any bioaerosol for any certified respirator will meet or exceed the certified efficiency level.

Comments concerning the choice of liquid test aerosols were varied. Several different test agents were suggested including paraffin oil, Emery 3004, and hydrofluoric acid. Paraffin oil was suggested because it is consistent with the European (CEN) standards. The U.S. military has adopted Emery 3004 as a DOP replacement in instantaneous testing of filter efficiency. A commenter suggested that because hydrofluoric acid aerosol is common in many industries, it would be a more realistic test agent.

Each of the suggested alternative liquid aerosols would provide essentially the same initial or lightly loaded filter efficiency levels. The initial efficiency level of a filter is defined primarily by the particle size of the aerosol, not its degrading ability. The CEN standards use paraffin oil as the liquid test aerosol, but the filters are not loaded to a significant level. Emery 3004 has been adopted as a replacement for DOP by the military in initial efficiency testing as performed for the part 11 HEPA filters. Unlike DOP, none of the recommended alternative test aerosols provide severe degrading effects of the filters. This severity is an integral part of the part 84 testing, and addressing the uncertainties of the effects of actual workplace aerosols.

In considering these options, NIOSH is aware that no single test agent is used by every prominent standard-setting agency or organization. The CEN standard uses NaCl as a solid test aerosol. The current draft for revising the ANSI Z88.8 standard proposes NaCl and DOP as the test aerosols. No choice of test aerosol would provide consistency with all other standards, as sought by commenters. A fundamental purpose of the new testing standards is to assure that at least one class of filters is highly resistant to degradation by workplace aerosols. The DOP aerosol was selected for this purpose specifically because of its severe effect on filter efficiency level. The proposed alternatives demonstrate less severe effects on the filter media; therefore, they have been considered inappropriate for the evaluation intended by NIOSH.

The generation method of dioctyl phthalate aerosol was a concern to many commenters. Commenters questioned the particle size distribution for this test aerosol specified in the proposal being greater than that specified in the existing part 11 requirements. Commenters also questioned differences in test results based on the use of thermally generated (hot) or cold-nebulized DOP aerosol. Although the proposal did not specify any aerosol generation technique to be used for DOP testing, much of NIOSH's research used as a basis for the proposal was performed with cold-nebulized DOP and NIOSH testing has demonstrated that correlation in results obtained between the two aerosol generation techniques is possible. Some commenters believed that the DOP aerosol generation method must be specified to ensure reproducible test results. These commenters used data from Industrial Safety Equipment Association-sponsored ''round robin'' testing of mechanical and electrostatic filter material. Complete data and specifics of the round robin testing were not provided to NIOSH. These tests were conducted among the majority of the air-purifying respirator manufacturers that are ISEA members. The test results indicated excellent correlation between the two aerosol generation methods for efficiency of standardized mechanical filter media. For standardized electrostatic media, a divergence in efficiency with increased filter loading was reported between the two aerosol generation methods. These commenters also reported that both the initial and stabilized efficiencies of the electrostatic media correlated well between the two aerosol generation methods. The divergence reported appears to be a different degradation rate between the two aerosols.

Moreover, several of the participants provided some additional insights into the circumstances of the testing. A significant portion of the manufacturers had recently acquired the cold-nebulized test instruments. The reproducibility problems reported, they admitted, could have resulted from operator inexperience. One of the participants with extensive experience with both aerosol generation methods related some of the experience gained by that manufacturer. Excellent correlation is maintained between this commenter's numerous cold-nebulized DOP instruments in use world-wide. Also, the commenter reported having encountered no reproducibility problems between thermally-generated and cold-nebulized instruments in testing electrostatic media when new DOP is used.

In NIOSH testing, some tests have provided good correlation of results between the two aerosol generation methods, while others have not. DOP changes chemically as it ages, becoming less pure. The thermal-generation method induces a similar chemical change, simulating accelerated aging of the DOP. Recent NIOSH testing indicates that the chemically-changed DOP may cause the test instruments to fluctuate from the stated testing parameters. If monitored closely, and kept within the specified parameters, equivalent results are obtained with either aerosol generation method. Therefore, to accommodate these concerns, the final rule specifies a test using a neat cold-nebulized DOP test, or equivalent test. Allowing equivalent test methods permits the use of tests that respirator manufacturers may have already developed. As part of the established certification process, NIOSH evaluates the test results submitted by the applicant by comparing them to the results of NIOSH testing. Any test method yielding results equivalent to the NIOSH testing will be acceptable.

To further address the testing reproducibility concerns expressed by commenters, NIOSH is initiating a program whereby a standard mechanical and electrostatic filter media sample will be made available upon request for applicant correlation testing. NIOSH will run characterization tests on these standardized media and send a data sheet showing the test results with the samples. NIOSH has traditionally conducted correlation testing for applicants requesting such testing to document the agreement of their test instruments and procedures and those of NIOSH. This new procedure will continue the service provided to the applicants of assuring that the results they obtain on their instruments and with their procedures provide results comparable with NIOSH's certification tests. This new process will reduce the NIOSH resource requirements for corroborating the test results of the large number of applicants that NIOSH anticipates will be requesting this service and expedite the correlation process.

Several comments were received on the humidity preconditioning requirement for filters. One commenter stated that the proposed preconditioning time (24 hours) was inadequate to have much of an effect on the performance of electrostatic filter media. The commenter suggested a thirty-day preconditioning period. Information provided regarding the ISEA round-robin testing stated that the effects of the preconditioning were insignificant when testing with the DOP aerosol. This assessment agrees with NIOSH testing experience. The other commenters had concerns that the proposal did not provide: detail regarding uniform preconditioning, the size of the container, the allowable time after conditioning at which filter media must be placed within the container and