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Design, Inspection, and Testing Criteria for Air Filtration and Adsorption Units of Normal Atmosphere Cleanup Systems in Light-Water-Cooled Nuclear Power Plants

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Submitter Information

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General Comment

See attached file(s)

Attachments

DG-1280

SUNSI Review Complete
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E-RIDS=ADM-03
Add = M. Brysac (mmb1)
M. Case (mjc)

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Rules, Announcements, and Directives Branch
Office of Administration
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555-0001

Subject: Comments, Draft Regulatory Guide DG-1280, *Proposed Revision 3 of Regulatory Guide 1.140 dated June 2001.*

Dear Sir/Madam,

Thank you for the opportunity to provide comments on Draft Regulatory Guide DG-1280.

Comment 1:

Page 10, Section 7.d *Laboratory Testing Criteria for Activated Carbon*

DG-1280 states:
Laboratory tests of representative samples of adsorbent should be conducted as indicated in Table 1 of this guide, with the test gas flow ***in the same direction*** *as normal cleanup system flow.*

We interpret the criteria, *in the same direction as normal cleanup system flow* to mean that the laboratory test flow shall be from inlet to outlet, as defined by the adsorbent bed depletion profile. It is well known that in-service activated carbon is depleted (in terms of radioiodine removal capability) from inlet to outlet. Thus, one would expect that as we move through the test canister carbon bed, that the carbon closest to the inlet of the canister would exhibit lower radioiodine removal efficiency than the carbon toward the outlet, replicating the depletion profile in the main carbon bed. When sample canisters are used to obtain surveillance samples, the inlet-to-outlet configuration of the carbon sample is preserved within the test canister. If the canister were placed undisturbed into the laboratory apparatus and tested, the requirement of the Regulatory Guide would be met.

When sample canisters are not used to obtain surveillance samples, e.g. test tray assemblies or grain thief sampling of Type III adsorbers, the inlet-to-outlet depletion profile of the sample compared to the main bed is no longer preserved. In these cases the requirement of the Regulatory Guide, as we interpret it, cannot be met.

Samples of activated carbon are tested in accordance with ASTM D-3803-1989. A great deal of work was done by INEL under contract with the NRC to validate this method and institute changes to assure results are repeatable from laboratory to laboratory. ASTM D-3803-1989 specifies critical dimensions of the laboratory sample and back-up bed test canisters (Section 6, Apparatus) and the procedure for filling the canisters (Section 10, Preparation of Apparatus). Section 10 requires that the laboratory canisters are filled in accordance with ASTM D-2854, to assure uniform and maximum packing density. These controls assure that the method produces results that are accurate, repeatable and comparable from one adsorbent sample to the next.

Sample canisters used in the field vary in design. While it is expected that field canisters are filled to maximum packing density and contain sufficient carbon to replicate the main bed depth, often this is not the case. ASTM D-3803-1989 recognizes this fact in Section 9, Sampling, and providing instructions for processing sub-standard bed depths.

It is clear that the statement in DG-1280, *Laboratory tests of representative samples of adsorbent should be conducted as indicated in Table 1 of this guide, with the test gas flow* ***in the same direction*** *as normal cleanup system flow,* requires:

1. The use of test canisters that preserve the inlet-to-outlet depletion profile
2. That the test canisters obtained in the field be mounted undisturbed in the laboratory test apparatus

Adherence to these requirements results in a loss of control of important variables (adsorbent packing density and critical laboratory test bed dimensions) that likely introduce unintended variability into the test method.

Current Industry Practice:

Plants using test canisters as a means of surveillance testing adsorbent normally remove the adsorbent from the test canister, seal the adsorbent in an air-tight container and send it to the laboratory for testing. The empty canisters are returned to controlled storage awaiting refill at the next main bed change-out.

In the event that a radioiodine test laboratory receives a surveillance sample still contained within a system sample canister, the laboratory removes the adsorbent from the canister and fills the laboratory apparatus test bed in accordance with Section 10 of ASTM D-3803-1989.

Summary:

Intuitively, it is clear that preserving the sampled adsorbent's depletion profile during radioiodine testing most closely replicates the actual condition of the main bed. Preserving this profile requires that system test canisters be tested undisturbed in the laboratory test apparatus. The utilization of a variety of manufacturer's test canisters directly in the laboratory test apparatus introduces uncontrolled

variables into ASTM D-3803-1989. Furthermore, much of current industry sampling does not rely on sample canisters, but other methods that do not preserve the carbon bed depletion profile. The question arises as to how the measured radioiodine efficiencies for the same carbon compare when tested in the in-situ, inlet-to-outlet configuration (undisturbed in the test canister) and when homogenized (current practice). There are likely to be differences in test results obtained by each of these methods.

Recommendation:

Eliminate the statement, *Laboratory tests of representative samples of adsorbent should be conducted as indicated in Table 1 of this guide, with the test gas flow* ***in the same direction*** *as normal cleanup system flow.*

The statement is not applicable to bulk-sampled adsorbent, and when applied to canister sampling introduces uncontrolled variables into ASTM D-3803-1989. Maintaining the procedural controls ASTM D-3803-1989 assures that all samples of adsorbent are tested in exactly the same manner, providing results that are accurate, repeatable and comparable. If significant differences are identified between testing adsorbent with the depletion profile preserved, and a homogenized sample, it may be preferable to accommodate these differences in a manner other than the introduction of uncontrolled variables into ASTM D-3803-1989.

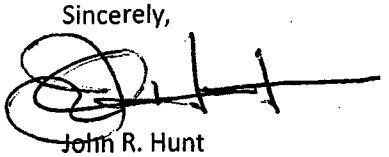
Comment 2:

Page 11, *Table 1, Inservice Adsorber Laboratory Tests for Activated Carbon*

The above-referenced Table assigns decontamination efficiencies for elemental and organic iodide to activated carbon used in delay tanks or beds. Note (5) applicable to the table states *For power cycle offgas systems relying on activated carbon delay tanks or beds...design capacity and number of delay tanks or beds.*

Typically, carbon manufactured for use in off-gas delay systems is not designed for, and not suitable for radioiodine removal. If the intent is to provide additional protection with a separate bed unrelated to the typical delay function of off-gas carbon, this should be clarified.

Sincerely,



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