· · ANSI N 4-5 - 8 COMMITTEE co: JER JUC DuBiel RE: Standard N-510, Testing of Nuclear Air-Cleanin G Kinder --- Sec me !. r. Ccolc. 42P J.Floyd Address writer 8-2.75 6. millier American Air Filter Company -J. BONTON (GPU we weed to P. O. Box 1100 look at import Befor ir occurs Louisville, Kentucky 18 JG14 we'd best GET STRIGHT Aux BUG & Rx Bidg. what applies to tiprey first 2 ... my feeling is we should do it right from June 26, 1975 the STRET. RIGHT to ME MESNS ... meet Reg Guide 1.52 to the little & Suggest you develop a Position or Identify if it fact Metropolitan Edison Company a Position contrary to mine Alvere PKISTS --- AT This time we P. O. Box 542 Reading, Pennsylvania 19603 Should TOLK. Jack 8-2-75 Attention: Mr. R. C. Arnold Vice President Subject: Carbon Filter, Periodic Performance Test Requirements Dear Mr. Arnold: Guideline 1.52 calls for carbon test canisters to be installed on safety systems containing adsorbers for periodic reconfirmation tests of carbon performance ability. Forthcoming standard, ANSI-N510, refers to such canisters. Early systems do not have this provision. The question then arises as to how to accomplish this reconfirmation ratest on such systems not canister equipped. A meeting between representatives of ANSI N45-3.3 and NRC personnel was held in Bethesda in February, 1975. Attached copy of minutes covers test procedure agreed upon at that time for adsorber systems not canister equipped. Standard N510 will not cover this particular problem as it is judged to be one which will disappear as existing systems are routinely fitted with test canisters when carbon is replaced. This copy of the minutes is sent to you for your file and use. Please refer it to appropriate members of your organization. If you have additional questions, please contact me accordingly. I will be happy to attempt to answer them. Sincerely yours, James F. Fish Chairman - ANSI N45.8 JFF: jkl attachs.ent 8001170 591 CC: Mr. Fred D. Lockie . CC: Dr. Ron R. Lellamy Chairman, N45-8.3

c/o Nuclear Containment Systems, Inc. P. C. Box 19827

Division of Technical Review

Nuclear Regulatory Commission Washington, D.C.

COMMITTEE:

ANSI N 45-8 Executive

Address Writer Care Of:

American Air Filter Co., Inc. P. O. Box 1100 Louisville, Kantucky 40201

DATE: April 28, 1975

SUBJECT: Application of ANSI N510 to Field Testing of Existing Adsorber Systems in Nuclear Power Reactors.

The N 45-8 Executive Committee* met with Dr. R. R. Bellamy of the Nuclear Regulatory Commission (NRC) on February 25-26, 1975, to establish acceptable basis for the application of proposed American National Standard N510, <u>Testing of Nuclear Air Cleaning Systems</u>, for testing of adsorber systems in existing power plants. Neither regulations nor the Model Technical Specifications provide sufficient guidance to the user for meeting their requirements for surveillance-test sampling and laboratory testing of adsorbents, and considerable confusion surrounds attempts by users to apply the sampling requirement of the proposed standard.

The problem exists in current-generation systems which do not have sufficient over-capacity or space to install the special canister provisions for sampling shown in proposed standard N509, Nuclear Power Plant Air Cleaning Units and Components, and which were built or approved prior to issuance of Regulatory Guide 1.52.

The following acceptable sampling techniques were established:

- 1. Tray Systems
 - a. Empty one cell, homogenize the carbon removed, and take a representative sample of approximately one to two pints. Refill the cell with the carbon removed plus additional material as required meeting the requirements of Regulatory Guide 1.52. Vibrate cell while filling to obtain good packing density of carbon in the cell, and blow off fines, after filling, with compressed air. Leak test either the complete stage or the area of the replaced cell in accordance with R.G. 1.52.
 - b. Empty cell and take sample as described in a , above, refill cell with, or replace cell with a new cell filled with, carbon meeting the requirements of R.G. 1.52. Leak test either the complete stage or the area of the refilled cell,
 - c. For segmented cell. At least one adsorber manufacturer provides a tray design having 8 separate, full-length, full depth compartments. Empty one compartment, take sample, refill, and test as described in a., above.

*ANSI N45-8 is responsible for developing American National Standards for testing of, and requirements for, nuclear power plant air cleaning systems, ANSI N 45-8 Executive April 28, 1975, page 2

- d. If sufficient excess airflow capacity exists in the system to maintain nominal design airflow (333 cfm) through the system adsorbers during future operation, it may be desirable to install a special sample tray (Fig. 2, N509) or "pipe" samplers (Fig. 1, N509) to meet future sampling needs. Sample trays and inlets to "pipe" samplers shall be designed and tested to demonstrate that resistance relationships at system design flow will produce the design airflow velocity through the sample beds (within limits) as required by N509.
- 2. Gasketless and Deep Bed Adsorbers
 - a. <u>Full-Depth Thief Samples</u>. The thief shall be designed to take a sample equivalent to the full depth (in direction of air flow) of the bed, and shall penetrate at least halfway into the bed. Replace sample with carbon meeting requirements of R.G. 1.52.
 - b. <u>Multiple Thief Samples</u>. Use thief similar to conventional grain thief (see RDT standard M 16-1), take at least 3 samples across depth of bed, one at front, one mid way, and one at downstream face. Replace samples with carbon meeting requirements of R.G. 1.52. (It may be difficult to obtain good thief samples because of the high resistance to penetration of the bed by the thief.)
 - c. Add samplers such as described in 1-d, above of same depth as the operating bed with airflow within limits as required by N509.

In all of the methods described, consideration must be given to the nominal velocity profile in the system in selecting points (across the face of the stage) to be sampled. Velocity profile should be within limits established in ANSI N510.

For multiple series-stage systems, each stage shall be sampled and submitted for test individually or, if a sample from the first stage fails the radioiodine test, the carbon in all stages may be replaced without further testing, at the option of the system Owner.

The carbon in each ESF system, and in each multiple parallel-stage (i.e. redundant) system shall be sampled and tested individually, even though all contain the same grade of carbon and though nonradioiodine screening tests (such as the CCl₄ activity or similar test) indicate no abnormalities.

In small (e.g. 6000 cfm and under) systems, it may be more economical to replace the carbon in the entire bank periodically than to submit the system for radioiodine test. In such cases, the system shall be refilled with carbon meeting the requirements of R.G. 1.52 and so documented.

The NRC "Model Technical Specification" requires that a satisfactory laboratory radio methyl iodide test result for ESF systems, <u>be received</u> before returning a tested system to service. A radioiodine test may take several weeks to run and receive results. If the system is redundant (i.e., multiple-parallel units of the same capacity), service may be switched to a redundant unit during this period and the <u>plant need not</u> ANSE N 45-8 Executive April 28, 1975 page 3

If the system is not redundant, the plant cannot be restarted until the system is returned to service. This suggests an area of economic trade-off between arbitrary replacement of all carbon in the system with carbon of documented (per 1.52) performance at the required test schedule, without testing, vs. plant shutdown for the time required to obtain test results. Another alternative would be to take samples several weeks prior to the scheduled in-place leak test so that laboratory-test results may be available at the time of the in-place test. If satisfactory test results have been obtained, this would permit resumption of system use with a minimum of downtime.

For the present, until better life-data are obtained, the NRC "Model Tech. spec." recommends that samples for radioiodine testing of ESF carbon be taken at the end of each 720 hours of time on-stream; that is, after each 720 hours during which air is actually drawn through the system. For continuously on-stream systems this appears to be a severe penalty, but is the cost of not having provided sufficient redundant capacity. If, after a period of service, life-data indicate that such frequent testing is not warranted, NRC may increase the period between tests. This will be on a plant-by-plant basis and will depend on the test history in the individual system and plant.

The testing discussed above applies only to ESF (Engineered Safety Feature) systems at this time. By definition, an ESF system is one which is required to mitigate the consequences of the design basis accident (DBA) of the plant as a whole (e.g., containment post-accident cleanup system) or of the facility served by the system (e.g. auxilliary building ventilation system). The ESF system must be operable after an incident. In at least future plants, non-ESF systems will be required to be inoperative during and after the incident. Because of the multiplicity of names of systems, with systems performing essentially the same function in different plants, it is impractical to tabulate those systems which are, and those which are not, in the ESF category. The SAR should identify the ESF systems.

A final point discussed at the neeting was the confusion between in-place leak tests (e.g., the Freon test of adsorber systems and the field DOP test of HEPA filter systems) and performance or "efficiency" tests (e.g., laboratory tests of carbon samples withdrawn from a system, and "hot" DOP tests, by the manufacturer or Quality Assurance Station, of individual HEPA filters). All currently approved ield tests are leak tests only, and do not give a direct measure of efficiency of the system tested. Test results should be reported as penetration, not efficiency.

These minutes are made available to anyone in the nuclear industry concerned with the testing of radioiodine adsorption systems.

Ear the N 45-8 Committee James Hule

Chairman

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