

December 2, 2010

2150-4060-59240-16

David Lui, P.Eng.
Petroleum Engineering Consultant
Murphy Oil Company Ltd.
P.O. Box 2721 Station M
Calgary, AB T2P 3Y3

Dear Mr. Lui:

**RE: ACID GAS DISPOSAL ORDER
MURPHY HERITAGE b-69-E/93-P-09; Well Permit # 24480
BALDONNEL FORMATION**

Commission staff have reviewed your application, dated February 17, 2010, requesting approval to dispose of acid gas into the Baldonnel formation of the subject well. Additional information has been submitted in response to Commission requests.

The well d-69-E, rig released December 3, 2008, was completed and the subject of a successful step-rate water injection test in the Baldonnel. An objection to acid gas disposal, filed by EnCana Corporation on April 1, 2010, was withdrawn June 25, 2010, following meetings between the parties.

The source of acid gas is the processing of natural gas at the Tupper West Plant. Disposal will support continued gas production growth, predominantly from the Montney formation, a current focus of development in the area. Attached please find Order 10-16-004 designating an area in the Baldonnel formation a Special Project under section 75 of the *Oil and Gas Activities Act*, for the operation and use of a storage reservoir for the disposal of acid gas.

Please note that, as per section 75 of the *Regulation*, a record of the volume of acid gas disposed of through this well must be included on a Monthly Injection or Disposal Statement (BC-S18), which must be submitted to the Oil and Gas Commission no later than the 25th day of the month in which activity occurred. Also, the operation of the acid gas disposal project will be subject to periodic review and the Commission may modify the Order, if deemed appropriate.

The Commission must be notified, in writing, of the date of commencement of acid gas injection into the subject well.

Should you have any questions, please contact Ron Stefik at (250) 419-4430.

Sincerely,



Alex Ferguson
Commissioner
Oil and Gas Commission

Attachment

IN THE MATTER of the application from Murphy Oil Company Ltd. to the Commission dated February 17, 2010 for the operation and use of a storage reservoir.

ORDER 10-16-004

- 1 Under Section 75(1)(d) of the *Oil and Gas Activities Act*, the Commission designates the Baldonnel formation as a special project for the operation and use of a storage reservoir for the disposal of acid gas within the following area:

TWP 76 RGE 16 W6M - fractional Section 31

TWP 77 RGE 16 W6M - Section 6

NTS 93-P-09 Block E – Units 58, 59 and fractional Units 68, 69.

- 2 Under section 75(2) of the *Oil and Gas Activities Act*, the special project designation in this Order is subject to the following conditions:
 - a) Acid gas shall be injected only into the Baldonnel formation (2,089.5 – 2,121.0 mKB) through the well b-69-E/93-P-09 (WP# 24480).
 - b) The wellhead injection pressure must be continually measured and recorded, and must not exceed 11,700 kPag.
 - c) The injection rate must not exceed $30 \times 10^3 \text{ m}^3/\text{d}$ expressed at 101.325 kPaa and 15 degrees Celsius.
 - d) The cumulative volume injected must not exceed $65 \times 10^6 \text{ m}^3$ expressed at 101.325 kPaa and 15 degrees Celsius.
 - e) The Permit Holder must monitor the casing-tubing annulus pressure.
 - f) The Permit Holder must maintain hydraulic isolation of the injection zone.
 - g) The Permit Holder must conduct a reservoir pressure (fall-off) test of the Baldonnel formation in the subject well, following an initial injection volume of $3,600 \times 10^3 \text{ m}^3$ and during subsequent scheduled plant shutdowns, with a shut-in period of sufficient length to provide data for calculation of the formation pressure.
 - h) The Permit Holder must conduct a program for monitoring bottom hole pressure during the initial injection period to a volume of $3,600 \times 10^3 \text{ m}^3$. New wells drilled by the Permit Holder within 3 km of disposal well b-69-E, following the injection of $3,600 \times 10^3 \text{ m}^3$, that penetrate the Baldonnel formation, require a formation pressure test and fluid sampling of the Baldonnel formation.
 - i) A barricade must be installed around the wellhead that is capable of withstanding vehicle collision.
 - j) All injection operations must be immediately suspended if any injection equipment, monitoring equipment or safety devices considered necessary for safe operation should fail.

- k) The permit holder must submit a progress report to the Commission for each six month period the project is in operation, determined from the first day of injection noted in (l). The progress report must be filed within 60 days after the end of each period and must contain the following :
- i) details of any workover or treatment program done on the well with reasons for the workover and results of the workover,
 - ii) a discussion of any changes in injection equipment and operations,
 - iii) a general review of the operation of the project including identification of problems, remedial action taken and results of the remedial action on project performance,
 - iv) a discussion of the overall performance of the project,
 - v) an evaluation of all monitoring done during the reporting period including corrosion protection, fluid analyses, logs and any other data collected,
 - vi) a table showing monthly volumes of injected fluid, corresponding maximum wellhead injection pressures and calculated bottomhole pressures, maximum daily injection rates, average wellhead temperatures and hours on injection,
 - vii) the volume-weighted average composition and formation volume factor for the injected fluid,
 - viii) a plot showing monthly injection volume and average pressure versus time on an ongoing basis,
 - ix) a table showing tonnes of sulphur and carbon dioxide disposed on a monthly and cumulative basis.
- l) The Project shall be deemed to have commenced upon initiation of acid gas injection into the well. The Supervisor, Reservoir Engineering, Resource Conservation, must be notified in writing within 72 hours of commencement of injection operations.



Alex Ferguson
Commissioner
Oil and Gas Commission

DATED AT the City of Victoria, in the Province of British Columbia, this 2 day of December 2010.