

REACTOR SAMPLING PIPING REVISIONS

ABERDEEN CHEMICAL PLANT

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I. PURPOSE

Presently only D-700 and 745 reactors have sampling piping adapted to use the reactor sampling cart. This design is to revise the remaining reactor sampling piping to allow use of the sampling carts on all reactors. D-700 piping is to be revised also to reduce the length of the line and the number of elbows to lessen chances of plugging.

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II. PROCESS DESCRIPTION

A. Old Module

a. D-300 Through D-600

The revisions to be made to D-300, D-400, D-500, and D-600 are similar. A description of the revisions to D-300 will be given below. Refer to the P & I Diagram for D-300.

D-300 reactor has an automatic ram valve on the catalyst bomb addition line to the reactor. Piping revisions will include tying into the catalyst addition line and running the sample line to a position near the local switch for the ram valve. A manual valve will be installed between the tie-in and the catalyst bomb.

b. D-700

D-700 piping is to be revised also. Revisions to piping will reduce the length of the line and the number of elbows to lessen chances of plugging. Refer to the P & I Diagram for D-700.

D-700 piping revisions will include moving the sampling station from the north side of the southeast support structure to the north side of the southwest support structure. The handswitch for the automatic ram valve will be relocated adjacent to the sampling station.

B. New Module

The revisions to be made to 741, 742, 743, and 744 are similar. A description of the revisions to 741 will be given below.

As seen from Figure 3, the diagram of existing piping for 741, the CTA addition line ties into the ram valve piping used for catalyst addition. Tying into the catalyst charge line would require installation of another valve to close off the additional line during reactor sampling to prevent live polymer from entering this line and plugging it.

Referring to the piping revisions for 741 in Figure 4, the reactor sampling tie-in will be adjacent to the CTA addition line. This arrangement will allow both the catalyst addition line and the CTA addition line to be flushed, with HPSW using the catalyst bomb, after reactor sampling to prevent line plugging.

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III. Reactor Sampling Procedures

A. D-300 Through D-600 and 741 Through 744

Following are the reactor sampling procedures when using the reactor sampling carts on D-300 through D-600. Differences in procedures when sampling 741 through 744 are noted in parentheses. (Refer to the P & I Diagrams. A diagram of the sampling cart is also attached.)

1. Check to make sure the sampling bomb is totally drained, then, close the drain valve.
2. Add $\frac{1}{2}$ pint of AMS to the sampling bomb. The relief bomb will already contain $\frac{1}{2}$ pint of AMS. The AMS in the relief bomb should be changed out every six months.
3. Close all valves on both bombs except the valves to the pressure gauges.
4. Attach the sample hose to the reactor sampling connection using the Weco fitting. Use the wrench chained to the cart to tighten the fitting.
5. Close the valve on the drain line from the initiator injection pot.
6. Close vent valve on initiator pot near pressure gauge.
7. Check to make sure that funnel valve on initiator pot is closed.
8. Open the two 1" valves in the reactor sample line and the 1" valve on the sample hose at the Weco fitting. (741 through 744 have only one valve in the sample line.)
9. Close the 1" manual valve on catalyst addition line upstream line tie-in.
10. Open sample bomb sample valve. Open the catalyst addition ram valve using the local switch. When the pressure in the bomb reaches 120 psig, close the ram valve at the Weco fitting. (741 through 744 have only one valve in the sample line.) Do not close the sample hose valve at the sample bomb. Blocking in the hose with the reactor contents may over-pressure and rupture the hose. DTH 000106546
11. Partially open valve in high pressure service water (HPSW) line and pressure up the initiator injection pot. When initiator pot is pressured up as indicated by no flow on the flow indicator, completely open HPSW valve. The bomb should now be pressured up in excess of 200 psig as indicated on the initiator pot pressure gauge. If the pressure on the bomb is less than 200 psig, a potential for backing vinyl chloride into the initiator system exists and the HPSW system should not be used at that point. If the

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III. Reactor Sampling Procedures

A. D-300 Through D-600 and 741 Through 744 (Continued)

11. (Continued)

pressure gauge indicates a pressure of less than 200 psig, check the valve on the pressure gauge line to be sure that it is open and the true process pressure is being read. If the valve is open and the pressure gauge reads less than 200 psig, replace the pressure gauge to be sure that a true pressure indication is being given. If the new pressure gauge also reads less than 200 psig, check all the valves on the initiator pot to be sure they are in the proper position and immediately contact the Shift Supervisor. So not try to use the HPSW system.

12. With the initiator pot pressured up in excess of 200 psig, slowly open valve in initiator injection line just above the initiator pot.
13. Open the initiator injection ram valve using the local switch and flush the sample line into the reactor for about 30 seconds with HPSW, then close the ram valve using the local switch. Do not flush this line for more than one minute.
14. Close the HPSW valve.
15. Open the two valves in the sample line and the hose valve at the Weco fitting. (741 through 744 have only one valve in the sample line.) Slightly open the HPSW valve and flush the contents of the hose into the bomb. Flush for about ten seconds then close the HPSW valve, the two valves in the sample line and the hose valve at the Weco fitting. (741 through 744 have only one valve in the sample line.)
16. Open drain valve on initiator injection pot and then open vent valve to let this system drain properly.
17. Disconnect the sample hose at the Weco fitting using the wrench to loosen the fitting.
18. Open the two valves in the sample line to let this line drain and then close the two valves. (Open the CTA addition valve and then the valve in the sample line to let the sample line drain when sampling 741 through 744, then close these valves.)
19. Move the sampling cart to the emission recovery system hook-up station. This station is located west of T-701 near ground level. (In the new module the hook-up station is located on the west side of the reactor structures between 742 and 743 near ground level.)

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III. Reactor Sampling Procedures (Continued)

A. D-300 Through D-600 and 741 Through 744 (Continued)

20. Connect the sample hose to the hook-up station with the Weco fitting. Open the sample hose valve and the two recovery line valves and pull a vacuum on the sample bomb.
21. When the sample bomb is pulled down to at least 10 inches of mercury vacuum, close the sample hose valve, then the recovery line valve nearest the bomb, and finally the second recovery line valve.
22. Disconnect the hose connection at the Weco fitting and break the vacuum on the sample bomb by opening the AMS funnel.
23. Move sampling apparatus to drain location near hook-up station. The drain is located directly west of T-701 at ground level. (The drain is located at the northwest corner of the 742 reactor structure in the new module.)
24. Open the bomb drain valve slightly and let liquid drain then open valve all the way and obtain resin sample in one gallon sample bucket. The bucket should be filled 2/3 of the way.
25. Connect a water hose to the sample bomb water hose connection and rinse bomb through the drain valve.
26. Close the drain valve, open the sample hose valves and flush the sample hose.
27. Shut off water to the sample bomb and disconnect the water hose. Open drain valve and allow the bomb to drain completely.
28. The sample bomb is now ready for reuse.

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III. Reactor Sampling Procedure

D-700 and 745

Following is the reactor sampling procedure when using the reactor sampling carts on D-700 and 745. Refer to the P & I Diagram for D-700 (Figure 2).

1. Check to make sure the sampling bomb is totally drained, then close the drain valve.
2. Add $\frac{1}{2}$ pint of AMS to the sampling bomb. The relief bomb will already contain $\frac{1}{2}$ pint of AMS. The AMS in the relief bomb should be changed out every six months.
3. Close all valves on both bombs except the valves to the pressure gauges.
4. Attach the sample hose to the reactor sample connection using the Weco fitting. Use wrench chained to platform to tighten fitting.
5. Open the 1" valve in the reactor sample line and the 1" valve on the sample hose.
6. Open sample bomb sample valve. Open reactor sampling Ram valve using the local switch. When the pressure in the bomb reaches 120 psig, close the Ram valve, the valve in the sample line, and the hose valve at the Weco fitting. Do not close the sample hose valve at the sample bomb. Blocking in the hose with the reactor contents may over-pressure and rupture the hose.
7. Check the pressure on the HPSW header. If the pressure is above 200 psig, open the HPSW line to the reactor and then the Ram valve and flush the sample line for about 30 seconds, then close the RAM valve using the local switch. Do not flush the sampling line for more than one minute. Do not use the HPSW system if the pressure on the header is less than 200 psig. Try changing out the pressure gauge to be sure a true process pressure is being given. If the pressure is still less than 200 psig, immediately contact the Shift Supervisor.
8. Close the HPSW valve. Open the valve in the line and the hose valve at the Weco fitting. Slightly open the HPSW valve and flush the contents of the hose into the bomb. Flush for about ten seconds, then close the HPSW valve, the valve in the line, and the hose valve at the Weco fitting.
9. Disconnect the sample hose at the Weco fitting using the wrench to loosen the fitting.
10. Slowly open the valve in the sample line and allow this line to drain, then close the valve.

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III. Reactor Sampling Procedure (Continued)

11. Move the sampling cart to the emission recovery system hook-up station. In the new module, this is located at the west end of the reactor structure near reactors 742 and 743 near ground level. In the old module, this is located west of T-701 near ground level.
12. Connect the sample hose to the recovery hook-up station with the Weco fitting. Open the sample hose valve and the two recovery line valves and pull a vacuum on the sample bomb.
13. When the sample bomb is pulled down to at least 10 inches of mercury vacuum, close the sample hose valve, then the recovery line valve nearest the bomb, and finally the second recovery line valve.
14. Disconnect the hose connection at the Weco fitting and break the vacuum on the sample bomb by opening the AMS funnel valve.
15. Move sampling apparatus to drain location near recovery hook-up station. The drain is located at the northwest corner of the 742 reactor structure in the new module and directly west of T-701 at ground level in the old module.
16. Open the bomb drain valve slightly and let liquid drain then open valve all the way and obtain resin sample in one gallon sample bucket. The bucket should be filled at least 2/3 of the way.
17. Connect a water hose to the sample bomb water hose connection and rinse bomb through the drain valve.
18. Close bomb drain valve, open the sample hose valve and flush the sample hose.
19. Shut off water to the sample bomb and disconnect the water hose. Open drain valve and allow the bomb to drain completely.
20. The sample bomb is now ready for reuse.

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IV. SAFETY EVALUATION SUMMARY

The purpose of this design is to revise the reactor sampling piping to allow use of the reactor sampling cart on all reactors. Use of the cart will reduce operator exposure to VCM while sampling a reactor. Safety was the main consideration in preparing the sampling procedures to be used with the reactor sampling cart. The procedures were written in a manner to reduce any possibilities of operator VCM exposure and VCM releases. If the sampling operating procedures are followed, the reactor sample can be taken without incident and without operator VCM exposure. Major design safety considerations are:

- (1) Provisions for flushing all lines tied into the reactor ram valve. Flushing with HPSW will remove any initiated VCM in the pipes that could react and cause pressure increase. Flushing also prevents lines from becoming plugged. Unplugging lines is a potential VCM exposure problem.
- (2) Requiring addition of AMS to both the sample bomb and relief bomb to stop polymerization.
- (3) Installation of a manual block valve in the catalyst addition line to prevent backflow of VCM into the catalyst bomb and HPSW system.

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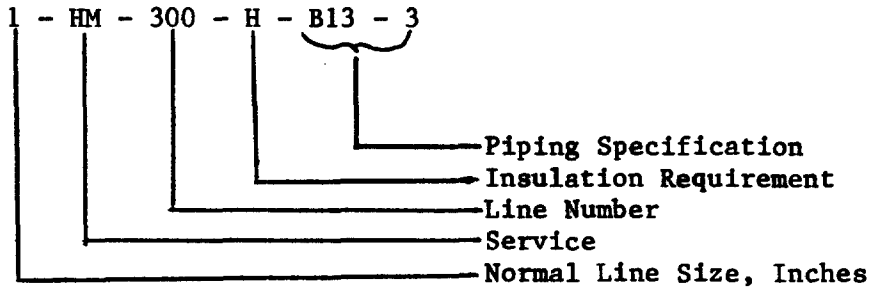
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V. PIPING SPECIFICATIONS

The following piping schedule uses a system of numbers and letters as a line designation. This system denotes the following information: line size, service, line number, insulation requirement, and piping specification.

Sample Line Description



Sample Piping Specification

B13 - 3

Third Specification Of B13 Group
Piping Material
Normal Pressure Specification

Service Description Used

WP	Process Water
HM	PVC Slurry

Insulation Requirement

H	Hot Service
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Nominal Pressure Rating

A	150 - Pound Class
B	300 - Pound Class

Piping Material

13	304 S. S.
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VI. WORK LIST (See P & I Diagrams For Installation Details.)

1. Tie-in line 1-HM_300 to D-300 initiator injection line upstream of check valve.
2. Tie-in line 1-HM-400 to D-400 initiator injection line upstream of check valve.
3. Tie-in line 1-HM-500 to D-500 initiator injection line upstream of check valve.
4. Tie-in line 1-HM-600 to D-600 initiator injection line upstream of check valve.
5. Remove exiting reactor sampling piping on D-700 located on north side of southeast reactor support structure. Run 1-HM-700 to north side of southwest support structure. Use as much existing piping as possible.
6. Tie-in line 1-WP-701 to HPSW header, run to north side of southeast reactor support structure on D-700, and tie-in to 1-HM-700.
7. Tie-in line 1-HM-741 to 741 CTA addition line.
8. Tie-in line 1-HM-742 to 742 CTA addition line.
9. Tie-in line 1-HM-743 to 743 CTA addition line.
10. Tie in line 1-HM-744 to 744 CTA addition line.

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