

Ministry of Environment
and Energy

2435 Holly Lane
Ottawa ON K1V 7P2
Telephone: (613) 521-3450
Fax: (613) 521-5437

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et de l'Énergie

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Téléphone: (613) 521-3450
Télécopieur: (613) 521-5437



December 10, 2003

The Town of Mississippi Mills
P.O. Box 400
3131 Old Perth Road, R.R. #2
Almonte, ON, K0A 1A0

Attention: Diane Smithson
Chief Administrative Officer

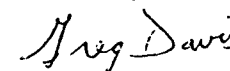
Re: Almonte Waste Disposal Site
2002 Annual Monitoring Report
Surface Water Review
Certificate of Approval A461001

The 2002 Annual Report for Almonte Waste Disposal Site was received at the Ministry's Ottawa District Office on August 25, 2003. Please note that Condition 31 of the Certificate of Approval requires the submission of the annual report by March 31 for the calendar year ending the preceding December 31. For future annual report submissions, please attach a letter of consent from the Township endorsing the report's activities, recommendations and conclusions. Approval from the Ministry is not required if the recommendations and conclusions refer to additional work activities at the site. Approval from the Ministry is required if the recommendations and conclusions represent a lessening of the activities to be undertaken at the site. A letter, dated September 4, 2003, was sent to the Township requiring the recommendations from their consultant to be undertaken to mitigate the off-site groundwater and surface water issues.

The 2002 Annual Report was sent to the Ministry's Technical Support for comment. Please find attached the findings and recommendations from the Ministry's Surface Water Technical Support Section for implementation at the Almonte Landfill Site. The reviewer outlines several deficiencies in the 2002 Annual Report which require attention in the 2003 Annual Report. Also, the Ministry recommends that a conceptual design for leachate interception and treatment be prepared. Please detail in the 2003 Annual Report how (and when) the Ministry's comments regarding surface water will (or have been) be implemented.

If you have any questions or concerns you may contact me at 1-800-860-2195 or 613-521-3450 extension 227.

Yours truly,


Greg Davis
Environmental Officer
Ottawa District Office

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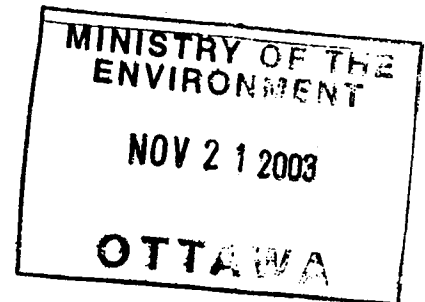

MEMORANDUM

20 November, 2003

TO: Greg Davis
Sr. Environmental Officer
Ottawa District Office
Eastern Region

FROM: Dana Cruikshank
Surface Water Scientist
Water Resources Group
Eastern Region

RE: 2002 Status Report
Almonte Landfill Site
Town of Mississippi Mills
C of A # A461001
IDS Ref. # 4356-5S3GKG



I have reviewed the report titled *Township of Mississippi Mills, Almonte Landfill, C of A A461001, 2002 Status Report* prepared by Trow Associates with respect to surface water concerns only.

Project Overview:

Trow reports:

The landfill site is located in the west half of Lot 14, Concession VII, Huntley Ward in West Carleton Township in the municipality of Town of Mississippi Mills. The landfill site is 10 ha in size and landfilling can occur in 4.8 ha of the site.

Surface drainage over most of the site is quite pronounced and flows towards the south and southwest. The site is well drained due to sandy overburden. The groundwater table is shallow and can rise close to the surface on the west side of the site. Drainage of the northeast corner of the property is via a drainage ditch that parallels the northwest property line. This ditch is a drainage outlet for a residential development in the north and northwest. Another ditch flows south towards the landfill through the easement between the site and the neighboring property drains an area of residential development to the north. The two systems intersect at the northwest corner of the site and the ditch then flows southwest in a ditch that crosses Howie Road. The ditch continues through a low lying poorly drained area where it connects with a major drainage system.

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Groundwater in the shallow aquifer flows in a east to west gradient. The area west of Town property is a natural discharge area for the shallow groundwater aquifer.

The site is monitored by seven surface water stations. Samples were collected on six occasions during 2002 including two storm event sampling periods. Trow reports that leachate impacts are being detected at locations northwest of the landfill specifically at stations S2 and S5. PWQO exceedances are reported for boron, cobalt, copper, iron, silver, vanadium and zinc. Un-ionized ammonia concentrations downstream of the site exceed PWQO's.

A number of organic compounds were detected but did not exceed PWQO's in 2002. No organic compounds were detected at the downgradient stations S3 and S7.

Trow reports that there is a measurable decline in water quality in the drainage ditch as it passes through the landfill site indicating that the landfill site is impacting on surface water. However they report that most parameters meet PWQO's at the site boundary.

Trow recommends continuation of monitoring the site at a Tier II level for 2003. Four sampling periods plus two precipitation events were sampled for the parameters listed on page 38 of the report. Trow also recommends that an ecological characterization of the area downgradient of the landfill site be conducted to assess the risk of surface water impacts. Trow further recommends that based on 2002 and historical results as well as the risk assessment that a conceptual plan design for leachate interception and treatment should be prepared.

Reviewer's Comments:

The 2002 Trow report was deficient on several accounts.

- Appendix D Surface Water data actually contains groundwater data that repeats that reported in Appendix A therefore no surface water data was presented in the report.
- Table 7 data conflicts with the conclusions Trow has made below it.
- The date of the storm events is not reported.
- The sampling stations have no site description or photographs.
- There was no indication if the current stations are compatible with previous reports.
- Hazard lands are indicated in the figures but no description has been given as to why this designation has been applied.
- No estimated flow data has been taken. It is unclear without flow information how Trow plans to assess the downstream impacts of contaminate loading.
- **Most importantly. There is little interpretation of the surface water data. There are values of metals concentrations such as October 2002 at S2 where iron is almost 1% of the sample. Aluminum concentrations of 19 mg/L etc.. Trow in their report does not even mention these extremely high concentrations or attempt to explain them. These values if real are likely toxic to aquatic life.**

Having contacted Trow I was able to obtain most of the missing surface water data as well as the dates of the precipitation events (June 19, 2002 and July 23, 2002) and a statement of historical station compatibility with the Trow stations (SG1, SG2 & SG3 correspond to S1, S2 & S3 respectively). Note that Trow did not forward any 1999 or 2000 data in their historical data spreadsheet nor did they respond to my enquiry with respect to the missing 1999 or 2000 data.

My review of the data indicates the following. There are three upgradient stations; S6, S4 and S1. S1 has been the historical upgradient station. Aluminum concentrations exceed PWQO's at all stations for most of the historical record of sampling dates. The reported concentrations however are all over the map. On some sampling dates S4 has higher values than S1 which is downstream, other days the reverse is true. S6 in October, 2002 exceeds the PWQO by 253 times which obviously impacts on downstream stations and is likely toxic at this concentration to some aquatic organisms. PWQO exceedances were also found for cobalt at S4 but not at S1 and one exceedance at S6. PWQO exceedances for copper, iron, total phosphorus and zinc were found at all upstream stations. There is little rhyme or reason to the data. During my review of the 1998 and 1999 reports the consultant told me the upstream area from the landfill site was forested land. This data does not indicate water quality draining from forested land.

S5 and S2 were sites adjacent to the landfill site. Each station had PWQO exceedances for aluminum, cadmium, cobalt, copper, iron, phenols, total phosphorus, zinc and boron. Boron which is widely used as a leachate indicator had PWQO exceedances slightly higher at S5 than S2. The only phenol PWQO exceedances were at S2 and were only slightly above PWQO. There were also several un-ionized ammonia exceedances at S2 and S5. These two parameters at least appear to be consistent with expectations of contaminated leachate from the landfill.

The downstream stations S3 and S7 reflected the same parameter exceedances as described above.

Extensive sampling was done for organics. There were some detections of several parameters at S1. However most of the remaining organic parameters were analyzed at method detection levels (MDL) above the PWQO and as a result the data is reported as less than (MDL). In some cases the MDL was an order of magnitude above PWQO's so it is not possible to ascertain whether PAH's, individual phenols and PCB's and other organics are in compliance.

The TSS values for many stations and sampling periods are extremely high. This can impact the concentrations of many parameters which is possibly why the data set is hard to interpret. These values just don't make sense if they are real. It may indicate a total disregard for proper sampling protocol and samples were likely contaminated. If the metals samples were acidified with high TSS concentrations then it would dissolve the clays etc., in the sample contributing to the high metals values seen in the data set.

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Summary:

The 2003 report should address all the deficiencies mentioned above as well as the recommendations below. If Trow is confident that the numbers reported in this report are real and are not sampling or lab errors then we have a major problem at this site as well as runoff from the residential area. The boron and phenols data indicates that the landfill is impacting on the surface watercourse on the site as well as downstream. Therefore in my opinion the Tier II sampling in 2001 and 2002 has confirmed that the landfill site is exceeding PWQO's for a large number of parameters. Sampling in 2003 was to continue at the Tier II level. It is my opinion that the Town of Mississippi Mills should have their consultant begin immediate interpretation of the 2003 data as well as a more detailed interpretation of the historical data to sort out what is going on at this site and submit the new report within 90 days. If the 2003 data confirms that the landfill is having continuing offsite impacts then the contingency plan should be implemented with leachate interception and treatment in place for 2004.

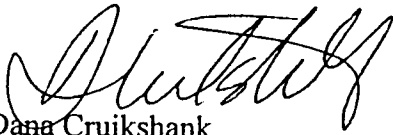
Recommendations:

1. 2003 and all historical data should be reviewed to determine if all the reported values are real or artifacts of sampling or lab errors. Any elimination of data must be supported with a valid explanation.
2. All the data should then be presented in tabular format and the major parameters of concern graphed over time to determine time trend analysis.
3. Interpretation of the two upstream stations is required. It is unlikely that one would expect concentrations at S4 to be higher than S1 which is supposedly only 300 m downstream if both are true background stations. In previous memos I had voiced my concern that I felt that S1 was impacted by the landfill so I wouldn't be surprised at values for some parameters at S2 compared to S4. S4 was established because it was thought to be not influenced by the landfill. The water chemistry at this site is not characteristic of water flowing from forested land unless there is something else happening that Trow is unaware of or has not investigated further.
4. The 2003 report should also provide an analysis of the impact of storm events on water quality leaving the site. If impacts are related to storm events and increased surface runoff then remedial measures should be implemented (i.e. better application of daily cover, grading etc.)
5. I concur with Trow's recommendation that an ecological characterization of the area downgradient of the LFS be conducted to assess the risk of surface water impacts.

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6. I also concur with the Trow recommendation that based on the data to date as well as the risk assessment that a conceptual plan design for leachate interception and treatment should be prepared. I also recommend that if the 2003 data confirms the level of concentrations and exceedances seen in previous years that this plan be implemented.
7. The reviewer had previously recommended (February 2001) that discharge estimates be made at all surface water stations to determine the risk assessment to offsite areas as well as aid in separating the impact from the residential area from the landfill site.
8. The reviewer had previously recommended (February 2001) that photographs of each sampling location site should be submitted with the next annual report along with a description of the site (e.g. Suspended material in water, flow rates, cow feces, notations of aquatic life like minnows, insects, aquatic plants etc.). Each report should have a description of sampling protocols used such as preserving techniques if any are used.
9. Further investigation into the possible sources of water quality impact observed at S1 and S4. Is this a groundwater impact, surface drainage or an upstream impact?
10. Due to the MDL associated with the organic data from 2001 and 2002 additional sampling for organics should continue at lower MDL's for only those parameters that have shown to be possibly of concern. I would also accept sampling for total PAH's etc. and if high concentrations are found then resampling for individual parameters.

If you have any questions regarding the above comments or recommendations I would be pleased to discuss them with you.



Dana Cruikshank
DC/gl

- c: Dana Cruikshank
Frank Crossley
Paul Kehoe
File SW-05-04 (Mississippi Mills LFS formerly Town of Almonte LFS)
File SW-13-01-02-01 (Carp River Basin)

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