



## Identifying all Sources of Benzene at UOG Sites / Facilities

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### Study Objectives

- ▶ Evaluate secondary sources of benzene at UOG facilities (i.e., sources besides glycol dehydrator vents).
  - ▶ Data mining of available source data.
  - ▶ Limited source sampling program.
  - ▶ Application of results to 2000 UOG emissions inventory.
- ▶ Develop recommendations on how to deal with any significant benzene sources:
  - ▶ Quick estimation techniques.
  - ▶ Potential control options.



## Project Status

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- ▶ **Sampling and analysis program:**
  - ▶ Completed during the summer of 2011.
- ▶ **Data analysis:**
  - ▶ In progress.
- ▶ **Draft report:**
  - ▶ Expected by October 31, 2011.



## Design of Sampling Program

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- ▶ **Focus on facilities currently reporting benzene emissions.**
- ▶ **Cover range of key facility types.**
  - ▶ Conventional oil.
  - ▶ Heavy oil.
  - ▶ Natural gas.
- ▶ **Provide geographic coverage:**
  - ▶ Foothills, plains and northern regions.



## Sampling Program

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- ▶ 1 – Gas Battery
- ▶ 4 – Sweet Gas Plants
- ▶ 1 – Sour Gas Plant
- ▶ 1 – Sweet Oil Battery
- ▶ 1 – Sour Oil Battery
- ▶ 1 – Cold Multi-well Heavy Oil Battery
- ▶ 2 – Cold Single-well Heavy Oil Batteries
- ▶ 2 – Thermal Heavy Oil Batteries & Treatment Facilities



## Additional Sites

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- ▶ 3 Single-well oil batteries.
- ▶ 3 Gas gathering compressor stations.



## Samples Collected

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- ▶ **Sampled all gas and vapour streams at each site:**
    - ▶ Inlet gas.
    - ▶ Tank vapours (condensate and crude oil).
    - ▶ Purchased fuel gas.
    - ▶ Sales gas.
    - ▶ High RVP product vapours.
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## Preliminary Results (Benzene Factors)

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### ▶ Shallow-Cut Gas Plant

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|--------------------------------|------|
| ▶ Inlet field gas:             | 1    |
| ▶ Residue gas:                 | 0.1  |
| ▶ High RVP product vapours:    | 2.8  |
| ▶ Pentanes Plus (NGL) vapours: | 56.0 |

### ▶ Deep-cut Gas Plant

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|--------------------------------|-------|
| ▶ Inlet field gas:             | 1     |
| ▶ Residue gas:                 | 0.004 |
| ▶ Pentanes Plus (NGL) vapours: | 87.2  |
| ▶ Lean Oil vapours:            | 29.6  |
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THANK YOU!