

June 27, 1997

Mr. Larry Hewitt, P. Eng.
Project Manager
Westcoast Gas Services Inc.
1100, 421 Seventh Avenue SW
Calgary, AB T2P 4K9

Dear Mr. Hewitt:

**Re: Applications For Acid Gas Injection
WGSi Bubbles b-19-A/94-G-8 (WA 464)
Bubbles Baldonnel "A" Pool**

This refers to your application wherein you requested approval of acid gas injection in the subject well.

Attached, please find Approval 97-16-002 for the application, granted under section 100 of the Petroleum and Natural Gas Act.

It should be noted that the Ministry must be notified, in writing, of the date of commencement of acid gas injection in the well.

Yours sincerely,

Bou van Oort
Director
Engineering and Operations Branch

Attachment

APPROVAL 97-16-002

**PETROLEUM AND NATURAL GAS ACT
THE PROVINCE OF BRITISH COLUMBIA
MINISTRY OF EMPLOYMENT AND INVESTMENT
ENERGY AND MINERALS DIVISION**

IN THE MATTER of a proposal by Westcoast Gas Services Inc. (the Operator) to inject acid gas into the Baldonnel "A" pool in the well WGSi Bubbles b-19-A/94-G-8 (the well).

The Minister of Employment and Investment, pursuant to section 100 of the Petroleum and Natural Gas Act, hereby orders as follows:

1. The proposal of the Operator for the injection of acid gas (hydrogen sulphide and carbon dioxide) into the Baldonnel "A" pool in the well, as such proposal is described in :

- a) an application from the Operator to the Ministry dated February 28, 1997,
- b) an application for a Project Approval Certificate from the Operator to the Environment Assessment Office dated October 18, 1996, and
- c) supplementary information filed in support thereof,

is hereby approved, subject to terms and conditions herein contained.

- 2. Acid gas shall be injected only in the well.
- 3. The wellhead injection pressure must not exceed 9,790 kPag.
- 4. The sandface injection pressure must not exceed 21,000 kPag.
- 5. The injection rate must not exceed $228 \times 10^3 \text{m}^3/\text{d}$ expressed at 101.325 kPa and 15 degrees Celsius.
- 6. The cumulative volume injected must not exceed $416.0 \times 10^6 \text{m}^3$ expressed at 101.325 kPa and 15 degrees Celsius.
- 7. The Operator must monitor the casing, conduct annular packer isolation tests and implement appropriate corrosion protection measures to maintain the hydraulic isolation of the injection zone.
- 8. The Operator must monitor the acid gas concentration in the offsetting wells for increases in the acid gas content.
- 9. The Wellhead Emergency Shut-Off Device and Subsurface Safety Valve must be installed to operate "fail-safe". The Wellhead Emergency Shut-Off Device should be linked to H₂S detector heads at the wellhead.

10. A barricade must be installed around the wellhead which is capable of withstanding vehicle collision.
11. All injection operations must be immediately suspended if any injection equipment, monitoring equipment or safety devices considered necessary for safe operation should fail.
12. The Operator must submit a progress report to the Energy and Minerals Division for each 6 month period the project is in operation, determined from the first day of injection. This requirement may be amended at the request of the operator after the scheme has been in operation for a period of 3 years. The progress report is due within 60 days after the end of each period and must contain:
 - a) details of any workover or treatment program done on the well with reasons for the workover and results of the workovers,
 - b) a discussion of any changes in injection equipment and operations,
 - c) 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,
 - d) a discussion of the overall performance of the project,
 - e) an evaluation of all monitoring done during the reporting period including corrosion protection, fluid analyses, logs and any other data collected,
 - f) a table showing monthly volumes of injected fluid, corresponding maximum wellhead injection pressures, maximum daily injection rates, average wellhead temperatures and hours on injection,
 - g) the volume-weighted average composition and formation volume factor for the injected fluid,
 - h) a plot showing monthly injection volume and average pressure versus time on an ongoing basis,
 - i) a table showing tonnes of sulphur and CO₂ disposed on a monthly and cumulative basis.
13. The project shall be deemed to have commenced upon the initiation of acid gas injection into the well. The Manager, Field Operations, at Charlie Lake must be notified in writing 72 hours prior to the commencement of injection operations.
14. An emergency response plan procedure must be filed with the Manager, Field Operations prior to the commencement of injection operations.

15. The operations of the acid gas injection scheme will be subject to periodic review by the Ministry. The Director of Engineering and Operations Branch or the Manager, Field Operations, may issue general guidelines regarding the operations of the acid gas injection scheme.

16. The approval or any condition of it may be modified or rescinded by the Director of Engineering and Operations Branch for non compliance of the conditions or unsafe operations.

Charles Kang, on behalf of the
Minister of Employment and Investment

DATED AT the City of Victoria, in the Province of British Columbia, this day of
June, 1997.