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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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## 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  $5000 \text{ d/m-100 cm}^2$ , 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  $\text{UF}_6$ , 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<sub>6</sub> 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  $^{137}\text{Cs}$  sources and observed no radiation of significance.

Havemever:

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 d/m-100 cm<sup>2</sup>.

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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