ExxonMobil  FCCU Restart Status Update

Stationary Source Committee
April 15, 2016

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Deputy Executive Officer
ExxonMobil Explosion (Feb. 18, 2015)
On February 18, 2015, the Electrostatic Precipitator (ESP), which controlled the PM emissions from the Fluid Catalytic Cracking Unit (FCCU) exploded.

As a result of the explosion ESP became inoperable and the FCCU along with a number of other process units were shutdown.

The FCCU and other process units have been shutdown since February 18, 2015 and refinery has operated below 20% of its capacity since.
Cause of ESP Explosion

- FCCU was in hot standby mode while repairs were being done on an Expander
- Steam pressure barrier was lost
- No catalyst seal was established at the spent catalyst slide valve
- Hydrocarbon flowed back from the main column and ignited in the ESP
What is an FCCU?

- Fluid Catalytic Cracking Unit
- Most important conversion process used in petroleum refineries.
- Convert the heavier liquid (high-boiling, high-molecular weight hydrocarbon fractions of crude oils) to lighter gasoline, diesel, and other products.
- Electrostatic Precipitator (ESP) is used to control Particulate Matter (PM) emissions
ExxonMobil's Proposed Interim Operation (8/2015)

- Refurbish and use the Old ESP while the New ESP undergoes repairs
- Unit feed rate at minimum; ~ 65 kbd fresh feed
- Excess PM10 emissions during the interim operation
- Retrofit cooling tower to reduce PM emissions
- **Not implemented – SCAQMD not agreeable to proposed operations**
FCC/ESP Flow Diagram (proposed interim operation – 8/2015)
Safety Improvements

- Define minimum steam flow target and set alarms
- Installed new instruments to monitor catalyst level above slide valve
- Updated main air blower control logic to de-energize ESP upon emergency shutdown
- Updated procedures covering normal shutdown, emergency shutdown, and normal startup
- Completed comprehensive training for all FCCU personnel on new and updated procedures
New FCCU Start-up Procedures

- ExxonMobil completed repairs to the new ESP and requested to restart FCCU
- ExxonMobil modified the FCCU Start-up Procedures to include periods when ESP is not in operation to eliminate possible source of ignition
- Initial proposal was to de-energize ESP throughout most of the start-up process (48 hours)
- Discussion with ExxonMobil resulted in reducing ESP downtime to 6 hours
Hearing on Stipulated Order of Abatement held on April 2, 2016 at Torrance City Hall

Excess PM and PM10 emissions higher than previous startups are expected during the 6-hour ESP off period

Mitigation measures:
- Cooling towers with new high efficiency mist eliminators
- Shut down two coker heaters during FCCU start up
- Limit the crude unit to 100 kbbl per day
- Maintain min. inlet velocity to primary internal cyclones
- Surrender NOx RTCs
- Street sweeping
Other Requirements

- Notify SCAQMD in advance of all major steps of start up procedure.
- Conduct source tests during start up.
- ExxonMobil to notify neighbors with door to door notices 48 hours prior to start up.
- Limit the time for de-energized ESP to 6 hours.
- Introduce torch oil to the FCCU during the hours between 7 pm and 7 am.
### Emission Mitigations Summary (6 hrs)

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<thead>
<tr>
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<th>Excess Emissions (lbs)</th>
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<tbody>
<tr>
<td></td>
<td>PM</td>
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<tr>
<td>Unmitigated</td>
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- Excess emissions during 6 hrs when ESP not fully utilized
- Uncontrolled emissions when ESP is not in full operation do not exceed short term health standards
## Emission Mitigations Summary (24 hrs)

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PM Emissions fully mitigated over one day
Current Status

- Completed refractory dry out
- FCCU start up scheduled for early May
- SCAQMD will conduct ambient PM monitoring in the vicinity downwind
- Staff continues to monitor operations