Emissions Inventory (EI): Reporting Requirements and What's New for 2011

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Overview

- Role and importance of the EI
- Brief introduction to EI applicability reporting requirements
- What's new for the 2011 reporting year
- Key considerations when determining tank emissions
- Summary

Emissions Inventory Goals

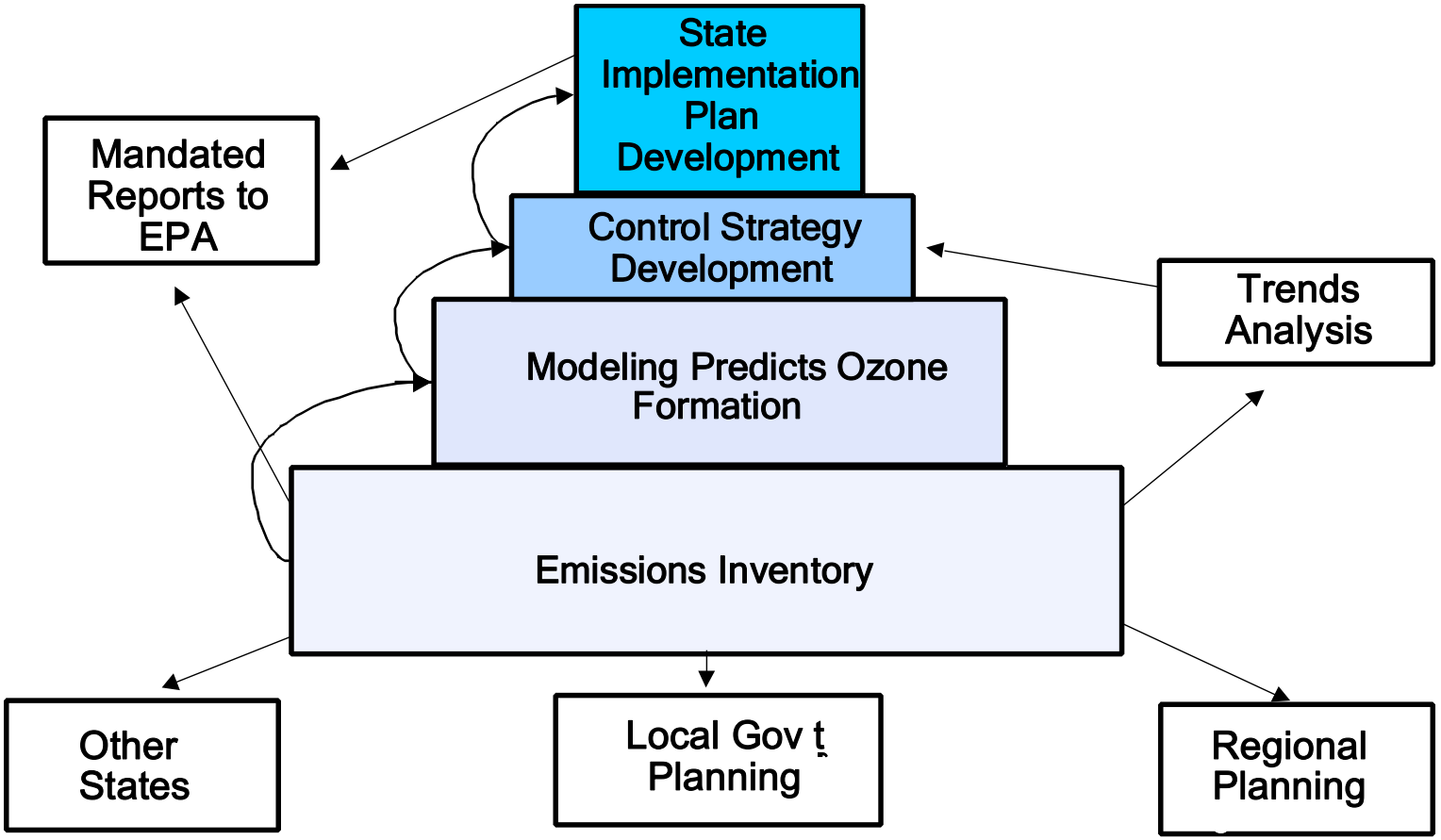
- Accurate determinations of mass emissions released to the atmosphere.
- Accurate identification of emission species released to the atmosphere.
  - Compounds react differently in the atmosphere to create ozone.
  - Air toxics
- Continuous improvement

Emissions Inventory Improvement

Air quality research projects have improved the quantitative understanding of emissions sources that were previously unknown or underestimated.

- Operation of assisted flares
- Tank emissions from floating roof landings
- Flash emissions from upstream oil and gas tanks
- Heated storage tanks
- Working and breathing losses from barges

Emissions Inventory – Use in Planning



Applicability Requirements

Do You Need to Submit an EI?

- 30 Texas Administrative Code (TAC) §101.10
  - EI types,
  - who needs to submit, and
  - what must be submitted, including:

    SUPPORTING DOCUMENTATION.
- Major stationary source under 30 TAC §116.12, Nonattainment and Prevention of Significant Deterioration Definitions
  - Rule defines potential to emit (PTE) thresholds
  - Applicability is generally based on attainment status of county

1997 Eight-Hour Ozone Nonattainment Areas

Summary of Reporting Requirements in Tons per Year for 30 TAC §101.10										
County	Volatile Organic Compounds (VOC)		Nitrogen Oxides		Other		Individual Hazardous Air Pollutants (HAPs)		Aggregate HAPs	
	Actual	PTE	Actual	PTE	Actual	PTE	Actual	PTE	Actual	PTE
Brazoria, Chambers, Fort Bend, Galveston, Harris, Liberty, Montgomery, Waller SEVERE/OZONE	10	25	25	25	100	100	10	10	25	25
Collin, Dallas, Denton, Ellis, Johnson, Kaufman, Parker, Rockwall, Tarrant SERIOUS/OZONE	10	50	25	50	100	100	10	10	25	25
All Other Counties	100	100	100	100	100	100	10	10	25	25

Applicability Summary

What Does This Mean to You?

- What is the 2011 attainment status of the county where the site is located?
- What were the site's actual 2011 emissions for regulated pollutants and hazardous air pollutants (HAPs) (single and aggregate)?
- What were the site's PTE limits for regulated pollutants and HAPs (single and aggregate)?
- Is the Texas Commission on Environmental Quality (TCEQ) conducting a special inventory?
  - 30 TAC § 101.10(b)(3)
    TCEQ must notify special inventory recipients
  - Special inventories for 2011
    - Requirements for all counties concerning lead
    - Ozone precursors in specified counties

New for 2011: Reporting Options

- 3 options for submitting an EI
  - Paper
  - Electronic text file (delta file method)
  - Online entry (alternative to paper)
- Paper emissions inventory questionnaires (EIQs) and extract files will no longer be mailed to regulated entities.
  - The TCEQ will still accept paper submittals.
    - Printable EIQ reports can be generated through the Central Registry's Public Query tool.
    - Instructions for Obtaining a Printable Copy of the EIQ: www.tceq.texas.gov/goto/eiqprint
  - Extract files can be obtained from TCEQ FTP site

    Direct link on TCEQ point source EI Web page

New for 2011: Reporting Options (cont.)

- Electronic delta file MUST be submitted through the State of Texas Electronic Emissions Reporting System (STEERS).

  Electronic delta files will no longer be accepted on disk or other media.

- Online data entry through STEERS
  - Great option for those sites currently using paper that would like to submit on-line.
  - On-line Annual Emissions Inventory Report User's Guide

    http://www.tceq.texas.gov/assets/public/implementation/air/ie/pseiforms/aierusersguide.pdf

New for 2011: General

- Tanks emissions determination guidance updates in Technical Supplement 6 of 2011 EI Guidelines
- More guidance regarding structure of and reporting emissions from glycol stills
- Specific list of updates available at:

  http://www.tceq.texas.gov/assets/public/implementation/air/ie/pseiforms/2011ei_request_ltr.pdf
- Ozone season update
  - May 1 through September 30 for EI purposes
  - Preference for 2011 EI submissions: adjust ozone season calculations based on May 1- Sept 30

Tank Emissions Concerns

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 tank VOC emissions are potentially under-reported in the annual EI.

Specific Tank Types Of Concern

- Ambient-temperature tanks: use of default data to determine emissions (e.g., crude oil tanks)

  Midstream, terminals, and refineries

- Heated tanks

  Refineries, terminals, and end users

- Intermediate process tanks with floating roofs that store material at warmer-than-ambient temperature (hot product tanks).
- Tanks with significant throughput variation

Ambient-Temperature Tanks

Emissions Determination Concerns

Annual emissions from tanks that store products at ambient temperatures:

- Concern: TANKS 4.09d (TANKS) software program does not incorporate temperature as a variable when determining unheated, fixed-roof tank working losses.

  Working-loss algorithm uses a fixed vapor-space temperature of 63°F.

- Acceptable to use TANKS with the following caveats:
  - For annual emissions, choose "Monthly" time basis (instead of "Annual") and select all 12 months of the year to obtain the best possible emissions estimates.
  - Never use default information unless it accurately represents the tank and its contents.

    Input detailed tank fittings, do not use defaults.

Ambient-Temperature Tanks (cont.)

Emissions Determination Concerns (cont.)

- Preferred method for determining ozone season emissions: appropriate AP-42, Chapter 7 equations that use accurate vapor pressure data at higher ozone season ambient temperatures.
- Concerns about using TANKS to determine ozone season emissions:
  - The working-loss algorithm error incorrectly calculates unheated, fixed-roof tank working loss emissions during the ozone season months.
  - TANKS inaccurately uses an annual average liquid bulk temperature, even when determining monthly emissions.

Comparing Emissions

TANKS 4.09d Default Data vs. Site-Specific

Floating-roof tank storing crude oil

- Default: TANKS default crude profile, Reid vapor pressure (RVP) 5
- Site-specific: TANKS but with user-entered, site-specific crude oil data (RVP 7).
  - Note: site-specific crude oil has higher RVP than default value.

Contents	Method	Monthly sum over 12 months in pounds (lbs)
Default Crude Oil Data	TANKS	2,357
Site-specific Crude Oil Data	TANKS	3,637

Heated and Hot Product Tanks

- TANKS does not apply AP-42, Chapter 7 equations accurately
- For EI purposes, TANKS is no longer an acceptable option to determine emissions from heated and hot product tanks.

  TANKS contains several default routines that prevent it from properly applying the AP-42, Chapter 7 equations. Examples include:

  - Incorrectly assumes the vapor-space and liquid-surface temperature ranges are equal
  - Cannot determine emissions for some high molecular weight petroleum distillates if storage temperature is above 100 degrees Fahrenheit (°F)
  - Does not compute the vapor space and liquid temperature ranges for heated tanks

Heated and Hot Product Tanks (cont.)

- TANKS will underestimate emissions from intermediate process tanks with floating roofs that store material at warmer-than-ambient temperature (hot product tanks).
- Use AP-42, Chapter 7 equations.
  - Use vapor pressure at the actual storage temperature of the liquid.
  - Do not use AP-42 defaults or permitted values for vapor pressure, liquid composition, and other relevant parameters unless representative of the stored liquid.
  - American Society for Testing and Materials method D 2879 is suitable for determining vapor pressure for heavy liquids.

Comparing Emissions – Part 2

Heated Tank

- Heated fuel oil tank, temperature at 150°F
- Comparing:
  - Emissions determined using TANKS default residual oil number 6 data
  - Emissions determined using AP-42, Chapter 7 equations and actual residual oil number 6 parameters, including vapor pressure

Contents	Method	Monthly sum over 12 months in lbs
Default Residual Oil Number 6	TANKS	55
Residual Oil Number 6	AP-42, Chapter 7	208

Tanks with 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 amount of cutter stock added.
- Cutter stock emissions must be speciated in the annual EI.

  Process records should provide detail about the cutter stock composition.

Comparing Emissions – Part 3

With and without cutter stock

- Heated fuel oil tank, temperature at 150°F
- Comparing:
  - Emissions determined using TANKS default residual oil number 6 data
  - Emissions determined using AP-42, Chapter 7 equations and the actual vapor pressure of the residual oil number 6 cut with 25% diesel

Contents	Method	Monthly sum over 12 months in lbs
Default Residual Oil Number 6	TANKS	55
Cut Residual Oil (75% Residual Oil Number 6/25% Diesel)	AP-42, Chapter 7	3,511

Significant Throughput Variation

- Because the liquid temperature remains at the annual average, even if the "monthly" calculation option is chosen, TANKS cannot adequately account for monthly variations in emissions.
- Use AP-42, Chapter 7 equations.

Degassing and Cleaning

Acceptable determination methods:

- Site-specific data and material balance equations
- The liquid heel method is described in Section 11, *Startup and Shutdown*, of United States Environmental Protection Agency's (EPA) "Emission Estimation Protocol for Petroleum Refineries."
- Degassing:
  - American Petroleum Institute (API) Technical Report 2568, "Evaporative Loss from the Cleaning of Storage Tanks" (drain-dry fixed-roof)
  - API Technical Report 2567, "Evaporative Loss from Storage Tank Floating Roof Landings" (drain-dry floating-roof)
- Cleaning: API Technical Report 2568

EI Calculations and Permit Allowables

If emissions determined using the procedures in the EI guidelines exceed the allowable emission rates in a site's relevant New Source Review permit:

- Regulated entity should apply for a permit amendment to authorize the corrected emission rates.
- Application should include a retrospective review to establish whether the higher level of emissions would have triggered nonattainment or prevention of significant deterioration permit review when emissions were authorized.

Tank Emissions Summary

Due to concerns about accurate reporting of EI emissions, EPA TANKS 4.09d (or any earlier version) is no longer accepted to determine emissions for emissions inventory purposes for:

- tanks storing warm or hot product,
- heated tanks, or
- tanks with significant variations in throughput.

Tank Emissions Summary (cont.)

- When TANKS is an accepted emissions determination option for EI reporting, do not use default settings and parameters.
  - Enter specific chemical or mixture data (including cutter stock) into the TANKS program's chemical database.
  - Default chemicals cannot be used unless the default vapor pressure and composition of the material are representative of the stored material.
- Detailed guidance in the *2011 EI Guidelines*, Appendix A, Technical Supplement 6: Aboveground Storage Tanks

  http://www.tceq.texas.gov/assets/public/comm_exec/pubs/rg/rg360/rg36011/appendix_a.pdf

EI Assistance

- 2011 Emissions Inventory Guidelines (RG-360A):
  - Step-by-step instructions for completing an EI
  - Updated annually with current reporting requirements
  - Technical supplements for common emissions sources
- 2011 Emissions Inventory Forms and Instructions (RG-360B):
  - Instructions on completing the forms
  - Blank forms
  - List of abatement codes and contaminant codes
- Point source Web page

  www.tceq.texas.gov/goto/ieas
- Help Line

  (512) 239-1773, available Monday-Friday from 8 AM-5 PM

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- Web page

  http://www.tceq.texas.gov/airquality/point-source-ei/psei.html