
IR Number 1.2.99

Attachment

PARAMOUNT RESOURCES LTD.

SOLIS

Progression Training Program

Module Name

Module Number

Operator Trainee

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Operator Level 4 – C

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Operator Level 1 – A

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Operator Level 1 - B

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Senior Operator Level

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**PARAMOUNT RESOURCES - SOLIS
TRAINING REQUIREMENTS**

	OPERATOR LEVEL	MIN. TIME IN POSITION	TRAINING MATERIAL	
			PLANT OPERATIONS	FIELD OPERATIONS
PRO- MOTION	SENIOR OPERATOR	X	27 PERSONAL DEVELOPMENT & COMMUNICATION MODULES CUSTOM COURSES, AS REQUIRED	
	OPERATOR 1	X	27 GPO MODULES 12 SAFETY MODULES 5 ENVIRONMENTAL MODULES	18 PFO MODULES 12 SAFETY MODULES 5 ENVIRONMENTAL MODULES
PRO- GRESSION	OPERATOR 2	2 YEARS	27 GPO MODULES 12 SAFETY MODULES 5 ENVIRONMENTAL MODULES	18 PFO MODULES 12 SAFETY MODULES 5 ENVIRONMENTAL MODULES
	OPERATOR 3	2 YEARS	27 GPO / PFO MODULES 12 HEALTH & SAFETY MODULES 5 ENVIRONMENTAL MODULES	
	OPERATOR 4	2 YEARS	27 GPO / PFO MODULES 12 HEALTH & SAFETY MODULES 5 ENVIRONMENTAL MODULES	
	OPERATOR TRAINEE	1 YEAR	14 GPO / PFO MODULES 12 HEALTH & SAFETY MODULES 1 ENVIRONMENTAL MODULES	
PRO- BATION	ROUST- ABOUT	X	COMPLIANCE SAFETY TRAINING BASIC ORIENTATION & EVALUATION	

* EXACT MODULES FOR EACH LEVEL TO BE DETERMINED

IR Number 1.2.99

(Source: KTFN)

Preamble

Paramount has total of 6 production employees – 2 lead operators and 4 assistants. Of the 4 assistants, 3 are aboriginal.

As it is not stated, it is assumed that neither of the lead operators are aboriginal.

Request

Please provide the MVEIRB with the following information:

- a) *Explain Paramount's training plan and target dates for promoting aboriginal assistants to the lead operator positions.*

Response

- a) Paramount's training plans are tailored to the individual. Promotion to lead operator is determined, in part, by the effort put forth by the individual to complete the requisite courses. Generally, safety, compression, oil handling and pump jack courses are provided on an as-needed basis in addition to the SOLIS (SAIT Open Learning Instruction System – outline attached) that is mandatory for promotion.

IR Number 1.2.100 (Source: KTFN)

Preamble

Paramount states that its efforts to work with northern businesses have resulted in these businesses being invited to bid on contracts in Alberta and British Columbia.

Request

Please provide the MVEIRB with the following information:

- a) Identify the number of times that KTFN businesses have bid on work in Alberta and British Columbia and,*
- b) the number of times that these bids have been successful.*

Response

- a & b) Paramount does not have information available on the number of times that KTFN businesses have bid on work in Alberta and British Columbia. However, Paramount has retained KTFN personnel on Alberta projects since January 2001 through the KTFN alliance company Travers Camp and Catering.

IR Number 1.2.101

(Source: KTFN)

Preamble

Paramount was instructed in the ToR to describe the effects of global warming on the project.

Paramount's discussion of this matter was brief, questioned whether or not global warming was actually happening and did not describe the effects on the project as instructed.

Request

Please provide the MVEIRB with the following information:

- a) *Describe the effects of global warming on the project, as was instructed in the ToR.*

Response:

- a) The assessment completed of the Cameron Hills Development addressed the climate change issue. The effect of climate change (sometimes simplistically referred to as global warming) on the Project was presented in Chapter 8 of the DAR. That section of the assessment dealt with contingencies measures that have been considered in the design of the project to ensure that environmental stressors (e.g., §8.1.1.2 – seasonal weather; §8.1.2.2 – weather; §8.1.2.5 – permafrost; §8.1.2.6 – hydrology; §8.1.2.10 – storms) that could result from year-to-year fluctuations in weather patterns or from changes in the climate will not adversely affect the safe operation of the development. In addition, the GHG emissions associated with the development were quantified for each assessment scenario. The Baseline, Application and Planned Development Case GHG emissions are presented in Tables 7.2-9, 7.2-15 and 7.2-21, respectively. Finally, section 8.3 deals specifically with Canada's potential commitments under the Kyoto Accord and how these may affect the project.

Recently, guidance for incorporating climate change in environmental assessments has been issued by the Federal-Provincial-Territorial Committee on Climate Change and Environmental Assessment (FPTCCEA) in the document entitled: Incorporating Climate Change Considerations in Environmental Assessment (FPTCCEA 2003). This document, which is available from the Canadian Environmental Assessment Agency (www.ceaa-acee.gc.ca), indicates that climate change should be addressed in one of the following two ways:

- characterize and consider the greenhouse gas (GHG) emissions, where a proposed project may contribute to GHG emissions; or

- consider the possible impact on the project where climate change may affect a proposed project.

Although projects are more usually associated with one or the other method, there are situations where both approaches should be considered, as was done in preparing the DAR for the Cameron Hills Extension project.

Reference:

FPTCCEA (The Federal-Provincial-Territorial Committee on Climate Change and Environmental Assessment). 2003. Incorporating Climate Change Considerations in Environmental Assessment: General Guidance for Practitioners. ISBN 0-662-35454-0.

IR Number 1.2.102 (Source: KTFN)

Preamble

Paramount provides industry-wide statistics on well blowouts, pipeline leaks and ruptures, and spills. Paramount does not, however, provide its own statistics for these incidences.

Paramount has had pipeline ruptures in both 2002 and 2003 with the 2003 rupture resulting in the release of over 36,000 L of product. Curiously, this spill is the only one without a volume shown in Table 8.2-2.

Request

Please provide the MVEIRB with the following information:

- a) The statistics on Paramount's Cameron Hills operations and,*
- b) compare these to industry standards.*
- c) Include a list of all spills, and volumes, since 1999.*

Response

a & c) Paramount began exploration in the Cameron Hills area in 1979 and continued to be active with drilling and production testing various wells until 2002. In February/March 2002, a trans-border pipeline was built along with a gathering system for six gas wells (A-73, C-50, J-37, N-28, B-08, and A-05). In February/March 2003, the H-03 battery was constructed and 2 gas wells (H-58 and D-49) and 5 oil wells (K-74, C-74, M-73, H-03, and F-73) were tied in.

Paramount tracks spills internally and reports spills in the NWT to a government agency no matter what quantity or type of spill. The Environmental Protection Service of RWED tracks spills on their Hazardous Materials Spill Database and the following is an excerpt of the 38 Cameron Hills spills reported to date:

Hazardous Materials Spill Database

Environmental Protection Service of RWED

1.1.1 Tuesday, January 13, 2004

Spill Date	Description	Commodity	Quantity (L or kg)
20-Feb-00	C75 60:04:09N 117:34:73W Cameron Hills	Crude Oil/Produced Water	3180
14-Feb-02	K-74 60:10W 117:15N Campsite	Diesel Fuel	75
20-Feb-02	60:10N 117:32W N28 Wellsite Cameron Hills	Potassium Chloride (KCl)	500
23-Feb-02	Cameron Hills Winter Road Km 12.9	Antifreeze	15
23-Feb-02	K-74 60:10N 117:15W	Diesel Fuel	20
27-Feb-02	M-3 60:10:00N 117:15:00W	Antifreeze	6
27-Feb-02	Paramount Winter Road Cameron River Bridge	Diesel Fuel/Engine Oil	27
28-Feb-02	Main Plant Site H03 Paramount	Hydraulic Oil	1
26-Feb-02	C50 Wellsite 60:09:04.059N 117:38:37.802W	ATF	7
26-Feb-02	C50 Wellsite 60:09:04.059N 117:38:37.802W	Antifreeze	20
01-Mar-02	Paramount Pipeline Right of Way Cameron Hills	Engine Oil	22
10-Mar-02	Cameron Hills Near the Cameron River	Diesel Fuel	5
16-Mar-02	Cameron Hills 60:06:088N 117:30:063W	Methanol	1
18-Mar-02	Cameron River Bridge 60:06:125N 117:30:054W	Methanol	20
18-Mar-02	C-50 Lease 60:09:0406N 117:38:378W	Glycol	5
19-Mar-02	B-08 60:10:00N 117:33:00W	Produced Water/Oil	30
26-Mar-02	C74 60:10:00N 117:15:00W	Hydraulic Oil	75
26-Mar-02	C74 60:10:00N 117:15:00W	Oil	800
28-Mar-02	H-03 Facility 60:02:158N 117:30:010W	Ethylene Glycol	1
17-Apr-02	H-03 60:02N 117:30W	Water - Rusty	20
18-Apr-02	J-37 60:10N 117:30W	Methanol/Water	30
05-May-02	C-50 Pig Receiver I-50	Condensate Water	200
24-May-02	Cameron Hills C50 60:10N 117:30W	Sour Gas	0
09-Jan-03	1 KM North of Cameron River 60:06:39N 117:30:05W	Hydraulic Oil	23
15-Feb-03	H-03 Plant Cameron Hills 60:02N 117:30W	Power Steering Fluid	1
03-Mar-03	H-03 Battery Lease 60:02:13N 117:29:51W	Diesel Fuel	5
06-Mar-03	D49 60:08:10.469N 117:38:56.867W	Produced Water/Oil	180
05-Apr-03	H-03 60:10N 117:30W Lease Cameron	Ethylene Glycol	1

Spill Date	Description	Commodity	Quantity (L or kg)
	Hills		
08-Apr-03	60:03N 117:29W	Oil	4000
17-Apr-03	60:10N 117:34W	Oil	0
19-Apr-03	Cameron Hills H-03 Grid	Crude Oil	36729
	HO3 60:04:03N 117:30:27W	Automatic Fluid Transmission	20
30-Sep-03	K74 Oil Well 60:10N 117:15W	Antifreeze	2
29-Sep-03	K74 Oil Well 60:10N 117:15W	Hydraulic Fluid	6
26-Oct-03	E-74 Lease Area 60:10N 117:15W	Condensate Water	10
17-Dec-03	Cameron Hills H-03 Plantsite	Oil	15
17-Dec-03	Cameron Hills H-03	Oil	20
17-Dec-03	Cameron Hills H-03	Oil	2

- b) As there are few operators in the NWT, there are no NWT industry spill standards developed. However, Paramount participates in CAPP's Stewardship Benchmarking program. The database generated includes a number of parameters including pipeline and non-pipeline releases and average volume per spill for all the members of CAPP. There is no ranking of companies as per spill event or quantity.

IR Number 1.2.103 (Source: KTFN)

Preamble

Paramount refers to its noise monitoring program.

Request

Please provide the MVEIRB with the following information:

a) Provide a copy of the noise monitoring program report.

Response

a) The following noise surveys were conducted by Patching Associates Acoustical Engineering Ltd. as part of the noise monitoring program:

- 1) Cameron Hills, N.W.T. Gathering System and Facilities Ambient Noise Survey January 30, 2002
- 2) Cameron Hills, N.W.T. Gathering System and Central Facility Noise Survey Following Production Operations Commencement April 19, 2002
- 3) Cameron Hills, N.W.T. Gathering System and Central Facility Second Noise Survey Following Production Operations Commencement July 6, 2003

A copy of the above mentioned reports are being submitted to the MVEIRB for their public registry in support of this EA.

IR Number 1.2.104

(Source: KTFN)

Preamble

Paramount has a table in Appendix I that seems to list every single contact between it and the KTFN, no matter how minor that contact might be.

As described in the Deh Cho Consultation Principles, consultation involves much more than a phone call or open house. Consultations must involve meaningful discussions, and negotiations, about infringements of KTFN aboriginal and treaty rights.

Request

Please provide the MVEIRB with the following information:

- a) *Review, revise and resubmit this table so that it only includes those events that Paramount considers to have been consultation with the KTFN, which are consistent with the Deh Cho Consultation Principles.*

Response

- a) The table submitted in Appendix 1 of the DAR does not include every contact between KTFN and Paramount, and does not accurately reflect Paramount's meaningful efforts to consult on the project; therefore, the table from Appendix 1 of the DAR has not been amended.

Prior to receiving this information request, Paramount had never seen the Deh Cho Consultation Principles (the "Consultation Principles") before and is not aware of their source or status. In any event, the Consultation Principles appear to be an attempt to state the legal requirements regarding consultation with aboriginal peoples. However, Paramount does not agree that it is an accurate statement of the law in all cases. Paramount has made every effort to comply with all legal and regulatory requirements with respect to consultation with all potentially affected communities, including the KTFN and FPMC.

IR Number 1.2.105

(Source: KTFN)

Preamble

Paramount states that drilling waste disposal will be in accordance with the Alberta Energy and Utilities Board's Drilling Waste Management Guide G-50.

Paramount also states that AEUB Guide 60 will be adhered to during flaring.

Request

Please provide the MVEIRB with the following information:

- a) *What other guidelines are available for use for drilling waste disposal and flaring?*
- b) *Why are the Alberta guidelines being proposed for use in the Cameron Hills?*
- c) *Are the other guidelines that are available more or less environmentally stringent than the Alberta guidelines?*
- d) *Why haven't NWT guidelines been developed?*
- e) *What organization would be responsible for developing the NWT guidelines and why haven't they done so?*

Response

- a) British Columbia uses the AEUB's G-50 "Drilling Waste Management" guidelines. Saskatchewan uses their own Information Guideline GL99-01 "Saskatchewan Drilling Waste Management Guidelines".
- b) Alberta has developed guidelines for drilling waste disposal and flaring management that are the most stringent in the country. As a result many jurisdictions defer to Alberta's guidelines rather than developing their own.

The MVLWB specified in Land Use Permit MV2000A0041 that Alberta G-60 guidelines be followed for flaring in the Cameron Hills area.

- c) Alberta Environment's March 24, 1999 report titled **A comparison of Alberta's Environmental Standards to those of other North American jurisdictions** states that "A comparison of ambient air quality requirements for the major air pollutants – sulphur dioxide, hydrogen sulphide, nitrogen dioxide, carbon monoxide, ground level ozone and total suspended particles – shows that Alberta's requirements are equivalent to, or more stringent than, those of other provinces and the U.S."

The "Saskatchewan Drilling Waste Management Guidelines" Information Guideline GL99-01 is similar to but slightly less stringent than Albert's guidelines.

- d) Paramount cannot respond to this question
- e) Paramount cannot respond to this question

This I.R. was also addressed to INAC.

IR Number 1.2.106

(Source: DFO)

Preamble

The Cameron Hills development is divided into three stages: baseline case, application case, and planned development case. Applicable project components are listed for each case.

Seismic activity is not specifically noted in either the baseline case or planned development case although on page 55 of the DAR it states that 2D seismic "may precede the acquisition of the projected 510 km's of 3D seismic." This is in addition to seismic that has already taken place.

Request

Please provide the MVEIRB with the following information:

- a) *Was this linear disturbance included in the calculations for surface area disturbance?*

Response

- a) Yes. Typically a few lines of 2D seismic are required to ensure that the 3D needs to go ahead. If this occurs, the resulting 2D lines would be expected to be within the 3D area, and subsequently reused to the extent practical. Because the location and length of the 2D lines was not known, Paramount assumed that the resulting disturbance was considered in the calculations for the 3D, considering the over-estimation of the 3D seismic disturbance footprint (i.e., 6 m cut assumed for all lines, when receiver lines are only cut to 4 m).

IR Number 1.2.107

(Source: DFO)

Preamble

Paramount states that "if snow makers are used, it is preferable to use water from the creek being crossed, but water can be imported from a nearby water source lake to the snow maker/ crossing site if water is not available from the water being crossed."

Four water source lakes have been identified for the Cameron Hills program area. No streams have been submitted to DFO as potential alternative water sources, and DFO recommends against the use of streams in general.

Request

Please provide the MVEIRB with the following information:

- a) *Will Paramount commit to using only the 4 approved water source lakes?*

Response

- a) Paramount cannot commit to using only the 4 approved water source lakes. Paramount must retain the flexibility to evaluate other water bodies for use during their development of their project as per DFO Guidelines (DFO 2002). This flexibility is necessary to allow adaptation related to uncertainty in the Planned Development Case and to provide for the potential for decreased water availability at one of the lakes (e.g., unsafe ice conditions, excessive ice thickness). Further, Paramount notes that one of the lakes evaluated has no water available when considering the DFO guidelines for water withdrawal.

Paramount's position is based on the uncertainty related to the location of future drilling in relation to the lakes. Further, Paramount feels that it may be in the best interest of the fish and fish habitat in the region, not to restrict water use to only the 4 approved water source lakes. This uncertainty relates to Paramount's findings to date, that indicate that many of the waterbodies on the Cameron Hills escarpment are shallow and are expected to freeze to the bottom; alternatively, the few deep lakes that provide suitable water volumes after applying the guidelines, are likely to support overwintering fish populations. As such, several watersources, including creeks, where smaller volumes could be taken, may be more desirable, compared to extracting larger volumes from a single source. Paramount will continue to discuss this issue with DFO.

References:

Department of Fisheries and Oceans. 2002. DFO Protocol for Water Withdrawal for Oil & Gas Activities in the Northwest Territories. 1 page.

IR Number 1.2.108

(Source: DFO)

Preamble

Paramount states that "depending on snow conditions, logs may be placed in the channel to facilitate ice bridge construction to ensure safe vehicle operation."

Request

Please provide the MVEIRB with the following information:

- a) *Will Paramount commit to obtaining approval from a Fishery Officer prior to using logs or any materials other than ice or snow for ice bridge construction?*

Please note: contacting DFO is a requirement as the use of materials other than ice or snow to construct a temporary crossing-over of any ice-covered stream is prohibited under Section 11 of the Northwest Territories Fishery Regulations, unless authorized by a Fishery Officer.

Response

- a) Yes, Paramount will commit to obtaining prior approval of a Fishery Officer prior to using logs or any materials other than snow and ice in the construction of ice bridges.

IR Number 1.2.109 (Source: DFO)

Preamble

In reference to open cut crossings Paramount states that excavated soil will be stored on the stream bank to minimize its entry into the stream at break up.

Request

Please provide the MVEIRB with the following information:

- a) How far from the stream bank will the excess excavated soil be placed to ensure it will not enter the water course?*
- b) Is any other mitigation (ex-berms, silt fences) proposed?*

Response

- a) Paramount submits that there will be no "excess" excavated soil.

Soil from the excavation is placed on the stream bank, above the high water mark. For all intents and purposes it is all returned to the trench as soon as practical.

- b) As there is no appreciable amount of excavated soil left on the bank, no supplemental mitigative measures for siltation will be implemented.

IR Number 1.2.110

(Source: DFO)

Preamble

Paramount states at various points throughout the DAR that the DFO Protocol for Water Withdrawal for Oil & Gas Activities in the NWT will be followed. However, on page 75 it is stated that intake screens of 5 mm will be utilized. According to the protocol the mesh size must be 2.54 mm (1/10") to prevent the potential entrainment of fish.

Request

Please provide the MVEIRB with the following information:

- a) *Will Paramount commit to ensuring that all intake screens for the Cameron Hills program are the proper mesh size (2.54 mm)?*

Response

- a) Contractors and staff at Paramount are following the September 30, 2002 DFO Letter of Advice regarding the mesh size limitation (2.54 mm) for all water intake screens used in the Cameron Hills area.

IR Number 1.2.111

(Source: DFO)

Preamble

A table is provided indicating regulatory approvals required for the planned development case. For the drilling, completion, facilities and tie-in production it is anticipated that Section 35(2) Fisheries Act authorizations will be required.

Request

Please provide the MVEIRB with the following information:

- a) *What activity is expected to create a harmful alteration, disruption, or destruction of fish habitat (HADD) that would require these authorizations?*

Response

- a) In the development of the Table 5.2-1, Paramount considered that there may be watercourse crossings required for the drilling program and operations. Paramount does not anticipate creation of a HADD during these activities. However, in an effort to maintain the conservatism inherent in the DAR and not preclude the need for a 35(2) authorization, Paramount has recognized the fact that future watercourse crossing activities may introduce a HADD, and therefore have included them in Table 5.2-1. This requirement will be reviewed on a site specific basis as the project proceeds.

IR Number 1.2.112

(Source: DFO)

Preamble

Water source information, based on bathymetric surveys is provided in a table format.

Request

Please provide the MVEIRB with the following information:

- a) *Since the water source information is based on bathymetric surveys why is the maximum depth column labelled "Approximate Maximum Depth"? Please clarify.*

Response

- a) The depth measurements for the lakes presented in Table 7.4-5 on page 186 of the DAR are the depth measurements recorded during the bathymetric surveys. As such, the heading of the table should read, "Recorded Maximum Depth". Reference to "approximate" would be reflective of the accuracy of the depth sounder used for completion of the survey.

IR Number 1.2.113 (Source: MVEIRB)

Preamble

The Deh Cho First Nations have been working towards the development of a set of Consultation Principles, to be used by Industry and Government when undertaking consultation with the First Nations. It is expected that Paramount Resources Ltd. would have followed the Consultation Principles set forth by the Deh Cho First Nations, providing they were available to Industry while Paramount was conducting consultation with potentially affected First Nations.

Request

Please provide the MVEIRB with the following information:

- a) *When were the Deh Cho First Nations Consultation Principles released to the public, government and industry?*

Response

This I.R. was addressed to the Deh Cho First Nation.

IR Number 1.2.114 (Source: MVEIRB)

Preamble

The Review Board requested a spatial analysis of the Cameron Hills SDL, employing a 250m buffer on either side of any linear disturbance (cutlines, ROWs, pipelines and roads) and a 1000m buffer around wellsites.

Paramount's response to this request was: "Paramount does not feel that employing a restrictive buffer of 250m on either side of a linear disturbance and 1000m buffer around wellsites, accurately depicts the situation in the Cameron Hills, therefore, a map will not accurately reflect the buffer on the linear disturbance".

The Review Board is not prepared to abandon this request, and is again making a request that this information be supplied.

Request

Please provide the MVEIRB with the following information:

- a) As indicated in Information Request 1.1.30 (b)*

Response

- a) Paramount does not feel that employing a restrictive butter of 250 m on either side of a linear disturbance and 1000 m buffer around wellsites, accurately depicts the situation in the Cameron Hills; therefore, a map will not accurately reflect the buffer on the linear disturbance. Refer to IR 1.1.30, 1.2.123, and 1.2.124.

However, to comply with this IR, one paper copy of Map 1.2.114 is enclosed for the MVEIRB and a PDF file is enclosed for the public registry.

IR Number 1.2.115

(Source: MVEIRB)

Preamble

Further to IR Number 1.1.2, the discussion of ecological thresholds notes that the 20% rule for severity of effects from contamination is applicable by analogy to areal scales of ecological effects. This was the basis for establishing a 20% change in the measurement endpoint as a high magnitude effect. Suter et al. (1995) note that some exceptions apply to the use of a 20% change in measurement endpoint for ecological effects. They specifically indicate that this value is not applicable to species of concern such as woodland caribou – that may be sensitive to small perturbations. They also note that this value is not applicable to habitats protected from any net loss (e.g., wetlands and fisheries habitat). Finally, they note that the 20% criterion is based on measured effects (e.g., documented change in population parameters that incorporates measurement error) and should not necessarily be assumed to apply to modelled effects (e.g., predicted changes in habitat suitability).

Request

Please provide the MVEIRB with the following information:

- a) *Rationale as to why the 20% contaminant-based threshold is an appropriate measure of high magnitude for modelled effects on woodland caribou, moose, marten, forest songbirds, and wetlands. Make specific reference to the range of natural variability and sensitivity of species displaying low recruitment or survival. If appropriate, provide an alternate magnitude rating scheme for these VECs.*

Response

- a) The assessment of the effects of the project is based on the change in areal extent of each VEC, as outlined in the application. The change in areal extent for each VEC is based on the area to be disturbed by the project and can therefore be considered a measured effect, which is consistent with the criteria established in Suter et al (1995). Our terrestrial assessments based on models such as HSI are also measured effects because the assessment of Habitat Unit loss is built on a measured physical footprint of the development.

As such, Paramount does not see the need to provide an alternate magnitude rating scheme for these VECs. In addition, the change in areal extent for each VEC due to the project is provided in the application allowing the reviewer to apply any rating scheme that they feel is applicable.

IR Number 1.2.116 (Source: MVEIRB)

Preamble

As noted in IR 1.1.3, because a spatially-explicit modelling approach was used for the cumulative effects assessment, the assessment conclusions are sensitive to the development footprint included in the Planned Development Case and Far Future Case. The Board acknowledges Paramount's effort to provide a reasonable projection of likely future development and discuss both best- and worst-case scenarios.

Request

Would Paramount be willing to accept a condition of approval that defines maximum acceptable disturbance using the number and areal extent of land features identified in the DAR Planned Development Case?

Response

Paramount, in developing the Planned Development Case, presented their best guess of the location and layout of a 48 well development and associated infrastructure (flowlines, power, facilities, access, etc). A spatially based assessment approach was then used to evaluate the potential for cumulative effects predicted to occur from this Planned Development Case, within a defined study area (i.e. the cumulative effects study area). However, exploration and development success is dependent on favorable geology, and not surface features. As such and as noted in the DAR, changes in the planned development could occur, depending on drilling success. Therefore, it would be somewhat presumptuous of Paramount to accept a condition of approval that defines maximum acceptable disturbance. Further, the DAR concludes no significant effect; therefore, discussions on maximum acceptable disturbance are not warranted at this time.

IR Number 1.2.117 (Source: MVEIRB)

Preamble

The responses to IR Numbers 1.1.5 and 1.1.6 note that the terrestrial CESA was expanded from 70,000 ha (the average home range of one female caribou) to 96,231 ha to include natural features, specifically the escarpment breaks of the Cameron Hills to the north and east, and natural drainages and lake boundaries to the south and west. The inclusion of these natural features increases the size of the terrestrial CESA by 37%. While it is clear that this larger CESA diminishes the relative effects of the project, it is not clear how the 'unique terrestrial resources' included in these areas are relevant to the assessment of cumulative effects for soil, terrain, wildlife, and vegetation VECs.

Request

Please provide the MVEIRB with the following information:

- a) Why the unique terrestrial resources included in the expanded terrestrial CESA must be considered to evaluate potential cumulative effects on terrain and soil.*
- b) Why the unique terrestrial resources included in the expanded terrestrial CESA must be considered to evaluate potential cumulative effects on woodland caribou at the home range scale.*
- c) Why the unique terrestrial resources included in the expanded terrestrial CESA must be considered to evaluate potential cumulative effects on each vegetation VEC.*

Response

a), b) and c)

The Terrestrial Resources Study Area (TSA) was determined based on the following criteria:

- ensuring consideration of the widest ranging receptor affected by project-related effects (i.e., caribou home range);
- ensuring consideration of reasonably foreseeable developments;
- ensuring objectivity in defining study area boundaries by considering natural features such as terrain, topography and waterbodies; and
- ensuring an integrated analysis of all terrestrial resources including soils, vegetation and wildlife.

As per the Terms of Reference (Section 4.1.1), the study areas needed to be selected to encompass project activities within the Significant Discovery License (SDL) and the potential effects to receptors that may be realized outside of this local area. Thus, the consideration of one home range for a female woodland caribou formed the basis for the spatial boundary definition and was used to assess effects to

wildlife. The home range scale was selected as the appropriate scale, as the alternative would be to use the entire range of the population, and this would result in a dilution of effects. By only using the SDL, potential effects would be greatly magnified and would not consider effects beyond the borders of the SDL.

IR Number 1.2.118 (Source: MVEIRB)

Preamble

Paramount provided additional information in the response to IR Number 1.1.7 in support of its use of a 20 year duration as the criteria for long-term impacts. In the response to IR Numbers 1.1.7 and 1.1.21, Paramount references a study conducted by MacFarlane (1999) to support its position that seismic lines will be revegetated 10-20 years following clearing (i.e., medium term duration). In the response to IR Number 1.1.11, Paramount indicates that direct vegetation loss associated with clearing was concluded to be medium-term in duration because reclamation will begin within 20 years.

DAR conclusions on direct vegetation loss are based on the attributes of the activity or feature that causes a response, rather than the way that these activities or features impact the VEC. For example, the DAR appears to conclude that clearing-related effects end once reclamation has begun or any kind of vegetation is established. With this 'cause-based approach', grass, shrubs, or immature trees are considered to be an equivalent replacement for mature spruce. However, the MVEIRB is interested in an 'effects-based approach' that focuses on the consequences of the loss or alteration of specific vegetation units (e.g., mature spruce and the associated wildlife habitat value of this unit). This requires consideration of the time required for regeneration of pre-disturbance vegetation units.

Request

Please provide the MVEIRB with the following information:

- a) *In the responses to IR Numbers 1.1.7 and 1.1.21, Paramount states that seismic lines can be considered to be revegetated 10-20 years following clearing (i.e., medium term duration) because MacFarlane (1999) found that seismic lines reach similar tree densities to those found after wildfires 10-20 years post-disturbance. This appears to be inconsistent with MacFarlane's (1999) own conclusions:*

"The large differences in tree densities on wellsites and seismic lines compared to fires provide evidence that the rate of revegetation of these features is much slower than natural. The trees that are growing are of smaller diameters and could be younger than expected based on the time passed since initial disturbance. ... There seems to be no period that wellsite recruitment equals that after fire nor, at any time, do they approach the standards set for regenerating cutblocks. Based on this evidence and the size of trees over each time period, recruitment is extremely slow, growth is slow, and mortality may be high (Discussion page 28)."

"Changes in age and growth characteristics of trees on these disturbances may result in cumulative long term losses of forested [landbase] (Abstract page 1)."

MacFarlane's (1999) work does not appear to support the DAR conclusion that regeneration of mid to mature seral stage vegetation communities that dominate the Cameron Hills area will occur in 10-20 years following disturbance. Please modify the DAR assessment conclusions regarding duration of vegetation loss and alteration, or provide data relevant to the Cameron Hills CESA area that documents regeneration of mid to mature seral stage vegetation communities within 20 years following disturbance.

- b) Please provide estimates of the time required for each of the vegetation communities listed in Table 7.8-1 to return to pre-disturbance density, size (height and diameter), species composition, and structure following clearing (e.g., for black spruce mature open with sphagnum and lichen to return to black spruce mature open with sphagnum and lichen; and aspen young closed to return to aspen young closed). Discuss any differences in regeneration rates for clearing conducted for seismic lines, pipelines, roads, and wellsites, and discuss implication of sequential disturbance where previously disturbed seismic lines or clearings are incorporated into rights-of-way, and facility or camp sites.*
- c) Information provided in the DAR and response to IR Numbers 1.1.7 and 1.1.11 does not appear to support the DAR conclusion that vegetation loss and alteration will result in a one-time loss of forest resources. Rather, MacFarlane's (1999) work suggests that this will result in cumulative effects expressed as a continuous loss to the forest land base until regeneration is complete. Please modify the DAR assessment conclusions regarding frequency of vegetation loss and alteration, or provide data relevant to the Cameron Hills CESA area that explains why impacts of forest clearing should not be considered to occur continuously within the CESA over the assessment period.*
- d) MacFarlane's (1999) study demonstrates that there is some uncertainty whether mid to mature seral stage vegetation communities can be regenerated following clearing. Please modify the DAR assessment conclusions regarding reversibility of vegetation loss and alteration, or provide data relevant to the study area that documents that clearing-related impacts are reversible within the assessment period considered in the DAR for each of the vegetation communities listed in Table 7.8-1.*
- e) Please provide evidence relevant to the Cameron Hills CESA that demonstrates that invasion of foreign species persists for less than 20 years and is reversible.*
- f) Conclusions presented in Table 7.8-6 and on DAR page 277 indicate that vegetation loss and alteration impacts are reversible, although a statement on the previous page indicates that clearing of black spruce bogs will result in permanent loss of disturbed areas because the peat layer will have been too disturbed to revert back to peatland (DAR page 276). Please resolve this apparent inconsistency.*

Response

a) & c)

Paramount's assumptions of revegetation on seismic lines and other disturbance patches do not assume full revegetation to seral stages found prior to disturbance. It is anticipated that within the 20 year timeframe, vegetation cover, including trees, will return to the seismic lines and disturbed areas, which is expected to exhibit a similar or comparable species composition as the adjacent natural areas. Revegetated areas are expected to provide ecological value in terms of being a self-sustaining plant community. The frequency of vegetation loss for the Planned Development Case is expected to remain as low, as industrial and recreational use on seismic lines after the initial disturbance is expected to be minimal and will only occur for Planned Development Case disturbances where wells and associated operations are required. Limiting the access network and using existing disturbance are expected to reduce the footprint size (i.e., additional clearing), and allow revegetation of the remainder of the disturbances.

b) Species composition vegetation plots assessed by Golder Associates Ltd. (ongoing internal study) in the Boreal Mixedwood Natural Region (northeast Alberta) on seismic lines and roads at various stages of regeneration found that in aspen stands and shrublands, the regeneration on the lines to pre-disturbance density, size and species composition is more rapid than in coniferous stands, especially those dominated by black spruce.

Estimates of the time required for each vegetation community to return to pre-disturbance density, size and species composition are presented in Table 1 below, based on the data collected to date in the above noted study. It must be recognized that there are likely differences between this area in Alberta and the Cameron Hills due to numerous variables, but the data is presented for discussion.

Table 1 Estimated Regeneration Times for Native Vegetation Communities in the Cameron Hills

Vegetation Communities	Community Type	Estimated Time Required to Achieve Pre-disturbance Density (years)
White Spruce Mature Closed	Upland	60-80
Black Spruce Closed Uneven Sized	Upland	70-90
Black Spruce Mature Open with sphagnum and lichen	Wetlands	80-100
Black Spruce Mature Closed	Upland	60-80
Black Spruce Open Uneven Sized with Lichen	Wetlands	80-100

Pine Mature Closed	Upland	60-80
Pine Young Closed	Upland	40-60
Aspen Young Closed	Upland	30-40
Aspen Mature Closed	Upland	50-70
Shrubland	Wetlands	30-60
Herbaceous with Shrubs	Wetlands	10-30
Herbaceous Wet	Wetlands	3-5
Herbaceous	Wetlands	2-5

- d) The regeneration of mid to mature seral stage vegetation communities is expected to occur in the assessment period (long-term duration >20 years) of the Cameron Hills Project (See Table 1, in response to part b). For this reason, the clearing-related impacts are considered to be reversible within the assessment period and thus no modifications were made to the reversibility criteria used in the DAR assessment.
- e) Although specific monitoring plots for exotic species do not exist for the Northern Alberta Uplands Ecoregion in which the Cameron Hills Project is located, succession of forest on disturbance reduces available habitat for exotic species over time. Invasive exotic (foreign) plant species, typically are shade-intolerant, thus can colonize recent disturbance. Exotic species are typically reduced over time due to inter-specific competition for light with native shrubs and trees of mid seral and mature seral structural (Revel et. al 1984). Foreign species would be expected to be out competed by shrub and tree regeneration in aspen stands in the 15-20 year time frame, due to dense pole sapling aspen that regenerates from disturbance in that time. Exotic species in the Northern Alberta Upland Ecoregion are adapted to moderately to well-drained sites. Aspen or aspen-spruce mixedwood typically occupies such sites in this ecoregion. The poorly drained sites, supporting black spruce stands (with slow regeneration rates) are less suitable habitat for exotic species.

Further, Paramount is monitoring revegetation on seeded and unseeded plots associated with slopes as part of an on-going assessment. Results are being provided to the regulatory agencies. Intrusions of weed species would be noted in this monitoring program.

- f) The text on page 276 of the DAR states:

“It was assumed that black spruce bogs, will likely revert to black spruce uplands, because the peat layer would have been too disturbed to revert back to a peatland”.

The text on page 277 of the DAR states:

“This level of vegetation loss/alteration is predicted to result in a negligible environmental consequence to the VECs (uplands and wetlands vegetation communities), including listed plants. This impact is seen as reversible with

communities returning to their respective classes following completion of the Project, as described for the Far Future Case”.

The conclusions state that the communities return through regeneration to their respective classes following completion of the Project, and time. The disturbance of peatlands due to Project activities may alter the site (e.g., trenchline) conditions, such that the regeneration occurs to a slightly different community (or reduced regeneration rate) than existed prior to disturbance, but stabilized and revegetated none-the-less. There is a high degree of overlap in the species composition and structure, tree density and tree size within the vegetation communities “black spruce uplands” and “black spruce bogs”. Thus, effects of clearing on black spruce bogs are reversible in the sense that a community with the same dominant tree species and similar overall species composition as existed prior to disturbance are expected to become established over time.

References

Revel, R. D., Dougherty, T. D., and Downing, D. J. 1984. Forest Growth and Regeneration Along Seismic Lines. University of Calgary Press, Calgary, Alberta.