



January 21, 1998

File: 2400-4805-59240-09  
Ref.: 980077

Mr. Dave Payne  
Exploitation Engineer  
Canadian Natural Resources Limited  
2000, 425 - 1st Street SW  
Calgary, AB T2P 3L8

*PILOT*  
*CNRL Project (12)*

Dear Mr. Payne:

**RE: APPLICATION FOR PILOT PRESSURE MAINTENANCE APPROVAL  
BUICK CREEK LOWER HALFWAY "B" POOL**

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This refers to your application dated December 5, 1997 wherein you requested approval of a pilot waterflood pressure maintenance scheme in the subject oil pool.

Attached is Approval # 98-09-001 for the application, granted under section 100 of the Petroleum and Natural Gas Act.

Yours sincerely,

*For*

B. van Oort, P. Eng.  
Director  
Engineering and Operations Branch

Attachment

Copies for Approval Letter to Industry (11)  
RE: GEP, Salt Water Disposals, etc.

<input type="checkbox"/>	G. Miltenberger
<input type="checkbox"/>	Data Management
<input checked="" type="checkbox"/>	R. Stefik
<input type="checkbox"/>	D. Richardson
<input type="checkbox"/>	P. Attariwala
<input type="checkbox"/>	G. Farr
<input type="checkbox"/>	S. Chicorelli
<input type="checkbox"/>	Resource Revenue
<input type="checkbox"/>	59240
<input type="checkbox"/>	Wellfiles (originals)
<input type="checkbox"/>	Daily



APPROVAL 98-09-001

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


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IN THE MATTER of a pilot pressure maintenance scheme of Canadian Natural Resources Limited (CNRL) for waterflood recovery of oil by water injection into the Buick Creek Lower Halfway "B" Pool.

The Deputy Minister of Employment and Investment, pursuant to section 100 of the Petroleum and Natural Gas Act, R.S.B.C. 1996, c.361 orders as follows:

The pilot pressure maintenance scheme of CNRL for waterflood recovery of oil from the Buick Creek Lower Halfway "B" Pool as such scheme is described in the Application from CNRL to the Ministry dated December 5, 1997 is approved, subject to the terms herein contained.

1. The pilot pressure maintenance scheme area shall be delineated by units 57, 58, 67 and 68 of Block I/94-A-11.
2. The daily oil allowable is waived.
3. Water may be injected into the Buick Creek Lower Halfway "B" Pool through the well c-57-I/94-A-11.
4. The scheme shall be deemed to have commenced upon water being injected into the well referred to in clause 3, with the Division being notified in writing of the date of commencement. (March 6, 1998)
5. The injection pressure at the sandface must not exceed the formation fracture pressure.
6. Progress reports shall be filed as stipulated in Part 9, section 108 of the *British Columbia Drilling and Production Regulation*.
7. The operations of the pilot pressure maintenance scheme will be subject to periodic review, and modification to the approval may be ordered, if deemed appropriate, by the Director of the Engineering and Operations Branch.

  
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Charles Kang  
Deputy Minister  
Ministry of Employment and Investment

DATED AT the City of Victoria, in the Province of British Columbia, this 19<sup>th</sup> day of January, 1998.

B17  
RS

## MINISTRY OF EMPLOYMENT AND INVESTMENT

- I. Prepared for Charles Kang, Deputy Minister for **DECISION**
- II. **Subject:** "Pressure Maintenance" application under section 100 of the Petroleum and Natural Gas Act (P&NG Act).

III. **Recommendation:**

Approval of a pilot waterflood pressure maintenance scheme in the Buick Creek Lower Halfway "B" oil pool is technically justified. There are no equity, resource conservation or environmental concerns. Your review and approval of this straightforward application is recommended under section 100 of the P&NG Act.

IV. **Background:**

Canadian Natural Resources Limited (CNRL), as operator, requests permission to inject water into an oil bearing formation. This is an effective production stimulation technique and the technical work supports this approach.

The Buick Creek Lower Halfway "B" pool, located about 70 km north of Fort St. John, was discovered in 1977. Nine oil wells were completed in the pool. A secondary recovery scheme of gas re-injection was implemented in 1986 to maintain reservoir pressure and oil productivity. However, the gas re-injection was suspended in 1989 due to early gas breakthrough. In 1995, these wells became essentially gas producers and were shut-in with a cumulative production of about 774,000 barrels of oil.

A limited pilot pressure maintenance scheme is proposed by CNRL to test the effectiveness of waterflooding this complex reservoir. Oil recovery would be increased moderately if this pilot proves successful and the pressure maintenance scheme is expanded to other portions of the pool.

The working interest owners in the pool are agreeable to this proposal and have supplied letters of agreement. Objections were not received from any interested parties following publication of a notice of the application in the B.C. Gazette.

V. **Discussion:**

Approvals for industry applications granted under section 100 of the P&NG Act require signature of the Minister. The Deputy Minister has full authority to act on behalf of the Minister in all matters explicitly authorized for ministerial action. The protocol among the Division, the Deputy's Office, and the Minister's Office, is to have the Deputy sign straightforward and non-controversial section 100

approvals and have any complex or controversial ones reviewed and signed by the Minister. The pilot pressure maintenance scheme under section 100 of the P&NG Act is justified for the Buick Creek Lower Halfway "B" pool and your approval of the scheme is recommended.

**VI. Options:**

1. Approval of the pilot waterflood pressure maintenance may improve recovery, resulting in higher oil production and higher Crown royalty.
2. Rejection of the application results in all wells remaining shut-in.

**VII. Recommended Option:**

Option 1.

AGREE/DISAGREE

  
Charles Kang  
Deputy Minister  
Ministry of Employment  
and Investment

Prepared by:

P.S. Attariwala / R.G. Stefik  
Engineering and Operations Branch  
Phone: 952-0311/ 952-0310  
January 7, 1998  
EMD980010

PEO