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PRELIMINARY SURVEY OF
VITRO CORPORATION
(VITRO LABORATORIES)
WEST ORANGE, NEW JERSEY

Work performed
by the
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March 1980

OAK RIDGE NATIONAL LABORATORY
operated by
UNION CARBIDE CORPORATION
for the
DEPARTMENT OF ENERGY
as part of the
Formerly Utilized Sites--
Remedial Action Program

VITRO CORPORATION
(VITRO LABORATORIES)
WEST ORANGE, NEW JERSEY

At the request of the Department of Energy (DOE), a preliminary survey was performed at the former Vitro Corporation Laboratory in West Orange, New Jersey (see Fig 1), on November 30, 1977, to assess the radiological status of those facilities utilized under Atomic Energy Commission (AEC) contract during the late 1950s and early 1960s. This site, no longer owned by the Vitro Corporation, is owned by the West Orange Tennis Club.

According to available records, Vitro Laboratories contracted with the AEC to perform a production process for the conversion of low enrichment uranium dioxide to uranium carbide. Apparently, there were two different contracts involving this process. The first contract required processing uranium with an enrichment of 3.68% and the second involved uranium enriched to 4.9%.

The site where the project was conducted consisted of approximately 3 acres. Arrangements for performing the survey were made through Mrs. Arons, one of the owners of the West Orange Tennis Club. From information contained in records and obtained during the survey, the contract work was apparently conducted on the second floor of a building at a location where the "lower" tennis courts are presently situated.

Present Use of Facilities

The entire site, including the building where the contract work was conducted, has been purchased by the West Orange Tennis Club, Inc. The building has been completely demolished, and there is presently no trace of the original structures (see Figs. 2, 3, and 4). No information was available as to the disposition of building debris or equipment utilized in the process. There was also no information available as to the radiological status of the facility when the work was terminated; however, there was indication that some waste associated with Vitro operations may have been buried at sea.

Results of Preliminary Survey

The preliminary survey was conducted by H. W. Dickson of the Oak Ridge National Laboratory and W. T. Thornton of the DOE/Oak Ridge Operations Office. A survey of the site was conducted, consisting of gamma-ray exposure rate measurements made at a height of 1 m above the surface and open-window, beta-gamma Geiger-Mueller survey meter, dose-rate readings taken 1 cm above the surface at corresponding locations (see Fig. 5). Additionally, a water sample was collected from the stream which traverses the property, and a surface soil sample (0 to 20 cm) was obtained from an area near the stream where there was an apparent undisturbed surface. A second surface soil sample was obtained from a location on the golf course adjacent to the site. The location of the soil and water samples is shown in Fig. 5.

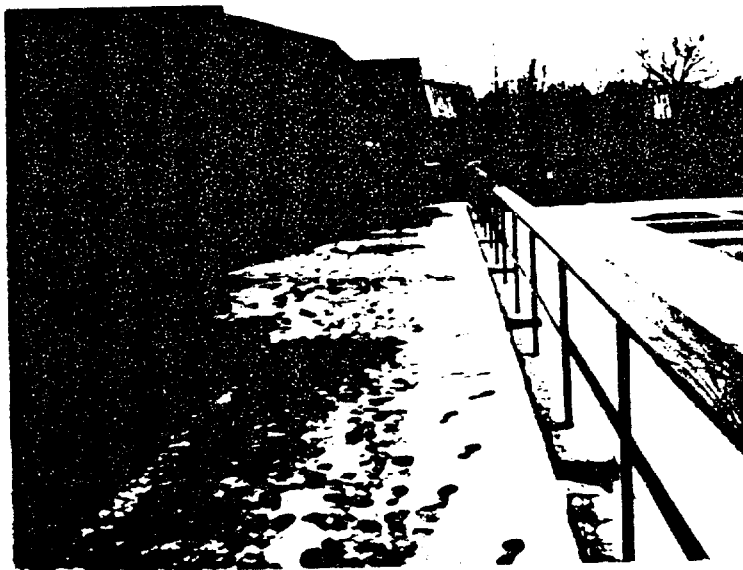
Average gamma-ray exposure rate on site was 6 to 7 $\mu\text{R/hr}$ at 1 m above the surface. The maximum gamma-ray exposure rate found was 9 $\mu\text{R/hr}$ near the swimming pool. The maximum open-window, beta-gamma dose-rate reading at 1 cm from the surface was 0.04 mrad/hr. Results of radio-nuclide analyses of the water and soil samples are listed in Table 1.

All measurements taken at the former Vitro Laboratories were within typical background levels for eastern New Jersey with the single exception of sample W01 which had a ^{232}Th concentration in surface soil of 7.9 pCi/g. The cause of this sample having ^{232}Th concentrations two to three times that of background samples is difficult to ascertain. However, it is unlikely that the higher-than-background ^{232}Th concentration is related to the activities of the former Vitro Laboratories since the enrichment processing operations at this site were apparently for uranium dioxide exclusively.

In view of the removal of the building and associated equipment as well as the radiological measurements within background levels at this site, it appears that additional radiological measurements are not required. However, some additional efforts should be made to determine the present location of equipment and building rubble. Also, operational records should be sought to determine if waste, debris, etc., were buried on the site.



Fig. 1. Location of the former Vitro Laboratories in West Orange, New Jersey.



Racquetball Clubhouse



Stream separates upper and lower tennis courts and clubhouses (water sample and soil sample taken on left bank)

Fig. 2. Photographs showing present status of site.



Lower tennis courts, likely site of old Vitro lab



Looking from deck of clubhouse over swimming pool toward tennis courts and Pleasant Valley Way

Fig. 3. Photographs showing present status of site.



View from Pleasant Valley Way showing upper tennis courts and clubhouse



View of lower tennis courts and clubhouse from access road

Fig. 4. Photographs showing present status of site.

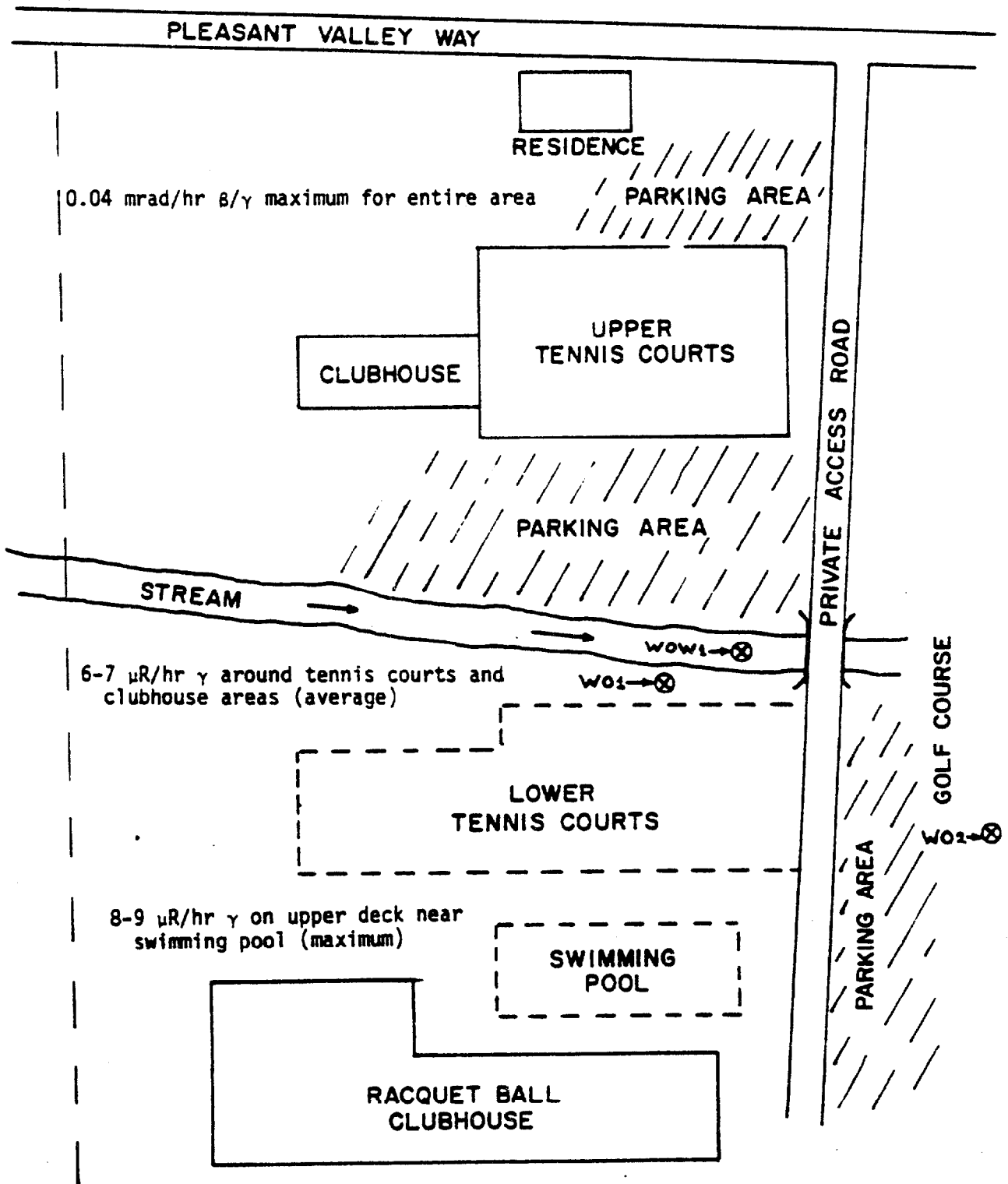


Fig. 5. Facilities surveyed at the West Orange Tennis Club, Inc., in West Orange, New Jersey. Location of soil and water samples are identified on diagram.

Table 1. Radionuclide concentrations in water and soil sample obtained at and near the former Vitro Laboratories site in West Orange, New Jersey

Sample ^a	Sample type	Location	Radionuclide	Concentration ^b
WOW1	Water	stream	²²⁶ Ra	0.90 pCi/liter
			²¹⁰ Pb	9.0 pCi/liter
			²³⁰ Th	<0.45 pCi/liter
W01	Soil	near stream	²²⁶ Ra	0.58 pCi/g
			²³² Th	7.9 pCi/g
			²³⁸ U	0.87 pCi/g
W02	Soil	golf course	²²⁶ Ra	0.73 pCi/g
			²³² Th	0.88 pCi/g
			²³⁸ U	1.58 pCi/g

^aLocations of samples are shown in Fig. 5.

^bAll other radionuclides were in concentrations below detectable limits for the above samples.