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To: Dr. M. Silberberg, USNRC
From: Dr. D.W. Cooper, Consultant

Re: Review of the Transcript of the Meetings 25-26 January 1983 on RADIONUCLIDE RELEASE UNDER SPECIFIC ACCIDENT CONDITIONS

In preparation for our meetings 24-25 May, I reviewed the transcript of the previous meeting and reviewed my memo to you of 6 February on the report, and I summarize here my comments related to the aerosol science and technology aspects of the work, the first twelve relating to the transcript, the second twelve recapitulating my memo:

1. Heating of the surfaces by deposited radioactive aerosol particles could reverse or reduce thermophoresis and reduce deposition.

2. The degree of vaporization of silver remains important and uncertain. The more silver vaporized, the less radioactive aerosol eventually released.

3. Uncertainties in core temperatures and in the vapor pressures of the alloys' constituents are very important.

4. The aerosol particles are likely to be mixed hygroscopic (CsI, CsOH, ...) and non-hygroscopic materials. They may retain water even when the volume is not saturated.

5. Whether or not the particles are resuspended will depend not only on their size and on the gas flow velocity, but on the nature of their surfaces and the surfaces to which they attach: "stickiness" is crucial.

6. Is gravitational deposition in the core taken into account?

7. Turbulent deposition and resuspension in the LPIS pipe could be crucial for sequence V. Is plugging likely?

8. Where might the deposition of the aerosols be sufficient to change the flow geometry appreciably?

9. Do we have any more information on containment failure geometry? What are the results of parametric studies?

10. Are there circumstances where there will be "rain" in the containment, even without the sprays, that could lead to significant aerosol capture?

11. Convection currents in the region of the core could be important in the slow-flow cases such as TMLB' and S_2D.

12. Aerosol concentrations greater than 1 g/m^3 could begin to produce hindered settling, which is slower than that expected for individual particles.

13. The work is generally at the state of the art and shows a high degree of technical competence.

14. Turbulent deposition and resuspension need more consideration.

15. Condensation of water vapor at the walls produces a cleaning effect, almost like flowing the gas through a filter, and needs consideration.

16. High radiation fields should produce charged particles, due to the difference in mobility of the bi-polar ions produced.

17. Same as 11: convection in the core should be important.

18. Condensation will occur on particles much smaller than 0.6 um diameter (and condensation tends to produce a fairly monodisperse aerosol, geometric standard deviation of 1.5 or less). Mixed nuclei will have condensate even without saturation. [Leaks will enhance condensation by adiabatic expansion.]

19. Equation 7.2 has an unconventional impaction term.

20. Concentrations of 1000 g/m^3 are not likely to persist for 10^3 s.

21. Some releases predicted by CORRAL-2 are 100x different from those predicted by NAUA in amount.

22. 1 μm seems small for sparged metal particles.

23. Equation B-9 would better be in terms of the important dimensionless groups with a coefficient determined by the experiments.

24. Cumulative size distributions are easier to use and interpret than are differential size distributions.

Look forward to seeing you again.

DWC