1 hour SO_2 NAAQS Issues

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SO_2 1 Hour NAAQS Background

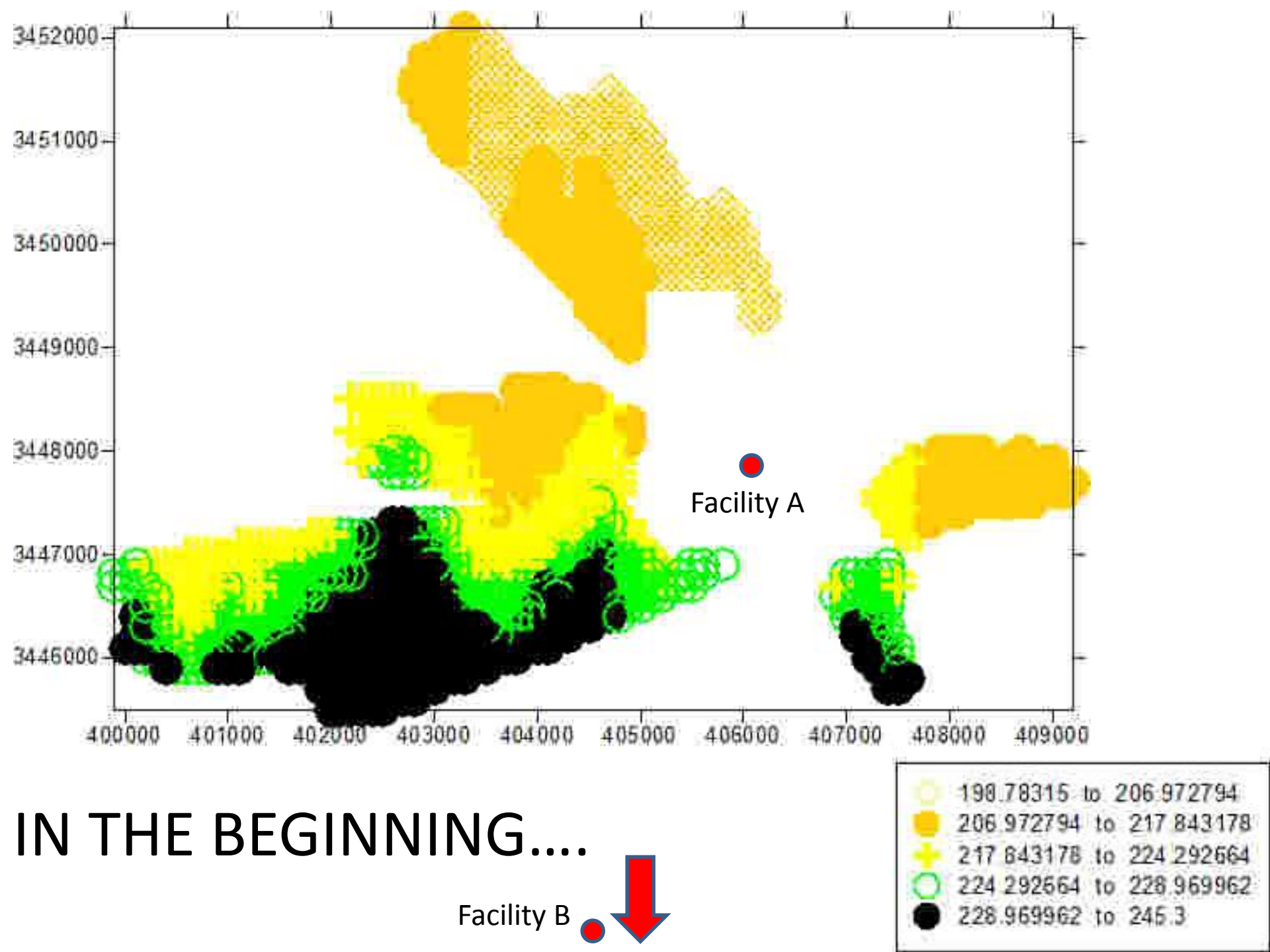
- June 2, 2010, EPA tightened the primary SO_2 NAAQS.
- Established a 1 hour standard at a level of 75 ppb (195 µg/m^3).
- The 1 hour standard included a new "form" of the standard.
    - 3 year average of the 99th percentile of the annual distribution of daily maximum 1 hour average concentrations.
    - HUH??
- The new standard has presented challenges in both PSD implementation and designation.
- We will focus on the ramifications on the standards on both attainment and non attainment NSR.

Example of a SO_2 1-hr PSD Challenge

- Facility A contacted ADEM to discuss issues with model predicted 1 hour SO_2 NAAQS violations revealed during modeling to support a PSD permit application.
  - The modeled violations were massive and widespread and primarily due to Facility B's emissions.
  - Facility A did significantly contribute to many of the violations.
- In the past, modeled violations were rare, but occurred occasionally.
  - These "violations" were usually resolved easily.
- Given the level of the new SO_2 1 hour standard, and the restrictive significance level, ADEM expected that these situations would become commonplace.
- The following slides walk through the challenges, experiences and solutions sought to resolve the predicted violations.

Location, Location, Location!!

In the past, predicted NAAQS violations occurred between sources in proximity. This is no longer the case.



IN THE BEGINNING....

Modeling Oddities

- Next slide shows surface wind direction during two of the worst violation hours.
- It is about 10 miles from Facility A to Facility B.
- How can the plume move 10 miles or more in an hour with a wind speed of ~5 mph or less?
  - Gaussian models predict impacts at distances beyond what the plume can travel in an hour to account for continuity.
- It seems pretty obvious that with a wind from the south that Facility B could impact the same locations as Facility A (esp. north of Facility A).
- How can Facility B impact the same locations as Facility A with a wind from the southeast?
  - Plumes at different heights can move at different directions during the same hour based on weather balloon data.

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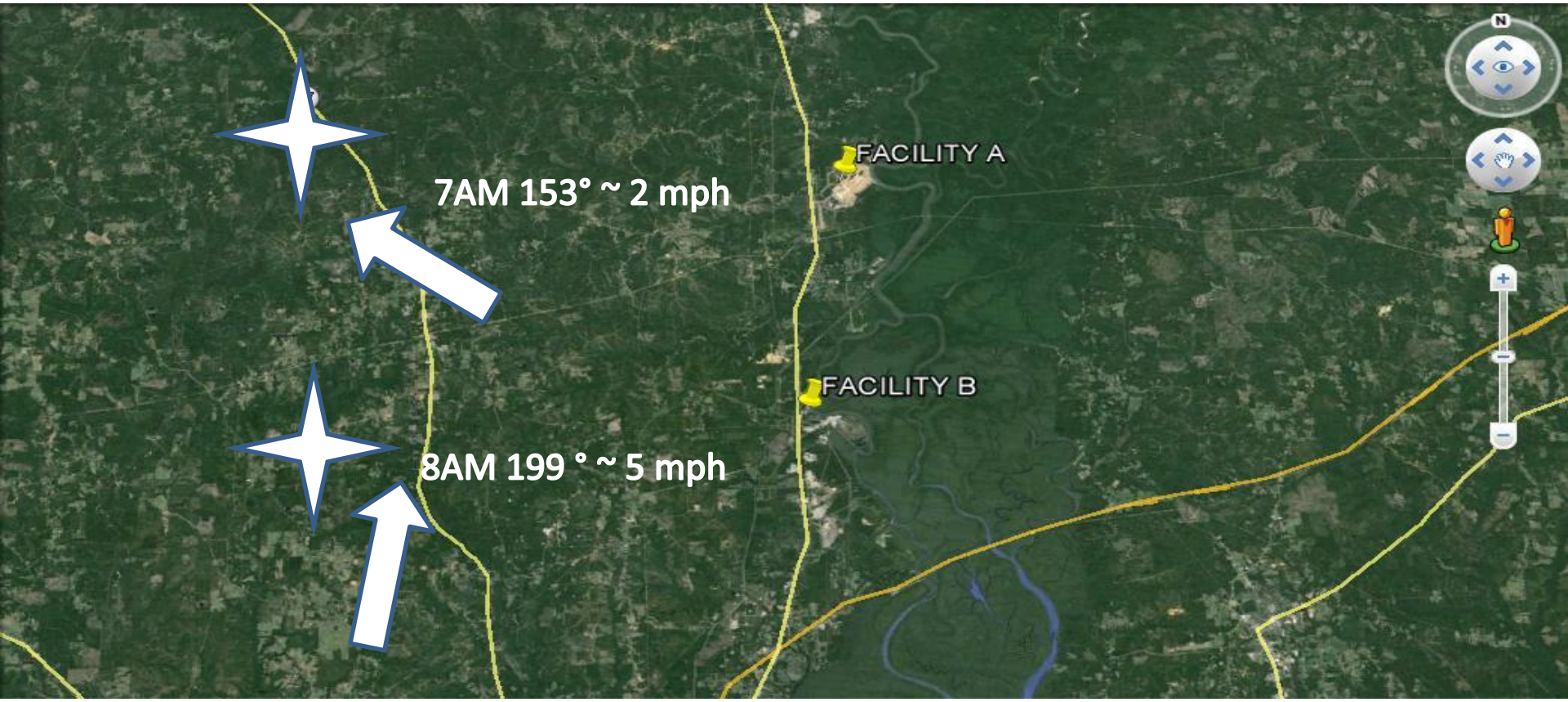

7AM 153° ~ 2 mph
8AM 199 ° ~ 5 mph
FACILITY A
FACILITY B

Model Input Revision #1

- ADEM instructed Facility A to evaluate plant property boundaries to determine whether the predicted violations were occurring on Facility B's property.
  - Facility A did "significantly contribute" to the modeled violations, but Facility B was the main contributor
- The predicted violations were not located on Facility B's property, so the modeled violations stood.

Model Input Revision #2

- Next, “building downwash” was applied to Facility B to see if the higher concentrations would be shifted closer to Facility B, resulting in lower concentrations at the predicted violating receptors.
  - The concentrations did not change, indicating that the buildings did not influence plume rise at those receptors.
  - No surprise given the distance from Facility B to the violating receptors.

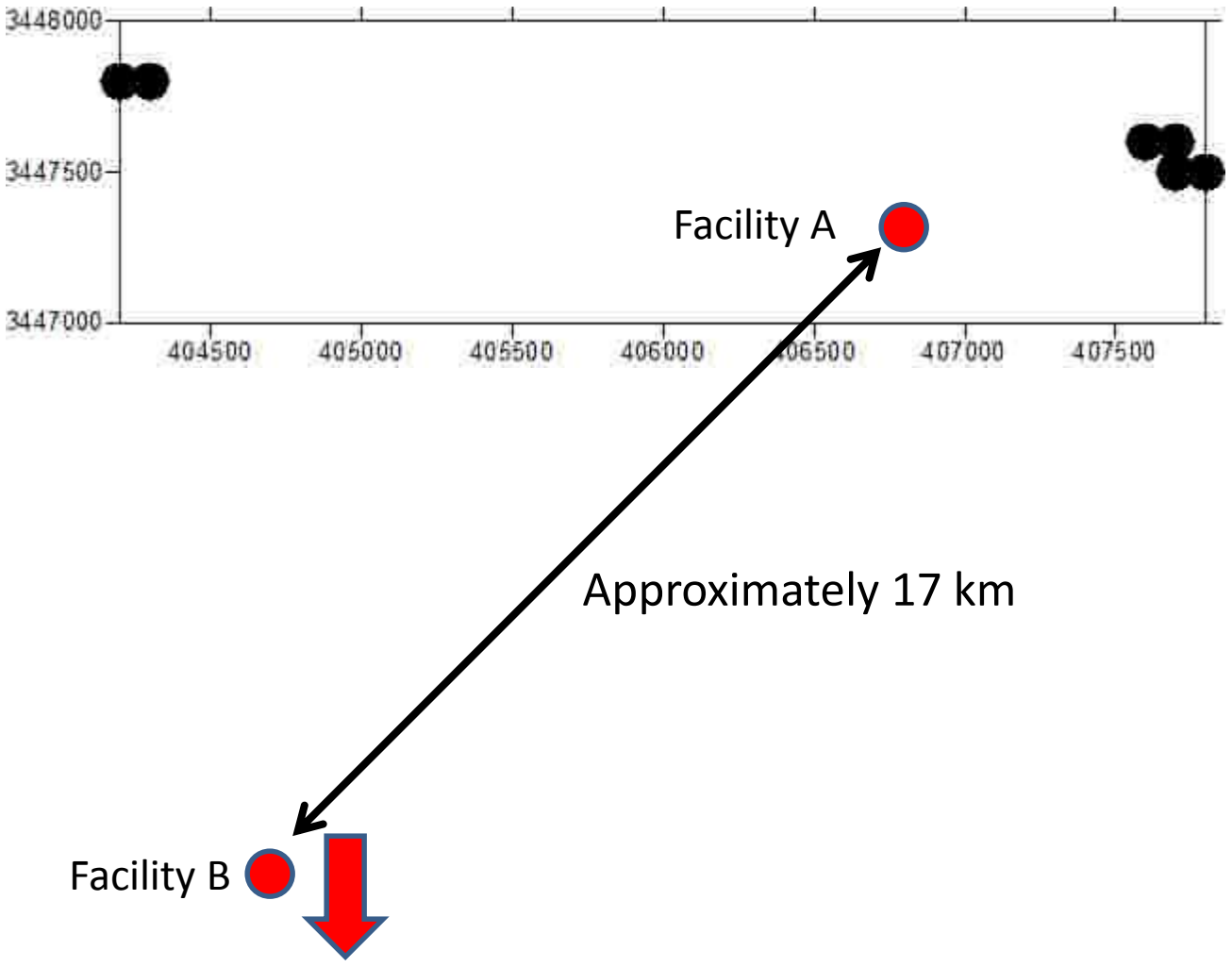
Model Input Revision #3

- Meteorological data adjustments:
  - ADEM revised several inputs to the land use characteristics in the modeling to be more representative of the application site.
- Magnitude of the predicted concentrations decreased, but predicted violations persisted.

Model Input Revision #4

- Substituted revised emission rates into the model for several units at Facility B. These revisions were based on Rule changes which would greatly reduce allowed emissions from Facility B in the near future.
- Predicted violations were greatly reduced, but not eliminated.

IN THE END….


3448000
3447500
3447000
404500
405000
405500
406000
406500
407000
407500
Facility A
Approximately 17 km
Facility B

Isn't It Ironic…

- Based on all this work, ADEM anticipated that the final modeling would show compliance with the SO_2 1 hour NAAQS, through significant, but necessary, revisions to the modeling inputs.
- However, during internal review by Facility A, they realized that there were several buildings that had not been included in the initial downwash analysis in the modeling.
- These changes, along with the change in the land use characteristics provided by ADEM, resulted in the facility "screening out". (*INSERT LOUD GASP HERE*)
- While it would have been ideal for this to have occurred sooner rather than later, it still provided a robust real world example of what can occur during PSD permitting.

Model Challenges

- Based on the changes to the standards, it is expected that more modeling and analysis will be required to demonstrate compliance.
- This will require more man hours to ensure that any predicted violations reflect reality as much as possible.
  - During this process, it is estimated that 120-200 additional man hours were used to run, re-run, analyze and present revised modeling results.
- This can become a resource burden for both the applicant and ADEM.

Model Challenges

- ADEM requests that, where possible, modeling be shared prior to official submittal in order to mitigate any outstanding violations.
  - However, ADEM also recognizes that the applicant is not required to perform additional modeling after it has demonstrated that the applicant does not significantly cause or contribute to a predicted NAAQS violation.

Key Take Aways

- For over 30-years, we have been able to perform PSD modeling in a very conservative manner by making simple “worst case” assumptions.

- With such restrictive 1-hour NAAQS for SO_2 and NO_2, we cannot continue to use present models with layer upon layer of conservative assumptions to show compliance.

- Significant time and resources may be required to “fine tune” modeling results closer to reality and demonstrate that a new or modified facility does not significantly contribute to a modeled SO_2 NAAQS violation.

Questions?

Designations for the 1-hr SO_2 NAAQS- A Timeline (of Sorts)

- New 1-hr NAAQS promulgated June 2010.
  - 75 ppb
- Revised standard requires all areas of the country to be designated attainment, nonattainment or unclassifiable.
- Between 2011 and 2014 **seven** guidance/policy/white papers are issued.
- In July 2012, EPA delays designations by 1 year to June 2013, but does not designate all areas in June 2013.
- May 13, 2014- Data Requirements Rule is proposed for 60 day comment period.
  - EPA-HQ-OAR-2013-0711 FRL-9903-61-OAR

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Designations for the 1-hr SO_2 NAAQS- A Timeline
(of Sorts)

- May 19, 2014, In response to a lawsuit, EPA filed a joint motion to lodge a settlement consent decree.
  - Proposed in the Federal Register June 2, 2014
- EPA filed a motion to enter the final decree on August 8, 2014. Awaiting Court's decision.
- Mid 2015- Final Data Requirements Rule promulgated (expected).

What does the CD mean to me?

- A Notice of Proposed Consent Decree Request for Public Comment was lodged in an effort to reconcile issues associated with the SO_2 1-hr NAAQS Designation process.
- Targets sources that meet specific emissions or monitoring criteria.
- ADEM submitted various comments, one of which requested that more specificity be provided in the CD as to what sources would be subject.
- Sources subject to the CD will be fast tracked through the designation process and will not be able to demonstrate compliance with the 1-hr SO_2 NAAQS through monitoring.

What does the CD mean to me?

- Modeling will be the only methodology available for demonstrating compliance.
- In Alabama, there are roughly 10 sources that may be subject to the consent decree.
  - Only 1 utility source

Just when you thought it was safe…

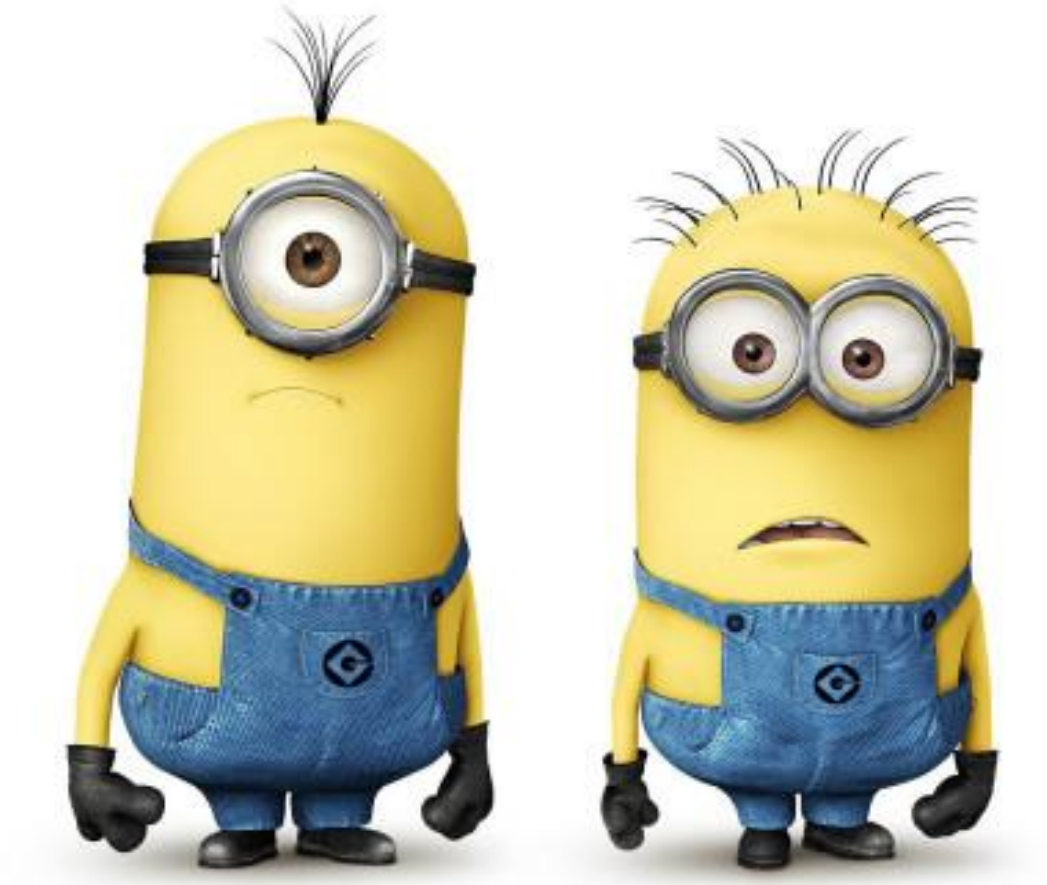
- EPA has proposed the Data Requirements Rule which will, through emissions thresholds, determine which sources in Alabama will be subject to the Rule.
- Three set of levels were proposed (EPA preferred):
  - 1,000 tpy of actual emissions would be used for sources in areas classified as “urban”, and
  - 2,000 tpy of actual emissions for sources that are classified as “rural”.
- In Alabama, using 2013 actual emissions, approximately 20 sources emitted greater than 1000 tpy.
  - Does not include JCDH or City of Huntsville sources
  - Does not differentiate between urban and rural sources

Just when you thought it was safe…

- Sources will be given the choice of whether to model or monitor.
- Lots of unknowns
  - Is an inventory needed?
  - How often will modeling be reaccomplished?
  - Will permits be incorporated into the SIP?
  - How many monitors will be required?
  - Who will be responsible for operating monitors?
  - How to handle “clusters” of sources

Date	Action
January 15, 2016	Modeling protocols are due for sources that will be characterized with modeling.
July 2016	Annual Monitoring Network Plans due to EPA; should include SO_2 monitoring network modifications intended to satisfy the Data Requirements Rule (DRR).
January 1, 2017	SO_2 monitors required to be operational per DRR.
January 13, 2017	Modeling analyses due to the EPA Regional Administrators.
August 2017	EPA notifies states of intended designations.
December 2017	EPA issues final designations for a majority of the country.
August 2019	Due date for state attainment plans for areas designated nonattainment in 2017.
May 2020	Required certification of 2019 monitoring data; states have the opportunity to provide updated state recommendations to EPA.
August 2020	EPA notifies states of intended designations for the remainder of the country not yet designated.
December 2020	EPA issues final designations for the remainder of the country.
August 2022	Due date for state attainment plans for areas designated nonattainment in 2020.

Questions?



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