Potential PM2.5 and CPM Pitfalls in Permitting, Testing and Compliance

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NCASI Southern Regional Meeting

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Agenda

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- Project overview
- PSD applicability assessment
- Permitting strategy
- PM2.5 and CPM baseline data
- Compliance testing results
- Critical review and planning
- Outcome and learnings

Project Overview

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- Bleached and unbleached Kraft Mill
- Modifications to pulp lines
- Production increase
- Debottlenecked recovery operations

PSD Applicability

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- Actual-to-projected actual assessment
- No contemporaneous projects
- Decreases in some pollutants due to project
- No project netting

Project Emissions Baseline Data

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- Baseline data from reported emissions
- Missing data for PM2.5 and CPM
- Test data and NCASI factors
- Projected actuals conservatively estimated

Project Emissions Increases

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- **PSD applicability Step 1 – project increases**
- **Project increases alone PSD significant for:**
  - **VOC, NOX, PM, PM10, PM2.5**

	VOC	NO_X	PM	PM_{10}	$PM_{2.5}$
Step 1					
Total Project-Related Emissions Increases	48	193	93	82	65
PSD Significance Levels	40	40	25	15	10
Step 1 - Project Increases Exceed PSD Significance Levels?	***Yes***	***Yes***	***Yes***	***Yes***	***Yes***

- **Biogenic deferral for CO2e**

Permitting Strategy and Boiler MACT

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- Coal boiler conversion to natural gas option
- Emission reductions available for netting
- Other project reductions made federally enforceable
- Net decreases less than PSD significant
- Construction permit issued with testing requirements including PM2.5

Summary of Project Emissions

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	VOC	NO_X	PM	PM_{10}	$PM_{2.5}$
Step 1					
Total Project-Related Emissions Increases	48	193	93	82	65
PSD Significance Levels	40	40	25	15	10
Step 1 - Project Increases Exceed PSD Significance Levels?	***Yes***	***Yes***	***Yes***	***Yes***	***Yes***
Step 2					
Emission Increases During the Contemporaneous Period	7	-	-	-	-
Emission Decreases During the Contemporaneous Period	17	183	81	71	56
Total Net Emissions Increase	38	10	12	11	9
PSD Significance Levels	40	40	25	15	10
Step 2 - Net Increases Exceed PSD Significance Levels?	***No***	***No***	***No***	***No***	***No***

Criticality of PM10/PM2.5 Emission Data

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- Recovery area sources largest contributors to increases
- Concern with lack of data therefore pre-project testing
- Results compared with other IP and NCASI data
- Projected actual emissions set conservatively with margins added

CPM Emission Factor Evaluation (Pre-project)

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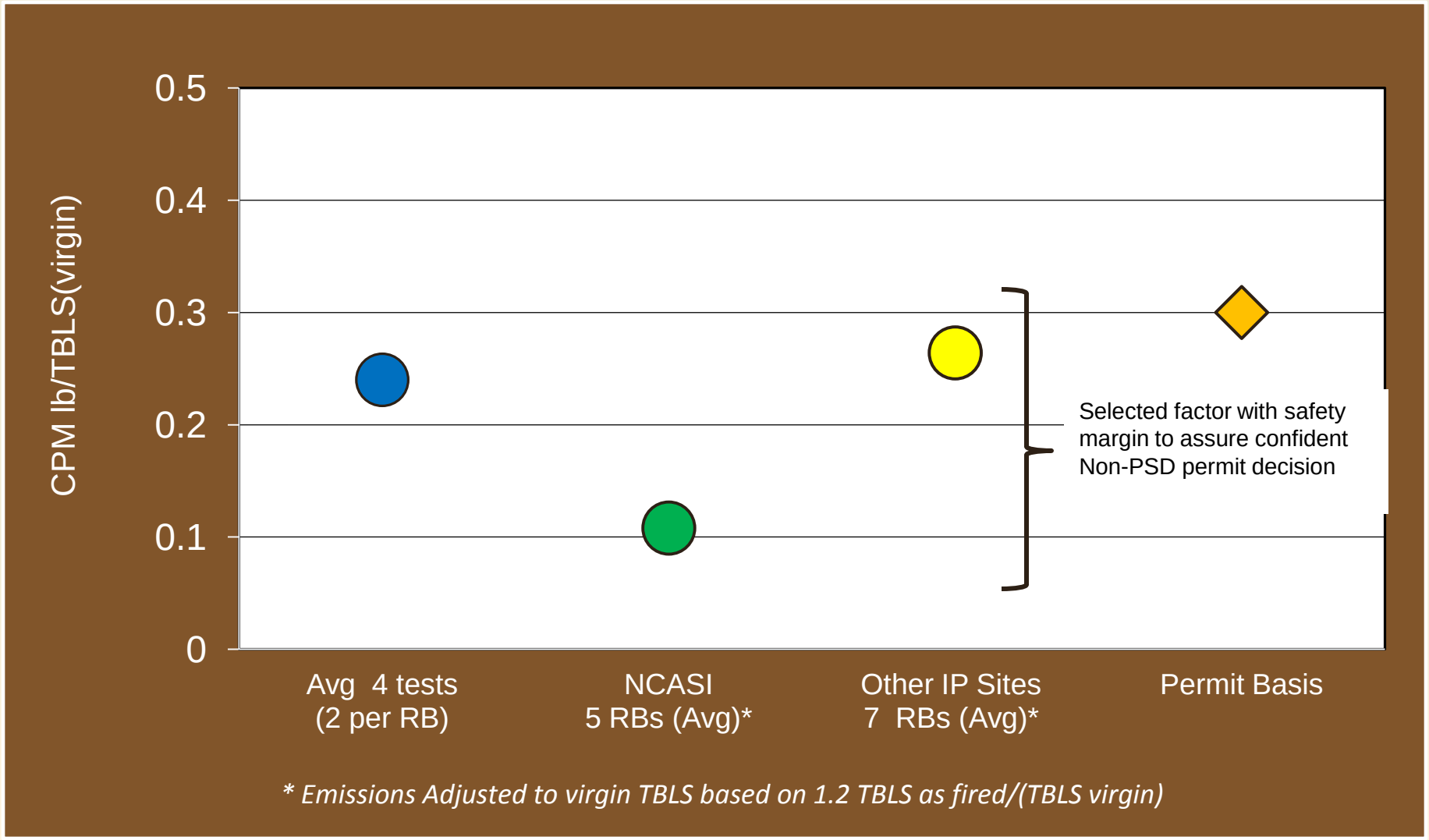

** Emissions Adjusted to virgin TBLS based on 1.2 TBLS as fired/(TBLS virgin)*

CPM Stack Test Demonstration (Post-project)

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1.15 lb CPM/TBLS-virgin

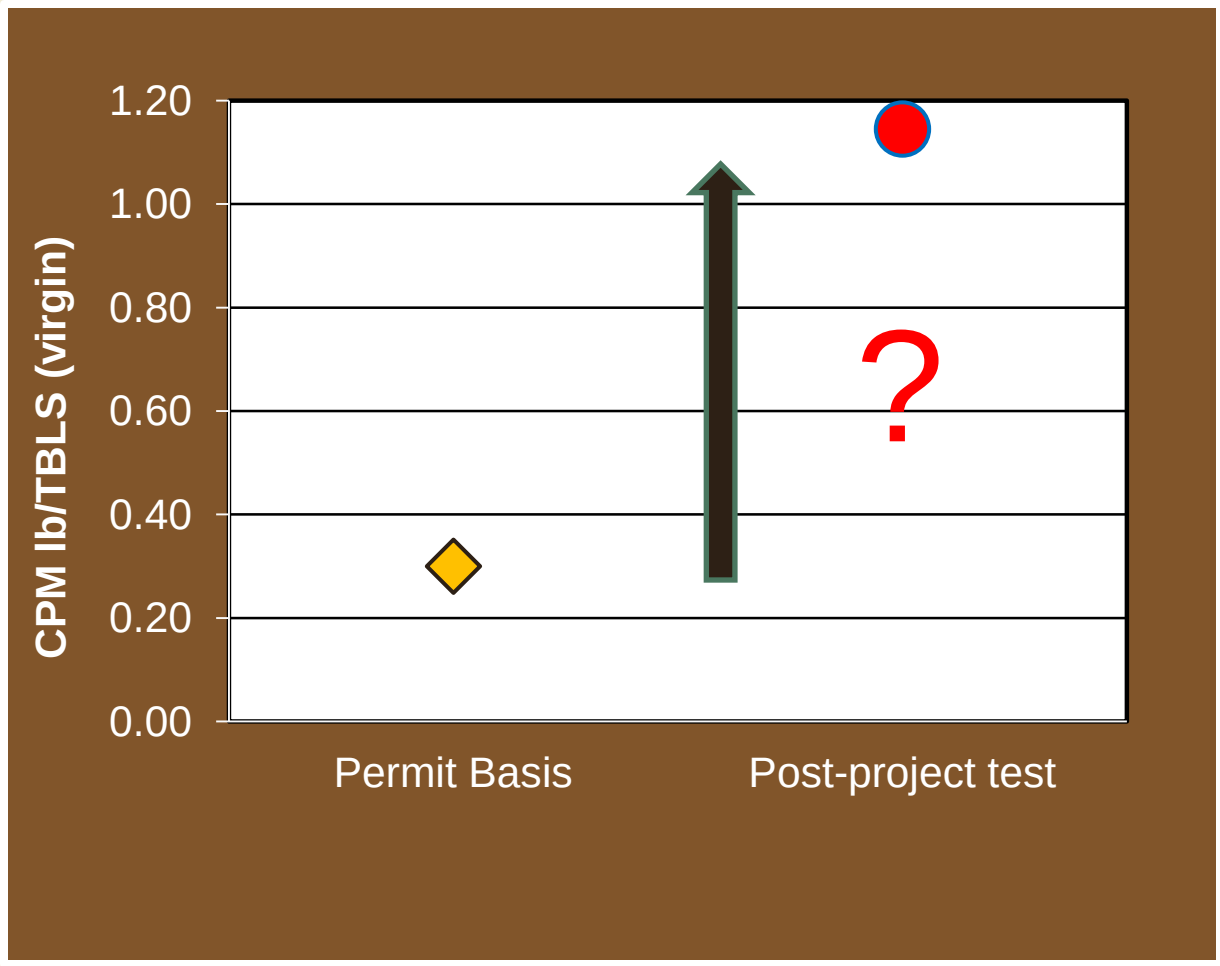
4 times higher than expected

Mostly organic > 80 wt%

~ 195 ppmdv as carbon

or

~ 53 ppmdv as propane



Critical Assessment
Systematic Review - Possible Explanations

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- Changes in Operating Conditions?
- Physical or Chemical Changes?
- Sample Collection/Analysis?
- True Emissions Variability?

Assessment Findings

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- **Process Review**
  - **Similar process & operating conditions all test programs**
  - **No physical/operational changes**
- **Previous Stack Test Programs**
  - **CPM coupled with M201A trains**
  - **Test plans/equipment selected to satisfy M201A cyclone cut point constraints**
  - **Insufficient sample volumes/collected mass for CPM**
  - **No Train/Field Reagent Blanks**

Re-test Planning-1

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- Use CEMs to confirm exhaust gas levels of CO and total hydrocarbons are within expected ranges
- Extend CEMs monitoring over several days to characterize typical values and ranges
- Collect and analyze Liquor and Smelt Chemical Composition, HHV

Re-test Planning-2

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- **Reduce sampling equipment/reagent residues**
  - **Confirm Field/Lab Glassware & Reagent purity in advance**
  - **4 Sampling Train Recovery Blanks**
- **Increase measurement certainty by:**
  - **Increasing sample volumes (> 75 cubic ft/run)**
  - **Targeting > 50 mg CPM**
  - **Tightening constant weight criteria to +/- 0.2 mg**
  - **Using only glass or Teflon® weighing containers**

Re-test Results

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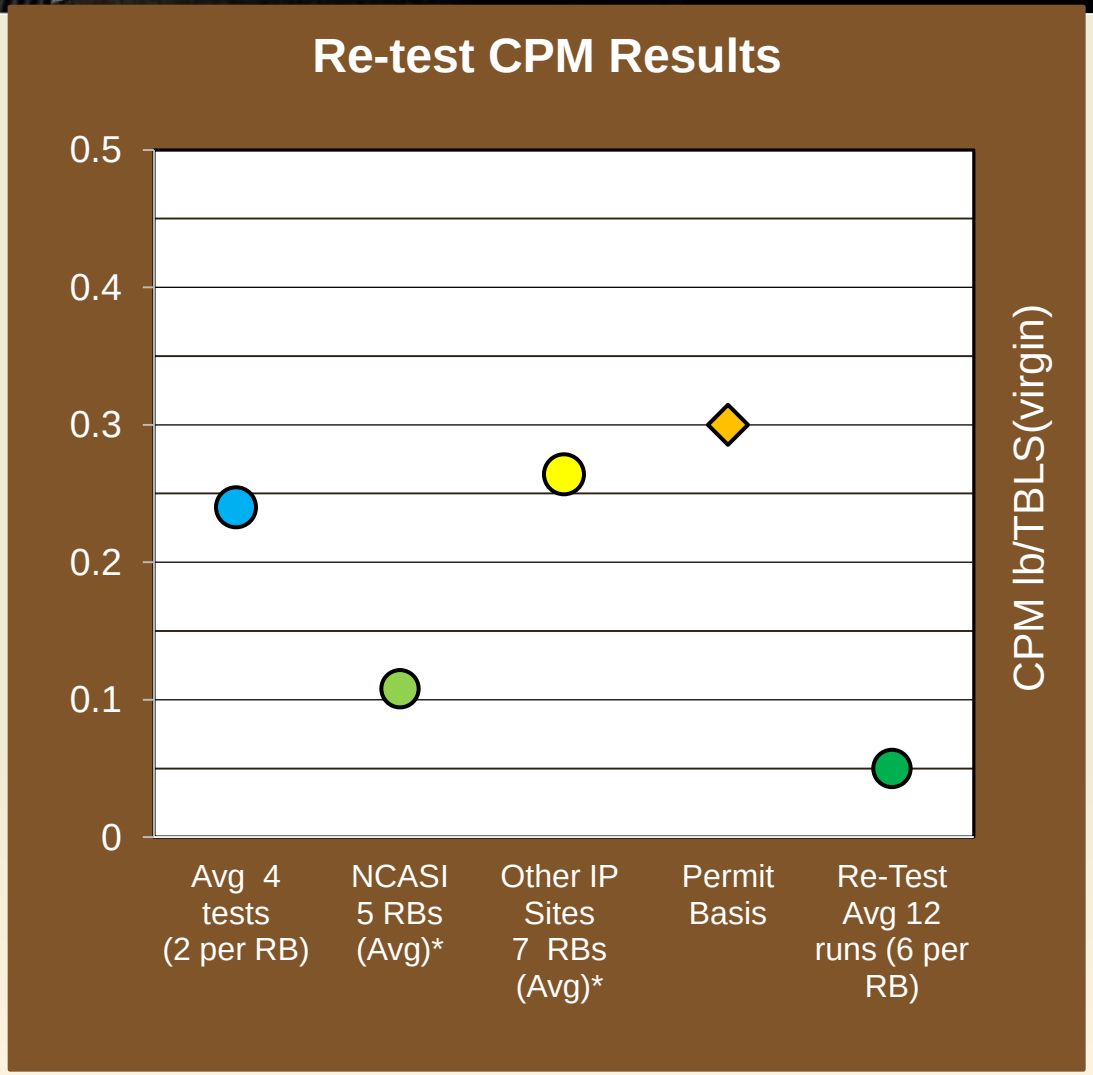
Two 3-run series each RB

Average CPM = 0.05 lb/TBLS virgin

In Expected Range

Predominately inorganic CPM



Conclusions and Takeaways

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- CPM and lower PM2.5 permitting thresholds bring scrutiny to very small “projects”
- Don’t wait till you have a “project” to test CPM
- Develop a site-specific CPM and PM2.5 emission “history”
- Don’t over complicate the test constraints – decouple M201 and M202
- Rely on literature emission factors to put you in the ballpark – don’t count on for “compliance”
- Design and execute test programs to answer critical questions at appropriate certainty level
- Don’t set yourself up for surprises