TRANSMOUNTAIN

Trans Mountain Expansion Project

Project Specific Safety Plan

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KINDER MORGAN CANADA INC.

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PROJECT SPECIFIC SAFETY PLAN

For the Edmonton Terminal, Pump Stations and Remote Mainline Block Valves

Project Name: Trans Mountain Expansion Project
Client: Trans Mountain Pipeline L.P.

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WorleyParsonsCord
#200, 8615 – 51st Ave. NW
Edmonton, AB T6E 6A8
Tel: 780 440-5300
Fax: 780 440-5555
www.WorleyParsonsCord.com

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TRANS MOUNTIAN EXPANTION PROJECT (TMEP) - PROJECT SPECIFIC SAFETY PLAN

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SECTION 1: PLAN OVERVIEW AND GENERAL REQUIREMENTS

Trans Mountain Pipeline L.P. ("Trans Mountain") is proposing to expand their existing pipeline system from Edmonton, Alberta, to Vancouver, British Columbia, to increase carrying capacity of light and heavy crude oils and refined products from 300,000 bbl/day (47,690 m3/day) to 890,000 bbl/day (141,500 m3/day), with infrastructure operational by end-of-year in 2019 through the Trans Mountain Expansion Project ("TMEP").

WorleyParsonsCord Ltd. ("WorleyParsonsCord") has been contracted to execute the engineering, procurement, and construction (EPC) scope for the facilities for between Edmonton, Alberta, and Hope, BC, including:

- Expansion to the Edmonton Terminal West Tank Area, including construction of four (4) additional oil storage tanks, a set of new booster pumps, a new manifold, modifications and tie-ins to existing manifolds, and associated demolition work;
- Sixteen (16) construction work site locations consisting mainly of pump stations and/or sending and receiving traps. Six (6) of the locations are in Alberta, including Edmonton Terminal initiation station, Gainford, Wolf, Edson, Hinton, and the Jasper sites. There are ten (10) additional worksite locations in British Columbia which include: Hargreaves, Rearguard, Blue River, McMurphy, Blackpool, Darfield, Black Pines, Kamloops, Kingsvale, and Hope. In total, there are twelve (12) new pump stations on eleven (11) sites, with the scope of the remaining locations including modifications, enhancements, or demolition existing facilities; and,
- Installation of control system remote mainline block valve(s) ("RMLBV") located along the pipeline easement. The WorleyParsonsCord EPC scope does not include the installation of the block valve or actuator assembly.

PURPOSE OF THIS DOCUMENT

This document is intended to fulfill WorleyParsonsCord's requirement to submit the Project Specific Safety Plan to Trans Mountain that will meet or exceed TMEP Health and Safety Management Plan as part of our deliverable and project set up for the TMEP. The Project Specific Safety Plan will focus on the following key items/deliverables:

1. Health and Safety Expectations
2. Leading and Lagging Indicators
3. Hazard Identification
4. Ground Disturbance
5. Communications
6. The NEB conditions referred to in this Project Specific Safety Plan is: 64b

ACRONYMS

AB	Alberta
AED	Automated External Defibrillator
ATV	All-Terrain Vehicle
BBSM	Behavioural Based Safety Management
BBSO	Behavioural Based Safety Observation
BC	British Columbia
CCAP	Contractor Competency Assurance Program
CCP	Construction Communications Plan
CESM	Contractor Environmental / Safety Manual
COHSR	Canada Occupational Health and Safety Regulations
CMP	Compliance Management Plan
CMR	Change Management Request
CPCN	Certificate of Public Convenience and Necessity
CQS	Contractor Qualification Specifications
CSA	Canadian Standards Association
DART	Days Away Restricted time
DPP	Damage Prevention Plan
EPC	Engineering, Procurement, Construction
EMP	Emergency Management Program
EPP	Environmental Protection Plan
ERL	Emergency Response Line
ERP	Emergency Response Plan
FA	First Aid
FAN	Field Audit Network
FLRA	Field Level Risk Assessment
FOPS	Falling Object Protection System
FPP	Fire Prevention Plan
GCC	General Construction Contractor
GD	Ground Disturbance
HMSP	Health Management Services Plan
H_2S	Hydrogen Sulphide
HSMP	Health and Safety Management Plan
ISLMS	Integrated Safety and Loss Management System
ISN	ISNetworld
JHA	Job Hazard Analysis
JSA	Job Safety Analysis
KEEP	Knowledge and Experience Enhancement Program
LEL	Lower Explosive Limit
LOTO	Lock Out Tag Out
MA	Medical Aid
MOC	Management of Change
MSTQ	Minimum Safety Training Qualification
MVA	Motor Vehicle Accident
NEB	National Energy Board
NM	Near Miss
NOP	Notice of Project
OH&S	Occupational Health and Safety
OTC	Over the Counter
OPR	National Energy Board On-Shore Pipeline Regulations, 1999
PAS	Positive Air Shutoff
P.Eng	Professional Engineer
PFD	Personal Flotation Device

PPE	Personal Protective Equipment
PLP	Pipeline Protection
PSMT	Project Safety Management Team
PSSP	Project Specific Safety Plan
QA	Quality Assurance
RA	Risk Assessment
RCT	Regulatory Compliance Team
ROPS	Roll-Over Protection System
ROW	Right-of-Way
SAZ	Serious About Zero
SWP	Safe Work Permit
TACMP	Traffic and Access Control Management Plan
TCP	Traffic Control Plan
TM	Trans Mountain
TMEP/Project	Trans Mountain Expansion Project
TMP	Traffic Management Plan
TMPL	Trans Mountain Pipeline System
Trans Mountain	Trans Mountain Pipeline ULC
TRIF	Total Recordable Injury Frequency
VP	Vice President

1 COMPANY HEALTH AND SAFETY POLICY

It is the responsibility of every WorleyParsonsCord employee and subcontract employee to review and understand the Health, Safety, and Environmental Policy and their individual responsibilities and accountabilities and WorleyParsonsCord expectations, as listed in the Health, Safety, and Environmental Policy. A copy of the policy is to be posted on the Safety Notice Board, as well as in office trailers and other prominent and/or conspicuous locations across site.

Figure 1 Health, Safety and Environment Policy

WorleyParsons
resources & energy

EcoNomics

Health, Safety and Environment Policy

WorleyParsons is committed to achieving its vision of zero harm to people and assets, and zero environmental incidents. OneWay™, our enterprise wide integrity framework, establishes the corporate expectations for progressing us towards this zero harm vision and it applies to all our people, contractors, products and services.

WorleyParsons requires an active commitment to, and accountability for, health, safety and the environment from all employees and contractors.

Our policy is to:

- Comply with all applicable laws, regulations and standards, customer requirements; and apply company standards where laws do not exist
- Consult and seek contributions from our people on issues that have the potential to affect the environment and their health and safety
- Lead, train and motivate our people, contractors and suppliers to work in a safe and responsible manner
- Identify, assess and manage risks that impact health, safety and the environment prior to commencing activities, when circumstances change and throughout project phases
- Foster a culture that empowers and supports anyone intervening to safeguard people and to protect the environment
- Require contractors and suppliers to manage health, safety and environment using standards and practices that align with ours
- Implement health management programs including effective injury management and rehabilitation to maintain and improve the well being of WorleyParsons' people
- Drive continual improvement in health, safety and environmental performance through establishing targets, open reporting and effective assessment and analysis of our performance, leadership and engagement with our stakeholders

The responsibility for application of this policy rests with us all.

Andrew Wood
Chief Executive Officer
September 2017

CHM-0114-COR-EN
Rev 14 Sep-2017

OneWay
to zero harm

Commitment to Zero Harm

WorleyParsonsCord is a member in good standing with Alberta Labour and the “Partnerships in Injury Reduction” program. A signed “Partner in Injury Reduction” MOU with Alberta Labour is valid through August 15, 2018.

The Partnership requires the following;

- Promoting awareness and involvement of employers, associations, contractors, organizations and others in Partnerships;
- Assisting employers in the development, implementation and evaluation of health and safety programs appropriate to their needs;
- Ongoing collaboration among workers, employers and other stakeholder, including sharing of information and expertise surrounding best practices; and,
- Communication of the importance or workplace health and safety to workers, employers and other stakeholders.

Our project based safety commitment was developed based on our vision of Zero Harm by Aligning TMEP “The Responsible Way” with WorleyParsonsCord and Alberta Labour`s MOU.

- The construction team will lead in the safe execution of the project;
- Reduced interfaces between WorleyParsonsCord and Trans Mountain Pipeline entities –“We are One Team”; and,
- Industry Leading Assurance Performance at all levels.

The Company HSE Policy is the principal document of the WorleyParsonsCord HSE management system. The HSE Policy is posted prominently at all Project locations.

2 LEGAL STANDARDS

As an employer, WorleyParsonsCord is required to fulfill its obligations under Federal and Provincial legislation pertaining to the TMEP. Obligations include the requirement to do everything that is reasonable and practicable to ensure the health and safety of its employees, and other employees present at WorleyParsonsCord sites but not employed directly by WorleyParsonsCord. There is also a requirement for employees to take reasonable care to protect themselves and others present at the work site, and to cooperate with WorleyParsonsCord for the purposes of protecting themselves and others.

WorleyParsonsCord will at a minimum be compliant with the applicable Canada Labour Code and Associated Regulations (Canada Occupational health and Safety Regulations http://laws-lois.justice.gc.ca/eng/regulations/SOR-86-304/index.html),Provincial health and safety legislation, and the National Energy Board Onshore Pipeline Requirements. The responsibility for compliance of this plan and associated Acts, Regulations and Codes is retained with all project personnel.

Federal and Provincial Occupational Health and Safety Acts, Regulations, and Code are considered to be a minimum standard of compliance. In many cases where a difference in Regulations or Project requirement is noted, WorleyParsonsCord will adhere to the standard promoting the most stringent application to safety. All project personnel, including subcontractors, will be made aware of their legal responsibilities and obligations related to project practices, procedures, and policies. Subcontractors are expected to maintain HSE programs that meet all current applicable regulatory requirements.

WorleyParsonsCord and subcontractors are expected to be familiar with and understand the aspects of legislation that apply to their area of work. The primary occupational health and safety legislation applicable to the TMEP include the following:

Overall

- Canada Occupational Health and Safety Regulations;
- National Energy Board Pipeline Damage Prevention Regulations – Authorizations
- National Energy Board Pipeline Damage Prevention Regulations – Obligations of Pipeline Companies;
- Canada Labour Code Part II;
- Criminal Code of Canada Section 217.1;
- CSA Z662-15 – Oil and Gas Pipeline Systems;
- Transportation Safety Board Regulations;
- Trans Mountain Expansion Project PSSP and Contract;
- Transportation of Dangerous Goods (TDG) Act and Regulations;
- Employment Standards Regulations;
- Ministry of Environment; and,
- Public Health Act;

Alberta

- Alberta Traffic Safety Act- Commercial Vehicle Safety Regulation 121/2009
- Alberta Traffic Safety Act 115.1 –Distracted Driving
- Alberta Occupational Health and Safety Act, Regulations and Code(2009);
- Alberta Workers Compensation Board; and,
- Alberta Fire Code

British Columbia

- WorkSafe BC – Workers Compensation Act;

- WorkSafe BC – Occupational Health and Safety Regulation (2015 Edition);
- BC Motor Vehicle Act, Part 3.1 – Use of Electronic Devices While Driving
- BC Commercial Transport Regulation 30/78
- BC Fire Code

Prime Contractor

WorleyParsonsCord will be the "Prime Contractor" for the duration of work within "greenfield" designated areas as defined within the construction agreement contract. For the purpose of this PSSP, Greenfield is defined as:

- New Pump Station (Black Pines)
- Extension of existing facilities (acquisition of new land separated by fencing)
- Site within a site (segregation of operating facility and new construction)

The general duty of WorleyParsonsCord as the prime contractor is to do what is reasonably practicable to ensure that the OHS legislation is complied with on the work site including the following:

- First Aid services, equipment and supplies;
- Equipment erected or installed is compliant with Provincial and Federal legislation;
- Communication of hazards that are existing or potential at the work site;
- Investigation of serious incidents; and,
- Proper management of controlled products (GHS)

Trans Mountain will retain Prime Contractor status in "brownfield" designated area's as defined within the construction agreement contract.

As Trans Mountain is "Prime Contractor" in active facilities, WorleyParsonsCord will be required to follow Trans Mountain site requirements including additional permitting requirements.

Imminent Danger

"Imminent danger" refers to any danger that is not normal for the job, or to any dangerous condition that the employee would not normally work under. If the employee is in a situation of an imminent danger, they are required to stop work and inform WorleyParsonsCord why work has stopped.

WorleyParsonsCord will ensure all reports of imminent danger are investigated thoroughly and take action to eliminate the danger.

Refusal of Unsafe Work

It is the obligation of every WorleyParsonsCord employee, subcontract employee, and/or anyone being asked to conduct work that they believe to be unsafe to refuse work and immediately notify their Supervisor of the refusal and the reason they believe the task to be unsafe.

The reporting WorleyParsonsCord Supervisor or subcontract Supervisor will then abide by the following steps:

- While working to resolve the refusal, no-one may complete the task under dispute;
- The Supervisor will stop all work related to the task that was refused;
- The Supervisor will respect the opinion of the affected personnel;
- Personnel may not be dismissed from the site or be subject to any disciplinary actions as a consequence of his/her work refusal;
- The HSE Director may be informed of the situation and called upon for advice at any time during this process;
- A safety meeting will be called with the involved personnel, the Supervisor and any other interested parties;

- The meeting will focus on how to perform the job safely and will be documented completely, with detailed descriptions of:
    - The exact task that was refused;
    - The hazard(s) that the affected personnel identified as the reason(s) for the refusal;
    - Any other hazards identified in the discussion process of the meeting;
    - The hazard control strategies that will be implemented; and,
    - The names and signatures of all persons attending the meeting, indicating their agreement with proposed control strategies.
- If a resolution is not reached, the meeting should be re-convened at a later time, after consultation with the HSE Director;
- If resolution is still not attained and the task is believed to be safe by management, the affected personnel may be assigned to reasonable alternate duties;
- The timing and extent of involvement of Occupational Health and Safety officers varies by jurisdiction. In the event of an Occupational Health and Safety Officer involvement, all personnel are expected to cooperate and provide reasonable assistance to the officer; and,
- A written report needs to be completed and placed on file.

See appendix F for the Work Refusal Standard

Alberta

The law in Alberta states that the employee shall refuse all unsafe work if they believe there is an imminent danger to themselves or others caused by a tool, appliance, equipment or work procedure at the worksite, according to Section 35 of the Occupational Health and Safety Act.

British Columbia

The law in British Columbia, the employee must not carry out work or cause work to be carried out if they believe a work process, or operation of a tool or equipment, would create an imminent danger to themselves or others, according to the Workers' Compensation Act (Occupational Health and Safety Regulation, Section 3.12).

3 GOALS AND OBJECTIVES, TARGETS (KPI'S)

Commitment

Vision of Zero Harm

WorleyParsonsCord' objective is to be an industry leader in HSE performance. We believe that in order to deliver superior business outcomes our vision statement needs to be:

"Zero harm to people and assets; Zero environmental Incidents"

Goals

In order for us to deliver superior business outcomes, WorleyParsonsCord demonstrates the commitment to our vision through the following goal setting:

- We keep our people safe and healthy at work;
- We avoid environmental Incidents and minimize impact on the community;
- We design, construct, and operate safely;
- We protect physical and other assets from damage;
- We are alert for potential problems;
- We respond quickly and effectively to issues;
- We learn from our experience to help prevent recurrence of issues; and,
- We act in a socially responsible manner.

This PSSP defines HSE requirements and expectations for the construction scope of services and then aligns the project to our OneWay™ program.

Objectives

Project Key Principles

To achieve the Company's vision of zero harm to people and assets and zero environmental incidents all projects will:

- Make health, safety and environmental protection a personal value that guides behavior, actions and decisions;
- Meet legal and moral obligations to keep people safe and protect the environment and community;
- Provide resources in terms of people, equipment, training and systems of work to prevent incidents and near misses in the workplace; and,
- Learn from incidents and near misses, and take action to prevent their recurrence.

The Trans Mountain Expansion Project's Leadership team is committed to achieving world class HSE performance and believes this will happen through:

- Leadership from ALL employees and contractors;
- Consistent application of documented processes and procedures; and,
- Everyone consistently demonstrating the desired behaviors.

Adherence to TMEP's Key Principles, Including HSE's policies and procedures, is a condition of site access. Failure to comply with these Key Principles is considered a violation of the conditions of employment. It will be the individual responsibility of each WorleyParsonsCord employee and subcontract employee to understand and comply with these rules which will be communicated prior to site access.

The following TMEP Principles apply to all WorleyParsonsCord employees, subcontract employees, Vendors, and Visitors:

- **Principle No. 1**: Ongoing senior management sponsorship, commitment, structure and availability
- **Principle No. 2**: Integrated engineering team between EPC Contractor, prior engineering services providers and consultants
- **Principle No. 3**: An enduring relationship between the key leadership positions within the parties is a high priority and parties will endeavor to act as an integrated team with shared objectives
- **Principle No. 4**: Alignment on execution plan to enable clear definition of scope
- **Principle No. 5**: EPC Contractor achieves project objectives with appropriate oversight from Trans Mountain on all matters including safety, environmental compliance, quality, operability, cost and schedule commitments and continuous cost and schedule improvement
- **Principle No. 6:** Key positions staffed with highly qualified and experienced personnel
- **Principle No. 7:** Commercial alignment and agreement
- **Principle No. 8**: Agreement on local and Aboriginal participation
- **Principle No. 9:** Focused, deliberate, and transparent Management of Change (MOC) with no surprises
- **Principle No. 10**: Stakeholder Management
- **Principle No. 11**: Handling of site security and potential for civil disobedience
- **Principle No. 12**: Risk and Opportunity Management

Targets

Leading and Lagging Indicators

There are several HSE performance indicators that will be tracked, recorded, and utilized to ensure that the TMEP maintains leading class HSE results.

Leading Indicators are those that assist in identifying at risk behavior and conditions prior to an incident or unplanned event taking place, thus making leading indicators a preferred HSE focus metric.

Leading indicators that will be tracked by WorleyParsonsCord are as follows:

- Shift site Inspections;
- Equipment Inspections;
- SAZ (Serious about Zero Cards);
- Near Miss and Hazard IDs Report and Resolved;
- FLRA Audits performed by the CM Team including Foremen;
- Toolbox Audits performed by CM Team;
- HSE Accountability Statements executed by CM Team;
- Emergency Response Drills – exercises completed versus planned;
- Management walk around tours completed versus planned (specific to: health, safety, environment and quality);
- Serious About Zero (SAZ) behavior observation performance statistic: percentage of “all safe” versus “at risk” – trended;
- Journeys tracked via the WorleyParsonsCord Journey Management System; and,

- Vehicle operation infractions (as reported by in-vehicle monitoring systems.

Lagging indicators that will be tracked by WorleyParsonsCord are as follows:

- Injuries (first aid, medical treatment, restricted work, lost time, fatalities);
- Project Life Saving Rule(s) violations;
- High potential near misses and Environmental incidents;
- Asset or property damage incidents; and,
- Tracking of incident rates (TRIF) will be calculated by WorleyParsonsCord and provided to Trans Mountain monthly. The WorleyParsonsCord Target is ZERO.

Table 1 Leading and Lagging Indicator Targets

PERFORMANCE MEASURE	TARGET
Leading Indicators	**Value**
Total # of Tailgate Meetings	**1 per day**
Total # of Shift Safety Meetings	**1** per shift (10-4 shift rotation)
Total # MPRD Safety Meetings (Project Team)	**1** per Month per location
Total # of JHAs reviewed	**1** per shift (10-4 shift rotation)
Total # of Safety Stand Downs	**1** per quarter
Total # of Formal/informal Inspections	1 formal and **5** focus inspections per shift (10-4 shift rotation)
Total # of Inspections with Project Manager/Construction Manager	**1** per shift (10-4 shift rotation)
Total # SAZ cards/Near Misses	**1** per worker per shift (10-4 shift rotation)
ER Drills	Start up and semi-annual thereafter
Lagging Indicators:	**Value**
Total # of lost time Incidents	Zero
Total # of Recordable Incidents	Zero
Total # of Environmental Incidents	Zero
Total # of Vehicle Incidents	Zero
Total # of Regulatory Incidents	Zero

4 ROLES AND RESPONSIBILITIES

This section defines safety responsibilities, accountability, and authority of project personnel that are to be communicated and regularly assessed at project levels. At WorleyParsonsCord, The vision of Zero Harm to people, assets, and no environmental incidents, underpins all of our business activities. Achieving zero harm starts with personal commitments and set responsibilities for everyone.

WorleyParsonsCord business model has included environmental responsibilities to several positions throughout the company and is included within their title or roles and responsibilities as indicated below in this Section. The purpose of this Section within this Plan is to define health and safety roles and responsibilities with environmental components included only as supplement information. For the purpose of this project, specific Environmental Monitors will be employed and a supplemental environmental plan issued. Please reference document number 01-13283-GG-0000-EV-PLN-003 Contractor Environmental Management Plan (CEEMP) for additional information on environmental planning and compliance.

Key Responsibilities

The responsibilities for safety, health and environmental protection have been identified and listed below for the following role:

- Project Sponsor;
- Project Director;
- HSE Director;
- Project Manager;
- Construction Manager;
- Site Supervisors;
- Health, Safety, and Environment Personnel;
- Vendor Personnel; and,
- Visitors.

Project Sponsors

The Project Sponsors will represent Trans Mountain and WorleyParsonsCord' respective company senior management. The Sponsors provide guidance to the project team to ensure that the project meets the Customer's objectives. The Project Sponsors meet at regular intervals to discuss and resolve contractual issues that have been escalated to the Sponsorship level. The Project Sponsors work closely with their respective company's Project Director and Project Managers to ensure that key resolutions are properly transferred to the Project Team and attended to in a timely manner.

Project Director

The Project Director has the overall responsibility and authority for execution of the project in accordance with the established execution plans. The Project Director is responsible for ensuring that all work is performed safely, meets or exceeds quality requirements, is within budget and schedule, and in compliance with contractual terms and conditions. The Project Director is the primary interface with the Customer for all matters relating to the project contract.

HSE Director

Role: Communicating WorleyParsonsCord HSE Program to personnel, Subcontractor's and other relevant stakeholders:

<u>Specific Responsibilities:</u>

Ensuring the implementation of the WorleyParsonsCord HSE Program across their location;

Leading in the development, setting, monitoring and periodic review of HSE initiatives and targets for the location and ensuring they are met;

Ensuring effective compliance with the WorleyParsonsCord HSE Program;

Demonstrating visible commitment to the WorleyParsonsCord HSE Program;

Contributing to, and advising on, the WorleyParsonsCord HSE Program implementation, maintenance, and continuous improvement requirements;

Leading, developing, implementing, maintaining, and improving a comprehensive documented HSE plan, in accordance with the WorleyParsonsCord HSE Program, for the location specifically, and ensuring HSE plans are in place for all projects;

Reporting on the performance of the location HSE plan and the WorleyParsonsCord HSE Program to Location management for review and as a basis for improvement of the location HSE management plan;

Reporting consolidated HSE metrics to the Location General Manager, and Director HSE Canadian Operations;

Driving continuous improvement in HSE performance;

Designing, scheduling and executing an efficient and effective “Assessment" process for the location, ensuring compliance with the WorleyParsonsCord HSE Program;

Contributing to the development of legislation, regulations and other relevant requirements that have the potential to affect WorleyParsonsCord’ business through industry groups;

Demonstrate leadership and be actively involved in incident/hazard reporting, investigation and management as required by the WorleyParsonsCord HSE Program;

Identifying, and implementing plans for the HSE risks in their area of responsibility;

Identify required resources for the effective development, operation, review, maintenance and improvement of the WorleyParsonsCord HSE Program within their location;

Establishing and maintaining systems to identify and ensure compliance with all applicable HSE related laws, regulations, licenses, permits and other requirements (codes, standards etc.) within their location; and,

Demonstrate leadership and be actively involved in incident/hazard reporting, investigation and management as required by the WorleyParsonsCord HSE Program.

Specific Accountabilities:

Leads the HSE team assigned to the jobsite;

Ensures that the Subcontractors are meeting our requirements for HSE performance;

Audits the Subcontractor’s to ensure compliance with the contract;

Provides coaching and mentoring to the construction management team and Subcontractor leadership personnel;

Mobilization of HSE resources to support the construction and C&SU efforts;

Conducts Subcontractor alignment workshops in conjunction with Construction Manager to gain leadership commitment; and,

Inspects and approves use of equipment on arrival at Site, and ensures that equipment and operator certification is in order;

Project Management

The Project Manager has the overall responsibility and authority for execution of the assigned project work scope in accordance with the established execution plans. The Construction Project Manager is responsible for ensuring that assigned work scope is performed safely, meets or exceeds quality requirements, is within budget and schedule, and in compliance with contractual terms and conditions. The Construction Project Manager interfaces with the Project Director for all matters relating to the project contract.

Role: The overall leadership, ownership, endorsement and support of this Plan and the Health, Safety and Environmental (HSE) management processes that are implemented by WorleyParsonsCord are, as follows:

Specific Responsibilities:

To allocate resources and assign responsibilities for the implementation, operation and ongoing improvement of the WorleyParsonsCord HSE management processes including all requirements of this plan;

To visibly lead by personal example with the implementation of the HSE Management Plan and to support all Project/Contract HSE initiatives;

To monitor, review and report on HSE performance;

To consult on and resolve HSE issues including, leading incident investigations, etc.;

To recognize and reward people who have positively impacted on HSE;

To have and apply a full working knowledge of HSE Management Systems, e.g. Safe Work Practices, HSE Procedures, JHA's, FLRA/HA, etc.; and,

To challenge unsafe behaviors and correct inappropriate HSE performance.

Specific Accountabilities:

To set expectations and hold functional/discipline managers accountable for delivery of HSE deliverables and meeting agreed performance metrics;

To actively promote HSE excellence and the HSE vision and so create a strong HSE culture;

To understand and apply general legislative HSE requirements; and,

To generate contingency plans to respond to emergencies.

Construction Management

The Construction Manager is responsible for the administration and organization of construction site and field personnel, direction of work activities as assigned by the Project Execution Plan, and supports the Project Manager in the overall execution of contract deliverables. The Construction Manager has the overall responsibility for ensuring that all site construction activities are performed in accordance with the Construction Execution Plan and associated subsidiary plans and has full authority and responsibility for all work performed at the construction site, including all WorleyParsonsCord workforce and its subcontractors. The Construction Manager is expected to be the leader of the Safety Culture on the construction site; in a manner that exemplifies WorleyParsonsCord' OneWay™ values and Customer's safety program. The Construction Manager is the primary liaison with Client construction personnel.

Role: Construction Director/Construction Manager provides Senior Project Management direction to Site Supervisors and Subcontractors in the application of this HSE Management Plan and associated programs.

This position has overall responsibility and accountability for the HSE performance of the project at a Site.

Specific Responsibilities:

Support the Project Manager and HSE personnel in the implementation of the HSE Management Plan;

Allocate resources and assign responsibilities for the implementation, operation and ongoing improvement of the WorleyParsonsCord HSE management processes;

Acquire adequate resources, and competent personnel are provided and processes are in place for the achievement of HSE initiatives;

Set expectations and hold project team management accountable for the delivery of HSE standards and attain deliverables and meeting agreed project performance metrics; and,

Ensure proper reporting and investigation of incidents by Supervision which result in a near miss, personal injury, and harm to the environment or damage to equipment is initiated and implement corrective actions.

Specific Accountabilities:

To comply with and administer all legal obligations imposed on the Construction Manager by governing regulations, codes and practices, local and national laws, regulations and legislation;

Visibly lead in by personal example the implementation of this HSE Management Plan and to support all WorleyParsonsCord HSE initiatives;

To actively promote HSE excellence and the HSE vision and to create a strong HSE culture;

To ensure that all personnel receive the appropriate HSE training;

To ensure that all equipment, tools, and Personal Protective Equipment (PPE) are supplied/maintained at the workplace and is fit for purpose;

To participate and ensure Supervision implement the Hazard Assessment requirements for work activities;

To participate and ensure that Subcontractor supervision and labor conduct JHA's for nominated work activities and alignment sessions;

To participate in Subcontractor evaluation, selection and alignment sessions;

To participate in Hazard ID and JHA sessions associated with the work;

To attend and participate in pre-start, toolbox and Site HSE committee meetings where required;

To challenge unsafe behavior and correct inappropriate HSE performance;

To understand and apply all legislative HSE requirements;

To have and apply a full working knowledge of HSE Management Systems, e.g. JHA's;

To recognize and reward people who have positively impacted on HSE;

To generate contingency plans to respond to emergencies;

To participate in management reviews of the Project's PSSP and associated documentation for ongoing suitability, adequacy, and effectiveness; and,

Guide leadership team and review work execution plans utilizing 5 week and 3 week look ahead and ensure JHA's, and FLRA's align with high risk activities.

Site Supervisors

Role: Managing the day to day activities of the Site personnel to ensure that the work is executed in a safe, environmentally responsible and productive manner.

Specific Responsibilities:

To instruct on SWP's and the hazards associated with the assigned tasks at commencement of each work assignment;

Ensure personnel assigned to tasks are competent;

To ensure that all equipment, tools and PPE are supplied/maintained at the workplace and are fit for purpose;

To ensure that work scope activities do not commence unless all the appropriate documentation (JHA; FLRA's are prepared and personnel have been familiarized with the hazards, control measures and other requirements related to the work;

To attend and actively participate in daily "pre-start" toolbox meetings to ensure relevant HSE issues associated with the tasks are discussed;

To ensure that personnel are properly using the correct PPE and safety devices for the work being performed and that they are properly trained in the use of their tools and equipment;

To ensure that Subcontractor's report and conduct incident investigations to determine all the facts necessary to take corrective action;

To review and report on HSE performance in their area as required, to the Construction Manager and the Project Manager;

To establish a team based work environment which recognizes and utilizes the contributions of all team members;

To actively promote the HSE vision, HSE excellence and create a strong HSE culture. Recognize and reward people (WorleyParsonsCord Recognition Program) who have positively impacted on HSE;

To challenge unsafe behavior and correct inappropriate HSE performance;

To conduct HSE inspections as required;

To consult on and resolve HSE issues including leading Incident investigations, etc.; and,

To understand and participate in contingency planning for Emergency Response Program (ERP) to respond to emergencies.

Specific Accountabilities:

To identify craft labour requirements and necessary HSE resources (PPE, tools, equipment) and ensure that adequate resources including competent personnel are provided and processes are in place for the achievement of HSE objectives;

To demonstrate leadership, commitment and accountability for the delivery of HSE objectives, and all WorleyParsonsCord HSE initiatives;

To have and apply a full working knowledge of the HSE Management System as they apply to their craft labour disciplines and functions and conduct HSE inspections;

To understand and apply all legislative HSE requirements;

To ensure that all personnel are implementing and actively involved in the relevant HSE processes and activities;

To instruct on safe work practices and the hazards associated with the assigned tasks at commencement of each work assignment;

Ensure personnel assigned to tasks are competent;

To ensure that all Equipment, Tools and PPE are supplied/maintained at the workplace and are fit for purpose;

To ensure that work scope activities do not commence unless all the appropriate documentation (JHA; FLRA's are prepared and personnel have been familiarized with the hazards, control measures and other requirements related to the work;

To attend and actively participate in daily "pre-start" toolbox meetings to ensure relevant HSE issues associated with the tasks are discussed;

To ensure that personnel are properly using the correct PPE and safety devices for the work being performed and that they are properly trained in the use of their tools and equipment;

To perform frequent checks on serviceability of all PPE and tools/equipment;

To ensure that Subcontractor's report and conduct Incident investigations to determine all the facts necessary to take corrective action;

To review and report on HSE performance in their area as required, to the Construction Manager and the Project Manager;

To establish a team based work environment which recognizes and utilizes the contributions of all team members;

To actively promote the HSE vision, HSE excellence and create a strong HSE culture;

Recognize and reward people (WorleyParsonsCord Employee Recognition Program) who have positively impacted on HSE;

To challenge unsafe behavior and correct inappropriate HSE performance;

To conduct HSE inspections as required;

To consult on and resolve HSE issues including leading Incident investigations, etc.; and,

To understand and participate in contingency planning for ERP to respond to emergencies.

Health Safety & Environmental Personnel

The HSE Lead facilitates the safe performance of work on the job site in accordance with the WorleyParsonsCord Site Specific Health, Safety and Environmental Plan and Client Safety Program. The HSE Lead works closely with the Project Director, Project Manager, Construction Manager and other site personnel to assess and review safety risks on the job site and perform regular safety inspections, with the aim that all workplace practices are performed safely. The HSE Lead is responsible for ensuring that site personnel complete the required Client and WorleyParsonsCord site safety orientations, specialized safety training requirements are met and monitors compliance to safety standards. The HSE Lead maintains safety statistics over the course of the project and reports to stakeholders on a regular basis.

Role: Provision of HSE specific and technical expert advice regarding WorleyParsonsCord requirements and other recognized best practices in HSE. All Field Safety Advisors have National Construction HSE Officer (NCSO) certification, as issued by the Alberta Construction Safety Association (ACSA) or other recognized certifying body. In the absence of coverage HSE will become the responsibility of the Construction Manager. In addition, Site HSE will be supported by the Construction Manager and Corporate Safety Management.

Specific Responsibilities:

To ensure the WorleyParsonsCord management and project team are aware of their responsibilities and their deliverables, in terms of both the work output and their personal behaviors;

To maintain knowledge of current governing regulations, codes and practices, and apply and inform the WorleyParsonsCord Construction Manager and others regarding opportunities to achieve whenever revisions to the PSSP are required the highest standards of HSE;

To provide timely advice to the WorleyParsonsCord management team and others regarding opportunities to achieve and recognize their contributions to the highest standards of HSE;

To develop and implement initiatives to engage management, supervision and personnel in achieving the HSE vision;

To demonstrate leadership and commitment towards for the achievement of HSE objectives, excellence and culture, including culture, excellence, vision and to the success of the WorleyParsonsCord HSE initiatives;

To assist, where appropriate, in Subcontractor Job Hazard Analysis (JHA) and ensure copies are maintained for records;

To ensure Subcontractor's supply, maintain, operate and locate all safety and emergency equipment in accordance with legislated, WorleyParsonsCord and Trans Mountain requirements;

To encourage management, supervision, and others to recognize their contributions to WorleyParsonsCord HSE performance;

To actively promote HSE excellence and the HSE vision and to create a strong HSE culture;

To identify, mentor and report unsafe behaviors and correct inappropriate HSE performance;

To understand and apply legislative HSE requirements;

To consult or conduct HSE inspections and audits to ensure the undertaking of investigations and review of all incidents such as all injuries, property/equipment damage, security or environmental incidents, health exposures, and fatalities, and produce reports for circulation to WorleyParsonsCord, Trans Mountain, Subcontractor's and the required authorities where required;

To consult on and resolve HSE issues including supporting Incident investigations, etc.

To recognize and reward people (WorleyParsonsCord Recognition Program) who have positively impacted on HSE; and,

To maintain relevant communications with appropriate personnel.

All Employees

Role: To use WorleyParsonsCord work methods and to undertake their respective tasks in a manner which does not affect the health and safety of themselves, other personnel, assets and the environment.

Specific Responsibilities:

To understand and apply WorleyParsonsCord HSE requirements;

To utilize the resources provided and the processes in place for the achievement of HSE objectives;

To regard HSE as a central theme in their actions;

Maintain trade or labour competencies as required, and to contribute fully to WorleyParsonsCord' HSE success;

To participate in the compiling of HSE initiatives include hazard alert reporting and elimination JHA and FLRA;

To ensure the correct tools, PPE and equipment are used for all tasks and to report to their supervisor any defects in plant, materials or equipment;

To use the safety equipment and protective clothing supplied as appropriate;

To actively participate in the implementation of all WorleyParsonsCord HSE initiatives including hazard reporting and elimination;

To report to their supervisor any defects in plant, materials or equipment;

To notify their supervisor of any Incident or near miss that occurs and to support the investigation into the same;

To challenge unsafe behavior and correct inappropriate HSE performance and report any HSE incidents near miss or Incident and support HSE investigations;

To avoid any improvising which entails additional work;

To warn others of known hazards, the obligation to report an unsafe condition and the right to refuse unsafe work;

To participate in emergency response exercises as required;

To dispose of all waste materials in the correct manner;

To report to their Supervisor, all HSE incidents and near misses at the time of their occurrence; and,

At all times, to comply with the relevant Safe Work Practices and HSE Procedures and regulations formulated and disseminated through inductions, pre-start and toolbox meetings and WorleyParsonsCord instructions.

Subcontractor, Managers and Supervisors

Role: In accordance with WorleyParsonsCord, managing the day to day activities of their personnel and thus ensure that the works are executed in a safe, environmentally responsible and productive manner.

Specific Responsibilities:

To ensure/assure all employees and Subcontractor's comply with WorleyParsonsCord HSE requirements, participate/enforce safety, industrial hygiene and environmental rules, regulations and standards;

To visibly demonstrate and enforce safety, industrial hygiene and environmental rules, regulations and standards;

To set expectations and hold their employees and Subcontractor's accountable for delivery of HSE deliverables and meeting agreed performance metrics;

To instruct personnel under their supervision on safe work practices, and safe work procedures and hazard associated with the assigned work scope tasks;

To ensure that all personnel are properly using the correct PPE, tools, equipment and safety devices for the work being performed, and that they are properly trained in the use of their tools and equipment;

To perform frequent checks on serviceability of all PPE, tools and equipment;

To conduct and participate in daily toolbox meetings to explain the safety measures associated with the tasks for the day, and discuss safety information that is issued by the Subcontractor's Site HSE Representative such as the Daily HSE Topic;

To actively promote HSE excellence and the HSE vision and to create a strong HSE culture;

To encourage HSE suggestions from the personnel;

To attend and participate in weekly safety meetings iterating specific HSE topics;

Ensure waste materials are disposed of in accordance with MSDS and Local Site Requirements;

Conduct, document and implement JHA's and relevant requirements of same;

Ensure personnel report all incidents, and that prompt First Aid is administered to injured personnel;

Should an injury occur that requires off-Site medical treatment, the Supervisor will ensure the injured person is accompanied to the medical facility to ensure proper initial treatment is received;

To participate in the investigation of Subcontractor's incidents to determine all the facts necessary to take corrective actions and complete those actions;

To monitor, review and report on HSE performance as required, to the Project Construction Manager, and to the Project HSE Manager;

To challenge unsafe behavior and correct inappropriate HSE performance;

To understand and apply applicable legislative HSE requirements;

To have and apply a full working knowledge of their own and WorleyParsonsCord's HSE Management Systems, e.g. JHA's, etc.;

To consult on and resolve HSE issues including leading Incident investigations, etc.;

To recognize and reward people who have positively impacted on HSE;

To generate contingency plans to respond to emergencies; and,

To record competency/training and retain training records on Site or make available electronically from their head office.

Specific Accountabilities:

To review and report on HSE performance in their areas as required, to the WorleyParsonsCord Manager, the Site Construction Manager, and the WorleyParsonsCord corporate HSE function;

To provide HSE topics and other information to WorleyParsonsCord and Subcontractor management as required for pre-start meetings, toolbox talks, etc.;

To have and apply a full working knowledge of all applicable HSE Managements Systems;

To monitor and review Site HSE inspections and reporting;

To generate contingency plans to respond to emergencies;

Incidents, health exposures, and fatalities, and produce reports for circulation to WorleyParsonsCord, Trans Mountain, Subcontractor's and the required authorities where required;

To consult on and resolve HSE issues including supporting Incident investigations, etc.;

To recognize and reward people (WorleyParsonsCord Recognition Program) who have positively impacted on HSE; and,

To maintain relevant communications with appropriate authorities and Trans Mountain contacts when authorized by the WorleyParsonsCord Manager.

Vendors Personnel

Role: Delivery and adjustment of equipment in accordance with approved WorleyParsonsCord HSE requirements. Meeting WorleyParsonsCord's HSE requirements while on Site.

Specific Responsibilities:

To understand and abide by the onsite HSE requirements;

To understand the WorleyParsonsCord induction process will be a requirement for all parties arriving at Site and FLRA's completed prior to on Site work; and,

To ensure that any of their own personnel who may visit or work at any WorleyParsonsCord office or field location fully complies with all HSE arrangements that are in place.

Visitors

Definition: WorleyParsonsCord, Subcontractor, vendor non-Site oriented personnel (both individuals and groups) who are to visit WorleyParsonsCord Sites on WorleyParsonsCord business as a short duration

trip or trips, for specific and limited tasks (e.g. vessel inspections, surveys etc.). If personnel are expected to remain on Site for more than 2 days or to return on a regular basis they would be expected to be fully inducted through the Site HSE orientation process Trans Mountain/WorleyParsonsCord).

Specific Responsibilities:

To be accompanied by a Site orientated employee at all times;

To understand and abide by the onsite HSE requirements; and,

To report any unsafe acts, behaviors, and/or conditions as soon as is reasonably practicable to their Site orientated chaperone or the HSE representative.

5 HAZARD IDENTIFICATION AND RISK CONTROLS

RISK MANAGEMENT

Risk management provides a structured and systematic approach that is relevant to the management of safety. Use of risk management processes can enhance decision making, and assist in reducing loss to personnel, the environment, equipment, and other assets. From planning to field execution, HSE Risk Management processes are to be applied to identify, prioritize, appropriately eliminate/mitigate, communicate, and manage risks through the early works scope of activities.

The following risk management processes will be utilized for the project scope of work:

- Hierarchy of Control;
- Detailed Project HSE Risk/Hazard Register;
- 3 Week Look Ahead;
- Field Level Risk Assessment;
- Last Minute Risk Assessment;
- Job Hazard Analysis; and,
- Serious about Zero Program

HSE risks in particular will be managed in accordance with WorleyParsonsCord Risk Management Standards and associated Procedures, forms and templates. The HSE risks identified for the project will be addressed and reflected in this plan. Endorsed risk management programs will be implemented by competent personnel and will include relevant stakeholders, including TMEP personnel as appropriate. Appropriate levels of management will review and approve the outputs of risk management activities.

Based on preliminary review and analysis, the most significant risks identified for the scope of works include:

- Risk associated with over the road transportation of individual workers to/from home location to TMEP;
- Risk associated with over the road transportation of workforce from the TMEP via van or other light duty vehicle;
- Working at heights/fall from heights, dropped objects, rescue requirements are impeded, etc.;
- Work in Live Plant;
- Heavy Lift Coordination;
- Confined Space;
- Environmental Conservation;
- Heavy Equipment Use/pedestrian vs. equipment, equipment vs. equipment, and equipment vs. plant materials and stationary equipment collisions, etc.;
- Ground Disturbance/line strikes/access egress/exposure to atmospheric hazards, etc.; and,
- Critical Lifts over operating facilities.

Construction/Commissioning HSE Risk Management Process

A full description of the WorleyParsonsCord HSE risk management process as it applies to the TMEP site may be found in WorleyParsonsCord site HSE Risk Management Procedure. In summary, this procedure requires that risk assessments are conducted at a high level as part of the planning process well in advance of work taking place. It typically utilizes WorleyParsonsCord, subcontractors, and TMEP Representatives to risk assess the Scope of Work prior to mobilizing to a site. For this reason, it is difficult to either include the personnel who will actually carry out the activities or to consider the risks inherent in the working environment on the day of the activity; e.g. interactions with others in the area or the presence of a temporary power supply cable.

To address this, a process of Job Hazard Analysis with Risk Prioritization (JHA) in accordance with WorleyParsonsCord Job Hazard Analysis Standard is implemented at each site. JHA's will be used throughout the Project to identify hazards and mitigate the risks associated with work activities using the same risk management principles as defined in the above sections. JHA's will be conducted for all activities and on non-routine or

potentially hazardous activities identified on the job and a Risk Ranking should be attributed to each hazard listed to ensure that controls are elevated for hazards that are defined as priority.

All JHA's will involve the relevant contract Supervisor and work group in their preparation. In the rare absence of work group members, the final outcome will be discussed with all persons concerned with the job, to ensure that the HSE requirements and procedures under the JHA are agreed and understood. Work group members will sign the completed JHA to acknowledge their understanding of the procedure and requirements. This ensures that all personnel are aware of the potential risks each time they conduct a new task and any changes identified are communicated to all personnel. The WorleyParsonsCord Construction Manager/Supervisor and HSE personnel will review the completed JHA's.

A copy of the JHA will be kept on site at all times and the signed copy will be retained in the relevant HSE site records and will be submitted with a copy of the daily safe work permit back to the permit office daily.

Hazard Reporting

The observation, reporting, and recording of hazards to the health and safety of personnel or to assets and the environment are strongly encouraged by management.

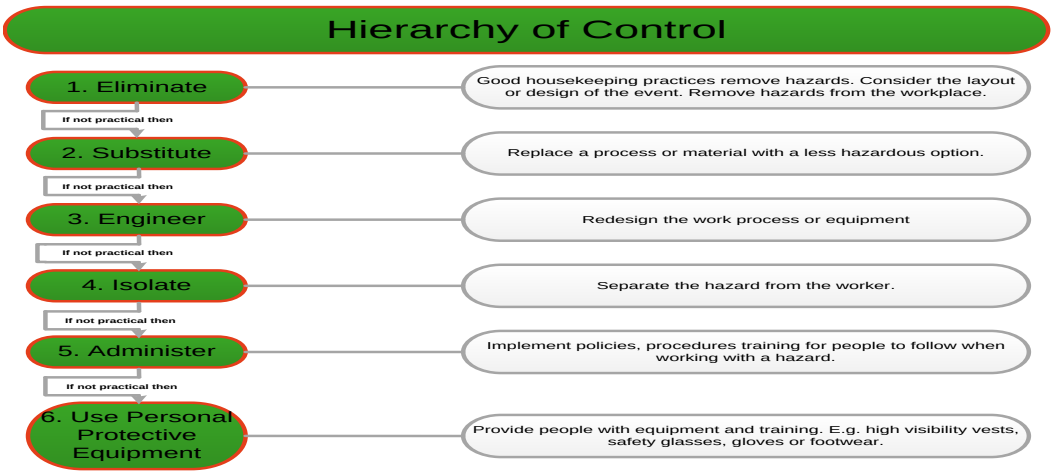
Observed hazards should firstly be addressed by the observer on a 'See it, Own it' basis, provided that they are capable and competent to do so. If the hazard cannot be rectified by the observer of the hazard, then they should report the hazard to their supervisor. Significant hazards should be reported formally to the WorleyParsonsCord Supervisor or HSE Advisor and may be recorded using the Near Miss/Hazard Identification card.

The report will be reviewed to ensure that the hazard is investigated and assessed and that effective and appropriate remedial action is taken.

Hierarchy of Controls

The hierarchy of control is a sequence of options which offer you a number of ways to approach the control of hazards. All WorleyParsonsCord employees will be trained and encouraged based on the fundamentals of the Hierarchy of controls and its principals. At a minimum, all workers should assess the hazards and implement the best measure possible for their situation. Notice that the use of protective equipment is the last resort to be used when all other control measures have been ruled out in the short term.

Figure 2 – Hierarchy of Control



Project Risk/Hazard Register

WorleyParsonsCord will conduct a Project Risk Assessment (also known as a "Pre Job Hazard Assessment") specific to the scope prior to mobilization. The Risk Assessment will refer to the associated risks and hazards and

the necessary controls that are required to be in alignment with our zero harm vision. The Risk Assessment will be reviewed quarterly by the Construction Management Team.

The Risk Assessment and associated JHA will be reviewed with all WorleyParsonsCord Employees during their site specific orientation and posted on the safety notice boards. In this manner the Project Risk Assessment is considered a *Live Document*.

See Appendix A for the Project Risk Register

3 Week Look Ahead

The use of a "3 Week Look Ahead" schedule provides a forecast of construction activities and will allow for early identification of HSE requirements and planning. This 3 Week Look Ahead is created and maintained by the Construction Team with the participation of the site HSE Lead. This also allows time for identification of competent personnel, ensuring training requirements are met, preparation of identified JHA's in advance, specialty PPE requirements, etc. to be communicated to the construction team by the HSE lead, as well as any other HSE considerations that need to be taken into consideration prior to work commencement.

Field Level Risk Assessment

WorleyParsonsCord and subcontractors will implement a documented Field Level Risk Assessment (FLRA) at the beginning of a new work task or whenever conditions surrounding the task have changed. For example; prior to commencing physical work or when work processes, tasks, or conditions change the FLRA is to be revisited and updated.

This FLRA process will be clearly communicated to include impacted personnel making them aware of the task-specific hazards and required control measures to be followed.

The worker is responsible to ensure the FLRA is reviewed and re-authorized by their supervisor whenever a change has been noted on the FLRA.

An FLRA is always completed at the work location so that a real-time assessment of the worksite conditions can be made.

Each crew will prepare an FLRA and share/communicate hazards with other workers during the creation of the FLRA. Each crew member will sign on to their own crew FLRA as a minimum.

As a person enters into a new area, they will sign on to the new crews' FLRA working in vicinity.

It is the responsibility of supervision to review and sign the FLRA. Prior to approving the FLRA, it will be demonstrated that all hazards have been mitigated/controlled and captured in the FLRA. Work will not commence until this process has been completed.

The FLRA process is as shown. This simple four step process is the core of our FLRA culture.

Figure 3 Stop and Think

Last Minute Risk Assessment

In addition to the documented FLRA process, the Last Minute Risk Assessment (LMRA) will be implemented.

The LMRA is a mental thought process that must be repeated on a continuous basis throughout the day; either while you are working and just prior to starting a task. The LMRA process essentially involves asking yourself the following questions and adjusting the work step/process as needed:

- What could go wrong?
- What is the worst thing that could happen?
- What should I do to avoid this happening?

Project personnel will be trained in both the FLRA and LMRA processes as part of FLRA training.

Job Hazard Analysis

WorleyParsonsCord and subcontractors will implement a formal Job Hazard Analysis (JHA) or equivalent process that utilizes a "Risk Prioritization Matrix" within the document.

This will assist in the identification, prioritization, and control of all activities as they relate to both the potential and consequence of the hazards they introduce.

The JHA process is to be used for tasks including:

- Activities for which there are no regular procedures or practices;
- Activities for which a regular practice or procedure is in place, but seldom or ever used (e.g. seasonal winterization readiness). This could result in not being trained for, or not being familiar with the task; and,
- Any task where the level Potential and Severity of failure have the potential for severe injury, death, loss of assets, materials or where the resulting failure would have lasting impact on reputation of WorleyParsonsCord or Trans Mountain.

The JHA process includes breaking the job into a sequence of steps, identifying hazards associated with each of the steps, ensuring adequate control measures are in place, and that a post control assessment of Potential and Severity are completed with each task step. JHA's will be prepared by competent supervision and HSE Representatives with involvement from the workers conducting the task.

Serious About Zero Program (SAZ)

WorleyParsonsCord and subcontractors shall utilize the **"Serious about Zero"** (SAZ) Program that is a proactive, behavioural approach to the HSE risk management processes within the workplace. Its intent is to build a caring culture where all personnel take ownership and responsibility for the well-being of each other. It is a process for observing work tasks in progress, positively reinforcing safe behaviours and identifying and correcting at risk behaviours through communication and coaching.

Implementation of the SAZ Program consists of the following fundamentals:

- Personnel will be provided training on the SAZ Program
- Identify, record and positively reinforce observed safe work behaviours
- Identify, record and discuss observed at risk behaviours and establish underlying causes and solutions
- Track results and assess data
- Communicate results and provide feedback to all personnel
- Follow through on improvement opportunities
- Each worker is encouraged to submit a minimum of 2 SAZ cards per Shift cycle
- Each Supervisor shall submit a minimum of 2 SAZ cards each day of the shift cycle

6 SECTION 2: PLAN IMPLEMENTATION AND CHECKING

Management of Change

All Management of Change (MoC) events will be monitored to ensure that they are executed in accordance with the requirements for implementation stipulated in change request documentation. This will include, but not be limited to communication of changes to appropriate TMEP representative or team, change implementation timelines and responsibilities, and maintaining environmental and regulatory compliance for all change events.

Change will be minimized as much as possible. Change can introduce new HSE hazards and risks that will be managed to an acceptable level.

HSE risks associated with any changes to construction, procedures, equipment, systems, services, and personnel need to be assessed and appropriate actions taken to ensure adequate HSE performance levels are not compromised.

HSE system and behavioural risks associated with temporary and permanent changes will be identified, evaluated, approved, and communicated prior to implementation or commencement of work and managed to an acceptable level. The first line of defence with MOC is to revisit and update the FLRA and ensure that Supervisor are both aware of the change and completes review and approval of the changes to a FLRA at a minimum. Depending on the level of change management identified more stringent hazard assessment and control process(es), such as the completion of a JHA, may be required.

For changes to this PSSP, an internal WorleyParsonsCord MOC process will be used to ensure that the effects of the change are understood to all Project functional areas and disciplines. The Project Director in communication with Trans Mountain will sign off on any change affecting this PSSP through the WorleyParsonsCord MOC process. The WorleyParsonsCord document control process will be used to ensure proper and timely communication to Trans Mountain and all subcontractors on the Project pertaining to a change in this PSSP.

Living Documents

As work scopes are completed and changes occur, WorleyParsonsCord Management recognizes that review and revision to specific HSE “Living Documents” will be completed and managed effectively throughout the project lifecycle.

Examples of HSE documents requiring scheduled and periodic review for the duration of the project are the following:

- PSSP, SSERP and associated plans; and
- Project Risk Assessment Register.

7 TRAINING, COMPETENCE, AND EVALUATION

Achievement of the **Zero Harm** vision requires the selection of people who share our organization's values, beliefs, and commitment to safety leadership and are able to demonstrate the expected behaviour and performance associated with their role and task.

WorleyParsonsCord and subcontractors will complete and pass the pre-access alcohol and drug test before being enrolled in the project safety orientation. The alcohol and drug test will be performed by a certified Point of Collection Tester with all positive prescreen tests sent for further analysis at a certified test laboratory. No worker is permitted to work without having completed the project safety orientation.

Orientation

Through orientations, WorleyParsonsCord and subcontractor personnel will be made aware of specific safety roles and responsibilities. This includes individual contribution to safety performance, review of identified hazards and associated controls documented in the Risk Register, and potential disciplinary consequences of not complying with specified and communicated HSE requirements.

WorleyParsonsCord and subcontractors will ensure that specific training is conducted for their personnel according to the hazard assessment, This PSSP, TMEP Health and Safety Management Plan, and requirements defined by legislation.

There are several levels of orientation training that WorleyParsonsCord and our contractors will be responsible for completing prior to mobilizing or executing services on the TMEP site(s). Prior to the start of work, all workers and visitors who enter any one of our project sites must comply with the project's safety, health, environment and security requirements. The orientation includes 2 sections; 1) WorleyParsonsCord safety, environment, cultural awareness, emergency response and security specific expectations 2) Trans Mountain safety, environment, cultural awareness, and the security expectation and the overall Trans Mountain safety videos that will include:

- A review of the TMEP EHS requirements, site specific hazards, abnormal operating conditions, emergency preparedness and response plans, restricted areas, security, potential hazards that may be encountered, evacuation procedures, assembly areas, safety systems and WorleyParsonsCord access and parking requirements at the worksite;

WorleyParsonsCord safety orientation will be documented through ISN Online Training process, or form **CSM-003**. WorleyParsonsCord will ensure that everyone that works on TMEP premises receives this orientation. The orientation is required annually or when changes to Project Scope of Work and/or the Environmental Management plan occur; and,

WorleyParsonsCord and our subcontract personnel will be issued an ISN ID badge at the completion of the required orientation. The ISN badge must be kept on the person while accessing Trans Mountain/TMEP project locations.

In addition, a separate site specific orientation will be required for Trans Mountain operating facilities including Edmonton Terminal in Strathcona County and project Pump Stations.

WorleyParsonsCord will utilize ISN Quick Check badging system. Visitors will not be granted entry without prior permission of WorleyParsonsCord or Trans Mountain.

Safety Visitor Orientation

Visitors to the TMEP site will receive a Visitor Orientation. Visitor's onsite will be accompanied at all times by a fully orientated person fully familiar with the worksite and activities. A visitor in this case is described as a person solely under the control (escorted) by a" Deemed competent and fully oriented for executing work, WorleyParsonsCord person". It is assumed the Visitor is not going to be performing any work or providing a service.

Visitor's onsite that wish to be unescorted or involved in hands on work processes will be authorized and attend the appropriate orientations and have the minimum required training courses for the site.

All visitors planning to come to site must provide notification to the WorleyParsonsCord Project Management Team.

Competency Assurance

All WorleyParsonsCord personnel and subcontractors will be adequately qualified, suitably trained, and supported with sufficient experience to conduct their work activities safely and in a socially and environmentally responsible manner. To continuously improve safety performance, WorleyParsonsCord and subcontractor management will actively define, promote, and encourage the involvement and motivation of personnel through training.

Appropriate to their function, location, and activities all personnel will be orientated and trained in:

- Their roles and responsibilities in meeting HSE requirements;
- The significant risks associated with their activities and the benefits of working safely; and,
- The potential consequences of deviation from plans and procedures.

All WorleyParsonsCord and subcontractor personnel performing activities or tasks that require statutory licenses or certificates of training will submit a current copy of them to the WorleyParsonsCord prior to starting work on the worksite. Verification of competency will be demonstrated as required with records of assessment stored within J+.

WorleyParsonsCord and subcontractors will ensure workers on-site are competent in their designated tasks utilizing competency programs designed for each position.

- Green Hat Mentorship Program;
- New and inexperienced workers (green hat);
- White Hat Program;
- Trade Specific Competency; and,
- Equipment Operator Competency;

Competency Verification

The competency verification process is a one-on-one recorded meeting between a Manager or Supervisor and those under their direction.

This competency verification process requires the use of a discipline specific form that will provide the manager with a means of measure as to the workers abilities and experience levels. The form identifies discipline specific requirements and allows the manager to better understand competencies and areas for improvement with those under their direction. There is a discipline specific form created for each of the following positions:

- Project Manager;
- Construction Manager;
- Superintendent/General Foreman;
- Foreman; and,
- Operator.

White Hat Program

The "White Hat Program" is a competency verification process that requires all levels of management prove competency in the application of various HSE related tasks/responsibilities.

The verification process starts with the assessment of the Project Manager by a Peer Group that has been identified as "Competent" by the WorleyParsonsCord HSE Director. The Peer Group then measures and assesses the identified candidates' level of competency in completing or assessing the various HSE related tasks they are given e.g. FLRA completion and assessment as well as conducting/assessing a proper tailgate/toolbox meeting.

The metric results are recorded utilizing the FLRA Audit Tool and the Toolbox Meeting Report by the White Hat Peers. If the candidate passes the overall assessment they are then "Knighted" into the White Hat program. Being "Knighted" allows them to assess those under their direction as defined in the program charter and approve those who qualify after being scrutinized utilizing the White Hat program criteria that they themselves were measured against.

Training Matrix

WorleyParsonsCord requires that each employee maintain a basic mandatory requirement with regards to training designated by discipline. An employee's discipline will determine the basic mandatory training required. A table illustrating the requirements of each WorleyParsonsCord and subcontract employee can be found in Appendix B of this PSSP. In addition, a live training matrix with a complete list of each employee will be updated and maintained by the WorleyParsonsCord HSE Advisor for the lifecycle of the project.

Site Specific TMEP Training Requirements

This project requires that all workers have Canada (Oil and Gas) Midstream Training Qualifications (CMSTQ). This ensures that all workers on the work site are indoctrinated to a minimum standard irrespective of training provided through Orientation. CMSTQ requirements will be entered into ISNetworld for each employee.

Table 2 CMTQ- Core Training

KM CORE Training Requirements (X = Required) *In-house training is acceptable*	Core Training Requirements (All Company) New/Annual Employee Orientation - Employer - Must include, but not limited to, general awareness training as defined in the TQ Matrix Course Descriptions. To view a list of course descriptions, click HERE.																									
	OWNER CLIENT Specific Orienation	Avalanche Awareness Safety	ATV/UTV Awareness Safety	Confined Space Awareness	Driving Safety Awareness	Electrical Awareness	Environmental General Awareness	Fall Protection Awareness	Fire Protection / Extinguishers Awareness	First Aid (OFA) Awareness	Flammable & Combustible Liquids Awareness	Hazard Recognition Awareness	H2S Awareness	Incident Reporting Awareness	Lockout / Tagout Awareness (Affected)	Mobile Heavy Equipmant and Spotting Awareness	Personal Protective Equipment - PPE	Slips, Trips, Falls & General Housekeeping, Walking/Working Surfaces	Tool (Hand/Small) Safety Awareness	Workplace Violence Awareness	Water Safety Awareness	Workplace Hazarouse Materials Information System (WHMIS)	Wild Animal Safety Awareness			
Training Frequency in Yrs (0=One Time)	1	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3			
ALL WORKERS	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X			

Core training requirements will be met by all WorleyParsonsCord and subcontract employees as a condition of employment. Additional training requirements based on location and risk assessment may include:

- CSTS 09;
- Fall protection;
- Confined Space (entry and monitor);
- Ground Disturbance 201;
- Forest Fire S100 Basic Training;
- H2S Alive;
- WHMIS 2015 (meets GHS requirements);
- Standard First Aid/CPR for Alberta & OFA for British Columbia:
    - Enough First Aiders onsite to meet the Provincial OHS requirement;

Additional Non-Core training will be provided based on roles, responsibilities or job types. See Appendix B for all additional training requirements in the training matrix.

8 COMMUNICATION

WorleyParsonsCord understands the importance of developing and maintaining effective lines of communication that keep the public and employees informed of important developments and newsworthy items pertaining to all types of safety concerns within the construction site.

Records of formal, internal communication shall be maintained as per the WorleyParsonsCord Document Control process. Internal communication within WorleyParsonsCord will follow established processes by WorleyParsonsCord including but not limited to:

- Change Management Request (CMR) process between TMEP and WorleyParsonsCord where safety policies, practices, standards or procedures are changed or deviate from existing operations requirements;
- Weekly Summary Reports;
- MOC process within WorleyParsonsCord where safety policies, practices, standards or procedures are changed or deviate from existing TMEP/WorleyParsonsCord requirements; and
- monthly, quarterly and annual summary reports for health and safety and which may require corrective action plans.

Internal:

Internal communications from WorleyParsonsCord to Trans Mountain about safety hazards, incidents will be done as quickly as possible. If an incident occurs WorleyParsonsCord will inform Trans Mountain as soon as possible for critical incidents via a face to face communication or a phone call if necessary. Incident reporting will be accordance with WorleyParsonsCord SSERP 01-13283-GG-0000-HS-PLN-0009 Incident reporting requirements for level 1-3 emergencies.

For hazard identifications and safety related information sharing; this will occur through the following:

- HSE Promotion;
- daily pre task instruction meetings;
- daily safety bulletins;
- daily coordination meetings; and,
- informally through face to face communication between WorleyParsonsCord and Trans Mountain personnel.

Depending on the safety concern, WorleyParsonsCord will utilize the following procedure for external communications:

- Press releases - Consultation with Trans Mountain will take place prior to any press release.
- Media - The WorleyParsonsCord media representative is the only authorized representative to communicate with the media on behalf of WorleyParsonsCord. This media representative will coordinate with Trans Mountain media contact personnel prior to any external communications. No worker shall release any information to the media.
- All media inquiries shall then be directed to the Trans Mountain Project Construction representative who will direct the media to the media@transmountain.com website for further information as it becomes released.

If approached by a member of the public with general enquiries into specific work being conducted, on a day to day basis, workers are permitted to discuss, within their area of expertise, their immediate tasks. Inquiries from the public into work as part of the general Project must be referred to **info@transmountain.com** or by calling 1-866-514-6700. The public can also be directed to www.transmountain.com for general Project information.

Figure 4 Media Communications Card

HSE Promotion

HSE signage/posters will be posted to provide workers with continued visual reinforcement of established HSE expectations, desirable behaviours, hazard warnings, and general communications and should include local languages and/or recognizable international safety symbols. An HSE Bulletin Board will be used to provide a means to consolidate important safety information in a central location.

HSE information may be relayed through the following means:

- HSE Notice Boards;
- HSE Bulletins and Newsletters;
- Incident Alerts;
- Biweekly HSE Meetings;
- Training/Orientation;
- Mail and Electronic Mail;
- HSE SharePoint site; and,
- Awareness Campaigns.

HSE Information and Postings

The site will have HSE postings placed in prominent positions. The HSE notice areas will hold relevant HSE data including, but not limited to:

- WorleyParsonsCord and Trans Mountain HSE Policies;
- Emergency Response Procedures (Including Maps of Muster Locations);
- HSE Alerts;
- HSE Inspections;
- Emergency Communication and Contacts;
- First Aid personnel;
- Environmental Management Plan;
- Fall Arrest Rescue Plan;
- Winter Readiness Plan (If applicable);
- Relevant Codes of Practice;
- Alcohol and Drug Policy;
- Workplace Respect Policy;
- NEB bulletins;
- Company Rules;
- Statistical Trending Graphs; and,
- Information updates related to safety requirements on the Project;

The following directives will be met with regards to HSE Notice Boards:

- All HSE Notice Boards should be kept in prominent and accessible locations to all project staff;

- The HSE notice areas will be kept clear of clutter or debris both in front of, and on the board itself;
- Keep personal or non-HSE related signs, posters and advertisements off of the HSE notice board;
- HSE personnel will ensure the HSE Notice Boards contain up to date HSE information and checks will be made to ensure the data is accurate and current; and,
- All documentation is kept current; e.g. HSE Meeting Minutes, HSE Inspections, ERP an Emergency Contact info, etc.

Kick-Off Meetings

Formal Kick off meetings will be conducted with various levels of the project (Senior Management, site Management, Supervisory Personnel), or where a new subcontractor is being introduced to an ongoing project. These kick off meetings may be combined to accommodate more than one level of audience levels and include the following fundamentals:

- Communicate safety expectations, objectives and desired results;
- Promote alignment, teamwork, and ownership;
- Provide high level overview of the site HSE Program;
- Demonstrate management leadership and commitment to safety; and,
- Communicate expectations to complete the subcontractor HSE performance reports.

Table 3 Kick-off Meeting Requirement Table

Audience	Timing
Management	After contract award and at mobilization and/or commencement of work scope.
Supervisory	At commencement of work scope.
Workforce	At commencement of work scope.

Daily Supervision Meetings

Daily Meeting will be held with Construction Managers, General Foreman, and Safety to discuss the plan for the day, identify any concerns that may arise, and discuss/plan mitigation strategies.

After this meeting a meeting with the Trade Foreman, will be conducted prior to the start of the day. This will be a focused overview of the day's planned activities for each Trade Foreman. It will also be used as a coordination meeting to ensure available equipment and resources are tasked appropriately for the day's events and that safety related issues are delegated to the appropriate personnel for completion.

Play of the Day

All WorleyParsonsCord personnel and subcontractors will attend daily Play of the Day meetings at the beginning of every workday. The purpose of this meeting is to present and discuss the daily work plan for all disciplines and for Site Management to promote a positive safety culture.

The most senior supervisor responsible for the activities directs these toolbox meetings. All involved supervisors and workers will attend and sign the Daily Sign in Sheet.

Topics that are discussed at this meeting typically include:

- Emerging Trans Mountain, WorleyParsonsCord or Regulatory Issues or Concerns;
- A Safety Moment – could be a Safe Work Practice, HSE Procedure, PSSP Elements or a general Safety Awareness Topic;
- Safety review of local, regional and project milestones;
- Brief overview of the Daily Tasks; and,
- Motivating Statement;

Field Tailgate Meetings (Task Specific)

Prior to the start of any field activities and immediately before any critical tasks are undertaken at the task specific work location, a Field Tailgate Meeting will be held. In these meetings, supervision is to review the hazards of the work and discuss the specific measures to be taken to protect workers from those hazards. The make-up the Tailgate Meeting will be the foreman, the crew, any support personnel, and any discipline working in the immediate area of concern.

The intent of this conversation is for:

- Review each group's/persons tasks;
- Supervisors to provide instruction on safe work practices and the hazards associated with the assigned tasks prior to the commencement of each work assignment;
- Ensure personnel assigned to tasks are competent;
- To ensure that all equipment, tools, and PPE are supplied/maintained at the workplace and are fit for purpose;
- To ensure that work scope activities do not commence unless all the appropriate documentation has been completed (JHA; FLRA's are prepared and personnel have been familiarized with the hazards, control measures and other requirements related to the work); and,
- To ensure that personnel are properly using the correct PPE and safety devices for the work being performed and that they are properly trained in the use of their tools and equipment.

The Field Tailgate will clarify and require that the specific hazards and controls of all tasks requiring a Safe Work Permit, any non-routine work, work requiring cranes or other lifting devices, or the handling of hazardous materials, etc. are thoroughly reviewed. This meeting will also identify the specific roles and HSE responsibilities of each crew member as applied to the proposed task. Teamwork coordination and any emergency actions that may be required as the result of the loss of control of a hazard will also be discussed.

Tailgate meetings will incur scheduled HSE Audits to ensure that Supervision is meeting the expectations set out in the White Hat Competency Verification Program.

Permit Coordination Meeting

This meeting will be conducted by supervision toward the end of the day. This brief review of the day's proceedings will be held to identify any planning consideration for upcoming work requiring a permit. Any permit requirements that have to be changed or adjusted will be discussed prior to the daily Coordination Meeting with TMEP management. Regardless of TMEP permit requirements being met, it is still mandatory that internal work permits are completed with regards to the Ground Disturbance Permit (GDP) and Confined Space.

The GDP permit requirements will be identified and completed with the participation of both the Supervisor and the onsite Health and Safety Representative.

Shift Safety Meetings

Each shift based on 10 days on and 4 days off, WorleyParsonsCord and our subcontractors will conduct a Shift Safety Meeting "Safety Sunday" which all personnel must attend. Minutes of all safety meetings with an attendance list will be maintained on file with copies provided to the designated WorleyParsonsCord Safety Representative.

This HSE meeting will review any significant Incidents, communications of the JHSC, findings of the Formal site Safety Inspection, communicate any special hazards, as well as enhance workers safety awareness and knowledge at the level necessary to support safe work behaviour.

A representative of WorleyParsonsCord will chair the WorleyParsonsCord Shift Safety meeting and TMEP Construction Management Team is encouraged to participate.

9 DOCUMENT CONTROL AND RECORDS MANAGEMENT

All HSE documentation generated on the Project, whether hard copy or electronic, will be controlled in accordance with the TMEP Document Control Plan. The plan will include WorleyParsonsCord archiving requirements as modified for the Project, to include additional statutory, Trans Mountain, and Project specific document retention and management requirements.

HSE Management System Documentation

The following documents work together to form the documentation for the Project's/Contract's HSE management system:

- Project Specific Safety Plan (this document);
- Site Specific Emergency Response Plan SSERP's;
- WorleyParsonsCord and/or Project's/Contract's HSE Policy;
- HSE Objectives and Targets and associated action plans;
- HSE procedures, programs and documents (including forms and checklists); and,
- Records generated as a result of the HSE management system (e.g. completed checklists, risk assessments, training attendance records, etc.).

10 INSPECTIONS, MEASUREMENT AND MONITORING

WorleyParsonsCord as a General or Prime Contractor will monitor and measure their safety performance against the defined safety targets and objectives. Evaluations and inspections are leading indicators that provide vital feedback to the overall performance and direction that a projects safety culture is taking. Focus can be directed at those areas that show less then desired results while utilizing HSE resources effectively and efficiently.

Safety Performance Measurement

WorleyParsonsCord' and subcontractors' HSE performance will be monitored on both a shift and monthly basis to ensure that the processes are in place and working effectively. Leading and lagging key performance indicators will be used to measure safety performance and promote continuous improvement. There are several leading indicators that are used by WorleyParsonsCord to identify at risk behavior. One such leading indicator that identifies HSE management risk is the White Hat Program.

Formal HSE Inspections

Formal inspections will be conducted by WorleyParsonsCord and its subcontractors to help identify potential hazards at the worksite. Some of these hazards become more apparent when inspecting the functioning work environment. WorleyParsonsCord and each subcontractor will complete at least one formal worksite inspection per shift in the field in the relevant area of responsibility.

A cross section of participants is encouraged and should include management, safety representatives, supervisors, and workers. A calendar for safety inspections will be created for each Pump Station and the Edmonton Terminal. An inspection report or checklist will be completed and submitted to the designated WorleyParsonsCord HSE Representative complete with the appropriate controls. A responsible individual will be assigned any recommendations to be taken and actions will be tracked until closure.

Inspection reports will identify hazards and recommend appropriate control measures. Wherever possible, hazards will be eliminated or mitigated.

Focus Inspections

Focus Inspections are a daily inspection meant to focus in on a particular task or element of the PSSP and will be completed on a daily basis by a site supervisor/representative. The Supervisor(s) responsible to complete the focus inspections will be pre-determined by the Construction Manager and site HSE Lead, and then defined in a project matrix so that project Supervision shares this responsibility evenly. Each Focus Inspection provides a snapshot of Safe vs. Unsafe actions and conditions observed during the inspection and provide leading indicators in terms of HSE performance and areas requiring improvement. All non-conformances identified will be communicated to the Construction Manager for delegation of corrective actions required to address the non-conformance.

Table 4 Focus Inspections

Examples of the areas covered in the focus inspection includes not limited to the following:

Scaffolding	FLRA
Ground Disturbance	Cranes and Equipment
Electrical Lockout	Rigging
Stop the Drop	Housekeeping

Informal Safety Inspections

Informal HSE inspections will be conducted daily by WorleyParsonsCord and subcontractor management, supervisors, and workers to ensure a continuous process of hazard identification, assessment, and control. These types of inspections are not documented, but include a management walk through, and any reporting of

hazardous acts and conditions via WorleyParsonsCord behaviour based observation program SAZ (Serious About Zero). These informal inspections should be visible to the workforce to assist in demonstrating subcontractor management commitment in providing a safe and healthy work environment.

Safety Audits/Reviews

Periodic independent reviews of the Project Specific Safety Plan are necessary to determine whether the system has been properly implemented and maintained and whether the performance objectives have been achieved.

WorleyParsonsCord and subcontractors will be subject to quarterly safety audit/reviews. This safety audit/review will be based on the requirements of maintaining the PSSP and are aimed at continuous improvement. The audit/review process will include a documentation review, interview, and observation process. WorleyParsonsCord and each subcontractor will promptly correct any identified action items.

11 INCIDENT REPORTING AND INVESTIGATIONS

Every incident and near miss shall be reported to ensure that an investigation is conducted to determine the cause and identify appropriate corrective actions to prevent recurrence.

Incident Investigation Process

WorleyParsonsCord will investigate and report all incidents and near misses in a consistent manner. The following standard will apply to all WorleyParsonsCord worksites:

- That all incidents and near misses occurring throughout the TMEP are reported and that the reporting is both accurate and uniform;
- That the incident reporting requirements of Trans Mountain, WorleyParsonsCord and the relevant national and local regulators are complied with as a minimum;
- That the causes of incidents and near misses are identified and that the necessary actions are taken to prevent recurrence;
- Accurate tracking of actions to closure to prevent recurrence;
- Sharing of lessons learnt from incidents and near misses across the Project; and,
- An auditable system for the reporting, investigation, tracking and review and of incidents and near misses and their subsequent corrective actions.

Requirements to be met

Every incident and near miss that falls within Trans Mountain reporting categories shall be reported to ensure that it is effectively managed and appropriate corrective action applied to prevent recurrence.

Response and Recovery

Immediately following any incident or near miss appropriate emergency response plans will be activated. The care of any injured persons, and the safety of all persons must be a first priority.

Post Incident Drug and Alcohol Testing

Post incident testing will be undertaken if there is reasonable suspicion that an individual's fitness for work may have been a contributing factor to an incident or near miss. Additionally, post incident drug and alcohol testing will be automatic for all involved, including the supervisor, where a fatality or permanent disability incident has occurred.

A positive test in a workplace environment is deemed to be an incident and as such must be recorded to the assurance database.

Investigation Findings and Corrective Actions

When an incident or near miss occurs immediate action shall be taken to make the workplace safe, followed by an investigation to prevent further occurrence.

Investigation findings will prompt, where necessary, a review of company procedures and processes, to ensure learnings are captured to help prevent recurrence. Causelink RCA software will be utilized for all recordable and high potential incidents.

Corrective actions arising out of incident investigations shall be implemented in accordance with the hierarchy of hazard controls.

The Hierarchy of Controls is:

1. Elimination (as the first priority, can the hazard be eliminated);
2. Substitution (substituting a hazardous substance for a less hazardous one);
3. Engineering controls (guarding, lifting mechanisms, etc.);
4. Administrative controls (procedures, signage, etc.); and,
5. Personal protective equipment (hearing protection, safety glasses, etc.).

In many situations, WorleyParsonsCord will use our internal R3 process to incident manage higher impact events; both threats and actual occurrences. Early notification is given to the Corporate R3 Group so that a determination can be made whether one or more R3 Teams need to be mobilized to manage necessary avoidance, response and/or recovery actions. WorleyParsonsCord Corporate R3 Group acts as our 3rd party investigation team.

Immediately following any incident or near miss appropriate emergency response plans will be enacted. The care of any injured persons, and the safety of all persons will be first priority.

WorleyParsonsCord will submit a copy of the written report and investigation (form **CSM-001** or equivalent) to the TMEP Representative, unless otherwise specified, within **48** hours of occurrence.

WorleyParsonsCord will maintain injury logs for our respective workers and contractors. All incidents occurring on Trans Mountain premises will be documented and reported.

As determined by the TMEP, WorleyParsonsCord is required to supply total employee hours worked on TMEP on a monthly basis using ISN Site Tracker, form CSM-007 or equivalent, which is due by the 15th of each month.

For WorleyParsonsCord Incident Reporting Procedure see Appendix D

12 SAFETY STAND DOWNS

Proactive

WorleyParsonsCord will schedule proactive Safety Stand Down meetings that coincide with major mile stones of the project. Senior managers will visit the site and discuss safety matters pertaining to the specific site and the project as a whole. These meetings will also give senior management an opportunity to recognise our employees for positive safe work behaviour through our Employee Rewards Program.

Reactive

Reactive Safety Stand Downs will occur whenever an unplanned event has or had the potential to occur or where poor safety performance has been identified. Safety Stand Down meetings provide an avenue to address concerns and build action plans with the affected employees and their leadership team. All meetings will be minuted and posted on the project HSE bulletin board.

WorleyParsonsCord Construction Manager or higher has the authority to initiate a Safety Stand Down. Typically the decision to have a stand down will be discussed by the Safety lead, Construction Manager in conjunction with a Trans Mountain representative.

SECTION 3: HEALTH & SAFETY PROGRAMS

13 AVALANCHE PREPAREDNESS

Avalanches occur naturally when the bonds that hold the winter snowpack together break from additional stresses created by weather factors such as rain, wind, rising temperatures and/or the weight of new or wind drifted snow.

WoreyParsonsCord will train through the orientation process all personnel on Avalanche Awareness. The training will include:

- Personal preparation for highway travel in avalanche zones;
    - Weather conditions (Drive BC)
    - Travel path planned (Journey Management)
    - Adequate time for travel
    - Winter driving skills (defensive driving)
    - Proper clothing
    - Understanding the Site Specific Emergency Response Plan
- Vehicle Preparedness
    - Winter tires (Mud and Snow)
    - Winter check up
    - Proper wiper blades
    - Communication (charged phone)
    - Winter survival Kit
    - Full fuel tanks

WorleyParsonsCord will monitor British Columbia's expansive Weather Network Programs and inform our employees at each location providing relevant information for the location on weather related notices.

Additional avalanche area evaluation and training will be provided to affected workers installing MLBV controls in designated avalanche zones and areas deemed to be high risk. Training will be compliant with the British Columbia OH&S Regulation.

14 DAMAGE PREVENTION

WorleyParsonsCord is member in good standing with the Gold Shovel Standard and as such, will ensure all affected personnel are trained to an approved standard by the company in ground disturbance procedures prior to any excavations taking place.

It will be the responsibility of Excavator to conduct all ground disturbance preliminary line locates and Alberta/British Columbia utility investigation for the duration of the TMEP.

Any and all ground disturbance operations conducted by WorleyParsonsCord, or its subcontractors, will be completed in accordance with WorleyParsonsCord Line Location Standard, as well as, all applicable Federal, Provincial, and Municipal laws/regulations for the jurisdiction(s), in addition to Trans Mountain policies and permitting.

The most stringent requirement will be followed in all cases involving ground disturbance/Line Location operations.

All ground disturbance documentation, Line Locate Drawings, Alberta/British Columbia ONE CALL, Historical Documentation, etc. will be provided to the WorleyParsonsCord Supervisor responsible for directing excavations and trenching 48 hours in advance so that a third party review can be conducted in compliance with WorleyParsonsCord Line Location Standard requirements.

WorleyParsonsCord will provide adequate protective systems such as benching, sloping, or shoring when the sides of a trench are more than 5’ / 1.5m deep and intended for worker entry.

Excavations over 20’ / 6.1m deep or that do not meet regulatory requirements will have protective systems designed by a Professional Engineer (P.Eng) within the same province. The P.Eng design documentation will be onsite and available for inspection.

WorleyParsonsCord Competent Person will conduct daily excavation inspections prior to anyone entering an excavation and this documentation (form **CSM-002** or equivalent) located at each excavation. If the inspection shows the area to be unsafe, the unsafe condition will be mitigated prior to resuming work.

A secured ladder, ramp, or other means of egress will be provided within 25’ (7.6m) of all workers in a trench that exceeds 4’ / 1.2m in depth and/or when using a trench box.

The Job Hazard Assessment will determine what atmospheric monitoring (e.g. O2, LEL, H2S, CO) will be conducted prior to a worker entering an excavation that exceeds 4’ / 1.2m in depth and has the potential to contain a hazardous atmosphere.

Excavated material will be placed at least 1 m away from the edge of the excavation (e.g., spoil pile, rocks, broken concrete or other debris).

If walkways are provided over excavations they will be capable of supporting the weight of the traffic, guardrails and toe boards. Every crossover will have engineering design documentation and meet regulatory design standards. Toe boards must be used, if working below the walkway.

Excavations will be secured to keep vehicles and unauthorized personnel out. High visibility fencing material placed 4’ / 1.2m from the edge of the excavation when possible will be used to warn of the danger in high profile/vehicular traffic areas. Traffic impact plans may be required in high vehicular traffic areas.

Line Locating Procedures

All Line Locates will be the responsibility of WorleyParsonsCord for the duration of the TMEP. WorleyParsonsCord Line Locate Expectations from the Ground Disturbance Excavation Safety Standard as outlined by WorleyParsonsCord.

A private utility locate will be completed for all ground disturbance activities and renewed as required by local jurisdictions. The site supervisor on the project will be at site during the utility locates to review the findings and ensure they clearly understand the locations of the sites buried utilities.

The supervisor is to complete the utility locate request form and include it in the ground disturbance package. Two independent private locates are to be completed by two separate companies.

Depending on the scope of work and the associated level of risk with the ground disturbance activity, one private locate may be conducted at the discretion of the Third Party Reviewer.

The Utility Locator is to be provided with a site diagram for reference to ensure that all relevant utilities are properly located and visibly marked. The diagram is to include the following information:

- The proposed ground disturbance area(s) identified as the Work Area(s); and,
- The 30 m zone around the proposed ground disturbance area(s) identified as the Search Area(s).

The locators are to provide an accurate locate diagram of the site, identifying all buried utilities located and/or identified. This information is to be included in the Ground Disturbance Package compiled by the site Supervisor prior to review by a Third Party Reviewer.

After the location of the existing buried facilities is identified, the project will review the find and:

- Adjust the location of proposed ground disturbance locations and the extent of scope based on location of buried utilities;
- Identify locations where daylighting using non mechanical means is required to expose a utility or gain clarity on any subsurface structure or anomaly;
- Plan the mobilization of equipment on site and general site access due to buried and/or overhead utilities;
- Compare the current location of buried utilities to previous locate drawings, site as-build's, and historical data to identify inconsistencies, all identified inconsistencies will be tracked and recorded;
- Reporting of all inconsistencies to the facility owner;and,
- Mitigate unforeseen risks by assessing the need to employ alternative forms of sub-surface identification when utilities cannot be located or unknown anomalies are identified.

Training and Competency

All affected personnel, both WorleyParsonsCord and assisting subcontractors, involved with operations that are defined as ground disturbance will have a valid Ground Disturbance Level II and have participated in Gold Shovel safety training.

All supervisors, both WorleyParsonsCord and assisting subcontractors, with valid training but no prior experience will be mentored by a WorleyParsonsCord Supervisor whom will have combined ground disturbance experience of not less than 1 year. All supervisors, both WorleyParsonsCord and assisting subcontractors, will additionally be familiar with the contents of the WorleyParsonsCord line location framework. Both the information presented here and site specific knowledge should be used to determine the scope of the Line Location services required. A subcontractor should be selected or hired accordingly.

Prior to contracting, the supervisor should:

- Acquire the most up-to-date map of all underground utilities on-site (as-built);
- Mark the proposed work area and the necessary search area around it;
- Follow the procedure as outlined in the ground disturbance and excavation safety standard; and,
- Consult any historical records and insure the as-built is accurate if current information proves/appears insufficient. All identified inconsistencies will be tracked and recorded.

This is to ensure that the scope of work required has been determined before the hiring of a subcontractor.

When the subcontractor is selected, the nature of the investigation, scope of the work, types of utilities expected, surface conditions, and availability of above ground access/exposed lines should be well communicated. A copy of the utility map should be given to the subcontractor so they can attempt to locate all lines/utilities in the search area.

For familiarization of the Standard and all associated forms in their entirety please refer to the following:

- Ground Disturbance (GD) Standard;
- Line Location Framework;
- GD Permit Form (Reference Appendix F);
- Third Party Review Form; and,
- GD Execution Plan Template.

15 DISCIPLINARY ACTION

When positive reinforcement and training fail to ensure a worker's compliance with WorleyParsonsCord HSE Management System and/or applicable health and safety legislation, a progressive disciplinary procedure will be enforced. This procedure will provide a documented set of consequences. However, if the situation is of a serious nature, where serious injury may have been or would have been caused or were non-compliance with any of the Project Lifesaving Rules, the violator will be automatically removed from the workplace.

Table 5 Disciplinary Action

FIRST OFFENCE Verbal warning to violator and recorded
SECOND OFFENCE Written warning to violator and recorded
THIRD OFFENCE Disciplinary action up to and including Termination

Disciplinary action taken against an employee will be formally recorded and placed in their onsite employee file, as well a copy should forwarded to the HR department to be placed in the employees permanent file for future reference.

Project Safety Rules

Figure 5 Project Safety Rules

1. **Confined Space-** Obtain authorization by the permit holder before entering a confined space

A confined space, such as a vessel, tank or pipe, can contain explosive gas, poisonous air or other dangers such as, lack of oxygen, things that can fall on you or you can fall from. Authorized and documented access keeps you safe.

2. **Working at Heights-** Protect yourself against a fall when working at height

Use fall protection equipment when working outside a protective environment where you can fall over 2.4 metres (8 feet) to keep you safe.

3. **Suspended Load-** Do not walk under a suspended load

Working or walking immediately under a suspended load is unsafe as the load can fall on you. A suspended load is an object that is temporarily lifted and hangs above the ground (rig floors are excluded from this rule).

4. **Seat belt-** Wear your seat belt

A seat belt protects you from injury in the event of an incident while driving and keeps you safe.

5. **Driving Safety-** While driving, do not use your phone and do not exceed speed limit

Speeding or using your phone while driving increases the risk of losing control of your vehicle. Trans Mountain has a back in only policy.

6. **Journey Management Plan-** Follow prescribed Journey Management Plan

A Journey Management Plan is a plan for you as a Driver that will help you to travel and arrive safely

7. **Work Permit-** Work with a valid Work Permit when required

A Work Permit describes what you must do to stay safe.

8. **Isolation Equipment-** Verify isolation before work begins utilizing the Lock Out Tag Out Policy/Procedure and use the specified life-protecting equipment

Isolation separates you from danger, such as electricity, pressure, toxic materials, poisonous gas, chemicals, hot liquids, or radiation, to keep you safe. Specified life-protecting equipment, such as breathing apparatus, electrical arc flash protection, or chemical resistant suits, protect you from danger.

Supplementary Rules

9. **Dropped Object-** Prevent Dropped Objects

There is a significant risk of dropped objects when using tools and portable equipment at height. Preventing objects from falling keeps you and people working below you safe.

10. **Safe Zone-** Position yourself in a safe zone in relation to moving and energized equipment

Working “in the line of fire” of moving equipment (e.g. cranes and other vehicles) and energized equipment (e.g. rotating, electrical or pressurized machinery) is unsafe as this can impact you.

11. **Excavation Activities**- Obtain authorization and required permits before starting excavation activities.

Excavation activities may contain hazards such as electrical cables, confined space, collapse of walls or excavated material. Check that it is safe (permitted) to start work start work within the 2.0m hot zone of the existing pipeline. An excavation is any man-made cut, cavity, trench, or depression formed by earth removal (e.g. digging).

12. **Gas Tests**- Conduct gas tests when required

Air is tested to stop explosions and/or make sure you can breathe the air safely

13. **Personal Flotation Devices**- Wear a personal floatation device when required

Personal flotation devices should always be worn when there is a danger of falling into water. When working near or on water, wearing a personal flotation device (e.g. life jackets or buoyancy aids) protects you from drowning.

14. **Electrical Power Lines-** Do not work under or near overhead electric power lines

Working with equipment immediately under or near overhead lines is unsafe as an electrical current or flashover can kill you. Maintain adequate distance to keep you safe. Be aware that a flashover can happen if you work within the clearance distance (e.g. 7 meters for 275kV line), even if you do not touch an overhead line.

15. **Alcohol and Drugs**- No Alcohol or drugs while working or driving

Using alcohol, illegal drugs and misusing legal drugs or other substances will reduce your ability to do your job safely

16. **Smoking**- Do not smoke outside of designated smoking areas

Smoking or use of matches or cigarette lighters could set on fire flammable materials. Designated smoking areas, such as a smoking hut or a smoking room, will keep you safe from causing fire and explosion.

17. **Lift Plan**- Follow prescribed lift plan

A lift plan describes how to lift and hoist safely. For routine lifts, there needs to be a general lift plan. For non-routine lifts, including complex and heavy lifts, the plan is specific.

18. **Safety-Critical Equipment**- Obtain authorization before overriding or disabling safety-critical equipment

Safety-critical equipment must work correctly to keep you safe. Examples of safety-critical equipment include isolation devices/emergency shut down valves, lock out/tag out devices trip systems, relief valves, fire and gas alarm systems, certain level controls, alarms, crane computers, In-Vehicle Monitoring Systems.

16 FATIGUE MANAGEMENT

Fatigue is generally defined as a feeling of lack of energy and motivation that can be physical, mental or both. Fatigue is not the same as drowsiness, but the desire to doze off may accompany fatigue. Apathy is a feeling of indifference that may accompany fatigue or exist independently. In addition, individuals often describe fatigue using a variety of terms including weary, tired, exhausted, etc. All management and supervisors will be responsible to make changes to work requirements if fatigue impairment signs are evident. Also, supervisory personnel are to recognize and respond to the signs and symptoms of fatigue.

The successful management of fatigue risk requires a shared responsibility between the WorleyParsonsCord and its personnel. Refer to Figure 1. Each party has control over a range of issues that may contribute to personnel becoming fatigued whilst at work.

Figure 6 – Shared Responsibility Model

17 FIT FOR WORK

An individual's fitness for work may be impaired by a variety of factors including the adverse effects of medical conditions, level of physical fitness, fatigue, stress, or the use of alcohol and other drugs. WorleyParsonsCord utilizes the Morning Stretching program to assess the workforce for anything that may be out of the ordinary. It is the expectation that all WorleyParsonsCord personnel and its subcontractors will participate in a pre-work Stretching program.

WorleyParsonsCord will implement its Alcohol and Drug (A&D) Program for providing a Safe Workplace. The pre-access and for cause requirements will be as per WorleyParsonsCord' procedures.
Supervisors will also receive basic training in their supervisory training on how to detect signs that a worker is not fit for duty including enhanced Alcohol & Drug Awareness for Supervisor training.

18 FOREST FIRE PREVENTION AND MITIGATION

Prior to commencement of construction, WorleyParsonsCord will designate one of our staff as the Fire Boss. The Fire Boss will be familiar with fire-fighting techniques and equipment. All Fire Bosses should have knowledge of fire weather and fire behavior.

Fire Suppression Supplies

Necessary firefighting equipment will be on site in accordance with the Alberta Forest, BC Wild fire Act, Wildfire Regulation and Prairie Protection Regulations.

As defined in the Wildfire Regulation, firefighting hand tools include shovels, axes, pulaskis, hand tank pumps, and fire extinguishers.

The Fire Boss will ensure that fire extinguishers are present and fully charged and all fire line equipment is present and in working order. The fire equipment and water supply on site should be increased as the fire hazard increases. In addition, all motorized equipment will carry a fully charged fire extinguisher.

A supply of fire extinguishers will be made available to suit the types of work being carried out and the class of fire that might be encountered. Trained personnel are to be familiarized with the general procedures for fire extinguishers use and hazards involved with first stage firefighting.

Personnel may encounter the following five different types of fires:

- Class A: Occurs in ordinary combustible materials such as wood, cloth, and paper. Extinguishing agents most commonly used are water and dry chemical agent;
- Class B: Occurs in vapor/air mixture of the surface of a flammable liquid such as grease, gasoline, or oil. BC – Type dry chemical (purple K) foam, carbon dioxide, and water-fog may be used as an extinguishing agent;
- Class C: Occurs in electrical equipment – non-conducting extinguishing agents will be used. Carbon dioxide is the most suitable. Dry chemicals may be used but will require extensive cleanup of equipment after use; and
- Most common type of fire extinguisher found and accepted on constructions sites are ABC, which handle all the above types of fires.

All portable fire extinguishers are subject to inspection, maintenance, and recharging as required by the AFC 2006, Division B, Article 6.2.1.1 that references NFPA 10, “Portable Fire Extinguishers.”(2002 Edition)

Inspection: A “quick check” that a fire extinguisher is available and is in operating condition. It is intended to give reasonable assurance that the fire extinguisher is fully charged. This is done by verifying that it is in its designated place, that it has not been actuated or tampered with, that there is no obvious physical damage or condition to prevent its operation, and that the indicators (if present) shows an acceptable level of charge

Fire extinguishers will be inspected monthly, or when it obvious that the extinguisher may be subjected to corrosive or damaging environments the frequency may be more often.

Fire Suppression Training

Fire suppression training (S-100) will be provided to the identified fire bosses for each location where forest fire risks have been identified.

Fire Hazard Identification and Control

When hot work (welding, cutting, grinding) is to be performed in areas that are within 15 m (50 ft.) of any flammable or combustible material, fire blankets, welding blinds, must be used to contain all sparks produced during the hot work process.

Spark containment will be in place for all hot work activities. Fire blankets will be installed in such a manner that they will contain the sparks in a controlled area. All hot work will stop if sparks are seen leaving the contained area, additional precautions will be put in place to contain sparks. Proper rated Fire extinguishers will be placed within 10 feet of all hot work sources and a designated fire watch will remain in place 30 mins after any hot work has been completed.

Under the British Columbia Wildfire act (section 6) WorleyParsonsCord will identify and document all hot work activities as per the Wildfire Regulation Definitions. The HSE team member on location will determine the fire danger based on representative weather available. Restrictions will be communicated via the daily bulletin to all WorleyParsonsCord employees, contractors, visitors and clients.

Fire Danger

Weather has a significant impact on wildfires – in how they start, how aggressively they spread, and how long they burn.

The BC Wildfire Service operates about 260 weather stations, which send reports on an hourly basis. These hourly weather observations, supplemented by data from other agency stations, support fire weather forecasting and the Canadian Forest Fire Danger Rating System (CFFDRS).

The computer-based CFFDRS is the primary fire management decision aid in Canada. With it, fire managers can assess the potential for ignition, spread and burning intensity. This information is used for making fire prevention, preparedness and suppression decisions, as well as other general fire management decisions.

Temperature, relative humidity, precipitation, wind speed and wind direction are recorded by the fully automated stations. This data is transmitted to BC Wildfire Service headquarters every hour from April through October, but less frequently and from fewer stations during the winter months. Data from other agencies' weather stations is also used and transferred electronically to headquarters.

Fire Danger Rating and High Risk Activities

The fire danger rating (i.e. the risk of a wildfire starting) for the province is updated daily at approximately 2 pm.

WorleyParsonsCord will apply for a Permit Variance from BC Regulatory Authorities (BC Ministry of Forestry Lands Natural Resources) when High Risk activities are planned on or within 300m of forested land or grass land on or after March 1st and before November 1st. All conditions of the permit variance will be communicated and adhered to (e.g. trained personnel, additional fire-fighting equipment such as water trucks, 24 hour spark-watch, etc.)

Refer to Section 33 of the SSERP 01-13283-GG-0000-HS-PLN-0009 Response to Fire for more information.

19 HEALTH PROGRAMS

Occupational Health will be assessed for the duration of the project. It is the intent of this section to identify the needs specific to each area of exposure and identify responsibilities to ensure that mitigated controls are in place with regards to occupational Health.

Any and all occupational health issues arising from the use of provided facilities will be communicated as soon as is reasonably practicable to the WorleyParsonsCord HSE Representative so that the delegated TMEP representative responsible can be notified respectively.

Process

A system will be in place to identify, assess, and manage physical, chemical, biological, ergonomic, and psychological hazards in the workplace for the duration of the TMEP life cycle. Where any substance is to be used that has significant potential to cause an adverse health effect, exposure to that substance will not exceed recognized occupational exposure limits. WorleyParsonsCord Project Management will ensure that the required control measures including protective equipment is properly used and, maintained. Every employee will make full and proper use of the control measures and equipment provided and report any defects.

Controls will be applied according to the hierarchy of controls:

- Elimination;
- Substitution;
- Minimization/Isolation;
- Engineering control;
- Administrative control; and,
- Use of Personal Protective Equipment.

Workplace exposure assessments and ongoing monitoring and medical surveillance programs will be conducted by competent people for all occupations, tasks and work environments, consistent with exposure risks.

Prevalence and incidence of work-related illness will be recorded, assessed and reviewed, using data available from all sources including medical surveillance programs and incident related medical treatments.

Employees, subcontractors, and visitors will have access to adequate medical and first aid services as appropriate to the location and nature of operations.

Systems will be in place for the rehabilitation of employees and contractors following work-related injury or illness. Employees suffering non work-related injuries or illness are assisted in their return to work, as appropriate.

Initiatives should be in place to promote and encourage a safe and healthy lifestyle. Employee assistance programs will be accessible to each WorleyParsonsCord Employee.

Community health hazards relevant to each operation will be identified in accordance with provincial law, then accessed and communicated to all project staff. Control measures should be implemented to manage the risks. Public Health and other relevant authorities are engaged, as appropriate.

Exposure Monitoring

A process will be in place to measure and monitor potential exposure to the hazards to health which are identified by WorleyParsonsCord onsite Construction Management and the HSE Representative. Results of monitoring will be conducted with assistance and participation of the project specific Joint Health and Safety Committee (JHSC) and its designated representatives.

Personal and/or work area monitoring will be utilized as appropriate to determine the efficiency of control methods and to support the assessment of health risk and epidemiological studies.

The workplace assessment will be based on source, area, other spot measurements, or personal exposure monitoring, using standard, documented I.H. methods, conducted by a trained person under the direction of Industrial Hygienist. Laboratory analysis (if required for verification) will be by accredited laboratories only.

A monitoring program will be established and documented. This will be a requirement of the Project or Office HSE Management Plan.

Selection and use of Respirators

A number of factors need to be carefully considered when selecting the appropriate type of respiratory equipment. It is very important to assess all these factors for each situation each time equipment is being chosen. Always take into consideration whether or not the equipment is going to be used for emergency conditions.

- Identify the airborne contaminant(s) — know the contaminant to ensure the respirator selected is approved for protecting against that specific contaminant. To select the appropriate particulate filter using the NIOSH classification system, it is necessary to determine whether or not oil is present in the workplace where the respirator will be used; and,
- Determine the concentration of the airborne contaminant(s) — determine the average workday concentration and the highest short-term concentrations of the contaminant.

Hazard Ration = Airborne Concentration/OEL
A respirator should never be used in an environment where the hazard ratio is greater than its assigned protection factor. To select the appropriate level of respirator protective equipment, use the highest hazard ration (HHR) or the individual components present.

Clothing

When choosing clothing to be worn on the TMEP, WorleyParsonsCord employees will dress with weather conditions in mind. In cold weather, clothing should be worn in multiple layers. When dressing with multiple layers you have the ability to control the amount of heat you generate while working. Clothing and undergarments will be the responsibility of the employee and it will be an expectation that each employee report to work ready for duty. The WorleyParsonsCord HSE department will issue daily updates on the weather and communicate any forecasts to WorleyParsonsCord employees on a daily basis. This will assist project staff in preparing clothing requirements for the next work day.

Heat Exhaustion

Heat exhaustion is a warning that the body is getting too hot. The person may be thirsty, giddy, weak, uncoordinated, nauseous, and sweating profusely. The body temperature is usually normal and the pulse is normal or raised. The skin is cold and clammy. Although heat exhaustion often is caused by the body's loss of water and salt, salt supplements should only be taken with advice from a doctor.

Heat exhaustion is the body's response to an excessive loss of water and salt contained in sweat. Those most prone to heat exhaustion are elderly people, people with high blood preset, and people working or exercising in a hot environment. WorleyParsonsCord Supervision, with the assistance of the WorleyParsonsCord HSE representative, will identify and control heat related hazards in accordance with WorleyParsonsCord COR requirements, related policies, standards, and applicable industry and legislated requirements, best practice, in addition to internal standards.

Heat Stroke

Heat stroke is a serious heat-related illness that requires immediate medical attention. Death or serious disability can result if symptoms are not addressed by of a medical professional. After exposure to extreme heat for extended periods, the body loses its ability to cool down naturally through sweating and evaporative cooling. All WorleyParsonsCord employees and Project Supervision will be provided awareness and communication on the

signs and symptoms of heat related illnesses and injuries as required and encouraged to monitor each other for signs and symptoms for the duration off the TMEP.

Heat Stress

Heat stress occurs when your body can no longer regulate your temperature and you become too hot. Heat stress leads to heat exhaustion heat stroke, or milder conditions like heat cramps. The main cause of heat stress is dehydration and exposure to heat. The humidity of the air also factors into the equation. Here are a few examples:

- If the temperature is 30 degrees and the humidity is 90%, then it feels like 40 degrees;
- A temperature of 32 degrees and a humidity of 70% feels like 40 degrees; and,
- A temperature of 36 degrees and a humidity of 40% feels like 40 degrees.

All three of these put you in the danger zone for heat stress.

WorleyParsonsCord Supervision will ensure that effective controls are in place with regards to limiting a workers exposure to heat stress prior to assigning the work such as:

- Job Rotation;
- Required Rest/Cool Down Breaks;
- Humidity and Temperature Monitoring; and,
- Water Jugs with Electrolytes Provided.

Cold Stress

Workers who are exposed to extreme cold or work in cold environments may be at risk of cold stress. Extreme cold weather is a dangerous situation that can bring on health emergencies in susceptible people, such as those without shelter, outdoor workers, and those who work in an area that is poorly insulated or without heat. What constitutes cold stress and its effects can vary across different areas of the country. In regions relatively unaccustomed to winter weather, near freezing temperatures are considered factors for "cold stress." Whenever temperatures drop decidedly below normal and as wind speed Increases, heat can more rapidly leave your body. These weather-related conditions may lead to serious health problems and will be monitored and controlled by WorleyParsonsCord project Supervision at all times.

Hypothermia

When exposed to cold temperatures, your body begins to lose heat faster than it can be produced. Prolonged exposure to cold will eventually use up your body's stored energy. The result is hypothermia, or abnormally low body temperature. A body temperature that is too low affects the brain, making the victim unable to think clearly or move well. This makes hypothermia particularly dangerous because a person may not know it is happening and will not be able to do anything about it.

Symptoms

Symptoms of hypothermia can vary depending on how long you have been exposed to the cold temperatures.

Early Symptoms include;

- Shivering;
- Fatigue;
- Loss of coordination; and,
- Confusion and disorientation.

Late Symptoms include;

- No shivering;
- Blue skin;
- Dilated pupils;
- Slowed pulse and breathing; and,

- Loss of consciousness.

Frostbite

Frostbite is an injury to the body that is caused by freezing. Frostbite causes a loss of feeling and color in the affected areas. It most often affects the nose, ears, cheeks, chin, fingers, or toes. Frostbite can permanently damage body tissues, and severe cases can lead to amputation. In extremely cold temperatures, the risk of frostbite is increased in workers with reduced blood circulation and among workers who are not dressed properly.

Symptoms of frostbite include:

- Reduced blood flow to hands and feet (fingers or toes can freeze);
- Numbness;
- Tingling or stinging;
- Aching; and,
- Bluish or pale, waxy skin.

N.O.R.M's

Radium, radon, and their decay products are radioactive elements of concern in petroleum production and gas processing. Human exposure may occur when contaminated dusts and sludge are inhaled or ingested (internal exposure) or when gamma radiation from surrounding equipment strikes the body (external exposure).

The amount of gamma radiation able to penetrate processing equipment is generally not large enough to present a health risk to employees although exceptions have been found.

Radium is found in most oil and gas fields in the world in varying concentrations. There is a potential to find radium in significant amounts in almost all types of equipment.

Radon is found in most natural gas deposits in the world. Radon is an inert, colourless, and odourless gas. Radon itself does not present a health hazard because it is not easily absorbed into the body and is quickly cleared when absorbed.

Radon's radioactive breakdown products, called radon progeny/daughters, may be hazardous. Radon naturally breaks down into radioactive metals before nonradioactive lead. Radon progeny/daughters may be inhaled or ingested when attached to scale or dust generated during equipment inspection and repair. Radon progeny/daughter exposure has been associated with an increased risk of lung cancer.

Work procedures are recommended when maintaining NORM contaminated equipment, such as pipelines, filters, pumps, lines, sludge, or wellhead equipment. The exposure risk is highest when grinding, cutting, polishing or performing other work that may generate dust. Get good technical advice if you suspect a NORM problem. If there is NORM contamination, all employees should attend a NORM training course.

Insect Bites

Insect bites are puncture wounds caused by insects. Due to the work location of the TMEP sites, insects will pose hazards that can be mitigated through awareness campaigns in addition to preventative action and supplied repellents.

Employees with known allergic reactions to insect bites will be encouraged to notify their Supervisor so that additional precautions can be taken to prevent an Incident.

Wildlife encounters

Construction activities in remote locations can cause substantial impacts to the environment and the wildlife that resides there. Government legislation provides protection to several different species and administers criminal convictions, fines, levies, etc. to offenders.

- Do not harass or feed wildlife or livestock;

- Do not allow pets on the ROW;
- Protection of waterfowl will be considered a priority of each employee and shouldn't under any circumstances be disturbed;
- Wildlife and waterfowl siting's will be immediately reported to the environmental representative; and,
- Where habitat degradation cannot be avoided, salvage and transplant vegetation or native seed of critical importance to the species.

Waterfowl/Migratory Birds

Waterfowl frequently land in wetlands surrounding the project site and so the risk of waterfowl nesting within construction areas will be considered.

All WorleyParsonsCord employees will be made aware of the policy and procedure of steps to be taken if there is evidence that migratory birds or their nests will be harmed by construction activity.

If evidence exists that migratory birds or their nest may be harmed as a result of construction activities all work in the immediate vicinity will STOP until appropriate avoidance measures can be implemented. The site supervisor should notify TMEP so that Environment Canada may be contacted for advice as needed. Activities will be suspended until the TMEP Environmental authorities responsible for construction have determined that there is no further risk to migratory birds.

It is an offence under the Migratory Birds Convention Act, 1994, for anyone to kill, hunt, capture, injure, harass, take or disturb a migratory bird or to damage, destroy, remove or disturb a migratory bird nest or eggs without a permit. Permits may only be granted for scientific purposes (scientific collection, education, salvage and rehabilitation), aviculture, taxidermy, damage or danger, airport safety, eiderdown collection and hunting.

Bear Awareness

Bear sightings are common surrounding the project site and human bear interface should be avoided at all costs. Bear awareness will be mandatory training during indoctrination for all WorleyParsonsCord project employees and subcontractors frequenting the project. Bears can learn to tolerate people even though their natural behavior pattern is to be wary of them. They learn this tolerance after they have repeated contact with people.

All Bear siting's should be immediately reported to your immediate supervisor.

Preventing Habituation
Human-bear conflicts can arise when the animal learns to associate people with food. This level of habituation is called human-food conditioning.

- Set boundaries –e.g. 400 metres from camp and do not let a bear encroach within the set boundary;
- Use negative experiences or devices to chase the bear away, such as bear bangers or a foghorn;
- Do not feed any wildlife or access human food sources; and,
- Do not let the bear feel comfortable around humans.

How to Protect Yourself
There are several tried and tested methods that have worked in previous situations however no one method is full proof when it comes to bears. Avoidance and preliminary preventive measures should always consider a first means of defense. However even with preventative measures in place human bear interface may still occur.

The following methods may increase your ability to avoid a bear attack:

- Stand on high ground;
- Raise your arms high;
- Shout aggressively;
- Utilize a whistle or air-horn;
- Use a shovel, stick, or whatever else is available in an aggressive manner; and,
- Act as if you are dominant to the bear.

If a bear attacks:

DO NOT PLAY DEAD

- Fighting is your best chance to end the attack;
- Fight back with everything you have;
- Strike at face and eyes, use whatever you can, rock, stick, pen etc.;
- NEVER GIVE UP; and,
- Use of Bear Spray (If Available).

Bear Spray:

Bear Spray has proven to be a deterrent for attacking or aggressive bears however the following precautions should be considered if use of bear spray is required:

- Spray needs to be readily available;
- Spray as close as you can to the bears face;
- Be Aware of Wind Direction;
- Short Sprays (Full can may only last 7-9 seconds);
- TARGET EYE AREA; and,
- 10 – 18 Feet Distance to Bear (each can is different).

Molds in the Workplace

Workers may be exposed to mold on water-damaged building materials inside buildings, sea cans, and during trailer maintenance and repair operations. The most common types of mold are generally not hazardous to healthy individuals, but some molds may be hazardous to certain individuals.

It will be the responsibility of the Supervisor to notify HSE of any suspected mold growth as soon as is reasonably practicable so that appropriate remedial actions can be taken to prevent Incident.

Ergonomics

Ergonomics is matching the job to the worker and product to the user. Ergonomics and human factors are often used interchangeably in workplaces. Both describe the interaction between the worker and the job demands. The difference between them is ergonomics focuses on how work affects workers, and human factors, emphasizes designs that reduce the potential for human error.

Ergonomic hazards refer to workplace conditions that pose the risk of injury to the musculoskeletal system of the worker. Examples of musculoskeletal injuries include tennis elbow (an inflammation of a tendon in the elbow) and carpal tunnel syndrome (a condition affecting the hand and wrist). Ergonomic hazards include repetitive and forceful movements, vibration, temperature extremes, and awkward postures that arise from improper work methods and improperly designed workstations, tools, and equipment.

Employees along with their Supervisor are to conduct a documented Ergonomic Self-Assessment.

Sanitation, Lunch Room and Hygiene

The following will be supplied by WorleyParsonsCord while on the TMEP. These are the basic health and welfare requirements expected to be addressed:

- Drinking water;
- Toilets(Includes regular cleaning);
- Washing facilities (Includes regular cleaning);
- Lunchrooms (Includes regular cleaning);
- Shelter;
- Seating;

- Temperature; and,
- Facilities Lighting.

Note: Employees are asked to use proper hygiene when at the work site. Coughing or sneezing into your sleeve and not on your hands can help minimize the spread of bacteria and viruses. When filling up water cups or bottles, keep the mouthpiece at a minimum of 3” from the tap. WorleyParsonsCord Project management will provide antibacterial hand wash at prominent locations as a deterrent from the spread of germs and bacteria.

20 NEW AND YOUNG WORKERS

Green Hat Mentorship –Short Service Workers

The Green Hat Mentorship and Competency Program is for workers that have less than one year of experience in industrial construction work, or who otherwise may require mentoring as determined by supervisors. In order to help supervisors determine workers that would fall into the Green Hat Mentorship and Competency Program, they must review the Worker Limitation/Experience Form which should have been completed during orientation.

The supervisor will assign a suitable mentor to the identified Green Hat worker. Only one Green Hat worker assigned per mentor.

- The mentor(s) will be assigned to the Green Hat worker for a minimum of 30 days to a maximum of 90 days.
- Until a mentor is assigned the direct supervisor of the Green Hat worker will assume the mentor role.
- Green Hat workers will not work alone or with other Green Hats, until they show competency in tasks being performed.

21 MODIFIED WORKER

Workers that have suffered a work related injury will be provided duties that are concurrent with the treating medical advisor's recommendations/limitations/restrictions. The WorleyParsonsCord Construction Management Team will manage these needs using one or more of the following options:

- Modify an existing job;
- Providing an alternate job;
- Provide a training opportunity;
- Providing transitional work; and,
- All or any combination of above.

Meaningful Work

Modified work will be meaningful and productive in that the work will contribute to the WorleyParsonsCord operation in a way that benefits the employee and WorleyParsonsCord. The work will be designed so as not to impede the healing of the present injury, and avoid re-injury to the worker.

The WorleyParsonsCord Construction Management Team will strive to ensure the following with regards to meaningful work:

- The Construction Management Team recognizing the potential of the injured employee;
- Ensuring that the employee is involved in the rehabilitation process from the beginning; and,
- Modified work should pose no threat to other workers.

22 SAFE DRIVING PROGRAM

Journey Management

WorleyParsonsCord has an established Journey Management and Road Safety Standard, including Journey risk assessment and trip monitoring/reporting, driver qualification, training and monitoring, use in-vehicle monitoring systems, and tracking of leading and lagging indicators that will be applied to TMEP. The WorleyParsonsCord Journey Management and Road Safety Standard also generate leading and lagging indicators that support TMEP socioeconomic indicator reporting requirements. The follow detail the important aspects of WorleyParsonsCord Journey Management and Road Safety Standard:

Journey Management Trip Planning and Risk Assessment:

- Specific Journeys over 100km (one way) or as defined by your location, will require Journey Management. This encompasses all Cord Owned, leased Vehicles and any personal vehicles that will be used for Company purposes;
- A process for planning and undertaking road transport journeys;
- Careful planning decreases risk;
- Journey Planning and preparation – identify hazards, aware of weather/road conditions, etc.;
- Telelink – service provider for booking and active tracking of Journey Management Plans;
- Journey Risk Assessment based on the information provided to Telelink; and,
- 24/7 live operator support.

In Vehicle Monitoring Systems (GFI Systems)

- In all company owned and long lease vehicles are equipped with in vehicle monitoring systems by GFI Systems;
- All TMEP site vehicles will be equipped with In vehicle monitoring systems;
- The systems monitors the progress of each Journey in real time as well as measure multiple parameters of driving
- Data from all Journeys is reported weekly and will part of monthly reports to TMEP as required;
- Exceptions to accepted driving performance (i.e. extreme braking) or contravention of laws (i.e. speeding) are monitored and immediately reported to the HSE Director for follow up;
- Determine the precise location of all vehicles;
- If a check-in call is missed we can determine the relative urgency of the situation (i.e. car is parked outside of hotel vs. an extended unplanned stop in a remote area);
- Timely and relevant feedback will be given to drivers regarding performance with follow up as required: and,
- Complaints from third parties can be quickly verified and addressed or disproven.

Driver Training:

- All personnel who drive company vehicles will be required to take the Defensive Green Drivers online training program.
- The average length of program 3 hours and it expires every three years;
- Personnel who drive >7000 km/year for company business or who drive off road will also be required to take a hands on defensive driving course.
- Drivers abstracts will also be obtained for anyone driving a company vehicle.

GEO Fencing- Sensitive to Socio-Economic needs:

- GEO Fencing is a tool that can be used to define geographical boundaries and set specific limit such as;
    - Speed limits set for site locations, school and playgrounds; and,
    - Mark roads that are not to be used and have notification sent immediately when used.

Site vehicles, their drivers and passengers will comply with all requirements in Company's Vehicle and Driving HSE Standard.

Winter driving

Rapid changes in elevation and weather can make highway conditions in B.C. and Alberta unpredictable during the winter. Most B.C. highways have high mountain passes where you are likely to encounter winter weather starting in October. It is the responsibility of the WorleyParsonsCord and subcontractor vehicle operator(s) to understand the conditions on the roads, WorleyParsonsCord will equip all owned and leased vehicles for the conditions to ensure the safety of the employees and the safety of others on the road.

TMEP Vehicle Requirements

- All vehicles must be in good mechanical condition;
- All vehicles must be equipped with:
    - 20LB Fire Extinguisher;
    - First Aid Kit; and,
    - Emergency Kit.
- All diesel motors must be equipped with an automatic Positive Air Shutoff;
- Any vehicles, i.e. pickers, cranes, etc. which require regulatory inspections/certification must be able to provide proof of inspection/certification upon request; and,
- Any vehicles requiring inspection log books must also be able to provide proof upon request.

23 SCHOOLS AND PLAYGROUND ZONES

All school and playground zones will be identified in the Traffic Management Plan. Additional mitigations will be required in these areas such as Geo Fencing, time and area restrictions. Communication will be established with all authorities in these zones prior to mobilization. Additional resources will be made available if additional crossing guards, signage and or supervision is required.

24 SAFE WORK PERMITTING

The permit to work system will address all the hazards identified by experience, history, and the hazard register(s) developed during risk assessments of operations at the site.

- The Construction Manager will nominate and document the Permit Authorities and their responsibilities. There will be a nominated person to manage the permit to work system.
- Permit Holders will be responsible for the activities of the work groups covered under a specific permit.

People assigned to the above designated roles will be trained in the permit to work system, its operation and will be competent in their specific roles in its operation.

WorleyParsonsCord while working on Brown Field Sites with Trans Mountain as the Prime Contractor will follow Trans Mountain Daily Safe Work Permit requirements. Ground Disturbance “30 Meter Permits” for Right of Way and Trans Mountain Facilities Ground Disturbance permits will be obtained prior to Ground Disturbances.

In certain situations, It will be agreed with operations to transfer permitting responsibilities within fenced operating areas to WorleyParsonsCord, agreements will be in writing and approved by both WorleyParsonsCord and Trans Mountain.

The Trans Mountain Safe Work Permit will identify specific activities, risks and required controls that have been deemed high risk such as:

- Hot Work;
- Confined Space; and,
- Lock out Tag out.

Trans Mountain Pipeline Protection Permits will be utilized for all Ground Disturbance activities located within Pump Stations or the Edmonton Terminal boundaries this will be inclusive of the 30 Meter Permit for ground disturbances within the Right of Way.

Daily Permit Coordination meetings will be held with relevant stakeholders including Trans Mountain Operations Liaison to review/prepare permit requirements for the following day.

Permit to Work, Greenfield Activities

The Permit to Work document from WorleyParsonsCord will act as Daily Safe Work Permit and will specify the work to be performed along with the associated controls. The permit(s) will include the following information;

- Work nature and Scope;
- Equipment Isolation;
- Personal Protection; and,
- Responsibilities of the Permit Receiver

Additional work permits will be required for certain activities at each TMEP site. All Safe Work Permits including ground disturbance will be in accordance with the requirements of the Permit to Work Standard, Permit to Work Procedure, associated forms, and templates will be in place before starting work to ensure that the work has been adequately planned in order to ensure safe work practices are observed.

Specific Work Permits, as a minimum, are required for the following activities:

- Confined Space Entry;
- Excavation and Penetration (ground disturbance);
- Radioactive Testing;
- Blasting and Explosives;
- Explosive Power Tools;
- Hot Work;
- Electric Access Permit;
- Crane suspended personnel baskets; and,
- High Voltage Electrical and Live Testing.

Adequate training will be provided by WorleyParsonsCord for permit receivers before engaging in the site “Permit to Work” process. All subcontractors are expected to provide suitable personnel for training as required.

The objectives of the Permit to Work system include:

- A safe system of work and all necessary precautions are in place and implemented;
- The proper authorization is obtained for all work to be performed;
- Substances which endanger personnel and/or the environment are isolated;
- Potential hazards are identified and precautions necessary to minimize any risks are implemented; and,
- Conflicting works which may pose a hazard to each other are identified.

Site procedures will list areas and specific tasks where specific permits are required. Any changes to permit requirements as agreed between WorleyParsonsCord and TMEP will be displayed on the appropriate HSE Notice boards and also notified to WorleyParsonsCord subcontractor’s site management by the WorleyParsonsCord Construction Manager.

25 WORKING ALONE

In accordance with WorleyParsonsCord Lone and Isolated Workers Standard and Risk Assessment, personnel are not permitted to work alone without specific approval from WorleyParsonsCord and Trans Mountain as required. WorleyParsonsCord Management approval will be subject to adequate arrangements for monitoring and support of the lone worker.

Personnel will not be permitted to work alone unless all of the following conditions are met:

- The activity they are engaged in has been assessed by site HSE personnel as of low hazard potential;
- The person's Supervisor is aware of their location and the nature of the work they are doing;
- Frequent, regular contact will be made by responsible personnel for the duration of the time they are alone; and,
- They have suitable means of communication with others to raise an alarm or summon assistance.

Personnel working alone or outside of normal working hours are required to call the Stay Connected toll free number to check in, update and check out while working on company business.

Stay Connected toll free number: 1-844-973-7483

26 WORKPLACE CONDUCT

WorleyParsonsCord Canada is committed to providing an environment which supports mutual respect, dignity and the ability of staff, contractors, students and whomever we do business with, or are associated with to work together collaboratively and productively. Our policy is that there will be no harassment or violence in the workplace.
It is the commitment of the Company to treat seriously all complaints of disrespectful or violent behaviour and to act upon all complaints to ensure that they are resolved quickly, confidentially, and fairly.

Harassment:
Harassment is defined as unwelcome and inappropriate verbal, visual, or physical conduct.

Workplace Violence:
Workplace Violence, whether at a work site or work related, is defined as the threatened, attempted or actual conduct of a person that causes or is likely to cause physical injury.

Procedures for Reporting Harassment and Workplace Violence

Right to Assistance:
Any employee who has been subjected to harassment or violence has the right to access assistance in communicating their objections, and, if warranted, in pursuing the complaint more formally.
In the event an employee feels they have been subjected to harassment or violence, the following steps should be taken.
Formal Reporting:
If the incident involves violence, or if the behaviour of the alleged offender has not changed as a result of step 1 above, the individual should:
1. Contact any member of management or Human Resources immediately.
2. Be prepared to answer the following questions:
   - What happened? What did you experience or encounter?
   - Who was involved?
   - When did the incident occur?
   - What was your response?
   - Were there any witnesses to the incident?

3. Provide any additional information you consider relevant.
Investigation and Follow-Up:
All complaints will be taken seriously and investigated by WorleyParsonsCord management or Human Resources staff. All complaints will be dealt with in confidence. Only those people who need to know will learn about the complaint. This includes the alleged offender who will be given the right to respond to the allegation. No correspondence relating to the complaint, other than that which is your personal property will be place in your Human Resources file.

Security

The WorleyParsonsCord Project Security Management Plan, Trans Mountain security plan and WorleyParsons Guideline shall be applied to ensure that project related security risks to people, assets and operations are minimized by incorporating a security risk assessment that is contained in the Project Security Management Plan

and prepared in accordance with the EMS Ready, Response and Recovery workflow. The Security Management Plan is a secure document and its circulation requires strict control.

All personnel and vehicles will be required to pass through the site security gate to gain access. All WorleyParsonsCord personnel will be required to take the Full Project Orientation and fill out paperwork to obtain an ISNet ID access card for the security gate. All vehicles required registration prior to arrival.

All personnel working on site are required to possess valid ID that will be confirmed following a site induction. Access to the site shall only be via the designated entrance(s).

All vehicles requiring access to the sites shall possess a relevant Vehicle Access Permit obtainable through the Site Project Manager.

Security is everyone's responsibility. Office trailers are locked. Good security practices include:

- Reporting all solicitors or loiterers to management;
- All vendors and deliveries are to sign in at the designated gate. A Delivery Orientation will be completed and an escort will be required for site access;
- Visitors are to sign in and receive an access card. Visitor Orientation will be required and visitors must be accompanied at all times when on site by a fully orientated personnel;
- All location workers / personnel witnessing unusual activities at or near the site will be required to immediately report said activities to their supervisor. Management will be responsible for providing direction, reporting the activities to local authorities if required. Never leave valuables unattended – lock them in cabinets or drawers;
- All incidents of theft/vandalism/sabotage will be reported immediately to site Management and the area of the incident will be secured from anyone entering that could result in tampering of evidence. Management will be responsible for direction in regards to reporting to TMEP Security and local authorities (i.e. Police) if deemed necessary;
- Escorting employees, contractors, and sub-contractors off site if they were terminated or laid off;
- Reporting any suspicious package that has been delivered to the site;
- Tools and equipment will be locked in supplied tool crib, sea-cans, and job boxes within the project boundaries while personnel are off site. Keys are under control of the respective Superintendent.
- Photograph restriction in effect. Approval from Management is required; and,

Threats will be taken seriously and will be reported to the Project Manager Immediately. Management will be responsible for direction in regards to reporting to local authorities (i.e. Police) if deemed necessary

SECTION 4: CONSTRUCTION STANDARDS

27 BRUSHING AND CLEARING

Brushing and clearing activities will be performed by subcontractors specialized in tree clearing. A specific safety plan must be submitted to WorleyParsonsCord for review form the tree clearing subcontractor. WorleyParsonsCord will conduct a pre activity kick off meeting with any tree clearing subcontractor. Specific hazards that must be included in the safety plan for tree clearing activities will include; slashing / mulching activities, slash cleanup activities, chain saw safety, specialized equipment safety, fall protection, line of fire, and body reaction and exertion.

Brushing and clearing activities will only commence once a proper assessment of the ROW is complete including the fall zones that may be outside of the ROW. The assessment will be documented on a site specific JHA while taking in to consideration of the following potential hazards:

- Danger trees;
- Overhead utilities;
- Adjacent structures and equipment;
- Potential fall zones;
- Fire and flood risk;
- Other workers in the area;
- Equipment protection;
- Underground and overhead utilities; and,
- Worker competency

Within limits as shown on contract document, WorleyParsonsCord will remove and dispose of all trees, logs, brush, undergrowth, deadwood, roots, vegetation, rubbish and other perishable or unsuitable matter. Requirements stated in the environmental plans shall be met.

Underground and Overhead Utilities

Exposure to underground and overhead utilities will be assessed prior to commencement of brushing or clearing activities. Minimum safe work distances will be followed at all times throughout the assessment and construction phases. Visual aids for safe limits of approach will be established utilizing spotters, signage and hi-viz goal-posts on paths, road ways and anywhere equipment or material may come into contact with the utility.

Tree and brush clearing that falls within the limits of approach established by Alberta OH&S Code Section 225 and Worksafe BC Part 19 will have ensure a properly trained/certified utility arborist or qualified electrical worker is present at the site and directing he work, and at least one additional qualified person who is trained in appropriate emergency rescue is present.

The following tables identifies the limits of approach for a utility arborist in Alberta and British Columbia.

Table 6 -WorkSafe BC Limits of approach for utility arborists

Voltage range	A. Insulated tool limit for certified utility arborists	B. Work limit for certified utility arborists	C. Work limit for apprentice utility arborists

Phase to phase	Metres	Feet	Metres	Feet	Metres	Feet
Over 750 V to 20 kV	**0.3**	1	**0.9**	3	**3**	10
Over 20 kV to 30 kV	**0.5**	1.5	**1.2**	4	**3**	10
Over 30 kV to 75 kV	**0.9**	3	**1.5**	5	**3**	10
Over 75 kV to 250 kV	**2.1**	7	**3**	10	**4.5**	15
Over 250 kV to 325 kV	**2.6**	8.5	**4.5**	15	**6**	20
Over 325 kV to 550 kV	**3.7**	12	**6**	20	**6**	20

Table 7 Alberta Safe limits of approach distances

Operating voltage between conductors of overhead power line	Safe limit of approach distance for persons and equipment
0 — 750 volts Insulated or polyethylene covered conductors (1)	300 millimetres
0 — 750 volts Bare, uninsulated	1.0 metre
Above 750 volts Insulated conductors (1) (2)	1.0 metre
750 volts — 40 kilovolts	3.0 metres
69 kilovolts, 72 kilovolts	3.5 metres
138 kilovolts, 144 kilovolts	4.0 metres
230 kilovolts, 260 kilovolts	5.0 metres
500 kilovolts	7.0 metres

Danger Trees

Dangerous trees pose a risk to personnel, equipment and material if they are not properly assessed and controlled as required. A dangerous tree is defined as:

Is any tree (regardless of size) that is hazardous to people or facilities because of:

- Location or lean;
- physical damage;
- overhead hazards;
- deterioration of limbs;
- stem or root system; or,
- combination of the above

A certified Dangerous Tree and Wildlife Tree Assessor will be onsite when there is suspect of dangerous trees to be fallen. Only certified, competent tree fellers will be permitted to down any trees along the TMEP.

The following tree felling procedures shall be followed:

- The ROW must be assessed for Danger Trees and be removed by a competent tree faller;
- All activities will be documented and retained as per WorleyParsonsCord Document Control Process;
- All chainsaw operators must be competent to use the equipment;
- Fallers must move a distance of 3 m (10 ft.) away to a predetermined safe zone, when a tree starts to fall; All other unauthorized personnel shall be kept away from the immediate area using barricades;
- All vehicles and equipment must be parked a minimum of 100 m (330 ft.) from the falling area;
- All equipment working in area must have Rollover Protection System (ROPS) and Falling Object Protection System (FOPS); screens and roll-cages;
- Consideration shall be given for existing utilities in the area. This includes both underground and above ground utilities.
- Workers shall understand and provide clear hand signals; and
- All chain saw fueling must be conducted inside drip trays or on top of absorbent pads to prevent environmental spills. Fueling is not allowed within 100 m (330 ft.) of a water course.

28 CONSTRUCTION VEHICLE TRAFFIC

Access to TMEP Pump Stations and Edmonton Terminal will be controlled in accordance with WorleyParsonsCord Vehicle and Driving Standard, Traffic Management Plan and Trans Mountains overarching Traffic and Access Control Management Plan (01-13283-GG-0000-HS-PLN-0003).
WorleyParsonsCord will establish ongoing assessments at each work location to manage the risks associated with the movements of vehicles on site in both internal and external operating areas. Additional hazard warning signs, trained flagging personnel and spotters utilized in specific areas based on the hazard assessment.

Driving with Courteous Conduct

In recognition of Trans Mountain key principles along with “the Responsible Way” and WorleyParsonsCord “Cord Cares”, it will be the expectation of every WorleyParsonsCord employee and subcontractor to adhere to the following points when driving:

General Requirements

- Slow down to reduce dust, blowing snow and the hazards of flying rocks;
- Reduce speed and Increase spacing between individual vehicles;
- Use headlights and four-way flashers so others can see you;
- Advise all employees of any unsafe road conditions due to dust and reduced visibility;
- Slow down by all residences and when meeting oncoming traffic; obey all posted signage/speed limits;
- Watch for school buses, pedestrians, cyclists, wildlife, slow-moving/agricultural equipment, livestock, persons on horseback, and ATVs;
- Use designated traffic routes to lessen the impact to residences and communities or as identified by municipal authorities, permit approval or by Trans Mountain-preferred routing;
- When practical, move equipment at times that minimize disturbances to area residents, for example before or after regularly scheduled school bus hours;
- Pull over and come to a complete stop when encountering a school bus;
- Exercise good judgment and caution when passing other vehicles;
- Use correct radio communications and protocol on controlled roads;
- Be aware of the proximity of residents and public;
- Facilities to the potential sources of noise;
- Use engine retarder brakes appropriately and avoid using “Jake brakes” in urban centres, country residential and acreage areas;
- Ensure muffler and exhaust systems are in good condition (straight pipe exhaust arrangements are prohibited);
- Meet all provincial motor vehicle and traffic safety acts and regulations;
- All light vehicles will only be driven by operators who have a valid driver’s license for that class of vehicle;
- Off-highway vehicles and mobile equipment will only be driven and/or operated by a person who has appropriate licenses or certificates, has obtained training, and has demonstrated competency to operate the equipment. Documentation will be made readily available upon request. Training records should be kept in the personal file of the operator;
- Employees have an obligation to declare their ineligibility to drive, in the event that their license to drive off site has been suspended or expired;
- The maximum number of persons permitted in a motor vehicle will be one per seat belt available. No passengers will be allowed to ride in a truck box;
- Seat belts will be worn at all times while operating a vehicle on the site;
- Seat belts will be worn at all times by passengers in company supplied light vehicles, equipment and other means of transport as specified by the business unit;
- All posted speed limits and traffic signs will be observed and the right of way yielded to pedestrians; and,

- A vehicle will be pulled off to the side of a roadway and stopped before the operator may use a cell phone. The use of cell phones is forbidden in all brownfield areas.

Driving in Residential Areas

Construction traffic in residential areas will be avoided where practical. Where the need to use residential streets is required, the following considerations must be taken:

- School and playground zones;
- Congested road ways (front street parking); and,
- Noise (hours of travel

Gravel and Delivery vehicles

All delivery vehicles accessing the Pump station locations and the Edmonton Terminal will be subjected to load assessments and will be escorted by a competent spotter. All gravel and delivery vehicles must adhere to the following:

- Drivers who do not have proper PPE shall remain in the cab of the vehicle;
- NO Person shall attempt to slam the tailgate of a dump box with their hands:
- Drivers are not permitted to leave site with their box raised in the air, box must be seated; and
- Drivers of trucks with a gross weight greater than 5,500 kg (12,000 lbs) working in the oil and gas industry are required to be certified in an Enform or equivalent driver course per Worksafe BC Part 23.22 Driver training.

Crossing/ Working on or adjacent to Roads or Railways

WorleyParsonsCord will minimize exposure of loading and unloading near public roadways and railroad crossings. Where the situation arises and the need to load/unload near roadways and or rail crossings, WorleyParsonsCord will ensure proper traffic control measures are in place and the task is completed by certified, competent employees.

The minimum requirements are set through the Traffic and Access Control Management Plan provided by Trans Mountain.

29 GRADING

Grading on the Edmonton Terminal and associated Pump Stations will be in compliance with Environment Protection Plan, Damage Prevention Plan and all crossing agreements are in place.

The site(s) will be rough graded to the levels, profiles and contours shown on the drawings or as required for concrete slabs, paving, or granular course construction.

Unless shown otherwise on the drawings, the gap between the finished grade and the bottom of the security fence will not exceed 50 mm and the finished grade of the site shall extend 500 mm beyond the security fence in all directions unless otherwise shown on the drawings.

See Appendix C for Ground Disturbance

30 HOT WORK IN TRANS MOUNTAIN FACILITIES

All hot work conducted at Trans Mountain facilities will be completed in accordance with Trans Mountain Safe Work Permit system.

Hot Work activities for the TMEP may include the following:

- Welding;
- Oxy-cutting;
- Grinding;
- Drilling;
- Jack hammering;
- Using any electrically-powered device;
- Any activity likely to produce sparks;
- Using any device with a hot surface > 150°C; and
- Using any spark-ignition engine.

Hot work will not be performed until:

- Atmospheric monitoring has been completed and proven not to contain a flammable substance;
- Isolation measures have been installed and tested to prevent exposure to flammable or combustible materials;
- Flammable liquids and vapours are isolated/controlled by:
    - Ensuring open drains within 15m have a cover and water seal; and,
    - Ensuring all potential flammable vapour sources located within 15m of the worksite are isolated.

Atmospheric Testing

WorleyParsonsCord will appoint a competent person to perform all Atmospheric testing will be completed as often as necessary before and while employees are in the area. Testing will be documented on the Safe Work Permit at regular intervals including after scheduled breaks or where work has stopped for more than 20 minutes.

31 HOT WORK CONTROL

When hot work (welding, cutting, grinding) is to be performed in areas that are within 15 m (50 ft.) of any flammable or combustible material, fire blankets, welding blinds, must be used to contain all sparks produced during the hot work process.

Spark containment will be in place for all hot work activities. Fire blankets will be installed in such a manner that they will contain the sparks in a controlled area. All hot work will stop if sparks are seen leaving the contained area, additional precautions will be put in place to contain sparks. Proper rated Fire extinguishers will be placed within 10 feet of all hot work sources.

Fire Suppression Training

Fire suppression training (S-100) will be provided to the identified fire bosses for each location where forest fire risks have been identified.

Fire Danger Rating and High Risk Activities

The fire danger rating (i.e. the risk of a wildfire starting) for the province is updated daily at approximately 2 pm.

WorleyParsonsCord will apply for a Permit Variance from BC Regulatory Authorities (BC Ministry of Forestry Lands Natural Resources) when High Risk activities are planned on or within 300m of forested land or grass land on or after March 1st and before November 1st. All conditions of the permit variance will be communicated and adhered to (e.g. trained personnel, additional fire-fighting equipment such as water trucks, 24 hour spark-watch, etc.)

Under the British Columbia Wildfire act (section 6) WorleyParsonsCord will identify and document all hot work activities as per the Wildfire Regulation Definitions. The HSE team member on location will determine the fire danger based on representative weather available. Restrictions will be communicated via the daily bulletin to all WorleyParsonsCord employees, contractors, visitors and clients.

Permit variance will be applied for and proper authorities contacted.

Refer to Section 33 of the SSERP 01-13283-GG-0000-HS-PLN-0009 Response to Fire for more information.

32 HYDROSTATIC PRESSURE TESTING

WorleyParsonsCord will develop a project hydrostatic test plan and job specific hydrostatic test package as per the TMEP and WorleyParsonsCord Quality Plan specifications. All plans will be submitted to TMEP for review within 14 days of the planned test. Included in the plans are:

Hydrotesting shall be performed in accordance with the applicable Code and TMEP specifications. After receipt of required approvals, the Construction Manager will delegate the hydrotest execution to the approved Hydro Testing Foreman, who in turn, will set up the hydrotest.

The Testing Foreman will ensure that everything is ready for the hydrotest, including:

- Ensuring that the testing equipment used can handle the required pressures;
- Verifying that pressure test gauges, if required, have been properly located and calibrated certificates are current;
- Ensures that gauge number(s) are logged on the Hydrotest Report form (CPL-FSP-03-03);
- Ensures that air is bled off using the high point vents; and,
- Ensures that gaskets are installed as per the Customer specification requirements (correct type, thickness, size, pressure rating and identification color code

Prior to pressuring the system, the Testing Foreman ensures that appropriate safety barriers and signs are erected.

Safety Precautions during Testing Operations

All personnel involved in the test will be trained and will participate in the development of the Job Hazard Analysis (JHA).

- Procedure and a JHA must be developed and in place prior to commencement of work. A SWP will be in place prior to the commencement of work;
- Prior to commencing the pressure test a personnel exclusion zone using warning barriers, supplemented with warning signs (Danger High Pressure Test), will be erected at the fill point and around piping system areas under test that are accessible to personnel, thus creating a minimum exclusion zone of 30m.
    - This informs personnel in the immediate area that hydrotesting is in progress.
    - The barriers will be brightly coloured and warning signs indicating a hydrotest is in progress strategically placed at regular intervals along the length of the exclusion zone.
    - The only personnel permitted to access the exclusion zone will be those directly involve with the hydrotest and only when the pressure is below 100% of the specified minimum yield strength (SMYS) of the system being tested. . The number of personnel within the exclusion zone will be kept to the absolute minimum necessary.
- The extent of the exclusion zone near buildings and other occupied structures, measured from the nearest pressure containing component of the test circuit, shall be determined by the Construction Manager. The exclusion zone will vary depending on the test pressure and the material / equipment being tested.

See Quality plan for the Hydrostatic testing procedure.

33 PIPE HANDLING

All rigging, its use, and those who are authorized to conduct rigging activities must comply with WorleyParsonsCord Rigging Equipment Selection and Use Standard.

Defective or damaged chains, slings, cables, or components will be tagged and removed from service immediately. Hooks, rings, links, or any coupling device will have a rating equivalent or greater than the chain, sling, or cable to which it is affixed. Never use makeshift links or coupling devices.

Chains will not be used for vertical lifting of materials weighing over 1,000 lbs. / 454 kilograms.
Daily inspections before use will be conducted and documented to look for wear, abrasions, collapse, and any other visible damage. Individual conducting the inspection will be designated as a competent person.

All personnel involved in hoisting and rigging operations must be deemed competent in the following:

- Sling and hitch types;
- Sling capacity determination;
- Equipment inspection, care, and maintenance;
- Load weight and center of gravity determination;
- Safe lifting techniques; and,

Inspections

Daily inspections before use must be conducted and documented by Contractor to look for wear, abrasions, collapse and any other visible damage. Individual conducting the inspection will be designated as a competent person by the WorleyParsonsCord.

All chains, slings and cables will have an identification tag attached showing its load rating and limitations.

Cranes and Lifting Devices

In accordance with WorleyParsonsCord Lifting Equipment and Operations Standard, Crane Heavy Lift Standard and their associated processes, all crane operators will possess both a valid driving license, trade ticket and the appropriate Certificate of Competency for the capacity of crane.

Only competent personnel shall work with cranes and lifting equipment. The competency evaluation procedure shall be in place to ensure operator competency, which will be regularly reviewed. The competency will be evidence of license and practical competency on the particular crane to be used.

A formal selection and acceptance process based on risk assessment will be in place for all new lifting equipment. Manufacture's crane and lifting equipment operating manuals and load charts will be immediately available to the operator.

Proximity Planning (cranes in working radius of each other)

Lift supervisor will determine the working area of each crane for points of installation, lay down, tail swing up to and including counterweights. When a crane must go through the working space of the other crane the designated signal persons must receive permission from the other signal person/crane operator prior to lift being executed.

Pre-Lift Meeting will be held as a tailgate with all workers associated with the lift to discuss the details of the procedure.

A lift plan describes how to lift and hoist safely. For routine lifts, WorleyParsonsCord will execute a general lift plan. For non-routine lifts, including complex and heavy lifts, the plan will be specific.

WorleyParsonsCord has eight key principles for crane operation.

Eight key areas that control lifting and hoisting safety

1) Planning
- A lift plan is required for every lift. If the lift deviates from the plan, make safe and stop the job.
- Hazard identification and risk assessment are an integral part of planning a lift.
- An assessment of the lift and determination of the lift method, equipment and number of people required are critical to planning of the lift.

2) Control
- One person in the lift team is designated as the person in charge of the lifting operation (referred to as PIC).
- The PIC reviews the lift plan and ensure that the required controls are in place and the lift is carried out following the plan.
- The PIC ensures that the lift team has tested and understood visual or radio communications prior to the lift.
- All personnel involved in the lifting operation shall have their individual responsibilities clearly allocated.
- All people shall be kept clear of overhead loads and areas of potential impact.
- Manual load handling shall not be used to stop a swinging load and shall only be performed below shoulder height.

3) Competence
- All persons involved in planning/performing lifting and maintaining lifting equipment shall be trained and competent for their role.
- Refresher training and periodic assessment is necessary to assure competence.

4) Equipment
- Equipment shall be fit for its intended purpose and operating conditions and shall be designed to a recognized standard.
- Equipment shall be fitted with appropriate safety devices.
- Any safety devices installed on lifting equipment shall be operational and not over-ridden.

5) Inspection, Maintenance and Certification
- Equipment integrity shall be maintained, supported by an equipment register.
- Lifting devices and equipment shall undergo detailed/thorough examination by a competent person at least every 12 months, and at least every 6 months for equipment used to lift people.
- All lifting devices and equipment shall be visually examined before use.

6) Load Integrity and Stability
- Load shall not exceed dynamic and/or static capacities of the lifting equipment.
- The integrity and stability of loads shall be verified before lifting.

7) Lifting of Personnel
- Lifting of personnel shall be avoided unless the risk has been demonstrated as being as low as is reasonably practicable.
- Lifting of personnel shall be according to a specific personnel lift plan for that lift.
- Lifted personnel shall be properly secured with lanyards unless written procedures and risk assessment require otherwise.

8) Management Systems
- Lifting operations will be conducted in accordance with a documented Management System.

Lifts will be broke into three classifications.

- Standard Lift (any lift between 0% and 75% chart capacity and not deemed serious or critical);
- Serious Lift (any lift between 75% and 90% chart capacity, involve personnel baskets, encroach the limits of approach for electrical lines, center of gravity/weight is unknown); and,
- Critical Lift (any lift involving two or more cranes where the total weight of the load Is greater than 75% of each crane, swing of the load, Special rigging i.e. multi-level, 3 or more spreader bars are used and or when the lift is greater than 90%.

34 PIPE LOWERING IN

WorleyParsonsCord will have a designated rigger and spotter for all spool placements within properly ditched excavations.

All equipment used for lowering in piping and other materials will be inspected (documented) and properly rated for the task. All side booms will be equipped with ROPS.

SAFETY CONSIDERATIONS FOR LOWERING IN PIPE

- All equipment to be parked a minimum of 1 m (3 ft.) away from ditch edges.
- Workers are prohibited from walking under suspended loads, or being in the ditch when pipe is being hoisted or lowered.
- All rigging must be inspected before use and worn slings discarded.
- Equipment operators must maintain visual contact with riggers and Foreman.
- Operators must refer to manufacturer's load chart to ensure hoisting is done within specifications.
- Safety latches are required on all boom hooks except when ditch entry is prohibited due to poor condition. Safety latches may be taped back for single lifts only.
- The ditch may be entered to remove rigging if the pipe is set in the ditch and the ditch deemed safe with appropriate sloping as per OH&S Regulations.
- If the pipeline parallels or crosses high voltage power lines non-conductive slings shall be used.

35 PRESSURE TESTING (FACILITIES)

TMEP will provide WorleyParsonsCord with the pressure testing specifications to be followed. Included in the specifications are test pressures, test durations and other technical specifications.

Pneumatic testing will not be permitted due to the amount of stored energy involved. Specifications may require that instrumentation air systems be tested in this manner. The following safety precautions must be taken during this type of test if approved by Trans Mountain:

All pneumatic testing requires the stored energy to be calculated. If the stored energy calculations exceed the provincial requirements, the appropriate government approvals must be obtained prior to the work being performed.

The procedure requires approval from WorleyParsonsCord Project Director or his designate before proceeding with a pneumatic test.

- Employees working on testing will be trained in operating testing equipment.
- A safe area will be calculated, barricaded and tagged to prevent people not directly associated with the test from entering the area.
- Communications will be maintained for all involved with the test.
- Pipe will be secured from movement during the test and venting process.
- Pressurization of pipe will be done in increments to avoid over-pressurization of the system.
- Protection will be provided to prevent plugs from being able to travel if they fail. Stay away from plugged ends, since that is where the pressure will release.
- Never tighten fittings while they are under pressure.
- Pipe pressuring devices must not be left unattended during test.
- Hoses and lines will be secured to prevent them coming apart while under pressure.

Hydrotesting shall be performed in accordance with the applicable Code and TMEP specifications. After receipt of required approvals, the Construction Manager will delegate the hydrotest execution to the approved Hydro Testing Foreman, who in turn, will set up the hydrotest.

Additional information on Hydrostatic testing may be found in section 32 of this PSSP.

36 TANK CONSTRUCTION

WorleyParsonsCord will construct four (4) new tanks 3 X 250k bbl tanks and 1 X.220k bbl tank in the west tank area of the Edmonton Terminal. Construction of the tanks will commence when all engineered work packages have been reviewed and proven to be understood by the site supervision and frontline workers.

WorleyParsonsCord will facilitate a kick off meeting with the two Tank Constructor subcontractors, HSE Lead and Trade Foreman to discuss the specific elements required to execute the task safely. Detailed safe work plans will be generated and distributed including applicable 3 Week Look Ahead schedules, JHA's, to all affected personnel. These plans will be referenced throughout the construction of the four tanks and will serve as a basis for the development of the field level risk assessments.

37 TIE- IN OF EXISTING TMPL

A Trans Mountain Operations permit will be in place to work on a tie in to the existing Trans Mountain Pipeline. The coal tar pipe coating on the existing Trans Mountain pipeline contains 10% to 25% asbestos by weight. BC/Alberta Legislation requires WorleyParsonsCord to send a Notice of Project (NOP) 48/72 hours prior removing any asbestos-containing material from the pipe.

Any workers who will be exposed to asbestos will be properly trained as per WorkSafe BC – Section 6. WorleyParsonsCord will contact the TMPL Representative 10 days prior to removal of ACM. WorleyParsonsCord will ensure notification to the applicable regulatory agencies has been completed prior to removal. WorleyParsonsCord employees and contractors working with Asbestos will be properly trained and protected. Protective clothing includes goggles and respirators equipped with high efficiency particulate air filters. Employees and contractors working with Asbestos shall wear rubber boots and use disposable coveralls and gloves.

Asbestos Disposal
Asbestos or asbestos related materials will not be disposed of in the common trash. All Asbestos materials shall be properly bagged and disposed of at an approved Asbestos landfill. Asbestos waste bags that are specifically designed for materials containing hazardous substances will be provided. The polyethylene bags are printed with an Asbestos warning label, 127 centimeters wide, 84 centimeters deep and a minimum of 6 millimeters thick. Once the bags have been filled, they are completely sealed with duct tape. During transportation to the Asbestos landfill, they are placed in double-sealed waste containers with warning labels that include the TMEP Terminal address of where the Asbestos originated from.

38 TIE-INS

Construction of the TMEP will involve a number of tie-ins, such as tying in new pump stations to the new line. WorleyParsonsCord procedures will be used to tie-in new facilities with consideration to TMEP procedures. Tie-in activities to piping systems that are in-service will be detailed in a job plan under the direction of a Trans Mountain field engineer. WorleyParsonsCord will dig, and slope bell holes to allow for welding operations. If bell holes cannot be constructed to OH&S regulatory requirements WorleyParsonsCord shall provide trench boxes or shoring.

Safety Consideration for Tie-Ins:

- Conduct a JHA and involve all workers in a Tailgate Meeting.
- Workers must not place any body part between pipe ends during alignment.
- Conduct continuous air monitoring when welders are working in a bell hole.
- Some bells holes due to their depth are classified as confined spaces, if working in a confined space confined space entry and rescue procedures must be followed.

39 WORKING ON (STEEP) SLOPES

Proper engineering and careful planning will be completed prior to mobilization of equipment on any slopes of 11 degrees or higher.

Prior to starting work on steep slopes, a site assessment must be conducted to determine the degree of slope and possible soil conditions of the area.

Some hazards associated with working on steep slopes include:

- Equipment operators are unable to see ground support workers (ground support workers working in operator's blind spot);
- Rigging Failure (improper rigging, or component failure);
- Miscommunication between workers;
- Equipment failure including booms, cables, winches and hydraulics;
- Equipment, loss of traction due to soil conditions, e.g., wet, frozen, unstable rock;
- Excavator instability due to changing forces when swinging; and,
- Instability due to vertical and horizontal slopes.

Safety Guidelines for Working on Steep Slopes

- Read the Equipment Operator's Manual, review lift capacities: o Lift capacities will decrease on slopes or soft ground, verify in Operator's Manual; and,
- Ensure decreased lift capacities are factored in when lifting on slopes for: o Lifting pipe, excavators lifting soil and material.

A pre-use inspection must be conducted on equipment prior to working on slopes, taking into consideration that:

- Lubricant and fluid levels may be different than for work on flat ground, ensure proper level for slopes;
- Check operational controls, such as, brakes, counter-weight movement;
- Adjust the equipment seat to ensure maximum operator stability;
- Ensure all items in the equipment cab are secured;
- All ground personnel shall conduct a pre-meeting with the Operator to review all hand signals;
- Ground Workers shall not work between equipment on steep slopes due to potential equipment or rigging failure. Ground workers must stay at least 0.6 m (2 ft.) from any moving part of equipment, e.g., counterweight or boom, pipe. Ground personnel must stay in the Operator's view at all times;
- Ground Workers must never place themselves under suspended loads;
- Avoid, if possible, leaving equipment unattended on a steep slope; if the equipment must be left unattended ensure that:
  - All loads are lowered.
  - The park break is fully engaged.

Anchoring

If anchoring of equipment is necessary, the following must be considered:

- The equipment to be used ;
- Proper cable sizes to be used ; and
- Proper shackles to be used

SECTION 5: SAFE WORK REQUIREMENTS

40 MEDICAL EMERGENCY RESPONSE PLAN

In planning for incident/illness response, site leadership and HSE will identify what resources including AED's are required and how long to deploy those resources. Understanding the scope of work, manpower loading, and the nearest medical clinic will determine the infrastructure and supplies required to respond to potential incidents. HSE Advisors and Senior Management will establish communication and build a rapport with the local clinics providing copies of our injury management forms as well as an overview of our modified work program. Partnering with an appropriate medical provider, WorleyParsonsCord can provide better access to occupational healthcare and enhance the effectiveness' of their treatments. All work related injuries will be reported to WorleyParsonsCord Supervision prior to accessing medical facilities unless an emergency arises that makes this prior notification impractical/life threatening.

Medical Emergency

The potential for an emergency exists due to activities performed within the boundaries of the worksite and the types of materials handled. Additionally, natural or other events (e.g. 'Acts of God') could create an emergency situation at the facilities that must be appropriately and effectively managed.

The response to an incident is always tailored to the requirements of the particular event. While the SSERP presents a broad range of capabilities and procedures, only those activities appropriate to a particular situation are employed. For example, the location shall only be evacuated if personnel are in direct physical danger. Depending on their scale, emergency situations may elicit a full, partial or no emergency evacuation.

All incidents that occur on site are to be immediately reported to the Construction Manager, Trans Mountain representatives including HSE. The Construction Manager will ensure any worker(s) injuries are immediately addressed. The On Site Supervisor(s) will contact the Construction Manager and together they will decide if the incident is an alert or an emergency.

For serious OH&S incidents under Alberta/BC legislation, all site work must stop and the site must be secured to preserve evidence until the arrival of OH&S. If an emergency stoppage is issued work permits will not be renewed until they receive clearance from OH&S and sound the 'All Clear' signal.

For the duration of the emergency, access to the facility location is controlled. Complete security is established 24 hours a day. Only those persons who can contribute to the resolution of the emergency will be admitted to the facility location until the crisis has passed. As is the case under normal circumstances, as much as is reasonably practicable, all persons leaving the facility during an emergency will be logged out (i.e. a record made of that person's departure).

The site specific emergency response plan and site plot plan information will be posted on all location bulletin boards.

Rescue and Medical Duties for Assigned Employees

WorleyParsonsCord will provide emergency response services to the Trans Mountain Expansion Project site. This strategy will provide consistent reporting, communication and alignment for the site. Emergency Services will respond to all emergencies when the alarm has been activated.

Trained WorleyParsonsCord and Subcontractor volunteers will function as 'First Responders.' If WorleyParsonsCord Services requires support in responding to an emergency, the Construction Manager will request assistance from local Fire Department.

Emergency responders both on and off-site who can assist with medical treatment and rescue emergencies shall be clearly identified at all times. WorleyParsonsCord employees trained in first-aid and CPR in co-operation with Trans Mountain Emergency Services (if necessary) shall be available at all times and be operational in accordance with Alberta OH&S Regulation Part 11 - First Aid and Worksafe BC Part 3.15-3.21.

Key requirements

WorleyParsonsCord will have personnel trained and immediately available to provide first aid/CPR treatment on site. Copies of current first aid/CPR certificates will be available onsite and via SharePoint.
WorleyParsonsCord will ensure all applicable first aid supplies are applicable to the hazard and are available onsite at all times..

WorleyParsonsCord has identified potential emergencies and has developed a Site Specific Emergency Plan for the each location and will have it available at all times. The SSERP includes:

- Location of the job site (GPS and LSD);
- Name of hospital or Emergency Care Center where WorleyParsonsCord personnel would be transported
- Travel route;
- A statement saying: "In Case of Serious Injury Call 911" or a specific number for the area; and,
- For remote premises, the Plan will include applicable transportation (STARS).

Modified Work

Workers that have suffered a work related injury must be provided duties that are concurrent with the treating medical advisor recommendations/limitations/restrictions. The WorleyParsonsCord Construction Management Team will manage these needs using one or more of the following options:

- Modify an existing job;
- Providing an alternate job;
- Provide a training opportunity;
- Providing transitional work; and,
- Any combination of above

Meaningful Work
Modified work must be meaningful and productive in that the work must contribute to the company's operation in a way that benefits the employee and company. The work must be designed so as not to impede the healing of the present injury, and avoid re-injury to the worker. The WorleyParsonsCord Construction

Injury and Illness Transportation

For all non-emergency illness and injuries, WorleyParsonsCord Supervision will arrange and provide transport to a medical facility using an appropriate and safe means of transport.

For all Major injury and illness related transportation needs in remote locations, STARS should be the primary mode of transport. If this is not practical, it will be the expectation that the injured worker will be transported to the hospital via Hospital dispatched Ambulance or designated Emergency Transport Vehicle (ETV).

41 ASBESTOS

The potential of encountering Asbestos-Containing Material (ACM) while performing work on TMEP premises exists. WorleyParsonsCord will request TMEP identify those areas where ACM may be or is present, if known. All historical information pertaining to ACM will be requested for review and planning.

Responsibilities

The implementation of Asbestos SWP is the responsibility of all WorleyParsonsCord personnel, and ultimate responsibility for adherence to the SWP rests with all senior management, including Project Managing Directors.

The Foreman will inform all employees of areas where asbestos is known to be, or may be, present, and prevent them from entering the area. The Foreman will also alert the Project Management of these areas.

The Worker(s) will adhere to the Asbestos Safety Safe Work Practice. If a Worker encounters a situation where there are unknown fibers present, the employee must stop work and inform their immediate supervisor. The Worker must refuse to work in areas where exposure to asbestos fibers is possible.

Control Plan

Work requiring ACM removal will be supervised by an individual who has received comprehensive abatement training. The training will meet the regulatory requirements of the Province where work is taking place. Training records and certificates will be documented and maintained by the WorleyParsonsCord J+ program. All training records and certificates will be readily available for review by TMEP upon request.

If asbestos abatement is deemed necessary, the appropriate provincial workplace health and safety agencies must be notified. All workers must be notified of the presence of asbestos.

To restrict emissions to adjacent areas, an enclosure will be constructed around an area from which the ACM is to be removed.
A documented procedure must be followed for removing, disposing, disturbing, or handling asbestos.
All asbestos-containing material must be identified with signage or other clear markings. An inventory of materials containing asbestos must be kept. They shall not be disturbed.

All workers who may be exposed to asbestos must be trained on the hazards and safe handling of asbestos.

All asbestos-containing materials removed during abatement activities must be adequately contained and labelled. Any asbestos waste and dust must be cleaned away promptly.

42 BURNING

No open burning will be permitted on WorleyParsonsCord/TMEP worksites.

43 CONFINED SPACE

Prior to entry into a confined space/ restricted space a hazard assessment must be completed by a supervisor. The hazards assessment must include the following information;

- Outline of scope of work;
- Identify, assess, and control the hazards the worker is likely to be exposed to in the confined or restricted space;
- Specify the type and frequency of inspections and tests necessary to determine the likelihood of worker exposure to any of the identified hazards;
- Specify who will perform the inspections and atmospheric testing identified;
- Specify the safety and personal protective equipment required to perform the work;
- Identify the personal protective equipment and emergency equipment to be used by a worker who undertakes rescue operations in the event of an accident or other emergency;
- Ensure that all personnel have the appropriate training that are work on the project;
- Refer to any JHA that may be applicable for the job;
- Types of isolations that are required; and,
- Ensure that there is a safe entrance to and exit from all accessible parts of the confined space

Hazards assessment shall include involvement from all levels of workers. Supervisor will hold a pre-job safety/ kick off meeting to inform all personnel of the hazards, all workers involved with entry will review and sign the JHA. Hazard assessments are a living document and must be reassessed at reasonably practicable intervals. All hazard assessment must be approved by management and safety department prior to the commencement of the entry.

Confined/restricted space classifications

To reflect the relative hazards, and to ensure a consistent approach, confined space entries have been classified into Level 1, Level 2, and Level 3. The classification of entry shall be based on the conditions present at the time of entry with the consideration for potential changes of conditions as identified in the hazards assessment.

Level 1 classification

A confined space will be considered a level 1 is the either the first or initial entry, and include one or all of the following:

- The hazards in the confined space or in its proximity are either not know or have not been determined;
- Oxygen concentration is less than 19.5% or more than 23% by volume;
- Explosive or flammable atmosphere between 10% and 20% of the lower explosive limit (LEL); and,
- The area exceeds the protective limits of air purifier respirator

Requirements for level 1

The following controls MUST be put in place for a level 1 classification:

- Approved hazard assessment;

- Supplied breathing apparatus;
- Training of inspection and use of supplied breathing apparatus;
- Qualified confined space monitor;
- A reviewed and approved rescue plan;
- Valid confined space entry permit;
- And an evacuation plan;
- A level 1 entry tag hung at each entrance; and,
- Confined space entry log

Level 2 classification

A confined space will be considered a level 2 if all identified hazards are controlled and all the following applies or exists:

- An oxygen concentration is between 19.5% and 23.0% by volume;
- Explosive or flammable atmosphere is > (greater than) 1% and < (less than) 10% lower explosive limit (LEL); and,
- Concentration of toxic substance exceeds 50% of the Occupational Exposure Limit (OEL)

Requirements for level 2

The following controls MUST be in place for level 2 classification:

- Approved hazard assessment;
- Qualified confined space monitor in attendance at all times;
- Valid confined space entry permit;
- Evacuation procedure;
- Valid rescue plan;
- A valid entry tag hung at each entrance; and,
- Confined space entry log

Level 3 classification

A confined space will be considered a level 3 if all identified hazards are controlled, the potential for change is unlikely and all the following applies or exists:

- Oxygen concentration is between 19.5% and 23.0% by volume;
- Concentration of explosive gasses is , (less than) 1% of the LEL; and
- Airborne concentrations of toxic substances is less than 50% of the OEL

Requirements for level 3

The following controls MUST be in place for a level 3 classification:

- Approved hazards Assessment;
- Qualified confined space monitor may be required;
- A valid confined space entry permit;
- An evacuation procedure;
- Valid rescue plan;

- A valid entry tag hung at each entrance; and
- Confined space entry log

Signage and Entry Tags

Whenever an entrance to a confined space is left unattended, three types of signs are used as indications of the status of the space and the requirements for entry.

Level 1

DANGER DO NOT ENTER

- This sign overrides all other signs at entrances to confined spaces when it is in place NO ONE is to enter the space under any circumstances. This sign will be placed if an event occurs that could compromise the conditions of the space

Figure 7 Danger Do Not Enter Sign

Level 2 and 3

CONFINED SPACE MONITOR AND PERMIT REQUIRED FOR ENTRY

- This sign is used to signify that the space is safe to enter provided that the people authorized to enter have a valid confined space permit and there is a confined space monitor present at the entrance when they enter

Figure 8 Confined Space Sign

Entry tags

Before any permit is issued for entry to a confined space, an ENTRY TAG must be completed and will contain the following information as a minimum

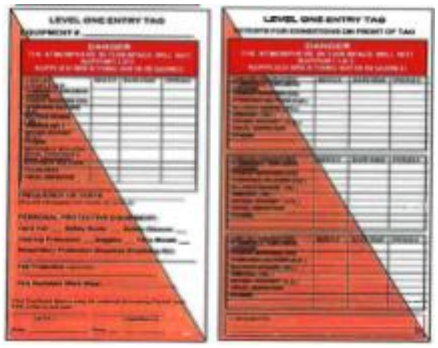
- Equipment number, description or identification;
- Entry level;
- Checks completed (atmospheric tests, temperature, cleanliness);

- Frequency of subsequent tests;
- Personal protective equipment required for entry name and signature and atmospheric tester;
- Date and time of initial atmospheric tests; and
- On the reverse side of tag, signature and time of subsequent retests will be recorded

Level 1 Entry Tag

A visually distinguishable salmon pink and white level 1 entry tag shall be used to identify IDLH

Figure 9 Confined Space Level 1 Entry Tag



Level 2 and 3 Entry Tag

A green and yellow level 2 and 3 entry tag shall be used

Figure 10 Confined Space Level 2/3 Entry Tag

44 ELECTRICAL SAFETY

Key Requirements

Power cable systems within the work area must be de-energized during excavation whenever there is doubt about cable location. WorleyParsonsCord will protect workers from electric shock while using power tools, appliances and related equipment by using Ground Fault Interrupter (GFI) systems on all power outlets/sources during construction and maintenance.

Only qualified and authorized WorleyParsonsCord Industrial Services and Electrical contractors will be permitted to work on electrical equipment on the TMEP.

Electrical Cabling/Wiring

All electrical cabling/wiring systems used to provide power to the work are to be installed by a qualified person.

All electrical equipment used in electrical installations will be of a rating approved for the specific purpose for which is it to be employed.

- All flexible extension cords and cord sets shall comply with local standards;
- All single phase plugs and sockets (including those on portable power tools) shall either be non-rewirable (molded) or transparent;
- All flexible extension cords shall be heavy duty sheathed;
- Cables normally used for fixed wiring shall not be used for flexible extension cords;
- All fittings for flexible conductors, flexible extension cords and cables shall be wired so that identical phases, neutral and earth connections will be selected by the pins of plugs when inserted in different sockets ie. correct polarization;
- All construction wiring shall be in accordance with local Regulations and standards;
- All construction cables shall be double insulated and mechanically protected; and,
- Aerial cables shall be positioned to avoid crossing roadways or access ways where cranes, high loads or heavy machinery may travel. Minimum clearance to ground of an aerial cable should be 22 feet (7m), taking sag and sway into account. A flagged safety barrier shall be placed 19 feet (6m) either side of an aerial cable where they cross the access way. The safety barrier shall be located at least 24 inches (600mm) below the minimum height of the aerial cable.

Electrical Inspections

All portable electrical equipment used for construction and demolition shall be inspected and tested using methods stated in Portable electrical equipment standard.

- Ground fault interrupters (residual current device) shall be tested.
- All other electrical equipment shall be inspected and tested using methods stated in local standards. With the exception to equipment that exemptions presently exist.
- When equipment including hired equipment is tested and found to be unsatisfactory, it shall be withdrawn from service immediately and have a warning tag attached to it warning against further use. Equipment shall not be returned to service until it has been repaired and retested by a licensed electrician.
- Equipment shall be inspected and tested at intervals stated in attachment Frequency Testing and Inspection. All results shall be recorded, made available, and retained for a period of seven years.
- All tested equipment shall be durably and legibly tagged with the following information:
    - plant or item number;
    - date of inspection/test;
    - next due test date;
    - electrician's certificate number; and
    - tester's signature.

45 OVERHEAD POWER LINES

WorleyParsonsCord will advise our workers and contractors of the location of any power lines, hazards involved, and the protective measures to ensure lines are not hit during the site specific orientation.

Mandatory controls to prevent utility strikes must include three of the following five layers of safety controls:

- Signage – "Beware of Overhead Lines" signs must be placed at equipment operator's eye level and must be a minimum of 2 feet by 2 feet (60cm by 60cm);
- Physical barriers – A non-conductive barrier, i.e., goal posts with rope and ribbons/flagging, must be set outside the limits of the approach on both upstream and downstream sides at a minimum of 10 feet;
- Dedicated spotter – A dedicated person to monitor and direct traffic around and under lines using an appropriate audible alarm such as an air horn to warn operators of the hazard;
- Proximity alarms – Alarms attached to the equipment that are set off when equipment is too close to an energized source; and,
- Utility controls – site specific controls (i.e., line insulators, line raising or outage(s)).

WorleyParsonsCord contact the local utility company and be aware of any special requirements. WorleyParsonsCord will maintain the clearance to the power line following minimum clearance requirements set by provincial legislation

British Columbia

Table 8 Minimum approach distance when working close to exposed electrical equipment and conductors

Column 1 Voltage	Column 2 Minimum approach distance for working close to exposed electrical equipment or conductors	
Phase to phase	Metres	Feet
Over 750 V to 75 kV	3	10
Over 75 kV to 250 kV	4.5	15
Over 250 kV to 550 kV	6	20

Table 9 Minimum clearance distance when passing under exposed electrical equipment and conductors

Column 1 Voltage	Column 2 Minimum clearance distance for passing under exposed electrical equipment or conductors	
Phase to phase	Metres	Feet
Over 750 V to 75 kV	2	6.5
Over 75 kV to 250 kV	3	10
Over 250 kV to 550 kV	4	13

Table 10 Alberta Safe limit of approach distances from overhead power lines for persons and equipment:

Operating voltage between conductors of overhead power line	Safe limit of approach distance for persons and equipment
0-750 volts Insulated or polyethylene covered conductors (1)	300 millimetres
0-750 volts Bare, uninsulated	1.0 metre
Above 750 volts Insulated conductors (1) (2)	1.0 metre
750 volts-40 kilovolts	3.0 metres
69 kilovolts, 72 kilovolts	3.5 metres
138 kilovolts, 144 kilovolts	4.0 metres
230 kilovolts, 260 kilovolts	5.0 metres
500 kilovolts	7.0 metres

46 EXCAVATIONS, TRENCHING & SHORING

There are a number of hazards that shall be considered when excavation activities are planned so that the work can be conducted safely. The hazards fall into the following groups. Not all groups are present for each excavation.

- Injury to workers entering, leaving, or crossing an excavation;
- Damage to underground services such as piping, electric cables, telephone cables etc;
- Damage to protected vegetation or archeologically significant areas;
- Injury to workers due to collapse of sides of excavation trench or hole;
- Injury to workers due to collapse of excavation into sink hole or cave;
- Injury to workers due to toxic or suffocating atmosphere or by fluid entry;
- Damage to foundations of buildings or to ground supporting heavy equipment near the excavation;
- Fall into excavation or excavated materials or equipment falls into excavation;
- Injury or damage to property that may be caused when a vehicle drives into an excavation; and
- Simultaneous operations and how excavation or penetration work will interact with other works in the area.

Control measures shall be identified on the applicable work permits.

Worker Access and Egress

All excavations deeper than 18 inches (0.5 meters) shall be provided with suitable means of access and egress such as a ramp, a secured ladder, or other suitable means, which shall be located no more than 25 feet (8 meters) apart laterally. If ladders are used, the ladder shall extend 39 inches (1 meter) above the original surface of the ground and safely secured. This means of access and egress shall remain in place when the excavation is not attended.

The number of workers in an excavation shall be limited to the maximum number that can work safely. Where possible, work in an excavation shall be conducted in separate zones by workers, for example on either side of a pipeline excavation.

Where there is a need for workers to cross an excavation, provide a safe walkway using materials such as appropriate scaffolding with handrails and kickboards (where indicated).

Emergency Response

It must be ensured that there is an emergency response plan in place to deal with excavation or penetration incidents, covering potential incidents for example:

- Ground slip;
- Engulfment/flooding;
- Gas build up/leaks;
- Emergency rescue from an excavation;
- Contact with essential / electrical services.

At all times, access for emergency services shall be provided to the work area in the event of an emergency. Emergency response plans shall be tested frequently as per the SSERP to maintain worker skills in recovery following potential incidents listed above.

Key Requirements

WorleyParsonsCord will provide adequate protective systems such as benching, sloping, or shoring when the sides of a trench are more than 5' / 1.5m deep and intended for worker entry. Excavations over 20' / 6.1m deep or that do not meet regulatory requirements must have protective systems designed by a Professional Engineer (PE/PEng) within the same state/province. The PE/PEng design documentation must be onsite and available for inspection.

WorleyParsonsCord Competent Person must conduct daily excavation inspections prior to anyone entering an excavation and this documentation (form CSM-002 or equivalent) located at each excavation. If the inspection shows the area to be unsafe, the unsafe condition will be mitigated prior to resuming work.

A secured ladder, ramp, or other means of egress must be provided within 25' (7.6m) of all workers in a trench that exceeds 4' / 1.2m in depth and/or when using a trench box.

The Job Hazard Assessment will determine what atmospheric monitoring (e.g. O2, LEL, H2S, CO), will be conducted prior to a worker entering an excavation that exceeds 4' / 1.2m in depth and has the potential to contain a hazardous atmosphere.

Excavated material must be placed at least 1 m away from the edge of the excavation (e.g., spoil pile, rocks, broken concrete or other debris).

Excavations must be secured to keep vehicles and unauthorized personnel out. High visibility fencing material placed 4' / 1.2m from the edge of the excavation when possible must be used to warn of the danger in high profile/vehicular traffic areas. Traffic impact plans may be required in high vehicular traffic areas.

47 FALL PROTECTION

General Protection

A fall protection system at a temporary work area is required if:

- personnel may fall 2.4 metres or more; or,
- there is an unusual possibility of injury if personnel fall less than 2.4 metres, an unusual possibility of injury is characterized as an injury that may be worse than an injury from landing on a solid, flat surface.

Where personnel are located at a permanent work area personnel must be protected from falling by a guardrail if personnel may fall a vertical distance of more than 1.2 metres and less than 2.4 metres. If the use of a guardrail is not reasonably practicable, a travel restraint system or an equally effective means that protects personnel from falling may be utilized.

When required by this procedure personnel must use the fall protection system that:

- prevents a worker from falling more than 1.2 metres without a shock absorber;
- applies a peak fall-arrest force not greater than 1800lbs (8kN) of force to a worker; and
- is fastened to a lifeline or to a secure anchor point that has a breaking strength of at least 3600lbs or 16 kilonewtons.

Fall Protection Plan

A fall protection plan must be developed with procedures to address situation at a work site where personnel may fall 2.4 metres or more and where personnel are not protected by guardrails.

- The fall protection plan must specify:
  - the fall hazards at the work site,
  - the fall protection systems to be used at the work site,
  - the procedures used to assemble, maintain, inspect, use and disassemble the fall protection system, and
  - the rescue procedures to be used if personnel suffer a fall, or are suspended by a personal fall arrest system or safety net and need to be rescued.

The fall protection plan must be available at the work site before work with a risk of falling begins.

Anchor Points

If personnel use a personal fall arrest system or a travel restraint system, personnel must ensure that it is safely secured to an anchor point or plate that meets the requirements of local legislation.

Inspection & Maintenance

Where the use of a connecting linkage, personal fall arrest system, full-body harness or lifeline is required, a competent person shall:

- inspect the connecting linkage, personal fall arrest system, full-body harness or lifeline;
- as recommended by the manufacturer; and
- after the connecting linkage, personal fall arrest system, full-body harness or lifeline has sustained a fall-arresting incident; and
- determine whether the connecting linkage, personal fall arrest system, full-body harness or lifeline is safe for continued use.

Competent workers inspecting the connecting linkage, personal fall arrest system, full-body harness or lifeline before each use and that where a defect or unsafe condition that may create a hazard is identified in a connecting linkage, personal fall arrest system, full-body harness or lifeline:

- steps are taken immediately to protect the health and safety of any worker who may be at risk until the defect is repaired or the unsafe condition is corrected; and
- as soon as is reasonably practicable, the defect is repaired or the unsafe condition is corrected.

Removal from Service

Equipment used as part of a fall protection system must be removed from service and either returned to the manufacturer or destroyed if it is defective, or if it has stopped a fall. A personal fall arrest system that is removed from service is not returned to service unless a professional engineer or the manufacturer certifies that the system is safe to use.

48 FIRE PREVENTION AND PROTECTION

Designated Fire Watch personnel will accompany all hot work activities where open flames, sparks or work on in-service equipment is being performed. The Fire Watch will be suitably trained to assess the area for level of risk and take necessary actions to implement mitigation measures relevant to the task being performed. The Fire Watch person will have at all times at a minimum a four gas monitor and a proper sized gas monitor and shall not perform any activities that will pose a conflict with the fire watch duties.

Key Requirements

- Firefighting equipment and a Fire Watch will be supplied by WorleyParsonsCord and will be present during any hot work. Access to firefighting equipment will be maintained at all times and be inspected as required to ensure proper working condition.
- Smoking and use of electronic cigarettes are allowed in designated areas only. Designated areas will be identified during the project pre-job construction meeting or work permitting process.
- Matches or uncovered and trigger-type lighters are not allowed.
- All non-intrinsically safe devices are permitted only in Company approved areas. Devices include, but are not limited to, cell phones, pagers and cameras.
- Unless otherwise specified by the Authority Having Jurisdiction, (AHJ), all flammable and combustible liquids must be stored in metal enclosures and must be placed at least 3' (0.9m) away from other flammable storage cabinets.
- Unless otherwise specified by the AHJ, the volume of Class I, Class II, and Class IIIA liquids stored within a single approved storage cabinet must not exceed 120 gallons / (454 L).
- Unless otherwise specified by the AHJ, approved storage cabinets must be UL Listed or FM Approved for indoor storage of flammable or combustible liquids.

Management Team will strive to ensure the following with regards to meaningful work:

- The CMT recognizing the potential of the injured employee;
- Ensuring that the employee is involved in the rehabilitation process from the beginning; and
- Modified work should pose no threat to other workers.

49 FLOORS, ROOFS AND WALL OPENINGS

All access points to any open holes and leading edges will be hard barricaded with toe board and high visibility signage warning of the danger. Open holes on work platforms where a fall danger exists will be covered with plywood of sufficient strength to prevent worker or material from falling through with Open Hole warning on the cover. The cover must be securely attached to prevent it from falling or coming free

Securement of Tools & Materials – "Stop the Drop" Campaign

In accordance with the hazards inherent with working at heights it will be the responsibility of the WorleyParsonsCord construction Manager to ensure that an effective Stop the Drop program is executed and administered for the duration of the project. One of the biggest challenges with work at heights is the control of loose tools and materials. This section is intended to provide the framework for a project specific "Stop the Drop" program and has been developed with the goal of preventing dropped item incidents which could lead to personal injury or equipment damage.

Supervisor Responsibilities

Prior to starting work, the location shall be assessed by the Supervisor to ensure that housekeeping is acceptable and all dropped item prevention tools are in place. This includes ensuring the area is equipped with material handling ropes, wheel wells and canvas bags, if applicable. Work shall not commence until corrections have been made and the Supervisor deems that work area to be acceptable. This same assessment will be performed at the end of the work day as well to ensure the location is being left in a safe condition.

Key Requirements

Wire rope used as top rail or/mid-rail must be ½" / 1.27cm in diameter with at least three J-type fist grip wire rope clamps at each connection and turn buckles every 100' / 30.4m. Use thimbles where the wire rope is connected.

For construction work performed on low sloped roofs (less than 4:12 pitch), or work areas within 25' / 7.6m of an unprotected edge, a warning line system may be used as alternative protection.

Stair railings must be constructed similar to a standard railing, but the vertical height must be 34-36" / 86.3-91.4cm from the top rail to the surface tread in line with the face of the riser, at the forward edge of the riser.

Floor opening covers must be used for openings greater than 2" / 5cm and capable of supporting the maximum intended load and installed to prevent accidental displacement.

During construction, WorleyParsonsCord will provide temporary stairs on structures that are two or more floors or more than 20' / 6.1m high until permanent stairways are in place.

Runways must be guarded by use of standard railing, or the equivalent, on open sides above the ground level**.** When tools, machine parts, or materials are likely to be used on the runway, provide a toe-board on each exposed side.

50 HAZARD COMMUNICATIONS

In 2015 Canada made significant changes to the Workplace Hazardous Materials Information System (WHMIS) provides information about many hazardous materials used in the workplace, referred to as Controlled Substances. WorleyParsonsCord will transition to GHS by May 31, 2018.

Under WHMIS, workers have the right to receive information about the identity, hazards and safety precautions for each controlled product they use.

Exposure to hazardous materials can result in health problems such as irritation of the eyes, sensitization of the skin or lungs, hear problems, kidney and lung disease or cancer. Hazardous materials can cause fires, explosions, or other accidents when improperly stored or handled.

WHMIS Training

All employees will receive training in handling of chemical products as necessary. There will be an annual review of the training program. The training program will provide instruction in the following areas:

1. Requirements of Hazard Communication Program/WHMIS/GHS.

2. Operations of the work area where chemical products are present including both routine and non-routine jobs.

3. Location and availability of SDS.

4. Interpretation of SDS data and of the labelling system.

5. Methods and observations that the employee may use to detect the presence or incidental release or spill of chemical products in the work area.

6. Measure(s) that employees can take to protect themselves from these hazards (i.e. work practices, persona; protective equipment, and emergency procedure(s).

There are 3 basic elements of WHMIS

1. WHMIS labels – labels on controlled products that alert workers to the identity of the product, hazards, and precautionary measures.
2. MSDS- technical bulletins that provide detailed hazard and precautionary information.
3. Education & Training – WorleyParsonsCord provides education and training for our workers so that they can work safety with and near controlled products. Workers will be made aware through training and mentorship how WHMIS works, the hazards of controlled products in their workplace, and the safe work procedures they must follow while working on the ConocoPhillips .

WHMIS Labels

All WHMIS/GHS controlled products on the TMEP must be labeled.

There are 2 types of WHMIS labels: Supplier Labels & Workplace Labels

Supplier Labels

Suppliers must provide supplier labels and the labels must meet WHMIS criteria.

Workplace Labels

Workplace labels must be applied to:

- Secondary containers;
- Containers of products received in bulk;
- Employer-produced products; and,

- Containers with missing or illegible supplier labels.

Workplace labels must contain the following:

- Product name;
- Safe handling procedures; and,
- Reference to the MSDS.

MSDS/SDS

MSDS contain detailed health and safety information specific to each controlled product.

There are 16 sections to each MSDS. Each section gives special information about the hazardous material. There is no specific format for MSDS but they must all have the same 16 information sections.

The 16 sections of an MSDS are:

1. Identification
2. Hazard Identification
3. Composition Information on Ingredients
4. First Aid Measures
5. Fire Fighting Measures
6. Accidental Release Measures
7. Handling & Storage
8. Exposure Controls
9. Physical & Chemical Properties
10. Stability & Reactivity
11. Toxicology Information
12. Ecological Information
13. Disposal Considerations
14. Transport Information
15. Regulatory Information
16. Other Information

A copy of the MSDS/SDS' for all identified controlled products on site will be kept in a binder(s) with a table of contents for ease of use. The MSDS binder(s) the HSE office and will be made available and accessible to workers for the duration of the TMEP lifecycle. The MSDS/SDS Binder(s) must contain MSDS not more than 3 years old and SDS's will be current.

51 HOUSEKEEPING

The Sites shall be maintained to a high standard of cleanliness in accordance with WorleyParsonsCord Housekeeping Standard. WorleyParsonsCord and subcontractor supervision are expected to review and rectify respective work areas as required on a daily basis. Subcontractors are responsible to supply adequate waste bins for the type and quantity of waste generated and in accordance with WorleyParsonsCord and TMEP guidelines.

Elevated Work Area Housekeeping

Non-essential tools and materials shall not be staged or stored on scaffold or elevated work platforms. The rule to remember is 'if you don't need it, don't bring it'. Each Supervisor and employee is responsible for the housekeeping of their individual work locations and shall be held accountable to ensure compliance with this plan. If tools or material are to be kept in elevated work locations proper storage containers must be available.

Job Hazard Analysis

WorleyParsonsCord and subcontractors must implement a formal Job Hazard Analysis (JHA) or equivalent process that utilizes a "Risk Prioritization Matrix" within the document.

This will assist in the identification, prioritization and control of all activities as they relate to both the potential and consequence of the hazards they introduce.

The JHA process is to be used for tasks including but not limited to:

- Activities for which there are no regular procedures or practices;
- Activities for which a regular practice or procedure is in place, but seldom or ever used (e.g. seasonal winter readiness). This could result in not being trained for, or not being familiar with the task
- Any task where the level Potential and Severity of failure have the potential for severe injury, death, loss of assets, materials or where the resulting failure would have lasting impact on reputation of WorleyParsonsCord.

The JHA process include breaking the job into a sequence of steps, identifying hazards associated with each of the steps, ensuring adequate control measures are in place, and that a post control assessment of Potential & Severity are completed with each task step. JHA's will be prepared by competent supervision and HSE Representatives with involvement from the workers conducting the task.

JHA's will be used in conjunction with Safe Work Practices, Safe Work Procedures, FLRA's and Safe Work Permits to identify risks and the mitigation for the risk. All site personnel must sign off on all JHA's and Safe Work Permits that are relative to their tasks being performed.

In all circumstances, the following tenets apply to any and all personnel under the employment and direction of WorleyParsonsCord:

- ***NO PLAN = NO WORK***
- ***NO FLRA = NO WORK***
- ***NO APPROVAL = NO WORK***

52 H2S

H2S is a naturally occurring colourless gas commonly encountered in the oil and gas industry. It may be trapped in solid sediment, or dissolved in produced water, crude oil or natural gas condensate. Commodities that contain sulfur compounds including H2S are colloquially termed “sour” and facilities that process sour commodities are termed sour facilities. Facilities that do not have H2S may turn sour over time. Agitation or circulation of sour material or depressurization of a sour system may cause H2S gas to release. At low concentrations, H2S has a characteristic rotten egg smell, which is not detectable at higher concentrations.

H2S is acutely toxic; inhaling elevated concentrations of H2S gas in the hundreds to thousands of ppm range can render a person unconscious and can cause death. The adverse health effects associated with exposure to H2S gas vary depending on the concentration and duration of exposure.

When working in a sour facility or performing tasks or activities that involve sour commodities, WorleyParsonsCord will assume H2S is present and put in place controls to protect the health and safety of workers.

All personnel whose work duties include handling or work in proximity to sour fluids, sludge or solids at WorleyParsonsCord worksites, including the transportation of sour product, are required to have done the following:

1. Completed a H2S Alive training course and received a valid H2S Alive certificate
2. Review the SDS for the product and complete a task specific JHA

Hazardous Atmospheres

It will be the requirement of all WorleyParsonsCord employees and Subcontract employees be trained in H2s Alive and don personal monitors while working in Trans Mountain defined Brownfield and modified Greenfield locations if applicable. Employees and contractors will be trained in the use and care of the monitoring equipment used at each location.

Personal monitors must be approved by WorleyParsonsCord prior to procurement and be considered sufficient for specific atmospheric hazards likely to be present in the areas as identified.

In addition all monitors will be signed out by each user and returned daily after use to the WorleyParsonsCord assigned location on Site for daily calibration and bump testing prior to re-use.

Even though a continuous monitor may have data logging capability, results must still be recorded at adequate intervals as determined by the plan, above and beyond the data logging printout or electronic storage. This ensures that workers are actually aware of the levels they are encountering and aware of any fluctuation that may be occurring in order to warn them of any unusual conditions as they develop.

Monitors must have functioning audible/visual alarms to be issued for use.

Key Requirements

All personnel working in a potential H2S environment must have certificates verifying proper training. Additionally, all personnel working in an H2S environment must be clean-shaven per the accepted practices governing SCBA (Self-Contained Breathing Apparatus) use.

A SCBA will be required for H2S levels exceeding the permissible exposure limit:

In areas where potential concentrations of Benzene and H2S may be present, applicable monitoring will be conducted using appropriate air monitoring equipment. Personnel will immediately exit the area if monitoring results are above the occupational exposure limit. Personnel must wear appropriate respiratory protection if concentration exceeds OEL

Oxygen levels must be between 19.5% and 23.5% (U.S.) and 19.5% and 23% (Canada).

Additional Testing Requirements

Atmospheric testing is required when the relevant assessment determines that the hazardous area may contain atmospheric hazards. The testing must be done as often as necessary before and while a worker is in these areas. The atmospheric hazards of concern include oxygen content outside the acceptable range of 19.5 to 23%, the potential accumulation of flammable, combustible, or explosive agents, or accumulation of atmospheric contaminants.

53 LADDERS

In accordance with WorleyParsonsCord Portable Ladder SWP, ladders will not be used as working platforms to support personnel when working at height without due consideration of alternative methods of access. Single lift ladders should only be used to access scaffolds.

All ladders are to be secured and will be subject to inspection. Ladders used on TMEP premises must meet appropriate guidelines. Ladders will comply with CSA Standard Can 3-Z11-M81 (R2001) portable ladders, and ANSI Standard A14.5-2000 portable reinforced plastic ladders. All ladders will be identified on the crew FLRA and signed off by the Foreman prior to use.

Extension Ladders

Extension ladders of any length are permitted for access and egress use only. When using these ladders for intended use, 3 point contact must be maintained at all times.

Ladder must be held at the bottom until it has been secured near the top by tying tight with a suitable rope.

Step Ladders

- Step ladders are acceptable as a working platform under the following conditions;
- 3 point contact must be maintained; a fall arrest harness with a retractable lanyard may be used as the 3rd point of contact;
- Ladder must be climbed for the step side of the ladder, using the brace side of the ladder to climb or stand on is unacceptable;
- Ladder must be placed on level and solid ground;
- The brace of the ladder must be fully extended and locked in prior to use;
- The individual's feet do not exceed 2 meters from the ground;
- Ladder must be held at the bottom until it has been secured near the top by tying tight with a suitable red rope;
- Only one person shall be on the ladder at one time;
- Persons on the ladder must stay within the confines (vertical planes) of the ladder;
- The top 2 steps of the step ladder are not to be used at any time; and
- Manufacturers specifications for ladders are to be followed.

Key Requirements

Metal ladders are prohibited for electrical work.
Stepladders must be fully opened when in use**.** Safety latches on extension ladders must be fully engaged. Always face the ladder when climbing or descending**.** When working, face the ladder with both feet securely on the rungs**.** Never stand, step or sit on the top of the ladder, straddle the ladder, work on leaned stepladders, or work with two people on the same ladder.

WorleyParsonsCord will ensure ladders are:

- Inspected before each use. Do not use ladders with broken or missing rungs, broken or split side-rails, without legible load ratings, or damaged components**.** Defective ladders must be tagged out of service and removed from job site;
- Extend 3' / 0.9m above the upper landing surface;
- Secured to prevent slippage and workers must use the three point contact rule while working or climbing on a ladder;

- The Contractor must use barricades or guards for areas impacted by ladder use. Areas include, but are not limited to, passageways and doorways; and
- Ladders must meet maximum load ratings.

54 LEAD IN CONSTRUCTION

TMEP representatives will provide WorleyParsonsCord information pertaining to lead contaminated construction materials that WorleyParsonsCord may encounter at the Edmonton Terminal and or the various Pump Stations between Edmonton Alberta and Hope B.C.

WorleyParsonsCord will complete an thorough risk assessment with a qualified lead abatement contractor and ensure all mitigations have been implemented and communicated to those affected by the abatement.

KEY REQUIREMENTS

All Contractors who perform work where there is exposure to regulated levels of lead must have a written lead abatement program.

All Contractor lead abatement workers must be adequately trained to understand the hazards associated with lead exposure. This includes the nature of operations that could expose them to lead, the purpose of medical surveillance, use of engineering work practices and appropriate PPE to minimize exposure.

Training records and certificates must be documented and maintained by the Contractor and made available to the WorleyParsonsCord upon request.

55 LIGHTING

When lighting levels are low, too high, or inconsistent (shadowy), the ability to complete tasks safely is compromised. This is because our eyes get tired and/or sore, which can lead to headaches and work mistakes. Furthermore, improper lighting can make it difficult to make appropriate judgements regarding footing, placement of materials, and timing when moving materials, tools, or equipment is being used.

Adequate lighting will be provided during construction activities in all work areas, this may include personal headlamps where lighting is poor.

Lighting will be sufficient for the task and assessed at regular intervals by the site construction management and safety representative.

56 INCLEMENT WEATHER

Given the random nature of lightning strikes, absolute protection cannot be guaranteed to any individual or group. However, awareness of certain lightning safety guidelines can greatly reduce the risk of injury or death.

Site management will ensure that education and training is provided to personnel that will equip them with the skills to identify the risks of severe weather, together with appropriate precautions and responses, in the event of severe weather occurring.

When working in an adverse environment (severe weather and temperatures), the supervisor responsible for the task must complete a hazard assessment with the affected workers, to address any hazards which may be encountered. The work environment, work processes and climate all need to be assessed.

In the event of pending inclement weather, the location supervisor/designate will order an evacuation of the surrounding area. The evacuation signal will be a combination of Klaxon air horns (2 short followed by 2 long blasts) and use of radios on the designated channel.

Designated “Safety Captains” will sweep each work location while making their way to the designated Emergency Muster Point.

Evacuated employees will muster at the lunchroom or shelter in place location. A WorleyParsonsCord designate with a radio will report to Operations of the muster and provide an accurate head count.

Preparation and Planning for Severe Weather

The hazards associated with severe weather will be addressed in hazard identification processes (e.g. risk assessments, safe work procedure CPL-HS-SWP-0040, Job Hazard Analysis).

National weather advisory services will be monitored for weather forecasts, and issuance of warnings of known weather events.

Lightning (Thunderstorm / Electrical Storm)

In the event of an approaching electrical storm all personnel will follow these steps:

Flash-to-Bang Method - The Flash-to-Bang (F/B) method adopted from the National Lightning Safety Institute (NLSI) states that for every three (3) seconds from the time of seeing the lightning strike to hearing the associated thunder, lightning is approximately 1 kilometer away.

Controls and Practice - If the daily weather forecast suggests that the potential exists for severe weather activity in the work site area, WorleyParsonsCord supervisory personnel should watch for signs of approaching storms throughout the work day.

In the event that a thunderstorm with visible lightning is approaching the site, the following steps will be followed to minimize the risk of personal injury:

- When thunder is heard and the F/B ratio is calculated to be 45 seconds apart, indicating that the storm is approximately 15 kilometers away, The WorleyParsonsCord HSE Advisor will inform all WorleyParsonsCord Supervisors and subcontract Supervisors of the potential for lightning in the area and that all unsheltered work must cease;
- WorleyParsonsCord supervisory personnel will suspend all crane activity, lower all loads and ensure that all work fronts are safe as best as is reasonably practicable;
- All WorleyParsonsCord and Subcontract employees will be advised by their Supervisor to assemble in their designated lunch trailer (Shelter in Place);

- Once all workers are assembled in the designated safe shelter the HSE Advisor with the assistance of Supervision will conduct a head count of field personnel and forward this information along to the TMEP HSE Site Representative; and,
- All workers will remain at the designated safe shelter until an All Clear is issued thru the WorleyParsonsCord HSE Advisor. An All Clear will not be given until 30 minutes has passed from the time of the last recorded Lightning Strike/Thunder clap.

Note an All Clear can only be provided to WorleyParsonsCord employees and subcontract employees from the WorleyParsonsCord HSE Advisor or WorleyParsonsCord Construction Manager.

High/extreme Winds

Many severe weather conditions are accompanied by high speed winds. If winds are anticipated to be associated with severe weather, processes will be implemented to minimize the disruption created by winds. These include:

- Optimum housekeeping to minimize windblown debris;
- Secure or anchor any loose equipment;
- Scaffold will be adequately anchored;
- Cranes will be stowed as per manufacture instructions;
- If a warning is issued for the tornado, Shelter in-Place procedures will be implemented; and,
- Hazardous substances will be stored and covered in secure locations.

Extreme Temperatures

The ability of personnel to function and work normally is affected by exposure to heat. Heat stress is increased with:

- Working in hot temperatures;
- Occurrence of previous heat related illness;
- Lack of acclimatization to high heat conditions;
- Insufficient fluid intake;
- Clothing that does not allow air circulation; and
- Over exertion.

For further information on working in extreme temperatures, please refer to CPL-HS-SWP-0040, *Severe Weather Safe Work Practice*.

57 LOCKOUT/TAGOUT (CONTROL OF HAZARDOUS ENERGY)

WorleyParsonsCord will Lockout and/or Tagout any energy isolating device when performing maintenance or service/repair of equipment. If an energy-isolating device is not capable of being locked out and a tag provides equal protection, tagout is acceptable.

WorleyParsonsCord will supply all required materials, equipment and training for their workers to comply with this requirement. WorleyParsonsCord discuss the proposed lock and tag locations with the TMEP Representative prior to proceeding with the planned work.

LOTO Overview

The Primary/Secondary Authorized Employees will apply locks to all energy sources in the open position in a pre-energized state verified.

- These electrical energy isolations will be logged on the LOTO Log;
- The lock number will be recorded on the LOTO Log; and
- The LOTO Log will be used to track all active LOTO's.

To Obtain a LOTO

To obtain a LOTO the Authorized Employee is to complete a LOTO Request submitted with all associated information the day before the LOTO is required.

Primary/Secondary Authorized Employees

Primary/Secondary Authorized Employees will review the LOTO Request and attached information submitted by the Authorized Employee. If the request meets all LOTO Procedure standards a LOTO Review will be completed to verify.

If single isolation is required the Primary/Secondary Authorized Employees will issue the Authorized Employee and Affected Employee(s) locks to apply to single isolation in field.

If lock box is required a Lock Box Contents form will be used by the Primary/Secondary Authorized Employees to create and track lock box activity and information.

Before the Authorized Employee and/or the Affected Employee(s) applies their lock to the lock box, they must visually confirm that the lock box contents match the Lock Box Contents form and the sheet is signed as complete.

A car seal will be applied to the lockbox to insure no tampering of contents occur. The car seal number will be recorded on the Lock Box Contents form.

If alterations to any lockbox occur (i.e. the seal is broken), the Lock Box Contents form shall be closed out by the Primary/Secondary Authorized Employees and the process shall begin again after an investigation.

Applying a Lock

The Authorized Employee and Affected Employee(s) will be issued locks from the Primary/Secondary Authorized Employees. The LOTO DAILY Log is then completed and locks are placed on the associated isolation whether in the LOTO office or in the field. Then the **Authorized Employee places lock on first and is last to take it off** (ensuring all members of his/her crew have removed their lock), followed by Affected Employees.

Personal locks will be signed out and issued daily, then removed and returned daily and tracked on the Daily LOTO Log.

Any installed lock will have a lockout tag attached, which will include name, date installed, contact info, equipment, and supervisor.

The Primary/Secondary Authorized Employees will issue the Authorized Employee a Zero Energy form to be completed in the field before work commences.

If a request comes in to de-energize a piece of electrical equipment, the Primary/Secondary Authorized Employee will assist and witness zero energy and complete the Zero Energy form with workers involved.

Zero Energy forms will be returned by the Authorized Employee to The Primary/Secondary Authorized Employee when task is complete and locks are removed.

For Pre-Commissioning (Motor Bumps, Panel Energization, and Testing Systems)

If Primary/Secondary Authorized Employee is required to remove locks for pre-commissioning activities, the Pre-Commissioning Authorized Employee shall submit an Isolation/De-Isolation Request verifying QC requirements have been met, the equipment is ready for energization, and they have physically walked down the system to verify.

A Transfer of Custody Sheet will be used. This document will transfer care and custody of the electrical energy sources, and will now be in their control for a maximum of 12 hours.

Primary/Secondary Authorized Employees will issue pre-commissioning team locks (orange) and the Authorized and Affected Employees will sign on to the Daily LOTO Log. Once the locks have been applied, the Primary/Secondary Authorized Employees will then remove their locks ensuring the isolation is constantly maintained.

At the end of the work day the pre-commissioning Authorized Employee must inform the Primary/Secondary Authorized Employees that custody can be returned. Primary/Secondary Authorized Employees will reapply locks and the pre-commissioning Authorized Employee can then remove their locks. The Primary/Secondary Authorized Employee then updates the LOTO Log.

The pre-commissioning Authorized Employee will return the locks and sign off the Daily LOTO Log and also will sign off and close the temporary Transfer of Custody sheet.

58 NOISE AND HEARING

Hearing protection must be worn in all areas where ear protection requirements are posted by the TMEP and/or WorleyParsonsCord. Hearing protection is required at all times when operating or using any equipment emitting noise greater than 85 decibels.

If there is a risk that workers may be exposed to noise at a work site in excess of 85 dBA and the noise exposure limits set within provincial legislation, the supervisor must request that a noise assessment be conducted by the Safety Department.

Survey Assessments
Noise survey monitoring with a sound level meter will be performed by the Safety Department, or their designate, utilizing a designed sampling strategy to:

- Determine the appropriate selection of hearing protection;
- Determine if the noise controls are working adequately to reduce noise exposures and
- Determine the need for cautionary signage.

Audiometric Testing
As per Part 7, Noise, Vibration, Radiation and Temperature of the BC Occupational Health and Safety Regulations and Part 16 Noise Exposure of the Alberta OH&S Act, Regulations and Code, WorleyParsonsCord and our subcontractors will ensure initial audiometric baseline testing is carried out within six months employment on projects where noise exposure limits have been exceeded. Further to the initial testing all exposed workers will be subjected to audiometric testing annually following their initial test.

Testing will be administered by a hearing tester authorized by the jurisdiction having authority.

Hazard Control
There are various methods and equipment used to control noise in the workplace. The hierarchy of control that must be followed, as per provincial legislation: Substitution, Engineering, Administrative and Personal Protective Equipment.

Engineered Controls
The best method of dealing with noise in the workplace is to reduce the noise at the source through the use of engineering controls. Engineered controls can eliminate the need for hearing protection; audiometric testing, and other elements of a hearing conservation program.

Reduction at Source – Many potential noise problems can be solved by choosing quieter equipment. When new equipment is purchased, specifications should include either a limit on the noise, or a requirement for the supplier to provide noise performance data. If noise is not engineered out in the design stage, retrofitting existing equipment with noise control devices such as mufflers, silencers, or isolators can sometimes be effective in reducing the overall noise output. Periodic inspections and maintenance to ensure equipment is in good order.

Administrative Controls
Safe work practices, education and training are the primary administrative controls for hearing protection. Administrative controls also include measures such as work-rest cycles, and infrequent work tasks. These controls are aimed at reducing the time a worker is potentially exposed to noise.

Warning Signs
Workplaces in which the noise level exceeds 85 dBA TWA will have signs posted. Signs shall read “Caution - Hearing Protection Required ". In extreme noise areas with measured noise levels greater than 105dBA, signs shall read “Danger – Hearing Protection Required”.

Personal Protective Equipment

When engineering controls cannot eliminate the noise hazard, hearing protection devices will provide worker an additional means of reducing worker noise exposures to acceptable levels.

Hearing protection devices provided to workers exposed to excess noise must meet the requirements of CSA Standard Z94.2-02, Hearing Protection Devices – Performance, Selection, Care and Use. Hearing protection shall meet Class A standards with an NRR of at least 32 will be used on site, additional hearing protection as required. The effectiveness of a hearing protector device is not determined by its noise reducing ability alone, it is determined by class of hearing protection and the wearing time of the worker.

59 PERSONAL PROTECTIVE EQUIPMENT

Every practical measure will be taken to eliminate or control hazards through proper risk management and in accordance with the hierarchy of control. When PPE is required its provision, storage, maintenance, associated training and usage will be in accordance with WorleyParsonsCord Personal Protective Equipment Standard.

Site-specific PPE for the project Include:

- Side impact hardhats (Type E or G) – CSA Standard CAN/CSA-Z941-92 Industrial Protective Head Gear;
- Safety boots with ankle support (6 Inch, measured from the top of the sole, and CSA approved) with aggressive sole and heels;
- Outerwear must be Fire Retardant FR and have high visibility reflective stripes on both front and back, so that good night visibility is present on the outerwear from either side. If it is not present, high visibility vest must be worn to give this level of protection;
- 100% natural fibre clothing, long sleeves and pants;
- Hearing protection (single hearing protection at 85 dBA, double hearing protection at 105 dBA, and impact ceiling of 135 dBA) and as required;
- Face shields and safety glasses within 10' of all welding, grinding, and cutting activities and as required;
- Safety glasses – CSA Approved Sealed Eyewear (Spoggles);
- Appropriate gloves for specific tasks;
- Fall Protection is required above 2.4 meters (8 feet); and,
- Respiratory Protective Equipment (RPE) will be selected, used, and maintained. Workers will conform to the current Alberta General Safety Regulation – Respiratory Protective Equipment which states an employer will ensure that:
    - Workers who are or may be required to wear respiratory protective equipment that is dependent on an effective facial seal are clean-shaven and where the face piece of the equipment seals with the skin of the face." Individuals on site will be fit tested if required. If required, Subcontractors are responsible for fit testing and maintaining their own records of testing. (Quantitative Testing);
- High visibility vests/coverall markings/gauntlets (crane signaler). Designated signal persons are required to be identified as per the OH & S Code (i.e. Gauntlets and high visibility stripes/coveralls); and,
- Personal H2S monitor.

WorleyParsonsCord hazard identification process (JHA/FLRA) will identify the potential for contaminated clothing. Controls for the handling and management of any contaminated clothing will be addressed on site.

These site-specific requirements will be identified during the site specific orientation. WorleyParsonsCord will continually monitor effectiveness of PPE through trend analysis on a monthly basis and implement measures to eliminate or reduce occurrences.

60 RADIATION PRODUCING EQUIPMENT

Only properly trained, qualified personnel are allowed to use radiation-producing equipment or materials on TMEP premises. WorleyParsonsCord will assist TMEP in maintaining records of all training and qualifications of NDE contractors through ISNet.

Radiation Safety

All Local/Provincial/National requirements relating to the transportation, storage, use and disposal of radioactive materials will be complied with by the NDE contractors.

The Construction Manager or the designated competent person, will approve the use of radioactive substances/devices; i.e. radiation equipment, before they are brought to Site. This approval is dependent on verification by the relevant competent person that radiography is required and that there is no safer technology/methodology that may be used.

WorleyParsonsCord subcontractors conducting works with radiation equipment are responsible for all HSE protection arrangements relating to the transport, storage, use and ultimate disposal of the radiation equipment.

Prior to using radiation equipment on Site, the radiation contractor will have available the following information for the Site Manager.

The following information will be on file before the radiography subcontractor begins work:

- A copy of the contractor's radioactive material license or registration;
- The name and phone number of the contractor's radiation safety officer;
- The type and size of the source of radiation being used or expected to be used in the future;
- The type of radiation equipment, x-ray machine, or source handling equipment to be used;
- A description and location of the project Site storage facility to be used; and,
- A copy of the contractor's operating and emergency procedures.

Radiation Signage

All radioactive equipment will be clearly sign posted with the appropriate trefoil (triangular sign as shown below) in accordance with the regulatory authority's requirements.

Figure 11 Radiation Signage

All work areas will be barricaded with magenta and yellow tape with signs affixed, reading: "CAUTION - RADIATION AREA" OR "CAUTION - RADIOGRAPHY IN PROGRESS"

61 RESPIRATORY PROTECTION

Respiratory Protective Equipment (RPE) will be selected, used, and maintained. Workers will conform to the current Alberta General Safety Regulation – Respiratory Protective Equipment which states an employer will ensure that:

- Workers who are or may be required to wear respiratory protective equipment that is dependent on an effective facial seal are clean-shaven and where the face piece of the equipment seals with the skin of the face." Individuals on site will be fit tested if required. If required, Subcontractors are responsible for fit testing and maintaining their own records of testing. (Quantitative Testing)

Selection and Use of Respirators

A number of factors need to be carefully considered when selecting the appropriate type of respiratory equipment. It is very important to assess all these factors for each situation each time equipment is being chosen. Always take into consideration whether or not the equipment is going to be used for emergency conditions.

- Identify the airborne contaminant(s) — know the contaminant to ensure the respirator selected is approved for protecting against that specific contaminant. To select the appropriate particulate filter using the NIOSH classification system, it is necessary to determine whether or not oil is present in the workplace where the respirator will be used; and,
- Determine the concentration of the airborne contaminant(s) — determine the average workday concentration and the highest short-term concentrations of the contaminant.

Hazard Ration = Airborne Concentration/OEL

A respirator should never be used in an environment where the hazard ratio is greater than its assigned protection factor. To select the appropriate level of respirator protective equipment, use the highest hazard ration (HHR) or the individual components present.

Table 11 Respirator

HHR	Minimum Level of Respirator Needed	
	Air Purifying	Air Supplying
≤ 10	Half facepiece	Demand half facepiece
≤ 25	Loose-fitting facepiece PAPR	Loose-fitting facepiece/visor
≤ 50	Half facepiece PAPR	Positive pressure half facepiece
≤ 100	Full facepiece	Positive pressure full facepiece or demand SCBA
≤ 1,000	Full facepiece PAPR	Positive pressure full facepiece
≤ 10,000	May not be used	Positive pressure SCBA or positive pressure air supply respirator with auxiliary air supply. *

TYPE	SUB-TYPE	ASSIGNED PROTECTION FACTOR	LIMITATIONS
Particulate Filter Chemical Cartridge or Canister Combination Particulate/Chemical	Half-Face piece	10	Unacceptable for protection in IDLH conditions or oxygen-deficient atmospheres. Choice of filter depends on identity of contaminant and, for particulate respirators, the presence of oil. (1). Service life depends on factors such as the type and amount of filtering medium, concentration of contaminant, temperature and humidity.
	Full-Face piece	100 (2)	
Powered Air-Purifying Respirator	Half-Face piece	50	
	Full-Face piece	1000	
	Helmet/Hood (3)	1000	
	Loose-Fitting Face piece (3)	25	

Key Requirements

WorleyParsonsCord will designate an individual to perform air monitoring at the premises to ensure our employees and contractors are not overexposed. This individual will inform his supervisor when respiratory protection is required and must continue to monitor the premises to determine if conditions change.

Supplied Breathing Air Use

WorleyParsonsCord will ensure supplied breathing air sources meet the applicable requirements (CSA Z180.1). Air-purifying devices must be tagged with the most recent date of change-out.

62 SCAFFOLDS AND PLATFORMS

In accordance with WorleyParsonsCord Scaffolding, Ladders, Stairs and Walkways Standard, all scaffolding will comply with a recognized National or International Standard and only appropriately certificated personnel will carry out erection.

Scaffolds will be designed, built, inspected, and tagged by a competent person and will conform to the applicable requirements. Conduct and document daily inspections before use.

Lean-to scaffolds and make-shift platforms are prohibited.

Scaffolding and Elevated work areas will be safe guarded as required. Fire blankets will be applied to the decks if the risk level is justified. The primary function of the blankets is to prevent loose items from being dropped or kicked from the scaffold deck. Fire blanket use will be the responsibility of the crew performing the task on an as needed basis

WorleyParsonsCord will ensure that scaffolds used by workers are in a safe condition and are able to withstand the load, as per Worksafe BC Part 13 and Alberta OH&S Part 23.

Planning and selection of appropriate scaffolding can have a major impact on the efficient and safe use in the erection of the scaffold. The following should be considered when selecting a scaffold and planning the construction:

- The condition of equipment or material selected for use;
- Any unusual conditions arising from the type of work that will be done from the scaffold; and
- Platform load capacity including the physical size and weight of objects or material to be supported

Site conditions, including:

- surfaces to be used for support;
- adjacent structures to be accessed or used for support;
- environmental effects of weather or nearby processes;
- proximity to vehicular and pedestrian traffic zones;
- Size, elevation, orientation, and numbers of platforms;
- Access to the platforms;
- Requirements to relocate or remove guardrails to provide working access or handle materials;
- Provisions for fall protection during erection and use, including identification of anchor points;
- Electrical hazards;
- Requirements for enclosing the scaffold;
- The duration of the work; and,
- The training and experience of the workers with the type of scaffold being considered.

Erecting Scaffolds

Refer to safety regulations and standards for design and assembly requirements. scaffold will be erected on a base that will support all the loads that will be applied including materials and equipment. Installation of scaffold jackscrews (adjusting screws) allow for minor adjustments to help keep scaffold plumb and level.

Scaffold erectors will provide adequate sills for scaffold posts and the sills will be selected and installed according to the following requirements:

- Sills shall be continuous under at least two legs or standards;
- Sills shall project at least 0.30 m (1 ft) beyond the bearing point of the standard; and
- Planks that have been used as sills shall not be used as scaffold planks.
-

Base plates will be installed under every standard. Insertion of the screw jack into the standard shall be according to the manufacturer's recommendation or at least one-third of the screw jack's length.

Standards, transoms, ledgers, and beams shall be installed plumb and level. The deviation from plumb shall not exceed:

- 12 mm over a height of 3 m (1/2 in over 10 ft);
- 19 mm over a height of 6 m (3/4 in over 20 ft); and
- 38 mm (1-1/2 in) over the total height of the scaffold.

The deviation from level shall not exceed 12 mm over a distance of 2.1 m (1/2 in over 7 ft).

Tagging

Scaffold tags are colour-coded for easy reference and should be used as follows:

Table 12 Tagging Colour Codes

Colour	Meaning
	Scaffold Incomplete – "Danger Do Not Use NO PERSON, other than a qualified scaffolder shall work off of a Red Tagged scaffold
	"Caution" This tag will be used to indicate special requirements for the use of a specific scaffold. Modifications or alterations have been made to meet work requirements that present an additional hazard and require additional precautions
	"Safe for Use" This tag is used for complete scaffolds that comply with manufacturer's and jurisdictional guidelines, and present no specific hazards
NO TAG	**"Danger Do Not Use"** Treat any scaffold without a tag as if it had a red tag on it.

Training

Employees will receive instruction on the particular types of scaffolds which they are to use. Training should focus on proper erection, handling, use, inspection, and care of the scaffolds. Training must also include the installation of fall protection, guardrails, and the proper use and care of fall arrest equipment.

This training should be done upon initial job assignment. Retraining will be done when job conditions change. Periodic refresher training will be done at the discretion of the supervisor.

Company designated "competent person(s)" will receive additional training regarding the selection of scaffolds, recognition of site conditions, recognition of scaffold hazards, protection of exposed personnel and public, repair and replacement options, and requirements of standards.

63 SMALL TOOLS (POWER, AIR AND HAND)

WorleyParsonsCord is committed to ensuring that tools and equipment are safe for use, properly maintained, and reliable. This will be accomplished with strict compliance to procedures, to preventative maintenance programs and the cooperative involvement of all personnel.

WorleyParsonsCord personnel will follow all legislative, WorleyParsonsCord and manufacturers' specifications / recommendations. Maintenance must be of the highest and industry recommended quality with regard to labour and materials. Equipment requiring regular maintenance will be diligently inspected, maintained and all records retained.

All WorleyParsonsCord personnel must report to their immediate supervisor any defective tools, equipment, and machinery immediately. The supervisor must ensure it is taken out of service and disposed of, or adequately repaired as required. WorleyParsonsCord personnel are not to use any tools, vehicle or equipment in need of repair that would cause themselves or others to be at risk.

WorleyParsonsCord personnel must complete a minimum of a daily documented pre-use checklist for vehicles and equipment, identifying any maintenance items required. It must be submitted to their immediate supervisor.

Any tools requiring maintenance must be noted on a hazard report form submitted to the supervisor immediately.

Preventative Measures

Breakdowns and incidents must be recorded, reviewed and monitored to determine the effectiveness of the preventative maintenance program. At a minimum, all WorleyParsonsCord tools, vehicles, and equipment must be maintained as per manufacturer's specifications and legislative requirements. Any maintenance that is conducted will be by competent personnel only.

The supervisor will prioritize any deficiencies and schedule the required maintenance, or take the tool or equipment out of service if necessary. Corrective measures must use the appropriate hierarchy of control, with the priority of eliminating the risk. Short term corrective measures will include a system such as removal, tags/lockouts to ensure personnel are aware that the tool, vehicle or equipment is taken out of service.

Maintenance, Schedule and Records

Maintenance schedules will be maintained and followed as per manufacturer's recommendations and specifications. Maintenance documentation and records will be kept on file for all for all tools, equipment and vehicles.

Training

Project specific orientation and on the job training will be provide to all WorleyParsonsCord employees and contractors.

Competency will be validated by the immediate supervisor and documented through the small tool competency form and if required, the restricted tool competency form.

Restricted tools

Restricted tools are classified into the following categories:

- Moderate Risk Restricted – Tools or equipment that pose a moderate risk of harm to the worker, or those around the worker, when used incorrectly or have a minimal chance of being used incorrectly;

- High Risk Restricted – Tools or equipment that pose a high risk of harm to a worker, or those around them, when used incorrectly or have a moderate to high chance of being used incorrectly. These tools may also have an intrinsic property that, through their use, may cause harm to a worker (such as kickback from a chainsaw);
- Ticketed – Tools, or equipment that require a ticket to use on our worksites. This ticket may be an official journeyman ticket or apprenticeship that directly relates to the use of that tool or equipment (such as a journeyman scaffolding ticket), or a third party internal ticket for the use of the specific tool (such as a powder actuated tool ticket); and
- Prohibited – Prohibited tools are those that have been deemed unfit for safe use on our work sites due to high probability of injury.

A list of all restricted tools and prohibited tools shall be posted in the tool crib.

64 HEAVY EQUIPMENT/MOBILE EQUIPMENT

Heavy vehicles/mobile equipment, when carrying a suspended load or any other load that could shift in transit, shall be limited to 10kph and shall be guided by a Spotter/Ground Guide who is in visual contact with the driver at all times. Suspended loads shall nevertheless be stabilized as far as is practicable by tying back to the mobile equipment and/or by the use of tag-lines held by personnel who shall move alongside, but at a safe distance from, the mobile equipment. Such personnel shall, at all times, be in the view of the operator and/or the Spotters/Ground Guides.

Telelift trucks, front end loaders, Bobcats, etc. shall only move with the forks/buckets in the lowered position; they should only be raised far enough to allow the free movement of the vehicle. When this is not practical (zoom boom/tele lift) additional spotters may be required to ensure equipment operations and material placement hazards are mitigated.

All heavy vehicles and mobile equipment that are required to move in any direction in which the driver does not have clear vision of the intended path of travel shall be guided by a Spotter/Ground Guide who is in visual contact with the driver at all times. Vehicles shall only move in a direction when the Spotter/Ground Guide has a clear line of site and the operator has been directed to do so by the spotter.

All equipment and machinery shall comply with the requirements of WorleyParsonsCord Mobile Equipment Standard and may be subject to a thorough machinery inspection by WorleyParsonsCord authorized personnel prior to being accepted to site. All “daily use” site equipment must still be inspected by the operator daily/prior to each use (Whichever comes first) for defects, damage and/or any maintenance issues and requirements. An inspection form will be supplied by WorleyParsonsCord to the operator to complete the inspection, and will be specific to that piece of equipment.

All non-conformant items found during inspection should be noted on the inspection sheet and reported to the operator’s immediate supervisor as soon as is reasonably practicable so that proper maintenance/repair can be scheduled. If the issue is of such a nature that has the potential to cause an HSE risk then the equipment should be taken out of service until repairs can be made.

Positive Air Shut Offs

Positive Air Shut Offs (PAS) systems are required for all diesel engines (light towers, heavy equipment, generators, etc.) that are working in “potentially hazardous atmospheres”. As a safety device, the PAS valve must be maintained in good working condition at all times. Weekly testing of the valve and actuation system is recommended, as is confirmation of functionality prior to entering a potentially hazardous work site. It is recommended that the test be performed with the engine running at idle, so as to confirm complete engine shutdown after the valve(s) is/are actuated. If the engine has multiple shut-off valves with gate position indicator switches; with the engine stopped, each valve should be closed while the other(s) is/are left open to confirm individual functionality of the gate position indicator system. In addition, all personnel working within the vicinity of the engine must be familiar with the operation of the PAS valve actuation system, and with the potential 'inhaled combustible gas' engine over-speed scenarios that require its use.

APPENDIX A- RISK REGISTER

General Construction Risk Assessment

Table 13 Likelihood & Consequence scale

Likelihood Category				
E	D	C	B	A
Rare	**Unlikely**	**Moderate**	**Likely**	**Almost Certain**
Highly unlikely to occur on this project	Given current practices and procedures, this incident is unlikely to occur on this project	Incident has occurred on a similar project	Incident is likely to occur on this project	Incident is very likely to occur on this project, possibly several times

	Consequences				
	1 - Insignificant	**2 - Minor**	**3 - Moderate**	**4 - Major**	**5 - Catastrophic**
Safety and Health	**First Aid Case**	**Minor Injury,** Medical Treatment Case with/or Restricted Work Case.	**Serious Injury** or Lost Work Case	**Major or Multiple Injuries** - permanent injury or disability	**Single or Multiple Fatalities**
Environment	**No impact** on baseline environment. Localized to point source. No recovery required	**Localized** within site boundaries. Recovery measurable within 1 month of impact	**Moderate** harm with possible wider effect. Recovery in 1 year	**Significant** harm with local effect. Recovery longer than 1 year.	**Significant** harm with widespread effect. Recovery longer than 1 year. Limited prospect of full recovery
Financial	< $100k	$100k - $500k	$500k - $5M	$5M - $10M	>$10M
Production/Schedule	< 3 days	3 days – 1 week	1 wk – 1 month	1 – 6 months	> 6 months
Reputation	Localized temporary impact	Localized, short term impact	Localized, long term impact but manageable	Localized, long term impact with unmanageable outcomes	Long term regional impact
Business Impact	Impact can be absorbed through normal activity	An adverse event which can be absorbed with some management effort	A serious event which requires additional management effort	A critical event which requires extraordinary management effort	Disaster with potential to lead to collapse of the project

Table 14 Risk Map

Risk Map Before Treatment			Consequence				
			Insignificant 1	Minor 2	Moderate 3	Major 4	Catastrophic 5
Likelihood	A	Almost Certain					
	B	Likely					
	C	Moderate					
	D	Unlikely					
	E	Rare					

Table 15 Risk Register and Action Plan

For a comprehensive list of WorleyParsonsCord Safe work Practices, Procedure can be referenced in Appendix F.

Number	Risk Description (Event and Consequence OR Cause)	Existing Controls *(WPC HSE Plan, Safe Work Practices, and Procedures)*	Risk Severity Before Treatment			Risk Treatment Plan *(Site/Project Specific)*	Ability to Influence	Action Plan Type	Risk Severity After Treatment		
			Consequence	Likelihood	Risk Level Before Treatment				Consequence	Likelihood	Risk Level After Treatment
General Construction (Applicable to All Disciplines & Trades)											
1	Driving To / From Work Site. High traffic area. Avalanche zone	Vehicle and Driving SWP 47a, Journey Management SWP 47b, Winter Driving PRO 43	Major	Moderate	*Extreme*	Limit the number of vehicles by using large passenger vans and buses. Winter tires	Moderate	Reduce likelihood and consequence	Moderate	Unlikely	*Moderate*
2	Work Site Parking Lot - ground condition, slips, trips, falls coming/going from work.	Designated Parking & Walkways, Traffic Management SWP 45	Moderate	Moderate	*High*	On-going parking lot maintenance - dust control/snow removal and grading.	Moderate	Reduce likelihood	Moderate	Rare	*Moderate*
3	Driving on Work Site - collision with construction equipment	Driving SWP 47a, 47b, Winter Driving PRO 43.	Catastrophic	Moderate	*Extreme*	Only permitted vehicles allowed on site. Headlights on at all times. Give right of way to equipment and emergency response vehicles. Worker awareness, Collision Avoidance Plan.	Moderate	Reduce likelihood and consequence	Minor	Unlikely	*Low*
4	Environment - weather impacts (rain, heat, storms)	Site Emergency Plan, Severe Weather SWP 40,	Moderate	Moderate	*High*	Worker awareness, follow WPC SWP.	Moderate	Reduce likelihood and consequence	Minor	Unlikely	*Low*

5	Blind Spots - around equipment, structures, material	Site Specific Spotter protocol	Moderate	Moderate	*High*	100% use of Spotters in congested areas.	Moderate	Reduce likelihood and consequence	Minor	Unlikely	*Low*
6	Congested Work Areas / Laydown Areas - injury due to unexpected movement, trips/falls, cuts, equipment contact/crushing injuries	Housekeeping PRO 23, Communication, Material Storage SWP 23	Moderate	Likely	*High*	Communication, Material Handling Planning, 3 week look ahead, Spotter protocol.	High	Reduce likelihood and consequence	Minor	Unlikely	*Low*
7	Working in Confined Space - air quality, hazardous gases	Confined Space Entry Code of Practice PRO 8, Atmospheric Monitoring/Detection PRO 1, Gas Monitor Training, Air Quality Control SWP 1, Barricades and Barriers PRO 2.	Moderate	Unlikely	*Moderate*	WPC Confined Space & Safety Standby Standards. Training, Certification, Competency.	High	Reduce likelihood and consequence	Minor	Unlikely	*Low*
8	Green or New-to-Construction Workers	Site Specific Orientation, Task Specific Training and Competency, Green Hat Mentorship Program.	Major	Moderate	*Extreme*	Green hard hats for new workers, Mentoring, Training.	High	Reduce likelihood and consequence	Minor	Unlikely	*Low*
9	Hand Tools - pinch/crush points, line of fire, drop from heights, exposure to noise	Defective Tools PRO 10, Hand Tools PRO 20, Knife and Cutting Tools PRO 28, Restricted Tools PRO 36a,b,c, Machine and Tool SWP 20, Noise Management SWP 26, PPE SWP 30	Moderate	Likely	*High*	SWP procedures, worker training, worker competency.	High	Reduce likelihood and consequence	Minor	Moderate	*Moderate*
10	Hazardous Material handling & storage - chemical exposure, compressed gas	Air Quality Control SWP 1, Storage and Use of Hazardous Substances SWP 43, Compressed	Major	Moderate	*Extreme*	Handling Compressed Gases Procedure, Storage Handling & Disposal of Harmful Substances Code of	Moderate	Reduce likelihood and consequence	Minor	Unlikely	*Low*

	cylinders	Gas Cylinders and Compressed Air PRO 7, Flammable and Combustible Liquids PRO 16, Fuel Storage and Refueling PRO 17, NORMS SWP 25				Practice, WHMIS (GHS). Enhanced PPE, Fit Testing.					
11	Working in, Live Site / Operating Facility - H2S plant, live/operating equipment, tie-ins.	TMEP requirements, Emergency Procedures, Site Specific Orientation, Isolation and Lockout SWP 18, Atmospheric Monitoring PRO 1, Notices an Signs SWP 27, Respirator Code of Practice SWP 38, PPE SWP 30	Catastrophic	Rare	*High*	TMEP work permit requirements & training, LOTO, permit verification, develop specific JHA as required. Gas Monitoring, Fit Testing.	High	Reduce likelihood and consequence	Moderate	Rare	*Moderate*
12	Material Handling - heavy lifting, soft tissue injury.	Manual Handling SWP 22	Moderate	Moderate	*High*	Attention & focus on FLRA's, Awareness of (20 kg) 44lb MAX lift, Stretching Program implemented.	High	Reduce likelihood and consequence	Minor	Unlikely	*Low*
13	Mobile Equipment - Zoom Boom, - property damage, poor visibility, line of fire.	Zoom Boom/ Skid Steer Operation PRO 45, Mobile Equipment PRO 32, Worker Competency.	Moderate	Likely	*High*	Qualified & ticketed operators, Spotter Training, use of Spotters in tight, congested areas.	High	Reduce likelihood and consequence	Minor	Moderate	*Moderate*
14	Noise Exposure - hearing loss, extended exposure to sound pressure levels.	PPE SWP 30 , Noise Management SWP 26	Moderate	Moderate	*High*	PPE, Compliance with SWP.	Moderate	Reduce likelihood and consequence	Minor	Unlikely	*Low*
15	Occupational Hygiene	Amenities and Sanitation SWP 2	Insignificant	Unlikely	*Low*	Regular housekeeping and sanitization	High	Reduce likelihood	Insignificant	Rare	*Low*
16	Overhead Lifts	Control Zone, Qualified Operators, Crane hoisting PRO 9, Signalmen, Competency,	Major	Moderate	*Extreme*	Signalman responsibilities, Zone Control, use of gauntlet, adhere to Crane/Rigging	Moderate	Reduce likelihood and consequence	Moderate	Unlikely	*Moderate*

		Overhead Powerlines SWP 29, Barricades & Barriers PRO 2, Rigging Selection & use PRO 38 Lift Study PRO 29				Standard, Heavy Lift Studies.					
17	Pinch points, line of fire, crush points	FLRA, Toolbox, JHA, Hand Safety Initiative.	Moderate	Likely	*High*	Attention & focus on FLRA's, SWP's.	High	Reduce likelihood and consequence	Moderate	Unlikely	*Moderate*
18	Poor housekeeping - slips and trips, limited access/ egress	Housekeeping PRO 23, Material Storage SWP 23	Minor	Moderate	*Moderate*	Regular housekeeping, identify laydown areas, frequent housekeeping inspections.	High	Reduce likelihood	Minor	Unlikely	*Low*
19	Power Tools - severe cuts, loss of appendages, flying debris, noise.	Machine and Tool SWP 20, Manual Handling SWP 22, PPE SWP 30, Circular Saw PRO 4, 5, 20, Restricted Tools PRO 36a,b,c. , Defective Tool PRO 10, Grinder PRO 18a,b,c, Jackhammer PRO 26, Table Saw PRO 39, Noise Management SWP 26, Cold Cutting Pipe PRO 5, Hand Tools PRO 20.	Moderate	Moderate	*High*	Worker Competency Program, skilled trades people, daily tool inspection, attention & focus on hazard identification, FLRA, SWP.	High	Reduce likelihood and consequence	Minor	Unlikely	*Low*
20	Man/Machine Interface - injury or fatality due to equipment/human interface	Existing HSE Plans and SWP's, Inspections, Traffic Management Plan	Major	Unlikely	*High*	Designated walkways, speed limit signs, Worker training, Toolbox discussions	High	Reduce likelihood and consequence	Minor	Rare	*Low*

21	Simultaneous operations - multi-trade/multi-contractor activities, injury potential due to dropped objects, congestion, lack of interface communication.	Field Level communication process, Cross-over coordination mtgs, Spotter Training, Traffic Management SWP 45, Mobile Equipment PRO 32	Major	Moderate	*Extreme*	Stop the Drop program , Simultaneous work SWP, contractor/TMEP interface meetings.	High	Reduce likelihood and consequence	Minor	Unlikely	*Low*
22	Uncontrolled energy source - auto start machinery (PAS), pressurized piping, compressed gases.	TMEP Requirements, Emergency Procedures, Site Specific Orientation, Isolation and Lockout SWP 18, Atmospheric Monitoring PRO 1, Notices and Signs SWP 27, Respirator Code of Practice SWP 38, PPE SWP 30	Moderate	Moderate	*High*	LOTO Procedures, Site Specific JHA's, Worker training, Positive air shutoff	High	Reduce likelihood and consequence	Minor	Rare	*Low*
23	Work Site Ground Conditions - uneven ground, ruts, snow, ice, slips, trips.	Approved Walking and Travelling Paths, PPE SWP 30, Housekeeping PRO 23, Barricades & Barriers PRO 2, Notices & Signs SWP 27	Moderate	Moderate	*High*	Designated walkways, walkway maintenance (dust control), rut maintenance.	High	Reduce likelihood and consequence	Minor	Unlikely	*Low*
24	Welding - arc flash, sparks, electrocution, flying debris, foreign bodies in eye, fire, explosion.	Welding truck inspections, FLRA, Welding PRO 41, Tiger Torch PRO 40, Machine & Tool SWP 20, Barricades & Barriers PRO 2, PPE SWP 30, Hand Tools PRO 20, Grinder PRO 18a,b,c, Fire Risk Management PRO 14.	Major	Moderate	*Extreme*	Double eye protection within 10', Hoarding, Hot Work Permit, gas monitoring, Fire Extinguisher present for all hot work	Moderate	Reduce likelihood and consequence	Minor	Unlikely	*Low*

25	Working at Heights - falls from heights, dropped objects/tools	Fall Protection SWP 12a,b,c, Fall Arrest Equipment Inspection	Catastrophic	Moderate	*Extreme*	Fall Protection Plan, Worker training and competency, Stop-The-Drop.	Moderate	Reduce likelihood and consequence	Moderate	Unlikely	*Moderate*
27	Ladder Use - falls from heights, unstable ladder, poor access, slips from environmental conditions	Ladders PRO 34a,b,c,d	Moderate	Moderate	*High*	Work Site Ladder Use protocol, ladder tie-off / securement, inspection process.	High	Reduce likelihood and consequence	Minor	Unlikely	*Low*
28	Fuel Storage / Fuel Transportation / Equipment Refueling - spills, flammable material, ignition sources	Flammable and Combustible Liquids PRO 16, Fuel Storage and Refueling PRO 17, Barricades and Barriers PRO 2, Housekeeping PRO 23, Notices & Signs SWP 27.	Minor	Unlikely	*Low*	Protective barriers around storage tanks, secondary containment, proper signage, work site refueling protocol.	High	Reduce likelihood	Minor	Rare	*Low*
29	Emergency Access / Egress	Housekeeping PRO 23, Material Storage SWP 23 SSERP-TMEP	Moderate	Unlikely	*Moderate*	Housekeeping, keep Access / Egress Routes free and clear of debris	High	Reduce likelihood and consequence	Minor	Rare	*Low*
30	General Hoisting, Lifting and Rigging - overhead lifts, swing radius	Crane Hoisting/ Lift Classifications PRO 9, Rigging Equipment Selection and Use PRO 38, Barricades and Barriers PRO 2, Equipment Loading and Unloading PRO 12, Overhead Powerlines SWP 29.	Catastrophic	Moderate	*Extreme*	Hoisting and Critical Lift Standard. Lift and rigging studies	Moderate	Reduce likelihood and consequence	Moderate	Unlikely	*Moderate*
31	Improper tools for task	Defective Tools PRO 10, Hand Tools PRO 20, Knife and Cutting Tools PRO 28, Machine and Tool SWP 20, Restricted Tool PRO 36a,b,c	Moderate	Unlikely	*Moderate*	Hand & Power Tools Procedure, Worker Competency.	Moderate	Reduce likelihood and consequence	Minor	Rare	*Low*

32	Material Receiving / Unloading - unstable loads, dropped materials / equipment	Equipment Loading and Unloading PRO 12, Rigging Equipment Selection and Use PRO 38, Manual Handling SWP 22	Moderate	Moderate	*High*	Delivery Driver instruction, Load Assessment, taglines, Site Specific JHA.	Moderate	Reduce likelihood	Minor	Unlikely	*Low*
33	Zone control - flagging/tagging of access & egress	Barricades and Barriers PRO 2, Notices and Signs SWP 27	Minor	Moderate	*Moderate*	Site Specific JHA, FLRA, Flag & Tag, Supervisor to complete final check	High	Reduce likelihood	Minor	Unlikely	*Low*
34	Power Cord and air line Management - trips, congested area	Housekeeping PRO 23	Minor	Moderate	*Moderate*	Housekeeping Procedure	Moderate	Reduce likelihood	Minor	Unlikely	*Low*
35	Improper Hand Rigging	Rigging Equipment Selection and Use PRO 38, Barricades and Barriers PRO 2	Moderate	Moderate	*High*	Securement Safe out of Pipe/Spools SWP 52	High	Reduce likelihood and consequence	Minor	Unlikely	*Low*
36	Contact by falling / swinging load (and/or lifting equipment components)- Instability or loss of control of lifting equipment (not rigging failure) from misuse.	Visual inspection, PPE, communication, training, tailgate meetings, rated slings, Rigging Equipment Selection and Use PRO 38, Barricades and Barriers PRO 2	Major	Moderate	*Extreme*	Safe Work Permit, Inspections and certification, Contractor Selection, Spotter, Competency Training, Planned maintenance	High	Reduce likelihood and consequence	Minor	Unlikely	*Low*
37	Contact by falling / swinging load (and/or lifting equipment components)- Rigging failure in suspended load from improper rigging.	Visual inspection, PPE, communication, training, tailgate meetings, rated slings, Rigging Equipment Selection and Use PRO 38, Barricades and Barriers PRO 2	Major	Moderate	*Extreme*	Safe Work Permit, Inspections and certification, Contractor Selection, Spotter, Competency Training, Planned maintenance	High	Reduce likelihood and consequence	Minor	Unlikely	*Low*

38	Contact by material (being unloaded from a truck) falling or shifting - Instability from the improper removal of dunnage or straps.	Visual inspection, PPE, communication, training, tailgate meetings, rated slings	Major	Moderate	*Extreme*	Safe Work Permit, Inspections and certification, Contractor Selection, Spotter, Competency Training, Planned maintenance	High	Reduce likelihood and consequence	Minor	Unlikely	*Low*
39	Contact by falling / swinging load (and/or lifting equipment components).- Lifting equipment (including cable) failure from worn or broken components.	Visual inspection, PPE, communication, training, tailgate meetings, Rigging Equipment Selection and Use PRO 38, Barricades and Barriers PRO 2	Major	Moderate	*Extreme*	Safe Work Permit, Inspections and certification, Contractor Selection, Spotter, Competency Training, Planned maintenance	High	Reduce likelihood and consequence	Minor	Unlikely	*Low*
40	Contact with the ground or the interior of a machinery cab- Loss of machinery control (and roll-over)	Equipment training, competency, Safe Work Procedures, pre use inspection, seat belts, PRO 32	Major	Unlikely	*High*	Equipment inspections Training, Log books Rollover protection systems, Operator competency, Inspections and audits	High	Reduce likelihood and consequence	Minor	Rare	*Low*
41	Contact by uncontrolled moving machinery- Loss of machinery control.	Equipment training, competency, Safe Work Procedures, pre use inspection, seat belts, proper maintenance of equipment, Use PRO 32	Major	Unlikely	*High*	Training and demonstrated skill, Engineered plans - detailed plan, Increased operator evaluations, Geotechnical plans, Increased focused on the OEMs manual, rollover protection	High	Reduce likelihood and consequence	Minor	Rare	*Low*
42	Exposure to extreme heat- Proximity to a construction "hot-work" fire.	Tailgate Meetings, SIMOPS, PPE, Fire extinguishers on site, SWP 16	Moderate	Moderate	*High*	Safe Work Permits, Contractor Selection, Designated Fire Watch, Engineered job plans, JSA`s	High	Reduce likelihood and consequence	Insignificant	Unlikely	*Low*

43	Fall from an extension ladder or step-ladder- Loss of balance, missed step, or missed handhold.	Three points of contact while climbing, Tailgate Meetings, Safe work pace. PRO 34C, 34D	Moderate	Likely	*High*	Fall protection harness, awareness, Drug and alcohol testing, spotter/buddy system	High	Reduce likelihood and consequence	Minor	Unlikely	*Low*
44	Fall from height- Loss of balance while working at heights	Three points of contact while climbing, Staying on defined personnel walkways and ladders, cages on fixed ladders, SWP 12A, 12B, 12C	Moderate	Likely	*High*	Fall protection harness, Travel constraints, Fall protection plans	High	Reduce likelihood and consequence	Minor	Unlikely	*Low*
45	Contact with sharp surface- Exposed pipe cut.	Awareness, PPE, flagging/signage, PRO 20	Minor	Likely	*High*	Pipe edge guards, tail gate meetings	High	Reduce likelihood and consequence	Insignificant	Unlikely	*Low*
46	Contact with the cutting, drilling, grasping, rotating and/or electrical components of hand tools- Use of hand tools.	Competency, training, Safe Work Practices, PPE, PRO 20	Moderate	Moderate	*High*	Pre-use inspection, SOPs (e.g., tool standards), Equipment guards	High	Reduce likelihood and consequence	Minor	Unlikely	*Low*
47	Personal Injury from Slip, Trip or Fall- unseen ground level obstruction from poor lighting	Proper footwear, Site assessment and maintenance	Minor	Moderate	*Moderate*	Advanced site preparation procedures, Better lighting Headlamps, Lighting plans	High	Reduce likelihood and consequence	Insignificant	Unlikely	*Low*
48	Fall from permanent platform- Loss of balance, missed step, or missed handhold.	Hand railings, PPE, PRO 34B	Moderate	Likely	*High*	Fall protection harness, Drug and alcohol testing	High	Reduce likelihood and consequence	Minor	Unlikely	*Low*
49	Personal Injury from Trip or Fall- Uneven surfaces and/or rugged terrain	Proper footwear, Site assessment and maintenance	Moderate	Likely	*High*	Site risk and hazard assessments	High	Reduce likelihood and consequence	Minor	Unlikely	*Low*

50	Personal Injury from Slip, Trip or Fall- Ice accumulation	Proper footwear, Site assessment and maintenance	Moderate	Likely	*High*	Advanced footwear, Boardwalks / crampons, Sand walkways	High	Reduce likelihood and consequence	Minor	Unlikely	*Low*
51	Exposure to ultraviolet radiation- Arc Welding	Safe Work Procedures, PPE , PRO 41	Moderate	Likely	*High*	Increased awareness, Require people to wear PPE in proximity to welders, Advanced welding technology	High	Reduce likelihood and consequence	Minor	Unlikely	*Low*
52	Contact by uncontrolled hose- Over pressured hose causing broken connection	Air hoses are inspected prior to us, PPE	Minor	Moderate	*Moderate*	Use of whip checks, Engineering design, Self-locking coupling	High	Reduce likelihood and consequence	Insignificant	Unlikely	*Low*
53	Contact by air-borne debris in a work area- Proximity and exposure to air-borne debris.	Monitor weather conditions, Mower guards, PPE	Minor	Moderate	*Moderate*	Isolate work area / controlled work space	High	Reduce likelihood and consequence	Insignificant	Unlikely	*Low*
54	Release (overpressure) - plugged start up strainers	Inspection, Work Permits, Task Planning	Minor	Moderate	*Moderate*	Follow construction plan, tailgate meetings	High	Reduce likelihood and consequence	Insignificant	Unlikely	*Low*
55	Exposure to radiation- Proximity to radiation generating devices.	Flag off setback distance, Shielding	Major	Unlikely	*High*	Follow Radiation procedures, Use proper equipment	High	Reduce likelihood and consequence	Minor	Unlikely	*Low*
56	Contact by uncontrolled moving construction material.-Loss of construction material stability from improper shoring.	Tailgate Meetings, Work Permits, Safe Work Procedures	Catastrophic	Unlikely	*Extreme*	Contractor Selection, Proper trenching techniques, Engineering assessments, QA/QC, Training and communication	High	Reduce likelihood and consequence	Moderate	Unlikely	*Moderate*

57	Exposure to oxygen deficient environment-Displacement of oxygen through vapour release (i.e. nitrogen purging.	Personal gas monitors, Area gas monitors, Safe Work Procedures, PRO 008	Catastrophic	Unlikely	*Extreme*	Engineered Job Plans, Job Hazard Assessments, Air movers, Continuous Gas Monitoring, Advanced PPE (Supplied Air)	High	Reduce likelihood and consequence	Major	Rare	*Moderate*
58	Exposure to open fire and/or smoke.-Proximity to a wildfire.	Evacuation Orders	Minor	Unlikely	*Low*	Emergency Response Procedures, On site emergency fire protection services	High	Reduce likelihood and consequence	Insignificant	Rare	*Low*
59	Exposure to loud high frequency noise-Proximity to noise generating machines or devices	Awareness and Signage, Basic Engineering Design, PPE	Minor	Almost Certain	*High*	Signage, Double Hearing Protection if required.	High	Reduce likelihood and consequence	Insignificant	Rare	*Low*
Pipefitters											
1	Pipe Fitting / Fabrication - improper placement/use of pipe stands, falling spools, pinch/crush points, line of fire.	Stand Set up for Large Bore Pipe JHA 23, Safe Out SWP 52	Moderate	Moderate	*High*	Site Specific JHA, Competency program.	High	Reduce likelihood and consequence	Minor	Unlikely	*Low*
2	Large Bore Pipe Spool Lifting and Installation	Crane and Hoisting PRO 9, Rigging Equipment Selection and Use PRO 38	Moderate	Moderate	*High*	Site Specific JHA, competency program, pre-lift planning, supervision involvement.	High	Reduce likelihood	Moderate	Unlikely	*Moderate*
3	Manual Handling of Compressed Gas Cylinders	Manual Handling SWP 22, Compressed Gas Cylinders and Compressed Air Pro 7	Moderate	Unlikely	*Moderate*	Site specific protocol for compressed gas handling.	High	Reduce likelihood and consequence	Minor	Rare	*Low*
4	Blind and deblinding- H2s Gas exposure, stored energy release, heavy lifting,	manual Handling SWP 22, Line Breaking Procedure	Moderate	Moderate	*High*	Site specific JHA, Respirator Training, Air Management, Competency Evaluations, LOTO, Gas monitors.	High	Reduce likelihood and consequence	Moderate	Unlikely	*Moderate*

5	Mobilization / Set-up of Pipe Stands - strains, soft tissue injury.	Manual Handling SWP 22	Moderate	Moderate	*High*	Proper equipment, stretching, micro breaks.	High	Reduce likelihood and consequence	Minor	Unlikely	*Low*
6	Contact by flying metal fragments or high-velocity water.-Pipe or fitting failure.	Visual inspection, PPE	Major	Unlikely	*High*	Contractor Selection, Designated Safety Watch, Set backs are further, Better QA/QC on the fabrication	High	Reduce likelihood and consequence	Minor	Unlikely	*Low*
7	Contact by high-velocity flying particles-Proximity to abrasive blasting or grinding activities	Awareness, Contract Inspection, Auto nozzle shut off, PPE, PRO 18A, 18B, 18C	Major	Unlikely	*High*	Third party contractors, Proper sandblast media, Grinder guards, Blasting procedure	High	Reduce likelihood and consequence	Minor	Unlikely	*Low*
Electrical											
1	Arc flash	PPE SWP 28, Arc Flash SWP	Major	Unlikely	*High*	Audit PPE Standard, JHA	Moderate	Reduce likelihood and consequence	Minor	Rare	*Low*
2	Cable pull	Installing Electrical Cable SWP 7, Manual Handling SWP 20	Moderate	Moderate	*High*	Ergonomics & Musculoskeletal Injury Prevention Program, Use approved Encana Methods, Stretching Program at documented intervals	Moderate	Reduce likelihood and consequence	Minor	Unlikely	*Low*
3	Congested Work Areas	Material Storage SWP 21, Housekeeping PRO 23.	Minor	Unlikely	*Low*	3 Week look ahead, Planning	Moderate	Reduce likelihood	Minor	Rare	*Low*
4	Cutting/fab of tray	Installing Electrical Cable Tray SWP 6, Machine and Tool SWP 18, Hand Tool PRO 20, Circular Saw PRO 4	Moderate	Moderate	*High*	Hand & Power Tools JHA	Moderate	Reduce likelihood and consequence	Minor	Unlikely	*Low*

5	Energized work	Isolation and Lock Out SWP 16	Major	Unlikely	*High*	Review CNRL's High Voltage LOTO Procedure Specific JHA	Moderate	Reduce likelihood and consequence	Moderate	Rare	*Moderate*
6	Grounding & Bonding	Grounding and Bonding SWP 4, Hand Tool PRO 20	Minor	Unlikely	*Low*	Site Specific JHA	Moderate	Reduce likelihood	Minor	Rare	*Low*
7	Heat Gun Operation	Machine and Tool SWP 18, Hand Tool PRO 20	Minor	Unlikely	*Low*	Hot Work Permits	Moderate	Reduce likelihood	Minor	Rare	*Low*
8	Heat Trace Installations	Electrical Installing Electrical Heat Tracing SWP 08	Moderate	Moderate	*High*	Site Specific JHA	Moderate	Reduce likelihood and consequence	Minor	Unlikely	*Low*
9	Instrumentation & Tubing	Installation of Instruments SWP 5, Raceways and Tubing Installation SWP 9	Minor	Unlikely	*Low*	Site Specific JHA	Moderate	Reduce likelihood	Minor	Rare	*Low*
10	Ladder use - falls from heights, unstable ladder, poor access, slips from environmental conditions	Ladders PRO 34a,b,c,d	Moderate	Moderate	*High*	Secure ladders, Inspection process	High	Reduce likelihood and consequence	Minor	Unlikely	*Low*
11	Meggering continuity testing	Megger Testing SWP 009,	Minor	Unlikely	*Low*	Site Specific JHA	Moderate	Reduce likelihood	Minor	Rare	*Low*
12	Terminations less than 750 v	Terminations SWP 10, Hand Tool PRO 20, Machine and Tool SWP 18	Minor	Moderate	*Moderate*	Site Specific JHA	Moderate	Reduce likelihood	Minor	Unlikely	*Low*
13	Use of Knives	Knife and Cutting Tools PRO 28, Hand Tools PRO 20	Moderate	Likely	*High*	Utility Knife JHA, Approved PPE	High	Reduce likelihood and consequence	Minor	Unlikely	*Low*

14	Working at Heights - falls from heights, dropped tools	Fall Protection SWP 12a,b,c, Fall Arrest Equipment Inspection	Catastrophic	Moderate	*Extreme*	Stop the Drop program, Simultaneous work SWP, contractor/client interface meetings.	High	Reduce likelihood and consequence	Moderate	Unlikely	*Moderate*
15	Exposure to short circuit- proximity of overhead power lines to work area	Saw work permits, safe work procedures, goal posts, spotters, rubber tire vehicles, SWP29	Catastrophic	Moderate	*Extreme*	Practice of de-energizing lines, proximity alarms, tailgate meetings	High	Reduce likelihood and consequence	Moderate	Rare	*Moderate*
16	Exposure to short circuit- Arc Flash	Signage, appropriate set backs, Safe Work Permits, Safe Work Procedures , Arc Flash Gear	Catastrophic	Unlikely	*Extreme*	Tailgate Meetings, follow all safe work procedures and permits, training, certified technicians, Lock Out/Tag Out and bump tests	High	Reduce likelihood and consequence	Moderate	Rare	*Moderate*
17	Exposure to short circuit- Operating electrical hand tools	Proper grounding, use of good electrical cords, preuse inspections	Moderate	Unlikely	*Moderate*	Follow JSA and Safe Work Procedures , double insulated tools	High	Reduce likelihood and consequence	Insignificant	Rare	*Low*
18	Ignition/Explosion- Static discharge when re-flooding a tank on maintenance legs	Inspection, work permits-, flood rate control	Catastrophic	Unlikely	*Extreme*	Follow JSA and Safe Work Procedures, tailgate meeting	High	Reduce likelihood and consequence	Major	Rare	*Moderate*
19	Exposure to extreme heat- Proximity to an industrial or electrical fire	Tailgate meetings, PPE, Fire extinguishers on site, emergency response plans	Major	Unlikely	*High*	Designated safety/ fire watch, onsite medical services, onsite fire protection crews	High	Reduce likelihood and consequence	Minor	Rare	*Low*
Welding											
1	Welding Fumes - inhalation of noxious fumes.	Air Quality Control SWP 1, Respirator Code of Practice SWP 38	Moderate	Unlikely	*Moderate*	Use of Respiratory Protection Equipment per Code of Practice.	Moderate	Reduce likelihood and consequence	Minor	Rare	*Low*

2	Arc Flash	PPE SWP 30, Welding PRO 41	Major	Unlikely	*High*	PPE Standard, Welding Screens, Barriers	Moderate	Reduce likelihood and consequence	Minor	Rare	*Low*
3	Hot Surfaces - burns during and post weld	PPE SWP 30, Welding PRO 41	Minor	Unlikely	*Low*	PPE Standard, Welding Screens, Barriers	Moderate	Reduce likelihood	Minor	Rare	*Low*
4	Prolonged / Awkward Body Position	Micro breaks, stretching	Moderate	Moderate	*High*	Worker awareness, Daily Stretching Program, micro-breaks.	Moderate	Reduce likelihood and consequence	Minor	Unlikely	*Low*
5	Tiger Torch Use - burns from open flame	Tiger Torch PRO 40	Minor	Unlikely	*Low*	Hot Work Permit, PPE Standard.	Moderate	Reduce likelihood	Minor	Rare	*Low*
Cranes & Rigging											
1	Crane Mobilization / Demobilization	Control Zone, Qualified Operators, Signalmen Competency, Overhead Powerlines SWP 29, Barricades & Barriers PRO 2, Manual Handling SWP 22.	Moderate	Moderate	*High*	Crane Rigging and Hoisting Procedure, Certified operators, Subcontractor safe work procedures.	Moderate	Reduce likelihood and consequence	Minor	Unlikely	*Low*
2	Critical/ Serious Lifts	Crane Hoisting/ Lift Classifications PRO 9, Lift Study PRO 29	Major	Unlikely	*High*	Crane Rigging and Hoisting Procedure, Engineered Lift Study & Permit.	Moderate	Reduce likelihood	Moderate	Unlikely	*Moderate*
3	Faulty / Damaged Rigging	Rigging and Lifting Equipment Storage and Maintenance PRO 37a, Rigging Equipment Selection and Use PRO 38	Moderate	Moderate	*High*	Daily Inspection Program, Crane Rigging & Hoisting Procedure	Moderate	Reduce likelihood and consequence	Minor	Unlikely	*Low*

4	Improper Maintenance to Crane and Components	Crane Hoisting/ Lift Classifications PRO 9, Inspection process	Moderate	Rare	*Moderate*	Daily Inspection Program, Crane Maintenance and Certification Program per Manufactures Recommendations and Provincial OH&S Regulations.	Moderate	Reduce likelihood and consequence	Minor	Rare	*Low*
5	Improper Size or Type of Rigging / Slings for Task	Rigging Equipment Selection and Use PRO 38	Moderate	Unlikely	*Moderate*	Crane Rigging & Hoisting Procedure, Competency & Training.	Moderate	Reduce likelihood and consequence	Minor	Rare	*Low*
6	Incompetent or Non-Designated Signalers	Trade Specific Training	Moderate	Moderate	*High*	Training and Competency	High	Reduce likelihood and consequence	Minor	Unlikely	*Low*
7	Incompetent Rigger - improper placement of slings, poor body placement	Rigging Equipment Selection and Use PRO 38	Moderate	Moderate	*High*	Training and Competency	Moderate	Reduce likelihood and consequence	Minor	Unlikely	*Low*
8	Poor Visibility During Blind / Radio Lifts	Control Zone, Crane Hoisting PRO 9.	Moderate	Moderate	*High*	Crane Specific Radio contact, controlled area.	Moderate	Reduce likelihood	Moderate	Unlikely	*Moderate*
9	Overhead Lifts - striking lines, line of fire	Control zone, qualified operators, rigging, Crane Hoisting PRO 9, signalmen, competency, Overhead Powerlines SWP 29, Barricades & Barriers PRO 2.	Major	Moderate	*Extreme*	Adhere to Crane Rigging and Hoisting Procedure, utilize trained spotters and signalman.	Moderate	Reduce likelihood and consequence	Moderate	Unlikely	*Moderate*

10	Swing Radius of Crane - pinch/crush points, line of fire	Crane Hoisting/ Lift Classifications PRO 9, Rigging Equipment Selection and Use PRO 38, Barricades and Barriers PRO 2, Equipment Loading and Unloading PRO 12, Overhead Powerlines SWP 29	Major	Moderate	*Extreme*	Worker awareness, use of spotters, supervisor involvement, Competency & Training. Test lifts.	Moderate	Reduce likelihood and consequence	Moderate	Unlikely	*Moderate*
11	Uncontrolled / Unstable Loads	Taglines, Rigging Equipment Selection and Use PRO 38	Moderate	Moderate	*High*	Crane Rigging & Hoisting Procedure	Moderate	Reduce likelihood	Minor	Unlikely	*Low*
Scaffolding											
1	Access / Egress	Housekeeping PRO 23, Material Storage SWP 23	Moderate	Moderate	*High*	FLRA, SWP.	Moderate	Reduce likelihood and consequence	Minor	Unlikely	*Low*
2	Collapse of Structure - structural integrity	Scaffolding SWP 39	Moderate	Unlikely	*Moderate*	Adhere to manufacturers specifications for allowable loads, etc. Inspection & tagging.	Moderate	Reduce likelihood	Moderate	Rare	*Moderate*
3	Congested Laydowns	Housekeeping PRO 23, Material Storage SWP 23	Minor	Moderate	*Moderate*	3 Week Look Ahead, laydown planning.	High	Avoid / eliminate	Minor	Unlikely	*Low*
4	Ground Conditions	Scaffolding SWP 39	Moderate	Moderate	*High*	Worker awareness, FLRA, Scaffold Inspection process.	Moderate	Reduce likelihood and consequence	Minor	Unlikely	*Low*
5	Hoisting & Lifting Material	Manual Handling SWP 22, Rigging Selection and Use PRO 38, Lifting over Live Equipment JHA, Constructing Scaffold in a Live Plant JHA	Moderate	Unlikely	*Moderate*	Increased attention/focus on FLRA's, Awareness of 20kg (44lb) MAX lift, Zone Control, Stop-The-Drop.	Moderate	Reduce likelihood and consequence	Minor	Rare	*Low*

6	Material Transport & Securement - loading / unloading / scaffold wagon	Equipment Loading and Unloading PRO 12, Manual Handling SWP 20	Moderate	Moderate	*High*	FLRA, spotters. Load Assessments	Moderate	Reduce likelihood and consequence	Minor	Unlikely	*Low*
7	Slippery Tubes/Decks	Severe Weather SWP 40, Housekeeping PRO 23	Moderate	Likely	*High*	FLRA, housekeeping inspections.	Moderate	Reduce likelihood and consequence	Minor	Moderate	*Moderate*
Hydrotesting											
1	High Pressure Testing - accidental pressure release	Hydrotesting PRO 29, Pneumatic Testing SWP 31, Pressure Testing for 100% Methanol SWP 33, Pressure Testing for 50% Water - 50% Polypropylene Glycol SWP 34, Pressure Testing for 60% water - 40% Methanol Mix SWP 35	Moderate	Moderate	*High*	Zone Control, flag & tag, Competency Program, experience, qualifications, hydrotest procedure.	Moderate	Reduce likelihood	Moderate	Unlikely	*Moderate*
2	Hydrotest Media Spills - environmental damage	Pressure Testing for 50% Water - 50% Polypropylene Glycol SWP 34, Pressure Testing for 1000% water, Spill Trays.	Minor	Moderate	*Moderate*	FLRA, utilize spill trays, site specific protocol.	Moderate	Reduce consequence	Minor	Moderate	*Moderate*
3	Movement of Hydrotest Wagons - property damage	Mobile Equipment PRO 32, Hydrotesting PRO 25, Traffic Management SWP 45	Moderate	Unlikely	*Moderate*	Use of spotters	Moderate	Reduce likelihood	Moderate	Rare	*Moderate*
Insulation											
1	Cuts from Cladding & Banding	Personal Protective Equipment SWP 30, Knife and Cutting Tools PRO 28	Moderate	Moderate	*High*	FLRA, Subcontractor safe work procedures, Competency.	Moderate	Reduce likelihood	Moderate	Rare	*Moderate*

2	Excessive garbage & debris	Housekeeping PRO 23, Material Storage SWP 23	Minor	Moderate	*Moderate*	FLRA, housekeeping inspections.	High	Reduce likelihood	Minor	Unlikely	*Low*
3	Inhalation of hazardous materials	Personal Protective Equipment SWP 30, Respirator Code of Practice SWP 38	Moderate	Unlikely	*Moderate*	FLRA, code of practice	Moderate	Reduce likelihood	Moderate	Unlikely	*Moderate*
Security											
1	Blockade of ROW-Unauthorized entry to construction site	Employee awareness training, signage, cameras, security guards, access lighting, locks, law enforcement	Moderate	Unlikely	*Moderate*	Fencing, gates, intelligence program , isoloate incident, continue working at alternate locations, legal injunction	Moderate	Reduce likelihood	Insignificant	Rare	*Low*
2	Civil disobedience, potential criminal conduct-Unauthorized access to a construction office building	Project security plan , fence, security guards, law enforcement, intrusion detection	Minor	Unlikely	*Low*	Contractors have added security personnel and security plans, briefings from intelligence community	Moderate	Reduce likelihood	Insignificant	Rare	*Low*
3	Vandalism-Unauthorized access to a facility	Project security plan , fence, security guards, law enforcement, intrusion detection	Minor	Unlikely	*Low*	Guards present, clustering machines, temporary fencing, contract security, security plans , motion activated cameras	Moderate	Reduce likelihood	Insignificant	Rare	*Low*

4	Civil disobedience, potential criminal conduct- Unauthorized access to Terminal site	Project security plan , fence, security guards, law enforcement, intrusion detection	Minor	Unlikely	*Low*	double fencing, co-ordinate with local bomb threat specialist, bomb threat training exercise, co-ordinate with local law enforcement, business continuity plan, on call technician co-ordinates with local law enforcement, vibration sensors on fencing, police and law enforcement, enhanced cameras, infrared detection, monitored social media	Moderate	Reduce likelihood	Insignificant	Rare	*Low*
5	Contact with abusive workers	Workplace violence procedure	Minor	Unlikely	*Low*	Proper training, disciplinary action, onsite medical services	Moderate	Reduce likelihood	Insignificant	Rare	*Low*
6	Escalating effects of an illness or injury- inability to obtain timely medical care	First Aid	Moderate	Unlikely	*Moderate*	Working Alone Policy, phone communication, JSA, onsite medical services	Moderate	Reduce likelihood	Minor	Rare	*Low*
7	Civil disobedience, Potential criminal conduct-Protestors (outside fence line)	Project security plan , fence, security guards, law enforcement, intrusion detection	Minor	Unlikely	*Low*	Fencing, gates, intelligence program , isolate incident, continue working at alternate locations, legal injunction	Moderate	Reduce likelihood	Insignificant	Rare	*Low*
Journey Management/Vehicle Use											
1	Contact with another vehicle or fixed object while driving (on road vehicle case) - unsafe driving conditions or fatigue	Driver operating class licensing, Green Driver Program, Journey Management Procedure, seatbelts, air bags, SWP 47B	Catastrophic	Unlikely	*Extreme*	Awareness and company culture, fatigue management , newer vehicles, onsite medical services	High	Reduce likelihood	Minor	Rare	*Low*

2	Contact with another vehicle or fixed object while driving (on road vehicle case) - slippery road conditions	Driver operating class licensing, Green Driver Program, seatbelts, air bags, SWP 43	Catastrophic	Unlikely	*Extreme*	Driver training, winter tires, awareness and company culture onsite medical services	High	Reduce likelihood	Minor	Rare	*Low*
3	Contact with wildlife while driving (on road vehicle case)	Driver operating class licensing, Green Driver Program, seatbelts, air bags	Moderate	Unlikely	*Moderate*	Driver training, awareness	High	Reduce likelihood	Minor	Rare	*Low*
4	Contact by a controlled public vehicle - worker ignorance or inexperience.	Driver operating class licensing, Green Driver Program, defensive driving	Moderate	Unlikely	*Moderate*	Driver training, awareness	High	Reduce likelihood	Minor	Rare	*Low*
5	Contact (or burial) by collapsing / falling snow, ice, and debris (avalanche)- Snowfield instability	Overhead building snow maintenance & avoidance, monitoring	Moderate	Unlikely	*Moderate*	Avalanche control, Advanced evaluation	High	Reduce likelihood and consequence	Minor	Rare	*Low*
6	Contact with an enraged driver- proximity to public roadways and enragement of other drivers	Driver operating class licensing, Green Driver Program, defensive driving, SWP 45	Minor	Unlikely	*Low*	Traffic management planning, awareness	High	Reduce likelihood	Insignificant	Rare	*Low*
7	Contact with another vehicle or fixed object while driving (while driving on site) - unsafe driving conditions or fatigue	Driver operating class licensing, Green Driver Program, Tailgate meetings, seatbelts, air bags, spotters, SWP 47	Catastrophic	Unlikely	*Extreme*	Awareness and company culture, fatigue management , newer vehicles, onsite medical services	High	Reduce likelihood	Minor	Rare	*Low*
8	Contact by an uncontrolled public vehicle.-Proximity to public roadways and uncontrolled driving.	Speed Limit Signage , SWP 45	Minor	Unlikely	*Low*	Advanced traffic routing High visibility vests Speed controls, Traffic management plan	High	Reduce likelihood and consequence	Insignificant	Rare	*Low*

9	Vehicles/equipment contacting above ground pipe-construction activities in a brownfield facility	Inspections, work permits, vehicle access control, spotters	Moderate	Moderate	*High*	Awareness of area, driver training	High	Reduce likelihood and consequence	Minor	Rare	*Low*
Building Hygiene /Personnel											
1	Exposure to carcinogenic solids (asbestos fibres)-Creation of (and proximity to) asbestos particles (dust).	Awareness, signage	Major	Unlikely	*High*	Asbestos containing coating removal and handling Procedure Regulations, Decontamination, Air testing/studies	High	Reduce likelihood and consequence	Moderate	Unlikely	*Moderate*
2	Exposure to vapour release-Filling a Sump tank/tank truck/vacuum truck	Safe Work Procedures, PPE,	Moderate	Unlikely	*Moderate*	Engineered Job Plans, Vapour Scrubbers, Advanced SOPs incl. Vac truck checklists, H2S monitoring, Gas monitoring, Standard Operating Procedures (incl. checklists)	High	Reduce likelihood and consequence	Insignificant	Unlikely	*Low*
3	Contact with toxic liquids / vapours-Uncontrolled presence of toxic liquids/vapors.	Visual Inspections, Tailgate meeting, PPE, Training	Moderate	Unlikely	*Moderate*	Designated work areas, Additional trainings	High	Reduce likelihood and consequence	Insignificant	Unlikely	*Low*
4	Exposure to extreme heat-Proximity to construction materials fire.	PPE, Fire Extinguishers on site, Proper Housekeeping, PRO 14, PRO 23	Moderate	Unlikely	*Moderate*	Increased inspections and awareness	High	Reduce likelihood and consequence	Insignificant	Unlikely	*Low*
5	Overuse of joints, tendons, or muscles- Repetitive motions	Micro breaks, stretching, use of equipment SWP 22	Moderate	Moderate	*High*	Ergonomics tools, task rotation	High	Reduce likelihood and consequence	Insignificant	Unlikely	*Low*

6	Overstress of joints, tendons, or muscles.-Heavy manual lifting.	Tailgate Meetings, Lifting equipment on site, Use of buddy system, proper lifting techniques, SWP 22	Moderate	Moderate	*High*	Contractor Selection, Safe Work Practices	High	Reduce likelihood and consequence	Insignificant	Unlikely	*Low*
7	Contact with heated surface-Welding	Hot Work Permit, Fire Watch, Competent Worker, PPE, PRO 41	Moderate	Moderate	*High*	Signage, barricades	High	Reduce likelihood and consequence	Insignificant	Unlikely	*Low*
8	Contact with human blood-borne pathogens-Proximity to bleeding worker (or member of the public) or blood contaminated waste.	Awareness, Training, Proper clean up and contaminated material handling	Catastrophic	Rare	*High*	Proper cleaning supplies available, advanced Fist Aid kit	High	Reduce likelihood and consequence	Minor	Rare	*Low*
9	Exposure to pathogens-Epidemic in work camp	Proper sanitation, awareness	Minor	Unlikely	*Low*	Promote healthy lifestyles, Onsite camp nurse	High	Reduce likelihood and consequence	Minor	Rare	*Low*
10	Exposure to extreme temperatures-Working outdoors.	Regular breaks, dress according to conditions , SWP 40	Moderate	Moderate	*High*	Buddy system, Hydration coolers, Awareness and tailgate meetings, Fibers in clothes, Continuous education	High	Reduce likelihood and consequence	Insignificant	Unlikely	*Low*
11	Attack by dangerous animals -Proximity to (and provocation of) dangerous animals.	Tailgate meetings/hazard identification, Awareness, SWP 50	Major	Unlikely	*High*	Work alone process, Bear awareness program	High	Reduce likelihood	Moderate	Rare	*Moderate*
Equipment											

1	Contact by controlled moving machinery.- Proximity to controlled moving machinery.	Basic training, PPE, Awareness	Moderate	Unlikely	*Moderate*	Advanced training, Procedures, Use of backup alarms, Spotters	High	Reduce likelihood and consequence	Insignificant	Rare	*Low*
2	Exposure to toxic combustion vapours-Proximity to toxic vapours from engines, SWP 001	Ventilation	Minor	Unlikely	*Low*	CO monitors, Parking procedures, Idling limit	High	Reduce likelihood and consequence	Insignificant	Unlikely	*Low*
3	Contact by moving machinery or flying machinery components- Failure of machinery from misuse.	Visual Observation, PPE	Major	Unlikely	*High*	Competency program, New and young worker program, Better gauges in machines, Fit for work purposes	High	Reduce likelihood and consequence	Insignificant	Unlikely	*Low*
4	Overstress of a Trans Mountain pipeline (no product release).- High external loading.	Basic signage, Depth of cover, PRO 13	Moderate	Unlikely	*Moderate*	Engineering tables, Increased patrol frequency, Signage	High	Reduce likelihood and consequence	Minor	Unlikely	*Low*
5	Rupture of a Trans Mountain pipeline (product release).- Authorized excavation at a facility by Trans Mountain or a Trans Mountain contractor.	Basic competency of operators, PRO 13	Moderate	Unlikely	*Moderate*	Ground disturbance training level 2, Facility ground disturbance permits, Public awareness presentations	High	Reduce likelihood and consequence	Minor	Unlikely	*Low*
Clearing and Grubbing											
1	Contact with tree cutting machinery.- Proximity to tree cutting machinery.	Worker Competency , PPE	Moderate	Unlikely	*Moderate*	Brush guards, Kevlar, Training	High	Reduce likelihood and consequence	Minor	Unlikely	*Low*

Ground Disturbance & Pile Driving											
1	Drilling mud release to surface water-Loss of bore containment during horizontal directional drilling	Design geotechnical studies	Moderate	Unlikely	*Moderate*	Advanced geotechnical information, Environmental Protection Plan, Contractor Selection	High	Reduce likelihood and consequence	Minor	Rare	*Low*
2	Overstress of a Trans Mountain pipeline (no product release).- High external loading.	Basic signage, Depth of cover, PRO 13	Moderate	Unlikely	*Moderate*	Depth of cover monitoring survey, Depth of cover verification procedure, Loading calculator, Signage, ROW control, Work permit	High	Reduce likelihood and consequence	Minor	Unlikely	*Low*
3	Rupture of a Trans Mountain pipeline (product release).- Authorized excavation at a facility by Trans Mountain or a Trans Mountain contractor.	Basic competency of operators, PRO 13	Moderate	Unlikely	*Moderate*	Ground disturbance training level 2, Facility ground disturbance permit, Public awareness presentations, Vapour detection, Volumetric detection in pond, Seal monitoring, Sump monitoring, Emergency response Isolation	High	Reduce likelihood and consequence	Minor	Unlikely	*Low*
4	Strike to a foreign pipeline or other utility (no product release or service interruption).- Authorized excavation by Trans Mountain or a Trans Mountain contractor.	PRO 13	Moderate	Unlikely	*Moderate*	Ground disturbance permits, Ground disturbance level 1 and level 2, Advanced signage, Contractor Selection	High	Reduce likelihood and consequence	Minor	Unlikely	*Low*
5	Strike to a foreign pipeline or other utility (no product release or service interruption).- Unauthorized excavation by Trans Mountain or a Trans Mountain contractor.	PRO 13	Major	Unlikely	*High*	Ground disturbance permits, Ground disturbance level 1 and level 2, Advanced signage, Contractor Selection	High	Reduce likelihood and consequence	Minor	Rare	*Low*

6	Rupture of a Trans Mountain pipeline (product release).- Authorized clearing on the pipeline ROW by Trans Mountain or a Trans Mountain contractor.	Basic Signage, Inspection, Tailgate Meetings, PRO 13	Major	Unlikely	*High*	Marking, Advanced signage, Contractor Selection, Ground disturbance procedure	High	Reduce likelihood and consequence	Minor	Rare	*Low*
7	Strike to a Trans Mountain pipeline (no product release).- Authorized excavation on the pipeline ROW by Trans Mountain or a Trans Mountain contractor.	Competent Operator, PRO 13	Minor	Unlikely	*Low*	Ground disturbance procedures, Following stringent excavation guidelines, Work permits	High	Reduce likelihood and consequence	Insignificant	Unlikely	*Low*
8	Rupture of a Trans Mountain pipeline (product release).- High external loading.	Depth of Cover, PRO 13	Major	Unlikely	*High*	Engineering table, Increased patrol frequency, Signage	High	Reduce likelihood and consequence	Minor	Unlikely	*Low*

APPENDIX B- TRAINING MATRIX

Through orientations, WorleyParsonsCord and subcontractor personnel will be made aware of specific safety roles and responsibilities. Section 7 of this PSSP outlines the requirements for Training and Orientations.

WorleyParsonsCord will perform applicable training relative to the scope of work. Conduct training and document the proper application, use, care and maintenance of safety equipment for all affected workers.

Table 16 Training matrix

X= Required O= As Required	Project Management	Construction Management	Site Leadership (foreman)	Electrical	Scaffold	Pipe Fitters	Welders	Iron Workers	Civil	Carpentures	Labourer	Equipment operators	Crane Operators	Visitors Short term (Delivery Vehicles)	Health, Safety and Environment Personnel	Regulators	Expiry
Required Training																	
Alcohol and Drug Training for Supervisors	X	X	X												X		3 YEARS
Code of Conduct	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	O	1 YEAR
Confined Space Entry and Monitor	O	O	X	O	O	O	O	O	O	O	O	O	O	O	X	O	3 YEARS
Construction Safety Training System (CSTS)	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	NO EXPIRY
Driver Training	X	X	X	O	O	O	O	O	O	O	O	O	X	O	X	O	3 YEARS
Electrical Safety Training System -Arc Flash (ESTS)	O	O	X	X	O	O	O	O	O	O	O	O	O	O	X	O	NO EXPIRY
Fall Protection	O	O	X	O	O	O	O	O	O	O	O	O	O	O	X	O	3 YEARS
Field Level Risk Assessment	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	1 YEAR
Fire Extinguisher/Watch	O	O	O	X	O	X	X	O	O	O	X	O	O	O	X	O	3 YEARS
Fire Prevention S-100	O	X	O	O	O	O	O	O	O	O	X	O	O	O	X	O	1 YEAR
First Aid (Alberta)	O	O	X	O	O	O	O	O	O	O	O	O	O	O	X	O	3 YEARS
Gas Detection	O	O	X	X	X	X	X	X	X	X	X	X	X	O	X	O	1 YEAR
Ground Disturbance Level 1	X	X	X	X	X	X	X	X	X	X	X	X	X	O	X	O	3 YEARS
Ground Disturbance Level 2	O	X	X	O	O	O	O	O	X	X	X	X	O	O	X	O	3 YEARS
H2s Alive Brown (Field)	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	3 YEARS
Lead Safe	X	X	X	O	O	O	O	O	O	O	O	O	O	O	X	O	3 YEARS
Leadership for Safety Excellence (LSE)	X	X	X	O	O	O	O	O	O	O	O	O	O	O	X	O	NO EXPIRY
Mobile Equipment Operation	O	O	O	O	O	O	O	O	O	O	O	X	X	O	O	O	3 YEARS
OFA (BC)	O	O	X	O	O	O	O	O	O	O	O	O	O	O	X	O	3 YEARS
Powder actuated tools	O	O	O	X	O	O	O	O	O	O	O	O	O	O	O	O	3 YEARS
Respirator Fit Testing	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	2 YEARS
SAZ (BBO)	X	X	X	X	X	X	X	X	X	X	X	X	X	O	X	O	NO EXPIRY
SCBA/SABA	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	3 YEARS
Simple/High Torque	O	O	O	O	O	X	O	X	O	O	O	O	O	O	O	O	1 YEAR
Small tool Comptency	O	O	O	X	X	X	X	X	X	X	X	X	O	O	O	O	2 YEARS
Spotter Training	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	O	1 YEAR
Supervisor Training (White Hat)	X	X	X	O	O	O	O		O	O	O	O	O	O	X	O	1 YEAR
TMEP Orientation	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	1 YEAR
Transportation of Dangerous Goods (TDG)	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	3 YEARS
WHMIS 2015/GHS	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	O	1 YEAR
WorleyParsonsCord Ground Disturbance (Gold Shovel)	X	X	X	X	X	X	X	X	X	X	X	X	X	O	X		1 YEAR
WorleyParsonsCord LOTO	X	X	X	X	X	X	X	X	X	X	X	X	X	O	X	O	2 YEARS
WorleyParsonsCord Orientation (CMTQ)	X	X	X	X	X	X	X	X	X	X	X	X	X	O	X	O	1 YEAR
Root Cause (Sologic)	X	O	O	O	O	O	O	O	O	O	O	O	O	O	X	O	3 YEARS

APPENDIX C- DAMAGE PREVENTION PLAN

1 OBJECTIVE

To define the minimum Health, Safety and Environmental requirements relating to ground disturbance activities, at WorleyParsonsCord ("the Company") work locations and other locations where the Company personnel undertake work.

2 SCOPE AND APPLICABILITY

This standard applies at all work locations under the Company management and locations managed by a Joint Venture of which the Company s is a partner. Regions and Locations may add to the requirements contained herein through the Process Improvement Process. This standard also applies to work locations where another party manages and the Company personnel undertake work and to all the Company managed personnel while engaged in any activity on behalf of the Company.

Where customers or joint venture partners propose that their standards shall apply at a particular work location the Company/Customer HSE Management Review and Application procedure and the Company/Customer HSE Bridging document Guideline and Template shall be used to ensure that the customer or joint venture partner standard(s) meet the minimum requirements of this standard.

This standard shall be applied to all Company personnel, contractors and their subcontractors. Contractors may, however, when agreed through the Company project engagement processes, utilize their own standards and procedures in so far as the requirements of their standards are at least equivalent to those of this standard, the Customer's standards and those of applicable National and Local regulations which should be read and complied with in conjunction with this standard.

3 PLANNING AND CONDUCTING GROUND DISTURBANCE.

The implementation of this standard is the responsibility of the Company senior management including Regional Managing Directors and other Directors/Executives.

The Company' managers are responsible for the application of, and compliance with, this standard at work locations where they have operational responsibilities. Company' managers will also be the focal points for associated liaison with, and coordination of, contractors' compliance with this standard, at the managers respective work locations.

Contractors are responsible for their personnel, and their subcontractor's personnel, compliance with this standard and / or other standard as agreed per Section 2 above.

Site Supervisors are responsible for the day to day application of this standard.

The Company' personnel have a responsibility to comply with this standard.

Personnel have a duty of care, to their work team and others in relation to the application and maintenance of this standard, for work they, their work team or others undertake.

4 GROUND DISTURBANCE & EXCAVATION REQUIREMENTS

All Ground Disturbance activities will be evaluated through WorleyParsons internal Third Party Review process, meet the requirements outlined in the Ground Disturbance Code of Practice, develop a Ground Disturbance PEP and have a Ground Disturbance Permit in place prior to commencing with Ground Disturbance activities.

1. The Third Party Review process is to be completed in-full and submitted prior to the commencement of work activities. The Project Manager is responsible for ensuring the information in the ground disturbance package is collected, compiled and submitted to the Third Party Reviewer.
    - A competent Site Supervisor or equivalent delegate may be assigned the responsibility for collecting and compiling required data.

2. Final approval of the ground disturbance package must be provided by a member of Third Party Review team and the Project Manager, before any ground is disturbed.
3. Where an alternate ground disturbance process or permit is in place at a project site or as a result of client or owner requirements, the Third Party Reviewer will be notified and responsible for conducting a review.
    - The Project Manager will request and review with the project team, the alternate ground disturbance process of the client or owner. Ground disturbance will not proceed without an understanding of the client or owner's ground disturbance process and training required to implement the clients' process.
    - Where discrepancies between the client and WorleyParsons ground disturbance processes are identified, the most stringent process will be used.
    - WorleyParsons standard should be used where an alternate process does not meet the intent of WorleyParsons Internal process.

4. WorleyParsons will comply with the Gold Shovel Standard and are committed to improving workforce and public safety and the integrity of vital buried infrastructure.

5 GROUND DISTURBANCE CODE OF PRACTICE

WorleyParsons Code of Practice is a five stage process for undertaking all ground disturbance activities. The completion of work activities, when aligned to the code of practice, ensures diligence and safety throughout the planning and execution stages by consistently applying the following steps:

1. Manage
2. Background Search
3. Notification
4. Locate
5. Finalize

Manage

Project management is the foundation of a safe and successful ground disturbance project and should include the following documentation:

- Project PEP, Scope of Work (ie: cost estimate, analytical schedule, project schedule) HSE planning requirements;
- Ground Disturbance PEP" Communication Plan; and
- Other documents may apply depending on project scope.

A review of the project management documentation, with the project team during the planning phase and/or as a project kick-off meeting prior to the project start, is necessary to ensure the clear communication, understanding and documentation of the project scope. It is also an opportunity to review:

- Rationale for proposed ground disturbance and sampling locations, analytical schedule; proposed schedule and cost estimate;
- Potential for changes to the scope as project progresses;
- Assessment of project risks and mitigations to be implemented;
- All required permissions are in place to complete the project; and
- Roles and responsibilities which are assigned to each project team member.

Background Search

The proposed work location is to be evaluated each time a ground disturbance activity is planned. The Project Manager and Site Supervisor are responsible for identifying, compiling and reviewing the following information, where applicable:

- Identification of stakeholders and ROW's through Land title searches;
- Requirements for site access, proximity and crossing agreements;
- As built drawings / Plot plans from client files;
- Locate drawings;
- Aerial images including site layout and existing structures;
- Historical / internal ground disturbance documents from past activities;
- One-Call or equivalent organization ticket information;
- Information from federal and provincial databases (i.e. EUB pipeline database); and
- Other applicable documentation as per regulatory requirements.

Notification

The Site Supervisor is responsible for ensuring that all utility owners within a 30m radius of the proposed ground disturbance are identified and notified of the proposed work activity prior to its commencement.

- At the commencement of the notification process, the Site Supervisor is responsible for informing a member of the Third Party Review team that the project planning has reached this stage.

All communications with utility and (or) property owners must be documented using the Ground Disturbance Notification Record. It is the responsibility of the Project Manager, to ensure that sufficient time is allotted in the project schedule to accommodate for the notification process and permitting requirements.

Ground disturbance cannot proceed until all applicable parties within the search area have acknowledged the notification and given permission for the work to proceed

1. Notification and permission is required if working within 30m of transmission pressure (TP) or intermediate pressure (IP) lines that are operating at 100psi (700kPa) or greater.
2. Notification and permission is required if working within "1m" of distribution pressure lines operating at less than 100psi (700kPa)
3. If the work activity is taking place within the existing right of way of an underground utility, a proximity or encroachment agreement is required.
    - Written approval from the utility owner is required for work activities conducted in the right of way
    - Utility owners may require additional precautions to be taken for ground disturbance activities. Where such stipulations are imposed, the Site Supervisor must ensure the appropriate controls are communicated to the project team, implemented and monitored, as requested by the utility owner.
4. If equipment will be required to cross facilities,
    - The owner must be contacted and arrangements made for safe crossing.
    - Agreements and conditions for crossing (e.g., ramp specifications, route of travel) must be documented.
    - The size and weight of the equipment intended to cross must discussed with the owner and documented within the agreement.

One-Call Systems

Where a one call system is in place, the Site Supervisor must contact that one call system and retain a record of the ticket number provided; see table 1 – Provincial One-Call Systems.

- Not all utility owners are mandated to participate in the one-call system; non-participating utility owners must be identified through a background information search and individually notified of the proposed ground disturbance
- The Site Supervisor must maintain detailed information on the dates and times for each owner notification conducted and records of responses received. This information is to be maintained in the Ground Disturbance Notification Record

Locate

A private utility locate must be completed for all ground disturbance activities and renewed as required by local jurisdictions. The Site Supervisor on the project must supervise the utility locates and review the findings to ensure they clearly understand the locations of the sites buried utilities.

The Site Supervisor is to complete the Utility Locate Request form and include it in the ground disturbance package.

1. Two independent private locates are to be completed by two separate line locating companies.
   - Dependant on the scope of work and a review of historical ground disturbance documentation, one private locate may be conducted at the discretion of the Project Manager and the Third Party Reviewer.
2. Where only one line locating company is employed, the Project Manager must ensure the following:
   - justification for the deviation, is documented; and
   - consider whether the locating company will complete two scans of the site, using two different locating technologies (i.e.: an induction scan and Ground Penetrating Radar (GPR)).
3. The Utility Locator is to be provided with a site diagram for reference, to assist with documenting all relevant utilities once they are located and visibly marked on site. The diagram is to identify the areas that require a 4-way locate sweep be conducted and includes the following information:
   - The proposed ground disturbance area(s) identified as the Work Area(s);
   - The 10 m area around proposed ground disturbance locations within the work area (e.g- borehole locations); and
   - The 30 m zone around the proposed ground disturbance area(s) identified as the Search Area(s).
4. The locators are to provide an accurate locate diagram of the site, identifying all buried utilities located and/or identified. Any areas where the locator was unable to receive a clear signal, debris detected or areas where ground disturbance is not recommended without daylighting of sub-surface anomalies, should also be indicated on the locate diagram along with the justification. This information is to be included in the Ground Disturbance Package, compiled by the Site Supervisor prior to review by a Third Party Reviewer
5. After the location of the existing buried facilities is identified, the project team must review the findings and:
   - Adjust the location of proposed ground disturbance locations and the extent of scope based on approximate location of buried utilities, if required;
   - Identify locations where daylighting is required to expose a utility or gain clarity on any subsurface structure or anomaly. Plan the mobilization of equipment on site and general site access due to buried and/or overhead utilities;

- Compare the current location of buried utilities to previous locate drawings, site as-builts and historical data to identify inconsistencies; and
- Mitigate unforeseen risks by assessing the need to employ alternative forms of sub-surface identification when utilities cannot be located, unknown anomalies are identified or a locator report recommends further pre-disturbance investigation be considered or completed (e.g- hydro-vac /daylighting, (GPR)).

Private Utility Locator Selection

- All utility locate companies must be prequalified and approved in advance to ensure competency.
- Locating contractors should at a minimum meet the competency requirements as specific by the Canadian Association of Pipeline and Utility Locating Contractors publication - Canadian Locator Technician Standard.
- Workers conducting the work should have valid Ground Disturbance Level 2 training or equivalent.
- Locating technology must be considered when selecting a locating contractor. Various locating technologies can be applied to differing levels of site complexity, as outline in the, Line Locating Framework-Canada, document.

All Ground Disturbance activities must be evaluated through WorleyParsons internal Third Party Review process. The Site Supervisor must finalize the information gathered during the Manage, Background Search, Notification and Locate stages and combine it into a ground disturbance package and include a Final Plot Plan. The Final Plot Plan must include the following:

1. Identification of the Work Area(s) and Search Area(s) where locators performed their locate sweeps;
2. On-site travel routes for heavy equipment and vehicles;
3. Areas requiring access preparation outlined in a crossing agreement identified which includes dimensions of access preparation materials (i.e.: dimensions and quantity of rig mats);
4. Location(s) where daylighting activities are required or have been completed;
5. All underground and overhead utilities highlighted, distance from ground disturbance identified and respective utility owner identified;
6. Identify any areas where the locator was unable to receive a clear signal or areas where ground disturbance must not proceed and the justification;
7. Hazardous/sensitive areas on site to avoid (i.e.: low lying wet areas, wetlands); and
8. Titled as “Final Plot Plan”, dated by the Site Supervisor

Third Party Review Process and Ground Disturbance Permitting

The Ground Disturbance Package must be reviewed by a member of the Third Party Review Team and the Site Supervisor to ensure the Ground Disturbance Package, meets the requirements as identified in, Section 5.5: Finalize.

- Dependant on the nature of the disturbance activity and evaluation of the documentation, additional stipulations or conditions may be imposed at the discretion of the reviewer.
- No ground disturbance is allowed to proceed without the Project Managers final review of the Ground Disturbance Package and Third Party Review documentation.

The Site Supervisor is responsible to ensure that any imposed conditions have been implemented as requested on the Third Party Review Form. After final review by the Project Manager and the completion of imposed

conditions, the Site Supervisor may proceed and issue a Ground Disturbance Permit. The Site Supervisor must sign the permit and:

- Review the Ground Disturbance Package with all involved personnel and inform them of all associated risks and hazards prior to conducting work;
- Ensure the permit is signed by the sub-contractors completing the ground disturbance and the client if required;
- Make the ground disturbance package available on site for all personnel to review, through the duration of the ground disturbance activities; and
- Where the client mandates the use of their owner Ground Disturbance Permit, the Project Manager must ensure that it meets or exceeds the requirements of WorleyParsons Ground Disturbance Permit.

6 GROUND DISTURBANCE GENERAL REQUIREMENTS

Emergency Response Plans

Site specific emergency response procedures are in place for all projects. Emergency Response Procedures shall ensure that in the event of a utility contact the appropriate notifications and emergency response are in place.

Where work involves working in proximity to a utility line, the Project Manager shall request a copy of the any emergency response plans and site specific information from the owner.

Daylighting / Exposing utility lines

Exposure should be considered for complex or congested sites or where line locators may have a difficult time getting accurate readings (i.e.: urban/commercial sites, decommissioned sites where utilities have been disconnected). Where a utility must be exposed in order to confirm its buried location, the utility owner will approve the method of daylighting.

No mechanical type excavation activity is permitted to occur within 5m of a pipeline or 1m of a utility line until the line has been exposed and is clearly visible. Exposure shall be by hand excavation or an alternate method such as daylighting.

Daylighting should:

- Be 0.5 m deeper than intended depth of ground disturbance (unless appropriate justification can be provided);
- Exceed the diameter of the drilling attachments used;
- Be done where utilities enter or exit a property boundary, as it relates to the ground disturbance;
- Be at regular intervals on the utility;
- Be on curves, bends or where clarity is required and should be considered when a utility dead-end is identified;
- Be done when discrepancies are identified between documents such as utility locate drawings, as-built or any document referenced for the purpose of confirming the location of a utility; and
- Be done as required by the owner of the utility and / or the Third Party Reviewer.

Any time a utility is exposed / daylighted;

- The owner will determine the non-destructive technique that is acceptable;
- The owner must be notified and should be on-site when their utility is exposed;
- No person shall use mechanical excavation within 60 cm of the pipeline unless authorized by the owner; and

- A designated signaller must be used, to ensure that equipment maintains the adequate distance restrictions from the utility.

Underground services that have the potential to be undermined in the excavating process shall be adequately blocked or supported to ensure the undermining does not create a hazard to personnel or the service.

Prior to backfilling, the owner representative shall be present to conduct an inspection. Backfill inspections must be documented by the WorleyParsonsCord Site Supervisor using WorleyParsonsCord Backfill Inspection Report form.

Utility Line Locations

1. Limits of approach must be maintained from overhead power lines according to local jurisdiction. If the voltage of the line is unknown, all equipment and activities must remain a minimum 7 m distance from the overhead line until the actual voltage is determined.
2. The Site Supervisor is to ensure any utilities are properly located and marked with visible paint and stakes or flags, directly over the utility; refer to
3. for acceptable markings.
    - Stakes are to be placed at regular intervals along the utility, as to clearly identify the horizontal alignment of the utility. Site conditions/features will dictate the spacing, but at no point shall the intervals be greater than 10m; and
    - Stakes and location markings are to be maintained by the Site Supervisor and replaced in the event of damage from equipment, material movement. The locator may be required to re-locate the utilities, in order to replace damaged utility markings.

7 PERMITTING

Any and all ground disturbance operations conducted by WorleyParsonsCord, or its subcontractors, will be completed in accordance with WorleyParsonsCord Line Location Standard, as well as, all applicable Federal, Provincial, and Municipal laws/regulations for the jurisdiction(s), in addition to Trans Mountain policies and permitting procedures, this includes the following:

- A Facilities GD Permit is required from Trans Mountain for all facilities ground disturbance; and,
- A 30 meter permit is required from Trans Mountain for all ground disturbances on the Right of Way within 30 meters of the existing Trans Mountain Pipeline.

Where a Trans Mountain facilities GD Permit is not required, WPC shall ensure that a Checklist or internal GD Permit system is enacted and which may include the Trans Mountain 30 meter permit

8 EXCAVATIONS

All temporary protective structures, shoring, sloping or benching must be done in accordance with the approved practices specific to the jurisdiction of work. As regulatory requirements vary with each province or territory, the excavation shall be managed by a person knowledgeable in the requirements for jurisdiction the excavation activities are taking place.

Hazard identification

Prior to undertaking any excavating work , evaluation of the proposed work and construction activities should be done to ensure that appropriate controls are put in place to protect workers from cave-ins and prevent damage to surrounding properties. Consideration includes, but no limited to the following:

- Soil characteristics / Type;
- Vibration from surrounding activities;

- Hydrostatic Pressure;
- Structures adjacent or within the vicinity of proposed excavation; and
- Materials stored or equipment operating nearby

Where any of the items listed above, or others specific to the scenario not listed, bring into question the stability of the proposed excavation, written instructions must be provided by a Professional Engineer.

General Requirements

No person shall enter an excavation or trench greater than a specified depth, as defined by their local jurisdiction, unless appropriate controls are in place. See Section 9.3 Summary of Provincial Sloping Requirements and Section 9.4 Summary of Provincial Benching Requirements. Excavations are to be controlled through the use of slopping / benching, shoring, protective structures or a combination thereof. Additionally:

Access/Egress

- A safe means of entry and exit must be present and should be located within 8 metres of personnel working within any excavation;
- Where ladders are used, the ladder must extend 1m (3 feet) above the edge of the excavation; and
- Where dirt ramp ways are used they must be adequately sloped to allow for safe access preferably 4:1 ratio.

Barricades

- All unattended excavations shall be barricaded. Barricades shall be used as a physical barrier to prevent personnel from falling/driving into the excavation and should be at intervals of no less than 3m (10 feet);
- A walk way consisting of 1m (3 feet) should be maintained between the edges of the excavation and barricading;
- Barricades can be portable wood sawhorses, concrete barricades, temporary fencing or posts and ropes, or tube & clamp scaffolding. The selection of barricading must be appropriate to the level of hazard that the excavation presents;
- Reflective signs or flashing lights must be attached to the barricades if the excavation is close to a road way or in high traffic areas are present during night; and
- Roadways or site access where equipment will be crossing under overhead power lines will have goal posts erected in advance, to identify the height restriction of the power line

Hazardous Environments (Contaminated Soils)

- Assessments for hazardous materials or ground contamination must be conducted prior to work activity beginning;
- Air quality testing must be in place where contaminated soils or work activities could pose a threat to the air quality; and
- If excavation is determined to be a confined or restricted space work activities must be in compliance with WorleyParsonsCord Confined Space Entry – Canada.

Hazard Removal

- All trees, boulders, fences and similar objects adjacent to the excavation need to be removed or secured to prevent a hazard to employees working in the excavation. The area to be cleared and considered adjacent would have a width equal to the depth of the excavation.

Inspections

- Excavations and protective structures are to be inspected prior to entry. Any loose material must be scaled from the excavations walls.

Spoil Pile

- Materials should be kept back a minimum one meter from the edge of the excavation. Ideally, spoil piles should be kept back a distance equal to depth of the excavation;
- The spoil pile cannot be sloped at an angle steeper than 45 degrees; and
- Where excavation activities occur within the vicinity of existing pipelines, spoil piles must not be placed over top of or adjacent to operating lines without approval from a Professional Engineer.

Utility Support Structures

- Trenches or excavations that may affect the stability of a foundation or other support structures (eg – power pole) , must have a temporary supporting structure installed that is designed, constructed and used in accordance with the specifications of a Professional Engineer. This structure must be installed prior to proceeding with the work.

Water Accumulation

- Water accumulation in excavations shall be minimized as to not pose a hazard to the worker as well as affect the integrity of the sloping/shoring of the side slopes of the excavation.
- Where pumping equipment is required the discharge should be located in area that minimizes erosion.

Working Alone

- No worker shall be permitted to work alone in an excavation; and
- A competent Site Supervisor knowledgeable about excavation activities must be on site overseeing the work where workers require entry.

Sloping and Benching Requirements

If there are any hazards identified that could compromise the soil integrity such as those listed in section 7.1, the excavation must be approved by a Professional Engineer.

Sloping and benching controls shall be constructed in accordance with Provincial Regulation or the excavation must be approved in writing by a Professional Engineer. See

Sloping

1. Sloping shall be flatter than the angle of repose, but in no case can it be less than the requirements established by the regulator.
2. No worker is allowed to approach an end wall unless:
    - It is adequately sloped; or
    - A distance equal to the depth of the excavation can be maintained from the end wall

Benching

1. Benches must be constructed from the top down. Workers are only allowed to work off of a bench provided all the requirements in table 3 are met.
2. Where workers require access to the bottom of the excavation only, the run of first bench must be 1.5 x the rise and the remaining benches maintained at a ratio of 1 to 1.

Shoring and Temporary Protective Structures

Shoring shall be constructed in accordance with Provincial Regulations. Where material or specifications dictated by legislation cannot be met, or are not provided, the process shall be approved by a professional engineer.

Where there is a requirement for shoring or temporary protective structures, no worker shall be allowed to enter the excavation until the support system has been installed.

Shoring

- Trenches less than 1.2 m (4 feet.) deep should be shored where entry is required and when the potential for hazardous ground movement is likely (ground is subject to hydrostatic pressure or vibration);
- Shoring shall be installed from the top and progress downwards;
- Hydraulic or pneumatic jacking systems are to be installed as per manufacturer's instructions and have mechanism in place to ensure they will not collapse;
- Shoring walls must rise a minimum of 1m above the excavation wall; and
- Access / egress must within 8m (25 feet) walking distance of the work area.

Temporary protective structures

- Where a temporary protective structure is used, it must be designed by a professional engineer and constructed and maintained according to specifications;
- Excavations and trenches must be cut to minimize the distance between the excavation and shielding walls;
- Temporary protective structures must rise a minimum of 1m above the excavation;
- No worker is allowed to work outside of any temporary protective structure; and
- Access must be provided within the confines of a temporary structure

9 TRAINING

Personnel shall be educated on the hazards associated with an excavation activity prior to undertaking any work.

1. In addition to the basic WorleyParsonsCord required HSE training, Site Supervisors, Project Managers, affected workers and Third Party Reviewers responsible for a ground disturbance project and its associated contractors performing ground disturbance, must have Ground Disturbance Level 2 training or equivalent, current within 3 years, completed the Ground Disturbance, Excavation and Trenching Safety Workshop and be deemed competent through:
    - Site Supervisor Progression Program;
    - White Hat Assessment Program; or
    - Third Party Review qualification process.
2. Workers required to enter and work in excavation are to complete WorleyParsonsCord Internal Ground Disturbance, Excavation and Trenching Safety Workshop.
3. A Third Party Review Team is to be an internally established group of designated persons with a combination of knowledge with ground disturbance activities and regulatory understanding of underground utilities. Third Party Reviewers must:
    - Have at least 4 years' experience directing ground disturbance which demonstrates past proficiency in leading ground disturbance activities; one year of which with WorleyParsonsCord where the individual's confidence and judgment demonstrates their ability to halt or delay project work if warranted;
    - Have up-to-date Ground Disturbance Level 2 or equivalent training;
    - Complete the WorleyParsonsCord Ground Disturbance, Excavation and Trenching Safety Workshop; and
    - Be currently involved in ground disturbance regularly and/or have consistently completed Third Party Ground Disturbance reviews;
    - Have a thorough understanding of the legislative requirements applicable to the work activity, industry recommended practices and client requirements as it applies to Ground Disturbance; and
    - Have references from two, currently qualified Third Party Reviewers and the endorsement of Line Manager / Team lead.

10 ADDITIONAL GUIDANCE

Canadian "One-Call Systems" Overview

In Canada “One Call Systems” have been established in most Canadian provinces. These organizations are in operation to assist in the prevention of damages to underground utilities by ensuring effective communication between utility owners/operators and those undertaking ground disturbance activities. See Table 1 Canadian “One-Call Systems” Overview.

Each provincial one call system acts as an intermediary between the excavating community and the owners/operators of underground facilities (pipelines, telecommunications cables, water and sewage lines, electrical wires, and other vital facilities). They do not directly provide the information on the location of buried facilities, but facilitate the identification and notification process to the owners registered within the proposed ground disturbance.

Table 17 Canadian "One-Call Systems" Overview

British Columbia					
One Call System	B.C. One Call	**Required Notification**		2 business days	
Telephone	1-800-474-6886	**Fax**	604-451-0344	**Website**	www.bconecall.bc.ca
Alberta					
One Call System	Alberta One-Call	**Required Notification**		2 business days	
Telephone	1-800-242-3447	**Fax**	1-800-940-3447	**Website**	www.alberta1call.com

Table 18 - International Colour Code for Marking Buried Facilities

WHITE		Proposed excavation or ground disturbance
PINK		7.5 metre safety zone around underground mainline pipe or station/terminal hydrocarbon piping, temporary survey markings
RED		Electrical, lighting cables
YELLOW		Gas, oil, steam
ORANGE		Telephone, cable, TV, signals, alarms
BLUE		Potable water
GREEN		Sanitary and storm sewer, culverts
PURPLE		Reclaimed water, irrigation, slurry

Summary of Provincial Sloping Requirements

Table 19 Provincial Sloping Requirements by Soil Type

Provincial Soil Type		Controls required if	Figure 1 *h to v*	Figure 2 *h to v*	Line AB ≤	H *max* ≤	Line S ≥	Entry / Exit
British Columbia	Type A	Depth ≥ 1.2m	3 to 4	3 to 1	1.2m	6.0m	0.6m	≤ 8.0m
	Type B & C		-	-				
Alberta	Type A	Depth ≥ 1.5m	3 to 1	3 to 1	1.5m	*N/A*	1.0m	≤ 8.0m
	Type B		1 to 1	1 to 1				
	Type C		1 to 1	-				
	Type B & C		-	-				

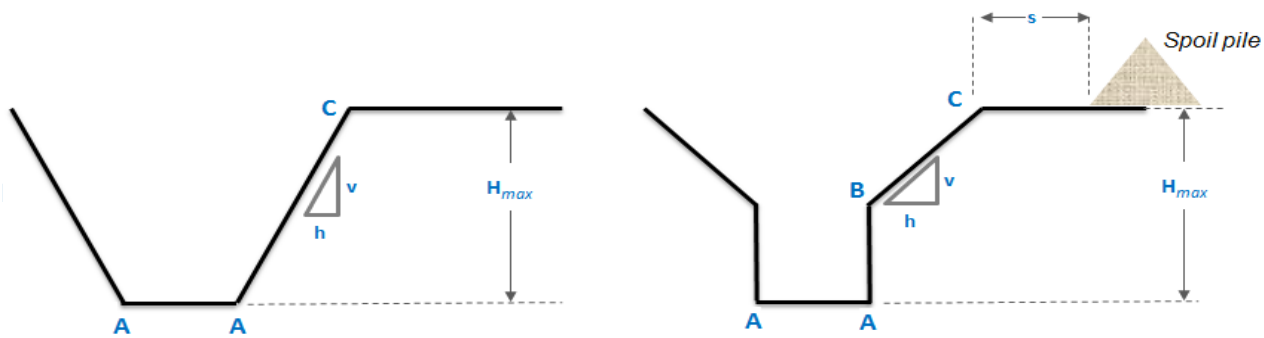


Figure 12 Excavation Sloping

Summary of Provincial Sloping Requirements

Table 20 Provincial Benching Requirements

Provincial Soil Type		Figure 3			Figure 4			Line AB	H *max* ≤
		r_1	r_2	h to v	r_1	r_2	h to v		
British Columbia	Type A	1.5 x r_2[2]	≤1.2m	3 to 4	1	1	3 to 4	≤1.2m	6.0m
	Type B & C	-	-	-	-	-	-		
Alberta	Type A	≥ 0.75 x r_2[3]	≤1.2m	3 to 4			3 to 4	≤1.2m	6.0m
	Type B	> r_2	<1.0m	1 to 1				≤1.0m	
	Type C	-	-	-	-	-	-		
Yukon	Type A	1.5 x r_2[4]	≤1.2m	3 to 4	1	1	3 to 4	≤1.2m	6.0m
	Type B & C	-	-	-	-	-	-	-	

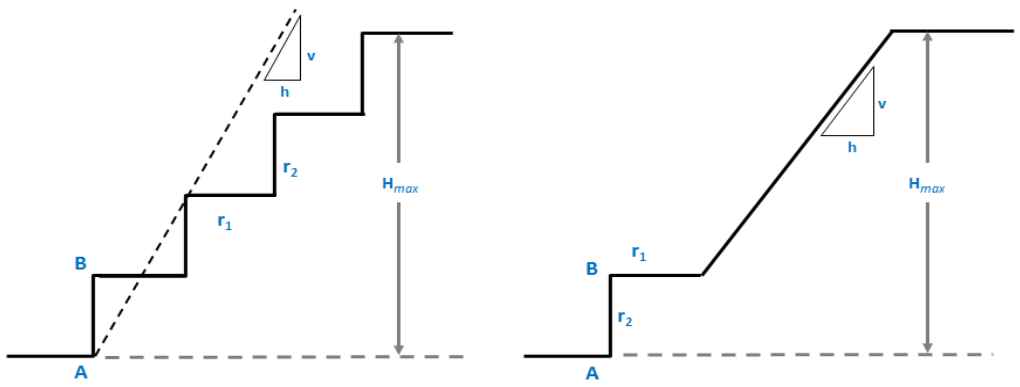


Figure 13 Excavation Benching

11 REFERENCES AND SUPPORTING DOCUMENTS

Publications

- CCGA (Canadian Common Ground Alliance), 2014. Underground Infrastructure Damage Prevention. Best Practices Version 1.0. Date October 2014
- CSA Z247-15 Damage Prevention for the Protection of Underground Infrastructure, May 2015
- ENFORM, 2016. Ground Disturbance and Damage Prevention. A Program Development Guide. Edition 3. Prepared by ENFORM, the Safety Association for Canada's Upstream Oil and Gas Industry. Dated January 2016.

Legislation

- National Energy Board Pipeline Crossing Regulations, Part I, SOR/88-528
- National Energy Board Pipeline Crossing Regulations, Part II, SOR/88-529
- Oil and Gas Activities Act, SBC 2008, c 36Pipeline Act, RSA 2000, c P-15
- Pipeline Crossings Regulation, BC Reg 147/2012
- Pipeline Crossings Regulation, AB Reg 91/2005
- Occupational Health and Safety Regulation (British Columbia)
- Occupational Health and Safety Regulation (Alberta)

WorleyParsonsCord Supporting Documents

- Ground Disturbance Notification Record
- Line Locating Framework-Canada
- Utility Locate Request
- Ground Disturbance Third Party Review Form
- Ground Disturbance Permit
- Backfill Inspection Record
- Process Improvement Process
- Ground Disturbance Third Party Reviewer List

12 DEFINITIONS

Daylighting	The physical exposure of existing buried utilities or anomalies by hydro-vac, air-vac and/or hand excavation.
Excavation	Means a dug-out area of ground other than a trench, tunnel or excavated shaft
Expose	Means to completely expose the circumference of the underground utility by hand excavation and/or hydro-vac.
Ground Disturbance	Ground disturbance means any work, operation, or activity which results in a disturbance of the earth. See attached provincial definitions for depths and conditions where Ground Disturbance definition applies.
Hand Excavation	The non-mechanical removal of soil from an area (i.e.: by using a shovel or by hand)
Locate (locate sweep)	The use of non-visual means to estimate the location of underground utilities. Sweep refers to the numerous passes the locator makes in various and overlapping directions, in order to identify underground utilities.
Proximity / Proximal	a) Any distance to a utility as established by the utility owner as a safe distance of approach and / or the distance to which the owner requests the ground disturbance remains from their utility. b) Any utility owner identified through a One-Call request is considered proximal, until the owner has confirmed
Recommended	To be considered as part of the documented, local risk assessment process.
Required authorities	Local government or applicable regulatory organizations that are specified as verifying and / or approving excavation plans where existing underground services or archeologically significant sites may be affected
Safe Distance of Approach	The distance determined by a utility owner for which equipment, vehicles may safely approach their utility.
Search Area	A 30 m wide area, surrounding the Work Area, which is included in the locate sweep.
Shall	A requirement. The introduction of exceptions to this standard needs endorsement by the Regional HSE Manager and approval of the Regional Managing Director. See HSE Regulatory and Other Compliance Standard
Should	A requirement. The introduction of exceptions to this standard needs endorsement by of the local

	HSE Manager and approval by the work location manager. See HSE Regulatory and Other Compliance Standard
Work Area	The proposed physical or geographical area, that is being disturbed.
Spoil Pile	Material excavated from an excavation, trench, tunnel, or underground shaft.
Temporary Protective Structure	An engineered structure or device designed to provide protection in an excavation, trench, tunnel or underground shaft from cave-ins, collapses or sliding or rolling material and includes shoring, bracing, planking or cages.
Trench	An elongated dug out area of ground whose depth exceeds its width at the bottom

APPENDIX D- INCIDENT REPORTING PROCEDURE

Incident Reporting Procedure

1 Alberta OH&S Serious Injuries and Accident Reporting

Section 18 of the Act

(1) If an injury or accident described in subsection (2) occurs at a work site, the prime contractor or, if there is no prime contractor, the contractor or employer responsible for that work site shall notify a Director of Inspection of the time, place and nature of the injury or accident as soon as possible.

(2) The injuries and accidents to be reported under subsection (1) are

(a) an injury or accident that results in death,
(b) an injury or accident that results in a worker's being admitted to a hospital for more than 2 days,
(c) an unplanned or uncontrolled explosion, fire or flood that causes a serious injury or that has the potential of causing a serious injury,
(d) the collapse or upset of a crane, derrick or hoist, or
(e) the collapse or failure of any component of a building or structure necessary for the structural integrity of the building or structure.

(3) If an injury or accident referred to in subsection (2) occurs at a work site or if any other serious injury or any other accident that has the potential of causing serious injury to a person occurs at a work site, the prime contractor or, if there is no prime contractor, the contractor or employer responsible for that work site shall

(a) carry out an investigation into the circumstances surrounding the serious injury or accident,
(b) prepare a report outlining the circumstances of the serious injury or accident and the corrective action, if any, undertaken to prevent a recurrence of the serious injury or accident, and
(c) ensure that a copy of the report is readily available for inspection by an officer.

(4) The prime contractor, contractor or employer who prepared the report referred to in subsection (3) shall retain the report for 2 years after the serious injury or accident.

(5) A report prepared under this section is not admissible as evidence for any purpose in a trial arising out of the serious injury or accident, an investigation or public inquiry under the *Fatality Inquiries Act* or any other action as defined in the *Alberta Evidence Act* except in a prosecution for perjury or for the giving of contradictory evidence.

(6) Except as otherwise directed by a Director of Inspection, an occupational health and safety officer or a peace officer, a person shall not disturb the scene of an accident reported under subsection (1) except insofar as is necessary in

(a) attending to persons injured or killed,
(b) preventing further injuries, and
(c) protecting property that is endangered as a result of the accident.

2 British Columbia OH&S Serious Injuries and Accident Reporting

The injuries and incidents to be reported to WorkSafe BC are:

- A worker is seriously injured or killed on the job.

- There is a major structural failure or collapse of a building, bridge, tower, crane, hoist, temporary construction support system, or excavation.
- There is a major release of a hazardous substance.
- There is a diving incident as defined by OHS Regulation 24.34.
- There is a dangerous incident involving a fire or explosion that had potential for causing serious injury to a worker.
- There is a blasting incident that results in personal injury or injuries.

If an injury or incident referred to above occurs at a work site, or if any other serious injury or any other incident that has the potential of causing serious injury to a person occurs at a work site WorleyParsonsCord shall:

1. Carry out an investigation into the circumstances surrounding the serious injury or incident;
2. Prepare a report outlining the circumstances of the serious injury or incident and the corrective action, if any, undertaken to prevent a recurrence of the serious injury or incident; and
3. Ensure that a copy of the report is readily available for WorkSafe BC's review.

Except as otherwise directed by a Director of Inspection, an occupational health and safety officer or a peace officer, a person shall not disturb the scene of an incident reported to OH&S except insofar as is necessary in;

- Attending to persons injured or killed;
- Preventing further injuries; and
- Protecting property that is endangered as a result of the incident.

3 Trans Mountain Expansion Project Reporting Requirements

Incidents are identified and categorized into three levels. The categorization of the incident will provide for the appropriate incident notification, emergency response (as required) and incident reporting requirements to Trans Mountain and regulatory authorities. They are generally classified as follows:

- Level 1—minor incidents;
- Level 2—moderate incidents; and
- Level 3—major incidents.

Incident Notification

WorleyParsonsCord is required to notify the TMEP Construction Representative on-site as well as the Trans Mountain
Field Safety Inspector and report the incident. Reporting requirements are as follows:

- Level 1: Within eight (8) hours of the event;
- Level 2: No more than two (2) hours after the event and immediately if the incident I reportable to a regulatory body; and
- Level 3: Immediately.

Incident Investigations

WorleyParsonsCord will investigate all incidents, including significant Near Misses. As part of their investigation and reporting, contractors will provide to Trans Mountain, an incident summary, identify immediate/direct causes (or equivalent) and basic/root causes (or equivalent) and identify any corrective actions or mitigations that are required to be put in place to prevent future recurrence.

WorleyParsonsCord utilizes Causelink software to generate Sologic rootcause analysis reports that identify and report the following indicators of an incident: Cause, solution, evidence, actions, causal chart, and report summaries.

Incident Reports

After notification, contractors are required to complete an incident and investigation report. Incident reports are to be submitted to the Trans Mountain Field Safety Inspector as follows:

- Level 1 and Level 2: Within 48 hours of the incident, a complete report is expected;
- Level 3: Within 24 hours of the incident, a formal, preliminary report is expected; and
  - an informal, electronic report is required with basic information within two (2) hours of the event, or immediately following emergency response actions.

A finalized report, with closed-out corrective actions or mitigations is expected in a reasonable timeframe as per the timing indicated above.

Reporting Classification Chart

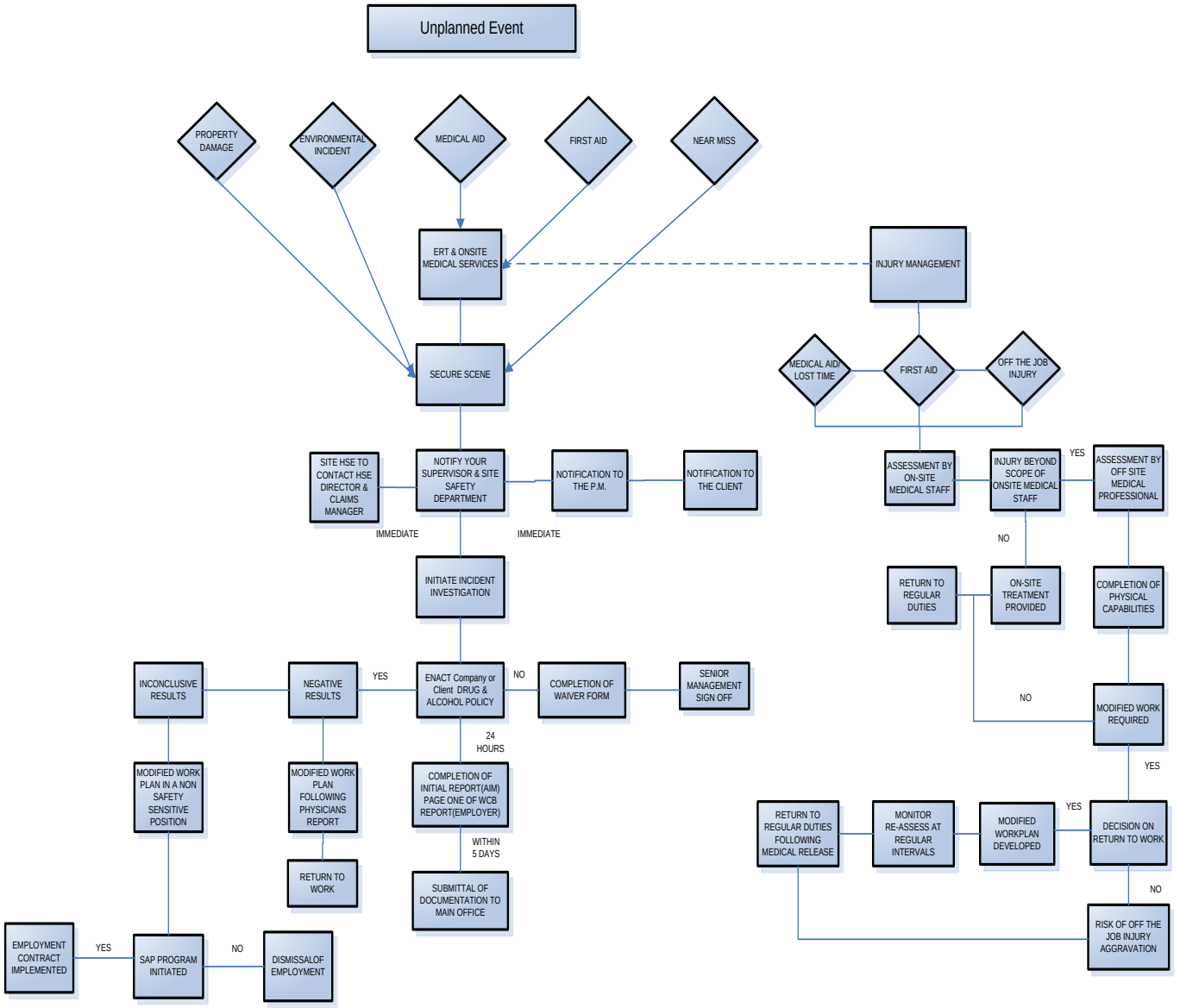
Figure 14 Reporting Classification Chart

Incident Type (Form Type)	Severity		
	Level I	Level II (Possible ERL Level 0 or 1 Classification)	Level III (Level I ERL/Level II ERL+ Classification)
INJURY (Level I Near Miss/Workplace Hazard Form Level II - III+ Incident Investigation Form)	• Near Miss • First Aid • Treatment obtained on-site from Paramedic	• Significant Potential Near Miss • Recordable Injury (Medical Aid [MA]) • Modified work duties (Days Away Restricted Time [DART])	• Serious Injury with Lost Time Injury (LTI) potential* • Fatality involving employee(s), contractor(s), or public regarding KMC projects, equipment or facilities.
FIRE/EXPLOSION All Levels (Incident Investigation Form)	• Contained/controlled on-site with little or no potential to spread	• First responders required • Most Fires • If wildfire, notify appropriate Provincial Government agency refer to contractor SSERP	• Corporate ERP activation • Significant Fires • Public • Notification as appropriate
VEHICLE (Level I Near Miss Form Level II - III+ Incident Investigation Form)	• Near Miss • Less than $1.0 k	• All vehicle incidents • Equal to or greater than $1.0 k and less than $5.0 k • Damage to a third party	• Any injuries to any party • Greater than $5.0 k
EQUIPMENT/PROPERTY DAMAGE (Level I Near Miss Form Level II - III+ Incident Investigation Form)	• Near Miss • Less than $5.0k	• Greater than $5k • Damage to a third party	• Greater than $50k • Any injuries to any party
SPILL **(NON COMMODITY)** (All Levels Environmental Spill Report)	• Less than 22 liters (5 gal)., and; • Contained on facility site or on ROW, and; • No release to water	• Less than 22 liters (5 gallons), and, • Off-site impact and, • No release to water	• Greater than 22 litres (5 gallons) whether contained or not on facility site or ROW • Any release to water • Environmental impact • Public impact
SPILL **(COMMODITY – P/L PRODUCT)** (All Levels Environmental Spill Report)			• Any product release from the pipeline system • Note: Company personnel will determine the level of response via the ERL
NON-CONFORMANCE (Level I Job Safety Analysis Level II - III+ Forward correspondence to Safety Inspector/Specialist)	• Minor procedural variation with no or minor EHS impact (Job Safety Analysis to grant waiver of policy, *i.e.*, hard hat welding combo)	• Scheduled inspection or audit resulting in regulatory action. • Procedural variation with or without EHS impact and potential for Regulatory involvement	• Receipt of a Regulatory Order with potential for fines or requiring significant action or resources. • Notification to a Regulatory Agency is required regarding an incident or non-compliance. • Regulatory involvement or inquiry regarding an incident or a non-compliance • Unannounced regulatory inspection/investigation
SECURITY	• No Level I Security Incidents	• Minor disruption	• Most Security Incidents
NEWS MEDIA COVERAGE	• No immediate attention or public concern	• Local Media Attention	• Moderate or Significant Attention

WorleyParsonsCord Incident Investigation Flow chart

Every incident or near miss shall be investigated following the flow chart below. In addition, for any incident or near miss where the actual or potential classification is rated as recordable/High potential or above, a formal Root Cause Analysis tool shall be completed.

Figure 15 Incident Flow Chart



APPENDIX E – AUDIT AND INSPECTION MATRIX

1 AUDIT AND INSPECTION

Health, Safety and Environmental site inspections shall be executed in accordance with the Project Specific Safety Plan. The program of inspections will cumulatively address all significant hazards / environmental aspects and their associated controls. Internal COR Health, Safety and Environment Management plan audits are conducted on a yearly basis, with project sites having a snap shot audit within 90 days of onsite work. Subcontractor's field and project safety plan compliance audits are completed on a quarterly basis.
The frequency and specific nature of each inspection will be appropriate to the nature of the workplace and the hazards and environmental aspects associated with the scope of works. All inspections will be led by an appropriate member of the project line management, with others in attendance as necessary. Inspections involve management, supervision and representatives of the work force.

All inspections will be documented in a form that is appropriate to the needs of the workplace. It is recommended that inspections are conducted using a checklist as an aide to those conducting the inspections of focus areas / topics. The results of inspections will be discussed at project HSE meetings and shared with Contractors as applicable.

Table 21 Audit and Inspection Matrix

TYPE OF EVALUATION	FREQUENCY	RESPONSIBILITY
Daily Safety Tour Inspection	Daily	WorleyParsonsCord
Offsite Corporate Safety Inspection & Meeting	Monthly	WorleyParsonsCord
Informal Safety Coordinator Field Inspections	Daily	WorleyParsonsCord
General Site Inspections	Monthly	WorleyParsonsCord
ERP Drill / Response with Corrective Action Follow Up	Initial startup & bi-annually thereafter	WorleyParsonsCord
RAVS Audits	Annually	WorleyParsonsCord
GD Training Review Audits	Monthly	WorleyParsonsCord
Permit System Audit	Weekly	WorleyParsonsCord
General Excavation Inspections	Monthly	WorleyParsonsCord
GD Plan Conformance Audits	Monthly	WorleyParsonsCord
Rigging inspections	Annually	WorleyParsonsCord
Worker rigging inspections	Per use (daily non documented)	WorleyParsonsCord
Tool inspections	Per use (daily non documented)	WorleyParsonsCord
Mobile Equipment	Per use (Daily)	WorleyParsonsCord

APPENDIX F- CORPORATE SAFETY PROGRAM

1 SAFE WORK PACTICES, PROCEDURES AND FORMS

This section provides the document number and name of WorleyParsonsCord Safe Work Practices, Procedures, and Forms which are available in hard/soft copy at the work location.

Table 22 Safe Work Practices

Document Number	***Document Name***
CPL-HS-SWP-0001	Air Quality Control
CPL-HS-SWP-0002	Amenities and Sanitation
CPL-HS-SWP-0003	Cell Phone
CPL-HS-SWP-0004	Electrical - Grounding and Bonding
CPL-HS-SWP-0005	Electrical - Installation of Instruments
CPL-HS-SWP-0006	Electrical - Installing Electrical Cable Tray
CPL-HS-SWP-0007	Electrical - Installing Electrical Cable
CPL-HS-SWP-0008	Electrical - Installing Electrical Heat Tracing
CPL-HS-SWP-0009	Electrical - Meggar Testing
CPL-HS-SWP-0010	Electrical - Raceway's and Tubing Installation
CPL-HS-SWP-0011	Electrical - Wire Terminations Less than 750 Volts
CPL-HS-SWP-0012a	Fall Prevention Protection and Recovery
CPL-HS-SWP-0012b	WPC Fall Protection Equipment Care Plan
CPL-HS-SWP-0012c	Fall Protection Plan
CPL-HS-SWP-0013	Fatigue Management
CPL-HS-SWP-0014	First Aid
CPL-HS-SWP-0016	Hot Work
CPL-HS-SWP-0017	HSE Training Practice
CPL-HS-SWP-0018	Isolation and Lock Out
CPL-HS-SWP-0019	Lone and Isolated Workers
CPL-HS-SWP-0020	Machine and Tool
CPL-HS-SWP-0021	Machine Guarding
CPL-HS-SWP-0022	Manual Handling
CPL-HS-SWP-0023	Material Storage
CPL-HS-SWP-0024	Modified Work
CPL-HS-SWP-0025	N.O.R.M. Handling
CPL-HS-SWP-0026	Noise Management
CPL-HS-SWP-0027	Notices and Signs
CPL-HS-SWP-0028	Office Trailer Safety
CPL-HS-SWP-0029	Overhead Powerlines
CPL-HS-SWP-0030	Personal Protective Equipment
CPL-HS-SWP-0032	Post Weld Heat Treatment
CPL-HS-SWP-0034	Pressure Testing for 50% Water - 50% Polypropylene Glycol – See Quality Control
CPL-HS-SWP-0036	Radiography
CPL-HS-SWP-0038	Respirator Code of Practice
CPL-HS-SWP-0039	Scaffolding
CPL-HS-SWP-0040	Severe Weather
CPL-HS-SWP-0041	Simultaneous Work

CPL-HS-SWP-0042	Site Vehicle Requirements
CPL-HS-SWP-0043	Storage and Use of Hazardous Substance
CPL-HS-SWP-0044	Structural Steel Erection - Developing Procedures
CPL-HS-SWP-0045	Traffic Management
CPL-HS-SWP-0046	Training Booking Procedure
CPL-HS-SWP-0047a	Vehicle and Driving
CPL-HS-SWP-0047b	Journey Management
CPL-HS-SWP-0048	Visitors to Company Sites
CPL-HS-SWP-0049	Visitors to Non-Company Sites
CPL-HS-SWP-0050	Wildlife Encounters
CPL-HS-SWP-0051	Winter Preparedness
CPL-HS-SWP-0052	Safe Out In Place Piping, Spools and Structural Steel
CPL-HS-SWP-0053a	SIMOPS & Multi Level Construction
CPL-HS-SWP-0053b	Multi-Level Construction “Stop the Drop “ Summary
CPL-HS-SWP-0054	Bear Awareness

Table 23 Safe Work Procedures

Document Number	***Document Name***
CPL-HS-PRO-0001	Atmospheric Monitoring/Detection
CPL-HS-PRO-0002	Barricades and Barriers
CPL-HS-PRO-0003	Chain Saw Safety
CPL-HS-PRO-0004	Circular Saw
CPL-HS-PRO-0005	Cold Cutting Piping
CPL-HS-PRO-0006	Comprehensive Incident Management System (CIMS)
CPL-HS-PRO-0007	Compressed Gas Cylinders and Compressed Air
CPL-HS-PRO-0008	Confined Space Entry Code Of Practice
CPL-HS-PRO-0009	Crane Hoisting/Lift Classifications
CPL-HS-PRO-0010	Defective Tools
CPL-HS-PRO-0011	Disciplinary Action
CPL-HS-PRO-0012	Equipment Loading and Unloading
CPL-HS-PRO-0013	Excavation and Penetration (Ground Disturbance)
CPL-HS-PRO-0014	Fire Risk Management
CPL-HS-PRO-0015	Fitness For Work
CPL-HS-PRO-0016	Flammable and Combustible Liquids
CPL-HS-PRO-0017	Fuel Storage and Refueling
CPL-HS-PRO-0018a	Grinder - Angle
CPL-HS-PRO-0018b	Grinder - Bench
CPL-HS-PRO-0018c	Grinder - Die
CPL-HS-PRO-0019	Ground Fault Circuit Interrupters: Use and Care
CPL-HS-PRO-0020	Hand Tools (Powered, Non-powered And Powder Actuated)
CPL-HS-PRO-0021	High Pressure Cutting and Washing
CPL-HS-PRO-0022	Hot Tap
CPL-HS-PRO-0023	Housekeeping
CPL-HS-PRO-0024	HSE Inspection

CPL-HS-PRO-0025	Hydro Testing
CPL-HS-PRO-0026	Jackhammer (Pneumatic/Electric)
CPL-HS-PRO-0027	Job Hazard Analysis
CPL-HS-PRO-0028	Knife and Cutting Tools
CPL-HS-PRO-0029	Lift Study
CPL-HS-PRO-0030	Man Basket
CPL-HS-PRO-0031	Mobile Elevated Work Platforms
CPL-HS-PRO-0032	Mobile Equipment
CPL-HS-PRO-0033	Pig Launching and Receiving
CPL-HS-PRO-0034a	Portable Ladders
CPL-HS-PRO-0034b	Fixed Ladders
CPL-HS-PRO-0034c	Extension Ladders
CPL-HS-PRO-0034d	Step Ladders
CPL-HS-PRO-0035	Portable Propane Heaters
CPL-HS-PRO-0036a	Restricted Tools
CPL-HS-PRO-0036b	Restricted Tools List
CPL-HS-PRO-0036c	Restricted Tools Competency Form
CPL-HS-PRO-0037a	Rigging & Lifting Equipment Storage and Maintenance
CPL-HS-PRO-0037b	Pre-Use Check List Hand Rigging
CPL-HS-PRO-0038	Rigging Equipment Selection and Use
CPL-HS-PRO-0039	Table Saw
CPL-HS-PRO-0040	Tiger Torch
CPL-HS-PRO-0041	Welding – Health and Safety
CPL-HS-PRO-0042	White Hat Program
CPL-HS-PRO-0043	Winter Driving
CPL-HS-PRO-0044	Wire Rope - Clamp and Clips
CPL-HS-PRO-0045	Zoom Boom / Skid Steer Operation
CPL-HS-PRO-0046	Safe Line Breaking
CPL-HS-PRO-0047	Employee Recognition Program
CPL-HS-PRO-0048	Competency Assessment

Table 24 Health and Safety Forms

CPL-HS-FRM-0001	Aerial Lift Pre Operational Inspection
CPL-HS-FRM-0002	Alcohol and Drug Acknowledgement, Consent and Release Form
CPL-HS-FRM-0003	Company Vehicle Usage
CPL-HS-FRM-0004	Confined Space Entry Permit Hazard Assessment Plan
CPL-HS-FRM-0005	Construction Hazardous Work Permit
CPL-HS-FRM-0006	Cost Form
CPL-HS-FRM-0007	Crane Inspection Checklist
CPL-HS-FRM-0008	Crane Operator Assessment Program
CPL-HS-FRM-0009	Crane/Hoisting Equipment Assessment
CPL-HS-FRM-0010	Critical Lift Checklist
CPL-HS-FRM-0011	Critical Lift Pre Permit Check Sheet
CPL-HS-FRM-0012	Daily Crane / Hoisting Equipment Worksheet

CPL-HS-FRM-0013	Delivery Orientation Checklist
CPL-HS-FRM-0014	Disciplinary Action Form
CPL-HS-FRM-0015	Emergency Contact List
CPL-HS-FRM-0016	Environmental Release Form
CPL-HS-FRM-0017	Equipment Inspection Checklist
CPL-HS-FRM-0018	Ergonomic Work Station Self-Assessment Form (Office Staff)
CPL-HS-FRM-0019	Fabrication Office Specific Orientation
CPL-HS-FRM-0020	Fabrication Shop Specific Orientation
CPL-HS-FRM-0021	Fall Arrest Equipment Inspection Checklist
CPL-HS-FRM-0022	Fall Protection Rescue Plan
CPL-HS-FRM-0023	Fire Extinguisher Monthly Inspection Checklist
CPL-HS-FRM-0024	First Aid Record Form
CPL-HS-FRM-0025	Fork Lift Inspection Checklist
CPL-HS-FRM-0026	Green Hat Mentorship/Competency Final Exam Answer Sheet
CPL-HS-FRM-0027	Green Hat Mentorship/Competency Final Exam
CPL-HS-FRM-0028	Green Hat Mentorship Observation Checklist
CPL-HS-FRM-0029	Green Hat Mentorship Program Completion List
CPL-HS-FRM-0030	Ground Disturbance Checklist
CPL-HS-FRM-0031	Hand and Power Tool Inspection Checklist
CPL-HS-FRM-0032	Hazard Assessment Register
CPL-HS-FRM-0033	HSE Document Feed Back Form
CPL-HS-FRM-0034	HSE Incident & Near Miss Notification Investigation Report (5 page)
CPL-HS-FRM-0035	HSE Inspection Action Plan
CPL-HS-FRM-0036	HSE Inspection Form
CPL-HS-FRM-0037	In-house Training Request Form
CPL-HS-FRM-0038	In-House Training Resource Requirements Form
CPL-HS-FRM-0039	Incident Reporting Flowchart
CPL-HS-FRM-0040	Injured Worker Package Contents and Instructions
CPL-HS-FRM-0041	Injury Management Checklist
CPL-HS-FRM-0042	Job Hazard Analysis Worksheet
CPL-HS-FRM-0043	Lift Study Planning Sheet
CPL-HS-FRM-0044	Load Assessment Form
CPL-HS-FRM-0045	Man Basket Checklist
CPL-HS-FRM-0046	Management Site Tour
CPL-HS-FRM-0047	Meeting Record
CPL-HS-FRM-0048	Modified Duties Log
CPL-HS-FRM-0049	Modified Duties Offer Form
CPL-HS-FRM-0050	Monthly Zeroing In Summary
CPL-HS-FRM-0051	Near Miss Report
CPL-HS-FRM-0052	Non-Referred Medical Treatment
CPL-HS-FRM-0053	Notice to Physician
CPL-HS-FRM-0054	Off-The-Job Injury Form

CPL-HS-FRM-0055	Operator Training and Competency Form
CPL-HS-FRM-0056	Orientation Quiz Answer Key
CPL-HS-FRM-0057	Orientation Checklist
CPL-HS-FRM-0058	Orientation Quiz
CPL-HS-FRM-0059	Personnel Basket Checklist
CPL-HS-FRM-0060	Personnel Sign In Form
CPL-HS-FRM-0061	Physical Capabilities
CPL-HS-FRM-0062	Recognition Program Infraction Report
CPL-HS-FRM-0063	Respiratory Fit Test Form
CPL-HS-FRM-0064	Rigging Equipment Inspection Checklist
CPL-HS-FRM-0065	Rough Terrain Lift Truck (Zoom Boom) Inspection Checklist
CPL-HS-FRM-0066	Safety Meeting Employee Sign-Off Sheet
CPL-HS-FRM-0067	Safety Meeting Record Template
CPL-HS-FRM-0068	Scaffold Inspection Form
CPL-HS-FRM-0069	Scaffolder Competency Form
CPL-HS-FRM-0070	Serious Lift Evaluation Form
CPL-HS-FRM-0071	Site Crew Truck Log
CPL-HS-FRM-0072	Site Hazard Assessment
CPL-HS-FRM-0073	Site Visit Log
CPL-HS-FRM-0074	Small Power Tool Competency Form
CPL-HS-FRM-0075	Spotter Competency Form
CPL-HS-FRM-0076	Stat Sheet Template
CPL-HS-FRM-0077	Statement of Incident
CPL-HS-FRM-0078	Subcontractor Agreement Sign Off
CPL-HS-FRM-0079	Subcontractor Field Assessment Form
CPL-HS-FRM-0080	Subcontractor Site Specific Safety Plan Acceptance
CPL-HS-FRM-0081	Subcontractor SSSP Assessment Form
CPL-HS-FRM-0082	Supervisor Orientation Checklist
CPL-HS-FRM-0083	Third Party Training Request Form
CPL-HS-FRM-0084	Toolbox Meeting Report
CPL-HS-FRM-0085	Variance Request Form
CPL-HS-FRM-0086	Vehicle Inspection
CPL-HS-FRM-0087	Visitor Orientation
CPL-HS-FRM-0088	Welding Truck Inspection Checklist
CPL-HS-FRM-0089	Winter Readiness Tool
CPL-HS-FRM-0090	Worker Limitation Experience

2 WORK REFUSAL STANDARD

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Work Refusal Standard - Canada

1. OBJECTIVE

To define the requirements relating to establishing a process response where personnel refuse to perform work they believe is unsafe, at WorleyParsons (the Company) work locations and other locations where the Company personnel undertake work.

2. SCOPE AND APPLICABILITY

This standard applies at all work locations under the Company management and locations managed by a Joint Venture of which the Company is a partner. Regions and Locations may add to the requirements contained herein through the Process Improvement Process.

This standard also applies to work locations where another party manages and the Company personnel undertake work and to all the Company managed personnel while engaged in any activity on behalf of the Company.

Where customers or joint venture partners propose that their standards shall apply at a particular work location the Company/Customer HSE Management Review and Application procedure and Company/Customer HSE Bridging document Guideline and Template shall be used to ensure that the customer or joint venture partner standard(s) meet the minimum requirements of this standard.

This standard shall be applied to all the Company personnel, contractors and their subcontractors. Contractors may, however, when agreed through the Company project engagement processes, utilize their own standards and procedures in so far as the requirements of their standards are at least equivalent to those of this standard, the Customer's standards and those of applicable National and Local regulations which should be read and complied with in conjunction with this standard.

3. RESPONSIBILITIES

The implementation of this standard is the responsibility of the Company senior management including Regional Managing Directors and other Directors/Executives.

The Company managers are responsible for the application of, and compliance with, this standard at work locations where they have operational responsibilities. Company managers will also be the focal points for associated liaison with, and coordination of, contractors' compliance with this standard, at the managers respective work locations.

Contractors are responsible for their personnel, and their subcontractor's personnel, compliance with this Standard and/or other standard as agreed per Section 2 above.

Supervisors are responsible for the day to day application of this standard.

Company personnel have a responsibility to comply with this standard.

Personnel have a duty of care, to their work team and others in relation to the application and maintenance of this standard, for work they, their work team or others undertake.

4. REQUIREMENTS

4.1 Legislation

a. Each jurisdiction within the WorleyParsons Canada Region has specific response and reporting requirements in the event of a work refusal. Each worksite will ensure compliance with the applicable jurisdiction's procedural requirements.

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4.2 Required Steps should a Refusal Occur

a. The following are the actions that must be taken should a work refusal occur:

i. While working to resolve the refusal, no-one may complete the task under dispute;

ii. The Supervisor must stop all work related to the task that was refused;

iii. The Supervisor must respect the opinion of the affected personnel;

iv. Personnel may not be dismissed from the site, or be subject to any disciplinary actions as a consequence of his/her work refusal;

v. The Division HSE Manager must be informed of the situation (and may be called upon for advice at any time during this process);

vi. A safety meeting must be called with the involved personnel, the Supervisor and any other interested parties;

vii. The meeting must focus on how to perform the job safely and must be documented completely, with detailed descriptions of:

a. the exact task that was refused;

b. the hazard(s) that the affected personnel identified as the reason(s) for the refusal;

c. any other hazards identified in the discussion process of the meeting;

d. the hazard control strategies that will be implemented; and

e. The names and signatures of all persons attending the meeting, indicating their agreement with proposed control strategies.

viii. If a resolution is not reached, the meeting should be re-convened at a later time, after consultation with the Division HSE Manager; and

ix. If resolution is still not attained and the task is believed to be safe by management, the affected personnel may be assigned to reasonable alternate duties.

x. The timing and extent of involvement of Occupational Health & Safety officers varies by jurisdiction. In the event of an Occupational Health and Safety Officer involvement, all personnel are expected to cooperate and provide reasonable assistance to the officer.

xi. A written report needs to be completed and placed on file.

4.3 Training

a. This standard and applicable refusal to work legislation will be reviewed with all personnel through the orientation process.

5. ADDITIONAL GUIDANCE

None

6. REFERENCES AND SUPPORTING DOCUMENTS

6.1 References

Appropriate Provincial/Territorial legislation.

6.2 Supporting Documents

None

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7. DEFINITIONS

Recommended	To be considered as part of the documented, local risk assessment process.
Shall	A requirement. The introduction of exceptions to this standard needs endorsement by the Regional HSE Manager and approval of the Regional Managing Director. See HSE Regulatory and Other Compliance Standard.
Should	A requirement. The introduction of exceptions to this standard needs endorsement by of the local HSE Manager and approval by the work location manager. See HSE Regulatory and Other Compliance Standard.
Unsafe work	Any work activity that a worker reasonably believes poses a significant hazard or risk to their health or safety. Each jurisdiction within the Worley Parsons Canada region has specific terms defined in their applicable OH&S legislation detailing what constitutes the grounds for a work refusal such as "Danger" or "Imminent Danger". These legally defined terms and the rights imparted to workers by them, supersede any definition or process in this document.