Mary Jane Wilson

- **Background and Experience**
  - Education: Stanford University Petroleum Engineering
  - Business roles
    - Runs an energy and environmental consulting business
    - Distinguished Lecturer for SPE
    - Editor of Environmental Monograph for SPE
    - Testifying Expert on behalf of O&G companies
  - Governmental Advisory roles
    - Appt. by Congress to Review Naval Petroleum Reserve
    - National Petroleum Council
    - Special Govt. Employee for Ultra-Deepwater Advisory Committee
    - Petroleum Technology Transfer Council
2014 Rulemaking for Oil and Gas

- WZI participated as a technical expert in this rule making at the request of EDF

**Summary of Key Findings:**
- CDPHE used accepted methodology:
  - In establishing the emission inventory
  - In assigning emissions reductions for proposed alternatives
  - In calculating the cost-effectiveness of program alternatives
- CDPHE cost estimates are reasonable and show program will be cost effective in reducing VOC and methane
LDAR

- Historically, LDAR has been in place in numerous facilities and air basins in various forms since the 80’s
- LDAR interfaces well with Planned Maintenance cycles which are focused on anticipating equipment failure and proactive maintenance
- LDAR programs in various forms have proven cost effective in reducing emissions
- Our opinion is that LDAR contributes to overall improvement of facility operations
CDPHE Proposed LDAR

- Tier-based approach results in sliding costs with lowest emitters bearing the least cost
- The CDPHE proposed reporting framework has a relatively minimal paperwork burden as compared to other LDAR programs
- The proposed LDAR program balances diminishing returns on emission reductions with industry costs
Louis Berger Group Program Economic Analysis: Key flaws

- Inflated Costs for:
  - LDAR
  - STEM
  - Flares

- Incorrect Methodology for cost effectiveness
Inflated Costs

- **LDAR**
  - LDAR equipment maintenance and training
  - Component Repair (10 times expected values)
  - Repaired Component Re-inspection (twice as high as complete facility inspections - done 12 times per year)
  - Findings are contrary to Economy-of-Scale expectations
Comparative Example -

LDAR Cost Estimate
per 50 TPY Well Production Facility
In Non-Attainment Areas

Berger Initial Year
Facility Components Surveyed: 592
Facility Component Repairs: 10

Berger
Division
Noble Actual Costs
Anadarko Actual Costs

$17,250  $15,851  $27,248  $60,350
$7,870  $9,408  $2,725/leak
$5,183  $1,563  27m-hrs @$100/m-hr
$1,585/leak
16 m-hrs @$100$/m-hr

$9,433  $5,183  $9,408

Inspection (includes capital costs)  Repair  Re-inspection  Total
Buffer Bottles as control devices

Separator

Buffer Bottle
Inflated Costs

- **STEM**
  - Buffer Bottle Capital Costs and Maintenance Costs are overstated
  - Similar errors as shown in prior LDAR discussion
- **Flares**
  - Inflated Costs
  - Useful life is understated
  - Overstated Maintenance Costs
- **STEM and Flares are still cost effective regardless of overstatement of costs**
Incorrect Methodology

- Berger developed a sliding emissions inventory year-to-year
- EPA cites the use of a fixed datum (baseline)
  - Baseline is established as a pre-rule inventory condition
  - Program effectiveness is tied to the pre-rule minus post-rule emissions inventories
- Incremental reductions year-to-year simply underscore the degree of progress (trajectory) toward the final program control effectiveness
- Berger costs are skewed by levelized NPV calculations
Best Management Practices

- Best Management Practices for well maintenance such as swabbing and liquids unloading has been and will continue to be a general oil and gas industry practice.

Examples:
- When swabbing in a well, use temporary or permanent equipment to
  - Capture gas and send to gas treatment system or reinject
  - Flare gas to permanent or temporary flare
- Limit unloading frequency and duration
- Install lift equipment or automatic controls that reduces or eliminates the need for unloading
- Correct problems with well completion and infrastructure
Conclusion

- CDPHE proposal is practical and applies common sense and reasonable approaches to control emissions from oil and gas operations
- Program is carefully tailored so that sites with fewer emissions have fewer requirements
- Program is cost effective
- Program will achieve large reductions in emissions