

Observe in the above data the thruput is directly related to bed diameter. Laboratory efficiency tests have been run only on the 4" size with and without an upstream condenser. Vapors from boiling 12.6 M HCl mixed at the vapor pickup with room air to make up volume was the feed material. Hence the concentration dropped as volume went up. Total acid in each run was 100 ml boiled to dryness. The tests were repeated with 16.2 M HNO₃. Efficiency calculations are based on back titration of scrubber liquor which was 2 N NaOH. Results are expressed as % removal to scrubber liquor from the air stream.

HCL tests

CFM	4" scrubber	4" scrubber with condenser
5	66	100
3	71	91
1	88	--

HNO₃ tests

5	58	--
3	--*	67
1	--*	98

*Not determined; acid reacted with tubing used in assembly.

In one application where beta-gamma radioactive mists were encountered the scrubber also acted as a satisfactory air cleaner. This is, however, an exception; its efficiency for particulates is like all scrubbers, rather poor. Qualitatively these scrubbers have performed well for our major purpose of protecting downstream equipment. They have worked visibly well on HF as expected but not so well on H₂SO₄. The 4" and 6" units are mounted downstream and outside of Berkeley boxes. The 2" under current study is designed to go inside such boxes. Rough sketches are available for those interested.

The second item to be discussed is more important. It might be said that it concerns not air cleaning, but a method of avoiding a probable failure of air cleaning. A few introductory remarks are necessary: At UCRL we encounter our major air cleaning problems in connection with investigations on the transuranics. Substantially, as you know, these are alpha emitters; some of them are beta-gamma and neutron emitters as well. When the specific activity is high a very small percentage loss to room air or to stack gas will result in exceeding the AEC limits for air pollution.

When one manipulates substantial quantities of high specific activity material and the treatments involve heating, cooling, stirring, transferring, gassing, centrifugation, precipitation, dissolving, evaporation to dryness and a host of energetic chemical reactions, the chances for aerosol formation and dispersion are considerably enhanced.

Since in research practice it never occurs that the sequence of processing events, or conditions surrounding each event, is duplicated in successive experi-

"sausage link" prepared by the usual heat-sealing technic. All components of the system are liquid, solid and gaseous waste receivers as such, and will be concrete jacketed and buried at the termination of the operations, with the exception of the accumulator tanks. It is planned to sample the bags in these and assay their contents by three methods: filtration, ESP and vibrating reed electrometer. Attempts to clean the accumulated gases are planned and will be prosecuted if time and the assays permit. In the event of poor success the gases will be compressed in steel cylinders, jacketed in polyethylene and encased in concrete for burial.

We have become truly amazed at the detailing required. The two operating boxes require eleven gloved boxes to serve them, 1200 feet of polyethylene pipe, 500 hose clamps, over 150 valves and much other impedimenta. The cost is of course commensurate. The designed capacity of the system is 615 cubic feet with a two-fold safety factor on volume. It is anticipated the equipment will run continuously for some 60 days. An example of the complexity a closed system requires may be given. Consider the sole factor of environmental temperature variations. We plan to hold the system at all times at about minus 1/2" water gauge with respect to atmospheric pressure. Yet a shift of 11 degrees F would cause a change of pressure in all voids of the apparatus of about 13" w.g. Stated another way, if the volume of one of our accumulators is 240 cubic feet, this would mean a volume change of about 8 cubic feet just because of this small temperature variation. This must be allowed for in the sensing and controlling apparatus and provisions made for tempering the ambient atmosphere.

What I should like to hear at this meeting of course is a description of an air cleaning train with sufficiently ample decontamination ability so all the above headaches could be avoided when we run into this type of problem again.