



December 7, 2000

Mackenzie Valley Environmental Impact Review Board
Box 938
5102 - 50 Avenue
Yellowknife, NT
X1A 2N7

Attention: Louis Azzolini, Environmental Assessment Officer

Dear Sir:

**Re: Cameron Hills Drilling Project
Environmental Assessment**

Paramount has reviewed the "Reasons for Decision" for the Cameron Hills Oil and Gas Drilling program prepared by the Mackenzie Valley Land and Water Board ("MVLWB"). The document identified five specific reasons that they believed warranted a referral to environmental assessment, namely:

1. Exact quantities of H₂S and SO₂ that would be released into the environment as a result of incomplete combustion or venting of gases from this development proposal.
2. The potential for deposition of waste from non-combusted gases released from flaring/venting operations in relation to the project area and the proposed operations were not documented.
3. The scope of the proposed development did not document when flaring or venting would be required and with what frequency.
4. The application did not outline what maximum allowable limits of H₂S and SO₂ emissions would be as a result of flaring activities.
5. Levels of other contaminants that can be released into and potentially contaminate the environment from project flaring or venting operations are unknown.

On October 31, 2000, Paramount submitted additional information in support of our application, which included dispersion modelling. In particular, we believe we had addressed the specific reasons identified by the MVLWB in its reasons for decision, as follows:

1. QUANTITIES OF H₂S AND SO₂

As stated in Paramount's October 31 letter, it is clear that the well tests will result in the release of 5 MMscf/d, with an average H₂S content of 1.15% (detailed on the Calculation Sheet for Flares). In accordance with Alberta Environment (AENV) guidance, 98% of the H₂S is converted to SO₂. This would result in SO₂ emissions 50.054 g/s (4.32 tonnes per day [t/d]). The remaining 0.543 g/s (0.047 t/d) of H₂S would not get converted.

It appears that the reasons for decision are referring to the potential for vented gases. The October 31 letter indicates there would be no venting during the well test and that all of the gases would be flared during the test.

2. POTENTIAL FOR DEPOSITION OF WASTES FROM NONCOMBUSTED GASES

Given the relatively short duration of the well tests (in the order of one to two weeks with only a portion of that time incorporating flaring), it is unlikely that there would be a significant amount of deposition from either the combusted or non-combusted gases from the flare. Regional deposition of compounds in the non-combusted gases from solution gas flares has been identified as a concern in Alberta and British Columbia. However, solution gas flares operate at relatively low flow rates, continuously for long periods of time and in close proximity to residents. None of these conditions are associated with the well tests proposed by Paramount in the Cameron Hills development area.

3. FREQUENCY AND DURATION OF FLARING

The October 31 letter did not specifically address the duration or frequency of the flaring during the well tests. The frequency of testing a single well would be "once". The duration of the test would depend on the reservoir conditions, however, it would be less than two weeks with the actual flaring being only a portion of that time.

4. MAXIMUM ALLOWABLE EMISSION LIMITS

The dispersion modelling attached to the October 31 letter did indicate that the maximum ground level concentration that could result from a well test that releases 5 MMscf/d of gas with a 1.15% H₂S content would be 50.85 µg/m³. This concentration is only 11.3% of the NWT standard of 450 µg/m³.

Although not explicitly included in the modelling, the maximum ground level concentrations of H₂S can be readily scaled from the SO₂ dispersion results as follows:

$$\text{Conc}_{\text{H}_2\text{S}} = \text{Conc}_{\text{SO}_2} \times \frac{\text{Emission}_{\text{H}_2\text{S}}}{\text{Emission}_{\text{SO}_2}}$$
$$\text{Conc}_{\text{H}_2\text{S}} = 50.85 \times \frac{0.543}{50.054} = 0.546 \frac{\mu\text{g}}{\text{m}^3}$$

The most stringent standards available are for Alberta where the 1-hour Alberta guideline level for H₂S is 14 µg/m³.

Working backwards from the predicted concentrations and the available ambient standards/criteria, it is possible to estimate the maximum emission limits for the project. This calculation is as follows:

$$\text{Allowable Emission}_{\text{SO}_2} = \text{Emission}_{\text{SO}_2} \times \frac{450}{\text{Conc}_{\text{SO}_2}} = 443 \text{ g/s}$$

$$\text{Allowable Emission}_{\text{H}_2\text{S}} = \text{Emission}_{\text{H}_2\text{S}} \times \frac{14}{\text{Conc}_{\text{H}_2\text{S}}} = 13.9 \text{ g/s}$$

5. LEVELS OF OTHER CONTAMINANTS

This is a more challenging question in that the MVLWB does not specifically identify what products or emissions they are concerned with. Currently, the NWT does have a standard for SO₂ and there are H₂S guidelines in Alberta. However, there are few comparable guidelines for any other products that might come from the flares.

Paramount complies with the requirements set out in the Canadian Environmental Protection Act, which incorporates emissions of, persistent and bioaccumulative and toxic substances.

If the concern of the MVLWB is aimed at the reviews of solution gas flares in Alberta, then the issue might be possible emissions of polycyclic aromatic hydrocarbons (PAHs) that have been found to occur in the releases from inefficient flares. However, the proposed flares used during testing are more efficient and clean burning

The cumulative affects associated with flaring are a global issue being addressed by a multitude of stakeholders, regulators and governments. A consortium of sponsors including Environment Canada, the Canadian Association of Petroleum Producers (of which Paramount is a member) and the Province of Alberta have initiated a research program, which is coordinated by the Petroleum Technology Alliance of Canada. In addition, related research is also being pursued by industry, government and academic scientists. The results of these studies will help advance the overall management of solution gas flaring and provide valuable information for potential regulatory changes. At present, various initiatives are under way to reduce flaring. As indicated in the document Flaring, Questions & Answers published by the Petroleum Communication Foundation, February 2000, at page 10, "Solution gas, which accounts for more than three-quarters of the volume flared, is a key target". "However, some test flaring may still be necessary to determine key production characteristics such as pressure and H₂S content. Flaring is also necessary to remove waste materials from wells after stimulation, a servicing procedure used to improve production"

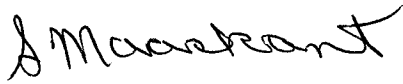
In conclusion, Paramount believes our initial application already adequately addressed the issues outlined in the Reasons for Decision.

Paramount understands that the National Energy Board regulates flaring. Paramount has and will continue to diligently adhere to National Energy Board regulations on all projects within the Northwest Territories, which involve flaring.

We respectfully request that the Mackenzie Valley Environmental Impact Review Board accept this letter, combined with the dispersion modeling which was submitted in support of Paramount's initial application, as sufficient evidence to address the MVLWB Reasons for Decision.

Yours truly,

PARAMOUNT RESOURCES LTD.

A handwritten signature in cursive script, appearing to read "S Maaskant".

Shirley Maaskant
Regulatory & Community Affairs Coordinator