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FORMERLY UTILIZED SITES REMEDIAL ACTION PROGRAM

**ELIMINATION REPORT
FOR
COLUMBIA UNIVERSITY
NEW YORK, NEW YORK**

**Department of Energy
Office of Nuclear Energy
Office of Remedial Action and Waste Technology
Division of Facility and Site Decommissioning Projects**

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INTRODUCTION

The Department of Energy (DOE), Office of Nuclear Energy, Office of Terminal Waste Disposal and Remedial Action, Division of Remedial Action Projects (and/or predecessor agencies, offices and divisions,) has reviewed the past activities of the Manhattan Engineer District (MED) and the Atomic Energy Commission (AEC) at Columbia University, New York, New York, and has completed a radiological screening survey at the site. DOE has determined that the facilities used by MED/AEC have been adequately decontaminated within current radiological guidelines and standards by the University. Therefore, the facilities used by MED/AEC require no remedial action and will not be included in the Formerly Utilized Sites Remedial Action Program.

This report presents information supporting the determination that the radiological conditions at the Columbia University facilities used for MED/AED work are in compliance with current DOE radiological guidelines and standards¹ and provides assurance that use of these areas will not result in any measurable radiological hazard to site occupants or the general public.

¹ U.S. Department of Energy Guidelines for Residual Radioactivity at Formerly Utilized Sites Remedial Action Program and Remote Surplus Facilities Management Program Sites (Rev. 1, July 1985).

This elimination report will be archived by DOE through the Assistant Secretary for Management and Administration. A copy of this package will be available for public review between 8:00 a.m. and 4:00 p.m., Monday through Friday (except Federal holidays), at the DOE Public Document Room located in Room 1E-190 of the Forrestal Building, 1000 Independence Avenue, SW., Washington, D.C.

BACKGROUND

Site Function

Columbia University was involved in nuclear research prior to the establishment of MED/AEC. Absorption experiments to determine the feasibility of nuclear chain reactions began in 1939. In November 1940, the National Research Defense Committee contracted with Columbia for additional research in this area. Columbia was a major contributor to research and development efforts throughout the early years of nuclear development under MED and later AEC. Research included work on isotope separation (centrifuge and gaseous diffusion), the nuclear chain reaction, and an atomic pile. Contracts included NDCro-32, AT-30-1-Gen-72, and W-7405-eng-50.

Site Description

Buildings utilized for the MED and AEC work at Columbia were Pupin, Schermerhorn, Havemeyer, Nash, and possibly Prentiss.

All buildings are owned by the University except Nash, which was leased for MED work reportedly involving uranium hexafluoride from 1943 to 1944.

Radiological History and Status

All buildings used for MED/AEC work, except Nash, are currently involved in radioactive work, licensed by the Nuclear Regulatory Commission and the City of New York, and are under continuing surveillance by the University Health Physics Office. In March 1978, the former DOE Division of Environmental Control Technology notified the Columbia University Health Physics Office that, based upon available data and the findings of a visit by Oak Ridge Operations Office personnel on August 16, 1976, the buildings were adequately decontaminated and no radiological survey was warranted. Five buildings were investigated:

Pupin--Used for nuclear research and storage of research quantities of radioactive material. A small amount of uranium contamination (within guidelines) remains under a linoleum floor. Some radium contamination also remains but it is unrelated to the MED/AEC work.

Schermerhorn--Used for early "pile" research and gaseous diffusion research and development and operation of a barrier production pilot plant. There was no detectable contamination remaining.

Havemeyer--Contains much of the University's present radiation chemistry work. Any residual contamination attributable to the MED work would be insignificant compared to the ongoing work.

Nash--Very small-scale gaseous diffusion test cascade work. No significant potential for residual contamination exists.

Prentiss--No evidence of MED or AEC experimental work being performed in this building was found. Columbia's Radiation Safety Officer made a detailed gamma survey of the building in preparation of installation of two 25-curie cesium-137 sources and observed no abnormal levels.

ELIMINATION ANALYSIS

Radiological surveys conducted by DOE Oak Ridge Operations Office personnel in those buildings where residual contamination from MED/AEC work was possible indicate that all buildings have been decontaminated adequately by University personnel. On the basis of the data

summarized in this report, the DOE Division of Facility and Site Decommissioning Projects has determined that no remedial action is required at this site and has eliminated Columbia University from further consideration under the Formerly Utilized Sites Remedial Action Program.

REFERENCES

- o Keller, Charles A. (Department of Energy) to W.E. Mott (Department of Energy), "Report of Findings--Columbia University," February 6, 1978.

- o Mott, William E. (Department of Energy) to Philip M. Lorio (Columbia University), letter of March 22, 1978.



Department of Energy
 Oak Ridge Operations
 P.O. Box E
 Oak Ridge, Tennessee 37830

February 6, 1978

W. E. Mott, Director, Division of
 Environmental Control Technology
 DoE Headquarters, GTN. MS E-201

REPORT OF FINDINGS -- COLUMBIA UNIVERSITY

Enclosed is a report of the OR radiological reassessment of Columbia University MED areas. In our judgement, any contamination resulting from MED operations has been adequately recognized and decontaminated by the University, obviating the need for further DoE action.

During the course of this reassessment, contact has been made with the following persons by OR:

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 520 West 120 Street
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 325 Broadway
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 State of New York Energy Office
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Charles A. Keller
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OSE:WTT

Enclosure:
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RADIOLOGICAL REASSESSMENT FINDINGS - COLUMBIA UNIVERSITY

On August 16, 1976, OR visited Columbia University at ERDA-Headquarters request to assess the residual radioactivity from Manhattan Project operations in the early 1940's.

As a followup to the preliminary report sent to HQ by TWX from W. T. Thornton to E. K. Loop, dated September 2, 1976, the following information will further document the OR reassessment.

Five buildings have been identified based on information accumulated from the best available University sources by Philip M. Lorio, University Radiation Safety Officer. For three of the buildings, Pupin, Schermerhorn and Nash, confirmatory information on the type of operations conducted is fairly explicit in WASH-1214.

Pupin:

According to WASH-1214, early nuclear chain reaction research was conducted at Pupin. A small University cyclotron located in Lab 128 was used to demonstrate fission for the first time in the United States. The magnet and vacuum chamber remain as a "memento" of this historic achievement. The room is currently used for storage of radioactive material associated with ongoing University programs. Lab 110 was also involved in early MED work. Traces of alpha contamination, less than $5000 \text{ d/m-}100 \text{ cm}^2$, were measured by the RSO prior to installation of present linoleum floor covering some time ago. It appears that this was the area where very early gaseous diffusion R&D was conducted. WASH-1214 indicates a 12-stage test cascade, involving relatively small quantities of UF_6 , was operated in a "wooden cabinet about eight feet square on the front face and three feet deep." The potential for contamination resulting from this operation was very small.

Other areas of this building (13th floor) were involved in pre-1940 research on radium. The RSO had, several years ago, traced residual contamination in drain pipes down through several floors, removed some piping and tagged other. According to the RSO, most of the radioactivity found during the surveys of Pupin and not related to present operations, was from this very old radium work.

Schermerhorn:

The earliest U.S. "pile" research was conducted in this building, probably in the area now identified as Lab 218-219. This work would have involved uranium-oxide; however, the scarcity of uranium at that time and the nature of the research would seem to preclude even the possibility of significant contamination. Indeed, radiation levels above background were not detected in this area. It is noted that gaseous diffusion R&D and a barrier production pilot plant operation were carried out probably in a courtyard area now used for fuel oil storage. Floor surfaces in this area are new since the MED project. No elevated radioactivity levels could be detected in this area.

Nash:

This building, located at 3280 Broadway at 133 Street, was rented by the University during 1943-44. It is not now under University control. Some work conducted in this building on a gaseous diffusion test cascade involving UF_6 is reported in WASH-1214. The work was smaller in scale than the similar work being done at Pupin. It also appears that a barrier production pilot plant was operated at Nash which, of course, would not have involved radioactivity. The Nash building is a large five-story structure currently used for a variety of light industrial operations. Since the potential for contamination during operations was extremely low, the possibility of finding even measurable levels of residual contamination after 30-plus years does not seem realistic; therefore, further investigation does not seem to be warranted.

Prentiss:

No evidence has been found from discussions with University representatives or review of WASH-1214 to indicate Manhattan Project work was conducted in this building. In the course of his normal activities as RSO, Mr. Lorio, did recently, however, make a detailed gamma background survey of the building in preparation for installation of two 25 Ci ^{137}Cs sources and observed no radiation of significance.

Havemeier:

This building contains much of the University's current radiation chemistry work. It is conceivable that some lab scale Manhattan Project work was done, possibly in Lab 505 where Professor Taylor did much U-chemistry predating the Manhattan Project. The Lab was cleaned and several bottles of U-solutions discarded about three years ago. Alpha radiation levels on lab surfaces were found during our visit to be well below $5000 \text{ d/m-100 cm}^2$.

It is apparent that any residual contamination attributable to the Manhattan Project is insignificant compared with ongoing University programs involving radioactivity. Columbia is currently licensed to utilize radioactive materials by both the NRC and the City of New York. At the time of our visit, Mr. Richard Borri of the New York City Health Department, Bureau of Radiation Control, participated and indicated satisfaction with existing controls.

Conclusion

Those instances of low level radioactivity which may have remained from Manhattan Project operation in University facilities have been, in our opinion, adequately recognized and decontaminated by the University.

Recommendation

It is recommended that the DoE reassessment of the Columbia University Site be terminated with this report.

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MAR 29 1978

Mr. Philip M. Lorio
Columbia University
Health Physics Office
289 Engineering Terrace
520 West 120 Street
New York, New York 10027

Dear Mr. Lorio:

On August 16, 1976, representatives of the Energy Research and Development Administration (currently the Department of Energy) visited your facility to determine whether there were conditions warranting a radiological survey of the properties utilized during the Manhattan project operations in the early 1940's.

A copy of the findings of that visit is enclosed for your information and records. Based upon these findings, it is concluded that the buildings utilized during the 1942-43 Manhattan project operations were adequately decontaminated.

It is our plan to issue a notice in the Federal Register listing all formerly utilized MED/AEC sites that have been reviewed under this program and a press release will also be made to this effect. ~~The Columbia University will be listed as one of the sites reviewed and found to be adequately decontaminated.~~

Your assistance and cooperation in this review effort is appreciated.

Sincerely,

William D. Mott, Director
Division of Environmental
Control Technology

Enclosure:
As stated

cc: R. Borri, w/encl. RAllen:le
T. K. DeBoer, w/encl.

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ECT

RWRemsey

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GC

WLBrown

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WEMott

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bcc

Dr. Mott

NOV 15 1985

Mr. Philip Lorio
Director, Health Physics Office
Columbia University
289 Engineering Terrace
520 West 120th Street
New York, New York 10027

Dear Mr. Lorio:

The Department of Energy (DOE), as part of its Formerly Utilized Sites Remedial Action Program (FUSRAP), has reviewed information on Columbia University facilities to determine whether they contain residual radioactivity traceable to activities conducted on behalf of the Manhattan Engineer District or the Atomic Energy Commission (predecessors to DOE). A radiological survey indicated that the radiation levels are equal to natural background in all areas not currently in use for licensed operations with radionuclides. Therefore, no remedial action is required, and DOE is eliminating the Columbia University facilities utilized for MED/AEC activities from further consideration under FUSRAP.

We plan to issue a Federal Register Notice listing sites being eliminated from the FUSRAP. The Columbia University facilities not under license will be included in the listing.

The information supporting this decision will be archived by DOE, and a copy of the elimination report will be available for public review between 8:00 a.m. and 4:00 p.m., Monday through Friday (except Federal holidays), at the DOE Public Document Room located in Room 1E-190 of the Forrestal Building, 1000 Independence Avenue, S.W., Washington, D.C.

If you have any questions regarding this decision, please contact Mr. Arthur Whitman of my staff at 301-353-5439.

bcc:
E. Keller, OR
B. Berven, ORNL
A. Whitman, NE-23
Aerospace
Baublitz RF
Whitman RF
NEG (4)

Sincerely,

ES
Edward G. DeLaney, Director
Division of Facility and Site
Decommissioning Projects
Office of Nuclear Energy

cc:
J. Spath, NYS ERDA
R. Borri, NYC Health Dept.

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