



DEM

Interoffice Communication

To : GWP, JES, RWS, KWC, DEL

From : G. A. Morgan

Date : September 10, 1975

Subject : HORTON SPHERE START-UP

Attached is the Horton Sphere start-up procedure with responsibility assignments, related equipment and check-out list, and VCM unloading procedure.

The sphere will be ready for introduction of VCM September 18, 1975. At that time the mechanical engineering department has estimated that all hazardous work in the area will have been completed. In cooperation with operations and plant maintenance and unless notified otherwise, process engineering will implement the start-up on Thursday, September 18. Prior to introduction of VCM, a meeting will be held for all concerned to discuss the schedule and to be sure that everyone is cognizant of their responsibilities. Once all items have been checked out and prior to introduction of liquid VCM into the sphere, the sphere will be turned over to production.

Please contact me if you have any questions.


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Process Technician

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ST 601 (Horton Sphere) Related Equipment and Check Out List

A. Fire and VCM Release Protection

1. Deluge System

The sphere is equipped with 20 heat sensing heads mounted around the bottom half of the sphere. Set at 160°F, the heads will open when area temperature reaches 160°F and activate the 6" top mounted fire deluge line and the panel alarm in the large reactor control room. The following conditions will activate the deluge system:

- a. 160°F heat at base of sphere
- b. Broken polyflo tubing between sensors
- c. Interrupted air supply

If the deluge is activated the following sequence occurs:

- a. All 4 automatic sphere valves close.
- b. Large reactor control room annunciator sounds.

Note: If the deluge system is manually activated, the 4 sphere automatic valves will not close.

When the problem is corrected, the system automatically returns to normal. A manual cut-off valve is located across the road west of the truck scales. A manual control switch is located at the tank farm local control panel should it become necessary to activate the system for tests or in an emergency.

Also supplied are 4 fire monitor nozzles on an individual water supply header. These are located at the (1) North-east end of 201, (2) North-east of the Horton Sphere, (3) North-west of the sphere and (4) Due south of the sphere.

Resp.
Instrument

2. Deluge Check-Out

To be completed prior to introduction of VCM to the Horton Sphere.

- a. Open the 4 sphere automatic valves

- (1) Liquid to sphere

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- (2) Vapor line

- (3) Liquid from sphere

- (4) Recirculation line

2. Continued

- b. Activate the deluge control switch at the local control panel by interrupting the air supply.
- c. Check the 4 sphere automatic valves. All 4 must close.
- d. Large reactor control room alarm must activate.
- e. De-activate the control switch at the local control panel.
- f. System must return to normal.
- g. Each of the four fire monitor nozzles will be checked at this time.

B. Dean VCM Supply Pumps (2)

- 1. The two supply pumps are provided with local control panel start/stop push bottoms, run light at large reactor control panel, and large reactor control panel start stop buttons.

Resp.
Electrical

2. VCM Supply Motor Rotation

- a. Check pump motor rotation
- b. Check local start/stop button
- c. Check remote (control room) start/stop
- d. Check remote run light

C. Alarms

1. High Level Alarm

The sphere is equipped with a high level alarm float switch which works with the Varec automatic level indicator. It is activated when the level reaches 90%. When the sphere reaches 90% the following occur:

- a. Horn at the local control panel will sound
- b. The red blinking beacon on top of the sphere will activate
- c. A high level signal will activate on the large reactor control room annunciator panel.

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When the local control panel silence button is pushed the:

- a. Horn silences
- b. The blinking light stops and remains on until the level drops below 90%

C. Continued

Resp.
Instrument

2. Check-Out

As the sphere is initially filled with water, the instrument personnel should:

- a. Check alarm setting - should activate at 48' - 6"
- b. Check blinker at sphere top
- c. Alarm horn at local control panel
- d. Large reactor control room annunciator alarm
- e. Silence (does top light stop blinking and remain on)
- f. Does system return to normal as level drops. (To be checked as water is purged from sphere)

D. Level Indicators

1. Differential Pressure Level Indicator

The D.P. level indicator reading is given as liquid level percentage.

Instrument

a. Check-Out

- (1) Purge inlet and outlet lines with N₂
- (2) Leave sphere inlet and outlet valves closed until all water has been cleared.
- (3) When liquid VCM has been introduced to the sphere, open the bottom inlet valve to the D.P. cell.
- (4) Using a VCM sample cylinder, introduce liquid VCM into the seal chamber at the sphere dome and open D.P. cell bleed line until vapor starts.
- (5) Close bleed valve, open top dome valve to sphere
- (6) Calibrate against Varec automatic level indicator.

2. Varec Automatic Level Indicator

The Varec indicator is a float-type unit equipped with a high limit switch connected to the local control panel and the large reactor control room annunciator panel. It gives its level read-out in feet and inches.

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2. Continued

Instrument

a. Check-Out

- (1) Check the Varec reading every three hours as the sphere is initially filling with water against actual tape measure readings taken from the top manway.
- (2) Check the high-limit switch which should activate at 48' 6" and adjust as necessary. Measure the outage from the dome head at the base of the manway.

E. Horton Sphere Automatic Valves

Four automatic valves are utilized at the sphere.

1. Liquid to sphere
2. Vapor line
3. Liquid from sphere
4. Recirculation line

These valves are operated by two-position switches at the local control panel with indicating lights and overrides in the large reactor control room.

Instrument

1. Check-Out

- a. Do the open-close switches at the local control panel operate the valves?
- b. Are the large reactor control room valve position indicating lights working?
- b. Does the large reactor control room open/close button override the local control panel switch?

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ST 601 (Horton Sphere) Start-Up Procedure and Responsibilities

Responsibility

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| Maintenance | 1. Inspect all nozzles, flanges, etc., for proper hook-up and tightness. All valves associated with the VCM sphere installation should be closed (OP). |
| Maintenance | 2. Remove top and bottom manhead. |
| Maintenance | 3. Flush walls with high pressure hose to remove all rust and scale possible. Engineering, operations, and maintenance personnel to inspect. |
| Maintenance | 4. Replace bottom manway. All inlet and outlet valves should be closed. |
| Operations | 5. Hook up fire hose to the 3" sphere fill/drain line from the well outlet and start filling with water. |
| Operations | 6. Open the top Varec automatic level indicator valve. Using a 50' tape periodically measure the outage and compare against the Varec reading. |
| Operations | 7. Fill sphere until it overflows thru the top manway. Open the liquid, fill, pump recirculation, and pump feed lines to the sphere. (All lines will remain blanked off at tie-ins) open high-point bleeds until all are free of air and hydro-statically full. Open water inlet and overflow the sphere again. Hook up a water hose to the 3/4" low point vapor line drain immediately in front of the automatic vapor valve #033. (See attached Figure 1) Open valve #033 and leave the top manual valve closed. (#034) Remove the 3/4" top vent plug and fill with water. When all air is purged, replace the plug. |
| | Note: During filling, the vapor level indicator readings will be required by the vinyl shift supervisor every three hours. The high level alarm will be set at 90% (48' 6"). See equipment check list for details. |
| Maintenance | 8. Once the sphere has been again filled, replace the top manway and secure. |
| Maintenance | 9. Loosen both relief valve base bolts, purge water thru, and retighten. Close the manual valves under the relief valve. |

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- Maintenance 10. Open the 2" vent valve, hook up nitrogen to the 3/4" bottom sample nozzle and purge the sphere until a top air sample shows less than 1000 PPM oxygen. Close the vent line and open the fill water to bring the sphere pressure up to 50-60 PSIG.
11. Using the N₂ Cylinder slowly bring the pressure up to 100 PSIG. Cut the N₂ off, check for leaks and repair as necessary. The sphere and lines must hold 100 PSIG for a minimum of 15 minutes.
- Operations 12. When the pressure check has been satisfactorily completed, de-pressurize by opening the two inch vent valve.
- Operations Maintenance 13. Close all sphere bottom valves and remove the line blanks at all tie-ins except for the cross-over valve to the V-11, V-12 VCM supply line. Blanks are at vapor valves #02, 03 and 012. Liquid line blanks are at valves #3, 5, 24, and 25.
- Operations 14. Once blanks are removed. Hook up water hose to each individual line and refill with H₂O using high point bleeds.
- Operations 15. Open the manual block valves under the two relief valves and the sphere vapor, VCM inlet, pump supply and recirculation valves. Very slowly and carefully re-pressure the sphere and lines to 70 PSIG. Check for leaks and repair as necessary. Pressure must hold at 70 PSIG for a minimum of 15 minutes.
- Operations 16. Leaving pressure on the sphere, close all bottom valves and prepare to introduce VCM.
- Operations 17. Disconnect the water fill hose from the well water line and move to drainage ditch. The sphere is now ready for VCM.
- Note: Meeting with DEL, DEM, GWP, RWS, JES, GAM, ELK, KWC, DFJ, Before introducing VCM.
- Yard 18. Have the yard operator open the vapor line cross-over from 201 or 202 into the vapor line to the sphere.
- Operations 19. Drop the pressure on T601 with the top 2" vent line to 5 PSIG. Positive pressure must be maintained on the sphere at all times to prevent air entry.
- Operations 20. Open the automatic vapor valve (#033) and the sphere top manual vapor inlet valve (#034).
- Note: VCM must be added to the D.P. level instrument lines at this point. See equipment check list.

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| Operations | 21. Pressurize the sphere to 30 PSIG and open the 3" manual drain valve leading to the drainage ditch. Do not allow the sphere pressure to drop below 10 PSIG. It may take some valve adjustment until the pressure stabilizes. |
| Operations | 22. Check and record the two level indicators every three hours as the water is drained. The Varec reads in feet-inches and the differential pressure indicator reads in %. |
| | 23. Fresh air masks must be worn from the time the sphere reaches 10'-6" on the Varec until the drain is completed. |
| Operations | 24. When all water possible has been drained, close the vapor inlet and water drain valves. Check the water drain valve hourly until no water remains. |
| Maintenance | 25. Remove water drain hose and install the blind flange on the drain valve. |
| Yard | 26. The sphere should now be ready for liquid VCM. Follow procedures for filling with liquid VCM as outlined in the attached VCM unloading procedure and as directed by production. |

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VCM SPHERE LIQUID LEVEL CHECK-OUT
(FILLING)

Date	Time (3 Hour Intervals)	Varec Reading (Ft.-In.-1/8 In.)	Tape Reading ¹ (Ft.-In.-1/8 In.)	Initials
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VCM SPHERE LIQUID LEVEL CHECK-OUT
(EMPTYING)

Date	Time (3 Hour Intervals)	Varec Readings (Ft.-In.-1/8 In.)	Barton Liquid Level (%)	Initials
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TENTATIVE START-UP SCHEDULE

September 18 - Wash down sphere walls
September 19, 20, 21 - Fill sphere with water
September 22 - Pressure checks and N₂ - purge
September 23,24 - Displace water with vapor
September 25 - Unload 1 R/C liquid VCM

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