Ethanolamines/Glycol Ethers
Tier 3 Procedure

Section Number: 201
Issue Number: 2.0`
Original Date: 11-11-91 **Author:** Anthony Machie
Revision Date: 12-29-95
Title: Ethanolamines start up
References: Glossary of equipment identification (text # 114)

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201. Ethanolamines Start Up

1.0 Objective

1.1 To start up the amines plant in a manner that will minimize the potential for accidents or incidents.

2.0 Responsibility

2.1 It is the responsibility of the operations supervisor and the senior operations specialist to ensure that this procedure is fully complied with.

2.2 It is the responsibility of the senior operations specialist and the operations specialist to ensure that this procedure is executed in a safe and efficient manner.

3.0 Procedure

3.1 Open the cooling tower water to E-210 (ammonia absorber) filling from bottom to top. Bleed out air from top bleed.

3.2 Put a condensate level in R-201 (amines primary reactor) shell from P-511's (condensate pumps). Bring the level up to 30% and start P-200 (R-201 recirculation pump) to recirculate to the top of R-201.

3.3 Line up EJ-201 to pull a vacuum on R-201 shell, and start the 30 pound steam flow to r- 201 shell to start warming up the reactor. Do this slowly to minimize water hammer.

3.4 Use condensate from P-511's to liquid fill R-201 and R-202. Take flow through the P-212 to be used (do not start P-212 at this time). the aqua ammonia ebv (emergency block valve) should be on manual in the field. Take a bleed on R-202 pressure safety valves and block the aqua ammonia control valve manually.

3.5 When R-201/202 are liquid full, block in the bleed on R-202 pressure safety valve (psv).

3.6 Block in the gate valve immediately upstream of the aqua ammonia

3.7 Start P-212 with about 6 units of recirculation flow.

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3.8 Start level controlling D-215 T-211 l to saturate the packing. Note: do not add any more water to the system than needed.

3.9 Before pressuring up R-201/202 and taking a forward flow to D-218,3 T-220 & 230 the following must be done.

3.9.1 E-211 must be recirculating and reflux from dD-215 must be established through T-211 packing.

3.9.2 D-218 and T-220 must be slowly back pressured from D-210. (all of D-218 overhead valves must be open to D-210 prior to introducing a flow to D-218)

3.10 When a level is established in T-211 start a recirculation flow) through E-211 (cooling tower

3.11 Start level controlling T-211 to D-210. T-211 until proper level and concentration is established in D-210. Take a bleed on T-240 overheads at E-215 to remove excess h20 from the system. Note: if T-211 pressures up, manually block in the anhydrous ammonia make up to D-210 and by-pass the condensate from D-510 to E-219. During the power failure we found the best way to get condensate into the system, which decreases the pressure and concentration, was to tie in cold condensate at the P-210's with a flex hose to the suction of the P-211's. The condensate should decrease the concentration and lower the pressure on T-211. As this pressure comes down to normal operating pressure, disconnect the condensate to the system and go back to normal operations.

3.12 Close the aqua ammonia control valve and slowly open the gate valve at the aqua ammonia ebv and start pressuring up R-201 and R-202.

3.13 When R-201 pressure lines out with P-212's discharge, start a small flow into D-218. Start level controlling D-510 through D-219 and line up D-220/230 to E-218.

3.14 Bring the aqua ammonia flow to 75% of final rate.

3.15 When a level is established in T-220, put T-220 bottoms to T-230 using P-220's and start heating E-220 .

3.16 When a level is established in T-230 start heating up E-230 with 235 pound steam. Put T-230 bottoms to E-215 using P-230's.

3.17 Start a vent flow from D-210 to E-211 and start T-211 overheads to D-215. Make sure D-215 pressure regulator and ammonia analyzer are operable.

3.18 Set T-240 pressure controller at 75 mmhg.

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3.19 Make sure lines to and from DV-243A to T-240 are lined up to feed from DV-243A and level control back to DV-243A by passing E-244.

3.20 Start a flow to T-240 at 5 units and put on flow control. Cooling tower water must be on E-241 and E-243 at this time.

3.21 When a level is seen in T-240, start a recirculation flow through E-240 at 5.0 units. When a proper level is reached start level controlling to DV-243A.

3.22 Prepare oxide system for start up. With oxide ebv tripped and oxide control valve closed, start a small flow through D-101 with incoming oxide gate valve through P-201 and bleed air through port number 6. To sump bleed tubing.

3.23 Before an oxide flow can be started to R-201 the aqua ammonia ebv must be bypassed in the control room. The oxide ebv must be by passed, TS-2086 and TS-2078 must be energized, the ready light must be on. Start up rates must be obtained from the area engineer. R-201 shell (condensate) must be 65 degrees and the pressure at 5 pounds per square inch absolute. D-210 concentration must be at 60% to 65%.

3.24 Pt the oxide meter in service (amines: MF-2071 and in coming to block MF-1030A) and call Glycol II.

3.25 Start oxide flow to R-201 (low rate of flow up to 3,000 #/hr.). ramp with computer to desired rates. note: monitor reactor temperature profile closely and adjust shell pressure accordingly. Also start cutting back on the 30 pound steam until it is completely off.

3.26 When T-240 bottoms are good, switch the bottoms to DV-243B. Note: E-244 will not be put in service until the feed to T-250 is available and started.

3.27 Start anhydrous system. Concentration will rise by dumping condensate so don't add too much ammonia initially. Bring D-210 level to 50% of large scale.

3.28 The ready light should be energized. Aqua ammonia ebv should be on auto in the field.

3.29 De-energize R-201 shutdown bypass and aqua ammonia to R-201 by-pass.

3.30 Start cooling tower water to E-251, E-261, E-263 and E-273.Throttle flows on downstream side of exchanger. This should be done at or about the same time as 201.3.1.

3.31 Set T-250 pressure controller at 20 mmhg. Note: EJ-250 may run with the second stage blocked in. Check control valve to determine this.

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3.32 Make sure E-252, E-262p and E-272p have water flows through them.

3.33 Check the plate coils on all check tanks to make sure they are in service.

3.34 Put feed to T-250 when DV-243B level reaches 10 to 15%.

3.35 Put level in T-250 to about 75% from DV-243B then shut the flow off from DV-243B.

3.36 Start P-250 A or B and recirculate to E-250 at 5 to 6 units. Add feed as necessary to maintain level.

3.37 Set up to level control T250 bottoms to T-260. Do not take a flown to T260 until T-250 temperatures are up and there is little or no mea in the bottoms.

3.38 Start 475 pound steam to E-250 and slowly bring up to desired temperature.

3.39 Start up P-251 A or B. Line up flow to DV-252 A or B. Start level controlling to check tanks.

3.40 Line up T-250 bottoms to T-260. Bring level to 75%.

3.41 Sart P-260 A or B and establish a recirculation flow through E-260 at 5 to 6 units.

3.42 Line up to level control T-260 to DV-243 A. Do not take a flow to T-271 until T-260 temperatures are up and there is little or no dea n the bottoms.

3.43 Start steam flow to E-260 slowly. Bring up to desired temperature.

3.44 Start up P-261 A or B. Line up to DV-262 A or B. Start level controlling to check tank.

3.45 Line up T-260 seal flush to P-250 A or B once T-260 overheads flow is established.

3.46 After T-260 is up and running and T-260 overheads put a level in T-271 of 75%.

3.47 Start P-270 A or B and establish a recirculation flow through E-270-1 at 5 units.

3.48 Line up P-270 to level control to DV-273 A or B.

3.49 Start warming up E-270-1.

3.50 Start P-271 A or B and level control to DV-272 A or B.

3.51 Line up T-271 overheads seal flush to P-260 A or B and P-270's when T-271 overheads flow is established.

3.52 After bringing T-271 to desired temperature, set the temperature controller and put bottoms to DV-273 A or B. Note: R-201 ethylene oxide feed divided by .81 + mea/dea recycl flows + (T-240 rerun - % water in rerun) = T-250 feed. operator.

4.0 Pre Startup Checklist:

4.1 Leak check towers and put on individual ejectors

4.2 Complete bleed and sample point checklist.

4.3 Replace spools (218, 220, and 230).

4.4 Oxide meter in service.

4.5 Cooling tower water in service.

4.6 System line up (valving)

4.7 No solenoids tied up.

4.8 Vent stacks in service

4.9 Condensate lines double blocked and bled at D-210.

4.10 T-240 feed point

4.11 Area ii sump low level.

4.12 Pull and clean all filters.

4.13 Put level in DV-243A for start up 20%.

4.14 Put level in DV-252A/Band DV-262 A/B for recycle operator:

5.0 Purpose of Bleed Checklist:

5.1 This checklist is for a general walk through of the plant to make sure all bleed valves are closed and plugged. When going through the plant be on the look out for any open bleed valves not on this list.

6.0 Bleed Checklist:

6.1 Incoming oxide to D-101

6.2 P-201 A/B suction and discharge.

6.3 P-201 A/B recirculation control valve.

6.4 Oxide to R-201 control loop.

6.5 R-202 outlet at psv-r202 A/B.

6.6 P-210 A/B suction and discharge.

6.7 E-210 recirculation control loop.

6.8 P-212 A/B suction and discharge.

6.9 P-212 A/B recirculation control loop.

6.10 Anhydrous ammonia to D-210 control loop.

6.11 T-211 overhead control loop.

6.12 T-211 level and recirculation control loops.

6.13 P-215 A/B suction and discharge.

6.14 E-215 outlet.

6.15 D-218 level control loop.

6.16 P-220 A/B suction and discharge.

6.17 T-220 level control loop.

6.18 P-230 A/B suction and discharge.

6.19 T-230 level control loop.

6.20 P-240 A/B suction and discharge.

6.21 E-240 level and recirculation control loops.

6.22 P-241 A/B suction and discharge.

6.23 T-240 overhead control loop.

6.24 T-240 overhead to central waste treatment control loop.

6.25 P-250 A/B suction and discharge.

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6.26 E-250 level and recirculation control loops.

6.27 P-251 A/B suction and discharge.

6.28 T-250 overhead control loop.

6.29 P-260 A/B suction and discharge

6.30 E-260 level and recirculation.

6.31 P-261 A/B suction and discharge.

6.32 T-260 overhead control loop.

6.33 P-270 A/B suction and discharge.

6.34 E-270 level and recirculation control loops.

6.35 P-271 A/B suction and discharge.

6.36 T-271 overhead control loop.

6.37 T-271 reflux control loop.

6.38 Dv-273 A/B outlets.

6.39 P-273 A/B suction.

6.40 Dv-272 A/B outlets.

6.41 P-272 A/B suction.

6.42 DV-262 A/B outlets.

6.43 P-262 A/B suction.

6.44 Dv-252 A/B outlets

6.45 P-252 A/B suction.

6.46 Dv-243 A/B outlets.

6.47 P-243 A/B suction.

6.48 T-250 feed control loop

6.49 F-240 A/B.

6.50 F-250 A/B

6.51 F-251 A/B

6.52 E-244 east inlet and outlet.

6.53 E-244 west inlet and outlet.

6.54 Cf-271 inlet and outlet.

6.55 Cf-272 inlet and outlet.

6.56 Fl-272 A/B inlet and outlet.

6.57 T-240 rerun control loop.E

6.58 Fl-273 A/B/C outlets.operator

7.0 Sample Point Checklist:

7.1 Check to make sure all sample points are closed.

8.0 Checklist:

8.1 T-240 bottoms.

8.2 T-250 overheads.

8.3 T-260 overheads

8.4 T-260 bottoms

8.5 T-271 overheads

8.6 T-271 bottoms at FL-273.

8.7 P-273 A/B.

8.8 P-272 A/B

8.9 P-262 A/B.

8.10 P-252 A/B.

8.11 P-243 A/B.

8.12 Cf-271 bottoms.

8.13 Cf-272 bottoms.operator

9.0 Revisi ns

Revision No. 1	12-29-95	Yearly Review

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