



CUSTOMER: Plains Midstream Canada

JOB
W376-15

UNIT
CRTK-124

PLANT LOCATION: Regina, Saskatchewan

PROJECT: Regina Terminal Expansion

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Rev. 0

BAY TANK AND VESSEL

HYDRO TESTING PROCEDURE

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1 PURPOSE

The purpose of this procedure is to define the Bay Tank and Vessel (BTV) execution strategy and the corresponding safety precautions to be established to ensure that hydro testing is undertaken in a manner that both personnel carrying out the works and personnel working in surrounded area will not be exposed to hazards which may derive from this specific activity.

2 REFERENCE DOCUMENTS

- API-650 12th edition, 1st addenda

3 RESPONSIBILITIES

BTV Project Manager is responsible for ensuring the project safety requirements and specific safety issues related to the activity considered.

BTV Supervisor has the duty to ensure the compliance with the established schedule, project and safety requirements.

Owner, Plains Midstream Canada, has the duty to furnish and dispose of the water for hydrotesting the tank. The water supply shall be at sufficient pressure and flow to fill the tank per this procedure. Water quality testing is at the discretion of the owner.

4 INTRODUCTION

Hydrostatic testing is universally known and accepted as a means of demonstrating the fitness of a pressurized component for service. After a hydro test, a tank can be expected to safely contain its intended operating pressure. The hydro test shall be conducted before permanent external piping is connected to the tank.

This project consisted of the erection of one field tank – CRTK-124, 132'-6 5/8" diameter x 60'-0" high fixed cone roof tank c/w a Sandborn internal floating roof (IFR). Tanks are open to atmosphere via roof venting & overflow vents.

5 PREPARATION

Prior to the start of the hydro test a number of items must be completed per the Appendix 3 – check list for hydro testing by the BTV QC and Supervision. Scope for the management of the tank is by BTV and management of the hydro water including pumping is by Owner.

A mechanical walk down must be completed prior to hydro test with all outstanding erection deficiencies clearly identified on an approved punch list.

The mechanical ITP shall be completed and signed for all mechanical items below the tank design liquid level.

5.1 Identification of Hydrotest Nozzles

The below list shall be used to indicate all nozzles and manways. Connections to the internal flange are listed from the flange inward, connections to the external flange are from the flange outward. Nozzles are based on W376-15-320-1-200 Rev 2.

Tag	Internal Connections	External Connections
N1	None – Internal diffuser will be in the tank, but not connected to the internal flange.	Gasket, bolting, 24" 150# Blind
N2	None	Gasket, bolting, 12" 150# Blind
N3	None	Gasket, bolting, 2" 150# Tapped Blind c/w 1/2" FNPT, nipple, 1/2" ball valve, nipple, clear plastic sight glass tube.
N4	None	Gasket, bolting, 4" 150# Blind
N5	Gasket, internal piping to sump	Gasket, bolting, 6" 150 # tapped blind c/w 3" FNPT opening, 3" 2000# NPT Ball valve, MNPT camlock fitting.
N6	None – the internal piping shall not be installed.	Gasket, bolting, 4" 150 # tapped blind c/w 3" FNPT opening, 3" 2000# NPT Ball valve, coupling, 3" 2000# NPT check valve (flow pointing into tank), MNPT camlock fitting.
N7A	None	Gasket, bolting, 10" 600# Blind
N7B	None	Gasket, bolting, 10" 600# Blind
N15	None	Gasket, bolting, 2" 150# Blind
M1	None	Gasket, bolting, FCO Coverplate
M2	None	Gasket, bolting, Mixer Coverplate
M3	None	Gasket, bolting, Mixer Coverplate
M4	None	Gasket, bolting, Mixer Coverplate

Primary Inlet / Outlet – N6

Secondary Outlet – N5

Sight Glass – N3

All Roof Nozzles, Overflows, and Roof Circulation Vents to remain open and uncovered during the hydrotest.

All gaskets and bolting shall be temporary hydrotest specific items. Permanent gaskets, and bolting shall not be used. Permanent blinds and covers may be used for the hydrostatic test.

5.2 Internal Preparation

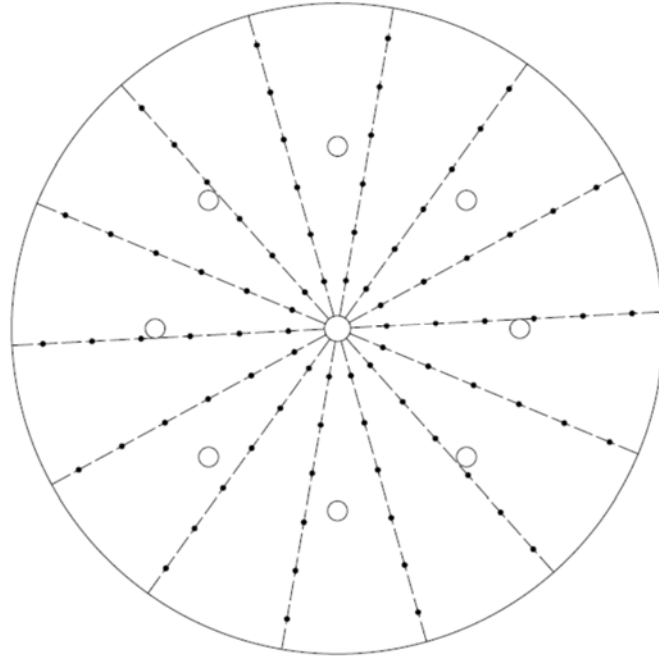
The tank involved in the test must be cleaned of all dirt and/or objects left inside. This shall include removal of all trash, debris, grease, oil, weld scale, weld spatter, and any other foreign matter.

Install internal piping to allow full draining of the tank on the hydro water outlet per the above table.

An internal walkdown shall be performed to ensure that all hydro test items are completed per this procedure prior to closing the access manway.

5.3 Internal Survey

Internal bottom elevation measurements shall be made before hydrostatic testing at 10' intervals measured on 14 diametrical lines (equally spaced lines from center to shell). This will result in 84 elevation points on the floor at the following radius values from the tank center: 10', 20', 30', 40', 50', and 60' similar to the figure below.



Shaded circles represent the survey points, hollow circles represent the location of internal columns.

Locations of elevation points are to be marked into floor plate so they are able to be measured again after hydrotest.

5.4 External Preparation

Installation of all temporary blind flanges (including temporary gaskets) in all the shell nozzles per the table in section 5.1. Special attention to the rating of the blinds, plugs, and valves is required to ensure it is above the hydro test pressure. Tightening of bolts on all flanged and/or threaded connections and testing of the torque value per BTV torque sheets.

Installation of the tank level gauge (clear hose) from the Level Gauge nozzle to the top of the tank. Ensure that the top of the level gauge is open to atmosphere and no kinks or interference in the line exist to allow accurate measurements.

The Hydro Water Inlet shall be identified and connected to the water supply. A ball valve, followed by a check valve, shall be connected between the tank nozzle and water supply to allow isolation of the tank. Ensure the ball valve is placed nearest the tank.

The Hydro Water Outlet shall be identified. A ball valve shall be connected to the nozzle and closed.

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Issue a notification to all contractors who are working in the area – the notification should be provided at least 24 hours prior to the start of fill activities.

A detailed inspection of all testing equipment and tools is required. Any servicing that is needed shall be performed prior to the start of fill activities.

Venting of the tank shall be via the tank roof centre vent (N10), around the roof perimeter and via the overflow vents. Ensure that the venting is not obstructed in any way.

Ensure that an external walkdown of the tank is completed to ensure all blinds, gaskets, bolting and valving is in place and secured and venting is not obstructed.

6 HYDRO TEST

6.1 General Notes

The approved task specific Job Hazard Analysis (JHA) signed off by BTV HSE, along with the completed Field Level Hazard Assessment (FLHA), is to be reviewed with all personnel directly involved with performing this procedure.

Only trained and competent workers will conduct the hydro test. Competency to be determined by BTV Site Supervision.

All hydro fill levels will conform to the table below – NEVER exceed these pressures. Minimum ambient air temperature during the test shall be above 0° C (32° F) to ensure that no heating of test water is required – if air temperature is below this, consult BTV engineering.

Water quality requirements are set by Owner, but shall include less than 5 ppm chlorides.

Continuous monitoring of the tank is expected during hydro test – particular attention to shell nozzles, repads, shell seams, shell to floor welds and attachments. If rain occurs then discretion is with the BTV Site Supervisor as to if the rain will delay the testing. A dry tank is required during some stage of the 24 hour hold period to ensure there are no leaks in the tank.

Approval must be obtained from the BTV Site Supervision and a hydro test permit is to be obtained from the Owner prior to start of filling operation. Only essential personnel needed to do the test are to be allowed in the test area exclusion zone.

Ensure that each step is completed methodically and that the hydro test QC form is available for completion and signature. After hydro test, ensure that the standard hydro test report is completed.

Survey of the tank shell external elevation will be conducted at various intervals throughout the hydro test (See section 6.3).

All defects found in welds shall be called to the attention of Owner's inspector, and approval shall be obtained before the defects are repaired. Repairs of defects discovered after the tank has been filled with water for testing shall be made with the water level at least 1' below any point being repaired or, if repairs have to be made on or near the tank bottom, with the tank empty. Welding shall not be done on any tank unless all connecting lines have been completely blinded.

Verify all roof connections are open for venting prior to discharge of water.

6.2 Hydro Test Procedure

Ensure all venting is open and not obstructed prior to and during the filling operation.

The maximum water fill level is to be as per Design Liquid Level (DLL) column in the below table:

Tank	Design Liquid Level	Liquid Pressure	Air Pressure	MDMT
CRTK-124	17,400mm (57'-1")	170 kPag (24.7 psig)	0 kPag (0 psig)	-28° C (-18° F)

Flow rate is a maximum of 18" per hour for all filling below the top shell course (0' to 50' elevation) and 12" per hour for the last shell course (50' to DLL elevation). The water will be filled to the bottom of the overflow vents – some water may escape the overflow vents – a reduction in the fill speed during the last minutes of the fill shall be determined by the BTV Site Supervisor as required.

The tank has a Sandborn IFR. BTV QC shall perform visual inspections of the IFR from the roof platform every hour to ensure that the IFR is functioning properly. The hydrotest shall be stopped to investigate any hangups or water pooling on the IFR. Engineering shall be contacted if the hydrotest is stopped due to IFR issues. The IFR does not effect the fill rate of the tank, however, particular attention shall be paid by BTV QC to the IFR during initial floatation.

Water levels are to be checked every hour via the sight glass. Water levels will be checked via measuring distance from roof manway M5 at 1/4, 1/2, 3/4 and full levels. All measurements are to be logged in Annex 1 time log.

6.3 Survey of Tank Shell

The tank foundation shall be professionally surveyed, using an established benchmark, during filling to ensure that the pad is stable and uneven settlement is not occurring. Uneven settlement will be determined via review of survey results. 1/2" difference over a minimum of 32' circumference shall be reported to the client. 2" difference over circumference shall **STOP** the test.

Filling may continue while survey is in progress so long as the liquid does not raise 12" or more between the start of the survey and the end. Measurements will be made at minimum 14 equally spaced intervals around the outside of the shell. Intervals are to be decided and marked by site personnel – survey shall be to the exact points each time.

Settlement elevations will be made:

- Before start of hydro
- With tank 1/4 full
- With tank 1/2 full
- With tank 3/4 full
- Full of Water after 24 hour hold
- After the tank has been emptied of test water

7 POST HYDROTEST ACTIVITIES

Ensure all roof venting is open and not obstructed prior to emptying.

Ensure that a Owner Representative has coordinated the transfer of water and release the water.

Remove all blinds and cover plates.

Clean up area, return all parts and tools used.

Sign ITP and hydro inspection form.

Perform final shell settlement survey with tank empty and final internal floor settlement survey.

8 DESCRIPTION OF SAFETY INSTRUCTION

8.1 General Instruction

The following general instructions shall be followed and adhered to:

- Dedicated work permit must be obtained allowing specific procedure.
- All current site specific safety plans (SSSP) and Owner requirements are in effect and will be maintained throughout the duration of the test.
- All personnel working at site must be informed in advance when hydro test is going to be carried out.

8.2 Notification

Before starting any operation, the Bay Tank and Vessel personnel responsible of hydro test has to give notification to all people present at site.

The communication has to contain, at least, the following information:

- Area involved in the activity – communicated via plot plan.
- The extension of the area to be ribboned off – minimum 8m exclusion zone around tank.
- Time and date of starting the activity.

8.3 Documentation

BTV Site Supervisor will verify, before start of the activity, that the tank has been prepared complying with all prescriptions written in the JHA and Work permit.

BTV personnel have also to prepare a map (plot plan) showing:

- The location of the hydro test.
- The required barricaded area – minimum 8m.
- Date and time of starting the activity.
- Pumps, Manifold, tubes, gauges, safety valves must be certified and calibrated for the ratio of the test. Calibration documents shall be reviewed and approved by Owner inspectors.

Entry to the area may be allowed after review of FLHA and / or JHA to the discretion of the Bay Tank HSE.

8.4 Safety Instruction

Bay Tank and Vessel has to ensure, that at site the following actions are put in place.

- Barricade / ribbon off at safe distance from the tested tank – 8m minimum.
- Post signs around the barricaded area showing:
“DANGER: NO ENTRY TO UNAUTHORIZED PERSONNEL”, or
“HYDRO TEST IN OPERATION”, or
“USE PROPER PERSONAL PROTECTIVE EQUIPMENT”

Bay Tank and Vessel has to carry out the following activities:

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- Inspect the system verifying that all mitigation measures are put in place:
- Removal of all valves and in-line equipment that must be excluded from the test and, if necessary, the prefabrication and installation of mock-ups.
- Installation/fixing of supports and anchorages. In certain cases, temporary or additional supports may be necessary due to the weight of the filled lines..
- Installation of all temporary blind flanges (including temporary gaskets) and/or plugs in all the battery limits.
- Tightening and torqueing of bolts on all flanged and/or threaded connections.
- Carry out a tool box meeting before start the activity.
- Suspend all activities inside the barricaded area when the testing is being executed.
- Verify, prior to filling tanks with water, if the tanks and their foundations can withstand full water weight.
- Verify that all people involved in the activity wear appropriate Personal Protective Equipment (PPE) per SSSP and Owner site specific standards.
- Activate the emergency procedure in case an unwanted situation happens per SSSP – i.e. a shutdown of the hydrotest equipment and evacuation from site.
- Make sure that the water to be discharged has the quality parameters complied with standard fixed by client.

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APPENDIX 1 – STANDARD HYDRO TEST REPORTS

STANDARD HYDRO TEST REPORT

CUSTOMER: _____

TANK VOLUME: _____ **SIZE:** _____

BUILD SPECIFICATIONS: _____

TANK SERIAL NUMBER: _____ **WORKORDER NUMBER:** _____

TEST DATE: _____ **AMBIENT TEMPERATURE:** _____

TANK TAG NUMBER: _____ **TEST MEDIUM:** _____

START TIME: _____ **END TIME:** _____

COMPONENT(S) EXAMINED: _____

OBSERVATIONS: _____

ACCEPTED BY: _____


BAY INSPECTOR

DATE: _____

CLIENT INSPECTOR

DATE: _____

APPENDIX 2 – JOB HAZARD ANALYSIS

		<h1>JOB HAZARD ANALYSIS</h1>			
Date:		JHA DRAFTED BY: Brett MacPherson	REVISION DATE:	REVISED BY: Brett MacPherson	NO. OF PAGES: 9
CRAFTS PERFORMING JOB: Welders		SUPERVISOR INVOLVED: Al Martin	JOB LOCATION: Plains Midstream Regina Terminal	PPE REQUIRED OR RECOMMENDED: FR long sleeve pants and shirts, work gloves, hardhat, approved eyewear, steel toed work boots, RPE where required	JHA NUMBER: 0001
		Detailed Description of Work: API - 650 Hydrostatic Testing			
		Priority Rating:- A =High, B = Medium, C= Low			
		Potential Hazards- Consider specific hazards that exist. Avoid generic statements like slips and trips or pinch-points. Write down exactly what the slip hazard is or what exactly could pinch you.			
		Identify Controls- Hazards identified in a job hazard analysis must be controlled in the following order: 1. Elimination, 2. Substitution, 3. Engineering Controls, 4.Administrative Controls, 5. PPE			
Steps	Risk Level A/B/C	Procedure Step	Tools, equipment, materials, people	Potential Hazard	Identify Controls
1.	C	Obtain and review Owner permit to hydro test	Test crew Supervisor	Unauthorized filling of tank	Owner permit must be obtained prior to hydro testing
2.	C	Review Bay Tank and Vessel hydro test procedure with supervision, testing crew, site HSE, site QC and client prior to conducting test.	Test crew Supervisor	Miscommunication of procedure	Review and sign off the Job Hazard Analysis by all parties. Only personnel who have been pre-authorized will be permitted in the hydro test area.
3.	C	Review Owner transfer procedure and sign onto their FLHA if working in close proximity.	Test crew Supervisor	Miscommunication of procedure and hazards	The Owner procedure and FLHA are to be reviewed prior to task when working in close proximity

4.	C	Preparation for Hydro testing	Water source Transfer pump Test crew Supervisor	Inaccurate fill amount	<p>Only use engineered drawing for fill amount and fill rate.</p> <p>Receive foreman or supervisor's permission to do hydrostatic (hydro test) testing.</p> <p>Check prints for agreed fill level. Make sure to confirm with supervisor or foreman.</p>
5.	C	Determine water source and fill time requirements	Water source Transfer pump Test crew Supervisor	Wrong medium used for testing	<p>Testing medium to be tested and approved by the client.</p> <p>Filling to follow the approved test procedure.</p>
6.	B	Set up water transfer equipment from source to tank inlet including grounding	Water source Transfer pump Test crew Supervisor	Slips and trips, pinch points, strains and sprains. Cuts and abrasions. Spills	<p>Ensure adequate housekeeping. Wear appropriate P.P.E. Use the buddy system as required when moving piping or hoses. Be aware of pinch points on equipment.</p>
7.	C	Inspect integrity of water transfer equipment before starting transfer. Contact other contractors on site before starting transfer.	Water source Transfer pump Test crew Supervisor	Leaking equipment-blow out-ruptures	<p>All lines to be walked and inspected by Owner/Bay Tank and Vessel representatives before filling.</p> <p>When filling starts, the area will become a controlled area. Pressure to be brought up slowly to check for leaks.</p> <p>Continuous monitoring of equipment when filling to ensure proper flow rates. Ensure adequate venting.</p>
8.	C	Clean and Inspect interior of tank	Supervisor Test crew	Confined space entry, Slips and trips. Airborne dust particles Poor illumination.	<p>Ensure confined space entry plan is followed.</p> <p>Ensure adequate lighting is available.</p> <p>Ensure use of appropriate PPE</p>

9.	C	Prepare restricted area for hydro test	Test crew Supervisor	Over pressure Unauthorized traffic and personnel exposure	Secure area around hydro area and fill point. Signage/pressure testing in place. Flag out the area with red danger flagging and tag it with pertinent information. Only persons who have signed onto JHA are authorized to enter the area.
10.	B	Plug, blind, or valve off all shell nozzles or connections for the tank to be hydro tested. All valves & blinds to be ANSI rated to match the tank flange. Only opening on the top will be left open to allow air to escape while the tank is being filled.	Test crew Supervisor	Inadequate / unsuitable covering which allows water to escape. Slips and trips, pinch points, cuts and abrasions. Working at heights. Strains and sprains	Close off all shell openings from tank. If they cannot be sealed off then a specific hydro test procedure will need to be developed to address this concern. Any site specific instructions must be approved by the Project Engineer, Project Manager and BTV safety. This is a stop point if there are openings in the tank that are not closed the hydro test will not continue until permission is given by the Site Superintendent. Be aware of your surroundings. Wear appropriate P.P.E. Ensure fall arrest equipment is used on roof. 100% tie off with a rope grab system on top of the roof for floating roof inspection / opening roof vents. Use two people or mechanical means for installing blanks and blinds

11.	C	Determine fill point and high point(s) to allow water in and air out.	Test crew Supervisor	Unable to verify leaks.	Make sure valves with plugs are used at these locations.
12.	B	Visually inspect all hoses, compressor equipment prior to conducting the test.	2 men required for AWP work and one worker manning the pump. Supervisor to be present at all times.	Compressor lines or connections could fail under pressure. Failure to communicate should equipment fail.	All connections must have whip checks and wired connections. Visual or radio contact must be maintained with the pump operator in the event of failure.
13.	B	Inspect all entire tank, shell and roof to ensure all openings have been closed. Set up test blinds on roof nozzles.	2 test blinds with manometers and trees or calibrated gauges. Tool bags and rope or AWP	Pinch points Work at heights Tools or bolts could slide off roof Slip, trip or fall on stairs.	Keep fingers clear during bolt up. 100% tie off when working from the AWP. Do not leave any items loose that could slide on the roof. Small tools to be raised to roof with AWP or roped up tool bags.
14.	C	Control the area surrounding the test tank	Signage Red ribbon Watchmen	Workers could walk into the area if unaware of the test.	Hydro test signs to be placed at any entry point into the tank area. Red ribbon and ribbon and tags required to restrict workers from entry to area.

15.	B	Fill slowly from the bottom and allow air to escape from the high point. (fill slowly as it raises to allow air to escape)	Water source Transfer pump Test crew Supervisor	Pressurized water lines	<p>Inspect lines and connection prior to filling.</p> <p>Fill tank to level determined by both manufacturer and client.</p> <p>Stop points will be determined by client, manufacturer and applicable code requirements.</p> <p>Constantly monitor filling to detect leaks as they appear.</p>
16.	B	<p>Flow rates to be monitored and continually inspect tank for integrity.</p> <p>Monitor area around tank for any changes, shifts, or any visible concerns developing during the testing if detected. report to supervisor immediately</p> <p>If leaks or concerns are detected, stop filling and assess situation if possible correct. If not possible, suspend filling until situation can be addressed.</p> <p>Water level must be 1' below repair location.</p>	Test crew Supervisor Survey crew QC Inspectors	Inaccurate fill amount Pad instability Buckling, settling, and collapsing, out of plumb conditions and leaks.	<p>Ensure adequate venting for flow rates. Survey tank at stated intervals as set out in hydro-test procedures.</p> <p>Ensure tank is filled to the approved engineered level.</p> <p>The tank foundation shall be monitored during filling to ensure that the pad is stable and uneven settlement is not occurring</p> <p>Continually monitor tank integrity during filling.</p>

17.	B	Survey points at 25-50-75 and 100% capacities	Test crew Supervisor Survey crew QC Inspectors	Leaking equipment, blow outs ruptures, pinch points, slips and trips cuts and abrasions	Continuous monitoring of tank. Check for leaks. Wear appropriate P.P.E. Maintain adequate housekeeping. No surveying after dark.
18.	B	When at proper fill level, turn off valves and turn off water, disconnect water. Follow holding procedures and continue to monitor tank if any signs of leaks or other concerns are found reduce pressure open up the top of the tank and do not continue until they have been corrected and only with Supervisors permission	Test crew Supervisor QC Inspectors	Not following approved written procedure.	Ensure the approved written procedures are followed.
19.	C	Visually inspect the tank for any indications of abnormal stress.	QC Inspectors	Slip trip and fall due to uneven ground surfaces around the tank pad.	Remove any obstacles from the inspection path. Watch footing.
20.	C	Hold tank at proper fill level until Q.C. personnel inform you that test is good	QC Inspectors Test crew Supervisor		QC documentation completed after 24 hour hold.

21.	C	When all roof nozzles and man way covers have been opened, dewatering can proceed.	Water pump to transfer water to the adjacent tank. Test crew Supervisor Bolt up tools	Tank collapse due to vacuum pressure. Water transferred to an unapproved area/tank	Ensure all roof nozzles and man way covers have been opened prior to dewatering. Ensure that a Owner representative has coordinated the transfer of water as per the Owner hydro testing water management plan. (tank to tank) Keep face and hands clear of line of fire when releasing water. 100% tie off when working from AWP. When complete, return confined space entry signs and red ribbon on the man ways
22.	B	Remove plug and reconnect water hose, connect other end to drain. Make sure there is an open vent for an air in source on the top of the tank to prevent a vacuum from forming Determine the drain area and where water will go. When on a clients site, check with client where water is to go and any special requirements for water disposal.	Test crew Supervisor	Early pressure release Leaks, collapsing , buckling, working at heights	Follow all the approved dewatering procedures. Ensure water is disposed as per Owner's environmental protocol. In the event of an emergency all personnel to evacuate area as per emergency response plan. Fall arrest to be used on fixed cone roof of tank with 100% tie-off at designated anchor points.

23.	B	Release water from tank after designated hold period.	Test crew Supervisor	<p>Early pressure release</p> <p>Leaks, collapsing , buckling, working at heights</p> <p>Personnel exposure, ground erosion. Pinch points, slips and trips. Cuts abrasions.</p>	<p>Ensure adequate venting on tank before discharging water. Install drainage piping to appropriate location. Appoint personnel to continuously monitor flow rates. Wear appropriate P.P.E. Maintain adequate housekeeping.</p>
24.	C	When drained, remove all plugs, pancakes and blinds used for test.	Test crew Supervisor	<p>Strains from body position</p> <p>Pinch points, slips and trips. Cuts abrasions.</p>	<p>Use proper body positioning</p> <p>Be aware of your surroundings.</p>
25.	B	Remove de-watering equipment from site.	Test crew Supervisor	<p>Personnel exposure. Strains and sprains. Cuts and abrasions. Slips and trips.</p>	<p>Use spotters where necessary. Wear all necessary P.P.E. Use the buddy system. Ensure housekeeping is maintained.</p>
26.	C	Clean up area, return all parts and tools used	Test crew Supervisor	<p>Tripping hazards</p>	<p>Clean up as soon as possible after test.</p>
27.	C	Close permits	Supervisor	<p>Inadequate communication about occupancy.</p> <p>Unauthorized entry.</p>	<p>Permit expiry date and times to be strictly adhered to.</p> <p>Request extension if absolutely necessary.</p>

REVIEWED BY:	DATE:	REVISION DATE:
APPROVED BY:	DATE:	NEXT REVISION DATE:

APPENDIX 3 – CHECK LIST

PRIOR TO HYDRO TESTING

No.	CHECKLIST	COMPLETED
1.	Ensure all mechanical ITP items below the design liquid level are completed and signed off for the tank to be hydro tested.	
2.	Sweep tank to remove loose debris from the tank.	
3.	Survey of external tank shell elevation.	
4.	Install drain lines	
5.	Measure & record the maximum and minimum annular space between the shell and the floating roof rim plate prior to initial floatation.	
6.	Internal walk down of the tank.	
7.	Install tank level gauge to verify the liquid height during hydro.	
8.	Ensure all the temporary tools (such as valve, fitting, hoses, flanges, blind plate, etc) are rated more than the maximum hydrostatic pressure.	
9.	Install fill / empty nozzles – ensure that ball valve is placed between the check valve and the tank nozzle.	
10.	Blinding / Plugging / Valve of all shell connections – ensure that tank is isolated from all piping and torque studs/bolts.	
11.	Issue notification to all contractors working in the area of the hydro test.	
12.	All test equipments and tools shall be inspected for wear and damage.	
13.	Vents are available and installed at the high points to vent air. Check the vent before testing and make sure it is not blocked. N14 A-D and N13 A-P shall be cut to provide venting.	
14.	Isolate the test area and display appropriate safety sign / ribbon in the area.	
15.	External walk down of the tank.	

Supervisor signature

Safety signature

DURING HYDRO TESTING

No.	CHECKLIST	COMPLETED
1.	Obtain a work safety permit by authorized personnel.	
2.	Ensure the specification sheet of the tank, which clearly defines the fill height, pressure and temperature limits of the tank.	
3.	Monitor the tank and equipment for leaks – 360 deg review of tank shell and monitor of IFR from roof platform.	
4.	Monitor the fill rate (minimum every hour) max 18"/hr below top course, 12"/hr for top course.	
5.	Survey of tank shell elevation at ¼ full.	
6.	Survey of tank shell elevation at ½ full.	
7.	Survey of tank shell elevation at ¾ full.	
8.	Survey of tank shell elevation after 24 hours at full.	
9.	Fill and sign the standard hydro test report.	
10.	Drain tank	
11.	Survey of tank shell elevation after empty.	

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APPENDIX 4 – TOOL BOX TALK HYDRO TESTING

- Permit for Hydro test must be obtained prior to starting the work.
- Hydro testing poses danger if not properly planned and performed.
- Prior to application of pressure, checks should be made on all connections, joints and plugs.
- Barriers and warning signs shall be provided around the area under test.
- Adequate lighting to be provided (for activities at night).
- An attendant shall be present at all times while the system is under test. Only personnel involved in the test shall be allowed inside barricaded area.
- Personnel working in the area are to be informed of the activity.
- No activities that could have a direct impact on testing operation shall be carried out during the testing process.
- Personnel directly involved in the work, supervisor / Foreman, shall be present / available at all times during the testing operations.
- Draining of test mediums (water) shall be made in a controlled manner where it will not affect the safety of other personnel, equipment and environment.
- Area should be barricaded and marked with appropriate sign boards displayed in required location.

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APPENDIX 5 – PLOT PLAN

