Emissions Inventory: Rule Applicability and What’s New?

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Presented to the 2015 Emissions Inventory Workshop
January 14, 2015
Overview

- 30 Texas Administrative Code (TAC) Section (§) 101.10
- Applicability
- Emissions inventory (EI) types
- EI updates
- Greenhouse gases (GHG)
- EI publications
EI rule organization

(a) Applicability
(b) Types of inventories
(c) Calculations
(d) Certifying statements
(e) Reporting requirements
(f) Enforcement
Applicability Requirements: Do You Need to Submit an EI?

- Major stationary source defined under 30 TAC §116.12, Nonattainment and Prevention of Significant Deterioration Definitions
  - The rule defines potential to emit (PTE) thresholds.
  - The definition of major source can change based on the attainment status of county.

- Need to know:
  - PTE and actual emissions thresholds for regulated pollutants
  - PTE and actual emissions thresholds for hazardous air pollutants (HAPs)
  - Site location and attainment status of county
Applicability Requirements: Do You Need to Submit an EI? (cont.)

- Any account located in an ozone nonattainment area emitting a minimum of 10 tons per year (tpy) volatile organic compounds (VOC), 25 tpy nitrogen oxides (NO$_x$), or 100 tpy or more of any other contaminant subject to national ambient air quality standards

- Any account that emits or has the potential to emit 100 tpy or more of any contaminant except for GHGs

- Any account that emits or has the potential to emit 10 tons of any single or 25 tons of aggregate hazardous air pollutants as defined in Federal Clean Air Act, §112(a)(1)

- Any source of emissions subject to special inventories under 30 TAC §101.10(b)(3)
### Summary of Reporting Thresholds

#### Summary of Reporting Requirements in Tons per Year (TPY) for 30 TAC §101.10

Note: For ozone nonattainment areas, the more stringent or severe classification (where applicable) between the 1997 and 2008 ozone standards is used to determine reporting requirements for ozone precursor potential emissions.

<table>
<thead>
<tr>
<th>County</th>
<th>Volatile Organic Compounds (VOC)</th>
<th>Nitrogen Oxides (NO(_x))</th>
<th>Other</th>
<th>Individual HAPs</th>
<th>Aggregate HAPs</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Actual</td>
<td>PTE</td>
<td>Actual</td>
<td>PTE</td>
<td>Actual</td>
</tr>
<tr>
<td>Brazoria, Chambers, Fort Bend, Galveston, Harris, Liberty, Montgomery, Waller SEVERE/OZONE</td>
<td>10</td>
<td>25</td>
<td>25</td>
<td>25</td>
<td>100</td>
</tr>
<tr>
<td>Collin, Dallas, Denton, Ellis, Johnson, Kaufman, Parker, Rockwall, Tarrant, SERIOUS/OZONE</td>
<td>10</td>
<td>50</td>
<td>25</td>
<td>50</td>
<td>100</td>
</tr>
<tr>
<td>Wise MODERATE/OZONE</td>
<td>10</td>
<td>100</td>
<td>25</td>
<td>100</td>
<td>100</td>
</tr>
<tr>
<td>All Other Counties</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>100</td>
</tr>
</tbody>
</table>
Applicability Requirements: Example

• Important: If an account (site) meets any of the EI reporting requirements at any time during the calendar year, an updated EI must be submitted.

• Remember, regardless of authorization type or status, this includes:
  – actual emissions and/or
  – potential emissions.

• Most common scenario:
  
  An operational major source voided the site's applicable permits in June 2014.

   The site met 30 TAC §101.10 PTE reporting thresholds.
   The site must submit a 2014 EI.
   The 2015 EI may not be required if none of the 30 TAC §101.10 reporting requirements are met.
Applicability Summary: What Does This Mean to You?

• What is the attainment status of the county where the site is located?

• What are the site’s actual emissions for regulated pollutants and HAPs (single and aggregate)?

• What are the site’s PTE limits for regulated pollutants and HAPs (single and aggregate)?
EI Types

- Initial
- Annual update
- Special
Initial EI

- Applies to a site that has never submitted an inventory
- Data collected using standardized forms or through the Web-based system
- *2014 Emissions Inventory Guidelines (RG-360/14)*
  - Chapter 2: "Creating an Initial Emissions Inventory"
  - Chapter 5: "Example Initial Emissions Inventory"
- Due to the Texas Commission on Environmental Quality (TCEQ) by March 31st
Annual EI Update

- Required every year reporting criteria are met
- Guidance for annual update
  - *2014 Emissions Inventory Guidelines*, Chapter 6: "Updating an Emissions Inventory Questionnaire"
  - *2014 Emissions Inventory Guidelines*: "Emissions Inventory Checklist"
Special EI

- Regulated entities that receive a written request from the TCEQ
  Respond to the letter even if site does not meet reporting thresholds.
- What are the current special emissions inventories?
  Lead
    - Any regulated entity that emits $\geq 0.5$ tpy of lead emissions during normal operations.
    - Any regulated entity that has the PTE 5 tpy of more of lead emissions.
What are the current special emissions inventories (cont.)?

**Ozone precursors**

Regulated entities that had at least 10 tpy of VOC or 25 tpy of NO\textsubscript{X} emissions during normal operation and that are located in one of the counties specified below:

<table>
<thead>
<tr>
<th>Bastrop</th>
<th>Gregg</th>
<th>Henderson</th>
<th>Orange</th>
<th>Upshur</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bexar</td>
<td>Guadalupe</td>
<td>Hood</td>
<td>Rusk</td>
<td>Victoria</td>
</tr>
<tr>
<td>Caldwell</td>
<td>Hardin</td>
<td>Jefferson</td>
<td>San Patricio</td>
<td>Williamson</td>
</tr>
<tr>
<td>Comal</td>
<td>Harrison</td>
<td>McLennan</td>
<td>Smith</td>
<td>Wilson</td>
</tr>
<tr>
<td>El Paso</td>
<td>Hays</td>
<td>Nueces</td>
<td>Travis</td>
<td></td>
</tr>
</tbody>
</table>
Inapplicability Notification Letter

• If you receive a notification letter from the TCEQ but the site does not meet any of the reporting thresholds in 30 TAC §101.10 or special inventory requirements a certifying letter instead of a full EI update is acceptable.

• The sample letter provided in the 2014 *Emissions Inventory Guidelines*, Appendix B is recommended.
  – No option currently to submit through the Web.
  – Similarly worded letter can be provided.

• The sample letter provides two options:
  – remain on the mailing list or
  – removal from the mailing list.
To be removed from the mailing list, the following are **required**:

- The most recently reported emissions in the State of Texas Air Reporting System (STARS) database cannot exceed the applicability requirements.
  
  Must submit a current updated emissions inventory questionnaire (EIQ) and calculations before the site can be removed.

- The site does not meet any special inventory reporting requirements.

- If a major source has an active Title V permit due to PTE levels, the EAS will not remove the site from the mailing list.
Insignificant Change Notification Letter

If changes in emissions for each pollutant do not exceed 5% or 5 tpy, whichever is greater, a letter can be submitted.

- The changes can be either increases or decreases.
- The 5% or 5 tpy criteria are based upon 2014 emissions compared to the most recently submitted EI entered into the STARS database.
- If a letter is submitted several years in a row, the EI may need to be updated if the OVERALL change exceeds 5% or 5 tpy from last submitted EI.
- The emissions from the last submitted EI are copied to current year.
- Sample letter provided in *2014 Emissions Inventory Guidelines*, Appendix B.
In addition to the Insignificant Change Notification Letter, the following must be provided:

- account information and EI contact information on page 2 of the EIQ;
- criteria emissions totals and site quantifiable event totals on page 3 of the EIQ;
- signature of the legally responsible party on page 4 of the EIQ; and
- updates to information about emissions events and/or scheduled maintenance, startup, and shutdown activities (EE/SMSS).

  - If the site experienced no EE, then the EE certification statement on page 4 of the EIQ must be signed.
  - If the site experienced EE, then provide EE updates on the applicable paths emissions pages of the EIQ.
Revising EI Data

• What should be included with the emissions inventory revision request?
  – Signed cover letter describing the nature and reason for the revisions
  – Revised applicable EIQ pages
  – Updated criteria emissions total for the site (found on page 3 of the EIQ)
  – Detailed calculations and supporting documentation for the revised emissions

• All company-initiated revisions requests are subject to the TCEQ's review and approval.

• Revisions are processed as time permits.
  Typically after all EIs for the current reporting year have been processed
The EAS' EI revisions policy is year-dependent.

- Current reporting year (2014) and one previous reporting year (2013):
  - Revisions may be updated in the STARS database and filed in the corresponding year’s EI folder.
- Up to three more reporting years (2012, 2011, and/or 2010):
  - Revisions may be updated in STARS and filed in the corresponding year’s EI folder.
  - The EAS will review these requests on a case-by-case basis.
- Five or more years from the current reporting year (2009 and prior):
  - The receipt of the revision request will be noted in STARS and filed in the corresponding year’s EI folder.

All revisions are subject to TCEQ review and approval.
### Company-Initiated Revisions Submitted During the 2014 Inventory Year

<table>
<thead>
<tr>
<th>Inventory Year Revision Requested</th>
<th>Can the revisions be entered in STARS?*</th>
</tr>
</thead>
<tbody>
<tr>
<td>2013</td>
<td>Yes</td>
</tr>
<tr>
<td>2012</td>
<td>Yes</td>
</tr>
<tr>
<td>2011</td>
<td>Case-by-case</td>
</tr>
<tr>
<td>2010</td>
<td>Case-by-case</td>
</tr>
<tr>
<td>2009</td>
<td>Case-by-case</td>
</tr>
<tr>
<td>2008 and prior</td>
<td>No. Filed only and noted in the STARS tracking system.</td>
</tr>
</tbody>
</table>

*Subject to TCEQ review and approval*
Who’s Responsible for Submitting the EI?

- The owner or operator of the site at the time the inventory is due is responsible for submitting the EI.
- The due date for sites that submitted an EI the previous year is March 31\textsuperscript{st} unless otherwise directed in writing by the TCEQ.
- The due date for sites that did not submit an EI the previous year but are applicable to reporting requirements is March 31\textsuperscript{st}.
Using EI Data

- Required reporting to the national emissions inventory
- Auditing for air emissions fee
  The fees group compares the EI to the fee basis form.
- Public information and internal data requests
- State implementation plan development
- Photochemical and dispersion modeling
- Emissions trends
- Section 185 baseline determinations
- Emissions reduction credits
EI Guidance Updates

- Chapters 1 and 2
  - Guidance for sites that are permitted but not built
  - Guidance on confidential information electronically

- Chapter 4
  Changed the denominator in the equation to determine ozone season pounds per day (ppd) emissions rates from ‘Operation Days’ to simply ‘153 days’ to obtain the ppd emission rate for the entire ozone season

- Appendix A, Technical Supplement 4: "Flares"
  The United States Environmental Protection Agency (EPA) is potentially updating certain AP-42, Chapter 13.5 emissions factors for flares; do not use proposed factors for EI purposes.
Technical Supplement 6: Aboveground Liquid Storage Tanks

- Clarified data required for determining emissions using chemical mixtures
- Streamlined guidance on produced water tanks, heated tanks, and tanks receiving hot products
- New guidance for potential breathing losses from heated, insulated tanks
- Clarified data required for tanks storing heavy fuel oils and related products
- New guidance for the ozone season emissions calculations using the American Petroleum Institute's Exploration and Production Tank program and how to adjust emissions accordingly
GHG Update

- In March 2014, the commission adopted rulemaking to implement House Bill 788 of the 83rd Legislative Session.
- On June 23, 2014, the Supreme Court of the United States issued an opinion in *Utility Air Regulatory Group v. EPA et al.* that affects GHG permitting.
  - Sources (sites) cannot be classified as major sources *solely* due to GHG emissions levels.
  - No changes to EI reporting requirements.
    - GHG are NOT required to be reported in EI.
  - No changes to emissions fee assessments.
Upcoming Changes

This is the last year that annual EI updates and initial EIs can be submitted on paper.

- Starting with reporting year 2015 (due March 31, 2016), the above EI types must be submitted through the State of Texas Electronic Emissions Reporting System (STEERS).

- If you have never submitted through STEERS, you should try the system this year to be prepared for next year.

  Creating a STEERS account this year is highly recommended.
EI Publications

- EI guidelines book (RG-360/14) provides:
  - Step-by-step instructions for completing an EI
  - Yearly updates with current reporting requirements
  - Technical supplements for common emissions sources

- EI forms and instructions
  - Blank forms in enterable portable document format
  - Files include instruction and example forms

- Web-based EI reporting instructions

- All documents available at:
  - [www.tceq.texas.gov/goto/ieas](http://www.tceq.texas.gov/goto/ieas)
  - Call TCEQ publication for your one free hard copy of the 2014 EI Guidelines: (512) 239-0028
Contact Information

Nina Castillo:
(512) 239-4415
nina.castillo@tceq.texas.gov

Emissions Assessment Section Help Line:
(512) 239-1773
psinvent@tceq.texas.gov
Questions
Basic Web-based Emissions Inventory Reporting (Web-EI)

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Presented to the 2015 Emissions Inventory Workshop
January 14, 2015
Overview

- Emissions inventory (EI) reporting basics
- What is Web-EI?
- What can and cannot be submitted using Web-EI
- Web-EI benefits
- Who is using Web-EI?
- Recent and future improvements
- Items to make Web-EI easier
- Increasing Web-EI use
EI Reporting Basics

• Two methods for reporting an emissions inventory: Web-EI or paper

• Web-EI: two options
  – Web entry method: analogous to updating paper
    Called "manual entry" or "emissions inventory questionnaire (EIQ) entry" method
  – Electronic file upload/submission
    • Now fully integrated into Web-based system
    • Called "text file upload" or "delta file" method

• Paper: around since the beginning
What is Web-EI?

**STEERS: the Framework**

- State of Texas Environmental Electronic Reporting System (STEERS)
- Web portal for reporting numerous types of environmental data electronically to the Texas Commission on Environmental Quality (TCEQ)
  - Manages items such as:
    - User accounts
    - Security settings
  - Different program areas have specific application or reporting functions within STEERS.
    - Air, water, waste
    - Various registration and permit functions
    - Web-EI is one of these programs
What is Web-EI (cont.)?

AEIR: the Program

- Annual Emissions Inventory Report system (AEIR) in STEERS
  Official program name for Web-EI
- Two-pronged system allows for:
  - Direct entry of EI data (manual/EIQ entry option)
  - Upload of data in a single text file (file upload option)
    Often referred to as electronic or delta file method
- Replaces using paper, floppy disks, and compact discs (CDs) to submit emissions inventories
- Primary option for submitting an EI
What is Web-EI (cont.)?

AEIR: the Program (cont.)

- Web-EI can be used to submit an initial EI.
  - The site must already have a regulated entity reference number (RN) assigned.
  - Basic RN, site, and contact information must exist in the State of Texas Air Reporting System (STARS).
    STARS stores all point source EI data, including Web-EI submissions.

- Before starting an initial EI, contact the Emissions Assessment Section to ensure all necessary data is in STARS and all EI processing has been completed.
  This process may require a site to submit either a Core Data Form or EI Account Information and Contact Information forms.
Terminology Review

- **STEERS**
  The system for accessing various TCEQ reporting programs

- **AEIR**
  The EI reporting program within STEERS, also called Web-EI

- **Web entry**
  A reporting option in Web-EI, also called manual entry or EIQ entry

- **File upload**
  A reporting option in Web-EI, also called:
  - electronic reporting
  - text file upload
  - delta file method
What Can and Can Not be Submitted Using Web-EI

- **Can update or add:**
  - Emissions
  - Facility, emission point, and control device parameters
  - Coordinates
  - Facility operating schedules and status
  - New sources and emissions paths

- **Cannot update:**
  - Facility, emission point, and control device labels and names
  - Standard industrial classification (SIC) and source classification codes (SCC) (referred to as SIC and SCC)
  - Historical emissions data

- **Cannot delete existing sources or structure**
Web-EI Benefits

- Quicker turnaround for industry
  No need to print EIQ
- Immediate access from anywhere
  - No interoffice/interstate/international mailing
  - No waiting for wet-ink signatures
- Quick feedback on errors or missing data
  - Immediate feedback during manual entry
  - Electronic file upload feedback within minutes
    For a large file, feedback may take an hour or two.
- Can be accessed by multiple people
  Manual entry or review can be done by multiple staff jointly
  EI data for RN stored in a common “work area”
Web-EI Benefits (cont.)

- Criteria totals automatically calculated
  Assists with identifying potential emissions errors
- Save paper and printing costs
- Confirmation of submission
  - STEERS Copy of Record (COR)
  - E-mail notification provided
    - Status updates
    - Next steps (if any)
- No more “interpreting” handwriting
  - 1’s and I’s
  - 0’s and O’s
Who is Using Web-EI?

- Since 2010, more than 700 companies have submitted nearly 4,300 EIs through the Web.
- Numerous industry sectors from all parts of the state use Web-EI.
  - Refineries (89%)
  - Oil and gas sectors (56%)
  - Power utilities (66%)
  - Cement (91%)
  - Metal can manufacturing (100%)
- Overall, 60% of EIs are submitted through Web-EI annually.
  40% still use paper.
Recent Web-EI Improvements

• Addition of full data checks in STEERS-AEIR
  – Electronic text files checked when loaded
  –Eliminates having to officially submit the delta file multiple times
  –Potentially saves days of time

• Performance
  TCEQ infrastructure improvements

• Data glitch corrections on manual entry
  –Data misread on status date for certain sources
  –Blank rows for heat input and nitrogen oxides emissions factors
Future Web-EI Improvements

- **Document attachment function***
  - Attach documents in electronic format
  - Incorporated into the COR
- **Changes to submit screen and COR***
  - Event totals displayed in summary format
  - Better display of totals
- **Repair emissions “roll-over” button***
- **Summary reports**
  Similar to the contaminant summary report
- **Possibly allow editing of locked data**
  Equipment names and profile types

*Currently in development, will be available soon*
Items to Make Web-EI Easier

- Start early
  - Set up STEERS accounts first.
  - Set-up can be completed anytime, not just during 90-day EI reporting window.

- STEERS accounts are assigned to individuals
  A STEERS account is not the same as an RN or air account number.

- Keep staff access up-to-date
  - When personnel change, STEERS access can be updated/changed/added at same time.
  - Assign back-up staff STEERS access in case it becomes necessary.
Items to Make Web-EI Easier (cont.)

• Understand the different STEERS levels of authority.
  – Read: Can only view data
  – Edit: Can enter or edit within STEERS-AEIR only
  – Submit: Same as "Edit" but can certify and submit STEERS-AEIR data

• Ensure the right person has the right level of authority.
  – Read: Not really relevant for Web-EI
  – Edit: Anyone that will be entering, updating, or uploading EI data
  – Submit: should only be given to person with “signature authority” for the EI
    For Title V sites, this is the responsible official or the duly authorized representative
Items to Make Web-EI Easier (cont.)

- STEERS participation agreement (SPA)
  - All **NEW** STEERS accounts and **ANY CHANGES** to existing accounts require a signed SPA.
  - The account will be on probation until a SPA is submitted.

- SPA can be completed online and submitted in one of two ways:
  - Electronically: Use "E-sign" option with valid Texas driver license.
  - Print the SPA and mail it to the TCEQ. STEERS staff may take at least three days to process.

- Forgotten passwords or accounts can be:
  - reset from the STEERS home page or
  - reset by STEERS staff.
Items to Make Web-EI Easier (cont.)

- Keep EI contact information updated.
  - The EI contact is the person listed in STARS for EI-related items.
  - Updates can be made at any time within STEERS-AEIR, not just during the 90-day EI reporting window.

- Contact changes are a separate submission from EI data.
  
  Submitting EI data does not trigger submission of contact changes and vice-versa.

- Only a user with submit authority can submit contact changes.
And Don’t Forget

CLICK THE SUBMIT BUTTON

- Entering or loading data into STEERS-AEIR work area is just one step in the process.
- Data must be submitted from STEERS-AEIR to meet 30 Texas Administrative Code (TAC) Section (§) 101.10 reporting requirements.
- Whether it’s contact or EI data, nothing is “official” and no data will be updated until it is submitted.
SUBMIT SUPPORTING DOCUMENTATION

- Required per 30 TAC §101.10(c)
  Used to verify calculation methodology and reported emissions
- System update will allow attachments to Web-EI submission
  Will be the primary option for sending supporting data
- Alternatively, supporting documentation can be
  - e-mailed to: psdocument@tceq.texas.gov
  - or sent via regular mail.
A Note About Confidential Information

- Do not submit confidential information through Web-EI or by e-mail.
  - No method to designate supporting documentation as confidential in STEERS and handle appropriately
  - Confidentiality cannot be ensured across multiple e-mail servers

- Confidential information should only be mailed.
  - Can be on paper or CD
  - Each confidential item should be clearly marked as such

- If any part of your supporting documentation is confidential, consider mailing all of it.
Increasing Web-EI Use

- Take a brochure or several
- Share with coworkers or clients
- For those that have not used it
  - Talk with those that have used it
- For those that have used it
  - Talk with those that may still use paper to submit EIs
- Create an account in STEERS— it’s free, try it
- STEERS reporting will be required for the 2015 emissions inventory due March 31, 2016
Questions?

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Emissions Assessment Section Help Line:
(512) 239-1773
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STEERS (non-AEIR items):
(512) 239-6925
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Supporting Documentation

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Presented to the 2015 Emissions Inventory Workshop
January 14, 2015
Overview

- Part 1 – Types of supporting documentation
- Part 2 – Guidance for specific source types
- Part 3 – General guidance
  - What to provide
  - What to avoid
  - Emissions Assessment Section (EAS) preferences
- Part 4 – Confidentiality
Part 1

Types of Supporting Documentation
What Supporting Documents Should Be Submitted with the Emissions Inventory (EI)?

- Information about the site and its processes
- Sample calculations that support the emissions as reported in the current year’s emissions inventory questionnaire (EIQ)
- Documentation to verify the sample calculation inputs
Information About the Site and Its Processes

• Plot plan showing the geographic locations of the emissions points

• Process information
  - Written description of the site’s operations
  - Process flow diagram(s) that illustrate the connections between the facilities/sources and the emissions points
Sample Calculations

• Sample calculations are required by 30 Texas Administrative Code Section 101.10(c).

• Calculations should be site-specific and use the current inventory year’s data.

• Update sample calculations with each EI submittal.
Sample Calculations (cont.)

• Submit sample calculations for each different process type.

• Provide sufficient data so the results can be reasonably verified, including but not limited to:
  – process rates,
  – operating hours,
  – emissions factors and sources,
  – vendor data pages, and
  – stack test summary pages.
Documentation to Verify the Sample Calculation Inputs

- Material throughput
- Emissions factors
- Summary reports
- Extended gas analysis
- Vendor specifications
Material throughput forms

- These forms are used to report fuel, feed, and/or production rate for a unit.

- Forms for specific facility types are located on the Point Source EI Web page: http://www.tceq.texas.gov/airquality/point-source-ei/psei.html.

- A single form may be used to report throughput data for similar source types.

- Company spreadsheets may be submitted in lieu of this form.
Identify the source of the emissions factor:

- Stack test
- Continuous emissions monitoring systems (CEMS)
- Vendor data
- AP-42
- American Petroleum Institute (API) factors
- Synthetic organic chemical manufacturing industry average factors
- Portable analyzer data
All summary reports submitted as supporting documentation should include:

- identification of the site and
- identification of the facility/source.
Summary report examples:

- Gas Research Institute GLYCalc software
  Aggregate Summary Emissions Report
- Relative accuracy test audits (RATAs) for CEMS
  - Hourly output readings
  - Material throughput
  - Time period during the year that the readings were taken
- Stack test results summary page
  - Factors and units
  - Date of the test
  - The process rate during the test
Documentation to Verify the Sample Calculation Inputs (cont.)

• Extended gas analysis
  – Most current analysis available
  – Applicable to the site being reviewed

• Vendor data
  – Include summary page of equipment information (specifications) that supports the emissions factor.
  – The unit should be operating according to the vendor’s specifications.
Supporting Documentation Summary

• GOAL: Submit current and complete supporting data so that the emissions can be verified.

• Submit supporting documentation, including:
  – specific sample calculations,
  – activity data,
  – emissions factors,
  – reference sources,
  – equations, and
  – assumptions,
  – all of which allow the EAS to verify the reported emissions.
Part 2

Guidance for Specific Source Types
Guidance for Specific Source Types

Common facility/source types:
- Combustion sources (including flares)
- Storage tanks
- Loading
- Coating and printing
- Glycol dehydrators
- Fugitives (equipment leaks)
Provide the determination methodology:

- CEMS
- Predictive emissions monitoring
- Stack sampling
- Portable analyzer data
- Vendor-supplied factors
- AP-42 or other United States Environmental Protection Agency (EPA) or Texas Commission on Environmental Quality-approved factors
For flares, provide sample calculations for the pilot gas and waste gas, and include the following data:

- Heat inputs
- Emissions factors and sources
- Molecular weights
- Volatile organic compounds (VOC) composition data
- Mole fractions
- Flow rates
- Destruction efficiencies
Guidance for Specific Source Types: Storage Tanks

• If emissions were determined using a software program, provide the detailed reports
  – EPA TANKS 4.09D
  – API Exploration and Production TANKS
  – TANKESP

• If emissions were determined using AP-42, Chapter 7 equations, provide the Excel spreadsheet with formulas and all input data
Floating roof tanks:

- Include fitting types (do not use program defaults).
- For external floating roof tanks, note if a slotted guidepole is used.
- Include landing loss calculations and verify the type of tank bottom used.
Flash or separator tanks:

Provide all the site-specific input data, which includes but is not limited to:

- Separator oil or gas composition
- API gravity
- Separator pressure
- Separator temperature
- Separator gas gravity at initial conditions
- Throughput (barrels of condensate per day)
- Stock tank gas molecular weight
- VOC content
- Gas/oil ratio
- Flash gas analysis
Guidance for Specific Source Types: Truck Loading

Provide the following:

- Throughput
- Vapor pressure
- Molecular weight
- Temperature, especially for heated materials
- Equation used to determine emissions
- Speciation profile (not from flash gas analysis)
- Collection or destruction efficiency of a control device, if one is used, and the basis for the collection or destruction efficiency
Provide the following:

- Material throughput including the type and amount of material used, and VOC content
- Material balance formulas used to determine VOC and particulate matter emissions
- Material safety data sheets for the materials most frequently used
- Control efficiencies or filter efficiencies applied
Guidance for Specific Source Types: Glycol Dehydrators

Provide the following input values:

- Actual glycol flow rate and actual gas throughput for current year (not permitted values)

- Extended wet gas analysis (composition upstream of absorber) through octanes+/C8+ (minimum), speciated to include benzene, toluene, ethylbenzene, xylene, and other applicable hazardous air pollutants
  
  Do not use a sales gas analysis

- Regenerator control device information
Guidance for Specific Source Types: Fugitives (Equipment Leaks)

Provide the following:

- Completed fugitive data form for sources that emitted more than 5 tons per year of VOC
- Breakdown of emissions between monitored and non-monitored components
- For monitored components include:
  - Sample calculations for one leaking and one pegged component for each component type
  - Concentration readings throughout the year, the dates of the readings, and the calculated emissions
  - VOC content of the gas/vapor or light liquid stream
## Fugitive Data Form

**TCEQ Emissions Inventory Year:**

<table>
<thead>
<tr>
<th>Service</th>
<th>Unmonitored</th>
<th>Monitored</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Number of components</td>
<td>Number of components</td>
</tr>
<tr>
<td>Valves</td>
<td>Gas/Vapor Light liquid Heavy liquid H₂O/Light oil</td>
<td></td>
</tr>
<tr>
<td>Pumps</td>
<td>Gas/Vapor Light liquid Heavy liquid H₂O/Light oil</td>
<td></td>
</tr>
<tr>
<td>Flanges</td>
<td>Gas/Vapor Light liquid Heavy liquid H₂O/Light oil</td>
<td></td>
</tr>
<tr>
<td>Connectors Open Ended Lines</td>
<td>Gas/Vapor Light liquid Heavy liquid H₂O/Light oil</td>
<td></td>
</tr>
<tr>
<td>Relief Valves</td>
<td>Gas/Vapor Light liquid Heavy liquid H₂O/Light oil</td>
<td></td>
</tr>
<tr>
<td>Compressors Sails</td>
<td>Gas/Vapor Light liquid Heavy liquid H₂O/Light oil</td>
<td></td>
</tr>
<tr>
<td>Other</td>
<td>Gas/Vapor Light liquid Heavy liquid H₂O/Light oil</td>
<td></td>
</tr>
</tbody>
</table>

### VOC PERCENTAGES

- Gas/vapor stream: ______ %
- Light liquid stream: ______ %
- Pegged Component Screening Value: ______ ppm
- Calibration Range: ______ min ______ max

### EMISSIONS DETERMINATION METHODOLOGY OR LDAR PROGRAM USED

- Oil and Gas Factors
- SOCMI Average Factors
- SOCMI without Ethylene Factors
- Refinery Factors
- SOCMI with Ethylene Factors
- Correlation Equations
- Petroleum Marketing Terminal Factors
- Other (explain): ___

**LDAR PROGRAM:**

- None
- 28M
- 28RCT
- 28VHP
- 28MID
- 28LAER
- AVO
- 28CNA
- 28CNTQ
- HRVOC
- Other: ___

---

Air Quality Division • Supporting Documents • SAW • January 14, 2015 • Page 26
Part 3

General Guidance: What to Provide, What to Avoid, and EAS Preferences
Provide:

- Detailed sample calculations for the current year
- Relevant summary reports from software programs, testing data, vendor data, etc.
- All equations and input data
- Summary spreadsheets listing emissions quantities per path
- Legible documents:
  - Font size of at least 10 when using paper
  - Verify that scanned and emailed PDFs are readable
Provide: (cont.)

When using software programs:

- Reports that list all input parameters and values
- Explanation of equations/calculations used
- Any other relevant data necessary to reproduce final emissions estimates
Provide: (cont.)

- Explanations for significant changes (increases and/or decreases) in emissions

- **Also note:**
  - The "Emissions Inventory Checklist" is located on pages xiv – xv at the front of the annual EAS publication, *Emissions Inventory Guidelines*. 
Avoid:

Submitting illegible paperwork
Avoid: (cont.)

- Sending printed copies of AP-42 chapters

- Referring only to emission point numbers (EPN) on the supporting documentation pages
  
  Provide both facility information numbers (FIN) and EPNs

- Mixing confidential and non-confidential materials
  
  Separate and clearly label confidential documents
Avoid: (cont.)

Using internal labels for FINs and/or EPNs that do not match the FINs and EPNs in the EIQ

- Caterpillar Engine 3616TALE = FIN:ENG3616 in the EIQ
- Internally, Caterpillar 3616TALE is referred to as “Unit 3”
- Do not refer to “FIN:Unit 3” in the supporting documents, instead, refer to "FIN:ENG3616"
Avoid: (cont.)

• Listing the permit as the source of an emissions factor
  Provide the origin of the factor used for the permit

• Using average annual data instead of actual ozone season data when calculating ozone season emissions

• Including supporting documentation for other sites
  Only provide site-specific data
Preferences

EAS staff preferences (things that are appreciated but not required for 2014 EIQs):

- Organize documents with a table of contents and page numbers.
- Send one electronic document with multiple pages rather than multiple individual PDFs.
- Do not include blank PDF pages.
- Provide non-confidential Excel spreadsheets electronically so that formulas can be easily verified.
- Submit your EI through State of Texas Environmental Electronic Reporting System (STEERS) rather than on paper (will be required for 2015 EIQs).
Part 4

Confidentiality
Confidentiality

- The following items may be marked confidential:
  - Material throughputs
  - Process flow diagrams
  - Process rates
  - Production
  - Trade secrets (information that reveals secret process or methods of manufacture or production)

- Clearly label each page “confidential”

- Provide confidential information as a paper hard-copy or on CD through the mail

- Do not send confidential information electronically
Confidentiality (cont.)

- Emissions data **cannot** be marked confidential.

- **Examples:**
  - Emissions rates (actual, ozone, emissions events, or maintenance, startup, or shutdown events)
  - Emissions factors
  - Emissions control equipment type and associated control efficiencies
  - Determination methods
  - Release point location

- **Note:** The data contained in the EIQ report itself is public.
How to Submit Non-Confidential Supporting Documentation

• Email documents to: psdocument@tceq.texas.gov.

• Attach documents to your STEERS submission

• United States Postal Service
  Emissions Inventory Data, MC 166
  Texas Commission on Environmental Quality
  P.O. Box 13087
  Austin, TX 78711-3087

• Overnight service (FedEx, UPS, courier, or hand delivery)
  Emissions Inventory Data, MC 166
  Texas Commission on Environmental Quality
  12100 Park 35 Circle, Bldg. E., Third Floor
  Austin, TX 78753
How to Submit Confidential Supporting Documentation

• United States Postal Service
  Emissions Inventory Data, MC 166
  Texas Commission on Environmental Quality
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  Texas Commission on Environmental Quality
  12100 Park 35 Circle, Bldg. E., Third Floor
  Austin, TX 78753
Contact Information

Susan Wampler:
(512) 239-1463
susan.wampler@tceq.texas.gov

Emissions Assessment Section Help Line:
(512) 239-1773
psinvent@tceq.texas.gov
Common Emissions Inventory (EI) Reporting Challenges

Ellen Reyes
Emissions Inventory Specialist
Air Quality Division

Presented to the 2015 Emissions Inventory Workshop
January 14, 2015
Overview

Part 1: Structure

- Basic EI structure terms
- When to add sources
- Shutting down a facility versus deactivating a path
- Representing combustion abatement devices
Overview (cont.)

Part 2: Emissions Determination and Reporting

- Using the best available data
- Speciation
- Ozone season calculations
- Maintenance, startup, and shutdown (MSS) and emissions events (EE) reporting
Part 1: Structure
Basic EI Structure Terms

• **Structure**: The relationship of emissions sources, emissions points, abatement devices, and related emissions data

• **Facility**: A stationary source capable of generating emissions
  - **FIN**: Facility Identification Number – an alphanumeric label for the facility

• **Emissions Point**: The physical location where emissions are released into the atmosphere
  - **EPN**: Emissions Point Number – an alphanumeric label for the emissions point
Basic EI Structure Terms (cont.)

- **Abatement Device**: A device used to control emissions
  - **CIN**: Control Identification Number – an alphanumeric label for the abatement device
  - Include all abatement devices at the appropriate paths

- **Emissions Path**: The route a pollutant takes from its origin, through its abatement device (if applicable), to its release into the atmosphere
  - The association of one FIN, any applicable CIN(s), and one EPN
When to Add Sources

Each emissions source must be added with associated emissions if it meets any of the following criteria:

- It emits 1 ton/year or more of any regulated pollutant.
- It emits 0.1 ton/year or more of any toxic chemical or hazardous air pollutant (HAP).
- It emits 0.001 ton/year or more of mercury or lead, or any individual HAP or aggregate HAP listed in any Texas Commission on Environmental Quality (TCEQ)-enforceable document such as a permit, regulation, or commission order.
- It is listed in any TCEQ-enforceable document such as a permit, regulation, or commission order.

Note: “TCEQ-enforceable document” includes permits by rule that have federally enforceable emissions limits.
When to Add Sources (cont.)

Small emissions sources should be grouped as a collective source if they meet all of the following criteria:

- Have similar source classification codes (SCC) (referred to as SCCs).
- Each emitted < 1 tons per year (tpy) of each regulated pollutant.
- Each emitted < 0.1 tpy or more of any toxic chemical or hazardous air pollutant.
- Each emitted < 0.001 tpy or more of mercury or lead.
- The sum of the emissions meets or exceeds 5 tpy for regulated pollutants or 1 tpy of aggregate HAPs.

Note: If small sources or small facilities are grouped in the regulated entity’s air permits, group these sources as collective FINs in a similar manner when adding them to the EI.
When to Add Sources (cont.)

Do not use existing structure to add brand new sources.

- Create new structure (FIN, EPN, or CIN) for new equipment.

- Do not rename or update the characteristics of an old FIN, EPN, or CIN to use for the new equipment.
Shutting Down a FIN

FIN is no longer operating and will never operate again

- If the equipment still exists: change the FIN status to shutdown (S) with the effective date.

- If the equipment has been completely removed from the site: change the FIN status to demolished (D) with the effective date.

- Note: if a FIN is only temporarily shut down, mark its status as idle (I).
Shutting Down a FIN (cont.)

<table>
<thead>
<tr>
<th>FIN: H-01</th>
<th>EPN: H-01</th>
</tr>
</thead>
<tbody>
<tr>
<td>Comment:</td>
<td></td>
</tr>
</tbody>
</table>

**FACILITY INFORMATION**

<table>
<thead>
<tr>
<th>FIN: H-01</th>
<th>Facility Name: GLYCOL REBOILER 1</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>Comment:</td>
<td></td>
</tr>
</tbody>
</table>

**SOC: 31000228**  
**Description:** GLYCOL DEHYDRATOR REBOILER BURNER

**Status:** A  
**Status Date:** 12/31/2012  
**Operating Schedule:** 24 hrs/day, 7 days/wk, 52 wks/yr  
**Annual Operating Hours:** 5991  
**Percentage Max Capacity:** 100  
**Start Time:** 1200

**Seasonal Operating Percentages (NOTE: Spring % + Summer % + Fall % + Winter % must be equal to 100%)**

<table>
<thead>
<tr>
<th>Spring: 12%</th>
<th>Summer: 32%</th>
<th>Fall: 36%</th>
<th>Winter: 20%</th>
</tr>
</thead>
</table>

**Group Type:** COMBUSTN

**Profile:** BOILER

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Value</th>
<th>Unit</th>
<th>Characteristic</th>
<th>Value</th>
<th>Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>DESIGN CAPACITY</td>
<td>2</td>
<td>MMBTU/HR</td>
<td>FIRING TYPE</td>
<td>TN</td>
<td>TN</td>
</tr>
</tbody>
</table>
Deactivating a Path

FIN is still operating, but the emissions will no longer vent through the current emissions point

- For example, a tank was vented to the atmosphere but was routed to a flare half-way through the year.

- Write on the emissions inventory questionnaire page: “Deactivate path (FIN) / (EPN), effective (date).”
Deactivating a Path (cont.)

Deactivate path FIN: TK-06 / EPN: TK-06 effective 6/15/2013

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Value</th>
<th>Unit</th>
<th>Characteristic</th>
<th>Value</th>
<th>Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>DIAMETER</td>
<td>15.6</td>
<td>FEET</td>
<td>FILL MTHD</td>
<td>B</td>
<td>----</td>
</tr>
<tr>
<td>HEATED TANK (Y/N)</td>
<td>N</td>
<td>----</td>
<td>HEIGHT</td>
<td>24</td>
<td>FEET</td>
</tr>
<tr>
<td>HOT PRODUCT (Y/N)</td>
<td>N</td>
<td>----</td>
<td>PAINT COND</td>
<td>G</td>
<td>----</td>
</tr>
<tr>
<td>ROOF COLOR</td>
<td>MD</td>
<td>----</td>
<td>SHELL COLOR</td>
<td>MD</td>
<td>----</td>
</tr>
<tr>
<td>SHELL CONST</td>
<td>F</td>
<td>----</td>
<td>STORE CAPACITY</td>
<td>31.5</td>
<td>MGALLONS</td>
</tr>
<tr>
<td>VAPR SPACE HGT</td>
<td>12</td>
<td>FEET</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Shutting Down a FIN Versus Deactivating a Path

Remember:

- If the FIN was active for any part of the reporting year, the FIN status must be marked as active (A), and any emissions must be reported.

- If a path is deactivated part-way through the year, any emissions until that deactivation date must be reported at that path.

- If a FIN is shut down or a path is deactivated for the entire year, the emissions must be set to zero.
Representing Combustion Abatement Devices

• Devices that generate emissions while burning contaminants

• Examples: flares, thermal oxidizers, vapor combustors, etc.

• Must be represented as both an emissions source and an abatement device
Representing Combustion Abatement Devices (cont.)

There should be a minimum of two paths in the inventory.

1. Process path(s) - for reporting undestroyed emissions from the controlled source(s)
   - Common contaminants: volatile organic compounds (VOC) or hydrogen sulfide (H$_2$S)
   - FIN: SOURCE / EPN: FLARE / CIN: FLARE
   - Potential for multiple process paths

2. Combustion path - for reporting pilot and secondary combustion emissions
   - Products of combustion: nitrogen oxides (NO$_x$), carbon monoxide (CO), and sulfur dioxide (SO$_2$).
   - Contaminants from pilot: NO$_x$, CO, SO$_2$, and VOC
   - FIN: FLARE / EPN: FLARE
Part 2: Emissions Determination and Reporting
### General Ranking for Emissions Determination Methods (in Descending Order):

<table>
<thead>
<tr>
<th>Rank</th>
<th>Method</th>
</tr>
</thead>
<tbody>
<tr>
<td>D</td>
<td>Continuous emissions monitoring systems (CEMS)*</td>
</tr>
<tr>
<td>H</td>
<td>Highly reactive volatile organic compounds monitoring systems</td>
</tr>
<tr>
<td>F</td>
<td>Predictive emissions monitoring systems</td>
</tr>
<tr>
<td>M</td>
<td>Measured (stack sampling) data</td>
</tr>
<tr>
<td>Q</td>
<td>Portable analyzer measurement data</td>
</tr>
<tr>
<td>V</td>
<td>Vendor-supplied emissions factors</td>
</tr>
<tr>
<td>A</td>
<td>AP-42 and other factors approved by the United States Environmental Protection Agency or TCEQ</td>
</tr>
<tr>
<td>B</td>
<td>Material Balance</td>
</tr>
<tr>
<td>S</td>
<td>Scientific Calculation</td>
</tr>
<tr>
<td>E</td>
<td>Estimation</td>
</tr>
<tr>
<td>O</td>
<td>Other</td>
</tr>
</tbody>
</table>

*Note: if properly operated and calibrated CEMS data is available, it must be used to determine emissions per 30 Texas Administrative Code Section 101.10(c).*
Using the Best Available Data: Stack Testing

- Use stack test results in conjunction with process rate data to determine emissions.
  - Do not use pound per hour (lb/hr) emissions rate multiplied by the operation hours.
  - Example: Divide the lb/hr emissions rate by the million British thermal unit per hour (MMBtu/hr) fuel usage rate during testing to obtain a factor with units of lb/MMBtu.

- Use stack test data that represents how the unit currently operates.
  Stack test data must reflect operations and processes during the reporting year, including control equipment.
Using the Best Available Data: Stack Testing (cont.)

Use the most recent representative stack test.

- A stack test from a previous year is acceptable as long as it is the most recent test and still reflects operations.

- The “most recent” only applies up to the current reporting year.
  - Stack test results cannot be used retroactively.
  - Do not use test data from the current year to determine emissions for the previous year.
Using the Best Available Data: Portable Analyzer Data

- Use test results in conjunction with process rate data to determine emissions.
  
  Example: divide the lb/hr emissions rate by the MMBtu/hr fuel usage rate during testing to obtain a factor with units of lb/MMBtu.

- Use test data that represents how the unit currently operates.
  
  Portable analyzer data must reflect operations and processes during the reporting year, including control equipment.
Use portable analyzer data if available instead of vendor data or AP-42 factors.

- The Emissions Assessment Section considers properly calibrated and operated portable analyzer data to be a better methodology than vendor data or AP-42 factors.

- Source-specific guidance for determining internal and external combustion emissions is available in Technical Supplement 1 of the 2014 Emissions Inventory Guidelines.
Any model is only as good as its inputted data.

- Site-specific inputs are always preferred over default or outdated values.

- Sometimes representative data can be used if certain criteria (found in source-specific TCEQ guidance) are met.
When is an extended gas or liquid analysis necessary?

- Gas Research Institute's GLYCalc software program for glycol dehydrators
  
  Note: The sample should be taken at inlet to dehydration process.

- American Petroleum Institute Exploration and Production TANKS software program for vertical fixed roof tanks

- Gas/oil ratio method for flash emissions from tanks

- Any time the VOC percentage by weight is needed
Using the Best Available Data: Permit Factors

• Do not list a permit as a factor’s source. If the same factor is used for the EI as was used in the permit application, provide the origin of the factor.

• If any of the following applies, the emissions factor used to obtain a permit must not be used in the EI:
  – Permitted emissions are based on outdated or unapproved emissions factors.
  – CEMS was installed or stack testing was conducted after the permit was issued.
  – The permit no longer reflects the conditions of actual operations.
Speciation: VOC

- Contaminant code 50001, VOC-unclassified (VOC-u), represents all VOC components that have not been speciated.
  
  \[(\text{Total VOC}) \text{ minus (all speciated VOCs)} = \text{VOC-u}\]

- Example:
  - An engine emits 5 tpy of VOC, and 1 ton of that total is formaldehyde.
  - Report 1 tpy formaldehyde and 4 tpy VOC-u.

- VOC-u is **not** total VOC.
  
  Exception: if no VOCs are speciated at a path, then VOC-u = total VOC.
Speciation: VOC (cont.)

Reporting requirements for VOC speciation:

- If the site is in El Paso or is located east of the 100º longitude line, speciate VOCs to at least 90% for each source that emits at least 5 tpy of total VOC.

- If the site is west of the 100º longitude line, speciate VOCs to at least 90% for each source that emits at least 25 tpy of VOC.
Speciation: Hazardous Air Pollutants (HAPs)

- Report emissions of any HAP $\geq 0.1$ tpy at an emissions path.
  
  Includes all kinds of HAPs, not just VOC

- Report emissions of mercury and lead $\geq 0.001$ tpy at a path.

- Benzene is a high profile compound. It is often present in:
  
  - Upstream oil and gas operations, especially uncontrolled glycol dehydration operations
  
  - Gasoline and mid-range distillates
Ozone Season Calculations

- Ozone season emissions are reported from sites in El Paso County and counties east of 100° longitude.

- For emissions inventory purposes, the ozone season is May through September (153 days).
Ozone Season Calculations (cont.)

**Ozone season emissions =**

*total emissions from May-Sept / 153 days*

- Use a denominator of 153 days, regardless of how many days it actually operated.

- Account for parameters that are variable.

- Update operation hours and seasonal operating percentages in EI every year.
MSS and EE Reporting

- Always report the number of reportable, non-reportable, and opacity events in the Site Quantifiable Events section of the inventory.

- If emissions from MSS activities or EE should be reported, ensure these emissions are reported both at the path level and in the Criteria Emissions Totals section of the inventory.
Reporting MSS Emissions

Are the MSS emissions permitted?  
Yes: Report emissions as annual emissions.  
No: Report emissions as SMSS emissions. Do not include in ozone season emissions.

Did they occur during May to Sept?  
Yes: Include in ozone season emissions.  
No: Do not include in ozone season emissions.
“Pursuant to the Texas Health and Safety Code 382.0215(f). I do hereby certify that ‘NO Emissions Events’ were experienced at this account during the Emissions Inventory Reporting Calendar year.”
Emissions Inventory Guidelines: References and Resources

- "Inventory Checklist"
  - Before Chapter 1
  - Assists in completing EI

- The following sections in Chapter 3:
  - "General Structure"
  - "Sources that Must Be Added to the EI and that May Be Grouped as Collective Sources"
  - "Collective Sources (Collective Facilities)"
  - "Representing Combustive Abatement Devices"
The following sections in Chapter 4:

- "Acceptable Determination Methodologies"
- "Using Factors from a Permit"
- "Speciating Emissions"
  
  Table 4-4. Summary of Speciation Criteria
- "Ozone Season Emissions"
- "Emissions Events"
- “Scheduled Maintenance Startup, and Shutdown (SMSS) Activities"

Appendix A

- Technical Supplement 1: "Selected Combustion Sources"
- Technical Supplement 4: "Flares"
Questions and Contact Information

Ellen Reyes:
(512) 239-1462
elen.reyes@tceq.texas.gov

Emissions Assessment Section Help Line:
(512) 239-1773
psinvent@tceq.texas.gov

Point Source Emissions Inventory Web site:
http://www.tceq.texas.gov/airquality/point-source-ei/psei.html
Air Inspection and Emissions Fee Program

Mary Facundo
Team Leader
Air Quality Division

Presented to the 2015 Emissions Inventory Workshop
January 14, 2015
Overview

- Two types of annual air fees
- Air inspection fee applicability
- Air emissions fee applicability
- Fee rates
- How to complete a fee basis form
Two Annual Air Fees

- The Texas Commission on Environmental Quality (TCEQ) assesses two types of annual air fees:
  - Air inspection fee
    Funds a portion of the costs for administering the TCEQ’s air programs
  - Air emissions fee
    - Funds the direct and indirect costs for administering the TCEQ’s federal operating permit program (also known as the Title V program)
    - Federal and State statutes require sufficient funds be generated to fund the Title V program
- Fees are assessed each fiscal year (FY)
  If a site meets the applicability requirements and operated any time during the fiscal year for which the fee is assessed, the full fee is due.
Air Inspection Fee Applicability

Per 30 Texas Administrative Code (TAC) Section (§) 101.24, a regulated entity being operated under one or more of the applicable standard industrial classification (SIC) codes listed in 30 TAC §101.24(f) shall pay an annual inspection fee to the TCEQ.
Air Emissions Fee Applicability

- Per 30 TAC §101.27, the owner or operator of an account that is required to obtain a federal operating permit as described in Chapter 122 of 30 TAC (relating to Federal Operating Permits Program) shall remit to the commission an emissions fee each year.

  The fee is based on the allowable emissions rates or actual emissions of all regulated pollutants from all individual emissions points or process units at the site.

- If a site is subject to both the air inspection fee and emissions fee, only the higher fee shall be assessed.
Important Dates to Remember

- **April 1**: Courtesy copies of fee basis forms are mailed.
- **June 1**: The TCEQ must receive your completed fee basis form by June 1 or 60 days from the date of the notification letter.
- **September**: Fee rates for emissions and inspection fees are published.
- **October**: By late October, invoices for the air emissions and inspection fees are mailed and are dated October 31
- **November**: By November 30, invoices must be paid in full to avoid any late fees.
Fee Rates

- Inspection Fee Rate
  - The fee is adjusted annually based on the rate of change of the consumer price index.
  - The fee rate is based on the SIC code and description as listed in 30 TAC §101.24(f).

- Emissions Fee Rate
  - The fee is adjusted annually based on the rate of change of the consumer price index.
  - The fee is based on the allowable emissions rates or actual emissions of all regulated pollutants at the site.
  - Fees are assessed up to the first 4,000 tons for each regulated pollutant.
Fee Rates (cont.)

Current fee rates for both fees can be found at: http://www.tceq.texas.gov/airquality/point-source-ei/air-fees.html.

<table>
<thead>
<tr>
<th>Description</th>
<th>Capacity/Throughput</th>
<th>SIC Code</th>
<th>Tier</th>
<th>Inspection Fee Amount for FY2016</th>
</tr>
</thead>
<tbody>
<tr>
<td>Natural Gas Sweetening</td>
<td>Gas processing and treatment operations with a rated inlet capacity or highest average daily inlet volume for one of the last three years of at least 5 million standard cubic feet per day (scf/day), but less than 25 million scf/day</td>
<td>1311</td>
<td>A</td>
<td>$2,209.33</td>
</tr>
<tr>
<td>Natural Gas Sweetening</td>
<td>Gas processing and treatment operations with a rated inlet capacity or highest average daily inlet volume for one of the last three years of at least 25 million scf/day</td>
<td>1311</td>
<td>B</td>
<td>$4,412.06</td>
</tr>
<tr>
<td>Natural Gas Sweetening</td>
<td>Compression with total horsepower (HP) of at least 10,000 HP from fossil fuel-fired engines</td>
<td>1311</td>
<td>C</td>
<td>$5,078.15</td>
</tr>
<tr>
<td>Natural Gas Liquids Processing</td>
<td>Gas processing and treatment operations with a rated inlet capacity or highest average daily inlet volume for one of the last three years of at least 5 million standard cubic feet per day (scf/day), but less than 25 million scf/day</td>
<td>1321</td>
<td>A</td>
<td>$5,078.15</td>
</tr>
<tr>
<td>Natural Gas Liquids Processing</td>
<td>Gas processing and treatment operations with a rated inlet capacity or highest average daily inlet volume for one of the last three years of at least 25 million scf/day</td>
<td>1321</td>
<td>B</td>
<td>$10,149.71</td>
</tr>
<tr>
<td>Natural Gas Liquids Processing</td>
<td>Compression with total horsepower (HP) of at least 10,000 HP from fossil fuel-fired engines</td>
<td>1321</td>
<td>C</td>
<td>$5,078.15</td>
</tr>
<tr>
<td>Fuller's Earth Processing</td>
<td>Material processing capacity of at least 25 tons per hour (tph)</td>
<td>1459</td>
<td></td>
<td>$9,982.07</td>
</tr>
</tbody>
</table>

Air Emissions Fees
Updated 09/22/2014

<table>
<thead>
<tr>
<th>Fiscal Year</th>
<th>Rate Per Ton</th>
</tr>
</thead>
<tbody>
<tr>
<td>2003</td>
<td>$28.63</td>
</tr>
<tr>
<td>2005</td>
<td>$29.77</td>
</tr>
<tr>
<td>2006</td>
<td>$30.90</td>
</tr>
<tr>
<td>2007</td>
<td>$32.39</td>
</tr>
<tr>
<td>2008</td>
<td>$32.73</td>
</tr>
<tr>
<td>2009</td>
<td>$33.74</td>
</tr>
<tr>
<td>2010</td>
<td>$33.71</td>
</tr>
<tr>
<td>2011</td>
<td>$33.58</td>
</tr>
<tr>
<td>2012</td>
<td>$45.53</td>
</tr>
<tr>
<td>2013</td>
<td>$46.70</td>
</tr>
<tr>
<td>2014</td>
<td>$47.49</td>
</tr>
<tr>
<td>2015</td>
<td>$48.24</td>
</tr>
</tbody>
</table>
Fee Rates (cont.)

Delinquent accounts

– Interest and penalties will accrue on a monthly basis.
– Permit applications will not be declared administratively complete until all fees/penalties have been paid in full.
### How to Complete a Fee Basis Form: Page 1

**Texas Commission on Environmental Quality**
For assistance completing this form, please call (512) 239-1459 or visit our website http://www.tceq.texas.gov/airquality/point-source-ei/air-fees.html

**Air Quality Division - Emissions Assessment Section**
**Air Emissions/Inspection Fees Basis Form**
Fiscal Year 2016
(9/1/2015 - 8/31/2016)
Per 30 Texas Administrative Code (TAC) §101.24(b) and 101.27(b), this form is due June 1, 2015.

**Please check one of the following:**

- [ ] Account will be active for any portion of fiscal year (FY) 2016 (9/1/2015 - 8/31/2016).
- [ ] Account will be idle for all of FY 2016.
- [ ] Account has been permanently shutdown. Please provide shutdown date: __________
- [ ] Account has been sold.

*If sold, please provide new owner information in the Regulated Entity Information box below.*

**Regulated Entity Information**
To update items below, strike through existing data and provide new information.

<table>
<thead>
<tr>
<th>Item</th>
<th>Information</th>
</tr>
</thead>
<tbody>
<tr>
<td>TCEQ Air Account No:</td>
<td></td>
</tr>
<tr>
<td>Regulated Entity No:</td>
<td></td>
</tr>
<tr>
<td>Customer Name:</td>
<td></td>
</tr>
<tr>
<td>Customer No:</td>
<td></td>
</tr>
<tr>
<td>Mailing Address:</td>
<td></td>
</tr>
<tr>
<td>City, State, Zip Code:</td>
<td></td>
</tr>
<tr>
<td>Fees Contact Name:</td>
<td></td>
</tr>
<tr>
<td>Fees Contact Email:</td>
<td></td>
</tr>
<tr>
<td>Fees Contact Phone No:</td>
<td></td>
</tr>
<tr>
<td>Fees Contact Fax No:</td>
<td></td>
</tr>
<tr>
<td>Site Name:</td>
<td></td>
</tr>
<tr>
<td>County:</td>
<td></td>
</tr>
<tr>
<td>SIC Code:</td>
<td></td>
</tr>
<tr>
<td>Comments/Additional Information:</td>
<td></td>
</tr>
</tbody>
</table>

**Inspection Fee Basis Information:**
The inspection fee applies to each account (site) that contains one or more of the types of plants, facilities, and/or processes described in 30 TAC §101.24(f), including permitted and non-permitted facilities.
How to Complete a Fee Basis Form: Page 1 (cont.)

**AIR QUALITY DIVISION** - EMISSIONS ASSESSMENT SECTION
AIR EMISSIONS/INSPECTION FEES BASIS FORM

Fiscal Year 2016
(9/1/2015 - 8/31/2016)
Per 30 Texas Administrative Code (TAC) §101.24(b) and 101.27(b), this form is due June 1, 2015.

**Please check one of the following:**
- Account will be active for any portion of fiscal year (FY) 2016 (9/1/2015 - 8/31/2016).
- Account will be idle for all of FY 2016.
- Account has been permanently shutdown. Please provide shutdown date: ________
- Account has been sold.
  *If sold, please provide new owner information in the Regulated Entity Information box below.*

Report the site’s status for the fiscal year:
- **Active** - operated any portion of the fiscal year
- **Idle** - did not operate any time during the fiscal year
- **Permanently shutdown** - site dismantled or torn down and no longer operational
- **Sold** - provide new owner’s information
How to Complete a Fee Basis Form: Page 1 (cont.)

- Verify company information
- Strike through incorrect data and include new data
INSPECTION FEE BASIS INFORMATION:
The inspection fee applies to each account (site) that contains one or more of the types of plants, facilities, and/or processes described in 30 TAC §101.24(f), including permitted and non-permitted facilities. If more than one Standard Industrial Classification (SIC) category can apply to a site, provide the SIC category that has the highest base inspection fee.

If the SIC category has an applicable tier letter associated with the SIC code (i.e., A, B, or C), provide the tier letter that is applicable for the plant, facility, and/or processes. Tier letters are assigned to assist in identifying the different levels of SIC categories. For a complete listing of the SIC codes, tiers with associated capacity/throughput, and the current fee rate for inspection fees, visit our fees website http://www.tceq.texas.gov/airquality/point-source-ei/air-fees.html.

If a site does not meet one of the applicable SIC categories or its associated tier description, the SIC code/tier letter should be provided as NOT APPLICABLE and an explanation should be provided in the comments box above.

SIC Code/Tier Letter: __________

Report the applicable SIC code for the site.

- If the site operates under more than one SIC code, the SIC code that is assessed the higher fee shall be reported.

- If SIC code is not applicable, report N/A and provide an explanation.
How to Complete a Fee Basis Form: Page 2

**EMISSIONS FEE BASIS INFORMATION:**
The following information is required to determine if an owner or operator of an account (site) is subject to being assessed an emissions fee under 30 TAC §110.27(b).

1. If you answered "No" to the question above, leave the emissions table below blank and go to step 4.
2. If you answered "Yes" to question above, follow steps 3-4 below and report either the site's allowable emissions rates or actual emissions for each pollutant or group of pollutants in the table below to establish the emissions fee basis for the site.
   a. **Allowable emissions rates** are limits specified in an enforceable document, such as a permit, certified registration of emissions, or Commission Order (hereafter referred to as enforceable emissions limits) that are in effect during the fiscal year that a fee is due.
   b. **Actual emissions** are emissions of all regulated pollutants emitted during the 2014 calendar year including emissions from emissions events and maintenance, startup, and shutdown (MSS) activities.

3. Enter only allowable OR actual emissions for each pollutant per the guidance below. Under no circumstances may the fee basis be less than the actual emissions at the site.
   a. If a complete and verifiable emissions inventory for the applicable calendar year (2014) has been submitted to the TCEQ, then the site's actual emissions should be reported in the table below.
   b. If the site has enforceable emissions limits establishing allowable levels for regulated pollutants, and the site did not submit an emissions inventory to the TCEQ, then report the site's allowable levels in the table below. Provide a copy of the Maximum Allowable Emissions Rate Table for all active permits and/or copy of any authorized certified emissions for the site.
   c. If the site does not have enforceable emissions limits establishing allowable levels for regulated pollutants and the site was not required to submit an EQ, then the site's actual emissions, including emissions from MSS and emission events, must be used to calculate the fee basis and should be reported in the table below. Submit actual production, throughput, or measurement records along with the complete documentation of the calculation methods.

<table>
<thead>
<tr>
<th>Regulated Pollutants (Include all regulated pollutants)</th>
<th>Allowable Emissions Rates (Tons per Year)</th>
<th>Actual Emissions (Tons per Year)</th>
<th>Maintenance, Startup, and Shutdown Emissions (Tons per Year)</th>
<th>Emissions Events (Tons per Year)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sulfur dioxide (SO₂)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Nitrogen oxides (NOₓ)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Carbon monoxide (CO)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Volatile organic compounds (VOC)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Particulate matter (PM total)</td>
<td></td>
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<td></td>
<td></td>
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<tr>
<td>Other:</td>
<td></td>
<td></td>
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<td>Other:</td>
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</tr>
<tr>
<td>Other:</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

4. Return this form along with any supplemental documentation and/or emissions calculations to the following mailing address:

   Air Quality Division, MC-170
   PO Box 13087
   Austin, Texas 78711-3087

Four steps to completing the emissions fee form on page 2
**EMISSIONS FEE BASIS INFORMATION:**  
The following information is required to determine if an owner or operator of a site is subject to being assessed an emissions fee per 30 TAC §101.27(a).

<table>
<thead>
<tr>
<th><strong>Is the site required to obtain/possess a Title V permit?</strong></th>
<th><strong>..YES or NO</strong></th>
</tr>
</thead>
</table>

1.) If you answered “No” to the question above, leave the emissions table below blank and skip to step 4.

**Step 1:**

- Two different questions; refer to 30 TAC Chapter 122 - Federal Operating Permits Program
  - Does the site possess a Title V permit?
  - Is the site **required** to obtain a Title V permit?

- If the answer is “Yes” to either question, then follow steps 2-3 to report emissions.
- If the answer is “No” to both questions, skip to step 4.
How to Complete a Fee Basis Form Page 2 (cont.)

2) If you answered “Yes” to the question above, follow steps 3-4 below and report either the site-level allowable emissions rates OR actual emissions for each pollutant or group of pollutants in the table below to establish the emissions fee basis for the site.

a) **Allowable emissions rates** are limits specified in an enforceable document such as a permit, certified registration of emissions, or Commission Order (hereafter referred to as enforceable emissions limits) that are in effect during the fiscal year that a fee is due. Emissions from emission events and non-permitted maintenance, startup, and shutdown activities must also be included in the table below if applicable to your site.

b) **Actual emissions** are emissions of all regulated pollutants emitted during the 2014 calendar year including emissions from emissions events and maintenance, startup, and shutdown activities.

---

**Step 2:**

If the site is required to possess/obtain a Title V permit, gather the data needed to report either the site-level allowable emissions rates **OR** the actual emissions (per 30 TAC 101.27).

Where there is an enforceable document, a complete and verifiable emissions inventory may be used to determine actual emissions.
How to Complete a Fee Basis Form: Page 2 (cont.)

Step 3:

Report either the site-level allowable emissions rates **OR** actual emissions for each regulated pollutant or group of pollutants in the table to establish the emissions fee basis for the site.

<table>
<thead>
<tr>
<th>Regulated Pollutants (Include all regulated pollutants)</th>
<th>Allowable Emissions Rates (Tons per Year) (Column 2)</th>
<th>Actual Emissions (Tons per Year) (Column 3)</th>
<th>Maintenance, Startup, and Shutdown Emissions (Tons per Year) (Column 4)</th>
<th>Emissions Events (Tons per Year) (Column 5)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sulfur dioxide (SO₂)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Nitrogen oxides (NOₓ)</td>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>Carbon monoxide (CO)</td>
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<tr>
<td>Volatile organic compounds (VOC)</td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Particulate matter (PM total)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other:</td>
<td></td>
<td></td>
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<td>Other:</td>
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<td>Other:</td>
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<td></td>
</tr>
<tr>
<td>Other:</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
4) Return this form along with any supplemental documentation and/or emissions calculations to the following mailing address:

Air Quality Division, MC-170
PO Box 13087
Austin, Texas 78711-3087

***DO NOT REMIT YOUR FEE PAYMENT AT THIS TIME, FEE INVOICES WILL BE SENT IN OCTOBER***

Step 4:

- Return the form to the printed mailing address.
- Invoices are prepared based upon reported information and are typically mailed in October.

*Do not mail payment with the fee basis form.*
Contact Information

Mary Facundo:
(512) 239-1182
Mary.Facundo@tceq.texas.gov

TCEQ Air Emissions and Air Inspection Fees
Web site:
http://www.tceq.texas.gov/airquality/point-source-ei/air-fees.html
Storage Tank Emissions Determination Challenges

Russ Nettles  
Technical Specialist  
Air Quality Division

Presented to the 2015 Emissions Inventory Workshop  
January 14, 2015
Overview

- Heated and hot product storage tanks: background information
- United States (US) Environmental Protection Agency (EPA) TANKS 4.09D (TANKS) software concerns
  - Cutter stock and number six (#6) fuel oil vapor pressure
- American Petroleum Institute (API) heavy petroleum product testing
- Potential breathing losses from heated tanks
- Emissions from mixing #6 fuel oil
- EPA tank screening procedure
Potential Tanks Emissions Determination Issues

Quantitative evidence

- 2007 TCEQ differential absorption lidar (DIAL) project measured elevated emissions from crude oil tanks.

- 2011 City of Houston DIAL project measured elevated emissions from crude oil tanks and intermediate refinery process tanks.

- These studies indicate that crude oil and heated tank volatile organic compounds (VOC) emissions are potentially under-estimated.
Heated Tanks: Potential Emissions Determination Issues

- Qualitative evidence
  
  Emissions from heated tanks are routinely identified with forward looking infrared (FLIR) camera technology.

- EPA initiated formal information collection request (ICR) for all US petroleum refineries in spring 2011
  
  - Purpose of ICR: gather data to reevaluate emissions standards for this source category.
  
Specific Tank Type Concerns

• Heated tanks
  Located at refineries and terminals

• Intermediate process tanks that receive “warm products” that are higher than ambient temperature, but not directly heated
  Referred to as "hot product" storage tanks
FLIR Video of Heated Tanks
Heated Tanks and Hot Product Storage Tanks

- The TANKS software does not apply AP-42, Chapter 7 equations accurately when determining emissions from these types of storage tanks.

- For emissions inventory (EI) purposes, TANKS 4.09D emissions estimates are no longer accepted for heated tanks or hot product storage tanks.

For heated tanks, TANKS contains several default routines that prevent the AP-42 equations from being properly applied. Examples include:

- TANKS cannot determine emissions for some high molecular weight petroleum distillates if storage temperature is above 100 degrees Fahrenheit (°F).
- TANKS does not compute the vapor space and liquid temperature ranges for heated tanks.
Heated Tanks and Hot Product Storage Tanks (cont.)

- TANKS 4.09D will underestimate emissions from intermediate process tanks with floating roofs that store material at warmer-than-ambient temperature.

- **Use AP-42, Chapter 7 equations.**
  - Use vapor pressure at the actual storage temperature of the liquid.
  - Do not use AP-42 defaults or other default values for vapor pressure, liquid composition, and other relevant parameters unless representative of the stored liquid.
  - American Society for Testing and Materials (ASTM) method D2879 is suitable for determining vapor pressure for heavy liquids at the actual storage temperature.
Cutter Stock

• If a stored product is “cut” with another material, the “cutter stock” must be accounted for in emissions determinations.
  – Cutter stock will impact the liquid’s:
    ▪ composition and
    ▪ vapor pressure at the stored temperature.
  – Process records should indicate the amount and type of cutter stock added.

• Cutter stock emissions must be accounted for when estimating emissions.
  – Process records should provide detail about the cutter stock composition.
  – Hazardous air pollutants and VOC must be speciated according to EI guidelines.
Number Six Fuel Oil Vapor Pressure Concerns

- Limited data on #6 fuel oil vapor pressures shows the potential for extremely large range of vapor pressures.
- Elevated vapor pressures from #6 fuel oil tanks were identified during an EPA investigation.
  
  Examples:
  - Vapor pressure of 0.32 pounds per square inch (psi) at 130°F
  - Vapor pressure of 0.21 psi at 116°F
- AP-42, Chapter 7 default vapor pressure for #6 fuel oil at 100°F is 0.00019 psi.
### Number Six Fuel Oil Working Emissions Versus Vapor Pressure

<table>
<thead>
<tr>
<th>Vapor Pressure (psi absolute)</th>
<th>*VOC Emissions at 180 °F</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.0003</td>
<td>0.0725 tons per year (tpy)</td>
</tr>
<tr>
<td>0.003</td>
<td>0.7252 tpy</td>
</tr>
<tr>
<td>0.03</td>
<td>7.2522 tpy</td>
</tr>
<tr>
<td>0.3</td>
<td>72.5221 tpy</td>
</tr>
</tbody>
</table>

*Some parameters were assumed.

- Emissions were estimated using TankESP software.
- Note: tank working emissions are **directly proportional** to the magnitude increase in vapor pressure.
API Heavy Petroleum Product Testing

  - Third edition, October 2012
  - Addendum 1, November 2013

- Performed heavy liquid vapor pressure testing on samples of vacuum residual oil, blended #6 fuel oil, and cutter stock
  - Very limited sample set
  - Four refineries provided samples
Three approaches were used to measure vapor pressure:

- Maxwell-Bonnell correlations
- Heavy Oil Storage Tank (HOST) Committee test method
  The HOST method was designed for heavy crude oil (API gravity 12-14) testing.
- ASTM D2879
  - This method may be delisted in the future by ASTM due to lack of a precision statement.
  - The Emissions Assessment Section is unaware whether the other two methods above have similar concerns regarding method validation.
API Testing Results

- Test results showed samples had vapor pressures that were 2-3 orders of magnitude higher than the AP-42 default vapor pressures for residual oil and #6 fuel oil.

- The cutter stock contributed to the vapor pressure of the #6 fuel oil samples. Potentially had the most significant impact on vapor pressure measurements.
API Recommendations for Vapor Pressure Determination

For #6 fuel oil and related products, API recommends the following methods to determine vapor pressure, in order of preference:

1. Use ASTM D2879.
2. Determine the blend ratio and properties of the cutter stock and calculate the vapor pressure as a corresponding percentage of the vapor pressure.
3. If specific information on the cutter stock is unavailable, assume 20% kerosene or 25% diesel as cutter stock using:
   - Use 10.781 as the dimensionless constant A in AP-42 Chapter 7 equations
   - Use 8933 as the dimensionless constant B in AP-42 Chapter 7 equations
Potential Breathing Losses From Insulated Shell Tanks

• Historically, only working losses were considered from insulated tanks.

• Tanks with insulated shells and **uninsulated roofs** may have potential for breathing losses.

• Significant heat exchange may occur between the vapor space and ambient air through the uninsulated roof resulting in breathing losses.

• Preferred approach: determine breathing loss emissions as if the tank were uninsulated using AP-42, Chapter 7 equations.
  – Use the actual bulk liquid temperature of the stored liquid.
  – Use the daily ambient temperature range.
Potential Breathing Losses From Fully Insulated Tanks

- Tanks with an insulated shell and **insulated** roof may have potential for breathing losses due to tank heating cycles.

- The amount of breathing losses depends on the heating cycle's:
  - temperature range,
  - frequency, and
  - duration.
To determine emissions from fully insulated storage tanks, the preferred approach would be to modify the breathing loss equations in AP-42, Chapter 7.

- Replace 365 days with the number of annual heating cycles.
- Replace the daily temperature range with the temperature range of the tank liquid.
Potential Emissions From Tank Mixing Operations

- Heavy liquid products can be mixed with compressed air sparging.
- AP-42, Chapter 7 equations do not account for emissions generated by mixing (stirring or blending) tank contents.
- If tank contents are mixed, emissions need to be estimated from:
  - mechanical mixing,
  - air injection or air sparging, and
  - other means of mixing.
- Estimate emissions using engineering calculations that account for air flow and volatility of the stored liquid, including cutter stock.
Accurate Data and Parameter Inputs

- Accurate data is critical for estimating all types of storage tank emissions.
- Use accurate and representative data inputs when using AP-42, Chapter 7 equations or tank estimation software that properly applies Chapter 7 equations.
- Accurate vapor pressure at the storage temperature is critical to determine an accurate emissions rate.

**Permitted or default vapor pressure values can only be used if these parameters are representative of the stored liquid.**
EPA Storage Tank Survey Procedure

- EPA has developed a downwind photoionization detector (PID) procedure to screen storage tanks.
- The procedure establishes a concentration baseline around the perimeter of the tank from the top of the tank berm.
- The anticipated VOC concentrations are less than 100 parts per billion by volume (ppbv) downwind of a tank at the berm from a properly operating tank.
• Winds between 4 and 13 miles per hour are required for this procedure.
  
  Airflow at this speed moves the tank emissions plume near ground-level for PID detection.

• EPA has trained staff on this procedure.

• When PID concentrations are above 100 ppbv, the tank is further inspected with a FLIR camera.
  
  Hydrocarbon plumes can easily be visualized by the FLIR camera.
Tank being drained. No visible emissions observed with a FLIR camera.

Data provided by EPA
Internal Floating Benzene Tank
PID Survey

No visible emissions observed with a FLIR camera.

15 second averages (15:35 - 15:38). Background = 24 ppbV
Concentrations >24 ppbV associated with tank

Data provided by EPA
Further inspection found crude oil on top of the internal floating roof. Visible emissions were observed with a FLIR camera.

Data provided by EPA
Visible emissions were observed with a FLIR camera.

Data provided by EPA

15 second averages (15:30 - 15:35) Background: 18 ppbV
North winds 1.5 3.0 m/s
Concentrations above 18 ppbV associated with tank
FLIR Camera

- Good screening tool to determine if a storage tank is operating properly.
- If hydrocarbon plumes can be seen from storage tanks with an infrared camera, then the tank is potentially not operating as designed.
  - Plumes from floating roof tanks may be due to a mechanical malfunction or rim seal problem.
  - Plumes from fixed roof tanks may potentially be due to elevated vapor pressure of the stored liquid.
Summary

• **EPA TANKS 4.09D** (or any earlier version) is no longer accepted as a tool for determining emissions for emissions inventory purposes for:
  - tanks storing warm products and
  - heated tanks.

• Use accurate input data when estimating emissions from heated and hot product tanks. Do not use default parameters unless these parameters are representative of the stored product.

• Account for potential breathing or mixing losses.
Contact Information

Russell Nettles:
(512) 239-1493
russell.nettles@tceq.texas.gov

Emissions Assessment Section Help Line:
(512) 239-1773
psinvent@tceq.texas.gov
Calculating Volatile Organic Compounds (VOC) Emissions for Common Sources

Steve O’Neal
Emissions Inventory Specialist
Air Quality Division

Presented to the 2015 Emissions Inventory Workshop
January 14, 2015
Overview

- Coating operations
- Flare waste gas calculations
- Marine loading
Coating Operation Terms

- **Coating** – A material applied onto or impregnated into a substrate for protective, decorative, or functional purposes.

- **Coating application system** – Devices or equipment designed for the purpose of applying a coating material to a surface.

- **Coating line** – An operation consisting of a series of one or more coating application systems and including associated flash-off area(s), drying area(s), and oven(s) where a surface coating is applied, dried, or cured.
Coating Operation Types

DIP COATING

Parts to be Coated → Dip Tank → Parts Drying → Dry Parts

VOC
Coating Operation Types

SPRAY COATING: PARTS DRY IN BOOTH

VOC PM

Particulate Matter (PM) Filter

Spray Booth

Parts to be coated

Over-spray/Solids Fallout

Dry Parts
Coating Operation Types (cont.)

SPRAY COATING: PARTS ARE DRIED OUTSIDE THE BOOTH OR IN AN OVEN

- Parts to be coated
  - Spray Booth
    - PM Filter
    - Over-spray Solids
    - VOC
    - Wet Parts on Conveyor
    - Over-spray Solids Fallout
  - VOC
  - Drying Ovens
    - VOC
    - Dry Parts

VOC
Over-spray Solids
Parts to be coated
Spray Booth
PM Filter
Dry Parts
Coating Operations: Collect Data

- Collect data required for emissions calculations
  - Coating throughput
  - VOC content (total and speciated)
  - Material safety data sheets
  - Transfer efficiency
  - Collection efficiency
  - Filter efficiency (for particulate)
  - VOC control efficiency

- Consider what happens to the solids and solvent in the coating during the process
Gather specific data to calculate VOC emissions rates for parts that dry in the spray booth:

<table>
<thead>
<tr>
<th>Required Data Element</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Coating VOC Content</td>
<td>3.5 pound (lb) VOC/gallon (gal)</td>
</tr>
<tr>
<td>Annual Coating Consumption</td>
<td>4750 gal/year</td>
</tr>
</tbody>
</table>
Coating Operations: Collect Data (cont.)

<table>
<thead>
<tr>
<th>FIN</th>
<th>Material Name</th>
<th>Quantity</th>
<th>Units</th>
<th>Density (pounds/gallon)</th>
<th>% Weight of Solvents</th>
<th>% Weight of Solids</th>
<th>Usage Start Date</th>
<th>Usage End Date</th>
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</tbody>
</table>

TCEQ Air Emissions Inventory

You may use this form to report confidential data. If you do so, mark the form “CONFIDENTIAL.”

Company Name:  Site Name:  TCEQ Air Account Number:  RN:

MATERIAL THROUGHPUT

TCEQ Emissions Inventory Year:

Printing, Painting, and Degreasing Facilities

TCEQ-20041c (10-01-08)  Page 1 of 1
Coating Operations: Calculating Emissions

Coating Line

VOC

Parts → Coating Line ← Coated Parts

Coating Line ← Coating ← Reclaimed Solvent

Solvents → Coating Line ← Reclaimed Solvent
Coating Operations: Calculating Emissions

- For VOC emissions, use a material balance approach (sample calculation below):

\[
\frac{3.5\ lbs\ VOC}{gal\ of\ coating} \times \frac{4,750\ gal\ of\ coating}{year} \times \frac{ton}{2000\ lbs} = \frac{8.3125\ tons}{year}
\]

- For PM emissions calculations, refer to the sample calculations in this guidance document:
Estimating Flared VOC Emissions

Required Data

Flow Rate

Waste Gas Composition

Destruction Efficiency

Determination Methodology
Estimating Flared VOC Emissions (cont.)

- Use the actual flare waste gas flow rate and composition.

- Ranking of emissions determination methods:
  1. Flares subject to 30 Texas Administrative Code (TAC) Chapter 115, Subchapter H relating to highly reactive VOC (HRVOC):
     - Valid flow rate and composition required by 30 TAC Sections 115.725 and 115.726
     - Required to determine emissions if HRVOC monitors were installed and operational during inventory year
     - Reminder: Code emissions determination method as “H”
Ranking of emissions determination methods (cont.):

2. Continuous monitoring with quality-assured instruments: code emissions determination method as “B” for material balance.

3. Continuous monitoring with instruments that may not meet all quality-assurance tests: code emissions determination method as “B.”

4. Periodic testing with instruments and laboratory analysis: code emissions determination method as “B.”

5. Engineering determination based on process knowledge: code emissions determination method as “S.”

6. One time performance test during inventory year: code emissions determination method as “E.”
Estimating Flared VOC Emissions (cont.)

Destruction Efficiency Choices

- Flare operations consistent with 30 TAC Chapter 115 may use destruction efficiencies specified in 30 TAC Section 115.725
- Applicable permit
- *2014 Emissions Inventory Guidelines, Technical Supplement 4, Table A-8:*

<table>
<thead>
<tr>
<th>Waste Stream Compounds (where C# = number of carbons)</th>
<th>Destruction and Removal Efficiency (DRE)</th>
</tr>
</thead>
<tbody>
<tr>
<td>VOC, C1–C3</td>
<td>98% (Only use 99% if specifically authorized in permit conditions).</td>
</tr>
<tr>
<td>VOC, C3 or higher</td>
<td>98% or DRE specifically authorized in permit conditions.</td>
</tr>
</tbody>
</table>

- For assisted flares, there is the potential for over-assisting the waste gas stream and lowering the above DREs.
  - In these cases, the DRE must be adjusted accordingly when determining and reporting emissions.
  - Note the presence of flare pilot flames does not guarantee the flare itself is combusting waste gas effectively. The flare pilot and flare flame have separate combustion zones.
Flared VOC Emissions: Sample Calculation

- Multi-step process for calculating flared VOC emissions:
  - Calculate annual mass flow rate for waste gas stream routed to the flare
  - Apply appropriate destruction efficiency to mass flow rates to determine VOC emissions from flare

- Sample parameters:
  - Operating hours: 8,760
  - Flow rate: 105.12 thousand standard cubic feet per year

<table>
<thead>
<tr>
<th>VOC Composition Data</th>
<th>Percent by Volume (Mole %)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Xylene</td>
<td>60</td>
</tr>
<tr>
<td>Toluene</td>
<td>20</td>
</tr>
<tr>
<td>Propane</td>
<td>10</td>
</tr>
<tr>
<td>Other VOC</td>
<td>10</td>
</tr>
</tbody>
</table>
Flared VOC Emissions: Sample Calculation (cont.)

- **Determine mass flow rate:**
  - Calculate average stream molecular weight
  - Convert flow rate units to standard cubic feet per year (scf/yr)
  - Use ideal gas law to determine total mass flow rate

- **Calculate average stream molecular weight:**
  - Mole percent divided by 100 = mole fraction
  - Multiply the mole fraction for an individual compound by the compound's molecular weight
  - Repeat for each compound in the stream
  - Sum results to determine average molecular weight
  - Example calculation on next slide
Flared VOC Emissions: Sample Calculation (cont.)

Calculate average stream molecular weight (cont.):

<table>
<thead>
<tr>
<th>COMPOUND</th>
<th>MOLECULAR WEIGHT OF COMPOUND (MWi)</th>
<th>MOLE FRACTION OF COMPOUND (Xi)</th>
<th>MWi*Xi</th>
<th>WEIGHT PERCENT</th>
</tr>
</thead>
<tbody>
<tr>
<td>PROPANE</td>
<td>44.1</td>
<td>0.1</td>
<td>4.41</td>
<td>4.75</td>
</tr>
<tr>
<td>OTHER VOC</td>
<td>63.8</td>
<td>0.1</td>
<td>6.38</td>
<td>6.87</td>
</tr>
<tr>
<td>TOLUENE</td>
<td>92.14</td>
<td>0.2</td>
<td>18.428</td>
<td>19.83</td>
</tr>
<tr>
<td>XYLENE</td>
<td>106.16</td>
<td>0.6</td>
<td>63.696</td>
<td>68.55</td>
</tr>
<tr>
<td>AVERAGE MOLECULAR WEIGHT</td>
<td>92.914</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Convert flow rate to units of scfm:

- Flow rate: 105.12 thousand standard cubic feet per year (Mscf)

\[
(105.12 \text{ Mscf/year} \times 1,000 \text{ scf/Mscf})
\]

- = 105,120 scf/yr
Next, assume an ideal gas mixture.

Use the ideal gas law to convert the total volumetric flow rate to total mass flow rate.

Ideal gas law:

\[ m = \frac{(MW)PV}{RT} \]

Where:
- \( m \) = mass flow rate in pounds (lb) per year;
- \( MW \) = molecular weight in lb per lb-mole (lbmol);
- \( P \) = standard pressure, 14.7 pounds per square inch absolute (psia);
- \( V \) = flow rate (scf/yr);
- \( T \) = standard temperature, 528 degrees Rankine (°R); and
- \( R \) = gas constant, 10.73 psia-cubic feet (ft³)/lbmol-°R.
Flared VOC Emissions: Sample Calculation (cont.)

Total Waste Gas Flow Rate Sample Calculation

\[ m = \frac{(MW)PV}{RT} \]

\[ m = \frac{\left(92.914 \text{ lb/lbmol} \times 14.7 \text{ psia} \times 105,120 \text{ scf/yr}\right)}{\left[(10.73 \text{ psia} - \text{ft}^3/\text{lbmol} - °R) \times (528 °R)\right]} \]

\[ m = 25,343 \text{ lb/year total VOC waste gas routed to the flare} \]

\[ m = 12.67 \text{ tons per year (tpy) total VOC waste gas routed to the flare} \]
Flared VOC Emissions: Sample Calculation (cont.)

- After calculating the total mass flow rate, apply weight percent (NOT mole percent) to determine individual compound speciated mass rates.

- Xylene routed to flare:
  \[
  12.67 \text{ tpy VOC} \times 0.6855 \text{ weight \% xylene} = 8.69 \text{ tpy}
  \]

- Toluene routed to flare:
  \[
  12.67 \text{ tpy VOC} \times 0.1983 \text{ weight \% toluene} = 2.51 \text{ tpy}
  \]

- Propane routed to flare:
  \[
  12.67 \text{ tpy VOC} \times 0.0475 \text{ weight \% propane} = 0.60 \text{ tpy}
  \]

- Other VOC routed to flare:
  \[
  12.67 \text{ tpy VOC} \times 0.0687 \text{ weight \% other VOC} = 0.87 \text{ tpy}
  \]
Finally, apply the appropriate, authorized destruction efficiency to speciated compounds to arrive at flared VOC emissions.

Report these compounds at the correct path in the emissions inventory.

Xylene emitted from flare:

\[ 8.69 \text{ tpy} \times (1 - 0.98) = 0.1738 \text{ tpy xylene} \]

Toluene emitted from flare:

\[ 2.51 \text{ tpy} \times (1 - 0.98) = 0.0502 \text{ tpy toluene} \]

Propane emitted from flare:

\[ 0.60 \text{ tpy} \times (1 - 0.98) = 0.012 \text{ tpy propane} \]

Other VOC emitted from flare:

\[ 0.87 \text{ tpy} \times (1 - 0.98) = 0.0174 \text{ tpy other VOC} \]
Marine Facilities
Marine VOC Sources

- VOC emissions sources may include:
  - Dock VOC emissions from equipment leak fugitives
  - Dockside marine vessel VOC emissions from loading and unloading of liquid bulk or liquefied gaseous material
  - Liquid vessel compartment degassing and cleaning
- Marine vessels may have reportable emissions if connected to the shore in any manner.
# Marine Loading Data

## Material Throughput

### TCEQ Air Emissions Inventory

You may use this form to report confidential data. If you do so, mark the form “CONFIDENTIAL.”

<table>
<thead>
<tr>
<th>Company Name:</th>
<th>Site Name:</th>
<th>TCEQ Air Account Number:</th>
<th>RN:</th>
</tr>
</thead>
</table>

### Material Detail

<table>
<thead>
<tr>
<th>FIN</th>
<th>Material Name</th>
<th>Vapor Molecular Weight (pounds/pound-mole)</th>
<th>Density (pounds/gallon)</th>
<th>Monthly Throughput (thousand gallons)</th>
<th>Total Vapor Pressure (psia)</th>
<th>Average Annual Temperature (degrees Fahrenheit)</th>
<th>Usage Start Date</th>
<th>Usage End Date</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
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TCEQ-20041b (10-01-06)
Marine Facility Emissions Determination Methodologies


- Emissions determination methodologies for:
  Loading and unloading bulk liquid materials:
  - Dock fugitive component emissions
    *2014 Emissions Inventory Guidelines, Technical Supplement 3: code emissions determination method as “A.”
  - Liquid material loading and unloading
    - AP-42, Chapter 5, Tables 5.2-2 and 5.2-3: code emissions determination method as “A.”
    - Material balance method: code emissions determination method as “B.”
Marine Crude Loading Loss

Deriving the Emissions Factor

- $C_L = C_A + C_G$ (Equation 2)

Where:

- $C_L =$ total loading loss, lb VOC/1000 gallons (gal) of crude oil loaded (emissions factor)
- $C_A =$ arrival emissions factor, contributed by vapors in an empty tank compartment before loading. Reference AP-42, Section 5.2, Table 5.2-3 (see next slide).
### Marine Crude Loading Loss (cont.)

**Determining $C_A$**

AP-42, Section 5.2, Table 5.2-3

<table>
<thead>
<tr>
<th>Condition</th>
<th>Previous Cargo</th>
<th>$C_A$ - lb/1000 gal</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Uncleaned</strong></td>
<td><strong>Volatile</strong></td>
<td>0.86</td>
</tr>
<tr>
<td></td>
<td><em>(True Vapor Pressure &gt; 1.5 psia)</em></td>
<td></td>
</tr>
<tr>
<td>Ballasted</td>
<td><strong>Volatile</strong></td>
<td>0.46</td>
</tr>
<tr>
<td>Cleaned or gas-freed</td>
<td><strong>Volatile</strong></td>
<td>0.33</td>
</tr>
<tr>
<td>Any condition</td>
<td><strong>Nonvolatile</strong></td>
<td>0.33</td>
</tr>
</tbody>
</table>

**Total hydrocarbon factor**

---

*Example Pick*

AP-42, Section 5.2, Table 5.2-3
Marine Crude Loading Loss (cont.)

Determining $C_A$ (cont.)

- Convert total hydrocarbon (THC) emissions factor to a VOC factor using one of the following applicable choices:
  - **Crude vapor composition is known:**
    Apply the crude oil vapor weight percent VOC (approximately 55 – 100%) to the THC factor.
  - **Crude vapor composition is NOT known:**
    Estimate the VOC emissions factor by applying 85 weight percent VOC to the THC factor.

- Example: determining the VOC emissions factor
  - $C_A = 0.86 \text{ lb THC/1000 gal} \times 0.85$ (weight percent VOC)
  - $C_A = 0.731 \text{ lb VOC/1000 gal}$
Marine Crude Loading Loss (cont.)

Determining \( C_G \)

- \( C_G = 1.84 \, (0.44 \, P - 0.42) \frac{MG}{T} \)

(AP-42, Section 5.2, Equation 3)

- Where:
  - \( P \) = true vapor pressure of loaded crude oil, psia
  - \( M \) = molecular weight of vapors, lb/lb-mole
  - \( G \) = vapor growth factor = 1.02 (dimensionless)
  - \( T \) = temperature of vapors, °R (°Fahrenheit + 460)
Marine Crude Loading Loss (cont.)

Determining $C_G$ (cont.)

- $C_G = 1.84 \left[ (0.44 \times 4) - 0.42 \right] \frac{50 \times 1.02}{538}$ (Equation 3)
- $C_G = 0.2337 \text{ lb VOC/1000 gal}$

- **Total Loading Emissions Factor**
  - $C_L = C_A + C_G$
  - $C_L = 0.731 \text{ lb VOC/1000 gal} + 0.2337 \text{ lb VOC/1000 gal}$
  - $C_L = 0.9647 \text{ lb VOC/1000 gal}$
## Marine Crude Loading: Example Calculation

<table>
<thead>
<tr>
<th>Input Data</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>( C_L )</td>
<td>0.9647 lb VOC/1000 gal</td>
</tr>
<tr>
<td>Annual Loading Throughput</td>
<td>1,260,000 Mgal (1 Mgal=1000 gal)</td>
</tr>
<tr>
<td>Vapor Recovery Unit (VRU)</td>
<td>Collects loading vapors and sends to vapor combustor</td>
</tr>
<tr>
<td>Vapor Combustor/Incinerator</td>
<td>95% destruction efficiency</td>
</tr>
</tbody>
</table>

\[
\text{Total emissions, tpy} = \frac{0.9647 \frac{lb\ VOC}{1000\ gal} \times 1,260,000\ Mgal \times (1 - 0.95)}{2000lb/ton}
\]

\[
\text{Total emissions, tpy} = 30.39\ tpy\ VOC
\]
Marine Facility Emissions Determination Methodologies

Emissions determination methodologies for:

Loading and unloading bulk liquefied gaseous materials:

- Dock fugitive component emissions
  
  *2014 Emissions Inventory Guidelines, Technical Supplement 3: code emissions determination method as “A.”*

- Pressurized vessel compartments
  - Gas freeing: Evacuation of residual liquid ("heel") and vapor after unloading and prior to loading new material.
  - Gas conditioning: displaces residual nitrogen pad with product vapor prior to loading.
  - Calculate emissions using ideal gas law and the actual pressure, concentration, and vessel volume.
  - Code emissions determination method as “S.”
Emissions determination methodologies for:

Degassing and cleaning vessel compartments:

- The following processes may result in emissions: degassing, deheeling, and cleaning.
- Emission determination choices:
  - Saturation test data (methodology code “B”)
    - Sample data must be obtained at average or greater ambient temperature.
    - The chemical vapor pressures used to determine emissions must be the vapor pressures at the average ozone season temperature.
  - Ideal gas law (methodology code “S”)

Marine Facility Emissions Determination Methodologies (cont.)
Structure: Loading/Unloading Bulk Liquids

Unabated Loading (Liquid or Gaseous Material)

- Use the structure represented above to report uncontrolled loading/unloading emissions from one or more vessels linked to a single emissions point.
- Include gas “freeing” or “conditioning” emissions on this path.
Use the structure represented above to report controlled loading/unloading emissions from one or more vessels linked to a VRU that vents to an incinerator.
Structure: Vessel Cleaning and Degassing

Unabated Vessel Cleaning and Degassing

Use the structure represented above to report cleaning and degassing emissions if the vessel does not have a control device.
Use this structure to report controlled as well as uncaptured fugitive degassing and cleaning emissions.
Contact Information

Steve O’Neal:
(512) 239-2390
Steve.ONeal@tceq.texas.gov

Emissions Assessment Section Helpline:
(512) 239-1773
psinvent@tceq.texas.gov
Combustion Sources: Reporting Challenges

Jill Dickey-Hull
Team Leader
Air Quality Division

Presented to the 2015 Emissions Inventory Workshop
January 14, 2015
Overview

- Combustion reporting challenges
  - Continuous emissions monitoring systems (CEMS)
  - Stack tests
  - Portable analyzers
  - Vendor factors
  - AP-42 factors
- Particulate matter (PM) challenges
- Volatile organic compounds (VOC) speciation challenges
- Flares and thermal oxidizers
Combustion Reporting Challenges

- Was the annual aggregate heat input in million British thermal units per year (MMBtu/yr) provided in the emissions inventory questionnaire (EIQ)?

- Was the nitrogen oxides (NO$_x$) emissions factor and methodology provided in the EIQ?
  - Process rate-based emissions factor
  - Other emissions factors are optional to provide in the EIQ, but must be included the supporting documentation

- Are abatement devices to control combustion-related emissions represented in the EIQ?
• Are the emissions determined using best available methodology?

• Combustion sources methodologies order of preference (method code in quotes):
  – CEMS: “D”
  – Predictive emissions monitoring system: “F”
  – Stack test data (measured): “M”
  – Portable analyzer data: “Q”
  – Vendor-supplied data: “V”
  – AP-42 factors or Texas Commission on Environmental Quality (TCEQ) factors: “A”
  – Scientifically calculated: “S”
  – Estimated: “E”
Combustion Reporting Challenges (cont.)

Were products of combustion reported?

- NO\textsubscript{x}
- Carbon monoxide (CO)
- Sulfur dioxide (SO\textsubscript{2})
- PM
- Particulate matter less than 10 microns in diameter (PM\textsubscript{10})
- Particulate matter less than 2.5 microns in diameter (PM\textsubscript{2.5})
- VOC
- Hazardous air pollutants
  Reporting threshold \( \geq 0.1 \text{ tons per year (tpy)} \)
  Formaldehyde from engines
- Note: Water and carbon dioxide are **not** required to be reported in the emissions inventory (EI).
Combustion Emissions Determination Method Challenges: CEMS

- Representative set of summary sheets from relative accuracy test audits
- Account for emissions during CEMS downtime
- Must be certified according to United States Environmental Protection Agency (EPA) or TCEQ standards and properly calibrated

- CEMS versus continuous monitoring system (CMS)
  - CEMS (method code "D"): generates real-time emissions data 24 hours (hr) a day.
  - CMS (method code "B"): measures the gas composition of a process stream and does not quantify emissions released to the atmosphere.
Combustion Emissions Determination Method Challenges: Stack Test

- Provide stack test summary pages from the stack testing company.
  - QA staff may request the full stack test report on a case-by-case basis.
  - Ensure summary pages clearly identify the Facility Identification Number (FIN) or Emissions Point Number (EPN).

- Ensure that the correct units are used when calculating emissions.

- Use process-based emissions factor (pound [lb]/MMBtu and not lb/hr).

- Valid stack test data must be used from that point in time forward; do not apply stack tests retroactively.
• If a similar unit’s stack test was used, then code as “E” in the EIQ.

• Averaging stack tests performed in the same calendar year is allowed.

• Do NOT average stack tests from multiple years.

• Stack test must be representative of actual operations.

• NO$_x$: Must use molecular weight of 46.01 when converting from parts per million (abbreviated as ppm) to report the mass emissions rate.

  NO$_x$ molecular weight is defined as 46.01 lb/lb-mole by the EPA.
Combustion Emissions Determination Method Challenges: Portable Analyzer

- Ensure portable analyzer data reflects actual routine operations.
- Provide quarterly reports and identify combustion source by FIN and EPN.
- If combustion source is tested quarterly, apply quarterly results to determine emissions for each quarter.
- Averaging may or may not be appropriate, depending on the source operation.
Combustion Emissions Determination Method Challenges: Vendor and AP-42

- Provide vendor sheets as supporting documentation
- No major modification to the equipment that would invalidate the vendor factors
- AP-42 reflects the most recent update
  - AP-42, Section 1.4 for external combustion natural gas-fired sources, updated July 1998
  - AP-42, Section 3.2 for stationary internal combustion natural gas-fired sources, updated August 2000
  - AP-42, Section 3.3 for internal combustion gasoline- or diesel-fired sources, updated October 1996 with a note regarding CO from March 2009
PM: Official Definition

30 Texas Administrative Code Section 101.1 (76) defines PM emissions as: “All finely-divided solid or liquid material, other than uncombined water, emitted to the ambient air as measured by United States Environmental Protection Agency Reference Method 5, as specified at 40 Code of Federal Regulations (CFR) Part 60, Appendix A, modified to include particulate caught by an impinger train; by an equivalent or alternative method, as specified at 40 CFR Part 51; or by a test method specified in an approved state implementation plan.”
PM: Official Definition Since 1989
PM: Filterable + Condensable

• What does the definition mean for EI reporting?
  – Both the filterable (front-half) and condensable (back-half) emissions must be summed and reported as PM, PM$_{10}$, and PM$_{2.5}$ emissions.
  – If condensable emissions were not tested, then an alternative method must be used to determine condensable PM emissions.

• Specific PM, PM$_{10}$, and PM$_{2.5}$ reporting guidance in *2014 Emissions Inventory Guidelines*:
  – Chapter 4, "Determining and Reporting Emissions"
  – Technical Supplement 1, "Selected Combustion Sources"
PM, PM$_{10}$, and PM$_{2.5}$

- PM total is PM filterable (front-half) + PM condensable (back-half)

- PM$_{10}$ is a subset of PM
  Most PM is composed of a certain percentage of PM$_{10}$

- PM$_{2.5}$ is subset of PM and PM$_{10}$
For natural gas combustion, all particulate matter is <1 micron in diameter, so $\text{PM}_{2.5} = \text{PM}_{10} = \text{PM-unclassified}$.

- **Natural gas-fired combustion engines**
  
  Sum the filterable and condensable emissions factors using AP-42 Section 3.2 emissions factors to determine a total PM factor.

- **External combustion sources**
  
  AP-42 Section 1.4 already sums the filterable and condensable factors to provide a total PM factor.
Combustion Reporting Challenges: PM Natural Gas Combustion (cont.)

- Example: Determine PM emissions from a 4-cycle rich burn (4CRB) engine using the following AP-42, Section 3.2 emissions factors:
  - PM (condensable) = 0.00991 lb/MMBtu
  - PM\textsubscript{10} (filterable) = 0.0095 lb/MMBtu
  - PM\textsubscript{2.5} (filterable) = 0.0095 lb/MMBtu

- Add PM condensable to PM\textsubscript{10} filterable or PM\textsubscript{2.5} filterable to achieve a cumulative factor.
  - 0.00991 + 0.0095 = 0.01941 lb/MMBtu
  - 0.01941 lb/MMBtu will be the emissions factor used to determine PM, PM\textsubscript{10}, and PM\textsubscript{2.5} from the 4CRB engine.
Combustion Reporting Challenges: VOC Emissions

- Stack test data or vendor data that provides total hydrocarbons (THC) instead of VOC
  - Determine VOC emissions by multiplying the THC emissions factor by the following ratio:
    - AP-42 VOC emissions factor/AP-42 total organic compounds (TOC) emissions factor
      - Code as “S” for scientifically calculated
  - Do not apply the inlet gas VOC percentage to the THC factor to obtain a VOC factor

- AP-42 combustion emissions factors
  - Must use the VOC emissions factor
  - Do not use the TOC emissions factors
Example: Stack test measured 10 tons of THC for a 4CRB engine.

Must use the AP-42 ratio method to report VOC.

- 4CRB AP-42, Section 3.2 VOC factor ÷ 4CRB AP-42, Section 3.2 TOC factor = ratio
  
  \[
  0.12 \div 1.64 = 0.0732
  \]

- AP-42 ratio * stack test TOC = VOC
  
  \[
  0.0732 \times 10 \text{ tpy of TOC} = 0.732 \text{ tpy of VOC}
  \]

- Code as “S” for scientifically calculated in the EIQ

- Use contaminant code for VOC-u, 50001
Stack test or vendor data exists for VOC but not for VOC species.

- Use AP-42 “trace organic compounds” emissions factors rated “C” or better (i.e., "A", "B", or "C").
- Divide each trace organic factor by AP-42’s VOC emissions factor to obtain the contaminant's speciation ratio.
- Multiply the source’s VOC-total emissions by each ratio to obtain that compounds emissions rate.
- Code the speciated contaminant as “S” for scientifically calculated.
- Code VOC-u as either “M” for stack test or “V” for vendor.
**Example:** 4-cycle lean burn (4CLB) engine with vendor data VOC results of 11.2 tpy

- No vendor or stack test results for speciated contaminants, so AP-42, Section 3.2 emissions factors must be used
- Formaldehyde is rated “A” for 4CLB
- Determine the AP-42 formaldehyde ratio:
  \[
  0.0528 \frac{lb}{MMBtu} \div 0.118 \frac{lb}{MMBtu} = 0.44746
  \]
- Multiply the ratio by the total VOC vendor data results
  \[
  11.2 \text{ tpy of VOC} \times 0.44746 = 5.0115 \text{ tpy of formaldehyde (coded as “S”)}
  \]

Does the vendor data **exclude** or **include** formaldehyde?
Combustion Reporting Challenges: SO$_2$ Emissions

- If higher order methods such as CEMS or stack testing are not available, emissions can be determined using material balance from the sulfur content of the fuel.

- An example of how to calculate SO$_2$ emissions is on the following slide.

- Need the following information:
  - Sulfur content of the fuel burned (fraction by weight) for the applicable year
  - Quantity of fuel burned based on quantity measurement
Combustion Reporting Challenges:  
SO$_2$ Emissions (cont.)

- Use material balance and destruction and removal efficiency (DRE) of the flare to determine emissions.
- Code as “B” for material balance.
- How much SO$_2$ is generated from hydrogen sulfide (H$_2$S) if 100 pounds lb/hr of flared gas composed of 20% percent H$_2$S is burned in an unassisted flare with a 98% DRE?

\[
20 \frac{lb \; H_2S}{hour} \times \frac{lb-mole}{34 \; lb \; H_2S} \times 64 \frac{lb \; SO_2}{lb-mole} \times (0.98) = 36.9 \frac{lb \; SO_2}{hr}
\]

- H$_2$S emitted:

\[
20 \frac{lb \; H_2S}{hour} \times (0.02) = 0.04 \frac{lb \; H_2S}{hr}
\]
Flare Reporting Challenges: NO\textsubscript{x} and CO Emissions

- Must know the net heating value of the flared gas
- NO\textsubscript{x} and CO flare emissions factors found in Technical Supplement 4 of the 2014 Emissions Inventory Guidelines
  - Choose factor based on the assist type and the waste gas stream net heating value.
  - Code as “A” for TCEQ emissions factors.
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Questions