

May 14, 1999

SECY-99-132

FOR: The Commissioners

FROM: William D. Travers /s/
Executive Director for Operations

SUBJECT: PROPOSED NRC GENERIC LETTER 99-XX, "LABORATORY TESTING OF
NUCLEAR-GRADE ACTIVATED CHARCOAL"

PURPOSE:

To inform the Commission of the staff's intent to issue the subject generic letter. In the generic letter, the staff asks the licensees of operating nuclear power reactors to amend their facility technical specifications to reference either the American Society for Testing and Materials (ASTM) Standard D3803-1989, "Standard Test Method for Nuclear-Grade Activated Carbon," or an alternate test protocol that has been demonstrated to give accurate and consistent results. Additionally, licensees may propose another course of action, which would be subject to NRC review and approval. The objective is to ensure licensee compliance with the licensing bases of their respective facilities, as they relate to the onsite and offsite dose consequences of General Design Criterion (GDC) 19 of Appendix A to Part 50 of Title 10 of the Code of Federal Regulations (10 CFR) and the guideline values of Subpart A of 10 CFR Part 100, respectively.

It is the staff's intent to exercise enforcement discretion with licensees under certain conditions in the resolution of this matter.

A copy of the proposed generic letter is attached (Attachment 1).

CONTACT:
John P. Segala, NRR/DSSA
415-1858

BACKGROUND:

Safety-related air-cleaning units used in the engineered safety feature (ESF) ventilation systems of nuclear power plants reduce the potential onsite and offsite consequences of a radiological accident by adsorbing radioiodine. The laboratory test acceptance criteria contain a safety factor to ensure that the efficiency assumed in the licensee's design-basis dose analysis is still valid at the end of the operating cycle. To ensure that the charcoal filters used in these systems will perform in a manner that is consistent with the licensing basis of a facility, most licensees have requirements in their facility technical specifications (TS) to periodically test (in a laboratory) samples of charcoal taken from the air-cleaning units.

DISCUSSION:

The NRC has been working with the industry on the problems associated with the laboratory testing of charcoal since the early 1980s. In 1982, the American Society of Mechanical Engineers (ASME) Committee on Nuclear Air and Gas Treatment (CONAGT) conducted an inter-laboratory comparison test using ASTM D3803-1979 (the standard then being endorsed by the NRC) and found that seven U.S. laboratories and eight foreign laboratories obtained vastly different results when testing samples of the same charcoal. After efforts to resolve the differences failed, the NRC contracted with the Idaho National Engineering Laboratory (INEL) to assess the problem. As a result of this assessment, the NRC issued Information Notice (IN) 87-32, "Deficiencies in the Testing of Nuclear-Grade Activated Charcoal." Through IN 87-32, the NRC informed licensees of deficiencies in charcoal testing, specifically noting serious problems with the capabilities of the testing laboratories and with the testing standard ASTM D3803-1979. The information notice indicated that the protocol developed by INEL could be utilized for performing the laboratory test until the 1979 standard could be revised. The ASTM completed the revision and issued it in December 1989 as ASTM D3803-1989. The staff considers ASTM D3803-1989 to be the most accurate and most realistic protocol for testing charcoal in ESF ventilation systems because it offers the greatest assurance of accurately and consistently determining the capability of the charcoal.

The staff intends to exercise enforcement discretion, consistent with Section VII.B.6 of the enforcement policy, provided that certain actions are taken by addressees, including the submittal of a TS amendment request and the testing of charcoal samples in accordance with ASTM D3803-1989, until such time that the TS amendment request is approved by the NRC. The Commission endorsed the use of enforcement discretion under the conditions outlined in the generic letter in a staff requirements memorandum (SRM) that was issued on February 5, 1998, in response to SECY-97-299, "Laboratory Testing of Nuclear-Grade Activated Charcoal," dated December 24, 1997. This SRM also directed the staff to consult with the Commission before issuance of the final generic letter if the staff received public comments that resulted in significant changes to the actions presented in the generic letter.

Subsequent to receiving the SRM noted above, a notice of opportunity for public comment was published in the *Federal Register* (63 FR 9581) on February 5, 1998. The staff received 23 letters in response to the *Federal Register* notice, and identified 130 comments. Of these 130 comments, 83 were redundant, leaving 47 distinct comments. Attachment 2 contains the staff's responses to the 47 distinct public comments and identifies whether, and how, the generic letter was revised to reflect a particular comment. As a result of the public comments, the majority of the changes to the generic letter concerned reducing unnecessary burden on

addressees (licensees). Specifically, the conditions under which enforcement discretion will be exercised have been changed to allow up to 180 days to submit a TS amendment request, to allow testing of the charcoal sample at the next required laboratory surveillance test, and to allow a safety factor as low as 2 to be applied to the charcoal filter efficiency assumed in an addressee's design-basis dose analysis to determine the operability of the charcoal. The other changes were technical and editorial in nature.

On the basis of available laboratory test results for more than 50 charcoal samples, there were significant differences in filter efficiencies for about 15 to 20 percent of the tested samples when comparing the test results from ASTM D3803-1979 and ASTM D3803-1989. This difference in filter efficiency can result in calculated design-basis doses to the control room operators exceeding the GDC 19 limits by as much as a factor of 1.5 to 2 and offsite doses from a filtered pathway increasing by as much as a factor of 10 to 15. However, the staff believes that most charcoal in use is not degraded to an extent that would adversely affect control room habitability or public health and safety. Therefore, given the low probability of a design-basis accident and the conservatism inherent in the design-basis dose calculations including the conservatism in the design-basis source term, this issue is not an immediate safety concern, and the staff believes that the time frames noted in the generic letter for resolution of this matter are justified.

The generic letter was reviewed by the Committee To Review Generic Requirements (CRGR) during its meeting (No. 333) on December 8, 1998. The staff incorporated the CRGR comments into the generic letter, with one variation. The generic letter originally cited 10 CFR 50.54(f) as the basis for requiring responses from the addressees. However, under Issue IV.F of the Chairman's tasking memo, the staff has reexamined the basis for invoking §50.54(f). The staff has decided that since the issue being addressed is not an immediate safety concern, §50.54(f) would not be cited for this generic communication.

When §50.54(f) is cited, however, it imposes a requirement on the staff. The regulation requires the preparation of the rationale for an information collection to ensure that the burden to be imposed on the respondents is justified in view of the potential safety significance of the issue being addressed; this analysis is not required if information is sought to verify licensee compliance with the licensing basis for a facility. Nevertheless, a section has been added to the generic letter that gives the staff's rationale for the information collection; this section is titled "Reasons for Requested Information." This is an appropriate standard that should be applied to all generic communication information requests, even if §50.54(f) is not cited in the generic communication.

The Office of Enforcement will issue an enforcement guidance memorandum to reflect the enforcement discretion described in the generic letter.

SUMMARY:

The staff intends to issue this generic letter approximately 5 working days after the date of this information paper.

COORDINATION:

The CRGR has endorsed the proposed final generic letter, including the staff's decision not to cite §50.54(f).

The Office of the General Counsel has reviewed this generic letter and has no legal objections to its content.

William D. Travers
Executive Director
for Operations

Attachments:

1. Proposed Generic Letter, "Laboratory Testing of Nuclear-Grade Activated Charcoal"
2. Public Comment Resolution and Staff Response

COORDINATION:

The CRGR has endorsed the proposed final generic letter, including the staff's decision not to cite §50.54(f).

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William D. Travers
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UNITED STATES
NUCLEAR REGULATORY COMMISSION
OFFICE OF NUCLEAR REACTOR REGULATION
WASHINGTON, D.C. 20555-0001

{Date}

NRC GENERIC LETTER 99-XX: LABORATORY TESTING OF NUCLEAR-GRADE ACTIVATED CHARCOAL

Addressees

All holders of operating licenses for nuclear power reactors, except those who have permanently ceased operations and have certified that fuel has been permanently removed from the reactor vessel.

Purpose

The U.S. Nuclear Regulatory Commission (NRC) is issuing this generic letter to:

- (1) Alert addressees that the NRC has determined that testing nuclear-grade activated charcoal to standards other than American Society for Testing and Materials (ASTM) D3803-1989, "Standard Test Method for Nuclear-Grade Activated Carbon," does not provide assurance for complying with the current licensing basis as it relates to the dose limits of General Design Criterion (GDC) 19 of Appendix A to Part 50 of Title 10 of the Code of Federal Regulations (10 CFR) and Subpart A of 10 CFR Part 100.
- (2) Request that all addressees determine whether their technical specifications (TS) reference ASTM D3803-1989 for charcoal filter laboratory testing. Addressees whose TS do not reference ASTM D3803-1989 should either amend their TS to reference ASTM D3803-1989 or propose an alternative test protocol and provide the information discussed in the requested actions.
- (3) Alert addressees of the staff's intent to exercise enforcement discretion under certain conditions.
- (4) Request that all addressees send the NRC written responses to this generic letter, relating to implementation of the requested actions.

Background

Safety-related air-cleaning units used in the engineered safety features (ESF) ventilation systems of nuclear power plants reduce the potential onsite and offsite consequences of a radiological accident by adsorbing radioiodine. To ensure that the charcoal filters used in these systems will perform in a manner that is consistent with the licensing basis of a facility, most licensees have requirements in their facility TS to periodically test (in a laboratory) samples of charcoal taken from the air-cleaning units.

The NRC's and the nuclear industry's understandings of the appropriate laboratory tests for nuclear-grade charcoal have evolved over the years since the issuance of Regulatory Guide (RG) 1.52, "Design, Testing, and Maintenance Criteria for Postaccident Engineered-Safety-Feature Atmosphere Cleanup System Air Filtration and Adsorption Units

of Light-Water-Cooled Nuclear Power Plants," which is referenced in many plant TS. It was initially assumed that high-temperature/high-relative-humidity (RH) conditions were the most severe. Later, with more testing experience, it became clear that the most conservative test is at low temperature/high humidity. The use of outdated test protocols or inappropriate test conditions can lead to an overestimation of the charcoal's ability to adsorb radioiodine following an accident.

Problems associated with the performance of the laboratory test of charcoal under inappropriate test conditions were discussed in Attachment 1 of Information Notice (IN) 86-76, "Problems Noted in Control Room Emergency Ventilation Systems." Attachment 1, "Summary of Control Room Habitability Reviews," noted that charcoal was being tested at much higher temperatures than any expected during the course of an accident, and that the performance of the laboratory test at that temperature can result in erroneously high efficiency measurements.

In 1982, the American Society of Mechanical Engineers (ASME) Committee on Nuclear Air and Gas Treatment (CONAGT) conducted an inter-laboratory comparison test using ASTM D3803-1979 and found that seven U.S. laboratories and eight foreign laboratories obtained vastly different results when testing samples of the same charcoal. After efforts to resolve the differences failed, the NRC contracted with EG&G at Idaho National Engineering Laboratory (INEL) to assess the problem. As a result of this assessment, the NRC issued IN 87-32, "Deficiencies in the Testing of Nuclear-Grade Activated Charcoal." Through IN 87-32, the NRC informed licensees of deficiencies in the testing of nuclear-grade charcoal, specifically noting serious problems with the capabilities of the testing laboratories and with the testing standard (ASTM D3803-1979). The NRC contractor detailed the specific problems in its technical evaluation report, EGG-CS-7653, "Final Technical Evaluation Report for the NRC/INEL Activated Carbon Testing Program." Specifically, EG&G reported that ASTM D3803-1979 had unacceptable test parameter tolerances and instrument calibration requirements, and that ASTM D3803-1979 was nonconservative in not requiring humidity pre-equilibration of used charcoal. The information notice indicated that the protocol developed by EG&G could be utilized for performing the laboratory test until the D-28 committee responsible for ASTM D3803 revised the standard. The committee completed the revision and issued it in December 1989. The problems associated with the testing laboratories were resolved after the number of U.S. firms performing such tests dropped from seven to the current two.

On April 29, 1993, representatives from ASME and CONAGT met with the NRC staff to express their concerns about laboratory testing of charcoal. CONAGT discussed the variation in laboratory test results obtained (methyl iodide penetration) when temperature, RH, face velocity, bed depth, test protocol, and impregnate were varied. CONAGT stated that the 1989 version of ASTM D3803 is the only acceptable test method for TS applications and compared the results of laboratory tests performed using the 1986 version of ASTM D3803 (which is the 1979 version with editorial changes) to results using the 1989 version. The results from the 1986 protocol showed significantly higher iodine-removal capabilities than the results from the 1989 version.

In addition, CONAGT indicated that testing charcoal at temperatures greater than 30 °C [86 °F] almost always results in the charcoal meeting the TS acceptance criteria, even when the charcoal is deficient. To support this premise, CONAGT presented the results of laboratory tests conducted at temperatures of 30 °C [86 °F], 80 °C [176 °F], and 130 °C [266 °F]. The data show significant increases in iodine-removal capabilities as the test temperature increases. CONAGT indicated that all systems located outside of containment should be tested at 30 °C [86 °F], which is more representative of the limiting accident conditions. Tests conducted at 80 °C [176 °F] or 130 °C [266 °F] are inappropriate because tests at these temperatures result in the regeneration of the charcoal. As the temperature of the charcoal is increased, there is an increase in the reaction rate, which results in the charcoal being able to adsorb more iodine than it could at lower temperatures. Therefore, testing at the elevated temperatures results in an overestimation of the actual iodine-removal capability of the charcoal, and testing at

25 °C [77 °F] or 30 °C [86 °F] gives results that represent a more realistic assessment of the capability of the charcoal. CONAGT concluded its presentation by stating that the major problems associated with the laboratory test of charcoal are the designation of the test protocol and the TS that designate the test to be performed.

On November 6, 1996, the staff visited the two remaining laboratories that test nuclear-grade activated charcoal, NCS Corporation and NUCON International, Inc. Both laboratories have resolved the poor reproducibility problem identified in the EG&G report by performing all tests with calibrated equipment that is capable of maintaining the tight tolerances of the test parameters as specified in ASTM D3803-1989. Tight tolerances are very important when tests are performed at high RH, because slight variations in RH result in unacceptably large differences in the tested efficiency of the charcoal.

Discussion

Although some licensees have changed their TS to reference the latest testing standard (ASTM D3803-1989), many still use outdated standards and/or test conditions that may overestimate the capability of the charcoal in their ESF systems. As a result, the ability of the charcoal filters in these systems to perform in a manner consistent with the licensing basis for the facility may be in question.

The licensees of four plants (V.C. Summer, Davis-Besse, Oconee, and Brunswick) determined that the tests they performed were not in compliance with their TS and submitted emergency TS amendments (see Enclosure 1 for details). As a result of the emergency TS changes, the staff has performed an internal survey of the TS of operating plants to determine whether other plants have the potential for similar compliance problems. The survey indicated that at least one-third of operating reactor licensees may be out of compliance with their TS because, although the plants' TS reference RG 1.52 or American National Standards Institute (ANSI) N509-1976, "Nuclear Power Plant Air-Cleaning Units and Components," the licensees may have used later versions of the standards for the laboratory tests of their nuclear-grade charcoal in order to achieve more accurate testing results. On the basis of this survey, the staff established the following four groups of plants:

- (1) plants in compliance with their TS that test in accordance with ASTM D3803-1989
- (2) plants in compliance with their TS that test in accordance with a test protocol other than ASTM D3803-1989
- (3) plants not in compliance with their TS that test in accordance with ASTM D3803-1989
- (4) plants not in compliance with their TS that test in accordance with a test protocol other than ASTM D3803-1989

Licensees in Group 1 have TS that require charcoal to be tested in accordance with ASTM D3803-1989, which adequately demonstrates the capability of the charcoal. As discussed in Enclosure 1, the staff considers ASTM D3803-1989 to be the most accurate and most realistic protocol for testing charcoal in ESF ventilation systems because it offers the greatest assurance of accurately and consistently determining the capability of the charcoal. For example, it requires the test to be performed at a constant low temperature of 30 °C [86 °F]; it provides for smaller tolerances in temperature, humidity, and air flow; and it has a humidity pre-equilibration.

Licensees in Group 2 have TS that require charcoal to be tested in accordance with test standards other than ASTM D3803-1989. On the basis of available laboratory test results for more than 50 charcoal samples, there were significant differences in filter efficiencies for about 15 to 20 percent of the tested samples when comparing the test results from ASTM D3803-1979 and ASTM D3803-1989. When the charcoal samples were tested in accordance

with ASTM D3803-1979, they appeared to have high efficiencies. However, when the same charcoal samples were tested in accordance with ASTM D3803-1989, significant reduction in efficiency was noted. Depending on the system arrangement, this reduction in filter efficiency can result in calculated doses to the control room operators exceeding the GDC 19 limits by as much as a factor of 1.5 to 2. For pressurized-water reactors (PWRs) with secondary containments and for all boiling-water reactors (BWRs), this reduction in filter efficiency can result in offsite doses from a filtered pathway increasing by as much as a factor of 10 to 15. As a result, the testing of nuclear-grade activated charcoal to standards other than ASTM D3803-1989 does not provide assurance for complying with the plant's licensing basis as it relates to the dose limits of GDC 19 and Part 100.

In addition, the staff has determined that ASTM D3803-1989 should be used for both new and used charcoal because it allows for accurately monitoring the degradation of the charcoal over time. The original rationale for testing used and new charcoal differently was the belief that a long equilibration period would regenerate the used charcoal by removing contaminants adsorbed by the charcoal during normal plant use. However, an EG&G technical evaluation report, described in Enclosure 1, demonstrated that this is not true. As a result, ASTM D3803-1989 specifies testing both used and new charcoal in the same manner.

Currently, before shipping, suppliers test most new charcoal with the ASTM D3803-1989 protocol at 30 °C [86 °F] and 95 percent RH in addition to the test protocol and test conditions the addressee records on the purchase order. The results from the new charcoal tested via ASTM D3803-1989 present a solid baseline for the initial capability of the charcoal. Using ASTM D3803-1989 to test used charcoal is a very accurate and reproducible method for determining the capability of the charcoal. By comparing the results of the tests performed on used charcoal with the baseline test performed on new charcoal, the addressee can be certain of the charcoal's level of degradation.

Analyses of design-basis accidents assume a particular ESF charcoal filter adsorption efficiency when calculating offsite and control room operator doses. Licensees then test charcoal filter samples to determine whether the filter adsorber efficiency is greater than that assumed in the design-basis accident analysis. The laboratory test acceptance criteria contain a safety factor to ensure that the efficiency assumed in the accident analysis is still valid at the end of the operating cycle. Because ASTM D3803-1989 is a more accurate and demanding test than older tests, addressees that upgrade their TS to this new protocol will be able to use a safety factor as low as 2 for determining the acceptance criteria for charcoal filter efficiency (see note in Enclosure 2 for further discussion). This safety factor can be used for systems with or without humidity control because the lack of humidity control is already accounted for in the test conditions (systems without humidity control test at 95 percent RH and systems with humidity control can test at 70 percent RH). The staff has previously approved reductions in the safety factor for plants adopting the ASTM D3803-1989 standard on a case-by-case basis. (The staff plans to make conforming changes to RG 1.52.)

The licensees that received emergency TS changes were in Groups 3 and 4. Licensees in Groups 3 and 4 have TS that require charcoal to be tested in accordance with RG 1.52 or ANSI N509-1976, and are not in compliance with their TS because the specified test protocol cannot be successfully completed as discussed in Enclosure 1. These licensees are either (1) testing in accordance with the desired ASTM D3803-1989 (Group 3) or (2) using earlier revisions of ASTM D3803 or an older standard, which they believe are acceptable (Group 4). The staff does not have confidence that the results from RG 1.52 or ANSI N509-1976 meet the intent of the TS, which is to ensure that the doses are within the required limits. Therefore, licensees in these groups have not adequately demonstrated compliance with their licensing basis as it relates to the dose limits of GDC 19 and Part 100.

The staff believes that (1) conflicting guidance, (2) complex and ambiguous standards, and (3) licensee belief that using later versions of the ASTM D3803 standard would satisfy TS requirements, contributed to confusion regarding

charcoal testing. These factors may explain why licensees did not adopt ASTM D3803-1989 (see Enclosure 1 for further discussion). In addition, on the basis of the available laboratory test results, the staff believes that most charcoal in use is not degraded to an extent that would adversely affect control room habitability or public health and safety. This confidence in charcoal performance, the low probability of a design-basis accident and the conservatism inherent in the design-basis dose calculations, including the conservatism in the design-basis source term, justify the time frames for the resolution of this matter. Therefore, the staff intends to exercise enforcement discretion, consistent with Section VII.B.6 of the Enforcement Policy, for all addressees in Groups 2, 3, and 4, provided that

- A TS amendment request referencing ASTM D3803-1989 or an alternate test protocol is submitted to the NRC within 180 days of the date of this letter;
- At the next required laboratory surveillance test of a charcoal sample that is 60 or more days after the date of this generic letter, charcoal samples are tested in accordance with ASTM D3803-1989 or all of the charcoal is replaced with new charcoal that has been tested in accordance with ASTM D3803-1989. In all cases, the results should meet the acceptance criterion that is derived from applying a safety factor as low as 2 (see the note in Enclosure 2) to the charcoal filter efficiency assumed in the addressee's design-basis dose analysis; and
- The charcoal samples continue to be tested in accordance with ASTM D3803-1989, in lieu of the current TS-required laboratory testing, until the TS amendment is approved by the NRC.

Licensees in Group 2 have been complying with their TS by testing their charcoal in accordance with their TS. Therefore, enforcement discretion is not required for past surveillance testing. However, the staff will exercise enforcement discretion for licensees in Group 2 to eliminate unnecessary testing of charcoal samples to both ASTM D3803-1989 and the current TS testing protocol during the period of time between issuance of the generic letter and approval of the TS amendment.

Requested Actions

1. Within 180 days of the date of this generic letter, submit a written response to the NRC describing your current TS requirements for the laboratory testing of charcoal samples for each ESF ventilation system including the specific test protocol, temperature, RH, charcoal bed thickness, total residence time per bed depth, and penetration at which the TS require the test to be performed. If your current TS specifically require laboratory testing of charcoal samples in accordance with the ASTM D3803-1989 protocol at 30 °C [86 °F], and you have been testing in accordance with this standard, then you only need to address this requested action (i.e. no TS amendment or additional testing is required).
2. If you choose to adopt the ASTM D3803-1989 protocol, submit a TS amendment request to require testing to this protocol within 180 days of the date of this generic letter. The request should contain the test temperature, RH, and penetration at which the proposed TS will require the test to be performed and the basis for these values. If the system has a face velocity greater than 10 percent of 0.203 m/s [40 ft/min], then the revised TS should specify the face velocity. Also, indicate when the next laboratory test is scheduled to be performed. (Enclosure 2 is a sample TS that the NRC considers acceptable.)
3. If you are proposing an alternate test protocol, address the attributes discussed below and submit a TS amendment request to require testing to this alternate protocol within 180 days of the date of this generic letter. The request should contain the test temperature, RH, and penetration at which the proposed TS will require the

test to be performed and the basis for these values. If the system has a face velocity greater than 10 percent of 0.203 m/s [40 ft/min], then the revised TS should specify the face velocity. Also, indicate when the next laboratory test is scheduled to be performed.

The following information should be submitted for staff review to determine the acceptability of the alternate protocol:

1. summary of the test method
2. precision of the method
3. description of the test apparatus along with tolerances
4. parameter specifications
5. material requirements
6. hazards
7. preparation of the apparatus before initiation of the test
8. calibration requirements of the test equipment
9. test procedure
10. manner of calculating penetration and error
11. repeatability and reproducibility of the results for 1 percent and 10 percent penetration and the penetration at a 95 percent confidence interval for charcoal tested at 70 percent RH and at 95 percent RH
12. bias associated with the method
13. results from at least two laboratories which demonstrate that the alternate test protocol achieves results that are consistent with, or more conservative than, results associated with ASTM D3803-1989.

The demonstration identified in Item 13 above should be based upon a series of tests comparing the alternate test protocol and ASTM D3803-1989, and it should apply to both new and used charcoal tested at 70 percent RH and at 95 percent RH. If an addressee chooses to test its charcoal samples at actual accident conditions which are different from the test conditions specified in ASTM D3803-1989, then that test should be treated as an alternate protocol. At least two laboratories should be used in determining the acceptability of the alternate protocol. One laboratory should be used to develop the alternate protocol and the other to demonstrate the repeatability and reproducibility of the alternate protocol. The two laboratories should be able to demonstrate that the alternate protocol is at least as conservative as ASTM D3803-1989, and should be able to perform the ASTM D3803-1989 test and achieve repeatable and reproducible results

4. At the next required laboratory surveillance test of a charcoal sample that is 60 or more days after the date of this generic letter, test your charcoal samples in accordance with ASTM D3803-1989 or replace all of the charcoal with new charcoal that has been tested in accordance with ASTM D3803-1989. In all cases, the results should meet the acceptance criterion that is derived from applying a safety factor as low as 2 (see the note in Enclosure 2) to the charcoal filter efficiency assumed in your design-basis dose analysis and the charcoal samples should continue to be tested in accordance with ASTM D3803-1989, in lieu of the current TS-required laboratory testing, until the TS amendment is approved by the NRC.
5. Addressees who choose not to do the above actions are requested to notify the NRC in writing of their decision, as soon as a decision is reached but no later than 60 days from the date of this generic letter. The 60 day written response should also discuss (1) addressee plans to pursue a proposed alternative course of action (including the basis for establishing its acceptability), (2) the schedule for submitting that proposal for NRC staff review (that proposal should be submitted to the NRC no later than 180 days from the date of this generic letter), and (3) the basis for continued operability of affected systems and components until such time that the proposed alternative course of action is approved by the NRC.

Address the written response to the U.S. Nuclear Regulatory Commission, ATTN: Document Control Desk, Washington, D.C. 20555-0001. In addition, send a copy to the appropriate regional administrator.

Reasons for Requested Information

This generic letter requests that addressees submit information. The requested information will enable the NRC staff to make a determination that addressees are testing the nuclear-grade activated charcoal of their ESF ventilation systems in accordance with a suitable testing standard to ensure that the charcoal filters are capable of performing their required safety function and that the licensing bases of their respective facilities regarding onsite and offsite dose consequences continue to be satisfied.

The NRC erroneously assumed that existing charcoal filter test protocols other than ASTM D3803-1989 would be sufficient to assure accurate and reproducible results. In fact, the available laboratory test results demonstrate that existing test protocols other than ASTM D3803-1989 do not provide accurate and reproducible test results and may overestimate the capability of the charcoal. Therefore, the requested information is necessary for the NRC staff to make an accurate assessment of the charcoal filter capability, in order to assure compliance with the plant's licensing basis as it relates to the dose limits of GDC 19 and Part 100, including commitment to the resolution of TMI Action Plan Item III.D.3.4.

Backfit Discussion

Appendix A to 10 CFR Part 50, "General Design Criteria (GDC) for Nuclear Power Plants," and the plant safety analyses require and/or commit that licensees design and test safety-related structures, systems, and components to offer adequate assurance that they can perform their safety functions. Specifically, GDC 19 of Appendix A to 10 CFR Part 50 specifies dose limits to ensure that control room operators are provided with adequate radiation protection under accident conditions. Following the accident at Three Mile Island (TMI), TMI Action Plan Item III.D.3.4, "Control Room Habitability Requirements," as specified in NUREG-0737, "Clarification of TMI Action Plan Requirements," required all licensees to perform evaluations and identify appropriate modifications to ensure that control room operators are adequately protected from the release of radioactive gases and that the nuclear power plant can be safely operated or shut down under design-basis accident conditions (GDC 19). When modifications were proposed by licensees, the NRC issued orders confirming licensee commitments. As a result, all

licensees are required to meet the dose limits of GDC 19. In addition, Subpart A of 10 CFR Part 100 specifies reference dose values that can be used in evaluating the suitability of proposed sites for nuclear power plants with respect to potential reactor accidents that could result in the release of significant quantities of radioactive fission products. The expectation is that the site location and the engineered safety features included as safeguards against the hazardous consequences of an accident, should one occur, ensure a low risk of public exposure. In this regard, licensees commit to dose limits that can be used as the basis for assessing the performance of safety-related structures, systems, and components. Accordingly, to ensure continued compliance with facilities' licensing bases, as they relate to the dose limits of GDC 19 and Part 100, a valid test protocol is necessary.

The actions requested in this generic letter are considered compliance backfits under the provisions of 10 CFR 50.109(a)(4)(i). The compliance exception addresses, inter alia, situations where the licensee has failed to meet known and established Commission standards because of mistake of fact. See 50 FR 38103 (September 20, 1985). The NRC erroneously assumed that existing charcoal filter test protocols other than ASTM D3803-1989 would be sufficient to assure accurate and reproducible results. In fact, the available laboratory test results demonstrate that existing test protocols other than ASTM D3803-1989 do not provide accurate and reproducible test results and may overestimate the capability of the charcoal. Therefore, the proposed backfit, which would apply only to used charcoal filters, is necessary for accurate assessment of the charcoal filter capability, in order to assure compliance with the plant's licensing basis as it relates to the dose limits of GDC 19 and Part 100, including commitment to the resolution of TMI Action Plan Item III.D.3.4. The NRC staff has adopted a new staff position by endorsing the ASTM D3803-1989 testing standard for referencing in plant TS because ASTM D3803-1989 is the only available testing standard the staff is aware of that provides accurate and reproducible test results. In accordance with the provisions of 10 CFR 50.109(a)(4)(i), regarding compliance backfits, a full backfit analysis was not performed. However, an evaluation was performed in accordance with NRC procedures, including a statement of the objectives, the reasons for the requested actions, and the basis for invoking the compliance exception, and is reflected in this backfit discussion.

Federal Register Notification

A notice of opportunity for public comment was published in the *Federal Register* on February 25, 1998. Comments were received from 18 licensees, 2 industry organizations, 2 charcoal testing laboratories, and 1 individual. The staff considered all comments that were received, including comments received as late as May 26, 1998. Copies of the staff evaluation of these comments are available in the Public Document Room.

Paperwork Reduction Act Statement

This generic letter contains information collections that are subject to the Paperwork Reduction Act of 1995 (22 U.S.C. 3501 et seq.). These information collections were approved by the Office of Management and Budget (OMB), approval number 3150-0011, through August 31, 2000.

The public reporting burden for this collection of information is estimated to average 250 hours per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. The U.S. Nuclear Regulatory Commission is seeking public comment on the potential impact of the collection of information contained in the generic letter and on the following issues:

- (1) Is the proposed collection of information necessary for the proper performance of the functions of the NRC, including consideration of whether the information will have practical utility?

- (2) Is the estimate of burden accurate?
- (3) Is there a way to enhance the quality, utility, and clarity of the information to be collected?
- (4) How can the burden of the collection of information be minimized, including consideration of the use of automated collection techniques?

Send comments on any aspect of this collection of information, including suggestions for reducing this burden, to the Information and Records Management Branch, T-6 F33, U.S. Nuclear Regulatory Commission, Washington, D.C. 20555-0001, and to the Desk Officer, Office of Information and Regulatory Affairs, NEOB-10202 (3150-0011), Office of Management and Budget, Washington, D.C. 20503.

The NRC may not conduct or sponsor, and a person is not required to respond to, a collection of information unless it displays a currently valid OMB control number.

If you have any questions about this matter, please contact the technical contact listed below or the appropriate Office of Nuclear Reactor Regulation (NRR) project manager.

Sincerely,

David B. Matthews, Director
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Office of Nuclear Reactor Regulation

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Enclosures:

- (1) Background Information on the Laboratory Testing of Nuclear-Grade Activated Charcoal
- (2) Sample Technical Specifications

BACKGROUND INFORMATION ON THE LABORATORY TESTING OF NUCLEAR-GRADE ACTIVATED CHARCOAL

Charcoal Testing Requirements

Analyses of design-basis accidents assume a particular engineered safety features (ESF) charcoal filter adsorption efficiency when calculating offsite and control room operator doses. Licensees then test charcoal filter samples to determine whether the filter adsorber efficiency is greater than that assumed in the design-basis accident analysis. The laboratory test acceptance criteria contain a safety factor to ensure that the efficiency assumed in the accident analysis is still valid at the end of the operating cycle.

Guidance on the frequency of, and the test method for, the laboratory testing of charcoal appears in various documents, including all revisions of Regulatory Guide (RG) 1.52, "Design, Testing, and Maintenance Criteria for Postaccident Engineered-Safety-Feature Atmosphere Cleanup System Air Filtration and Adsorption Units of Light-Water-Cooled Nuclear Power Plants," and other NRC documents on plant technical specifications (TS). Guidance on the laboratory test protocol appears in such standards as American National Standards Institute (ANSI) N509, "Nuclear Power Plant Air-Cleaning Units and Components"; ANSI N510, "Testing of Nuclear Air-Cleaning Systems"; Military Specification RDT M 16-1T, "Gas Phase Adsorbents for Trapping Radioactive Iodine and Iodine Components"; and American Society for Testing and Materials (ASTM) Standard D3803, "Standard Test Method for Nuclear-Grade Activated Carbon."

All of the standards describe a pre-equilibration period, a challenge period, and an elution period. During the pre-equilibration (pre-sweep) period, the charcoal is exposed to a flow of air controlled at the test temperature and relative humidity (RH) before the challenge gas is fed through the charcoal. The pre-equilibration period ensures that the charcoal has stabilized at the specified test temperature and RH for a period of time, which results in the charcoal becoming saturated with moisture before it is challenged with methyl iodide. During the challenge period, air at the test temperature and RH with radio-labeled methyl iodide is injected through the charcoal beds to challenge the capability of the charcoal. During the elution (post-sweep) period, air at the test temperature and RH is passed through the charcoal beds to evaluate the ability of the charcoal to hold the methyl iodide once it is captured.

The ASTM D3803-1989 standard has two additional testing periods that are not required by other standards: the stabilization period and the equilibration period. During the stabilization period, the charcoal bed is brought to thermal equilibrium with the test temperature before the start of pre-equilibration. During the equilibration period, air at the test temperature and RH is passed through the charcoal beds to ensure the charcoal adsorbs all the available moisture before the feed period. During this period, the system is more closely monitored than in the pre-equilibration period to ensure that all parameters are maintained within their limits.

Depending upon the plant's TS, typical test temperatures are usually one of the following: 25 °C [77 °F], 30 °C [86 °F], 80 °C [176 °F], or 130 °C [266 °F]. In addition, the TS usually require that the test be conducted at 70 percent RH if the ESF system controls the RH to 70 percent or less, or at 95 percent if the RH is not controlled to 70 percent.

The standard technical specifications (STS) and many plant-specific TS specify Regulatory Position C.6.a of RG 1.52, Revision 2, as the requirement for the laboratory testing of the charcoal. Regulatory Position C.6.a refers to Table 2 of RG 1.52. Table 2 references Test 5.b of Table 5-1 of ANSI N509-1976, "Nuclear Power Plant Air-Cleaning Units and Components." Test 5.b references the test method from paragraph 4.5.3 of Military Specification RDT M 16-1T, "Gas Phase Adsorbents for Trapping Radioactive Iodine and Iodine Components" (date not indicated), but specifies that the test is to be conducted at 80 °C [176 °F] and 95 percent RH with preloading and postloading sweep at 25 °C [77 °F]. This test is referred to as the "25-80-25 test." The essential elements of this test are as follows:

- 70 percent or 95 percent RH
- 5-hour pre-equilibration (pre-sweep) time, with air at 25 °C [77 °F] and plant-specific RH
- 2-hour challenge, with gas at 80 °C [176 °F] and plant-specific RH
- A 2-hour elution (post-sweep) time, with air at 25 °C [77 °F] and plant-specific RH

The latest acceptable methodology for the laboratory testing of the charcoal is ASTM Standard D3803-1989, "Standard Test Method for Nuclear-Grade Activated Carbon." ASTM D3803-1989 is updated guidance based on an NRC verification and validation effort regarding ASTM D3803-1979, which is updated guidance based on RDT M 16-1T. The essential elements of the ASTM D3803-1989 test are as follows:

- 70 percent or 95 percent RH
- 2-hour minimum thermal stabilization, at 30 °C [86 °F]
- 16-hour pre-equilibration (pre-sweep) time, with air at 30 °C [86 °F] and plant-specific RH
- 2-hour equilibration time, with air at 30 °C [86 °F] and plant-specific RH
- 1-hour challenge, with gas at 30 °C [86 °F] and plant-specific RH
- 1-hour elution (post-sweep) time, with air at 30 °C [86 °F] and plant-specific RH

The major differences between the ANSI N509-1976 and ASTM D3803-1989 standards for charcoal testing are as follows:

MAJOR DIFFERENCES	ASTM D3803-1989	ANSI N509-1976
Pre-Equilibration (Pre-Sweep) Temperature	30 °C [86 °F]	25 °C [77 °F]
Challenge Temperature	30 °C [86 °F]	80 °C [176 °F]
Elution (Post-Sweep) Temperature	30 °C [86 °F]	25 °C [77 °F]
Total Pre-Test Equilibration	18 hours	5 hours
Tolerances of Test Parameters	Smaller	Larger

As stated above, ASTM D3803-1989 challenges the representative charcoal samples at 30 °C [86 °F] rather than at 80 °C [176 °F]. The quantity of water retained by charcoal is dependent on temperature, and less water is retained as the temperature rises. The water retained by the charcoal decreases its efficiency in adsorbing other contaminants. At 30 °C [86 °F] and 95 percent RH, charcoal will retain about 24 to 25 weight-percent water. At 80 °C [176 °F] and 95 percent RH, charcoal retains only about 19 to 20 weight-percent water. Because most charcoal is anticipated to be challenged at a temperature closer to 30 °C [86 °F] rather than 80 °C [176 °F], the lower temperature test condition of ASTM D3803-1989 will yield more realistic results than would a test performed at 80 °C [176 °F].

ASTM D3803-1989 specifies a test temperature of 30 °C [86 °F] for both the pre- and post-test sweep rather than 25 °C [77 °F]. There is little difference in the adsorption behavior of charcoal between these two temperatures. A temperature of 25 °C [77 °F] is more conservative; however, the increase from 25 °C [77 °F] to 30 °C [86 °F] does not represent a significant variation in the test results.

ASTM D3803-1989 provides results that are reproducible compared to RDT M 16-1T because it has smaller tolerances on various test parameters, and it requires that the charcoal sample be pre-equilibrated for a much longer period. The longer pre-equilibration time is more conservative because it will completely saturate the representative charcoal sample, which ensures reproducibility of the results by having every charcoal sample begin the test at the same initial conditions. Therefore, testing in accordance with ASTM D3803-1989 will result in a more realistic prediction of the capability of the charcoal.

TS Testing Reference

Laboratory tests of the charcoal are typically required (1) once every refueling outage, (2) when certain events occur that could adversely affect the ability of the charcoal to perform its intended function, and (3) following a defined period of ESF system operation. The TS require demonstration by laboratory testing that the charcoal is capable of performing at a level greater than that assumed in the NRC staff's safety evaluation report. If it fails to perform at that level, the charcoal must be replaced.

The determination of the appropriate test conditions, test protocol, and acceptance criteria for laboratory testing of nuclear-grade activated charcoal is frequently not a straightforward process. It sometimes requires a complex journey through a number of documents to ascertain the appropriate test conditions, test protocol, and acceptance criteria. As described earlier, if the plant has STS, the STS reference Regulatory Position C.6.a of RG 1.52 for the requirements for the laboratory testing of charcoal. Regulatory Position C.6.a refers to Table 2 of the regulatory guide. Table 2 references Test 5.b of Table 5-1 of ANSI N509-1976. Test 5.b from Table 5-1 references the test method from paragraph 4.5.3 of RDT M 16-1T (date not indicated), but specifies that the test is to be conducted at 80 °C [176 °F] and 95 percent RH with pre-loading and postloading sweep at 25 °C [77 °F]. This test is referred to as the "25-80-25 test."

Also contributing to the potential confusion are the various ways in which TS are written, and conflicting NRC guidance on testing, particularly NRC letters to the nuclear industry and NRC papers presented at national conferences. This problem arose from the evolving understanding of what constituted an appropriate test. At various times, the NRC has stated that the newest version of a standard can be used and the test can be conducted at a temperature of 30 °C [86 °F]. At other times, the NRC indicated that the TS are requirements and that the tests must be performed at the 25-80-25 conditions. In various forums, the NRC has also stated that a technical argument may be made for using the newer standard. However, in some instances when newer standards were utilized to demonstrate conformance with the TS, the NRC required licensees to submit TS amendment requests because the newer standards were not referenced in the TS. Therefore, it is understandable that licensees may be confused about laboratory testing protocols, testing conditions, and acceptance criteria. As a result, many licensees are not testing charcoal in accordance with their TS, although the tests they conduct may be more conservative than the tests required by the TS.

Additionally, the 25-80-25 test has difficulties in that none of the protocols in any version of RDT M 16-1T or ASTM D3803 addresses performing the laboratory test at multiple temperatures as required by ANSI N509-1976. If the test protocol described in paragraph 4.5.3 of RDT M 16-1T (1973) is followed verbatim, a thermal step change must be made after the 5-hour pre-equilibration period to increase the temperature from 25 °C [77 °F] to 80 °C [176 °F] for the challenge period. The problem with such thermal step changes is that they result in condensation forming on the charcoal. The condensation of free water in the sample bed is cause for aborting the test, according to the 1977 version of RDT M 16-1T and subsequent versions of ASTM D3803. Therefore, the 25-80-25 test cannot be performed pursuant to any existing test protocol.

Because paragraph 4.5.3 cannot be followed verbatim, a few licensees have changed the 25-80-25 test to thermally equilibrate the charcoal before introducing the challenge gas. Following the pre-sweep conditioning at 25 °C [77 °F], the bed temperature is raised to 80 °C [176 °F] before introducing the challenge gas. Although such testing does not cause condensation in the test rig, it is not acceptable because the results are not easily reproducible, and even when the test is successfully completed, the results may not be conservative.

Section 2 of ANSI N509-1976 states for the various documents that supplement ANSI N509 that the issuance of a document in effect at the time of the purchase order shall apply unless otherwise specified. In the case of charcoal, the purchase order date could be considered the date that the charcoal is procured. Therefore, TS that have the STS wording may allow the licensee the flexibility to use a more recent laboratory protocol than the 1973 version of RDT M 16-1T, depending on the procurement date for the charcoal, without a TS change. However, although the

flexibility of protocol selection exists, the requirement to perform a 25-80-25 test for those plants that have TS that reference either Revision 1 or Revision 2 of RG 1.52, Table 5-1 of ANSI N509-1976, or ANSI N510-1975 can only be relieved by license amendment.

Categorization of Plants

Since February 1996, the staff has issued three emergency TS changes to licensees that had determined that the tests they performed were not in compliance with their TS because the required testing standards and test protocols did not support a test in which the temperature is changed as required by the TS. If the temperature in the test apparatus is changed from 25 °C [77 °F] to 80 °C [176 °F] during the test without modifying the test protocol, water condenses on the charcoal, thereby causing the test to be aborted (to fail). The emergency TS changes were issued for the V.C. Summer, Davis-Besse, and Oconee facilities. The details of these TS changes are discussed below.

On February 10, 1996, the licensee for the V.C. Summer Nuclear Station, South Carolina Electric & Gas Company (SCE&G), requested an emergency TS change. The systems involved were the control room emergency ventilation system and the fuel handling building exhaust system. On February 10, 1996, the NRC granted the emergency TS change. The emergency TS change was requested because SCE&G had determined that laboratory tests of the charcoal of the control room ventilation system and the fuel-handling building system had not been performed in compliance with the V.C. Summer TS. The laboratory test performed for V.C. Summer was a 25-25-25 test in lieu of the 25-80-25 required by its TS. The licensee had been performing the 25-25-25 test because, in consultation with its testing laboratory, it concluded that performance of the 25-80-25 test would result in condensation on the charcoal and, thus, an invalid test.

On March 29, 1996, the Toledo Edison Company requested an emergency TS change for the Davis-Besse plant. The systems involved were the hydrogen purge, the shield building emergency ventilation, and the control room. The TS for Davis-Besse required the laboratory test to be performed in accordance with RG 1.52, Revision 2. In this case, the licensee was performing a 30-30-30 test using the testing protocol of ASTM D3803-1979 in lieu of the 25-80-25 test. On March 29, 1996, the NRC granted the emergency TS change to allow the 30-30-30 test.

On April 2, 1996, Duke Power Company requested an emergency TS change for the Oconee Nuclear Station. The systems involved were the reactor building purge, the spent fuel pool ventilation, and the penetration room ventilation. The TS for Oconee required the laboratory test of charcoal to be performed in accordance with ANSI N510-1975 and Method C of ASTM D3803-1979, which requires the performance of the test at 130 °C (266 °F) and 95 percent RH. However, the licensee was actually performing a 30-30-30 test using the test protocol of ASTM D3803-1989. The NRC granted an emergency TS change on April 2, 1996, to permit the 30-30-30 test.

In each of these cases, the test performed to demonstrate compliance with TS provided results that the staff considered closer to reflecting the capability of the charcoal than the test required by the TS. In addition, the licensees believed that using the newer standard would satisfy their TS requirement. Their bases for this belief were the limitations of the test referenced in RG 1.52, their interpretation of ANSI N509 as allowing the use of later versions of the test protocol, and some of the guidance provided by the NRC. In the case of Oconee, the test actually performed is the test that the staff believes is the appropriate one, ASTM D3803-1989. However, because these tests had not been conducted in compliance with the plant's TS, each licensee would have had to shut down its plant or remain in a cold-shutdown mode until the test required by the TS could be successfully performed, or until the TS were amended.

On March 21, 1996, Carolina Power & Light Company flew a charcoal sample from the Brunswick standby gas treatment system (SGTS) to its testing laboratory in Ohio for the performance of the 25-80-25 test to comply with the Brunswick TS before restart of an idle unit. The Brunswick TS required that the laboratory tests be performed in accordance with Revision 1 of RG 1.52. Previously, the licensee directed its testing laboratory to perform an

80-80-80 test. To perform the 25-80-25 test, the laboratory equilibrated the charcoal to 80 °C [176 °F] before introducing the challenge gas. The licensee has not requested a TS change for Brunswick to correct the problem and is awaiting guidance from the NRC.

As a result of the emergency TS changes, the staff has performed an internal survey of operating plant TS to determine whether other plants have the potential for similar problems with compliance. The survey indicated that at least one-third of operating reactor licensees may not be in compliance with their TS because they reference the flawed 25-80-25 testing protocol and may have used later versions of the standards for the laboratory tests of their nuclear-grade charcoal. On the basis of this survey, the staff established the following four groups of plants:

- (1) plants in compliance with their TS that test in accordance with ASTM D3803-1989
- (2) plants in compliance with their TS that test in accordance with a test protocol other than ASTM D3803-1989
- (3) plants not in compliance with their TS that test in accordance with ASTM D3803-1989
- (4) plants not in compliance with their TS that test in accordance with a test protocol other than ASTM D3803-1989

The licensees in Group 1 have TS that require charcoal to be tested in accordance with ASTM D3803-1989, which adequately demonstrates the capability of the charcoal. The licensees in Group 2 have TS that require charcoal to be tested in accordance with test standards other than ASTM D3803-1989. The licensees that received emergency TS changes were in Groups 3 and 4. Licensees in Groups 3 and 4 have TS that require charcoal to be tested in accordance with the 25-80-25 test.

SAMPLE TECHNICAL SPECIFICATIONS

For Plants With Improved Standard Technical Specifications

- C. Demonstrate for each of the ESF systems that a laboratory test of a sample of the charcoal adsorber, when obtained as described in [Regulatory Guide 1.52, Revision 2], shows the methyl iodide penetration less than the value specified below when tested in accordance with ASTM D3803-1989 at a temperature of 30 °C [86 °F] and the relative humidity specified below.

ESF Ventilation System	Penetration	RH
	see note below	see note below

Note: The use of any standard other than ASTM D3803-1989 to test the charcoal sample may result in an overestimation of the capability of the charcoal to adsorb radioiodine. As a result, the ability of the charcoal filters to perform in a manner consistent with the licensing basis for the facility is indeterminate.

ASTM D3803-1989 is a more stringent testing standard because it does not differentiate between used and new charcoal, it has a longer equilibration period performed at a temperature of 30 °C [86 °F] and a relative humidity (RH) of 95% (or 70% RH with humidity control), and it has more stringent tolerances that improve repeatability of the test.

$$\text{Allowable Penetration} = \frac{[100\% - \text{Methyl Iodide Efficiency}^* \text{ for Charcoal Credited In Licensee's Accident Analysis}]}{\text{Safety Factor}}$$

When ASTM D3803-1989 is used with 30 °C [86 °F] and 95% RH (or 70% RH with humidity control) is used, the staff will accept the following:

Safety factor \geq 2 for systems with or without humidity control.

Humidity control can be provided by heaters or an NRC-approved analysis that demonstrates that the air entering the charcoal will be maintained less than or equal to 70 percent RH under worst-case design-basis conditions.

*This value should be the efficiency that was incorporated in the licensee's accident analysis which was reviewed and approved by the staff in a safety evaluation.

For Plants With Older Technical Specifications

Each engineered safety features (ESF) ventilation system shall be demonstrated OPERABLE:

- a. At least once per 18 months or (1) after any structural maintenance on the HEPA filter or charcoal adsorber housings, or (2) following painting, fire, or chemical release in any ventilation zone communicating with the system by:
 - 1) Verifying, within 31 days after removal, that a laboratory test of a sample of the charcoal adsorber, when obtained in accordance with Regulatory Position C.6.b of Regulatory Guide 1.52, Revision 2, March 1978, shows the methyl iodide penetration less than [see note in preceding section titled “For Plants With Improved Standard Technical Specifications”]% when tested in accordance with ASTM D3803-1989 at a temperature of 30 °C [86 °F] and a relative humidity of [see note in preceding section titled “For Plants With Improved Standard Technical Specifications”]%.
- b. Within 31 days of completing 720 hours of charcoal adsorber operation, verify that a laboratory test of a sample of the charcoal adsorber, when obtained in accordance with Regulatory Position C.6.b of Regulatory Guide 1.52, Revision 2, March 1978, shows the methyl iodide penetration less than [see note in preceding section titled “For Plants With Improved Standard Technical Specifications”]% when tested in accordance with ASTM D3803-1989 at a temperature of 30 °C [86 °F] and a relative humidity of [see note in preceding section titled “For Plants With Improved Standard Technical Specifications”]%.

STAFF RESOLUTION OF PUBLIC COMMENTS RECEIVED
ON DRAFT GENERIC LETTER ENTITLED
“LABORATORY TESTING OF NUCLEAR-GRADE ACTIVATED CHARCOAL”
(FEDERAL REGISTER VOL. 63, No. 37, Doc. 98-4761)

The staff received 23 letters in response to the draft generic letter entitled “Laboratory Testing of Nuclear-Grade Activated Charcoal.” From the 23 letters, the staff identified 130 comments. Of these, 83 were repetitive, leaving 47 distinct comments. The following discussion provides the distinct comments received and the NRC staff’s response to these comments. The staff’s responses state clearly whether, and how, the generic letter was revised to reflect a particular comment. Appendix A provides a list of the 23 respondents and Appendix B provides a matrix showing which comments each respondent provided.

Comment 1: (NUCON International, Inc.)

This letter does not adequately address one of the ongoing problems that we face: the specifications for testing new charcoal are different from those for testing used carbon. Furthermore, we feel that the AG-1 code might be a more appropriate vehicle to address the charcoal testing problems (where ASTM D3803-1989 is invoked as a requirement) than the procedure of ASTM D3803-1989 alone, e.g., if the particular batch is for a system to be tested at 30 °C, 70 percent relative humidity (RH), would the new carbon be tested at 70 percent RH or 95 percent RH or both? Who would specify the choices? Current specifications for new carbon require "qualification" and "surveillance" tests. The NRC letter discusses only surveillance testing. What is the impact on currently required "qualification" tests?

Response:

The proposed generic letter addresses surveillance testing requirements for used charcoal. It was not intended to cover new charcoal qualification testing issues. The staff has determined that it would be more appropriate to incorporate the qualification testing comments in the next revision of Regulatory Guide 1.52.

Comment 2: (NUCON International, Inc.)

The explanation for the increase in iodine removal efficiencies at higher temperatures (discussed on page 9583 of the Federal Register notice) does not take into consideration the increased reaction rate that occurs as the temperature is increased, which is the cause of the increased iodine removal efficiencies.

Response:

The staff has **revised** the generic letter to more clearly explain that the iodine removal efficiency of the charcoal increases at higher temperatures because of the increased reaction rate at higher temperatures.

Comment 3: (Similar comments appeared in 14 individual letters)

The actions proposed by NRC could not be met within the proposed schedule. If adopted as proposed, the generic letter will require licensees to perform charcoal testing within 60 days of the date of the letter and to submit a revised technical specification to the NRC which invokes ASTM D3803-1989 as the test protocol, as required. As stated in the generic letter, only two commercial laboratories, NUCON and NCS Corporation, are available to perform such testing. If problems are encountered, the need to replace charcoal could overburden charcoal suppliers with multiple requests for charcoal. This will be in addition to the normal testing burden on the existing laboratories. Replacement of any activated charcoal adsorbers requires in-place bypass testing in accordance with Regulatory Position C.5.d of Regulatory Guide 1.52, Rev. 2. For many licensees, this requires field support from the same two

companies that perform the laboratory testing. This will be an additional strain on existing resources. Sixty days is insufficient time to withdraw sample trays, ship them to test labs, perform testing, fabricate or refill trays where needed, conduct receipt inspections, install new charcoal, conduct in-place testing, and return filter systems to service. Logistically, it will be impractical if not impossible for the licensees and the laboratories to meet the 60-day time frame imposed by the generic letter. It would be a more reasonable expectation to have each plant perform testing (i.e., ASTM D3803-1989 or other utility proposed testing) at the next scheduled charcoal sampling test date or within 180 days (or preferably one fuel cycle) of the date of the generic letter. A 180-day testing schedule is consistent with the safety significance of this issue. In addition, the proposed generic letter states that "the staff believes that most charcoal in use is not degraded to an extent that would adversely affect control room habitability or public health and safety." Providing a 180-day time frame for testing would allow sufficient time to implement the appropriate testing protocol. It should be noted that filter applications that are normally inaccessible during plant operation may require a unit shutdown in order for the testing to be performed. Further, the development of an alternate test protocol within 60 days as proposed by the generic letter would be virtually impossible. The time required to collect and evaluate the information necessary to address the 13 points required by the NRC to determine the acceptability of an alternate protocol would be much greater than the 60 days proposed in the generic letter. For sites that have submitted the Improved Technical Specifications (ITS) for NRC review, licensees should be allowed to incorporate the changes into their ITS, rather than revising their current Technical Specifications. The expanded implementation period is necessary to allow for testing laboratory backlog, charcoal availability for procurement and alternate train testing for the same system.

Response:

The staff has **revised** the generic letter to request licensees in Groups 2, 3, and 4 to test their charcoal at the next required laboratory surveillance test of a charcoal sample that is 60 or more days after the date of this generic letter. It is not the intent of this generic letter to cause plants to shut down. Therefore, if a plant must shut down to perform this testing, the licensee may seek relief from the time limits for testing specified in the generic letter (see response to Comment 24). If a plant has submitted the ITS and the ITS is scheduled to be completed within a year from the issue date of the generic letter, then the licensee may seek relief from the time limits for submittal of a technical specification amendment as specified in the generic letter. If a licensee has a specific problem that is not addressed by the generic letter, then the licensee may seek relief from the time limits specified in the generic letter.

Comment 4: (Similar comments appeared in 4 individual letters)

The last paragraph of "Requested Information" states that "the independent laboratory should not be engaged in the measurement of iodine penetration of charcoal as a business either for TS compliance purposes or for the sale and/or production of activated charcoal for nuclear power plant applications." While it is obvious that this requirement is to prevent a conflict of interest, it also increases the burden of finding an acceptable independent lab that is capable of performing the required tests and providing adequate quality assurance. The laboratories that currently perform testing to the ASTM standard should not be excluded from performing the qualification testing for new, proposed test protocols. These laboratories have extensive experience in testing nuclear-grade charcoal, have established quality assurance programs, and have the equipment and facilities to safely perform this testing. In addition, the extensive experience that these laboratories have gained by performing testing to the ASTM standard provides added assurance that the proposed test protocol will be evaluated accurately and objectively. By restricting the use of existing laboratories for test development, the alternate test protocol cannot be completed without setting up a new laboratory, which is cost prohibitive. If an alternate test protocol is proposed, the utility should be allowed access to the existing testing laboratories.

Response:

The staff has **revised** the generic letter to require the use of at least two laboratories in determining the acceptability of the alternate protocol. One laboratory should be used to develop the alternate protocol and the other to

demonstrate the repeatability and reproducibility of the alternate protocol. The two laboratories should be able to demonstrate that the alternate protocol is at least as conservative as ASTM D3803-1989, and should be able to perform the ASTM D3803-1989 test and achieve repeatable and reproducible results.

Comment 5: (NUCON International, Inc.)

As discussed on page 9585 of the Federal Register notice, the face velocity requirement in Requested Information Items 2 and 3 would also apply to systems that are more than 10 percent below 0.203 m/s [40 ft/min] as well.

Response:

The staff is mainly concerned with systems that have an as-built face velocity greater than the face velocity used to perform the laboratory charcoal sample test. The laboratory test will overestimate the capability of the charcoal when the charcoal is tested with a face velocity that is less than the face velocity to which the charcoal is actually exposed when installed in the system. This happens because as the velocity of the contaminated air passing through the charcoal filter is reduced, the amount of time (called residence time) the air is in contact with the charcoal increases, thus increasing the adsorption. Therefore, the staff did not revise the generic letter to specify 40 fpm \pm 10 percent.

Comment 6: (Similar comments appeared in 2 individual letters)

On page 9586 of the Federal Register notice, the statement is made that the ASTM D3803-1989 standard has two additional testing periods that are not required by other standards. The statement is also made that during the stabilization period, air at the test temperature is passed through the charcoal beds. This is not correct. During the stabilization period, the carbon is brought to thermal equilibrium with the test temperature. The erroneous Federal Register statement could be misinterpreted and should be revised to agree with Section 12.1 of ASTM D3803-1989. The duration of this stabilization period is recommended to be a minimum of 2 hours, during which the canisters and the carbon must come to thermal equilibrium at the specified test temperature.

Response:

The staff has **revised** the generic letter to correctly specify that during the stabilization period the carbon is brought to thermal equilibrium with the test temperature to agree with Section 12.1 of ASTM D3803-1989. In addition, the generic letter has been **revised** to specify that the duration of this stabilization period is recommended to be a minimum of 2 hours, during which the canisters and the carbon must come to thermal equilibrium at the specified test temperature.

Comment 7: (Similar comments appeared in 2 individual letters)

On page 9587 of the Federal register notice, the statement is made that charcoal retains about 40 weight percent water at 30 °C and 95 percent RH and 2–3 weight percent at 80 °C and 95 percent RH. These values are incorrect. Typically 24–25 weight percent water is adsorbed at 30 °C and 95 percent RH (see ASTM D3803-1989 A5 and Figure 1, EGG-CS-7653); experience in our lab has shown that 19–20 weight percent water is adsorbed at 80 °C and 95 percent RH. This amount of water is nearly equivalent to the amount adsorbed at 30 °C and 70 percent RH and probably explains in large part why the methyl iodide efficiency is typically 99.9 percent for both the 30/70 and 80/95 (again see ASTM D3803-1989 A5 and Figure 1, EGG-CS-7653).

Response:

The staff has **revised** the generic letter to correctly specify that charcoal retains about 24–25 weight percent water at 30 °C and 95 percent RH and 19–20 weight percent water at 80 °C and 95 percent RH.

Comment 8: (NUCON International, Inc.)

On page 9587 of the Federal Register notice, the statement is made that the longer equilibration time is representative of the conditions "expected during design base conditions;" this is not correct in terms of the purpose of ASTM D3803-1989. This method is sensitive to the condition of the charcoal for radioactive methyl iodide removal but is not necessarily related to expected conditions.

Response:

The staff has **revised** the generic letter to correctly specify that the longer pre-equilibration time is more conservative because it will completely saturate the representative charcoal sample which ensures reproducibility of the results by having every charcoal sample begin the test at the same initial conditions.

Comment 9: (Similar comments appeared in 5 individual letters)

The approach taken in the proposed generic letter is a very conservative "one size fits all" approach without a thorough evaluation of the plant-specific design-basis. Performance of this testing, while conservative, may exceed, or not be representative of, the design basis for various filter applications. The draft generic letter would require filter testing at 30 °C according to the ASTM D3803-1989 protocol. These conditions would be viewed as generally representative of conditions for filters located outside of containment. On the basis of expected accident conditions, filter units located inside containment would be expected to operate at temperatures on the order of 130 °C when required to be in service. Accordingly, ASTM D3803-1989, when performed at 30 °C, is not representative of design operating conditions inside containment. The proposed test would be overconservative compared to a test at higher temperatures representative of conditions inside containment. On the basis of the foregoing, the scope of a final generic letter should, therefore, be restricted to outside containment applications only.

Response:

TMI Action Item III.D.3.4, "Control Room Habitability," required that licensees analyze all design-basis accidents with regard to control room operator doses (GDC 19). A temperature of 30 °C is more appropriate than 130 °C for design-basis accidents such as a fuel handling accident inside containment. Therefore, testing the charcoal samples at 30 °C is bounding for all design-basis accident conditions. The staff has determined that if credit is taken for the containment recirculation charcoal filters in the plant's design-basis dose analysis, the charcoal should be tested in accordance with ASTM D3803-1989. ASTM D3803-1989 is the only available test that (1) provides a reproducible standard test method for determining the quality of the charcoal and (2) provides the ability to adequately discriminate between good and bad charcoal. If the containment recirculation charcoal filters are not needed to meet 10 CFR Part 100 and GDC 19 dose limits, the licensee can, if it desires, provide the staff with a revised dose analysis without taking credit for the containment recirculation charcoal filters. The staff has previously approved this for several plants. The staff has **revised** the generic letter to state that if a licensee chooses to test its charcoal samples at actual accident conditions which are different from the test conditions specified in ASTM D3803-1989, then that test should be treated as an alternate protocol.

Comment 10: (Similar comments appeared in 2 individual letters)

On page 9585 of the Federal Register notice, Requested Information Item 2, the statement is made that plants adopting the ASTM D3803-1989 protocol are required to submit certain information regarding test parameters to support a TS amendment. In adopting the ASTM D3803-1989 protocol, certain conditions of the protocol are accepted as variables by the Commission. While the Commission is correct in requiring information on test parameters that may vary from plant to plant, e.g., relative humidity and face velocity, requesting the test temperature implies that this parameter is also a variable, which it is not. The test temperature of 30 °C is the only acceptable temperature. In order for the Commission to fully evaluate TS amendment requests, we believe the

variable of test bed thickness should be included in the list of requested information since bed thickness affects gas residence time in the bed as does face velocity. The penetration at which the proposed TS will require the test to be performed should specify the actual bed thickness for which credit is taken.

Response:

The proposed generic letter requests the test temperature because Annex A5 of ASTM D3803-1989 states that nuclear facilities that have different operating conditions may use a test temperature other than 30 °C. Therefore, the staff has determined that it is necessary to specify a temperature of 30 °C because test temperatures other than 30 °C are not acceptable. Regarding the test bed thickness, the staff has **revised** the generic letter to request the charcoal bed thickness.

Comment 11: (Similar comments appeared in 2 individual letters)

On pages 9588 and 9589 of the Federal Register notice (“Sample Technical Specifications”), the statement is made that when referring to ASTM D3803-1989 and the required test relative humidity and temperature, the term greater than or equal to and the symbol for less than or equal to are used. A temperature of 30 °C and relative humidity of 95 percent or 70 percent should be specified without the use of this symbol or term. Allowing changes in test temperature and humidity, albeit in a conservative direction, effectively changes the method and is contrary to NRC/INEL developmental work.

Response:

The staff has **revised** the sample technical specifications in the generic letter to remove the “greater than or equal to” and “less than or equal to” terms and to just state “at a temperature of 30 °C and a relative humidity of 95 percent (or 70 percent with humidity control).”

Comment 12: (Similar comments appeared in 4 individual letters)

An oral request for an extension of the public comment period to better understand and respond to the complexities of this issue was denied by the NRC staff. This short comment period has hindered the ability of the industry to fully explore the merits of the technical proposals in the proposed generic letter. We recommend that future public comment periods be a minimum of 45 days, consistent with the safety significance and resource impact of the issue.

Response:

The 30-day public comment period for this generic letter is commensurate with the staff’s policy (Section 6.25 of Generic Communications Branch Procedure No. 1, Revision 1, “Processing of Proposed Generic Communications”) regarding the length of the public comment period for generic letters and is therefore adequate for this proposed generic letter. However, comments received by the staff as late as 90 days after the proposed generic letter was published in the Federal Register for public comment were considered.

Comment 13: (Similar comments appeared in 11 individual letters)

We believe the regulatory process was not followed properly. The proposed new generic requirement and staff position has not been justified by an appropriate regulatory analysis.

The Federal Register backfit discussion characterizes the requested actions as necessary to demonstrate compliance. In examining the issues involved, we conclude this is an incorrect application of the compliance exception provision of the Backfitting Rule, 10 CFR 50-109. Paragraph (a)(1) of §50.109 states that “[b]ackfitting is defined as the modification of or addition to systems, structures, components... or the procedures... required to design, construct or operate a facility; any of which may result from a new or amended provision in the Commission

rules or the imposition of a regulator staff position interpreting the Commission rule that is either new or different from a previous applicable staff position ..."
[underline added for emphasis].

The NRC previously established "a regulatory staff position interpreting the Commission rule" when it approved licensee test methods documented in plant technical specifications or accepted other licensee commitments. These approved test methods were deemed by the NRC at the time to be in compliance with the regulatory requirements cited in the proposed generic letter. In accordance with 10 CFR 50.109(a)(3), the NRC staff must demonstrate a significant safety improvement relative to the costs to be incurred by licensees before imposing the improved ASTM test method.

Response:

The NRC has decided that the generic letter is a backfit, but the Section 50.109(a)(3) finding need not be demonstrated in a backfit analysis because the NRC considers the generic letter to be a compliance backfit pursuant to Section 50.109(a)(4)(i). The staff's position is that the licensees are required to demonstrate compliance with the dose limits of GDC 19 of Appendix A to 10 CFR Part 50 as incorporated in their licensing basis either during initial plant licensing or as a result of TMI Action Item III.D.3.4. The staff identified as early as 1987 (Information Notice 87-32) that problems existed with charcoal laboratory testing methods used to demonstrate compliance with the dose limits of GDC 19 and Part 100. The proposed generic letter provides additional evidence that existing test protocols other than ASTM D3803-1989 do not provide accurate and reproducible test results and therefore do not ensure compliance with the dose limits of GDC 19 and Part 100.

Comment 14: (Similar comments appeared in 5 individual letters)

The proposed generic letter identifies that "based on the available laboratory test results, the staff believes that most charcoal in use is not degraded to an extent that would adversely affect control room habitability or public health and safety." Since the result of the proposed change in testing methodology is not expected to uncover that the currently installed systems would not be able to perform their design function, the revised testing methodology is not required for compliance with 10 CFR 100 or GDC 19, nor is it expected to result in a significant safety benefit.

Response:

The quoted paragraph states that "most" charcoal is not degraded. However, on the basis of available laboratory test results, the staff also believes that there are a group of plants with degraded charcoal and the required test in their technical specifications is ineffective in identifying the degradation. As a result, these plants are not in compliance with 10 CFR Part 100 or GDC 19 dose limits. Although the staff believes today that most charcoal is not significantly degraded, it is essential to use reliable and reproducible test standards to identify future degradation of the charcoal. Therefore, this generic letter is necessary.

Comment 15: (Similar comments appeared in 5 individual letters)

The purpose of crediting charcoal in the licensing basis is to filter volatile forms of iodine (i.e., elemental and organic). Current Regulatory Guides 1.3 and 1.4 assume 95 percent of iodine to be this type. NUREG-1465 stated that where pH is controlled at values of 7 or greater within the containment, elemental iodine can be taken as comprising no more than 5 percent of the total iodine released, and iodine in organic form may be taken as comprising no greater than 0.15 percent of the total iodine released. Thus, the elemental and organic iodine releases are over an order of magnitude less than those obtained with the existing licensing source term. This greatly reduces the safety significance of charcoal filtration.

Operating plants (i.e., pilot plants) have submitted revised source term analyses to NRC that meet dose limits with no credit for charcoal filtration. In addition to the operating plant analyses, NRC has certified the System 80+ Advanced Light Water Reactor (ALWR) with no credit for the charcoal filters in the annulus filtration system. On the basis of the NUREG-1465 information and these operating plant and ALWR applications, TVA notes that requirements for additional charcoal testing are unlikely to have any safety significance. Consequently, the need for this generic letter is not clear.

Response:

Revised (NUREG-1465) source term rebaselining efforts are almost complete. The combination of the revised chemical form of the source term in NUREG-1465 and the proposed change in the dose limits (TEDE) deemphasizes the importance of charcoal filtration. The results from the revised source term rebaselining seem to indicate that for some plants that adopt the NUREG-1465 source term and the TEDE dose limits, charcoal filtration may not be necessary, but this would need to be reviewed on a case-by-case basis. Although the chemical form of iodine distribution has changed, the major component of the release from containment remains organic after sprays, suppression pools, and ice condensers have performed their function. Therefore, if charcoal adsorption is required to meet the dose limits, then it is important to adequately test the charcoal because organic will be the form to remove. In addition, for certain accidents which are not impacted by the revised source term (e.g. fuel handling accident, main steam line break, and steam generator tube rupture) the chemical forms to be released are principally organic which may need to be adsorbed by the charcoal in the control room emergency ventilation system and the fuel handling building ventilation system to meet the dose limits. Also, for plants that continue to use the TID-14844 source term, charcoal in ESF filtration systems will still be needed to meet the dose limits of GDC 19 and Part 100.

Comment 16: (Similar comments appeared in 4 individual letters)

As stated in the proposed generic letter, many of the current problems occurred as the result of "conflicting guidance" and "complex and ambiguous" standards. Therefore WPSC strongly encourages the staff to revise Regulatory Guide 1.52, the Standard Review Plan, HPPOS-069, and NUREG-1431 before it issues the proposed generic letter. Revising the guidelines first will provide licensees with clear and consistent guidance.

Response:

As required by the Staff Requirements Memorandum dated February 5, 1998, the staff has developed plans to expedite its revision of the regulatory guidance applicable to the testing of safety-related charcoal. This work will not be completed before the generic letter is issued because laboratory testing of charcoal filters is only a small portion of the changes that need to be made to the regulatory guidance. However, NUREGs 1430–1434 will be revised following the issuance of the generic letter to reflect the sample technical specification that appears in Enclosure 2 of the generic letter.

Comment 17: (Entergy Operations, Inc.)

The lessons learned from the regulatory box that the NRC describes (e.g., the utilities being prevented from using improved testing methods) should be addressed in a more comprehensive manner than just addressing this isolated issue. As discussed in the proposed generic letter, the NRC requires licensees to spell out the specific methods of filter testing in their Technical Specifications. The specific methods for performing surveillances are not generally contained in the Technical Specifications. The inclusion of the detailed requirements for filter testing places excessive burdens on licensees and the NRC staff and should be removed to allow licensees to apply improved methods.

Response:

As a result of the past and present confusion regarding appropriate laboratory testing requirements, the staff has determined that the detailed requirements for charcoal filter testing need to be included in the technical specifications to clarify what the NRC staff has found acceptable. For plants converting to the improved standard technical specifications (ITS), the charcoal laboratory testing requirements are in the Administrative Section of the ITS as part of the ventilation filter testing program rather than being provided as a specific surveillance requirement as in older technical specifications. By moving these and other testing requirements to the Administrative Section of the ITS, the staff has significantly reduced the amount of specific methods provided in the Surveillance Section.

In light of the lessons learned from the charcoal filter testing issue, the NRC staff has been sensitized to and will focus on other generic testing issues.

Comment 18: (Similar comments appeared in 5 individual letters)

To improve the efficiency of the regulatory process, licensees and NRC should assess the issues highlighted in the proposed generic letter in concert with the related issues of control room habitability, other emergency ventilation systems, and revised source term insights. Because this issue has low safety significance, and because of the lack of evidence that those licensees using charcoal test standards other than the ASTM D3803-1989 standard are not in compliance, further dialogue is appropriate before finalizing any generic request for information. We recommend that a joint NRC-industry workshop be conducted. This would permit a more comprehensive discussion of NRC and industry concerns as they relate to charcoal test methodologies, control room habitability, other emergency ventilation systems, and application of the revised source term. Any new NRC staff guidance or positions should only be established after an integration of the relevant technical test performance and risk insights.

Response:

The staff met with representatives from NEI and NHUG on May 7, 1998, to discuss this public comment and it was decided that a specific workshop concerning charcoal filter testing would not be the most efficient use of industry and NRC resources. However, it was decided that the generic letter would be discussed at the NRC/NEI/NHUG Workshop on Control Room Habitability on July 16, 1998, at the 25th DOE/NRC Nuclear Air Cleaning and Treatment Conference on August 3–6, 1998, and at the Summer '98 NHUG Conference on August 6–7, 1998.

Comment 19: (Arizona Public Service Company)

The third bullet of paragraph 9 of "Discussion" requires licensees to submit an amendment request to their technical specifications. Implied in this bullet is that licensees are required to amend their technical specifications to reference ASTM D3803-1989. Clarification should be provided to state that this amendment request may propose an alternative test protocol.

Response:

The staff has **revised** the third bullet of paragraph 9 of the "Discussion" section of the generic letter to clarify that the amendment request may propose an alternate test protocol.

Comment 20: (Similar comments appeared in 2 individual letters)

We believe the generic letter should include a statement in all sections indicating that the ASTM D3803-1989 testing can be performed at 70 percent RH in lieu of 95 percent RH if the design bases of the ESF system includes humidity control in the form of duct heaters or design analysis justification that the air is maintained less than or equal to 70 percent RH without the use of duct heaters.

Response:

The staff has **revised** Enclosure 2 of the generic letter to clarify its position on humidity control. The staff's position is that plants whose design basis includes an NRC-approved analysis that demonstrates that the air entering the charcoal is maintained at less than or equal to 70 percent RH without the use of heaters and under worst-case design-basis conditions can test their charcoal at 70 percent RH.

Comment 21: (Arizona Public Service Company)

Paragraph 7 of "Discussion" states that the staff has previously approved reductions in the safety factor for plants adopting ASTM D3803-1989 on a case-by-case basis. Generic guidance should be provided that outlines the NRC-accepted criteria used to allow reductions in the safety factor so that facilities may implement the reduced safety factor, if appropriate, without having to obtain prior NRC approval.

Response:

The use of the safety factor is discussed in paragraph 7 of the "Discussion" section as well as in the sample technical specification note provided in Enclosure 2. However, prior NRC approval is still required. The staff has **revised** the generic letter to clarify the appropriate use of the safety factor by providing a reference in paragraph 7 of the "Discussion" section to the sample technical specification note provided in Enclosure 2.

Comment 22: (Southern California Edison)

The generic letter should include more detail in all sections on how to apply the safety factor of 2 for determining the acceptance criteria for charcoal removal efficiency. For example, if the licensee's design removal efficiency is 95 percent as specified in Table 2 of Regulatory Guide 1.52, Revision 2, 1978, and ASTM D3803-1989 is used for laboratory testing of charcoal, the acceptance criteria can be 97.5 percent. This acceptance criterion can be calculated as follows:

$$\begin{aligned} \text{Acceptance Criterion} &= \text{Design Bases Removal Efficiency (DBRE)} + (100 - \text{DBRE}) / \text{SF} \\ &= 95 + (100 - 95) / 2.0 \\ &= 95 + 2.5 \\ &= 97.5 \text{ percent} \end{aligned}$$

(SF = Safety Factor = 2.0)

Response:

The use of the safety factor is discussed in paragraph 7 of the "Discussion" section as well as in the sample technical specification note provided in Enclosure 2. In addition, the formula for calculating the acceptance criterion appears in the sample technical specification note in Enclosure 2. The staff has **revised** the generic letter to clarify the appropriate use of the safety factor by referring in paragraph 7 of the "Discussion" section to the sample technical specification note in Enclosure 2.

Comment 23: (Virginia Power)

The proposed generic letter indicates that ASTM D3803-1989 is the test method of choice. This test uses methyl iodide to test the charcoal adsorbers for efficiency in removing organic iodine. Basing acceptance criteria on methyl iodide retention may not ensure compliance with existing accident analyses where inorganic (elemental) iodine retention in adsorbers is the limiting factor. Depending on plant design, some accident analyses assume higher elemental iodine removal filter efficiency than that of organic iodine. In other accident analysis cases, only elemental

iodine filtration is credited. Using the ASTM D3803-1989 testing methodology has an implicit assumption that organic iodine is the controlling element and that elemental iodine is removed at a higher rate than organic iodine. This may not be applicable to all plants. On the basis of discussions with vendors, test laboratories, and our review of the existing test data, we do not believe that it is possible to draw a correlation between organic and inorganic retention for all retention percentages which are contained in current accident analyses. ASTM D3803-1989 does not evaluate the removal efficiency for elemental iodine. Therefore, we believe that an alternate test may be required to determine the removal efficiency for elemental iodine.

Response:

Particulate and elemental forms of iodine are anticipated to be aggressively removed through the use of sprays, suppression pools, ice condensers, and spent fuel pool water. Therefore, the form of iodine that is anticipated to require treatment by ESF filtration systems is organic. The staff has determined that all charcoal should be tested in accordance with ASTM D3803-1989 because it is the only available test that (1) provides a reproducible standard test method for determining the quality of the charcoal and (2) provides the ability to adequately discriminate between good and bad charcoal. ASTM D3803-1989 is a very stringent and reliable measure of the ability of charcoal to fulfill its intended purpose, i.e., to remove radioiodine in any chemical form from air within a nuclear power plant. The specified test conditions cannot cover the diverse conditions encountered by the variety of charcoal applications within power plants under normal and emergency operations. Attempts to predict charcoal performance based on simulations of the myriad number of hypothesized accident conditions have only led to chaos for both the test specifications and the regulatory acceptance criteria employed. This confused situation has led to enormous inequities for the nuclear power industry by allowing some plants to retain seriously degraded or "spent" charcoal while requiring others to replace acceptably good charcoal frequently. To remedy this situation, licensees should adopt the ASTM D3803-1989 standard test method.

Comment 24: (Similar comments appeared in 6 individual letters)

Calvert Cliffs currently tests all of the nuclear-grade activated charcoal used outside of the containment buildings in accordance with ASTM D3803-1989, and our Technical Specifications reference ASTM D3803-1989. We test the nuclear-grade activated charcoal used in the containment iodine filter trains in accordance with the same ASTM, with exceptions for temperature, species of iodine, and pressure to more closely reflect the actual post-accident conditions in our containment buildings. Testing the containment iodine filter trains using the temperatures, pressures, and species of iodine as required by the ASTM D3803-1989, without exceptions, would require Calvert Cliffs to replace the charcoal currently in the iodine filters at a cost of approximately \$300,000 for all six filters. The replacement of the charcoal also requires that the unit be off line and shut down, creating substantial lost revenues. We feel that none of these actions create a commensurate increase in the health and safety of the public. Calvert Cliffs and similarly designed plants should not be subject to the proposed generic letter.

Response:

The staff has determined that if credit is taken for the containment recirculation charcoal filters in the plant's design-basis dose analysis, the charcoal should then be tested in accordance with ASTM D3803-1989. ASTM D3803-1989 is the only available test that (1) provides a reproducible standard test method for determining the quality of the charcoal and (2) provides the ability to adequately discriminate between good and bad charcoal. If the containment recirculation charcoal filters are not needed to meet 10 CFR Part 100 and GDC 19 dose limits, then the licensee should give the staff a revised dose analysis without taking credit for the containment recirculation charcoal filters. The staff has previously approved this for several plants and will entertain such a request in response to this generic letter.

It is not the intent of this generic letter to cause plants to shut down. Therefore, if a plant must shut down to perform this testing, then the licensee may seek relief from the time limits for testing specified in the generic letter (see response to Comment 3).

Comment 25: (Similar comments appeared in 5 individual letters)

The proposed generic letter identifies several actions the NRC expects licensees to undertake to increase confidence that they comply with their plant's licensing bases relating to the dose limits of General Design Criterion (GDC) 19 of 10 CFR Part 50 Appendix A and 10 CFR Part 100, Subpart A. These actions include changes to plant Technical Specifications and testing of charcoal samples in accordance with American Society for Testing and Materials (ASTM) D3803-1989, "Standard Test Method for Nuclear-Grade Activated Carbon." The role of a generic letter is to gather or disseminate information, not to impose new requirements. Therefore, the proposal is an inappropriate use of the generic letter process. It should not be issued until comments are carefully considered and resolved.

Response:

NRC Inspection Manual Chapter 0720, "NRC Generic Communications Regarding Nuclear Issues," specifies that a generic letter is a type of generic communication that

1. Requests that analyses be performed or descriptions of proposed corrective actions be submitted regarding matters of safety, safeguards, or environmental significance. The licensees may be asked to accomplish the actions and report their completion by letter with or without prior NRC approval of the action. Information relating to these analyses may be requested on a voluntary basis or in accordance with Section 182a, Atomic Energy Act of 1954, as amended, and 10 CFR 50.54(f). Usually, this type of generic letter requests new or revised licensee commitments or other continuing actions, but may not explicitly or coercively solicit licensee commitments.
 - The proposed generic letter requests that licensees test their charcoal in accordance with a different test standard (ASTM D3803-1989) than the one currently specified in their technical specifications.
2. Requests licensees to submit technical information which NRC needs to perform its function. The information may be requested on a voluntary basis or in accordance with Section 182a, Atomic Energy Act of 1954 as amended, and 10 CFR 50.54(f).
 - The proposed generic letter requests that licensees submit specific laboratory test parameter information.
3. Requests or provides the opportunity to licensees to submit proposed changes to technical specifications.
 - The proposed generic letter requests that licensees submit a technical specification amendment requiring testing of charcoal in accordance with the ASTM D3803-1989 standard or propose an alternate test protocol.
4. Provides staff technical or policy positions not previously communicated or broadly understood.
 - The proposed generic letter reiterates the staff position that testing charcoal to the previous, NRC-endorsed ASTM D3803-1979 standard does not provide the needed assurance that licensees are complying with their respective, plant licensing bases as they relate to the dose limits of General Design Criterion 19 of Appendix A to 10 CFR Part 50, and Subpart A of 10 CFR Part 100. This information was previously conveyed to licensees in Information Notice 87-32. The proposed generic letter endorses ASTM D3803-1989 as an acceptable charcoal testing protocol for verifying compliance with plant licensing bases.

Therefore, the staff has determined that the proposed generic letter is an appropriate use of the generic letter process.

Comment 26: (Nuclear Energy Institute)

The draft generic letter permits licensees to propose alternate test protocols for laboratory testing of charcoal in lieu of using the ASTM D3803-1989 standard. But, the NRC staff guidance is that any alternate protocol is to be compared to ASTM D3803-1989. The evaluation of an alternate test method should be based on its ability to assure that the licensing basis is satisfied, which is not necessarily the same performance criterion as that contained in the 1989 standard.

Response:

If a licensee proposes an alternate test protocol, then the NRC staff expects that the alternate test protocol be subjected to the same rigorous program that was essential in the development of ASTM D3803-1989 (see response to Comment 4).

Comment 27: (Similar comments appeared in 4 individual letters)

The staff cites test results showing that testing to ASTM D3803-1989 produces more accurate measures of charcoal performance. Requiring utilities to submit test results has no value since NRC has already reached a determination about the unsuitability of testing to earlier test standards. The requirement to supply test results showing the charcoal is tested to the ASTM D3803-1989 standard should be deleted. This would reduce the burden of the generic information request without reducing the level of protection afforded the public. Additionally, if filter systems have been recently filled with new charcoal that was tested to the 1989 standard by the manufacturer, additional testing and submission of results should not be required. See Requested Action 2 (i).

Where licensees have tested to ASTM D3803-1989, the results are either satisfactory or the charcoal is replaced with new charcoal which has passed ASTM D3803 1989 tests. Requiring submittal of test results is an unnecessary expense that should be deleted. Submittal of test results should only be required where the licensee proposes an alternative to NRC-approved test methods (ASTM D3803-1989).

Response:

The staff has **revised** the generic letter to not require licensees to provide test results. Additional testing will not be required because testing will be performed at the next required laboratory surveillance test. (See response to Comment 3.)

Comment 28: (Similar comments appeared in 3 individual letters)

The Paper Reduction Act Statement estimates the public reporting burden for this mandatory information collection to be 40 hours per response. The generic letter does not provide the basis for this conclusion. A more accurate estimate of the burden to perform the actions requested is on the order of 100 to 400 man-hours per response.

Response:

The staff has **revised** the generic letter to clarify that the public reporting burden for this mandatory information collection is 250 hours per response.

Comment 29: (Nuclear Energy Institute)

Federal Register notice, page 9588, fourth paragraph states that ANSI N510-1975, requires performance of the 25-80-25 test. This test is not a requirement of ANSI N510-1975. Section 13.3 of the ANSI standards requires test of adsorbent samples to be performed in accordance with Table 4 of RDT M 16- 1T, "Gas-Phase Adsorbents for Trapping Radioactive Iodine Compounds." The October 1973 edition of the RDT standard is listed in the references section of the ANSI standard. Table 4 of the RDT does not specify performance of the 80 °C test. Only tests for either I₂ or methyl iodide performed at 130 °C and 25 °C are required. The 25-80-25 test is required by the 1976 edition of ASTM N509-76 and Revision 1 of Regulatory Guide 1.52.

Response:

The staff has **revised** Enclosure 1 of the generic letter to clarify that the TS for Oconee required the laboratory test of charcoal to be performed in accordance with ANSI N510-1975 and Method C of ASTM D3803-1979, which requires the performance of the test at 130 °C (266 °F) and 95 percent RH.

Comment 30: (Similar comments appeared in 4 individual letters)

Omaha Public Power District (OPPD), as the licensee for Fort Calhoun Station, endorses the comments on this issue provided by the Nuclear Energy Institute (NEI) in a letter dated March 27, 1998. In addition, OPPD estimates the cost of Fort Calhoun Station compliance with the proposed GL at approximately \$1,000,000. This and the costs incurred by other licensees do not seem justifiable under the Backfitting Rule.

Response:

Whether licensees test their charcoal in accordance with the test standard required by their current technical specifications or with ASTM D3803-1989, there is no difference in the cost of performing the test. However, charcoal that can no longer protect the public or the control room operators during an accident will have to be replaced with new charcoal, as it should be. The staff does not believe that charcoal will have to be changed out more frequently as a result of testing in accordance with the more stringent and reproducible ASTM D3803-1989 test standard because of the reduction of the safety factor proposed in the generic letter. The actions requested in the proposed generic letter are considered compliance backfits under the provisions of 10 CFR 50.109 in order to ensure compliance with the plant's licensing basis as it relates to the dose requirements of GDC 19 and Part 100, including commitment to the resolution of TMI Action Plan Item III.D.3.4. In accordance with the provisions of 10 CFR 50.109(a)(4)(i), regarding compliance backfits, a full backfit analysis is not required. Most of Fort Calhoun's expense stems from the containment recirculation systems. See Comment 24 regarding possible removal of containment recirculation systems.

Comment 31: (Similar comments appeared in 2 individual letters)

New York Power Authority stated that "the backfit discussion in the Federal Register notice concludes that because the NRC issued orders confirming licensees' commitments to modify control room ventilation systems, all licensees are required to meet the dose requirements of GDC 19. The accuracy of this statement cannot be confirmed without a complete and thorough review of all confirmatory orders associated with NUREG-0737, TMI Action Plan Item III.D.3.4. Absent an explicit commitment and confirmatory orders to the contrary, plants with construction permits issued before May 21, 1971 (like Indian Point 3 and FitzPatrick) are pre-GDC plants (see NRC memorandum, S. J. Chilk to J. M. Taylor, September 18, 1992, regarding SECY-92-233, "Resolution of Deviations Identified During the Systematic Evaluation Program")." However, Duquesne Light Co. stated that "we agree that GDC 19 is a regulatory requirement for all licensees."

Response:

TMI Action Item III.D.3.4, "Control Room Habitability," required that all plants meet the dose limits of GDC 19 of Appendix A to 10 CFR Part 50. Confirmatory orders were issued to licensees to ensure that they addressed TMI Action Item III.D.3.4. This resulted in the GDC 19 dose limits becoming part of their licensing bases.

Comment 32: (Similar comments appeared in 4 individual letters)

The use of enforcement discretion is addressed in the proposed generic letter, but it only addresses discretion with respect to the test methodology used. The proposed enforcement discretion would permit use of American Society for Testing and Materials (ASTM) D3803-1989, regardless of what testing standard the TS currently specify. The discussions of enforcement discretion should be expanded to also state that discretion will apply to the test acceptance criteria (to permit acceptance criteria consistent with those that will be approved in subsequent TS changes, and that are appropriate criteria for use when testing to ASTM D3803-1989).

If the enforcement discretion is not expanded to include use of the more appropriate acceptance criteria, two possible types of unnecessary burden may be placed on licensees:

- 1. Licensees may choose to accept the NRC recommendation to test using the more conservative testing methodologies of ASTM D3803-1989. Without the expanded enforcement discretion, these plants would need to meet the acceptance criteria in the existing TS. As stated by the NRC in the proposed generic letter, the existing acceptance criteria typically have a safety margin of between 5 to 7 to address testing uncertainties and to allow for some degradation of the charcoal between tests. As also noted, when testing to the more conservative ASTM D3803-1989 standard, the NRC will be approving TS acceptance criteria with a safety margin of 2. If plants that test to ASTM D3803-1989 are required to meet their existing acceptance criteria (in the interim period until a TS change is approved by the NRC), it is likely that charcoal that would pass the test following receipt of the license amendment might fail the interim criteria. This result would lead to unnecessary replacement of charcoal.*
- 2. Licensees may choose to continue to test using the testing methodology specified in existing TS (in order to remain a Group 2 plant as described in the GL, i.e., plants that do not need enforcement discretion because they are continuing to test in accordance with their TS, but their TS do not specify ASTM D3803-1989). If these Group 2 plants also perform parallel testing in accordance with ASTM D3803-1989 in order to meet the intent of the NRC recommendation, they will be forced to perform two tests instead of one. For plants such as the Perry Nuclear Power Plant, that have TS ventilation systems that are run on a continuous basis, this dual testing would need to be performed on a monthly basis.*

This imposes additional, unnecessary costs for the dual sample testing, a reduction in available sample containers, extra carbon replacement, and additional burden on the testing facilities.

The expansion of the enforcement discretion and the resulting avoidance of unnecessary burden on licensees as described above are consistent with the NRC Principles of Good Regulation. Under the heading "Efficient," as noted within the NRC Principles of Good Regulation, is the statement: "The American taxpayer, the rate-paying consumer, and licensees are all entitled to the best possible management and administration of regulatory activities. Where several effective alternatives are available, the option which minimizes the use of resources should be adapted."

Response:

For Part 1 of this comment, the staff has **revised** the generic letter to specify that the results should meet the acceptance criterion that is derived from applying a safety factor as low as 2 (see the note in Enclosure 2) to the

charcoal filter efficiency assumed in the licensee's design-basis dose analysis. For Part 2 of this comment, see the staff's response to Comment 36.

Comment 33: (Nuclear Utility Backfitting & Reform Group—NUBARG)

The alternative to adopting ASTM D3803-1989 is not a real alternative. It is a transparent attempt to force licensees to adopt a new standard selected by the NRC staff. Having previously licensed facilities based on other standards and where the licensee demonstrated conformance with the dose requirements of GDC 19, Part 100, and resolved TMI Action Plan Item III.D.3.4, the retroactive imposition of a new testing standard for activated charcoal is impermissible. By its very terms, the alternative testing protocol called for by staff does not provide a real alternative to ASTM D3803-1989 for licensees. Under Section 50.109(a), this action is impermissible unless the appropriate backfitting analysis has been completed.

Response:

The NRC has decided that the GL is a backfit, but the Section 50.109(a)(3) finding need not be demonstrated in a backfit analysis because the NRC considers the GL to be a compliance backfit pursuant to Section 50.109(a)(4)(i). (see response to comment 13). With respect to the issue of a real alternative, the generic letter is not intended by the NRC staff to mandate the use of ASTM D3803-1989 by licensees; a licensee may propose an alternative test protocol to demonstrate charcoal filter functionality. However, if a licensee proposes an alternative test protocol, then the NRC staff expects that the technical adequacy of the alternate test protocol be demonstrated using the same rigorous program that was essential in the development of ASTM D3803-1989.

Comment 34: (Tennessee Valley Authority)

On page 9584 of the Federal Register notice, NRC discusses the factor of safety that can be applied when using the new test methodology. Allowance should be made for plants that replace installed charcoal at specified intervals (approximately 5-year intervals), which coincide with the qualified life of charcoal trays. These programmed replacement intervals provide assurance that the charcoal will not degrade below values assumed in accident analysis when tested within the frequencies provided in the Technical Specifications (TS).

Response:

The replacement of the charcoal at certain intervals is an option available to all licensees but is not a requirement. The generic letter already proposes to reduce the safety factor from a value of 5 or 7 in accordance with Regulatory Guide 1.52 to a value of 2. Any further reductions in the safety factor will not provide assurance that the charcoal filter efficiency assumed in the accident analysis will still be valid at the end of the operating cycle. Therefore, the generic letter will not be revised.

Comment 35: (Tennessee Valley Authority)

Requested Action 1 should be clarified to state that for plants that already test to ASTM D3803-1989 and whose TS already reference the standard "no TS amendment and no additional testing is required." Without this clarification, the generic letter could be interpreted to require testing within 60 days for all plants. This proposed revision would be consistent with the "Response Requested" section, which does not require submittal of test information for plants currently testing to ASTM D3803-1989.

Response:

The staff has **revised** Requested Action 1 to clarify that no TS amendment and no additional testing is required for licensees who have TS that require the laboratory testing of charcoal samples for each ESF ventilation system to be conducted in accordance with ASTM D3803-1989.

Comment 36: (Texas Utilities Electric Company)

In the discussion on page 9584 of the Federal Register notice, the generic letter "Requested Actions" indicate that testing in accordance with ASTM D3803-1989 should be conducted within 60 days of the date of the generic letter. For plants not in Group 1, this would require dual testing until such time as a technical specification change is approved by the NRC. In order to avoid the dual-testing requirement, the generic letter should be modified to require adoption of ASTM D3803-1989 after approval of a license amendment.

Response:

As proposed in the generic letter, licensees in Groups 3 and 4 have already been granted enforcement discretion to test in accordance with ASTM D3803-1989 during the period of time between issuance of the generic letter and approval of the technical specification amendment. Therefore, dual testing is not required for licensees in Groups 3 and 4. To solve the potential dual testing problem for licensees in Group 2, the staff has **revised** the generic letter to specify that licensees in Group 2 will also be granted enforcement discretion.

Comment 37: (One individual)

Is this a safety issue? Then why isn't it being changed immediately?

Response:

The staff understands that this is not a significant safety issue that requires immediate action which has allowed the staff to develop and implement the proposed resolution in a reasonable time. On the basis of the available laboratory test results, the staff believes that most charcoal in use is not degraded to an extent that would adversely affect control room habitability or public health and safety. However, the staff also believes, on the basis of the available test results, that there is a group of plants with significantly degraded charcoal and the required test in their technical specifications is ineffective in identifying the degradation. Because of this group of plants and the group of plants not in compliance with their technical specifications, this issue needs to be addressed. Therefore, the staff has developed this generic letter as a way to resolve this issue in an effective and efficient manner. The overall confidence in charcoal performance, and the low probability of a design-basis accident and the conservatism inherent in the design basis dose calculations including the conservatism in the design-basis source term, justify the time frame for resolving this matter.

Comment 38: (One individual)

Does the NRC intend to notify licensees that the current Safety Evaluation Reports that have been issued in support of the licenses will be amended to identify this new requirement that must be to meet GDC 19? Currently, some SERs document the use of other standards to satisfy GDC 19.

Response:

In response to the proposed generic letter, all licensees who have TS that do not reference ASTM D3803-1989 will be requested to submit a TS amendment referencing ASTM D3803-1989 or an alternate test protocol. A safety evaluation will then be written by the staff which will approving the TS amendment and concluding that the dose limits of GDC 19 are met. This safety evalutaion will supersede the previous safety evaluations regarding charcoal filter testing.

Comment 39: (One individual)

Some licensees were required to comply with 10 CFR 50.34(g), which required a review to the NUREG-0800 Standard Review Plan that was in effect 6 months before to their date of docketing. Will this change require licensees to apply for exemptions to 50.34(g) since this proposed change has not been incorporated into their review?

Response:

10 CFR 50.34(g) requires the applicant to provide the staff with an evaluation identifying any differences from the Standard Review Plan (SRP) acceptance criteria and evaluating how the proposed alternatives to the SRP criteria provide an acceptable method of complying with NRC's regulations. As during the licensing process, exemptions from 50.34(g) are not required for deviating from the SRP. The SRP is not a substitute for the regulations, and compliance is not a requirement.

Comment 40: (One individual)

The technical specifications are issued by the NRC as an attachment to the license. Doesn't the NRC have a means to determine the requirements that they have issued to licensees?

Response:

Yes, but due to the past and present confusion about charcoal filter testing, the staff has determined that it is necessary to have licensees review their current technical specifications requirements and compare them to the test protocol actually being used when the charcoal sample canisters are tested by the laboratory to determine if the technical specification surveillance requirements are being met.

Comment 41: (One individual)

Does the survey results statement on page 9583 of the Federal Register notice mean that the NRC is aware of licensees who are not in compliance with the requirements of the operating license? Why wasn't this corrected through orders or by the NRC initiating technical specification changes?

Response:

As discussed in the proposed generic letter, the staff issued emergency technical specification amendments to three plants that were not in compliance with their technical specifications and found through a survey that as many as one-third of the plants may not be in compliance with their technical specifications. Plant-specific orders and NRC initiation of technical specification changes were discussed as possible ways to resolve this issue, but it was decided that a generic letter was a better approach because of the safety significance as discussed in response to Comment 37.

Comment 42: (One individual)

The Commission should also question the training and qualifications of members of the Committee To Review Generic Requirements (CRGR) who failed to identify this as a change of position that would place a burden on licensees. CRGR should have recognized that licensees would not be able to answer under oath and affirmation since they were already meeting their current licensing basis and they had no documentation from NRC to identify what was wrong with the current requirements.

Response:

The staff has **revised** the backfit discussion of generic letter to specify that endorsing the ASTM D3803-1989 testing standard is a new staff position. This has been reviewed and approved by the CRGR. CRGR did recognize that there was adequate documentation from the NRC and industry identifying the problems with the current requirements. In 1982, the American Society of Mechanical Engineers (ASME) Committee on Nuclear Air and Gas Treatment (CONAGT) conducted an interlaboratory comparison test using ASTM D3803-1979 and found that seven U.S. laboratories and eight foreign laboratories obtained vastly different results when testing samples of the same charcoal. After efforts to resolve the differences failed, the NRC contracted with EG&G at Idaho National Engineering Laboratory (INEL) to assess the problem. As a result of this assessment, the NRC issued IN 87-32. Through IN 87-32, the NRC informed licensees of deficiencies in the testing of nuclear-grade charcoal, specifically noting serious problems with the capabilities of the testing laboratories and with the testing standard (ASTM D3803-1979). The NRC contractor detailed the specific problems in its technical evaluation report, EGG-CS-7653, "Final Technical Evaluation Report for the NRC/INEL Activated Carbon Testing Program." Specifically, EG&G reported that ASTM D3803-1979 had unacceptable test parameter tolerances and instrument calibration requirements, and that ASTM D3803-1979 was nonconservative in not requiring humidity pre-equilibration of used charcoal. The information notice indicated that the protocol developed by EG&G could be utilized for performing the laboratory test until the D-28 committee responsible for ASTM D3803 revised the standard. The committee completed the revision and issued it in December 1989.

Following the issuance of IN 87-32, responsible licensees revised their technical specifications to test their charcoal in accordance with ASTM D3803-1989.

Comment 43: (Commonwealth Edison Company)

On page 9584 of the Federal Register notice (Requested Actions), the statement is made: "1. If your current TS require the laboratory testing of charcoal samples for each ESF ventilation system to be conducted in accordance with ASTM D3803-1989, then no TS amendment is required." This should be reworded as follows: "Stations that currently reflect the acceptance criteria for testing ESF ventilation systems to D3803-1989 without the safety factor of 2 being applied, may want to consider submitting a TS amendment to allow laboratory results that include the safety factor of 2."

Response:

This proposed revision is not necessary. Once the generic letter is issued, any station with technical specifications that reference ASTM D3803-1989 without a safety factor of 2 can submit a technical specification amendment to the staff utilizing a safety factor of 2 for review and approval.

Comment 44: (Commonwealth Edison Company)

On page 9589 of the Federal Register notice, the following formula appears:

Allowable Penetration = [100% - Methyl Iodide Efficiency for Charcoal Credited in SER]/Safety Factor

The equation should be revised as follows:

Allowable Penetration = [100% - Methyl Iodide Efficiency for Charcoal Credited in Accident Analysis]/Safety Factor

Use of the efficiency credit in the accident analysis is more accurate because it reflects current assumptions and analysis versus those assumed in the original SER.

Response:

The staff has **revised** the equation in the sample technical specification note in Enclosure 2 of the generic letter to state:

Allowable Penetration = [100% - Methyl Iodide Efficiency for Charcoal Credited in the Licensee's Accident Analysis]/Safety Factor*

* This value should be the efficiency that was incorporated in the licensee's accident analysis which was reviewed and approved by the staff in a safety evaluation.

Comment 45: (Consolidated Edison Company of New York, Inc.)

Will the tertiary document be the final document to which the licensee is held accountable? At present, many Technical Specifications simply require the use of Regulatory Guide 1.52. This document specifies the use of a secondary document (i.e., ANSI N509), which in turn specifies a tertiary document (i.e., RDT M16). Will ASTM D3803-1989 be the final, non-technical- specification-cited document to which the licensee will become committed? If not, will there be forthcoming additional commitments required to fourth-level documents specified from ASTM D3803-1989 (such as D 1193, "Specification for Reagent Water," or MIL-F-51068D, "Filter, Particulate, High Efficiency, Fire Resistant," etc.)? These reference documents, if updated, could cause changes to the testing method described in ASTM D3803-1989. Will it become incumbent on the licensee to comply with changes in these documents or verify vendor compliance with the requirements of these documents?

Response:

The proposed generic letter requests that plants revise their technical specifications to test in accordance with ASTM D3803-1989, which would then become the primary document. The ASTM D3803-1989 test standard allows the use of updated reference documents because it does not specify the specific date of the reference document. The staff only requires plants to revise standards in their technical specifications if it can be shown that there are significant problems with the standard that may result in the licensee not being able to meet the requirements. Therefore, the staff expects this to be the final document to which licensees will be held accountable in their technical specifications, but the possibility for future changes exists if substantial new problems are identified.

Comment 46: (First Energy)

The proposed generic letter doesn't address an estimated timeframe for approval of the TS revisions based upon the generic letter or specifically address whether submitted TS revisions are going to be expedited for approval. If the enforcement discretion is not expanded to include the acceptance criteria, as previously recommended in Comment 2, then plants will be burdened with extra expenses until the NRC completes its processing of the TS change. Therefore, timely processing would be essential.

Response:

The staff will review all of the submitted technical specification amendments in an expedited manner. Requested Actions Items 2 and 3 ask the licensee to indicate when the next laboratory test is scheduled to be performed so the staff can prioritize its review efforts. In addition, the staff has **revised** the generic letter to specify that a safety factor as low as 2 can be used during the period of time between issuance of the generic letter and approval of the technical specification amendment. (See response to Comment 36.)

Comment 47: (Similar comments appeared in 10 individual letters)

We endorse the comments submitted by the Nuclear Energy Institute (NEI) in a letter dated March 27, 1998 on this proposed generic letter.

Response:

In the above discussion of the comments, the staff has provided a response to all of NEI's comments regarding the proposed generic letter.

Appendix A, "Alphabetical List of Respondents"

1. Arizona Public Service Company
Palo Verde Nuclear Generating Station
Mail Station 7605
P.O. Box 52034
Phoenix, AZ 85072-2034
2. Baltimore Gas and Electric Company
Calvert Cliffs Nuclear Power Plant
1650 Calvert Cliffs Parkway
Lusby, MD 20657
3. Carolina Power & Light Company
P.O. Box 1551
411 Fayetteville Street Mall
Raleigh, NC 27602
4. Cleveland Electric Illuminating Company
Perry Nuclear Power Plant
10 Center Road
P.O. Box 97
Perry, Ohio 44081
5. Commonwealth Edison Company
1400 Opus Place
Downers Grove, IL 60515-5701
6. Consolidated Edison Company of New York
Indian Point Station
Broadway & Bleakley Avenue
Buchanan, NY 10511
7. Entergy Operations, Inc.
P.O. Box 31995
Jackson, MS 39286-1995
8. Eugene F. Kurtz, Jr.
P.O. Box 164
Shippingport, PA 15077
9. Florida Power & Light Company
P.O. Box 14000
Juno Beach, FL 33408-0420
10. NCS Corporation
4555 Groves Road, No. 41
Columbus, Ohio 43232
11. New York Power Authority
123 Main Street
White Plains, New York 10601
12. North Atlantic Energy Service Corporation
P.O. Box 300
Seabrook, NH 03874
13. Nuclear Energy Institute (NEI)
1776 I Street, NW
Suite 400
Washington, DC 20006-3708
14. Nuclear Utility Backfitting & Reform Group
Winston & Strawn
1400 L. Street, N.W.
Washington, DC 20005-3502
15. NUCON International, Inc.
P.O. Box 29151
7000 Huntley Road
Columbus, Ohio 43229
16. Omaha Public Power District
Fort Calhoun Station
444 South 16th Street Mall
Omaha, Nebraska 68102-2247
17. PECO Energy Company
965 Chesterbrook Boulevard
Wayne, PA 19087-5691
18. Southern California Edison
San Onofre Nuclear Generating Station
P.O. Box 128
San Clemente, CA 92674-0128
19. Tennessee Valley Authority
1101 Market Street
Chattanooga, TN 37402-2801
20. Texas Utilities Electric Company
Comanche Peak Steam Electric Station
P.O. Box 1002
Glen Rose, Texas 76043-1002
21. Toledo Edison Company
Davis-Besse Nuclear Power Station
5501 North State Route 2
Oak Harbor, Ohio 43449-9760
22. Virginia Power
Innsbrook Technical Center
5000 Dominion Boulevard
Glen Allen, Virginia 23060
23. Wisconsin Public Service Corporation
Kewaunee Nuclear Power Plant
North 490, Highway 42
Kewaunee, WI 54216-9511

