b. Work platforms must be provided on pile drivers, with the following minimum requirements:
 1. Guardrails or guardlines (must be at least 3/8 inch wire rope, or 1 inch manila rope), placed at a height of 42-45 inches in height from the platform.
 2. Toeboards at least 4 inches in height must be installed on work platforms for firm footing and to prevent the fall of tools and material.
- c. Drop Hammers:
 1. When a drop hammer is used, a driving head or bonnet shall be provided to bell the head of the pile and hold it true in the leads.
 2. Steam controls shall consist of 2 shutoff valves within easy reach of the hammer operator.
 3. The hammer shall be secured in the leads by means of an adequate chock, toggle or other device to safely support the hammer when personnel are working under the hammer.
 4. Under no circumstances, shall work personnel ride the hammer or hammer leads.
 5. Stop blocks shall be provided to prevent the hammer from being raised against the head block.

6. Hammers shall be lowered to the bottom of the leads while the pile driver is being moved.
- d. Walkways:
 1. Required walkways must have a minimum width of 22 inches.
 - e. Hoses:
 1. All hose connections to pile driver hammers, pile ejectors or jet pipes must be securely attached with an adequate length of at least 1/4 inch steel alloy chain having at least a 3,250 pound working load limit, or equal strength wire rope cable, to prevent whipping if the joint is broken.
 - f. Hoisting Drums:
 1. Every hoisting drum using a dog and ratchet must be equipped with an adequate dog system. Such dog shall be visible from the operator's station.
 2. Dogs on pile driver hoist drums, which automatically disengage when the load is relieved or the drum rotated is prohibited.
 3. Guards shall be provided across the top of the head block to prevent cable from jumping out of the sheaves.
 - g. Unloading Piles:
 1. If unloading is done by hand, transport vehicles must have chocks and 2 binder chains.
 2. Unloading side of the truck shall be at least 10 inches lower than opposing side, or by securely bracing the load on either side with a maximum of two timbers that are designed to hold the load.
 3. When using peavies, personnel shall work from the ends of the load.
 4. If unloading trucks using automatic power is performed, a bridle shall be used.
 5. Employees shall be kept away from the danger of falling material in blown out tube piles.
 6. On jacked piles, all access pits shall be provided with ladders and bulkhead curbs to prevent material from falling into the pit.
 7. For better piles, provision shall be made for stabilizing the leads.
 8. Stirrups shall be used on sheet piles.
 - h. Pile Extraction:
 1. If piling cannot be pulled without exceeding the load rating of the equipment, a pile extractor shall be used.
 2. When pulling piling, crane booms shall not be raised more than 60 degrees above the horizontal.

3. Piling shall not be pulled by tipping the crane, releasing the load brake momentarily and catching the load before the crane has settled.

4.17.7 Conveyors

- a. Comply with Section 5 of these Provisions.

4.18 MOBILE AND STATIONARY MECHANIZED EQUIPMENT

4.18.1 Motor Vehicles

- a. All employees who operate motor vehicles shall have a valid Drivers License.
- b. Each driver is responsible for the safe operation of their vehicle. Drivers must make a daily inspection of the following: steering, brakes, mirrors, lights, horn, seat belts, backup alarm, tires and windshield wipers. Noted defects shall be reported for prompt repair.
- c. Preventive maintenance must be regularly scheduled for all vehicles to assure their safe operating condition. All vehicles shall be in compliance with State requirements.
- d. Trucks must never be loaded beyond their rated capacities, or in a manner that will obscure the driver's vision. To prevent shifting or loss of material, all loads shall be securely fastened.
- e. Runways, stairways and/or platforms must be provided whenever required for the safe operation or maintenance of the equipment.

4.18.2 Earthmoving Haulage, and Handling Equipment

- a. Vehicles and mobile equipment may be operated only by individuals designated by the Contractor who are qualified to operate the equipment to which they are assigned.
- b. Vehicles and mobile equipment must not be operated at speeds greater than are reasonable and safe considering other conditions, traffic, road conditions, type and condition of equipment, etc. The operator shall have the equipment under control at all time and be able to stop it within the clear-sight distance.
- c. No vehicle or equipment shall be stopped, parked, or left standing on any road or in any location in such a manner to endanger personnel or property. Vehicles and equipment shall not be left unattended unless the motor has been shut off, brakes set securely, and the gears engaged. When parked on a hill or grade, the wheels shall be turned into the curb or the wheels chocked.
- d. Mobile equipment shall have brakes adequate to stop the fully loaded vehicle and the brakes shall be maintained in good conditions.
- e. All equipment left unattended on or near a roadway must have appropriate lighted barricades placed around the location of the

equipment.

- f. Loaders, backhoe, bulldozers and other similar equipment must have their blades and buckets fully lowered and engines shut off when left unattended.
- g. All vehicles and equipment shall be checked at the beginning of each shift to ensure that the equipment is in proper operating condition and that accessories that affect safe operations are free from defects.
- h. Operators may not start or operate any equipment while other personnel are oiling or adjusting the equipment.
- i. Heavy equipment, machinery, or parts thereof, shall be safely blocked or pinned to prevent falling or shifting before employees are permitted to work under or between them.
- j. All equipment and vehicles with cabs must have safety glass or equivalent windshields that are free of cracks and defects and shall be kept clean. Broken or cracked glass shall be replaced or repaired.
- k. No person will be allowed to ride in or on any equipment or vehicle except in seats which are provided by the manufacturer.
- l. On all rubber-tired or crawler scrapers, bulldozers, front end loaders, backhoes, motor graders, industrial tractors, and forklift tractors, Rollover Protective Structures (ROPS) and Falling Object Protective Structures (FOPS) are required.
- m. If equipment is provided with ROPS, seat belts must be worn at all times during equipment movement. The driver's seat must be maintained in good and safe condition as manufactured.
- n. Vehicles shall be equipped with headlights and taillights in good condition. Such equipment shall be equipped with back-up lights and alarms which function automatically when the vehicle is put in reverse gear.
- o. A safe means of access shall be provided and maintained from the ground to the driver's location.
- p. All bi-directional earth moving, haulage, or compacting equipment shall be equipped and maintained with automatically operated reverse signal alarm, audible above the surrounding noise level.
- q. Haul roads shall be maintained free from holes, deep ruts, dust and excessive water. Safety berms, concrete barriers, or other structural barriers shall be installed adjacent to haul roads that are either elevated more than 2 feet, or within 15 feet of the top of the slope of any excavation, job shack, storage conex or other structure on the site. Any such barrier shall be at least 2 feet taller than the crown of the road surface. Constructed berms shall have a minimum slope of 3H:1V.
- r. Speed limits shall be designated as job conditions warrant by Contractor

with approval of the Owner's Representative.

- s. When changing or installing buckets, forks, and all other attachments the Competent Person shall ensure that the attachments are properly secured to the equipment.

4.19 SCAFFOLDING AND STAIR TOWERS

- 4.19.1 The Contractor shall comply with OAR 437, Division 3, Subdivision L, 1926.450 - Scaffolding.
- 4.19.2 Scaffolds, platforms, or temporary floors must be provided for employees engaged in work that cannot be performed safely from the ground or from solid construction.
- 4.19.3 Ladders may be used as work platforms only when use of small hand tools or handling of light material is involved.
- 4.19.4 Scaffolding must be erected, dismantled or altered under the supervision of a competent person and in compliance with the requirements of ANSI A10.8, "Safety Requirements for Scaffolding".
- 4.19.5 Ladders or makeshift devices may not be used to increase height of scaffolding.
- 4.19.6 Scaffold working surfaces shall be essentially level.
- 4.19.7 Scaffolds and their components, except for wire or fiber rope suspension, must be capable of supporting at least 4 times the maximum intended load. Wire or fiber rope used for scaffold suspension shall be capable of supporting at least 6 times the maximum intended load.
- 4.19.8 Access to scaffolding can be by separate or integral ladders or stairways. Structural members shall not be used for means of access.
- 4.19.9 Employees working on suspended or movable scaffolding or scaffolding without standard guardrails, must be protected by nets, lifelines, lanyards and body harnesses. Employees may not be on rolling scaffolding or stair towers when being moved.
- 4.19.10 Work platforms and scaffolds shall be provided with standard guardrails, mid-rails, and toe boards on the open sides and ends. In addition, all necessary bracing will be required with movable scaffolding.
- 4.19.11 The footing or anchorage for scaffolds shall be sound, rigid, and capable of carrying the maximum intended load without settling or displacement. Unstable objects such as barrels, boxes, loose brick, or concrete blocks shall not be used to support scaffolds or planks.
- 4.19.12 Poles, legs, and uprights shall be plumb, and securely and rigidly braced to prevent swaying and displacement.
- 4.19.13 Ladder jacks, lean-to and prop-scaffolds are prohibited.
- 4.19.14 Emergency descent devices shall not be used as working platforms.

- 4.19.15 Where persons are required to work or pass under a working platform, a screen consisting of No. 18 gauge US Standard wire 1/2 inch mesh or the equivalent, shall be provided between the toeboard and the guardrail and extending over the entire opening.
- 4.19.16 Overhead protection shall be provided for employees working on scaffolds exposed to falling objects.
- 4.19.17 All planking of platforms shall be either overlapped minimum 8 inches to maximum of 12 inches over bearing point, and secured from movement.
- 4.19.18 Material hoists shall not be mounted on scaffolds or elevated work platforms unless the scaffold or work platform is designed or strengthened to withstand the additional loading.
- 4.19.19 Scaffolds, platforms, and access ways shall be maintained free of ice, snow, grease, mud, and other materials or equipment which would create a slipping or falling hazard. Tools, materials, equipment, or debris shall not be permitted to accumulate on scaffolds, work platforms, or in access ways.
- 4.19.20 Where scaffolds, work platforms, or access ways are usually wet or slippery, an abrasive material shall be applied to improve footing.
- 4.19.21 Workers must access/egress all scaffolding with free hands and not carry tools or materials. Provisions must be made to raise or lower tools and materials.
- 4.19.22 Scaffold and work platforms, including access thereto, shall be routinely checked by competent personnel and maintained in safe condition. Scaffolding or elevated work platforms damaged or weakened in any manner shall be removed or repaired immediately. The Contractor shall not permit employees to work from weakened or damaged scaffolding.
- 4.19.23 A scaffold tagging system is required. Scaffolds must be tagged as follows:
 - a. Green Complete: Inspected by competent person.
 - b. Yellow Special Instructions.
 - c. Red Danger - Do not use!
- 4.19.24 During the erection and dismantling of scaffold and stair tower systems, fall protection shall be used unless the Competent Person determines that the use of fall protection is infeasible. If such determination is made, the Competent Person shall determine when fall protection can be used and ensure its use when feasible. The Owner's Representative may direct that a JHA be developed and submitted that details when fall protection will and will not be used during the erection and dismantling process.

4.20 LADDERS, STAIRWAYS AND RAMPS

- 4.20.1 Ladders
 - a. The Contractor must comply with OAR 437, Division 3, Subdivision X, 1926.1050-1060 - Ladders, Stairways and Ramps.

- b. Except where either permanent or temporary stairways, ramps, personnel hoists, or runways are provided, ladders meeting the requirements or this subsection must be used to provide access to all elevations.
- c. Portable metal ladders may not be used for any electrical work or permitted in substations, or in any area where contact can be made with energized circuits.
- d. Quarterly documented inspections and maintenance of all ladders must be done by the Competent Person. Broken or damaged ladders must be tagged, promptly repaired or removed from service and destroyed.
- e. All ladders shall be secured to prevent inadvertent moving or displacements.
- f. Ladders may not be placed in access ways or other locations where they may be displaced unless protected by barricades or guards. The area immediately adjacent to the top and bottom of a ladder shall be kept free of debris, materials, equipment or other obstructions.
- g. No shaft or incline used for hoisting shall have the center line of the ladder width closer than 36 inches from any part of the moving skip, cage or bucket. Unless ladder-way is in a separate, closed compartment, it will be used only in emergency or occasional service.
- h. All ladders shall be of such design, material, and construction that they will safely support all normal loads imposed upon them. Side rails, if of wood construction, shall be the equivalent of Douglas fir, graded as suitable for a bending stress of 1,500 psi and shall not have knots, except for an occasional one less than 1/2 inch in diameter that appears only on the wide face and is at least 1/2 inch back from either edge.
- i. Every ladder-way, more than 30 feet in length, must have enclosed cages with platforms at intervals not exceeding 20 feet. In all vertical excavations and inclined excavations that are more than 60 degrees, the sections of the ladders shall be staggered at each platform. Fall protection equipment shall be provided per OR-OSHA Requirements, OAR Chapter 437, Division 3, Subdivision M, 1926.500.
- j. Swing gates or adequate guarding (top and mid-rail chains) shall be provided in ladder-ways at each level. Ladder-ways shall have a minimum unobstructed cross sectional opening of 24 inch x 24 inch measured from the face of the ladder.
- k. All outside edges of platforms must be protected by railings.
- l. Ladders must project at least 3 feet 6 inches above every platform and the collar of the shaft, unless convenient and secure hand holds are fixed at such places.
- m. All ladders must be securely fastened.
- n. Under no circumstances shall any ladder be installed inclining backward

from the vertical.

- o. Ladder-ways and platforms must be kept clear of loose rock and obstructions.
- p. For all ladders provisions for raising/lowering tools and materials shall be provided. All workers shall ascend and descend ladders with free hands.

4.20.2 Portable Ladders

- a. The design, construction, use and maintenance of portable ladders must comply with ANSI A14.1, "Portable Wood Ladders", ANSI A14.2, "Portable Metal Ladders", and ANSI A14.5, "Portable Reinforced Plastic Ladders".
- b. Portable ladders used for access in lieu of fixed ladders must be secured against accidental displacement at the top and bottom. They must extend a minimum of 36 inches above the upper landing. Step ladders shall not be used for this purpose.
- c. Portable ladders shall rest on a firm foundation capable of supporting the load without displacement in any direction.
- d. Ladders must be equipped with safety shoes, spurs, spikes, tread feet, or other approved slip-resistant devices at base section of each rail. The devices shall be designed to function at the specified angles of inclination and on the type of surface available.

4.20.3 Fixed Ladders

- a. The design, construction, use and maintenance of fixed ladders must comply with ANSI A14.3, "Safety Requirements for Fixed Ladders", and ANSI A14.4, "Safety Requirements for Job-Made Ladders".
- b. Fixed ladders shall not have a length of climb over 20 feet unless equipped with a cage, well or ladder safety device or offset landings at 20 foot intervals.
- c. Provisions must be made for a landing at the top of all fixed ladders by extending the side rails, stanchions, or other supports at least 42 inches above the landing.
- d. At least 7 inches toe space shall be provided between the inside face of rung or step and wall or other obstructions.

4.20.4 Stairways

- a. Stairways must be constructed for access to fixed scaffolds, walkways, and work platforms affixed to buildings and structures for access over extended periods of construction, or when employees routinely carry tools and materials.
- b. Stairways must be installed at angles to the horizontal of between 30 degrees and 50 degrees. Any uniform combination of rise/tread dimensions between 6 to 9 inch rise and 11 to 8 inch tread run can be

used to obtain a stairway within this permissible range. No flight of stairs shall have an unbroken rise of more than 12 feet without a standard landing extending not less than 30 inches in direction of travel. Vertical clearance above any stair tread shall be at least 7 feet measured from the leading edge.

- c. Temporary stairways and handrails shall be securely fastened in place.
- d. Stairs having 4 or more risers or more than 30-inches in height shall be equipped with standard railings and standard handrails.
- e. Standard stair railings shall not be more than 34 inches or less than 30 inches, measured from top of the forward edge of the tread to the upper surface of the top rail.
- f. A standard handrail shall be securely mounted on the wall or partition, enclosing the stairs, and shall be the same height as the top rail of a standard stair railing.
- g. Where permanent metal pan stairs are set for temporary use, treads of wood filler pieces shall be installed flush with the pan rims.
- h. Stairwells must be routinely maintained and debris, water, oil, ice, and materials shall not be permitted to accumulate on stairs. Slippery conditions must be eliminated as they occur.

4.20.5 Ramps

- a. Temporary access ramps may be substituted for stairways when the slope or incline does not exceed 15 degrees.
- b. Ramp width must be sufficient to prevent congestion of persons, materials, or equipment but never less than 18 inches wide.
- c. Ramps must be equipped with standard guardrails on open sides and with a minimum of one handrail.
- d. Cleats must be equal in length to the width of the ramp spaced at intervals not to exceed 12 inches.
- e. Trestles, ramps, and bridges on which foot traffic is permitted shall be provided with a suitable walkway and guardrail outside of the roadway. Roadway ramps shall be protected with timbers or curbs not less than 8 inches high, secured to each side of the roadway.
- f. Overhead protection shall be provided as needed to protect the public, employees, or property from falling objects. The overhead protection shall be of sufficient strength to withstand the potential impact and shall be installed not less than 7 feet above the ramp.

4.21 FLOOR AND WALL HOLES AND OPENINGS

- 4.21.1 All floor and roof openings into which persons can accidentally walk or fall through must be guarded by a physical barrier or be covered.

- 4.21.2 All floor and roof holes through which equipment, materials, or debris can fall must be covered.
- 4.21.3 Coverings for floor and roof openings must be of sufficient strength to support 2 times the load which may be imposed and shall be secured in place to prevent accidental removal or displacement. All covers over openings will be marked with "HOLE COVER DO NOT REMOVE".
- 4.21.4 Conduits, trenches, and manhole covers and their supports, when exposed to vehicles or equipment, shall be designed to carry a truck rear axle load of 2 times the maximum anticipated load.
- 4.21.5 Wall openings, from which there is a drop of more than 4 feet and the bottom of the opening is less than 3 feet above the working surface, shall be guarded with a top rail, or a top rail and intermediate rail, or a standard guardrail. A toeboard or enclosing screen shall be provided where the bottom of the wall opening, regardless of width, is less than 4 inches above the working surface.
- 4.21.6 Wall opening protection shall meet one of the following requirements:
 - a. Barriers of such construction and mounting that, when in place at the opening, the barrier is capable of withstanding a load of at least 200 pounds applied in any direction (except upward) with a minimum of deflection at any point on the top rail or corresponding member.
 - b. Screens of such construction and mounting that they are capable of withstanding a load of at least 200 pounds applied horizontally at any point on the near side of the screen; they may be of solid construction, or grill work with openings not more than 8 inches long, or of slat work with openings not more than 4 inches wide with length unrestricted.
- 4.21.7 Every hatchway and chute floor opening shall be guarded by a hinged floor-opening cover. The opening shall be barricaded with railings so as to leave only one exposed side; the exposed side shall be provided either with a swinging gate or so offset that a person cannot walk into the opening.
- 4.21.8 An extension platform outside a wall opening onto which materials can be hoisted for handling must have a standard railing. One side of an extension platform may have removable railings to facilitate handling materials.

4.22 STEEL ERECTION

- 4.22.1 Any steel erection work must comply with Section 4 of these Provisions.
- 4.22.2 Permanent floors must be installed as soon as practical following the erection of structural members.
- 4.22.3 Temporary Flooring
 - a. The erection floor must be solidly planked over its entire surface except for access openings. Planking shall be not fewer than 2 inches thick, full size undressed, and shall be laid tight and secured against movement.

- b. On structures not adaptable to temporary floors, safety nets must be installed and maintained whenever the potential fall distance exceeds two stories or 25 feet.
- c. A safety railing shall be installed, at minimum of 42 inches high, and a maximum of 45 inches high around the periphery of all temporary planked floors during structural steel erection.

4.22.4 General Requirements

- a. Bundles or sheets of small material must be so secured as to prevent their falling.
- b. When setting structural steel, each piece must be secured with not fewer than two bolts at each connection and drawn up wrench tight before the load is released.
- c. When loads are being hoisted, do not walk under the lift or permit an employee to be exposed to the swing of the lift.
- d. A tag line shall be used to control all loads.
- e. For the protection of other Personnel on the CIP, signs must be posted in the erection area, "Danger Workers Overhead".

4.23 CONCRETE, MASONRY AND FORM WORK

- 4.23.1 All equipment and materials used in concrete construction and masonry work must meet the applicable requirements as prescribed in ANSI A10.9 "Safety Requirements for Concrete Construction and Masonry Work".
- 4.23.2 Comply with all requirements in Section 4 of these Provisions.
- 4.23.3 Employees will not be permitted to work above vertically protruding reinforcing steel unless such steel has been covered to eliminate the impalement hazard.
- 4.23.4 The riding of concrete buckets for any purpose is prohibited.
- 4.23.5 Concrete trowelling machines, the powered (electrical or otherwise) rotating-blade type that are equipped manually, must be equipped with a control switch that shall automatically shut off the power whenever the operator's hand is removed from the equipment handle (deadman switch).
- 4.23.6 When working from electrical equipment or lines, float handles must be on non-conductive material.
- 4.23.7 All workers and supervisors around the "pour" operation including ready-mix equipment shall wear eye protection along with other required personal protective gear.
- 4.23.8 Shotcrete: During Shotcrete operations the following will apply:
 - a. Personal protective equipment for using during shotcrete operations will include rubber gloves, protective clothing, face shields and barrier cream.

- b. If respirators are needed, each employee must be examined by a physician prior to using.
- c. Keep an eyewash station in the area to out splatter and dust from eyes.
- d. When pumping shotcrete, ensure line is bled off before disconnecting.
- e. Nozzle handlers must be aware of direction of hose even when not in use.
- f. Encourage good hygiene practice to avoid grout burns.

4.24 HAND TOOLS, POWER TOOLS, HOISTS AND JACKS

- 4.24.1 Hand tools, power tools, and jacks must be maintained in safe operating condition and used only for the purpose which they were designed and manufactured. Damaged and defective tools must be repaired or tagged and removed from service immediately.
- 4.24.2 Tools may not be left on scaffolds or elevated work spaces, and containers must be provided for hand tools on the Project Site.
- 4.24.3 Tools designed to accommodate guards shall be operated with such guards in place. Belts, gears, shafts, pulleys, sprockets, spindles, drums, and other type moving drives shall be isolated or guarded as set forth in the current edition of ANSI B15.1, "Safety Code for Mechanical Power Transmission Apparatus".
- 4.24.4 Only non-sparking tools may be used in locations where sources of ignition may cause an explosion or fire. Gasoline-powered tools shall not be used underground or in locations where toxic exhaust gases can accumulate. Impact tools including drift pins, wedges, and chisels shall be kept in a dressed condition or equipped with non-mushrooming heads. Employees shall not work under areas where handheld tools are being used unless the tools are equipped with restraining straps, or appropriate decking, planking, and netting are provided for employee protection.
- 4.24.5 Workers shall secure loose clothing, remove jewelry and confine hair that could become entangled when working around machinery or moving parts.

4.25 PNEUMATIC TOOLS

- 4.25.1 Pneumatic impact tools shall be operated with safety clips or retainers installed to prevent tools being accidentally discharged from the chuck.
- 4.25.2 All connections, couplings and splices in air lines exceeding 0.5 inch inside diameter must be equipped with clips and wire rope or chain lashings. The clips and lashings shall be installed in a manner that prevents whipping of the hose line should the connection coupling or splice fail.
- 4.25.3 The manufacturer's safe operating pressure for hoses, pipes, valves, and fittings may not be exceeded. Defective hoses, valves, and fittings must be removed from service.
- 4.25.4 Compressed air must not be directed at any part of the body. Compressed air

shall not be used for cleaning purposes except when reduced to less than 30 lb/inch-squared and the operator is protected by personal protective equipment. The 30 lb/inch-squared requirement does not apply to sandblasting, green cutting, removal of mill scale, cleaning concrete forms, and similar cleaning operations.

4.25.5 Air hoses shall not be used for hoisting or lowering tools. Hoses shall not be laid on ladders, steps, scaffolds, or walkways in a manner creating a tripping hazard.

4.25.6 Pneumatically driven nailers, staplers, and similar equipment provided with automatic fastener feed, which operate at more than 100 lb/inch-squared, shall have a safety device on the muzzle to prevent the ejection of the fasteners unless the muzzle is in contact with the work surface.

4.25.7 Grinding Tools

a. The installation, guarding, use, and care of grinding tools must comply with the standards set forth in the current ANSI B71, "Safety Code for the Use, Care, and Protection of Abrasive Wheels". Grinding tools shall not be used without the safety guards, protective flanges, and tool rests installed and maintained in proper adjustment.

b. Abrasive wheels and scratch brush wheels shall not be operated in excess of their rated safe speed. Cracked or defective abrasive wheels shall be tagged and removed from service immediately.

4.25.8 Woodworking Tools

a. The installation, guarding, use, and care of power operated woodworking tools must comply with the standards set forth in ANSI 01.1, "Safety Code for Woodworking Machinery", current edition.

b. Switches must be located to enable the operator to cut off the power without leaving his operating position. Fixed power-driven tools shall be provided with a disconnect switch that can be locked in the off position.

c. Whenever the nature of the work will permit, automatic feeding devices must be installed on fixed power-driven woodworking tools. Feeder attachments must have the feed rolls and/or other moving parts guarded to protect the operator.

d. When automatic restarting would create a hazard, electrically driven equipment shall be controlled with a device which will prevent automatic restarting following a power failure.

e. A push stick, block, or similar safe means shall be used for all operations close to high-speed cutting edges.

f. Planers and joiners shall be equipped with cylindrical cutting heads and fully guarded.

g. Handsaw blades shall be fully enclosed except at the point of operation.

- h. Work areas shall be kept clean and a brush provided at each machine to remove sawdust, chips, and shavings.

4.25.9 Hydraulic-Powered Tools

- a. The manufacturer's safe operating pressure for hoses, valves, pipes, filters, and fittings may not be exceeded.
- b. Fluid in hydraulic-powered tools shall be fire resistant type approved by a recognized authority, such as Underwriters Laboratories or Factory Mutual.
- c. Presses shall be provided with guards that adequately contain flying particles forcibly expelled from the material being compressed.

4.25.10 Powder Actuated Tools

- a. Powder-actuated tools must be designed, maintained, and used in accordance with the standards set forth in the current edition of ANSI A 10.3, "Safety Requirements for Powder-Actuated Fastening Systems", and the requirements of this subsection.
- b. Powder-actuated tools may be operated and serviced only by persons who have been trained and certified in the safe use of such tools. Operators shall possess an operator's card issued by a firm or person authorized to issue such cards.
- c. Powder-actuated tools may not be used in explosive or flammable atmospheres.
- d. Only powder charges, studs, or fasteners specified by the manufacturer for the specified tool may be used.
- e. Tools must be designed to operate only when pressed against the work surface with a force at least 5 pounds greater than the weight of the tool. They shall be constructed so the tool cannot fire when dropped, during loading, or preparation to fire.
- f. Driving into soft or easily penetrated material is prohibited unless the material is backed to prevent complete penetration. Tools shall not be used on very hard or brittle materials such as cast iron, glazed tile, surface hardened steel, glass block, live rock, face brick, or hollow tile.
- g. Tools must not be loaded until just prior to firing. Loaded tools must not be left unattended. Tools must not be pointed at any person, and all parts of the body shall be kept clear of the muzzle.
- h. Tools shall be tested each day before loading to ensure that the safety devices are in proper working order; the test shall be conducted in accordance with the manufacturer's recommended test procedures.
- i. High-velocity tools will be used only for those applications where low-velocity tools will not meet the job requirements.
- j. The Contractor must submit a list of all powder-actuated tools and names

of certified operators to the Owner's Representative prior to the use of the tools.

- k. Disposal of spent-miss fired shot shall be disposed of per OAR 437, Division 3, Subdivision U, 1926.900.

4.25.11 Hand-Powered Winches and Hoists

- a. Hand-powered winches and hoists must be used within the manufacturer's rated capacity, and the capacity shall be legibly marked on the winch or hoist.
- b. The use of hand cranks is prohibited unless the winch or hoist is equipped with positive self-locking dogs or of the worm gear types. Hand wheels shall not have projecting spokes or knobs. The use of "cheater bars" is prohibited on hand cranks.

4.25.12 Power Saws

- a. Bench-type circular saws must be equipped with spreaders, anti-kickback devices, and guards that automatically enclose the exposed cutting edges.
- b. Portable hand-held circular saws shall be equipped with guards above and below the base plate or shoe. The upper guard shall cover the saw to the depth of the teeth, except for the minimum arc required to permit the base to be tilted for bevel cuts. The lower guard shall cover the saw to the depth of the teeth, except for the minimum arc required to allow proper retraction and contact with the work. As the blade is withdrawn, the lower guard shall automatically and instantly return to the covering position.
- c. Radial arm saws and swing cutoff saws shall be equipped with:
 - 1. Limit stops which prevent the leading edge of the blade from traveling beyond the edge of the table.
 - 2. Hoods and/or guards that protect the operator from flying material direct the sawdust toward the back of the blade and enclose all parts of the blade not in contact with the material being cut.
 - 3. Automatic brakes or automatic return devices.
- d. Scrap and sawdust shall not be permitted to accumulate, and the shop area shall be cleaned up at the end of each shift.
- e. Cracked, bent, or otherwise defective blades shall be removed from service.

4.25.13 Lever and Ratchet, Screw and Hydraulic Jacks

- a. The manufacturer's rated capacity must be legibly marked on all jacks and may not be exceeded.
- b. Jacks, of any type, must have a positive stop to prevent over travel.
- c. Jacks shall be set on a stable and firm footing, and cribbed or blocked where necessary to prevent settlement or dislodgement. Where there is a

- d. Only non-sparking tools shall be used in locations where sources of ignition may cause an explosion or fire. Gasoline-powered tools shall not be used underground or in locations where toxic exhaust gases can accumulate. Impact tools including drift pins, wedges, and chisels shall be kept in a dressed condition or equipped with non-mushrooming heads. Employees shall not work under areas where handheld tools are being used unless the tools are equipped with restraining straps, or appropriate decking, planking, and netting are provided for employee protection.

4.25.14 Chain Saws

- a. All chain saws must have an automatic chain brake or kickback device.
- b. The idle speed must be adjusted so that the chain does not move when the engine is idling.
- c. Operators shall wear personal protective equipment: eye, ear, hand, foot (safety shoes), and leg protection.
- d. Chain saws shall not be fueled while running, hot, or near open flame.
- e. Chain saws shall not be started within 10 feet of a fuel container.
- f. Chain saws shall never be used to cut above the operators' shoulder height.

4.26 WELDING AND CUTTING

4.26.1 General

- a. All welding and cutting apparatus, equipment, and operations must be in accordance with the standards and recommendations set forth in the current edition of ANSI Z49.1, Safety in Welding and Cutting;" OAR 437, Division 3, Subdivision J, 1926.350; and the requirements of this section.
- b. Welding apparatus and equipment must be inspected daily prior to use. Defective apparatus and equipment shall be tagged and removed from service, replaced, or repaired and re-inspected before being used again.
- c. Fire extinguishers will be immediately available wherever welding or cutting is being carried out.
- d. The following precautions must be taken, as applicable, when welding or cutting:
 - 1. Welding must, whenever possible, be confined to areas free of combustible materials. When this is not possible, all combustible material shall be removed or protected from fire, sparks, and slag.
 - 2. When welding, cutting, or heating is such that normal fire prevention

precautions are not considered adequate, fire watchers will be assigned to the operation. They will be on duty during the operations and for 4 hours following the completion of the work to ensure that no possibility of fire exists. Fire watchers shall be provided with necessary fire protection equipment and instructed in its use.

3. Before welding, cutting, or heating any material covered by a preservative coating whose flammability is unknown, a test shall be made to determine its flammability and toxicity.
 4. Non-combustible barriers shall be installed below welding or burning operations in or over a shaft or raise.
 5. No welding, cutting or burning will be done in areas containing flammable and/or combustible liquids, vapors, or dusts.
- e. Welders and helpers must wear protective clothing and eye protection. Further, other persons shall be protected from exposure to welding rays, flashes, sparks, molten metal, and slag. Welding screens must be installed in areas where welding is done regularly.
 - f. When preservative coatings are highly flammable, they must be removed from the area to be heated in order to prevent ignition. When the coatings are determined to be toxic, the appropriate industrial hygiene controls shall be taken.
 - g. Ventilation and protection (i.e. Positive or Negative Pressured Respirators) of employees welding, cutting or heating in confined spaces shall conform to requirements contained or referenced in "Confined Spaces". Specifically employees welding, cutting, heating, brazing, or using fluxes, coating and filler materials containing the following materials:
 1. Cadmium
 2. Fluorides
 3. Mercury
 4. Chlorinated Hydrocarbons
 5. Stainless Steel
 6. Zinc or Galvanized Materials
 7. Beryllium
 8. Lead
 9. Other materials or compounds determined to be toxic by the manufacturer or OAR 437, Division 3, Subdivision J, 1926.350.
 - h. Airflow, either natural or mechanically induced shall be at least 100 linear feet per minute across welding and cutting operations.

4.26.2 Gas Welding and Cutting

- a. Gas welding and cutting equipment shall be as listed by Underwriters Laboratories, Inc., or by Factory Mutual.
- b. Both full and empty cylinders must be segregated in storage, caps in place and secured in an upright position at all times.
- c. Distance between oxygen and flammable gas storage will be at least 20 feet, or a 5 foot high wall with at least 1/2 hour fire resistance rating must be installed between the cylinder storage areas.
- d. Storage areas for cylinders shall be at least 35 feet from any permanent building. 20 feet will be acceptable for construction facilities provided all necessary storage requirements are satisfied.
- e. Smoking shall not be permitted within 20 feet of the storage area. Signs shall be posted.
- f. A roof or cover shall be constructed to protect the cylinders.
- g. When transported by truck, cylinders shall be secured in a vertical position and caps must be on all cylinders which are equipped to receive them.
- h. When hoisting by crane or other device, a rack designed for hoisting purposes shall be used. Chokers shall not be used.
- i. Pressure-reducing regulators shall be used only for the gas for which they were designed. Except for cracking the valve slightly to remove dust or dirt, gas shall not be released from a cylinder under pressure without attaching the pressure-reducing regulator to the cylinder valve. Acetylene regulators shall not be adjusted to permit a discharge greater than 15 lb/inch-squared (gage).
- j. Torch valves shall be closed and the gas supply shut off when work is suspended. Torch valves shall be checked for leaks at the beginning of each shift. Torches shall be lighted by friction lighters or other approved devices and not by matches or from hot work.
- k. All oxygen, acetylene, or other fuel gas-oxygen combinations used in cutting or welding shall have reverse flow check valves installed at the inlet side of the torch.
- l. Only properly marked and identified hose in good condition and specifically manufactured for oxyacetylene service shall be used for gas welding and cutting. Hose, which has been subjected to flashback or which indicates evidence of severe wear or damage, or leakage shall be removed from service. Containers used for storage of fuel gas hose shall be ventilated.
- m. Fire extinguishers shall be provided for all gas torch setups.

4.26.3 Arc Welding and Cutting

- a. Electric arc welding apparatus shall comply with the National Electrical Manufacturer's Association "Electric Arc Welding Machine Standards" and must be installed, operated, and maintained in accordance with ANSI Z49.1, "Safety in Welding and Cutting".
- b. Power circuits for electric arc welding equipment shall be installed and maintained in accordance with applicable provisions of the current National Electrical Code.
- c. Frames of all electric welding machines operated from power circuits shall be effectively grounded in accordance with current NEC standards. The ground of electric welding circuits shall be both mechanically and electrically adequate. Pipelines containing flammable gases or liquids, electrical conduits, chains, wire rope, cranes, hoists or similar devices shall not be used for a ground.
- d. Splices or repaired insulation will not be permitted within 10 feet of the electrode holder. Cables must be positioned so as not to create obstructions on walkways, scaffolds, stairs, or ladders.
- e. Gasoline-driven arc welders cannot be used in confined spaces, or underground in tunnels, shafts, conduits, etc.

4.26.4 Inert-Gas Metal-Arc Welding

- a. Application of chlorinated solvents shall not be done within 200 feet of the exposed arc. Surfaces prepared with chlorinated solvents shall be thoroughly dry before welding is permitted on such surfaces.
- b. Employees exposed to the arc shall be required to wear goggles with filter lenses. When two or more welders are exposed to each other's arc, filter lens goggles of suitable type shall be worn under the welding helmets. Hand shields designed to dissipate radiant energy shall be used when either the helmet is lifted or the shield is removed.
- c. Welders and persons exposed to radiation must wear protective clothing completely covering the skin to prevent harmful effects of ultraviolet rays.

4.26.5 Thermic Welding

- a. Any molds or items that are damaged or unsafe shall be promptly replaced.
- b. Cable, wire ends, molds or other items must be dry and free of any protective coatings before placing contents of cartridge into crucible.
- c. If a mold cover is provided, the cover must be tightly closed before igniting the powder and a sufficient length of time allowed for the metal to solidify before opening the mold cover.
- d. The tests as specified by manufacturer shall be performed before first use,

before equipment is returned to service following repairs, before equipment is used following an incident which could have damaged the grounding system, and at intervals not to exceed three months or the appropriate calendar quarter, except that the intervals may be six months for cord sets and receptacles which are fixed and not exposed to damage.

4.26.6 Hot Work Permit

- a. The Owner's Representative may direct the Contractor to develop, submit and utilize a hot work program for welding and hot cutting operations. Such a program will be required for all hot work performed in BES and PWB facilities. The written description of the program must include all procedures to be implemented and samples of forms to be used.
- b. A hot work permit is required whenever there is particular risk of fire when either welding, cutting or grinding operations may ignite materials, fumes or vapors.
- c. A completed copy of the permit must be posted in the immediate work area. Copies of all hot work permits shall be maintained in Contractor's Field Office and transmitted for review upon request.
- d. When work is performed at facilities that are controlled by BES or PWB, the Contractor shall complete an Owner approved hot work permit.

4.27 PRESSURE VESSELS/BOILER CERTIFICATION

- 4.27.1 Current and valid certification by an insurance company or regulatory authority will be deemed as acceptable evidence of safe installation, inspection, and testing of pressure vessels provided by Contractor or Subcontractor. A copy of certification must be noticeably affixed to each vessel and a copy maintained on file at Contractor's Field Office(s).
- 4.27.2 Boilers provided by the Contractor or Subcontractor must be deemed to be in compliance with the requirements of OR-OSHA Chapter 437, Division 3, Subdivision C, 1926.29 when there is evidence of current and valid certification by an insurance company or regulatory authority. Certification must attest to the safe installation with testing affixed to each boiler in use, and a copy maintained on file at Contractor's Field Office.

4.28 LOCATING UTILITIES

- 4.28.1 Comply with the requirements outlined in the Contract Specifications, Protection, Support and Maintenance of Existing Utilities. Ensure that the Oregon Utility Notifications Center (1-800-332-2344) has been contacted for utility locate services at least 48 hours in advance of digging operations.

4.29 EXCAVATION AND TRENCHING OPERATIONS

- 4.29.1 In addition to meeting the requirements below, the Contractor must also comply

with the requirements on excavation, sheeting, shoring and bracing in the Specifications.

- 4.29.2 Prior to the start of any excavation work, the site must be carefully inspected for conditions, particularly unstable soil conditions.
- 4.29.3 Prior to any excavation work, underground installations (e.g., sewer, telephone, water, fuel, electric lines) must be located and protected from damage or displacement. Utility companies and other responsible authorities must be contacted to locate and mark the locations and, if they so desire, direct or assist with protecting the underground installations.
- 4.29.4 When persons are in or around an excavation(s), the excavation(s), adjacent areas and protective systems, the Competent Person must inspect and maintain documentation:
 - a. Continuously throughout work shifts.
 - b. After every rainstorm, and when other hazards are noted.
- 4.29.5 If evidence of possible cave-ins, slides, failure of protective systems, hazardous atmospheres, or other hazardous condition is identified, exposed workers must be removed from the area at once. All work in the excavation will be suspended until all hazards have been eliminated or controlled.
- 4.29.6 In locations where oxygen deficiency or gaseous conditions are known or suspected, air in the excavation must be tested prior to the start of each shift with continuous monitoring. A log of all test results must be maintained at the Contractor's Field Office. Comply with Section 4.6 of these Provisions.
- 4.29.7 The sides of all excavations which employees are exposed to moving ground must be guarded by a support system, sloping or benching of the ground, or other means that meet or exceed OR-OSHA Standards, OAR Chapter 437, Division 3, Subdivision P, 1926.650.
- 4.29.8 Excavations less than 5 feet in depth and which a Competent Person examines and determines there to be no potential for cave-in do not require protective systems.
- 4.29.9 Unsupported excavations must be sloped at an angle equal to or smaller than the natural angle of repose. The determination of the angle or repose and design of the supporting system will be based on careful consideration of the following: depth of the cut; anticipated changes in the soil due to air, sun and water; and ground movement caused by vehicle vibration or blasting, and earth pressures. All work must be per OR-OSHA Standards, OAR Chapter 437, Division 3, Subdivision P, 1926.650.
- 4.29.10 In those instances where excavations cannot be sloped to the recommended angle, shoring must be used to support the excavation walls. Protective systems must have the capacity to resist without failure all loads that are intended or could reasonably be expected to be applied to the system. This must be designed by a professional engineer.

- 4.29.11 A soil support system must be placed in every trench over 5 feet in depth, regardless of soil type, unless banks are sloped to the angle of repose.
- 4.29.12 The support system must be applied starting from the top of the trench or excavation and working down.
- 4.29.13 The support system must be designed by a professional engineer and meet accepted engineering requirements. Any excavation over 20 feet requires a site specific professional engineer's design of the protective system. All tabulated data must be maintained at the work site and in the Contractor's Field Office and made available upon request.
- 4.29.14 In installing the shoring, care must be taken to place the cross beams or trench jacks into horizontal position and space them vertically at appropriate intervals.
- 4.29.15 Braces must be secured to prevent sliding, falling, or kick-outs.
- 4.29.16 All materials used for shoring must be in good condition, free of defects, and of the proper size. Defective equipment must be tagged and removed from service.
- 4.29.17 Properly designed and constructed trench shields or boxes may be used in lieu of shoring or sloping if such device provides equal or greater protection than required shoring or sloping protection.
- 4.29.18 Excavations 4 feet or more in depth must be equipped with ladder or steps whereby no more than 25 feet of travel is necessary to reach each means of exit.
- 4.29.19 A Competent Person will be held responsible for daily inspection of the shoring system, and each worker will be instructed to report at once any indication of weakness.
- 4.29.20 Shoring and walls must be protected against damage from swinging loads being hoisted.
- 4.29.21 Special precautions must be taken to guard against damage to shoring and walls from vibration of machinery or traffic.
- 4.29.22 Jacks must be inspected and known to be of sufficient strength for the load they are to carry before being placed into position. The load must be properly centered so the jack will not kick out.
- 4.29.23 Workers will not be allowed to work under an object supported by jacks alone. Blocking must be carried forward with jacking in order to minimize hazards due to failure or slipping of jacks.
- 4.29.24 Ground water, where encountered, must be controlled to minimize any disturbance of moisture content which may cause subgrade movements. Comply with all the dewatering requirements in the Specifications.
- 4.29.25 Spoils, tools or other materials must be stored at least 2 feet from the trench.
- 4.29.26 Care must be used in locating excavating equipment. Mats or heavy planking must be used on soft ground to distribute a load.
- 4.29.27 Workers must stay clear of the swing of the bucket and or the cab. The bucket

must not swing over the personnel at work.

- 4.29.28 When mobile equipment is allowed adjacent to an excavation, stop logs or barricades must be installed. Ramps to provide access to the excavation cannot be sloped more than 15 degrees. Where ramps or runways are steeper than 15 degrees, a towing wrench must be provided to prevent trucks from slipping backwards, with potential damage to equipment and injury to personnel.
- 4.29.29 Runways for shovels, tractors, bulldozers, etc. are subject to hard usage and require frequent inspection and repair. Guard rails or curbs must be placed along the edge of ramps. One-way traffic ramps shall be constructed with a minimum width of 12 feet. For two-way traffic, the minimum width shall be 22 feet. Such structures must be designed by a registered professional engineer.
- 4.29.30 Every precaution must be taken to prevent falls of people, materials, equipment, and tools into the excavation. Open cuts in or adjacent to thoroughfares shall be adequately barricaded and posted. Lighting must be provided during hours of darkness. Pedestrian traffic must be protected by guard rails or fences. Sidewalks shall not be undermined if used by the public during construction.
- 4.29.31 Temporary walkways, extending past the curb lines, must be substantial and provided with protection at both ends and overhead, if needed. Pedestrian traffic cannot be routed into the street without total means of protection or approved traffic control plan. Walkways and passageways must be lighted if used during hours of darkness and full consideration for the disabled shall be applied in all design and construction.
- 4.29.32 Plank walkways may be built with lumber which is free of nails, large knot holes, and splinters. Planking must be parallel to the movement of traffic and must be securely fastened down. Butt-joining must be used to avoid tripping hazard. Exposed ends must be beveled.
- 4.29.33 Pipes, hoses, power lines, etc. crossing sidewalks and walkways must be covered, run preferably underneath or be covered by troughs with beveled-edge boards.
- 4.29.34 Trucks or other equipment routed across walkways or into public thoroughfares must be directed into traffic by a signal person. Trucks and pedestrians may not be on the walkway at the same time.
- 4.29.35 Structures adjacent to excavations must be braced to prevent settlement and lateral movement. Consideration of moving traffic loads shall be taken into account when excavations are located adjacent to sidewalks, streets, or other pavements.

4.30 DEMOLITION

- 4.30.1 Prior to initiating demolition activities the following survey and plan must be accomplished:
 - a. An engineering survey by a Professional Engineer of the structure to determine the structure layout; the condition of the framing, floors, walls;

the possibility of unplanned collapse of any portion of the structure (any adjacent structure where employees or property may be exposed must be similarly checked).

- b. An Environmental Survey by a Certified Industrial Hygienist or equivalent must be conducted to determine if any hazardous building materials, hazardous chemicals, gases, explosives, flammable materials, or dangerous substances have been used in any building. Identified hazardous materials or substances must be controlled or eliminated before demolition is started, unless otherwise directed by the Owner's Representative.
- c. A demolition plan must be developed by a Professional Engineer and based on the engineering survey and the Environmental Survey, for the safe dismantling and removal of all building components and debris.

4.30.2 All employees engaged in demolition activities must be instructed in the demolition plan.

4.30.3 All electric, gas, water, steam, sewer and other service lines must be shut off, capped, or otherwise controlled outside the building line before demolition is started. In each case, any utility company which is involved must be notified in advance.

4.31 FALL PROTECTION

4.31.1 The Contractor must plan, provide and use 100% Fall Protection (i.e., guardrail systems, fall protection devices, nets, etc.) when employees are exposed to fall distances of six feet or more except when performing excavation operations.

4.31.2 The Contractor must comply with OAR 437, Division 3, Subdivision M.

4.31.3 The Contractor must develop, submit and/or incorporate into the SSSHP a Fall Management Plan that identifies the potential fall hazards and strategies to eliminate or control the potential fall hazards. If unanticipated fall hazards are encountered, or if any element of the plan is demonstrated to be ineffective, the Contractor must develop and submit addendums to the Fall Management Plan.

4.31.4 Comply with the training requirements in Section 3.3(2) of these Provisions.

4.31.5 The Contractor shall ensure that a Competent Person who understands the Fall Management Plan and who has the authority and resources to implement the plan is assigned to each work location where fall hazards exist.

4.31.6 When performing excavation work the fall protection standards will be as follows:

- a. For wells, reservoirs, pits, shafts, augured or drilled holes, and similar excavations that are 6 feet or more in depth guardrail systems, fences, or barricades that meet OSHA guardrail requirements shall be used. While these types of excavations are being dug, fall arrest or fall restraint systems may also be used for fall protection.

- b. Positive fall protection shall also be provided and used for all other excavations that are 20 feet or greater in depth. For the purpose of this specification “positive fall protection” shall include systems that meet the Oregon OSHA rules for standard guardrail system, fall restraint, and/or fall arrest systems.
- c. Undermined areas around excavations that are two feet or greater shall be backfilled or barricaded. If areas are undermined less than two feet the contractor’s competent person for the site will determine if hazard controls are required.

4.32 POTABLE WATER DISINFECTION PROCEDURE

4.32.1 Refer to Section 6 of these provisions and the Specifications.

END OF SECTION 4

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SECTION 5 TUNNELS AND UNDERGROUND CONSTRUCTION

5.1 MICROTUNNELING / PIPE JACKING

- 5.1.1 Comply with the Microtunneling / Pipe Jacking requirements outlined in the Specifications.

5.2 VENTILATION

- 5.2.1 In addition to meeting the requirements below, the Contractor must also comply with the requirements of the Specifications.
- 5.2.2 Fresh air must be provided to all underground work areas by use of a fan which is reversible from the surface.
- 5.2.3 The air supply must be sufficient to prevent dangerous or harmful accumulations of dusts, fumes, vapors or gases and shall not be less than 200 cubic feet per minute for each person underground plus 100 cubic feet per minute per diesel brake horsepower.
- 5.2.4 The lineal velocity of air flow in the tunnel bore must not be less than 30 feet per minute in tunnels 20' in diameter or larger and 60 feet per minute in tunnels less than 20' in diameter.
- 5.2.5 Additional linear air flow velocities during the construction of project structures shall be as follows:
- a. During active tunnel excavation - not less than 30 feet per minute.
 - b. Shafts - not less than 30 feet per minute.
 - c. Cut-and-Cover Operations - not less than 30 feet per minute.
 - d. Conduits (such as pipe, channels, ducts, etc) – not less than 60 feet per minute.
- 5.2.6 Ventilation line must be made up of non-combustible material that can withstand air flow reversal.
- 5.2.7 In case of a failure in the tunnel ventilation system, all diesel engines underground must be shut down and personnel evacuated from the underground atmosphere until the ventilation system is restored.
- 5.2.8 A standby source of electrical power shall be provided for the ventilation fan system, in case of the failure of the primary power supply system.
- a. Fans, motors, and other electrical components of the main ventilation systems shall conform to Class I, Division 1, requirements of Subdivision K, OR-OSHA standards. A working blower with electrical components conforming to Class I, Division 2, requirements of Subdivision K, OR-OSHA Standards, shall be directed at the muck discharge point of the mining machine at all times.

5.2.9 Tunnels:

- a. Bulkheads, brattices or similar means, equally as effective must be utilized to isolate the tunnel atmosphere from shafts, outfalls, conduits and pipelines encountered along the projected tunnel alignment, to assure and provide a constant, reliable, cleanly ventilated tunnel atmosphere at all times.
- b. Bulkheads and forced ventilation in one direction must be provided after holing through of excavated tunnel sections.

5.3 AIR QUALITY AND DUST CONTROL

5.3.1 General

- a. The air flow in the tunnel and cut and cover operations shall be tested by a competent person using approved testing equipment.
- b. Testing shall be done prior to the start of each shift and at a minimum of every four (4) hours thereafter.
- c. Should hazardous concentrations of air contaminants be encountered, testing shall be performed continuously to ensure that the air flow is sufficient to reduce airborne concentrations to levels below Threshold Limit Values (TLV). Records shall be maintained in the Contractor's Field Office and indicate date, time, specific location, and person's name and signature performing tests.
- d. Atmospheric testing equipment shall be capable of testing for at a minimum oxygen, carbon monoxide, LEL and hydrogen sulfide. The contractor's primary safety representative shall determine any additional gases that may be required to be tested. All atmospheric tests shall be recorded and maintained in the Contractor's field office.
- e. Gas detection systems and equipment shall be tested and where necessary, recalibrated at start of each shift and such tests and calibrations shall be documented in a gas testers log and maintained in the Contractor's Field Office.
- f. An atmospheric gas testing log sheet shall be maintained at the Contractor's Field Office. The log sheet shall include but not be limited to the following information: printed name and signature of person performing tests, date of tests, times and specific locations where tests/readings were taken and an area for comments.
- g. All documentation shall be maintained and made available for review upon request by the Owner's Representative.
- h. Tunnels
 1. Automatic and manual gas monitoring equipment shall be provided for the heading and return air of tunnels.

2. The automatic monitor on the equipment shall signal the heading and shut down electric power in the tunnel except for ventilation equipment, when 5% or more of Lower Explosive Limit (LEL) is encountered. In addition a manual shutdown control shall be provided near the heading.
3. In tunnels drilled by conventional drill and blast methods the air shall be tested for gases prior to re-entry after blasting and continuously while workers are working in the tunnels.

5.4 DANGEROUS OR POISONOUS GASES

- 5.4.1 When the air in any part of the tunnel is found to contain or suspected of containing dangerous or explosive gas, it shall be tested initially and continuously before workers are allowed to work in the area. Such tests shall be performed by a competent person and documented per these Provisions.
- 5.4.2 Tests for flammable gas shall be conducted in the return air and not less than 12 inches from the roof, face, floor and walls in any open workings.
- 5.4.3 Tests for flammable petroleum vapors shall be conducted in the return air and not less than 3 inches from the roof, face, floor and walls in any working area.
- 5.4.4 If more than 5% of LEL of flammable gas or petroleum vapor is found in the tunnel, any work therein shall stop until steps are taken to improve ventilation immediately. The Owner's Representative shall be notified of hazardous condition.
- 5.4.5 Whenever any of the following conditions have been encountered, all underground work shall cease immediately. All employees shall be removed, and reentry except for rescue purposes shall be prohibited until the Owner's Representative has been notified.
 - a. An underground ignition of gas or vapor occurs.
 - b. 5% of LEL of flammable gas or vapor is encountered.
 - c. A poisonous or suffocating gas is considered dangerous to health and life is encountered.
 - d. Whenever air monitoring indicates the presence of 5 ppm or more of hydrogen sulfide, a hydrogen sulfide test shall be conducted in the affected underground work area(s), at least at the beginning and the midpoint of each shift, until the concentration of hydrogen sulfide has been less than 5 ppm for three successive workdays.

5.5 SHAFTS/CUT AND COVER OPERATIONS

- 5.5.1 Comply with Section 4 of these Provisions.

5.6 DUST CONTROL

- 5.6.1 The drilling of holes in rock or concrete underground by machines without the use of water or other effective methods of controlling dust is prohibited.
- 5.6.2 Auger Steel may be used for boring holes provided effective means are taken for controlling any dust that is produced.
- 5.6.3 Sprinklers shall be installed and used on all chutes from which dusty rock is taken or other effective devices or methods shall be used to prevent harmful concentrations of dust in the atmosphere.
- 5.6.4 Whenever a sprinkling device is installed at any chute for the control of dust, it shall be so placed that it can be operated by the worker(s) loading cars from said chute.
- 5.6.5 The muck pile shall be wet down prior to mucking and kept wet during the mucking operations in order to control dust.
- 5.6.6 It is recommended that a high pressure spray nozzle utilizing both water and compressed air be used near the face at the time of blasting to control dust produced by the blast. Such a nozzle on the end of the compressed air line and designed to provide a curtain of spray across tunnel will effectively reduce the amount of dust in the tunnel atmosphere from blasting.
- 5.6.7 If the above mentioned methods of dust control do not control dust concentrations in the tunnel's atmosphere then other or additional means shall be provided before work advances or until the dust concentrations are reduced to acceptable levels per OR-OSHA standards.
- 5.6.8 Dust from concrete finishing and grinding operations shall be controlled by use of water or other effective means. Dust enclosures, dust collectors and exhaust ventilation shall be used when necessary.

5.7 ACCOUNTABILITY CHECK-IN, CHECK-OUT SYSTEM

- 5.7.1 A written check-in, check-out system for anyone, including visitors, entering the underground work area(s) shall be established to identify all persons in underground operation(s) at any given time.
- 5.7.2 Every person shall have a positive means of identification on self (i.e. brass tag with name and identification number, etc.) and have tag attached to lamp belt or person at all times while underground.
- 5.7.3 All visitors shall report to the Contractor's Field Office prior to going on site or entering the tunnel or any underground work area. The Contractor's Competent Person shall give each visitor a safety briefing on the safety requirements of the construction site.
- 5.7.4 A visitors log with information as to visitors' name, who the visitor represents, time in and time out with visitors initials on each entry. Log shall be maintained both at the Contractor's Field Office.

5.8 COMMUNICATIONS

- 5.8.1 During periods of construction or repair the tunnel shall have at least one underground telephone system in operation as soon as the length reaches 1,000 feet. Other phones are to be added as each length zone or 2,000 feet, and one for any remaining zone exceeding 1,000 feet in length. They shall be conveniently located, properly identified, and tested at start of each shift. Arrangements shall be such that calls shall be answered promptly. The telephone or communication system shall be activated when five (5) or more people are underground.
- 5.8.2 Telephone systems shall be independent of the tunnel power supply and shall be installed so that the destruction of one phone will not interrupt the use of other telephones on the same system.
- 5.8.3 Telephones shall be equipped with an audible bell and signal light.
- 5.8.4 Underground phones shall also be located but not limited to, the following:
- a. Heading/working part.
 - b. Bottom and top of shafts.
 - c. First - aid station(s).
 - d. Contractor's office.

5.9 DRESSING FACILITIES

- 5.9.1 The Contractor shall provide a dressing facility, suitable for use of workers changing and drying clothing, at a place convenient to the tunnel opening. No structure of combustible material shall be within 100 feet of such opening.
- 5.9.2 The dressing facility shall be provided with adequate means of heating and lighting and be equipped with shower baths having sufficient hot and cold water. At least one shower being provided for each four (4) workers per shift working in the tunnel.
- 5.9.3 These facilities shall be available to the workers at all times when they are going on or coming off shift and shall be kept in a reasonably clean and sanitary condition.
- 5.9.4 Work clothes shall be either elevated by suitable means such as, hangers, chains or lines to the upper air of the dressing facility or separate adequately ventilated rooms or lockers shall be provided for drying working and changing street clothes.

5.10 TUNNEL SUPPORT

- 5.10.1 Every working place underground shall be supported with timber, steel sets or otherwise protected by installing wire mesh, rock bolts, granite, shotcrete or a combination of methods when necessary for the safety of workers.

- 5.10.2 All sets including horseshoe shaped or arched rib steel sets shall be of adequate design and installed so that the bottoms will have sufficient anchorage to prevent pressures from pushing them inward into the tunnel. Adequate lateral bracing shall be provided between sets to stabilize the support.
- 5.10.3 After each blast, tunnel supports near the face shall be checked, tightened, or re-welded as necessary.
- 5.10.4 Rock bolt systems when used, shall be installed in uniform patterns. These patterns shall be determined by competent persons with a thorough knowledge of rock mechanics and geology, plans and specifications of the rock bolting installation shall be available for review at the Contractor's Field Office. These plans shall include bolt spacing diameter, length, type, tension in the bolts to the supported surface and type of washers and bearing plates. A method shall be provided to properly torque the rock bolts. Additional rock bolts shall be installed as necessary to support the ground. Documentation for all additional rock bolts, their pattern(s) and locations shall be added to the plans.
- 5.10.5 Adequate protection shall be provided for workers exposed to the hazard of falling ground while installing tunnel support systems.
- 5.10.6 Tunnel portal excavations shall be adequately protected for sloping, benching, installing wire mesh and/or rock bolts, or equivalent methods.

5.11 GROUND CONTROL

- 5.11.1 The Contractor shall inspect the roof face, walls and ground support system at the beginning of each shift and frequently thereafter. Any loose or dangerous ground shall be dislodged or adequately supported.
- 5.11.2 The entire tunnel roof and walls shall be inspected weekly by a competent person and records shall be kept of such inspections and maintained at Contractor's Field Office for review upon request.

5.12 SPECIAL FIRE PREVENTION AND CONTROL

- 5.12.1 Fire Resistant Hydraulic Fluids
 - a. Only fire-resistant hydraulic fluids shall be used in hydraulically activated under ground machinery and equipment, unless the machinery or equipment is protected by a fire suppression system capable of immediate fire suppression and approved by local fire protection agency.
 - b. All such machinery or equipment to be used underground shall be inspected and certified to contain only fire-resistant hydraulic fluid. Each piece of machinery or equipment shall have a permanent type tag, label, etc. which will signify date of inspection, inspected by or work performed by, and the Competent Person's signature and date.
 - c. Any machinery or equipment to be used underground and containing non-fire resistant hydraulic fluid shall be completely drained and refilled with

acceptable fluid(s) and inspected and certified per above requirements before placement in any underground operation regardless of duration of use.

5.12.2 Fire Control

- a. An adequate number of 16 A:B:C rated fire extinguisher shall be provided for hydraulic oil, electrical, wood, and (rubber) conveyor belt fires. Fire extinguisher or equivalent protection shall be provided at the head and tail pulleys of underground belt conveyors and at 300-foot intervals along the belt line.
- b. Hydraulic oils used in excavation or shield equipment shall be fire resistant as approved by the U.S. Bureau of Mines or adequate fire suppression systems shall be used.
- c. Fire shields and standby water hoses or adequate fire extinguisher shall be used when burning or welding near combustible materials.
- d. No combustible structure shall be erected over a shaft or tunnel opening except head frames and bins necessary for hoisting from the shaft or tunnel opening and the hatch or door necessary for closing the shaft house, hoisting engine house or ventilating fan house.
- e. Flammable framing sheds, storage buildings or change houses shall not be located within 100 feet of any tunnel opening, shaft house, hoisting engine house or ventilating fan house.
- f. Temporary stockpiles of timber or buildings that are as fire resistive as a change house with concrete floor, wood frame and corrugated iron sheathing may be located within 100 feet if they are as far as practicable from tunnel opening. Other combustible material shall not be stored or permitted within 100 feet of any tunnel opening. Under no circumstances shall oxygen or any flammable gas be stored in proximity to oil.
- g. Open flame lights shall be prohibited at all places where gasoline, distillate, oil or other flammable are stored (includes any temporary storage). Where necessary electric lights shall be installed.
- h. Lubricating oils, greases and Rope dressings taken underground shall be in closed metal containers that shall not permit the contents to leak out or spill. When taken underground they shall be stored in a secluded place away from shafts, winches, hoists, powder magazines and tunnel timbers in such a manner that the oil from a ruptured or overturned container will not flow from its storage place. Quantities of oil and grease shall be limited to a maximum of one-day supply.
- i. No oil shall be taken underground for illuminating purposes.
- j. The use of volatile solvents (below 100 degrees F flash point), such as gasoline, underground are prohibited.
- k. All oily waste or rags used underground shall be stored in metal

receptacles with secure cover (step type with positive lid/cover closure is acceptable). The filled receptacles shall be sent to the surface every week or whenever the receptacle is full.

- l. Waste materials for which no underground storage facilities are provided shall be promptly removed from the tunnel.
- m. All fires shall be reported to the Contractor's Field Office and to the Owner's Representative immediately.
- n. Suitable fire extinguisher or other fire protection equipment shall be provided at appropriate locations throughout underground operations. At the designated visible positions and all underground workers shall be instructed as to their location and training in their proper use. Such equipment shall be inspected at least monthly, maintained in acceptable operating condition and a log book on inspection(s) shall be maintained in the Contractor's Field Office.

5.13 MECHANICAL TUNNELING METHODS AND EQUIPMENT

5.13.1 Mechanical Hazards

- a. An audible and visual warning shall be sounded before starting excavating or conveyor machinery.
- b. Pull cords or conveniently located shut down switches shall be provided for emergency shutdown of conveyors.
- c. Excavating machines shall be equipped with emergency shut off switches (Deadman Control).
- d. Power transmission equipment, hazardous moving parts, and conveyors shall be guarded as required by OR-OSHA Standards.
- e. A device to prevent inclined conveyors from rolling back shall be provided.
- f. Hazardous equipment shall be locked in the off position or otherwise blocked during cleaning, adjusting, or repairing operations.
- g. Ready access and escape exit shall be provided for workers at the heading.
- h. Adequate guarding shall be provided where workers are exposed to shear hazards from erector arms and other moving equipment.
 1. If it came with a guard, the guard must stay on.
 2. An effective guard should meet the following criteria:
 - i. Provide Maximum Protection
 - ii. Prevent Access to the danger zone during operation
 - iii. Must not interfere with efficient operations

- iv. Be designed to provide for oiling, inspection, adjusting, and repairing of machine parts
 - v. Be durable and strong enough to resist normal wear and vibration
 - vi. Must not present a hazard itself
 - vii. Provide positive protection for all personnel
3. Erector arms shall be operated with a power up and power down system and shall have provisions for locking devices or safety pins.
 4. Tunnel support systems shall have adequate strength to resist the thrust of hydraulic jacks.
 5. Safety cables shall be provided on jacking shoes located above the spring line.
 6. A thorough examination of the heading shall be made before starting excavation equipment.
 7. Examinations of working places shall be made and records maintained and made available upon request.

5.14 TUNNEL DRIVING EQUIPMENT

- 5.14.1 Only qualified and properly trained personnel shall operate tunnel driving equipment.
- 5.14.2 All hazardous moving parts and conveyors shall be guarded as required by OR-OSHA standards.
- 5.14.3 Warning devices and precautions such as horns, bells and flashing lights, shall be used to ensure the safety of personnel while the tunnel drilling equipment is being operated.
- 5.14.4 The tunnel drilling equipment/Tunnel Boring Machine (TBM) shall be equipped with an automated gas detection system. The gas detection system shall be connected to an audible (above surrounding noise level(s)) emergency alarm system and all equipment shall be immediately shutdown (except emergency systems) whenever the gas detection system "reads" a dangerous level of gas.
- 5.14.5 Excessive Heat
 - a. Hydraulic lines subject to contact that operate at temperatures above 160 degrees F. shall be insulated or otherwise guarded.
 - b. Excessive heat shall be exhausted into the vent line or other controls shall be used to provide reasonable working conditions.
 - c. Equipment operators and workers shall be protected from the hazard of being sprayed by hot hydraulic oil.

5.14.6 Use of Jumbos/Working Platforms in Tunneling Operations

- a. Jumbo working platforms at 7 feet 6 inches high or higher shall be equipped with guardrails on open ends and sides; except for the end or side at which work is in progress or where the open space between a platform edge and the tunnel wall is less than 16 inches.
- b. Guardrails with a top rail of 42 inches and mid rail of 21 inches shall be installed.
- c. Toeboards at least 4 inches high shall be provided around platforms of jumbos to prevent tools or other equipment from falling off.
- d. Where drill steel is kept on jumbo platforms, suitable receptacles such as boxes, racks, grooves or equivalent shall be provided for temporary storage.
- e. No tools, material, equipment, or other unattached objects shall remain on any platform which jumbo/work platform is being moved if any part of such object protrudes beyond width of jumbo.
- f. Suitable access ladders or stairways with railings shall be provided on all jumbos. Jumbo platforms 10 feet high or higher shall have suitable stairways with 30 to 34 inch high stair rails. Platforms, ladder rungs, and stair treads on jumbos shall be made of non-slip grating or similar material to prevent falls caused by oil slick surfaces.
- g. Overhead protection against falling rock and other objects shall be provided at all jumbo working areas by means of crown bars, solid platforms or other equivalent protection.
- h. All electrical circuits to the jumbo shall be disconnected and the live ends removed to a minimum distance of 100 feet from the jumbo before explosives are brought up to heading or bench.
- i. A flashing light or visual warning shall be given to men working below, before starting to collar holes.
- j. When drill steel is hoisted by power method, double slings and tag line or an equivalent method shall be used.

5.15 TRANSPORTATION AND HAULAGE

5.15.1 Fuel-Burning Internal Combustion Engines

- a. The use of fuel-burning or internal combustion engines or locomotives underground is prohibited, except for diesel engines.
- b. The Contractor shall submit to the Owner's Representative a report containing the following:
 1. Complete details and specifications of diesel engine and scrubbers.
 2. Maximum number and brake horsepower of diesels to be operated in

any air course.

3. Ventilation plan including direction of air flow, fan capacity, duct sizes, and auxiliary ventilation.
4. Dates and locations where the Contractor shall make tests of the diesel's exhaust gases and maintain records of tests.
5. Procedures and equipment for testing of ventilation flow and air quality.

c. Track Installation

1. All locomotives, cars and other on-track equipment shall be periodically inspected and maintained at all times in a safe condition. All inspection records shall be kept in the Contractor's Field Office and made available for review.
2. All locomotives, cars, and other railway equipment shall be equipped with standard automatic couplers. The use of rolling equipment with link and pin couplers shall not be permitted, except with the written approval of the Owner's Representative. If approved, only equipment having extension draw wheels shall be used.
3. Only designated personnel shall be permitted to ride on locomotives or cranes. A list of designated personnel shall be made available to the Owner's Representative.
4. Workers shall not be permitted to ride on the front, rear, or top of loaded rail cars.
5. Footboards, grab rims, and steps on locomotives and cars shall be maintained in good condition.
6. Equipment shall come to a full stop for employees to get on/off.
7. Workers shall not project any portion of their body beyond side or rear of any moving piece of equipment.
8. Workers shall not go between or in front of moving engines or cars to couple or uncouple, or connect or disconnect hose.
9. Care shall be taken to see that signals are not given to move the engine or car while a worker is between or under them.
10. Cars shall be uncoupled only with the pin lift lever. If the lever does not work, full protection shall be secured before pulling the pin by other means.
11. All coupler release levers on cars carrying rails shall be wired down or removed to avoid inadvertent use.
12. Radio communication between the supervisor of the unloading crew and locomotive engineer shall be maintained. Signals shall be established and understood between the unloading crew and the train

crew prior to the start of all unloading operations.

13. An effective communications system shall be established between the person guiding the strings of rail onto/off of flat cars and the operator of the winch or pulling mechanism.
14. Workers shall be kept clear of all wire ropes during the pulling of welded rail.
15. Employees must expect the movement of trains, engine or cars at any time, on any track, in either direction.
16. Track maintenance equipment shall not be left on live tracks.

5.15.2 Locomotives

- a. Only competent operators with at least one year experience in underground operations shall be allowed to operate haulage locomotives.
- b. Locomotives shall be equipped with a back up braking system due to grades encountered in tunnel alignment.
- c. Electric locomotives shall be equipped with a "dead-man" control which shuts power off automatically when the operator leaves his post or compartment.
- d. All haulage locomotives shall be equipped with audible bell, horn or whistle, which shall be maintained in a workable condition.
- e. Tops of locomotives shall have raised edges or equivalent at their sides to prevent tools from rolling or falling off or protruding over the sides.
- f. Locomotives shall be equipped with steps or footboards. Steps and footboards shall be made of non-slip material and handholds shall be provided. No person shall ride on any Part of locomotives not so equipped.
- g. Tools or materials shall not be carried on top of locomotives except for secured re-railing devices.

5.15.3 Lights on Trains

- a. All locomotives and cars shall be equipped with rotating lights, front and rear, an audible warning device (to be clearly heard above the surrounding operation noise; being either horn, bell or siren. However all such alarms shall be alike (i.e.) all horns, all bells or all sirens.
- b. Ends of trains shall be equipped with lights or reflectors.
- c. Concrete cars shall be equipped with flashing or rotating lights visible from the front and rear.

5.15.4 Transportation of Workers

- a. The regular transportation of tunnel crews shall be in trains made up for that purpose only and they shall be operated below 12 mph. Where

switching facilities are available, the man-cars shall be pulled, not pushed, by the locomotive.

- b. No car containing explosives or detonators shall be included in the regular, worker transportation train.
- c. Workers shall not ride in or on cars loaded with items such as timbers, rib-steel, rail, pipe, muck or other similar material.
- d. Workers, except the train crew, shall not ride in muck cars. Rocker-type muck cars shall have positive locks to prevent accidental dumping.
- e. Workers using train for transportation shall not be permitted to get on or off cars while trains are in motion.
- f. Personnel-cars with seats and railed sides shall be provided and used to transport workers. Personnel cars shall have non-skid floors and a safe entrance with a gate at the side of the car.
- g. Workers, except regular train crews, shall not ride on the front end of locomotives or trains and workers shall not ride between cars.

5.15.5 Trains

- a. All locomotives and cars shall be safety inspected at the beginning of each shift prior to actual operation. Any defects shall be reported and corrected prior to operation. A log book of all inspections, discrepancies and repairs or service shall be maintained on all locomotives and be available for inspection.
- b. A fire extinguisher and self rescuers in appropriate number for anticipated amount of workers shall be carried on trains.
- c. All muck cars shall be equipped with automatic coupling devices. Exception: Small end-dump muck cars.
- d. Couplings shall not be shifted or lined up on moving cars or locomotives. Car or locomotive shall be stopped before they are shifted.
- e. The powder car shall be pulled, not pushed, except when switching or traveling on a dead-ended portion of the line beyond the last suitable switch, and only the motorman and the brakeman shall be on the train.
- f. Where switching of cars is being performed both a brakeman and a motorman shall be provided to assist in the switching.
- g. All locomotives and cars left standing on a track shall be blocked to prevent rolling. All cars shall be equipped with safety chains that are connected between cars/locomotives at all times.
- h. Trains shall not operate at speeds above 12 mph.
- i. All trains shall slow down when anyone is alongside the track or passing over switches.
- j. No train shall be moved until the operator has first given warning by

sounding a bell, horn or siren. The signaling code shall be posted and given to all personnel working underground.

- k. All materials being transported by train shall be adequately secured against shifting.
- l. Flying switches are prohibited.

5.15.6 Limited Visibility Precautions

- a. While a mucker, jumbo or other equipment which seriously interferes with motorman's vision is pushed into the tunnel a worker with a whistle or other signaling device shall be stationed in a safe position on the equipment to watch for workers in danger of being struck, or other hazards.
- b. A brakeman shall be used to observe the movement of a train when visibility is limited. The brakeman shall be located at a safe location at the head end of the train.

5.15.7 Tracks

- a. Surface and tunnel tracks shall be kept in good condition, reasonably level and free of dips, bumps, and obstructions, commensurate with the safe passage of trains at reasonable operating speeds.
- b. Track joints and fish plates shall be installed directly over ties or other suitable support.
- c. Derailers shall be provided and installed at locations where disconnected equipment can roll if unattended.
- d. Appropriate equipment, such as jacks or re-railers, shall be provided to re-track equipment that is derailed.
- e. Adequate drainage or pumping shall be provided to maintain the rails above water.

5.15.8 Block Signals

- a. If there are curves in a tunnel where trains or locomotives operate, block signals for each curve shall be installed and used. These signals may be manually operated from each approach to the curve or turn if arranged so as to give effective notice that a train is on the curve.

5.15.9 Car Passers and Cherry Pickers

- a. Where car passers of any type are used, a colored light operated by a worker at the car passer shall be used to signal the motorman when regular track is blocked or clear.
- b. A reverse grade away from the main track, or a positive stop or lock shall be provided on the car passer track to avoid the unexpected rolling of a car onto the main travel way space.
- c. Cherry pickers shall be equipped with automatic locking devices that will

prevent muck cars from falling when in the raised position.

5.15.10 Surface Dump Track

- a. A securely anchored bumper equivalent to a 6 x 8 inch timber, at least larger than the wheel radius, shall be placed at the end of surface waste dump tracks to prevent cars from going over the embankment.
- b. Dump track areas shall be maintained reasonably level and properly ballasted or the ties planked over to prevent men from tripping.
- c. Standard walkways with railings shall be provided on elevated trestles.
- d. Provisions shall be made to prevent cars from overturning while dumping.

5.15.11 Switches

- a. Frogs, guardrails and lead rails of switches shall be filled as to eliminate the danger of a foot being caught therein.

5.15.12 Places of Refuge

- a. At intervals of not more than 200 feet in every tunnel providing less than 2 feet of clearance in which mechanical haulage is employed, places of refuge shall be provided with a clearance of at least 2 feet between the widest portion of the car or train running on the tramway and the side of the haulage way.
- b. Places of refuge shall be kept constantly clear. No debris shall be placed and nothing shall be done to prevent access.
- c. Every place of refuge shall be made readily visible by contrasting lights or other effective means.

5.16 WALKWAYS AND ACCESS

5.16.1 Clear unobstructed walkways shall be maintained throughout the tunnel. Walkways shall be located on the lighted side of the tunnel unless other conditions preclude this side.

5.16.2 Sump holes or other excavations shall be secured by barricades, covers, or railings. Abandoned sumps shall be filled immediately.

5.17 HOISTING AND SHAFTS

5.17.1 Vertical Access Shafts

- a. Shafts over 50 feet deep shall be equipped with guide rails or guide cables of such design that the cage or conveyance upon which workers ride shall be prevented from undue sway.
- b. Hoists for Handling Workers:
 1. In access shafts the hoist control shall be such that it will return to the

Stop" position when the hand of the operator is removed from the control lever. The brakes shall be automatically applied and the power cut off whenever the control lever is in the "stop" position. All hoisting equipment shall be tested before it is placed in operation to see that it performs properly.

2. Hoists which handle workers in access shafts shall be equipped with two brakes, either of which is capable of stopping and holding a fully loaded cage. One shall be an automatic brake that shall be applied whenever the power fails, is shut off or when the power control lever is in the "off" position. The other brake shall be a hand or foot brake that operates on the hoist drum.
 3. In access shafts the hoist shall be of such design that the load is powered up and down. There shall be no friction gearing or clutch mechanism by which the motor or other power source can be disconnected from the hoisting drum.
 4. Hoists shall be equipped with over-speed controls and limit switches to prevent over winding.
- c. Conveyance for Hoisting and Lowering Workers:
1. Cages, skips or buckets operating on guides or guide cables in access shafts over 50 feet deep shall be equipped with broken-Rope safety devices or equivalent that shall stop and hold a capacity load in the event the hoisting cable parts. The safety device shall be tested in a manner and at intervals satisfactory to the manufacturer and OR-OSHA on every installation before use. Records shall be maintained of all tests and made available upon request. No method of roping shall be used which might interfere with the proper operation of the safety device.
 2. A cage, skip, or bucket, shall be equipped with a bonnet that covers the top in such a manner as to protect riders from objects falling in the shaft. It shall be the equivalent of two steel plates, three-sixteenths inch in thickness, sloping toward each side, so arranged that they may be readily pushed upward to afford egress from inside.
 3. Cages shall be provided with sheet iron or steel side-casings not less than 6 feet in height and not less than 1/16th inch thick or with netting composed of wire not less than 1/60th inch in diameter (the maximum size of openings of wire netting shall not be greater than 1 inch), and with gates of not less than four and feet in height and made of such materials as specified for side-casing, either hung on hinges or working in slides; provided, however, that this does not preclude the use of other materials having equivalent strength and providing equal safety. The man-cage shall have handholds provided so that each man will have a convenient means for steadying himself.

4. Emergency chains, slings or double clevis pins shall be used between the lower end of the wire Rope and the cage or skip so that, in the event of ring bolt or clevis-pin breakage, the emergency attachments shall prevent the cage or skip from falling.
5. Workers shall not be permitted to ride on the tops of skips, and board platforms shall not be provided on tops for that purpose.
6. Workers shall not be permitted to ride on any equipment in which the cage, skip, or bucket is loaded with explosives. Exception: This order shall not apply in the case of a worker in charge of the explosives or the cage operator.

5.17.2 Shafts and Inclines

- a. Personnel shall not be hoisted by crane in or out of the shafts except in the case of emergency and then only in an approved man-cage or basket stretcher. This also applies to cut and cover operations.
- b. Criteria for acceptable use of crane hoisted man basket shall meet the specifications set forth in OR-OSHA Standards 1926-550.
- c. The top lander shall stand at the top of the shaft where he/she can see all vertical movement of the line as best possible and material being hoisted. The bottom lander on an incoming load can pick-up the line and load visually and can take over where sight of loads or top lander. The reverse would take effect on outgoing loads.
- d. The bottom lander shall also keep all personnel clear of the shafts, perimeter and loads.
- e. At the bottom perimeter of all shafts a fence with gate(s) 6 feet high shall be provided to prevent people walking into shaft line.
- f. All shafts shall be inspected by a competent person at least once each week. A written report of the inspection shall be kept on file in the respective Contractor's Field Office and shall be made available upon request by the Owner's Representative.
- g. A log book shall be maintained logging all inspections, discrepancies, service or repair showing dates, and by whom operation was performed.
- h. If buckets or cages without guides are used for handling workers and material, the arrangements shall be such that:
 1. The work bucket shall have all sides enclosed by a heavy screen or equivalent to a height of at least 42 inches, and have a protective canopy top. Shaft crews shall be hoisted or lowered in a man cage enclosure with bonnet.
 2. The connection between the hoisting Rope and the man-cage shall be a shackle or equivalent, of a non-spinning type.
 3. All parts of the rigging shall provide a safety factor of 10 or more

when workers are being transported.

- i. The hoist shall be of such design that the worker load is powered up and down, so arranged that the load stops or creeps slowly if the motor stops. No system of lowering against the brake or friction, with the spool in free wheeling, is to be allowed.
- j. The drum operating lever shall be of a type that returns automatically to the "stop" position when the operator's hand is removed, unless as a substitute, the throttle that controls the drum speed automatically stops or slows the engine to idling speed when throttle is released.
- k. Adequate level landing areas shall be provided for the use of men getting on or off buckets or cages.
- l. Makeshift hoisting operations shall not be permitted for workers or materials.
- m. During sinking operations no cage, skip, bucket, or other conveyance shall be lowered directly to the bottom of a shaft or incline steeper than 20 degrees from the horizontal when men are working there. All such equipment shall be stopped at least 15 feet above the bottom of such excavation, and remain there until the signal to lower further is received from the bottom of the shaft.
- n. During sinking operations in access shafts or inclines steeper than 20 degrees from the horizontal, no other work in any other place in the shaft shall be executed, nor shall any material or tools be hoisted or lowered from or to any other place in the shaft or incline while employees are at work in the bottom of the shaft, unless the employees so engaged are covered by a well-constructed barrier, or otherwise protected from the danger of falling material.
- o. Positive means shall be provided to prevent equipment from rolling into shaft excavations.
- p. Open pilot raises in shafts being enlarged shall be covered or railed except when necessarily open for the passage of muck. Full body harnesses and lifelines shall be worn when the raise is not guarded.
- q. Means of unplugging shafts, such as chains or cables that can be worked up and down, shall be provided. "Bombs" shall not be used to unplug shafts from the bottom.
- r. Shaft bottoms shall be cleaned of muck and an examination made for misfires before resuming drilling.
- s. At the tops of all shafts or inclines and at all shaft or incline stations, 6-foot high gates or barriers suitable for the condition shall be installed, and kept in place except when necessarily removed for loading operations.
- t. When a bucket is used for hoisting materials, buckets shall be trimmed

prior to hoisting and means shall be provided that will prevent material from falling into the shaft or incline while the bucket is being dumped.

- u. Before repairs are commenced in a shaft or incline served by a hoist-operated conveyance, the hoisting engineer shall be informed concerning the details and given appropriate instructions.
- v. When workers enter the sump of a shaft or incline a positive stop shall be provided to prevent the skip from being lowered on top of them, or the hoist engineer shall be notified that the skip is not to be moved until the workers working in the sump give clearance.
- w. All sumps shall be covered, or fenced with standard railings.
- x. All stations or skip pockets shall have sufficient passageway so that crossing through the hoisting compartment of shafts or inclines is unnecessary.
- y. When the Owner's Representative considers it necessary, cage and skip compartments shall be screened or timbered off from other shaft compartments. This divider shall extend high enough upon the head frame to confine in the skip compartment any muck that might become dislodged during the dumping of the skip.
- z. If a shaft or incline has a separate, unenclosed compartment for the handling of materials there shall be some means provided to give prior warning to workers at the bottom of the shaft or incline and at any intermediate stations whenever this compartment is to be used. The area around the shaft shall be barricaded.
- aa. In shafts and inclines precautions shall be taken to prevent materials being hoisted from catching on rocks, timbers or other obstructions.
- bb. All timbers, tools, etc., longer than the depth of the bucket, skip, cage or other conveyance in which they are to be hoisted or lowered shall be lashed at their upper ends to the cable or otherwise secured.
- cc. There shall be two safe means of access in shafts at all times. This may include the ladder and hoist.

5.17.3 Hoisting Signals

- a. Every shaft or incline shall be provided with an efficient means of interchanging distinct and definite signals between the top of the shaft and the lowest level and any intermediate level from which hoisting is being done.
- b. Special care shall be taken to keep the signal apparatus in good order and to prevent electric signal and telephone wires from making contact with other electric conductors. In addition to the primary signal system, there shall be a secondary signal system.
- c. Signals to hoist personnel shall be given only by persons authorized to do so.

- d. Hoisting signals shall be posted at the hoist and at each level.
- e. The signal “ready to blast” shall be followed by the signal “ready to hoist” coming from the hoisting engineer.
- f. The engineer's signal that he is ready to hoist is to raise the bucket, cage, or skip about 2 feet and lower it again.
- g. Legible copies of the signals shall be posted in a convenient location at the collar of the shaft, at each station and in the engine room. This signal code shall include proper signal for each level or station.

5.17.4 Hoisting Personnel

- a. At every shaft where workers or materials are hoisted or lowered there shall be one or more workers to be known as hoisting personnel. These workers shall be able to speak and read English readily, and must have had practical experience in operating shaft hoists. Each hoisting personnel shall pass a thorough physical examination, at least once a year, by a medical physician authorized to practice in Oregon.
- b. Workers who have not had practical experience in hoisting a person(s) or material shall not be assigned to duty as hoisting operators without prior training under the direction of an experienced hoisting personnel. Training shall include experience in operation of the hoist handling material only, until such time as the employer considers the learner competent to hoist and lower workers. Training shall be done at such times and under such circumstances as to avoid the creation of any unusual hazard.
- c. At all shafts or inclines where workers or materials are hoisted or lowered, hoisting personnel shall be not less than 21 years of age. Only those familiar with the details and workings of a shaft hoist shall be assigned to this work and, except in cases of emergency or as provided for in (b) above, no one but the duly appointed hoisting personnel shall run such hoist.
- d. Hoisting personnel (underground shafts) shall be provided with and trained in the safe and proper use of a self contained breathing apparatus having a two (2) hour duration of respirable air. This Provision is for safe means of operation and escape for the hoisting personnel, whenever an air emergency arises.

5.17.5 Hoisting Operations

- a. Inexperienced or untrained employees shall not be permitted to operate the hoist. Only those designated as hoisting personnel shall be permitted to operate a hoist per Section 5.14.5 above.
- b. Hoisting ropes shall be accurately marked or equivalent steps taken to indicate when the load has reached certain important positions including top and bottom landings.

- c. Unauthorized persons shall not be allowed in the hoist room.
- d. There shall be no conversation involving the hoisting personnel while the engine is in motion, or while he is attending to signals, except to receive orders or instructions.
- e. All hoisting machinery and safety appliances connected therewith shall be inspected daily and necessary corrections made.
- f. The bucket, skip, cage, or other conveyance shall not be left at the collar of the shaft, or at a landing, but shall be hung at least 10 feet above the collar of the shaft, or above a landing before the hoist operator leaves his post.
- g. Whenever workers are working in a place to which they have been lowered by mechanical power, arrangements shall be such that a hoisting personnel or a substitute shall be within hearing distance of the signal system.
- h. The hoist shall not be operated and the cage, skip or bucket moved while oiling operations are under way unless clearance is obtained from the oiler. The hoisting engineer shall be notified when oiling operations are to commence and when they are finished.
- i. When workers are working in a shaft without a bulkhead over their heads and the skip, cage or bucket is stopped to avoid hazard to them, it shall not be moved unless it can be done with safety. Moving shall not be attempted without permission from those who issued the hold order.
- j. When workers are working in a shaft without a bulkhead over their heads, the skip, cage or bucket shall not be moved until the employees in the shaft are in the clear.

5.17.6 Hoisting Operations--Extra Precautions When Handling Workers

- a. The hoist shall be operated with extreme caution whenever men are being hoisted or lowered.
- b. The maximum rate of speed at which men can be hoisted or lowered shall be posted in the engine room.
- c. At the beginning of each shift, the skip or other conveyance on which no person(s) is riding shall be operated up and down in the working part of the shaft at least once before anyone is hoisted or lowered, special attention shall be given during this trial run to the condition of the hoisting machinery and shaft. No person(s) shall be hoisted or lowered until all hazards disclosed by this trial are corrected.

5.17.7 Shaft Inspection

- a. A weekly inspection of all shafts shall be made by a competent person, and a report made and kept on file at Contractor's Field Office and made available for review upon request by the Owner's Representative.

5.18 TUNNEL SECURITY

- 5.18.1 Mobile radios or telephones of at least 800 megahertz may be utilized as a secondary means of communication.
- 5.18.2 Contractor shall provide continuous on-site security protection when there are no regularly scheduled shifts.
- 5.18.3 Contractor Security Personnel shall be qualified and experienced. An outside Security service qualified by training and experience may be used.
- 5.18.4 The Owner reserves the right to require Security Guard Services be obtained when deemed necessary. All associated costs of the Security Guard Service shall be absorbed by the Contractor.
- 5.18.5 Security personnel shall:
 - a. Make periodic inspection patrols and visually ascertain that fences or other perimeter barriers are secure and in good repair and that no trespassers are present.
 - b. Protect and prevent the Project Sites from encroachment by unauthorized persons by maintaining patrols.
 - c. Permit entry to Project Sites only to those persons that meet established identification procedures and communication with the Owner's Representative.
 - d. Record the name and time of entry of all persons entering the Project Site.
 - e. Obtain an ID on unexpected persons encountered during non-work time, noting name, address and appropriate ID of person, as well as person's stated reason for being on the premises, on "written rounds" record.
 - f. Maintains a written log during each shift indicating beginning and end times for shift, notations of unusual occurrences, security violations, persons encountered on rounds, etc.
 - g. Security personnel shall assist, when requested, in the following actions:
 - 1. The safe evacuation and care of personnel.
 - 2. Communicate with local police forces.
 - 3. Secure the area to prevent additional injury or damages.
 - 4. Preserve the scene to permit effective investigations.
 - 5. Assist fire or other emergency response agency in controlling the specific problem and assist in crowd control or dispersal.

END OF SECTION 5

SECTION 6 RESERVOIR CONSTRUCTION

6.1 INTRODUCTION

6.1.1 The following standards will be applicable for reservoir work and shall be followed for the duration of the construction of the reservoir. The Contractor shall develop and submit a written reservoir construction Safety Plan that describes in detail how the following standards will be addressed. This plan shall be submitted 30 days prior to the commencement of the construction of the reservoir.

6.2 GENERAL

6.2.1 Comply with requirements contained herein and as specified in the specifications.

6.2.2 Contractor shall coordinate with Owner's Representative prior to commencing with work.

6.2.3 Contractor shall provide Work Plan discussing site specific plans for work at, on, or over existing reservoir systems. The Plan shall at a minimum include coordination with Owner, sequence of work, etc.

6.3 VENTILATION

6.3.1 In addition to meeting the requirements below, the Contractor must also comply with the requirements of the Specifications.

6.3.2 The air supply must be sufficient to prevent dangerous or harmful accumulations of dusts, fumes, vapors or gases and shall not be less than 200 cubic feet per minute for each person in a partially or fully enclosed work area plus 100 cubic feet per minute per diesel brake horsepower. The lineal velocity of air flow in work areas must not be less than 30 feet per minute.

6.3.3 The Contractor must demonstrate that the air supply meets or exceeds the requirements above.

6.3.4 Fresh air must be provided to all reservoir work areas. If fans are used, they must be reversible.

6.3.5 Any ventilation line must be made up of non-combustible material that can withstand air flow reversal.

6.3.6 Bulkheads, brattices or similar means, equally as effective must be utilized to isolate the areas as needed in the various areas of the reservoir to assure and provide a constant, reliable, cleanly ventilated atmosphere at all times.

6.3.7 Bulkheads and forced ventilation in one direction must be provided.

6.3.8 In case of failure in the ventilation system, all diesel engines in the reservoir must be shut down and personnel evacuated from the reservoir until the ventilation system is restored and air quality is tested and acceptable.

- 6.3.9 A standby source of electrical power shall be provided for the ventilation fan system, in case of the failure of the primary power supply system.
- 6.3.10 Fans, motors, and other electrical components of the main ventilation systems shall conform to Class I, Division 1, requirements of Subdivision K, OR-OSHA standards. A working blower with electrical components conforming to Class I, Division 2, requirements of Subdivision K, OR-OSHA Standards.

6.4 AIR QUALITY AND DUST CONTROL

- 6.4.1 The air flow shall be tested by the Competent Person using approved testing equipment.
- 6.4.2 Air quality testing in enclosed areas of the reservoir shall be done prior to the start of each shift and at a minimum of every four (4) hours thereafter. At a minimum, test the air provided at ventilation supply and discharge points. The Contractor's Primary Safety Representative shall determine other locations within work areas where tests will be performed. Records of tests shall be maintained in the Contractor's Field Office and indicate date, time, specific location, test results and name and signature of person performing tests.
- 6.4.3 Should hazardous concentrations of air contaminants be encountered, testing shall be performed continuously to ensure that the air flow is sufficient to reduce airborne concentrations to levels below Threshold Limit Values (TLV).
- 6.4.4 Atmospheric testing equipment shall be capable of testing at a minimum oxygen, carbon monoxide, LEL and hydrogen sulfide. The Contractor's Primary Safety Representative shall determine any additional gases that may be required to be tested. All atmospheric tests shall be recorded and maintained in the Contractor's field office as discussed above.
- 6.4.5 Gas detection systems and equipment shall be tested and where necessary, recalibrated at start of each shift and such tests and calibrations shall be documented in a gas testers log and maintained in the Contractor's Field Office.
- 6.4.6 An atmospheric gas testing log sheet shall be maintained at the Contractor's Field Office. The log sheet shall include but not be limited to the following information: printed name and signature of person performing tests, date of tests, times and specific locations where tests/readings were taken and an area for comments.
- 6.4.7 All documentation shall be maintained and made available for review upon request by the Owner's Representative.

6.5 DANGEROUS OR POISONOUS GASES

- 6.5.1 When the air in any part of the reservoir is found to contain or suspected of containing dangerous or explosive gas, it shall be tested initially and continuously before workers are allowed to work in the area. Such tests shall be performed by a Competent Person and documented. Records shall be maintained at the work area and in the Contractor's Office and shall be

provided to the Owner's Representative when requested.

- 6.5.2 If more than 10% of LEL of flammable gas or petroleum vapor is found in the reservoir, any work therein shall stop until steps are taken to improve ventilation immediately. The Owner's Representative shall be notified of hazardous condition.
- 6.5.3 Whenever any of the following conditions have been encountered, all work in the partially or fully enclosed area shall cease immediately. All employees shall be evacuated, and re-entry except for rescue purposes shall be prohibited until the Owner's Representative has been notified.
- a. An ignition of gas or vapor occurs in the partially or fully enclosed work area.
 - b. 10% of LEL of flammable gas or vapor is encountered.
 - c. A poisonous or suffocating gas is considered dangerous to health and life.
 - d. Whenever air monitoring indicates the presence of hazardous atmosphere above the specific limits for those gases, the Contractor shall take appropriate measures to control or eliminate in order to maintain acceptable atmospheric conditions. Contractor shall verify through atmospheric testing and monitoring to ensure safe conditions are maintained.

6.6 ACCOUNTABILITY CHECK-IN, CHECK-OUT SYSTEM

- 6.6.1 A written accountability check-in/ check-out system is required when work on the roof structure commences and there is limited ingress/ egress from the work area or as directed by the Owner's Representative.
- 6.6.2 Every person, including visitors must sign-in/ sign-out, to identify all persons inside the reservoir area at any given time.
- 6.6.3 Every person shall have a positive means of identification on themselves (i.e. brass tag or identification badge with name or number) at all times while inside the reservoir.
- 6.6.4 All visitors shall report to the Contractor's Field Office prior to going on site or entering the reservoir. The Contractor's Competent Person shall give each visitor a safety briefing on the safety requirements of the construction site. The Owner's Competent Person, upon Contractor's request and when available, will brief personnel visiting the site for Owner's purposes.

6.7 COMMUNICATIONS

- 6.7.1 Contractor shall maintain effective communication systems for summoning emergency services as well as emergency notification and evacuation for all workers on-site.
- 6.7.2 Cell phone service may not be dependable in all locations of the project.

6.8 GROUND CONTROL

- 6.8.1 The Contractor shall inspect the roof face, walls and ground support system and surrounding soils at the beginning of each shift and frequently thereafter. Any loose or dangerous ground shall be properly dislodged or adequately supported.
- 6.8.2 Records of such inspections shall be kept and maintained at Contractor's Field Office and shall be provided to the Owner's Representative when requested.

6.9 SPECIAL FIRE PREVENTION AND CONTROL

6.9.1 Fire Resistant Hydraulic Fluids

- a. Only fire-resistant hydraulic fluids shall be used in hydraulically activated machinery and equipment in partially or fully enclosed work areas, unless the machinery or equipment is protected by a fire suppression system capable of immediate fire suppression and approved by local fire protection agency.
- b. All such machinery or equipment to be used in the partially or fully enclosed work area shall be inspected and certified to contain only fire-resistant hydraulic fluid. Each piece of machinery or equipment shall have a permanent type tag, label, etc. which will signify date of inspection, inspected by or work performed by, and the Competent Person's signature and date.
- c. Any machinery or equipment to be used in partially or fully enclosed work area and containing non-fire resistant hydraulic fluid shall be completely drained and refilled with acceptable fluid(s) and inspected and certified per above requirements before placement in any partially or fully enclosed work operation regardless of duration of use.

6.9.2 Fire Control

- a. An adequate number of 16 A:B:C rated fire extinguishers shall be provided for hydraulic oil, electrical, wood, and equipment.
- b. Fire extinguishers or equivalent protection shall be provided at the entrances, and at 200-foot intervals.
- c. Fire shields and standby water hoses or adequate fire extinguisher(s) shall be used when spark inducing tools or tasks are utilized near combustible materials.
- d. Flammable or combustible materials or storage buildings shall not be located within 100 feet of any reservoir opening, hoisting engine house or ventilating fan house.
- e. Under no circumstances shall oxygen or any flammable gas be stored in proximity to oil. Precaution shall be taken with all chemicals to ensure proper storage to prevent any chemical reactions.
- f. Open flame lights shall be prohibited at all places where gasoline,

distillate, oil or other flammable are stored (includes any temporary storage). Where necessary, electric lights shall be installed.

- g. Lubricating oils, greases and rope dressings taken into partially or fully enclosed areas shall be in closed metal containers that do not permit the contents to leak out or spill. When taken into partially or fully enclosed areas they shall be stored in a secluded place away from ingress/egress points, winches, hoists, powder magazines and lumber storage in such a manner that the oil from a ruptured or overturned container will not flow from its storage place. Quantities of oil and grease shall be limited to a maximum of one-day supply.
- h. No oil shall be taken into partially or fully enclosed work area for illuminating purposes.
- i. The use of volatile solvents (below 100 degrees F flash point), such as gasoline, are prohibited in the partially or fully enclosed work area.
- j. Acetylene, liquefied petroleum gas, oxygen, and methylacetylene propadiene stabilized gas may be used in the work area only for welding, cutting and other hot work. No more than the amount of fuel gas and oxygen cylinders necessary to perform welding, cutting, or other hot work for a 24-hour period shall be permitted in the partially or fully enclosed work area.
- k. All oily waste or rags used in partially or fully enclosed work area shall be stored in metal receptacles with secure cover (step type with positive lid/cover closure is acceptable). The filled receptacles shall be sent to the surface every week or whenever the receptacle is full.
- l. Waste materials for which no storage facilities are provided shall be promptly removed from the partially or fully enclosed work site.
- m. All fires shall be reported to the Contractor's Field Office and to the Owner's Representative immediately.
- n. Suitable fire extinguisher or other fire protection equipment shall be provided at appropriate locations throughout work area operations. At the designated visible positions, all workers shall be instructed of their locations and training in their proper use. Such equipment shall be inspected at least monthly, maintained in acceptable operating condition and a log book on inspection(s) shall be maintained in the Contractor's Field Office.
- o. Contractor shall submit a Fire Protection Plan per Section 4. The Fire Prevention/Protection Plan shall identify water sources available at the project site, the location and quantity of water available from each water source. The Plan shall also include quantity of water storage (tanks, etc) that will be needed on site, as well as location and availability of other nearby but off-site water sources. Copies of the Plan shall be shared with the Portland Fire Bureau or other applicable governing jurisdiction and

the Owner.

- p. Existing water systems must remain in service until alternative water systems are available.

6.10 WALKWAYS AND ACCESS

- 6.10.1 When the slope of any concrete structure exceeds 15%, a ramp, ladder, stair system or other safe means of ingress/egress shall be provided within 200 ft of all work areas.
- 6.10.2 At least two (2) safe means of egress from the reservoir shall be provided during work hours.

6.11 RESERVOIR SECURITY

- 6.11.1 Contractor shall submit a Security Plan to the Owner's Representative for approval.
- 6.11.2 Contractor shall provide continuous on-site security protection. On-site security protection may include perimeter fencing, security cameras, lighting, etc. See the requirements in the Specifications.
- 6.11.3 The Owner reserves the right to require Security Guard Services be obtained when deemed necessary. All associated costs of the Security Guard Service shall be absorbed by the Contractor.
- 6.11.4 Contractor Security Personnel shall be qualified and experienced. An outside Security service qualified by training and experience may be used.
- 6.11.5 Security personnel shall:
 - a. Make periodic inspection patrols and visually ascertain that fences or other perimeter barriers are secure and in good repair and that no trespassers are present.
 - b. Protect and prevent the Project Sites from encroachment by unauthorized persons by maintaining patrols.
 - c. Permit entry to Project Sites only to those persons that meet established identification procedures and communication with the Owner's Representative.
 - d. Record the name and time of entry of all persons entering the Project Site.
 - e. Obtain an ID on unexpected persons encountered during non-work time, noting name, address and appropriate ID of person, as well as person's stated reason for being on the premises, on "written rounds" record.
 - f. Maintain a written log during each shift indicating beginning and end times for shift, notations of unusual occurrences, security violations, persons encountered on rounds, etc.
 - g. Security personnel shall assist, when requested, in the following actions:

1. The safe evacuation and care of personnel.
2. Communicate with local police forces.
3. Secure the area to prevent additional injury or damages.
4. Preserve the scene to permit effective investigations.
5. Assist fire or other emergency response agency in controlling the specific problem and assist in crowd control or dispersal.

6.12 WORK ON OR AROUND EXISTING RESERVOIR

- 6.12.1 The Contractor shall submit a Work Plan for work on or around an existing reservoir that includes, at a minimum:
- a. Drawdown plan of water in the reservoir, including pump size, pump location and estimated duration to lift water out of reservoir to be cleaned.
 - b. Procedure for sediment removal and cleaning from sump and reservoir floor, water sources for cleaning.
 - c. Method for removal of large debris including the egress locations.
 - d. Injury prevention from pulling hoses through the facility.
 - e. Ventilation and power sources needs for the Work.
 - f. Existing screened vents around roof.
 - g. Entry request and documentation into existing reservoir.
 - h. Description of systems that will be utilized to prevent falls and/or drowning.

6.13 VEHICLES AND EQUIPMENT WORKING IN OR ON THE RESERVOIR

- 6.13.1 Contractor shall ensure roof structures and working surfaces are capable to withstand intended loads.
- 6.13.2 All vehicles and equipment working on or near the reservoir roof and/or floor slab must be maintained in a leak free condition or be removed.
- 6.13.3 Operators of any vehicle or equipment being used on the roof and/or floor slab, shall be inspected daily for leaks of any fluid. This inspection shall be documented, and at a minimum, include the time and date of the inspection, plus the name of the person performing the inspection.
- 6.13.4 Oil absorbent pads are required under equipment that inherently leak oil such as yarders, loaders, etc.
- 6.13.5 A spill containment barrier and pads shall be established prior to any refueling, repair or servicing operation and must be installed under any vehicle or equipment that is parked or stored on the roof or floor slab of the reservoir, during off-shift hours or during idle periods exceeding 4 hours.

- 6.13.6 Spill response kits shall be stored within 200 feet of any vehicle operating on the roof or floor slab of the reservoir.
- 6.13.7 The Contractor shall take prompt action to repair oil leaks within 48 hours of observation of leak. Vehicles or equipment that cannot be repaired to a leak free condition shall be removed.

6.14 SANITATION

- 6.14.1 All persons working on the Project site must use sanitary facilities. These facilities shall be provided by the Contractor.
- 6.14.2 Contractor shall not install or place temporary sanitation facility on concrete floor or roof of reservoir. Contractor shall take appropriate measures necessary to ensure potable water facilities remain free from contamination. The sanitary facilities shall be properly secured to prevent from tipping.
- 6.14.3 Domestic garbage and refuse shall be disposed in trash receptacle that can be secured to prevent spillage and vandalism.

6.15 CLEANING AND DISINFECTION

- 6.15.1 Comply with requirements contained herein and as specified in the Specifications.
- 6.15.2 Provide adequate training to all staff for the cleaning and disinfection work. Contractor shall document the training sessions including a list of all attendees. Contractor shall provide the document to the Owner's Representative upon request.
- 6.15.3 During the disinfection process, the Contractor shall not perform any other work in the area impacted by the disinfection process.
- 6.15.4 The Contractor shall submit a Cleaning and Disinfection Plan that will include at a minimum the following:
 - a. A safety orientation outline that includes the key elements of this plan.
 - b. Description of cleaning and disinfection procedure which includes flushing, chlorination, and de-chlorination of reservoir floor, ceiling, walls, associated pipelines and appurtenances.
 - c. Procedure for sediment removal and cleaning from sump and reservoir floor, water sources for cleaning.
 - d. Method for removal of any debris including any hoisting equipment to be used and the egress locations.
 - e. Description of chlorine storage and procedure for safe application.
 - f. Plan for spill prevention and containment of the chlorine or other chemicals before and or during the reservoir disinfection.
 - g. Description of systems that will be utilized to prevent falls and/or

drowning.

- h. Lighting plan for to ensure adequate visibility inside the enclosed reservoir structure.
- i. Identify any special personal protective equipment (e.g. respiratory protection) needed.
- j. Describe means and access for Contractor and Owner's Representative for taking readings of water in reservoir to ensure it meets the design and operations requirements. Include means to prevent falls and drowning.
- k. Provide plan to avoid injuries from hoisting and handling of equipment and materials (e.g. hoses) during wash down activity.
- l. Identify and provide any air monitoring tests and ventilation needs for the disinfection process in reservoirs.
- m. Identify potential hazards that may be encountered (e.g. high PH from cleaning concrete liner/floor, etc.) and a means to control these hazards.
- n. Provide plan for handling and disposal of highly chlorinated water.

END OF SECTION 6

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SECTION 7 SUBSTANCE ABUSE PROGRAM

7.1 INTRODUCTION

- 7.1.1 The Owner is committed to the establishment of a drug-free, alcohol free, and safe and healthy work environment for all Capital Improvement Projects (CIP).
- 7.1.2 The Contractor must establish and implement an employee substance abuse program covering all of its employees at the Project Site including all of its subcontractor's employees at any tier. The Contractor will be responsible for all costs of the program including testing and third party administration. Contractor will submit its program to the Owner's Representative for review and acceptance. The Contractor will submit its Substance Abuse Program within 30 days following notice of award and prior to work beginning.

7.2 POLICY

- 7.2.1 The use, possession, distribution, or sale of alcoholic substances or beverages, intoxicants, illegal drugs, controlled substances not medically authorized, related drug paraphernalia, or other substances including prescription drugs which impair job performance, or being under the influence of such substances or drugs on a CIP construction Project Site is strictly prohibited. Being under the influence is defined as testing positive for drugs or alcohol under this policy.
- 7.2.2 All contractors and subcontractors must establish and implement a substance abuse program that complies with the requirements of this Section. The Contractor and Subcontractor is not limited by the requirements set forth in this Section and may adopt additional requirements, including more extensive urinalysis testing, where the Contractor and Subcontractor determines that such additional testing is in the best interests of the Contractor and Subcontractor and the safety of its employees, others on the Project Site, or the public.
- 7.2.3 The Owner reserves the right to administer its own Substance Abuse Testing Procedures.

7.3 PROHIBITED SUBSTANCES

- 7.3.1 Drugs are defined as any substance which may impair mental or motor function including but not limited to illegal drugs, controlled substances, designer drugs, synthetic drugs and look-alike drugs.
- 7.3.2 Alcohol means ethyl alcohol and any beverage or substance containing ethyl alcohol.

7.4 PRESCRIPTION DRUGS

- 7.4.1 OCIP covered employees must advise of the use of medically authorized prescription drugs or substances which may impair job performance or have

side effects to their immediate supervisor and provide proper written medical authorization from their physician, on request. Individuals failing to advise of their medications shall be cause for removal from any Project Site.

7.5 COVERED EMPLOYEE

7.5.1 OCIP covered employee refers to an employee of the Contractor or Subcontractor, including independent Contractors and operators retained by the Contractor or a Subcontractor, who is engaged in the performance of Work on a CIP.

7.6 POSITIVE ALCOHOL/DRUG TEST

7.6.1 A positive alcohol/drug test means that the sample tested exceeds the threshold levels of a prohibited substance or substance metabolite established by the U.S. Department of Health and Human Services.

7.7 SUBMISSION OF PROGRAM TO OWNER

7.7.1 Contractor must, within 30 days following notice of award and prior to beginning Work at the Project Site, submit to the Owner for approval a copy of its Substance Abuse Program. The Contractor's program must comply with the requirements of this Section and further the policy established in these Provisions.

7.8 COMPLIANCE

7.8.1 Contractor's program, when approved by the Owner will become a Contract requirement and Contractor's failure to fully implement or enforce the program will be considered a breach of the Contract. The Owner may hold all or any portion of any payment due the Contractor, until compliance can be demonstrated.

7.9 PROGRAM REQUIREMENTS

7.9.1 The Contractor must develop and implement a substance abuse prevention program which conforms to the requirements of this Section. The program must contain at least the following elements:

- a. Policy Statement: The Contractor must prepare a policy statement describing the Contractor's policy on prohibited alcohol/drug use on construction workplaces and premises, including:
 1. Written notification to all contractor and subcontractor employees that the unlawful manufacture, distribution, dispensing, possession, or use of alcohol or a controlled substance is prohibited at the Project Site and violations of such policy shall result in removal from the CIP.

2. Specific information concerning covered employee behavior that is prohibited.
3. Specific circumstances under which a covered employee will be tested for prohibited drugs/alcohol.
4. Requirement that as a minimum, drug testing be performed using an Enzyme Multiplied Immunoassay Technique (EMIT) and alcohol testing be performed by Department of Transportation standards, at a National Institute of Drug Abuse certified laboratory. Other rapid response methods may be used in conjunction with the EMIT provided any positive testing person is precluded from entering the Project Site and that all positive tests are confirmed by gas chromatography mass spectrometry. Under no circumstance shall the Contractor allow an untested or positive testing person on the Project Site.
5. Procedures that will be used to test for drugs to protect the covered employee and the integrity of the process, to safeguard the validity and confidentiality of test results, and to ensure that the results are attributed to the correct covered employee.
6. Contractor and subcontractor employees will be advised about the random sampling program and they shall agree that they shall be subject to such random sampling throughout the contract period. The Contractor's program will describe the method of random selection of employees to be tested on a monthly basis and the method by which the Contractor demonstrates the independence of the selection process and the integrity of the results.
7. Requirement that a covered employee submit to alcohol/drug testing, as required.
8. Requirement that a refusal to submit to alcohol/drug testing constitutes a failure to pass an alcohol/drug test.
9. Consequences for a covered employee who fails to pass or refuses to submit to a drug test as required.

7.9.2 Education and Training

- a. The Contractor must provide to every covered employee pamphlet/brochure explaining the policy and requirements under the drug and alcohol policy.
- b. Additional training must be provided to supervisory employees in identifying the physical, behavioral, and performance indicators of probable drug use to determine when a covered employee is subject to alcohol/drug testing based on reasonable suspicion (i.e., visibly impaired).

7.9.3 Alcohol/Drug Testing

- a. The Contractor must establish a program which provides for alcohol/drug testing pursuant to ORS 279.312 and in accordance with 1999 House Bill 2574 for covered employees in the following circumstances: pre-enrollment; post-incident; and other covered employees where reasonable suspicion exists. When administering an alcohol/drug test the Contractor shall ensure that the following are tested for, at a minimum:
 1. Marijuana
 2. Cocaine
 3. Opiates
 4. Amphetamines
 5. Phencyclidine
 6. Ethyl Alcohol

7.9.4 Pre-enrollment Testing

- a. An OCIP covered employee may not be assigned to the CIP unless the individual has a negative drug and alcohol test. Employees must submit to a drug and alcohol test within 48 hours of starting work on the Project. Only test results, in accordance with the requirements referenced herein shall be accepted. Such pre-enrollment test results of a covered employee who has previously worked under another CIP contract will not be accepted. Exception will be made for covered employees working on two or more active CIP under one Contractor. Applicants who test positive for alcohol/drugs may re-apply for Project employment after 180 days and will be subject to the provisions of the GCSP.

7.9.5 Reasonable Suspicion Testing

- a. The Contractor must require an OCIP covered employee to submit to an alcohol/drug test when there is a reasonable suspicion that the covered employee is impaired or affected by a prohibited drug or alcohol. A negative test result shall be obtained before permitting the employee to return to a CIP Site.

7.9.6 Post-incident Testing

- a. An OCIP covered employee who has a direct involvement or a possible involvement in a work-related incident will be tested for drugs and alcohol. A work-related incident is defined as an incident resulting in an injury requiring treatment by a physician (OSHA recordable), injury to the public or resulting in damage to property or equipment. Testing must occur as soon as practical. The employee may continue working until the test results have been verified. If the test result is positive the employee must be removed from the Project Site. A negative test result must be obtained before returning the employee to the Project Site.

- b. If an OCIP covered employee leaves the scene of the incident without a valid reason before submission to testing or cannot be located for testing following the incident, the Contractor will treat such action as a refusal to submit to testing.
- c. Nothing in this section may be construed to require the delay of necessary medical attention for injured persons following an incident or to prohibit a covered employee from leaving the scene of an incident to obtain assistance in responding to the incident or to obtain necessary emergency medical care.

7.9.7 Random Testing of Covered Employees

- a. The Contractor must at various times conduct random testing of covered employees. Such random testing will be in addition to any other testing required by this Section.
- b. The selection of covered employees will be made by a scientifically valid method, such as a random number table or a computer based random number generator that is matched with covered employees' social security numbers, payroll identification numbers, or other comparable identifying numbers.
- c. The unannounced testing of randomly selected covered employees must be spread reasonably throughout the contract period or within each 12 months of the contract period, whichever period is shorter.
- d. The number of covered employees randomly selected for testing during the contract period or 12 months of the contract period must be equal to a rate of at least 25 percent of the total number of covered employees subject to testing.
- e. Each covered employee may be in a pool from which random selection is made. Each covered employee in the pool must have an equal chance of selection and must remain in the pool, whether or not the covered employee is ever tested.

7.9.8 Return-to-Duty Testing and Follow-up Testing

7.9.9 The Contractor must ensure that each OCIP covered employee, who returns to work on a Project Site after having tested positive for alcohol/ drugs must test negative for alcohol/drugs before returning to work and if recommended by the treating substance abuse professional, such employee shall be subject to unannounced follow-up drug testing. The frequency for such testing must be determined by the treating substance abuse professional and shall be transmitted in writing to the employer.

7.9.10 Positive Alcohol/Drug Test or Test Refusal

- a. The Contractor must ensure that, before returning to duty, each covered employee who has refused to submit to alcohol/drug testing or has a positive alcohol/drug test, has been evaluated by a substance abuse

professional and has followed the recommended actions of the substance abuse professional, including participation in any rehabilitation program and is ready to return to duty; and has passed a return to duty alcohol/drug test.

- b. Refusal to submit to alcohol/drug testing means the non-production of a specimen for alcohol/drug testing. Refusal includes an unsubstantiated inability to provide a specimen, as well as, a verbal declination or physical absence resulting in the inability to conduct the test.

7.9.11 Employee Acknowledgments

7.9.12 The program must require each covered employee, prior to working under a Project contract to:

1. Acknowledge in writing, the receipt of a copy of Contractor's substance abuse program, and an understanding of the implications of the program for the employee.
2. Give advance written consent to any alcohol/drug testing that may be conducted under the Contractor's program and the use of test results for decisions related to continued employment on the Project.
3. Certify, in writing, that the employee has not been denied employment on the CIP or has not been previously removed from the CIP by any Project Contractor or Subcontractor for violating the Project substance abuse program.
4. Certify in writing that the employee is not presently using illegal drugs.

7.9.13 Collection and Test Procedures

- a. Policies and procedures for specimen collection, chain of custody for specimens, laboratory analysis procedures, and quality control requirements, will be in accordance with the United States Department of Health and Human Services, Mandatory Guidelines for Federal Workplace Drug Testing Programs Final Guidelines. All positive tests will be verified by Gas Chromatography/Mass Spectrometry (GC/MS). Testing under this program shall be by urine analysis.
- b. The collection and test procedures must contain provisions for the protection of employee confidentiality of test results. Test results will be revealed only to those persons with a business related need to know.

7.9.14 Levels of Drugs and Alcohol

7.9.15 The levels of alcohol or prohibited substances which will be used for determining that an employee has a positive alcohol/drug test are those as established by the U.S. Department of Health and Human Services.

7.9.16 Record Keeping

- a. The Contractor must maintain records of its substance abuse program.

Records shall be in sufficient detail to demonstrate compliance with the requirements of this section including, but not limited to:

1. Certification of compliance from Subcontractors.
2. Documents relating to the random selection process.
3. Documents generated in connection with decisions to administer post incident and reasonable suspicion alcohol/drug tests.
4. Records related to alcohol/drug testing.
 - i. Contractor's copy of the chain of custody form.
 - ii. Documents related to the refusal of any covered employee to take an alcohol/drug test.
5. Records pertaining to a determination by a substance abuse professional concerning a covered employee's suitability to return to work.
6. Records related to education and training of employees and supervisory employees.
7. The Contractor must certify monthly, via an independent third-party plan administrator, that all employees are in full compliance with the specified alcohol and drug-free requirements, and that all employees are subject to random selection by similar independent methods. The Contractor must report to the Owner's Representative any violations of the Substance Abuse Program and the disposition of the violation within 24 hours of test results.
8. The Contractor's records, other than test results, will be subject to inspection and audit at any time by the Owner. The Contractor must be able to demonstrate independent random selection and reporting. Complete, accurate records must be maintained at the Contractor's Field Office and made available upon request.

7.9.17 Removal from Project Site

7.9.18 Any covered employee who violates any Provisions of the substance abuse program will be subject to removal from the CIP. The Contractor will develop appropriate standards for the return of covered employees found in violation of the Contractor's substance abuse program. At a minimum the requirements of these Provisions will be imposed.

7.10 OTHER REQUIREMENTS

7.10.1 Except as expressly provided in this section, nothing will be construed to affect the authority of the Contractor to negotiate or implement more stringent elements of the substance abuse program.

END OF SECTION 7

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SECTION 8 EMERGENCY PLANS

8.1 GENERAL

- 8.1.1 The Contractor's Safety and Health Plan must incorporate a plan for safely and expeditiously handling possible emergency situations such as floods, fires, sewer gases, earthquakes, cave-ins, landslides, explosions, power outages, accidental chemical release, windstorms, and similar catastrophic occurrences. The Contractor will develop an Emergency Action and Crisis Management Plan for the CIP. The Plan shall be available for review by the Owner's Representative.
- 8.1.2 An Emergency Response Plan must be developed and implemented to handle anticipated emergencies. The Plan will address the following at a minimum:
- a. Pre-emergency planning
 - b. Personnel roles, lines of authority, and communication
 - c. Emergency recognition and prevention
 - d. Safe distances and staging areas (safety zones)
 - e. Site security and control
 - f. Evacuation routes and procedures
 - g. Decontamination procedures
 - h. Emergency medical treatment and first aid
 - i. Emergency alerting and response procedures
 - j. Critique of response and follow-up
 - k. Personal protective and emergency equipment
 - l. Site topography, layout, and prevailing wind conditions
 - m. Procedures for reporting incidents to State and local governments
 - n. Injuries to the general public on or adjacent to the Project Site.
 - o. Property damage with particular emphasis on utilities
 - p. Injuries to employees
 - q. Fire
- 8.1.3 The Plan must be in writing and must be available for inspection by the Owner's Representative.
- 8.1.4 Procedures must be provided for emergency response at all times, including non-work periods at night, weekends, and holidays. It is essential that the response be on a 24-hour basis. In the event that work is not conducted on a 24-hour, 7-day basis, provision for notification of responsible personnel must be included in the procedure.

8.2 TUNNEL EMERGENCY PLAN

- 8.2.1 The tunnel Contractor shall prepare and submit to the Owner's Representative an emergency plan to address the unique situations encountered during tunnel construction. The plan shall address at a minimum:
- a. General plan of action for use in time of emergency.
 - b. The duties and responsibilities, locations, and phone numbers of key personnel for handling fire, explosion, collapse, rock falls or other emergencies, and respective organization chart.
 - c. Description and illustration of escape routes. Routes shall be conspicuously marked with easily read signs which clearly indicate the ways of escape.
 - d. A tunnel map showing direction of principal air flow location of escape route(s) and location of existing telephones, fans and controls, and places of refuge shall be established as to their location. Places of refuge shall be conspicuously marked with easily read signs.
 - e. Frequency of emergency drills to ensure rescue efficiency.
 - f. **NOTE:** The emergency plan shall be discussed with the entire work force and be in effect on a 24 hour basis, including weekends and holidays.
- 8.2.2 The Contractor shall establish a rescue team, in conformance with the applicable regulations contained in the Underground Construction, 29 CFR 1926.800 and the OR-OSHA Regulations. Rescue team members shall be trained and equipped to respond to tunnel emergencies.
- 8.2.3 The Contractor shall establish, develop and maintain liaison with the Governing Regulatory Fire jurisdiction (i.e. PFB) and/or teams in the area that might be called as backup. At a minimum, the following contacts shall be made:
- a. Governing Regulatory Fire jurisdiction one month prior to the initiation of tunneling construction activities and provide information on scheduling, and the Tunnel Emergency Plan.
 - b. Public Works Agencies, Utility Companies, and/or Private Companies to control: gas line leaks, fuel leaks, water leaks, sewer issues, electric issues, railroad issues, etc.
 - c. Nearest medical care facilities, hospitals, industrial clinics and related health care facilities, that could be called on for immediate help in case of an emergency in or near the tunnel alignment.
 - d. Law enforcement sheriff or police, to assist in emergency situations, security, vandalism, sabotage and civil unrest, earthquake and windstorms.
 - e. **NOTE:** All public works liaisons are required to conduct periodic visits to maintain familiarity with the project progress, knowledge of the location of the utilities, emergency shut offs, ventilation controls and

lines in the tunnel atmosphere.

- 8.2.4 The Contractor shall establish a rescue team who has primary (initial) response requirements, followed by the Governing Regulatory Fire jurisdiction and outside agencies as secondary response(s).
- 8.2.5 The Contractor's Primary Safety Representative or Rescue Coordinator shall develop contact with these teams, coordinate their order of response to the incident site, and develop joint training exercises and a schedule for regular familiarity trips to the tunneling portion of the Project. At a minimum, the Contractor shall devote one working shift per calendar quarter to familiarization/training drills with each of the Governing Regulatory Fire jurisdiction shifts.
- 8.2.6 The Contractor shall assure by training or other means, that their management and supervisory personnel on the CIP have full understanding of the Incident Command System that shall be implemented in case of a response to an underground fire by the governing regulatory fire jurisdiction.
- 8.2.7 Rescue emergency equipment shall be provided at each portal or shaft entry. Inspections and tests of the equipment shall be made monthly by the Safety Representative and records of the inspection filed at the Contractor's Field Office and made available for review.
- 8.2.8 When a shaft is used as a means of egress, arrangements shall be made for hoisting capability to be readily available in an emergency.
- 8.2.9 A trained rescue crew of at least six people (five plus one alternate) shall be provided at tunnels with ten or more workers in tunnels at any one time per shift or where flammable or noxious gases are encountered or anticipated in hazardous quantities.
- 8.2.10 The rescue crew may be located outside of the tunnel, provided the crew is within reach by telephone, radio, or other means of emergency communication and is able to respond to the rescue location within 30 minutes.
- a. Rescue team members shall be qualified in rescue procedures, the use and limitations of breathing apparatus, and the use of firefighting equipment.
 - b. Training of crew members shall be at least annually and shall be equivalent to that offered by MSHA. Records of the training shall be maintained in the Contractor's Field Office.
 - c. Crew members shall be drilled quarterly with the PFB. Drills shall include the maintenance and repair of the equipment; equipment shall be stationed at or near key entry locations.
 - d. No employee who has not been medically qualified by a physician or who has not had the required training shall be allowed to participate in rescue work or use self contained breathing apparatus.
- 8.2.11 All workers shall be initially trained at time of hire in the use of self rescue and re-trained on a quarterly basis. Records of all such training shall be maintained

on file at the Contractors Field Office.

- 8.2.12 The Contractor shall post emergency procedures bulletin boards throughout the Project Site, placed strategically where employees congregate, where emergency telephone numbers for ambulance, fire, police, first aid, hospital and other vital phone numbers, as well as special instructions are posted.
- 8.2.13 The Contractor shall establish a surveillance team of supervisors, foremen, shifters, inspectors and engineers to provide continuous study, adapting and modifying the tunnel emergency rescue response procedures and plans as needed.

END OF SECTION 8

SECTION 9 INCIDENT REPORTING AND INVESTIGATIONS

9.1 GENERAL

9.1.1 All incidents and emergencies, whether involving persons, equipment, or property, which occur from operations or work performed on any CIP shall be investigated, reported, and analyzed as prescribed in this Section.

9.2 INCIDENT REPORTING

9.2.1 The Contractor shall designate responsible and experienced personnel to make emergency calls in case of a serious incident or emergency. Should an emergency occur, the Contractor must:

- a. Immediately implement the Emergency Plans (Section 8).
- b. Seek immediate first aid/medical assistance for anyone who is injured.
- c. Immediately notify the Owner's Representative of all emergencies and incidents.
- d. Immediately remove all unauthorized personnel, including but not limited to the General public from the incident scene.
- e. Except in cases where departure is required for safety and health reasons or medical treatment, employees either witnessing or party to the incident shall remain at the Project Site to provide a detailed accounting of facts to the investigation team.
- f. Immediately secure (i.e., barrier tape) the incident scene. It must not be disturbed until authorized by the Owner's Representative or Insurance Carrier.
- g. Inform OR-OSHA as required.
- h. By the tenth of each month the Contractor must submit to the Owner's Representative the following reports:
 1. The total number of employee-hours worked (by Contractor/Subcontractor) and a log of occupational injuries and illnesses (OSHA Form No. 300 or equivalent as prescribed by 29 CFR 1904); and
 2. A list of the first aid treatments not reported on the OSHA Form No. 300 by Contractor/Subcontractor.
- i. Only authorized personnel approved by the Owner's Representative will be given information pertaining to the event. Questions from the media and others will be referred to the Owner's Representative and/or Owner's Communications Division.

9.3 INCIDENT INVESTIGATION

9.3.1 At a minimum, the Contractor and Subcontractor must:

- a. Investigate the following circumstances immediately following the incident:
 1. Employee injury involving on-site first aid and/or medical treatment.
 2. Any near miss (Comply with Appendix B).
 3. Property or equipment damage.
- b. Upon notification of an incident, the scene must immediately be secured and not disturbed until authorized by the Owner's Representative or Insurance Carrier Representative.
- c. Gather facts about the incident to include the following:
 1. Identify people involved.
 2. Interviews of witnesses.
 3. Photographs or sketches of the scene.
 4. Other important information pertinent to the incident.
- d. Complete the Incident Investigation Report Form (Appendix C) and transmit copies of all investigation documentation to the Owner's Representative within 48 hours.
- e. Acknowledge that the Owner reserves the right to jointly participate in the investigative process with the Contractor or conduct its own independent investigation.
- f. The Owner's Representative reserves the right to require Contractor and Subcontractor tiers involvement in Incident Review Meetings which shall include involvement from managers, supervisors, and effected employee(s).

END OF SECTION 9

SECTION 10 MODIFIED DUTY/TRANSITIONAL WORK

10.1 GENERAL

- 10.1.1 The purpose of this section is to provide direction for the implementation of modified duty/transitional work for an employee with an occupational injury or illness. The basis of such a procedure will be to ensure that when an employee incurs an occupational injury or illness, if the worker is physically able, the Contractor will make every effort to provide the employee with some form of productive work which the employee can adequately perform considering his/her injury or illness. Implementation of a Modified Duty/Transitional Work Program is expected to achieve the following:
- a. Reduced employee time lost from work due to minor injuries or illness.
 - b. Injured employee returned to regular work assignment sooner.
 - c. Better control and monitoring of injured worker's condition by their employer.
 - d. Reduced Workers' Compensation cost.

10.2 IMPLEMENTATION

- 10.2.1 The Contractor must:
- a. Develop and implement a Modified Duty/Transitional Work Program for all contractors and subcontractor tiers assigned to the CIP. Contractor must submit its program to the Owner's Representative for review and acceptance.
 - b. Return injured employee to transitional work when the employee's physician releases the employee to return to work with restrictions.
 - c. Provide modified duty/transitional work to all injured employees for all work-related injuries.
 - d. Adhere to the work restrictions specified by the treating physician. This may require altering the transitional work job tasks as the worker's physical capacities change.
 - e. Ensure that the injured worker follows up with physicians and attends scheduled medical appointments and treatments.
 - f. The Contractor may change the worker's shift, and/or work hours if it is needed, so the Contractor can provide appropriate modified work for the injured worker.
 - g. Use the forms provided by the City and the Owner's Insurance Carrier for the transitional work program.
 - h. Cooperate with the Owner's Representative and the Owner's Insurance Carrier to develop appropriate transitional work (modified) tasks;

document offers of employment; provide information necessary to develop modified jobs; provide information to document a worker's regular job duties; communicate with the worker's medical providers when necessary; and to provide any other necessary information for the return-to-work program and claims management purposes.

- i. Coordinate and cooperate with all other Modified/Transition Duty activities/procedures with the Owner's Insurance Carrier.
- j. A salaried supervisor with the contractor will accompany all injured employees during the initial treatment and follow up appointments with the physicians.

END OF SECTION 10

SECTION 11 PROJECT SECURITY

11.1 GENERAL

- 11.1.1 The Contractor must develop and implement a written project security plan which protects the Project Site from unauthorized entry, theft, vandalism, or other security related events. The project area will include the work site, storage yard and staging areas where work related activities occur. Contractor must submit its project security plan to the Owner's Representative for review and acceptance. If the security measures are found to be inadequate to the project, equipment, property, and/or public the Owner will have the authority to require additional measures be taken.
- 11.1.2 It will be the responsibility of the Contractor to provide the protection until final completion of the Project and acceptance by the Owner's Representative.

11.2 DEFINITION

- 11.2.1 "Security" refers to the protection of both the Owner's property and the property of the Contractor. It is the Contractor's responsibility to provide protection for any property, including equipment or supplies, under their care, custody and control.

11.3 SECURITY PLAN

- 11.3.1 The Contractor must develop a security plan which describes the methods of protection against:
- a. Fire
 - b. Explosion
 - c. Earthquake
 - d. Power failure
 - e. Incidents
 - f. Theft of equipment, materials and explosives
 - g. Vandalism
 - h. Unauthorized entry
 - i. Assault, violence and robbery
 - j. Flood and surface/ground water sources
 - k. Sabotage
- 11.3.2 The Contractor must address and provide physical perimeter barriers or fencing and adequate lighting to secure areas and property. The physical controls shall appear in the written security plan.

END OF SECTION 11

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SECTION 12 MARINE CONSTRUCTION

12.1 GENERAL

12.1.1 The Contractor's SSSHP must incorporate a plan for marine construction activities. The Contractor must develop and implement a written marine construction safety plan that identifies the sequence of work to be performed, the specific hazards/exposures associated with the work, and the means/methods for eliminating or controlling those hazards/exposures. The Plan must also detail coordination of all subcontractors on site, OSHA compliance responsibility, industry best practices to accomplish all work tasks safely and efficiently, and public safety. The Plan must comply with the following minimum requirements.

12.2 COORDINATION AND COMPLIANCE WITH REGULATORY AND OWNER-MANDATED SAFETY PROVISIONS

12.2.1 The Contractor and marine construction subcontractors will refer to Federal OSHA and US Coast Guard rules for all over-the-water work performed. Owner reserves the right to default to stricter safety rules where applicable (OR-OSHA, Industry Consensus Standards, or Owner-mandated safety provisions).

12.3 CRANE SAFETY

12.3.1 All crane operators must demonstrate recent (within past 24 months), formal documented training, certification, and significant experience with the type of crane(s) present on the Project. Training and certification must be relevant and specific to the type and size of cranes employed on the Project. Acceptable examples of training and/or certification would include manufacturer training and/or certification, Crane Institute of America, Wire Rope and Rigging Consultants, Inc., or similar. Crane operators and riggers (competent persons) shall be expected to show substantial knowledge and compliance of OSHA and ANSI/ASME standards, including but not limited to:

- a. ANSI B30.5 – Mobile and Locomotive Cranes
- b. ANSI B30.9 – Slings
- c. ANSI B30.10 – Hooks
- d. ANSI B30.20 – Below-the-Hook Lifting Devices

12.3.2 Crane Operators and Riggers are responsible to:

- a. Utilize appropriate rigging gear suitable for overhead lifting.
- b. Utilize rigging gear within industry standards and manufacturer recommendations.
- c. Conduct regular inspection and maintenance of all rigging apparatus.

- d. Demonstrate and implement lifting plans using appropriate load charts and rigging reference materials.
- 12.3.3 All cranes utilized on the Project shall have up-to-date crane logbooks on site that detail a comprehensive history of preventative maintenance, inspection, and certification. Logbooks shall be made available on request of the Owner or Owner's designee.
- 12.3.4 All cranes utilized on the CIP shall have been inspected with sufficient documentation within the past 6 months of the date of crane deployment to the Project.
- 12.3.5 Owner reserves the right to require the Contractor to perform nondestructive testing of any cranes or other lifting apparatus associated with the Project at the Contractor's expense, due to reasonable cause (evidence of overloading, metal fatigue, etc.).
- 12.3.6 Formal, written, lifting plans shall be completed for all significant crane lifts, including tandem lifts, i.e., two or more cranes working together.
- 12.3.7 Owner reserves the right to define "significant crane lift." The Contractor shall advise Owner of significant lifts in advance; written lifting plans shall be available for inspection by the Owner prior to lift.

12.4 RIGGING REQUIREMENTS FOR PERSONNEL PLATFORMS

- 12.4.1 Any crane-suspended personnel platforms shall meet OSHA 1926.550.

12.5 DIVING

- 12.5.1 General
 - a. OSHA's Commercial Diving Safety Standard has not been updated since 1978. Thus, the Contractor must ensure that any commercial diving contractors working on the Project comply with:
 - b. OSHA 1910, Subpart T - Commercial Diving Operations
 - c. ANSI/ACDE 01 - Diver Training Standard
 - d. Association of Diving Contractors, Inc. - Consensus Standards for Commercial Diving Operations
- 12.5.2 The diving contractor must provide documentation to support Dive Team Member qualifications, certifications and experience.
- 12.5.3 All divers employed on the CIP must be fully qualified in underwater construction work and experienced in underwater pipeline construction. The Contractor must provide a qualified diving supervisor on board the work vessel at all times that diving operations are in progress. The diving supervisor must have at least five (5) years of supervisory experience in diving operations, and must be a qualified commercial diver.
- 12.5.4 All diving must be done using surface supplied air. Scuba diving operations

will only be used if specifically approved by the Owner.

- 12.5.5 Contractor's diving operations shall demonstrate that:
- a. Each diver exposed to hyperbaric environments is medically fit as attested to by a licensed physician who is qualified in barotrauma and hyperbaric medicine. Physician qualification must meet commonly accepted standards for qualification in this medical specialty as recognized by the medical profession.
 - b. Each diver must provide documented training and experience appropriate to the work to be performed under this contract.
 - c. Divers must not fly for 12 hours after any single dive or 24 hours after multiple days of diving.
 - d. Each dive team member is to be currently certified in cardiopulmonary resuscitation (CPR) and first aid.
- 12.5.6 Medical certifications must be updated every 12 months and any diver lacking a current certification may not be employed on the Project. Certifications must be kept on-site and be available for inspection upon request.
- 12.5.7 Each diver requiring medical attention for an injury or illness will be re-examined by the certifying physician before returning to work.
- 12.5.8 The Contractor must provide continuous communication via a direct link between the divers and the surface, and must record all communications for the Project records. A copy of the recorded diving communications shall be provided to the Owner's Representative at the end of the Project, or within 24-hours of a request by the Owner's Representative to provide a tape-recorded copy of a specific day's work. The Owner's Representative shall be provided with access to direct communications with the divers upon request to the diving supervisor, and shall have indirect communications with the divers through the diving supervisor. All written diving reports shall be furnished to the Owner's Representative, and no information relating to Project quality, whether written or otherwise, shall be withheld by the divers or diving supervisor.
- 12.5.9 Diving operations shall be governed by applicable State, Federal, and industry standards, and shall conform to the "Consensus Standards for Commercial Diving Operations" of the Association of Diving Contractors, and the U.S. Navy Diving Manual.
- 12.5.10 Contractor shall include in the SSSHP a diving plan that addresses issues related to emergency response, notification of rescue personnel and other considerations specific to underwater construction. The SSSHP does not relieve the Contractor of his sole responsibility to conduct construction operations in a safe and legal manner. The diving safety plan shall include, at a minimum, the following:
- a. Safety procedures and checklists
 - b. Assignments and responsibilities of dive team members

- c. Equipment certifications, procedures and checklists
 - d. Emergency procedures for fire, equipment failure, adverse weather conditions, and medical problems or accidents
 - e. Safety inspection requirements
- 12.5.11 The diving safety plan must be submitted to the Owner three weeks prior to beginning diving operations, and shall be readily available on-site for use by diving team members and government inspectors. The diving safety plan shall not be reviewed or accepted by the Owner, except to confirm its preparation and availability. The Contractor shall be responsible for the adequacy of the plan under existing State and Federal regulations and industry standards.
- 12.5.12 The Contractor must prepare a Diving Operations Manual for the Work. The manual must be amended for each diving operation to include the following information:
- a. Names and duties for each dive team member including the team supervisor and surface support crew.
 - b. Time, date and location information for each dive.
 - c. Nature of the diving work to be performed and the Owner's inspection requirements.
 - d. Surface and underwater conditions, including visibility, air/water temperatures, wind/current velocities and weather.
 - e. Comprehensive Job Hazard Analysis specific to the work to be performed and existing weather and water conditions. Sample conditions to be considered include high winds, high water velocities, floating debris, poor visibility or other unusual occurrences.
 - f. Maximum dive depths and bottom times.
 - g. Emergency management plan, including telephone numbers for ambulances, fire departments, nearest Coast Guard rescue center, doctors, and decompression chambers. The plan shall also contain the telephone number of the Multnomah County River Patrol.
 - h. Lockout/tagout procedures and methods for dealing with differential pressures.
 - i. Equipment certifications, procedures and checklists for all equipment to be used on the Project.
 - j. Plan amendments shall be kept with the Diving Operations Manual and may be in the form of loose leaf inserts or other easy to handle additions.
- 12.5.13 Any substantial revisions to the Diving Operations Manual shall be reviewed with the Owner's representative and inspection divers.
- 12.5.14 Prior to each dive, the Diving Operations Manual for the dive shall be reviewed by each team member including discussion of the following information at a

minimum:

- a. Description of the dive objectives, team member responsibilities, works to be accomplished and tools to be used.
- b. Discussion of diving equipment and water craft to be used.
- c. Maximum depth, estimated bottom times and water temperatures.
- d. Discussion of specific hazard analysis for the activity.
- e. Emergency procedures.

12.5.15 A Dive Log must be maintained at the Project Site containing the following information on dive activities and individual team members:

- a. Date, location and work accomplished.
- b. Names of all dive team members.
- c. Maximum depths and times of dive for each team member.
- d. Surface intervals between dives for each dive team member.
- e. Equipment used.
- f. Water and air temperatures.
- g. Depth(s) and duration(s) of any decompression stops.
- h. Date, depth and time of previous dives by any dive team member on any dive work performed on projects other than this Project.
- i. Full information on any decompression sickness or pulmonary barotrauma requiring medical attention or decompression including treatment details, locations and physicians.

12.5.16 Surface Supplied Air Operations

- a. All diving operations must be surface supplied air except as specifically approved by the Owner. Scuba or mixed-gas diving procedures shall only be used if specifically approved by the Owner.
- b. A dual-lock, decompression chamber must be provided on-site and be available for use at all times when diving operations are in progress. A trained chamber operator must be available at all times during diving operations. The trained chamber operator must have radio or cellular telephone access to a physician with experience in hyperbaric medicine. The physician will be on-call during the diving operation so that the chamber operator can reach the physician immediately in the event of an emergency. The physician does not need to be on-site.
- c. Each surface-supplied dive team shall be manned, at a minimum, in accordance with Appendix N of the U.S. Army Corps of Engineers (USACE) Manual EM 385-1-1.
- d. The minimum requirements for surface-supplied air diving are as follows:

1. Each diver shall be continuously tethered while in the water with one diver per tether, regardless of depth.
2. A diver shall be stationed at the point of entry to any confined or enclosed space when diving work is occurring therein.
3. Each diving operation shall have a primary breathing air supply sufficient to support all divers for the planned dive duration including decompression.
4. A surface air supplied standby diver shall be dressed out and readily available on the dive craft at all times that a diver is in the water.
5. Each diver shall have a secondary reserve supply of air available, which can be turned on immediately by the diver in the event that the primary supply is lost.
6. Each dive location shall have a reserve breathing air supply in-line capable of supporting the dive operation.
7. Electronic communication systems shall be incorporated in all surface supplied air diving operations. Any dive in which voice communication is lost shall be immediately terminated. The diver shall surface at once.

12.6 PILE DRIVING OPERATIONS FROM BARGES AND FLOATS

- 12.6.1 In addition to 4.16.7 of these Provisions, barges or floats supporting pile-driving operations shall meet the applicable requirements of OSHA 29 CFR.1926.603 (b).

12.7 TEXT OF FEDERAL OSHA 29 CFR 1926.605 - MARINE OPERATIONS AND EQUIPMENT

12.7.1 Materials handling operations

- a. Operations fitting the definition of “material handling” shall be performed in conformance with applicable requirements of Part 1918 – Safety and Health Regulations for Longshoring of this chapter. The term “longshoring operations” means the loading, unloading, moving, or handling of construction materials, equipment, and supplies, etc. into, in, on, or out of any vessel from a fixed structure or shore-to-vessel, vessel-to-shore, or fixed structure or vessel-to-vessel.

12.7.2 Access to barges

- a. Ramps for access to vehicles to or between barges shall be of adequate strength, provided with side boards well-maintained and properly secured.
- b. Unless employees can step safely to or from the wharf, float, barge, or river towboat, either a ramp meeting the requirements of paragraph 2.(a.)

of this section or a safe walkway, shall be provided.

- c. Jacob's ladders shall be of the double-rung or flat-tread type. They shall be well-maintained and properly secured.
- d. A Jacob's ladder must either hang without slack from its lashing or be pulled up entirely.
- e. When the upper end of the means of access rests on or is flush with the top of the bulwark, substantial steps properly secured and equipped with at least one substantial hand rail approximately 33 inches in height, must be provided between the top of the bulwark and the deck.
- f. Obstruction shall not be laid on or across the gangway.
- g. The means of access shall be adequately illuminated for its full length.
- h. Unless the structure makes it impossible, the means of access shall be so located that the load shall not pass over employees.

12.7.3 Working surfaces of barges

- a. Employees shall not be permitted to walk along the sides of the covered lighters or barges with coamings more than five feet high, unless there is a three-foot clear walkway, or a grab rail, or a taut hand-line is provided.
- b. Decks and other working surfaces shall be maintained in a safe condition.
- c. Employees shall not be permitted to pass fore and aft, over, or around deck loads, unless there is a safe passage.
- d. Employees shall not be permitted to walk over deck loads from rail to coaming unless there is a safe passage. If it is necessary to stand at the outboard or inboard edge of the deck load where less than 24 inches of bulwark, rail, coaming, or other protection exists, all employees shall be provided with a suitable means of protection against falling from the deck load.

12.7.4 First aid and lifesaving equipment

- a. Provisions for rendering first aid and medical assistance shall be in accordance with Subpart D of OSHA 1918.
- b. The employer shall ensure that there is in the vicinity of each barge in use at least one US Coast Guard-approved 30-inch life-ring with not less than 90 feet of line attached, and at least one portable or permanent ladder which reaches the top of the apron to the surface of the water. If the above equipment is not available at the pier, the employer shall furnish it during the time that he is working the barge. Life-ring will be located within 200 feet of where employees are working.
- c. Employees walking or working on the unguarded decks of barges shall be protected with US Coast Guard-approved work vests or buoyant vests.

12.8 LIFESAVING SKIFF

- 12.8.1 At least one powered, lifesaving skiff shall be immediately available at the Project site. Should concurrent over-the-water work be underway in the Slough and River, a lifesaving skiff shall be deployed at each site. Each lifesaving skiff shall be equipped with an anchor or mooring lines, horn or whistle, ABC dry chemical fire extinguisher, one set of oars, navigation lights, radio and life ring with 90 feet of rope.

12.9 DREDGING OPERATIONS

- 12.9.1 The Contractor shall ensure that any dredging operations conform to ANSI A10.15-1995 – Safety Requirements for Dredging.

12.10 RADIO COMMUNICATIONS, ASSIGNED CHANNELS, MULTIPLE CONTRACTORS

- 12.10.1 The Contractor shall implement an effective radio communications plan that contemplates multiple contractor radio use.

12.11 HEARING CONSERVATION

- 12.11.1 Adhere to requirements in Section 4 of these Provisions.

12.12 COORDINATION WITH US ARMY CORPS OF ENGINEERS

- 12.12.1 The Contractor shall regularly obtain river flow forecasts and announcements of special river management events (flood control, emergency releases, etc.) from the US Army Corps of Engineers.
- a. Contact: Reservoir Control Center, NW Division; US Army Corps of Engineers, US Customs House, 220 NW 8th, Portland, Oregon 97209-3589, (503) 808-3945

12.13 COORDINATION WITH LOCAL LAW ENFORCEMENT

- 12.13.1 The Contractor shall communicate about and coordinate public safety in and around the Project Site with the local Sheriff's Office River patrol.
- a. Contact: Multnomah County Sheriff's Department River Patrol, 4325 NE Marine Drive, Portland, Oregon 97218
 - b. (503) 288-6788 – Columbia River
 - c. (503) 243-7952 – Willamette River
 - d. Clackamas County
 - e. US Forest Service
- 12.13.2 The Contractor shall consider the necessity or desirability of contract-enhanced patrols or special escorts that can be provided by the River Patrol to protect the

Project and the general public.

12.14 COORDINATION WITH US COAST GUARD

- 12.14.1 The Contractor shall coordinate commercial vessel navigation and work performed on the Willamette River with the US Coast Guard Waterway Management Division.
- 12.14.2 Contact: US Coast Guard Marine Safety Office, 6767 N Basin Avenue, Portland, Oregon 97217, (503) 240-2594
- 12.14.3 Marine Construction Contractors shall comply with the following where relevant:
 - a. 46 CFR Subchapter C – Uninspected Vessels
 - b. 46 CFR Subchapter I – Cargo and Miscellaneous Vessels
 - c. 46 CFR Subchapter E – Load lines
 - d. 46 CFR Subchapter F – Marine Engineering
 - e. 46 CFR Subchapter J – Electrical Engineering
 - f. 46 CFR Subchapter Q – Specifications
 - g. 33 CFR Subchapter E – Inland Navigation Rules
 - h. 33 CFR Subchapter O – Pollution
 - i. 33 CFR Subchapter P – Ports and Waterways
- 12.14.4 The Contractor shall request (at least 30 days in advance of Project Work) that the US Coast Guard issue a written Local Notice to Mariners detailing Project activity to the boating community.
- 12.14.5 The Contractor shall also request US Coast Guard broadcast notice to mariners detailing specific Project-related activity via VHF Channel 16 and 22. The Contractor shall notify US Coast Guard Marine Safety Office up to the same day for specific broadcast requests.
- 12.14.6 90 days prior to Project marine activity, the Contractor shall request that the US Coast Guard establish a federally enforceable safety zone for the Project area (white buoys).

12.15 PUBLIC SAFETY

- 12.15.1 A high degree of protection must be afforded to the various public entities that may be impacted by Project activities on the Willamette River.
- 12.15.2 The Contractor must identify in the marine construction safety plan the Project-associated activities that pose potential risk to the general public and detail the means/methods for assuring their safety. The general public includes, but is not limited to:
 - a. Resident floating community associations

- b. Yacht clubs
- c. Commercial/industrial enterprises
- d. Recreational boating public
- e. The means/methods shall include a public communication and relations plan.
- f. The Contractor must maintain regular communications with Portland Harbormaster to further public safety on the waters of the Willamette River.

END OF SECTION 12

APPENDIX A INSPECTION CHECKLIST

Project Title: _____	
Contractor: _____	Contract No.: _____
Project Location(s): _____	Specification No. _____
Person in Charge: _____	
Person(s) making inspection: _____	
Inspection Date: _____	Inspection Time: _____

A = Adequate I = Inadequate			
ITEMS INSPECTED	A	I	REMARKS
PROGRAM ADMINISTRATION			
Posting OSHA and other Project Site warning posters.			
Safety meetings, frequency?			
Job safety training, including first aid training?			
Medical service and first aid equipment, stretchers and emergency vehicles available?			
Project Site injury records being kept?			
Emergency telephone numbers, such as police department, fire department, doctor, hospital and ambulance posted?			
HOUSEKEEPING AND SANITATION			
General neatness of working areas?			
Regular disposal of waste and trash?			
Passageways and walkways clear?			
Adequate lighting?			
Projecting nails removed?			
Oil and grease removed?			
Waste containers provided and used?			
Sanitary facilities adequate and clean?			
Drinking water tested and approved?			
Adequate supply of water?			
Disposable drinking cups?			
FIRE PREVENTIONS			

A = Adequate I = Inadequate			
ITEMS INSPECTED	A	I	REMARKS
Fire instructions to personnel?			
Fire extinguishers identified, checked, lighted?			
Phone number of fire department posted?			
Hydrants clear, access to public thoroughfare open?			
Good housekeeping?			
“No Smoking” posted and enforced where needed?			
All undergrowth vegetation trimmed?			
Fire brigades?			
ELECTRICAL INSTALLATIONS			
Adequate wiring, well insulated?			
Fuses provided?			
Fire hazards checked?			
Electrical dangers posted?			
Proper fire extinguishers provided?			
Terminal boxes equipped with required covers? Are covers used?			
HAND TOOLS			
Proper tool being used for each job?			
Neat storage and safe carrying?			
Inspection and maintenance?			
Damaged tools repaired or replaced promptly. Are employee’s tools inspected and repaired?			
POWER TOOLS			
Good housekeeping where tools are used?			
Tools and cords in good condition?			
Proper grounding?			
All mechanical safeguards in use?			
Tools neatly stored when not in use?			
Right tool being used for the job at hand?			
Wiring properly installed?			
POWER TOOLS			
Comply with Local laws and ordinances?			

A = Adequate I = Inadequate			
ITEMS INSPECTED	A	I	REMARKS
All operators qualified?			
Tools and charges protected from unauthorized use?			
Competent instruction and supervision?			
Tools checked and in good working order?			
Tools not used on any but recommended materials?			
Use safety goggles or face shields?			
Flying hazard checked by backing up, removal of personnel, or use of captive stud tool?			
LADDERS			
Ladders inspected and in good condition?			
Properly secured to prevent slipping, sliding or falling?			
Side rails extend 36" above top of landing?			
Rungs or cleats not over 12" on center?			
Stepladders fully open when in use?			
Metal ladders not used around electrical hazards?			
Proper maintenance and storage?			
Ladders painted?			
Safety shoes in use?			
SCAFFOLDING			
Erection properly supervised?			
All structural members meet the safety factor?			
All connections secured?			
Scaffold tied into structure?			
Working areas free of debris, snow, ice, grease?			
Foot sills and mud sills provided?			
Workers protected from falling objects?			
Scaffold plumb and square with cross-bracing?			
Guardrails, intermediate rails, & toe boards in place?			
Scaffold equipment in good working order?			
Ropes and cables in good condition?			

A = Adequate I = Inadequate			
ITEMS INSPECTED	A	I	REMARKS
HOISTS, CRANES AND DERRICKS			
Check slings and chains, hooks and eyes?			
Equipment fully supported?			
Outriggers used if needed?			
Power lines inactivated, removed or at safe distance, and properly flagged?			
Proper loading for capacity at lifting radius?			
All equipment properly lubricated and maintained?			
Vehicles and equipment maintained in a leak free condition?			
Spill response kits stored near vehicles?			
Signal person where needed?			
Signals understood and observed?			
Are inspection and maintenance logs maintained?			
HEAVY EQUIPMENT			
Regular inspection and maintenance?			
Vehicles and equipment maintained in a leak free condition?			
Spill response kits stored near vehicles?			
Lubrication and repair of moving parts?			
Lights, brakes, warning signals operative?			
Wheels chocked when necessary?			
Haul roads well maintained and laid out properly?			
Protection when equipment is not in use?			
Shut-off devices on hose lines in case of hose failure?			
Noise arresters in use?			
MOTOR VEHICLES			
Regular inspection and maintenance?			
Vehicles and equipment maintained in a leak free condition?			
Qualified Operators?			
Local and state vehicles laws and regulations			

A = Adequate I = Inadequate			
ITEMS INSPECTED	A	I	REMARKS
observed?			
Brakes, lights, warning devices operative?			
Weight limits and load sizes controlled?			
Personnel carried in a safe manner - seated?			
All glass in good condition?			
Back-up signals provided?			
Fire extinguishers installed where required?			
GARAGES AND REPAIR SHOPS			
Fire hazards?			
Dispensing of fuels and lubricants?			
Good housekeeping?			
Lighting?			
Carbon monoxide dangers?			
All fuels and lubricants in proper containers?			
Proper ventilation?			
Proper grounding and bonding?			
BARRICADES			
Openings planked over or barricaded?			
Roadways and sidewalks effectively protected?			
Adequate lighting provided?			
Traffic controlled?			
HANDLING AND STORAGE OF MATERIALS			
Materials properly stored or stacked?			
Passageways clear?			
Stacks on firm footings, not too high.			
Proper number of personnel for each operation?			
Personnel lifting loads correctly?			
Materials protected from weather conditions?			
Protection against falling into hoppers and bins?			
Dust protection observed?			
Extinguishers and other fire protection.			
Traffic controlled in the storage area?			

A = Adequate I = Inadequate			
ITEMS INSPECTED	A	I	REMARKS
EXCAVATION AND SHORING			
Adjacent structures properly shored?			
Shoring and sheathing used for soil and depth?			
Roads and sidewalks supported and protected?			
Material stored adequate distance from excavations?			
Excavation barricaded and lighting provided?			
Equipment a safe distance from edge of excavation?			
Ladders provided where needed?			
Equipment ramps adequate?			
Job supervision adequate?			
DEMOLITION			
Operations planned ahead?			
Shoring of adjacent structures?			
Material chutes used?			
Sidewalk and other public protection?			
Clear operating space for trucks and other vehicles.			
Adequate access ladders or stairs.			
PILE DRIVING			
Proper storage procedures?			
Unloading only by properly instructed personnel?			
Steam lines, slings, etc. in operating condition?			
Pile driving rigs properly supported?			
Ladders on frames?			
Cofferdams maintained and inspected?			
Adequate pumping available?			
Personnel protection adequate?			
EXPLOSIVES			
Qualified operators and supervision?			
Proper transport vehicles?			
Local laws and regulations observed?			

A = Adequate I = Inadequate			
ITEMS INSPECTED	A	I	REMARKS
Storage magazines constructed per regulations or as recommended?			
Cases opened properly?.			
“No Smoking” posted and observed where appropriate?			
Detonators tested before each shot?			
All personnel familiar with signals, and signals properly used at all times?			
Inspection after each shot?			
Proper protection and accounting for all explosives at all times?			
Proper disposal of wrappings, waste and scrap?			
Advise residents nearby of blasting cap danger, and inspect potential damage points?			
Check radio frequency hazards?			
FLAMMABLE GASES AND LIQUIDS			
All containers clearly identified?			
Proper storage practices observed?			
Fire hazards checked?			
Proper storage temperatures and protection?			
Proper types and number of extinguishers nearby?			
Carts for moving cylinders?			
MASONRY			
Proper scaffolding?			
Masonry saws properly equipped, dust protection provided?			
Safe hoisting equipment?			
ROADWAY CONSTRUCTION			
Laws and ordinances observed?			
Competent flaggers properly dressed, instructed and posted?			
Adequate warning signs and markers?			
Equipment not blocking right-of-way?			
Traffic control through construction site?			
Adequate marking and maintenance of detours?			

A = Adequate I = Inadequate			
ITEMS INSPECTED	A	I	REMARKS
Dust control?			
Adequate lighting?			
PERSONAL PROTECTIVE EQUIPMENT			
Eye protection?			
Face shields?			
Respirators and masks?			
Helmets and hoods?			
Head protection?			
Ear Protection?			
Foot Protection?			
Gloves, aprons, and sleeves: rubber or plastic, designed to afford protection from alkalis and acids; electrician's rubber gloves with protectors?			
Respirators for harmful dust, asbestos, sand blasting, welding (lead paint and galvanized zinc or cadmium)?			
Adequate ventilation when painting or applying epoxy resins?			
All safe practices in spraying asbestos materials using vacuum to clean up?			
When there is a question about injurious exposure, notify superior immediately who in turn shall arrange for atmospheric samples to be taken?			
UNSAFE ACTS AND/OR PRACTICES OBSERVED (list)			
OTHER			

APPENDIX B NEAR MISS NON-MEDICAL INCIDENT

Employee Name: _____	
Job Title: _____	
Date of Incident: _____	Time: _____
Project Name: _____	
Project No.: _____	Contractor: _____
Where and how did incident occur:	
Equipment involved (if applicable):	
Nature and extent of injury:	
Name of Witness(es):	
If you visit a doctor or hospital as a result of this incident, you must complete an 801 Form (Report of Occupational Injury or Disease).	
Preventative measures recommended (To be completed by manager):	
Manager's Name: _____	(Print) _____ (Date)
_____	(Signature) _____

- Copies Distribution:
- Owner's Representative
 - Employee Medical File
 - Incident File
 - Employee

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APPENDIX C

INCIDENT INVESTIGATION REPORT

Project Name:			
When?	Date of Incident		Time of Incident
	Report to Supervisor Delayed?		<input type="checkbox"/> Yes <input type="checkbox"/> No
	If yes, why?		
Who?	Injured Person		
	Job Title:		Occupation
	Department:		Length of Employment:
Injury/Loss?	Nature of Injuries or Property Damage:		
Where?	Location where incident occurred:		
What/How?	Was employee doing something other than required duties at time of incident? If yes, explain:		
	Description of incident (detail what employee was doing, how he/she was doing it, and what physical objects, tools, machines, structures or equipment were involved)		
	Incident causes:		
Prevention?	What should be done and by whom to prevent recurrence of this type of incident?		
	What action are you taking to see that this is done?		
Task and General Activity		Supervisor at Time of Incident	
<input type="checkbox"/> Alone		<input type="checkbox"/> Directly supervised	
<input type="checkbox"/> With crew or fellow worker		<input type="checkbox"/> Indirectly supervised	
<input type="checkbox"/> Other, specify		<input type="checkbox"/> Supervision not feasible	
<input type="checkbox"/> Not supervised			

List Witnesses and Phone Numbers:	
Photos/Diagram? (Attach to Report)	<input type="checkbox"/> Yes <input type="checkbox"/> No
Was the incident caused by faulty equipment?	<input type="checkbox"/> Yes <input type="checkbox"/> No
If yes, preserve evidence.	
Identify:	
Describe first aid/medical treatment (when and by whom):	
Is there reason to question whether this is job-related injury or illness? <input type="checkbox"/> Yes <input type="checkbox"/> No If yes, explain:	
What situation developed that led to the incident?	
Lack of:	
Training?	
Supervision?	
Rule Enforcement?	
Maintenance?	
Investigation by:	
Investigator's Name	Date Investigated

Transmit copies of all investigation documentation including a complete version of this form to the Owner's Representative within 48 hours of incident.



ENVIRONMENTAL SERVICES
CITY OF PORTLAND
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