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AHS

To: D. W. Hollis

From: F. G. Jeanson
Date: January 20, 1986

Subject: REACTOR PRESSURE CHECK OPERATING PROCEDURES

**Interoffice
Communication**

VISTA

Attached is a proposed operating procedure for pressure checking vinyl reactors. The procedure is designed to efficiently pressure check reactors and protect reactor rupture discs from damage during the pressure check process. This procedure will be used to train the vinyl shift supervisors. The supervisors will then be qualified pressure check observers.

Please review and return any comments to me.

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Process Engineer

ATTACHMENTS
/aeb

cc: JF, JWW, CWT, MLN, SCH, VEM, VLT, JGC, AHS, CLW

REACTOR PRESSURE CHECK
OPERATING PROCEDURES

A. General Information

Prior to the startup of a reactor after an extended outage or following maintenance work that involves breaking a connection to the reactor such as replacing actuated valves, cleaning the condenser tubes, or replacing a rupture disc, the reactor must be pressure checked. This is done by filling the reactor with water until a specified pressure is reached. A properly performed pressure check shows that no reactor leakage will occur, either inward or outward, during subsequent operations. The reactor must be pressure checked to 90% of the pressure of the lowest rated rupture disc on the reactor condenser. Use the following to determine the pressure required for a proper pressure check:

<u>Reactor Size</u>	<u>Lowest Rupture Disc Pressure</u>	<u>Required Pressure For Pressure Check</u>	<u>High Pressure Alarm</u>
Large (32,000 gal.)	205 psig	185 psig (90%)	160 psig (78%)
Small (18-22,000 gal.)	185 psig	165 psig (89%)	140 psig (76%)

The operators involved must be extremely careful during pressure check procedures not to burst or damage a rupture disc. Bursting a disc during pressure check will cause reactor downtime to change the disc. A disc can be damaged by hydraulic shock if the reactor becomes liquid full during the pressure check. A damaged rupture disc may burst at lower than the rated pressure causing leakage through the reactor relief valve. In addition, a damaged disc may not burst at the rated pressure which could allow a reactor to overpressure. The shift supervisor observer must watch the pressure check from the field as the pressure rises on the reactor and must verify the final reactor pressure. The reason for the pressure check, the signature of the shift supervisor, the final reactor pressure, and other test findings will be noted in the reactor pressure check log kept in the Vinyl control room.

NOTE: PVC reactors will operate no longer than six months between rupture disc changeouts.

Reactor Pressure Check Operating Procedures
Page 2

B. Procedure

1. When the reactor is ready for pressure check, the lead operator will move the mode advance switch until the reactor is in the SWIRL mode. All the reactor valves should be closed and the lead operator will check to make sure that they are.
2. Turn the reactor agitator off. The lead operator will check the amps to make sure that the agitator is not running.
3. The lead operator will notify the reactor "A" operator that the reactor is ready for pressure check. He will then instruct the "A" operator to shut off the reactor lip seal flush, to shut off the sprayhead flush, and to open the top manway. The lip seal flush must not be turned off until the agitator is shut off. The "A" operator will notify the lead operator when the flushes are shut off and the manway is open.
4. The lead operator will take the following steps to fill the reactor:
 - a. Check to make sure the charge water pumps are available for use.
 - b. When the charge water pumps are available for use, notify the "A" operator that the reactor is ready to be filled for the pressure check.
 - c. Set the charge water temperature controller down to 100°F. This will conserve energy while pressure checking the reactor.
 - d. The reactor hot water charge water and main dump valve must first be checked for leakage. Turn on "A" charge water pump and open the discharge valve. The charge water meter should count a few counts and then stop. Wait about 15 seconds to make sure the meter does not count. If the meter does show additional counts, it indicates a leaking hot water valve. Report this condition to the Shift Supervisor and note it in the pressure check logbook.

Reactor Pressure Check Operating Procedures
Page 3

- e. When the reactor hot water charge valve leak check is completed, open the hot water charge valve so that the reactor charge (main dump) valve can be pressure checked. The hot water counter on the panel should show a few counts, then stop. Wait about 15 seconds to make sure the meter does not count. If the meter does show additional counts, it indicates that the main dump valve is leaking through. Report this condition to the Shift Supervisor and note it in the pressure check logbook.
 - f. When the reactor main dump valve leak check is completed, open the main dump valve.
 - g. Turn on the charge water pump and open the discharge valve. Using both pumps for pressure checks will reduce the time to fill the reactor.
 - h. Monitor the charge water meter counter to make sure water is going into the reactor.
 - i. Fill the reactor until water reaches the bottom of the reactor manway. When notified that the water is up to the manway, shut the reactor main dump and hot water charge valves and the discharge valves on "A" and "B" charge water pumps, then shut down the pumps.
5. The "A" operator will close the reactor top manway and notify the lead operator when it is closed.

NOTE: The "A" Operator will inspect the manway "O" ring for wear or defects and will replace it, if needed, prior to closing the manway.

6. The lead operator will inform the reactor "A" operator that water will be put into the reactor until the reactor reaches 30 psig (120 psig for D-700 or 745 reactor). The shift supervisor will go to the top of the reactor and monitor the pressure on a reliable pressure gauge and will inform the lead by radio of each 10 psig increase in pressure.

NOTE: It is the "A" operator's responsibility to keep pressure gauges in the unit changed out as needed.

The lead operator will then take the following steps:

- a. Set the charge water temperature controller setpoint back to the normal charge water temperature.
- b. Check to make sure all reactor valves are closed.
- c. Start one hot water charge pump and open the discharge valve.

Reactor Pressure Check Operating Procedures
Page 4

- d. Open the reactor hot water charge valve and the main dump valve while monitoring the reactor pressure.
 - e. Fill the reactor until it reaches 30 psig pressure, either by the control panel pressure indicator or the gauge in the field that is monitored by the "A" operator (fill D-700 and reactor 745 to 120 psig). This should take 20-30 counts of water (180 counts for 745 or D-700).
 - f. When the reactor reaches the pressure specified in Step e, close the reactor main dump and charge water valves and immediately close the charge water pump discharge valve and shut down the pump.
7. The "A" operator will proceed to the reactor catalyst bomb and will use the following steps to finish filling and pressure checking the reactor.
- a. Make sure the catalyst bomb is empty.
 - b. Close all the valves on the bomb except the one to the pressure gauge.
 - c. Open the valve that supplies high pressure service water to the catalyst bomb.
 - d. Be sure that the valve which separates the bomb from the pressure gauge is open. The pressure should come up to about 200 psig and the HPSW meter will stop turning.
 - e. Notify the lead operator and the person on top of the reactor that the water is about to start going into the reactor through the catalyst bomb. DO NOT begin water injection through the bomb until the lead operator is ready (watching the control room pressure indicator) and the person on top of the reactor is in position and watching a reliable pressure gauge.
 - f. When the lead operator and person on top of the reactor are ready, open the catalyst injection ram valve for the reactor, using the local hand switch at the catalyst bomb. The catalyst bomb pressure should drop to about 15-20 psig above the reactor pressure (due to the head of liquid in the reactor) and the HPSW meter should resume turning.

Reactor Pressure Check Operating Procedures
Page 5

8. All three operators, the lead operator, the "A" operator, and the person on top of the reactor will monitor the reactor pressure as it rises and will communicate the pressures observed at 10 psig intervals. The pressure reading shown in the control room and on top of the reactor should be identical. If they are more than 5 psig apart, shut off the water going into the reactor and change the gauge or have the pressure transmitter recalibrated (this takes an instrument maintenance work order). The pressure shown on the gauge at the catalyst bomb should read 15-20 psig more than the gauge on top of the reactor due to the head of liquid in the reactor. The pressure increases should be no faster than 10 psig every 10-15 seconds to allow all three operators to communicate the pressures effectively. As the reactor becomes full and the pressure rises faster, the "A" operator must crack the manual HPSW valve closed to slow the rate of pressure increase so that the pressures can be communicated effectively.
9. The lead operator will inform the shift supervisor when the reactor high pressure alarm comes on. This information will be recorded in the pressure check logbook.
10. When either the indicator in the control room or the gauge on top of the reactor reaches the desired pressure, the "A" operator will immediately close the HPSW valve to the catalyst bomb and then the catalyst injection ram valve.
11. The "A" operator and either the chief operator or a supervisor will check the entire reactor from the bottom to the top of the condenser for leaks. If a flange or gasket has been changed, check these very closely. All rupture disc gauges must be checked to make sure they are not leaking.
12. The lead operator will monitor the reactor pressure. If the reactor holds pressure for ten minutes, the pressure check is completed. This pressure must be verified by the pressure check observer on the gauge on top of the reactor. If the reactor loses pressure, check the reactor for leaks and have them repaired. After the leaks are repaired, the reactor must be brought back up to at least 150 psig with HPSW through the catalyst bomb to make sure that the leaks are stopped.

Reactor Pressure Check Operating Procedures
Page 6

13. When the pressure check is completed, the lead operator will open the reactor sewer valve and main dump valve and drain water from the reactor.
14. When the reactor pressure reaches 0 psig, the lead operator will open the reactor vent valve to complete draining of the reactor.
15. The "A" operator will vent and drain the catalyst bomb and then will turn the lip seal flush and reactor spray-head flush back on after verifying with the lead operator that there is no pressure on the reactor.
16. The "A" operator will notify the lead operator when the lip seal flush is turned on, and the lead operator will turn on the reactor agitator.

NOTE: DO NOT turn on the reactor agitator until it has proper lip seal flush flow.

17. The lead operator will monitor the reactor amps as they fall to the no-load amperage. He will then notify the "A" operator to watch the sewer bullseye for when the reactor comes empty.
18. The "A" operator will notify the lead operator via radio when the sewer bullseye shows that the reactor is empty. If the "A" operator is unsure whether the reactor is empty or not, he will notify the lead operator to run some water through the condenser rinse nozzle to make sure the flow starts and stops in the sewer bullseye. The lead operator will follow the Rinse Procedures to start flow through the reactor and then shut off the flow according to the Rinse Procedure.

NOTE: DO NOT flush water through the charge manifold to the sewer to check for the reactor being empty. This could give a false indication because no water will actually flush through the reactor.

The "A" operator will observe the water flowing through the bullseye and then stopping as the reactor is emptied. When the bullseye shows that the reactor is empty, the reactor is ready for evacuation and charging.