



Directive 60

EUB / CAPP session to
highlight new requirements

January 8, 2007

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EUB Operations Group



Overview

- ◆ Format for session
- ◆ Introduction of presenters
- ◆ Background to Directive 060
- ◆ Implementation schedule
- ◆ What's new

Background to Directive 060


- ◆ CASA Flaring Team formed in 1997
- ◆ Recommendations led to Guide 60 in 1999
- ◆ G60 Updates and Clarifications in 2001
- ◆ CASA 2002 recommendations led to Draft D60
- ◆ Draft sent out for feedback – significant feedback received, especially from CAPP
- ◆ Feedback reviewed, revisions made

Background to Directive 060

- ◆ CASA FVPT meets again – issues 3 new reports and recommendations
- ◆ Latest reports address solution gas economics, CBM, and well test flaring duration
- ◆ New recommendations incorporated into D60
- ◆ Final Draft provided to CAPP
- ◆ Working meetings to resolve remaining outstanding issues and improve clarity
- ◆ D60 released November 2006. Same Section #s.

New Directive 060

- ◆ Now: one document; 1999 G60 & 2001 U&C to be rescinded
- ◆ Implementation timing (see Section 1.1)
 - ◆ Effective January 31, 2007
 - ◆ Until April 30, EUB will educate. Compliance with new requirements identified, but no enforcement consequence. Existing requirements still enforced.
 - ◆ After April 30, enforcement unless operator shows plan for becoming compliant by June 30 and justification for delay
 - ◆ After June 30, full enforcement



Directive 060 – What's new

- ◆ See Section 1.2 for 7 major highlights
- ◆ See Appendix 1 for 5 page table of key revisions



New Directive 60 – Solution Gas Management

What's new in Section 2?

January 8, 2007
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Overview

- ◆ Solution gas flaring is down 72% since 1996.
- ◆ Solution gas venting is down 59% since 2000.
- ◆ Still gains to be made.
- ◆ Section 2 of the new Directive adds more clarity to the Solution Gas conservation evaluation process.

Minimum Thresholds

- ◆ Gas production greater than 900 m³/day
 - ◆ Economic evaluation must be conducted
 - ◆ Positive economics (Crude Oil) – Well must be shut in until gas is conserved.
 - ◆ Positive economics (Bitumen) – Well must be tied in within 6 months.
 - ◆ Negative economics – Copy of economics must be kept on file and re-evaluated once per year.
 - ◆ Economics from wells that are deemed uneconomic to conserve must be submitted to the EUB upon request.

Minimum Threshold continued...

- ◆ 900 m³/day per **site** basis – a single surface lease.
 - ◆ Pads are counted as one lease.
- ◆ The EUB encourages that sites with gas production of less than 900 m³/d be evaluated.
- ◆ The EUB can request that economics be conducted at sites producing less than 900 m³/d.
- ◆ No Flaring > 900 m³/d within 500 m of a residence.

Net Present Value (NPV)

- ◆ The NPV used in economic evaluations has now changed from \$0 to -\$50,000.
 - ◆ If at any time over the life of the project, the net present value exceeds -\$50,000, the gas must be conserved.



Considerations for Economic Evaluations

- ◆ Conservation is defined as
 - ◆ Design for 95% conservation
 - ◆ Minimum operating conservation is 90%.
- ◆ Must consider clustering opportunities within a 3km radius.
- ◆ Annual operating costs may be calculated up to 20% of the initial capital cost for sour facilities (>1% H₂S)

Bitumen

- ◆ Definition for D60 purposes:
 - ◆ Crude Oil sites within the geographic area defined by the boundary Township (TWP) 45, Range (RGE) 1W4 to RGE 8W4, and TWP 52, RGE1W4 to RGE 8W4 and producing from the Manville Group.

Bitumen continued...

- ◆ Must pre-build lines to one common point on lease as part of initial construction.
- ◆ Test period limited to the lesser of 6 months or when a 900 m³/d rolling average over 3 months.
- ◆ Tie in as quickly as possible – maximum of 6 months after testing. Otherwise must be shut in.

Non-routine flaring

- ◆ Table 1 requirements the same as before except for:
 - ◆ Small allowance now given for outages less than 5 days that involve small volumes of gas ($<2 \text{ e}^3\text{m}^3$).
 - ◆ Reasons maybe tank or VRU repair, for example.



Cooperation with third parties

- ◆ In circumstances where it is demonstrated that solution gas is uneconomic to conserve:
 - ◆ The EUB recommends that the solution gas be made available to the lease boundary in “as is” condition to any third parties wishing to conserve the gas (i.e. rural gas co-ops).

Well Test Flaring/Venting Time Limits

Objective

Flaring and venting of a well test will only be conducted long enough to determine the economic viability of gas conservation and the data required to size the conservation equipment.

These well test flare time limits was based on recommendations by the CASA group using data obtained from a provincial survey on well test conducted in 2005.

- Results indicated of 2223 well tests data submitted, 86% flared < 72 hours.



Well Test Flaring/Venting Time Limits

- **Prior to conducting a well test the Licensee is required to use the Decision Tree Process to evaluate opportunities to eliminate or reduce flaring.**
 - most common method is in line testing
 - development well, if sufficient productivity is known then a pipeline can be constructed prior to testing
- **Time limits in this Directive for well test are per zone and does not include shut-in time.**
- **Well test time limit includes completion, clean up and testing operations.**
- **If sufficient well test information is obtained then the test must be discontinued even if the time limit has not been reached.**
 - this requirement does not apply to bitumen and wet CBM wells



Well Test Flaring/Venting Time Limits

Well test time limits and expectations while conducting the test will vary dependant on the type of test:

- crude oil wells
- gas wells
- bitumen oil wells
- dry CBM wells
- wet CBM wells



Gas Well Test

- 72 hour well test flare limit includes flaring/incinerating
 - after 72 hours the well has to be shut-in and an economic evaluation for gas conservation must be completed
- Time limit includes completion, cleanup and testing operations.
- Time limit is per zone and does not include shut-in time
 - extensions to the time limit is allowed if cleanup is not complete, well not stabilized, mechanical problems; document reasons for extensions
 - licensee must notify the EUB field centre through the DDS system (not required to get approval)
- Short term venting for well test is acceptable where the total gas volume does not exceed 2 e3m3 and the duration does not exceed 24 hours.



Crude Oil Well Test

- 72 hour well test flare limit includes flaring/incinerating
 - after 72 hours the well has to be shut-in and an economic evaluation for gas conservation must be completed
- Time limit includes completion, cleanup and testing operations.
- Time limit is per zone and does not include shut-in time
 - extensions to the time limit is allowed if cleanup is not complete, well not stabilized, mechanical problems; document reasons for extensions
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Bitumen Oil Well Test



- **Bitumen oil wells are located in 3 defined regions: Cold Lake, Athabasca and Peace River areas. ST 44: Active oilsands scheme map.**
 - also a defined area TWP 45, RGE 1-8W4 and TWP 52, RGE 1-8W4 and producing from the Mannville Group
- **Test period is up to 6 months or if the gas volumes > 900 m³/day averaged over a 3 month period per bitumen site.**
 - a bitumen site is defined as a single surface lease; pads counted as a lease
- **Economic evaluation for gas conservation must be evaluated after 6 months or if the 3 month average gas rate is met.**
- **If the economic evaluation determines it is economical to conserve the gas then conservation must occur within 6 months after the determination.**
 - if additional time is required the EUB field centre must be contacted for approval
- **Bitumen well test venting is acceptable where the gas flow rate will not support stable combustion.**

Dry CBM Well Test (Producing < 1 m³ of water/operating day)

- **CBM development well: 120 hours**
- **CBM non-development well: 336 hours**
- **Time limit is per zone and does not include shut-in time**
 - **extensions to the time limit is allowed if cleanup is not complete, well not stabilized, mechanical problems; document reasons for extensions**
 - **licensee must notify the EUB field centre through the DDS system** (not required to get approval)
- **CBM venting is acceptable when the gas flow rate will not support stable combustion.**



Wet CBM Well

(Producing $> 1 \text{ m}^3$ of water/operating day)

- For an individual well test that exceeds $100 \text{ e}3\text{m}^3$ for any consecutive 3 month period the gas must be conserved after this period within 6 months.
 - licensee must notify EUB Operations Group as soon as this requirement is met
- For wells that do not trigger this requirement, flaring/venting are limited to:
 - a total period of 18 months or
 - a cumulative volume threshold limits of 600, 400, 200 $\text{e}3\text{m}^3$ dependant upon the Lahee classification of the well. Example: for a development well the threshold limit is 400 $\text{e}3\text{m}^3$.
- CBM venting is acceptable when the gas flow rate will not support stable combustion.
- For extensions to the time limits the licensee must make a written request to the EUB Operations Group and obtain approval from the EUB Field Centre.





New Directive 60 – Temporary and Well Test Flaring and Incinerating

Section 3

January 8, 2007

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EUB Operations Group

Section 3 Continued

- ◆ Flaring/Incineration Permits required:
 - ◆ For >5% H₂S
 - ◆ (Dispersion modeling still has to be conducted for any temporary flaring/incineration over 1% H₂S)
- ◆ Excess Volume Flaring/Incineration Permits regardless of H₂S content when Volume Allowance Threshold (200, 400, 600 e³m³) exceeded.
- ◆ **Note: Any volume must be justified and volumes less than this may be challenged.**



Flaring/Incineration Permits

- ◆ Clarification where proposed operations have higher H₂S content than that of the well (i.e. Vapours from tanks)
- ◆ Volume Allowance Threshold apply to gas well tests only.
- ◆ Fuel gas usage as a last resort only and for increasing plume buoyancy, not dilution.

New Exception for Small Volumes over 5% H₂S

- ◆ No permit required if:
 - ◆ Sulphur (equivalent) rate is < 1 tonne/day
 - ◆ Flow rate is < 10 e³m³/d
 - ◆ Total volume is < 50 e³m³ over the duration
- ◆ Modeling conducted and meets AAAQO
- ◆ The EUB must be notified prior to commencement.
- ◆ This new exception will be closely audited by the EUB.

In-Line Testing

- ◆ The EUB will be pushing hard for tests to be conducted inline.
 - ◆ Not a new requirement
 - ◆ Overall well test volumes need to be reduced
 - ◆ EUB is challenging the need to flare and the need for volumes requested (even when less than Volume Allowance Threshold)



Flaring at a Permanent Facility

- ◆ Clarification
- ◆ If flaring is taking place through a permanent stack at a facility, a permit is not required as long as:
 - ◆ The operation is within the limits of the facility license and modeling
 - ◆ The volume does not exceed the Volume Allowance Threshold.



New Spreadsheets

- ◆ New spreadsheets for flaring and incinerating available on the EUB website.
 - ◆ The spreadsheet must be submitted with flaring/incineration application.
 - ◆ The flaring spreadsheet has been updated over the previous version.
 - ◆ The incineration spreadsheet is brand new.
 - ◆ New spreadsheet will calculate radiant heat intensity
 - Could be used on permanent flares, but intended for temporary.

New Spreadsheets Continued...

- ◆ Option to add minimum fuel gas.
 - ◆ This should be a last resort.
 - ◆ Conservation of a valuable resource
 - ◆ Will be closely monitored by the EUB.

- ◆ Fill out as much of the spreadsheet as possible.
 - ◆ The more info we have, the less we have to contact you.



Directive 60

Highlights of Changes in Sections 4 – 12 plus Appendices

January 8, 2007

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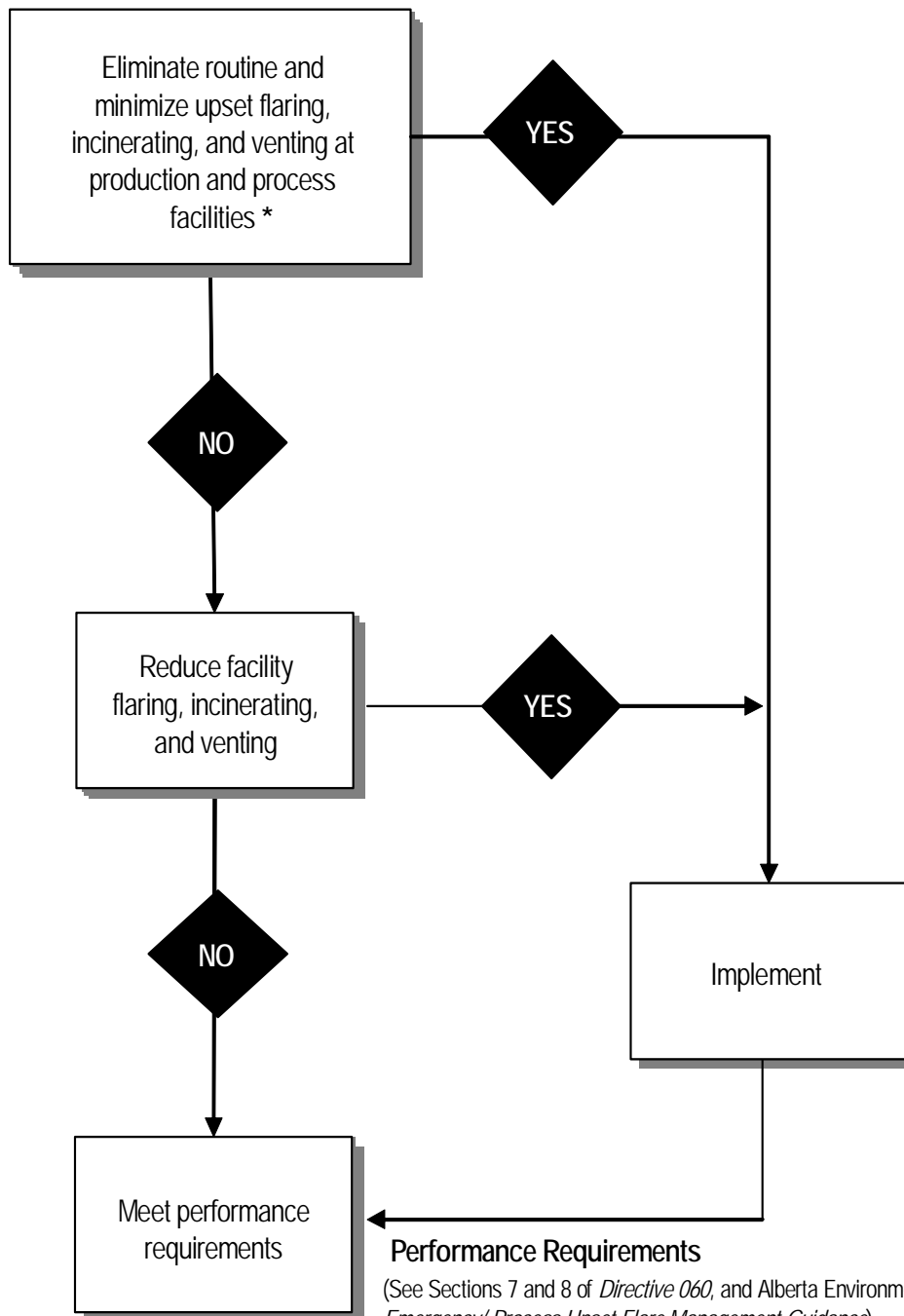


Gas Batteries, Plants, Pipelines

- ◆ Sections 4, 5, 6
- ◆ Section 4 – Operators must assess opportunities to eliminate or reduce nonroutine flaring, incinerating, and venting of gas due to frequent (*i.e., one event per month*) maintenance or facility outages
- ◆ Decision Tree from 1999 D60 now applies to non-associated gas (well testing, batteries, plants, pipelines)

Tests

- Environmental or public health and safety impacts?



Performance Requirements

(See Sections 7 and 8 of *Directive 060*, and Alberta Environment *Emergency/ Process Upset Flare Management Guidance*)

Gas Plants (Section 5)

- ◆ Flare volume limits
 - ◆ Previously 0.5% of receipts, regardless of plant size
 - ◆ Now 0.2% for plants processing > 1 billion m³ / year
- ◆ Must not exceed 6 major nonroutine flaring events in any 6 month period
 - ◆ Plant Inlet
 - > 500 10³m³/d
 - 150 – 500 10³m³/d
 - < 150 10³m³/d
 - ◆ “Major flaring event”
 - >= 100 10³m³
 - >= 20% of design daily inlet
 - >= 30 10³m³

Gas Plants

"6-in-6"

- ◆ If a sixth major flaring event occurs in a consecutive six-month period, operator must submit a written report to EUB
 - ◆ Includes corrective plan and timelines
 - ◆ If another 6-in-6 occurs within 24 months, then enforcement
- ◆ Operators must be able to justify fuel gas usage volumes. Must monitor and minimize.

Performance Requirements (Section 7)

- ◆ Professional Engineer, Certified Technician, Certified Technologist or Registered Engineering Technologist must design or review flare or incinerator system
 - ◆ System includes separation, related piping, controls, and specification of safe operating procedures
 - ◆ Design information must be provided to EUB upon request where there is a concern
- ◆ Operating procedures and limits must be defined, and followed

Conversion Efficiency (Section 7.1)

- ◆ Section applies to both flares and incinerators
- ◆ Must comply with AAAQO and have no off-lease H₂S odours
- ◆ Flares: heating value and recommended diameter
 - ◆ Unchanged:
 - Minimum 20 MJ/m³
 - Can remain at 12 – 20 MJ/m³ if history of satisfactory operation
 - ◆ EUBflare.xls spreadsheet provides range of recommended diameters

Conversion Efficiency (Section 7.1)

- ◆ Incinerators: residence time and temperature
 - ◆ Minimum residence time of 0.5 seconds
 - (does not apply if less than 1% H₂S and > 20 MJ/m³), providing similar requirements to flare
 - ◆ Minimum exit temperature of 600°C
 - Why not 538°C, as in AENV approvals?
Combustion modelling has shown that 600°C often needed for proper combustion of sour gas in units other than those governed by AENV approvals.
 - Where an AENV approval applies, the conditions of that approval take precedence (i.e. 538°C, etc.)
 - ◆ Greater than 5% H₂S, must have process temperature control and recording to ensure temperature



Ignition (Section 7.3)

- ◆ $> 1\%$ H_2S , must have pilot or automatic ignition
- ◆ At gas plants > 10 ppm H_2S , must have pilot and automatic ignition

Stack Design (Section 7.4)

- ◆ Radiant heat intensity at ground must not exceed 4.73 kW/m²
 - ◆ Unchanged
 - ◆ Don't forget to include background value for solar radiation; included in EUBflare.xls spreadsheet
- ◆ Flare stacks > 1% H₂S must be ≥ 12 m tall
 - ◆ Unchanged
- ◆ No minimum height for incinerators but must meet AAAQO

Liquid Separation (Section 7.6)

- ◆ Designed to remove droplets of 300 to 600 micron
 - ◆ Previous draft proposed 300 micron
- ◆ * Change to current Directive 060 (to be amended):
Must have:
 - ◆ Visual level indicators,
 - ◆ Operating procedures, and
 - ◆ High-level facility shutdown or high-level alarms (that can be responded to prior to carryover).
- ◆ Well test vessels receiving production from oil wells must have HLSD unless attended 24 hours a day

Backflash Control (Section 7.7)

- ◆ Must have:
 - ◆ Flame arrestor between point of combustion and separator, or
 - ◆ Sufficient flare header sweep gas velocity
 - ◆ Check valves are not acceptable

Flare/Incinerator Spacing Requirements (Section 7.8)

- ◆ Unchanged: *(plus clarification)*
 - ◆ 50 m from wells, *not including water disposal or water injection wells where there is no risk of flammable vapours*
 - ◆ 50 m from storage tanks *containing flammable liquids or flammable vapours*
 - ◆ 25 m from any oil and gas processing equipment
- ◆ No minimum spacing requirement for flare/incinerator knockouts/separators (significant point of feedback from industry on previous Draft)



Dispersion Modelling (Section 7.12)

- ◆ Required if greater than 1% H₂S or 1 tonne/day of sulphur (unchanged)
- ◆ EUBflare.xls and EUBincin.xls spreadsheets also provide screening modelling for continuous sources

Cumulative Emissions Assessment

- ◆ Must be considered if predictions exceed 1/3 of AAAQO
- ◆ Must look for other continuous sources of SO₂ within 1/3 isopleth up to a maximum of 20 km (7 km for well testing)
 - ◆ In applications for a continuous source, other sources must be modelled at licensed emission rates
 - ◆ In requests for a temporary flare event occurring at a known time (i.e. well test, planned maintenance blowdown), other sources can be modelled at maximum expected operating emission rates

Venting (Section 8)

- ◆ Unchanged:
 - ◆ If economic, conserve
 - ◆ Must be burned if it will support combustion
 - ◆ Can not be vented if $> 1\% \text{ H}_2\text{S}$
 - ◆ Must not result in off-lease odours
 - ◆ Must not exceed AAAQO

- ◆ New:
 - ◆ Sweet venting limited to $2 \times 10^3 \text{ m}^3$ and 24 hours
 - ◆ Does not include clean-out phase for well testing and servicing
 - ◆ (used to be $15 \times 10^3 \text{ m}^3$ and 12 hours)
 - ◆ Notification still applies (i.e. venting greater than 4 hours)

Venting (Section 8)

- ◆ Benzene limits – see Directive 039
 - ◆ 1 tonne / year total for facility/lease site
- ◆ Non-combustible gas mixtures (i.e. N₂, CO₂) can be vented if it will not result in off-lease odours (i.e. H₂S)
 - ◆ Otherwise, must combust and provide necessary fuel gas
- ◆ Fugitive Emissions
 - ◆ Must have programs to detect and repair leaks
 - ◆ Must meet or exceed CAPP BMP

Measurement and Reporting (Section 10)

- ◆ Section edited to match Directive 017 and address feedback from Industry Measurement Group
- ◆ Unchanged:
 - ◆ Must report volumes $\geq 0.1 \text{ } 10^3\text{m}^3$ / month
 - ◆ Must meter $> 0.5 \text{ } 10^3\text{m}^3$ / day (annual average total for facility)

Zero Flaring Agreement (Appendix 12)

- ◆ Provides a template agreement whereby the operator and landowner can agree to no flaring at a well
- ◆ Provides opportunity to indicate which activities will or will not require flaring (well testing, clean up, drillstem test)
- ◆ Viewed as a condition of the well licence, until on production
 - ◆ For an oil well, must then apply to discontinue conservation if uneconomic



Contact Information

- ◆ The EUB's Customer Contact Centre has been trained on how to direct calls on the various subject areas in Directive 060, and are the best point of first contact:

(403) 297-8311

eub.inquiries@eub.ca