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TOLEDO EDISON

RICHARD P. CROUSE
Vice President
Nuclear
(419) 259-5221

Director of Nuclear Reactor Regulation
Attention: Mr. John F. Stolz
Operating Reactor Branch No. 4
Division of Operating Reactors
United States Nuclear Regulatory Commission
Washington, D. C. 20555

Dear Mr. Stolz:

This letter is being submitted to identify the departure from the isokinetic sampling requirement stated in NUREG 0737, Item II.F.1, Attachment 2, Clarification (3). In an audit conducted by Region III on April 16-19, 1984 (Inspection Report 84-08), Toledo Edison was requested, per Open Item 346/84-08-06, to submit to Nuclear Reactor Regulation (NRR) a written request for variance from the task item clarification. The Inspection Report Open Item states:

> "As described in a contractor's memos, during preoperational startup testing of the station vent sampling system it was determined that the design sample flow rate was too low and was increased to 3.2 CFM. The reason for the increase was to improve collection efficiency, which was measured by DOP testing for 1.2 and 2.0 CFM sample flow rates at 40 and 72 percent, respectively. The flow rate was then increased to 3.2 CFM where the collection efficiency was 92 percent. This flow rate change was made by taking a flow control valve out of the sampling line and replacing it with stainless steel tubing. The flow rate has remained at 3.2 CFM since.
>
> The increase in flow rate caused a departure from isokinetic sampling characteristics. According to the contractor's memos, the deviation from the isokinetic requirement stated in NUREG-0737, Task Item II.F.1.2, Clarification (3), was given verbal approval by NRR; however, the inspectors were unable to verify the verbal approval. Upon the inspectors' request, the licensee stated that they would submit to NRR a written request for variance from the task item clarification, and that the request would be submitted by May 31, 1984."

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Toledo Edison based its departure from the criteria on the following:

In NUREG 0737, Item II.F.1, Attachment 2, the NRC references ANSI N13.1-1969 to establish the criteria for representative sampling. Section 4.2.2.3 of ANSI N13.1-1969 discusses a particle size fractionation phenomenon due to anisokinetic sampling in which smaller particles are preferentially drawn into the sample probe when the velocity of the sample air is significantly greater than the velocity in the duct stream sampled. The discussion in ANSI N13.1-1969 states that "Except in very unusual situations, particles smaller than an aerodynamic diameter of about five microns are able to follow the streamlines of the air, and the fractionation error is not great". Since the vent stack monitor sample point for Davis-Besse is downstream of HEPA filters with typical efficiencies of 99.97% down to 0.3 micron particle size, the particle size fractionation phenomenon should not occur and it would be expected that very little error would be observed if conditions at the vent monitor isokinetic nozzles were not previously isokinetic.

Dioctylphthalate (DOP) tests have been performed on the plant vent at Davis-Besse. The test material was injected into the plant vent exhaust duct well upstream of the isokinetic nozzles. The baseline (reference) concentration of DOP was measured at the point of injection and not at the isokinetic nozzles. The downstream sample point was at the radiation monitor skid. Therefore, the test measured the total sample loss between the injection point in the duct and the sample point at the monitor skid. Accordingly, the total sample loss includes the sum of the plateout in the duct upstream of the isokinetic nozzles, any error produced by the lack of precisely isokinetic sampling at the nozzles, and the plateout in the sample line itself. The testing did not differentiate the magnitude of each of the 3 contributors, but simply measured the total sample loss. The test results indicated that the total sample loss was 9%. To correct for the measured sample loss, it would be conservative to divide by 0.91 since this correction also includes the sample plateout in the duct upstream of the sample nozzle.

In summary, empirical data measured during initial preoperational tests of the station vent effluent monitors at Davis-Besse have shown higher percent return, or lower plateout, for sample flow rates somewhat greater than isokinetic conditions, considering accident vent flow rates. Additionally, since the vast majority of particles in the unit vent air stream should be no larger than 0.3 microns, errors due to sample flow rates that are not precisely isokinetic should be small.

Therefore, Toledo Edison believes the departure from isokinetic sampling is acceptable because errors will be in the conservative direction. This position is believed to be concurrent with the NRC's position on this issue, based upon numerous telephone conversations between Bechtel Nuclear Staff and the NRC.

Very truly yours,

RP Crouse

RPC:SGW:CMK:nlf
cc: DB-1 NRC Resident Inspector