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PRELIMINARY SURVEY OF TEXAS CITY CHEMICALS, INC. (BORDEN CHEMICAL DIVISION OF BORDEN, INC.) TEXAS CITY, TEXAS

Work performed
by the
Health and Safety Research Division
Oak Ridge National Laboratory
Oak Ridge, Tennessee 37830

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for the
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as part of the
Formerly Utilized Sites--
Remedial Action Program

TEXAS CITY CHEMICALS, INC.
(BORDEN CHEMICAL DIVISION OF BORDEN, INC.)
TEXAS CITY, TEXAS

At the request of the Department of Energy (DOE), a preliminary survey was performed at the Borden Chemical Division plant in Texas City, Texas (see Fig. 1), on November 17, 1977, to assess the radiological status of those facilities utilized under Atomic Energy Commission (AEC) contract during the period 1951 through 1958. Richard J. Fosdick, Plant Manager, provided information about the project and was the escort to the site of the former plant. At the time of the AEC project, the plant was owned by Texas City Chemicals, Inc., and operated under contracts with the AEC [Contract AT(49-1)-616, 2/14/52, extended by amendments to 6/1/53; Contract AT(49-1)-647, 5/12/53 (a small amount of uranium was produced under this contract); Contract AT(49-6)-910, expired 9/10/55; Contract AT(05-1)-481, nature and terms unknown]. It was believed that no operations involving contract work were conducted at this site after about 1956, when the Texas City Chemicals Company went bankrupt. The plant was purchased by Smith-Douglas Company, a Division of Borden Chemical Company, Bordon, Inc.

From information contained in Letter Contract AT(49-1)-616, dated February 14, 1952, between the AEC and Texas City Chemicals, Inc., of Dallas, Texas, the contractor extracted U_3O_8 from phosphoric acid solution which was used in the processing of phosphate rock at the site. No information was available as to the exact amounts of U_3O_8 produced nor as to the radiological conditions of the facility at the termination of the project by the contractor or the successor company.

Present Use of Facilities

The building utilized in the AEC project was located on a concrete pad approximately 19 x 36 yd (see Fig. 2). The building used for uranium extraction was demolished (year unknown) and salvaged. The location of building rubble and contents was unknown. No information was available as to any further use of the pad except the storage of gypsum resulting from phosphate rock processing, which occurred after demolition of the building. The property was not in use at the time of the current survey. Since that time, the property was acquired by the American Oil Company.

Results of Preliminary Survey

The preliminary survey was conducted by F. F. Haywood of the Oak Ridge National Laboratory and W. T. Thornton of the DOE/Oak Ridge Operations Office. A survey of the pad area and areas adjacent to the pad was performed, 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 grid points as indicated in Fig. 3. Additionally, dirt and gypsum samples were collected from the surface at four locations adjacent to the pad and on the pad where elevated readings were observed. One sample (B2) was taken at a depth of 15 cm below the surface where the highest direct reading was found (120 μR/hr gamma-ray exposure rate at 1 m and 0.25 mrad/hr beta-gamma dose rate at 1 cm from the surface). Results are presented in Table 1. Concentrations of ^{227}Ac, ^{223}Ra, and ^{228}Ra were below detection limits in all samples. No attempt was made to obtain beta-gamma dose-rate measurements or soil samples on the concrete pad due to the amount of gypsum piled on the pad. All soil samples taken at this site contained higher than background concentrations of ^{226}Ra. The maximum concentration of ^{226}Ra observed was 170 pCi/g for sample B4. Concentrations of ^{40}K are determined for all soil samples; however, they are not generally reported since these concentrations are almost always within background levels (10 to 15 pCi/g). The concentration of ^{40}K in surface soil at location B1 was noteworthy, however, since the concentration was an order of magnitude above background concentrations (230 pCi/g). There is no apparent explanation for this high value.

Some measurements taken at this site were significantly greater than background values found in this region of Texas (e.g., the maximum gamma-ray exposure rate was 120 μR/hr, and the maximum ^{226}Ra concentration was 170 pCi/g). The maximum gamma-ray exposure rate at this site is similar to that found at phosphate product plants in other parts of the country where uranium recovery is not a part of normal operations.[1,2] However, the maximum observed ^{226}Ra concentration (170 pCi/g) is significantly higher than that which might be observed at phosphate product plants.[3] Therefore, it may be necessary to perform some additional investigations in the vicinity of the concrete pad where the pilot plant was located.

REFERENCES

1. F. F. Haywood, W. A. Goldsmith, R. W. Leggett, R. W. Doane, W. F. Fox, W. H. Shinpaugh, D. R. Stone, and D. J. Crawford, *Radiological Survey of the Former Uranium Recovery Pilot and Process Sites, Gardinier, Incorporated, Tampa, Florida*, Final Report, U.S. Department of Energy, DOE/EV-0005/-- (to be published).
2. F. F. Haywood, D. J. Crawford, R. W. Doane, W. F. Fox, W. A. Goldsmith, R. W. Leggett, W. H. Shinpaugh, and D. R. Stone, *Radiological Survey of the Former Virginia-Carolina Chemical Corporation Uranium Recovery Pilot Plant, Nichols, Florida*, Final Report, U.S. Department of Energy, DOE/EV-0005/18, January 1980.
3. W. Davis, Jr., F. F. Haywood, J. L. Danek, R. E. Moore, E. B. Wagner, E. M. Rupp, and P. J. Walsh, *Potential Radiological Impacts of Recovery of Uranium from Wet Process Acid*, Oak Ridge National Laboratory Report ORNL/EPA-2, January 1979.

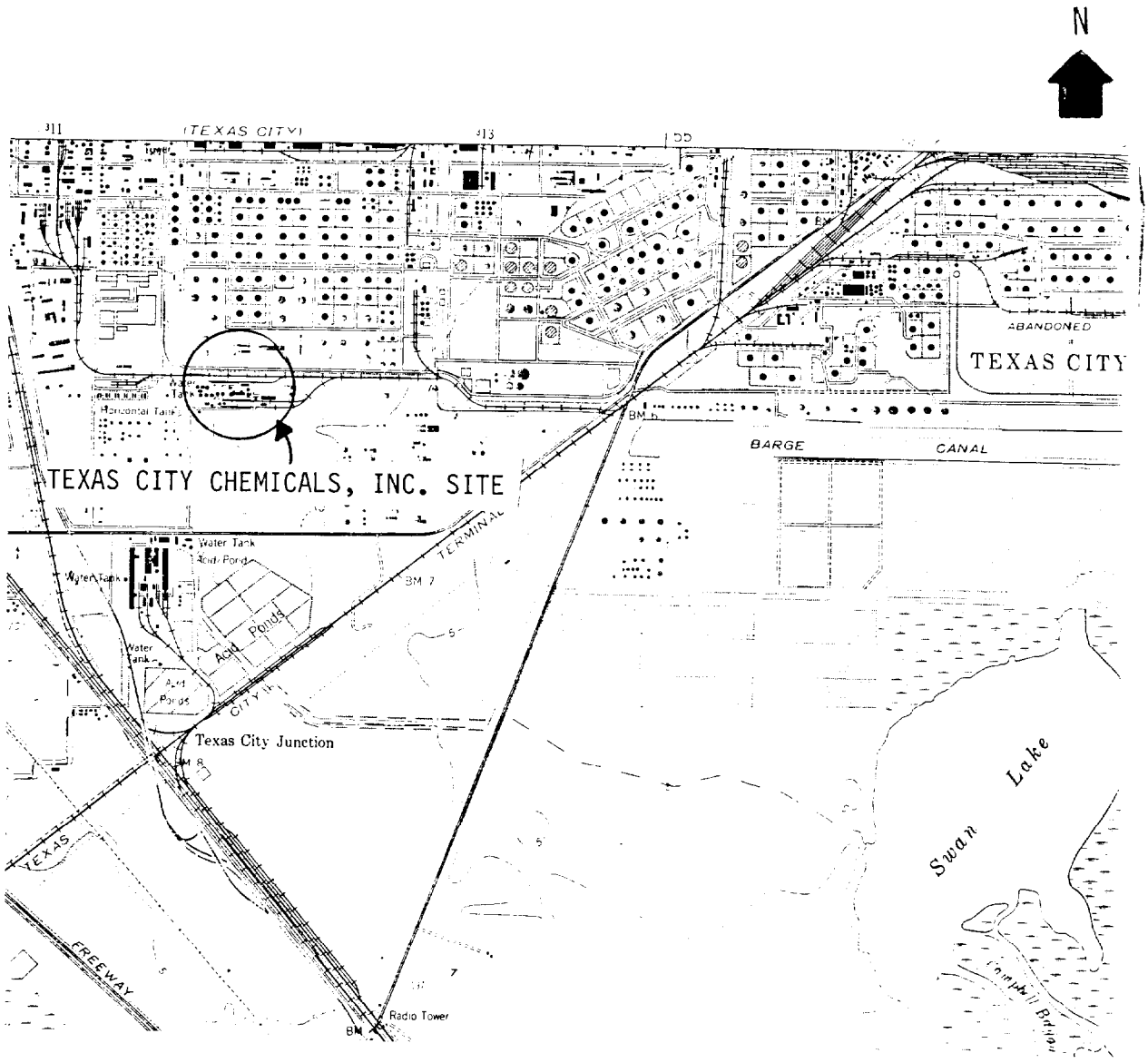


Fig. 1. Location of the former Texas City Chemical, Inc., in Texas City, Texas.

Fig. 2. Concrete pad on which uranium recovery plant was located (note gypsum pile on pad).

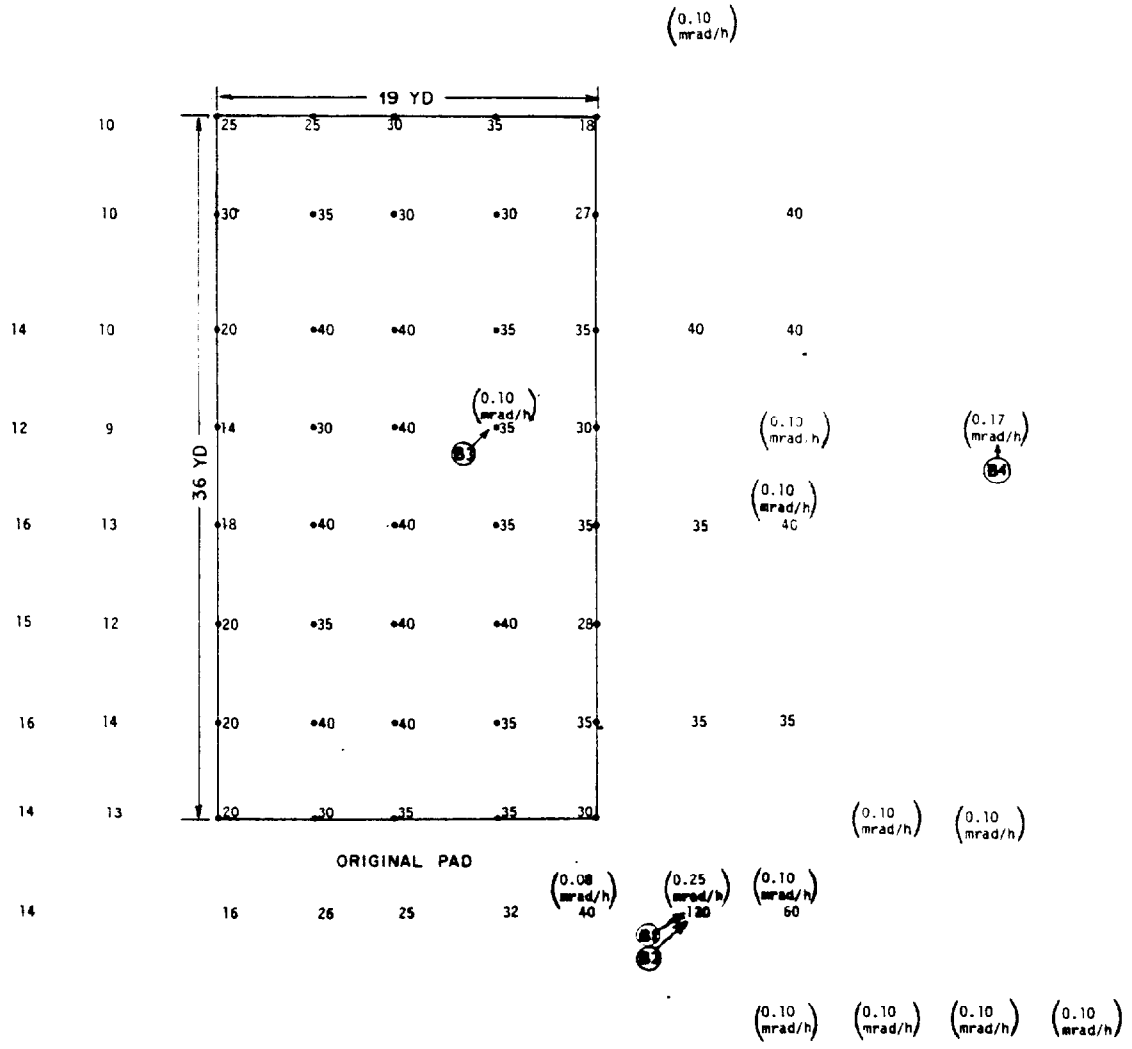


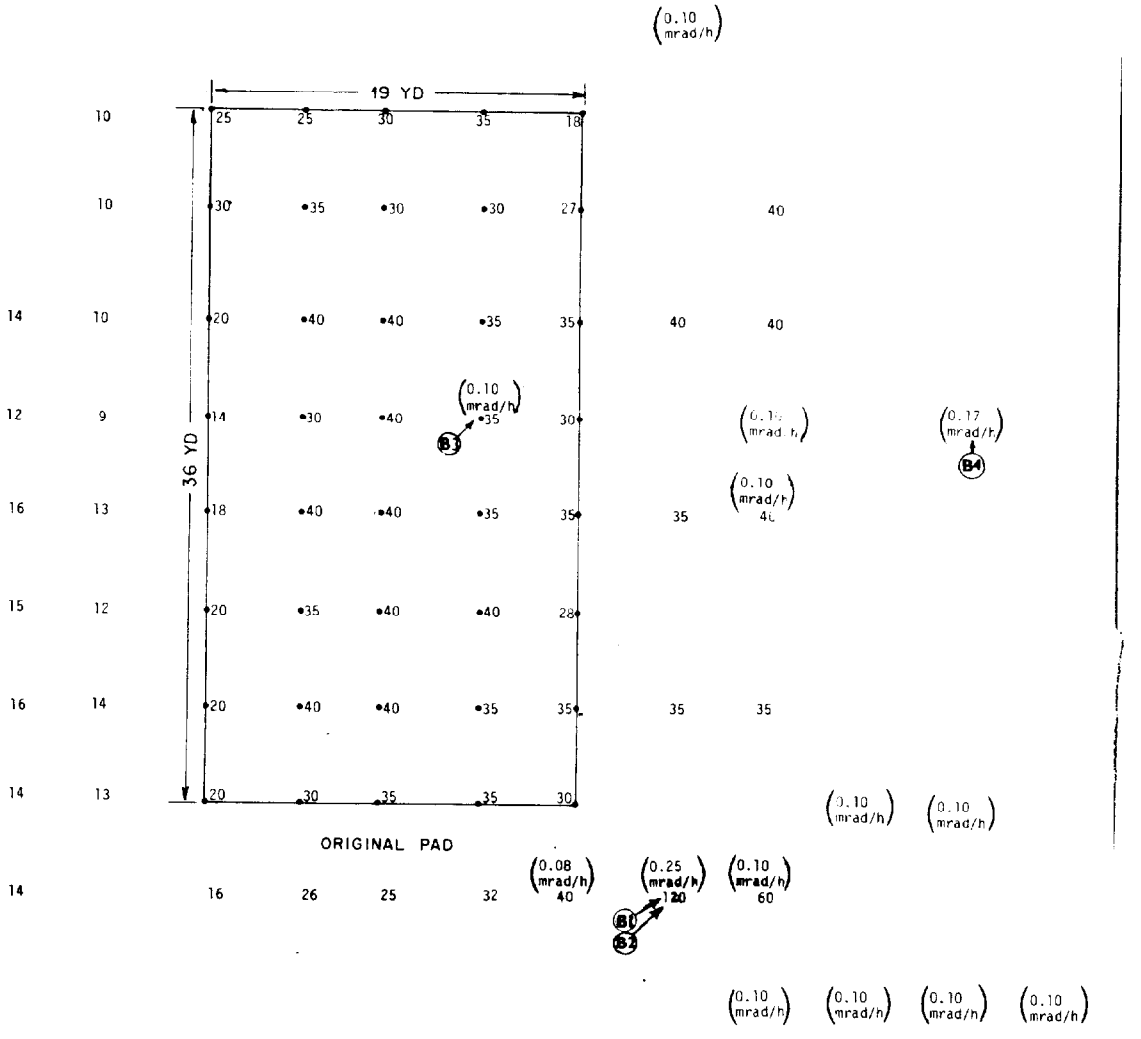
Fig. 3. Location and measurement values obtained during preliminary survey at Borden Chemical Company. (Above values are external gamma exposure rates [μR/hr] and unless noted otherwise, beta-gamma dose-rate values [in parentheses] were less than or equal to 0.05 mrad/hr. Soil samples are indicated by sample code and arrow.)

Table 1. Radionuclide concentrations in dirt and gypsum samples taken on and off the concrete pad at Borden Chemical Company

Sample[a]	Sample description and location	Radionuclide concentration (pCi/g)		
		^{238}U	^{226}Ra	^{232}Th
B1	surface	4.5	19.7	BDL[b]
B2	15 cm below surface	9.7	4.5	BDL
B3	surface	15.3	18	0.5
B4	surface	8.6	170	BDL

[a]Location of samples indicated in Fig. 3.

[b]BDL: Radionuclide concentrations below detection limits.



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