

ENERGY MANAGEMENT WORKSHOP 2007

The Fuel Gas Challenge

The Efficiency Reserve

Al Wakelin

Sensor Environmental



CETAC-WEST



Environment
Canada

Environnement
Canada



Methane to Markets



PETROLEUM
TECHNOLOGY
ALLIANCE
CANADA
PTAC

Why the Fuel Gas Challenge?

- Fuel Gas has a very significant value
 - about \$5B in Alberta
 - about 10% of the total gas produced
- Not recorded as an operating cost
- There seems to be a lack of ownership and accountability



CETAC-WEST



Environment
Canada

Environnement
Canada



Methane to Markets



Fuel Gas Consumption Pattern in Alberta

Fuel Gas Vs Sales Gas (Conventional Gas)



CETAC-WEST



Environment
Canada

Environnement
Canada



Methane to Markets



PTAC

Why Fuel Gas consumption may continue to Climb

- Declining Reservoir pressures
- Changing inlet composition
- Plants operating below design capacity



CETAC-WEST



Environment
Canada

Environnement
Canada



Methane to Markets



Fuel Gas – An Historical Perspective

- The price of gas resulted in it being largely unimportant in the design of facilities
- Supply exceeded markets – saving fuel had no immediate value.



CETAC-WEST



Environment
Canada

Environnement
Canada



Methane to Markets



PETROLEUM
TECHNOLOGY
ALLIANCE
CANADA

PTAC

What has changed?

- Declining raw gas production
- Natural Gas prices are significantly higher
- Market forces are strong and growing
- Excessive consumption equates to lost sales
- Public awareness vis-a-vis the GHG debate



CETAC-WEST



Environment
Canada

Environnement
Canada



Methane to Markets



PETROLEUM
TECHNOLOGY
ALLIANCE
CANADA

PTAC

Responding to the Challenge

- In order to make informed decisions, we need to better understand
 - Where fuel gas is being used
 - To what degree fuel consumption is measured.
 - the validity of unmeasured fuel estimates.
 - How to adopt Better Management Practices.



CETAC-WEST



Environment
Canada

Environnement
Canada



Methane to Markets



PETROLEUM
TECHNOLOGY
ALLIANCE
CANADA

PTAC

ENERGY MANAGEMENT WORKSHOP 2007

Fuel Gas Survey

A Progress Report

Don Gabruck



CETAC-WEST



Environment
Canada

Environnement
Canada



Methane to Markets



PETROLEUM
TECHNOLOGY
ALLIANCE
CANADA
PTAC

Survey Methodology

- Selected 62 facilities that provide good cross section of the industry
- 32 Responded with full disclosure of data
- 5 Provided partial data
- 10 still compiling data
- 15 have not been able to extract all required data



CETAC-WEST



Environment
Canada

Environnement
Canada



Methane to Markets



PETROLEUM
TECHNOLOGY
ALLIANCE
CANADA

PTAC

Objectives

- What are the Practices employed to MANAGE fuel gas consumption
- Where is Fuel Gas used
- How is Fuel Gas Measured, Reported and Accounted for
- Identify examples of Good Management Practices



CETAC-WEST



Environment
Canada

Environnement
Canada



Methane to Markets



Sour gas processing – Example A

- 100% of Plant gas measured and reported
- Single point measurement of Field gas covering
 - 12 Field compressors - estimated
 - 20 junction heaters - estimated
 - 98 well heaters - estimated
- 100% of all Field gas reported
- Not in strict compliance with Directive 17
- Fuel Gas is not a budget item
- Typical of the cluster



CETAC-WEST



Environment
Canada

Environnement
Canada



Methane to Markets



PETROLEUM
TECHNOLOGY
ALLIANCE
CANADA

PTAC

Sour gas processing – Example B

- 100% of Plant gas measured
- 100% measurement of Field gas
- In full compliance with Directive 17
- Fuel Gas is not a budget item
- Best Example in Cluster

Sweet gas processing – Example A

- 100% of Plant gas measured
- 95% of gas gathering consumption is measured (21 of 25 compressors)
- 32% of battery gas is measured (280 wells)
- 100% of estimated and measured gas reported
- Fuel Gas is not a budget item
- A good example



CETAC-WEST



Environment
Canada

Environnement
Canada



Methane to Markets



PETROLEUM
TECHNOLOGY
ALLIANCE
CANADA

PTAC

Sweet gas processing – Example B

- 100% of Plant gas measured
- 18% of field gas is measured
- 62% of field gas is reported
- Fuel gas is not a budget item
- An typical example



CETAC-WEST



Environment
Canada

Environnement
Canada



Methane to Markets



PETROLEUM
TECHNOLOGY
ALLIANCE
CANADA

PTAC

Sweet gas processing – Example C

- 100% of Plant gas measured
- 64% of field gas is measured
- 0% of field gas is reported
- Fuel gas is not a budget item
- A poor example



CETAC-WEST



Environment
Canada

Environnement
Canada



Methane to Markets



PETROLEUM
TECHNOLOGY
ALLIANCE
CANADA

PTAC

Straddle Plants

- All fuel gas is measured
- Data is assembled and submitted by Operating Superintendent
- Fuel Gas Consumption and Cost is an integral component of
Operating Budget
- An excellent example



CETAC-WEST



Environment
Canada

Environnement
Canada



Methane to Markets



Findings – Sour Gas Processing

- Sour gas processing plants measure all gas used as fuel including field gas
- Meters are calibrated periodically in accordance with prescribed procedures
- Production Account (usually on-site) assembles and submits fuel gas reports
- No Technical or Managerial review of submitted data
- Estimates and “forced balances” employed for individual field device consumption
- Value of fuel gas is not a budget item



CETAC-WEST



Environment
Canada

Environnement
Canada



Methane to Markets



PETROLEUM
TECHNOLOGY
ALLIANCE
CANADA

PTAC

Findings – Sweet gas processing

- In-plant fuel gas is measured
- Field consumption is difficult to validate due to low % that is measured
- Diverse ownership and third party gas increases complexity of data gathering
- Data is assembled and submitted by Production Accountant (usually off-site)
- Fuel Gas is not a budget item

Quality of Estimates

- A sour gas example
 - Compressors underestimated by 5% - all assigned a single fuel rate/HP regardless of load
 - Heaters underestimated by 24% - all assumed to be 600 MMBTU/h
 - Gas well overestimated (by balance) by 28%



CETAC-WEST



Environment
Canada

Environnement
Canada



Methane to Markets



PETROLEUM
TECHNOLOGY
ALLIANCE
CANADA

PTAC

EUB data

- Not all data is publicly available – difficult to validate data related to sweet gas field systems
- Reported data for plants is consistent with data submitted
- Gaps exist indicating unreported consumption



CETAC-WEST



Environment
Canada

Environnement
Canada



Methane to Markets



PETROLEUM
TECHNOLOGY
ALLIANCE
CANADA

PTAC

Management Practices

- EUB Directive 017 is not well understood by field personnel
- Little evidence of Management involvement at any stage of the process
- Few checks and balances to detect and correct errors
- Straddle Plants provide a model that could be emulated



CETAC-WEST



Environment
Canada

Environnement
Canada



Methane to Markets



PETROLEUM
TECHNOLOGY
ALLIANCE
CANADA

PTAC

ENERGY MANAGEMENT WORKSHOP 2007



CETAC-WEST



Environment
Canada

Environnement
Canada



Methane to Markets



PETROLEUM
TECHNOLOGY
ALLIANCE
CANADA
PTAC

Observations and Comments

- Fuel gas is not a line item in Plant operating budgets and hence is not reviewed as critically as other costs.
- Fuel gas reporting is driven by Producers needs for allocation rather than control



CETAC-WEST



Environment
Canada

Environnement
Canada



Methane to Markets

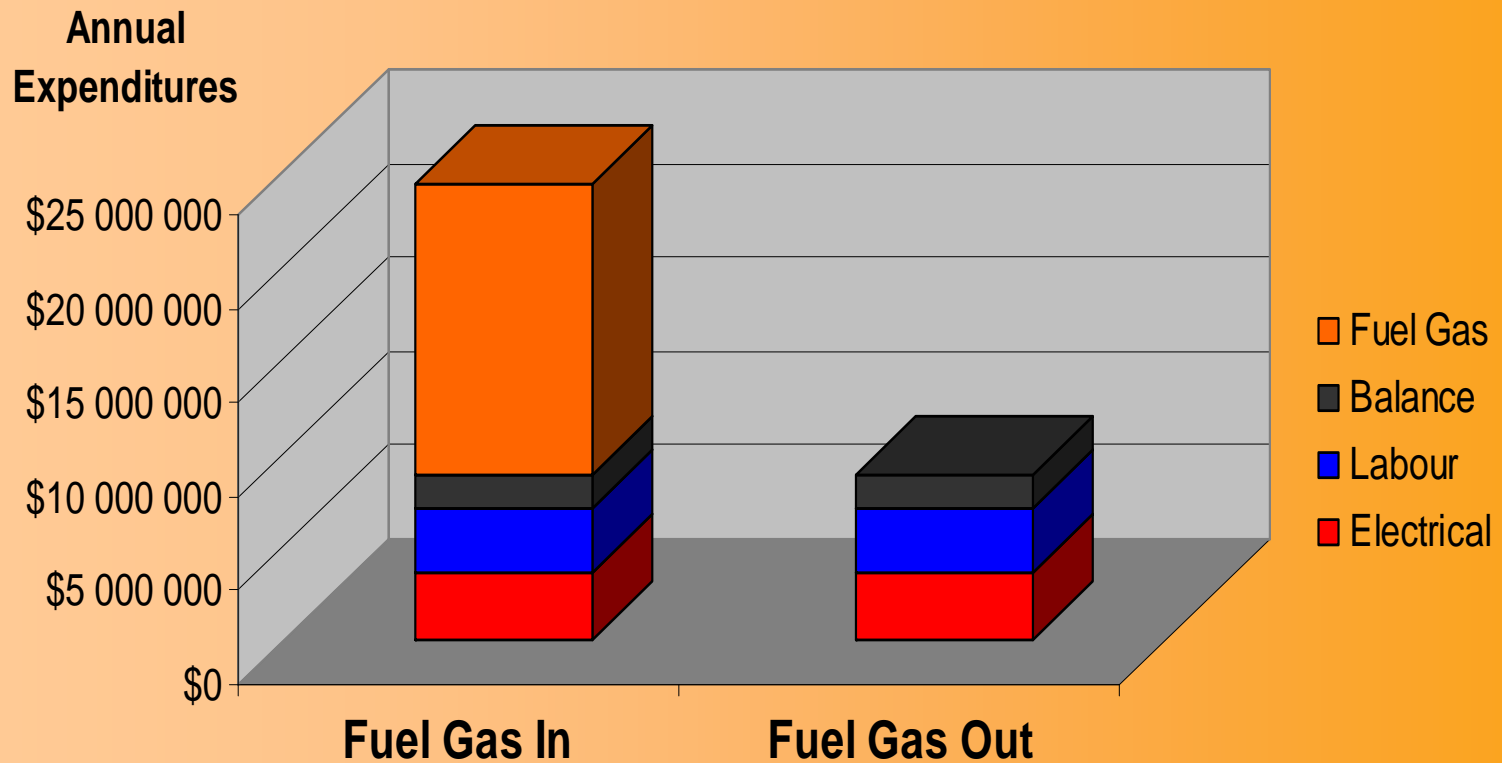


PETROLEUM
TECHNOLOGY
ALLIANCE
CANADA

PTAC

Budgetary Impact- Sour Gas Plant

Plant Operating Budget



Observations and Comments

- Line management involvement is the exception rather than the rule
- Sweet gas fuel consumption will require more effort than originally anticipated.



CETAC-WEST



Environment
Canada

Environnement
Canada



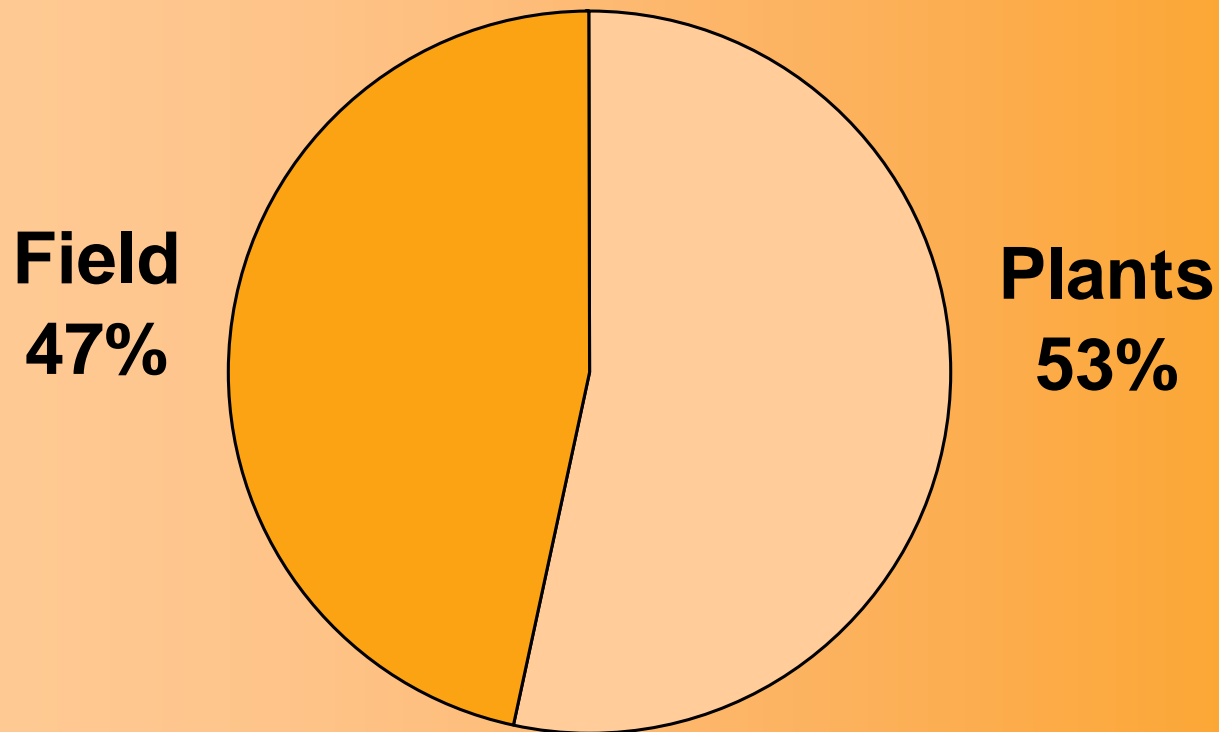
Methane to Markets



PETROLEUM
TECHNOLOGY
ALLIANCE
CANADA

PTAC

Significance of Field Fuel Gas



CETAC-WEST



Environment
Canada

Environnement
Canada



Methane to Markets



PETROLEUM
TECHNOLOGY
ALLIANCE
CANADA

PTAC

Observations and Comments

- Current EUB data can be used to highlight significant users
- Measurement is less rigorous than Directive 17
- Estimates of fuel consumption are not subject to ongoing technical review and may not reflect current consumption
- Rigorous Management Practices are the exception rather than the rule



CETAC-WEST



Environment
Canada

Environnement
Canada



Methane to Markets



In Conclusion

- Fuel Gas is \$5B a year
- It is not included in Plant operating Budgets
- Field consumption is comparable to the Plants but receives even less attention



CETAC-WEST



Environment
Canada

Environnement
Canada



Methane to Markets

