Emissions Reduction
Warehousing Analysis

Positioning Your Plant for Growth

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Agenda

- Perspective: EPC viewpoint on emission reductions
- Motivation: value of internal control evaluations
- Process: steps to evaluate/rank control costs
- Execution: typical control project cycle
- Examples: EPC projects, options, value
- Tips & Takeaways
Perspective: EPC Viewpoint on Emission Reductions

- Emission reduction solutions enable strategic EPC projects: expansions, revamps, grassroots
- ER demands create EPC opportunities
- ER demand is already increasing for HGB serious ozone nonattainment bump - be ready for of the pinch

**Bottom line:** EPC success in Houston area depends on understanding requirements + delivering internal control solutions
Motivation: Value of Proactive Internal Control Project Evaluations

Identify & rank control opportunities to achieve...

► **Confidence:**
  • manage risk to future project feasibility, cost, schedule with identified ERs ready when needed – improve position for site selections

► **Value:**
  • estimate project costs for comparison to market value
  • market value could justify controls for revenue
  • net out to avoid LAER costs and choose best control spend

► **Speed:**
  • net out to avoid nonattainment and PSD permit delays
  • positioned to execute projects when needed
Process: Steps to Evaluate/Rank Control Costs

1. **Define** actual or potential pollutant/program needs
2. **Identify** sources with credible control options
3. **Validate** selected SIP baseline actual emissions
4. **Scope and estimate** control project CAPEX/OPEX
5. **Quantify** emission reduction and cost/ton
6. **Normalize** cost/ton for comparison
7. **Rank** control options along key decision-making axes
Execution: Typical Control Project Cycle and Resource Needs

- Planning & Conception
- Permits & ERC Conversions
- Project Ranking & Selection
- EPC
- DD & Construction
Example: EPC Control Projects

- **Storage tanks**: domed roof on EFR, IFR upgrades
- **Flares**: vapor recovery, reroute to oxidizer
- **Wastewater systems**: enclose, add controls
- **Fired units**: replace, retrofit, fuel treatment
- **Other sources**: add/replace control device
- **Process changes**: solvent/material substitution, heat recovery and integration
Example: Potential Lower Cost Options

Evaluate and optimize key utility systems:

► **Flare headers**: flow contribution evaluation, replace PSVs, reduce sweep gas & inert gas flows, analyzer sample loops

► **Steam distribution**: steam trap study, improve thermal efficiency and reduce boiler firing demand

► **Wastewater**: reduce inert gas flows, constant-level controls, conservation vents, reflective coatings on uninsulated surfaces, operating adjustments
Example: Value Captured by One Project

Houston area facility:

- **Problem**: strategic project needed large VOC emission reduction to permit construction
- **Market cost**: budgeted ~$50M
- **Solution**: internal control options evaluated, new VOC control device installation opportunity identified
- **EPC cost**: preliminary engineering estimate <$15M
- **Savings**: >$35M
Tips and Takeaways

► **Appreciate strategic implications** of emissions credit and netting programs for projects: worthy of investment

► **Secure resources** needed for complex, innovative evaluations and decision-making tools

► **Define** the problem, potential problem set, or opportunity

► **Make internal control plan** by evaluating/ranking options

► **Integrate** control plan with long-term permit strategy and credit/allowance planning

► **Maintain** control plan with tools designed to respond… change is the only constant
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