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Ms. Rhonda Batchelor
Government of the Northwest Territories
Department of Transportation
Environmental Affairs
4th Floor, 5015 – 49 Street
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Yellowknife, AB
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Remedial Action Plan: Impacted Areas proximate to James Creek - DRAFT

Dear Ms. Batchelor:

Please find below a proposed remedial action plan for the Government of the Northwest Territories Department of Transportation (DOT) highway maintenance yard located at kilometer 14 on the Dempster Highway.

Background and work to date

KBL was contacted by DOT representatives July 6, 2016 to provide delineation and soil disposal for a diesel spill that had taken place in June 2016. The reported release volume of diesel is 6000 L. The spill was from a diesel tank up gradient of the James creek. A portion of the diesel reportedly ran over the surface of a road before settling into a low area on the west side of the road. Diesel also ran to the east side of the road and was released into a nearby creek (James Creek).

KBL was informed that residents and visitors in the area use the creek as a drinking water source from a location near the spill location. Based on the review of the reports available the site has historical Petroleum hydrocarbon (PHC) impacts to soil and groundwater from the operation of the DOT maintenance facility. A remedial action plan, water monitoring results and water license for a soil treatment cell have been posted on the Gwi'chin Land and Water Board registry. KBL understands that permafrost is present and based on surface topography and previous reports groundwater flow is assumed to be toward James Creek and in its direction of flow.

Work to date and current status

The site was visited by a KBL representative on July 10, 2016. During the Site visit, KBL collected surface water and soil samples that have been submitted for laboratory analysis. Prior to KBL arriving at the site a DOT contractor installed PHC absorbing booms in James Creek and spill pads along the shore. In addition, a trench was excavated parallel to the road. Once KBL completed the initial site evaluation, booms were adjusted to intercept PHC on the water surface and contaminated sorbent pads were removed and replaced with clean pads.

Approximately 300 cubic meters of soil were excavated and transported from the Site to Castle Rock Enterprise soil treatment facility in Whitehorse, YT. Approximately 20 cubic meters of soil remains at the site stored in a tarped end dump trailer.

KBL observed that the site access road had obvious PHC staining. The area to the north of the trench had surface staining with a strong odor and PHC was observed seeping from the bank into James Creek. Opposite the area of concern along the creek, within a low lying area to the south in a thickly vegetated area was also obvious contamination. Visible staining and a strong odor was noted in this area as well.

The PHC seeps along the bank of James Creek were present as of July 10 and intermittently appeared during and shortly after rainfall. Currently there is little appearance of seeps or sheen on James Creek however, product entering the creek presents a going concern. Site visits for surface water sampling, replacement of booms and visual observations have continued since July 10, 2016 and are ongoing.

Groundwater samples were collected from three existing monitoring wells located 30-40 m upstream of the area of investigation (MW10-22, MW10-24, and MW10-28), other monitoring wells in the area were either frozen (MW10-26), dry (MW5, MW4) or destroyed (MW3, MW 10-32). It is not known if groundwater directly beneath the impacted areas contains elevated concentrations of PHCs as no wells were located in the immediate proximity.

A grayling was caught, July 25, 2016 from the area just downstream of the impacted area and it's tissue is being tested for concentrations of PHCs and degradation products.

Applicable criteria

Based upon previous investigations (KIA. 2011) and the observed conditions at the site the criteria applicable to the remediation of soil at the site the following criteria will be applied to the site:

Soil

Canadian Council of Ministers of the Environment (CCME) Canadian Soil Quality Guidelines (CSQG) for coarse grained soil with industrial and parkland land use and the CCME Canada Wide Standard for Petroleum Hydrocarbons in Soil (CWS) for coarse grained surface soil with industrial and parkland land use.

The industrial criteria will be applied to the site >30 m from James Creek. Within 10-30 m of James Creek the parkland criterial will be applied. At <10 m of the high water level of James creek, remediation of soil impacts will proceed to below detection level as assumptions associated with development of the CCME guidelines are invalid.

Surface Water

Surface water samples will be compared to Health Canada's Canadian Drinking Water Quality Guidelines (HC. 2014) and the Alberta Surface Water Quality Guidelines (AESRD. 2014)

Groundwater

Groundwater samples will be compared to Federal Interim Groundwater Quality Guidelines (GC. 2012).

Summary of results

Soil impacts presumed to be resulting from the spill are not delineated vertically or horizontally and are present in 2 areas at the site (see Figure 4). Surface water sample results showed detectable concentrations of PHC near the impacted area during the July 11 sampling events (addition surface water sample results are forthcoming). Groundwater results are expected July 29.

Proposed Remediation

Ex-situ remediation is proposed to remove impacts as their proximity to the creek represents an environmental concern. The soil sampling undertaken on July 11 showed impacts at depths of 0.8 m. Based on field observations and soil results excavation of approximately 650 cubic meters to an estimated depth of 1.0 m will be required in area 1 and excavation of approximately 650 cubic meters to an estimated depth of 1.2 m will be required in area 2 along with removal of impacts along the bank of James Creek (see Figure 3). The remediation of the site will consist of the following:

- Vegetation will be selectively removed in order to allow access to the site;
- Excavation will be done with a cleanup bucket or grading blade to minimize scarification or disturbance of the unimpacted soil;
- Two test pits will be excavated up gradient of groundwater flow to confirm that no free product is present above groundwater prior to excavation;
- A portable containment dam will be installed in the creek near impacted area 2. The dam will run parallel to the creek bank and perpendicular up and down stream of the spill area (A drawing of the proposed excavation area is shown in Figure 3; photos of the dam are located below);
- Excavation along the streambank will take place during low water flow conditions in James Creek; weather forecasts and flow will be used to determine the timing of the work;
- The soil treatment pad at the James Creek highway maintenance yard has sufficient space to store the soil from the excavation. The soil will be taken to the treatment pad and stored under a cover to prevent contact with precipitation. The soil will be clearly demarcated from surrounding soil in the cell and photographs will be taken;
- Upon sampling and analysis the soil may be transported to an approved facility for disposal. Representatives from the GNWT Environment and Natural Resources (ENR) will be provided confirmation that the soil is received;

- Confirmatory samples will be collected from the excavation area and field screened using an RKI Eagle 2 to measure headspace concentration of PHCs. Soil samples will be submitted to an accredited laboratory for analysis;
- The area near the creek will be backfilled and graded to match the streambed and riparian area. The backfill selected will comprise of coarse shale (>10 mm) intended to prevent fine material from being washed into the stream;
- Areas at the top of the bank will be backfilled using a compactable fill and graded to match the drainage of the surrounding site. Erosion control barriers will be installed to prevent runoff of fine soils;
- Upon receiving confirmatory analysis from the lab showing results are clean the remaining excavation will be backfilled.
- Surface water samples will be completed twice more. Once during the remediation of the site and once upon the conclusion of activities.
- A limited sediment sampling program will be carried out upon conclusion of remedial activities.
- Upon completion of work a vegetation survey will be completed and recommendations developed to aid re-establishment of the vegetation in the riparian area. Potential reclamation activities may include:
    - Collection and transplantation a small amount of riparian soil from an adjacent area to hasten vegetation re-establishment
    - Seeding with a native seed mix
    - Live staking in transplanted soils

The work outlined above will proceed Aug 2, 2016 and is expected to be complete Aug 12, 2016.

Photo: Example of Aquadam use

References

Alberta Environment and Sustainable Development (ESRD). 2014. Environemntal Quality Guidelines for Surface Water. Water Policy Branch Division. Edmonton.

Canadian Council for Ministers of the Environment (CCME). 2008. Canada Wide Standard for Petroleum Hydrocarbons in Soil

Canadian Council for Ministers of the Environment (CCME). 2008. Canadian Soil Quality Guidelines for the Protection of Environmental and Human Health

Government of Canada (GC). 2012 Federal Contaminated Sites Action Plan Guidance Document on Federal interim Groundwater Quality Guidelines

Health Canada (HC). 2014. Guidelines for Canadian Drinking Water Quality—Summary Table. Water and Air Quality Bureau, Healthy Environments and Consumer Safety Branch, Health Canada, Ottawa, Ontario

Kavik-Axys Inc (KAI). 2011. Phase III Environmental Site Assessment for James Creek Highway Maintenance Camp Final Report

Closure

KBL anticipates that the information contained herein meets the requirements of DOT, ENR and the Gwi'chin Land and Water Board. If you have any questions about this information, please do not hesitate to contact the undersigned.

Sincerely,

Shawn Samborsky, P.Ag.
Permit to practice:

Reviewed by:

Patrick Jordan, P. Eng
Senior Engineer, Clifton Associates

Attachments:
Figure 1: Site Location Map
Figure 2: Satellite Photo Showing Infrastructure
Figure 3: Site Diagram Showing July 11, 2016 Sampling Locations
Figure 4: Site Diagram Showing Petroleum Hydrocarbon Exceedances in Soil
Figure 5: Cross Section