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TENNESSEE VALLEY AUTHORITY
MUSCLE SHOALS, ALABAMA 35660

Copy: Tennessee Aviss

National Fertilizer Development Center
May 15, 1980

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Mr. William E. Mott, Director
Environmental Control
Technology Division
Office of Environment
Department of Energy
Washington, DC 20545

Dear Mr. Mott:

This is in response to your letter of May 5 requesting comments on a report dated March 1980 which summarizes a preliminary radiological survey of facilities used in the early 1950's for studies of recovery of uranium from leached zone ore.

I have made a few suggested changes to the report, which is being returned to you.

Thank you for the opportunity to review this report.

Sincerely,

M. R. Siegel
Assistant Chief
Development Branch

Enclosure

PRELIMINARY SURVEY OF TENNESSEE VALLEY AUTHORITY MUSCLE SHOALS, ALABAMA

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

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

TENNESSEE VALLEY AUTHORITY
MUSCLE SHOALS, ALABAMA

At the request of the Department of Energy (DOE), a preliminary survey was performed at the Tennessee Valley Authority's (TVA) Muscle Shoals, Alabama, facilities (see Fig. 1) on November 3, 1977, to assess the radiological status of those facilities utilized under a cooperative agreement between TVA and the Atomic Energy Commission (AEC) ~~contract~~ during the period 1951 through 1955. Milton Siegel ~~Siegal~~, Chief of the Applied Research Branch in the Division of Chemical Developments, provided information about the AEC project and introduced other TVA staff members who also provided information about the activities and location of the project. ~~Apparently, there were several contracts (number unknown) that are now destroyed, which directed TVA to research and develop~~ The work involved the development of a process to recover uranium from the production of phosphate fertilizer. A laboratory and pilot plant were operated at this site, but very little uranium was produced.

From information obtained in discussions with TVA personnel and from the review of available records, facilities involved in the project were laboratories 20 and 21 of the Research and Engineering Office Building and the Pilot Plant Building 411 (see Figs. 2 and 3). Two laboratories (T-283 and L-275/276) of the National Fertilizer Development Center were apparently used for analytical work for uranium production. Disposition of equipment utilized in the project was not known. The process, originally developed by Dow Chemical Company of Pittsburgh, California, involved separation of U_3O_8 from leached zone phosphate ore from Florida. A total of about 2.5 kg (5.5 lb) of uranium concentrate was produced, and it contained from 0.3 to 25% uranium with an average of 2% by weight. Since no accountability records were retained, disposition of the material was unknown. As far as is presently known, the material is not located at the site. No information was available as to the radiological status of the facilities at the termination of the project.

Present Use of Facilities

Laboratories 20 and 21 of the Research and Engineering Office Building and laboratories T-283 and L-275/276 of the National Fertilizer

Development Center are presently used for research activities. Apparently there has been little change made in these facilities since the project concluded. The pilot plant area in Building 411 has been modified three times since conclusion of the project. These modifications have included removal of the floor (including drains) because of their poor condition.

Results of Preliminary Survey

The preliminary survey was conducted by J. E. Burden, consultant health physicist of the Oak Ridge National Laboratory, and W. T. Thornton of the DOE/Oak Ridge Operations Office. A survey of the laboratories and pilot plant area was conducted consisting of gamma-ray exposure rate measurements made at a height of 1 m above the surface of floors and direct alpha and direct beta-gamma measurements made at the surface and 1 cm from surfaces using portable alpha scintillation and open-window Geiger-Mueller survey meters, respectively. Additionally, filter paper swipes were taken (see Fig. 4) on laboratory benches, inside a hood, and on the floor of each facility. The maximum observed gamma-ray exposure rate at 1-m heights was 10 μR/hr. All direct alpha and beta-gamma measurements on surfaces were within typical background levels. Analyses of swipes for transferable gross alpha and gross beta-gamma contamination resulted in measurements of activity that were not significantly different from background. Because all measurements were within normal background variability, it does not appear that additional radiological measurements are required at this site.

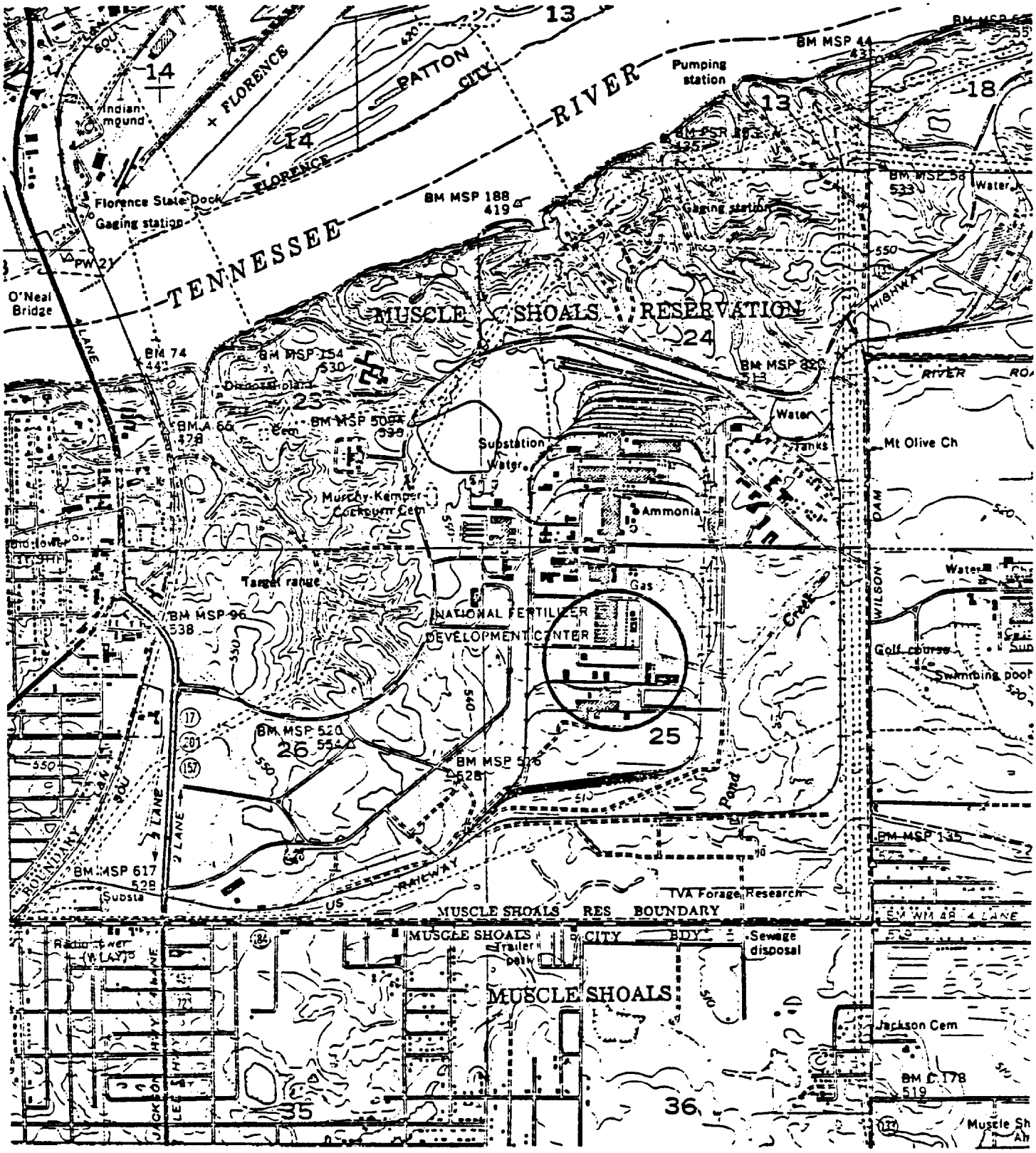
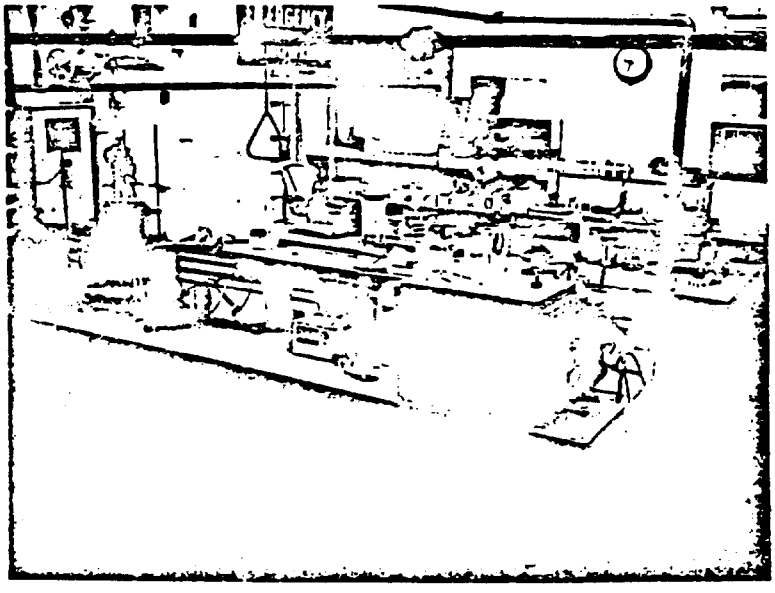


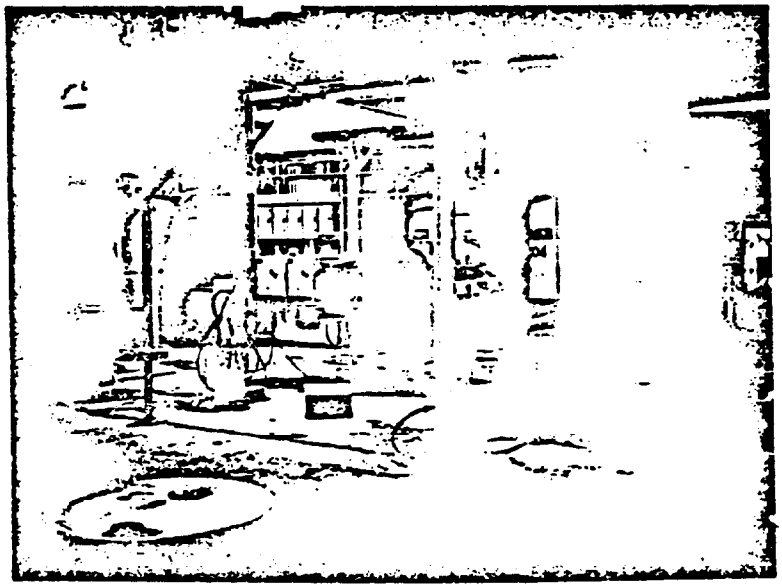
Fig. 1. Location of Tennessee Valley Authority site in Muscle Shoals, Alabama.

Laboratory 20



Laboratory 21

Fig. 2. Interior views of laboratories 20 and 21 of the Research and Engineering Office Building.



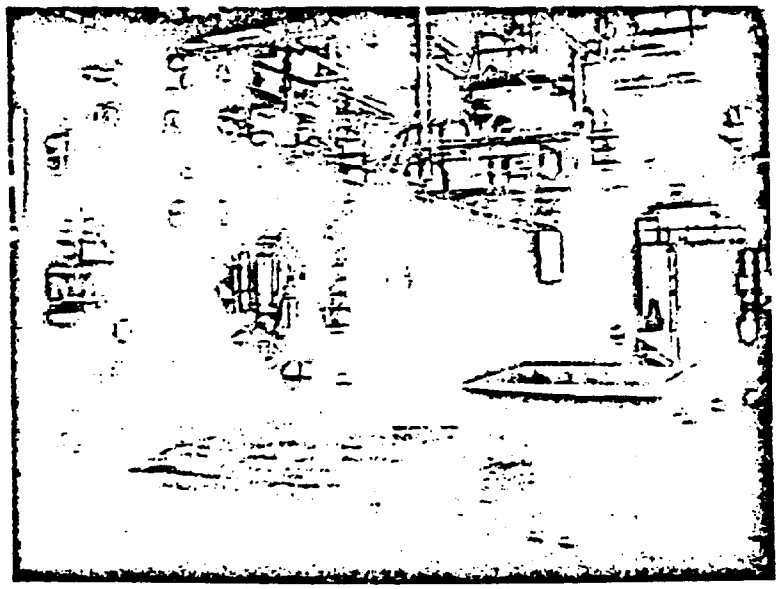


Fig. 3. Interior views of Pilot Plant Building 411.

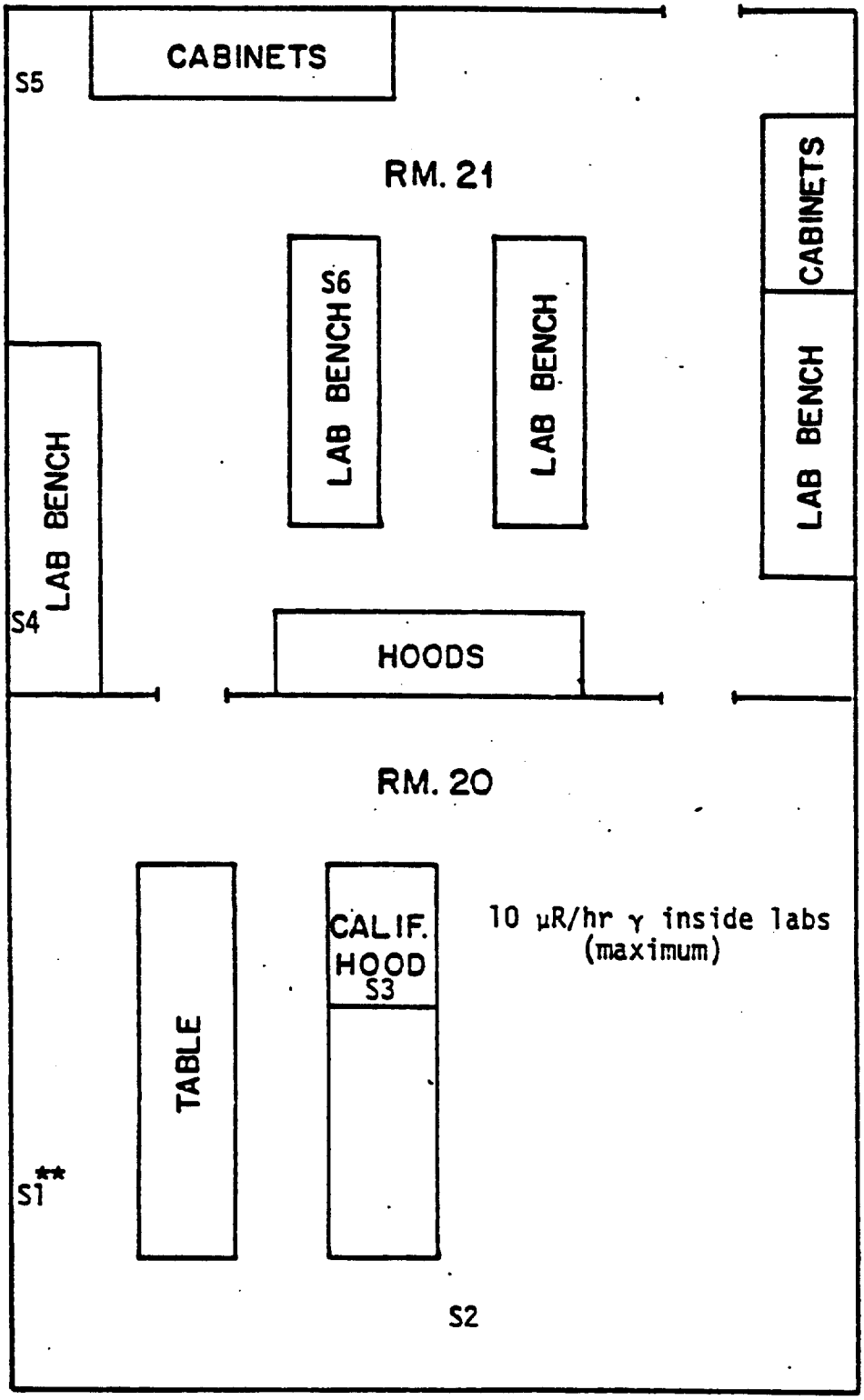


Fig. 4. Facilities surveyed at the Tennessee Valley Authority site in Muscle Shoals, Alabama. Filter paper swipes were taken at locations S1 through S5.