AIRBORNE MONITORING AT OAK RIDGE NATIONAL LABORATORY

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INSTRUMENTS USED

Slide 1 - Filtron, _____ cf/min
U. S. P. H. S. Filters, _____ cf/min

Slide 2 - Continuous Air Monitor, _____

Slide 3 - Airway Filter, _____
Frame Collector

Slide 4 - Station _____. (Could D. M. Davis have slide made of new station?)

The approximately 600 curies per day comprised of Argon, Xenon, Iodine, C^{14}, etc. discharged into the X-10 stacks causes little concern and has never indicated any problem with the exception of fluctuation in the background instrument count with changing meteorological conditions. This plus particulate activity has led to a gradual build-up in area background.

Slide 5 Backgrounds '47, '48, '49

Rainwater analyses sometimes yield as high as 0.1 mc gross /100 gal. water and 0.01 mc Pa/100 gal water.
Particle problem of considerable concern because it is impossible to estimate hazard or increased probability of cancer due to presence of particle of high specific activity in lungs.

Slides 6 and 7 - Typical particles as collected on frames in 1948 and radioautographed, 24 hrs. Most of early particles due to UO_2 from ruptured slugs.

Slide 8 - Ruptured slugs. Many particles also from the various chemical operations. Some soluble and others insoluble.
$T_{\frac{1}{2}}$ -- range from few days to years.
UO_2 particles/day (1948) 5×10^{12} (0 - 0.5 μ), 3.6×10^{11} (0.5 - 1 μ), 6×10^{10} (1 - 10 μ), 6×10^{5} (10 μ ⟶)
Activity - 10^{-3} to 10^{-4} mc/μ particle (-); 10^{-7} to 10^{-10} mc/μ particle (+). A 1 μ μ μ speck (or γ) would give a dose to a shell of tissue 100 μ distant of 0.1 r/d and many higher dose in closer

$$\left(\frac{mr}{hr}\right) = \frac{8.4\,r^2}{Ea\,P} = \frac{8.4\,r^2}{66 \times 1.1} \doteq 0.1\,r^2$$ or an average dose in this

volume of tissue of 3×10^{3} r/d

IMPROVEMENT FACTORS

1 - Pave roads at plant site, plant grass, wash down roofs and roads.
2 - Cut off pile operations during unfavorable meteorological conditions or slug rupture.
3 - Cut down pile once a week and scan each slug row for slug blisters. Push out slugs before rupture.
4 - Improvements in slug canning.
5 - Installation of filter house for pile bldg.
6 - Installation of " " , precipitator and tall stack for all 706-C and 706-D isotope production areas.
7 - Installation of filter house in other chemical areas.

Slide 9 - Reduction in particles collected

PRESENT CONDITION

1 - Can detect nothing coming through filters of pile building at present.
2 - Been very little decrease in number of air-borne particles since initial drop by factor of 30 to 50 following installation of pile filters.
3 - Very few (if any) CO_2 particles at present. Most of these found are soluble and of short half-life.
4 - Most particles found now are of much lower specific activity.
5 - Can expect further decrease due to filters, precipitator and stack for hot chemical production operations when building construction in area stops lifting dust.

Slide 10 - 1950 average values.

KLM:mof