Ethylene / Propylene Trends at Lake Jackson C1016 Auto-GC and Clute C11 Canister

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Update on Lake Jackson Auto GC Data –
What it Shows and the Value of its Information

- **What it is:** An Industry-sponsored (EISM) AutoGC, in operation since 2003, near the Freeport industrial facilities in Southern Brazoria County (40 some VOC species, 1-hr measurements)

- **What’s up:** How important is ongoing collection of this VOC data to TCEQ?

  - **TCEQ’s uses of Lake Jackson data**
    - **Modeling Evaluations** – test HRVOC model performance in Southern Brazoria County, including isoprene (partly rural area, biogenic emissions). May be important to have all EISM data for possible future modeling of upcoming Discover/AQ period
    - **Monitoring Trends** – do concentrations continue to remain relatively low? Monitoring data important to assess nearby industry emissions, as reported EI VOC data has large amount of statistical error

  - **In this presentation:**
    - Trends in ethylene/propylene concentrations at Lake Jackson C1016 and nearby Clute C11 24-hr canister
    - EI trends
    - Comparison of concentrations to those of other Brazoria monitors, and Texas City and Ship Channel
    - Plant expansions planned? How likely is this, given area NA status?
1. Propylene
Concentrations decreasing across 10 year period, during both North and Southeast winds.
Same data as previous slide. Note northeast and southeast lobes.
Lobes due to Ship Channel emissions (no local sources to NE of these 3 monitors)
Clute C11

24-hr VOC canister – very close to industrial sources
Clute, like any monitor adjacent to industrial sources, can have very high VOCs at times.
The geometric mean is a good averaging method when there are some very high concentrations along with considerably lower ones. Here it shows that indeed, propylene decreasing in the area.

Incomplete years are omitted.
When wind direction analyses performed for 12 HGB AutoGCs each year, each monitor will have a particular direction (a single compass degree) that has a higher mean concentration than the other 359 compass degrees. These “highest directions” shown here.

Note that all monitors show decreasing trends, and that Lake Jackson (along with Danciger C618) have lowest mean concentrations.

This is Lynchburg Ferry. Its first 3 years were all > 50 ppb, so they don’t appear on this graph.
2. Ethylene
As with propylene, concentrations have decreased at key wind directions.
GM ethylene by wind direction (same data as previous slide)
This is ethylene at Clute. Its top 3 concentrations show steady decrease, unlike those of propylene.
As with propylene, geometric mean ethylene shows steady decrease.

Incomplete years are omitted.
Ethylene emitted in much greater quantities than propylene (which ranged from 70-140 tons/yr across same years).
Note that unlike propylene, ethylene at Lake Jackson is higher than TX City, and roughly the same as HRM 3 for a while; in 2012 it was close to Channelview.
Moving forward

• **Plant expansions/modifications**
  – If 25 or more tons/year increase in NOx or VOC, must offset these increases with **decreases at 1.3 to 1 ratio**
    • Can buy these “offsets” from anyone in NA area
  – In spite of these offsetting emission decreases, lots of permit applications for plant expansions (low cost of nat. gas)

  – **Problem:** Generating or finding VOC offsets
Summary / Next Steps

- Steadily decreasing concentrations of ethylene and propylene in Freeport area at both 1- and 24-hr monitors

- HRVOC concentrations remain low relative to Ship Channel

- Lake Jackson data likely to be important for future modeling of AQ/Discover period

- Permit applications for plant expansions increasing, but no VOC offsets in HGB area for increasing emissions – uncertain future regarding plant expansions.