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1. Dr. E. R. Jette, Attn: Mr. E. Philip Edwards

2. J. E. Greeninger - O. E. Greager
3. J. E. Work - E. Waldenstrom
4. T. O. Ellis
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AUGUST 17, 1956

Dr. E. R. Jette
Los Alamos Scientific Laboratory
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Los Alamos, New Mexico

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This document consists of

2 pages, 10 copies, 10 copies, 10 copies

Attention: Mr. E. Philip Edwards

Dear Edwards:

This will let you know that I have received the copy of Langmuir's paper which I had left with you. The other article that I mentioned during our discussion is by H. Sell in Forschungstrakt 357, Ausgabe 2, Vol. 2, August 1955. The English translation of the title is, "Separation of Dust on Fly, In Holes and in Air Filters".

In connection with further studies with your proposed dust water scrubber system you appreciate the necessity of doing the experimental work with a dispersed system of liquid and controllable particle size distribution. To obtain such a system one can use a commercial system, such as a Blake No. 15, and vary the particle size by changing the concentration of the solids salt in the spray solution. The pressure used for atomization will also affect the particle size of the droplets and ultimately the dispersed solid, although over a relatively narrow range. According to data in several that is manufactured in this is described by H. May and Sinclair in CHEM Engng No. 127 (1954) and this report 1272 (1954). If you are interested in using the single type of atomizer that I have, we will be glad to send you a sketch of it.

Any further work you do with the dust scrubber will be of considerable interest to us since the problem of removing dispersed material in air stream is one with which all states are of increasing concern. We realize the difficulty of setting up a program of experimental work to work on the basis of design for an actual system for a laboratory building, but feel that the experimental program should be set up on the basis of the system that I have and a laboratory air system - I give you 1,000 cubic feet of air, and with known particle size distribution and make for the maximum efficiency of removal from the air stream. For design, make of CHE No. 6 paper, an experimental air collection of the dust you desire particles whose diameter is 0.3 micron are the most difficult to remove from an air stream. The mechanism of removal in this case is primarily diffusion of the particles to the collecting surface on the filter, as well as some movement from the air stream due to Brownian motion. In your dust scrubber the mechanism of collection will probably be impingement, particularly in the case of the equipment

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By J. Hoke August 17, 1948

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Dr. H. E. Jette

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is not to become excessive. In this case too, however, diffusion becomes of importance for sub-micron particles since impractical face velocities would otherwise be required to insure removal of this size of particles.

We believe you will be interested in some work done here in which a four foot section of an 8" column packed with 1/8" Rasch rings was tested. For an air stream containing approximately 1 grain per 1,000 cfm of an average shape average particle size was about 2 microns, 65-85% of the particles were removed at an air flow of 30-40 cfm and water flow (spray current) of 1-2 gallons per minute. By the introduction of steam into the air stream to build up the particle size, the removal was increased to 90-95%. For your information, a filter made from 60 No. 6 paper removed 99.9% of the particles from this air stream when operated at its rated capacity. Preliminary work here indicates that a sand filter operating at a superficial velocity of six feet per minute will also achieve this high degree of clean up.

In general we would favor a system that does not use water or other liquids to effect the removal of particles. The handling and disposal of substantial quantities of hot liquid wastes, even at low radiation levels, is believed to be a more difficult problem than the replacement of a hot gas-contaminated filter unit. The sand filter would appear particularly suitable for this reason, since it can be permanently sealed in the ground. At your installation, with water in limited supply and the source of a large fraction of the supply located as it is with respect to your operations, and with the soil apparently not too suitable for use as a sink, it is believed that other methods, even with groundwater, would not be an attractive choice for your new laboratory building.

If we can be of further service to you in this matter, do not hesitate to call on us.

Very truly yours,

William C. Sullivan Chief
Air Force Technical Division

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