NUCLEAR ENERGY INSTITUTE

David J. Modeen
DIRECTOR, ENGINEERING
NUCLEAR GENERATION DIVISION

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Mr. John N. Hannon, Chief
Plant Systems Branch
Division of Systems Safety and Analysis
Office of Nuclear Reactor Regulation
U.S. Nuclear Regulatory Commission
Washington, DC 20555

SUBJECT: Recommended Changes to Regulatory Guide 1.52

PROJECT NUMBER: 689

Dear Mr. Hannon:

We understand that the NRC staff plans to update Regulatory Guide 1.52, *Design, Testing and Maintenance Criteria for Post-Accident Engineered-Safety-Feature Atmospheric Air Filtration and Adsorption Units of Light-Water-Cooled Nuclear Power Plants.* Enclosed are recommended changes developed by the Nuclear HVAC Utility Issues Group (NHUG). The NHUG is an ad hoc group of utility HVAC and equipment supplier personnel that exchanges HVAC operating and maintenance practices, and identifies common approaches toward resolving HVAC issues.

We request the NRC staff consider these recommendations during its redraft of the regulatory guide.

If you have questions concerning these suggestions, please contact Mr. Robert Campbell, NHUG Chairman, at (423) 751-8210.

Sincerely,

David J. Modeen

KOC/edb
Enclosure

c: Mr. John P. Segala, U.S. Nuclear Regulatory Commission
Mr. Robert Campbell, TVA

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Public
per: John Segala

1776 I STREET, NW SUITE 400 WASHINGTON, DC 20006-3708 PHONE 202.739.8000 FAX 202.785.4019 www.nei.org

RECOMMENDED CHANGES TO REGULATORY GUIDE 1.52, REVISION 2
NHUG COMMENTS (Final)

02/23/00

The following comments identify areas where corrections, improvements, or clarifications have been identified during licensee use of the current version. These comments do not exclude other corrections, improvements, or clarifications where technically or grammatically prudent. These comments are not intended to preclude further comment at a later date.

No.	Sect.	Current Language	Recommendation/Comments
0	B.	Atmosphere cleanup systems are included as engineered safety features in the design of light-water-cooled nuclear power plants to mitigate the consequences of postulated accidents by removing from the building or containment atmosphere radioactive material that may be released in the accident. All such cleanup systems should be designed to operate under the environmental conditions from the accident.	1. Revise 1st sentence to read "...that may be released during and post accident." 2. Revise 2nd sentence to read "...conditions generated during and post accident."
0a	B.	The DBA environmental conditions for a given ESF system should be determined for each plant. DBA environmental conditions for typical primary and secondary systems are shown in Table 1. In addition, primary systems should be designed to withstand the radiation dose from water and plateout of chemical sprays (if such sprays are included in the plant design).	1. Revise 1st sentence to read as, " The DBA environmental conditions for a given ESF system (primary and secondary systems) should be determined for each plant.". 2. Delete 2nd sentence, " DBA ....Table 1."
1	B.	An ESF atmosphere cleanup system consists of some or all of the following components: demisters, heaters, prefilters, high-efficiency particulate air (HEPA) filters, adsorption units, fans, and associated ductwork, valving, and instrumentation. The purpose of the demister is to remove entrained water droplets from the inlet stream, thereby protecting prefilters, HEPA filters, and adsorbers from water damage and plugging. Heaters, when used on secondary systems, normally follow the demisters in the cleanup train and are designed to heat the incoming stream to reduce the stream's relative humidity before it reaches the filters and adsorbers.	1. Revise "demisters" to "moisture separators". 2. Add "air" to stream in the last sentence.
1a	B.	Prefilters and HEPA filters are installed to remove particulate matter, which may be radioactive. Prefilters remove the larger particles and prevent excessive loading of HEPA filters; to some extent demisters may also perform this function. The HEPA filters remove the fine discrete particulate matter and pass the air stream to the adsorber. The adsorber removes gaseous iodine (elemental iodine and organic iodides) from the air stream. HEPA filters downstream of the adsorption units collect carbon fines and provide redundant protection against particulate release in case of failure of the upstream HEPA filter bank. The fan is the final item in an atmosphere cleanup train.	1. Describes HEPA filters as being able to "remove the fine discrete particulate matter and pass the air stream to the adsorber", which then "removes iodine (elemental iodine and organic iodides) from the air stream". As recognized by recent regulatory information related to "alternate source terms", most of the radioiodine released from a degraded-core accident is now known to be aerosol form (e.g.,CsI). The RG should address this fact and the extent to which standard HEPA filters should be expected to remove the predominant aerosol form of iodines.
1b	B.	The environmental conditions preceding a postulated DBA may affect the performance of the ESF atmosphere cleanup system. Such factors, for example, as industrial contaminants, pollutants, temperature, and relative humidity contribute to the aging and weathering of filters and adsorbers and reduce their capability to perform their intended functions. Therefore, aging and weathering of the filters and adsorbers, both of which vary from site to site, need to be considered during design and operation. Average temperature and relative humidity also vary from site to site, and the potential buildup of moisture in the adsorber should also be given design consideration. The effects of these	1. Revise to read "Such factors, ...their intended design functions."

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		environmental factors on the ESF atmosphere cleanup system can be determined by scheduled testing during operation.	
2	B.	Standards for the design and testing of ESF atmosphere cleanup systems include ANSI N509-1976, "Nuclear Power Plant Air Cleaning Units and Components" (Ref. 1), and ANSI N510-1975, "Testing of Nuclear Air Cleaning Systems" (Ref. 2).	1. Revise to reference ASME AG-1-1997.
3	B.	Not all of the documents mentioned in ANSI N509-1976 (Ref. 1), ANSI N510-1975 (Ref. 2), or other standards referenced in this guide have been the subject of an evaluation by the NRC staff as to their applicability or acceptability. It should be noted that ANSI N509-1976 and ANSI N510-1975 refer to ORNL-NSIC-65, "Design, Construction and Testing of High-Efficiency Air Filtration Systems for Nuclear Application" (Ref. 4), which has been replaced by ERDA 76-21 (Ref. 3).	1. Revise to reference ASME AG-1-1997. 2. Delete reference to ORNL NISC-65 and ERDA 76-21.
4	C.	Section 2 of ANSI N509-1976 (Ref. 1) and Section 2 of ANSI N510-1975 (Ref. 2) list additional documents referred to in these standards. The specific applicability or acceptability of these listed documents, as well as documents listed in other standards referenced in this guide, has been or will be covered separately in other regulatory guides, where appropriate.	1. Add reference to ASME AG-1-1997, Articles AA-2000 through TA-2000.
5	C.	Where reference is made to ORNL-NISC-65 (Ref. 4) in ANSI N509-1976 and in ANSI N510-1975, it should be interpreted to mean the corresponding portion of EFDA 76-21 (Ref. 3).	1. Delete paragraph.
6	C.1	New Paragraph	1. Add paragraph prior to section C.1.a to read: "In addition to respective environmental design requirements of ASME AG-1-1997, components of ESF atmosphere cleanup systems should be designed using the following guidelines:"
6a	C.1.b	b. The design of each ESF system should be based on the radiation dose to essential services in the vicinity of the adsorber section integrated over the 30-day period following the postulated DBA. The radiation source term should be consistent with the assumptions found in Regulatory Guides 1.3 (Ref. 5), 1.4 (Ref. 6), and 1.25 (Ref. 7). Other engineered safety features, including pertinent components of essential services such as power, air, and control cables should be adequately shielded from the ESF atmosphere cleanup systems.	1. Incorporate Alternate Source Term Regulatory Guide. 2. Provide clarification of 30-day dose to essential services.
6b	C.1.c	c. The design of each adsorber should be based on the concentration and relative abundance of the iodine species (elemental, particulate, and organic), which should be consistent with the assumptions found in Regulatory Guides 1.3 (Ref. 5), 1.4 (Ref. 6), and 1.25 (Ref. 7).	1. Incorporate Alternate Source Term Regulatory Guide.
6c	C.2.e	e. In the mechanical design of the ESF system, the high radiation levels that may be associated with buildup of radioactive materials on the ESF system components should be given particular consideration. ESF system construction materials should effectively perform their intended function under the postulated radiation levels. The effects of radiation should be considered not only for the demisters, heaters, HEPA filters, adsorbers, and fans, but also for any electrical insulation, controls, joining compounds, dampers, gaskets, and other organic-containing materials that are necessary for operation during a postulated DBA.	1. Revise last sentence to read " ...for operation during and after a postulated DBA."

RECOMMENDED CHANGES TO REGULATORY GUIDE 1.52, REVISION 2
NHUG COMMENTS (Final)

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7	C.2.l	l. ESF atmosphere cleanup system housings and ductwork should be designed to exhibit on test a maximum total leakage rate as defined in Section 4.12 of ANSI N509-1976 (Ref. 1). Duct and housing leak tests should be performed in accordance with the provisions of Section 6 of ANSI N510-1975 (Ref. 2).	1. Reference ASME AG-1-1997, Article SA-4500 and Section TA.
8	C.3.a	Demisters should be designed, constructed, and tested in accordance with the requirements of Section 5.4 of ANSI N509-1976 (Ref. 1). Demisters should meet Underwriters' Laboratories (UL) Class 1 (Ref. 17) requirements.	1. Revise to reference Section FA, ASME AG-1, 1997. 2. Delete the second line regarding UL Class 1 requirement, since UL Class is incorporated by reference of AG-1. 3. Revise "Demisters" to read "Moisture Separators".
9	C.3.b	Air heaters should be designed, constructed, and tested in accordance with the requirements of Section 5.5 of ANSI N509-1976 (Ref. 1).	1. Revise to reference Section CA, ASME AG-1, 1997.
10	C.3.c	Materials used in the prefilters should withstand the radiation levels and environmental conditions prevalent during the postulated DBA. Prefilters should be designed, constructed, and tested in accordance with the provisions of Section 5.3 of ANSI N509-1976 (Ref. 1).	1. Revise to reference Section FB, ASME AG-1, 1997.
11	C.3.d	The HEPA filters should be designed, constructed, and tested in accordance with Section 5.1 of ANSI N509-1976 (Ref. 1) [1].Each HEPA filter should be tested for penetration of dioctyl phthalate (DOP) in accordance with the provisions of MIL-F-51068 (Ref. 19) and MIL-STD-282 (Ref. 20). [2]	1. Revise to reference Section FC, ASME AG-1, 1997. 2. Delete requirement for HEPA filter testing, since it is incorporated by reference to FC-5200 of ASME AG-1, 1997.
12	C.3.e	Filter and adsorber mounting frames should be constructed and designed in accordance with the provisions of Section 5.6.3 of ANSI N509-1976 (Ref. 1).	1. Revise to reference Section FG, ASME AG-1, 1997.
13	C.3.f	Filter and adsorber banks should be arranged in accordance with the recommendations of Section 4.4 of ERDA 76-21 (Ref. 3).	1. Revise to reference proposed Section HA, ASME AG-1, 1997.
14	C.3.g	System filter housings, including floors and doors, should be constructed and designed in accordance with the provisions of Section 5.6 of ANSI N509-1976 (Ref. 1).	1. Revise to reference proposed Section HA, ASME AG-1, 1997.
15	C.3.h	Water drains should be designed in accordance with the recommendations of Section 4.5.8 of ERDA 76-21 (Ref. 3).	1. Revise to reference proposed Section HA, ASME AG-1, 1997.
16	C.3.i	The adsorber section of the ESF atmosphere cleanup system may contain any adsorbent material demonstrated to remove gaseous iodine (elemental iodine and organic iodides) from air at the required efficiency. Since impregnated activated carbon is commonly used, only this adsorbent is discussed in this guide. Each original or replacement batch of impregnated activated carbon used in the adsorber section should meet the qualification and batch test results summarized in Table 5.1 of ANSI N509-1976 (Ref. 1). In this table, a "qualification test" should be interpreted to mean a test that establishes the suitability of a product for a general application, normally a one-time test reflecting historical typical performance of material. In this table,	1. Revise to reference Section FF, ASME AG-1, 1997 for physical characteristics and identify acceptance when tested to ASTM D3803-1989 of less than 1% penetration. Eliminate Table 1. 2. Eliminate the concept of homogenized mixing. Carbon is purchased to the minimum specifications provided by the approved Code. The test report confirms the performance characteristics and no benefit is gained by any additional requirement. 3. Eliminate the residence time and specify face velocity of nominal 40 ft/min or less.

[1] The pertinent quality assurance requirements of Appendix B, "Quality Assurance Criteria for Nuclear Power Plants and Fuel Reprocessing Plants," to 10 CFR Part 50 apply to all activities affecting the safety-related functions of HEPA filters.

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		a "batch test" should be interpreted to mean a test made on a production batch of product to establish suitability for a specific application. A "batch of activated carbon" should be interpreted to mean a quantity of material of the same grade, type, and series that has been homogenized to exhibit, within reasonable tolerance, the same performance and physical characteristics and for which the manufacturer can demonstrate by acceptable tests and quality control practices such uniformity. All material in the same batch should be activated, impregnated, and otherwise treated under the same process conditions and procedures in the same process equipment and should be produced under the same manufacturing release and instructions. Material produced in the same charge of batch equipment constitutes a batch; material produced in different charges of the same batch equipment should be included in the same batch only if it can be homogenized as above. The maximum batch size should be 350 ft^3 of activated material. If an adsorbent other than impregnated activated carbon is proposed or if the mesh size distribution is different from the specifications in Table 5.1 of ANSI N509-1976 (Ref. 1), the proposed adsorbent should have demonstrated the capability to perform as well as or better than activated carbon in satisfying the specifications in Table 5.1 of ANSI N509-1976 (Ref. 1). If impregnated activated carbon is used as the adsorbent, the adsorber system should be designed for an average atmosphere residence time of 0.25 sec per two inches of adsorbent bed. The adsorption unit should be designed for a maximum loading of 2.5 mg of total iodine (radioactive plus stable) per gram of activated carbon. No more than 5% of impregnant (50 mg of impregnant per gram of carbon) should be used. The radiation stability of the type of carbon specified should be demonstrated and certified (see Section C.1.b of this guide for the design source term).	4. In paragraph "All material…", revise batch size to 500 $ft^3$and eliminate the discussion regarding homogenizing. 5. Eliminate the discussion regarding the limitation on impregnant and radiation stability. 6. Provide defensible guideline on quantity of stable iodine loading or eliminate the requirement.
17	C.3.j	Adsorber cells should be designed, constructed, and tested in accordance with the requirements of Section 5.2 of ANSI N509-1976 (Ref. 1).	1. Revise to reference Section FD for Type II Adsorber cells and FE for Type III Adsorber cells, ASME AG-1, 1997. 2. Revise "Adsorber cells" to "Adsorbers"
18	C.3.k	The design of the adsorber section should consider possible iodine desorption and adsorbent auto-ignition that may result from radioactivity-induced heat in the adsorbent and concomitant temperature rise. Acceptable designs include a low-flow air bleed system, cooling coils, water sprays for the adsorber section, or other cooling mechanisms. Any cooling mechanism should satisfy the single-failure criterion. A low-flow air bleed system should satisfy the single-failure criterion for providing low-humidity (less than 70% relative humidity) cooling airflow.	1. Revise to reference Section HA, ASME AG-1, 1997. This topic is discussed in (draft) Section HA, Housings, paragraph HA-4248, Fire Protection, stating: Fire protection requirements shall be specified by the Owner or his designee commensurate with individual component requirements. Fire protection for Type III adsorbers shall be provided per FE-4620. (Derived from HA draft Rev #9). Specifically, FE-4623 Fire Control Systems [under FE-4600, Auxiliary Systems, FE-4620, Fire Protection].
19	C.3.l	The system fan, its mounting, and the ductwork connections should be designed, constructed, and tested in accordance with the requirements of Sections 5.7 and 5.8 of ANSI N509-1976 (Ref. 1).	1. Revise to reference Section BA for Blowers and SA for Ducts, ASME AG-1, 1997. 2. Combine with C.3.m and C.3.n.
20	C.3.m	The fan or blower used on the ESF atmosphere cleanup system	1. Revise to reference Section BA, ASME AG-

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		should be capable of operating under the environmental conditions postulated, including radiation.	1, 1997 2. Combine with C.3.l and C.3.n
21	C.3.n	Ductwork should be designed, constructed, and tested in accordance with the provisions of Section 5.10 of ANSI N509-1976 (Ref. 1).	1. Revise to reference Section SA, ASME AG-1, 1997 2. Combine with C.3.l and C.3.m
22	C.3.o	Ducts and housings should be laid out with a minimum of ledges, protrusions, and crevices that could collect dust and moisture and that could impede personnel or create a hazard to them in the performance of their work. Straightening vanes should be installed where required to ensure representative airflow measurement and uniform flow distribution through cleanup components.	No comment.
23	C.3.p	Dampers should be designed, constructed, and tested in accordance with the provisions of Section 5.9 of ANSI N509 1976 (Ref. 1).	1. Revise to reference Section DA, ASME AG-1, 1997
24	C.4	**Maintenance**	Eliminate Section 4 (Maintenance) as a Section. Incorporate selected paragraphs into Sections 3 or 5. The section does not address actual maintenance.
25	C.4.a	Accessibility of components and maintenance should be considered in the design of ESF atmosphere cleanup systems in accordance with the provisions of Section 2.3.8 of ERDA 76-21 (Ref. 3) and Section 4.7 of ANSI N509-1976 (Ref. 1).	1. Combine with C.4.b & c and relocate to Section C.2.a as part of System Design. 2. Correct references to Section HA [HA-4433]. Derived from HA draft rev. 9, ASME AG-1, 1997.
26	C.4.b	For ease of maintenance, the system design should provide for a minimum of three feet from mounting frame to mounting frame between banks of components. If components are to be replaced, the dimension to be provided should be the maximum length of the component plus a minimum of three feet.	1. Combine with C.4.a & c and relocate to Section C.2.a as part of System Design 2. Potential to eliminate the dimension information based upon the guidance of AG-1, Section HA.
27	C.4.c	The system design should provide for permanent test probes with external connections in accordance with the provisions of Section 4.11 of ANSI N509-1976 (Ref. 1).	1. Combine with C.4.a &b and relocate to Section C.2.a as part of System Design 2. Correct reference to Section HA [HA-4432]. Derived from HA draft Rev. 9, ASME AG-1, 1997. 3. Add "or ports" after test probes
28	C.4.d	Each ESF atmosphere cleanup train should be operated at least 10 hours per month, with the heaters on (if so equipped), in order to reduce the buildup of moisture on the adsorbers and HEPA filters.	1. Relocate to Section C.5 and revise to 15 minutes per quarter. Operation of a system for ten hours per month will not serve to reduce moisture on the adsorber. The frequency should be consistent with other system surveillance periods (i.e. pump and valve SRs which are generally quarterly) and the time required should be sufficient to ensure fan and heater, if equipped, have reached a stable condition. Additionally, this is support by ASTM D3803-1989 testing by initializing tests at a standard point of reference (as discussed in GL 99-02).
29	C.4.e	The cleanup components (i.e., HEPA filters, prefilters, and adsorbers) should not be installed while active construction is still in progress.	1. Delete. This statement should be common sense and not contained in the RG.
30	C.5	**In-Place Testing Criteria**	1. Combine C.5 and C.6 into one section and address as "Testing". Create two subheadings as follows:

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			a) Acceptance Testing Perform applicable testing in accordance with Section TA of ASME, AG-1, 1997 b) Surveillance Testing
31	C.5.a	A visual inspection of the ESF atmosphere cleanup system and all associated components should be made before each in-place airflow distribution test, DOP test, or activated carbon adsorber section leak test in accordance with the provisions of Section 5 of ANSI N510-1975 (Ref. 2).	1. Revise to proposed ANSI N511-1999. 2. Revise DOP test to aerosol leak test.
32	C.5.b	The airflow distribution to the HEPA filters and iodine adsorbers should be tested in place for uniformity initially and after maintenance affecting the flow distribution. The distribution should be within ±20% of the average flow per unit. The testing should be conducted in accordance with the provisions of Section 9 of "Industrial Ventilation" (Ref. 21) and Section 8 of ANSI N510-1975 (Ref. 2).	1. Delete. Addressed by Acceptance Testing under Section TA, ASME AG-1, 1997.
33	C.5.c	The in-place DOP test for HEPA filters should conform to Section 10 of ANSI N510-1975 (Ref. 2). HEPA filter sections should be tested in place (1) initially, (2) at least once per 18 months thereafter, and (3) following painting, fire, or chemical release in any ventilation zone communicating with the system to confirm a penetration of less than 0.05% at rated flow. An engineered-safety-feature air filtration system satisfying this condition can be considered to warrant a 99% removal efficiency for particulates in accident dose evaluations. HEPA filters that fail to satisfy this condition should be replaced with filters qualified pursuant to regulatory position C.3.d of this guide. If the HEPA filter bank is entirely or only partially replaced, an in-place DOP test should be conducted. If any welding repairs are necessary on, within, or adjacent to the ducts, housing, or mounting frames, the filters and adsorbers should be removed from the housing during such repairs. The repairs should be completed prior to periodic testing, filter inspection, and in-place testing. The use of silicone sealants or any other temporary patching material on filters, housing, mounting frames, or ducts should not be allowed.	1. Revise to proposed ANSI N511-1999. 2. Revise 18 months to "per refueling cyle or 24 months". 3. Eliminate item (3) as not applicable to HEPA filters. 4. Incorporate the allowances of Generic Letter 83-13 for penetration and bypass leakage testing including the less than 1% bypass leakage for 95% or less efficiency. 5. Eliminate the exclusion from use of silicone sealants on ductwork. Disallowance for use in sealing of filters, housings, or mounting frames remains. 6. Eliminate "DOP" and use "aerosol leak".
34	C.5.d	The activated carbon adsorber section should be leak tested with a gaseous halogenated hydrocarbon refrigerant in accordance with Section 12 of ANSI N510-1975 (Ref. 2) to ensure that bypass leakage through the adsorber section is less than 0.05%. After the test is completed, airflow through the unit should be maintained until the residual refrigerant gas in the effluent is less than 0.01 ppm. Adsorber leak testing should be conducted (1) initially, (2) at least once per 18 months thereafter, (3) following removal of an adsorber sample for laboratory testing if the integrity of the adsorber section is affected, and (4) following painting, fire, or chemical release in any ventilation zone communicating with the system.	1. Revise to ANSI N511-1999 2. Eliminate the words gaseous halogenated hydrocarbon refrigerant" and incorporate "halide tracer gas such as R-11 (trichloromonofluoromethane) or acceptable alternative challenge gas meeting the guidelines of Section TA, Appendix TA-C-ASME AG-1, 1997". 3. Incorporate the allowances of Generic Letter 83-13 including less than 1% bypass leakage with 95% or less efficiency. 4. Change 18 months "per refueling cyle or 24 months". 5. Revise (4) to read "Laboratory testing on a representative sample collected from the carbon adsorber shall be conducted following

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			events occurring in any ventilation zone that is directly communicating with the system (such that flow is established through the adsorber) which may damage or reduce the effectiveness of the adsorber section. Such events include painting, fire, or chemical release, and should be evaluated on an individual case basis.
35	C.6	**Laboratory Testing Criteria for Activated Carbon**	Incorporate under Testing, b) Surveillance Testing
36	C.6.a	The activated carbon adsorber section of the ESF atmosphere cleanup system should be assigned the decontamination efficiencies given in Table 2 for elemental iodine and organic iodides if the following conditions are met: (1) The adsorber section meets the conditions given in regulatory position C.5.d of this guide. (2) New activated carbon meets the physical property specifications given in Table 5.1 of ANSI N509-1976 (Ref. 1), and (3) Representative samples of used activated carbon pass the laboratory tests given in Table 2. If the activated carbon fails to meet any of the above conditions, it should not be used in engineered-safety-feature adsorbers.	1. (1) Bypass testing in accordance with proposed ANSI N511-1999. 2. (2) New activated carbon meets the requirements of Section FF, ASME AG-1, 1997 for physical properties and efficiency testing in Accordance with ASTM D3803-1989 is less than 1%. 3. (3) Representative samples pass laboratory testing in accordance with ASTM D3803-1989 with in accordance with GL 99-02, Attachment 2 or better. Optionally, revise the statement to include the criteria provided in the GL as part of the statement. 4. Provide reference regarding the decontamination efficiencies in the table are maximum values.
37	C.6.b	The efficiency of the activated carbon adsorber section should be determined by laboratory testing of representative samples of the activated carbon exposed simultaneously to the same service conditions as the adsorber section. Each representative sample should be not less than two inches in both length and diameter, and each sample should have the same qualification and batch test characteristics as the system adsorbent. There should be a sufficient number of representative samples located in parallel with the adsorber section to estimate the amount of penetration of the system adsorbent throughout its service life. The design of the samplers should be in accordance with the provisions of Appendix A of ANSI N509-1976 (Ref. 1). Where the system activated carbon is greater than two inches deep, each representative sampling station should consist of enough two-inch samples in series to equal the thickness of the system adsorbent. Once representative samples are removed for laboratory test, their positions in the sampling array should be blocked off. Laboratory tests of representative samples should be conducted, as indicated in Table 2 of this guide, with the test gas flow in the same direction as the flow during service conditions. Similar laboratory tests should be performed on an adsorbent sample before loading into the adsorbers to establish an initial point for comparison of future test results. The activated carbon adsorber section should be replaced with new unused activated carbon meeting the physical property specifications of Table 5.1 of ANSI N509-1976 (Ref. 1) if (1) testing in accordance with the frequency	1. Revise to reference Section, ASME AG-1, 1997. 2. Revise to read as follows: "The efficiency of the activated carbon adsorber section must be determined by laboratory testing of representative samples of the carbon installed in the adsorber bank. Sample canisters filled with activated carbon exposed simultaneously to the same service conditions as the adsorber section are an acceptable way to obtain a representative sample. Each representative canister sample should be not less than two inches in both length and diameter, and each canister should be filled with the same carbon batch or lot as the adsorber section. There should be a sufficient number of representative canister samples located in parallel with the adsorber section to estimate the amount of penetration of the system adsorbent throughout its service life. Once representative sample canisters are removed for laboratory test, their positions in the sampling array should be blanked off. Where the system activated carbon is greater than two inches deep, each representative sampling station should consist of enough two-inch samples in series to equal the thickness of the system adsorbent. Representative samples from the adsorber section may also be collected directly

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		specified in Footnote c of Table 2 results in a representative sample failing to pass the applicable test in Table 2 or (2) no representative sample is available for testing.	from the main bank by using a grain thief as described in ASTM E-300 or other industry guidance. Representative samples from may be collected both Type II by tray/cell dumping or grain thief and Type III using the grain thief methods. Laboratory tests of representative samples should be conducted, as indicated in Table 2 of this guide. Similar laboratory tests should be performed on an adsorbent sample which have not been tested within a period of 24 months prior to loading into the adsorbers to establish an initial point for comparison of future test results. 3. The present draft of the RG does not specify the design or testing requirements for systems that contain carbon filters with a bed depth of less than 2". There are several plants in the USA that fall into this category. TABLE 2 of the RG, which provides the guidance for most plants to test their carbon, filters starts at 2 inches. I would like to see the RG specify design and testing requirements for systems containing carbon bed depths of 1 inch. There is little to no guidance for a one inch bed depth carbon system.
38	D.	**IMPLEMENTATION** The purpose of this section is to provide information to applicants and licensees regarding the NRC staff's plans for using this regulatory guide. This guide reflects current NRC staff practice. Therefore, except in those cases in which the applicant or licensee proposes an acceptable alternative method for complying with specified portions of the Commission's regulations, the method described herein is being and will continue to be used in the evaluation of submittals for operating license or construction permit applications until this guide is revised as a result of suggestions from the public or additional staff review.	
39	Table 2		Revise Table as depicted below and described herein 1. Revise Table 2 to read "Assigned Decontamination Efficiencies for Activated Carbon". 2. Eliminate the specification of operation inside or outside of primary containment. 3. Add fourth line as depicted below.

TABLE 2

LABORATORY TESTS FOR ACTIVATED CARBON

Activated Carbon[a] Bed Depth[b]	Assigned Activated Carbon Decontamination Efficiencies	Laboratory Tests for Representative Sample[c]
2 inches. Air filtration system designed to operate inside primary containment.	Elemental iodine 90% Organic iodide 30%	Penetration <10% when tested in accordance with ASTM D-3803-1989.
2 inches. Air filtration system designed to operate outside the primary containment.	Elemental iodine 95% Organic iodide 95%	Penetration <2.5% when tested in accordance with ASTM D-3803-1989.
4 inches or greater. Air filtration system designed to operate outside the primary containment.	Elemental iodine 99% Organic iodide 99%	Penetration <0.5% when tested in accordance with ASTM D-3803-1989.
Greater than 4 inches	Elemental iodine 99.9% Organic iodide 99.9% (Optional by licensee)	Penetration <0.05% when tested in accordance with ASTM D-3803-1989.

Additional Comments for Concerns Not Currently in Regulatory Guide 1.52

No.	Issue
40	The proposed revision to the Reg. Guide appears to address only more recently designed systems without consideration for application to older design systems. Specifically, there are no provisions for functionally addressing alternate means of testing and acceptance necessitated by older designs that do not meet present design performance standards and/or were installed as back-fits to existing plants. The revision to RG 1.52 needs to provide a mechanism to acknowledge and account for the 60-day exceptions to GL 99-02 that have been approved by the NRC.
41	Accident analysis release assumptions may be significantly higher for elemental Iodine than methyl Iodide. In order to appropriately utilize the "Safety Factor of 2" from GL 99-02, testing for elemental Iodine separately may not only be appropriate, it may be necessary to functionally address analytical assumptions for accident consequences. Testing with only methyl Iodide is inadequate as it provides no correlation to elemental Iodine removal capabilities and is overly conservative as a bounding test medium and would lead to excessive charcoal replacement. An option to test the charcoal for elemental Iodine removal efficiency, if applicable, is required.
42	The bypass leakage needs to be addressed with respect to the "safety factor of 2" to the accident analysis assumptions.

[a] The activated carbon, when new, should meet the specifications of Section FF of ASME AG-1, 1997.
[b] Multiple beds, e.g., two 2-inch beds in series, should be treated as a single bed of aggregate depth.
[c] See regulatory position C.6.b for definition of representative sample. Testing should be performed: (1) initially, if carbon has not been tested within 24 months prior to use; (2) at least once per 24 months thereafter for systems maintained in a standby status or after 1440 hours of system operation; and (3) following events occurring in any ventilation zone that is directly communicating with the system (i.e. such that flow is established through the adsorber) which may damage or reduce the effectiveness of the adsorber section. Such events include painting, fire or chemical release, and should be evaluated on a case by case basis.