Mackenzie Valley Environmental Impact Review Board

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From:	Kimberley Cliffe-Phillips	Fax:	766-7074
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Date:	January 29, 2004	Pages:	including this page
To:	Paramount EA	Fax:	
	Distribution	CC:	
Subject:	Additional IR Responses		

NOTES:

Distribution;

Please find attached Developer's responses to additional IRs.

Hard copies are being distributed by the Developer.

If you require any further information, please do not hesitate to contact me.

Regards,

K. Cliffe-Phillips

Kimberley Cliffe-Phillips

January 29, 2004

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

Attention: Kimberley Cliffe-Phillips

Dear Ms. Cliffe-Phillips:

Re: Environmental Assessment EA03-005
Cameron Hills Extension Information Responses, Round Three
1.2.131 – 1.2.135

With reference to the subject environmental assessment, the attached document contains Paramount Resources Ltd. responses to Mackenzie Valley Environmental Impact Review Board round three information requests 1.2.131 through 1.2.135.

Paramount is distributing copies of these Responses as outlined in the attached distribution list. Please contact Shirley Maaskant at (403) 290-3618 should you require additional information.

Yours truly,

PARAMOUNT RESOURCES LTD.

Shirley Maaskant, Regulatory & Community Affairs Coordinator

Encl:
12 copies of IR responses
1 CD containing ISC3 input and output data files

IR Number 1.2.131 (Source: EC/RWED)

Preamble

The H_2S percentage of the gas used as fuel is a critical component in determining the values of SO_2 emissions from the varied equipment operating at the Cameron Hills facility. It is, therefore, vital that the H_2S percentages not be under-estimated and that the modelling represent 'worst case' emission scenarios. Appendix III Tables III-1 to 5, 12 and 18 to 21 indicate that the estimated H_2S percentages are based on only one round of gas sampling conducted on July 3, 2003. Although a certain element of conservatism was introduced by slightly increasing the sample results, basing the estimates on only one sample day does not inspire confidence that the full potential range of percentages have been captured. It is assumed that over the numerous years that the Cameron Hills facility has been in operation, gas sampling has been conducted and that these results could be used to better assess the potential range of H_2S percentages for the various fuel gas types. It is noted that in a recent submission of their Emergency Response Plan for the Cameron Hills facility (revised July 2003), Paramount estimates the H_2S percentages for all existing gas and oil wells at 3% (Table 3.4) - a figure in excess of any of the estimates used in the DAR.

It is our understanding that Paramount is required to submit the results of their gas analysis to the National Energy Board on a regular basis for review. Independent confirmation of the range of H_2S percentages for the various sources of fuel gas used at the Cameron Hills facility would provide a greater level of comfort regarding the SO_2 emission estimates.

Request

1) *Confirm the basis for the estimated H_2S percentages in the various fuel sources. Were they based on only one round of samples?*
2) *Are additional (historical) analyses of fuel gas available to better represent the potential range of H_2S percentages in the fuel gas? If so, why was the July 3, 2003 sampling chosen as the sole source of information?*
3) *Over the course of time, and as various wells become depleted, is the percentage of H_2S likely to change (i.e. increase)? If so, are the H_2S values used in the emission estimates sufficiently conservative to account for this scenario?*

Response

1) The reviewer's concern is well founded, that a single gas analysis would not provide the depth of data required to build confidence. Paramount samples and analyzes the gas from each well at various phases of development so that it does not rely on a single sample.

In gathering data for the dispersion model, many analyses were examined, over the range of wells. It is important to take samples of gas that represent stable flow conditions so that preliminary samples, while drilling, and early production test data, are not given the same weight in generating the gas composition to be used for dispersion modeling.

The gas compositions used in the dispersion modeling are based on single samples that provide the best representative analysis, based on stabilized well flow, and equipment stabilization.

2) It should be noted that without the introduction of another fluid to the reservoir, gas composition from each is homogeneous, and should not change over time. The H_2S concentration from each pool will be stable over an extended period of time. It is important to sample well fluids after a significant quantity of production has been removed from the reservoir for two reasons:

   a) Immediately after well completion, some completion fluids remain in the near well bore reservoir rock due to invasion during the well work. These fluids can absorb or react with reservoir fluid to give slightly misleading early results.

   b) Well bore tubulars, and surface production equipment, to a large degree, contain molecular iron. That molecular iron on the surface of pipe, vessels, etc., reacts with hydrogen sulfide in the gas to form a film of iron sulfide. Once the film of iron sulfide has formed, the reaction consuming hydrogen sulfide from the gas, is arrested.

   To conclude, samples taken early can be slightly misleading. To assure long term, representative samples are gathered, gas analyses are arrived at, some time after initial production, as is the case in hand. The July 3, 2003 samples are, in Paramount's view, the best to provide long term, reliable forecasts regarding air dispersion modeling.

3) As stated above, without the introduction of another fluid to the reservoir, gas compositions are not expected to change significantly over time. We would expect results over time to vary, reflecting sampling and analyses error, but those variations are not expected to be significant.

It is Paramount's objective to avoid having to amend licenses and permits should minor gas composition changes materialize. Paramount has gathered representative samples, and adjusted the hydrogen sulfide concentration, to exaggerate the emissions. It is Paramount's assertion that even given minor unforeseeable changes in gas composition, the gas compositions used in the air quality modeling represent the extreme case and are sufficiently conservative to cover the range of gas compositions that could be expected.

IR Number 1.2.132 (Source EC/RWED)

Preamble

The NO_x emissions estimates for the central battery (0.142 t/d) provided in Table 7.2-8 of the "Developers Assessment Report for the Paramount Cameron Hills Extensions", September 2003, are less than 25% of the NO_x emissions reported for the central battery (0.6224 t/d) in Table 5-9 of the "Environmental Impact Assessment for the Cameron Hills Gathering System and Facilities Project", April 2001.

Request

1) *Do these reports describe the same gathering system and central battery?*

2) *Please explain why the NO_x emissions have been reduced by 75%. Are there significant design changes or different assumptions made in estimating NO_x emissions?*

Response

1) No, these reports do not reflect the same equipment in service.

2) The NO_x emissions from the central battery have, in fact, been reduced by approximately 75% because of a change in equipment. A summary of the equipment and NO_x emissions included in the Environmental Impact Assessment for the Cameron Hills Gathering System and Facilities Project submitted in April 2001 and the Developers Assessment Report for the Paramount Cameron Hills Extensions submitted in September 2003 are presented in Table 1.

Equipment	NO_X Emissions [t/d][a]		
	April 2001[b]	September 2003[c]	Net Change
1.30 MMBtu/hr Treater Unit-1	0.0022	—	-0.0022
1.30 MMBtu/hr Treater Unit-2	0.0022	—	-0.0022
0.75 MMBtu/hr Treater Unit	—	0.0013	0.0013
1800 hp Compressor	0.2714	—	-0.2714
1200 hp Compressor	0.1809	—	-0.1809
634 hp Compressor	—	0.1309	0.1309
1 MMBtu/hr Dehydrator (Reboiler)	0.0017	—	-0.0017
Low Pressure Flare (1416 m^3/d)	0.0014	—	-0.0014
Low Pressure Flare (371 m^3/d)	—	0.0004	0.0004
0.75 MMBtu/hr Heat Medium Heater	0.0013	—	-0.0013
0.25 MMBtu/hr Heat Medium Heater	—	0.0004	0.0004
0.15 MMBtu/hr Water Tank Heater-1	—	0.0003	0.0003
0.15 MMBtu/hr Water Tank Heater-2	—	0.0003	0.0003
400 kW Generator-1	0.0809	—	-0.0809
400 kW Generator-2	0.0809	—	-0.0809
200 kW Turbine-1	—	0.0086	0.0086
Total	**0.6229**	**0.1422**	**-0.4807 (-77%)**

(a) Emissions are expressed in units of tonnes per day (t/d).

(b) Data from Tables 5-8a, 5-8b and 5-8c of the Environmental Impact Assessment for the Cameron Hills Gathering and Facilities Project, submitted in April 2001.

(c) Data from Table III-6 of the Developers Assessment Report for the Paramount Cameron Hills Extension, submitted in September 2003.

IR Number 1.2.133 (Source: EC/RWED)

Preamble

The quality of modelling predictions is dependant on the input data used in the model. Since the modelling predictions for 1-hour SO_2 concentrations are within 98% of the NWT Ambient Air Quality Standards, we feel it is important to review the input files used to generate the modelling predictions. To be complete we would like to review input data for each pollutant modelled and each emission scenario with the respective control files and output files.

Request

Please provide all input and output data files plus control files used to generate model predictions for each pollutant and each emission scenario: Baseline, Application and Planned Development Cases.

Response

One copy of a CD containing the ISC3 input and output data files is being submitted to the MVEIRB for their public registry in support of this EA.

The meteorological data used to run the input files is not included, as this data was purchased from SDA Weather Services. Golder is not permitted to redistribute the data.

I.R. Number 1.2.134 (Source: EC/RWED)

Preamble

As part of the Canada-wide Standards for PM and Ozone, the Government of Canada and the Government of the Northwest Territories have recognized that polluting "up to a limit" is not acceptable and that the best strategy to avoid future problems is Keeping Clean Areas Clean (KCAC). The KCAC s trategy encourages the pollution prevention approach (e.g. the use of best management practices and best available technology) to minimize emissions and environmental impacts.

The foot notes attached to tables of stack heights for line heaters and pumpjacks, Tables III-8, -10, -24 and -26, state:

> *"A standard line heater stack height of 6.1m was assumed. Stack heights associated with concentrations in excess of the NT standards were increased to comply with NT standards."*

and

> *"A standard pumpjack stack height of 3m was assumed. Stack heights associated with concentrations in excess of the NT standards were increased to comply with NT standards."*

The proposed stack heights for line heaters ranged from 6.1m to 19m and stack heights for pumpjacks ranged from 3m to 8.5m. It appears that there were many exceedances predicted under the original stack configurations. Subsequently, the proponent ran multiple iterations of the model with increased stack heights until all concentrations were under the ambient standards. Even with this extreme modelling and configuration exercise, the maximum predicted 1-hour SO_2 concentrations are still within 98% of ambient standards for each emission scenario.

We are concerned that the proponent is configuring stack heights so that model predictions meet ambient guidelines rather than trying to mitigate emissions. This "solution to pollution is dilution" approach essentially results in a polluting "up to a limit" scenario and is contrary to the approach advocated under the Canada-wide Standards process and KCAC strategy. It should be noted that Tables III-8 and -10 (the Baseline Case) indicate that potential exceedences of the NWT SO_2 standards could be occurring now under the current stack configurations for the existing line heaters and pumpjacks. Clearly there is a sulphur issue that needs to be addressed.

In the Baseline Case and Application Case, maximum SO_2 concentrations are predicted to occur very close to the central battery facility. In the Planned

Development Case, the proponent introduces an amine sweetening unit which reduces the central battery SO_2 emissions estimates to 7% of the Baseline and Application Cases. However, no timeline is provided for the installation of this equipment and, although the predicted SO_2 concentrations near the central battery are greatly reduced in the Planned Development Case, SO_2 levels in other areas are still within 99% of ambient standards. Perhaps further benefits could be achieved by using the sweetened fuel for all combustion engines such as the line heaters and pumpjacks.

Request

In the spirit of Keeping Clean Areas Clean, we recommend that the proponent install the amine sweetening unit as soon as technically possible rather than at some as yet undefined date in the future and use the sweetened fuel in all combustion engines. Please provide a timeline for installation along with new emissions estimates and SO_2 predictions assuming that all combustion engines will use the sweetened fuel.

Response

Engineering, licensing, and equipment deliveries make it impossible to install the reviewers' proposed amine system this construction season. If Paramount were to undertake to install a fuel sweetening system, and Paramount is not currently undertaking to do so, the earliest the fuel sweetening system could be operable would be sometime in early January 2005.

If sweet fuel were used at all sites, as suggested by the reviewer, SO_2 emissions would be too small to measure. Therefore no modeling is necessary as SO_2 emissions would be negligible.

It should be noted that the modeling results referred to are for a fictitious case which does not exist currently. The Planned Development Case describes a speculative development that represents the most extreme case. Paramount's effort was to demonstrate that relevant air quality guidelines could be met even in the most extreme case, and Paramount undertakes to meet or exceed air quality guidelines in each phase of development.

Paramount understands that the air quality guidelines have been developed to create an atmosphere of sustainable development. Paramount supports that goal. While the elimination of all emissions is honourable, it is not practical considering economics also.

The reviewer opines "that potential exceedences of the NWT SO_2 standards could be occurring now." Paramount has modeled its current development and that proposed for this season, and determined that air quality guidelines can be met. Paramount does monitor air quality with respect to sulfur compounds. That monitoring indicates that air quality guidelines are being met.

IR Number 1.2.135 (Source: EC/RWED)

Preamble

Air dispersion models are used to identify potential air quality issues due to local emissions. If potential issues are identified then an air quality monitoring program is required to ensure that the environment is protected. Despite the apparent effort the proponent has made to minimize modelled concentrations, the SO_2 concentrations are still predicted to be within 98% of ambient standards. We recommend that a monitoring program be implemented for the lifetime of this project. The monitoring program should be developed by the proponent through consultation with government agencies and stakeholders.

Request

Please prepare a draft monitoring program and initiate the consultation process.

Response

Paramount has a two-step process to assure compliance with air quality guidelines:

1) model pollutant dispersion to verify that acceptable conditions can be achieved.
2) monitor air quality to assure that acceptable air quality is achieved.

Paramount has installed two continuous total sulfation stations to measure actual long-term air quality. The stations are placed near locations indicated by the modeling to have higher long-term pollutant concentrations.

Paramount asserts that it has already honoured the spirit of this request and plans no further action.

Cameron Hills EA 03-005
IR Responses round three 131 - 135

Distribution List

Organization	Individual	Method of Delivery
MVEIRB (12)	Kimberley Cliffe-Phillips	E-mail, followed by Air courier
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Deh Cho First Nation	Herb Norwegian	Fax
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