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PRELIMINARY RADIOLOGICAL SURVEY REPORT OF THE
FORMER STATEN ISLAND WAREHOUSE SITE
(ARCHER-DANIELS MIDLAND COMPANY) AT
PORT RICHMOND, NEW YORK

Work performed
by the
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Introduction

A number of buildings located at the site of the former Staten Island Warehouse in Port Richmond, New York, were used by Union Miniere du Haut-Katanga Company to store high-grade Belgian Congo uranium ore (owned by that company) from 1939 to 1942. In 1942, 2007 drums of uranium ore were stored at the Staten Island Warehouse (owned by Archer-Daniels Midland Company) containing 1089 metric tons of ore. The ore contained approximately 600 metric tons of U_3O_8 and 170 grams (Ci) of radium. Following purchase of this material by the U.S. Government, the uranium ore was shipped to various Manhattan Engineer District (MED) sites for storage and processing. There is no record of any previous radiological survey of this site.

At the request of the Department of Energy (DOE), a preliminary radiological survey of this site was conducted on July 10, 1980, by members of the Health and Safety Research Division at Oak Ridge National Laboratory (ORNL). The site survey was intended to provide information on the present radiological condition and to determine the need for a more extensive radiological survey.

Site Description

The site is located at the base of the Bayonne Bridge on Richmond Terrace Avenue in Staten Island, New York (Fig. 1). The original property owned by Archer-Daniels Midland Company was divided into three parcels (Fig. 2). Since 1942, these parcels have changed ownership numerous times. Parcels 1 and 2 are currently owned by R. H. S. Realty Corporation (New York, New York); the boundary dimensions have been accurately defined in present county property records. Ownership of Parcel 3 was separated from Parcels 1 and 2 in the 1950's, and the location of Parcel 3 is known, but not the boundary dimensions.

After discussions with several local residents who had lived in the vicinity of the site for longer than 30 years, several conclusions were drawn:

1. The warehouses were believed to be located on Parcel 1, exclusively;
2. Parcel 2 had always been a vacant lot; however, at one time there had been an aborted attempt at building a two-car garage on that lot;
3. Parcel 3 has had a number of buildings on it that have been located there for over 30 years.

Currently, Parcel 1 is a vacant lot with no buildings present and ground cover of gravel and low weeds (Fig. 3). Parcel 2 is a vacant lot with no buildings present, but has remnants of a short retaining wall facing Richmond Terrace, a two-car garage foundation, and a ground cover of soil, rocks, high weeds, and small trees (Fig. 4). Parcel 3 is occupied by commercial and residential structures.

Survey Methods

The preliminary radiological survey of the former Staten Island Warehouse site consisted of the following measurements for Parcel 1: (1) a gamma-ray scan of the ground surface; (2) several random on-site surface soil samples; (3) bias soil samples of locations where external gamma radiation levels are significantly above background. For parcels 2 and 3, a ground-level gamma-ray scan was made along the perimeters of these properties. The high weeds on Parcel 2 and the lack of owner permission on Parcel 3 prohibited more extensive radiological surveys of these parcels.

The instrumentation used in this radiological survey included a gamma-ray scintillation (NaI) survey meter and a beta-gamma Geiger-Mueller (G-M) survey meter.

Survey Results

Parcel 1

External gamma-ray exposure rate levels were generally 20 to 50% lower than most background values observed in New Jersey (Fig. 5). However, in the northwest corner of the parcel, gamma radiation levels were found to be significantly above background, indicating the presence

of contamination. Although the contamination was low-level throughout this area, there were localized spots with gamma exposure rates up to 0.2 mR/h (20 times background) on the ground surface (increasing to 0.4 mR/h at 15-cm depth). The contamination appeared to be in a 6-cm layer at a depth of approximately 35 to 40 cm (Fig. 6).

Three soil samples were taken for radionuclide analyses. The location of these samples are identified in Fig. 5 and the results of the analyses are listed below.

Sample	Depth From Ground Surface (cm)	Concentration of Radionuclides (pCi/g) ^a		
		²³⁸ U	²²⁶ Ra	²³² Th
ST 1	35 - 40	660 ± 3%	590 ± 0.2%	<i>b</i>
ST 2	0 - 10	1.1 ± 3%	1.2 ± 2%	1.4 ± 3%
ST 3	0 - 5	0.62 ± 3%	0.62 ± 3%	0.45 ± 2%

^aUncertainties are listed as 2 σ (95% confidence intervals).

^bBelow minimum detectable concentration (MDC).

Parcels 2 and 3

The gamma scan of the perimeter of these parcels indicated there were no radiation levels significantly above background. Higher than normal gamma radiation levels were observed from a short stone retaining wall facing Richmond Terrace on Parcel 2. This was not considered unusual since the type of stone encountered has typically higher concentrations of ²²⁶Ra than the surrounding soil. It should be noted that the gamma scan was very limited and yielded information only about a 2 to 3 m strip around the perimeter of these parcels.

Recommendations

Based on the results of this preliminary survey at the former Staten Island Warehouse Site, it is recommended that a formal detailed radiological survey of Parcel 1 be conducted. There is evidence that a 20 m x 40 m area may have been contaminated with high-grade Belgian Congo uranium ore; preliminary results cannot rule out the existence of other such areas on this or other parcels.

A detailed historical and property search is needed to determine whether the uranium ore was ever stored on Parcels 2 and 3. Aerial photographs taken during the early 1940's might provide information as to the specific location of the ore storage warehouses. If enough evidence cannot be gathered to adequately determine the locations of uranium ore storage, then it is also recommended that Parcels 2 and 3 of the former Staten Island Warehouse site receive a formal radiological survey.



Figure 1. Location of the former Staten Island Warehouse site in Port Richmond, New York.

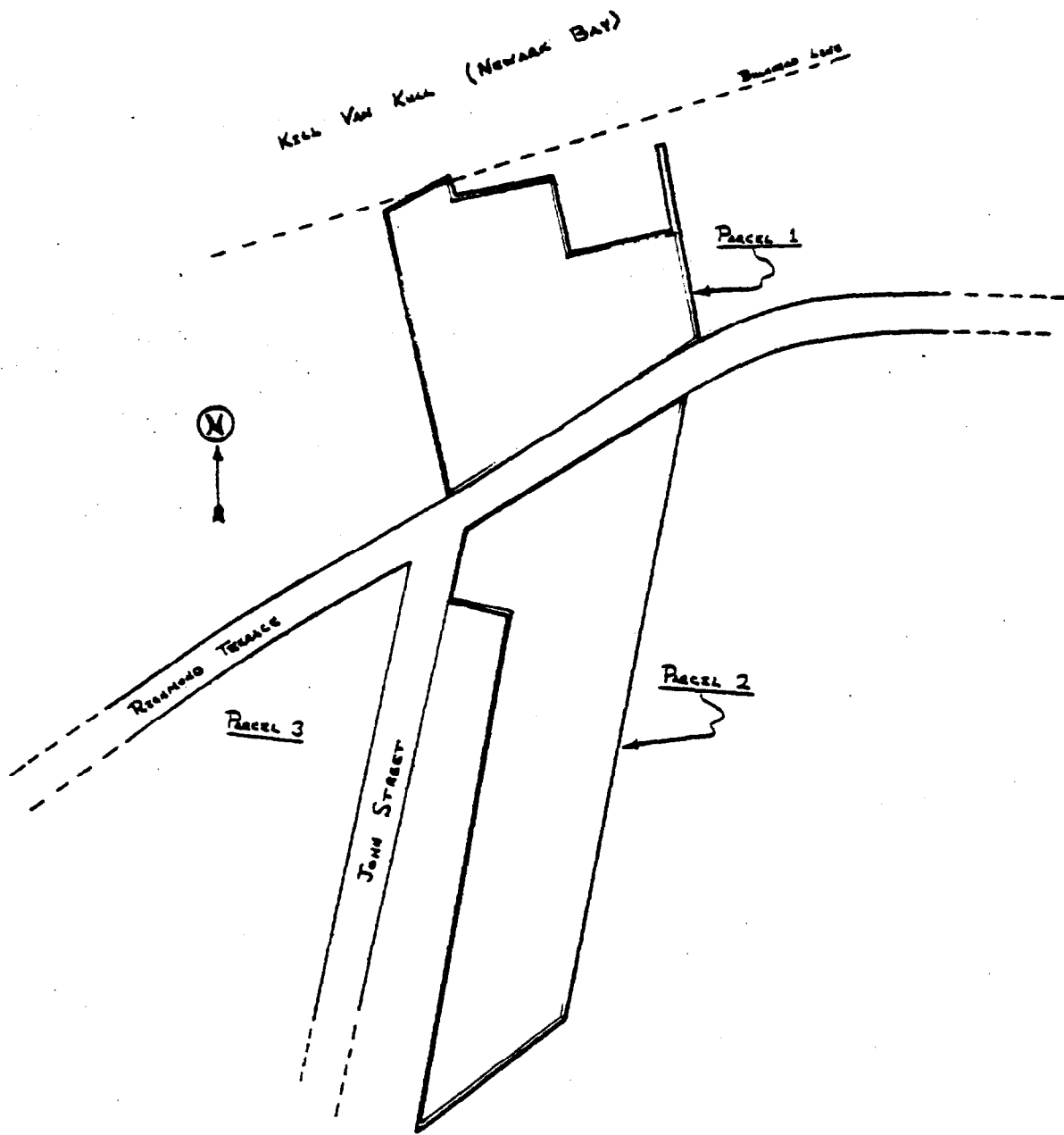


Figure 2. Location of three property parcels formerly owned by Archer-Daniels Midland Company in Port Richmond, New York.



Figure 3. View of Parcel 1 of the former Staten Island Warehouse site looking north.



Figure 4. View of Parcel 2 (left side of John St.) and Parcel 3 (right side of John St.) of the former Staten Island Warehouse site looking south.

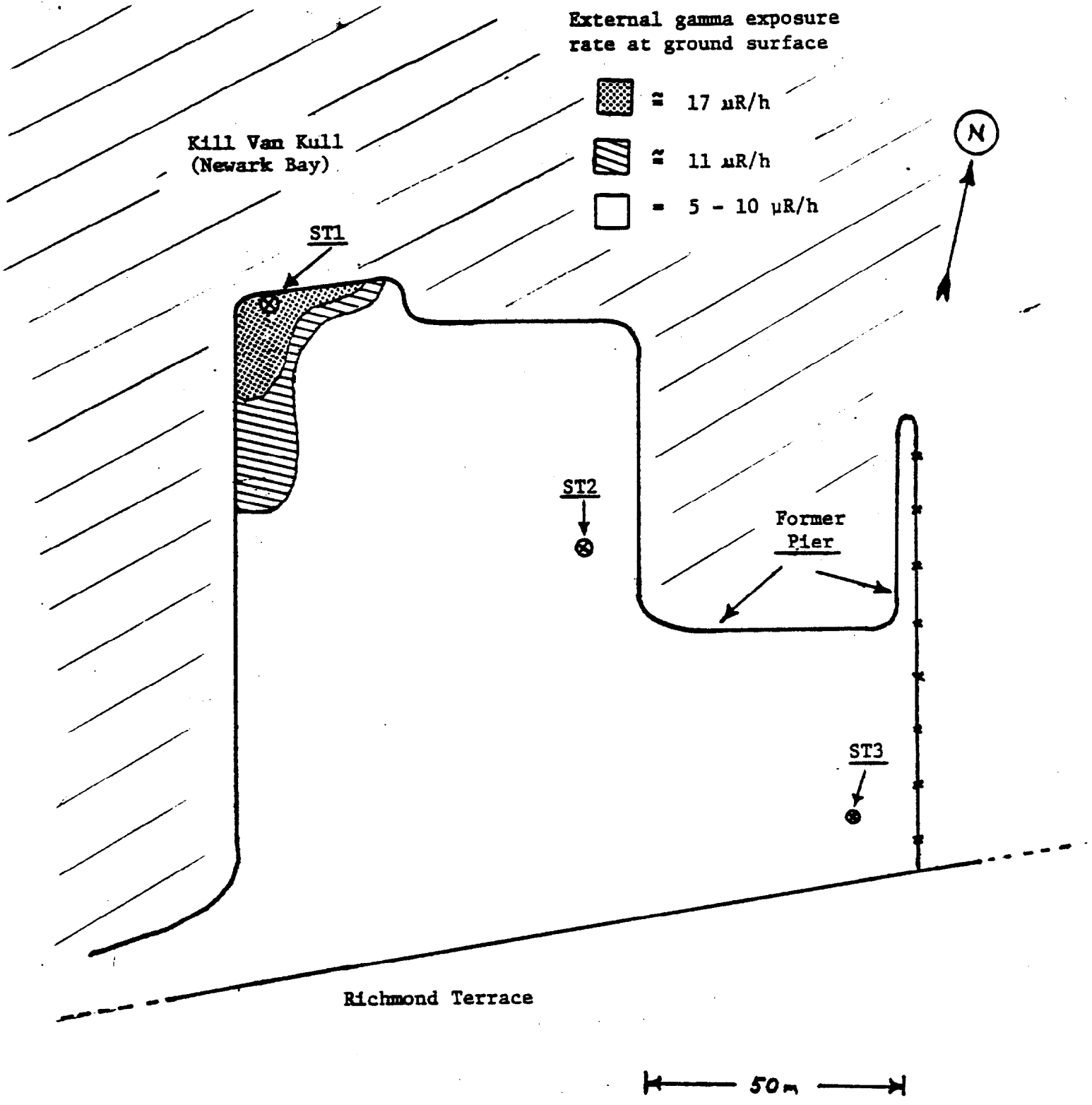


Figure 5. External gamma exposure rates observed at ground surface on Parcel 1 and location of three surface soil samples.



Figure 6. Location of soil sample ST 1 showing layer of contamination at 35 - 40 cm depth.