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REPORT

2010 Site Development, Operations and Environmental Monitoring Arnprior Waste Disposal Site Township of McNab/Braeside, Ontario

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REPORT



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ARNPRIOR WASTE DISPOSAL SITE
TOWNSHIP OF MCNAB/BRAESIDE, ONTARIO

EXECUTIVE SUMMARY

This 2010 Annual Site Development, Operations and Environmental Monitoring Report has been prepared to fulfill the annual reporting requirements as set out in the Provisional Certificate of Approval (C of A.) No. A412603.

The Executive Summary highlights key points from the report only; for complete information and findings, as well as the limitations, the reader should examine the complete report.

A total of approximately 18,502 cubic metres of waste materials and cover (15,858 cubic metres of which were within the licensed fill area) was placed at the Arnprior Waste Disposal Site between November 25, 2009 and January 21, 2011. The gross air space remaining has been determined to be approximately 247,120 cubic metres. Assuming the annual waste receipt rate is maintained at approximately 15,858 cubic metres per year, the remaining landfill life is equivalent to approximately 15.6 years.

The 2010 field investigation activities included groundwater level measurements and sampling of groundwater in May and November and surface water in May/June, August and November. There were no deviations from the groundwater monitoring program outlined in the 2009 Site Development, Operations and Environmental Monitoring Report (Golder, 2010) apart from the addition of an additional upstream background surface water sampling location within the Ottawa River (SW-26) as proposed by the MOE.

The direction of groundwater flow in the overburden at the site is interpreted to be in a north to north-easterly direction towards the Ottawa River. The direction of groundwater flow in the bedrock at the site is interpreted to be northeasterly toward the Ottawa River.

Conventional borehole logs detailing the geological conditions encountered in each borehole augered during the previous investigation programs were obtained and reviewed in 2006. There is a limited thickness of overburden downgradient of the site which explains why there are no overburden compliance monitoring wells. The bedrock encountered at the site generally consists of limestone, siltstone, shale and/or sandstone.

The groundwater data from background monitoring wells (OV-13, BR-13S and BR-13D), the background surface water location (SW-10), and the monitoring well most indicative of leachate quality (OV-7) were examined to determine site-specific *leachate indicator parameters*. Thirteen parameters typically monitored in the groundwater and often monitored in the surface water were identified as site-specific *leachate indicator parameters* and they include: alkalinity, ammonia (for groundwater) and unionized ammonia (for surface water), boron, barium, chloride, iron, hardness, potassium, manganese, sodium, TDS, DOC and dissolved reactive phosphorus (for groundwater) and total phosphorus (for surface water). These parameters were primarily used to evaluate site compliance with trigger mechanisms.

Based on historical results, the tannin and lignin concentrations, the groundwater flow direction, the 2010 monitoring activities and piper trilinear diagrams, groundwater monitors OV-7, BR-1D, and BR-1S have been interpreted to be impacted by landfill leachate. Groundwater monitors BR-5D, BR-5S, BR-6D, BR-6S, BR-8D, BR-8S, BR-9D, BR-9S, BR-12, BR 08-1D, BR 08-1S, BR 08-2S and BR 08-2D are interpreted to be impacted by wood waste deposited on the CAZ Areas, and/or by landfill leachate. Groundwater monitors BR-7D, BR-7S, BR-10, BR-11, BR 08-3D and BR 08-3S are interpreted to be impacted by road salt, wood waste, or other industrial activities on the CAZ lands, but not by landfill leachate. Since groundwater monitor BR-3 and OV-10 are up-gradient or cross-gradient of the landfill, the reason for elevated concentrations of several parameters is unclear. It is notable that the increase in concentrations also occurred during the 2008 and 2009 monitoring sessions

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and that reconfiguring of the waste pile closest to these monitoring wells in 2008 may have contributed to the elevated concentrations (e.g., infiltration of leachate-impacted runoff from the exposed waste). The groundwater quality at these monitoring locations will be evaluated carefully in the future. Data from these monitoring wells will be closely evaluated in 2011. Groundwater monitor OV-9 is interpreted not to be impacted by landfill leachate or wood waste.

The water quality data for locations SW-10, SW-11 and SW-12 suggest a consistent water quality that is not being impacted by the landfill. There were no exceedances of the PWQO during the 2010 sampling sessions at these locations (note that SW-10 was dry during all three sampling sessions). Historical exceedances of PWQO observed at these sampling locations may be natural or may be attributable to road salting activities and/or industrial activities. All of the surface water sampling stations sampled within and on the periphery of the wetland (SW-1, SW-2, SW-21, and SW-22) had parameters in excess of the PWQO in 2009 except for SW-23, which was dry or frozen during all three sampling sessions. These exceedances may be attributable to the landfill, industrial activities associated with the railway or lumber industries (i.e., the wood waste), or the fact that water quality within the wetland is often poor. Evaporation from the stagnant water within the wetland may be resulting in elevated parameter concentrations in surface water. Surface water sampling locations SW-18 and SW-19 within, or in close proximity, the Ottawa River are interpreted not to be impacted by the landfill leachate even though several parameters exceed PWQO and the trigger concentrations. A new background surface water sampling location within the Ottawa River, SW-26, was added to the 2010 sampling program and was found to have very similar water quality to SW-18 in 2010. Water quality within the river (i.e, SW-18) is distinctly different than the ephemeral/intermittent stream and the ponds/wetland.

The impact of landfill leachate on the surface water quality in the wetland to the north of the fill area is not resulting in a persistent increase in the concentration of any of the analytical parameters beyond their site-specific trigger concentrations. In 2007, an additional surface water point of compliance (SW-2) was added, as recommended by MOE to provide an earlier warning further upstream of potential impacts by landfill site contaminants to the receiving surface water regime. At surface water sampling station SW-2, boron, iron and/or unionized ammonia exceeded the trigger concentration in May, August and November 2010.

The concern with beaver dams at landfills is with the potential for failure, causing potentially leachate-impacted water and sediment to be suddenly released to downstream surface waters. For this reason, the extent of beaver activity within the wetland watershed was monitored during the 2010 monitoring program, with emphasis on documenting the location and age of the beaver dams. No new beaver activity was noted during the three monitoring sessions in 2010. Remnants of beaver dams near sampling location SW-2 (downstream of the culvert beneath the Canadian Pacific Railway line) and SW-19 were observed during the 2010 monitoring events.

Groundwater and surface water monitoring programs will be continued in order to evaluate site compliance on an ongoing basis and a proposed groundwater and surface water monitoring program for 2011 is presented in Section 12.0 of this report.

Activities to revise the site specific groundwater and surface water trigger mechanisms and contingency plans will continue in 2011.