

**Title:** Groundwater Quality Impacts from the Storage of Sludge and Septage

**Project I.D.:** DNR Project No. 85

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**Period of Contract:** July 1, 1990 through June 30, 1991

**Objectives:** To assess the concentrations of NPDES Priority Pollutants present in stored sludge/septage material and to evaluate the possibility of these compounds migrating to groundwater.

**Background/Need:** A 1987 study suggests that volatile organic compounds (VOCs) are often present in wastewater sludge and may migrate from unlined sludge storage lagoons to groundwater. Due to evidence of leakage from Pat's sludge storage lagoon there is concern that groundwater may have been impacted from VOCs present in the stored sludge material.

**Methods:** The sludge/septage storage lagoon operated by Pat's Sanitary Service was selected as the site for this study because it met a number of desirable project criteria. Sludge and septage material was being stored in the lagoon and a groundwater monitoring system was in place at the site. Ongoing permit sampling of the facility monitoring wells for inorganic substances indicated that the lagoon was leaking and impacting groundwater. The lagoon is located in a fairly remote rural area minimizing the possibility of other sources impacting groundwater at the site.

The field investigation at this site consisted of collecting samples of the stored sludge/septage material and of groundwater from some of the facility monitoring wells located around the lagoon. These samples were analyzed for National Pollutant Discharge Elimination System (NPDES) Priority Pollutants.

**Results:** Groundwater samples were collected from three facility monitoring wells on two occasions: February 20, 1991 and May 1, 1991. A sample of the sludge/septage material in the storage lagoon was also collected on May 1, 1991. These samples were analyzed for NPDES Priority Pollutants and three organic compounds: phenol, 2-methylphenol and chlorobenzene were detected. Phenol and 2-methylphenol were found only in the sludge material sample. Chlorobenzene was detected only in samples from one of the facility monitoring wells. The results of the analyses were as follows:

<u>Sample Origin</u>	<u>Sample Date</u>	<u>Substance Detected</u>	<u>Measured Level</u>
Sludge/Septage	5/1/91	2-Methylphenol	210 UG/L
		Phenol	630 UG/L
MW-1/201	2/20/91	Chlorobenzene	18 UG/L
MW-1/201	5/1/91	Chlorobenzene	15 UG/L
MW-3/203	2/20/91	No organics detected	-
MW-3/203	5/1/91	No organics detected	-
MW-4/204	2/20/91	No organics detected	-

Heavy metals, common in domestic wastewater sludge and septage, were detected at low concentrations in the material stored in the facility lagoon. Low levels of metals were also detected in the sampled facility monitoring wells.

**Conclusions:** Because only a limited number of samples were collected for this study it is difficult to draw many definite conclusions, however, the sample results obtained do seem to support the claim that organic compounds are often present in stored sludge and septage material and that, if mobile, these substances can migrate to groundwater. The levels of chlorobenzene detected in groundwater at this site were quite low and it does not appear to be of concern as a potential public health problem.

A variety of metals were detected in the material stored in Pat's lagoon and in the groundwater samples from the three facility wells monitored. Heavy metals are commonly present in domestic wastewater sludge and the levels detected in the stored sludge/septage at Pat's were low; well below the most stringent federal standards (40 CFR Part 503 Pollutant Concentrations) established for land spreading this material. Some heavy metals were detected in the study site wells but, because only one round of samples was analyzed for metals and because conditions at the site do not seem to be favorable for metals migration, it is difficult to place any significance on these results.

**Recommendations/  
Implications:** The results of this study seem to confirm the presence of organic compounds associated with sludge and septage material and the possibility of the migration of these substances to groundwater. Current Departmental policy requires that new sludge and septage storage lagoons be constructed with approved liners. Existing storage facilities are evaluated and, if excessive leakage is confirmed, repair or relining is required.

**Key Words:** priority pollutants, sludge, septage, leaky lagoons

**Funding:** DNR

**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.