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MEMORANDUM

10 June 2009

TO: G. Davis
Senior Environmental Officer
Ottawa District Office
Eastern Region

FROM: B. W. Metcalfe
Senior Environmental Officer (Surface Water)
Technical Support Section
Eastern Region

RE: 2008 Annual Report – Ottawa Landfill
Waste Management of Canada Corporation
Lots 3 and 4, Concession III, Geographic Region of West Carleton
City of Ottawa
Certificate of Approval No. A461002

I have reviewed the noted report dated March 2009 prepared by Water and Earth Science Associates Limited (WESA) for Waste Management of Canada Corporation. The report includes environmental monitoring at the Waste Management of Canada, Ottawa Landfill Site during the period from January 1 to December 31, 2008. The environmental monitoring included water quality analyses for leachate, groundwater and surface water on and around the site. The following comments are offered by the reviewer relative to surface water impact concerns.

Surface Water Regime

The landfill site is situated within the Carp River watershed, Ottawa River basin. The Carp River is located approximately 4 km east of the landfill site.

The area surrounding the landfill site is characterized being poorly drained with swamp areas located to the east. Surface water drainage within the area surrounding the landfill is controlled by the ground surface topography, as modified by the area quarry operations and the Highway 417 drainage system. The area surface water drainage proximate to the landfill site is characterized being intermittent flowing. Ditches and culverts installed within the Highway 417 road allowance direct seasonal intermittent / ephemeral surface water flow eastward along the highway alignment.

North and west of the site, surface drainage flows within the Huntley Creek subwatershed, and discharges via Huntley Creek to the Carp River. East of the landfill site property the surface drainage flows within Feed Mill Creek subwatershed. Feed Mill Creek discharges to the Carp River east of Huntmar Road, approximately 0.3 km north of Highway 417. Surface water flow along Highway 417 within the study area is controlled by a system of ditches, catch basins and culverts, and discharges into Feed Mill Creek.

Surface Water Monitoring Program

Surface water elevations at monitoring locations S1, S2 and S3 (in the ditch on the northside of Highway 417) are referenced to staff gauges installed at each monitoring location. Surface water elevations at the Pond and Retention Pond (S17) locations on the landfill site were surveyed using a level.

Surface water samples were collected on two occasions, May 23, 2009 (spring) and November 19, 2009 (fall). The collected samples were analysed for general chemistry quality and the assessment for the landfill site's primary leachate indicator parameter list (PIL) which included un-ionized ammonia, boron, benzene, trichloroethylene, 1,2-dichloroethylene (cis & trans), vinyl chloride, 1,1-dichloroethane, chlorobenzene, and 1,4-dichlorobenzene. VOCs are monitored at surface water sample stations S1 and S2 once each year, in the spring. Field measurements of pH, temperature, conductivity and dissolved oxygen were taken from the surface water bodies at the time of sample collection. The surface water quality data was compared to the MOE Provincial Water Quality Objectives (PWQO) where applicable.

2008 Surface Water Sampling Results

Surface water quality during 2008 was monitored from three locations off-site along the drainage ditch north of Highway 417. These sample locations are identified as S1, S3, and S10 and are situated progressively 250 m, 550 m and 750 m downstream of the landfill site respectively.

Drainage Ditch Station S1

The surface water quality approximately 250 metres downstream of the landfill site at sample station S1 was characterized having COD (25 - 33 mg/L), Nitrate (0.4 - 1.60 mg/L), Ammonia (1.35 - 2.91 mg/L), TKN (2.6 - 3.00 mg/L), potassium (12 - 17 mg/L), pH (7.9 - 8.0), Conductivity (2520 - 2810 μ S/cm), Chlorides (490 - 500 mg/L), TDS (1510 - 1840 mg/L), and Hardness (520 - 660 mg/L).

PWQO exceedances were limited to Boron (0.42 - 0.52 mg/L, exceeding 0.20 mg/L), Chromium_{tot} (<0.005 mg/L, potentially exceeding 0.0001 mg/L Cr⁺⁶), and Iron (1.0 - 11 mg/L, significantly exceeding 0.30 mg/L).

All VOC analyses for collected samples at S1 were reported to be less than method detection limits and there were no exceedance of PWQO.

Drainage Ditch Station S3

The surface water quality approximately 550 metres downstream of the landfill site at sample station S3 was characterized having COD (31 - 67 mg/L), Nitrate (0.6 – 0.8 mg/L), Ammonia (0.49 – 1.38 mg/L), TKN (1.2 – < 7.00 mg/L), potassium (6.9 – 10.0 mg/L), pH (8.0 – 8.1), Conductivity (2910 – 3040 μ S/cm), Chlorides (590 – 690 mg/L), TDS (1810 - 1840 mg/L), and Hardness (500 – 510 mg/L).

PWQO exceedances were limited to Boron (0.38 mg/L, slightly exceeding 0.20 mg/L), Chromium (<0.005 mg/L, potentially exceeding 0.0001 mg/L Cr⁺⁶), and Iron (1.1 – 80.0 mg/L, significantly exceeding 0.30 mg/L).

All VOC analyses for collected samples at S3 were reported to be less than method detection limits and there were no exceedance of PWQO.

Drainage Ditch Station S10

The surface water quality approximately 750 metres downstream of the landfill site at sample station S10 was characterized having COD (34 - 42 mg/L), Nitrate (0.4 – 0.7 mg/L), Ammonia (0.20 – 0.53 mg/L), TKN (1.0 – < 1.1 mg/L), potassium (5.9 – 9.3 mg/L), pH (8.1 – 8.2), Conductivity (2990 – 3650 μ S/cm), Chlorides (670 – 840 mg/L), TDS (1810 - 2400 mg/L), and Hardness (490 – 630 mg/L).

PWQO exceedances were limited to Boron (0.22 mg/L, slightly exceeding 0.20 mg/L), Chromium (<0.005 mg/L, potentially exceeding 0.0001 mg/L Cr⁺⁶), and Iron (0.41 – 0.59 mg/L, slightly exceeding 0.30 mg/L).

All VOC analyses for collected samples at S10 were reported to be less than method detection limits and there were no exceedance of PWQO.

Summary - Surface Water Quality Impact Assessment

WESA determined for the 2008 sampling events relative to downstream surface water quality that the primary leachate indicators ammonia, TKN, potassium, and COD were at the lower limit of their historical ranges. PWQO exceedances were limited to boron and iron. Boron is a landfill leachate indicator parameter; however the boron concentrations only slightly exceeded the PWQO for the 2008 sampling year events. WESA noted that iron is not a landfill leachate assessment parameter for the WM Ottawa LFS and the presence of iron-stained sediment and suspended material at S1 and S3 may be influencing the iron concentrations i.e., high concentrations reported for the 2008 sampling events.

WESA reported there were no PWQO exceedance for un-ionized ammonia at sample stations S1, S3 and S10.

All VOC analyses for the 2008 year sampling events at S1, S3, and S10 were reported to be less than method detection limits and there were no exceedance of PWQO.

The current PWQOs for chromium are 1 µg/L (0.0001 mg/L) for hexavalent chromium (Cr VI) and 8.9 µg/L (0.0089 mg/L) for trivalent chromium (Cr III). The landfill site owner reported the analysis of “total” chromium for the collected surface water samples and compared the concentrations to the former PWQO of 100 µg/L (0.100 mg/L).

In summary, the reviewer is in overall agreement with the surface water quality impact assessment presented by WESA in the WM Ottawa Landfill 2008 Annual Report. The 2008 surface water quality data was indicative that landfill leachate was not causing significant impact to the Highway 417 drainage ditch reach downstream of the landfill site.

Recommendations

- The landfill site Owner reported the analysis of “total” chromium for the collected surface water samples and compared the concentrations to the former PWQO of 100 µg/L (0.100 mg/L). The reviewer requests that in future monitoring for the landfill site the collected water samples be analyzed for hexavalent chromium (Cr VI) and trivalent chromium (Cr III) and be compared to their respective current PWQOs.
- WESA interpreted that the presence of iron-stained sediment and suspended material at sample stations S1 and S3 may be influencing the iron concentrations i.e., high concentrations reported for the 2008 sampling events. The reviewer recommends that the analysis of Total Suspended Solids (TSS) concentrations be provided for collected surface water samples in future monitoring for the landfill site in order to confirm the noted influence effect to the surface water quality.
- The reviewer requests for future annual monitoring reports that the calculated un-ionized ammonia concentrations be reported in the surface water quality data summary tables i.e., the landfill site Owner report the total ammonia, pH and temperature data and the calculated un-ionized ammonia concentration for the collected surface water samples.



Bruce Metcalfe
BWM/gl

c: F. Crossley
P. Kehoe
B. Metcalfe (Aba2009/aba3209) 1516-7RALMT
File SW 05-04, Waste Management, Ottawa Landfill Site, City of Ottawa
File SW 13-01-02-02, Carp River, Ottawa River Basin

ec: P. Taylor