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TECHNOS INC.

Geophysical Survey
Calumet Industrial Disposal Facility
Cook County, Illinois

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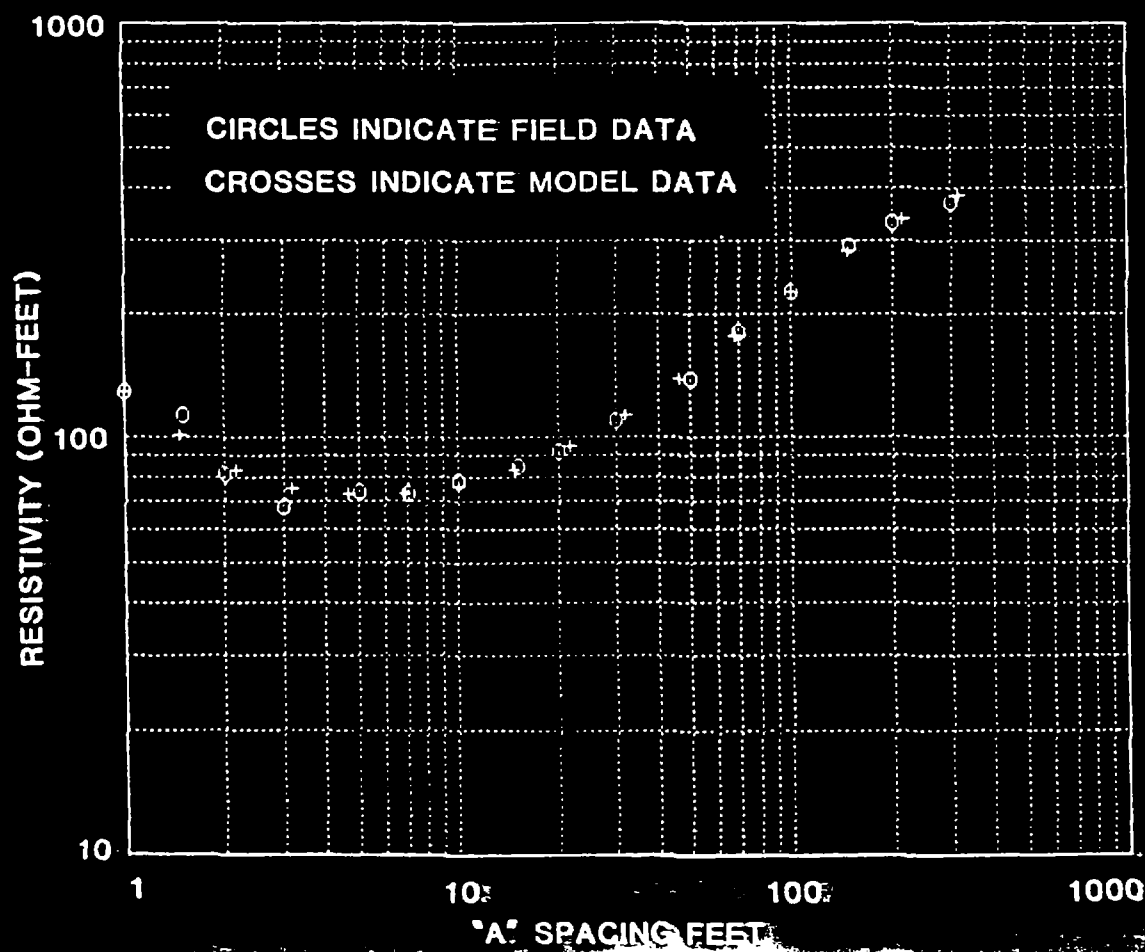

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FINAL REPORT

GEOPHYSICAL SURVEY

at the

CALUMET INDUSTRIAL DISPOSAL FACILITY

Cook County, Illinois

for

WASTE MANAGEMENT, INC.

Oak Brook, Illinois

August 1984

Technos 84-126

WMI Addendum # 12

Submitted by:
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1.0 EXECUTIVE SUMMARY

A geophysical investigation, consisting of electromagnetic conductivity profiles and electrical resistivity soundings, was carried out at the Calumet Industrial Dispoal (CID) facility of Waste Management of Illinois Inc. (WMI) in order to: 1) understand the applicability of geophysical techniques to the site geology, and 2) supplement and aid in the interpretation of groundwater monitoring data in the Dolton sand and Niagaran dolomite.

The results of the electromagnetic conductivity survey indicate that refuse is buried outside of the disposal area sideliners. This refuse, apparently associated with "fly dumping" and previous landfilling activities which occurred in this area prior to WMI operations, occurs along approximately one-third of the six miles of disposal area perimeter. It is very likely that leachate generated from this refuse material, buried outside of the disposal area sideliner, can account for the lower water quality observed in some of the monitor wells, especially well 11S. In order to detect possible migration of waste constituents from the landfills we recommend that a ground-water monitor system for the Dolton sand be located outside of these areas of previously disposed refuse material.

The results of the reconnaissance resistivity survey indicate that no substantial variations in the conductivity of the bedrock aquifer occur. This is attributed to the homogeneous nature of the bedrock and the absence of ground-water anomalies. These results correlate with existing monitor well data and substantiate the integrity of the lining system for the disposal areas.

2.0 INTRODUCTION

Waste Management of Illinois Inc. (WMI) operates a landfill disposal facility at Calumet Industrial Disposal (CID) in Cook County, Illinois (Figure 1). In order to: 1) understand the applicability of geophysical techniques to the site geology, and 2) supplement and aid in the interpretation of groundwater monitoring data in the Dolton sand and Niagaran dolomite, TECHNOS, INC. was contracted by WMI to carry out a geophysical survey utilizing shallow, high-resolution electromagnetic conductivity and electrical resistivity soundings.

The CID facility is comprised of four disposal areas (Figure 2). Landfill activities at Disposal Areas 1 and 2 have been completed. Disposal Area 3 is the currently active landfill disposal facility and Disposal Area 4 is the currently active hazardous waste landfill disposal facility.

Prior to WMI ownership, previous landfilling and dumping occurred in the area (WMI breifing session, July, 1983). Extensive landfilling took place north of 134th Street in the area which is now Disposal Area 3. In addition, roadside dumping occurred along the western edge of CID and in the Forest Preserve District area (Figure 3). Some of the presently lined disposal areas are therefore situated within these areas of previously uncontrolled landfilling and "fly-dumping". Certain anomolies have been noted in the groundwater monitoring results from these areas, which require further evaluation.

The geologic section at the site is comprised of two Pleistocene-age units

Figure 1. General site location map.

which are the Dolton Member sand and the Wadsworth Member till. The Dolton sand overlies the Wadsworth till which in turn overlies the Silurian age, Niagaran Series dolomite bedrock.

The upper sand member forms a surficial water-bearing zone that is approximately 8 feet thick. The shallowest useable aquifer is the dolomite bedrock which varies in depth from 45 to 80 feet and is greater than 400 feet thick.

Ground water in the surficial sand aquifer flows east and south towards the Little Calumet River. Within the bedrock aquifer, Woodward-Clyde Consultants (1983a, 1983b) report a ground-water ridge beneath Disposal Area 3 which causes water to flow towards the northwest and also towards the east. Beneath Disposal Area 4, the ground-water levels indicate flow toward the northwest and seasonal fluctuations to the southeast.

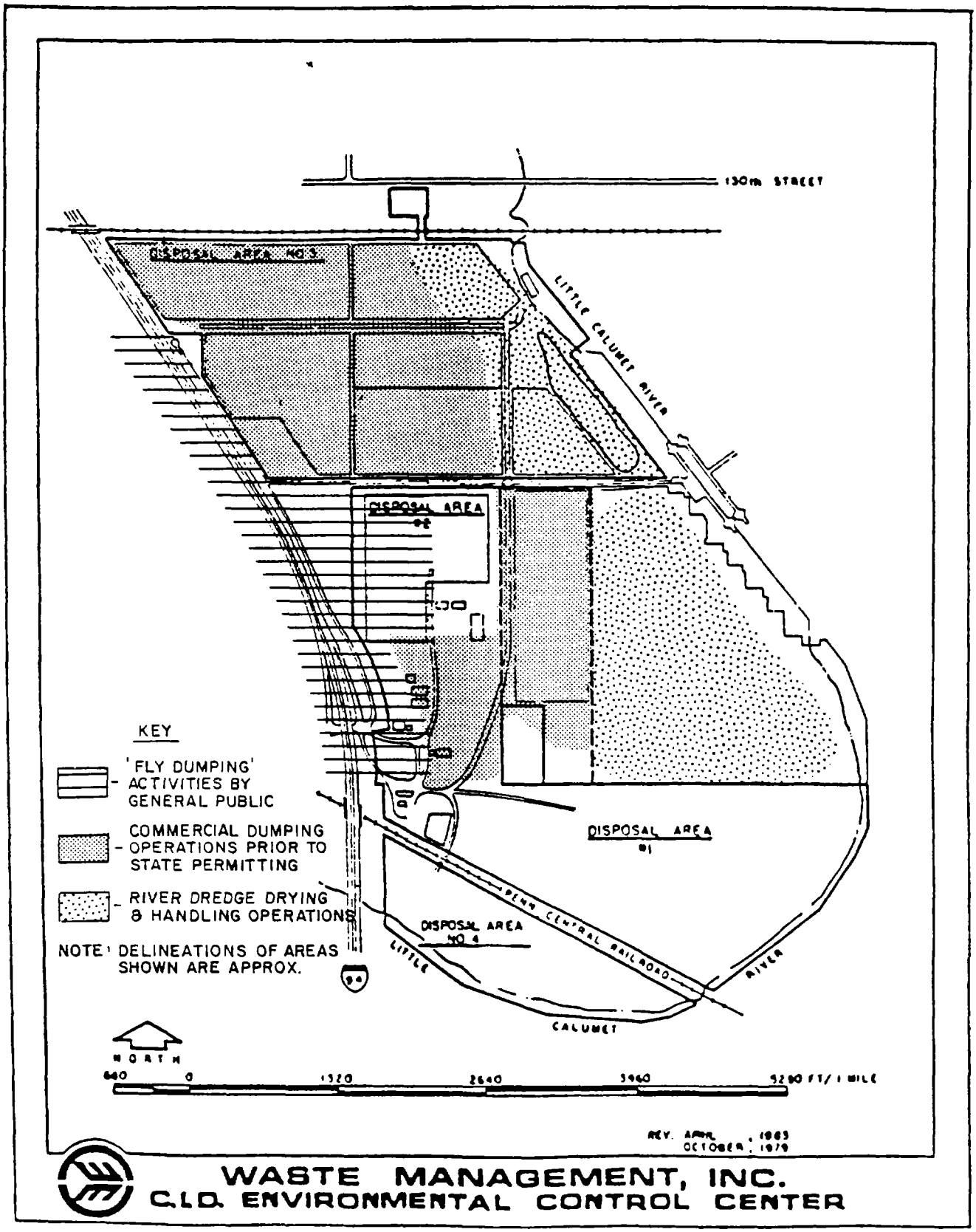

Figure 3. Map of previous disposal areas prior to WMI operations.
Source: Conversations with personnel present during said operations & construction drawings of dredge drying operations

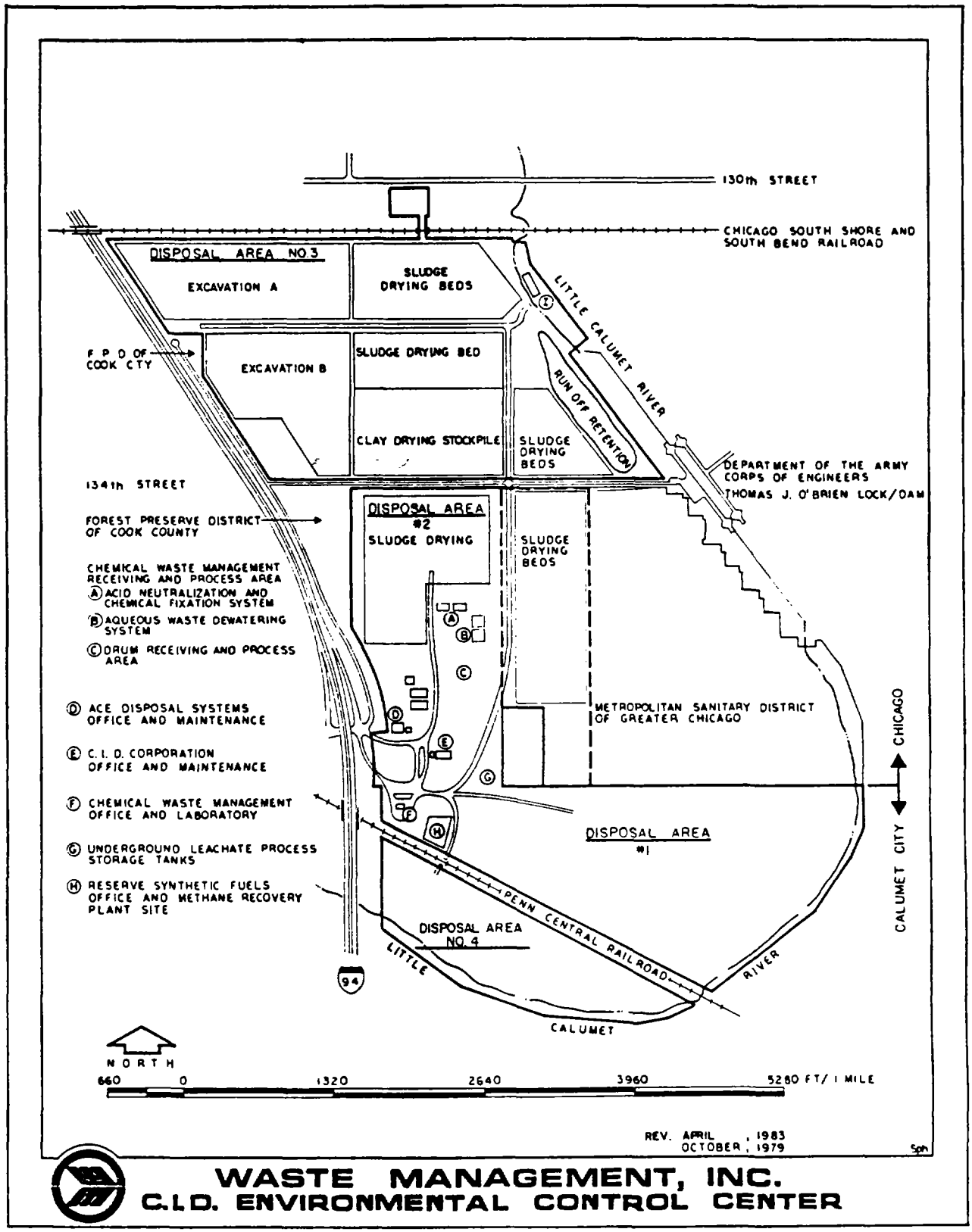

Figure 2. Map of Calumet Industrial Disposal (CID).