Competing Source Emission Inventories for Air Quality Analysis

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What are we talking about here?

Background
- Why ODEQ should do Competing Source Inventories?
- Statement of the Issues
- Purpose of Project

About the Case Study

Screening Process Design and Application

Recommendations
What are we talking about here?

- What is a competing source emission inventory?
- Why is it needed?
- Who is considered a competing source?
Inherited task of preparing competing source emission inventories for permit modeling

Opportunity to more clearly define emission inventory’s role in air quality analysis
Why ODEQ should develop competing source emission inventories?

- direct access to permitting databases and files
- more familiar with types and location of permitted sources in the state
- access to emission inventory references and tools
- direct access to permit writers for assistance
Statement of the Issues

- Regardless if emission inventory was done in-house or not, a list of competing sources would still need to be provided by ODEQ.

- Limited timeframes for permit modeling projects.

- Key information is not always available to prepare competing source list.

- Large volume of sources with air operating permits may get pulled into list.

- 1 FTE for developing point source emission inventories.
Purpose for the Project

- Design screening process to identify sources to include in competing source emission inventories
- Apply the new screening process to a Case Study from Washington County, Oregon
A CASE STUDY FOR COMPETING SOURCE DETERMINATION FOR WASHINGTON COUNTY, OREGON
Where is Washington County?
Where is Washington County?

- Area: 726 sq miles
- Population: 562,998
- Major Industries:
  - Agriculture
  - Lumber
  - Manufacturing
  - Food Processing
  - Electronics
Demonstrate the large volume of nearby sources that may be pulled in for competing source determination in urban areas

Unique topographical features that creates localized meteorological conditions within the county and obstructs pollutant transport
About the Case Study Subject

- Facility is located in Hillsboro, Oregon

- Proposed emission increases will raise allowable emission limits

- Apply for a permit that requires a Prevention of Significant Deterioration (PSD) analysis

- CO, NO2, PM10, and PM2.5 are pollutants of concern
Case Study: Competing Source Determination

Screening Process Design and Application
4 step screening process:

1) Develop initial list of nearby sources
2) “Range of Influence” (ROI) screening method
3) Topography and Meteorological Assessment
4) Evaluate remaining nearby sources for background rather than inventorying
Case Study: Competing Source Determination

Step 1: Develop initial list of sources

- Map new or modified source centered in area with a 50 km radius
- Identify counties within 50 km boundary
- Query permitting database for all nearby stationary and portable sources within boundary that have:
  - Title V or Air Contaminant Discharge Permit (ACDP) and allowable limits for pollutants being modeled
- Add existing sources to map with new or modified source
Case Study:
Competing Source Determination

Step 1: Initial List of Sources within 50 km Boundary
Case Study: Competing Source Determination

- Six counties: Clackamas, Columbia, Marion, Multnomah, Washington, and Yamhill
- 2 counties not included in inventory: Tillamook County Oregon and Clark County Washington
- 329 nearby stationary sources were added to map
- 151 portables not included on map
- Federal and state air operating permit programs

### Breakdown of Nearby Sources by Permit Type

<table>
<thead>
<tr>
<th>Permit Program</th>
<th>Permit Type</th>
<th># of Sources</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACDP Basic</td>
<td></td>
<td>23</td>
</tr>
<tr>
<td>ACDP Generals</td>
<td></td>
<td>318</td>
</tr>
<tr>
<td>ACDP Simples</td>
<td></td>
<td>52</td>
</tr>
<tr>
<td>ACDP Standards</td>
<td></td>
<td>57</td>
</tr>
<tr>
<td>Title V Title V</td>
<td></td>
<td>30</td>
</tr>
<tr>
<td>Total Sources</td>
<td></td>
<td>480</td>
</tr>
</tbody>
</table>
Case Study: Competing Source Determination

Step 2: Range of Influence (ROI) Screening Method

- Oregon rules provide a methodology for identifying nearby sources to include in competing source modeling.

- The ROI estimates the distance from a source that emissions can have a significant impact.

- The modeled Source Impact Area (SIA) of the new or modified source is used to define significance.

- SIA is not always available at the time the inventory is initially developed but will be to refine the inventory for final modeling.
Step 2: Range of Influence (ROI) Screening Method

➢ Revised ROI method to work without SIA
   • add new or modified source and nearby source annual allowable emissions together for each pollutant
   • calculate ROI for total annual allowable emissions for both sources

➢ Compare combined ROI to the distance from the nearby source to new or modified source
   • ROI > than distance keep on list
   • ROI < than distance remove from list
Case Study: Competing Source Determination

- 115 sources removed by the ROI screening method
- The most number of sources removed from the list are Generals and Simples
- The least number of sources removed from the list are Title V
- 214 sources are still a large undertaking to inventory each at process-level

### Comparison of Nearby Sources Remaining by Screening Step

<table>
<thead>
<tr>
<th>Permit Type</th>
<th>Step 1: 50 km boundary</th>
<th>Step 2: ROI Screening Method</th>
</tr>
</thead>
<tbody>
<tr>
<td>Title V</td>
<td>30</td>
<td>25</td>
</tr>
<tr>
<td>ACDP:</td>
<td></td>
<td></td>
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<tr>
<td>Basics</td>
<td>10</td>
<td>7</td>
</tr>
<tr>
<td>Generals</td>
<td>182</td>
<td>114</td>
</tr>
<tr>
<td>Simples</td>
<td>50</td>
<td>28</td>
</tr>
<tr>
<td>Standards</td>
<td>57</td>
<td>40</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>329</strong></td>
<td><strong>214</strong></td>
</tr>
</tbody>
</table>
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Step 3: Topography and Meteorological Assessment

- Analyze natural and artificial features surrounding the new or modified source and nearby sources
- Topography can cause unique meteorological conditions
  - localized weather patterns: stagnant days, prevailing winds
  - act as a barrier for pollutant transport
Case Study:
Competing Source Determination
Case Study: Competing Source Determination
Case Study: Competing Source Determination

Natural Features:
- Bull Mtn - 715 ft
- Coastal Range - 1295-2421 ft
- Cooper Mtn - 774 ft
- Chehalem Mtns - 1601 ft
- Parrett Mtn - 1112 ft
- Tualatin Mtns - 1227 ft
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Step 3: Washington County Topography Map

- 1227 ft elevation
- 1295-2421 ft elevation
- 774 ft elevation
- 715 ft elevation
- 1601 ft elevation
- 1112 ft elevation
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Step 4: Considerations for removing sources from emission inventory

- Small or intermittent sources do not operate at the same time as the new or modified source
- Source that do not emit a pollutant of concern
- Portable sources
- Source's actual emissions are substantially lower than the allowable emission limit and not expected to operate close to the assigned limit:
  - Apply a 5 km cutoff to basic and general permit types
  - Sources located over 5 km away not included on list
  - Assume small or insignificant sources are represented in the background
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Step 4: Sources Removed Because
- Small or Intermittent Sources (8)
- Not emit pollutant of concern (3)
- >5 km cutoff (22)
- Portables removed from the beginning (151)

Conclude:
Step 1: 329 sources to start

Sources Removed by Each Step:
Step 2: 115 sources (214 remain)
Step 3: 152 sources (62 remain)
Step 4: 33 sources (29 remain)

Total removed: 300 sources
Recommendations

- Screening process can be used for different areas in the state
- Use 50 km boundary for the initial list
- Use screening ROI method
- Use 5 km cut-off for Basic and General ACDP Permits
- Use SIA when it becomes available to revise initial inventory
Questions?

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