Standard Specification

Section: 15552

Baffinland Iron Mine Corporation - Mary River Project
1 ML Fuel Storage Tank Aboveground Early Work - September 13, 2011

Baffinland Iron Mine Corporation

Mary River Project

1 ML Fuel Storage Tank Aboveground Early Work

PERMIT TO PRACTICE
HATCH LTD.
Signature _____
Date Sept 13 /2011
PERMIT NUMBER: P 512
The Association of Professional Engineers, Geologists and Geophysicists of NWT/NU

REGISTERED PROFESSIONAL ENGINEER
L1247
R. A. HALIM
LICENSEE
13 Sept, 2011
NWT/NU

2011-09-13	A	Approve for Permitting - PDW	D Stephenson	P Cashin	F Butts	
DATE	**REV.**	**STATUS**	**PREPARED BY**	**CHECKED BY**	**APPROVED BY**	**APPROVED BY**
			HATCH			**CLIENT**

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1. GENERAL

1.1 Documents

Conform to the requirements stated in the General Conditions, the Supplementary General Conditions, the General Requirements, this specification and all addenda.

1.2 References

1. Applicable federal, provincial and territorial codes
2. API 650, 11th Edition, 2008, Welded Steel Tanks for Oil Storage including Addendums 1 and 2
3. API 653 4th Edition, 2009, Tank Inspection, Repair, Alteration and Reconstruction
4. National Building Code of Canada (NBC) 2010
5. National Fire Code of Canada (NFCC) 2010
6. NFPA 30, 2008 Edition, Flammable and Combustible Liquids Code
7. CCME Environmental Code of Practice for Aboveground and Below Ground Storage Tank Systems containing Petroleum and Allied Petroleum, 2003
8. ANSI / ASME B31.3-2010, Process Piping
9. CSA W47.1-09, Certification of Companies for Fusion Welding of Steel
10. CSA W59-03 (R2008) - Welded Steel Construction (Metal Arc Welding)
11. Canadian Environmental Protection Act 1999, (2008 Update), Storage Tank System for Petroleum Products and Allied Petroleum Products Regulations
12. CSA W178.2-08, Certification of Welding Inspectors

1.3 Submission Requirements

Coordinate each submission with requirements of work and Contract Documents. Individual submissions will not be reviewed until all related information is available.

Allow seven (7) days for Owner or Owner's representative's review of each submission.

Accompany submissions with transmittal letter 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

Submissions shall include:

1. Date and revision dates
2. Project title and number
3. Name and address of:
   i) Subcontractor
   ii) Supplier
   iii) Manufacturer
4. Contractor's stamp, signed by Contractors authorized representative certifying approval of submissions, verification of field measurements and compliance with Contract Documents.
5. Details of appropriate portions of Work as applicable:
   a) Fabrication
   b) Layout, showing dimensions, including identified field dimensions, and clearances
   c) Setting or erection details
   d) Capacities
   e) Performance characteristics
   f) Standards
   g) Operating weight
   h) Relationship to adjacent work

1.4 Shop Drawings

Shop drawings: original drawings or modified standard drawings provided by Contractor, to illustrate details of portions of Work, which are specific to project requirements.

Shop drawing data information to be submitted in PDF or Cad format via email or FTP.

Cross-reference shop drawing information to applicable portions of Contract Documents.

1.5 Quality Assurance

Contractor to submit quality inspection and test plan for tank construction. Include milestone signoff sheets and qualifications for inspection personnel.

1.6 Specifications Requirements For Shop Fabricated, Fuel Storage Tanks 4640-TK-006, 4640-TK-007, 4640-TK-008, 4640-TK-009 ,4640-TK-010, 4640-TK-011 4640-TK-012, 4640-TK-013, 4640-TK-014, 4640-TK-015, 4640-TK-016, 4640-TK-017, 4640-TK-018, 4640-TK-019

Design, supply, fabricate, erect and test four (4) welded steel (Diesel) storage tank meeting the following criteria:

1. Number of tanks = 15
2. Nominal capacity =1,000,000 Liters
3. Diameter: 12 meters
4. Height: 9 meters
5. Specific gravity of contents = 0.82 – 0.95
6. Appurtenances: (See Part 2 Products)
7. Design metal temperature extremes to National Building Code of Canada (NBC) data for Arctic Bay, Nunavut
8. Design Pressure: Depth of fluid with tank at atmospheric and a 0.5 oz pressure / vacuum vent
9. Design for tanks to incorporate a center column
10. Location FOB Steensby Inlet, Baffin Island Nunavut
11. Permits, Fees for Construction: Owner's responsibility
12. Live Load (Wind Velocity): 1/10= 0.40 kPa, 1/50=0.55 kPa
13. Live Load (Ground Snow Load): Ss = 2.1 kPa
14. Foundation Type: prepared sand and gravel bedding (by civil contractor)
15. Operating Temperature Range: -45°C to 20°C
16. Plate and structural steel specification: (bottom, shell and roof) = CSA G40.21, Structural Quality Steels – 260WT Category 4 to -50°F
17. Mill test reports on steel: Supplied by Contractor

18. Tank Plate thicknesses: Bottom Plate, minimum thickness 6mm or to API 650 standards, whichever is greater; Shell Plate, minimum thickness 6mm or to API 650 standards, whichever is greater; Roof Plate, to API 650 minimum requirement
19. Roof supports: framing as required to API 650
20. Seismic data to National Building Code of Canada (NBC) edition for Arctic Bay, Nunavut
21. Allowable Site Sub Base Soil Bearing Resistance: 168 kPa (3500 psf)
22. All shell / roof nozzles shall have slip-on flanges unless noted otherwise
23. In lieu of a frangible joint roof connector the tanks shall be designed to incorporate two (2) emergency relief manholes API flange drilling
24. Tank Chime: Floor plate protection at shell connection shall be 75 mm or to API 650, whichever is greater
25. All nozzle heights and projections shall be as noted on the drawings and exceed API 650 minimum requirements
26. Tank floor plates shall be overlapped in a manner to reduce the tendency for liquid to puddle during draw down toward the exterior shell
27. The tank shall be constructed with three (3) water draw off sumps sized to API 650 requirements
28. Tanks shall be designed to incorporate lifting lugs located in strategic positions which will enable a safe and stable lift for the loading on flatbeds in preparation for land and sea transportation to project site
29. All tank trim, railing, stairs and platforms and associated support framing will be shipped loose to project site
30. All tank manways, nozzles, and associated trim openings shall be blinded off and / or plugged in preparation for transportation to project site

1.7 Specifications Requirements For Shop Fabricated, Fuel Storage Tanks 4640-TK-020, 4640-TK-021, 4640-TK-022 , 4640-TK-023, 4640-TK-024 (Future Jet Tanks)

Design, supply, fabricate, erect and test five (5) welded steel (Future Jet A1) storage tanks meeting the following criteria:

1. Number of tanks = 5
2. Nominal capacity =1,000,000 Liters
3. Diameter: 12 meters
4. Height: 9 meters
5. Specific gravity of contents = 0.82 – 0.95
6. Appurtenances: (See Part 2 Products)
7. Design metal temperature extremes to National Building Code of Canada (NBC) data for Arctic Bay, Nunavut
8. Design Pressure: Depth of fluid with tank at atmospheric and a 0.5 oz pressure / vacuum vent
9. Design for tanks to incorporate a center column
10. Location FOB Steensby Inlet, Baffin Island Nunavut
11. Permits, Fees for Construction: Owner's responsibility
12. Live Load (Wind Velocity): 1/10= 0.40 kPa, 1/50=0.55 kPa
13. Live Load (Ground Snow Load): Ss = 2.1 kPa
14. Foundation Type: prepared sand and gravel bedding (by civil contractor)
15. Operating Temperature Range: -45°C to 20°C
16. Plate and structural steel specification: (bottom, shell and roof) = CSA G40.21, Structural Quality Steels – 260WT Category 4 to -50°F
17. Mill test reports on steel: Supplied by Contractor
18. Tank Plate thicknesses: Bottom Plate, minimum thickness 6mm or to API 650 standards, whichever is greater; Shell Plate, minimum thickness 6mm or to API 650 standards, whichever is greater; Roof Plate, to API 650 minimum requirement
19. Roof supports: framing as required to API 650

20. Seismic data to National Building Code of Canada (NBC) edition for Arctic Bay, Nunavut
21. Allowable Site Sub Base Soil Bearing Resistance: 168 kPa (3500 psf)
22. All shell / roof nozzles shall have slip-on flanges unless noted otherwise
23. In lieu of a frangible joint roof connector the tanks shall be designed to incorporate 2 (two) emergency relief manholes API Flange drilling
24. Tank Chime: Floor plate protection at shell connection shall be 75 mm or to API 650, whichever is greater
25. All nozzle heights and projections shall be as noted on the drawings and exceed API 650 minimum requirements
26. Tank floor plates shall be overlapped in a manner to reduce the tendency for liquid to puddle during draw down toward the exterior shell
27. The tank shall be constructed with three (3) water draw off sumps sized to API 650 requirements
28. Jet A1 tank shall have internal coatings – Refer to specification – 09915
29. Tanks shall be designed to incorporate lifting lugs located in strategic positions which will enable a safe and stable lift for the loading on flatbeds in preparation for land and sea transportation to project site
30. All tank trim, railing, stairs and platforms and associated support framing will be shipped loose to project site
31. All tank manways, nozzles, and associated trim openings shall be blinded off and / or plugged in preparation for transportation to project site

2. PRODUCTS

2.1 Steel Tank

Plate material for tank shall be furnished to CSA G40.21-04 in Grade 260WT Category 4 to -50°F, rolled, kilned and made to fine grain practice.

Construction (vertical): to API standard 650.

All shell, floor and roof attachments are to have doubler plates. All column bases are to have doubler plates with minimum 150 mm beyond column base plate bearing surfaces.

Tank appurtenances:

1. See drawings for list and sizes and as described in this section.
2. All internal studs, nuts and fasteners shall be stainless steel. ASTM A193, Grade B8M and ASTM A194, Grade 8/8M.
3. Manway cover bolts and nuts shall be cadium plated. ASTM B766-86 (2008).

Railings, stairs and platform: Design to API standard 650, Table 5-19 and as shown on the drawings and outlined herein.

Stair tread, platform grating, handrail and supports:

1. Stair treads: Diamond grip, galvanized steel 12 gauge - 915 wide x 241 deep x 38
2. Platform Grating: Diamond grip, safety grating, pre-galvanized steel, 12 gauge with 38 mm channel, length and width to suit dimensions shown on the drawing
3. Guard rails at Walkways and Tank Roof:
    a) Rails: 50 x 50 x 6 mm angle. Railing height on platform measured from top of grating to top of rail. Intermediate rail 610 mm from top of platform to centerline of rail
    b) Posts: 50 x 50 x 6 mm angle at 1500 mm c/c maximum spacing
    c) Toe Plate: 125 mm height x 6 mm thick plate
4. Handrails at Stairs:
    a) Rails: 50 x 50 x 6 mm angle
    b) Railing height from toe of tread to top of rail: 1067 mm
    c) Posts: 20 square bar x 1130 mm long
5. Loadings: complete structure shall be capable of supporting a moving concentration load of 455 kg, and the handrail structure shall be capable of withstanding a load of 91 kg applied in any direction at any point on the top rail
6. Steel support framing: structural steel to CSA G40.21, grade 350 W weldable Steel
7. Railing, stairs and platforms to meet all local, provincial, territorial and federal regulations.

All tank attachments are to be fastened by use of seal welded doubler plates.

API Inspection and testing of tank:

1. Inspection of roof welds shall be as per API Standard 650, Section 8 – Methods of Inspecting Joints including complete visual inspections.
2. Inspection of shell - radiograph inspections of butt welded shell seams shall be as per API 650 Code Section 8 including complete visual inspections.
3. Inspection of floor welds shall be as per API 650 Section 8 including complete visual and complete vacuum box testing.
4. Inspection of floor to shell joint shall be as per API Standard 650 Section 8 including complete visual, liquid penetrant and vacuum box testing.
5. Inspection of roof to shell joint shall be as per API Standard 650 Section 8 including complete visual testing.
6. Inspection of nozzle to shell or nozzle to reinforcing pad welds shall be as per API Standard 650 Section 8 including Mag Particle testing of the back gouged root pass weld and Mag Particle and UT of the completed weld. Reinforcing pad to shell welds shall be tested by Mag Particle and the Reinforcing pad shall be pressure tested.
7. Inspection of double plates shall be as per API Standard 650 Section 8 and API Standard 653 including complete visual and vacuum box testing.
8. All Visual Inspection shall be to API standard 650.
9. All Dimensional Tolerances shall be to API standard 650.
10. All Welding shall be to CSA W47.1, CSA W178.2, and CSA W59.
11. Welders to be certified in accordance with CSA W47.1-03.
12. Submit records of Welders certification and test results to Owner or Owner's Representative.

3. EXECUTION

3.1 Installation

Install tanks in accordance with API standard 650 and the National Fire Code of Canada.

Contractor shall take care as to not puncture the dyke membrane with scaffolding and / or digging. Any damage to the membrane shall be repaired as instructed by Owner or Owner's Representative at no additional cost to the Owner.

Position tanks using lifting lugs and hooks, and where necessary use spreader bars. Do not use chains in contact with tank walls.

3.2 Field Quality Control

Test tank for leaks in presence of Owner or Owner's Representative.

Field test for leaks in accordance with API 650. API monogram is acceptable evidence of testing.

Contractor shall confirm that tank base finish grade elevation tolerances are within acceptable range before and after floor plate installation as per API-650.

Tank shall be hydrostatically tested for a period of 24 hours and monitored for leaks and/or level change during the test period. Contractor is responsible for the supply and disposal of hydrostatic test water. All water shall be clean and free of rust and other foreign particles.

All costs associated with hydro-testing shall be by the contractor. Owner or Owner's Representative shall outline method of test water discharge once completed.

Tank shall be surveyed in two locations per quadrant before test, after construction is complete. Further survey shall be completed during testing at:

1. 25% Full
2. 50% Full
3. 100% Full
4. Empty (post-testing)

In lieu of a hydrostatic test which may not be practical in this instance, additional shell testing shall be performed on all welds by: (1) performing an penetrating oil test by applying oil to the interior side of the weld and examining the exterior or (2) by applying a soapy water solution and a vacuum to either side of the weld as per Section 7.3.5 of API 650.

All costs associated with testing shall be by the Contractor. All test results shall be provided to the Owner or Owner's Representative for review upon completion.

3.3 Repair of Defective Welds

Requirements outlined in API standard 650 and at contractor's expense.

Additional testing as a result of defective welds is at Contractor's expense.