

Approved: 2007-12-31

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END OF SECTION

Approved: 2006-03-31

Part 1 General

1.1 RELATED REQUIREMENTS

- .1 Section 02 61 00.01 - Soil Remediation.
- .2 Section 31 11 00 - Clearing and Grubbing.

1.2 WORK COVERED BY CONTRACT DOCUMENTS

- .1 Work under this Contract comprises in situ chemical oxidation of petroleum hydrocarbon impacted soil and groundwater at the Lobstick Golf Course Maintenance Compound, located at Waskesiu Lake in Prince Albert National Park, Saskatchewan (refer to Figure 1) and further identified as the Site.

1.3 CONTRACT METHOD

- .1 Complete work as per contract method stated in request for proposal.

1.4 DEFINITIONS

- .1 In Situ Chemical Oxidation: an environmental remediation technique used for soil and/or groundwater remediation to reduce the concentrations of targeted environmental contaminants. In Situ Chemical Oxidation is accomplished by injecting or otherwise introducing chemical oxidizers directly into petroleum hydrocarbon impacted soil and/or groundwater to chemically react with the chemical contaminants in place and reduce them to benign compounds.
- .2 Petroleum hydrocarbon impacted soil: surface and subsurface soils containing concentrations exceeding the Canadian Council of Ministers of the Environment (CCME) Soil Quality Guidelines for the Protection of Environmental and Human Health and the CCME Canada Wide Standard for Petroleum Hydrocarbons in Soils for Commercial Land (CL) and coarse-grained soil, excluding the drinking water and freshwater aquatic life pathways for all soils and the ecological soil contact pathway for soils deeper than 3 metres (m), for any or all of the following contaminants:
 - .1 Benzene, toluene, ethylbenzene, xylenes, and petroleum hydrocarbon fractions F1 through F4 in soils.
- .3 Petroleum hydrocarbon impacted groundwater: groundwater containing concentrations exceeding the Federal Contaminated Sites Action Plan Guidance Document on Federal Interim Groundwater Quality for Federal Contaminated Sites for CL and coarse-grained soil, excluding the drinking water and freshwater aquatic life pathways, for any or all of the following contaminants:
 - .1 Benzene, toluene, ethylbenzene, xylenes, and petroleum hydrocarbon fractions F1 and F2 in groundwater.
- .4 Target Area: area of hydrocarbon impacted soil that extends from between the two maintenance garage shops to the treeline near the edge of the 14th hole (refer to Figure 2).

- .5 Target Zone: depth of hydrocarbon impacts range from 2 to 8 m below ground surface (refer to Figure 2).
- .6 Target Oxidant Dosage: mass of activated potassium persulfate to be injected in order to remediate the chemical contaminants in place.
- .7 Departmental Representative: within the context of these Specifications, the term Departmental Representative refers to personnel appointed by Parks Canada Agency or their consultant acting on their behalf. Departmental Representative will provide recommendations/technical guidance, as required, for the enforcement of these specifications.
- .8 Contractor: The contractor procured to undertake the Site management and operation services, Site preparation, injection, and restoration is defined, within the context of these specifications, as the Contractor.
- .9 Owner: within the context of these specifications, the term Owner refers to Parks Canada Agency.

1.5 BACKGROUND INFORMATION

- .1 Remediation activities will occur at the Lobstick Golf Course Maintenance Compound (the Site), located at Waskesiu Lake in Prince Albert National Park, Saskatchewan (refer to Figure 1).
- .2 The Site consists of two maintenance workshops some small outbuildings, and is bounded on all sides by the Lobstick Golf Course (refer to Figure 2).
- .3 The Site has operated as a maintenance compound and storage area for grounds keeping equipment since the area was developed in the 1930s.
- .4 Environmental assessments have identified subsurface petroleum hydrocarbon soil and groundwater impacts in the area of historical above ground and underground fuel storage tanks that have since been replaced with a single dual compartment above ground storage tank (refer to Appendix A).
- .5 In the near future, the Site will be redeveloped to replace the two maintenance garage shops with one large maintenance garage shop and parking area (Figure 2).
- .6 In Situ Chemical Oxidization has been selected for remediation of the Site, due to its viability given the Site subsurface characteristics and the relatively low level of surface disturbance.
- .7 Remediation of the Site is scheduled to commence after the closure of the golf course on October 1, 2013.

1.6 SUPPORTING DOCUMENTS

- .1 2012 Environmental Investigation Lobstick Maintenance Compound Waskesiu Lake, Saskatchewan dated February 2013, by Tetra Tech WEI Inc.

1.7 DESCRIPTION OF WORK

- .1 Work under this Contract comprises in situ chemical oxidation of petroleum hydrocarbon impacted soil and groundwater at the Lobstick Golf Course

Maintenance Compound. The required work to be undertaken by the Contractor for the project will include but not be limited to the following activities:

- .1 Remediation Work Plan, including proposed chemical injection method, equipment required, selection of borehole locations, injection depths, proposed delivery concentrations and rates to achieve the target oxidant dosage, and quality assurance/quality control monitoring approach.
 - .1 Final borehole locations and chemical delivery methods will be approved by the Departmental Representative.
- .2 Site Preparation and Restoration Plan, outlining Site modification requirements, tree removal, equipment and materials required, construction plans, utilities disruptions, building relocations, restoration strategies, environmental and infrastructure protection strategies, and off-Site disposal of waste materials.
- .3 Environmental Protection Plan.
- .4 Health and Safety Plan.
- .5 Obtaining all necessary permits to undertake the project.
- .6 Obtaining all equipment and materials required.
- .7 Mobilization of equipment and materials.
- .8 Completion of Site preparation activities to allow access to the treed area west of the Maintenance Compound.
- .9 Obtaining at a minimum 35,200 kilograms of activated potassium persulfate to be used as a chemical oxidant in injection boreholes to reach the Target Oxidant Dosage.
- .10 Distribute Target Oxidant Dosage of activated potassium persulfate over the Target Zone within the Target Area. Distribution to occur during Contractor's initial mobilization to the Site.
 - .1 Injection boreholes to be located within the Target Area (see 1.4.4) and Target Zone (see 1.4.5) and Target Oxidant Dosage to be distributed in general proportion to the hydrocarbon concentrations as detailed in the Supporting Document (see 1.6.1). Final placement of each injection borehole to be approved by the Departmental Representative.
 - .2 Acceptable methods of injection include, but are not limited to, temporary direct push wells, conventional drilled wells, and hydraulic fracturing.
 - .3 Injection equipment will be constructed of materials compatible with the in situ chemical oxidation treatment process used (chemical and thermal compatibility).
 - .4 Injection equipment will include provision for real time measurements of injection pressure and flow rate. Equipment will include check-valves to prevent backflow.
 - .5 Contractor will provide Departmental Representative with continuous real time measurement of the pressure at the injection point for the purposes of determining if short-circuiting (daylighting) of the injected oxidant occurs.

- .6 Contractor shall monitor, document, and report the rate, total volume, and concentration of the oxidant/catalyst delivered, during and after operation of the treatment system to demonstrate that delivery is in accordance with the Remediation Work Plan. All modifications that deviate from the Remediation Work Plan shall be approved by the Departmental Representative prior to implementation.
- .7 Contractor will ensure that injected oxidant is effectively accepted into the subsurface, so as to maximize contact with impacted soils. Such acceptance will be certified by the Departmental Representative based on visual absence of daylighting and observations of injection pressure.
- .8 Injection locations where the oxidant solution is not accepted by the native soil, as demonstrated by visual evidence of daylighting and/or a rapid decrease in injection pressure, shall be deemed by the Departmental Representative as unsuccessful and will not be counted as contributing to the Target Oxidant Dosage.
- .9 Use a field photo-ionization or flame ionization detector and explosimeter to monitor for explosive conditions in the injection boreholes.
- .10 Monitoring of groundwater levels in existing monitor wells shall be performed prior, during, and after the completion of the injection boreholes.
- .11 Through the use of automatic monitoring devices (YSI 600 probe or equivalent) existing Site monitor wells shall be monitored for organic redox potential, pH, temperature, conductivity, dissolved oxygen, and any catalyst dependant by-products every 30 minutes during injection.
- .12 Boundary checks of fugitive emissions of organic vapours shall be monitored daily at the nearest receptor or property boundary downwind from the injection boreholes.
- .13 Where temporary probes are used, the annular space will be sealed by the Contractor immediately following injection in such a manner so as to prevent subsequent oxidant injections from short-circuiting to the surface through the annular space.
- .14 Where daylighting occurs, Contractor will implement a spill response plan to manage the oxidant and restore the site.
- .11 Restoration of Site to pre-construction conditions, including disposal of materials to an appropriate off-Site facility.
 - .1 Contractor will be required to remove all materials, constructed features and replace any existing Site buildings, and/or infrastructure damaged during remediation activities, excluding subsurface damage to existing monitoring wells.
- .12 De-mobilization of all equipment and materials.

1.8 WORK SEQUENCE

- .1 Co-ordinate Progress Schedule and co-ordinate with Owner Occupancy during construction.

1.9 CONTRACTOR USE OF PREMISES

- .1 Limit use of premises for Work, storage, and access to allow:
 - .1 Owner occupancy.
 - .2 Work by other contractors.
- .2 Co-ordinate use of premises under direction of Departmental Representative and Owner.

1.10 OWNER OCCUPANCY

- .1 Owner will occupy premises during entire construction period for execution of normal operations.
- .2 Co-operate with Owner in scheduling operations to minimize conflict and to facilitate Owner usage.

1.11 EXISTING SERVICES

- .1 Notify Departmental Representative and utility companies of intended interruption of services and obtain required permission.
- .2 Where work involves breaking into or connecting to existing services, give Departmental Representative 48 hours' notice for necessary interruption of mechanical or electrical service throughout course of work. Minimize duration of interruptions. Carry out work at times as directed by governing authorities with minimum disturbance to tenant operations.
- .3 Provide alternative routes for personnel and vehicular traffic.
- .4 Establish location and extent of service lines in area of work before starting work. Notify Departmental Representative of findings.
- .5 Submit schedule to and obtain approval from Departmental Representative for any shut-down or closure of active service or facility including power and communications services. Adhere to approved schedule and provide notice to affected parties.
- .6 Provide temporary services when directed by Departmental Representative to maintain critical building and tenant systems.
- .7 Where unknown services are encountered, immediately advise Departmental Representative and confirm findings in writing.
- .8 Protect, relocate or maintain existing active services. When inactive services are encountered, cap off in manner approved by authorities having jurisdiction.
- .9 Record locations of maintained, re-routed and abandoned service lines.

1.12 DOCUMENTS REQUIRED

- .1 Maintain at Site, one copy each document as follows:
 - .1 Contract Drawings.
 - .2 Specifications.
 - .3 Addenda.
 - .4 Reviewed Shop Drawings.
 - .5 List of Outstanding Shop Drawings.
 - .6 Change Orders.
 - .7 Other Modifications to Contract.
 - .8 Field Test Reports.
 - .9 Copy of Remediation Work Plan and Schedule.
 - .10 Copy of Site Preparation and Restoration Plan.
 - .11 Copy of Environmental Protection Plan.
 - .12 Health and Safety Plan and Other Safety Related Documents.
 - .13 Other documents as specified.

Part 2 Products

2.1 NOT USED

- .1 Not used.

Part 3 Execution

3.1 NOT USED

- .1 Not used.

END OF SECTION

Approved: 2010-12-31

Part 1 General

1.1 RELATED REQUIREMENTS

- .1 Section 01 31 19 - Project Meetings.
- .2 Section 01 32 16.07 - Construction Progress Schedule - Bar (GANTT) Chart.
- .3 Section 01 41 00 - Regulatory Requirements.

1.2 USE OF SITE AND FACILITIES

- .1 Work cannot commence on-Site until October 1, 2013.
- .2 Execute work with least possible interference or disturbance to normal use of premises. Make arrangements with Departmental Representative to facilitate work as stated.
- .3 Maintain existing services to buildings, if required, and provide for personnel and vehicle access.
- .4 Arrangement of sanitary facilities will be the responsibility of the Contractor. Keep facilities clean.

1.3 EXISTING SERVICES

- .1 Notify Departmental Representative and utility companies of intended interruption of services and obtain required permission.
- .2 Where work involves breaking into or connecting to existing services, give Departmental Representative 48 hours of notice for necessary interruption of mechanical or electrical service throughout course of work. Keep duration of interruptions to a minimum.
- .3 Provide for personnel and vehicular traffic.

1.4 SPECIAL REQUIREMENTS

- .1 Carry out noise generating work Sunday to Saturday from 07:00 to 19:00 hours.
- .2 Submit schedule in accordance with Section 01 32 16.07 - Construction Progress Schedule - Bar (GANTT) Chart.
- .3 Ensure Contractor's personnel employed on Site become familiar with and obey regulations including safety, fire, traffic and security regulations.
- .4 Keep within limits of work and avenues of ingress and egress.
- .5 Ingress and egress of Contractor vehicles at Site is limited to pre-existing roads and gravelled areas.

1.5 SMOKING ENVIRONMENT

- .1 Comply with smoking restrictions. Smoking is not permitted.

Part 2 Products

2.1 NOT USED

.1 Not Used.

Part 3 Execution

3.1 NOT USED

.1 Not Used.

END OF SECTION

Approved: 2006-06-30

Part 1 General

1.1 RELATED REQUIREMENTS

- .1 Section 01 14 00 - Work Restrictions.
- .2 Section 01 32 16.07 - Construction Progress Schedules - Bar (GANNT) Chart.
- .3 Section 01 33 00 - Submittal Procedures.
- .4 Section 01 52 00 - Construction Facilities.
- .5 Section 01 78 00 - Closeout Submittals.

1.2 ADMINISTRATIVE

- .1 Schedule and administer project meetings throughout the progress of the work at the call of Departmental Representative.
- .2 Prepare agenda for meetings.
- .3 Distribute written notice of each meeting five (5) days in advance of meeting date to Departmental Representative and Consultant.
- .4 Provide physical space and make arrangements for meetings.
- .5 Preside at meetings.
- .6 Record the meeting minutes. Include significant proceedings and decisions. Identify actions by parties.
- .7 Reproduce and distribute copies of minutes within three (3) days after meetings and transmit to meeting participants and, affected parties not in attendance.
- .8 Representative of Contractor, Subcontractor and suppliers attending meetings will be qualified and authorized to act on behalf of party each represents.

1.3 PRECONSTRUCTION MEETING

- .1 Within one (1) week after award of Contract, request a meeting of parties in contract to discuss and resolve administrative procedures and responsibilities.
- .2 Departmental Representative, Owner, Contractor, major Subcontractors, field inspectors and supervisors will be in attendance.
- .3 Establish time and location of meeting and notify parties concerned minimum five (5) days before meeting.
- .4 Incorporate mutually agreed variations to Contract Documents into Agreement, prior to signing.

- .5 Agenda to include:
 - .1 Appointment of official representative of participants in the work.
 - .2 Schedule of Work: in accordance with Section 01 32 16.07 - Construction Progress Schedules - Bar (GANTT) Chart.
 - .3 Schedule of submission of shop drawings and samples. Submit submittals in accordance with Section 01 33 00 - Submittal Procedures.
 - .4 Requirements for temporary facilities, Site sign, offices, storage sheds, utilities, fences in accordance with Section 01 52 00 - Construction Facilities.
 - .5 Delivery schedule of specified equipment.
 - .6 Proposed changes, change orders, procedures, approvals required, mark-up percentages permitted, time extensions, overtime, administrative requirements.
 - .7 Owner provided services.
 - .8 Record drawings in accordance with Section 01 33 00 - Submittal Procedures.
 - .9 Take-over procedures, acceptance, warranties in accordance with Section 01 78 00 - Closeout Submittals.
 - .10 Monthly progress claims, administrative procedures, photographs, hold backs.
 - .11 Appointment of inspection and testing agencies or firms.
 - .12 Insurances, transcript of policies.

1.4 PROGRESS MEETINGS

- .1 During course of work and one (1) week prior to project completion, schedule progress meetings weekly.
- .2 Contractor, major Subcontractors involved in Work Departmental Representative, Consultant, and Owner are to be in attendance.
- .3 Notify parties minimum five (5) days prior to meetings.
- .4 Record minutes of meetings and circulate to attending parties and affected parties not in attendance within three (3) days after meeting.
- .5 Submittals for Progress Meetings: make submittals at least 24 hours prior to scheduled progress meetings as follows:
 - .1 Updated progress schedule detailing activities. Include review of progress with respect to previously established dates for starting and stopping various stages of work, major problems and action taken, deviations from work plan, injury reports, equipment breakdown, and material removal.
 - .2 Weekly copies of Site entry and work area logbooks with information on worker and visitor access.
 - .3 Other information required by Departmental Representative or relevant to agenda for upcoming progress meeting.

- .6 Agenda to include the following:
 - .1 Review, approval of minutes of previous meeting.
 - .2 Review of Work progress since previous meeting.
 - .3 Field observations, problems, conflicts.
 - .4 Problems which impede schedule.
 - .5 Review of delivery schedules.
 - .6 Corrective measures and procedures to regain projected schedule.
 - .7 Revision to schedule.
 - .8 Progress schedule, during succeeding work period.
 - .9 Review submittal schedules: expedite as required.
 - .10 Maintenance of quality standards.
 - .11 Review proposed changes for affect on schedule and on completion date.
 - .12 Other business.

Part 2 Products

2.1 NOT USED

- .1 Not Used.

Part 3 Execution

3.1 NOT USED

- .1 Not Used.

END OF SECTION

Approved: 2006-06-30

Part 1 General**1.1 RELATED REQUIREMENTS**

- .1 Section 01 14 00 - Work Restrictions.
- .2 Section 01 31 19 - Project Meetings.
- .3 Section 01 33 00 - Submittal Procedures.

1.2 DEFINITIONS

- .1 Activity: element of work performed during course of Project. Activity normally has expected duration, and expected cost and expected resource requirements. Activities can be subdivided into tasks.
- .2 Bar Chart (GANTT Chart): graphic display of schedule-related information. In typical bar chart, activities or other Project elements are listed down left side of chart, dates are shown across top, and activity durations are shown as date-placed horizontal bars. Generally Bar Chart should be derived from commercially available computerized project management system.
- .3 Baseline: original approved plan (for project, work package, or activity), plus or minus approved scope changes.
- .4 Construction Work Week: Sunday to Saturday, inclusive, will provide seven (7) day work week and define schedule calendar working days as part of Bar (GANTT) Chart submission.
- .5 Duration: number of work periods (not including holidays or other nonworking periods) required to complete activity or other project element. Usually expressed as work days or work weeks.
- .6 Master Plan: summary-level schedule that identifies major activities and key milestones.
- .7 Milestone: significant event in project, usually completion of major deliverable.
- .8 Project Schedule: planned dates for performing activities and the planned dates for meeting milestones. Dynamic, detailed record of tasks or activities that must be accomplished to satisfy Project objectives. Monitoring and control process involves using Project Schedule in executing and controlling activities and is used as basis for decision making throughout project life cycle.
- .9 Project Planning, Monitoring and Control System: overall system operated by Departmental Representative to enable monitoring of project work in relation to established milestones.

1.3 REQUIREMENTS

- .1 Ensure Master Plan and Detail Schedules are practical and remain within specified Contract duration.

- .2 Plan to complete work in accordance with prescribed milestones and time frame.
- .3 Ensure that it is understood that Award of Contract or time of beginning, rate of progress, Interim Certificate and Final Certificate as defined times of completion are of essence of this contract.

1.4 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Provide submittals in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Submit to Departmental Representative within one (1) week following Award of Contract Bar (GANTT) Chart as Master Plan for planning, monitoring and reporting of project progress.
- .3 Submit Project Schedule to Departmental Representative within two (2) working days of receipt of acceptance of Master Plan.

1.5 MASTER PLAN

- .1 Structure schedule to allow orderly planning, organizing and execution of work as Bar Chart (GANTT).
- .2 Departmental Representative will review and return revised schedules within five (5) working days.
- .3 Revise impractical schedule and resubmit within two (2) working days.
- .4 Accepted revised schedule will become Master Plan and be used as baseline for updates.

1.6 PROJECT SCHEDULE

- .1 Develop detailed Project Schedule derived from Master Plan.
- .2 Ensure detailed Project Schedule includes as minimum milestone and activity types as follows:
 - .1 Award.
 - .2 Shop Drawings, Samples.
 - .3 Permits.
 - .4 Submittals.
 - .5 Mobilization.
 - .6 Site Preparation.
 - .7 Completion of Injection Boreholes.
 - .8 Site Restoration.
 - .9 Final Inspections.
 - .10 De-Mobilization.

1.7 PROJECT SCHEDULE REPORTING

- .1 Update Project Schedule on weekly basis reflecting activity changes and completions, as well as activities in progress.

- .2 Include as part of Project Schedule, narrative report identifying work status to date, comparing current progress to baseline, presenting current forecasts, defining problem areas, anticipated delays and impact with possible mitigation.

1.8 PROJECT MEETINGS

- .1 Discuss Project Schedule at regular Site meetings, identify activities that are behind schedule and provide measures to regain slippage. Activities considered behind schedule are those with projected start or completion dates later than current approved dates shown on baseline schedule.
- .2 Weather related delays with their remedial measures will be discussed and negotiated.

Part 2 Products

2.1 NOT USED

- .1 Not used.

Part 3 Execution

3.1 NOT USED

- .1 Not used.

END OF SECTION

Approved: 2009-12-31

Part 1 General

1.1 RELATED REQUIREMENTS

- .1 Section 01 31 19 - Project Meetings.
- .2 Section 01 32 16.07 - Construction Progress Schedules - Bar (GANNT) Chart.
- .3 Section 01 35 13.43 - Special Project Procedures for Contaminated Sites.
- .4 Section 01 35 29.06 - Health and Safety Requirements.
- .5 Section 01 35 29.14 - Health and Safety for Contaminated Sites.
- .6 Section 01 35 43 - Environmental Procedures.
- .7 Section 01 52 00 - Construction Facilities.
- .8 Section 01 77 00 - Closeout Procedures.
- .9 Section 01 78 00 - Closeout Submittals.
- .10 Section 02 61 00.01 - Soil Remediation.
- .11 Section 31 11 00 - Clearing and Grubbing.

1.2 ADMINISTRATIVE

- .1 Submit to Departmental Representative submittals listed for review. Submit promptly and in orderly sequence to not cause delay in work. Failure to submit in ample time is not considered sufficient reason for extension of Contract Time and no claim for extension by reason of such default will be allowed.
- .2 Do not proceed with work affected by submittal until review is complete.
- .3 Present shop drawings, product, and monitoring data, samples and mock-ups in SI Metric units.
- .4 Review submittals prior to submission to Departmental Representative. This review represents that necessary requirements have been determined and verified, or will be, and that each submittal has been checked and co-ordinated with requirements of work and Contract Documents. Submittals not stamped, signed, dated and identified as to specific project will be returned without being examined and considered rejected.
- .5 Notify Departmental Representative, in writing at time of submission, identifying deviations from requirements of Contract Documents stating reasons for deviations.
- .6 Verify field measurements and affected adjacent Work is co-ordinated.
- .7 Contractor's responsibility for errors and omissions in submission is not relieved by Departmental Representative's review of submittals.
- .8 Contractor's responsibility for deviations in submission from requirements of Contract Documents is not relieved by Departmental Representative review.

- .9 Keep one reviewed copy of each submission on Site.

1.3 SHOP DRAWINGS AND PRODUCT DATA

- .1 Refer to the CCDC 2-2008 GC 3.10 Shop Drawings.
- .2 The term "shop drawings" means drawings, diagrams, illustrations, schedules, performance charts, brochures and other data which are to be provided by Contractor to illustrate details of a portion of Work.
- .3 Indicate materials, methods of construction and attachment or anchorage, erection diagrams, connections, explanatory notes and other information necessary for completion of Work. Where articles or equipment attach or connect to other articles or equipment, indicate that such items have been co-ordinated, regardless of Section under which adjacent items will be supplied and installed. Indicate cross references to design drawings and specifications.
- .4 Allow five (5) days for Departmental Representative's review of each submission.
- .5 Adjustments made on shop drawings by Departmental Representative are not intended to change Contract Price. If adjustments affect value of Work, state such in writing to Departmental Representative prior to proceeding with Work.
- .6 Make changes in shop drawings as Departmental Representative may require, consistent with Contract Documents. When resubmitting, notify Departmental Representative in writing of revisions other than those requested.
- .7 Accompany submissions with transmittal letter, in duplicate, containing:
 - .1 Date.
 - .2 Project title and number.
 - .3 Contractor's name and address.
 - .4 Identification and quantity of each shop drawing, product data and sample.
 - .5 Other pertinent data.
- .8 Submissions include:
 - .1 Date and revision dates.
 - .2 Project title and number.
 - .3 Name and address of:
 - .1 Subcontractor.
 - .2 Supplier.
 - .3 Manufacturer.
 - .4 Contractor's stamp, signed by Contractor's authorized representative certifying approval of submissions, verification of field measurements and compliance with Contract Documents.
 - .5 Details of appropriate portions of Work as applicable:
 - .1 Layout, showing dimensions, including identified field dimensions, and clearances.
 - .2 Setting or erection details.
 - .3 Capacities.

- .4 Performance characteristics.
- .5 Standards.
- .6 Operating weight.

- .9 After Departmental Representative's review, distribute copies.
- .10 Submit electronic copy of shop drawings in format requested for each requirement requested in specification Sections and as Departmental Representative may reasonably request.
- .11 Submit 2 electronic copies of product data sheets or brochures for requirements requested in specification Sections and as requested by Departmental Representative where shop drawings will not be prepared due to standardized manufacture of product.
- .12 Delete information not applicable to project.
- .13 Supplement standard information to provide details applicable to project.
- .14 If upon review by Departmental Representative, no errors or omissions are discovered or if only minor corrections are made, copies will be returned and fabrication and installation of Work may proceed. If shop drawings are rejected, noted copy will be returned and resubmission of corrected shop drawings, through same procedure indicated above, must be performed before fabrication and installation of Work may proceed.
- .15 The review of shop drawings by Departmental Representative is for sole purpose of ascertaining conformance with general concept.
 - .1 This review shall not mean that Departmental Representative approves detail design inherent in shop drawings, responsibility for which shall remain with Contractor submitting same, and such review shall not relieve Contractor of responsibility for errors or omissions in shop drawings or of responsibility for meeting requirements of construction and Contract Documents.
 - .2 Without restricting generality of foregoing, Contractor is responsible for dimensions to be confirmed and correlated at job Site, for information that pertains solely to fabrication processes or to techniques of construction and installation and for co-ordination of Work of sub-trades.

1.4 PHOTOGRAPHIC DOCUMENTATION

- .1 Submit electronic copy of colour digital photography in jpg format, fine resolution as directed by Departmental Representative.
- .2 Project identification: name and number of project and date of exposure indicated.
- .3 Number of viewpoints: two (2) locations.
 - .1 Viewpoints and their location as determined by Departmental Representative.
- .4 Frequency of photographic documentation: weekly.

- .1 Prior to any Site preparation and upon completion of: Site preparation, injection, Site restoration, and as directed by Departmental Representative.

1.5 CERTIFICATES AND TRANSCRIPTS

- .1 Immediately after award of Contract, submit Workers' Compensation Board status.

1.6 CONTRACTOR SUBMITTAL SCHEDULE

- .1 The Contractor must adhere to the following submittal items and proposed deadlines, unless discussed with the Departmental Representative and agreed in writing:

CONTRACTOR SUBMITTAL SCHEDULE		
Specification Section	Description	Date
01 31 19	Request for Preconstruction Meeting	Within one (1) week following Contract Award
01 31 19	Preconstruction Meeting Minutes	Within three (3) days of meeting
01 32 16.07	Master Plan	Within one (1) week following Contract Award
01 32 16.07	Project Schedule	Within two (2) working days of acceptance of Master Plan
01 33 00	Worker's Compensation Board Status	Immediately after Contract Award
01 35 13.43	Remediation Work Plan	Within one (1) week following Contract Award
01 35 13.43	Site Layout	Within Remediation Work Plan
01 35 13.43	Equipment Decontamination Pad Design	Within Remediation Work Plan
01 35 13.43	Proposed Licensed Off-Site Waste Disposal Facility	Within Remediation Work Plan
01 35 29.06	Site Specific Health and Safety Plan	Within one (1) week following Contract Award

CONTRACTOR SUBMITTAL SCHEDULE (continued)		
Specification Section	Description	Date
01 35 29.06	Material Safety Data Sheets	Within Site Specific Health and Safety Plan
01 35 29.14	Proof of Personnel Training	Within Site Specific Health and Safety Plan
01 35 29.14	Proof of Personal Protective Equipment Program	Within Site Specific Health and Safety Plan
01 35 29.14	On-Site/Off-Site Contingency and Emergency Response Plan	Within Site Specific Health and Safety Plan
01 35 43	Site Preparation and Restoration Plan	Within one (1) week following Contract Award
01 35 43	Environmental Protection Plan	Within one (1) week following Contract Award
01 35 43	Traffic Control Plan	Within Environmental Protection Plan
01 35 43	Work Area Plan	Within Environmental Protection Plan
01 35 43	Spill Control Plan	Within Environmental Protection Plan
01 35 43	Non-Hazardous Waste Disposal Plan	Within Environmental Protection Plan
01 35 43	Air Pollution Control Plan	Within Environmental Protection Plan
01 35 43	Contaminant Prevention Plan	Within Environmental Protection Plan
01 35 43	Waste Water Management Plan	Within Environmental Protection Plan
01 35 43	Product Data	Within one (1) week following Contract Award

CONTRACTOR SUBMITTAL SCHEDULE (continued)		
Specification Section	Description	Date
02 61 00.01	Quality Assurance/Quality Control Plan	Within Environmental Protection Plan
01 31 19	Progress Meeting Submittals	At least 24 hours prior to scheduled progress meetings
01 33 00	Progress Photographs	Weekly upon commencement of work
01 35 13.43	Weekly Progress Reports	Weekly upon commencement of work
01 35 29.06	Incident or Accident Reports	Verbal report immediately followed by written report within 24 hours
01 35 29.06	Health and Safety Inspection Reports	Weekly upon commencement of work
01 35 29.06	Copies of Reports or Directions Issued by Federal or Provincial Health and Safety Inspectors	Verbal report immediately followed by written report within 24 hours
01 35 29.06	Correction Action Report for Non-Compliance Health and Safety or Environmental Issues	As required
02 61 00.01	Injection Reports	Daily upon commencement of injection boreholes
31 11 00	Clearing of Isolated Trees	As required
01 31 19	Request for Close Out Meeting	Within one (1) week of project completion
01 31 19	Close Out Meeting Minutes	Within three (3) days of meeting
01 33 00	Final Photographs	Within one (1) week following project completion

CONTRACTOR SUBMITTAL SCHEDULE (continued)		
Specification Section	Description	Date
01 35 13.43	Waste Transport Manifests	Within one (1) week after project completion
01 77 00	Request for Final Inspection	Within one (1) week of project completion
01 78 00	As-Built Documents	Within one (1) week after project completion
01 78 00	Project Record Documents	Within one (1) week after project completion

Part 2 Products

2.1 NOT USED

.1 Not Used.

Part 3 Execution

3.1 NOT USED

.1 Not Used.

END OF SECTION

Approved: 2006-03-31

Part 1 General**1.1 RELATED REQUIREMENTS**

- .1 Section 01 33 00 - Submittal Procedures.
- .2 Section 01 74 11 - Cleaning.

1.2 REFERENCES

- .1 Transportation and Dangerous Goods Act (1999).
- .2 Canadian Council of Ministers of the Environment Documentation.

1.3 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Submittals: in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Submittals for Progress Meetings: make submittals at least 24 hours prior to scheduled progress meetings as follows:
 - .1 Updated progress schedule detailing activities. Include review of progress with respect to previously established dates for starting and stopping various stages of work, major problems and action taken, deviations from work plan, injury reports, equipment breakdown, and material removal.
 - .2 Weekly copies of Site entry and work area logbooks with information on worker and visitor access.
 - .3 Other information required by Departmental Representative or relevant to agenda for upcoming progress meeting.
- .3 Site Layout: within one (1) week after date of Notice to Proceed and prior to mobilization to Site, submit Site layout drawings showing existing conditions and facilities, construction facilities and temporary controls provided by Contractor including following:
 - .1 Equipment and personnel decontamination areas.
 - .2 Means of ingress, egress and temporary traffic control facilities.
 - .3 Equipment and material staging areas.
 - .4 Exclusion Zones, Contaminant Reduction Zones, and other zones specified in Contractor's Site-specific Health and Safety Plan.
- .4 Equipment Decontamination Pad: submit equipment decontamination pad design to Departmental Representative for review prior one (1) week after date of Notice to Proceed and prior to mobilization to Site.

- .5 Remediation Work Plan: within one (1) week after date of Notice to Proceed and prior to mobilization to Site, submit remediation work plan to Departmental Representative. Include proposed chemical injection method, equipment required, borehole locations, injection depths, proposed delivery concentrations and rates to achieve the target oxidant dosage, and quality assurance/quality control monitoring approach.
 - .1 Final borehole locations and chemical delivery methods will be approved by the Departmental Representative.
- .6 Site Preparation and Restoration Plan: submit to Departmental Representative within one (1) week after date of Notice to Proceed and prior to mobilization to Site.

1.4 REGULATORY REQUIREMENTS

- .1 Comply with federal, provincial, and local anti-pollution laws, ordinances, codes, and regulations when disposing of waste materials, debris, and rubbish.
- .2 Work to meet or exceed minimum requirements established by federal, provincial, and local laws and regulations which are applicable.
 - .1 Contractor: responsible for complying with amendments as they become effective.
- .3 In event that compliance exceeds scope of work or conflicts with specific requirements of contract notify Departmental Representative immediately.

1.5 SEQUENCING AND SCHEDULING

- .1 Do not commence work involving contact with potentially contaminated materials until decontamination facilities are operational and approved by Departmental Representative.

1.6 EQUIPMENT DECONTAMINATION FACILITY

- .1 Prior to commencing work involving equipment contact with potentially contaminated materials, construct equipment decontamination pad to accommodate largest piece of on-Site potentially contaminated equipment.

1.7 VEHICULAR ACCESS AND PARKING

- .1 Maintenance and Use:
 - .1 Prevent contamination of access roads. Immediately scrape up debris or material on access roads which is suspected to be contaminated as determined by Departmental Representative; Clean access roads once per day.

- .2 Departmental Representative may collect soil samples for chemical analyses from traveling surfaces of constructed and existing access routes prior to, during, and upon completion of work. Excavate and dispose of clean soil contaminated by Contractor's activities at no additional cost to Departmental Representative.

1.8 DUST AND PARTICULATE CONTROL

- .1 Execute work by methods to minimize raising dust from construction operations.
- .2 Implement and maintain dust and particulate control measures as determined necessary by Departmental Representative during construction and in accordance with Federal regulations.
- .3 Provide positive means to prevent airborne dust from dispersing into atmosphere. Use water misting system for dust and particulate control.
- .4 As minimum, use appropriate covers on trucks hauling fine or dusty material. Use watertight vehicles to haul wet materials.
- .5 Prevent dust from spreading to adjacent property sites.
- .6 Departmental Representative will stop work at any time when Contractor's control of dusts and particulates is inadequate for wind conditions present at Site, or when air quality monitoring indicates that release of fugitive dusts and particulates into atmosphere equals or exceeds specified levels.
- .7 If Contractor's dust and particulate control is not sufficient for controlling dusts and particulates into atmosphere, stop work. Contractor must discuss procedures that Contractor proposes to resolve problem. Make necessary changes to operations prior to resuming excavation, handling, processing, or other work that may cause release of dusts or particulates.

1.9 POLLUTION CONTROL

- .1 Provide methods, means, and facilities to prevent contamination of soil, water, and atmosphere from discharge of noxious toxic substances and pollutants produced by construction operations.
- .2 Be prepared to intercept, clean up, and dispose of spills or releases that may occur whether on land or water. Maintain materials and equipment required for cleanup of spills or releases readily accessible on Site.
- .3 Promptly report spills and releases potentially causing damage to environment to:
 - .1 Authority having jurisdiction or interest in spill or release including conservation authority, water supply authorities, drainage authority, road authority, and fire department.
 - .2 Owner of pollutant, if known.
 - .3 Person having control over pollutant, if known.
 - .4 Departmental Representative.

- .4 Contact manufacturer of pollutant if known and ascertain hazards involved, precautions required, and measures used in cleanup or mitigating action.
- .5 Take immediate action using available resources to contain and mitigate effects on environment and persons from spill or release.
- .6 Provide spill response materials including, containers, adsorbent, shovels, and personal protective equipment. Make spill response materials available at all times in which hazardous materials or wastes are being handled or transported. Spill response materials: compatible with type of material being handled.

1.10 EQUIPMENT DECONTAMINATION

- .1 Commence work involving equipment contact with potentially contaminated material only after Equipment Decontamination Facility is operational.
- .2 Decontaminate equipment after working in potentially contaminated work areas and prior to subsequent work or travel on clean areas.
- .3 Perform equipment decontamination on Contractor-constructed equipment decontamination pad.
- .4 At minimum, perform following steps during equipment decontamination: mechanically remove packed dirt, grit, and debris by scraping and brushing without using steam or high-pressure water to reduce amount of water needed and to reduce amount of contaminated rinsate generated. Use high-pressure, low-volume, hot water or steam supplemented by detergents or solvents as appropriate and as approved by Departmental Representative. Pay particular attention to tire treads, equipment tracks, springs, joints, sprockets, and undercarriages. Scrub surfaces with long handle scrub brushes and cleaning agent. Rinse off and collect cleaning agent. Air dry equipment in Clean Zone before removing from Site or travelling on clean areas. Perform assessment as directed by Departmental Representative to determine effectiveness of decontamination.
- .5 Each piece of equipment will be inspected by Departmental Representative after decontamination and prior to removal from Site and/or travel on clean areas. Departmental Representative will have right to require additional decontamination to be completed if deemed necessary.
- .6 Furnish and equip personnel engaged in equipment decontamination with protective equipment including suitable disposable clothing, respiratory protection, and face shields.

1.11 WATER CONTROL

- .1 Prevent surface water runoff from leaving work areas.
- .2 Do not discharge decontaminated water, or surface water runoff, or groundwater which may have come in contact with potentially contaminated material, off Site or to municipal sewers.
- .3 Direct surface waters that have not contacted potentially contaminated materials to existing surface drainage systems.

- .4 Control surface drainage including ensuring that gutters are kept open, water is not directed across or over pavements or sidewalks except through approved pipes or properly constructed troughs, and runoff from unstabilized areas is intercepted and diverted to suitable outlet.
- .5 Dispose of water in manner not injurious to public health or safety, to property, or to any part of work completed or under construction.
- .6 Provide, operate, and maintain necessary equipment appropriately sized to keep excavations, staging pads, and other work areas free from water.

1.12 PROGRESS CLEANING

- .1 Maintain cleanliness of work and surrounding Site to comply with federal, provincial, and local fire and safety laws, ordinances, codes, and regulations.
- .2 Co-ordinate cleaning operations with disposal operations to prevent accumulation of dust, dirt, debris, rubbish, and waste materials.
- .3 Refer to Section 01 74 11 – Cleaning.

1.13 FINAL DECONTAMINATION

- .1 Perform final decontamination of construction facilities, equipment, and materials which may have come in contact with potentially contaminated materials prior to removal from Site.
- .2 Perform decontamination as specified to satisfaction of Departmental Representative. Departmental Representative will direct Contractor to perform additional decontamination if required.

1.14 REMOVAL AND DISPOSAL

- .1 Remove surplus materials and temporary facilities from Site.
- .2 Dispose of non-contaminated waste materials, litter, debris, and rubbish off Site at appropriate disposal facility.
- .3 Do not burn or bury rubbish and waste materials on Site.
- .4 Do not dispose of volatile or hazardous wastes such as mineral spirits, oil, or paint thinner in storm or sanitary drains.
- .5 Do not discharge wastes into streams or waterways.
- .6 Dispose of following materials at appropriate off-Site facility identified by Contractor and approved by Departmental Representative:
 - .1 Debris including excess construction material.
 - .2 Non-contaminated litter and rubbish.
 - .3 Disposable personal protective equipment worn during final cleaning.

1.15 RECORD KEEPING

- .1 Maintain adequate records to support information provided to Departmental Representative regarding exception reports, annual reports, and biennial reports.

- .2 Maintain bills of lading for minimum of 375 days from date of shipment or longer period required by applicable law or regulation.

Part 2 Products

2.1 NOT USED

- .1 Not Used.

Part 3 Execution

3.1 NOT USED

- .1 Not Used.

END OF SECTION

Approved: 2006-06-30

Part 1 General

1.1 RELATED REQUIREMENTS

- .1 Section 01 33 00 - Submittal Procedures.
- .2 Section 01 35 29.14 - Health and Safety Requirements for Contaminated Soils.
- .3 Section 01 35 43 - Environmental Procedures.
- .4 Section 01 41 00 - Regulatory Requirements.
- .5 Section 02 61 00.01 - Soil Remediation.
- .6 Section 31 11 00 - Clearing and Grubbing.

1.2 REFERENCES

- .1 Canada Labour Code, Part 2, Canada Occupational Safety and Health Regulations.
- .2 Health Canada/Workplace Hazardous Materials Information System (WHMIS).
 - .1 Material Safety Data Sheets (MSDS).
- .3 Province of Saskatchewan.
 - .1 Occupational Health and Safety Act, 1993, S.S. 2005.
- .4 Transportation and Dangerous Goods Act (1999).

1.3 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Make submittals in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Submit Site-specific Health and Safety Plan: Within one (1) week after date of Notice to Proceed and prior to commencement of work. Health and Safety Plan must include:
 - .1 Results of Site specific safety hazard assessment.
 - .2 Results of safety and health risk or hazard analysis for Site tasks and operation.
 - .3 Site health and safety measures to minimize hazards.
 - .4 Emergency medical procedures that will be followed in case of accident requiring medical attention, including a muster point, contact list of emergency personnel and hospitals, and fire department.
 - .5 List of health and safety equipment that will be on-Site, including but not limited to personal protective equipment (PPE), first aid kit, fire extinguishers, and spill kits.
- .3 Submit copies of Contractor's authorized representative's work site health and safety inspection reports to Departmental Representative.

- .4 Submit copies of reports or directions issued by Federal and Provincial health and safety inspectors.
- .5 Submit copies of incident and accident reports.
- .6 Submit WHMIS MSDS - Material Safety Data Sheets.
- .7 On-Site Contingency and Emergency Response Plan: address standard operating procedures to be implemented during emergency situations.
- .8 Personnel training requirements including:
 - .1 Names of personnel and alternates responsible for Site safety and health, hazards present on Site, and use of personal protective equipment.
 - .2 Work practices by which personnel can minimize risks from hazards, safe use of engineering controls and equipment on Site, medical surveillance requirements, including recognition of symptoms and signs which might indicate overexposure to hazards, and elements of Site-specific Health and Safety Plan.
- .9 Personal protective equipment (PPE) program addressing:
 - .1 Donning and doffing procedures.
 - .2 PPE selection based upon Site hazards and specific work activities.
 - .3 PPE use and limitations of equipment.
 - .4 Work mission duration, PPE maintenance and storage.
 - .5 PPE decontamination and disposal.
 - .6 PPE inspection procedures prior to, during, and after use.
 - .7 Evaluation of effectiveness of PPE program, and limitations during temperature extremes, and other appropriate medical considerations.
 - .8 Medical surveillance requirements for personnel assigned to work at Site.
 - .9 Site control measures employed at Site including Site map, Site work zones, use of 'buddy system', Site communications including Site security, alerting means for emergencies, standard operating procedures or safe work practices, and identification of nearest medical assistance.
 - .10 Decontamination procedures for both personnel and equipment.
 - .11 Emergency response requirements addressing: pre-emergency planning, personnel roles, lines of authority and communication, emergency recognition and prevention, safe distances and places of refuge, Site security and control, evacuation routes and procedures, decontamination procedures not covered under decontamination section, emergency medical treatment and first aid, emergency alerting and response procedures, critique of response and follow-up, PPE and emergency equipment, Site topography, layout, prevailing weather conditions, and procedures for reporting incidents to local, provincial, or federal agencies.
 - .12 Procedures dealing with heat and/or cold stress.

.10 Departmental Representative will review Contractor's Site-specific Health and Safety Plan and provide comments to Contractor within five (5) days after receipt of plan. Revise plan as appropriate and resubmit plan to Departmental Representative within two (2) days after receipt of comments from Departmental Representative.

.11 Departmental Representative's review of Contractor's final Health and Safety plan should not be construed as approval and does not reduce the Contractor's overall responsibility for construction Health and Safety.

1.4 SAFETY ASSESSMENT

.1 Perform Site specific safety hazard assessment related to project.

1.5 MEETINGS

.1 Schedule and administer Health and Safety meeting with Departmental Representative prior to commencement of work.

1.6 REGULATORY REQUIREMENTS

.1 Do work in accordance with Section 01 41 00 - Regulatory Requirements.

1.7 PROJECT/SITE CONDITIONS

.1 Work at Site will involve contact with:

- .1 Petroleum hydrocarbon impacted soil and groundwater.
- .2 Activated potassium persulfate.

1.8 GENERAL REQUIREMENTS

- .1 Develop written Site-specific Health and Safety Plan based on hazard assessment prior to beginning Site work and continue to implement, maintain, and enforce plan until final demobilization from Site. Health and Safety Plan must address project specifications.
- .2 Departmental Representative may respond in writing, where deficiencies or concerns are noted and may request re-submission with correction of deficiencies or concerns.

1.9 RESPONSIBILITY

- .1 Be responsible for health and safety of persons on Site, safety of property on Site and for protection of persons adjacent to Site and environment to extent that they may be affected by conduct of work.
- .2 Comply with and enforce compliance by employees with safety requirements of Contract Documents, applicable federal, provincial, and local statutes, regulations, and ordinances, and with Site-specific Health and Safety Plan.

1.10 COMPLIANCE REQUIREMENTS

.1 Comply with Canada Occupational Health and Safety Regulations.

- .2 Comply with Canada Labour Code, Canada Occupational Safety and Health Regulations.

1.11 UNFORESEEN HAZARDS

- .1 Should unforeseen or peculiar safety-related factor, hazard, or condition become evident during performance of work, stop work and immediately advise Departmental Representative verbally and in writing.

1.12 HEALTH AND SAFETY CO-ORDINATOR

- .1 Employ and assign to work, competent and authorized representative as Health and Safety Co-ordinator. Health and Safety Co-ordinator must:
 - .1 Have minimum 5 years' site-related working experience specific to activities associated with in situ chemical oxidation.
 - .2 Have working knowledge of occupational safety and health regulations.
 - .3 Be responsible for completing Contractor's Health and Safety Training Sessions and ensuring that personnel not successfully completing required training are not permitted to enter Site to perform work.
 - .4 Be responsible for implementing, enforcing daily and monitoring Site-specific Contractor's Health and Safety Plan.
 - .5 Be on Site during execution of work and report directly to and be under direction of Site supervisor.

1.13 PERSONNEL HEALTH, SAFETY, AND HYGIENE

- .1 Medical Surveillance:
 - .1 Conduct medical surveillance of personnel as required by specified regulations.
- .2 Training: ensure personnel entering Site are trained in accordance with specified personnel training requirements. Training session must be completed by Health and Safety Officer.
- .3 Levels of Protection: establish levels of protection for each work area based on planned activity and location of activity. Minimum PPE required for each level of protection as follows:
- .4 Level B:
 - .1 Respiratory: SCBA.
 - .2 Head, Eye, Ear Protection: hard hat, safety glasses with side shields, and ear muffs or plugs.
 - .3 Hand Protection: gloves, chemically resistant.
 - .4 Foot Protection: steel toed safety boots.
 - .5 Clothing: chemically resistant coveralls.
- .5 Level C/Modified Level C:
 - .1 Respiratory: half mask, Cartridge - MSA GME-H (GME-P100).

- .2 Head, Eye, Ear Protection: hard hat, safety glasses with side shields, and ear muffs or plugs.
- .3 Hand Protection: gloves, chemically resistant.
- .4 Foot Protection: steel toed safety boots.
- .5 Clothing: chemically resistant coveralls.
- .6 Level D:
 - .1 Head, Eye, Ear Protection: hard hat, safety glasses with side shields, and ear muffs or plugs.
 - .2 Clothing: standard work uniform.
- .7 Anticipated levels of personal protection based on work activity are as follows:

Work Activity	Anticipated Level of Personal Protection
Site Preparation	Level D
Completion of Injection Boreholes	Modified Level C
- .8 Personal Protective Equipment:
 - .1 Furnish Site personnel with appropriate PPE as specified above. Ensure that safety equipment and protective clothing is kept clean and maintained.
- .9 Develop protective equipment usage procedures and ensure that procedures are strictly followed by Site personnel; include following procedures as minimum:
 - .1 Ensure prescription eyeglasses worn are safety glasses and do not permit contact lenses on Site within work zones.
 - .2 Ensure footwear is steel-toed safety shoes or boots and is covered by rubber overshoes when entering or working in potentially contaminated work areas.
 - .3 Dispose of or decontaminate PPE worn on Site at end of each workday.
 - .4 Decontaminate reusable PPE before reissuing.
 - .5 Ensure Site personnel have passed respirator fit test prior to entering potentially contaminated work areas.
 - .6 Ensure facial hair does not interfere with proper respirator fit.
- .10 Heat Stress/Cold Stress: implement heat stress/cold stress monitoring program as applicable and include in Site-specific Health and Safety Plan.
- .11 Personnel Hygiene and Personnel Decontamination Procedures. Provide minimum as follows:
 - .1 Suitable containers for storage and disposal of used disposable PPE.
 - .2 Potable water and suitable sanitation facility.

- .12 Emergency and First-Aid Equipment:
 - .1 Locate and maintain emergency and first-aid equipment in appropriate location on Site including first-aid kit to accommodate number of Site personnel; portable emergency eye wash; two 9 kilogram ABC type dry chemical fire extinguishers.
 - .2 As minimum, provide 1 certified first-aid technician on Site at all times when work activities are in progress.
- .13 Site Communications:
 - .1 Post emergency numbers near Site telephones.
 - .2 Ensure personnel use of "buddy" system and develop hand signal system appropriate for Site activities.
 - .3 Provide employee alarm system to notify employees of Site emergency situations or to stop work activities if necessary.
 - .4 Safety Meetings: conduct mandatory daily safety meetings for personnel, and additionally as required by special or work-related conditions; include refresher training for existing equipment and protocols, review ongoing safety issues and protocols, and examine new Site conditions as encountered. Hold additional safety meetings on as-needed basis.

1.14 POSTING OF DOCUMENTS

- .1 Ensure applicable items, articles, notices and orders are posted in conspicuous location on Site in accordance with Acts and Regulations of Country of Canada, and in consultation with Departmental Representative.

1.15 CORRECTION OF NON-COMPLIANCE

- .1 Immediately address health and safety non-compliance issues identified by authority having jurisdiction or by Departmental Representative.
- .2 Provide Departmental Representative with written report of action taken to correct non-compliance of health and safety issues identified.
- .3 Departmental Representative may stop work if non-compliance of health and safety regulations is not corrected.

1.16 WORK STOPPAGE

- .1 Give precedence to safety and health of public and Site personnel and protection of environment over cost and schedule considerations for work.

Part 2 Products

2.1 NOT USED

- .1 Not used.

Part 3 Execution

3.1 NOT USED

.1 Not used.

END OF SECTION

Approved: 2006-03-31

Part 1 General**1.1 RELATED REQUIREMENTS**

- .1 Section 01 33 00 - Submittal Procedures.
- .2 Section 01 35 29.06 - Health and Safety Requirements.
- .3 Section 01 35 43 - Environmental Procedures.
- .4 Section 01 41 00 - Regulatory Requirements.
- .5 Section 02 61 00.01 - Soil Remediation.
- .6 Section 31 11 00 - Clearing and Grubbing.

1.2 REFERENCES

- .1 Canada Labour Code, Part 2, Canada Occupational Safety and Health Regulations.
- .2 Health Canada/Workplace Hazardous Materials Information System (WHMIS).
 - .1 Material Safety Data Sheets (MSDS).
- .3 Province of Saskatchewan.
 - .1 Occupational Health and Safety Act, 1993, S.S. 2005.
- .4 Transportation and Dangerous Goods Act (1999).

1.3 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Make submittals in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Submit Site-specific Health and Safety Plan, within one (1) week after date of Notice to Proceed and prior to mobilization to Site. Address following items:
 - .1 Results of Site specific safety hazard assessment.
 - .2 Results of safety and health risk or hazard analysis for Site tasks and operation.
 - .3 Site health and safety measures to minimize hazards.
 - .4 Emergency medical procedures that will be followed in case of accident requiring medical attention, including a muster point, contact list of emergency personnel and hospitals, and fire department.
 - .5 List of health and safety equipment that will be on-Site, including but not limited to personal protective equipment (PPE), first aid kit, fire extinguishers, and spill kits.
- .3 Submit copies of Contractor's authorized representative's work site health and safety inspection reports to Departmental Representative.
- .4 Submit copies of reports or directions issued by Federal and Provincial health and safety inspectors.

- .5 Submit copies of incident and accident reports.
- .6 Submit WHMIS MSDS - Material Safety Data Sheets.
- .7 On-Site Contingency and Emergency Response Plan: address standard operating procedures to be implemented during emergency situations.
- .8 Off-Site Contingency and Emergency Response Plan:
 - .1 Prior to commencing work involving handling of hazardous materials, develop off-Site Contingency and Emergency Response Plan.
 - .2 Plan must provide immediate response to serious Site occurrence such as explosion, fire, or migration of significant quantities of toxic or hazardous material from Site.
- .9 Personnel training requirements including:
 - .1 Names of personnel and alternates responsible for Site safety and health, hazards present on Site, and use of personal protective equipment.
 - .2 Work practices by which personnel can minimize risks from hazards, safe use of engineering controls and equipment on Site, medical surveillance requirements, including recognition of symptoms and signs which might indicate overexposure to hazards, and elements of Site-specific Health and Safety Plan.
- .10 Personal protective equipment (PPE) program addressing:
 - .1 Donning and doffing procedures.
 - .2 PPE selection based upon Site hazards.
 - .3 PPE use and limitations of equipment.
 - .4 Work mission duration, PPE maintenance and storage.
 - .5 PPE decontamination and disposal.
 - .6 PPE inspection procedures prior to, during, and after use.
 - .7 Evaluation of effectiveness of PPE program, and limitations during temperature extremes, and other appropriate medical considerations.
 - .8 Medical surveillance requirements for personnel assigned to work at Site.
 - .9 Site control measures employed at Site including Site map, Site work zones, use of 'buddy system', Site communications including Site security, alerting means for emergencies, standard operating procedures or safe work practices, and identification of nearest medical assistance.
 - .10 Decontamination procedures for both personnel and equipment.
 - .11 Emergency response requirements addressing: pre-emergency planning, personnel roles, lines of authority and communication, emergency recognition and prevention, safe distances and places of refuge, Site security and control, evacuation routes and procedures, decontamination procedures not covered under decontamination section, emergency medical treatment and first aid, emergency alerting and response procedures, critique of response and follow-up, PPE and emergency equipment, Site topography, layout, prevailing weather conditions, and procedures for reporting incidents to local, provincial, or federal agencies.

- .12 Procedures dealing with heat and/or cold stress.
- .11 Departmental Representative will review Contractor's Site-specific Health and Safety Plan and provide comments to Contractor within five (5) days after receipt of plan. Revise plan as appropriate and resubmit plan to Departmental Representative within two (2) days after receipt of comments from Departmental Representative.
- .12 Departmental Representative will review Contractor's Site-specific Health and Safety Plan and provide comments to Contractor within five (5) days after receipt of plan. Revise plan as appropriate and resubmit plan to Departmental Representative within two (2) days after receipt of comments from Departmental Representative.
- .13 Departmental Representative's review of Contractor's final Health and Safety plan should not be construed as approval and does not reduce the Contractor's overall responsibility for construction Health and Safety.
- .14 On-Site Contingency and Emergency Response Plan: address standard operating procedures to be implemented during emergency situations.
- .15 Off-Site Contingency and Emergency Response Plan:
 - .1 Prior to commencing work involving handling of hazardous materials, develop off-Site Contingency and Emergency Response Plan.
 - .2 Plan must provide immediate response to serious Site occurrence such as explosion, fire, or migration of significant quantities of toxic or hazardous material from Site.

1.4 REGULATORY REQUIREMENTS

- .1 Do work in accordance with Section 01 41 00 - Regulatory Requirements.
- .2 Comply with specified standards and regulations to ensure safe operations at Site containing hazardous or toxic materials.

1.5 SITE CONDITIONS

- .1 Work at Site will involve contact with:
 - .1 Petroleum hydrocarbon impacted soil and groundwater.
 - .2 Activated potassium persulfate.

1.6 GENERAL REQUIREMENTS

- .1 Develop written Site-specific Health and Safety Plan based on hazard assessment prior to beginning Site work and continue to implement, maintain, and enforce plan until final demobilization from Site. Health and Safety Plan must address project specifications.
- .2 Departmental Representative may respond in writing, where deficiencies or concerns are noted and may request re-submission with correction of deficiencies or concerns.

- .3 Ensure Health and Safety guidelines provide for safe and minimal risk working environment for Site personnel and minimize impact of activities involving contact with hazardous materials or hazardous wastes on general public and surrounding environment.
- .4 Relief from or substitution for portion or provision of minimum Health and Safety Guidelines specified or reviewed Site-specific Health and Safety Plan must be submitted to Departmental Representative in writing. Departmental Representative will respond in writing, either accepting or requesting improvements.

1.7 RESPONSIBILITY

- .1 Be responsible for health and safety of persons on Site, safety of property on Site and for protection of persons adjacent to Site and environment to extent that they may be affected by conduct of work.
- .2 Comply with and enforce compliance by employees with safety requirements of Contract Documents, applicable federal, provincial, and local statutes, regulations, and ordinances, and with Site-specific Health and Safety Plan.

1.8 HAZARD COMMUNICATION REQUIREMENTS

- .1 Comply with Occupational Health and Safety Regulations, Part XXII Controlled Products - WHMIS.
- .2 Comply with Canada Labour Code, Canada Occupational Safety and Health Regulations, Part X - Hazardous Substances.
- .3 Provide Departmental Representative with MSDS and documentation on any "hazardous" chemical that Contractor or Contractor Representatives plan to bring onto Site.

1.9 WORK STOPPAGE

- .1 Give precedence to safety and health of public and Site personnel and protection of environment over cost and schedule considerations for work.
- .2 Assign responsibility and obligation to Health and Safety Officer where required to stop or start work when, at Health and Safety Officer's discretion, it is necessary or advisable for reasons of health or safety. Departmental Representative may also stop work for health and safety considerations.
- .3 In the event an environmental complaint is received it shall be documented by the Contractor.
 - .1 If the complaint is received during an injection, the process shall be stopped.
 - .2 The Contractor will immediately report the complaint to the Departmental Representative who will contact the complainant and deal with any concerns before continuing with the injections.

1.10 UNFORESEEN HAZARDS

- .1 Should unforeseen or peculiar safety-related factor, hazard, or condition become evident during performance of work, stop work and immediately advise Departmental Representative verbally and in writing.

1.11 HEALTH AND SAFETY OFFICER

- .1 Employ and assign to work competent and authorized representative as Health and Safety Adviser. Health and Safety Adviser must:
 - .1 Have minimum 5 years' site-related working experience specific to activities associated with in situ chemical oxidation.
 - .2 Have working knowledge of specified occupational safety and health regulations.
 - .3 Be responsible for completing Contractor's Health and Safety Training Sessions and ensuring that personnel not successfully completing required training are not permitted to enter Site to perform work.
 - .4 Be responsible for implementing, enforcing daily and monitoring Site-specific Health and Safety Plan.
 - .5 Be on Site during execution of work.

1.12 PERSONNEL HEALTH, SAFETY, AND HYGIENE

- .1 Medical Surveillance:
 - .1 Conduct medical surveillance of personnel as required by specified regulations.
- .2 Training: ensure personnel entering Site are trained in accordance with specified personnel training requirements. Training session must be completed by Health and Safety Officer.
- .3 Levels of Protection: establish levels of protection for each work area based on planned activity and location of activity. Minimum PPE required for each level of protection as follows:
- .4 Level B:
 - .1 Respiratory: SCBA.
 - .2 Head, Eye, Ear Protection: hard hat, safety glasses with side shields, and ear muffs or plugs.
 - .3 Hand Protection: gloves, chemically resistant.
 - .4 Foot Protection: steel toed safety boots.
 - .5 Clothing: chemically resistant coveralls.
- .5 Level C/Modified Level C:
 - .1 Respiratory: half mask, Cartridge - MSA GME-H (GME-P100).
 - .2 Head, Eye, Ear Protection: hard hat, safety glasses with side shields, and ear muffs or plugs.
 - .3 Hand Protection: gloves, chemically resistant.

- .4 Foot Protection: steel toed safety boots.
- .5 Clothing: chemically resistant coveralls.
- .6 Level D:
 - .1 Head, Eye, Ear Protection: hard hat, safety glasses with side shields, and ear muffs or plugs.
 - .2 Clothing: standard work uniform.
- .7 Anticipated levels of personal protection based on work activity are as follows:

Work Activity	Anticipated Level of Personal Protection
Site Preparation	Level D
Completion of Injection Boreholes	Modified Level C

- .8 Personal Protective Equipment:
 - .1 Furnish Site personnel with appropriate PPE as specified above. Ensure that safety equipment and protective clothing is kept clean and maintained.
- .9 Develop protective equipment usage procedures and ensure that procedures are strictly followed by Site personnel; include following procedures as minimum:
 - .1 Ensure prescription eyeglasses worn are safety glasses and do not permit contact lenses on Site within work zones.
 - .2 Ensure footwear is steel-toed safety shoes or boots and is covered by rubber overshoes when entering or working in potentially contaminated work areas.
 - .3 Dispose of or decontaminate PPE worn on Site at end of each workday.
 - .4 Decontaminate reusable PPE before reissuing.
 - .5 Ensure Site personnel have passed respirator fit test prior to entering potentially contaminated work areas.
 - .6 Ensure facial hair does not interfere with proper respirator fit.
- .10 Explosive Atmosphere: use a field photo-ionization or flame ionization detector (PID/FID) and explosimeter to monitor for explosive conditions in the injection boreholes.
- .11 Respiratory Protection:
 - .1 Provide Site personnel with extensive training in usage and limitations of, and qualitative fit testing for, air purifying and supplied-air respirators in accordance with specified regulations.
 - .2 Develop, implement, and maintain respirator program.
 - .3 Monitor, evaluate, and provide respiratory protection for Site personnel.
 - .4 Assess ability for Site personnel to wear respiratory protection.
 - .5 Ensure Site personnel are able to pass respirator fit test prior to entering potentially contaminated work areas.

- .12 Heat Stress/Cold Stress: implement heat stress/cold stress monitoring program as applicable and include in Site-specific Health and Safety Plan.
- .13 Personnel Hygiene and Personnel Decontamination Procedures. Provide minimum as follows:
 - .1 Suitable containers for storage and disposal of used disposable PPE.
 - .2 Potable water and suitable sanitation facility.
- .14 Emergency and First-Aid Equipment:
 - .1 Locate and maintain emergency and first-aid equipment in appropriate location on Site including first-aid kit to accommodate number of Site personnel; portable emergency eye wash; two 9 kilograms ABC type dry chemical fire extinguishers.
 - .2 As minimum, provide 1 certified first-aid technician on Site at all times when work activities are in progress.
- .15 Site Communications:
 - .1 Post emergency numbers near Site telephones.
 - .2 Ensure personnel use of "buddy" system and develop hand signal system appropriate for Site activities.
 - .3 Provide employee alarm system to notify employees of Site emergency situations or to stop work activities if necessary.
 - .4 Safety Meetings: conduct mandatory daily safety meetings for personnel, and additionally as required by special or work-related conditions; include refresher training for existing equipment and protocols, review ongoing safety issues and protocols, and examine new Site conditions as encountered. Hold additional safety meetings on as-needed basis.
- .16 Air Monitoring:
 - .1 Contractor shall provide a means for monitoring and controlling off-gas to comply with emission limits and worker exposure limits identified in the health and safety plan.
 - .2 Boundary checks of fugitive emissions of organic vapours shall be monitored daily at the nearest receptor or property boundary down gradient from the injection boreholes.
 - .1 A PID (10.6e V Lamp) shall be used to monitor organic vapours and olfactory means shall be used to detect the presence of odours.
 - .2 If noticeable odours are encountered during the boundary checks, related to the injection activity, the injections will be stopped.
 - .3 Injections can only continue once the events leading to the termination of the injection have been reviewed and control measures have been implemented to reduce the re-occurrence of the same conditions.
 - .4 Control measure may include: reduce injection rate, the use of fans and blowers to improve local ventilation

1.13 POSTING OF DOCUMENTS

- .1 Ensure applicable items, articles, notices and orders are posted in conspicuous location on Site in accordance with Acts and Regulations of Country of Canada, and in consultation with Departmental Representative.

1.14 CORRECTION OF NON-COMPLIANCE

- .1 Immediately address health and safety non-compliance issues identified by authority having jurisdiction or by Departmental Representative.
- .2 Provide Departmental Representative with written report of action taken to correct non-compliance of health and safety issues identified.
- .3 Departmental Representative may stop work if non-compliance of health and safety regulations is not corrected.

1.15 WORK STOPPAGE

- .1 Give precedence to safety and health of public and Site personnel and protection of environment over cost and schedule considerations for work.
- .2 Assign responsibility and obligation to Health and Safety Officer where required to stop or start work when, at Health and Safety Officer's discretion, it is necessary or advisable for reasons of health or safety. Departmental Representative may also stop work for health and safety considerations.
- .3 In the event an environmental complaint is received it shall be documented by the Contractor.
 - .1 If the complaint is received during an injection, the process shall be stopped.
 - .2 The Contractor will immediately report the complaint to the Departmental Representative who will contact the complainant and deal with any concerns before continuing with the injections.

Part 2 Products**2.1 NOT USED**

- .1 Not Used.

Part 3 Execution**3.1 NOT USED**

- .1 Not Used.

END OF SECTION

Approved: 2012-06-30

Part 1 General

1.1 RELATED REQUIREMENTS

- .1 Section 01 33 00 - Submittal Procedures.
- .2 Section 01 35 29.06 - Health and Safety Requirements.
- .3 Section 01 35 29.14 - Health and Safety Requirements for Contaminated Sites.
- .4 Section 01 74 11 - Cleaning.
- .5 Section 01 77 00 - Closeout Procedures.
- .6 Section 31 11 00 - Clearing and Grubbing.

1.2 REFERENCES

- .1 Definitions:
 - .1 Environmental Pollution and Damage: presence of chemical, physical, biological elements or agents which adversely affect human health and welfare; unfavourably alter ecological balances of importance to human life; affect other species of importance to humans; or degrade environment aesthetically, culturally and/or historically.
 - .2 Environmental Protection: prevention/control of pollution and habitat or environment disruption during construction.
- .2 Reference Standards:
 - .1 Health Canada/Workplace Hazardous Materials Information System (WHMIS).
 - .1 Material Safety Data Sheets (MSDS).
 - .2 Transportation and Dangerous Goods Act (1999).

1.3 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Submit in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Product Data:
 - .1 Submit manufacturer's instructions, printed product literature and data sheets for potassium persulfate and catalyst and include product characteristics, performance criteria, physical size, finish and limitations.
 - .2 Submit two (2) copies of WHMIS MSDS in accordance with Section 01 35 29.06 - Health and Safety Requirements.
- .3 Before commencing construction activities or delivery of materials to Site, submit Environmental Protection Plan for review and approval by Departmental Representative.
- .4 Environmental Protection Plan must include comprehensive overview of known or potential environmental issues to be addressed during construction.

- .5 Address topics at level of detail commensurate with environmental issue and required construction tasks.
- .6 Include in Environmental Protection Plan:
 - .1 Names of persons responsible for ensuring adherence to Environmental Protection Plan.
 - .2 Names and qualifications of persons responsible for training Site personnel.
 - .3 Descriptions of environmental protection personnel training program.
 - .4 Drawings indicating locations of proposed material storage areas, structures, and sanitary facilities.
 - .5 Traffic Control Plans including measures to reduce erosion of temporary roadbeds by construction traffic, especially during wet weather.
 - .1 Plans to include measures to minimize amount of material transported onto paved public roads by vehicles or runoff.
 - .6 Work area plan showing proposed activity in each portion of area and identifying areas of limited use or non-use.
 - .1 Plan to include measures for marking limits of use areas and methods for protection of features to be preserved within authorized work areas, including methods of reducing damage to vegetation, soils, infrastructure and erosion and run-off control plans.
 - .7 Spill Control Plan to include procedures, instructions, and reports to be used in event of unforeseen spill of regulated substance.
 - .8 Non-Hazardous solid waste disposal plan identifying methods and locations for solid waste disposal including clearing debris.
 - .9 Air pollution control plan detailing provisions to assure that dust, debris, materials, and trash, are contained on project Site.
 - .10 Contaminant Prevention Plan identifying potentially hazardous substances to be used on job Site; intended actions to prevent introduction of such materials into air, water, or ground; and detailing provisions for compliance with Federal, Provincial, and Municipal laws and regulations for storage and handling of these materials.
 - .11 Waste Water Management Plan identifying methods and procedures for management of discharge of waste waters which are directly derived from construction activities, such as chemical water, clean-up water, and, disinfection water.
- .7 Submit Site Preparation and Restoration Plan for review and approval by Departmental Representative outlining Site modification requirements, tree removal, equipment and materials required, construction plans, utilities disruptions, building relocations, restoration strategies, environmental and infrastructure protection strategies, and off-Site disposal of waste materials. Site Preparation and Restoration Plan shall include provisions for the following potential tasks:

- .1 Soil removal and/or stripping and storage to be completed in a manner that separates topsoil from sub soils. Distinct horizons should be stripped and stored separately for replacement in the reverse order that they were excavated. Soil piles should be stored on gravelled or tarped surfaces and covered during strong wind or rain events.
- .2 Backfilling to be completed in a manner that enables complete removal and reclamation upon project completion or of sufficient material and design to withstand long-term future use. Backfill material must be approved by the Departmental Representative prior to use.
- .3 Tree clearing must be approved in advance by the Departmental Representative and must be done in a manner that will maintain a visual buffer between the maintenance compound and the golf course. Tree clearing shall be completed as per Section 31 11 00 - Clearing and Grubbing.
- .4 Grading shall be conducted, post-remediation, to restore natural drainage patterns (or to achieve modified drainage patterns to protect infrastructure) after dismantling of equipment and temporary structures.
- .5 Rutting and/or compaction of ground surfaces, both natural and man-made, should be avoided as much as possible. Equipment should be kept to existing roads, parking lots and pathways or approved routes during approved conditions. Access requirements that include areas of the golf course fairway must be identified and plans to avoid damage approved by the Departmental Representative. All areas with rutting damage or noticeable compaction from heavy equipment will be re-graded and back-filled. Any holes or depressions caused by Site preparation or construction will be back-filled and compacted to an appropriate degree.
- .6 Seeding of areas with bare soil may be required. Seeding should occur as soon as feasible to prevent the establishment of weeds. Native vegetation representative of the surrounding area shall be used.
- .7 Weed control measures may be required on any disturbed areas with bare soil, which may include treatment with herbicide prior to re-seeding with a native seed mixture representative of the natural species in the area.

1.4 FIRES

- .1 Fires and burning of rubbish on Site is not permitted.

1.5 SITE CLEARING AND PLANT PROTECTION

- .1 The Contractor will be responsible for Site clearing activities, as identified in the Contractor's approved Site Preparation and Restoration Plan.
- .2 Submit Site Preparation and Restoration Plan to include activities to allow access to the treed area west of the Maintenance Compound and to restore area to original contours and pre-construction state.
- .3 Submit to Departmental Representative one (1) week after date of Notice to Proceed and prior to mobilization to Site.

- .4 Departmental Representative will review Contractor's Site Preparation and Restoration Plan and provide comments to Contractor within five (5) days after receipt of plan. Revise plan as appropriate and resubmit plan to Departmental Representative within two (2) days after receipt of comments from Departmental Representative.
- .5 Plan to include:
 - .1 Protect trees and plants on Site and adjacent properties as indicated.
 - .2 Minimize stripping of topsoil and vegetation.
 - .3 Proper soil stripping, storage, and replacement techniques
 - .4 Post-disturbance reclamation of bare soils.
 - .5 Restrict tree removal to areas designated by Departmental Representative.

1.6 POLLUTION CONTROL

- .1 Maintain temporary erosion and pollution control features installed under this Contract.
- .2 Control emissions from equipment in accordance with local authorities' emission requirements.
- .3 Contractor shall provide a means for monitoring and controlling off-gas to comply with emission limits and worker exposure limits identified in the health and safety plan.
- .4 Cover or wet down dry materials and rubbish to prevent blowing dust and debris. Provide dust control for temporary roads.
- .5 Execute work by methods to minimize raising dust from construction operations.
- .6 Implement and maintain dust and particulate control measures as determined necessary by Departmental Representative during construction and in accordance with Federal regulations.
- .7 Provide positive means to prevent airborne dust from dispersing into atmosphere. Use water misting system for dust and particulate control.
- .8 As minimum, use appropriate covers on trucks hauling fine or dusty material. Use watertight vehicles to haul wet materials.
- .9 Prevent dust from spreading to adjacent property sites.
- .10 Departmental Representative will stop work at any time when Contractor's control of dusts and particulates is inadequate for wind conditions present at Site, or when air quality monitoring indicates that release of fugitive dusts and particulates into atmosphere equals or exceeds specified levels.
- .11 If Contractor's dust and particulate control is not sufficient for controlling dusts and particulates into atmosphere, stop work. Contractor must discuss procedures that Contractor proposes to resolve problem. Make necessary changes to operations prior to resuming excavation, handling, processing, or other work that may cause release of dusts or particulates.

1.7 NOTIFICATION

- .1 Departmental Representative will notify Contractor in writing of observed noncompliance with Federal, Provincial or Municipal environmental laws or regulations, permits, and other elements of Contractor's Environmental Protection plan.
- .2 Contractor: after receipt of such notice, inform Departmental Representative of proposed corrective action and take such action for approval by Departmental Representative.
 - .1 Take action only after receipt of written approval by Departmental Representative.
- .3 Departmental Representative will issue stop order of work until satisfactory corrective action has been taken.
- .4 No time extensions granted or equitable adjustments allowed to Contractor for such suspensions.

Part 2 Products

2.1 NOT USED

- .1 Not Used.

Part 3 Execution

3.1 CLEANING

- .1 Progress Cleaning: clean in accordance with Section 01 74 11 - Cleaning.
 - .1 Leave work area clean at end of each day.
- .2 Ensure public waterways, storm and sanitary sewers remain free of waste and volatile materials disposal.
- .3 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 11 - Cleaning.

END OF SECTION

Approved: 2006-03-31

Part 1 General

1.1 RELATED REQUIREMENTS

- .1 Section 01 14 00 - Work Restrictions.
- .2 Section 01 35 29.06 - Health and Safety Requirements.
- .3 Section 01 35 29.14 - Health and Safety Requirements for Contaminated Sites.

1.2 SMOKING ENVIRONMENT

- .1 Comply with smoking restrictions and municipal by-laws.

1.3 NATIONAL PARKS ACT

- .1 Perform Work in accordance with National Parks Act when projects are located within boundaries of National Park.

Part 2 Products

2.1 NOT USED

- .1 Not Used.

Part 3 Execution

3.1 NOT USED

- .1 Not Used.

END OF SECTION

Approved: 2006-06-30

Part 1 General

1.1 RELATED REQUIREMENTS

- .1 Section 01 31 19 - Project Meetings.
- .2 Section 01 35 13.43 - Special Project Procedures for Contaminated Sites.
- .3 Section 01 74 11 - Cleaning.

1.2 REFERENCES

- .1 Canadian Construction Documents Committee (CCDC).
 - .1 CCDC 2-2008, GC 3.11 Use of the Work.
- .2 Canadian Standards Association (CSA International).
 - .1 CAN/CSA-Z321-96(R2001), Signs and Symbols for the Occupational Environment.
- .3 U.S. Environmental Protection Agency (EPA)/Office of Water.
 - .1 EPA 832R92005, Storm Water Management for Construction Activities: Developing Pollution Prevention Plans and Best Management Practices.

1.3 INSTALLATION AND REMOVAL

- .1 Indicate use of supplemental or other staging area.
- .2 Provide construction facilities in order to execute work expeditiously.
- .3 Remove from Site all such work after use.

1.4 SITE STORAGE/LOADING

- .1 Refer to CCDC 2-2008, GC 3.11 Use of the Work.
- .2 Confine work and operations of employees by Contract Documents. Do not unreasonably encumber premises with products.
- .3 Do not load or permit to load any part of work with weight or force that will endanger work.

1.5 CONSTRUCTION PARKING

- .1 Parking will be permitted on Site provided it does not disrupt performance of work.
- .2 Provide and maintain adequate access to project Site.

1.6 EQUIPMENT, TOOL AND MATERIALS STORAGE

- .1 Provide and maintain, in clean and orderly condition, lockable weatherproof sheds for storage of tools, equipment and materials.

- .2 Locate materials not required to be stored in weatherproof sheds on Site in manner to cause least interference with work activities.

1.7 SANITARY FACILITIES

- .1 Provide sanitary facilities for work force in accordance with governing regulations and ordinances.
- .2 Post notices and take precautions as required by local health authorities. Keep area and premises in sanitary condition.

1.8 CONSTRUCTION SIGNAGE

- .1 Direct requests for approval to erect Consultant/Contractor signboard to Departmental Representative. For consideration general appearance of Consultant/Contractor signboard must conform to project identification Site sign. Wording in both official languages.
- .2 Signs and notices for safety and instruction in both official languages Graphic symbols to CAN/CSA-Z321.
- .3 Maintain approved signs and notices in good condition for duration of project, and dispose of off Site on completion of project or earlier if directed by Departmental Representative.

1.9 PROTECTION AND MAINTENANCE OF TRAFFIC

- .1 Provide access and temporary relocated roads as necessary to maintain traffic.
- .2 Maintain and protect traffic on affected roads during construction period except as otherwise specifically directed by Departmental Representative.
- .3 Provide measures for protection and diversion of traffic, including provision of watch-persons and flag-persons, erection of barricades, placing of lights around and in front of equipment and work, and erection and maintenance of adequate warning, danger, and direction signs.
- .4 Protect travelling public from damage to person and property.
- .5 Contractor's traffic on roads selected for hauling material to and from Site to interfere as little as possible with public traffic.
- .6 Verify adequacy of existing roads and allowable load limit on these roads. Contractor: responsible for repair of damage to roads caused by construction operations.
- .7 Construction of access roads must be completed according to Site Preparation and Restoration Plan and will be subject to approval by Departmental Representative.
- .8 Provide necessary lighting, signs, barricades, and distinctive markings for safe movement of traffic.
- .9 Dust control: adequate to ensure safe operation at all times.
- .10 Location, grade, width, and alignment of construction and hauling roads: subject to approval by Departmental Representative.

- .11 Lighting: to assure full and clear visibility for full width of haul road and work areas during night work operations.

1.10 CLEAN-UP

- .1 Remove all construction debris, waste materials, packaging material from work Site at end of work.
- .2 Clean dirt or mud tracked onto paved or surfaced roadways.
- .3 Store materials resulting from demolition activities that are salvageable and remove from Site, unless directed otherwise by the Departmental Representative.
- .4 Stack stored new or salvaged material not in construction facilities.

Part 2 Products

2.1 NOT USED

- .1 Not Used.

Part 3 Execution

- .1 Not Used.

END OF SECTION

Approved: 2006-03-31

Part 1 General

1.1 RELATED REQUIREMENTS

- .1 Section 01 35 13.43 - Special Project Procedures for Contaminated Sites.
- .2 Section 01 35 43 - Environmental Procedures.
- .3 Section 01 52 00 - Construction Facilities.
- .4 Section 01 77 00 - Closeout Procedures.
- .5 Section 02 61 00.01 - Soil Remediation.
- .6 Section 31 11 00 - Clearing and Grubbing.

1.2 REFERENCES

- .1 Canadian Construction Documents Committee (CCDC).
 - .1 CCDC 2-2008, GC 3.13 Cleanup.

1.3 PROJECT CLEANLINESS

- .1 Maintain work in tidy condition, free from accumulation of waste products and debris.
- .2 Remove waste materials from Site at daily regularly scheduled times or dispose of as directed by Departmental Representative. Do not burn waste materials on Site.
- .3 Make arrangements with and obtain permits from authorities having jurisdiction for disposal of waste and debris.
- .4 Use on-Site bear-proof waste containers for collection of household wastes; construction materials and debris must be disposed off-site at an approved facility.

1.4 FINAL CLEANING

- .1 Refer to CCDC 2-2008, GC 3.13 Cleanup.

Part 2 Products

2.1 NOT USED

- .1 Not Used.

Part 3 Execution

3.1 NOT USED

.1 Not Used.

END OF SECTION

Approved: 2009-06-30

Part 1 General

1.1 RELATED REQUIREMENTS

- .1 Section 01 35 43 - Environmental Procedures.
- .2 Section 01 74 11 - Cleaning.

1.2 REFERENCES

- .1 Canadian Construction Documents Committee (CCDC).
 - .1 CCDC 2-2008, GC 3.13 Cleanup.

1.3 ADMINISTRATIVE REQUIREMENTS

- .1 Acceptance of Work Procedures:
 - .1 Contractor's Inspection: Contractor: conduct inspection of work, identify deficiencies and defects, and repair as required to conform to Contract Documents.
 - .1 Notify Departmental Representative in writing of satisfactory completion of Contractor's inspection and submit verification that corrections have been made.
 - .2 Request Departmental Representative inspection.
 - .2 Departmental Representative Inspection:
 - .1 Departmental Representative and Contractor to inspect work and identify defects and deficiencies.
 - .2 Contractor to correct work as directed.
 - .3 Completion Tasks: submit written certificates in English that tasks have been performed as follows:
 - .1 Work: completed and inspected for compliance with Contract Documents.
 - .2 Defects: corrected and deficiencies completed.
 - .3 Work: complete and ready for final inspection.
 - .4 Final Inspection:
 - .1 When completion tasks are done, request final inspection of work by Departmental Representative and Contractor.
 - .2 When work incomplete according to Departmental Representative, complete outstanding items and request re-inspection.

1.4 FINAL CLEANING

- .1 Clean in accordance with Section 01 74 11 - Cleaning.
 - .1 Remove surplus materials, excess materials, rubbish, tools and equipment.
- .2 Refer to CCDC 2-2008, GC 3.13 Cleanup.

1.5 SITE RESTORATION

- .1 Restore Site to original contours and pre-construction state as per Site Preparation and Restoration Plan in accordance with Section 01 35 43 - Environmental Procedures.

Part 2 Products

2.1 NOT USED

- .1 Not Used.

Part 3 Execution

3.1 NOT USED

- .1 Not Used.

END OF SECTION

Approved: 2009-06-30

Part 1 General

1.1 RELATED REQUIREMENTS

- .1 Section 01 31 19 - Project Meetings.
- .2 Section 01 33 00 - Submittal Procedures.
- .3 Section 02 61 00.01 - Soil Remediation.

1.2 REFERENCES

- .1 Not Used.

1.3 ADMINISTRATIVE REQUIREMENTS

- .1 Pre-warranty Meeting:
 - .1 Convene meeting within one (1) week prior to completion of work with Contractor, Departmental Representative, and Owner, in accordance with Section 01 31 19 - Project Meetings to:
 - .1 Verify Project requirements.
 - .2 Review warranty requirements.
 - .2 Departmental Representative to establish communication procedures for:
 - .1 Notifying construction warranty defects.
 - .2 Determine priorities for type of defects.
 - .3 Determine reasonable response time.
 - .3 Contact information for bonded and licensed company for warranty work action: provide name, telephone number and address of company authorized for construction warranty work action.
 - .4 Ensure contact is located within local service area of warranted construction, is continuously available, and is responsive to inquiries for warranty work action.

1.4 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Provide submittals in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Provide evidence, if requested, for type, source and quality of products supplied.

1.5 FORMAT

- .1 Organize data as instructional manual.
- .2 Binders: vinyl, hard covered, 3 'D' ring, loose leaf 219 x 279 millimetres with spine and face pockets.
- .3 When multiple binders are used correlate data into related consistent groupings.
 - .1 Identify contents of each binder on spine.

- .4 Cover: identify each binder with type or printed title 'Project Record Documents'; list title of project and identify subject matter of contents.
- .5 Arrange content under Section numbers and sequence of Table of Contents.
- .6 Text: manufacturer's printed data, or typewritten data.
- .7 Drawings: provide with reinforced punched binder tab.
 - .1 Bind in with text; fold larger drawings to size of text pages.
- .8 Provide 1:1 scaled CAD files in dwg format on CD.

1.6 AS -BUILT DOCUMENTS AND SAMPLES

- .1 Maintain at Site for Departmental Representative one record copy of:
 - .1 Contract Drawings.
 - .2 Specifications.
 - .3 Addenda.
 - .4 Change Orders and other modifications to Contract.
 - .5 Reviewed shop drawings, product data, and samples.
 - .6 Field test records.
 - .7 Inspection certificates.
 - .8 Manufacturer's certificates.
- .2 Store record documents in field office apart from documents used for construction.
- .3 Label record documents and file in accordance with Section number listings in List of Contents of this Project Manual.
 - .1 Label each document "PROJECT RECORD" in neat, large, printed letters.
- .4 Maintain record documents in clean, dry and legible condition.
 - .1 Do not use record documents for construction purposes.
- .5 Keep record documents available for inspection by Departmental Representative.

1.7 RECORDING INFORMATION ON PROJECT RECORD DOCUMENTS

- .1 Record information concurrently with construction progress.
 - .1 Do not conceal work until required information is recorded.
- .2 Contract Drawings and shop drawings: mark each item to record actual construction, including:
 - .1 Measured horizontal and vertical locations of underground utilities and appurtenances, referenced to permanent surface improvements.
 - .2 Field changes of dimension and detail.
 - .3 Changes made by change orders.
 - .4 Details not on original Contract Drawings.
 - .5 References to related shop drawings and modifications.

- .3 Provide digital photos, if requested, for Site records.

Part 2 Products

2.1 NOT USED

- .1 Not Used.

Part 3 Execution

3.1 NOT USED

- .1 Not Used.

END OF SECTION

Approved: 2008-06-30

Part 1 General

1.1 RELATED REQUIREMENTS

- .1 Section 01 33 00 - Submittal Procedures.
- .2 Section 01 74 11 - Cleaning.
- .3 Section 01 78 00 - Closeout Submittals.

1.2 SUMMARY

- .1 Section includes:
 - .1 In Situ Chemical Oxidation.
- .2 Work Includes:
 - .1 Obtaining required federal/provincial/municipal permits.
 - .2 Provision of necessary materials and equipment necessary to remediate Site.
 - .3 Site preparation to allow access to the Site.
 - .4 Completion of injection boreholes and chemical delivery.
 - .5 Site restoration to pre-construction state.

1.3 REFERENCES

- .1 Applicable environmental and health and safety laws and regulations for Province of Saskatchewan, Municipal by-laws.
- .2 Canadian Council of Ministers of the Environment (CCME) Soil Quality Guidelines for the Protection of Environmental and Human Health.
- .3 CCME Canada Wide Standard for Petroleum Hydrocarbons in Soils.
- .4 Federal Contaminated Sites Action Plan (FCSAP) Guidance Document on Federal Interim Groundwater Quality for Federal Contaminated Sites.

1.4 DEFINITIONS

- .1 In Situ Chemical Oxidation: an environmental remediation technique used for soil and/or groundwater remediation to reduce the concentrations of targeted environmental contaminants. In Situ Chemical Oxidation is accomplished by injecting or otherwise introducing chemical oxidizers directly into petroleum hydrocarbon impacted soil and/or groundwater to chemically react with the chemical contaminants in place and reduce them to benign compounds.

- .2 Petroleum hydrocarbon impacted soil: surface and subsurface soils containing concentrations exceeding the CCME Soil Quality Guidelines for the Protection of Environmental and Human Health and the CCME Canada Wide Standard for Petroleum Hydrocarbons in Soils for Commercial Land (CL) and coarse-grained soil, excluding the drinking water and freshwater aquatic life pathways for all soils and the ecological soil contact pathway for soils deeper than 3 metres (m), for any or all of the following contaminants:
 - .1 Benzene, toluene, ethylbenzene, xylenes, and petroleum hydrocarbon fractions F1 through F4 in soils.
- .3 Petroleum hydrocarbon impacted groundwater: groundwater containing concentrations exceeding the FCSAP Guidance Document on Federal Interim Groundwater Quality for Federal Contaminated Sites for CL and coarse-grained soil, excluding the drinking water and freshwater aquatic life pathways, for any or all of the following contaminants:
 - .1 Benzene, toluene, ethylbenzene, xylenes, and petroleum hydrocarbon fractions F1 and F2 in groundwater.
- .4 Target Area: area of hydrocarbon impacted soil that extends from between the two maintenance garage shops to the treeline near the edge of the 14th hole (refer to Figure 2).
- .5 Target Zone: depth of hydrocarbon impacts range from 2 to 8 m below ground surface (bgs) (refer to Figure 2).
- .6 Target Oxidant Dosage: mass of activated potassium persulfate to be injected in order to remediate the chemical contaminants in place.

1.5 DESCRIPTION

- .1 The required work to be undertaken by the Contractor for the project will include but not be limited to the following activities:
 - .1 Remediation Work Plan, including proposed chemical injection method, equipment required, selection of borehole locations, injection depths, proposed delivery concentrations and rates to achieve the target oxidant dosage, and quality assurance/quality control (QA/QC) monitoring approach.
 - .1 Final borehole locations and chemical delivery methods will be approved by the Departmental Representative.
 - .2 Site Preparation and Restoration Plan, outlining Site modification requirements, tree removal, equipment and materials required, construction plans, utilities disruptions, building relocations, restoration strategies, environmental and infrastructure protection strategies, and off-Site disposal of waste materials.
 - .3 Environmental Protection Plan.
 - .4 Health and Safety Plan.
 - .5 Obtaining all necessary permits to undertake the project.
 - .6 Obtaining all equipment and materials required.
 - .7 Mobilization of equipment and materials.

- .8 Completion of Site preparation activities to allow access to the treed area west of the Maintenance Compound.
- .9 Obtaining at a minimum 35,200 kilograms of activated potassium persulfate to be used as a chemical oxidant in injection boreholes to reach the Target Oxidant Dosage.
- .10 Distribute Target Oxidant Dosage of activated potassium persulfate over the Target Zone within the Target Area. Distribution to occur during Contractor's initial mobilization to the Site.
 - .1 Injection boreholes to be located within the Target Area (see 1.4.4) and Target Zone (see 1.4.5) and Target Oxidant Dosage to be distributed in general proportion to the hydrocarbon concentrations as detailed in the Supporting Document (see 1.6.1). Final placement of each injection borehole to be approved by the Departmental Representative.
 - .2 Acceptable methods of injection include, but are not limited to, temporary direct push wells, conventional drilled wells, and hydraulic fracturing.
 - .3 Injection equipment will be constructed of materials compatible with the in situ chemical oxidation treatment process used (chemical and thermal compatibility).
 - .4 Injection equipment will include provision for real time measurement of injection pressure and flow rate. Equipment will include check-valves to prevent backflow.
 - .5 Contractor will provide Departmental Representative with continuous real time measurement of the pressure at the injection point for the purposes of determining if short-circuiting (daylighting) of the injected oxidant occurs.
 - .6 Contractor shall monitor, document, and report the rate, total volume, and concentration of the oxidant/catalyst delivered, during and after operation of the treatment system to demonstrate that delivery is in accordance with the approved Work Plan. All modifications that deviate from the Work Plan shall be approved by the Departmental Representative prior to implementation.
 - .7 Contractor will ensure that injected oxidant is effectively accepted into the subsurface, so as to maximize contact with impacted soils. Such acceptance will be certified by the Departmental Representative based on visual absence of daylighting and observations of injection pressure.
 - .8 Injection locations where the oxidant solution is not accepted by the native soil, as demonstrated by visual evidence of daylighting and/or a rapid decrease in injection pressure, shall be deemed by the Departmental Representative as unsuccessful and will not be counted as contributing to the Target Oxidant Dosage.
 - .9 Use a field photo-ionization or flame ionization detector (PID/FID) and explosimeter to monitor for explosive conditions in the injection boreholes.

- .10 Monitoring of groundwater levels in existing monitor wells shall be performed prior, during, and after the completion of the injection boreholes.
- .11 Through the use of automatic monitoring devices (YSI 600 probe or equivalent) existing Site monitor wells shall be monitored for organic redox potential (ORP), pH, temperature, conductivity, and dissolved oxygen (DO) every thirty (30) minutes during injection.
- .12 Boundary checks of fugitive emissions of organic vapours shall be monitored daily at the nearest receptor or property boundary downwind from the injection boreholes.
- .13 Where temporary probes are used, the annular space will be sealed by the Contractor immediately following injection in such a manner so as to prevent subsequent oxidant injections from short-circuiting to surface through the annular space.
- .14 Where daylighting occurs, Contractor will implement a spill response plan to manage the oxidant.
- .11 Restoration of Site to pre-construction conditions, including disposal of waste materials to an appropriate off-Site facility.
 - .1 Contractor will be required to replace any existing monitor wells damaged during remediation activities.
- .12 De-mobilization of all equipment and materials.

1.6 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Provide submittals in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Remediation Work Plan
 - .1 Include proposed chemical injection method, equipment required, borehole locations, injection depths, proposed delivery concentrations and rates to achieve the target oxidant dosage, and QA/QC monitoring approach.
 - .1 Final borehole locations and chemical delivery methods will be approved by the Departmental Representative.
- .3 Site Preparation and Restoration Plan:
 - .1 Include activities to allow access to the treed area west of the Maintenance Compound and to restore area to original contours and pre-construction state.
 - .2 Plan to include:
 - .1 Protection measures for existing infrastructure and plans to minimize equipment and building movement.
 - .2 Protection measures for golf course fairways, trees and plants on Site and adjacent properties as indicated.
 - .3 Plans to minimize stripping of topsoil and vegetation.
 - .4 Maintenance of surface drainage to protect environment and infrastructure

- .5 Restriction of tree removal to areas designated by Departmental Representative.
 - .6 Construction plans and materials, including grading, backfilling, and required structures.
 - .7 Methods used to dismantle equipment and materials and restore Site to pre-construction conditions.
- .4 Product Data:
- .1 Provide manufacturer's product data in accordance with Section 01 33 00 - Submittal Procedures as follows:
 - .1 Submit two copies of product descriptions for:
 - .1 Amendment products.
 - .2 Submit to Departmental Representative within one (1) week following reception of written request:
 - .1 Manufacturer's name and address.
 - .2 Technical data.
 - .3 Manufacturer's instructions concerning application.
 - .4 Proof of procurement method.
- .5 Quality Assurance and Quality Control Submittals:
- .1 Provide QA/QC Submittals within Environmental Protection Plan in accordance with Section 01 33 00 - Submittal Procedures as follows:
 - .1 Description of emergency plans in case of breakdown, spill or other problem.
 - .2 Description of contingency plan in case of variations of critical parameters during system operation.
 - .3 Waste management plan and complete list of wastes, including waste registration numbers as required by provincial regulations, that will be generated by activities.
 - .4 Information on proposed technology including environmental impacts.
 - .5 Contractor shall provide a means for monitoring and controlling off-gas to comply with emission limits and worker exposure limits identified in the health and safety plan.
- .6 Injection reports from each injection borehole including injection locations, depths, and continuous monitoring data.
- .7 Closeout Submittals:
- .1 Provide Closeout Submittals in accordance with Section 01 78 00 - Closeout Submittals.

1.7 QUALITY ASSURANCE

- .1 Qualifications:
 - .1 Contractors must have personnel with a minimum 5 years of experience conducting in situ chemical oxidization on petroleum hydrocarbon impacted soils and groundwater.
 - .2 Provide detailed descriptions of firm and sub-contractors, indicating experience in completing in situ chemical oxidation. Provide descriptions of similar projects completed in past 5 years including names of individuals in charge of such projects.
 - .3 Identify members of project team including project manager. Define experience, education and training, qualifications, tasks and responsibilities of each team member. Supply résumés of key technical and management staff.
- .2 Regulatory Requirements:
 - .1 Perform work in accordance with:
 - .1 Acts, Regulations, Laws, guidelines, codes of practice, directives and policies of government authorities pertaining to: environment; noise; health and safety; transportation; waste management.
 - .2 Workplace Hazardous Materials Information System.
 - .3 Canadian Environmental Assessment Act.
 - .4 Canadian Environmental Protection Act (New Substance Notification Regulations).
 - .5 Transportation of Dangerous Goods Act.
- .3 Field Injections:
 - .1 Indicate position of injection boreholes (location and depths) and injection method. Injection is to be designed for a single application during the initial mobilization.
 - .2 Contractor will provide Departmental Representative with continuous real time measurement of the pressure at the injection point for the purposes of determining if short-circuiting (daylighting) of the injected oxidant occurs.
 - .3 Contractor shall monitor, document, and report the rate, total volume, and concentration of the oxidant/catalyst delivered, during and after operation of the treatment system to demonstrate that delivery is in accordance with the approved Work Plan. All modifications that deviate from the Work Plan shall be approved by the Departmental Representative prior to implementation.
 - .4 Contractor will ensure that injected oxidant is effectively accepted into the subsurface, so as to maximize contact with impacted soils. Such acceptance will be certified by the Departmental Representative based on visual absence of daylighting and observations of injection pressure.

- .5 Injection locations where the oxidant solution is not accepted by the native soil, as demonstrated by visual evidence of daylighting and/or a rapid decrease in injection pressure, shall be deemed by the Departmental Representative as unsuccessful and will not be counted as contributing to the Target Oxidant Dosage.
- .6 Use a field PID/FID and explosimeter to monitor for explosive conditions in the injection boreholes.
- .7 Monitoring of groundwater levels in existing monitor wells shall be performed prior, during, and after the completion of the injection boreholes.
- .8 Through the use of automatic monitoring devices (YSI 600 probe or equivalent) existing Site monitor wells shall be monitored for ORP, pH, temperature, conductivity, DO, and any catalyst dependant by-products every thirty (30) minutes during injection.
- .9 Boundary checks of fugitive emissions of organic vapours shall be monitored daily at the nearest receptor or property boundary downwind from the injection boreholes.
 - .1 A PID (10.6e V Lamp) shall be used to monitor organic vapours and olfactory means shall be used to detect the presence of odours.
 - .2 If noticeable odours are encountered during the boundary checks, related to the injection activity, the injections will be stopped.
 - .3 Injections can only continue once the events leading to the termination of the injection have been reviewed and control measures have been implemented to reduce the re-occurrence of the same conditions.
 - .4 Control measure may include: reduce injection rate, the use of fans and blowers to improve local ventilation.
- .4 Pre-proposal meeting:
 - .1 An on-Site pre-proposal meeting will be held for bidders to confirm Site conditions and constraints for Site preparation, restoration, and remediation plans prior to proposal submission. Attendance at the bidder's Site meeting is strongly recommended.

1.8 DELIVERY, STORAGE, AND HANDLING

- .1 New Materials and Equipment:
 - .1 Ship, store and preserve in original packaging with manufacturer's seal and ensure label remains intact.
 - .2 Ensure materials and equipment are not damaged, altered or soiled during shipment, handling and storage.
 - .3 Transport rejected equipment and materials from work Site immediately.
 - .4 Store materials and equipment according to manufacturer's and supplier's instructions.
 - .5 Establish quality management system for materials and equipment.

1.9 SITE CONDITIONS

- .1 Existing Conditions:
 - .1 Review 2012 Environmental Investigation Lobstick Maintenance Compound Waskesiu Lake, Saskatchewan dated February 2013, by Tetra Tech WEI Inc. (refer to Appendix A).
 - .2 Understand restrictions to Site access and requirements for Site preparation activities to allow access to the treed area west of the Maintenance Compound.
 - .3 Review in detail prior to determining injection depths and locations, sub surface conditions. Sub-surface conditions generally consists of fine-grained soils (refer to borehole logs in Appendix E of Tetra Tech, 2013).

1.10 MAINTENANCE

- .1 Access Roads and Staging Area:
 - .1 Maintain Access Roads and Staging Area as follows:
 - .1 Maintain and clean roads and staging area for duration of work.
 - .2 Repair damage incurred from use of roads and staging area.
 - .3 Provide photographic documentation of roads and staging area used by construction vehicles before, during and after work.

Part 2 Products

2.1 MATERIALS

- .1 Activated Potassium Persulfate:
 - .1 A minimum of 35,200 kg to be used as a chemical oxidant in injection boreholes to reach the Target Oxidant Dosage.

2.2 EQUIPMENT

- .1 Leave equipment and machinery running only while in use, except where extreme temperatures prohibit shutting down.
- .2 Injection equipment will be constructed of materials compatible with the in situ chemical oxidation treatment process used (chemical and thermal compatibility).
- .3 Maintained in good working order and inspected before and after each work day.
- .4 Injection System:
 - .1 Maintain in safe working condition.
 - .2 Injection system shall be inspected daily prior to start up and equipment conditions recorded.
 - .3 System conditions shall be inspected prior to re-start after any required stoppages due to system alteration, maintenance, relocation or solution preparation.
 - .4 Any items noted during the inspections will be rectified prior to continuing operations.

- .5 Actions taken shall be noted on a preventative maintenance checklist.
- .6 Cleaned meticulously between injection boreholes.
- .7 Cleaned meticulously at end of work day.
- .8 Cleaned meticulously at end of project.

Part 3 Execution

3.1 EXAMINATION

- .1 Site Verification of Conditions:
 - .1 Determine locations and depths of proposed injection boreholes.
 - .2 Verify locations of existing monitor wells.
 - .3 Verify Site access constraints, including topography and infrastructure.
 - .4 Verify Site preparation activities required to allow access to the treed area west of the Maintenance Compound.

3.2 PREPARATION

- .1 Protection:
 - .1 Provide safety measures to ensure worker and public safety.
- .2 Consult Departmental Representative regarding potential removal of trees as part of Site Preparation and Restoration Plan.
- .3 Locate and protect utility lines: preserve in operating condition active utilities traversing Site.
 - .1 Notify Departmental Representative immediately of damage to or when unknown existing utility lines are encountered.
- .4 Notify utility authorities before commencing ground disturbance activities.
- .5 Protect Site buildings and infrastructure from potential damage due to remediation activities.

3.3 METHOD OF REMEDIATION

- .1 In Situ Chemical Oxidation:
 - .1 Distribute Target Oxidant Dosage of activated potassium persulfate over the Target Zone within the Target Area. Distribution to occur during Contractor's initial mobilization to the Site.
 - .2 Injection boreholes to be located within the Target Area (see 1.4.4) and Target Zone (see 1.4.5) and Target Oxidant Dosage to be distributed in general proportion to the hydrocarbon concentrations as detailed in the Supporting Document (see 1.6.1). Final placement of each injection borehole to be approved by the Departmental Representative.
 - .3 Acceptable methods of injection include, but are not limited to, temporary direct push wells, conventional drilled wells, and hydraulic fracturing.

- .4 Injection equipment will include provision for real time measurement of injection pressure and flow rate. Equipment will include check-valves to prevent backflow.
- .5 Use a field PID/FID and explosimeter to monitor for explosive conditions in the injection boreholes.
- .6 Monitoring of groundwater levels in existing monitor wells shall be performed prior, during, and after the completion of the injection boreholes.
- .7 Through the use of automatic monitoring devices (YSI 600 probe or equivalent) existing Site monitor wells shall be monitored for ORP, pH, temperature, conductivity, and DO every thirty (30) minutes during injection.
- .8 Boundary checks of fugitive emissions of organic vapours shall be monitored daily at the nearest receptor or property boundary downwind from the injection boreholes.
- .9 In the event an environmental complaint is received it shall be documented by the Contractor.
 - .1 If the complaint is received during an injection, the process shall be stopped.
 - .2 The Contractor will immediately report the complaint to the Departmental Representative who will contact the complainant and deal with any concerns before continuing with the injections.

3.4 RESTORATION

- .1 Remove and properly dispose of all equipment, materials, temporary structures, and backfill used during work.
- .2 Re-instate surface grading to restore surface drainage to pre-remediation conditions.
- .3 Reclaim all disturbed areas to pre-construction condition, including backfilling and seeding, as determined by Departmental Representative.
- .4 Clean work area and permanent access roads of contamination resulting from project activities at request of Departmental Representative.
- .5 Contractor will be required to replace any Site infrastructure damaged during remediation activities, with the exception of subsurface damage to existing monitoring wells.

3.5 FIELD QUALITY CONTROL

- .1 Contractor will provide Departmental Representative with continuous real time measurement of the pressure at the injection point for the purposes of determining if short-circuiting (daylighting) of the injected oxidant occurs.
- .2 Contractor shall monitor and document the rate, total volume, and concentration of the oxidant/catalyst delivered, during and after operation of the treatment system to demonstrate that delivery is in accordance with the approved Work Plans. All modifications that deviate from the Work Plan shall be approved by the Departmental Representative prior to implementation.

- .3 Contractor will ensure that injected oxidant is effectively accepted into the subsurface, so as to maximize contact with impacted soils. Such acceptance will be certified by the Departmental Representative based on visual absence of daylighting and observations of injection pressure.
- .4 Injection locations where the oxidant solution is not accepted by the native soil, as demonstrated by visual evidence of daylighting and/or a rapid decrease in injection pressure, shall be deemed by the Departmental Representative as unsuccessful and will not be counted as contributing to the Target Oxidant Dosage.
- .5 Use a field PID/FID and explosimeter to monitor for explosive conditions in the injection boreholes.
- .6 Monitoring of groundwater levels in existing monitor wells shall be performed prior, during, and after the completion of the injection boreholes.
- .7 Through the use of automatic monitoring devices (YSI 600 probe or equivalent) existing Site monitor wells shall be monitored for ORP, pH, temperature, conductivity, DO, and any catalyst dependant by-products every thirty (30) minutes during injection.
- .8 Boundary checks of fugitive emissions of organic vapours shall be monitored daily at the nearest receptor or property boundary downwind from the injection boreholes.
 - .1 A PID (10.6e V Lamp) shall be used to monitor organic vapours and olfactory means shall be used to detect the presence of odours.
 - .2 If noticeable odours are encountered during the boundary checks, related to the injection activity, the injections will be stopped.
 - .3 Injections can only continue once the events leading to the termination of the injection have been reviewed and control measures have been implemented to reduce the re-occurrence of the same conditions.
 - .4 Control measure may include: reduce injection rate, the use of fans and blowers to improve local ventilation.

3.6 EQUIPMENT DECONTAMINATION

- .1 Decontaminate equipment used in injection process and remove from Site at end of injection activities.

END OF SECTION

Approved: 2006-06-30

Part 1 General

1.1 RELATED REQUIREMENTS

- .1 Section 01 33 00 - Submittal Procedures.
- .2 Section 01 35 29.06 - Health and Safety Requirements.
- .3 Section 01 74 11 - Cleaning.

1.2 MEASUREMENT PROCEDURES

- .1 Fixed price payment will be made for Site preparation activities which may include:
 - .1 Clearing isolated trees.

1.3 DEFINITIONS

- .1 Clearing isolated trees consists of cutting off to not more than specified height above ground of designated trees, and disposing of felled trees and debris.

1.4 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Provide submittals in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Submit requests for clearing isolated trees to Departmental Representative.

1.5 QUALITY ASSURANCE

- .1 Complete construction occupational health and safety in accordance with Section 01 35 29.06 - Health and Safety Requirements.
- .2 Safety Requirements: worker protection.
 - .1 At minimum workers must wear gloves, hard hats, ear protection, chainsaw pants and boots, and eye protection when clearing isolated trees.

1.6 STORAGE AND PROTECTION

- .1 Prevent damage to trees, landscaping, natural features, existing buildings, existing pavement, utility lines, and Site appurtenances which are to remain.
 - .1 Repair damaged items to approval of Departmental Representative.
 - .2 Replace trees designated to remain, if damaged, as directed by Departmental Representative.

1.7 WASTE MANAGEMENT AND DISPOSAL

- .1 Felled timber shall be bucked and stockpiled adjacent to Site and disposed of as directed by Departmental Representative.

Part 2 Products

2.1 NOT USED

- .1 Not Used.

Part 3 Execution

3.1 PREPARATION

- .1 Inspect Site and verify with Departmental Representative, items designated to remain. Site clearing will occur as per the Site Preparation and Restoration Plan.
- .2 Locate and protect utility lines: preserve in operating condition active utilities traversing Site.
 - .1 Notify Departmental Representative immediately of damage to or when unknown existing utility lines are encountered.
- .3 Notify utility authorities before starting ground disturbance.
- .4 Keep roads and walks free of dirt and debris.

3.2 ISOLATED TREES

- .1 Cut off isolated trees as directed by Departmental Representative at height of not more than 300 millimetres above ground surface.

3.3 REMOVAL AND DISPOSAL

- .1 Felled timber shall be stockpile adjacent to Site and disposed as directed by Departmental Representative.

3.4 FINISHED SURFACE

- .1 Leave ground surface in condition suitable to allow access of injection rig to approval of Departmental Representative.

3.5 CLEANING

- .1 Proceed in accordance with Section 01 74 11 - Cleaning.
- .2 On completion remove surplus materials, excess materials, rubbish, tools and equipment.
- .3 Restore Site to original contours and pre-construction state.

END OF SECTION

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PROJECT PUBLIC WORKS AND GOVERNMENT SERVICES CANADA-
 REMEDIATION DESIGN SPECIFICATIONS - LOBSTICK MAINTENANCE
 COMPOUND, PRINCE ALBERT NATIONAL PARK, SK

TITLE
SITE LOCATION PLAN

REFERENCE
 NAD83 UTM ZONE 13
 NTS MAPSHEET 73G16
 BASED ON DRAWING 1018901603-SKT-V0001, FIGURE 1, TOPOGRAPHICAL MAP SHOWING
 LOCATION - LOBSTICK MAINTENANCE COMPOUND - WASKESIU LAKE, SK 12/12/03



PROJECT	13-1362-0084	FILE No.
DESIGN		
CADD	AJL/JDS	30/07/13
CHECK	JK	01/08/13
REVIEW	DS	01/08/13

SCALE	AS SHOWN	REV.	0
FIGURE: 1			

Please see attachment "FIG 2 – 13-1362-0084 – Site Plan and Estimated Extents of Soil Impacts."

Please see attachment "Appendix A – 2012_Lobstick_Mtnce_ESA_final"