

# Independence County

## An Arkansas 2010 SO<sub>2</sub> NAAQS Designation Retrospective

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ARKANSAS DEPARTMENT OF ENVIRONMENTAL QUALITY

# 2010 SO<sub>2</sub> NAAQS: OVERVIEW

- **June 2010:** EPA set a 1-hour, SO<sub>2</sub> NAAQS at 75 ppb (75 FR 35520)
  - *Round 1* - July 2013: EPA designates 29 areas in 16 states as nonattainment for SO<sub>2</sub> NAAQS based on 2009 - 2011 monitoring data (78 FR 47191)
- **August 2013:** Lawsuit by Sierra Club alleged that EPA violated the CAA duty by not designating all portions of U.S. by June 2013 deadline.
  - Sierra Club & EPA filed a consent decree for EPA to complete the area designations according to 3 deadlines:
    - Round 2: by July 2, 2016
    - Round 3: by December 31, 2017
    - Round 4: by December 31, 2020

# 2010 SO<sub>2</sub> NAAQS: OVERVIEW

- **August 2015:** EPA promulgated the SO<sub>2</sub> Data Requirements Rule (DRR) (80 FR 51052)
  - EPA required characterization of ambient SO<sub>2</sub> around sources emitting  $\geq 2,000$  tpy
  - Through ambient monitoring or dispersion modeling
- States must submit in advance for EPA approval an Air Quality Modeling Protocol

# 2010 SO<sub>2</sub> NAAQS: ARKANSAS

- *Round 2* Arkansas facilities:
  - Entergy Arkansas' White Bluff Steam Electric Station
  - ***Entergy Arkansas' Independence Steam Electric Station***
- *Round 3* Arkansas facilities:
  - ***FutureFuel Chemical Company***
  - Southwest Electric Power Company's Flint Creek Power Plant
  - Plum Point Services Company's Plum Point Energy Station

# Independence Steam Electric Station



# FutureFuel Chemical Co.



# 2010 SO<sub>2</sub> NAAQS: ARKANSAS ROUND 2 DESIGNATIONS

- **2015:** Arkansas submitted modeling for a round 2 source, Independence Steam Electric Station, with passing results
  - Sierra Club submitted to EPA inaccurate/unrefined modeling & unsupported findings during state submittal period
  - No Sierra Club modeling protocol, thus no assurance that 3rd-party modeling conducted in a proper and meaningful fashion



# Sierra Club Independence Plant Modeling Results & Methods

“It was determined that based on either current allowable emissions or measured actual emissions, the Independence Plant is estimated to create downwind SO<sub>2</sub> concentrations which exceed the 1-hour NAAQS.”

*Table 1 - SO<sub>2</sub> Modeling Results for Independence Plant Modeling Analysis*

| Emission Rates | Facility            | 99 <sup>th</sup> Percentile 1-hour Daily Maximum (µg/m <sup>3</sup> ) |            |         |       | Complies with NAAQS? |
|----------------|---------------------|-----------------------------------------------------------------------|------------|---------|-------|----------------------|
|                |                     | Impact                                                                | Background | Total   | NAAQS |                      |
| Allowable      | Independence        | 251.3                                                                 | 20.9       | 272.2   | 196.2 | No                   |
| Actual         |                     | 116.8                                                                 | 20.9       | 137.7   | 196.2 | Yes                  |
| Allowable      | Independence (GEP)  | 306.9                                                                 | 20.9       | 327.8   | 196.2 | No                   |
| Actual         |                     | 148.8                                                                 | 20.9       | 169.7   | 196.2 | No                   |
| Allowable      | FutureFuel Chemical | 1,128.2                                                               | 20.9       | 1,149.1 | 196.2 | No                   |
| Actual         |                     | 565.1                                                                 | 20.9       | 586.0   | 196.2 | No                   |
| Allowable      | Both Plants         | 1,128.2                                                               | 20.9       | 1,149.1 | 196.2 | No                   |
| Actual         |                     | 565.1                                                                 | 20.9       | 586.0   | 196.2 | No                   |
| Allowable      | Both Plants (GEP)   | 1,128.2                                                               | 20.9       | 1,149.1 | 196.2 | No                   |
| Actual         |                     | 565.1                                                                 | 20.9       | 586.0   | 196.2 | No                   |

- EPA Modeling TAD: “...flexibility of modeling of actual emissions or...monitors.” & “EPA recommends modeling most recent 3 years of actual emissions.”
- Did not perform culpability analysis (ADEQ: SIL=7.9µg/m<sup>3</sup> & Result=0.0154µg/m<sup>3</sup>)
- GEP stack height under calculated by 92.5 m
- Used constant emission rates, stack parameters & not temporally varying daily & seasonal rates; used same stack parameters for two units that in reality differ
- Used older version of AERMOD
- Receptor grid within fenceline



# 2010 SO<sub>2</sub> NAAQS: ARKANSAS ROUND 2 DESIGNATIONS

- **October 2015:** EPA provided Sierra Club modeling to Arkansas
- Arkansas had no opportunity to evaluate/respond to Sierra Club Modeling prior to EPA's September 2015 due date .
- Sierra Club Modelled one Round 2 facility (Independence) and one Round 3 (Futurefuel) facility in their submittal for Round 2.
- Sierra Club modeling that did not adhere to DRR & Technical Assistance Document (TAD) contained significant flaws.
  - EPA required follow up analysis from Arkansas modeling to address both the Round 2 **and** the Round 3 source together.

# 2010 SO<sub>2</sub> NAAQS: ARKANSAS ROUND 2 DESIGNATIONS CONTINUED

- Sierra Club pulled a Round 3 facility into Round 2 & Arkansas had to deviate from approved schedule
  - In response, Arkansas performed a culpability analysis showing that the two facilities' emissions did not combine.
    - Arkansas should not have been required to evaluate both sources simultaneously.
  - Without culpability analysis, Sierra Club should not have made cumulative impact conclusions

# EPA Designates Independence County

- **February 2016:** Based on “insufficient information,” EPA proposes an “unclassifiable” designation in its 120 day letter

Because the EPA has insufficient information to determine whether the following area is meeting or not meeting the SO<sub>2</sub> NAAQS, the EPA intends to designate this area as unclassifiable:

Intended Unclassifiable Area  
Independence County, Arkansas\*

Intended Unclassifiable Counties  
Independence County

The asterisk (\*) indicates the designation for this intended unclassifiable area represents a modification to the designation that you have recommended.

# 2010 SO<sub>2</sub> NAAQS: ARKANSAS ROUNDS 2&3 DESIGNATIONS

- **April 2016:** In order to reflect the unusual terrain in the area, Arkansas requested using two beta options:
  - Adjust\_U\* and Low Wind 3. EPA early feedback suggested Adjust\_U\* was warranted.
- **August 2016:** EPA requested additional information
- **October 2016:** Arkansas provided additional information
  - EPA never responded despite repeated follow up requests.
- **January 2017:** After 9 months without a response, Arkansas nevertheless submitted follow-up modeling results with Adjust\_U\* to correct model error during low winds among complex terrain.

# 2010 SO<sub>2</sub> NAAQS: ARKANSAS ROUNDS 2&3 DESIGNATIONS

- **January 2017:** After 9 months without a response, Arkansas submitted follow-up modeling results with Adjust\_U\* to correct model error during low winds among complex terrain.
- **March 2017:** EPA modified model algorithm & stated Arkansas should re-submit with new version of model.
  - Effects of the changes are drastic on counties with terrain such as the one in which these facilities are located.
  - Despite knowledge of the modeling changes in advance, EPA Region 6 failed to notify Arkansas of the impact of the changes.

# Use of Prognostic Meteorological Data

- Given the updated model, Arkansas sought to address the greater impact of complex terrain and lack of complete, nearby, meteorological data with a new option presented in the recently updated Appendix W:
  - **use of prognostic meteorological data.**
- Closest meteorological site has  $\approx 25\%$  missing data
  - 2016 Appendix W update: *“use of prognostic meteorological data for use in AERMOD for areas where it is cost-prohibitive or not feasible to collect site-specific data and there is no representative NWS or comparable station nearby.”*
  - **May 2017:** Arkansas/EPA Confer Regarding Potential Use Of Prognostic meteorological data in updated model.

# Use of Prognostic Meteorological Data

- **June-August 2017:** Arkansas performed an analysis that evaluated the observed data vs the prognostic data set and discussed the use with EPA
- **Sept. 2017:** Arkansas submits Observed vs WRF data evaluation.
  - WRF represents better than Observed met site 123km away
- **December 2017:** Round 3 Deadline



# About that designation letter . . .

- EPA had intended to designate Independence County as a “Unclassifiable” in February 2016

Because the EPA has insufficient information to determine whether the following area is meeting or not meeting the SO<sub>2</sub> NAAQS, the EPA intends to designate this area as unclassifiable:

Intended Unclassifiable Area  
Independence County, Arkansas\*

Intended Unclassifiable Counties  
Independence County

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# About that designation letter . . .

- **December 2017:** EPA informed ADEQ that the model run using the prognostic meteorological data would need to be submitted as part of a redesignation request from “unclassifiable” to “attainment/unclassifiable.”
- EPA no longer viewed this as part of the initial designation process, but as a separate re-designation process.

# Redesignation Request

- **April 2018:** ADEQ submitted the request to re-designate Independence County from unclassifiable to attainment/unclassifiable
- **November 2018:** EPA proposed redesignation of Independence county

# EPA Received only One Comment from a 3<sup>rd</sup> Party

- “I am writing in support of the Roadless Area Conservation; National Forest System Lands in Alaska ID: FS-2018-0059-0001. The Tongass National Forest should remain roadless in accordance with the 2001 Roadless Rule and should be conserved. . . . Please keep this forest free from roads which will enviably open the forest up to exploitation of resources and damage.”

# Redesignation

**March 2019:** EPA published a final rule to redesignate Independence County to attainment/unclassifiable.

**– Effective April 12, 2019**

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**ENVIRONMENTAL PROTECTION  
AGENCY**

**40 CFR Part 81**

[EPA-R06-OAR-2018-0624; FRL-9990-00-  
Region 6]

**Air Quality Designation for the 2010  
Sulfur Dioxide (SO<sub>2</sub>) Primary National  
Ambient Air Quality Standard;  
Arkansas; Redesignation of the  
Independence County Area**

**AGENCY:** Environmental Protection  
Agency (EPA).

**ACTION:** Final rule.

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**SUMMARY:** On April 20, 2018, the State of Arkansas, through the Arkansas Department of Environmental Quality (ADEQ) submitted a request for the Environmental Protection Agency (EPA) to assess new available information and redesignate the Independence County unclassifiable area (hereinafter referred to as the “County” or “Area”) for the 2010 sulfur dioxide (SO<sub>2</sub>) primary national ambient air quality standard (NAAQS) to attainment/unclassifiable.

# Takeaways from the Process

- **Flexible approaches have unintended consequences**
  - Use of modeling vs. monitoring
- **Hedge your bets**
  - Use of both modeling *and* monitoring could have avoided substantial expense and time
- **Communication with EPA is key**
  - Knowledge of the changes to Adjust U\* in advance could have led to alternative approaches being considered

# Questions Raised by the Process

- What is the proper role of a third party in a NAAQS demonstration process?
- What are the implications of an “unclassifiable” designation?
- What role should modeling have in a NAAQS designation process?