Duke Energy®

JAMES R. MORRIS
Vice President

Catawba Nuclear Station
4800 Concord Rd. / CN01VP
York, SC 29745-9635

803 831 4251
803 831 3221 fax

March 29, 2007

U.S. Nuclear Regulatory Commission
Document Control Desk
Washington, DC 20555-001

Subject: Duke Power Company LLC d.b.a. Duke Energy Carolinas, LLC

Catawba Nuclear Station, Units 1 and 2
Docket Nos. 50-413 and 50-414

License Amendment Request Revising Catawba, Units 1 and 2 Commitments to USNRC Regulatory Guide 1.82, Revision 0, "Sumps For Emergency Core Cooling and Containment Spray Systems" and Revising Technical Specification Surveillance Requirement (SR) 3.5.2.8 and Associated Bases.

In accordance with the provisions of Section 50.90 of Title 10 of the Code of Federal Regulations (10CFR), Duke Power Company LLC d.b.a. Duke Energy Carolinas, LLC (Duke) proposes a license amendment request (LAR) for the Facility Operating Licenses (FOL), Updated Final Safety Analysis Reports (UFSAR) and Technical Specifications for Catawba Nuclear Station, Units 1 and 2. The proposed changes will ensure that as the modified sump strainer assemblies are installed for each unit, the current licensing basis is accurate.

The purpose of this license amendment request is two fold:

(1): Change the licensing bases for the Catawba Nuclear Station (CNS) Units 1 and 2 containment sumps, as stated in the CNS UFSAR, by revising commitments to USNRC Regulatory Guide 1.82, Revision 0, "Sumps for Emergency Core Cooling and Containment Spray Systems." The proposed changes are needed to:

A001
A002

a. delete the requirement or implication that two physically separated containment sumps (one for each train of RHR/CSS) must be maintained;

b. eliminate the requirement for trash racks;

c. clarify the wording to replace "trash racks and screens" with the word "strainers"; and

d. describe the required ECCS Sump Strainer Assembly Surveillance.

(2): Revise Catawba Technical Specification Surveillance Requirement (SR) 3.5.2.8: The use of the revised generic terminology reflects the replacement sump configuration, which does not include trash racks.

Attachment 1 provides the existing UFSAR page for Catawba Units 1 and 2, marked-up to show the proposed changes.

Attachment 2 provides existing Technical Specifications and Bases pages for Catawba Units 1 and 2, marked-up to show the proposed change.

Attachment 3 provides Duke's evaluation of the LAR which contains a description of the proposed changes, the technical analysis, the determination that this LAR contains No Significant Hazards Considerations, the basis for the categorical exclusion from performing an Environmental Assessment/Impact Statement, and Precedents.

As communicated by our November 1, 2006 letter, Catawba Unit 2 will install the sump strainer modification to support resolution of GSI 191 during its fall 2007 refueling outage. Catawba Unit 1 will install the sump strainer modification during its spring 2008 refueling outage.

Based on the fall outage date for Unit 2, Duke is requesting review and approval of this license amendment request by October 1, 2007. Duke has determined that the NRC's standard 30-day grace period will be acceptable for the implementation of revised Technical Specification SR 3.5.2.8.

The proposed licensing basis changes will become effective as each of the Catawba Units enters Mode 4 operations subsequent to completing the sump modifications required by USNRC Generic Letter 2004-02, "Potential Impact of Debris Blockage on Emergency Recirculation During Design Basis Accidents at Pressurized-Water Reactors." Until such time as those modifications are completed, each Catawba Unit will comply with the current licensing basis commitments to Regulatory Guide 1.82, Revision 0, "Sumps for Emergency Core Cooling and Containment Spray Systems."

Reprinted Catawba Technical Specification and Bases pages will be provided to the NRC upon issuance of the approved amendments.

Revisions to the Catawba UFSAR, necessary to reflect approval of this submittal, will be made in accordance with 10CFR50.71(e).

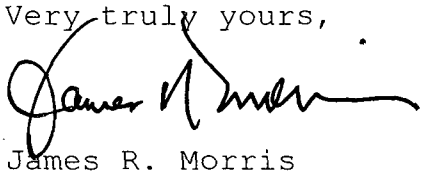
In accordance with Duke internal procedures and the Quality Assurance Topical Report, the proposed amendment has been reviewed and approved by the Catawba Plant Operations Review Committees and the Duke Corporate Nuclear Safety Review Board.

Pursuant to 10CFR50.91, a copy of this LAR has been forwarded to the appropriate South Carolina state officials.

There are no regulatory commitments included in this document or its associated attachments.

Please direct any questions you may have in this matter to A. P. Jackson (803) 831-3742.

Very truly yours,



James R. Morris

xc w/ Attachments:

W. D. Travers
Administrator, Region II
U.S. Nuclear Regulatory Commission
Atlanta Federal Center
61 Forsyth Street, Suite 23T85
Atlanta, GA 30303

A. T. Sabisch
NRC Senior Resident Inspector
Catawba Nuclear Station

J. F. Stang, Jr. (addressee only)
NRC Senior Project Manager (MNS and CNS)
U.S. Nuclear Regulatory Commission
Mail Stop O-8 H4A
Washington, DC 20555-0001

H. J. Porter, Assistant Director
Division of Radioactive Waste Management
Bureau of Land and Waste Management
Department of Health and Environmental Control
2600 Bull Street
Columbia, SC 29201

James R. Morris affirms that he is the person who subscribed his name to the foregoing statement, and that all the matters and facts set forth herein are true and correct to the best of his knowledge.

James R. Morris, Vice President, Catawba Nuclear Station

Subscribed and sworn to me: 3-29-2007
Date

Kay E. Nicholson, Notary Public

My commission expires: 12-28-2015
Date

Kay E. Nicholson
Kay E. Nicholson
Notary Public
South Carolina
My Commission Expires 12/28/2015

ATTACHMENT 1

Marked-Up Catawba UFSAR

Discussion

The Containment Recirculation Sump at Catawba is designed to fully meet the regulatory positions of the regulatory guide with modifications to positions C.4, 6, and 7 as stated below.

C.4 The floor level in the vicinity of the coolant sump location should not slope down toward the sump.

C.6 An outer trash rack should be provided to prevent large debris from reaching the fine inner screen. The strength of the trash rack should be considered in protecting the inner screen from missiles and large debris.

C.7 The design coolant velocity at the fine inner screen should be approximately 2.0 ft/sec. The available surface area used in determining the design coolant velocity should be based on one-half of the free surface area of the fine inner screen to conservatively account for partial blockage. No horizontal screen should be considered in determining available surface area.

Insert 1

Regulatory Guide 1.83

Inservice Inspection of Pressurized Water Reactor Steam Generator Tubes (Revision 1, 7/75).

Discussion

Westinghouse and BWI steam generators are designed to permit access to tubes for inspection and/or plugging. The inservice inspection program is discussed in the Technical Specifications.

The BWI steam generator design complies with the regulatory position with the following clarifications:

The Regulatory Guide addresses both new and in-service components. The RSGs are new components and as such comply with the appropriate sections of this regulatory guide. Specifically C.1.a, C.1.b, C.2, C.3.a, and C.4.a. A 100 percent baseline inspection of the RSG is performed prior to the unit being put into service. BWI acceptance criteria exceeds the NRC guidelines for wall thickness reductions in that BWI limits wall thickness reductions to no more than 15% versus 20% allowed in the NRC guidelines.

Regulatory Guide 1.84

Code Case Acceptability - ASME Section III Design and Fabrication (Revision 16, 5/80).

Discussion - Westinghouse

1. Westinghouse controls its suppliers to:
   a. Limit the use of code cases to those listed in Regulatory Position C.1 of the Regulatory Guide 1.84 and 1.85 revision in effect at the time the equipment is ordered, except as allowed in item b. below.
   b. Identify and request permission for use of any code cases not listed in Regulatory Position C.1 of the Regulatory Guide 1.84 and 1.85 revision in effect at the time the equipment is ordered, where use of such code cases is needed by the supplier.
   c. Permit continued use of a code case considered acceptable at the time of equipment order, where such code case was subsequently annulled or amended.

INSERT 1

Upon completion of the ECCS sump strainer assembly modifications during outage 2EOC15 for Unit 2 and 1EOC17 for Unit 1, the following Discussion section will apply:

Discussion

The Containment Recirculation Sump at Catawba is designed to fully meet the regulatory positions of the regulatory guide with modifications to positions as shown below:

C.1 A configuration utilizing the containment side structure and floor as the intake structure boundary is considered acceptable for those plants in which the post LOCA water level in the containment is sufficiently high, thus making additional sump depressions in the floor non-productive. Redundance should be provided by two separate suction pipes.

C.2 The containment recirculation intake structure and suction piping should be protected from high energy piping systems to the extent practical to preclude damage by whipping pipes or high-velocity jets of water or steam. ECCS redundancy begins at the sump suction pipes, and the need to provide ECCS/CSS train separation within the common sump strainer is not required in the absence of any credible loads which could fail the sump strainer.

C.3 The sumps should be located on the lowest floor elevation in the containment exclusive of the reactor vessel cavity. A substantial strainer is provided to filter debris from recirculated coolant. The polar crane wall acts as a primary filter to prevent large debris from reaching the sump strainer assembly.

C.4 Exception is taken to this position.

C.6 The location of the sump strainer assembly should provide protection from missiles and large debris. The polar crane wall can be credited as a primary filter to prevent large debris from reaching the sump strainer.

C.7 A sump strainer design (i.e., size and shape) should be chosen that is intended to preclude the loss of NPSH to ECCS and CSS pumps from debris blockage during the period that the ECCS is required to operate and maintain long-term cooling.

C.8 Vortex suppression should be provided to preclude air entrainment in the recirculated coolant.

C.9 Sump strainers should be designed to withstand the vibratory motion of seismic events without loss of structural integrity.

C.10 The size of openings in the sump strainer should be based on the minimum restrictions found in systems served by the sump. The minimum restriction should take into account the overall operability of the system served.

C.12 Materials for the sump strainers should be selected to avoid degradation during periods of inactivity and operation and should have a low sensitivity to adverse effects such as stress assisted corrosion that may be induced by chemically reactive spray during LOCA conditions

C.13 The sump strainer should include access openings to facilitate inspection.

C.14 Inservice inspection requirements for coolant sump components (the strainer assembly) should include the following:

a. Coolant sump components should be inspected during every refueling period downtime, and

b. The inspection should be a visual examination of the components for evidence of structural distress or corrosion.

ATTACHMENT 2
Marked-Up Catawba
Technical Specifications and Bases

SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE		FREQUENCY
SR 3.5.2.6	Verify each ECCS pump starts automatically on an actual or simulated actuation signal.	18 months
SR 3.5.2.7	Verify, for each ECCS throttle valve listed below, each position stop is in the correct position. Centrifugal Charging Pump Injection Throttle Valve Number: NI14, NI16, NI18, NI20 Safety Injection Pump Throttle Valve Number: NI164, NI166, NI168, NI170	18 months
SR 3.5.2.8	~~Verify, by visual inspection, each ECCS train containment sump suction inlet is not restricted by debris and the suction inlet trash racks and screens show no evidence of structural distress or abnormal corrosion.~~	18 months

Delete and Insert:
Verify, by visual inspection, that the ECCS containment sump strainer assembly is not restricted by debris and shows no evidence of structural distress or abnormal corrosion.

BASES

SURVEILLANCE REQUIREMENTS (continued)

SR 3.5.2.5 and SR 3.5.2.6

These Surveillances demonstrate that each automatic ECCS valve actuates to the required position on an actual or simulated SI and Containment Sump Recirculation signal and that each ECCS pump starts on receipt of an actual or simulated SI signal. This Surveillance is not required for valves that are locked, sealed, or otherwise secured in the required position under administrative controls. The 18 month Frequency is based on the need to perform these Surveillances under the conditions that apply during a plant outage and the potential for unplanned plant transients if the Surveillances were performed with the reactor at power. The 18 month Frequency is also acceptable based on consideration of the design reliability (and confirming operating experience) of the equipment. The actuation logic is tested as part of ESF Actuation System testing, and equipment performance is monitored as part of the Inservice Testing Program.

SR 3.5.2.7

The position of throttle valves in the flow path on an SI signal is necessary for proper ECCS performance. These valves have mechanical locks to ensure proper positioning for restricted flow to a ruptured cold leg, ensuring that the other cold legs receive at least the required minimum flow. The 18 month Frequency is based on the same reasons as those stated in SR 3.5.2.5 and SR 3.5.2.6.

SR 3.5.2.8

Periodic inspections of the containment sump suction inlet ensure that it is unrestricted and stays in proper operating condition. The 18 month Frequency is based on the need to perform this Surveillance under the conditions that apply during a plant outage and on the need to have access to the location. This Frequency has been found to be sufficient to detect abnormal degradation and is confirmed by operating experience.

Insert 1

INSERT 1

Upon completion of the ECCS sump strainer assembly modifications during outage 2EOC15 for Unit 2 and 1EOC17 for Unit 1, the following SR Bases will apply:

Periodic inspections of the ECCS containment sump strainer assembly (consisting of modular tophats, grating, plenums, and waterboxes) ensure it is unrestricted and remains in proper operating condition. Inspections will consist of a visual examination of the exterior surfaces of the strainer assembly for any evidence of debris, structural distress or abnormal corrosion. The intent of this surveillance is to ensure the absence of any condition which could adversely affect strainer functionality. Surveillance performance will not require removal of any tophat modules or grating, but the strainer exteriors shall be visually inspected. This surveillance is not a commitment to inspect 100 percent of the surface area of all tophats, but a sufficiently detailed inspection of exterior strainer surfaces is required to establish a high confidence that no adverse conditions are present. The 18 month Frequency is based on the need to perform this Surveillance under the conditions that apply during a plant outage and on the need to have access to the location. This Frequency has been found to be sufficient to detect abnormal degradation and is confirmed by operating experience.

ATTACHMENT 3
Evaluation for License Amendment Request

1.0 GENERAL DESCRIPTION

Pursuant to 10CFR50.90, Duke Energy Carolinas, LLC (Duke) proposes a license amendment request (LAR) for the Facility Operating License (FOL) and Updated Final Safety Analysis Report (UFSAR) for Catawba Nuclear Stations, Units 1 and 2.

The proposed license amendment seeks to revise existing commitments to USNRC Regulatory Guide 1.82, Revision 0, "Sumps for Emergency Core Cooling and Containment Spray Systems," as stated in the Catawba Nuclear Station (CNS) Unit 1 and Unit 2 UFSAR.

The proposed changes will ensure that as the modified sump strainer assemblies are installed at each of the two Catawba Units, the current licensing basis is accurate. The new design consists of one strainer feeding two trains of suction piping.

Additionally, the License Amendment Request seeks to revise Catawba Technical Specification Surveillance Requirement (SR) 3.5.2.8 by replacing the phrase "trash racks and screens" with the term "strainers". The use of the revised generic terminology reflects the replacement sump configuration, which does not include trash racks, as well as the existing unmodified design, thus negating the need for the inclusion of a note to distinguish inspection requirements for each of the affected Units which would require an administrative change to remove at a later date.

Also, a revision of the surveillance process for the new strainer assembly is included. This revision recognizes that the new strainer assembly will present challenges to a visual inspection.

2.0 BACKGROUND

The Emergency Core Cooling System (ECCS) is designed to cool the reactor core and provide shutdown capability following initiation of the following accident conditions:

1. Loss of Coolant Accident (LOCA) including a pipe break or a spurious relief or safety valve opening in the

RCS which would result in a discharge larger than that which could be made up by the normal make-up system.

2. Rupture of a control rod drive mechanism causing a rod cluster control assembly ejection accident.

3. Steam or feedwater system break accident including a pipe break or a spurious relief or safety valve opening in the secondary steam system which would result in an uncontrolled steam release or a loss of feedwater.

4. A steam generator tube rupture.

The primary function of the ECCS is to remove the stored and fission product decay heat from the reactor core during accident conditions.

During Modes 1, 2, and 3, Tech Spec 3.5.2 requires an OPERABLE flow path capable of taking suction from the Refueling Water Storage Tank on a Safety Injection Signal and automatically transferring suction to the containment sump during the recirculation phase of operation.

The flow path of containment sump water in recirculation through the Containment Spray and Emergency Core Cooling Systems is described in the following paragraphs.

Following a large break LOCA (LBLOCA), water exiting the Containment Spray System (CSS) spray nozzles cools the upper containment to reduce containment pressure and collects in the refueling canal. Six (6) drains in the bottom of the canal allow the spray water to return to lower containment, inside the Crane Wall, where it re-joins the water in the recirculation sump and the ice melt exiting the Ice Condenser drains. Since the Containment Sump Recirculation Screen Assembly is located in the "tunnel" area outside the Crane Wall, water must then pass through numerous penetrations in the lower portion of the Crane Wall. Water entering the tunnel area must then pass circumferentially around the tunnel area until it reaches the Sump Recirculation Screen.

In addition to CSS spray, water is injected directly into the primary system via the ECCS to provide core cooling. For this injection flow path, water must pass through the Residual Heat Removal (RHR) pumps, RHR Heat Exchangers,

Safety Injection Pumps, and Centrifugal Charging Pumps before being injected to cool the fuel assemblies. Along the way it must pass through numerous gate, globe, check, and throttling valves. The water exits the primary system at the break location (i.e., LBLOCA) and returns to lower containment, inside the crane wall, where it re-joins the water in the recirculation sump.

For some small break LOCAs (SBLOCA), the CSS spray system is not actuated; however, the ECCS actuates to inject water directly into the primary system to provide core cooling. The water being injected is expected to fill the pressurizer and overflow to the pressurizer relief tank (PRT). If the event continues, the PRT rupture disc will relieve and allow water to again return to lower containment, where it flows through the crane wall to the re-join the water in the recirculation sump.

2.1 Current ECCS Sump Design

The Catawba containment sumps provide a long term source of cooling water to the Residual Heat Removal and the Containment Spray (CS) system. In general, the floor grade of the Containment Building (552 foot elevation at Catawba) is considered the containment sump. The containment sump collects ice condenser melt, reactor coolant system spill [including Emergency Core Cooling System (ECCS) injection water], and containment spray water and provides water for the ECCS recirculation phase. Two suction lines (the ECCS recirculation lines) are provided. Each ECCS recirculation line supplies one train of ECCS and one containment spray pump. The ECCS recirculation lines are located on either side of the 180° azimuth in the Unit 1 or 2 Reactor Buildings.

Each "sump" screen assembly consists of a horizontal solid top and filtering screen panels which extend almost to the floor. Above the ECCS intake pipe, the horizontal solid top of the screen assembly is at approximately 555' elevation. Beyond the ECCS intake pipe, the horizontal solid top extends slightly higher to approximately 558' elevation. The screen panels contain an outer trash rack which prevents large debris from reaching the inner fine screen. The fine screen prevents particles which are large enough to

impair ECCS or containment spray performance from being drawn into these systems. The fine screen mesh is sized to preclude any particle larger than 1/8" in diameter. This size is significantly smaller than the size needed to prevent clogging of the NS spray nozzles. The top of the screen assembly contains holes which are 1/8" in diameter. This feature ensures that the assemblies are self venting as the water covers the top. Sump Recirculation Screen performance, including the description of debris transport through the Containment, is discussed and evaluated in the Catawba UFSAR Section 6.2.2.2. A summary drawing of this structure also appears in the UFSAR, Figure 6-111. Reference Figure 1.

2.2 New ECCS Sump Strainer Assembly Design

The Catawba modification removes the original ECCS Sump structure described above and replaces it with a structure consisting of tube modules (top-hats) made of stainless steel, having two layers of perforated plate for straining debris from the water. (Reference Figure 2.) The openings in the perforated plate do not exceed 3/32 inch diameter. The RHR/CSS recirculation lines are connected to the main plenum of the strainer assembly using 18 inch piping. Horizontal vortex suppressors will be installed above the top-hat strainer assemblies.

The Catawba strainer will be installed entirely inside the pipechase outside the polar crane wall. There are no pipe whips or water/steam jet loads projected to occur within the Catawba pipechase.

These new sump structures are nuclear safety-related, QA Condition 1 assemblies designed to withstand safe shutdown earthquake loadings and protected from tornado missiles by virtue of being located within the Containment Building which is, in turn, protected by the seismically designed Reactor Building. These structures are passive assemblies qualified for all design environmental conditions in the sump.

The objective of the new strainer design is to provide acceptable flow with minimal head loss at the specified debris loads and to ensure adequate NPSH to

the RHR/CSS Pumps during the post-LOCA Recirculation Phase. The new strainer offers approximately 2000 square feet of surface area versus the original 135 square feet total for the original sump screens. When completed, the installation of the revised sump design is intended to resolve concerns associated with GSI-191. The changes made enhance the existing design by providing a larger surface area for the filtration of debris.

3.0 PROPOSED CHANGES

3.1 Current Catawba Licensing Basis

NUREG-0954, "Safety Evaluation Report by the Office of Nuclear Reactor Regulation US Nuclear Regulatory Commission in the Matter of Duke Power Company Catawba Nuclear Station Units 1 and 2," Supplement 2, Section 6.3.4.1 "Preoperational testing", contains the following statement: "In a letter dated January 14, 1983, the applicant provided a detailed comparison between the configurations of the McGuire and Catawba sumps." "... Confirmatory Issue 23 is resolved." Confirmatory Issue 23 required a detailed comparison of McGuire versus Catawba ECCS sump and screen parameters to demonstrate that McGuire scale model testing applied to Catawba.

Catawba UFSAR Chapter 1.7, "Regulatory Guides," states that the Containment Recirculation Sump at Catawba is designed to fully meet the regulatory positions of Regulatory Guide 1.82, Rev 0, with modifications to positions C.4, 6, and 7 as stated below:

> *C.4 - The floor level in the vicinity of the coolant sump location should not slope toward the sump.*
>
> *C.6 - The outer trash rack should be provided to prevent large debris from reaching the fine inner screen. The strength of the trash rack should be considered in protecting the inner screen from missiles and large debris.*

C.7 - The design coolant velocity at the fine inner screen should be approximately 2.0 ft/sec. The available surface area used in determining the design coolant velocity should be based on one-half of the free surface area of the fine inner screen to conservatively account for partial blockage. No horizontal screen should be considered in determining available surface area.

Chapter 6 of the UFSAR states:

The two screen assemblies and the vortex suppressor are located between the polar crane wall and the containment vessel. Piping subject to breaks that result in the need for recirculation capabilities are located inside the crane wall and are thus isolated from the recirculation sump screen assemblies.

3.2 Proposed Technical Specification and Bases Changes

The proposed license amendment seeks to revise Catawba Technical Specification Surveillance Requirement (SR) 3.5.2.8 to reflect the ECCS Sump modification. This modification encloses the ECCS Containment Sump suction pipe inlets, thus making them an integral part of the strainer assembly.

Catawba Technical Specification SR 3.5.2.8 currently states:

Verify, by visual inspection, each ECCS train containment sump suction inlet is not restricted by debris and the suction inlet trash racks and screens show no evidence of structural distress or abnormal corrosion.

It is proposed that Catawba Technical Specification SR 3.5.2.8 be revised to state:

Verify, by visual inspection, that the ECCS containment sump strainer assembly is not restricted by debris and shows no evidence of structural distress or abnormal corrosion.

The Bases document for Catawba Technical Specification SR 3.5.2.8 currently states:

> *Periodic inspections of the containment sump suction inlet ensure that it is unrestricted and stays in proper operating condition. The 18 month Frequency is based on the need to perform this Surveillance under the conditions that apply during a plant outage and on the need to have access to the location. This Frequency has been found to be sufficient to detect abnormal degradation and is confirmed by operating experience*

It is proposed that the Catawba Technical Specification Bases document for SR 3.5.2.8 be revised to add:

> *Upon completion of the ECCS sump strainer assembly modifications during outage 2EOC15 for Unit 2 and 1EOC17 for Unit 1, the following SR Bases will apply:*
>
> *Periodic inspections of the ECCS containment sump strainer assembly (consisting of modular tophats, grating, plenums, and waterboxes) ensure it is unrestricted and remains in proper operating condition. Inspections will consist of a visual examination of the exterior surfaces of the strainer assembly for any evidence of debris, structural distress or abnormal corrosion. The intent of this surveillance is to ensure the absence of any condition which could adversely affect strainer functionality. Surveillance performance will not require removal of any tophat modules or grating, but the strainer exteriors shall be visually inspected. This surveillance is not a commitment to inspect 100 percent of the surface area of all tophats, but a sufficiently detailed inspection of exterior strainer surfaces is required to establish a high confidence that no adverse conditions are present. The 18 month Frequency is based on the need to perform this Surveillance under the conditions that apply during a plant outage and*

on the need to have access to the location. This Frequency has been found to be sufficient to detect abnormal degradation and is confirmed by operating experience.

These changes are required to reflect constraints in the new strainer assembly design. A detailed justification of this change is included in the Technical Analysis and Discussion portion of this document under the header: "Trash Racks Elimination and ECCS Sump Strainer Assembly Surveillance Discussion."

3.3 Proposed Revisions to the Catawba UFSAR

Revisions to the Catawba UFSAR related to the strainer modification will be made through the normal UFSAR update process as the modifications are installed. However, it is proposed to revise Section 1.7 of the UFSAR due to the upcoming ECCS sump strainer assembly modification to reflect a change in the site's commitments to Regulatory Guide 1.82, "Sumps for Emergency Core Cooling and Containment Spray Systems",Rev.0. The attached Table 1, is included at the end of this section to provide a vehicle for easy comparison of the regulatory guide criterion, current exceptions, and the proposed revision.

Table 1
Comparing Current and Future State Regulatory Guide 1.82, Rev.0 Criterion

Reg. Guide 1.82, Rev 0 Regulatory Position	Current Criteria	Proposed Criteria	Justification for the Revision
C.1: A minimum of two sumps should be provided, each with sufficient capacity to serve one of the redundant halves of the ECCS and CSS systems	The current commitment conforms to the Regulatory Position.	A configuration utilizing the containment side structure and floor as the intake structure boundary is considered acceptable for those plants in which the post LOCA water level in the containment is sufficiently high, thus making additional sump depressions in the floor non-productive. Redundance should be provided by two separate suction pipes.	The current exception to Regulatory Position C.1 is revised to reflect the new ECCS containment sump strainer design. Redundancy of passive strainer components located in shielded areas (i.e., not subject to failure), is not required to meet the GDC criterion of sustained core cooling capability. There are no credible passive failures.

Table 1
Comparing Current and Future State Regulatory Guide 1.82, Rev.0 Criteria

Reg. Guide 1.82, Rev 0 Regulatory Position	Current Criteria	Proposed Criteria	Justification for the Revision
C.2: Redundant sumps should be physically separated from each other and from high-energy piping systems by structural barriers to the extent practical, to preclude damage to the sump intake filters by whipping pipes or high-velocity jets of water or steam	The current commitment conforms to the Regulatory Position.	The containment recirculation intake structure and suction piping should be protected from high energy piping systems to the extent practical to preclude damage by whipping pipes or high-velocity jets of water or steam. ECCS redundancy begins at the sump suction pipes, and the need to provide ECCS/CSS train separation within the common sump strainer is not required in the absence of any credible loads which could fail the sump strainer.	The current exception to Regulatory Position C.2 is revised to clearly state Duke's position that ECCS redundancy begins at the sump suction pipes, and the need to provide ECCS/CSS train separation within the common sump strainer is not required due to the absence of any credible loads which could fail the ECCS containment sump strainer. Reference the "Consideration of ECCS Strainer Single Failure" Discussion.

Table 1
Comparing Current and Future State Regulatory Guide 1.82, Rev.0 Criteria

Reg. Guide 1.82, Rev 0 Regulatory Position	Current Criteria	Proposed Criteria	Justification for the Revision
C.3: The sumps should be located on the lowest floor elevation in the containment exclusive of the reactor vessel cavity. At a minimum, the sump intake should be protected by two screens (1) an outer trash rack and (2) a fine inner screen. The sump screens should not be depressed below the floor elevation	The current commitment conforms to the Regulatory Position.	The sumps should be located on the lowest floor elevation in the containment exclusive of the reactor vessel cavity. A substantial strainer is provided to filter debris from recirculated coolant. The polar crane wall acts as a primary filter to prevent large debris from reaching the sump strainer assembly.	A new exception to Regulatory Position C.3 is requested in order to reflect the new sump strainer design. The intended functions of the trash rack are provided by alternate means. Reference the "Trash Racks Elimination and ECCS Sump Strainer Assembly" discussion.
C.4: The floor level in the vicinity of the coolant sump location should slope gradually down away from the sump	The floor level in the vicinity of the coolant sump location should not slope toward the sump	Exception is taken to this position.	The complex geometry of the new strainer design accommodates settling debris without affecting the performance adversely.

Table 1
Comparing Current and Future State Regulatory Guide 1.82, Rev.0 Criteria

Reg. Guide 1.82, Rev 0 Regulatory Position	Current Criteria	Proposed Criteria	Justification for the Revision
C.5: All drains from the upper regions of the reactor building should terminate in such a manner that direct streams of water, which may contain entrained debris, will not impinge on the filter assemblies	The current commitment conforms to the Regulatory Position.	No Changes are required.	Not Required.
C.6: A vertically mounted outer trash rack should be provided to prevent large debris from reaching the fine inner screen. The strength of the trash rack should be considered in protecting the inner screen from missiles and large debris	The outer trash rack should be provided to prevent large debris from reaching the fine inner screen. The strength of the trash rack should be considered in protecting the inner screen from missiles and large debris	The location of the sump strainer assembly should provide protection from missiles and large debris. The polar crane wall can be credited as a primary filter to prevent large debris from reaching the sump strainer.	A new exception to Regulatory Position C.6 is requested to reflect the new ECCS containment sump strainer design. The intended functions of the trash rack are provided by alternate means. Reference the "Trash Racks Elimination and ECCS Sump Strainer Assembly" discussion.

Table 1
Comparing Current and Future State Regulatory Guide 1.82, Rev.0 Criteria

Reg. Guide 1.82, Rev 0 Regulatory Position	Current Criteria	Proposed Criteria	Justification for the Revision
C.7: A vertically mounted fine inner screen should be provided. The design coolant velocity at the inner screen should be approximately 6 cm/sec (0.2ft/sec). The available surface area used in determining design coolant velocity should be based on 1/2 of the free surface area of the fine inner screen to conservatively account for partial blockage. Only the vertical screens should be considered in determining available surface area	The design coolant velocity at the fine inner screen should be approximately 2.0 ft/sec. The available surface area used in determining the design coolant velocity should be based on one-half of the free surface area of the fine inner screen to conservatively account for partial blockage. No horizontal screen should be considered in determining available surface area	A sump strainer design (i.e., size and shape) should be chosen that is intended to preclude the loss of NPSH to ECCS and CSS pumps from debris blockage during the period that the ECCS is required to operate and maintain long-term cooling.	The current exception to Regulatory Position C.7 is revised to reflect the new ECCS containment sump strainer design and eliminate non-conservatisms. The main thrust of GSI-191 and Generic Letter 2004-02 is the recognition that the implicit assumption contained in the guidance (directing an evaluation of strainer surface area that incorporates 50% blockage) is non-conservative. Rather than using a pre-set blockage 'rule of thumb,' licensees are expected to assess strainer performance using evaluations that take plant-specific factors such as debris sources, flow rates and NPSH margins into account. The modified ECCS containment sump assembly was designed using the methodology contained in NEI 04-07, "Pressurized Water Reactor Sump Performance Evaluation Methodology," Rev 0, and the associated NRC Safety Evaluation Report. The completion of chemical effects studies and other evaluations is required to confirm that Catawba's ECCS recirculation functions under debris loading conditions will be in full compliance with the Applicable Regulatory Requirements section of NRC Generic Letter 2004-02.

Table 1
Comparing Current and Future State Regulatory Guide 1.82, Rev.0 Criteria

Reg. Guide 1.82, Rev 0 Regulatory Position	Current Criteria	Proposed Criteria	Justification for the Revision
C.8: A solid top deck is preferable, and the top deck should be designed to be fully submerged after a LOCA and completion of the safety injection	The current commitment conforms to the Regulatory Position.	Vortex suppression should be provided to preclude air entrainment in the recirculated coolant.	A new exception to Regulatory Guide 1.82, Rev. 0, Regulatory Position C.8 is proposed so as to reflect the new sump strainer design. Vortex suppression and the elimination of air entrainment will be provided by gratings. The efficacy of the horizontal grating serving as a vortex suppressor was demonstrated through qualification testing.

Table 1
Comparing Current and Future State Regulatory Guide 1.82, Rev.0 Criteria

Reg. Guide 1.82, Rev 0 Regulatory Position	Current Criteria	Proposed Criteria	Justification for the Revision
C.9: The trash rack and screens should be designed to withstand the vibratory motion of seismic events without loss of structural integrity.	The current commitment conforms to the Regulatory Position.	Sump strainers should be designed to withstand the vibratory motion of seismic events without loss of structural integrity	A new exception to Regulatory Position C.9 is requested to reflect the new ECCS containment sump strainer design. The intended functions of the trash rack are provided by alternate means. Reference the "Trash Racks Elimination and ECCS Sump Strainer Assembly" discussion.
C.10: The size of openings in the fine screen should be based on the minimum restrictions found in systems served by the sump. The minimum restriction should take into account the overall operability of the system served	The current commitment conforms to the Regulatory Position.	The size of openings in the sump strainer should be based on the minimum restrictions found in systems served by the sump. The minimum restriction should take into account the overall operability of the system served.	A new exception to Regulatory Position C.10 is requested to reflect the new ECCS containment sump strainer design. The new strainer design does not rely on fine screens. Thus, the reference to a "fine screen" is replaced by a reference to a "sump strainer."

Table 1
Comparing Current and Future State Regulatory Guide 1.82, Rev.0 Criteria

Reg. Guide 1.82, Rev 0 Regulatory Position	Current Criteria	Proposed Criteria	Justification for the Revision
C.11: Pump intake locations in the sump should be carefully considered to prevent degrading effects such as vortexing on the pump performance	The current commitment conforms to the Regulatory Position.	No change to the criteria is requested.	The strainer assembly is designed to meet this criterion.
C.12: Materials for trash racks and screens should be selected to avoid degradation during periods of inactivity and operation and should have low sensitivity to adverse effects such as stress-assisted corrosion that may be induced by the chemical reactive spray during LOCA conditions	The current commitment conforms to the Regulatory Position.	Materials for the sump strainers should be selected to avoid degradation during periods of inactivity and operation and should have a low sensitivity to adverse effects such as stress assisted corrosion that may be induced by chemically reactive spray during LOCA conditions.	A new exception to Regulatory Position C.12 is requested to reflect the new ECCS containment sump strainer design. The intended functions of the trash rack are provided by alternate means. Reference the "Trash Racks Elimination and ECCS Sump Strainer Assembly" discussion.

Table 1
Comparing Current and Future State Regulatory Guide 1.82, Rev.0 Criteria

Reg. Guide 1.82, Rev 0 Regulatory Position	Current Criteria	Proposed Criteria	Justification for the Revision
C.13: The trash rack and screen structure should include access openings to facilitate inspection of the structure and pump suction intake	The current commitment conforms to the Regulatory Position.	The sump strainer should include access openings to facilitate inspection.	A new exception to Regulatory Position C.13 is requested to reflect the new ECCS containment sump strainer design. The intended functions of the trash rack are provided by alternate means. The suction intakes are internal to the strainer assembly with the new design. Reference the "Trash Racks Elimination and ECCS Sump Strainer Assembly" discussion.

Table 1
Comparing Current and Future State Regulatory Guide 1.82, Rev.0 Criteria

Reg. Guide 1.82, Rev 0 Regulatory Position	Current Criteria	Proposed Criteria	Justification for the Revision
C.14: Inservice inspection requirements for coolant sump components (trash racks, screens, and pump suction inlets) should include the following: a. Coolant sump components should be inspected during every refueling period downtime, and b. The inspection should be a visual examination of the components for evidence of structural distress or corrosion.	The current commitment conforms to the Regulatory Position.	Inservice inspection requirements for coolant sump components (the strainer assembly) should include the following: a. Coolant sump components should be inspected during every refueling period downtime, and b. The inspection should be a visual examination of the components for evidence of structural distress or corrosion.	A new exception to Regulatory Position C.14 is requested to reflect the new ECCS containment sump strainer design. The intended functions of the trash rack are provided by alternate means. Reference the "Trash Racks Elimination and ECCS Sump Strainer Assembly" discussion.

4.0 TECHNICAL ANALYSIS and DISCUSSION

4.1 Overview

Generic Letter 2004-02, "Potential Impact of Debris Blockage on Emergency Recirculation During Design Basis Accidents at Pressurized-Water Reactors," states that the current 50% screen blockage assumption identified in Regulatory Guide (RG) 1.82, Revision 0, "Sumps for Emergency Core Cooling and Containment Spray Systems," should be replaced with a more comprehensive means of assessing debris effects on a plant-specific basis. The 50% screen blockage assumption did not require a plant-specific evaluation of the debris-blockage potential and may result in a non-conservative analysis for screen blockage effects.

As stated in Duke's letters of March 1 and September 1, 2005, Catawba confirmed the Emergency Core Cooling System (ECCS) and Containment Spray System (CSS) recirculation functions under debris loading conditions would be in compliance with the regulatory positions listed in the Regulatory Requirements Section of Generic Letter 2004-02 by December 31, 2007. The design of the modified containment sump structure will accommodate the effects of debris loading as determined by baseline and refined evaluations specific to Catawba. These evaluations use the guidance of NEI 04-07, "Pressurized Water Reactor Sump Performance Evaluation Methodology," Revision 0, dated December 2004, as amended by the NRC's Safety Evaluation Report.

As communicated in the November 1, 2006 letter, Catawba Unit 2 will install the sump strainer modification to support the resolution of GSI 191 during its fall 2007 refueling outage. As discussed in the same letter, Catawba Unit 1 will install the sump strainer modification prior to entry into Mode 4 operations after May 19, 2008.

4.2 Trash Racks Elimination and ECCS Sump Strainer Assembly Surveillance Discussion

Generically, as discussed in Regulatory Guide 1.82, Rev. 0, the design functions of trash racks are to protect the fine inner screens structurally and to prevent large debris from reaching the fine inner screens.

Duke has determined trash racks to be unnecessary based on the following considerations:

1. Regulatory Guide 1.82 position regarding trash racks is predicated on the broad range of possible sump locations for various PWR containment designs.

2. Catawba's sump strainer is located entirely within the pipechase area. As a result, it will not be subjected to missile loads, jet impingement, or pipe whip. It is therefore concluded that structural protection offered by trash racks is not a design function required for the replacement strainer design. Thus, preventing large debris from reaching the fine inner screen/strainer elements is the only potential function that would be served by trash racks.

3. All debris-laden flow to the strainer is first filtered by passage through crane wall penetrations.

4. Most of the debris that might transport through the crane wall and most of the large debris generated in the pipechase must traverse a torturous flow path before nearing the modified sump strainer due to the large number of structures and interferences that would provide capture of large debris.

These containment building and modified sump strainer features effectively provide the design function of trash racks (mitigating debris transport to the ECCS Sump Strainer) and negate the need for trash racks at the sump intake.

The proposed license amendment seeks to revise Catawba Technical Specification Surveillance Requirement (SR) 3.5.2.8 to reflect the ECCS containment sump modification. This modification encloses the containment sump suction inlet, thus making it an integral part of the strainer assembly. The use of the term "strainers" reflects the replacement sump configuration, which does not include trash racks. The use of the term "ECCS containment sump strainer assembly" allows the surveillance to apply to the existing unmodified ECCS containment sump screen as well as the new modified sump strainer.

The proposed changes modify the requirements of SR 3.5.2.8 by removal of the word "train". The word "train" is no longer required since the new design has one large strainer assembly feeding two trains of suction piping.

The terminology change from "trash racks and screens" to "strainers" provides a more appropriate, and generic description of the new configuration that strains through perforated stainless steel plates. The modification, which adds the new strainer assembly to each unit, is being designed based on inputs from evaluations completed or to be done in response to Generic Letter 2004-02. The new strainers are functionally equivalent to trash racks and screens for meeting the requirements of 10CRF50.46(b)(5) for long term cooling. The use of the word "ECCS containment sump strainer assembly" will not affect the implementation of SR 3.5.2.8 for the unmodified unit.

The statement: "*This surveillance is not a commitment to inspect 100 percent of perforated plate area*" is due to the size, complexity, and location of the new strainer assembly. Normal inspection areas will be defined as those regions of the strainer assembly that can be accessed by an inspector for a normal visual inspection without disassembling the strainer assembly or the protective grating located above the strainers. The intent of this surveillance is to ensure the absence of any condition which could adversely affect strainer functionality. Gratings located above the strainers will be installed per criterion C.8 of

Regulatory Guide 1.82, "Sumps for Emergency Core Cooling and Containment Spray Systems",Rev.0. Due to the larger strainer assembly size, some of the grating and portions of the strainers will be against the outer wall of the pipechase. Thus, some of the top hat assemblies, portions of top hat assemblies, and portions of the plenums will be inaccessible without disassembling the structure.

The gratings for vortex suppression, while presenting a challenge to the inspection, also serve to keep foreign material from reaching the strainers during normal operation and during outages. The strainer assembly will be carefully installed with cleanliness checks throughout the process. Once the entire strainer assembly is installed with vortex suppression grating in place there will be no mechanism during normal operation to foul the strainers with debris. Inspecting the entire surface area of the strainer assembly during each outage would put the strainers at risk of damage when the protective grating over the strainers was disassembled out of the way to allow inspection of the covered area. Limiting the visual inspection to regions that do not require disassembly will also help minimize the dose to individuals performing the inspection. Since the strainers are constructed of stainless steel it is very unlikely that they would corrode during normal operation. A sufficiently detailed inspection of the exterior strainer surfaces to establish a high confidence that no adverse conditions are present using normal visual inspection techniques, as described above, will meet the goal of assuring that the strainer units remain clean and have no structural distress or abnormal corrosion.

4.3 Consideration of ECCS Strainer Single Failure

Regulatory Guide 1.82, Rev. 0, includes criteria for the physical separation of containment sumps assuming the potential for damage exists due to structural interaction (missiles, pipe whip) or other consequences (jet impingement) following an initiating event requiring subsequent use of the sump. Regulatory Guide 1.82, Revision 3, contains the following

statement on page 1.82-6: "Consistent with the plant licensing basis single-failure criterion, redundant ECC Sumps and sump outlets should be separated to the extent practical to reduce the possibility *that a single event* could render both sumps inoperable.

Catawba's licensing bases for single failures, as reflected in Chapters 3.0 and 6.0 Catawba UFSAR, assumes that during the short-term period (i.e., within the first 24 hours following the initiating incident), the single failure is limited to the failure of an active component to complete its function as required. Should a single failure occur during the long-term period rather than the short-term, the engineered safety features are designed to tolerate an active failure or a passive failure without loss of its protective function.

SECY-77-439, "Single Failure Criterion," states the following:

However, in applying the Criterion, it is not assumed that any conceivable failure could occur. For example, reactor vessels or certain types of structural elements within systems, when combined with other unlikely events, are not assumed to fail because the probabilities of the resulting scenarios of events are deemed to be sufficiently small that they need not be considered. In general only those components which are judged to have a credible chance of failure are assumed to fail when the Single Failure Criterion is applied.

SECY-77-439, Section 3.B states the following:

> During the long-term ECCS recirculation cooling mode, the most limiting active failure, or single passive failure equal to the leakage that would occur from a valve or pump seal failure, is assumed. The basis for not including other passive failures during the long term is based on engineering judgment that such failures (pipe or valve breaks) have an acceptably low likelihood of occurrence during the long-term phase of a loss-of-coolant accident. Analysis of ECCS performance in WASH-1400 indicate that passive failures of valves and piping are relatively

small contributors to the ECCS unavailability during both injection and recirculation modes of operation.

Due to the fact that no modifications or changes are made to any ECCS control or protection system, valve operators, pumps, or instrumentation (e.g., level/pressure switches), it is reasonable to conclude active failure response is unaffected by the proposed changes. The actuation and alignment of the ECCS in response to a LOCA are unaffected. Swapover to sump recirculation, including any required manual operator actions, will take place as before the modification.

The consideration of passive failures is more relevant since the new strainer is a passive device. Passive failures are usually limited to piping systems, pump seals, flanges, gaskets and similar components. Structural failures are typically not imposed on QA Condition 1 safety-related structures, systems or components (SSCs) not subjected to loads outside of their design bases.

Regulatory Guide 1.82, Rev. 0 establishes a position that redundant ECC Sumps should be provided. The inferred intent of this position is to reduce the possibility that a single event could render both ECC Sumps inoperable. A single, shared (non-redundant) strainer meets the intent of this requirement if it can be shown that it is not susceptible to failure in a manner which would result in the loss of both trains of RHR/CSS. Active components whose credible failures could render the ECCS inoperable have redundance built into their design. Passive components, on the other hand, do not require such redundance because they are designed such that neither a consequential failure nor single passive failure is credible, and if so, the intent of Regulatory Guide 1.82 and Generic Letter 2004-02 is met.

Catawba stuctural analyses conclude that there are no high energy line break loads, jet impingement loads or missile loads applicable to the containment sump strainer assemblies located in the pipechase. Section 6.2.2.2 of the Catawba UFSAR states:

Piping subject to breaks that result in need for recirculation capabilities are located inside the crane wall and are thus isolated from the recirculation sump screen assemblies. This physical isolation protects the screen assemblies from pipe whip and jet impingement, and also eliminates air entrainment in the recirculating fluid caused by jet effects on the liquid surface. In addition the crane wall keeps insulation and other debris directly generated by the break from getting into the annular region where the sump is located.

In summary, given that the strainers are seismically qualified, fully passive components, there are no credible failures which could adversely affect the sump strainer structures at Catawba. The presumption that a single passive structural failure would allow unfiltered water to be introduced into an RHR or CSS Pump is not warranted. Therefore, the need to maintain two physically separated containment sumps or ECCS/CSS train separation within the same sump is unnecessary due to the absence of any reasonable assumptions that would require that level of redundancy and protection. Such redundancy does not result in any increase in safety.

An ECCS system design with multiple means of accessing inventory for recirculation clearly is in the interest of greater safety. Redundancy of trains and duplication of active components such as ECCS Sump isolation valves provide greater assurance and reliability that the safety function of continuing to provide coolant flow to the core will be met.

There are two considerations which preclude the ability to provide each train of ECCS with its own dedicated strainer having sufficient surface area to resolve Generic Safety Issue (GSI) 191:

a. Fibrous Debris Challenge

   At Catawba, the primary large break LOCA debris reaching the strainers is projected to be fibrous insulation. The projected maximum volume is in the range of several

hundred cubic feet. With this large volumetric challenge, a compact, surface-intensive strainer design is not suited to the goal of minimizing head loss. Instead, a less compact design that optimizes both surface area and interstitial volume (i.e., one that allows space to accommodate the anticipated debris load) is required.

b. Available Space

There are two primary restrictions on available space. First, because Catawba is an ice condenser plant with small containment buildings, space is limited. Second, Duke chose to resolve GSI-191 concerns with a design that ensures full submergence of the strainer during all postulated scenarios. The limiting submergence case for ECCS containment sump operation at Catawba is a small break LOCA which limits the maximum height of the strainer assembly.

The objective of the new strainer design is to provide acceptable flow with minimum head loss at the specified debris loads and ensure adequate NPSH to the ECCS/CSS Pumps during the post-LOCA Recirculation Phase. When installation is completed, the new sump strainer design is intended to resolve concerns associated with GSI-191. The changes made enhance the existing design by providing a larger sump strainer surface area. The completion of chemical effects studies and other evaluations is required to confirm that Catawba's ECCS recirculation functions under debris loading conditions will be in full compliance with the Applicable Regulatory Requirements section of NRC Generic Letter 2004-02.

5.0 REGULATORY SAFETY ANALYSIS

5.1 No Significant Hazards Consideration

Duke Energy Carolinas, LLC (Duke) has concluded that operation of Catawba Nuclear Station Units 1 & 2, in accordance with the proposed changes to the UFSAR and licensing basis does not involve a significant hazards

consideration. Duke's conclusion is based on its evaluation, in accordance with 10CFR50.91(a)(1), of the three standards set forth in 10CFR50.59(c) as discussed below:

A. Does the proposed amendment involve a significant increase in the probability or consequences of an accident previously evaluated?

Response: No.

Implementation of the proposed amendment does not significantly increase the probability or the consequences of an accident previously evaluated. The containment sump strainer structures function to mitigate the consequences of an accident. As stated in Generic Letter 2004-02, "Potential Impact of Debris Blockage on Emergency Recirculation During Design Basis Accidents at Pressurized-Water Reactors," the current 50% screen blockage assumption identified in Regulatory Guide (RG) 1.82, Rev. 0, "Sumps for Emergency Core Cooling and Containment Spray Systems," should be replaced with a more comprehensive means of assessing debris effects on a plant-specific basis. The 50% screen blockage assumption did not require a plant-specific evaluation of the debris-blockage potential and usually results in a non-conservative analysis for screen blockage effects.

As stated in Duke's letters of March 1 and September 1, 2005, Catawba confirmed the Emergency Core Cooling System (ECCS) and Containment Spray System (CSS) recirculation functions under debris loading conditions would be in compliance with the regulatory positions listed in the Regulatory Requirements Section of Generic Letter 2004-02. The design of the modified containment sump structure will accommodate the effects of debris loading as determined by a baseline and refined evaluations specific to Catawba. These evaluations use the guidance

of NEI 04-07, "Pressurized Water Reactor Sump Performance Evaluation Methodology, Revision 0," dated December 2004, as amended by the NRC's Safety Evaluation Report.

Removal of the implied licensing basis requirement to physically separate the containment sump into two halves or provide ECCS train separation within the same containment sump will not impact the assumptions made in Chapter 15 of the Catawba UFSAR. There are no changes in any failure mode or effects analysis associated with this change. Since there are no credible failures which could result in the introduction of unfiltered debris within the strainer assembly beyond the design limits, the need to maintain this physical separation is not warranted.

Although the configurations of the existing containment sump trash racks and screen and the replacement sump strainer assemblies are different, they serve the same fundamental purpose of passively removing debris from the sump's suction supply of the supported system pumps. Removal of trash racks does not impact the adequacy of the pump NPSH assumed in the safety analysis. Likewise, the change does not reduce the reliability of any supported systems or introduce any new system interactions. The greatly increased surface area of the new strainer is designed to reduce head loss and reduce the approach velocity at the strainer face significantly, decreasing the risk of impact from large debris entrained in the sump flow stream.

Thus, based on the above, the proposed change does not involve a significant increase in the probability or consequences of an accident previously evaluated.

B. Does the proposed amendment create the possibility of a new or different kind of

accident from any accident previously evaluated?

Response: No.

The proposed licensing basis changes will not create the possibility of a new or different kind of accident. The ECCS containment sump serves as a portion of the ECCS accident mitigation system. It is, therefore, not an accident initiator. Duke's evaluation concludes that there are no credible failures which could result in the introduction of debris within the strainer assembly and clog downstream components. Accordingly, there is no change in the consequences of an accident previously evaluated in the UFSARs.

Catawba is replacing the ECCS Sump trash racks and screens with strainer assemblies in support of the response to Generic Letter 2004-02. These strainer assemblies are passive components in standby safety systems used for accident mitigation. As such, they cannot be accident initiators.

A change to Catawba Technical Specification Surveillance Requirement 3.5.2.8 does not alter the nature of events postulated in the Safety Analysis Report nor do they introduce any unique precursor mechanisms.

Therefore, the proposed changes will not create the possibility of a new or different kind of accident from any accident previously evaluated.

C. Does the proposed amendment involve a significant reduction in the margin of safety?

Response: No.

Margin of safety is related to the confidence in the ability of the fission product barriers to perform their design

functions during and following an accident situation. These barriers include the fuel cladding, the reactor coolant system, and the containment system. The performance of the fuel cladding, the reactor coolant system, and the containment system will not be impacted by the proposed change.

Nuclear safety is greatly enhanced by the proposed licensing basis changes by ensuring consistent interpretation and implementation of their requirements.

As previously stated, Duke's evaluation concludes that there are no credible failure mechanisms which could result in the introduction of debris above design limits within the strainer assembly and clog downstream components. The partitioning of the containment sump into two halves is therefore unnecessary and does not result in any increase in safety or protection.

The proposed change to Technical Specification SR 3.5.2.8 will have no effect on the manner in which safety limits, limiting safety system settings, or limiting conditions for operation are determined nor will there be any effect on those plant systems necessary to assure the accomplishment of protective functions. The proposed change does not adversely affect the fuel, fuel cladding, Reactor Coolant System, or containment integrity.

Thus, it is concluded that the proposed changes do not involve a significant reduction in the margin of safety.

5.2 Applicable Regulatory Requirements/Criteria:

Catawba's position with respect to Regulatory Guide 1.82, Revision 0, as currently described in their UFSARs, has been revised to: (1) delete the requirement or implication that two physically separated containment sumps (one for each train of RHR/CSS) must be maintained; (2) Eliminate the requirement for trash

racks; (3) Clarify the wording to replace "trash racks and screens" with the word "strainers"; and (4) Describe the required ECCS Sump Strainer Assembly Surveillance.

Adherence to the criteria of 10CFR50, Appendix A, General Design Criteria (GDC) 34, 35, 38, and 41 are enhanced through the adoption of the proposed licensing basis changes.

Although the configurations of the existing sump screen and the replacement strainer assemblies are different, they serve the same fundamental purpose of passively removing debris from the sump's suction supply of the supported system pumps. Removal of trash racks does not impact the adequacy of the pump NPSH assumed in the safety analyses.

This LAR is being submitted in accordance with 10 CFR 50.90.

6.0 ENVIRONMENTAL CONSIDERATIONS

The proposed change does not involve a significant hazards consideration, a significant change in the types of or significant increase in the amounts of any effluents that may be released offsite, or a significant increase in individual or cumulative occupational radiation exposure. Therefore, the proposed change meets the eligibility criteria for categorical exclusion set forth in 10 CFR 51.22(c)(9).

Pursuant to 10 CFR 51.22(b), an environmental assessment of the proposed change is not required.

7.0 PRECEDENTS

The stations listed below are currently using or plan to use a single, shared strainer design. None of the facilities listed below are committed to Regulatory Guide 1.82, Revision 0. The listing is not intended to be all inclusive but is provided to confirm that a single shared strainer concept will not be unique to Catawba:

Oconee Nuclear Station, Units 1, 2, and 3: As reflected in their UFSAR, each of the Oconee Units has a common undivided containment sump.

H. B. Robinson 2: As reflected in their UFSAR, Robinson has a common containment sump.

Turkey Point: Turkey Point Units 3 and 4 utilize a single set of strainer modules.

Similar changes have been approved for:

Oconee Nuclear Station, Units 1 and 2, by NRC Safety Evaluation Report (SER) dated Nov 1, 2005,

Wolf Creek by NRC SER dated Oct 5, 2006, and

Comanche Units 1 and 2 by NRC SER dated Oct 5, 2006.

8.0 REFERENCES

Catawba Nuclear Station (CNS) electronic UFSAR, effective date October 24, 2006, Revision 12 including Tracking Tool.

CNS Technical Specifications through amendments 234/230.

NRC Bulletin 2003-01, Potential Impact of Debris Blockage on Emergency Sump Recirculation at PWRs.

Generic Letter 2004-02, Potential Impact of Debris Blockage on Emergency Recirculation During Design Basis Accidents at PWRs .

Drawing CN-1080-54 revision 16, Recirculation Sump Screen Assembly.

Calculation CNC-1223.12-00-0056, Containment Recirculation Sump Documentation of Information Related to Design of Structures and Comparison to Design at McGuire Nuclear Station.

Response to Generic Letter 2004-02, dated 9-1-2005.

Responses to NRC Bulletin 2003-01, dated 8-7-2003 and 5-27-2004.

NEI 04-07, "Pressurized Water Reactor Sump Performance Evaluation Methodology," Rev. 0, December 2004, Vol. 1 and Vol. 2 - "Safety Evaluation by the Office of Nuclear Reactor Regulation Related to NRC Generic Letter 2004-02," Revision 0, December 6, 2004.

Regulatory Guide 1.82, Revision 0.

CD-100493, Unit 1 Scope Description- ECCS Sump Strainer (Document No. CNC-1223.12-00-0056, Rev.2)

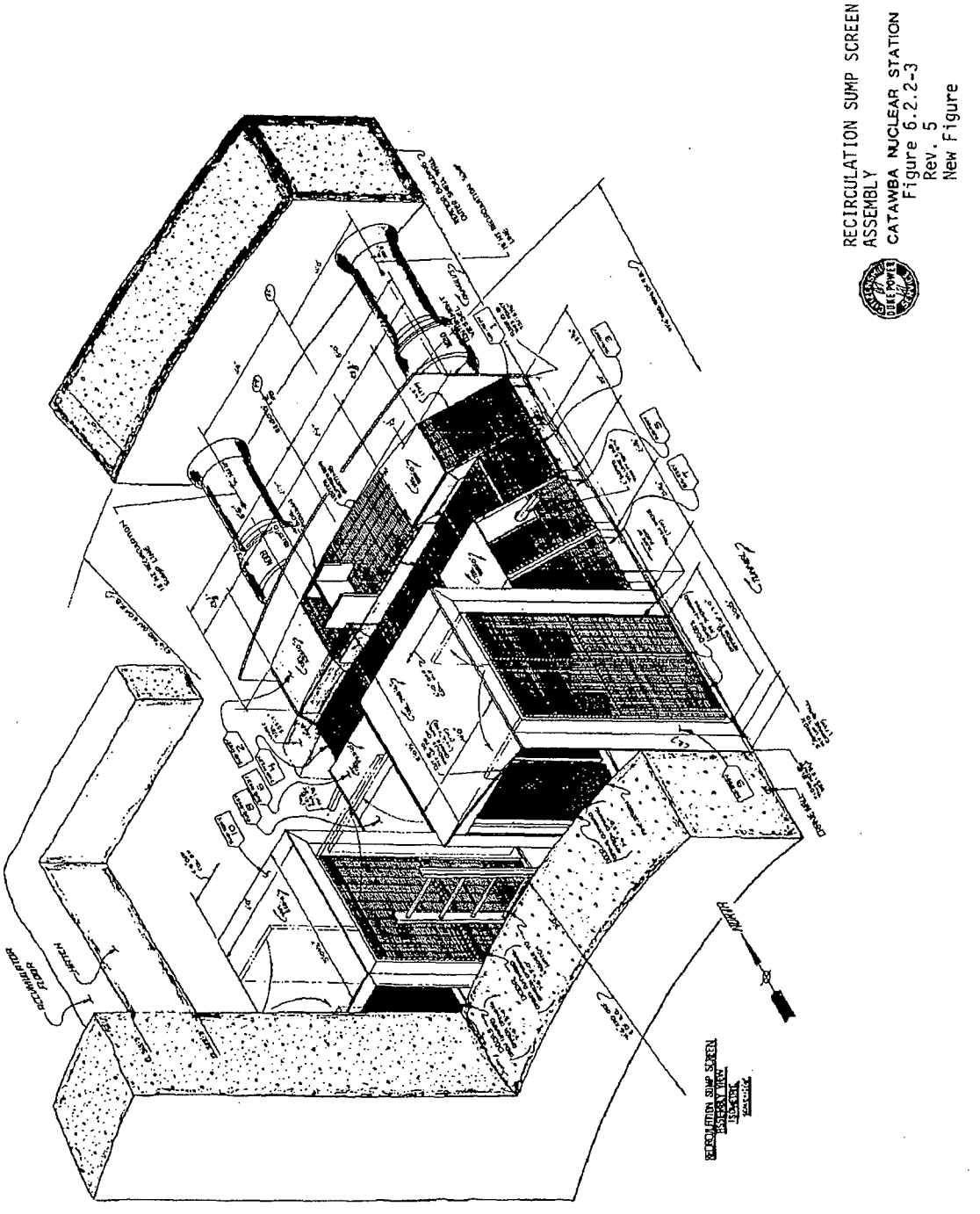
Catawba Nuclear Station SER (2/22/1983), section 6.2.2, Containment Heat Removal System

January 14, 1983 -Response to the NRC Comparing McGuire and Catawba sump tests (Response to Q 440-113); Pages 440-127, 440-128.

9.0 FIGURES

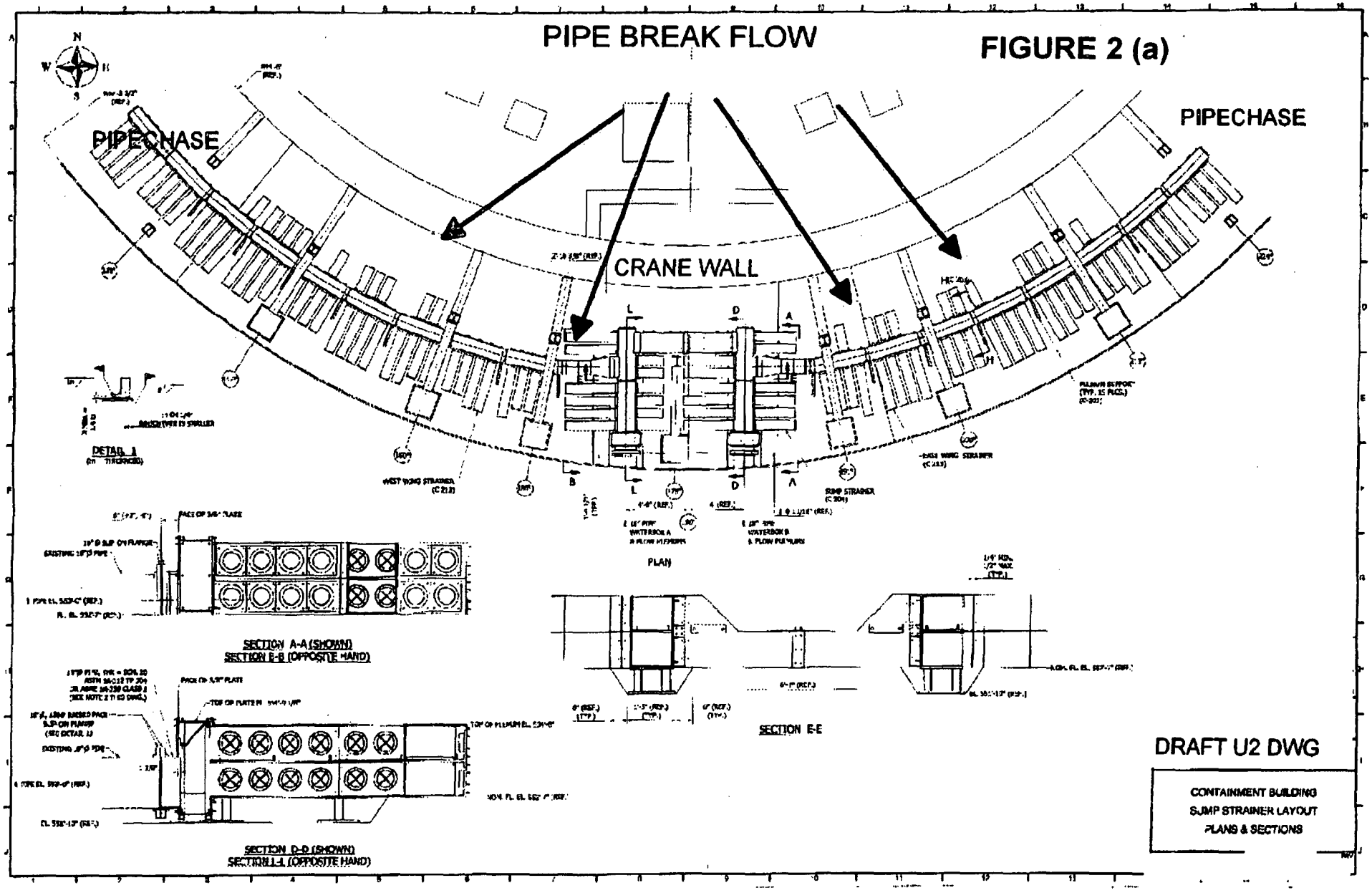
Figure 1: Current ECCS Sump Design Drawing
Figure 2: Modified ECCS Sump Design Drawings and Photo

Figure 1: Current ECCS Sump Design Drawing



PIPE BREAK FLOW

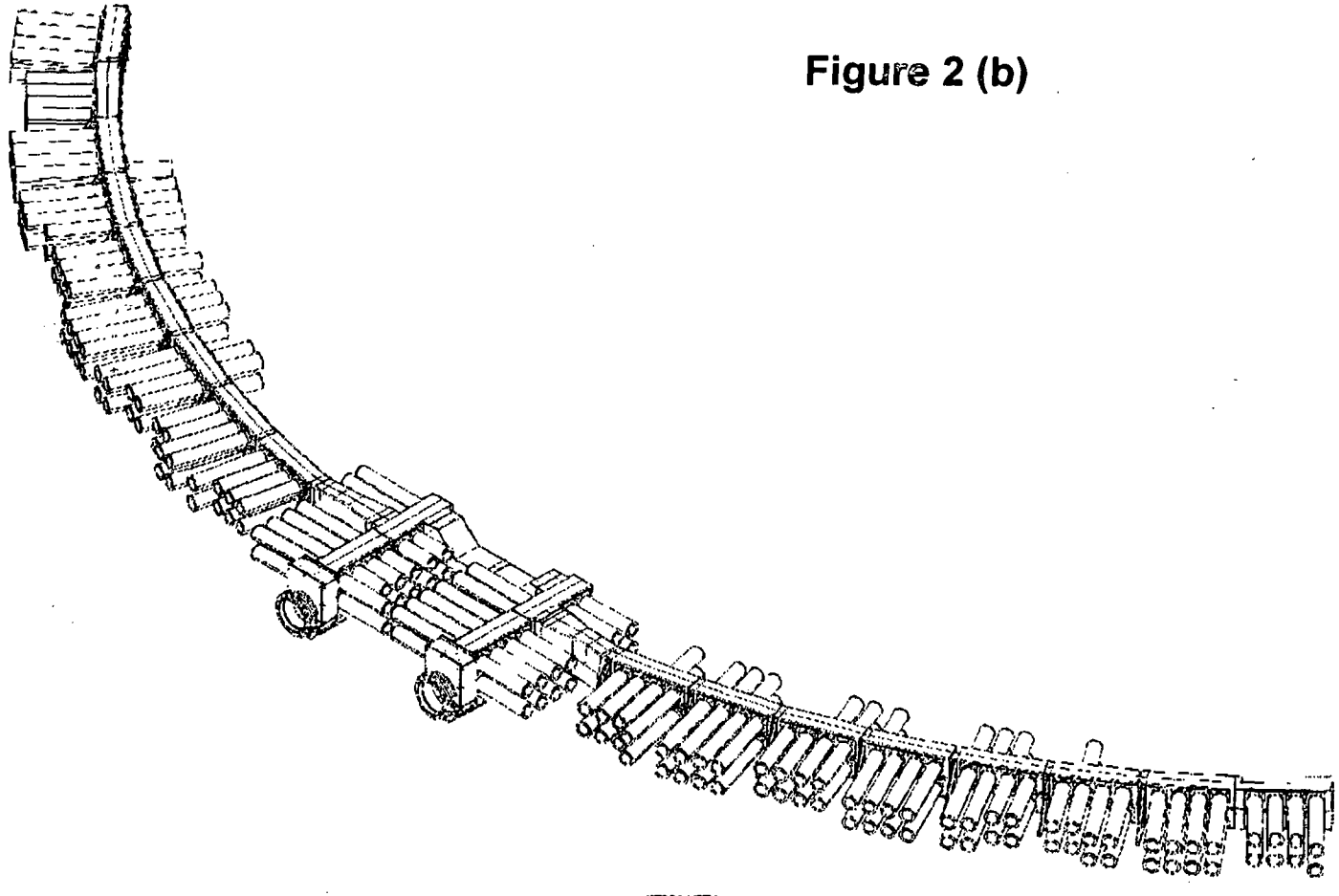
FIGURE 2 (a)



DRAFT U2 DWG

CONTAINMENT BUILDING
SUMP STRAINER LAYOUT
PLANS & SECTIONS

Figure 2 (b)



ISOMETRIC VIEW

CONTAINMENT BUILDING
SUMP STRAINER
GENERAL NOTES

DRAFT U2 DWG

Figure 2 (c)

Photo of a "Top Hat" Strainer