GEORGIA
DEPARTMENT OF NATURAL RESOURCES
ENVIRONMENTAL PROTECTION DIVISION

Georgia Permit Modeling Review Process Leaning

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GA Environmental Protection Division

2021 R/S/L Modelers Workshop
June 22, 2021

OUTLINE

- Project Background
- Project Accomplishments
- Summary and Next Steps

PROJECT BACKGROUND

- Modeling is required as part of the air permitting process.
  - In GA EPD, Data and Modeling Unit (DMU) of Planning and Support Program (PSP) reviews modeling submitted by an applicant upon the request of Stationary Source Permitting Program (SSPP)
    - Prevention of Significant Deterioration (PSD) Modeling Review (Federal Program)
    - Toxic Air Pollutant (TAP) Modeling Review (State Program)
    - Quarry Modeling Review (State Program)
- Problem Statement
  - In some permit modeling reviews, it is not clear which parts of the review should be performed by DMU vs. SSPP.
  - Also, there are no standard procedures for reviewing model input and output files.
  - As a result, there is no existing way to efficiently and effectively bring new staff up to speed quickly creating possible inconsistencies in how facilities are modeled.

FINAL PROJECT METRICS

Metrics	Historic	New Target
Number of DMU staff (with more than 12 months experience) that have the technical background to independently review all types of permit modeling from start to finish.	67%	100%
Percent of draft PSD modeling protocol approval letters completed within 30 days. Percentage based on 24-month rolling average.	< 75% (estimated)	95%
Percent of PSD permit modeling reviews completed within 45 days. Percentage based on 24-month rolling average.	< 25% (estimated)	90%
Percent of TAP (Toxic Air Pollutant) permit modeling and Quarry permit modeling reviews completed within 30 days. Percentage based on 12-month rolling average.	53%	95%

*All review durations are in calendar days.

WHAT IS LEAN SIX SIGMA?

Lean Six Sigma is a combination of two powerful method:

Lean and Six Sigma.

LEAN

Reduce waste by streaming a process.

Six Sigma

Reduce defects by conducting root cause analysis

LEAN Six Sigma

Lean accelerates Six Sigma.
Solves problems and improves processes.
Faster and more efficient.

WHAT WE LEARNED

- **Lean (i.e., Reduce Waste)**
  - Too frequent (and unnecessary) iterations between DMU and SSPP as well as applicants
  - Long lee time before the start of modeling review by DMU
  - Irrelevant questions/comments from DMU to SSPP
  - Unnecessary work by DMU modelers (i.e., reviewing PSD applicability section of the application)
- **Six Sigma (i.e., Reduce Defects)**
  - Ambiguity in responsibility and timelines
  - No written manual to follow for consistent reviewing results
  - Little efforts made to utilize latest tools and/or analysis methods
  - “Patching” solutions accumulated over time without pursuing a clear solution
  - Non-essential elements in modeling review memos

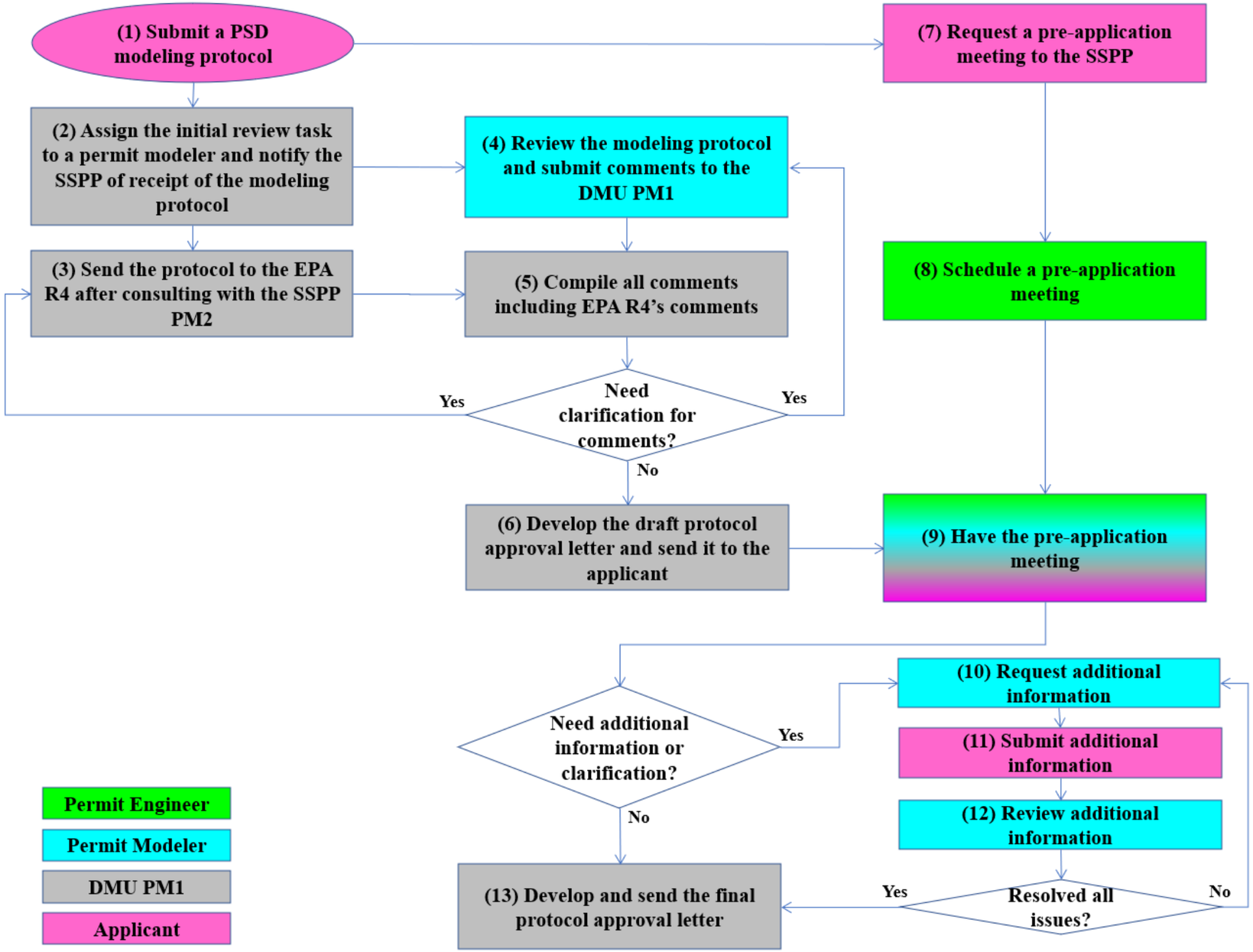
PROJECT ACCOMPLISHMENTS

- Clearly identified roles of DMU, SSPP, and the applicant
- Collected benchmarking survey results from nine SE states
- Developed new “Information Clarification Request Package”
- Simplified modeling review reporting
  - Modeling review reports (for SSPP)
  - Modeling review narratives (for DMU)
- Revised modeling review request form
- Established review milestone dates for both SSPP and DMU
- Removed ISCST3 model from TAP and Quarry guidelines
  - Based on DMU’s modeling study

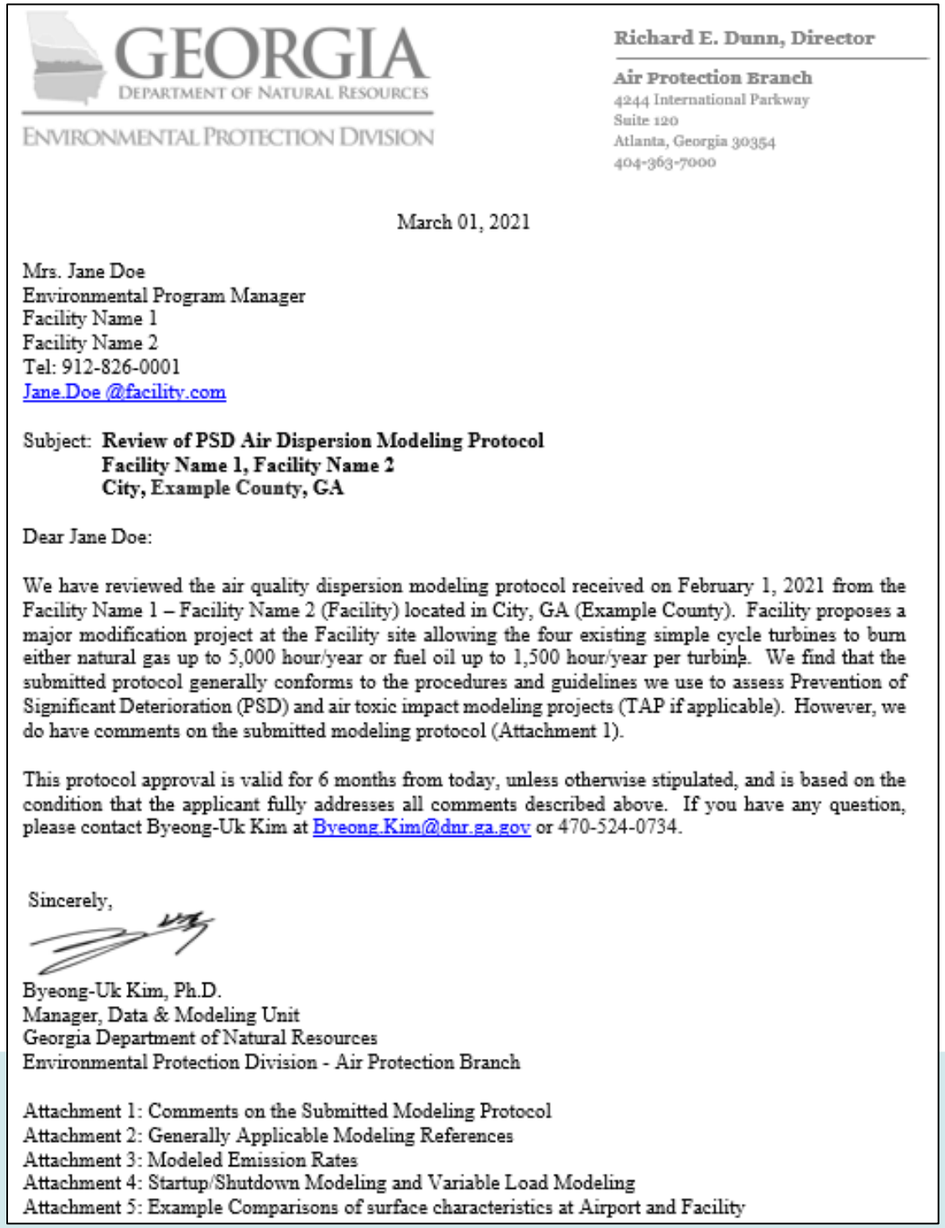
FINAL PROJECT DELIVERABLES

- **Developed New Standard Operating Procedures (SOP)**
  - PSD Modeling Protocol Review
  - PSD Modeling Review
  - TAP Modeling Review
  - Quarry Modeling Review

PSD MODELING PROTOCOL REVIEW FLOWCHART



EXAMPLE APPROVAL LETTER



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ENVIRONMENTAL PROTECTION DIVISION

Richard E. Dunn, Director

Air Protection Branch
4244 International Parkway
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Atlanta, Georgia 30354
404-363-7000

March 01, 2021

Mrs. Jane Doe
Environmental Program Manager
Facility Name 1
Facility Name 2
Tel: 912-826-0001
Jane.Doe @facility.com

Subject: **Review of PSD Air Dispersion Modeling Protocol**
Facility Name 1, Facility Name 2
City, Example County, GA

Dear Jane Doe:

We have reviewed the air quality dispersion modeling protocol received on February 1, 2021 from the Facility Name 1 – Facility Name 2 (Facility) located in City, GA (Example County). Facility proposes a major modification project at the Facility site allowing the four existing simple cycle turbines to burn either natural gas up to 5,000 hour/year or fuel oil up to 1,500 hour/year per turbine. We find that the submitted protocol generally conforms to the procedures and guidelines we use to assess Prevention of Significant Deterioration (PSD) and air toxic impact modeling projects (TAP if applicable). However, we do have comments on the submitted modeling protocol (Attachment 1).

This protocol approval is valid for 6 months from today, unless otherwise stipulated, and is based on the condition that the applicant fully addresses all comments described above. If you have any question, please contact Byeong-Uk Kim at Byeong.Kim@dnr.ga.gov or 470-524-0734.

Sincerely,

Byeong-Uk Kim, Ph.D.
Manager, Data & Modeling Unit
Georgia Department of Natural Resources
Environmental Protection Division - Air Protection Branch

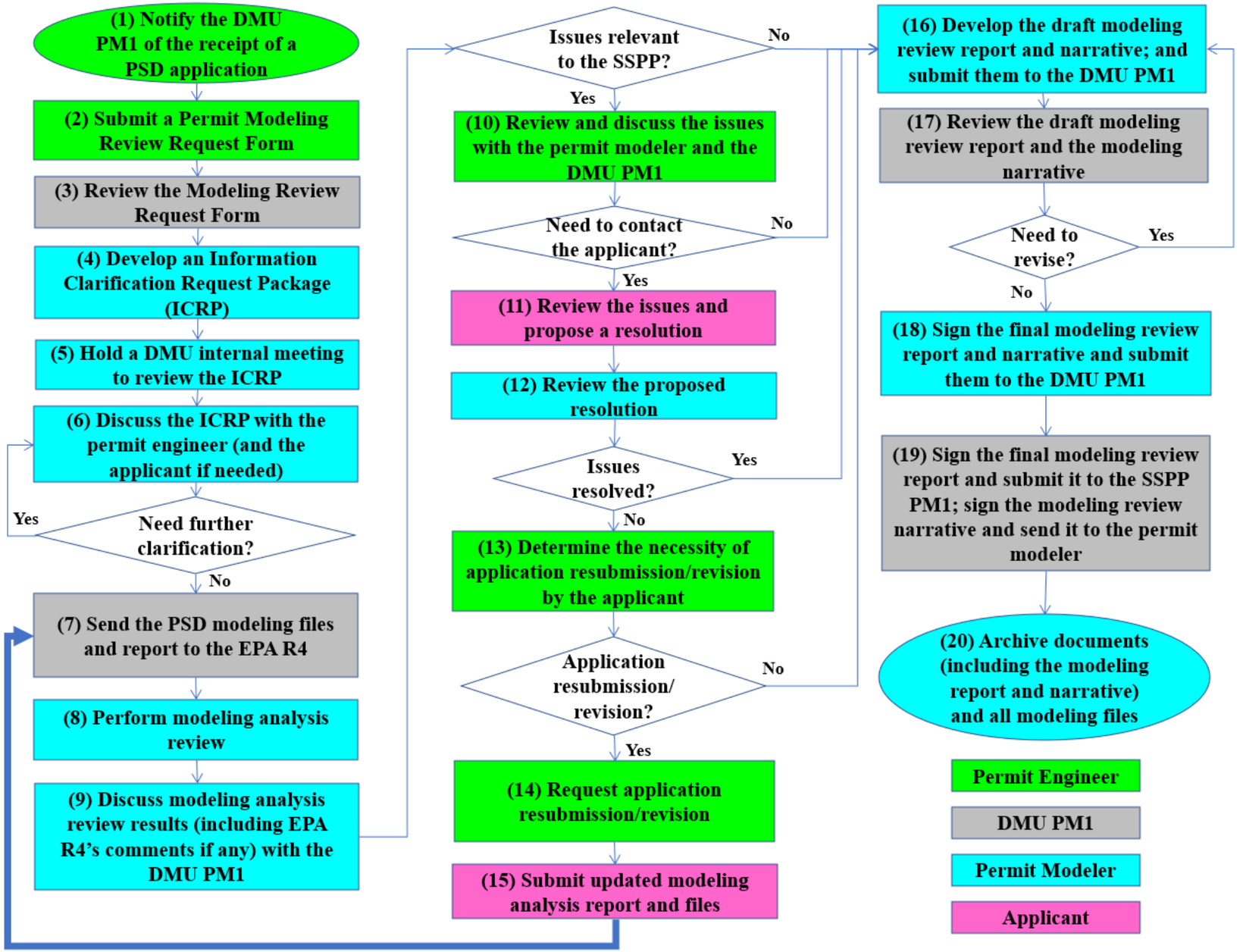
Attachment 1: Comments on the Submitted Modeling Protocol
Attachment 2: Generally Applicable Modeling References
Attachment 3: Modeled Emission Rates
Attachment 4: Startup/Shutdown Modeling and Variable Load Modeling
Attachment 5: Example Comparisons of surface characteristics at Airport and Facility

- Content
  - Cover Letter
  - Major Comments
  - Additional Comments
  - General Comments
  - Attachments

- DMU plans to use the protocol review process as a tool to deliver any necessary PSD modeling approach updates until the PSD modeling guidance is finalized.

PSD MODELING REVIEW FLOWCHART

DMU will try to get modeling files and other necessary information between Steps 1 and 2.



PSD MODELING REVIEW QUICK REFERENCE

Step	Description	Detailed Information and Notes	Timeline
1	Notify the DMU PM1 of the receipt of a PSD application	The permit engineer notifies the DMU PM1 of the receipt of a PSD application and arranges the transfer of information to the DMU PM1.	1-2 business days
2	Submit a Permit Modeling Review Request Form	The permit engineer submits the Permit Modeling Review Request Form (Enclosure 1) to DMU PM1. **This starts the review clock.**	1-5 business days
3	Review the Modeling Review Request Form	The DMU PM1 reviews the submitted Permit Modeling Review Request Form (Enclosure 1) and assigns the modeling review project to a permit modeler.	1 business day
4	Develop an Information Clarification Request Package (ICRP)	The assigned permit modeler develops an ICRP (Enclosure 2) that contains the information (including issues) identified by the permit modeler for further clarification.	10 business days
5	Hold a DMU internal meeting to review the ICRP	The permit modeler requests a DMU internal meeting and discusses information compiled in STEP 4 with the DMU PM1.	1 business day
6	Discuss the ICRP with the permit engineer (and the applicant, if needed)	The permit modeler discusses the ICRP with the permit engineer (and the applicant, if needed) until no further clarification is needed.	2 business days
7	Send the PSD modeling files and report to EPA R4	The DMU PM1 sends PSD modeling files and the modeling portion of the application to EPA R4 upon consultation with the SSPP PM2.	1 business day
8	Perform modeling analysis review	The permit modeler performs modeling analysis review.	10 business days
9	Discuss modeling analysis review results (including EPA R4's comments if any) with the DMU PM1	The permit modeler discusses the modeling analysis review results and EPA R4's comments with the DMU PM1.	1 business day
10	Review and discuss the issues with the permit modeler and the DMU PM1	The permit modeler discusses any applicable issues identified in STEP 9 with the permit engineer and/or SSPP PM1. The permit engineer and/or SSPP PM1 determines if the issues can be resolved without contacting the applicant. **The review clock stops** if the permit modeler contacts the applicant. Proceed to STEP 16 if the permit engineer and/or SSPP PM1 determines that the applicant doesn't need to be contacted.	1 business day
11	Review the issues and propose a resolution	The applicant is contacted and informed of the issue(s) identified in STEP 10. The applicant reviews the issues and proposes a resolution.	1-21 calendar days
12	Review the proposed resolution	The permit modeler reviews the applicant's proposed resolution and confirms whether or not that the proposed resolution will resolve the issue. **The review clock resumes.** If the proposed resolution resolves the issues, proceed to Step 16.	1-5 business days
13	Determine the necessity of application resubmission/revision by the applicant	The permit engineer assesses the extent of changes in the application due to the applicant's proposed resolution and/or yet unresolved issues. The permit engineer determines the necessity of modeling file re-submission/revision after consulting the permit modeler and/or the SSPP PM1.	1 business day
14	Request application resubmission/revision	The permit engineer requests that the applicant resubmit/revise the application based on the approved resolution to issues found in the initial version of the application. **The review clock stops.**	3 business days
15	Submit updated modeling analysis report and files	The applicant submits updated modeling analysis report and files to the permit modeler and the DMU PM1. After this point, the whole review process will go to the STEP 7. **The review clock resumes.**	2 business days
16	Develop the draft modeling review report and narrative; and submit them to the DMU PM1	The permit modeler develops and submits the draft modeling review report and narrative to the DMU PM1 using the report template (Enclosure 3) and the modeling review narrative template (Enclosure 4).	2 business day
17	Review the draft modeling review report and the modeling narrative	The DMU PM1 reviews the submitted draft modeling review report and modeling review narrative. The DMU PM1 works with the permit modeler to resolve any outstanding issues and finalizes these review documents.	1 business days
18	Sign the final modeling review report and narrative and submit them to the DMU PM1	The permit modeler signs the final modeling review report and narrative; and sends them to the DMU PM1.	1 business day
19	Sign the final modeling review report and submit it to the SSPP PM1; sign the modeling review narrative and send it to the permit modeler	The DMU PM1 signs the final modeling review report and sends it to the SSPP PM1. The DMU PM1 also signs the final modeling review narrative and sends it to the permit modeler for archiving.	1 business day
20	Archive documents (including the modeling report and narrative) and all modeling files	The permit modeler archives the final modeling review report, narrative, and modeling files in the File Room.	1 business day

* In general, any additional information request to the applicant will stop DMU's review clock.

Permit Modeling Review Request Form

Fill out and send this form and the relevant information to DMU PM1 via email. Submit the hard copy of permit application and modeling files to DMU PM1 on the same day of the request form submittal:

- Byeong-Uk Kim, Room 1304, Byeong.Kim@dnr.ga.gov, 470-524-0734

1. General Information (To be completed by SSPP permitting engineer):

Facility Name	Interfor U.S. Inc. – Thomaston Mill
AIRS # (if applicable)	293-00007
Application Number	27981 (Expedited Permit Application)
Date of Application	06/09/2021
Assigned SSPP PM1	Jeng-Hon Su
Assigned Permit Engineer	Seetharaman Ganapathy
Date of Modeling Review Request	06/10/2021
Expected Issuance Date of Preliminary Determination (PSD) or Draft Permit (TAP/Quarry)	07/30/2021 Requesting Modeling Review Report by 07/15/2021
Expedited Project?	☒ Yes ☐ No
Send modeling files and report to the EPA R4 (PSD Only)?	☐ Yes ☐ No
Permit Modeling Type	☐ PSD ☒ Air toxics ☐ Quarry Operation ☐ Other
For PSD Modeling: Please list the Criteria Air Pollutants for which SSPP is requesting modeling review.	
For Air Toxics Modeling: Please list the TAPs for which SSPP is requesting modeling review. Formaldehyde	
Note from SSPP (e.g., if the application has CBI, alternative ACSL/AAC values): ISCST3 Modeling	

2. DMU Internal Action Log (requesting additional information from facility, stopping review clock, changing due date, getting verification information from SSPP permit engineer, etc.)

Date	By	Action
06/10/2021	Byeong-Uk Kim	Assigned the review project to Susan Jenkins.

If not provided, DMU will assume 15 days for TAP/Quarry and 30 days for PSD prior to an expected issuance date.

Please list modeled TAPs only.

It will be helpful if SSPP can put any note such as ISCST3 until the new guidance is fully developed and implemented.

INFORMATION CLARIFICATION REQUEST PACKAGE

DMU Information Clarification Request Package (ICRP) – PSD

In this package, the DMU is providing the modeling information that requires further clarification by the SSPP due to ambiguity, insufficiency, and/or inaccuracy of what the applicant provided.

Application #	547905
AIRS #	30300039
Applicant	Washington County Power, LLC
Assigned DMU Modeler	Byeong-Uk Kim/Yunhee Kim/Susan Jenkins
ICRP Request Date	MM/DD/YYYY
Assigned Permit Engineer	Renee Browne
ICRP Completion Date	MM/DD/YYYY

We are requesting to the SSPP to review the following material:

1. Site map overlaid with AERMOD receptors and sources: Please review the fence line that DMU inferred from receptors to see if the DMU's inferred fence line is consistent with what the SSPP approved.
2. Application Completeness Checklist: Please fill out the Application Complete Checklist in this request letter.
3. **DMU's question for the applicant: Q/D Screening Analysis**
   The applicant proposed a numerical value for "Q" as 1,993.25 tons per year. This value of "Q" is based on the following data as supplied in Volume II-Appendix B

Pollutant	Facility-Wide Max. 24-hr Emissions Increase (lb/hr)	FLAG 2010 Approach Annual Emissions (tpy) Note 1
NOx	139.48	610.94
PM_{10} (filterable plus condensable)	39.27	172.00
SO_2	2.10	9.19
H_2SO_4	0.97	4.26

Note 1: FLAG 2010 Approach: Q=Sum of allowable emissions (8760/3500) for limited source operation. Values listed (tpy) are total tpy allowable emissions for the source during limited source operation.

Please provide written derivation of the facility-wide maximum 24-hour emission increase (lb/hr)

4. **DMU's question for the applicant: Significant Impact Area(s)/Significant Impact Distances for Class II Modeling**

Pollutant	Averaging Period	SIL ($\mu g/m^3$)	MGLC ($\mu g/m^3$)	Exceeds SIL?	Radius of SIA (km)
NO_2	Annual	1	103.76	Yes	Please provide the numerical values of each SIA/SID and their derivation.
NO_2	1-hour	7.5	28.7	Yes	
$PM_{2.5}$	Annual	0.2	0.23	Yes	
$PM_{2.5}$	24-hour	1.2	2.89	Yes	

5. **DMU's question for the applicant: MERPs for SIL Analyses:** The applicant proposed emission increases for NOx, VOC, and SO_2 as indicated in the red font. Please provide the derivation of these numerical values. Why are these values so different from the net emissions increases per the PSD Applicability analyses?

Application Volume	Application Component	Pollutant	Project Emissions Increase (tpy)
I	Table 1-1	NOx	565.97
II	Chapter 4.5.6.1	NOx	237.71
II	Chapter 4.5.6.2	NOx	237.71
I	Table 1-1	VOC	95.21
II	Chapter 4.5.6.1	VOC	27.06
I	Table 1-1	SO2	8.86
II	Chapter 4.5.6.2	SO2	2.84

6. **DMU's question for the applicant: MERPs for NAAQS Analyses:** GA EPD's MERP guidance requires the use of the facility-wide emissions (after the modification) rather than the emissions increase as used by the applicant. Please update the MERPs for NAAQS Analyses using the facility-wide emissions (after the modification) and submit to DMU.

Application Volume	Application Component	Pollutant	Facility-Wide Emissions (after the modification) (tpy)
I	SIP Application	NOx	624.48
II	Chapter 4.5.6.2	NOx	237.71
I	Table 1-1	SO2	9.64

AERMOD DISPERSION WORKSHEET

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AERMOD Dispersion Worksheet for Emissions Calculations

Version 1.0-March 2021

Note: Data populated in this worksheet will be verified for credibility by the Stationary Source Permitting Program(SSPP)

Note: Be sure to include all formulas used to compute applicable parameters.

Facility AIRS # (if applicable)	
Facility name:	
Facility address:	
Facility contact:	

Ultimately, DMU prefers receiving a completed version of this file with an application.

Stack ID	Emission Unit ID	Model Source ID	Emission Unit Description	Pollutant	Operating scenario #	Operating scenario Description	Description	Throughput
SV001	SV001	FACSV001	Emergency Generator	NO_2	1	running 24 hours / 7days	Emergency Power Generator Concentrator - Diesel	
SV001	SV001	FACSV001	Emergency Generator	NO_2	2	testing scenario: run for 1-hr between noon and 4 pm.	Emergency Power Generator Concentrator - Diesel	

EXAMPLE

Emission Calculations Table

Stack ID	Permit ID	AERMOD ID	Emission unit	Pollutant	Operating scenario #	Operating scenario Description	Description	Throughput

EXAMPLE: DMU MODELING REVIEW REPORT

DMU Modeling Review Report – PSD
Washington County Power, LLC

General Information

Application #	547905
AIRS #	30300039
Applicant	Washington County Power, LLC
Application Date	02/25/2021
Preferred Report Deadline (30 days prior to "Draft Preliminary Determination Date")	05/09/2021
Draft Preliminary Determination Date	06/09/2021 (Final)
Modeling Review Request Date	03/17/2021
Assigned SSPP PM1	James Eason
Assigned Permit Engineer	Renee Browne
Date of Review Report Submission	05/04/2021
Assigned DMU Modeler	Susan Jenkins, Yunhee Kim, and Byeong-Uk Kim
Approved by DMU PM1	05/07/2021 BK
List of Reviewed Pollutants	CO, PM_{10}, $PM_{2.5}$, NO_2, and VOC

Review Summary

Are the modeled concentrations of all pollutants below SIL for Class I and Class II areas?	☐ Yes	☒ No
If "No" for the question above, list all pollutants whose modeled impacts were greater than or equal to the applicable SIL.	Class II 1-hour NO_2 Class II Annual NO_2 Class II 24-hour $PM_{2.5}$ Class II Annual $PM_{2.5}$	
If cumulative modeling (i.e., Increment and NAAQS) is performed, are all pollutant below their applicable PSD Increment thresholds and NAAQS?	☐ Yes	☒ No
If "No" for the question above, list all pollutants whose modeled impacts were greater than applicable PSD Increment threshold and/or NAAQS.	Class II 1-hour NO_2 NAAQS (**Facility contribution is below SIL.**)	
Did the AQRV analysis show compliance?	☒ Yes*	☐ No
If "No" for the question above, list all AQRVs whose impacts were greater than thresholds.		

Review Notes

DMU requested additional information to the application on May 4, 2021. As of May 7, DMU have not received requested information from the applicant yet. This report assumes no additional/updated modeling to be done. If new modeling files are submitted, DMU will update this report accordingly.

*DMU has received no comments made by FLM agencies as of May 7, 2021. The applicant submitted a concurrence letter from USDA Forest Service. However, that letter was for the applicant's AQRV analysis with an error. DMU advised the applicant to resubmit an updated AQRV analysis to FLMs and submit new concurrent letters to DMU.

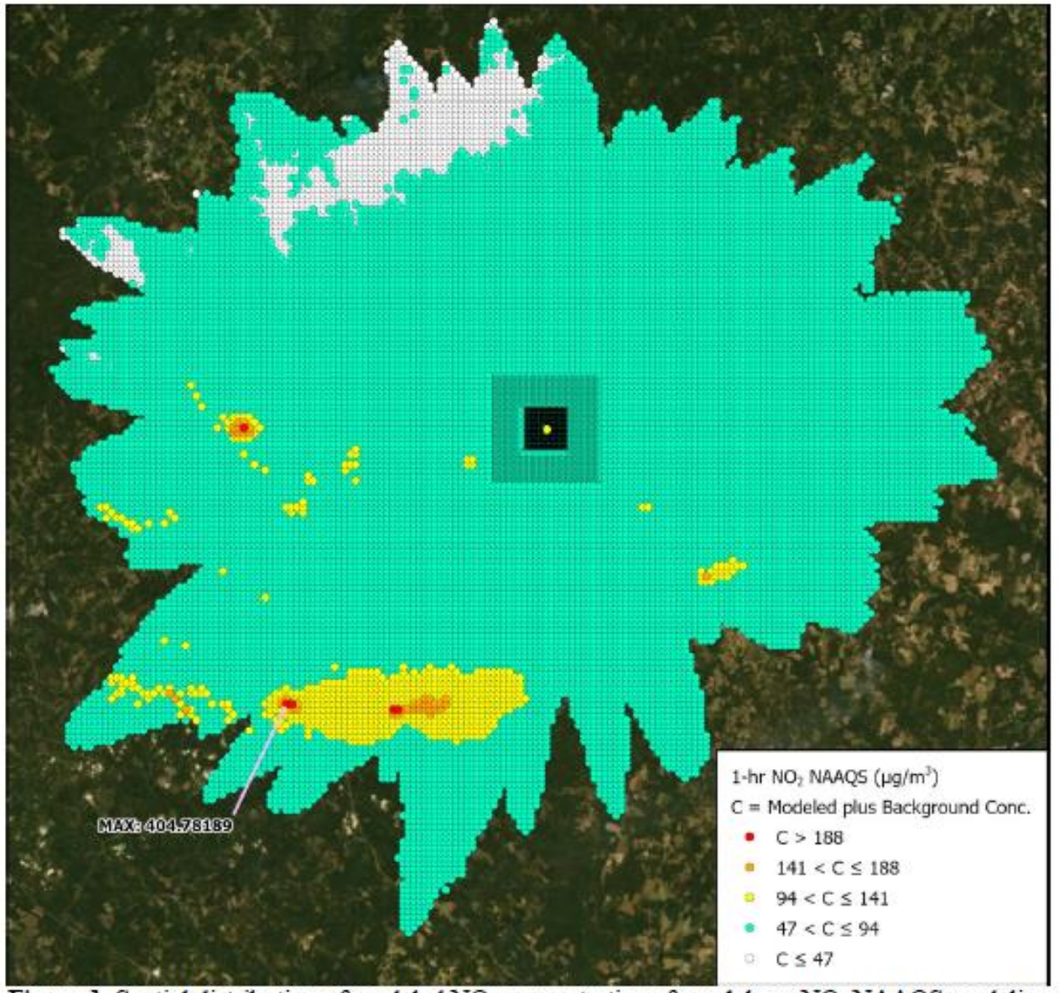

Figure 1. Spatial distribution of modeled NO_2 concentrations from 1-hour NO_2 NAAQS modeling (Fuel Oil Operation).

SUMMARY AND NEXT STEPS

SUMMARY

1. Reviewed similar projects for flowcharts, quick reference sheets, and checklists.
2. Performed benchmarking survey for nine SE states.
3. Developed new modeling review SOP documents for PSD modeling protocol, PSD modeling, TAP modeling, and Quarry modeling.
4. Developed a mechanism to (1) collect modeled emission rate information more efficiently and accurately from applicants; and (2) request verification/validation of modeled emissions more efficiently and effectively by SSPP.
5. Updated modeling review metrics.

CURRENT PROJECT METRICS

Metrics	Current	Target
Number of DMU staff (with more than 12 months experience) that have the technical background to independently review all types of permit modeling from start to finish.	50% (1 out of 2)	100%
Percent of draft PSD modeling protocol approval letters completed within 30 days. Percentage based on 24-month rolling average.	N/A (0 out of 0)	95%
Percent of PSD permit modeling reviews completed within 45 days. Percentage based on 24-month rolling average.	100% (1 out of 1)	90%
Percent of TAP (Toxic Air Pollutant) permit modeling and Quarry permit modeling reviews completed within 30 days. Percentage based on 12-month rolling average.	100% (2 out of 2)	95%

*All review durations are in calendar days.

NEXT STEPS

- **Update guidance documents with SSPP.**
  - Identify any need for guidance updates while reviewing/implementing SOPs
    - **Will streamline application and review process**
    - **Will establish routine communication between DMU and SSPP**
  - Separate PSD Modeling Guidance from the PSD Guidance
  - Finalize TAP and Quarry Guidance Update
  - Develop one-page fact sheets for PSD, TAP, and Quarry modeling guidelines outlining major changes for applicants
- **Provide interim guidance via memos/letters to applicants until guidance updates are finalized (with SSPP's help)**
- **Update SOPs (ongoing, as needed)**
- **DMU Manager will report metrics to upper-management and Director's Office on a regular basis.**
  - Monthly reporting for the Air Branch Chief and Quarterly reporting to LSS POC team

QUESTIONS?