NATIONAL ENERGY BOARD

Hearing Order OH-3-2011

Vantage Pipeline Canada Inc.
Section 52 of the NEB Act Application for Vantage Pipeline Project
Application filed 8 February 2011

VANTAGE PIPELINE CANADA INC. RESPONSE TO NEB INFORMATION REQUEST NO. 6

Engineering Matters

6.1 *Pump Stations - Flare System*

Reference:
i) Vantage Pipeline Project, Vol. 1, Engineering, Section 5.6.7, page 27 (PDF page 35) [A1X5W0]
ii) CSA Z662-07 Oil and gas pipeline systems, Clause 4.14.3.2

Preamble: Reference (i) indicates the flare system will be designed in accordance with CSA Z662-07 in order to relieve the High Vapour Pressure (HVP) liquids, if needed. However, this reference does not provide any details on safe collection of the potential fluid release (such as seal leaks), as required in reference (ii), paragraph (d).

Additional information on leak detection in pump stations is required.

Request: Please provide:

a) details on how a leak will be detected in pump stations and what measures will be taken to safely collect the released product;

b) a description of the blowdown system design which satisfies the requirements of CSA Z662-07, Clause 4.14.3.2 (a), describing how to ensure that the proposed blowdown system has enough capacity and not being constrained by acoustic speed limit during blowdown;

c) details on how the requirements of CSA Z662-07, Clause 4.14.3.2 (d) will be met; and,

d) whether the pump stations are unmanned. If so, please provide details on how the system detects a station leak and alerts the central operators.

Response:

a) Two primary means of leak detection will be employed at pumps stations: gas detection and periodic visual inspection. If a leak is detected at a pump station the pump station will be isolated, shutdown and depressurized to a flare on site. Any ethane released from a leak will vapourize when released to atmosphere and will naturally disperse.

b) The blowdown system will be designed in accordance with CSA Z662-07 and will relieve to a flare system. The flare systems will be designed for the maximum amount of ethane received from the pumps and piping under a depressuring scenario. In designing the blow down system, simulations will be used to ensure constraints due to acoustic speed limits are eliminated.

c) CSA Z662-07, clause 4.14.3.2(d), requires collection systems to capture any fluid leaking from compromised pump seals. Due to the high vapour pressure of ethane, any ethane leaking from a pump seal will immediately vapourize and will not be collected. In the event that the pumps require lube oil for operation, the pump station will be designed with a collection system sized to hold the maximum amount of lube oil in the pump lubrication system.

d) The pump stations will be designed to operate remotely and will be unmanned during regular operation. As part of the Leak Detection System ("LDS") real time pump station data for various parameters, including gas detection (see response to (a) above), will be transmitted via SCADA to the Central Control Facility and operators will be alerted of variations in these parameters outside normal operating ranges. Please also see the response to NEB IR 6.3.

6.2 *SCADA (Supervisory Control and Data Acquisition), Station Monitoring and Control, and Overpressure Protection Systems*

Reference:

i) Vantage Pipeline Project, Vol. 1, Engineering, Section 5.6.7, page 27 (PDF Page 35) [A1X5W0]

ii) CSA Z662-07 Oil and gas pipeline systems, Clause 4.18 and 10.7.5

Preamble: Reference (i) indicates that the proposed pipeline will be monitored and controlled 24 hours per day, 365 days per year, from a Central Control Facility (CCF) using a state-of-the-art SCADA system. Block valves located at the pump stations will isolate the stations from the pipeline in the event of an emergency.

Reference (ii) provides requirements for overpressure protection systems. Accordingly, overpressure protection must be set to ensure Maximum Operating Pressure (MOP) is not exceeding more than 10% or by 35 kPa (whichever is greater).

Additional information on the SCADA system and overpressure protection of the proposed pipeline and facilities is required.

Request: a) Please provide:

a.1) details on the SCADA system. The response should include, but not be limited to, a description of reliability, safety and security parameters to be monitored and instrumentation, locations for the remote terminals (RTU) and communications, and polling time, alarm annunciation and acknowledgement;

a.2) details on the pump station monitoring and control system. The response should include, but not limited to, a description of the station monitoring and control system such as PLC (Programmable Logic Controller), ESD (Emergency Shutdown), station equipment including auxiliary system, instrumentation, communications with the host SCADA, pump unit start and shutdown operation, station valve opening and closing operation;

a.3) a description of the redundancy strategy of the overpressure protection system when some of the other systems fail (e.g. communications with the host SCADA);

a.4) a surge analysis for potential sources of overpressure (e.g. unexpected valve closure) and mitigative measures (e.g. burst flanges);

a.5) details on an overpressure protection strategy for a potential communication outage. The response should also include how the data from each valve location will be transmitted to the SCADA system, if the communication is interrupted; and,

a.6) information as to whether the depressurizing valve opens automatically if the pipeline is over-pressured:

i) if yes, indicate how the product will be handled to avoid any possible incident, considering the product is HVP product. The response should also indicate whether there is a procedure in place for the safe collection of the product; if the procedure is not in place, advise when it will be available for the Board review; and,

ii) if no, indicate how the pipeline over-pressurization will be handled;

b) Please indicate:

b.1) whether the overpressure protection system will be automatic and be operating continuously, without any reliance on manual intervention; and,

b.2) whether the reliability of the overpressure protection system and associated components will be assessed. If so, please provide how frequently the reliability of the system components will be assessed.

Response: a) a.1) The detailed engineering phase of the project has not commenced and is currently scheduled to commence in early 2012. The detailed design of the SCADA system (e.g. instrumentation, communications, RTU locations and reliability , safety and security parameters) as well as detailed operational design (e.g. communications, alarm annunciation and acknowledgement) will commence during the detailed engineering phase. It is anticipated that the SCADA polling times will follow the guidelines in CSA Z662-07, Appendix E, Table E.1.

a.2) The information requested is not currently available. The detailed engineering phase of the project is currently scheduled to commence in early 2012 and only after this phase has been completed will the requested information be available.

a.3) The primary overpressure protection system will be automated using pressure monitoring and pump shut down switches. The overpressure system will be designed to have two forms of redundancy: pressure monitors and

switches will be installed at the discharge of each pump unit (i.e. highest point of pressure); and each pump station will be designed and equipped with mechanical (i.e. not energized or controlled) automatic pressure safety valves that will relieve to the flare system in the event of an overpressure situation that is not otherwise remedied by the automated system (e.g. in the event of power or SCADA communication failure).

a.4) The information requested is not available. Surge will be examined in more detailed during the detailed engineering phase of the project which is currently scheduled to commence in early 2012. Vantage does not currently intend to conduct a full surge analysis**.** A surge analysis is not normally completed for ethane pipelines. Since ethane has some compressibility characteristics relative to incompressible fluids, ethane pipelines are less prone to overpressure due to surge.

a.5) Please see the response to: (a.1), (a.2) and (a.3).

a.6) (i) Yes, in the event of an overpressure situation the automatic pressure safety valve opens automatically. The automatic pressure safety valve will relieve to the flare system and not to atmosphere. Please also see the response to NEB IR 6.1(b).

a.6) (ii) n/a.

b) b.1) Yes. Please see the response to (a.3) and (a.6).

b.2) Yes. The frequency of inspections of the overpressure protection system will be conducted in accordance with CSA Z662-07, clause 10.7.5.

6.3 ***Leak Detection System (LDS)***

Reference:

i) Vantage Pipeline Project, Vol. 1, Operation, Section 7.2.3, page 38 (PDF Page 46) [A1X5W0]

ii) CSA Z662-07 Oil and gas pipeline systems, Clause 4.20.1

iii) CSA Z662-07 Oil and gas pipeline systems, Annex E— Recommended practice for liquid hydrocarbon pipeline system leak detection

iv) Onshore Pipeline Regulations 1999 (OPR-99), Section 37 and 56

v) API RP 1130-2007 Computational Pipeline monitoring for liquids, Section 4

Preamble: Reference (i) indicates Vantage will develop and install a LDS for the pipeline to assist the Control System Facility (CSF) operators in the detection of hydraulic anomalies in pipeline operation.

Reference (ii) requires the liquid hydrocarbon pipeline systems are designed to provide appropriate leak detection capability

Reference (iii) provides recommended practice for leak detection.

Reference (iv) requires companies to develop and implement a pipeline leak detection system including the frequency of record retention and the training requirements.

Reference (v) provides definition on internally-based and externally based leak detection methods.

Further details on the leak detection system for the proposed pipeline and facilities are required.

Request: Please provide:

a) the LDS Manual for the proposed pipeline that should include, but not be limited to a description of the:

a.1) senior management's commitment to an effective and efficient leak detection system;

a.2) company philosophy which identifies objectives and targets considering the flow rates, type of product and consequence areas;

a.3) roles, responsibilities, accountabilities, and authorities associated with the pipeline operator's staff (e.g. operations manager, system engineer, controller, field operator and maintenance personnel) including a company directive on controller authority and responsibility to take action when a leak is suspected;

a.4) theory of operations, rationale for selection, applications, and unique features of the leak detection system including critical instrumentation requirements;

a.5) methodology and instrumentation requirements;

a.6) accuracy, reliability and sensitivity of the proposed leak detection system (proven for other HVP pipelines). Note that reliability is measured on the basis of limited number of false alarms and sensitivity on minimum detectable leak size;

a.7) list of leak alarm and diagnostic messages including alarm definition, acceptable tolerances, critical data to be displayed on host SCADA, diagnostic procedures of confirming, locating and isolating a leak, and contact points for remedial actions. A reference to a detailed Alarm Management Procedure should be included also;

a.8) information provided by the leak detection system useful for operation staff to minimize the spillage;

a.9) adequate procedure for ensuring the safety of public and employees in case a leak occurs; Vantage shall indicate whether the procedure takes into account the fact that ethane vapour is heavier than air and that is highly volatile and flammable;

a.10) expected maximum spillage when a leak is detected and isolated; and,

a.11) leak detection system continuous improvement process including nonconformity identification related to leak detection procedure and/or performance, internal audits and associated protocols, corrective action plans, and follow-up;

b) the date when the Leak Detection System Manual will be available for the Board's review;

c) a description of company requirements for leak detection system record keeping and archiving, including history, training, maintenance, testing, and performance;

d) the details on detection capability of a very small leak. For example, leak statistics indicate that most frequently occurring leaks are either very small (less than 0.1% of the design flow), very large or full pipe rupture. If the proposed leak detection system cannot detect such a small leak, what other method(s) does Vantage propose?

e) details on how Vantage will ensure that the leak detection system performs as expected in terms of testing methods and frequency as well how it will ensure the maintenance of the associated instrumentation; and,

f) an indication of whether externally-based leak detection methods will be used for road crossings. If not, please provide the rationale and a description of the proposed internally-based leak detection method at road crossings including an assessment in terms of sensitivity, reliability and accuracy.

Response: a) Detailed engineering needs to be substantially complete prior to completing the LDS Manual. Vantage will develop the LDS Manual concurrent with and following completion of the detailed engineering phase of the project. Vantage's senior management is committed to an effective LDS as outlined in CSA Z662-07. Additionally, the LDS Manual will address and provide detail in relation to the requirements and guidelines of CSA Z662-07 Appendix E including, but not limited to:

- objectives, targets and tolerances taking into account the type of product shipped and consequence areas;
- the roles, responsibilities and authorities of personnel in the event of suspected leak;
- the theory and rationale for the LDS design and application;
- methodology and instrument requirements;
- accuracy, reliability and sensitivity of the measurement devices used;
- leak alarms and diagnostic messaging as well as related procedures;
- any information to be provided by the LDS to assist in operating the LDS and responding to any potential leak;
- the estimated maximum amount of ethane released when a leak is detected; and
- the process to be followed with respect to continuous improvement, non-conformity, audits and correction protocols.

Additionally, Vantage notes that any procedures for ensuring the safety of the public and employees in the event of a leak will be detailed in its emergency response manual which will take into account the density of ethane. Please also see response to NEB IR 5.12.

b) The LDS Manual will be available for NEB review at least three months prior to the Vantage pipeline being placed into service.

c) The company requirements for LDS record keeping, training, maintenance, testing and performance will be outlined in the LDS Manual and will follow the guidelines in CSA Z662-07, Appendix E.

d) The LDS system will have a limit on the size of leak that it is capable of detection. This limitation (i.e. sensitivity and accuracy) will be estimated once the LDS is designed and completed. To address this limit on sensitivity and accuracy, the overall LDS will include a combination of other leak detection methods including: visual and aerial surveys for leak indicators (e.g. vegetation/snow discoloration); gas detection; and fugitive emissions programs.

e) The measurement systems used to supply data to the LDS will be tested monthly. The LDS Manual will outline the testing methods and frequency for testing the LDS itself.

f) No external based leak detection systems will be used for road crossings. The LDS will incorporate leak detection for the entire pipeline system, including road crossings. The accuracy, reliability and sensitivity of the LDS will be determined in the detailed engineering phase of the project. Please also see response to (a) above. The road crossings will be designed in accordance with CSA Z662-07, section 4.12.3.

6.4 ***Custody Transfer Metering***

Reference: i) Vantage Pipeline Project, Vol. 1, Engineering, Section 5.5, page 25 (PDF Page 33) [A1X5W0]

ii) Filing Manual, Chapter 4, Section Al- Engineering

iii) Vantage Pipeline Project, Vol. 1, Appendices A-C, Appendix B-4-

Schematics - Empress Pump Station, (PDF Page 47) [A1X5W3]

iv) Vantage Pipeline Project, Vol. 1, Engineering, Section 5.3.1 , page 20 (PDF Page 28) [A1X5W0]

Preamble: Reference (i) states that the metering information will be used for custody transfer and will be used by the leak detection system monitoring the pipeline.

Reference (ii) requires an applicant to provide details on metering facilities such as a description of the gas or fluid analysis system, a station schematics showing buildings and all major piping and valves, pipe material and type, etc.

Reference (iii) includes the metering facility for Empress Pump Station, however it does not provide any details on major piping components, as requested per reference (ii).

Reference (iv) describes the ethane characteristics and composition. The ethane density varies from 349kg/m^3 to 383kg/m^3, but only a representative ethane specification is provided.

Further information on metering facilities is required.

Request: Please provide the following:

a) process and Instrumentation Diagrams (P&Ds) for metering facilities;

b) details on pipe material and type, outside diameter and pipe wall thickness;

c) a description of the fluid analysis system in terms of analysis method (lab or online test), density calculation, frequency, location, etc;

d) description of the meter proving plan including the proving of frequency;

e) details as to whether the flow meters are used for leak detection. If so, please provide the minimum detectable leak size and how it is related to flow meter accuracy; and,

f) details as to how the leak detection system will be effected if flow meters are not installed at the Assiniboia station (no flow meter is proposed at the Assiniboia station).

Response: a) Please see attachment 6.4(a).

b) Details with respect to metering facilities piping are outlined in the table below:

	Pipe Size (mm)	Steel Grade (MPa)	W.T. (mm)	Design Pressure (kPa)
Meter Inlet Piping	273.1	359	6.4	9930
Meter Discharge Piping	273.1	359	6.4	9930

All meter process piping will be ERW pipe, CSA Z245.1, CAT II, -45 degrees Celsius.

c) The fluid analysis will be conducted using a real time chromatograph and a real time densitometer. One of each will be located at each pipeline receipt and delivery point and will be calibrated monthly.

d) All meters at pipeline receipt and delivery points will be proven monthly. A detailed meter proving plan will be developed and implemented in advance of the pipeline being placed into service. The proving plan will involve comparing meter readings from the flow measurement device with a known volume established by a fixed meter prover. The readings will be compared and the flow measurement will be calibrated to the values established by the fixed meter prover.

e) Yes the flow meters will be used for leak detection. Please see response to NEB IR 6.3(d) with respect to the sensitivity and accuracy of the LDS.

f) All ethane received and delivered to the pipeline will be metered using custody transfer meters. Data from these meters will be used by the LDS. The custody transfer meters will be highly accurate and it is anticipated that the LDS will not be affected by a lack of flow measurement at Assiniboia station.

6.5 ***Hydrostatic Testing***

Reference: i) Vantage Pipeline Project, Vol. 1, Construction, Section 6.12, page 32 (PDF page 40) [A1X5W0]

ii) Vantage Pipeline Project, Vol. 1, Engineering, Section 5.3.1, page 32 (PDF page 40) [A1X5W01

Preamble: Reference (i) indicates the pipeline will be hydrostatically tested upon construction completion. Furthermore, the same reference indicates water will be used for pressure and leak testing.

In reference (ii), Table 5-1 provides an ethane mixture specification, indicating that the mixture includes 6% CO_2 and <60ppmw H_2S.

In a presence of free water, CO_2 and H_2S could cause formation of hydrates at the elevated pressures as well as corrosion of the pipeline. Additional information regarding the hydrostatic testing of the proposed pipeline is required.

Request: Please provide:

a) details on how Vantage will ensure the pipeline and pump station piping do not contain free water prior to line fill. Please include line drying criteria in your response;

b) the date when the procedure from (a) above will be available for the Board's review; and,

c) the date when the pressure testing program (for both pipeline and pump station piping) will be available for the Board's review.

Response: a) After hydrotesting Vantage will sweep the pipeline with a tight fitting hard plastic pig that is moved through the pipeline using compressed air. This will remove the majority of the water. Vantage will then run successive sponge pigs in the pipeline until the pigs received at the receiving end are dry. This will confirm that all free water has been removed from the pipeline. The pipeline will then be purged with dry nitrogen to displace the air in the pipeline. The nitrogen purge will also provide a drying effect in the pipe.

b) The detailed pipeline and station piping drying procedure will be available for NEB review at least three months prior to Vantage conducting any hydrotesting.

c) The pressure testing program for both the pipeline and station piping will be available for NEB review at least three months prior to Vantage conducting any hydrotesting.

6.6 ***Design Criteria***

Reference:

i) Vantage Pipeline Project, Response to IR No. 3.31, page 52 (PDF page 52) [A1Z7T7]
ii) Vantage Pipeline Project, Vol. 1, Engineering, Section 5.3.1, page 20 (PDF page 28) [A1X5W0]
iii) Vantage Pipeline Project, Vol. 2, Assessment of Environmental effects on the atmospheric environment, Section 6.2.1, page 40 (PDF page 6) [A1X5X3]
iv) Vantage Pipeline Project, Vol. 1, Engineering, Section 5.6.2, page 26 (PDF page 34) [A1X5W0]

Preamble: Reference (i) indicates the operating conditions will be within the dense phase.

Reference (ii) indicates the product density ranges from 349kg/m^3 to 383kg/m^3.

Reference (iii) indicates the annual temperature can vary between -40^o C to +40^o C.

Reference (iv) indicates the pump station piping "will be installed above grade on racks in order to permit ready access to valves and other piping components".

The response to the Board's IR 3.31 includes the pressure-enthalpy diagram; however, it does not demonstrate that the minimum and maximum operating conditions will be adequate for the product to be in the dense phase. The Board notes that the pressure-enthalpy diagram indicates that, for the maximum operating temperature (+27 C) and the minimum operating pressure (4500 kPag) the product could be in vapour phase.

Reference (ii) indicates the product density changes. This density change could potentially cause changes in vapour pressure. To determine the minimum operating pressure to avoid any vapourization in the pipeline, the pressure-enthalpy diagram for the case of the lowest ethane density should be obtained.

Furthermore, due to ambient temperature up to +40^o C, the ethane temperature in above ground piping will increase, which will also cause

a pressure increase. The same pressure increase could be expected when the buried pipeline is shut-in for the prolonged period in the hot summer season.

Additional information related to design criteria of the proposed pipeline is required.

Request: Please provide:

a) the rationale as to how Vantage plans to keep the product in the dense phase for the operational conditions provided in the reference (i). The response should include, but not be limited to:

a.1) an engineering assessment supported by a phase diagram clearly indicating the dense phase for the composition specified in Table 5-1 (reference (ii)) including the operating conditions and density at which the calculation was performed; and,

a.2) details of how the vaporization will be avoided for the maximum operating temperature (+27 C) at the minimum operating pressure (4500 kPag);

b) details on whether the above ground piping and piping components will be insulated to minimize the effect of the ambient temperature (as high as +40 C) effect, particularly when operating at minimum operating pressure (4500 kPag). If it is not going to be insulated, please provide the mitigative measures to address the effect of the ambient temperature; and,

c) confirmation that the pressure increase due to higher ambient temperature (+40 C) was taken in consideration for the pipeline and pump station design.

Response: a) Vantage will operate the pipeline in a manner that ensures the fluid remains in a single liquid or dense phase state at all times. This will be done by maintaining sufficient back pressure at the terminus of the pipeline system. This will ensure that at any time the highest point of elevation along the pipeline will maintain a line pressure of at least 200 KPa above the bubble point of the fluid.

Generally, the pipeline will operate through a defined range of temperatures and pressures. The temperature and pressure

will be highest at the receipt point of the pipeline. Both temperature and pressure will decline as the fluid moves along the line until the ethane reaches an equilibrium temperature with the surrounding ground (0 - 5 degrees Celsius). Once this equilibrium temperature is reached the ethane will maintain this temperature throughout the length of the pipeline. The operating envelope for the pipeline can be drawn on the phase envelope as show in response to NEB IR 3.31. As can be seen on that phase envelope, the fluid will remain in the single liquid or dense phase region under all circumstances. This phase analysis was completed using an industry standard equation of state (i.e. BWRS). The simulation takes into account the variability in density throughout the operating range of interest.

When the pipeline is in operation the maximum operating temperature of 27 degrees Celsius will not be reached. Once temperature equilibrium is reached the ethane product will stay at a temperature of 0 to 5 degrees Celsius. If the pipeline is shutdown for a length of time, above ground piping may absorb enough heat from the surrounding atmosphere to change the ethane from liquid to gas. The amount of ethane in gas phase will be very small compared to the total ethane in liquid phase in the pipeline system. Under these circumstances any ethane in gas phase at the pump station will be removed through the flare system prior to re-starting the pumps at the pump station. In the event that there is any ethane in gas phase at block valves, that gas phase ethane will condense to a liquid when it is mixed with the liquid phase ethane in the pipeline as flow is re-established in the pipeline.

b) Vantage does not currently plan on insulating any piping or piping components to minimize the effect of ambient temperature. Mitigative measures that Vantage currently intends to employ include automatic pressure safety valves on the station piping that will relieve to the flare system in accordance with the operating procedures outlined in (a) above.

c) Confirmed. The pressure increase due to higher ambient temperatures will be taken into account during the detailed engineering phase of the project.

6.7 ***Materials***

Reference:

i) Vantage Pipeline Project, Response to NEB IR No. 3.31, page 52 (PDF page 52) [A1Z7T7]

ii) Vantage Pipeline Project, Vol. 1, Engineering, Section 5.3.2, page 21 (PDF page 29) [A1X5W0]

iii) Vantage Pipeline Project, Response to NEB IR No. 3.35, page 57 (PDF page 57) [A1Z7T7]

iv) Vantage Pipeline Project, Additional Written Evidence, Project Update 14 June 2011, page 1 of 1 [A1Z7L9]

v) Vantage Pipeline Project, Response to NEB IR No. 3.35 — Attachment 3.35 (a-2), page 1 of 1[A1Z7V3]

Preamble:

Reference (i) indicates the minimum operating temperature for the pipeline is -10 C.

Reference (ii) indicates the pipe for the project will be Category II based on notch toughness characteristics. Furthermore, the same reference indicates the test temperature shall be specified at -5 C since the pipe will be installed underground. The same reference indicates the pipe to be above ground will be specified at -45 C. In addition, Table 5-3 of the same reference provides pipe specification for the proposed project, indicating the minimum wall thickness for the pipeline will be 5.6 mm.

Reference (iii) response 3.35 (c) indicates the piping from the depressurizing valve to the flare and the flare will be designed to the low temperature to ensure mechanical integrity when the pipe is cooled.

Reference (iv) indicates that the outside diameter (OD) will be changed from the originally proposed 323.9 mm (12 inch) to 273 mm (10 inch).

Reference (v) indicates the wall thickness for NPS 10 (273 mm) piping will be 4.8 mm and changing to 6.4 mm at the transition point.

Further clarification regarding materials is required

Request:

Please provide the:

a) rationale for choosing the pipe notch toughness at -5°C, when the product minimum temperature is -10 C. The rationale should be supported by an engineering assessment which will demonstrate that the minimum operating temperature (-10 C) will not affect the mechanical properties of the pipe with the selected notch toughness;

b) confirmation that all above ground piping components (not only pipe will have the notch toughness at -45 C;

c) material specification (grade, thickness, diameter) for the piping from the depressurizing valve to the flare and the flare itself, including the value for "low temperature" discussed in reference (iii); and,

d) details on which wall thickness will be used for the proposed pipeline. Accordingly, Vantage is required to revise and resubmit Table 5-3 of the application or Attachment 3.35 (a-2).

Response:

a) The equilibrium temperature of the ethane in the below ground pipeline when flowing will approach ground temperature. The ground temperature will vary seasonally between 0 and 5 degrees Celsius. The minimum pipe operating temperature will be 0 degrees Celsius. The selection of -5 degrees Celsius for determining pipe notch toughness properties is appropriate given the minimum pipe operating pressure. Please also see response to NEB IR 6.6(a).

b) Confirmed. All above ground piping components will have pipe notch toughness properties at -45 degrees Celsius.

c) The preliminary design diameter of the flare line from the automatic pressure safety valve to the flare is currently NPS 4 (114.3 mm). The material specification for this pipe is currently: 114.3 mm OD x 10S, BE ASTM A312 Gr. T304L, SMLS. The material will have a minimum design temperature of -100 degrees Celsius. The sizing and material specifications will be confirmed during the detailed engineering phase of the project.

d) Below is an updated Table 5-3 reflecting changes in pipe diameter and associated wall thickness:

Pipe Size (mm)	Steel Grade (MPa)	W.T. (mm)	Length (km)	Class Location
273.1	359	4.8	528	General Class 1 Line

				Pipe
273.1	359	7.8	.05	Railway Crossings
273.1	359	6.0	50.5	Class 2 and Road Crossings

6.8 ***Pipeline Risk Assessment***

Reference:

i) Attachment to Vantage's response to NEB IR No. 3.33, Vantage Pipeline Risk Assessment [A1Z7V1]

ii) Vantage Pipeline Project, Environmental Alignment Sheets, pages 61-63 (PDF pages 1-3) [A1X6E6]

iii) Jacques Whitford AXYS Ltd report "The Effects of HVP System parameters on dispersion and thermal radiation hazard extents" (referenced in CAPP "Companion Planning Guide to ERCB Directive 071") (hard copy attached)

iv) Vantage Pipeline Project, Environmental Alignment Sheets, pages 1-2 (PDF pages 1-2) [A1X6H4]

v) Vantage Pipeline Project, Appendices A-C, Appendix B-2-Proposed block valve locations, page 119 (PDF page 42) [A1X5W3]

Preamble:

Reference (i), "Consequence Analysis" Section states that, according to ERCB Directive 071, Appendix 10, Emergency Planning Zone (EPZ) for 10-inch and 12-inch pipelines shall be 900 meters and 1100 meters for ethane. Furthermore, the same reference requires that "since the EPZ represents the distance from the source to the endpoint, it must be multiplied by a factor of two to obtain a bi-directional distance". Reference (i), Table 2, provides the EPZ distances multiplied by two to obtain the hazard distances for leaks and ruptures. According to Table 2, hazard distance for a NPS 10 HVP pipeline leak is 100 metres and for rupture is 1800 metres.

Reference (ii) shows maps indicating that the proposed pipeline runs in some areas parallel to the Highway 13. The separation distance between the pipeline and Highway 13 ranges from 100 metres to about 1800 metres at several locations.

Reference (iii) provides the extent of the thermal radiation consequence of HVP pipelines including ethane. Figure 21 indicates

that the predicted distance to a consequence of 2nd Degree Burns for NPS 10 pipeline ethane is between 200 and 300 metres. Figure 14 of this study also indicates that the estimated distance to the Lower Flammability Limit/2 locations (released fuel supporting combustion if ignition source is present divided by 2) is between 600 to 900 meters. In addition, Table 6 proposes an Emergency Planning Zone distance for NPS 10 (273.1 mm) of 900 metres.

Reference (iv) indicates pipeline is passing nearby several populated areas and urban municipalities such as Admiral, Cadillac, Bengough, etc.

Reference (v) provides locations for block valves. However, the maps (reference (iv)) indicate proximity of pipeline to populated areas such as Cadillac and Admiral, which are not considered for the valve locations.

Vantage is required to provide further clarification on the risk assessment for the proposed pipeline.

Request: Please provide the:

a) list of all highways and public roads that are within a 900 metre radius of the pipeline;

b) list of populated areas, urban and rural municipalities that are located within a 900 metre radius of the pipeline;

c) list of the block valve locations associated with the pipeline segments in proximity (i.e. 900 metres) to consequence areas (e.g. populated areas, rural and urban municipalities and highways and public roads) and the rationale for the selected block valve locations;

d) list of all threats to the pipeline integrity addressed in the risk assessment, including the rationale for the choice and the steps to mitigate them; and,

e) mitigative and preventative measures for reducing the consequence of a failure (e.g. leak or rupture) in the areas listed in (a) and (b) above.

Response: a) Please see Attachment 6.8(a).

b) Please see Attachment 6.8(b).

c) The criteria in CSA Z662-07, section 4.4, was used to determine

valve location and spacing. The rationale for locating block valves is discussed in Volume 1, section 5.3.4 of the Application. The pipeline route was purposively selected so that it remained at or in excess of 900 metres distant from populated areas.

d) The risk assessment was premised on a worst case scenario of a full pipeline rupture, with the cause being a mechanical hit due to excavation. Mitigation of mechanical hits include: adequate signage marking the pipeline route, public education programs promoting awareness of pipelines and the use of the first call program, aerial surveys, and emergency response programs.

e) Mitigative and preventative measures for reducing the consequences of a pipeline failure are primarily the focus of emergency response procedures. Vantage's Emergency Prepardeness and Response Program will incorporate measures to limit the consequences of a pipeline failure. Please see the response to NEB IR 5.12.

6.9 ***Pipeline Depressurization***

Reference: Vantage Pipeline Project, Response to NEB IR No. 3.35, page 57 (PDF page 57) [A1Z7T7]

Preamble: The above reference indicates that the pipeline will be depressurized through the use of a portable flare that will be located at the appropriate locations along the pipeline route.

It is not clear on how quickly the portable flare can be connected to the main valve.

Additional information is required regarding pipeline depressurization. Request: Please provide:

a) details on how long it would take to bring the portable flare to the location that requires depressurizing in a case of the emergency. The response should include but not be limited to the number of portable flares, their locations and the maximum time required for bringing and connecting the portable flare(s) to emergency site(s). The response should also include the rationale for choosing those numbers and confirmation that the selected number of portable flares, locations and time will be adequate to safely and efficiently depressurize the pipeline in a

case of the emergency;

b) information as to whether there is procedure in place for bringing the portable flare to the required location, connecting it to the pipeline and operating it safely; if the procedure is not in place, advise when it will be available for the Board review; and,

c) details on the design criteria for the portable flare to ensure the proper dispersion of burned gases to atmosphere.

Response: a) Currently Vantage intends to deploy three portable flares located at Empress, Assiniboia and a location close to the Canada/U.S. border. This is in addition to the permanent flares to be located at the Empress and Assiniboia pump stations. There will also be two portable flares located in North Dakota for the U.S. operation of the pipeline. Assuming a worst case scenario where the leak occurs at a location furthest from all of the portable flares, the estimated time to deploy a portable flare at the appropriate valve station is approximately 4 hours. This estimate is determined as follows:

- Operator dispatched to portable flare site - 1 hour
- Operator connects portable flare to vehicle - 0.5 hour
- Operator travels to valve site - 1 hour
- Operator connects portable flare and commences flaring - 1.5 hours

The Jacques Whitford AXYS Ltd. report "*The Effects of HVP System Parameters on Dispersion and Thermal Radiation Hazard Extents*" indicates that the use of portable flares for depressurization is effective for rupture sizes of 1 inch or less where duration of the release exceeds 22 hours. For rupture sizes greater than 2 inches, the release duration is 5 hours or less. So for rupture sizes in excess of 2 inches the majority of ethane will likely escape to atmosphere before a portable flare may be deployed (i.e. approximately 4 hours to deploy). In such circumstances alternate mitigation, addressed through the concurrent implementation of emergency response procedures, must be implemented since additional portable flares will not be any more effective due to the amount of response time associated with connecting the flares once they are in location.

b) Currently the procedure for deploying the portable flares has not been formally developed and documented. The portable flare deployment procedure will be available for NEB review at least three months prior to the Vantage pipeline being placed into service.

c) The information requested is not currently available. The design criteria for the portable flares will be determined during the detailed engineering phase of the project which is currently scheduled to commence in early 2012.

6.10 ***Pipeline In Line Inspection***

Reference: Vantage Pipeline Project, Response to NEB IR No. 3.40, page 67 (PDF page 67) [A1Z7T7]

Preamble: In the reference, response (c) states that a pipeline integrity run will be completed after one year in operation. However, the response does not indicate which integrity tool will be used for the in line inspection.

Further information on the integrity tools that will be used for in line inspection of the proposed pipeline is required.

Request: Please provide details on which type of in line inspection tools (such as caliper tools, crack detection tools, etc) will be used to inspect the proposed pipeline, and the reason for choosing this type of tools.

Response: After one year of operation, Vantage will run both deformation and metal loss internal inspection tools to confirm pipeline integrity and to establish a baseline for future internal inspections. The metal loss tool will be magnetic flux leakage based tool and not an ultrasonic tool since ultrasonic tools do not work in lighter density fluids such as ethane.

Economics / Finance / Toll Matters

6.11 ***Finance***

Reference: Vantage Response to NEB IR 3.6 (b) [A1Z7T7]

Preamble: In the reference, Vantage states that the required equity capital will be allocated from Riverstone/Carlyle Global energy and Power Fund IV as long as the capital costs of the project do not increase significantly and

regulatory approvals are granted.

Request: a) Please elaborate on what would constitute a "significant increase in capital cost."

b) Please explain how Vantage will arrange for additional capital if the capital costs of the project were to increase significantly.

Response: a) A projected capital cost increase of 20% would be a significant increase in capital cost.

b) Under the commercial financing terms, once construction has commenced the financers are committed to complete the project and as a result would provide any additional financing required. Under the commercial financing terms, if, in advance of construction, a significant increase in capital cost were projected, then the financers may choose to not proceed with financing the project or to seek additional funding options such as partners or additional debt capacity.

6.12 ***Tolls***

Reference: i) Vantage Response to NEB IR 3.8 (d) [A1Z7T71
ii) Vantage Pipeline Ethane Transportation Services Agreement (Canada) dated 31 January 2011, between Vantage Pipelines Canada Inc. and NOVA Chemicals Corporation (NCC) [A1Z7W9]

Preamble: In reference (i), Vantage states that revenue from uncommitted shippers would not reduce the toll charges to NCC; however, the NOVA Chemicals Ethane Transportation Services Agreement dated 31 January 2011 does provide for a toll discount to NCC if the monthly volume shipped on the pipeline by all shippers exceeds an agreed to amount.

Request: Please state whether, in addition to NCC, the toll discount will be provided to other shippers as well, either committed or uncommitted.

Response: All tolls for transportation on Vantage pipeline are negotiated contracts between Vantage and the company requesting a transportation arrangement. The toll under such contracts will be based on a number of factors, such as, but not limited to, volume, term and credit rating. Vantage cannot speculate at this time whether a toll discount will be provided in such instances.

6.13 ***Abandonment***

Reference:
i) Vantage Pipeline Project, Vol. 1, Section 1.11, page 8 (PDF page 16) [A1X5W0]
ii) NEB Reasons for Decision RH-2-2008 [A1J9R9]
iii) 4 March 2010 - Revisions to Preliminary Base Case Assumptions [Al SOC 1]
iv) 21 December 2010 Letter and Amended table [A1W9T1 & A1W9T3
v) 7 March 2011 letter adjusting timelines [A1YOH3]

Preamble: In reference (i), the Applicant states that the project will be designed and maintained for a useful life in excess of 30 years. It will be decommissioned and abandoned in accordance with all applicable regulatory requirements at the time of decommissioning and abandonment.

References (ii) through (v) provide guidance for preparing a preliminary abandonment plan and an estimate of future abandonment costs.

For all Group 1 pipelines, preliminary physical plans are due by 31 May 2011 and cost estimates are due by 30 November 2011. For Group 2 pipelines, preliminary physical plans and cost estimates are due by 30 November 2011. As these filings are expected of companies who are presently Group 1 or Group 2 companies and the Vantage hearing is scheduled to start 1 November 2011, it is appropriate for Vantage to file similar information a month prior to the hearing date.

Request: Please provide the Board with a preliminary abandonment plan and an estimate of future abandonment costs prior to the start of the oral hearing on 1 November 2011.

Response: Vantage confirms that it will file with the NEB a preliminary abandonment plan and an estimate of future abandonment costs prior to the start of the oral hearing on 1 November 2011.

Markets & Transportation

6.14 ***Take-away Capacity of the Alberta Ethane Gathering System***

Reference:
i) Vantage Pipeline Project, Vol. 1, Section 1.2, page 1 (PDF page 9) [A1X5W0]
ii) Vantage Pipeline Project, Vol. 1, Section 5.5, page 25 (PDF page 33) [A1X5W0]

iii) Vantage Pipeline Project, Vol. 1, Section 1.4, page 3 (PDF page 11) [A1X5W0]
iv) Vantage Pipeline Project, Vol. 1, Section 2.5, page 11 (PDF page 19) [A1X5W01

Preamble: In reference (i), Vantage states that the 12-inch Vantage pipeline will be connected to the Alberta Ethane Gathering System (AEGS) near Empress, Alberta.

In reference (ii), Vantage states that the expected ethane flow at the custody transfer metering point at the Empress Pump station (before the transfer point from the Vantage pipeline to the AEGS system) would be 9,500 m^3/d (59,800 bId), with a minimum flow of 3,970 m^3/d (25,000 bId).

In reference (iii) Vantage states, that the firm transportation capacity contracted by NCC is 30,000 b/d for ten years, with options provided for two 5-year extensions.

In reference (iv), Vantage commented in relationship to the access to the pipeline by shippers other than NCC that one of the requirements for access is to have an offtake agreement with AEGS.

Information is missing in the application about the available takeaway capacity on the AEGS system at Empress to receive the volumes that would be delivered by Vantage. Also, there is no information about an offtake agreement between AEGS and Vantage or NCC to receive the ethane that would be transported by the pipeline.

Request: Please respond to the following:

a) What is the capacity of the AEGS system downstream of the Vantage delivery point at Empress?

b) What is the expected available spare capacity at the AEGS system downstream of Empress that would be available for Vantage when the pipeline starts operations?

c) Is there an existing offtake agreement between Vantage and AEGS? If yes, please provide details. If no, please inform if NCC has entered into an offtake agreement with AEGS.

Response: a) It is Vantage's understanding that the capacity of the AEGS downstream of the Vantage delivery point is 23,850 cubic metres per day (150,000 barrels per day).

b) Vantage will deliver ethane to NCC at Empress. NCC has an

offtake agreement to move their contracted volumes on AEGS from Vantage to the Joffre petrochemical complex. Based on an examination of ethane production from Empress area plants over the previous 12 months (June 2010 to May 2011), which averaged 15,250 cubic metres (95,927 barrels per day), it appears that the AEGS had 8,600 cubic metres (54,073 barrels per day) of spare capacity over the past 12 months.

c) No. NCC has entered into an offtake agreement with AEGS. See the response to (b) above.

Supply Matters

6.15 ***Reduction in Pipeline Size***

Reference:
i) Vantage Pipeline Project, Vol. 1, Section 3, page 13 (PDF page 21) [A1X5W0]
ii) Vantage Pipeline Project, Vol. 1, Section 4, page 15 (PDF page 23) [A1X5W0]
iii) Vantage Pipeline Project, Additional Written Evidence — Project Update 14 June 2011, page 1 [A1Z7L9]

Preamble: In reference (i), Vantage states, "Estimates suggest that there will be approximately 40,000 to 50,000 bpd of ethane available to the Vantage Pipeline. Given the scope for further development in the northwestern quadrant of North Dakota, there is a reasonable probability that existing gas processing facilities could be expanded or new facilities could be built to process more gas and produce even more ethane."

In reference (ii), with respect to Alberta ethane demand, Vantage states, "Given that the ultimate ethane shortfall is forecast to be greater than 76,000 bpd, Vantage has decided to use 323.9 mm [12 inch] O.D. pipe so additional transportation capacity may be available without the need for additional pump stations."

In reference (iii), Vantage states, "As a result of further discussions with natural gas producers and processors in North Dakota, Vantage has decided to decrease the size of the pipe from 323 9 mm (12 inch) to 273 mm (10 inch) O.D."

Request: Please respond to the following:

a) Is the decision to decrease the size of the pipe related to a material reduction in the supply of ethane estimated to be available for this project? If the answer is yes, is the statement

that the forecast supply available to Vantage is in the range of 40,000 to 50,000 bpd still accurate? Please explain.

b) Is the decision to decrease the size of the pipe related to a material reduction in the forecast ethane demand shortfall in Alberta? If the answer is yes, is the statement that the ultimate ethane shortfall is forecast to be greater than 76,000 bpd still accurate? Please explain.

Response: a) No. The forecast supply range of 40,000 to 50,000 barrels per day is still valid and did not form part of Vantage's decision to decrease the pipe size. The decision was based on an economic optimization of capital and operating costs arising from various combinations of pipe size and pumping horsepower required to provide service over a range of possible supply volume scenarios, including potential scenarios with volumes in excess of forecast.

b) No.

Environment Matters

6.16 ***Impacts from Traffic on Right-of-Way (ROW)***

Reference:
i) Vantage Response to NEB IR No. 3, IR 3.12 Construction Methods — Soil Disturbance, pages 17-19 [A1Z7T71
ii) Vantage Pipeline Project, Vol. 2, Section 14, Table 14-3, pages 276-278 (PDF pages 10-12) [A2X5Y1]
iii) Vantage Response to NEB IR No. 3, IR 3.19 Construction Traffic Management Plan, pages 31-34 [A1Z7T71
iv) Vantage Pipeline Project, Vol. 3, Appendix A, 3.1 Traffic Management Plan, pages 66-67 (PDF pages 5-6) [A1X6A1]

Preamble: In reference (i), Vantage listed limitations of narrowing trench and stripping widths for the project that include the risks of admixing of topsoil and subsoils in high traffic areas, topsoil pulverization and subsoil compaction.

High traffic areas can also impact wildlife. In reference (ii), mortality due to vehicle collisions is listed as a potential effect/limitation on species across the majority of species groups.

Vantage has listed several mitigation measures intended to reduce impacts from traffic on the ROW. In reference (iii) Vantage indicated that contractors would use buses to transport the majority of workers

from the marshalling point to the ROW, while welders, contractor supervisors and professionals would drive their own vehicles. Reference (iv) describes access control measures such as fences, barriers, flagging or signage to limit access to sensitive areas and to limit public access to the worksite. Access control measures would be monitored and assessed by the Environmental Inspector. Additional measures such as reduced speed limits in areas of high wildlife potential, minimal vehicle traffic through sensitive habitat areas, and restrictions on non-essential vehicle traffic on the ROW, are listed in reference (iv).

Although Vantage has described potentially effective mitigation measures, it is unclear how their effectiveness will be ensured (i.e., through enforcement).

Request: Please provide the following:

a) information about the anticipated traffic on the ROW during the construction period, including traffic vehicle types, volumes, and duration for each major phase of construction (e.g., clearing, grading, trenching, etc.) for a set distance; and,

b) a clear description of how Vantage plans to monitor and enforce restrictions on ROW traffic and usage.

Response: a) The information requested is not currently available. In preparing the detailed traffic management plan information relating to anticipated traffic on the ROW, including the traffic vehicle types, volumes and duration, will be compiled, considered and incorporated. Please also see the response to NEB IR 3.19(a).

b) Vantage will use both environmental and construction inspectors to monitor and enforce restrictions on ROW traffic and usage.

6.17 *Access and Temporary Workspace*

Reference:

i) Vantage Pipeline Project, Vol. 2, Section 2.3 Project Components, pages 13-15 (PDF pages 1-3) [A1X5W9]

ii) Vantage Pipeline Project, Vol. 3, Appendix A, Section 3.1 Traffic Management Plan, page 66 (PDF page 5) [A1X6A1]

iii) Vantage Pipeline Project, Vol. 1, Section 6.7, page 30 (PDF page 38) [A1X5W0]

iv) Vantage Pipeline Project, Appendix A, Section 1.4 Surveying and Clearing, page 8 (PDF p. 13) [A1X5Z8]

Preamble: Reference (i) identifies the need for permanent access roads for pipeline operations at the pump stations and at some block valve sites. These roads would be 6 m in width. Reference (i) also states that any additional roads required for pipeline operations once final routing is determined would be no greater than 10 m in width and would be of minimal disturbance. According to reference (ii), the need for developing new access roads is reduced since the proposed pipeline parallels a number of existing roads. Reference (iii) states that a Construction Access, Grade and Clean-up Plan will be developed before construction commences.

Temporary lands would also be required for construction of the proposed project, including temporary access roads, temporary infrastructure (e.g., pipe storage sites, contractor yards) and additional workspace at drainages, road, railway and foreign line crossings, sidebends, and areas with special terrain or soil considerations (reference (i) and (iv)).

In order to evaluate the proposed mitigation of potential impacts, further details are required concerning Vantage's environmental considerations with respect to permanent access roads and temporary land requirements.

Request: Please provide the following:

a) details on the permanent access roads, including:

a.1) whether the 6 to 10 m width described in reference (i) represents the road or the full ROW;

a.2) the rationale for the road and ROW width, including the types, volumes and frequency of traffic expected; and,

a.3) the proposed alteration of the area (i.e., road surface, rest of ROW);

b) the criteria for defining 'minimal disturbance' with respect to permanent access roads;

c) confirmation that the Construction Access, Grade and Clean-up Plan will be filed with the Board, and the anticipated timing of filing;

d) constraint criteria for the selection of temporary lands for access, infrastructure and workspace to ensure sufficient environmental protection; and,

e) confirmation that pre-construction surveys and updates to the Environmental Protection Plan will both include the lands required for temporary access, infrastructure and workspace.

Response:

a) Vantage anticipates that all roads constructed will be 6 metres in width and that any associated ROW will be 10 metres in width. The road and ROW width was determined based on the expected maximum size of equipment required for construction, operation and maintenance of the pump stations and valve sites. During normal operations the pump stations will be accessed bi-weekly and the valve stations accessed monthly. In the event of maintenance at any of these sites, the sites will likely be accessed many times daily until the maintenance is complete. The road surface will be gravel and the remainder of the ROW will be re-established to the same state as the land adjacent to the ROW.

b) The primary criteria for determining whether an access road will result in "minimal disturbance" is minimization of surface impact (i.e. minimizing the length of any access road) while maximizing the utilization of existing road infrastructure. All of the planned pump stations and surface valve locations are adjacent to existing roads which will result in the use of existing road infrastructure and less new access road construction as the length of new access roads will be minimized. Please also see the response to (d) below.

c) The Construction Access, Grade and Clean-up Plan will be filed with the NEB at least 3 months prior to construction commencing.

d) Constraint criteria include: length of access roads, residential and public impacts with respect to noise, dust, safety, security and environmental impacts such as type of land, wetland impacts, wildlife impacts, surface and groundwater impacts, vegetation impacts, archeology and traditional use impacts.

e) Confirmed.

6.18 *Rare Plants*

Reference:

i) Vantage Pipeline Project, Vol. 2, Section 13.3.5, Mitigation Options for Potential Project Interactions with Rare Plants pages 239-241 (PDF pages 81-83) [A1X5Y0]

ii) Vantage Pipeline Project, Vol. 2, Table 13-5, pages 242-246 [PDF pages 84-88] [A1X5Y0]

iii) Vantage Pipeline Project, Vol. 3, Section 4.10 Rare Plants Contingency Plan, pages 102-103 (PDF pages 41-42) [A1X6A1]

iv) Vantage Environmental and Socio-Economic Assessment Update, Section 8.2.5, pages 3M-14 (PDF page 16-17) [A1Z7Q3]

Preamble: Reference (i) describes general mitigation options for rare plant species including rerouting, transplanting species, protecting species with covering, and others, depending on proximity to the proposed route and species characteristics. Reference (ii) applies the general mitigation options presented in reference (i) to each of the 23 rare plant species found in initial surveys, by quarter section and by plant location (whether the plant occurs on or off the Project Study Area (PSA)). Reference (iii) provides criteria for determining appropriate mitigative action if rare plants are encountered during construction activities. The preferred method listed in reference (iii) is avoidance.

Reference (iv) describes the location of linear-leaved plantain *(Plantago elongata* Pursh subsp. *elongate),* ranked as S2S3 by the Saskatchewan Conservation Data Centre, on the proposed pipeline route. According to the reference, "In one quarter section the species covered virtually the entire length of the proposed ROW, and extended well off to both sides for many tens of meters."

In reference (i), Vantage states that the most conservative mitigation measures are preferred for species that have a Subnational Conservation Status Rank of Critically Imperiled (51), Imperiled (S2) or an intermediate variant of Imperiled (S2S3 and S2S4). For Imperiled (S2, S2S3) species there should be a 10 m to 25 m setback, where possible (reference (i)).

For each of the 23 rare plant species initially surveyed, as well as 13 additional species described in reference (iv), it is not clear which of the general mitigation options provided in references (i), (ii) and (iii), including avoidance, would be preferred and what criteria would be applied to choose the option. It is also not clear how Vantage would apply their criteria to a rare plant species such as linear-leaved plantain that covers a large portion of the proposed ROW in a quarter section.

Request: Please provide the following:

a) clear criteria for identifying plant and site-specific mitigation measures from among the general mitigation options for rare plant species;

b) whether Vantage has consulted with appropriate agencies with respect to the criteria developed in (a), and:

b.1) if so, a summary of consultation outcomes; or,

b.2) if not, an indication of when Vantage will file an update on consultation and mitigation for rare plant species;

c) the preferred mitigation for linear-leaved plantain, applying the criteria described in (a); and,

d) whether Vantage has consulted with appropriate agencies with respect to the linear-leaved plantain, and:

d.1) if so, a summary of consultation outcomes including local status of the linear-leaved plantain and potential mitigation measures; or,

d.2) if not, when Vantage will file an update on consultation and mitigation for this species.

Response: a) Criteria commonly used to determine site-specific mitigation measures include (Fryer et. al. 2002):

- proximity and location of individuals in relation to the ROW boundaries;
- number of individuals at a given site;
- distribution of individuals at a given site;
- degree and type of rarity;
- anticipated construction restrictions (requirements for extra workspace, feasibility of narrowed ROW, etc.)

Additional biological factors affecting a plant's rarity status (Robson 1999) which may be considered include:

- whether the plant is an annual or perennial;
- whether the species has specific mycorrhizal, saprophytic, parasitic, or pollinator relationships that will affect their ability to propagate;
- whether the species has an early or late seral community association; and
- habitat specific considerations such as habitat sensitivity

The preferred mitigation options for rare species occurrences are as follows:

1. Avoidance – this involves relocating known occurrences using GPS data from field surveys, marking of populations with flags or exclusion fencing, monitoring of construction activities by a qualified biologist, the application of recommended setbacks wherever possible through re-routing of the ROW, particularly in non-contiguous portions of the proposed route, narrowing of the ROW in the vicinity of the population, and micro-routing the pipeline within the ROW to avoid the population.

2. Cover: Where the pipeline cannot be re-routed or narrowed, rare plants occurring in temporary workspaces, in certain circumstances, could be temporarily covered by protective mats or geotextiles to eliminate or reduce crushing or compaction by construction vehicles. Covering the plants will seek to reduce the impacts of crushing or compaction on the plants and their root systems from the equipment used during the construction process.

3. Transplantation/ Collection of seed and/or protection of seed bank in topsoil: In consultation with the appropriate regulatory agencies, transplantation and seed collection may be viable in select occurrences based on the biology of the plant species, and habitat sensitivity, where re-routing the pipeline around a population is not a practical option. Particularly in the case of annuals, the protection of the seed bank in topsoil may be important in maximizing the potential of successful re-establishment of the species in the disturbed area. The collection of seed, protection of the seed bank in the topsoil, transplantation of certain

species, and the subsequent re-introduction of the species (seed, or mature plants) during reclamation will require careful planning, and monitoring to evaluate any potential issues that may arise.

b) Potential mitigation measures for identified populations of rare species will be determined in consultation with Saskatchewan Environment (SE) and Environment Canada (EC), following the conclusion of the 2011 field season. The results of this consultation will be submitted to the Board as soon as possible.

c) Due to the wide distribution of linear-leaved plantain, the preferred mitigation of avoidance may not be feasible. The protection of the seed bank in the topsoil may be a feasible mitigative alternative once the seeds have dispersed. Topsoil would be salvaged and saved separately from the sites with occurrences of the species, and re-distributed during the clean-up phase of construction. Post-construction monitoring on the Alliance Pipeline, following similar mitigation measures, noted populations of linear-leaved plaintain in the following year (Fryer 2000). Additionally, in-situ covering of the plants where encountered on the ROW/TWS is an alternate option. SE and EC will be consulted regarding mitigative options.

References:

Fryer, G., Dunn, G. and Anderson, P. Rare Plant Impact Mitigation for Alliance Pipeline Project. In Environmental Concerns in Rights-of-Way Management: Seventh International Symposium.

Robson, D.B. 1999. Reasons for Prairie Plant Rarity. In Proceedings of the Fifth Prairie Conservation and Endangered Species Conference. Saskatoon, SK. Natural History Occasional Paper No. 24.

d) During Vantage's consultation with SE and EC, the linear-leaved plantain will be specifically discussed. The results of this consultation will be submitted to the Board as soon as possible.

6.19 ***Aircraft Overflight***

Reference:

i) Vantage Pipeline Project, Vol. 2, Section 14.1.1 Ecological Context, pages 267-268 (PDF pages 1-2) [A1X5Y1]

ii) Vantage Pipeline Project, Vol. 2, Section 7.3.5, Operations page 67 (PDF page 10) [A1X5X5]

iii) Vantage Pipeline Project, Vol. 2, Section 14.3.5, Accidents and Malfunctions, pages 291-292 (PDF pages 25-26) [A1X5Y1]

iv) Vantage Pipeline Project, Vol. 2, Section 19.4.8 Wildlife and Wildlife Habitat, pages 441-442 (PDF pages 9-10) [A1X5Z01

Preamble: Reference (i) describes the proximity of the proposed project ROW to two Important Bird Areas (IBAs), as well as Ducks Unlimited (DU) and North American Waterfowl Management Plan (NAWMP)lands. There are also a considerable number of wetlands along the project route.

References (ii) and (iii) state that, once commissioned, the Vantage pipeline route will be flown bi-weekly (every two weeks) by fixed wing aircraft. These biweekly surveillance flights represent a source of intermittent noise during operation of the pipeline and will be flown at 200 to 300 feet above ground level (reference (ii)).

Reference (iv) describes potential cumulative effects on wildlife in the area, including disturbance due to construction of the adjacent Keystone XL pipeline, bird strikes with power lines, and others.

The impacts of regular overflight on bird species in the area, especially species at risk, and the mitigation measures to reduce these impacts are unclear.

Request: Please provide the following:

a) identification of species that may be sensitive to the impacts of overflight of the project area at 200 to 300 feet, including identifying the sensitivities of species at risk;

b) how timing of flights might affect the impacts (i.e., time of day, season);

c) whether Vantage is aware of other flight surveys that would be taking place on adjacent pipelines, and if so, the timing, altitude

and typical frequency of those surveys; and

d) mitigation measures proposed by Vantage for both direct and cumulative effects of aircraft pipeline surveillance

Response: a) The potential effects of aircraft on wildlife have been extensively studied for many terrestrial mammal and bird species. The physical responses to aircraft can range from mild (raised head, body shift), to moderate (leave area for short-term), to severe (panicked flight) (NoiseQuest 2011; National Park Service 2004). The long-term chronic effects are less understood (National Park Service 2004).

Birds

For almost all bird species, escape flight is a natural response to an object flying overhead, including aircraft (Kempf and Huppop 1998). However, most bird species studied adapt and acclimatize fairly quickly to the stimulus, and the flushing behaviour is replaced with less intense response behaviour (such as raised heads or body shifts) (Kempf and Huppop 1998).

A wide range of responses have been observed in bird species, including increased heart rate, increased calling, restless pacing, flight, avoidance of area (short period, long-term or total abandonment) (Kempf and Huppop 1998), increased energy consumption, lower food intake, lower resting time (Komenda-Zehnder, Cevailos and Bruderer 2003; Institute for Environmental Monitoring and Research). Most bird strikes occur between 50 and 800 feet above-ground-level (AGL).

Waterfowl flushed off a waterbody typically remain in the air for approximately 5 minutes (Komenda-Zehnder, Cevailos and Bruderer 2003). Geese are particularly sensitive to aircraft; greater snow geese were observed to reduce habitat use by up to 50% following a disturbance of over 2 flights per hour (USDA-APHIS Wildlife Services 2001). A study of American wigeon, gadwall and green-winged teal found the birds responded (flying, swimming or alert behaviour) for approximately 10 to 40 seconds per overflight (Conomy *et al*. 1998).

Colonies of bird species, such as terns and pelicans, are also susceptible (Kempf and Huppop 1998). Godwits and curlews have also been shown to experience negative impacts (USDA-APHIS Wildlife Services 2001). A previous study of tree-nesting colonial waterbirds found no moderate or severe reaction in

response to low-level flyovers (USDA-APHIS Wildlife Services 2001). A similar study on shorebirds found little response to flights 195-309 feet AGL, but non-nesting birds reacted more than nesting birds (NoiseQuest 2011). Gulls and cormorants are known to kick eggs from their nests when flushed suddenly, which can lead to reduced nesting success (National Park Service 2004). Tundra swans and pelicans have been known to abandon nest due to chronic from aircraft (National Park Service 2004). Sandhill cranes will abandon specific areas for extended periods of time when overflights are occurring (National Park Service 2004).

Red-tailed hawks appear to habituate to low level flights, and experience no apparent effect on nesting success; golden eagles appear equally tolerant (USDA-APHIS Wildlife Services 2001). Most raptor species show a stronger reaction to helicopters than fixed-wing aircraft (NoiseQuest 2011). A study of bald eagles found approximately half (37-61%) flushed in response to helicopter activity (Stalmaster and Kaiser 1997). The same study found that juvenile bald eagles flushed more often than adults, and individuals on the ground flushed more readily than ones in trees (Stalmaster and Kaiser 1997). The threshold noise level for most raptor species is between 62-85 db (NoiseQuest 2011). Many of the studies noted that the birds displayed more reaction to terrestrial disturbances than to aerial ones (NoiseQuest 2011).

Subtle effects on peregrine falcon parenting behaviour due to disturbances caused by aircraft have been observed. The effects of disturbance increase during the incubation-brooding period (Palmer, Nordmeyer and Roby).

Mammals

Mammals are more sensitive to the noise associated with aircraft than birds are. Noise levels of 120 dBA can cause damage to mammals' ears, while levels of 95 dBA can cause temporary loss of hearing sensitivity (NoiseQuest 2011). Noise associated with airplane has been shown to cause changes in home ranges, foraging patterns, and breeding behavior in large carnivores.

Mule deer display little response to aircraft (USDA-APHIS Wildlife Services 2001).

Please also see the attachment to 6.19(a) being a table providing species' responses to overflights.

References:

Kempf, N. and O. Huppop. 1998. What effect do airplanes have on birds? – A summary. In Nature and Landscape 30(1): 17-28 (translated from its original German).

Komenda-Zehnder, S., M. Cevallos and B. Bruderer. 2003. Effects of disturbance by aircraft overflight on waterbirds – an experimental approach. International Bird Strike Committee report IBSC26/WP-LE2.

Institute for Environmental Monitoring and Research. Date. Effect of low-level overflights on the behavious of spring staging waterfowl in central Labrador.

USDA-APHIS Wildlife Services. 2001. Environmental Assessment Monitoring: Eastern Montana Predator Damage Management.

Palmer, A.G., D.L. Nordmeyer, and D.D. Roby. Effects of jet aircraft overflights on parental care of peregrine falcons. Wildlife Society Bulletin Vol. 31(2):499-509.

NoiseQuest. 2011. Aviation Noise Information and Resources. Website.

National Park Service. 1994. Chapter 5: Effects of Overflights on Wildlife. In Report on Effects of Aircraft Overflights on the National Park Service.

Conomy, J.T. et al. 1998. Dabbling duck behavior and aircraft activity in coastal North Carolina. Journal of Wildlife Management 62(2): 1127-1134.

Stalmaster, M.V. and J.L. Kaiser. 1997. Flushing responses of wintering bald eagles to military activity. Journal of Wildlife Management 61(4):1307-1313.

b) Aircraft overflights during nesting season can displace adult birds from nests and ultimately may result in loss of egg clutches and decreased young survivorship for some species, while overflights during fall or winter may affect energy expenditures by displacing birds from staging habitat or feeding grounds. Low-level aircraft overflights during certain times of day may cause a change in activity patterns for some wildlife species (Belanger and Bedard 1989; Gese *et al*. 1989).

Wildlife can habituate to aircraft disturbance (Workman *et al.* 1992; Krausman *et al*. 1993, 1998; Weisenberger *et al.* 1996) and impacts were found to be brief, insignificant and not detrimental to reproductive success for some wildlife species (Smith *et al*. 1998; Lamp 1989; Ellis *et al.* 1991; Grubb and Bowerman 1997).

References:

Belanger, L. and J. Bedard, 1989b. Energetic cost of man-induced disturbance to staging snow geese. Journal of Wildlife Management 54: 36-41.

Ellis, D.H., C.H. Ellis, and D.P. Mindell. 1991. Raptor Responses to Low-level Jet Aircraft and Sonic Booms. Environmental Pollution 74:53-83.

Gese, E. M., Rongstad, O. J., and Mytton, W. R. 1989. Changes in coyote movements due to military activity. *Journal of Wildlife Management*, 53:334-339.

Grubb, T.G. and W.W. Bowerman. 1997. Variations in Breeding Bald Eagle Responses to Jets, Light Planes, and Helicopters. Journal of Raptor Research, 31:213-222.

Lamp 1989. Monitoring the Effects of Military Air Operations at Naval Air Station Fallon on the Biota of Nevada. Nevada Department of Wildlife, Reno.

Krausman, P.R., M.C. Wallace, D.W. DeYoung, M.E. Weisenberger, and C.L. Hayes. 1993. The Effects of Low-altitude Jet Aircraft on Desert Ungulates. International Congress: Noise as a Public Health Problem 6:471-478.

Smith. D.G., D.H. Ellis, and T.H. Johnson. 1988. Raptors and Aircraft. *In* R.L. Glinski, B. Gron- Pendelton, M.B. Moss, M.N. LeFranc, Jr. B.A. Millsap, and S.W. Hoffman, eds. Proceedings of the Southwest Raptor Management Symposium. Pp. 360-367. National Wildlife Federation, Washington, D.C.

Weisenberger, M.E., P.R. Krausman, M.C. Wallace, D.W. DeYoung, and O.E. Maughan. 1996. Effects of Simulated Jet Aircraft Noise on Heart Rate and Behavior of Desert Ungulates. Journal of Wildlife Management 60:52-61.

Workman, G.W., T.D. Bunch, J.W. Call, R.C. Evans, L.S. Neilson, and E.M. Rawlings. 1992. Sonic Boom/Animal Disturbance Studies on Pronghorn Antelope, Rocky Mountain Elk, and Bighorn sheep. Utah State University Foundation, Logan. Prepared for U.S. Air Force, Hill AFB, Contract F42650-87-C-0349.

c) The TransCanada Keystone Integrity Management Program includes periodic aerial patrols by helicopter or fixed wing aircraft. Details of aerial patrol timing, altitude and frequency are not available at this time. Typically survey flights occur at 500 feet above ground level (AGL).

d) Mitigation measures that may minimize disturbance to wildlife include:

- Restrict overflights over areas with known sensitive or threatened species during the breeding season;
- maintain constant speed, distance, and height when conducting flyovers;
- survey at a distance from the pipeline, rather than directly overhead;
- use fixed-wing aircraft rather than helicopters; and

- minimize use of aircraft in areas with little existing disturbance (i.e. areas with no roads or rail lines, far removed from urban centers or industry).

6.20 ***Critical Habitat***

Reference: i) Vantage Pipeline Project, Vol. 2, Section 14.2 Baseline Conditions Summary, pages 270-273 (PDF pages 4-7) [A1X5Y1]

ii) Vantage Pipeline Project, Vol. 3, Appendix J, Table J-3, pages 51-52 (PDF pages 14-15) [A1X6D81

Preamble: In reference (i), and throughout its Application, Vantage lists several Species at Risk and Species of Special Status that may occur in the vicinity of the proposed pipeline or that were found during wildlife surveys conducted to date, and describes several important habitats for these species. In reference (ii), Vantage states that the shoreline of Willow Bunch Lake Important Bird Area is designated as critical piping plover habitat under the Saskatchewan *Wildlife Habitat Protection Act* (WHPA). It is not clear if any of the other important habitats described by Vantage are designated critical habitat as defined by the *Species at Risk Act* (SARA) or provincial legislation.

Request: Please provide:

a) clarification of what habitats occur within the project Regional Study Area (RSA) that have been identified as critical habitat as defined by the SARA or provincial legislation; and,

b) if critical habitat exists within the project RSA, the following information for each critical habitat site:

b.1) the anticipated interaction between project activities and the critical habitat, including the proximity of any activity to the critical habitat even if no direct contact is anticipated;

b.2) site-specific mitigation measures; and,

b.3) evidence of consultation on site-specific mitigation measures with appropriate regulatory agencies, landowners, or other parties.

Response: a) There are no identified critical habitats as defined by the SARA or provincial legislation of listed species occurring within the

project's Regional Study Area (being a 30 km wide corridor centred on the proposed ROW). The Saskatchewan *Critical Wildlife Habitat Protection Act* was amended in 1992 by striking the term "critical" from the Act, and by a title change to the *Wildlife Habitat Protection Act*.

In reference (ii), Vantage stated that the shoreline of Willow Bunch Lake Important Bird Area is designated as critical piping plover habitat under the Saskatchewan *Wildlife Habitat Protection Act* (WHPA). However, this is an error as the Saskatchewan *Critical Wildlife Habitat Protection Act* was amended in 1992 by striking out the term "critical" wherever it occurred within the Act, and by a title change to the WHPA. Critical habitat is not defined in the WHPA.

b) b.1) No interaction between project activities and critical habitat is anticipated.

b.2) Since critical habitat is not traversed by the project, and no interaction between the project and critical habitat is anticipated, site-specific mitigation measures for critical habitat will not be required.

b.3) Vantage does not believe that site-specific mitigation measures for critical habitat will be required. Regardless, Vantage will consult with SE and EC following the completion of the 2011 field season. Vantage will submit the results of this consultation to the Board as soon as it is available.

References:

Government of Saskatchewan. 1992. An Act to amend *The Critical Wildlife Habitat Protection Act*. Queen's Printer for Saskatchewan, Regina, Saskatchewan.

Government of Saskatchewan. 1992. *The Wildlife Habitat Protection Act*. Chapter W-132. Queen's Printer for Saskatchewan, Regina, Saskatchewan.

6.21 ***Illumination***

Reference:
i) Vantage Pipeline Project, Vol. 2, Table 14-3, pages 276-278 (PDF pages 10-12) [A1X5Y1]
ii) Vantage Pipeline Project, Vol. 2, Section 14.3.4, Disturbance of Wildlife, page 282 (PDF page 16) [A1X5Y1]

Preamble: Reference (i) states several impacts of excess illumination on wildlife, including affecting foraging amphibians and potentially decreasing survival or reproduction of Ord's kangaroo rat. Reference (ii) adds that increased activity, noise and night-time illumination due to construction may cause disturbance to wildlife and cause reduced productivity or nest or breeding site desertion and reduced use or displacement from habitats.

Request: Please provide Vantage's policy on artificial illumination during construction and operations, including:

a) any times where lighting would be required (factoring in seasonal variation in hours of daylight and wildlife activity);

b) any times or locations where lighting would be prohibited; and

c) if artificial lighting would be used during construction or operations:

c.1) the light levels and distances at which amphibians and Ord's kangaroo rat are affected; and,

c.2) the mitigation measures Vantage would use to reduce impacts of illumination on wildlife.

Response: a) Lighting may be required during HDD activities. Most of the proposed HDD's will be completed within a relatively short time frame. An Environmental Monitor will be present during all HDD activities.

In addition, as daylight hours shorten, vehicular lighting will be required to and from the construction site.

During operations, lights at pump stations will only be turned on in the evenings if personnel are present.

b) Vantage is not aware of any times or locations where lighting

would be prohibited.

c) c.1) Ord's Kangaroo Rat - Research suggests that increased nighttime illumination near dens and home ranges changes the behaviour of Ord's kangaroo rats including reducing their foraging behaviour (Kaufman and Kaufman 1982; Kotler 1984, COSEWIC 2006). The *Recovery Strategy for the Ord's Kangaroo Rat* has indicated that "nocturnal illumination has the potential to mimic intense moonlight conditions, consequently increasing predation risk or minimizing the above ground time kangaroo rats spend foraging and may ultimately cause a decrease in survival or reproduction". (Environment Canada 2011) An evaluation of pipeline activities during and post-construction of the North Suffield pipeline indicated that although no nighttime construction was undertaken, Ord's kangaroo rats appeared to reduce their home range size to a smaller core area in response to daytime disturbances. The study recommended that no nighttime activities nor lights should be allowed where Ord's kangaroo rats are known to occur (Gummer and Robertson 2003).

The thresholds at which light levels and distances effect Ord's kangaroo rats requires further investigation (Kissner 2009). ASRD F&W recommend however that "all activity should be concluded before sunset and not use artificial illumination within 1000 m of Ord's kangaroo rat range" (ASRD F&W 2011)

Amphibians - Research has indicated that light illumination affects amphibian activities including foraging and possibly mating (Buchanan 1993, Hailman 1984, Baker and Richardson 2006). This has lead to speculation that excess illumination at breeding ponds due to oil and gas development activities may have an impact on amphibian reproductive success (Environment Canada 2009).

Conclusive research on absolute light levels and distance thresholds at which amphibians are affected is generally lacking. A review of the possible effects of night lighting on many species of amphibians and reptiles indicates that very few studies on the consequences of artificial lights to amphibian and reptile species have been

conducted to date. However the authors of the review do indicate light pollution is a threat to amphibians and further information is required to provide more specific management recommendations (Perry *et al*. 2008). There is evidence emerging that different species may vary in sensitivities to light pollution from having no effect, a beneficial effect or a negative effect on a particular taxon (Perry *et al*. 2008). Disturbance thresholds for artificial illumination have not been provided for amphibian Species of Management Concern (i.e., northern leopard frog, great plains toad or spadefoot toad) which have been observed within the project area. The potential effect of artificial illumination on these species has not been specifically noted as a potential limiting factor within recent provincial and Committee on the Status of Endangered Wildlife in Canada (COSEWIC) reports (Arsenault 2009, COSEWIC 2009 and 1010, Lauzon 1999).

c.2) Ord's Kangaroo Rat - Survey's for Ord's kangaroo rats will be conducted during appropriate times and conditions to identify the presence of this species and determine the precise locations of burrows in habitat with potential for this species. Surveys will be based upon protocols outlined by Alberta Sustainable Resource Development in 2010. Supplemental surveys are scheduled for August 2011, at a time when population densities are higher in order to maximize the probability of encountering this species (ASRD 2010, Bender *et al*. 2007).

In areas where Ord's kangaroo rat are found during supplemental surveys, it is recommended that development activities occur in the winter and that predevelopment surveys be undertaken prior to construction. Predevelopment surveys should be undertaken immediately prior to snow cover to ensure that all newly inhabited sites are recorded (Kissner 2009).

Setback distances of the proposed development from where Ord's kangaroo rat burrows are found will be discussed with regulatory authorities on a site by site basis. In areas where Ord's kangaroo rat burrows are found, it is recommended that all activity (including

nighttime traffic) be concluded before sunset and that artificial illumination not be used within 1000 m of Ord's kangaroo rat range along the proposed pipeline ROW. It is also recommended that facilities which require lighting (i.e. pump stations) not be located within 1000 m of known Ord's kangaroo rat burrows.

Amphibians - Night illumination will be required for HDD. It is recommended that these activities, and any others where nighttime illumination may be required, be undertaken in the fall during dispersal and outside of the breeding period for amphibian Species of Management Concern (i.e. mid April to July) in areas where amphibian Species of Management Concern have been found, so that the potential for disruption of amphibian mating and reproduction activities from illumination is reduced.

It is also recommended that facilities which require lighting (i.e. pump stations) not be located within the vicinity of known site-specific habitats of amphibian Species of Management Concern.

References:

Alberta Sustainable Resource Development Fish and Wildlife 2011. Recommended Land Use Guidelines for Protection of Selected Wildlife Species and Habitat within Grassland and Parkland Natural Regions of Alberta Government of Alberta

Alberta Sustainable Resource Development Fish and Wildlife 2011 Sensitive Species Inventory Guidelines August 2010.

Arsenault, A.A. 2009. Disturbance impact thresholds: recommended land use guidelines for protection of vertebrate species of concern in Saskatchewan. Saskatchewan Ministry of Environment. Lands Branch - Fish and Wildlife Branch Technical Report 2009-06. 93 pp.

Baker, B.J. and J.M.L. Richardson 2006. The effect of artificial light on male breeding season behaviour in greed tree frogs. Canadian Journal of Zoology 84: 1528-1532 (2006).

Bender, D.J., D.L. Gummer and R.E. Dzenkiw. Monitoring Protocol for the Ord's Kangaroo Rat. Alberta Species at Risk Report No. 113 March 2007. University of Calgary, Royal Alberta Museum, Alberta Sustainable Resource Development Fish and Wildlife. 21 pp.

Buchanan, B.W. 1993 Effects of enhanced lighting on the behaviour of nocturnal frogs. Animal Behaviour 45: 893-899.

COSEWIC 2006. COSEWIC assessment and update status report on the Ord's kangaroo rat *Dipodomys ordii* in Canada. Committee on the Status of Endangered Wildlife in Canada. Ottawa. Vii + 34 pp.

COSEWIC 2010. COSEWIC assessment and status report on the Great Plains Toad *Anaxyrus cognatus* in Canada. Committee on the Status of Endangered Wildlife in Canada. Ottawa. Vii + 54 pp.

COSEWIC 2009. COSEWIC assessment and status report on the northern leopard frog *Lithobates pipiens,* Rocky Mountain population, Wstern Boreal/PPrairie Population and Eastern Population in Canada. Committee on the Status of Endangered Wildlife in Canada. Ottawa. 69 pp.

Environment Canada. 2009 Petroleum Industry Activity Guidelines for Wildlife Species at Risk in the Prairie and Northern Region. Canadian Wildlife Service, Environment Canada, Prairie and Northern Region, Edmonton, Alberta. 64pp.

Environment Canada. 2011. Recovery Strategy for the Ord's Kangaroo Rat (*Dipodomys ordii*) in Canada [Proposed]. *Species at Risk Act* Recovery Strategy Series. Environment Canada, Ottawa. vi + 28 pp. + Appendices.

Gummer, D. and S. Robertson 2003. Evaluation of activities and survivial of Ord's kangaroo rats during and post construction of the North Suffield pipeline. Final Report submitted to EnCana Suffield GasPipeline Inc. Mammology Program, Provinical Museum of Alberta. 42 pp.

Hailman, J.P. 1984. Bimodal nocturnal activity of the western toad *Bufo boreas* in relation to ambient illumination Copeia (2) 283-290.

Kaufman, D.W., and G.A. and G.A. Kaufman Effect of Moonlight on Acitivity and Microhabitat Use by Ord's Kanagoo Rat (Dipodomys ordii) Journal of Mammalogy, Vol. 63, No. 2 (May 1982) pp 309-312.

Kissner, K.J., 2009 Beneficial Management Practices for Ord' Kangaroo Rat in Alberta. Alberta Sustainable Resource Development. Alberta Species at Risk Report No. 125 42 p.

Kotler, B.P. 1984 Effects of Illumination on the Rate of Resource Harvesting in a Community of Desert Rodents American Midland Naturalist, Vol. 111, No. 2 (april 1984) pp383-389.

Lauzon, R.D. 1999. Status of the Plains Spadefoot *Spea bombirfons* in Alberta. Alberta Environment, Fisheries and Wildlife Management Division, and Alberta Conservation Association, Wildlife Status Report No. 25, Edmonton, Alberta. 17 pp.

Perry, G., B.W. Buchanan, R.N. Fisher, M. Salmon and S.E. Wise. 2008. Effects of artificial night lighting on amphibians and reptiles in urban environments. Pages 239-256 in J.C. Mitchell, R.E. Jung Brown and B. Bartholomew editors, Urban Herpetology Society for the study of Amphibians and Reptiles, Salt Lake City, UT. Herpetological Conservation Number Three.

6.22 *Fragmentation of Native Habitats*

Reference:

i) Vantage Pipeline Project, Vol. 2, Section 13.1.1 Ecological Context, page 222 (PDF page 64) [A1X5Y0]

ii) Vantage Pipeline Project, Vol. 2, Section 14, Table 14-3, pages 276-278 (PDF pages 10-12) [A1X5Y11

iii) Vantage Pipeline Project, Vol. 3, Appendix J, Table J-4, pages 53-64 (PDF pages 16-27) [A1X6D8]

iv) Vantage Pipeline Project, Vol. 2, Section 13.3.4, Detailed Assessment of Potential Project Interactions with Vegetation, pages 233-237 (PDF pages 75-79) [A1X5Y0]

v) Vantage Pipeline Project, Vol. 2, Section 14.5.3 Identification of Possible Interactions, pages 326-329 (PDF pages 60-63) [A1X5Y1]

vi) Vantage Pipeline Project, Vol. 2, Section 13.3.6.3 Potential Residual Effects and the Determination of their Significance, page 255-259 (PDF page 97-101) [A1X5Y0]

vii) Vantage Pipeline Project, Vol. 3, Appendix J, Table J-5, pages 65-67 (PDF pages 28-30) [A1X6D8]

viii) Vantage Pipeline Canada Inc. Response to IR 3.16, pages 24-26 [A1Z7T7]

ix) Vantage Pipeline Project, Vol. 2, Section 14.3.11 Potential Residual Effects, pages 320-324 (PDF pages 54-58) [A1X5Y1]

x) National Energy Board Filing Manual, Revised May 2011, Table A-2 Filing Requirements for Biophysical Elements, Wildlife and Wildlife Habitat, page 4A-54 to 4A-55

Preamble: Reference (i) discusses the importance and value of the remaining tracks of native vegetation in the prairies. Habitat fragmentation in the grasslands is linked to limitations and declines of wildlife species, many of which are species at risk (reference (ii) and (iii)).

Reference (iv) notes that habitat fragmentation resulting from the proposed project is expected to be limited, as care was taken to route the project adjacent to existing pipelines and roads, where possible. However, where the project is non-contiguous and traverses native prairie, fragmentation may pose a problem for species. Reference (v) describes habitat fragmentation and reduction of patch size of habitats resulting from cumulative impacts of development.

Reference (vi) identifies the direct footprint of the proposed project on native prairie as 61.9 ha based on stated assumptions. The length of

pipeline crossing native prairie is 63.29 km as of 2010 field surveys, with 11.22 km of new, non-contiguous ROW (reference (vi)). One hundred and thirty-nine quarter sections crossed by the proposed pipeline are High Potential Wildlife Areas (reference (vii); 33 of these are crossed by new, non-contiguous ROW (reference (viii)).

In reference (vi), Vantage claims that no measurable effects to the sustainability of native prairies in the region are expected. According to reference (ix), with respect to impacts on wildlife due to habitat fragmentation, Vantage notes that there are currently no government or industry measures or thresholds for potential effects.

However, the scientific literature contains considerable and well-established quantitative analyses and measures of landscape effects such as habitat fragmentation on grassland species, particularly species at risk.

Reference (x) guides proponents to describe the cumulative disturbance footprint within key known habitats and distribution of that footprint, preferably quantitatively, and to compare the cumulative effect to any available species-specific thresholds or policies. The guidance provided in reference (x)lists examples of tools that may be used to assess cumulative effects including spatial analysis and landscape level indicators of change such as linear density.

Request: Please provide the following:

a) the current patch sizes of connected native habitat (including prairie, wetlands and drainages) within each quarter-section or group of connected quarter-sections identified as High Potential Wildlife Areas in reference (iv);

b) the projected patch sizes of connected native habitat, as described in (a), after construction of the proposed pipeline;

c) estimated values for patch sizes of connected native habitat including both the proposed pipeline and projects considered in the cumulative effects assessment, with clear assumptions stated;

d) the current values for linear disturbance density in the RSA, in km/km^2, within an appropriate area centered on each quarter-section or group of connected quarter-sections identified as High Potential Wildlife Areas in reference (iv);

e) the projected values for linear disturbance density, as described

in (d), after construction of the proposed pipeline;

f) estimated values for linear disturbance density including both the proposed pipeline and projects considered in the cumulative effects assessment, with clear assumptions stated;

g) threshold values for linear disturbance density available in the scientific literature (e.g., landscape ecology, conservation biology) for species of management concern in the RSA; and

h) please compare each of the values derived in (d), (e), and (f) to the thresholds summarized in (g).

Response: a) - f) Please see Attachments to 6.22.

g) - h) While scientific and government literature extensively discuss species thresholds in relation to disturbances, it is generally subjective in nature (with the exception of some species which do not inhabit the project area such as grizzly bear and woodland caribou). In addition, the literature weighs heavily towards roads rather than pipelines. Arsenault (2009) and Whitfield *et al*. (2008) state that "there is a severe knowledge gaps (sic) for disturbance impact thresholds for most species, so expert opinion is commonly used to infer prescribed buffers". No specific quantitative threshold values for linear disturbance density (in km/km^2) are documented for species of management concern which may occur in the project area.

References:

A.A. Arsenault 2009. Disturbance Impact Thresholds: Recommended Land Use Guidelines for Protection of Vertebrate Species of Concern in Saskatchewan. Saskatchewan Ministry of Environment, Lands Branch – Fish and Wildlife Branch Technical Report 2009-06. 93 pp.

Alberta Burrowing Owl Recovery Team. 2005. Recovery Plan for Burrowing Owl in Alberta. Alberta Sustainable Resource Development. Fish and Wildlife Division, Alberta Recovery Plan No. 6. Edmonton, AB.

Dale, B.C., Weins, T.S., and Hamilton, L.E. 2008. Abundance of Three Grassland Songbirds in an Area of Natural Gas Infill Drilling in Alberta, Canada. In: Proceedings of the Fourth International Partners in Flight Conference: Tundra to Tropics.

Downey, B.A., Downey B.L., Quinlan, R.W., Castelli, O., Remesz, V.J., Jones P.F. 2004. MULTISAR: The Milk River Basin Project. Habitat Suitability Models for Selected Wildlife Management Species. Alberta Species at Risk Report No. 86.

Forman, R. T. T., Friedman, D. S., Fitzhenry, D., Martin, J. D., Chen, A. S., and L. E. Alexander. 1997. Ecological effects of roads: Towards three summary indices and an overview for North America. Pages 40-54 in K. Canters, editor. Habitat fragmentation

and inifrastructure. Min-istry of Transport, Public Works and Water Management, Delft, The Netherlands.

Forman, R. T. T. and L. E. Alexander. 1998. Roads and their major ecological effects. Annual Review of Ecology and Systematics 29: 207-31.

Golder Associates Ltd. 2009. Terrestrial resources assessment report for the Encana Christina Lake Thermal Expansion Project, phases 1E, 1F, and 1G. Prepared for EnCana FCCL Ltd.

Government of Alberta. 2008. Alberta grizzly bear recovery plan 2008 – 2013.

Gratto-Trevor, C.L. and Abbott S. 2011. Conservation of Piping Plover (Charadrius melodus) on North America: Science, Successes, and Challenges. Canadian Journal of Zoology. 89: 401-418.

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Holroyd, P. 2008. Towards Acceptable Change: A Thresholds Approach to Manage Cumulative Effects of Land Use Change in the Southern Foothills of Alberta. MSc. Thesis, University of Calgary.

Lee, P. and M. Hanneman. 2011 Castle area forest land use zone: Linear disturbances, access densities and grizzly bear habitat security areas.

Linnen, C. 2006. The Effects of Minimal Disturbance Shallow Gas Activity on Grassland Birds. Northern EnviroSearch Ltd.

MacFarlane, B. 2006. A Review of Provincial/Municipal Regulations and Guidelines Applicable to Surface Disturbance Associated with Natural Gas Developments on Crown Lands in the Great Sand Hills, Saskatchewan. Canadian Plains Research Center. University of Regina.

Salmo Consulting Inc., Axys Environmental Consulting Ltd., Forem Technologies Ltd, and Wildlife & Company Ltd. 2004. Deh Cho Cumulative Effects Study Phase I: Management Indicators and Thresholds. Prepared for Deh Cho Land Use Planning Committee, Fort Providence, Northwest Territories.

Seiler, A. Ecological Effects of Roads: A Review. Swedish University of Agricultural Sciences.

Switalski, T. A. How many is too many: A review of road density thresholds for wildlife. The Road-RIPorter. 11.

Wakkinen, W. L., and Kasworm, W. F. 1997. Grizzly Bear and road density relationships in the Selkirk and Cabinet – Yaak Recovery Zones.

Whitfield, P.D., M. Ruddock, and R. Bullman. 2008. Expert opinion as a tool for quantifying bird tolerance to human disturbance. Biol. Cons 141(11):2708 – 2717.

6.23 ***Sod Types***

Reference: i) Vantage Pipeline Canada Inc. Response to NEB IR 3.12, pages 17-19, [A1Z7T7]
ii) Vantage Pipeline Project, Vol. 3, Appendix A, Dwgs. 3 through 9, [A1X5Z81]

Preamble: Reference (i) and (ii) describe different topsoil stripping and ROW preparation procedures for poorly sodded improved pasture and hayland compared to well sodded improved pasture and hayland. The definition of `poorly sodded' versus 'well sodded' is not clear.

Request: Please provide Vantage's definition of 'poorly sodded' and 'well sodded' improved pasture and hayland.

Response: The terms “poorly sodded” and “well sodded” are terms used in a construction context to determine appropriate topsoil stripping widths. Lands are considered well sodded when the sod is of sufficient density and thickness (strength) to be able to store and replace subsoil without taking the sod (and topsoil) with it during backfilling (using a grader or backhoe blade). Lands that are considered poorly sodded have sod that is not stable enough to store subsoil on it without risking admixing during backfill operations. In terms of construction (topsoil stripping), poorly sodded improved pasture and haylands are treated similar to cultivated lands.

6.24 ***Mitigation Measures for Native Prairie***

Reference: Vantage Pipeline Canada Inc. Response to NEB IR 3.15, pages 23-24, [A1Z7T71

Preamble: In the reference, Vantage provides five examples of small and mid-sized pipeline projects where the no-strip method was successfully used. However, Vantage does not provide further details of these examples with which to make a comparison to the Vantage project.

Request: Please provide the following:

a) the pipeline diameter for each of the projects listed in the reference;

b) who determined that the no-strip method was successfully used in each of these cases and according to what measures of

success, applied over what time period;

c) confirmation as to whether any of the examples are of a 10-inch pipeline, and if not, provide additional examples of 10-inch pipeline projects of which Vantage is aware; and,

d) a discussion of whether examples listed in (c) were successful, based on the definitions of success provided in(b).

Response: a) Encana Monogram Pipeline Project - 60 km of 88.9 mm O.D., 114.3 mm O.D., 168.3 mm O.D. and 219.1 mm O.D.

Encana Alderson 3 Pipeline Project- 93 km of 60.3 mm O.D., 88.9 mm O.D., 114.3 mm O.D., 168.3 mm O.D., and 219.1 mm O.D.

Encana Walsh Pipeline Project - 33 km of 168.3 mm O.D. (sales pipeline); 2 km of 88.9 mm O.D. and 15.2 km of 168.3 mm O.D. (gathering system)

Murphy Oil Milk River Pipeline Project – 273.1 mm O.D.

Suncor Looping Projects in South eastern Alberta – 219.1 mm.O.D (ASRD).

b) & c) Alberta Sustainable Resource Development Public Lands Branch (PL) required no-strip construction be used on all Crown-owned lands. Prior to 2004, no specific requirements for Post Construction Reclamation Assessments (PCRA) existed for either Class 1 or Class 2 pipeline projects in Alberta. In October 2003, Alberta Environment initiated a Post Construction Reclamation Reporting requirement for all Class I pipeline projects. The PCRA is conducted one growing season after construction. During the assessment, reclamation success is evaluated in relation to adjacent undisturbed lands using the following criteria:

i) species diversity;

ii) vigour;

iii) density; and

iv) weeds present.

During the PCRA, areas showing indications of poor reclamation (using the above criteria) are examined for

possible reasons (soil compaction, admixing, cattle damage etc) and additional recommendations may be made.

The Murphy Oil Company Ltd. Milk River to USA Loop (1995 Section 58 - NEB Reference number 3400-W023-11) is the only 273.1 mm O.D (10-inch) pipeline of the projects listed in the response to NEB IR 3.15. A copy of the Post Construction Environmental Reports for the project has been requested from NEB archives.

Vantage believes that there is little difference between 219.1 mm O.D. (8-inch) and 273.1 mm O.D. (10-inch) pipelines in terms of trench width or equipment used (size, number of pieces), which is why the other projects were listed in the response to NEB IR 3.15. ASRD advised Vantage of the Suncor project as being a no-strip project. No reclamation information is available for this project.

References:

Gramineae Services Ltd in Association with Alta Rangeland Services Ltd., CorPirate Services, Kestrel Research Ltd. LandWise Inc. and Peggy Desserud, 2007. Revegetation Strategies for Public Lands: A Gap Analysis. Prepared for: Alberta Sustainable Resources Development Land Division, Land Management and Rangeland Management Branches

d) Except for areas where external factors (e.g. cattle damage) affected re-growth, reclamation success for the two projects where PCRAs were conducted (Monogram and Alderson 3) was good.

6.25 *Wetlands - Re-routes to Avoid Wetlands*

Reference:

i) Vantage Pipeline Project, Environmental and Socio-Economic Assessment, Executive Summary [A1X5W6]

ii) Vantage Pipeline Project, Vol. 2, Section 11, pages 159-182 (PDF pages 1-24) [A1X5Y0]

iii) Vantage Pipeline Canada Inc. Response to IR No. 2 and Response Table NEB IR 2.2 [A1Y1J6 & A1Y1J71

iv) Vantage Pipeline Canada Inc. Response to IR No. 3, Attachment 3.16(b-2) and (b-3) [A1Z7U7 & A1Z7U81

Preamble: References (i) and (ii) indicate that the proposed Project crosses about 180 wetlands.

Reference (iii) explains that supplemental surveys planned for 2011 include additional wetland surveys and assessments to confirm number, location, size and class of wetlands. Provincial governments and Environment Canada will receive 2011 data and will review recommended mitigation.

In reference (ii) Vantage states that additional routing options will be considered based on field results. Minor alterations of the proposed routing based on field survey results are expected to lower the number and total area of wetlands crossed.

In reference (iv) Vantage states that it understands that any wetland disturbance is subject to mitigation and compensation measures, and that due to the pipeline size, in most cases the pipeline will be routed to avoid wetlands.

It is not clear when any re-routes to avoid wetlands would be submitted to the Board, and when Vantage will finalize its mitigation measures.

Request: Please provide a clear explanation of:

a) when, after completion of 2011 wetland surveys, Vantage expects to consult with Environment Canada and Provincial governments regarding wetland mitigation;

b) Vantage's criteria for deciding where altering the proposed routing to avoid wetlands is the preferred mitigation and where it is not; and,

c) when Vantage expects to identify pipeline re-routes based on wetland survey results and submit these to the Board.

Response: a) Vantage will consult with Saskatchewan Environment (SE) and Environment Canada (EC) upon completion of the field surveys in September regarding wetland mitigation.

b) Vantage’s criteria for deciding where altering the proposed route to avoid wetlands include:

i) acceptable routing options;

ii) other environmental considerations in the area (wildlife,

rare plant, archaeological);

iii) land use;

iv) size of wetland;

v) class of wetland; and

v) landowner consultation.

c) Several re-route options around wetlands are currently being evaluated vis-à-vis HDD and open cut options. Vantage will consult with SE and EC upon completion of the field surveys to further address wetland issues. Once the consultation is complete, all wetlands where re-routing is the preferred option will be submitted to the Board.

Socio-Economic Matters

6.26 ***Hiring and Contacting Opportunities for Aboriginal Businesses***

Reference: Vantage Response to NEB IR No. 3, Response 3.20, page 35-36-40, (PDF pages 35-36) [A1Z7T7]

Preamble: Reference states that Vantage has asked that any interested Aboriginal businesses provide information relating to the services they could supply during construction. It further states that Vantage will be performing a capacity assessment to determine how the Aboriginal businesses may become involved during the pipeline construction.

Request: Please provide the following:

a) a description of the methods that Vantage has used to contact Aboriginal businesses, including methods of contact and information provided;

b) information that Vantage has asked businesses to provide relating to services they could supply during pipeline construction; and,

c) a description of how Vantage has or will use the information provided by Aboriginal businesses to undertake a capacity assessment, including a description of the criteria Vantage will use for the capacity assessment.

Response:

a) As part of the ongoing meetings with Aboriginal groups, Vantage has described the work being undertaken to construct the pipeline, the various products and services that will be required and the timing of such requirements. Vantage has inquired as to each community's interest in and ability to provide products and services and has encouraged communities with any interest to contact Vantage.

b) Vantage has not asked businesses to provide any specific information yet. Discussions with Aboriginal businesses have focused on the nature of the project and the types of products and services that will be required.

c) Vantage will work with interested Aboriginal businesses to determine their capacity and capability to provide a specific product or service. Vantage has not developed a criteria to be used in order to perform such capacity assessments, but expects that the criteria will in part depend upon the product or service to be provided. Criteria that may be considered include previous experience, whether equipment is in good condition, the ability to meet safety standards, as well as any differences when compared to products or services that might be available from non-Aboriginal businesses.

Aboriginal Matters

6.27 ***Consultation with Potentially Affected Aboriginal Groups***

Reference:

i) Vantage Pipeline Project, Vol. 1, Attachment E-2 Aboriginal Consultation Activities (as of January 2011), pages 213-291 (PDF pages 54-132) [A1X5W4]
ii) Vantage Additional Written Evidence, Appendix B Aboriginal Engagement Program Update [A1Z7Q2]
iii) Vantage Pipeline Project, Vol. 1, Attachment E-1 Aboriginal Groups contacted by NEB, page 212 (PDF page 53) [A1X5W4]
iv) Vantage Response to NEB IR No. 3, Response 3.23, pages 39-40 (PDF pages 39-40) [A1Z7T71

Preamble: References (i) and (ii) provide an update on consultation activities that have taken place since January 2011.

Reference (iii) lists the Aboriginal groups identified by the Major Project Management Office (MPMO) as communities which may be impacted

by the Vantage Pipeline Project.

Reference (iv) states that Vantage has engaged, or attempted to engage, in consultation with all potentially affected Aboriginal groups identified by Vantage and the MPMO in the same manner and to the same extent. The Board notes the following 15 Aboriginal groups identified by the MPMO as communities which may be impacted by the Vantage Pipeline Project were not included in Vantage's update on consultation; Blood Tribe, Carry the Kettle First Nation, Chacachas First Nation, Kahkewistahaw First Nation, Lean Man, Mosquito, Grizzly Bear's Head First Nation, Lucky Man First Nation, Moosomin First Nation, Muscowpetung First Nation, Ochapowace First Nation, Okanese First Nation, Peepeekisis First Nation, Piikani First Nation, Standing Buffalo Dakota First Nation, Star Blanket First Nation and Sweetgrass First Nation.

Request: Please provide an updated itemized table on consultation activities undertaken with the Aboriginal groups listed in the preamble above. In the response, please include:

a) a summary of all activities carried out, including the date and method of contact (for example: telephone, personal meeting, email, letter mail);

b) a summary of all issues and concerns raised;

c) steps that Vantage has taken or will take to address concerns, including any proposed mitigation measures;

d) a summary of any outstanding concerns or issues; and,

e) an explanation why no further action would be required to address any particular concerns.

Response: a) Please see Attachment 6.27(a).

b) With the exception of the Lucky Man and Mosquito First Nations, who are represented by counsel, all of the other listed First Nations have not expressed an interest in the project. To date, the Lucky Man and Mosquito First Nations have asserted that they currently exercise TLU on or adjacent to the proposed ROW but have not provided specific information to Vantage in support of such claim.

c) Vantage continues to request information from the Lucky Man and Mosquito First Nations regarding specific impacts of the project on the Aboriginal groups' TLU. Until such information is

provided, Vantage is not in a position to consider whether mitigation measures are required.

d) Please see the response to (b) above.

e) Vantage will continue to attempt to engage in consultation with the Lucky Man and Mosquito First Nation. All of the other listed Aboriginal groups have expressed no interest in the project and so no further action on the part of Vantage is required.

6.28 ***Aboriginal Consultation Program***

Reference: Vantage Response to NEB IR No. 3, Response to 3.23, pages 39-40 (PDF pages 39-40) [A1Z7T7]

Preamble: The reference states that Vantage's Aboriginal consultation program has focused on assessing the capacity of each potentially affected Aboriginal group to participate meaningfully in the consultation process.

Request: Please provide the following:

a) a full description of the criteria Vantage is using to assess the capacity of each potentially affected Aboriginal group to participate in the consultation process;

b) a summary of how Vantage will use this information to guide future consultation with Aboriginal groups; and,

c) a description of how Vantage has or will communicate this information to Aboriginal groups.

Response: a) – c) Vantage does not have a specific criteria to assess capacity but understands that having the capacity to meaningfully participate in the consultation process includes having access to timely project information, as well as technical expertise and financial resources. During ongoing discussions and consultation with Aboriginal groups, Vantage attempts to ascertain what experience, if any, Aboriginal groups have had with pipeline development and the oil and gas industry generally. Whenever requested, Vantage communicates with representatives of the Aboriginal groups who are appointed to assist the Aboriginal group in dealing with the project. Vantage has also, for example, offered to make its environmental consultants available to explain the results of environmental surveys and

studies. Where Aboriginal groups have submitted reasonable requests for funding in order to assist with reviewing and understanding the Vantage Application, and communicating within the community regarding the project, Vantage has provided the requested funding.

6.29 ***Traditional Knowledge Studies***

Reference:
i) Vantage Additional Written Evidence, Aboriginal Engagement Program Update, pages 2-7 (PDF pages 2-7) [A1Z7Q0]
ii) NEB Filing Manual, Guide A, Table A-5 • Filing Requirements for Socio-Economic Elements

Preamble: Reference (i) indicates a number of potential issues and concerns with respect to traditional use have been identified by potentially affected groups. Vantage has requested that groups which have expressed concern provide Vantage with a clear demonstration of impacts before the request for funds to perform a Traditional Knowledge study (TKS) can be determined.

Reference (ii) states the NEB's requirements for reporting the current use of lands and resources for traditional purposes in the project area.

Request: Please provide the following:

a) a full description of what information Vantage requires the Aboriginal groups to provide in order for a clear demonstration of impacts to be determined;

b) a description of how Vantage has or will use this information provided to determine the extent of potential project impacts on the First Nation's use of lands in the vicinity of the project. If a TKS study identifying any impacts, or demonstrating that there are no impacts, will not be undertaken, please provide a detailed description of the methodology that has been or will be used, and a rationale;

c) a detailed description of the mitigation measures that will address any potential impacts identified through information provided by the Aboriginal groups at the request of Vantage, above; and,

d) a detailed description of how Vantage will address any outstanding issues or concerns regarding impacts to traditional

uses by potentially affected Aboriginal groups.

Response: a) The information Vantage requires an Aboriginal group to provide in order to demonstrate an impact includes:

- a description of the specific current traditional land use;
- the time of year when the current traditional land use is exercised;
- the person or group who undertakes the current traditional land use; and
- a description of the how the Vantage project may interfere with or disrupt the current traditional land use.

b) Vantage will meet with Aboriginal groups providing such information in order to discuss and understand the extent of potential project impacts on the Aboriginal groups' use of lands in the vicinity of the project. In one instance, rather than requiring a TKS, Vantage and an Aboriginal group have agreed to engage in a desktop study which will include reviewing project maps with community members and elders in order to understand how the project may affect the Aboriginal group. A discussion regarding whether any specific mitigation measures are required will also occur. A written report documenting the results of the desktop study is expected to be prepared.

c) Vantage has not been advised of any specific impacts to Aboriginal groups' current traditional land use on or adjacent to the project ROW. Therefore, it is difficult to provide a detailed description of mitigation measures which may be used if potential impacts are identified. Theoretically, possible mitigation measures may include adapting the timing of construction or making adjustments to the pipeline route within the proposed ROW.

d) Vantage has not been advised of any specific impacts to Aboriginal groups' current traditional land use on or adjacent to the project ROW. Therefore, it is difficult to speculate as to how Vantage will address any outstanding issues or concerns if potential impacts are identified.

Consultation Matters

6.30 ***Consultation with Land Users***

Reference:

i) Vantage Pipeline Project, Vol. 1, Section 8 Lands, page 39 (PDF page 47) [A1X5W0]

ii) Vantage Pipeline Project, Vol. 2 ESA, Section 15 Socio-Economic Assessment, page 361 (PDF page 2) [A1X5У61

Preamble: Reference (i) states that the proposed route traverses 7% of Crown land.

Reference (ii) states that the Vantage pipeline route crosses Saskatchewan Wildlife Management Zones 1, 4, 5, 6, 8, 9 and 15. Activities within these zones include trapping, hunting and fishing.

Although Vantage has provided information regarding consultation with land users on private (freehold) lands, it has not provided information regarding consultation with potential land users on Crown land.

The Board notes that hunting, trapping, fishing, guiding and outfitting in Saskatchewan are regulated by the Saskatchewan Ministry of the Environment who administrates licenses and requires registration to carry out these activities.

Request: Please provide an itemized table of any meetings or consultation activities that have taken place with the Saskatchewan Ministry of the Environment and any land users regarding land use on Crown lands for the proposed Vantage Pipeline Project, including:

a) the party consulted, date for each contact and method of contact (for example telephone, personal meeting, email, letter mail);

b) a summary of issues and concerns that were identified in the Application as outstanding or ongoing, the steps Vantage has taken or will take to address the issues and concerns; and,

c) a summary of any new issues and concerns that have been raised since the Application was filed, the steps Vantage has taken or will take to address these issue and concerns, or,

d) an explanation of why steps will not be taken to address any particular concerns.

Response: a) Please see the table below.

Association	**Date**	**Method of Contact**	**Comments**
Saskatchewan Lands Branch (SLB) - Crown Lease Holders along the Right of Way	November 2010 – Ongoing	Personal meetings and Phone calls	Land Agents representing Vantage Pipeline meet with Crown Land Lease holders. During the ongoing meetings, each lease holder is provided with project description documents as well as the applicable NEB publications. Lease holders enter into easement agreements with Vantage Pipeline as interested parties. Land agents complete Construction questionnaires with each leaseholder. The intent of the construction questionnaire document is to identify construction concerns and determine current land use.
Saskatchewan Trappers Association (STA)	June 2, 2011	Phone Call	STA indicated that STA does not have any interest in the Vantage Pipeline project as the routing does not affect areas registered STA members currently use for trapping.
Saskatchewan Wildlife Federation (SWF)	June 2, 2011	Phone Call	SWF indicated that SWF is always concerned about net loss wildlife habitat. STA was referred to Ghostpine Environmental.
Saskatchewan Wildlife Federation (SWF)	June 2, 2011 June 3, 2011	Phone call Follow up call	Ghostpine returned STA's call. Referred STA to Wildlife section in ESA (Appendix J). Follow up call on June 3, 2011. STA indicated that the ESA addressed STA's questions.
Saskatchewan Lands Branch (SLB)	July 19, 2011	Phone Call	SLB administers leases for agricultural purposes only. Any land users other than the lease holder, who wish to enter upon a parcel of Crown land must first obtain consent from the lease holder. The lease holder has the right to deny access to the lands if the terms of entry are not

			agreeable.
Saskatchewan Environment and Resource Management (SERM)	July 21, 2011	Phone call/Email	Discussed project with SERM. SERM indicated that SERM administers two different types of outfitting licenses within the affected Saskatchewan Wildlife Management Zones. These licenses are issued to Outfitters for the purpose of guiding hunts for migratory birds and Canadian Resident white tail deer. SERM provided a list of all actively endorsed outfitters.
Saskatchewan Endorsed Outfitters (Migratory Birds and Canadian Resident Whitetail) 36 Registered outfitters within affected Wildlife Management Zones	July – September 2011	Phone calls/Personal Meetings	Vantage representatives are consulting outfitters to identify areas that are affected by the current routing of the pipeline. Where those areas are identified, Vantage will work with the outfitters to develop a plan to minimize disturbance to specified hunting areas.

b) Please see the response to (a) above. Vantage has successfully resolved many of the issues and questions raised during its consultation process with Crown land users. The issues and questions primarily focused on general aspects of the project and many were addressed by referring parties to information contained in the Application. In some instances consultation is ongoing to address issues and concerns raised.

c) Please see the response to (a) above. Vantage will address any issues raised by registered outfitters and develop a plan to minimize disturbance to hunting areas.

d) To date, Vantage has not encountered any land use issues that could not be resolved.

6.31 ***Consultation with Non-Government Organizations (NGOs)***

Reference: i) Vantage Response to NEB IR No. 3, Response 3.26, pages 43-45 (PDF pages 43-45) [A1Z7T7]

ii) Vantage Response to NEB IR No. 3, Response 3.30, pages 50-51 (PDF pages 50-51) [A1Z7T71

Preamble: Reference (i) states that Saskatchewan Wildlife Federation (SWF) has concerns regarding net habitat loss and Vantage is continuing to work SWF to mitigate specific concerns.

Reference (ii) states SFW had some questions regarding the effect of the project on wildlife habitat and that the concerns were addressed.

Request: Please clarify if any additional concerns have been raised or remain outstanding with SWF. If so, describe what concerns have been raised or remain outstanding, what actions are proposed to deal with those concerns, or provide a justification for why no action is required.

Response: No additional concerns have been raised or remain outstanding with SWF.