

## THE APPLICATION OF PROCESSED ORGANIC WASTE TO ACID MINE TAILINGS

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The city of Sudbury has solved the problem of discarding its processed organic waste (sewage sludge), that results from secondary treatment of sewage, by spreading the very liquid waste (1½% solids) onto the International Nickel Company's Copper Cliff tailings.

A problem exists, however, in that sewage treatment tends to concentrate toxic ions such as nickel and copper and these then constitute a potential hazard to plant growth and as a contaminant in seepage water. Although the raw sewage has been digested during treatment, the bacterial count is still fairly high and this adds further to the possibility of contamination.

The present three-year investigation which is funded by the Ministry of the Environment (Ontario) was initiated in September 1973 and has three aims:

- 1) the monitoring of seepage water quality (bacteria and heavy metals),
- 2) the role of sewage sludge as a fertilizer and soil ameliorant,
- 3) the role of the tailings as a filter bed to bacteria and heavy metals.

The monthly sampling of seepage water during the frost-free season (May to November) has shown no definable trend in heavy metal levels that could be attributed to the application of sewage sludge, whereas coliform bacteria were found several times during Summer 1975. The source is not presently known.

Measured quantities of sludge were applied to two sample areas of the tailings several times each season; application frequency being controlled by the moisture content of the tailings. Samples of sludge, tailings and vegetation were taken regularly during each frost-free season for subsequent analysis.

Laboratory studies with undisturbed tailings cores showed that percolation was severely impeded following three or four applications of sludge but that simulated 'discing' restored percolation to former levels. At the same time the increase in organic matter improved the water-holding capacity of the soil.

The analysis of the heavy metals in the sewage sludge/tailings/plant

system has been slow to date and little quantitative data are available. There are, however, two subjective conclusions that may be made. No serious heavy metal toxicity symptoms have been noted, and there was a very marked visible change in the vigour of the tailings grasses at the end of the 1975 field season. The lack of toxicity indicates that the organic matter is tying up heavy metals over and above changes that occur in texture and water-holding capacity. Furthermore, whereas the nitrogen is present in minimal quantities, it is present in a very favourable form for plant growth and is having a maximal effect as a fertilizer.

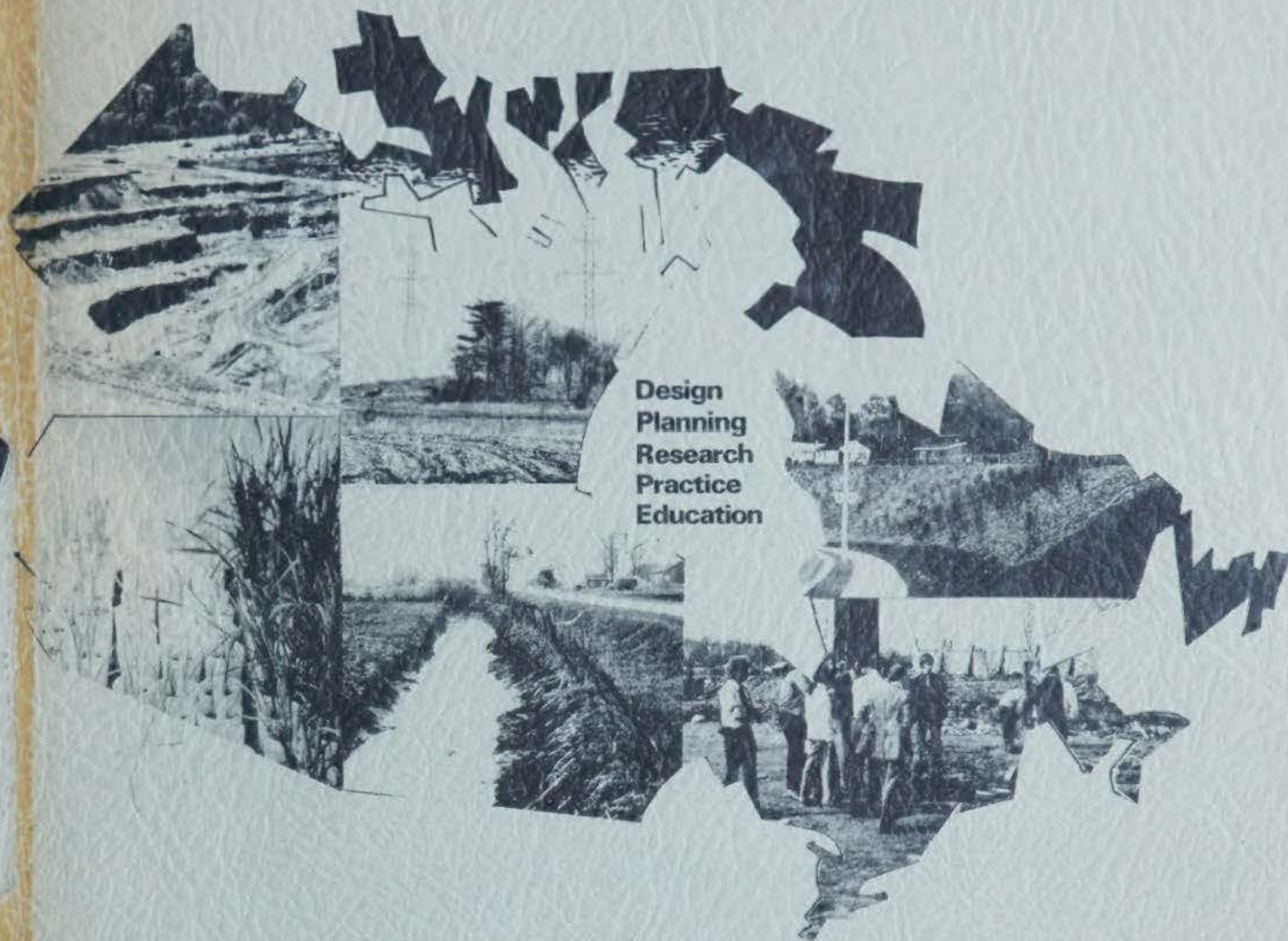
The work remaining consists of further percolation tests through undisturbed tailings cores to determine the efficacy of tailings as a bacterial filter, and the completion of heavy metal analyses by atomic absorption spectrophotometry.

It is hoped that the results of this study will help establish guidelines for management of tailings to which sewage sludge has been applied.



**Proceedings of the Inaugural Meeting  
Canadian Land Reclamation Association**

**DECEMBER 1975**



**Design  
Planning  
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Practice  
Education**

**Crop Science Department  
Ontario Agricultural College  
University Of Guelph  
Guelph, Ontario, Canada  
March 1976**

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PROCEEDINGS OF THE INAUGURAL MEETING  
OF THE  
CANADIAN LAND RECLAMATION ASSOCIATION

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