
NEB 1.8 – Water Quality and Quantity (hydrogeology)

- Reference:**
- (i) Application, Environmental and Socio-Economic Assessment, Section 1.7.4, pages 1-12 and 1-13 (*NEB Regulatory Document A1C2E5, Adobe pages 24 and 25 of 66*)
 - (ii) Letter of Comments from Hadwin Cattle Co Ltd, 11 January 2007, pages 2 and 3 (*NEB Regulatory Document A1D0H2, Adobe pages 2 and 3 of 5*)
 - (iii) Application, Environmental and Socio-Economic Assessment, Appendix 14 A Environmental Protection Plan, page 7-3 (*NEB Regulatory Document A1C2F0, Adobe page 24 of 49*)
 - (iv) Application, Section 7.3.11.2, page 8 (*NEB Regulatory Document A1C2D9, Adobe page 8 of 66*)

Preamble: In reference (i), Keystone discusses potential effects to ground water quality and quantity related to construction activities, but does not provide potential effects and mitigation measures related to the operation of pump stations and associated sump tanks. Keystone states that design modifications may be needed if the geotechnical drilling program indicates a shallow water table or if the potential for flowing artesian conditions is significant.

In reference (ii), Hadwin Cattle Co Ltd expresses some concerns about the potential for ground water contamination due to the presence of a sump tank at PS 07, in a high water table area (also referred to as shallow water table area).

In reference (iii), Keystone states that a Spill Response Plan and a Spill Contingency Plan will be developed.

In reference (iv), Keystone states that all sump tanks will be double walled and the interstitial space between the two shells will be monitored to ensure the integrity of the tank shell. However, Keystone does not describe the purpose of the sump tanks or the substances they may contain.

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Request:

- (a) Please describe the purpose of a sump tank at a pump station and, in general terms, describe the types of contaminants that could potentially be contained in the tank.
- (b) Please provide a discussion on the sump tank monitoring and maintenance program that Keystone plans to implement; include in this discussion elements such as the frequency of and the method that will be used to empty the tanks and leak detection measures.
- (c) Please describe the modifications that would be made to the sump tank, or other mitigative measures that would be used if the geotechnical drilling program indicates there is a shallow water table or significant potential for flowing artesian conditions at any of the new or modified pump stations.
- (d) Please discuss the potential environmental impacts of a leak from a sump tank, in particular on groundwater, and proposed mitigation measures, especially in areas where there is a shallow water table or significant potential for flowing artesian conditions.

Response:

- (a) Sump tanks will be used to drain oil from the station lines and equipment for maintenance purposes. Thermal relief valves and a line from the pump seals will also drain into the sump tanks. The sump tanks will contain crude oil in accordance with Keystone's Tariff specifications.
- (b) Drain lines within each pump station will be routed to the below-grade sump tank. The tank will be sized to drain down the pump station's inlet and out and suction/discharge piping to a single pump, while remaining within the specified operating levels. A sump pump and sump injection pump will be installed on each sump tank to allow re-injection of the sump contents into the suction side of the first mainline pump. In addition, the contents can be evacuated by a tanker truck if required.

All sump tanks will be double walled and the interstitial space between the two walls will be monitored to ensure the integrity of the tank shell.

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Continuous and point level monitoring will be provided for each sump tank. Sump tank pumps will operate based on the tank level, and shut down and lock-out of the pumps will be initiated based on a specified threshold.

- (c) The sump tanks will be constrained from upward movement to ensure there is no damage to the tank or attached piping.
- (d) Sump tanks will be constructed from fibreglass and will be double-walled. The interstitial space between the two walls is filled with an environmentally benign liquid and leak detection is based on monitoring the liquid presence between the two walls. High level alarms will be connected to the Supervisory Control and Data Acquisition (“SCADA”) system and will be monitored on a continual basis by Keystone’s Oil Control Center, located in Calgary.

The following mitigation will be used to minimize or eliminate the potential effect on shallow ground water from a leak or spill from the sump tank:

- i. The tanks will be leak tested before installation.
- ii. The level of the environmentally benign liquid in interstitial space between the two walls of the tank will be checked after installation and before operation, and thereafter on a regular basis in order to confirm that the walls have not been compromised;
- iii. Monitoring for detection of leakage on sump tank will be automated through connection to the SCADA system and will be monitored on a continual basis by Keystone’s oil control center;
- iv. To minimize the potential for damage to the sump tank during any operation activities involving ground disturbance, the tanks will be located and marked;
- v. Secondary containment is provided by the double walled construction of the sump tanks; and
- vi. Activation of the high level alarm or loss of integrity of the double wall seal will initiate a response by the Keystone’s Operations department.

Leakage from the sump tanks is highly unlikely as this would require failure of the inner wall, failure of the interstitial monitoring, and failure of the outer wall.