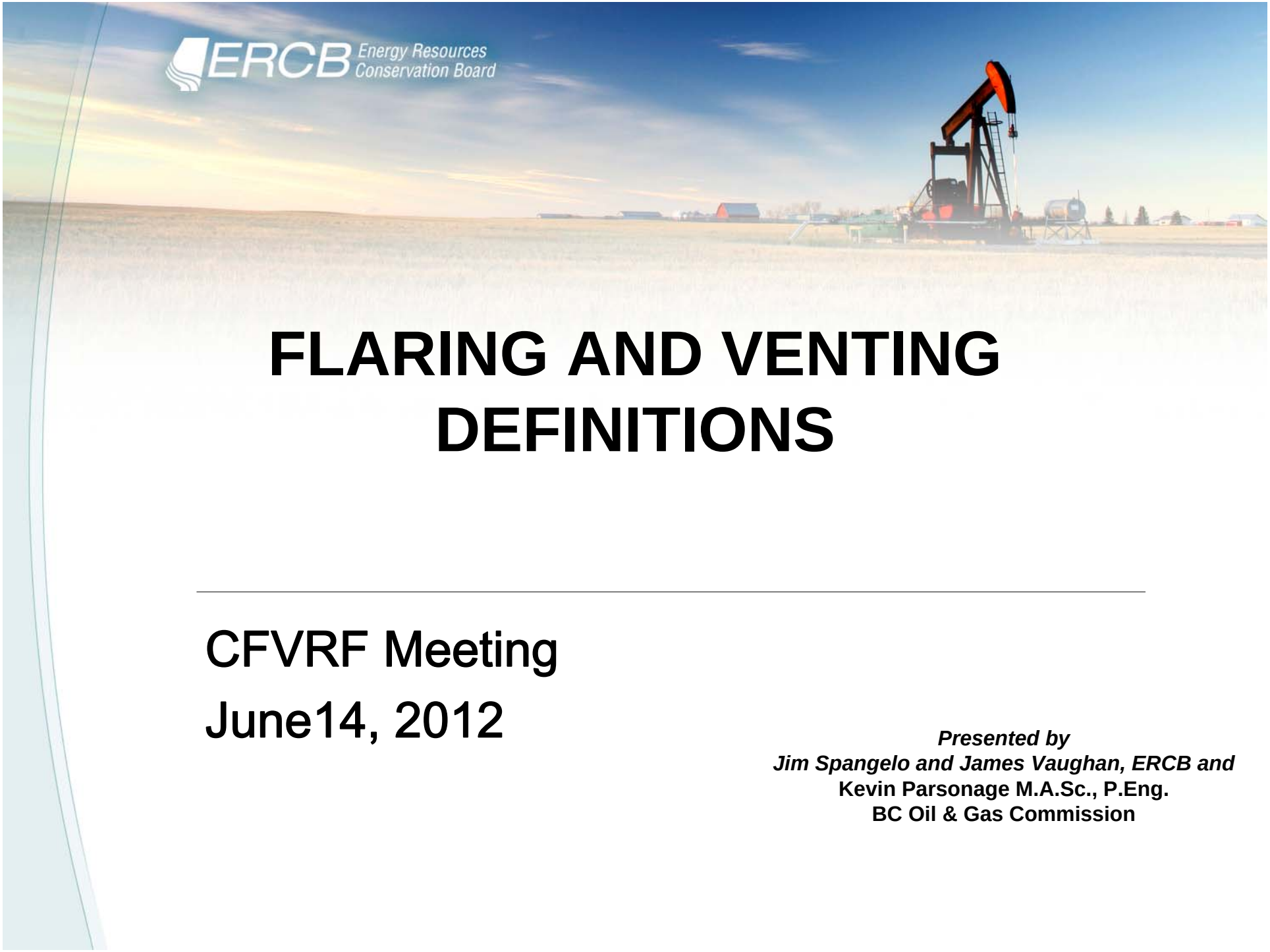


FLARING AND VENTING DEFINITIONS

CFVRF Meeting

June14, 2012

Presented by
Jim Spangelo and James Vaughan, ERCB and
Kevin Parsonage M.A.Sc., P.Eng.
BC Oil & Gas Commission

Flare and Vent Definitions

1. What's the latest?

- Industry Meeting
  - Attendees,
  - What was covered

2. Where are we at?

- Industry feedback
- CAMPUT feedback

3. Whats Next?

- Next Industry Meeting - Agenda

4. CFVRF Feedback?

1. What's the latest?

Industry Meeting on April 17th

- Industry Attendees
  - CNRL
  - ConocoPhillips
  - Husky
  - Keyera
  - Nexen
  - Spectra
  - SEPAC/Trilogy

- Government – AB, BC, SK, NL

What was covered in Industry Meeting:

ADVANTAGES OF HARMONIZATION

- Prevent errors occurring because of different rules between provinces
- Cost savings to industry by not having to maintain and follow multiple definitions
- If reporting is consistent and clear, reporting is more complete
- Improved granularity will help improve conservation (numbers more visible)
- Quality of flare and vent numbers for Canada will improve
- Improved alignment with GHG reporting will help simplify industry reporting

IMPACTS OF HARMONIZATION

- Cost to change production accounting systems
- Cost to change reports and computer programs
- Consultation effort with others prior to and after change
- Greater granularity will result in extra cost for the measurement/estimating

Flaring

- Definitions Examined
- Current Reporting
- Proposed Definition

ERCB Energy Resources Conservation Board

Flaring Definitions Examined

- Provinces
  - AB D56/D60/D17
  - BC
  - AEW Specified Gas Emitters Regulation
  - Newfoundland Offshore
  - Sask
  - GNWT
- Federal/NEB
- Federal/Env Can
- US EPA GHG Reporting (40 CFR Part 98, Subpart W)

- GGFR (Global Gas Flaring Reduction Initiative)

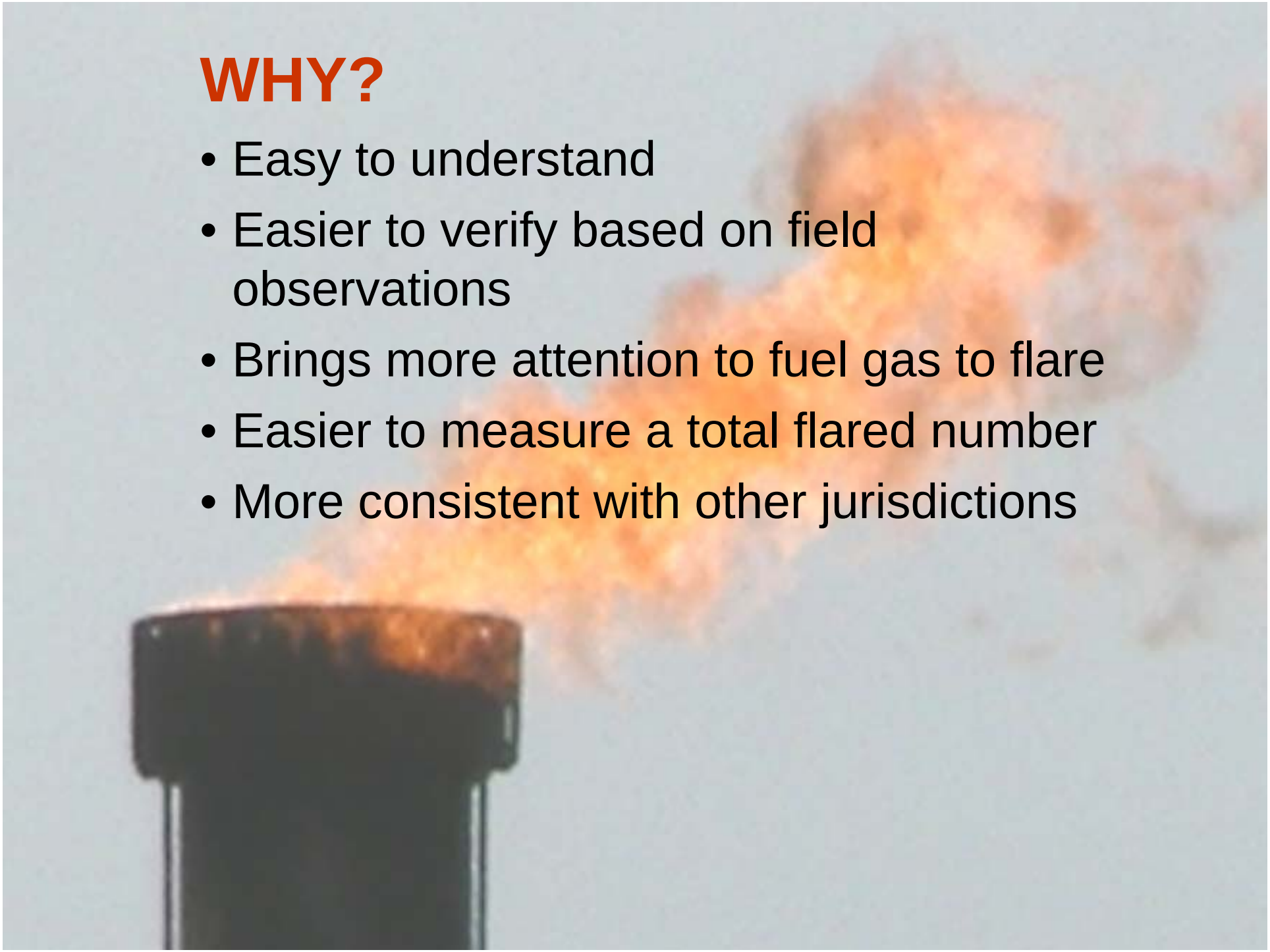
FLARING AND VENTING
Current Reporting

- Spreadsheet

NEW PROPOSED FLARING DEFINITION

Flaring

- **Flaring** includes gas streams directed to a flare or incinerator stack for combustion. (*Acid gas directed to a sulphur plant incinerator and fuel gas directed to a sulphur plant incinerator are excluded.)*
- Flaring includes:
  - Flared fuel gas (fuel gas directed to flare to enhance dispersion and to improve combustion efficiency, purge gas, flare pilot gas),
  - Flared waste gas, and
  - Flared acid gas continuously or intermittently flared.
- Flared fuel gas, flared waste gas and flared acid gas should be separately reported.



WHY?

- Easy to understand
- Easier to verify based on field observations
- Brings more attention to fuel gas to flare
- Easier to measure a total flared number
- More consistent with other jurisdictions

Other Whys for Alberta

- Alberta specifies gas plant flare limits as percent of receipts – we don't want to penalize plants for flaring fuel gas and acid gas which aren't part of this limit now – we aren't planning to change limits

- ST60B numbers will go up, without explanation, if we can't separately break out flared fuel gas and flared acid gas – we want to be able to separately report on these so we can clearly show the change in reporting

Flare Measurement Expectations

- Total Flared
  - ➢ >0.5 E3M3/d (annual average per site) **Metered (5%)**
  - ➢ <=0.5 E3M3/d **20% estimate accuracy**
  - - Flared Waste Gas
    - Estimate with **20% accuracy**
  - - Flared Fuel Gas
    - Dilution gas must be **metered (3%)**
    - Other fuel to flare (eg purge and pilot gas) may be **estimated 20% accuracy or if measured 3% accuracy**
  - - Flared Acid Gas (maybe 150 facilities)
    - Acid gas must be **metered (10%)**

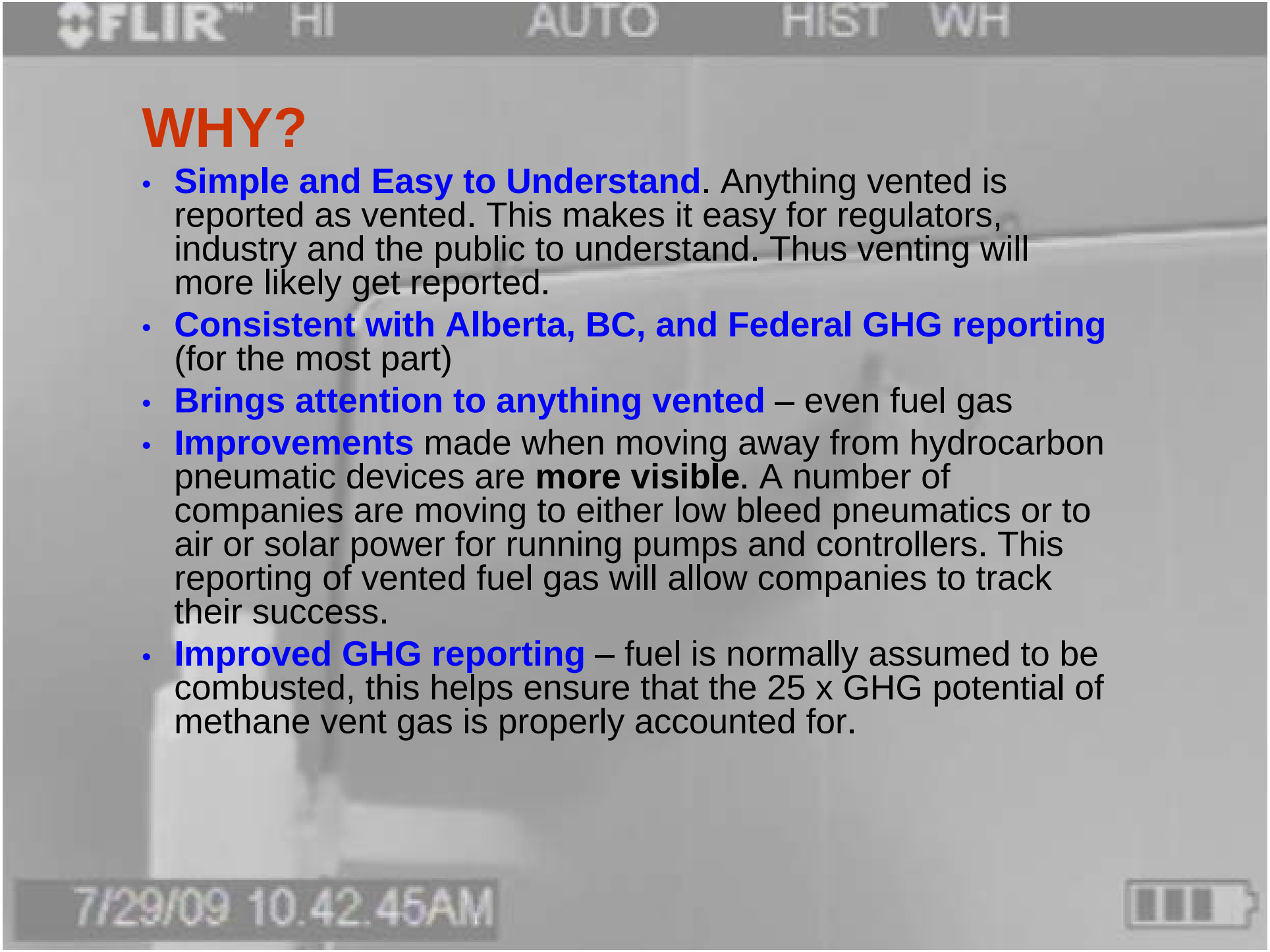
Note: For total fuel gas reporting you must subtract estimated purge and pilot gas.

PROPOSED NEW VENT DEFINITION

Venting

- **Venting** is the direct emission from the intentional releases to the atmosphere of hydrocarbon or CO2 gas.
- Venting includes:
  - vented fuel gas
  - vented waste gas, and
  - vented CO2 where the stream is primarily CO2

  Each of these streams should be separately reported.
- Reporting fugitives (unintentional leakage) as part of reportable venting is optional.
- Where gas contains CO2 because of the nature of operation – such as well fracturing operations or underground combustion these vented amounts should be split between CO2 reported as CO2 and hydrocarbon reported as waste gas.



WHY?

- **Simple and Easy to Understand**. Anything vented is reported as vented. This makes it easy for regulators, industry and the public to understand. Thus venting will more likely get reported.
- **Consistent with Alberta, BC, and Federal GHG reporting** (for the most part)
- **Brings attention to anything vented** – even fuel gas
- **Improvements** made when moving away from hydrocarbon pneumatic devices are **more visible**. A number of companies are moving to either low bleed pneumatics or to air or solar power for running pumps and controllers. This reporting of vented fuel gas will allow companies to track their success.
- **Improved GHG reporting** – fuel is normally assumed to be combusted, this helps ensure that the 25 x GHG potential of methane vent gas is properly accounted for.

Vent Measurement Expectations

- Vented Waste Gas
  - >0.5 E3M3/d (annual average for vent waste per site) Meter (5%)
  - <=0.5 E3M3/d estimate 20% Accuracy
- Vented Fuel Gas
  - Fuel to vent may be estimated with 20% accuracy
- Vented CO2 (small number of facilities)
  - >0.5 E3M3/d (annual average per vented CO2 per site) Meter (5%)
  - <=0.5 E3M3/d estimate 20% Accuracy

What about Nitrogen?

ERCB Energy Resources Conservation Board

2. Where are we at?

A) Industry feedback and proposed agenda for next meeting
B) CAMPUT feedback

Industry Feedback

- Generally positive
- Reporting under BC ministry and environment – beneficial for them to be involved in a discussion like this – value in having a standard definition across the provinces.
- We are too early in the process to look at costs for measurement and reporting changes to the Petroleum Registry.
- Need to capture comments, need to capture cost and value of change.
- Need to look at the level of change for a few facilities in detail

Further Feedback Since Meeting Re Flare Purge Rates

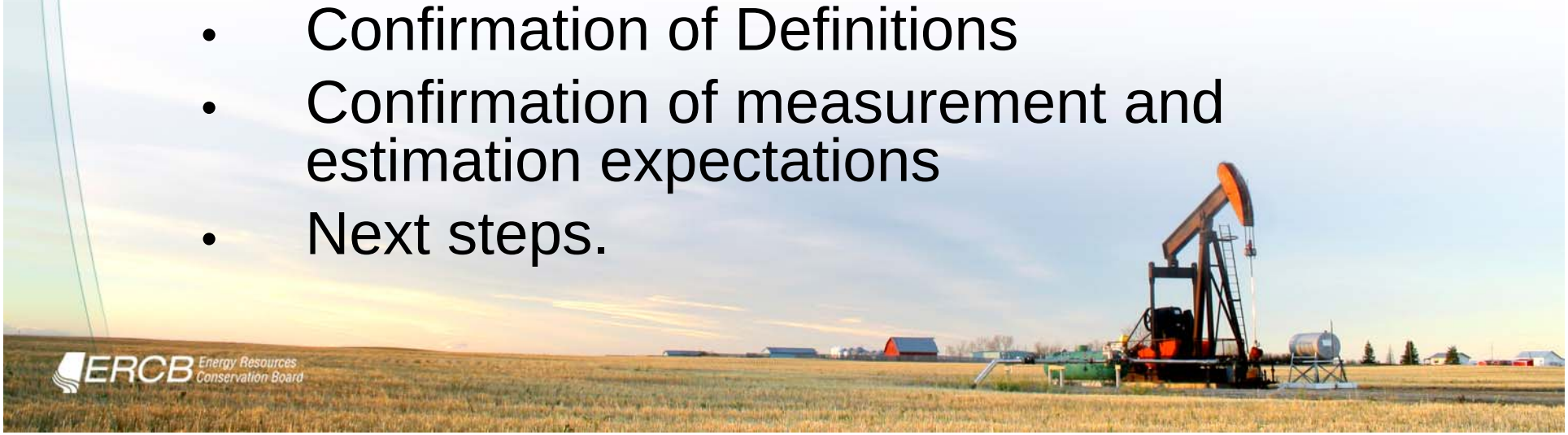
- Numbers around purge rates were provided following meeting:
  - Two numbers were provided one was based on plant capacity and the other was based on a percentage of fuel use. With some assumptions I calculate these two numbers to be 0.055% and 0.053% of plant throughput
  - One company suggested that flare purge was 0.018% of capacity
  - One company suggest that they found the flare purge is about 1.5% to 2% of total fuel use. (If one assumes 1.5% of the fuel gas used in the upstream industry is used as purge then in Alberta this translates to approximately 14 mmscfd)

Estimate of flare purge provided by 1 company

"Typical" flare stack capacities and purge gas rates			
stack ID (inches)	max flare rate (MMscfd)	Purge Gas Rate (m3/d)	Purge gas as % of capacity
10	26.5	131	0.018%
12	38.0	189	0.018%
14	51.6	258	0.018%
16	67.5	336	0.018%
20	105.5	526	0.018%
24	151.8	757	0.018%
28	206.6	1,030	0.018%
32	269.9	1,345	0.018%
Notes:			
- Max flare rate calculated at a stack velocity of 0.5 Mach			
- Purge rate calculated at 0.03 m/s stack velocity			

Industry Meeting 2 Agenda (Jun 27, 2012 9-11 AM MDT)

- Comments on Last Meeting
  - Feedback on definitions (All)
  - Feedback on Measurement/Estimating
- Analysis of fuel/flare/vent at facilities (Husky)
- Changes that would be required for Measurement Directive D17 (ERCB)
- Confirmation of Definitions
- Confirmation of measurement and estimation expectations
- Next steps.



CAMPUT FEEDBACK

- General agreement with direction
- Like better understanding of impact
  - Cost
  - Affected facilities
- Support for further investigation

3. Whats Next?

- 2nd Industry Meeting – June 27th
- Meeting with Petroleum Registry – get feedback on impact? - No date set yet
- 3rd Industry Meeting - Fall 2012
- Confirmation of Approach with Regulators e.g. ERCB back to its Board
- Update and Discussion with CFVRF

4. CFVRF FEEDBACK

- Does approach have continued support?
- Anything missing?
- Other?