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**Question 20: What are common causes for platinum agglomeration and the catalyst of continuously regenerated reforming units, and what are the common solutions to address these issues?**

**PATEL** (Valero Energy Corporation)

The common causes for platinum agglomeration in CCR reforming units are the:

- Low oxygen level in the chlorination zone;
- Low temperature in the chlorination zone;
- Low chloride injection into the chlorination zone;
- Injection of off-specification (high water content) chloriding agent: The most common chloriding agent is perchloroethylene. The perchloroethylene should be dry Isomerization-grade perchloroethylene;
- Wet air into the drying zone due to high level of moisture in the air supply or low temperature from the lower air heater;
- Wet catalyst in a surge hopper maybe because of any coil leak;
- Wet catalyst in the reduction zone due to cutting back the lower air rate; and
- Lack of or insufficient drying zone residence time.

The common solutions for these issues are to fix them, if there are issues in the chlorination zone, because that is where the platinum will be dispersed in the chlorination zone after getting agglomerated in the burn zone.

1. Verify that the O<sub>2</sub> content in the chlorination zone is more than 17%.
2. Maximize the use of lower air as much as possible.
3. Confirm that the gas flow rate to the chlorination zone is within the designed limit and also that the chlorination heater operating temperature is at design value.

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4. Confirm the composition and lack of naphtha contamination of the chloriding agent. Check the chlorination injection fluoride and chloride content on the regen catalyst.
  5. Confirm that there is no moisture breakthrough from the air dryers to the drying zone. Air has to be dry, less than 5 ppm of water, with a dew point of at least minus 85°F.

**DUNHAM** (UOP LLC, A Honeywell Company)

I am not a reforming expert, but I often travel with one. I have to listen to these discussions [laughter]. What Kiran said is all correct; it gets down to procedures. After you come out of the burn, you must go into the rejuvenation step. It is critical to do that properly, so it needs to be monitored. You have to have the controls right. If you do not disperse the platinum on the catalyst, it can snowball because that catalyst will come around again. So the key is to monitor this regeneration/rejuvenation step. If something changes, get it corrected right away.

**KYLE BAILEY** (Marathon Petroleum Corporation)

With respect to the air dryer package on the outlet or on the drying section, what is the practice for moisture content? Is it dew point analyzers, or do folks switch the dryer skid on a predetermined schedule to make sure there is dry air in the bottom of the regenerator?

**KEADY** (Technip USA)

It has been a very long time, but I have experience with an air dryer. It was not with a CCR, but I tried to do it. I worked with the operators to get a cycle based on the dryer dew point, but it did not work out well. So we all went back to a predetermined cycle for the air dryer.

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