

Title: Assessment of Wisconsin's Groundwater Monitoring Plan (GWM) Program for Active Non-Approved Landfills (1985-1990)

Project I.D.: DNR Project No. 92

Investigators: Laura Pugh, DNR Bureau of Solid & Hazardous Waste Management
Barbara Gear, DNR Bureau of Solid & Hazardous Waste Management

Period of Contract: July 1, 1991 through June 30, 1992

Background/Need: Prior to this study, no assessment had been made of the criteria and process used to choose active unlined landfills for groundwater monitoring. Evaluation of the effectiveness of the process helps define how we can apply it to monitoring, investigating and cleaning up the large number of closed landfills that now exist. Ultimately, the assessment could be used to develop methods for faster detection and cleanup of groundwater contamination near the state's closed landfills.

Objectives:

- 1.To summarize facts regarding nonapproved landfills required to monitor groundwater as a condition of relicensure;
- 2.To review the groundwater monitoring data from these landfills to see if any further action is needed;
- 3.To evaluate the effectiveness of the former program for requiring monitoring at nonapproved landfills;
- 4.To evaluate the former criteria for choosing sites to be monitored;
- 5.To recommend criteria for assessing all landfills in the State which are not currently monitored (i.e., closed nonapproved landfills); and
- 6.To help WDNR respond to the recommendations that the Legislative Audit Bureau expressed in its September 1990 audit of the State's groundwater protection program.

Methods: The criteria used to choose sites were identified and examined to determine if sites were chosen appropriately. General characteristics of all the sites were compiled and compared, and contamination at the sites was estimated with the Percentage of Wells Impacted (PWI) method, Volatile Organic Compound (VOC) Screen, and Chloride Screen. The contamination estimates were compared for all the sites to determine the effectiveness of the program

Conclusions:

- 1.Application of the criteria used to choose sites changed over time as the number of potential sites decreased and district personnel increased.
- 2.A significant number of the sites show evidence of some type of groundwater contamination, based on the results of the three contamination evaluation methods used in this study.

Successes of GWM program

- 1.Approximately 26% (123 of 478) of the solid waste facilities currently reporting groundwater monitoring data in Wisconsin began reporting as a result of the GWM Plan Program which required monitoring as a condition of relicensure.
- 2.Over 75 % of the 156 sites chosen to monitor as a condition of relicensure are currently monitoring or are preparing to monitor in the near future.
- 3.The criteria used to choose the sites were effective for identification of problem sites, given that the majority of the sites required to monitor have shown evidence of groundwater contamination.

Problems with GWM Program

- 1.The variation between districts in the number of sites chosen and the number of these sites that were allowed to close without monitoring suggests that implementation of the program may not have been uniform.
- 2.It is likely that more sites could have been chosen during the program, but staff limitations did not allow for selection and followup of additional sites.
- 3.At a number of the GWM sites where the groundwater data indicates there may be contamination, complete followup investigations have not taken place due to staff limitations.

Recommendations/ Implications:

- 1.When sufficient data are available, use the PWI method to estimate the contamination at all GWM sites that have not been ranked.
- 2.Follow-up on all sites that have monitoring and exhibit signs of groundwater contamination. These sites should be added to the Solid Waste Management Section's Groundwater Impact List and investigated in priority order.
- 3.Review all sites that were included in the GWM Plan Program, that did not monitor and determine if further action is now needed.
- 4.Review closed sites without groundwater monitoring using criteria similar to those used in the past. At a minimum the review should include the following factors:
 - depth to groundwater
 - soil type
 - distance to wells
 - waste types
 - site size

More factors may need to be included such as distance to surface water (including wetlands), distance to buildings and history of operating problems.

- 5.Additional factors should be taken into account for closed sites. At a minimum they should include:
 - Type of cap used
 - Time since closure
- 6.Develop a more objective method for ranking closed sites without groundwater monitoring that can be applied consistently in all districts.
- 7.Use this method to evaluate all closed sites, and as workload permits, require groundwater monitoring at sites that rank the highest.

Key words: nonapproved landfill, volatile organic compounds, chloride, groundwater monitoring plans, statistical groundwater data analysis

Funding: DNR, The DNR's Bureau of Solid and Hazardous Waste Management provided additional funding for office space, supplies and publication costs necessary to make this study possible.

Final Report: A final report containing more detailed information on this project is available for loan from Wisconsin's Water Library, University of Wisconsin - Madison, 1975 Willow Drive, Madison, Wisconsin 53706 (608) 262-3069.