Ethanolamines/Glycol Ethers
In Plant Training (IPT)

Section Number :5
Issue Number :1.3
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Section Test 4B
Ammonia System

Objectives/Answers:

1. **State what shuts down the P-205's.**
   A. All oxide shutdowns.
   B. Reactor shutdowns.
   C. Anhydrous ammonia shutdowns.
   D. Field switches.

2. **Explain what happens if the anhydrous ammonia trip button is pushed.**
   A. P-205 A/B shuts down.
   B. P-205 A/B air operated suction block valve closes.
   C. Emergency air operated valve at D-210 closes.
   D. Closes ammonia control valve to D-210.

3. **State the best way to prime a P-205 after it has gassed out.**
   Put a water hose on it to condense the vapor in the bowl.

4. **State what documentation needs to accompany each ammonia tank car to v rify contents.**
   A certificate of analysis from the supplier.

5. **Explain the steps in catching a sample on an ammonia tank car.**
   The railroad tracks need to have the derailers, blue flags, and blue light in place. The tank car needs to be chocked and grounded. The dome lid is raised, the plug taken out of the sample point, sample tubing and sample cylinder hooked up to the sample point, all bleeds on the tubing and cylinder closed, and the cylinder piped up so a flow would pass through it and vent out the top. The sample valve on the tank car would then be opened and the cylinder filled. When a white stream of vapor comes out of the top of the cylinder the cylinder is full and the top vent can be closed along with the inlet to the cylinder. The sample valve on the tank car is then closed, the tubing between the cylinder and the sample point bled down, and the tubing and cylinder removed.

6. **Explain the reason we put the TV camera on the tank car while we are off loading it.**
The department of transportation requires the tank car be monitored at all times while off-loading.

7. **Explain what you do with the ammonia that is left in the sample cylinder after the analysis is complete.**
Release it into D-215 at the station set up at T-211 overheads to D-215.

8. **Explain the operation of D-210 and E-210.**
E-210 is a cooling tower water exchanger which cools down T-220 and D-218 overheads and removes the heat released when ammonia vapors are absorbed by water. Anhydrous ammonia is fed into D-210 to replace the ammonia used in the reaction. The P-210's pump D-210 bottoms back to the top of E-210 as recirculation. It is this flow which will absorb the vapors from T-220 and D-218 overheads. The P-210's also pump to the suction of the P-212's which pump aqua ammonia to the reactor, R-201. The level is controlled in D-210 by T-211 bottoms which joins in with D-210 bottoms recirculation to E-210. A vent is taken on D-210 to remove inerts, mainly nitrogen. This vent goes to E-211 or T-211 to control the pressure in T-211.

9. **Explain why an exchanger is needed to mix ammonia and water.**
When ammonia goes into solution with water, heat is released. E-210 removes this heat and helps keep the pressure low.

10. **Explain how the level in D-210 is controlled.**
The flow from T-211 bottoms controls the level in D-210. Since we are always taking out a flow through the P-212's to the reactor, we need to have a flow constantly making up to D-210. As the level in D-210 raises the flow from T-211 drops off. As the level in D-210 falls the flow from T-211 bottoms picks up.

11. **Explain the purpose of lube oil pumps.**
To make sure the bearings have oil before starting the pump.

12. **Describe what three mechanical problems will shut down a P-212.**
Low oil pressure, high amps and high vibrations (if not bypassed)

13. **State what line-o-logic trips will shut down a P-212.**
Low oil pressure will shut down the P-212. No other trips will shut it down.

14. **State the function of T-211.**
T-211 is a vent scrubber used to remove nitrogen from the system and to absorb ammonia from E-211, D-215 and D-210.

15. **State the function of E-211.**
To condense T-230 overheads and provide additional cooling for T-211. The lower the temperature the lower the pressure will be in that system.

16. **State the function of D-215.**
Surge drum for T-240 overheads. Absorbs any ammonia from T-211 overheads.

17. **State the function of D-218.**
Remove ammonia from the reactor effluent.

18. **State what drives E-218 and E-219 (heat source).**
A. E-218 - driven by condensate out of D-220 and D-230.
B. E-219 - condensate from D-510.

19. **Demonstrate how to bypass D-510 condensate around E-219.**
Out in the field.

20. **State the hazards associated with skin contact and ammonia.**
Frostbite, burns, and skin irritation.

21. **State what the TLV (threshold limit value) of ammonia is.**
25 ppm (parts per million).

22. **Explain how ammonia vapors affect the lungs and respiratory tract.**
Highly irritating, causes system to lock up, breathing is halted.

Revisions:

Revision No. 1	07-21-93	yearly review
Revision No. 2	12-02-94	yearly review
Revision No. 3	12-11-95	Modified #12.