4 September 2025 CA0042726.0037

Inuvialuit Water Board
P.O. Box 2531
Inuvik, NT, X0E 0T0

RE: ADDENDUM 1 TO THE REMEDIAL ACTION PLAN IN SUPPORT OF WATER LICENCE APPLICATION N5L8-1848 TO THE INUVIALUIT WATER BOARD – SOIL REMEDIATION AT THE FORMER UNIPKAT I-22 WELLSITE, INUVIALUIT SETTLEMENT REGION, NORTHWEST TERRITORIES – SHELL CANADA LIMITED

On behalf of Shell Canada Limited (Shell), WSP Canada Inc. (WSP) is providing supplemental information in response to the Inuvialuit Water Board's (IWB's) 25 July 2025 Information Request (IR) related to review of Water Licence Application N5L8-1848. The Remedial Action Plan (RAP), for Soil Remediation at the Former Unipkat I-22 Wellsite (the Project) was submitted as Appendix B to the Water Licence Application, submitted to the IWB on 16 June 2025.

The following amended text provides additional detail to the sections of the RAP included in the IR, including: Executive Summary, Sections 5, 6, 7, 8 and 9. The **bold text** at the start of each section are the comments received from the IWB on 25 July 2025, with amended text below. In addition, updated Figure 12 is provided in Appendix A. Given that this document is intended to supplement the information currently included in the RAP, it should be considered a companion document.

Remedial Action Plan Addendum

EXECUTIVE SUMMARY

Page ii, Executive Summary, paragraph 1: The GPS coordinates of the project site are listed as 69°11'37.00"N latitude and 135°20'36.95"W longitude. However, the GPS coordinates provided in Schedule C, Section 3, and in the Project Description (Page 1, Section 4.1) are 69°11 '36.07" N latitude and 135°20'33.88" W longitude. Please clarify these discrepancies.

Based on the above request, paragraph 1 of the Executive Summary is replaced in its entirety with the following text.

The former Shell Unipkat I-22 wellsite (the Site) is 115 kilometres (km) northwest of Inuvik, Northwest Territories (NWT) in the Inuvialuit Settlement Region (ISR) (69°11'36.07"N latitude and 135°20'33.88"W longitude), within the Mackenzie Delta. The former operating area of the Site had an approximate area of 3.3 hectares (ha) and is surrounded by tundra to the north, east and west, as well as the Arvoknar Channel to the south (Figure 1).

1.0 INTRODUCTION

No amended text required.

2.0 CONCEPTUAL SITE MODEL

No amended text required.

3.0 PHYSICAL SITE CHARACTERISTICS

No amended text required.

4.0 REMEDIATION OBJECTIVES

No amended text required.

5.0 REMEDIAL TECHNOLOGY SCREENING

5.1 Petroleum Hydrocarbon Remediation Technologies

Page 25, the text below Table J states: “Although source excavation is common to both ETC and off-site disposal, soil hauling is expected to result in increased greenhouse emissions as compared to a remedial option on-site treatment". PD, Page 71, Section 16.0, Table V, provides the estimated GHG emissions for on-site treatment using the ETC soil treatment method, with a total estimated GHG emissions of 4,330 tonnes CO_2e. For the support of statement, is there a corresponding estimate for GHG emissions associated with off-site disposal for comparison with the on-site ETC treatment?

Based on the above request, the following text is added to the end of paragraph 2, Section 5.1.

If an off-site disposal option were to be pursued, carbon dioxide equivalent (CO_2-e) emissions for the transportation of the soil to an out of territory landfill would be approximately 1,800 tonnes CO_2-e, compared to the estimated 1,045 tonnes CO_2-e resulting from the ETC treatment component of the project. This would increase the overall estimated CO_2-e emissions for the project to 5,084 tonnes CO_2-e.

5.2 Barite Remediation Technologies

No amended text required.

6.0 REMEDIATION LOGISTICS AND MITIGATION MEASURES

6.1 Personnel and Equipment Mobilization

Page 27, section 6.1, last paragraph states: "The Site is known to flood during freshet, and as such, if remedial activities coincide with this timeframe, activities at the Site will be temporarily halted".

If the excavated area, contaminated soil staging area, soil treatment area and contact water storage area becomes flooded, there is a risk that contaminants could be washed into adjacent water bodies. If this worst-case scenario occurs, what contingency plan for preventive and mitigative measures will be implemented to protect such worst-case scenario.

Based on the above request, paragraph 3 of Section 6.1 is replaced in its entirety with the following text.

While the estimated treatment duration is expected to be approximately 60 days, delays in startup or during excavation and treatment of soil may necessitate an extended project duration. The Site is known to flood during freshet, and as such, should the remediation extend into an additional season, the Site will be prepared for freshet. Mitigation measures may include increasing berm height in the soil staging, treatment and contact water storage areas, or emptying the bermed areas and treating residual soils prior to demobilization depending on the remediation progression. The excavation will be progressed in a manner that targets areas closest to the Arvoknar Channel first and backfilling as the excavation progresses to preserve the maximum distance between any residual contaminated soil and the shoreline. If an excavation is left open, it is expected

that the open excavation will, at a minimum, be backfilled to above the groundwater level observed and surface water runoff collected within the excavation during freshet will be extracted and treated as described in Section 9.2.1 of the Remedial Action Plan to meet the applicable guidelines prior to discharge.

6.2 Demobilization

No amended text required.

6.3 Mitigation measures

No amended text required.

7.0 SOIL MANAGEMENT

7.1 Excavation and Treatment of Soil Exceeding SQOs

7.1.1.1 Stage 1 – Hydrocarbon Remediation

Page 34, second paragraph from top of the page states: "The thermal oxidizer is operated such that minimum temperatures in the chamber, combined with chamber volume / residence time during treatment allows for CoC destruction efficiencies of greater than 99%. This will be verified through data collected by the treatment contractor at regular intervals (i.e., a datalogger set at 30-minute intervals) from airflow and temperature sensors (see Appendix F for an example) within the thermal oxidizer exhaust. In addition, air quality measurements will be collected using hand-held photoionization detectors twice daily during operational time in the predominant downwind direction of the exhaust".

The air quality parameters to be measured are not specified. For additional clarity, please provide a description of the parameters to be monitored (i.e. off-gas CoCs). This information will help confirm that the thermal oxidizer is operating optimally for the destruction of CoCs and that off-gases are not releasing CoCs into the atmosphere or depositing them aerially into the adjacent water body.

Based on the above request, Section 7.1.1.1, paragraph 3 is replaced in its entirety with the following text.

Off-gassing from the treatment process is managed through a single exit point in each treatment unit, diverting gasses for treatment via thermal oxidation and discharge. The thermal oxidizer is operated such that minimum temperatures in the chamber, combined with chamber volume/residence time during treatment allows for CoC destruction efficiencies of greater than 99%. Data collected during the thermal oxidizer's operations include airflow and temperature sensors (see Appendix F [in the Remedial Action Plan submitted with the Water Licence Application] for an example) within the thermal oxidizer exhaust. In addition to the operational data being collected, perimeter air monitoring of volatile organic compound (VOC) concentrations will be completed using hand-held photoionization detectors twice daily during operational time in the predominant downwind direction of the exhaust. Visual observation of opacity of the exhaust is conducted and recorded throughout soil treatment. Condensation plumes from moisture in the process are typically visible, particularly in ambient air temperatures below 0°C.

7.2 Confirmatory Sampling Plan

No amended text required.

7.3 Methodology, Analytical Requirements and Quality Assurance /Quality Control Measures

No amended text required.

8.0 WASTE MANAGEMENT

8.1 Non-Hazardous Waste

No amended text required.

8.2 Recyclables

No amended text required.

8.3 Wastewater

Page 41, section 8.3 states that "Wastewater is expected to be limited to sewage from portable washroom facilities. The proposed barge camp will include water and sewage tanks mobilized from and back to Inuvik for disposal during and at the completion of the project".

It is unclear whether "sewage" in this context includes both toilet waste and greywater. Other associated documents, such as the Waste Management Plan (Page 8, Section 3.2) refer to "sewage and greywater." For consistency and clarity, the statement on Page 41, Section 8.3 should be revised.

Based on the above request, paragraph 1 of Section 8.3 is replaced in its entirety with the following text.

Wastewater is expected to be limited to sewage and greywater from portable washroom and kitchen facilities. The proposed barge or winter camp will include water and combined sewage / greywater tanks mobilized from and back to Inuvik for disposal during and at the completion of the project. Camp use of potable water is not expected to exceed a volume of 50 cubic metres (m^3) per day.

8.4 Hazardous Waste

No amended text required.

9.0 WATER MANAGEMENT

9.1 Water Supply

No amended text required.

9.2 Surface Water Discharge

9.2.1 Ponded Areas

Page 4, Paragraph 3 describes the remediation activities conducted in 2011 and mentions the issue of river water seeping into the excavation, filling it, and halting the work. If a similar issue arises during the upcoming proposed excavation of contaminated soil, please describe the preventive and mitigation measures that will be implemented.

As noted in the RAP, Site contact water (either from surface water runoff or river water infiltration into the excavation) suspected to have elevated contaminants of concern (CoC) concentrations (i.e., visible sheen) will be stored in temporary storage tanks (e.g., drums) prior to off-site disposal at a licensed facility. In addition to using an on-site activated carbon treatment system (currently described in the RAP), for any instances where the quantity of surface water suspected to have elevated CoC concentrations exceeds that which can be drummed (e.g., during heavy rainfall events in the summer), this water may be evaporated using quench towers connected to the existing thermal oxidizers used in the ETC soil treatment process.

The quench towers consist of an open tower structure with three water injection ports arranged in a vertical sequence within the tower itself. Site contact water will be pumped from temporary holding ponds, through the

quench tower feed, and into the injection ports. This water stream is then injected directly into the heated process exhaust, destroying potential residual PHCs in the water by combustion, with carbon dioxide (CO_2) and water vapour byproducts. Injecting the water into the quench tower in this manner allows the water to be evaporated during heat exchange inside of the quench tower, where any suspended solids drop out and remain on site for treatment in the ETC system. The water is ultimately recycled back into the regional water cycle as water vapour through this process. Estimated evaporative capacity of a quench tower system is expected to range between 10 to 20 m^3 of water per day for each tower. It is estimated that by employing up to two quench towers at the Site, up to 40 m^3 of water may be evaporated per day. A flow diagram illustrating the process is presented in Figure A and an example quench tower in operation is presented in Photo A, below. Additional information from Iron Creek Group detailing the proposed system utilized successfully at the West Channel remediation (approved under IWB Water Licence N5L8-1846) are provided in Appendix B.

Contact water will be pumped to the settling ponds located in the bermed and lined water treatment area. Water with visible particulate matter will be filtered through a 200 micrometre (µm) and 100 µm filter bag housing unit. Following this initial sediment removal, water will be pumped to a holding pond located in the bermed and lined fuel storage area. A hydrocarbon sorbent boom will be placed on the water surface in the pond to adsorb any hydrocarbons present on the water surface. As needed, water will be pumped to the quench towers. During this process a second 200 µm filter bag housing exists to capture any larger particles prior to evaporation. The quench towers are heated using waste heat from the ETC soil treatment heaters exhaust that is approximately 1,000 to 1,250 degrees Fahrenheit (540 to 680 degrees Celsius). The water is instantly vaporized and any VOCs that are present are converted into the byproducts of combustion (e.g., water vapour and CO_2). Contact water can be input to the quench system either in an “intermittent/on-demand” or “continuous flow” process, depending on the Site and water volume requirements. The quench feed and recirculation pumps will be shut down when there is no contact water to be handled at the Site.

The potential effects on aquatic resources arising from this treatment process may include:

- Accidental contact water releases that may reach nearby water bodies (prior to evaporation in the quench towers).
- Malfunctioning of the quench tower could potentially result in incomplete destruction of VOCs.

To address these potential effects, the following mitigation measures will be implemented:

- Regular maintenance and checks of the settling and holding ponds, and associated piping connections to the quench towers, will be undertaken to avoid preventable leaks.
- Settling and holding ponds and quench towers will be in bermed areas.
- Twice a day perimeter monitoring at site boundaries to detect VOC release to the atmosphere, in which case the system would be stopped and repaired. This monitoring will be completed using hand-held photoionization detectors during operational time at set points at the site boundary, in the predominant downwind direction from the thermal oxidizer exhaust.
- Continuous temperature monitoring of the thermal oxidizer to assure complete destruction of VOCs.

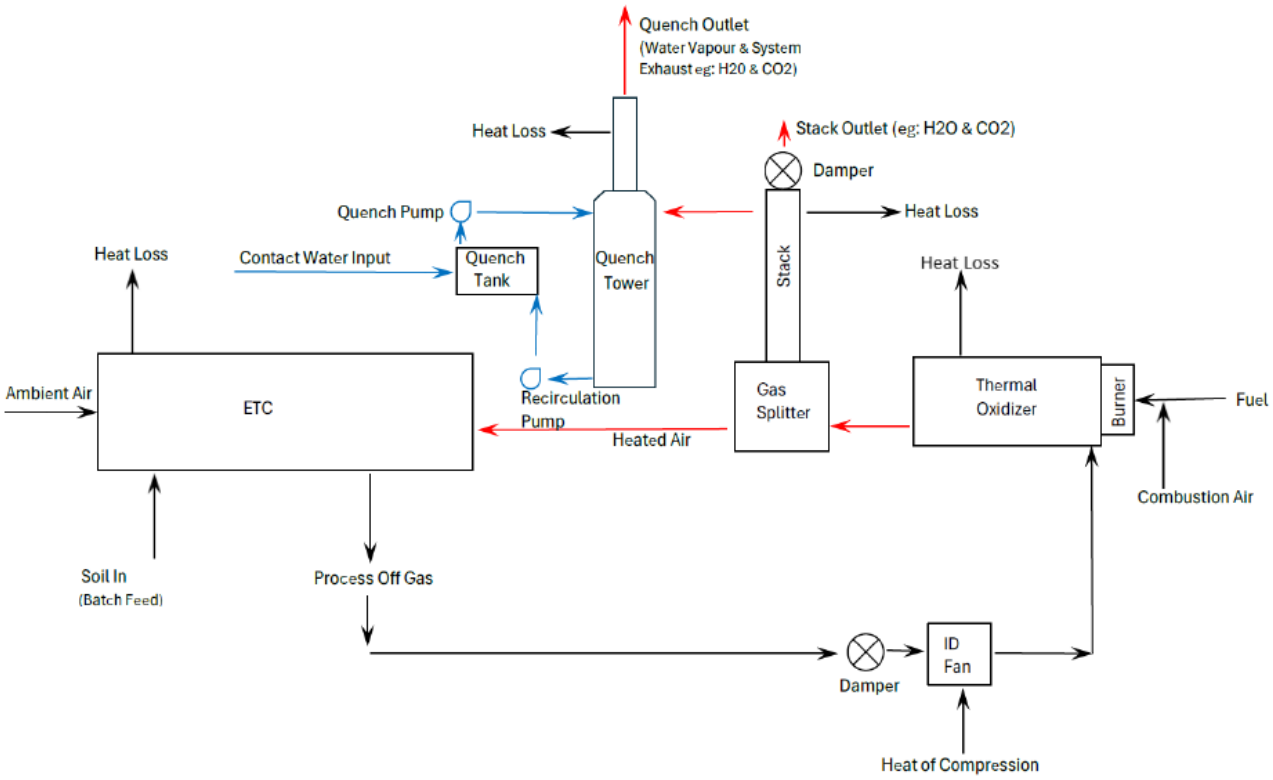

Figure A: ETC system with quench tower, contact water evaporation process flow diagram.

Photo A: Example quench tower in operation at an unrelated site.

9.3 Groundwater Seepage

No amended text required.

10.0 BORROW SOURCES

No amended text required.

11.0 POST-REMEDIAL MONITORING

No amended text required.

12.0 SCHEDULE

No amended text required.

13.0 REFERENCES

No amended text required.

CLOSURE

We trust the information provided herein meets your requirements. If you have any questions, please contact the undersigned or Kyle Thompson (Senior Program Manager), 403-691-3174, kyle.thompson@shell.com, and Dave Kliewer (External Relations Advisor), 250-329-4094, dave.kliewer@shell.com at your convenience.

Yours truly,

WSP Canada Inc.

REGISTERED PROFESSIONAL ENGINEER
A.D. HACHKOWSKI
LICENSEE
04 Sept 2025
NT/NU

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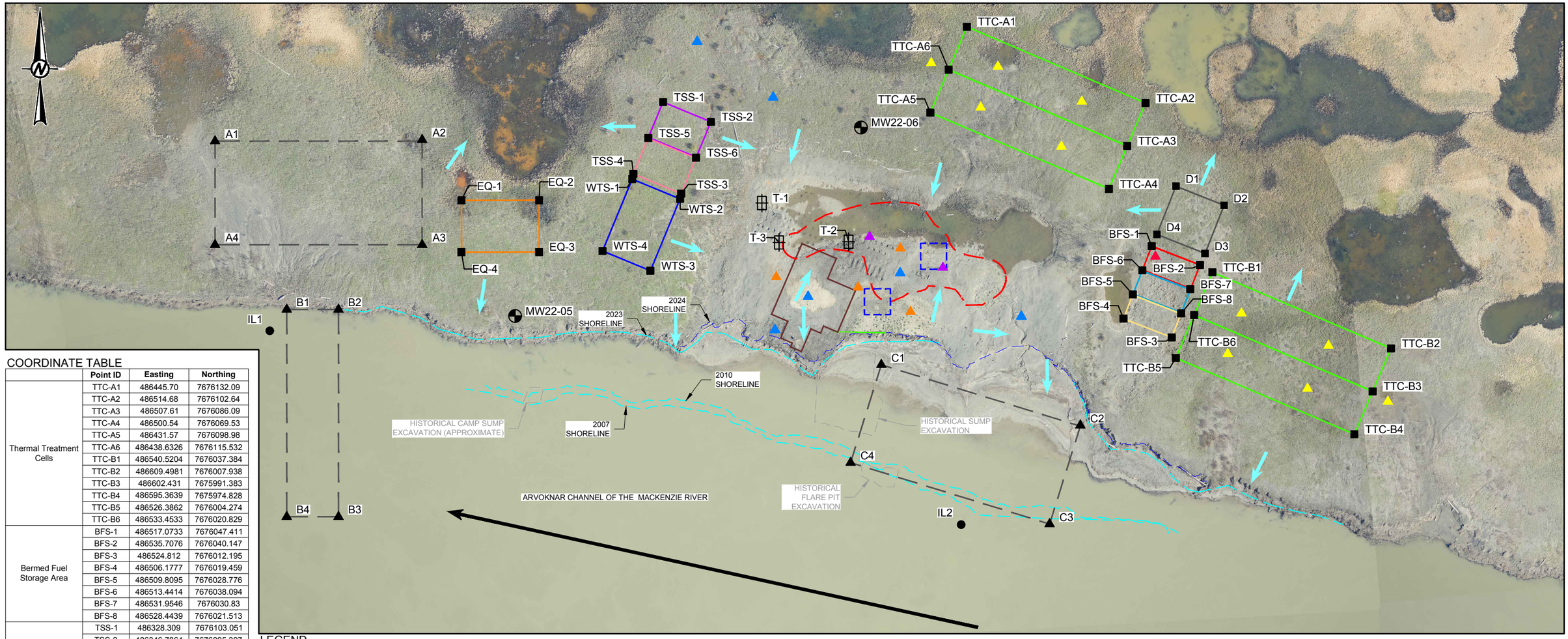
PERMIT TO PRACTICE
WSP Canada Inc.
Signature
Date 4 September 2025
PERMIT NUMBER: P407
NT/NU Association of Professional Engineers and Geoscientists

Attachments: Appendix A - Figure
Appendix B - Information from Iron Creek Group

APPENDIX A

Figure



COORDINATE TABLE

	Point ID	Easting	Northing
Thermal Treatment Cells	TTC-A1	486445.70	7676132.09
	TTC-A2	486514.68	7676102.64
	TTC-A3	486507.61	7676086.09
	TTC-A4	486500.54	7676069.53
	TTC-A5	486431.57	7676098.98
	TTC-A6	486438.6326	7676115.532
	TTC-B1	486540.5204	7676037.384
	TTC-B2	486609.4981	7676007.938
	TTC-B3	486602.431	7675991.383
	TTC-B4	486595.3639	7675974.828
	TTC-B5	486526.3862	7676004.274
	TTC-B6	486533.4533	7676020.829
Bermed Fuel Storage Area	BFS-1	486517.0733	7676047.411
	BFS-2	486535.7076	7676040.147
	BFS-3	486524.812	7676012.195
	BFS-4	486506.1777	7676019.459
	BFS-5	486509.8095	7676028.776
	BFS-6	486513.4414	7676038.094
	BFS-7	486531.9546	7676030.83
	BFS-8	486528.4439	7676021.513
Temporary Soil Storage	TSS-1	486328.309	7676103.051
	TSS-2	486346.7864	7676095.397
	TSS-3	486335.305	7676067.681
	TSS-4	486316.8277	7676075.335
	TSS-5	486322.5684	7676089.193
	TSS-6	486341.0457	7676081.539
Activated Carbon Water Treatment System	WTS-1	486316.3993	7676073.299
	WTS-2	486334.8766	7676065.645
	WTS-3	486323.3953	7676037.929
	WTS-4	486304.9179	7676045.583
Equipment Lay Down Area	EQ-1	486250.4222	7676065.121
	EQ-2	486280.4222	7676065.121
	EQ-3	486280.4222	7676045.121
	EQ-4	486250.4222	7676045.121
Water Intake Locations	IL1	486176.3624	7676014.732
	IL2	486443.4605	7675939.946
Potential Locations of Land, Ice or Barge-based Camp	A1	486155.2446	7676087.94
	A2	486235.2446	7676088.475
	A3	486235.2446	7676047.94
	A4	486155.2446	7676047.94
	B1	486182.9283	7676022.999
	B2	486202.9283	7676022.999
	B3	486202.9283	7675942.999
	B4	486182.9283	7675942.999
	C1	486412.6244	7676001.643
	C2	486489.5093	7675978.281
	C3	486477.6255	7675940.178
	C4	486400.7407	7675963.871
Thermal Treatment Office/Control Center	D1	486526.4449	7676070.549
	D2	486545.0355	7676063.174
	D3	486537.6604	7676044.583
	D4	486519.07	7676051.96

LEGEND

- AREA OF REMAINING WOOD PILES
- EXCAVATION LIMITS (FORMER)
- SHORELINE
- OVERALL EXCAVATION EXTENTS FOR SOIL WITH PHC CONCENTRATIONS EXCEEDING SQOs FROM SURFACE TO 3.0 mbgs
- OVERALL EXCAVATION EXTENTS FOR SOIL WITH PHC CONCENTRATIONS EXCEEDING SQOs FROM SURFACE TO 1.5 mbgs
- POTENTIAL LOCATIONS OF LAND, ICE OR BARGE-BASED CAMP
- BERMED FUEL STORAGE
- BERMED HAZARDOUS WASTE STORAGE
- BERMED SOIL STORAGE FOR DISPOSAL
- EQUIPMENT PARKING / LAY DOWN AREA
- THERMAL TREATMENT CELLS
- ACTIVATED CARBON WATER TREATMENT SYSTEM AND TEMPORARY WATER STORAGE
- TEMPORARY SOIL STORAGE AREA (TREATED SOIL)
- TEMPORARY SOIL STORAGE AREA (UNTREATED SOIL)
- THERMAL TREATMENT OFFICE / CONTROL CENTER
- MONITORING WELL (EXISTING)
- THERMISTOR LOCATION
- WATER INTAKE LOCATIONS
- THERMISTOR TO MONITOR ETC TREATMENT CELLS
- POST-REMEDIAL GROUNDWATER MONITORING WELL
- PRE-REMEDIAL THERMISTOR
- POST-REMEDIAL THERMISTOR
- SPILL RESPONSE EQUIPMENT
- DIRECTION OF WATER CHANNEL FLOW
- DIRECTION OF SURFACE WATER FLOW

0 25 50
1:1,500 METRES

NOTES

1. ALL LOCATIONS ARE APPROXIMATE AND SUBJECT TO CHANGE BASED ON ACTUAL FIELD CONDITIONS.
2. GPS COORDINATES PROJECTION: TRANSVERSE MERCATOR; DATUM: UTM83; COORDINATE SYSTEM: UTM ZONE 8.

REFERENCE

ORIGINAL DRAWING OBTAINED FROM CHALLENGER GEOMATICS LTD.; DWG No.: 22-35141-002; SCALE: 1:1,250; DATE: SEPTEMBER 12, 2022.

ADDITIONAL INFORMATION OBTAINED FROM IEG CONSULTANTS LTD.; PROJECT No.: A04025A02; SCALE 1:750; DATE: SEPTEMBER 20, 2011.

CLIENT
SHELL CANADA LIMITED

CONSULTANT
wsp

YYYY-MM-DD	2025-08-11
DESIGNED	SVilleneuve
PREPARED	APaull
REVIEWED	JKrizan
APPROVED	BVervoort

PROJECT
SOIL REMEDIATION
FORMER UNIPKAT I-22 WELLSITE
INUVIALUIT SETTLEMENT REGION, NORTHWEST TERRITORIES

TITLE
PROPOSED SITE LAYOUT AND REMEDIAL EXTENTS FOR TYPE B PETROLEUM HYDROCARBONS AND BARITE (TRUE TOTAL BARIUM)

PROJECT NO.	PHASE-TASK	REV.	FIGURE
CA0042726.0037	1000-2403	1	12

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: ANSI B

0 25 mm

APPENDIX B

Information from Iron Creek Group

QUENCH TOWER WATER EVAPORATION PROCESS SUMMARY MAY 2025

SOIL REMEDIATION PROJECT WEST CHANNEL, NWT

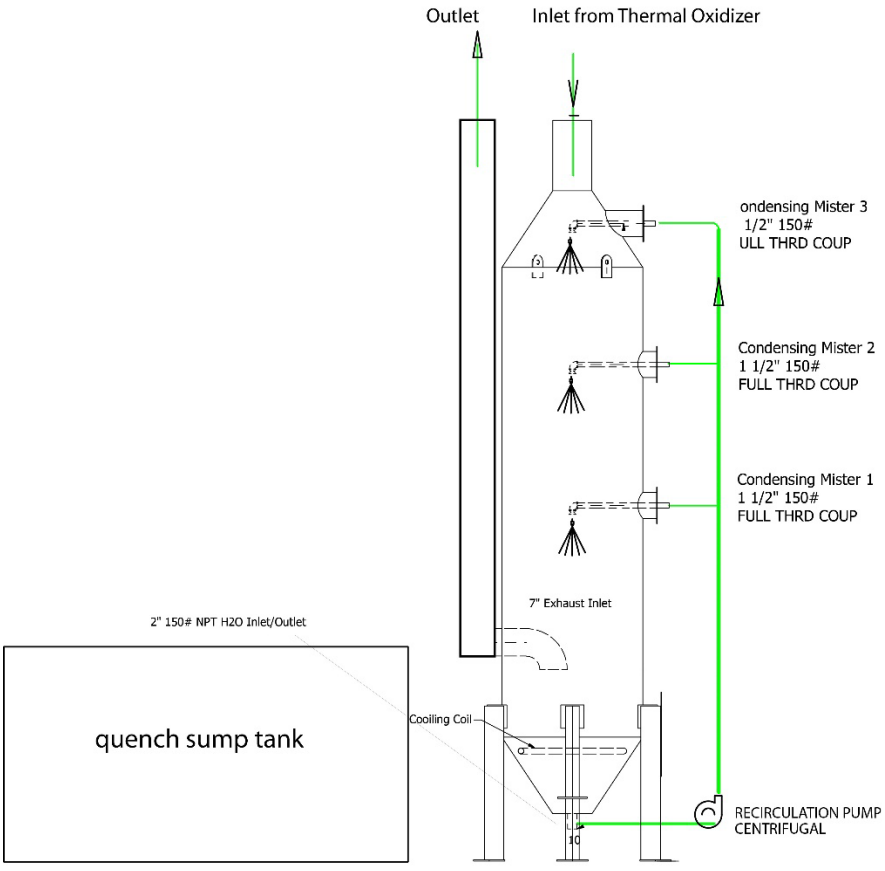
Prepared For:

Quench Tower Operational Overview

Iron Creek's quench towers provide an evaporative solution for site contact water collected during remedial operations. The quench towers consist of an open tower structure with three water injection ports arranged in a vertical sequence within the tower itself.

Water collected at the site can be pumped from the existing water collection and storage equipment through the quench tower feed and into the injection ports. This water stream is then injected directly into the heated process exhaust. Injecting the water into the quench tower in this fashion allows the water to be evaporated during heat exchange inside of the quench tower. The water is ultimately recycled back into the regional water cycle as water vapour through this process.

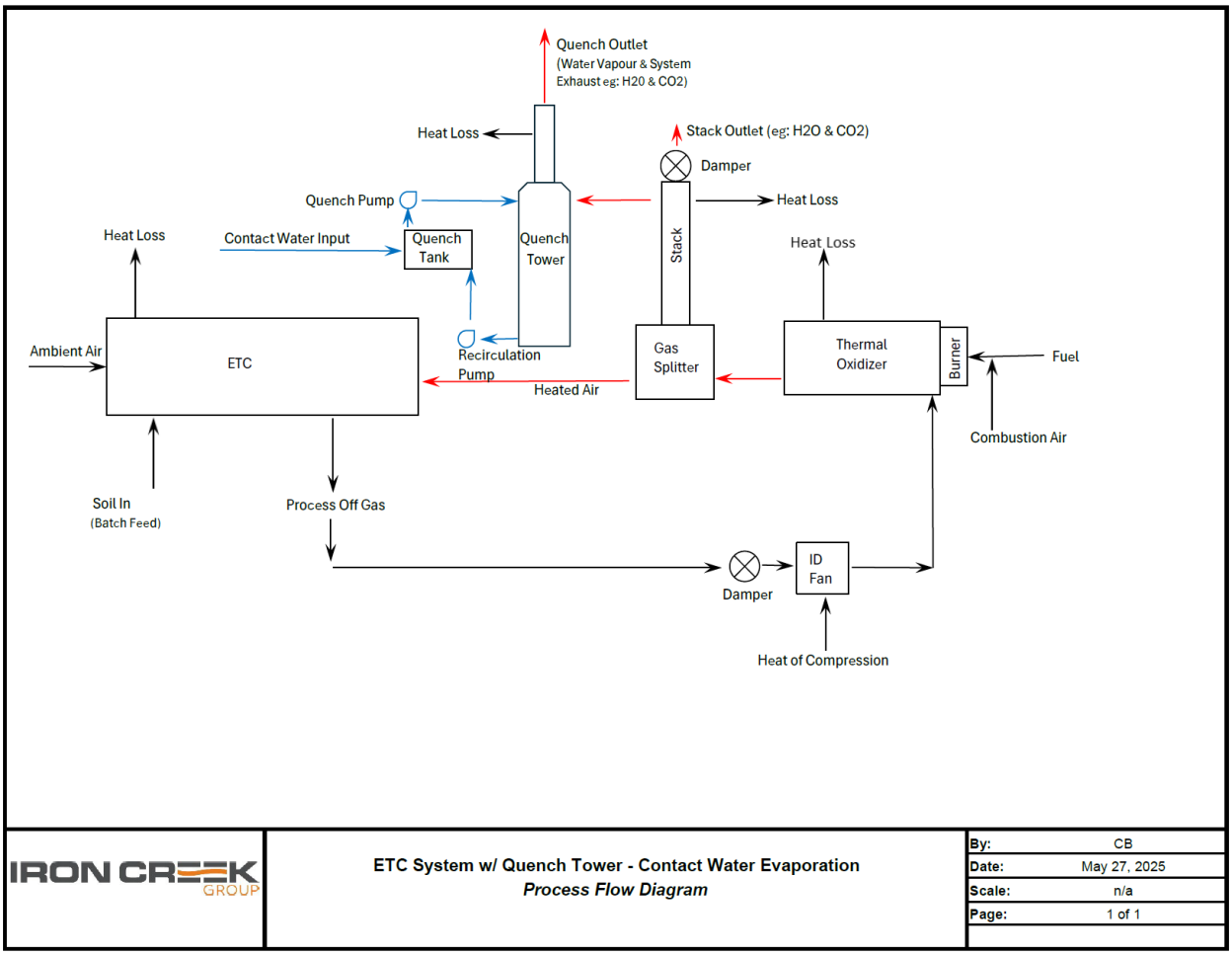
OVERVIEW OF QUENCH SYSTEM



The quench towers connect to the existing ETC thermal oxidizer equipment at the site and are able to evaporate water 24 hours per day during soil treatment operations. Estimated evaporative capacity of a quench tower system is expected to range between 10-20 m^3 H_2O/day for each tower.

Quench Tower Operational Procedures

- Install quench assembly into the ETC off gas exhaust stream, behind the thermal oxidizer in the process cycle;
- Move site contact water sequentially, through the various existing, onsite water management infrastructure to allow solids to settle prior to pumping into the quench units;
- Utilize quench pump and recirculation pump to circulate site contact water into the quench for evaporation via waste heat in the ETC process exhaust (1,000-1,250 °F) while the treatment systems are in operation;
- Contact water can be input to the quench system either in an "intermittent/on-demand" or "continuous flow" process, depending on the site and water volume requirements;
- The water is sprayed into the thermal oxidizer's air stream where the water is instantly vaporized and VOC 's are converted into water vapour and CO_2 (byproducts of combustion).
- Shut down quench feed and recirculation pumps when there is no contact water to be handled at site.



The photos included below provide a visual reference of how Iron Creek's quench towers look while operating:

Photo 1: A quench tower set up during Northern Canada Winter Operations

Photo 2: An operating ETC system with a quench tower connected to the process exhaust.

Photo 3: A quench tower in operation.