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1. Construction Execution Plan

1.1. General Scope of Work

The existing tank farm in Arviat does not meet capacity or codes requirements. Costing to upgrade the current facility is equivalent to new build costs (including demolition and remediation of the old tank farm). It is more cost effective and feasible to justify a new build within the community.

There is currently no contracted engineering consultant or construction contractor as this work is still within planning stages. Construction will be completed throughout summer 2021 and 2023. Substantial completion is targeted for September 30, 2023. Painting of external surfaces is scheduled for the Summer of 2024 to achieve the best coating application in accordance with the Contract Division 1, Section 01014 Work Sequence 1.9.

The major elements of the scope of work are listed for a new tank farm within Arviat and include the following:

1. Construct 4 new vertical tanks;
 - a. 3 for LSDL (diesel) service at 3,333 m³ capacity each,
 - b. 1 for Gasoline service at 3,333 m³ capacity, and
 - c. 1 for Jet A-1 service at 3,333 m³ capacity.
2. Add motor operated automatic shut off valves at tank outlets;
3. Dismantle and remove existing tank farm including;
 - a. piping and pipe supports,
 - b. tanks (vertical and horizontal),
 - c. dispenser building,
 - d. operator shelter,
 - e. island dispenser,
 - f. liner,
 - g. berm,
 - h. resupply pipeline (approximately 920 m long), and
 - i. shore manifold.
4. Supply and install new painted piping and pipe supports;
5. Supply and install the following buildings;
 - a. Operator Shelter Building at the tank farm
 - b. Jet A1 Dispenser Building at the tank farm
 - c. Jet A1 Dispenser Building at the airport
 - d. Gasoline / LSDL Remove Dispenser Island
6. Supply and install new above ground resupply lines from the marine unloading dock to the tank farm complete with pipe supports, external painting and secondary

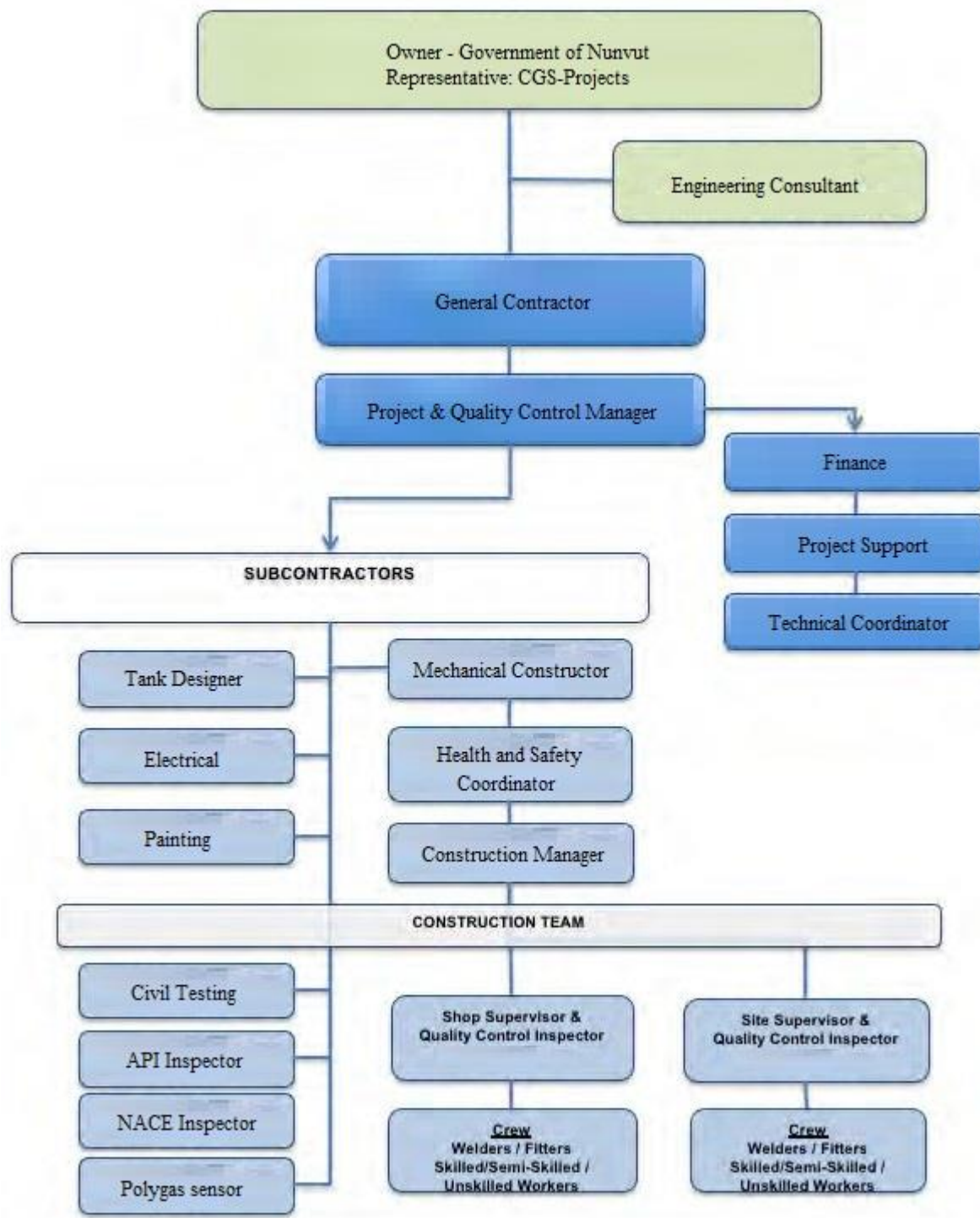
7. Supply and install a new marine spill basin;
8. Supply and install two mooring bollards at the unloading dock;
9. Supply and install new overfill alarm system on vertical tanks;
10. Supply and install tank lighting and site lighting; and
11. Decommission underground resupply lines and ship the dismantled lines South.

There is currently no engineering consultant or general contractor. However, the selected engineering consultant and contractor would be responsible for the successful completion while the Government of Nunavut, Department of Community and Government Services, Projects Division would be responsible for the overall management of the project.

Subcontractors could include;

- Electrical services including operator shelter and dispenser buildings
- Welding
- Laboratory analysis
- Painting
- API Inspectors

Organization of the Arviat Tank Farm Expansion



The construction sequence will ensure no interruption to resupply and dispensing operations. The facility will operate as intended during each year of construction and fuel dispensing services to the community will not be disrupted. This will be achieved by the creation of temporary fuel facilities early within the construction season and by commissioning new aspects of the facility prior to any decommissioning and disconnection activities.

Year 2 Activities: Additional materials will be shipped to the site to support construction activities in 2021. Work will include the establishment of fuel facilities, tank work and new resupply lines, and the installation of buildings. It will include all electrical and lighting work, the decommissioning of piping lines and shipping materials South for proper disposal, and substantial completion of construction by September 30, 2023.

A more detailed description of the construction sequence and activities is provided below with the complete work breakdown structure (WBS) provided in Appendix A.

1.4.1. Tank and Piping Work – Pre-construction

- All tank structural steel
- Tank nozzles, stairways and handrails
- Appurtenances for the tanks
- Misc. structural steel – pipe supports for the resupply line and the tank farm
- Stiles to be installed over the pipe.
- Pipe spools for the tank farm.

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1.4.2. New LSDL/Gasoline Dispenser Building – Pre-construction

1.4.3. Other Materials Prepared and Shipped

1.4.4. Pipe Painting

1.4.5. Tanks – Pre-construction

All shell plates will be squared and sketch plates for the roof and floor will be cut. The floor and roof plates will be crated for sealift transportation. Note that the plates will be shaped at the site as per API 650 or they could be pre-rolled on arrival to site.

The floor, shell plates, flat racks, rim nglcs, and skids will be shipped to site. Whenever possible, shell plates and tanks should be blasted and primed.

Construction Execution Plan – Bulk Fuel Storage Capacity Increase – Arviat,

1.4.6. Underground Piping

1.4.7. Cabinet at Remote Island Dispenser

1.4.8. Equipment Mobilization

- New 30-ton boom truck
- Cat 320 excavator
- Two new girth scaffolds
- Cat 950 loader
- L9000 dump truck
- 25 ton tag trailer
- Cat 323C compactor
- Two pickup trucks
- 15 passenger van
- JLG 80 foot articulated boom
- Three 500A welding machines
- One 300A welding machine
- Four multi-welders complete with welding leads and welding consumables
- Dewatering pump
- 4 inch water transfer pump
- Hydrostatic pump
- 375 CFM compressor
- Cat 267 Skid Steer
- Pig launcher
- 2 inch fuel transfer pump
- ¾ inch fuel transfer pump
- Hose fittings and fasteners for temporary fuel hookup

Heavy equipment may also be used by the Hamlet, who could act as a subcontractor to the selected contractor. The Hamlet of Arviat has a wide inventory of heavy equipment already within the community.

The paint and sand grit required for internal coating of the tanks is shipped before construction. The paint is to be stored in a heated storage facility for the duration of winter. The paint and sand grit for the balance of the facility will be shipped before construction commences.

On arrival of the sealift, crew will mobilize to transport the material and equipment from the high water mark at the sealift receiving area to the laydown area location provided by GN-PPD in accordance with Contract Specifications.

Equipment and materials will be moved to the site using a boom truck, dump truck, and a 25-ton TAG trailer.

The selected contractor generally meets with PPD to review the site and the location of the laydown area. While there, they will investigate potential sources of aggregate for the Project. The gravel at the site will be reviewed as well as the aggregates at the Arviat quarry, if applicable.

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Site work will be completed as per the Contract. Multiple tank pads will be constructed and new tank floors (tank bottom plate) will be laid. Also in this season, weather permitting, there is generally an attempt to install the granular pad for the resupply / marine pipeline. Work will continue through the month of September and will wrap up based on weather conditions, potentially the end of October for Arviat.

1.5.1. Mobilization

Crews will be tasked as follows:

- It is important to note that the new facility and all associated infrastructure must be constructed, tested and commissioned before the old facility can be removed from the community.

The bermed area will need to be completed first before tank pads are installed. The berm will be sealed with HDPE liner and geotextile. The selected contractor (or subcontractor) will supply the liner and will provide a field service technician to weld the new liner, if required.

The tanks will include external painting, spiral stairway, roof handrail around top half of the tanks, 24" roof and shell manholes (varies depending on size and capacity), mechanical level gauge, electronic level gauge, conservation pressure and vacuum valve, gauge hatch and other appurtenances as per the drawings.

1.5.3. Inspection of New Tanks

1.5.6. Installation of New Piping, LSDL building, Jet A1 building

1.5.7. Removal of Existing Facility; Tanks, Piping, Fittings, Valves and Pipe Supports

The associated tankage will be drained, cleaned, stripped out, and dismantled. The parts will be deposited at the same location assigned by the Owner. Please note that GN-PPD is currently looking at temporary sites until transportation by sealift to a southern facility for disposal.

It is common for the selected contractor to subcontract the electrical work. The following is an outline of the electrical scope of work:

- #### 1.5.11. Demonstration and Training Video of Facility

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Following commissioning of the facility, the selected contractor will request a substantial completion inspection in accordance with Contract Specifications, Section 01650 Substantial Completion Inspection Requirements.

Painting will commence late **June 2020 and be completed by September 2020**. See Appendix A, Inspection and Test Plan – Painting, for a detailed discussion of the procedures and testing that will be used to ensure a quality paint application. All surface preparation and painting will be completed in accordance with the Contract Specification.

Please note the following are general practices for exterior tank painting;

- Please note the following are general practices for exterior tank painting:

- The welds will be prepared to SP3. Welds will be coated with one coat of Wasser MC-



Miozinc 100 over the welds. One full coat of Wasser MC-CR100 will be applied along with a full final coat of Wasser MC-Luster 2.8.

Generally, the selected contractor subcontracts this work to a third party to maintain quality control. The API 650 Out of Service Inspection work should be completed by an independent certified API 650 Inspector once all tanks have been erected and before refurbishment work (should it be required based on the API 650 inspection).

The tanks require internal and external inspection will full adherence to safety procedures regarding work in confined spaces as per applicable guidelines, standards and best practices. The selected contractor will need to provide their confined space procedure for review to CGS-Projects, CGS-PPD, and Technical Services.

2.1. Inspection Activities

A detailed list of inspection activities, to be performed by API 650 inspector, is as follows:

- General housekeeping of the tank farm, drainage away from tank, settlement around perimeter of tank, vegetation, operation of dike sump pump, etc.
- Visual inspection of bottom shell joints
- Visual inspection of shell for bulges and distortions, shell mapping and defect location
- Foundation and chine ring inspection (e.g. broken/spalling concrete, cracks in concrete, cavities under tank, grout bottom-to- foundation seal condition, sand, etc.)
- Measure foundation levelness and bottom elevations
- Ultrasonic spot inspection of tank nozzles
- Shell plate thickness measurement with spot ultrasonic testing for actual thickness
- Roof deck visual inspection with spot ultrasonic testing for actual thickness
- Visual inspection of appurtenances (manways, flanged nozzles, sample hatches, roof drains, gage wells, vents, vacuum breakers, etc. – check for cracks, signs of leakage on welded joints, shell plate dimpling, etc.
- Indications and suspect areas to be inspected with magnetic particle inspection.)
- Visual inspection of the tank for defects and evidence of leakage
- Inspection of stairs, ladders, and handrails – pitting, holes, and paint failure; welds; safety chain, etc.
- Overall hydraulic and structural integrity survey of the tank
- Survey for tank plumbness and roundness
- External shell coating – paint failure, corrosion, pitting, disbanding, discoloration
- Identify low areas on the roof of the tank that do not drain adequately

All vertical tanks in service shall be drained (or product transferred), cleaned, and gas

The tank floor will be inspected with an MFE machine for backside corrosion.

- ### 2.3. Ultrasonic (UT) Inspection

- Upon completion of API 650 Inspection, completed checklist for tank inspection, NDE examination results and inspection report with recommendations for repair/replacement methods will be submitted.

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The lifting of the shell plates or large floor or roof plate will consist of:

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4. QA/QC

Work will be inspected both through formal quality control methods such as inspection and testing during procurement, welding, fabrication, and through informal daily inspection as the work progresses in accordance with the Contract Specifications and Drawings.

4.1. Civil Work

The selected contractor will be required to retain the services of an independent testing company to complete the following tests:

1. Sieve analysis of sands and aggregates
2. Standard Proctor Density curves for backfill materials
3. Standard Proctor Density curves for approved borrow materials
4. Compaction control tests for backfill and embankment materials

- Structures and embankments (from excavated material) – one for each 400 m² of compacted layers
- Pipe bedding – one for each 100 m of pipe installed
- Pipe zone backfill – one for each 100 m of pipe installed
- Trench backfill – one for every 100 m of trench of 1,000 mm fill depth
- Subgrade Preparation – one field density for every 200 m² of 150 mm compacted layers
- Road sub-base and base course – one field density for every 100 m² of sub-base and one field density for every 100 m² of base course

The selected contractor will promptly prepare and distribute required copies of test reports, test information, and reports as deemed appropriate. The Engineering consultant will be provided with the reports plus all supporting test information promptly.

4.2. HDPE Liner Membrane

1. The selected contractor will submit certification from the liner manufacturer stating that the liner and proposed field joining will meet the physical property requirements for the intended application.
2. The material mill test specifications and quality control certificate will be submitted to the engineer prior to shipment
3. The Engineer will be notified when the prequalification testing will be performed.
4. Test seams will be performed by the technician and observed by the Engineer to ensure conditions are adequate. Test seams will be conducted at the beginning of each seaming period and performed under the same conditions and with the same equipment as production seaming. The test seam will be 3,050 mm long for double wedge fusion welding and 900 mm long for extrusion welding with the seam centered lengthwise.
5. Three 25 mm wide pieces will be die cut by the technician. One from each opposite end, and one from the centre of the test seam. These pieces will be tested by the technician using a field tensiometer in peel and will not fail in the weld. The three weld seam specimens will be tested. Any failures through the weld will be considered a failing test.
6. The minimum acceptable seam strength values must adhere to Division 2 – Section 02592 Clause 2.7.
7. If a test seam fails, a second test will be conducted. If the second test fails, the seaming apparatus will be rejected and not used for production until it is fixed and a successful seam is produced.
8. Non-destructive field seam testing will be as per Division 2 – Section 02592 Clause

3.9.2 and destructive field seam testing will be as per Division 2 – Section 02592 Clause 3.9.3.

4.3. Cast in Place Concrete

An independent testing company will complete the following quality control tests:

1. One set of three cylinders for each type of concrete mix, for each days concreting, or for each 40 m3 of concrete placed.
2. Cylinders will be taken at the point of deposit
3. For each test, slump and air content will be taken and three cylinders will be prepared for and cured in the lab
4. One cylinder from each test will be broken at 7 days and the remaining at 28 days.
5. When temperatures are below 5 degrees C, additional field cured cylinders will be prepared to verify the strength.
6. Test reports will be distributed to the Engineer.
7. In the case of concrete not meeting the specifications, a remedial measure may be taken as per Division 3 – Section 03300 Clause 1.5.6.

4.4 Tank Fabrication and Erection

See also Appendix D – Inspection and Test Program for tank construction.

4.4.1. Foundations

1. The tank foundation must be built to the elevation shown on the drawing.
2. Tank foundations must be level to within 12 mm around the circumference and crowned to allow water to drain to the water draw off valve. Crown slope: 1:120.
3. The tank foundation must be properly compacted. A 100 mm lift of sand is required on the tank pad.
4. As the tanks are being filled with water for hydrotesting, the tank elevations must be shot 6 times as follows: before filling (0%), 25%, 50%, 75%, 100% full, and again 24 hours after 100% full.

4.4.2. Welding

1. A weld map must be made showing the name and symbol of each welder.
2. Rod ovens will be used to keep low hydrogen rods dry. Holding rods will be kept at 220 degrees C.

4.4.3. Quality Control Procedures

1. Weep holes must be installed on shell reinforcing pads and air tested to 15psig. Test must be witnessed and documented.

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4.6. Pigging Procedures

- The pipeline should be walked and visually inspected for low points that cannot be pigged. In some cases a low point drain will have to be installed.
- The lines should be cleaned with a wire brush pig to remove scale, rust, dirt and welding slag. This pig should be propelled through the lines several times and should be done prior to hydrotesting. If tees or reducers exist, contact the office for work around plan.
- Once the lines have been hydrotested, a rigid foam pig should be used to remove water. It should be run through several times to ensure all water has been removed. Light foam swab pigs will compress and will not remove all water.
- Once all water has been removed, swab pigs should be propelled through the line until they come out clean and dry.

- All work will be completed in accordance with the Canadian Electrical Code, Part 1, latest edition.
- The Polygas Surveillance and Detection System will be verified, calibrated, and tested on site.
- The LSDL / Gasoline Dispenser Building equipment, lighting fixtures, heater, etc. will be tested at the shop prior to shipping.
- The ventilation system for each dispenser building will be tested onsite.
- The following will be checked for motors:
 - That the motor starter and its overload settings are sized appropriately and that the motor is properly rated for its location.
 - Voltage and rotation.
 - Amperage including insulation resistance testing; high potential testing; loop impedance under fault conditions; and motors, heaters, and associated control equipment at full load.
 - Test data will be reported on Test Sheet in Appendix F.
- Anti-static ground continuity tests will be conducted on each tank.
- Circuits originating from branch distribution panels will be tested for continuity, short circuit and ground.

- #### 4.8. Procurement Procedures

- ## 4.9. Material Receiving

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Control Manager (Project Manager).

4. The Quality Control Manager (Project Manager) will compile the MTRs and submit to the Engineer.
5. Other miscellaneous parts shall be verified by trademark, manufacturer's markings or such other markings as are required by the ASME/ANSI standard. These parts are examined for size, ratings type of material and visual defects. If material is found to be unacceptable the Quality Control Inspector will notify the Quality Control Manager.
6. All rejected items will be marked with the shop order and retained in the "Rejected Area".

4.10. Correction of Non-Conformity

Non-conformity is any condition that does not meet all the applicable requirements. If during the Receiving inspection, any non-conformity is detected, the following steps shall be taken:

1. When the nonconformity requires repairs by welding, the Quality Control Inspector will oversee the repair work and ensure it is completed correctly.
2. When the disposition is use-as-is, the QCM will verify that Code compliance is maintained, and request correction of affected documents by the Consulting Engineer as described in the Quality Control Manager.
3. For items rejected for scrap or return to vendor, they will be removed to a segregated area and marked "REJECTED" to prevent further use.
4. For non-conformities that can be corrected, after the fault has been corrected and re-inspected, the "Reject – Do Not Use" marking will be removed by the Quality Control Inspector only.

4.11. Welding

1. Structural steel welding will be performed to CSA-W47.1 and W59.
2. Welding procedures and certified electrodes will be to CSAW48.
3. Tank farm yard piping will be performed in accordance with ASME B 31.3 with ASME Section IX qualified WPS.
4. Resupply pipeline will be welded in accordance with CSA Z662 with ASME Section IX qualified WPS.
5. Tankage welding will be performed in accordance with API 650 with ASME Section IX qualified WPS.
6. MEL will inspect and test fabrication, welding and fastening.

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Appendix A - Inspection and Test Plan - Painting



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Building *Nunavut* Together
Nunavut liuqatigiingniq
Bâtir le *Nunavut* ensemble

**Inspection and Test Program
Painting of Tanks and Piping
Bulk Fuel Storage Capacity Increase
Arviat, NU**

Prepared by:

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Revision Date: February 28, 2019

This Plan provides an outline of procedures that will be used to ensure quality control during the preparation, painting, inspection and testing of the two new tanks and in painting the existing tanks and pipelines at of the Bulk Fuel Storage Capacity Increase Project in Arviat, Nunavut.

1. New vertical tanks
2. Internal coating of tanks
3. All piping, supports, valves, etc., new resupply line, and the new and existing stilts

In addition to the Arviat Tank Farm Expansion, Division 13 Section 09900 Painting specification, the following standards are referenced in this work.

- SP1 – Solvent Cleaning
- SP2 – Hand Tool Cleaning
- SP3 – Power Tool Cleaning
- SP5/NACE 1 – White Metal Blast Cleaning
- SP6/NACE 3 – Commercial Blast Cleaning
- SP7/NACE 4 – Brush-off Blast Cleaning
- SP10/NACE 2 – Near White Metal Blast Cleaning
- SP12/NACE 5 – High Pressure Water Jetting
- SSPC VIS.1 – Guide and Reference Photographs for Steel Surfaces
- SSPC VIS.2 – Visual Standard No. 2, Standard Method of Evaluating Degree of Rusting on Painted Steel Surfaces
- PA 1 – Shop, Field and Maintenance Painting of Steel
- PA 2 – Measurement of Dry Paint Thickness with Magnetic Gauges
- PA 8/ NACE 11–Thin Film Organic Linings Applied New Carbon Steel Process Vessels
- NACE SP0178 – Design, Fabrication, and Surface Finish Practices for Tanks and Vessels to be lined for immersion Service
- NACE SP0188 Discontinuity (Holiday) Testing of New Protective Coatings on Conductive Substrates
- NACE SP0288 Inspection of Lining Application in Steel and Concrete Equipment

- D1186 – Measurement of Dry Film Thickness of Non-Magnetic Organic Coatings Applied on Magnetic Base
- D2200 – Pictorial Surface Preparation Standards for Painting Steel Surfaces.

3. Coat Systems for Arviat

All tanks and associated piping will be painted according to Division 13 – Section 09900. Manufacturer product information sheets for the paint system are attached. Preparation and painting activities will include:

New tanks and associated piping, railings, etc. will be prepared and painted as follows:

1. The exterior surfaces of the tank will be sandblasted in the shop to SSPC-SP10 Near White Metal Blast Cleaning. The tank exterior will be shop primed with one coat of Wasser MC-Zink 100 primer at 2-3 mils.
2. Once onsite the surfaces will be accessed to ensure it is dull and free of any surface contamination. Any shiny areas will be hand sanded until dull.
3. The tanks will then be tested for chloride contamination. If chloride is at or below normal levels, then the tank will be washed with 3,500 to 4,500 psi water to remove dirt, grease, and oil. If salt is found in concentrations above normal, then the tanks will be washed with DevPrep 88 reduced with water and rinsed with fresh water. The tank will then be retested and the process repeated if salt above normal levels is detected.
4. The welds and other minor damages will be prepared to SSPC-3 or SP7 brush blast. One coat of Wasser MC-Miozinc primer will be applied at 2-3 mils. One intermediate coat of Wasser MC-CR will be applied over the entire exterior surface at 2 – 3 mils. One full finish coat of Wasser MC-Luster 2.8 will be applied as at 2-3 mils.

Piping in Tank Farm, Piping for Resupply Pipeline, and Stilts

1. The welds will be prepared to SP3.
2. Welds will be coated with one coat of MC-Miozinc 100. One full coat of MC-CR100 will be applied along with a full final coat of MC-Luster 2.8.

Before washing any new or existing tank, the surfaces will be tested for chloride contamination. If chloride is at or below normal levels, then the tank will be washed with 3,500 to 4,500 psi water to remove dirt, grease, and oil. If salt is found in concentrations above normal, then the tanks will be washed with DevPrep. The tank will then be retested and the process repeated if salt above normal levels is detected.

Prior to painting, all metal surfaces will be blown down and free of surface dust. After the surfaces are cleaned to the appropriate surface preparation specification, the steel surfaces will be primed as soon as possible. Should recontamination of the steel surface occurs before the primer is ready to be applied, the surface will be re-cleaned to meet the specification. As such, the cleaning of surfaces will be coordinated so that the cleaned surface can be primed in the same work day.

Product application, thinning, drying interval and film thickness requirements for each of the coating systems will be applied in accordance with the manufacturer's data sheets and recommended application procedures. The Wasser product system (product sheets attached) is a low-temperature product line and as such they can be applied with air temperatures down to - 8 degrees C and up to 99% relative humidity.

- When the temperature of the air, product, and surface to be painted is at or above 0°C
- When the relative humidity is less than 99%.

Construction Execution Plan – Bulk Fuel Storage Capacity Increase – Arviat, NU

Table 2 – Quality Control Measures provides an overview of the test procedures, frequencies, and acceptable criteria that will be used to ensure quality control of painting activities.

The crew should be journeymen certified painters by trade. While each member of the team should be able to perform all tasks required of the project, certain crew members are designated to focus on certain aspects of the job. For example, crew will complete the sandblasting and painting while other crew will focus on mixing and other tasks. Work will be coordinated so that activities of a different nature are not interfering with each other.

Table 2 – Quality Control Measures

Inspection Item	Technique/Instrument	Frequency of Test	Standard Test Method Reference	Spec Reference	Acceptance Criteria
Verify grease and oil removal	Visual	100% of surfaces prior to mechanical surface preparation	SSPC-SP1	Division 9 – Section 09900 3.1.1.1	No visible surface contamination
Verify surface chloride, sulfate, and nitrate removal	Test with chlor tester	Before coating and repeated until surface chloride level meets acceptable criteria.	As per manufacturer's recommendations for surface chloride removal	Division 9 – Section 09900 3.1.1.2	At or below normal chloride levels
Ensure coating materials are correct materials and in good condition	Visual	Prior to surface preparation	N/A	Division 9 – Section 09900 1.5.2-1.5.10	Materials are in original containers, sealed with labels intact; no damaged containers; materials are stored in dry, weatherproof, heated storage away from heating devices in a temperature range from 5 C to 30 C.
Verify correct coating environmental conditions	Visual	Prior to coating and during coating if conditions change	N/A	Division 9 – Section 09900 1.6.1.1	Surfaces are not to be painted during rain if the surface to be painted will be exposed to or is wetted by rain.

Table 2 – Quality Control Measures (continued)

Inspection Item	Technique/Instrument	Frequency of Test	Standard Test Method Reference	Spec Reference	Acceptance Criteria
Measure and verify ambient conditions and steel surface temperature	Sling psychrometer – Tailor Pocket Sling range between 20-120f; Surface thermometer	Prior to coating mixing and at 4 hour intervals	Record measurements in Table 3	Division 9 – Section 09900 1.6.1.2-1.6.1.3	Air temperature $\geq 0^{\circ}$ C; Steel temperature $\geq 0^{\circ}$ C or $\geq 5^{\circ}$ F above dew point; Relative
Verify dust removal	Visual / tactile	Prior to primer application	N/A		No visible dust
Verify coating thickness	Dry film thickness gage	Arbitrarily select and measure the first 100 m2 For each additional 1,000 ft2 coated area, arbitrarily select and measure one additional 100 ft2 area.	SSPC-PA 2	Division 9 – Section 09900 Table 3 and 3.3.6	As per thicknesses in Division 9 – Section 09900 Table 3
Verify adhesion to the surface	Test Method A - X Cut Tape Test	3 adhesion tests per tank exterior and interior, if applicable.	ASTM D3359-09		3A or better (less)

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Appendix C – Lifting Beam Drawing (example)



DRAWN
M. LOSIER

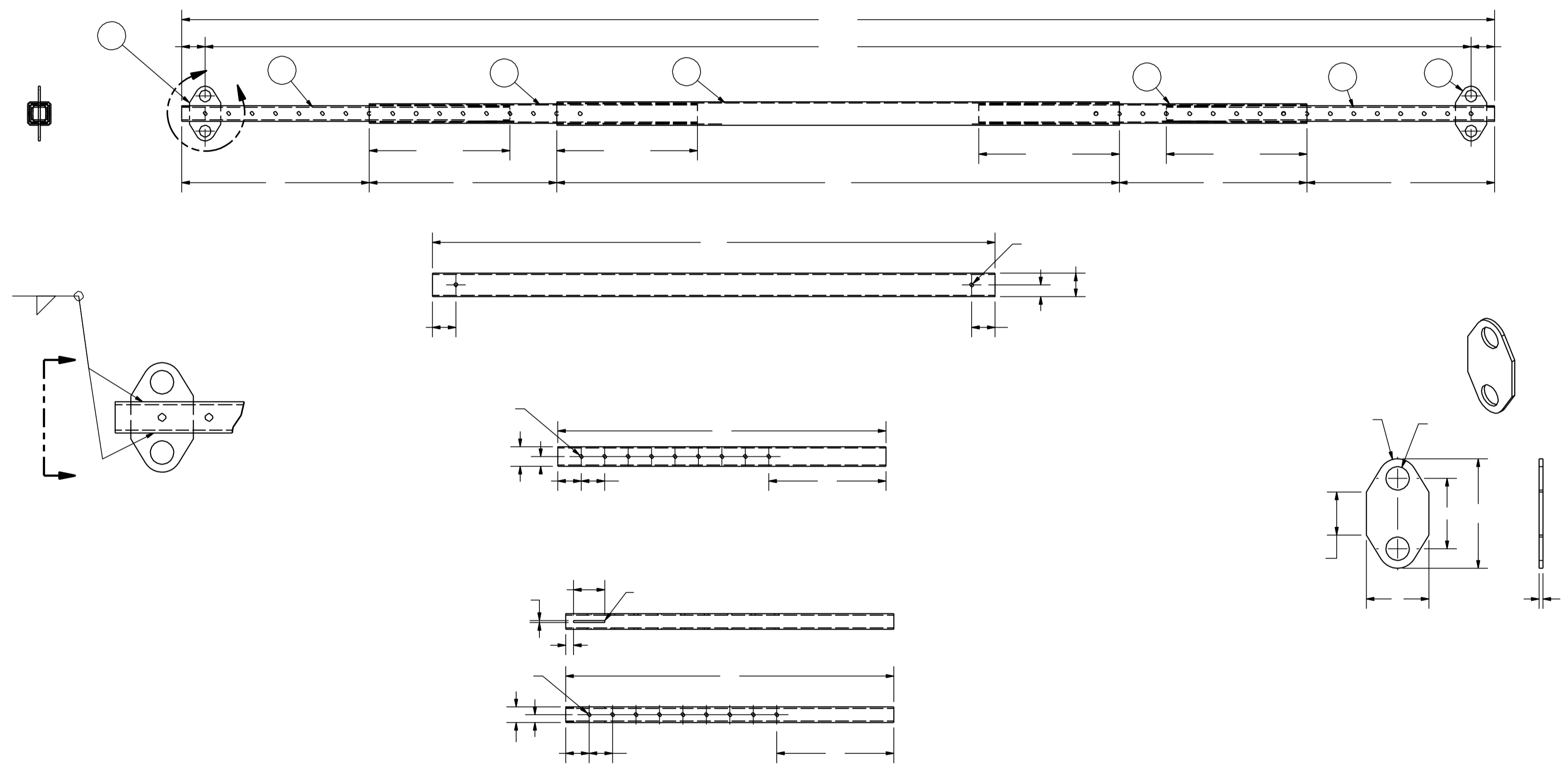
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ITEM	ITEM QTY	CUT (IN)	PARTS LIST		DESCRIPTION	STOCK NUMBER	QA	TITLE	REV
			PART NUMBER				MFG		
							APPROVED		
								TANK SHELL PLATE LIFTING BEAM	
1	1	144	AISC - 6x6x5/16 - 144	Tube		6x6x5/16			
2	2	84	AISC - 5x5x5/16 - 84	Tube		5x5x5/16			
3	2	84	AISC - 4x4x3/8 - 84	Tube		4x4x3/8			
4	2	1	Lifting Lug	Plate, Steel 44W, 1/2" x 8" x 14"					
8			7		6	5	4	3	2
									SHEET 1 OF 1
									1

SIZE
A2
SCALE
TE-42

SHEET 1 OF 1





Appendix D - Inspection and Test Plan – Tank Construction

INSPECTION & TEST PLAN

Tank:	EXAMPLE		Project:	Arviat Fuel Storage Tank Farm Expansion		Document:		
By:	Contractor to be selected		Proj. #:			Revision:	EXAMPLE	
Item	Component	Activity	ITP Type	Documentation	Acceptance Criteria	Notes	Witness, Hold, Review Points	
							Client	Q.C.
							Sign/Da	Sign/Date
1	Kick-Off Meeting	Kickoff Meeting	N/A	Meeting Minutes	N/A			H
2	Signature Log	Verify	N/A	Signature Log	N/A			H
3	Welder Qualification	Verify	N/A	Individual Welder Qualifications / Welder Log	API-650 / ASME IX			H
4	Inspector Qualification	Verify	N/A	In house Inspector & 3 rd Party Qualifications	API-650			H
5	Weld Procedures	Verify	N/A	Approved Weld Procedures	API-650 / ASME IX, CWB W47.1, ASME B 31.3, CSA Z662			H
6	Welding Consumable	Electrode Storage	N/A	N/A	Manufacturer's Instructions			R
7	Foundation	Foundation Survey	DC	Foundation Acceptance Report, Compaction Report & Survey from 3rd Party	API-650 Para 7.5.5			H
8	Floor	Materials	FI	MTR Confirmation to Dwg	Drawing & API-650 Sect. 4	MTR issued prior to shipping		H
		Fit up	VE, DC	As Built Drawing	Drawing	Per API-650 5.1.5.4 - bottom plates under the shell shall have the outer ends of the joints fitted and lap-welded		R
		Welding	VE	Weld Map, Visual Report	API-650 Para 7.2 & 8.5 & WPS MEL - WP-002			R
		Vacuum Test	VB	Vacuum Box Test Report	API-650 Para 7.3.3(a) & 8.6			W
9	Shell to Floor Seams	Initial Weld Pass	VE	Weld Map, Visual Report	API-650 Para 8.5, 7.2.4.1			R
		Final Weld Pass	VE	Weld Map, Visual Report	API-650 Para 8.5, 7.2.4.1			R
		MPI	NDT	MPI Report	API-650 Para 7.2.4.3 c)	MPI inside or outside of final joint		W
10	Shell	Materials	FI	MTR Confirmation to Dwg	Drawing & API-650 Sect. 4	MTR issued prior to shipping		H
		Fit up 1 st Course	VE, DC	As Built Drawing	Drawing			R
		Roundness	DC	Dimension Report	API-650 Para 7.5.3			H

Welding	VE	Weld Map, Visual Report	API-650 Para 7.2, 7.5, 8.5 & WPS MEL - WP-002			R
Tolerance Check – Plumbness & Local Deviations	DC	Dimension Report	API-650 Para 7.5			W
Radiography	NDT	X-ray report / Log / Map	API-650 Para 7.2.3 & 8.1			R

Tank:	LSDL Tank #01		Project:	ArviatFuel Storage Tank Farm Expansion		Document:	TK#1 ITP	
By:	Mosher Engineering		Proj. #:	308		Revision:	B-Issued for Approval	
11	Compression Ring	Fit up	VE, DC	As Built Drawing	Drawing			R
		Welding	VE	Weld Map, Visual Report	API-650 Para 7.2 & 8.5 & WPS			R
12	Roof	Fit up	VE, DC	As Built Drawing	Drawing			R
		Welding	VE	Visual Report	API-650 Para 7.2 & 8.5 & WPS			R
		Vacuum Test	VB	Vacuum Box Test Report	API-650 Para 7.3.8(b) & 8.6			W
13	Roof Structure	Fit up	VE, DC	As Built Drawing	Drawing			R
		Column Plumbness	DC	Dimension Report	API-650 Para 7.5.2 b)			H
		Welding	VE	Visual Report	API-650 Para 7.2 & 8.5 & WPS			R
14	Nozzles	Layout	VE, DC	As Built Drawing	Drawing			H
		Fit up	VE, DC	As Built Drawing	Drawing			R
		Shop Prep Welding	VE	Weld Map, Visual Report	API-650 Para 7.2 & 8.5 & WPS			R
		Welding	VE	Weld Map, Visual Report	API-650 Para 7.2 & 8.5 & WPS			R
		Tolerance Check – Plumbness & Local Deviations	DC	Dimension Report	API-650 Para 7.5			H
		Shell Nozzle Repad Air test	AT	Leak Test Report	API-650 Para 7.3.5			W
		MPI of Shell Nozzles	NDT	MPI Report	API-650 Para 7.2.3.6	All welds of Shell Nozzles		W
15	Manways	Layout	VE, DC	As Built Drawing	Drawing			H
		Fit up	VE, DC	As Built Drawing	Drawing			R
		Welding	VE	Weld Map, Visual Report	API-650 Para 7.2 & 8.5 & WPS			R
		Tolerance Check – Plumbness & Local Deviations	DC	Dimension Report	API-650 Para 7.5			H

		Shell Manway Repad Air test	AT	Leak Test Report	API-650 Para 7.3.5			W
		MPI	NDT	MPI Report	API-650 Para 7.2.3.6	All welds of Shell Manways		R
16	Internals	Layout	VE, DC	As Built Drawing	Drawing			H
		Fit up	VE, DC	As Built Drawing	Drawing			R
		Welding	VE	Visual Report	API-650 Para 7.2 & 8.5 & WPS			R
17	Externals	Layout	VE, DC	As Built Drawing	Drawing			H
		Fit up	VE, DC	As Built Drawing	Drawing			R
		Welding	VE	Visual Report	API-650 Para 7.2 & 8.5 & WPS			R

Tank:	LSDL Tank #01		Project:	ArviatFuel Storage Tank Farm Expansion		Document:	TK#1 ITP	
By:	Mosher Engineering		Proj. #:	308		Revision:	B-Issued for Approval	
18	Stairs & Platforms	Layout	VE, DC	As Built Drawing	Drawing			H
		Fit up	VE, DC	As Built Drawing	Drawing			R
		Welding	VE	Visual Report	API-650 Para 7.2 & 8.5 & WPS			R
19	Bolts & Nuts	Inspection	VE, DC	As Built Drawing	Drawing	Bolt Torque		W
20	Hydrotest	Inspection	VE, NDT	Hydrotest Report	API-650 Para 7.3.6 & 7.3.7	Steps per separate hydrotest procedure.		H
21	Final	Name Plate Verification	N/A	Scan of Name Plate	Drawings			H
		Final Inspection	FI	As Built Drawings, Data Sheet, Manufacturer's Certification (3 rd Party), Punch List	Drawings			H

DEFINITIONS:

W - WITNESS: Specified activity to be observed by an outlined party. QC to provide the applicable party 24 hours notice of witness point.

H - HOLD: Specified component or installation to be inspected by an outlined party. No further activities specific to the component or installation may proceed until inspection is carried out.

QC to provide the applicable party 24 hours notice of hold point.

R - REVIEW: Specified documentation and specifications applicable to a particular component and/or installation to be examined by an outlined party.

AT - AIR TEST: Specified component and/or installation to be air tested according to specified documentation and specifications.

DC - DIMENSION CHECK: Physical dimensions of component and/or installation to be verified according to specified documentation and specifications.

FI - FINAL INSPECTION: Specified inspection procedures to be executed prior to release of the component and/or installation and verified according to specified documentation and specifications.

NDT - NON DESTRUCTIVE TESTING: Specified component and/or installation to be inspected using a named non destructive testing method according to specified documentation and specifications.

VE - VISUAL Examination: Specified component and/or installation to be examined visually according to specified documentation and specification.

VB - VACUUM-BOX TEST: Specified component and/or installation to be vacuum box tested according to specified documentation and specifications.

INSPECTION & TEST PLAN

Tank:	LSDL Tank #02		Project:	ArviatFuel Storage Tank Farm Expansion		Document:	TK#2 ITP	
By:	Mosher Engineering		Proj. #:	308		Revision:	B-Issued for Approval	
Item	Component	Activity	ITP Type	Documentation	Acceptance Criteria	Notes	Witness, Hold, Review Points	
							Client	Q.C.
							Sign/Da	Sign/Date
1	Kick-Off Meeting	Kickoff Meeting	N/A	Meeting Minutes	N/A			H
2	Signature Log	Verify	N/A	Signature Log	N/A			H
3	Welder Qualification	Verify	N/A	Individual Welder Qualifications / Welder Log	API-650 / ASME IX			H
4	Inspector Qualification	Verify	N/A	In house Inspector & 3 rd Party Qualifications	API-650			H
5	Weld Procedures	Verify	N/A	Approved Weld Procedures	API-650 / ASME IX, CWB W47.1, ASME B 31.3, CSA Z662			H
6	Welding Consumable	Electrode Storage	N/A	N/A	Manufacturer's Instructions			R
7	Foundation	Foundation Survey	DC	Foundation Acceptance Report, Compaction Report & Survey from 3rd Party	API-650 Para 7.5.5			H
8	Floor	Materials	FI	MTR Confirmation to Dwg	Drawing & API-650 Sect. 4	MTR issued prior to shipping		H
		Fit up	VE, DC	As Built Drawing	Drawing	Per API-650 5.1.5.4 - bottom plates under the shell shall have the outer ends of the joints fitted and lap-welded		R
		Welding	VE	Weld Map, Visual Report	API-650 Para 7.2 & 8.5 & WPS MEL - WP-002			R
		Vacuum Test	VB	Vacuum Box Test Report	API-650 Para 7.3.3(a) & 8.6			W
9	Shell to Floor Seams	Initial Weld Pass	VE	Weld Map, Visual Report	API-650 Para 8.5, 7.2.4.1			R
		Final Weld Pass	VE	Weld Map, Visual Report	API-650 Para 8.5, 7.2.4.1			R
		MPI	NDT	MPI Report	API-650 Para 7.2.4.3 c)	MPI inside or outside of final joint		W
10	Shell	Materials	FI	MTR Confirmation to Dwg	Drawing & API-650 Sect. 4	MTR issued prior to shipping		H
		Fit up 1 st Course	VE, DC	As Built Drawing	Drawing			R
		Roundness	DC	Dimension Report	API-650 Para 7.5.3			H

Welding	VE	Weld Map, Visual Report	API-650 Para 7.2, 7.5, 8.5 & WPS MEL - WP-002			R
Tolerance Check – Plumbness & Local Deviations	DC	Dimension Report	API-650 Para 7.5			W
Radiography	NDT	X-ray report / Log / Map	API-650 Para 7.2.3 & 8.1			R

Tank:	LSDL Tank #02		Project:	ArviatFuel Storage Tank Farm Expansion		Document:	TK#2 ITP	
By:	Mosher Engineering		Proj. #:	308		Revision:	B-Issued for Approval	
11	Compression Ring	Fit up	VE, DC	As Built Drawing	Drawing			R
		Welding	VE	Weld Map, Visual Report	API-650 Para 7.2 & 8.5 & WPS			R
12	Roof	Fit up	VE, DC	As Built Drawing	Drawing			R
		Welding	VE	Visual Report	API-650 Para 7.2 & 8.5 & WPS			R
		Vacuum Test	VB	Vacuum Box Test Report	API-650 Para 7.3.8(b) & 8.6			W
13	Roof Structure	Fit up	VE, DC	As Built Drawing	Drawing			R
		Column Plumbness	DC	Dimension Report	API-650 Para 7.5.2 b)			H
		Welding	VE	Visual Report	API-650 Para 7.2 & 8.5 & WPS			R
14	Nozzles	Layout	VE, DC	As Built Drawing	Drawing			H
		Fit up	VE, DC	As Built Drawing	Drawing			R
		Shop Prep Welding	VE	Weld Map, Visual Report	API-650 Para 7.2 & 8.5 & WPS			R
		Welding	VE	Weld Map, Visual Report	API-650 Para 7.2 & 8.5 & WPS			R
		Tolerance Check – Plumbness & Local Deviations	DC	Dimension Report	API-650 Para 7.5			H
		Shell Nozzle Repad Air test	AT	Leak Test Report	API-650 Para 7.3.5			W
		MPI of Shell Nozzles	NDT	MPI Report	API-650 Para 7.2.3.6	All welds of Shell Nozzles		W
15	Manways	Layout	VE, DC	As Built Drawing	Drawing			H
		Fit up	VE, DC	As Built Drawing	Drawing			R
		Welding	VE	Weld Map, Visual Report	API-650 Para 7.2 & 8.5 & WPS			R

		Tolerance Check – Plumbness & Local Deviations	DC	Dimension Report	API-650 Para 7.5			H
		Shell Manway Repad Air test	AT	Leak Test Report	API-650 Para 7.3.5			W
		MPI	NDT	MPI Report	API-650 Para 7.2.3.6	All welds of Shell Manways		R
16	Internals	Layout	VE, DC	As Built Drawing	Drawing			H
		Fit up	VE, DC	As Built Drawing	Drawing			R
		Welding	VE	Visual Report	API–650 Para 7.2 & 8.5 & WPS			R
17	Externals	Layout	VE, DC	As Built Drawing	Drawing			H
		Fit up	VE, DC	As Built Drawing	Drawing			R
		Welding	VE	Visual Report	API–650 Para 7.2 & 8.5 & WPS			R

Tank:	LSDL Tank #02		Project:	ArviatFuel Storage Tank Farm Expansion		Document:	TK#2 ITP	
By:	Mosher Engineering		Proj. #:	308		Revision:	B-Issued for Approval	
18	Stairs & Platforms	Layout	VE, DC	As Built Drawing	Drawing			H
		Fit up	VE, DC	As Built Drawing	Drawing			R
		Welding	VE	Visual Report	API-650 Para 7.2 & 8.5 & WPS			R
19	Bolts & Nuts	Inspection	VE, DC	As Built Drawing	Drawing	Bolt Torque		W
20	Hydrotest	Inspection	VE, NDT	Hydrotest Report	API-650 Para 7.3.6 & 7.3.7	Steps per separate hydrotest procedure.		H
21	Final	Name Plate Verification	N/A	Scan of Name Plate	Drawings			H
		Final Inspection	FI	As Built Drawings, Data Sheet, Manufacturer's Certification (3 rd Party), Punch List	Drawings			H

DEFINITIONS:

W - WITNESS: Specified activity to be observed by an outlined party. QC to provide the applicable party 24 hours notice of witness point.

H - HOLD: Specified component or installation to be inspected by an outlined party. No further activities specific to the component or installation may proceed until inspection is carried out.
QC to provide the applicable party 24 hours notice of hold point.

R - REVIEW: Specified documentation and specifications applicable to a particular component and/or installation to be examined by an outlined party.

AT - AIR TEST: Specified component and/or installation to be air tested according to specified documentation and specifications.



DC - DIMENSION CHECK: Physical dimensions of component and/or installation to be verified according to specified documentation and specifications.

FI - FINAL INSPECTION: Specified inspection procedures to be executed prior to release of the component and/or installation and verified according to specified documentation and specifications.

NDT - NON DESTRUCTIVE TESTING: Specified component and/or installation to be inspected using a named non destructive testing method according to specified documentation and specifications.

VE - VISUAL Examination: Specified component and/or installation to be examined visually according to specified documentation and specification.

VB - VACUUM-BOX TEST: Specified component and/or installation to be vacuum box tested according to specified documentation and specifications.

Appendix E – Inspection and Test Plan – Shop Construction

INSPECTION & TEST PLAN								
By: Inukshuk Construction Limited			Project:	Arviat Tank Farm Expansion		Document:	SHOP-ITP	
			Proj. #:	308		Revision:	B - Issued for Approval	
Item		Component	ITP Type	Documentation	Acceptance Criteria	Notes	Witness, Hold, Review Points	Responsible Party
1.0 Material Receiving	1.1	Material matches Purchase Order	VE	Marked up packing slip	PO matches packing slip	Send marked up packing slips to office	R	SM
	1.2	Dimensional Check	VE/DC	N/A	Measurements match shop drawing		R	F/W
	1.3	Lot, Batches, Heat # Recorded	VE	MTR's with Heat Numbers	MTR's provided for all material, if required	As required, send MTRs to office	R	SM
	1.4	Proper Storage	VE	N/A	N/A	Visual Inspection of Storage	R	SM
2.0 Fabrication of Structural Material	2.1	Checked and approved drawings	VE	N/A	Drawings and Specifications	Ensure Shop Drawings are IFC and current revision only	R	SM
	2.2	Correct Material Issued for Fabrication	VE	N/A	Drawings and Specifications	Ensure material received matches Shop Drawings	R	SM / F/W
	2.3	Dimensional Check Prior to Fit Up	VE/DC	As Built Drawing	Shop Drawings		R	SM / F/W
	2.4	Structural Welding Procedures	N/A	Approved Welding Procedures	CSA-W59M		R	SM / WE
	2.5	Welding Consumables - Electrode Storage	N/A	N/A	Manufacturer's Instructions, CSA W48		R	SM / WE
	2.6	Welder Qualifications	N/A	Individual Welder Qualifications / Welder Log	CSA W47.1/W59		R	SM
	2.7	Visual Inspection	N/A	N/A	CSA W59		R	SM
	2.8	Inspector Qualifications	N/A	In house Inspector & 3 rd Party Qualifications	CSA W178.2		R	SM
	3.1	Checked and approved drawings	VE	N/A	Drawings and Specifications	Ensure Shop Drawings are IFC and current revision only	R	SM
	3.2	Correct Material Issued for Fabrication	VE	N/A	Drawings and Specifications	Ensure material received matches Shop Drawings	R	SM / WE
	3.3	Dimensional Check Prior to Fit Up	VE/DC	As Built Drawing	Shop Drawings		R	WE
	3.4	Pipe Welding Procedures	N/A	Approved Welding Procedures	Section 9 Enrollment Letter IX, ASME Boiler Pressure Code, WPS - MEL - WP-002; CSA Z662 for resupply pipeline		R	SM

3.0 Tank Farm	3.5	Welding Consumables - Electrode Storage	N/A	N/A	CSA W48		R	SM / WE
	3.6	Welder Qualifications	N/A	Individual Welder Qualifications / Welder Log	CSA B51		R	SM
	3.7	Visual Inspection	N/A	N/A	ASME B31.3		R	SM
	3.8	Radiography	NDT	X-ray report / Log / Weld Map	ASME B31.3	Testing by a qualified independent inspection firm	R	PM
	3.9	Inspector Qualifications	N/A	In house Inspector & 3 rd Party Qualifications	CSA W178.2	Ensure all inspectors have required qualifications and experience	R	SM

INSPECTION & TEST PLAN

By: Inukshuk Construction Limited			Project:	ArviatTank Farm Expansion			Document:	SHOP-ITP
			Proj. #:	308			Revision:	B - Issued for Approval
4.0 Assembly of Material	4.1	Checked and approved drawings	VE	N/A	Drawings and Specifications	Ensure Shop Drawings are IFC and current revision only	R	SM
	4.2	Correct Material Issued for Assembly	VE	N/A	Drawings and Specifications	Ensure material received matches Shop Drawings	R	SM / WE / LA
	4.3	Assembly	VE	As Built Drawing	Drawings and Specifications	Ensure material is assembled as instructed in Drawings and Specifications	R	SM / WE / LA
	4.4	Dimensional Check Prior to assembly	VE/DC	As Built Drawing	Shop Drawings		R	WE
	4.5	Commissioning	VE	N/A	Drawings and Specifications	As required by specifications	R	SM
5.0 Shipping - Land, Marine and Air	5.1	Stuff Container	VE	Shipping List	Land and Marine Shipping Instructions, Shop Drawings	Send to office list of all items, weights, quantities and container #	R	SM
	5.2	Crate for Marine Shipping	VE	N/A	NSSI or NEAS Packaging Instructions	As applicable, as per specifications	R	SM
	5.3	Crate for Air Shipment	VE	N/A	Air Freight Shipping Requirements		R	SM
	5.4	TDG	VE	TDG Labelling	Transport Canada Regulations for Marine and Land or Air TDG	Must be overseen by qualified TDG personnel	R	SM / LA
	5.5	Light and Heavy Equipment	VE	N/A	Transport Canada Regulations for Marine TDG	Fuel tank must be at most 1/4 full, or up to 200L maximum.	R	SM
	5.6	Labelling	VE	Tagging	Shop Drawings	All items must be tagged according to shipping/tagging instructions from office	R	SM
6.0 Nonconformance	6.1	Nonconformance	VE	Nonconformance Report	Nonconformance resolved	As required	H	SM



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DC - DIMENSION CHECK: Physical dimensions of component and/or installation to be verified according to specified documentation and specifications.

VE - VISUAL EXAMINATION: Specified component and/or installation to be examined visually according to specified documentation and specification.

IFC - Issued for Construction

SM - Shop Manager

WE - Welder

LA - Labourer

Appendix F – Test Sheet for Electrical Installations



Appendix G - Welding Procedures