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July 22, 2005

U. S. Nuclear Regulatory Commission
Attention: Document Control Desk
Washington, DC 20555-0001

Subject: Duke Energy Corporation
Catawba Nuclear Station Units 1 and 2
Docket Nos. 50-413 and 50-414
An Interpretation of Surface Water Tritium Reporting Levels for Catawba Nuclear Station

References: NUREG 1301, Offsite Dose Calculation Manual
Guidance: Standard Radiological Effluent Controls for Pressurized Water Reactors, Generic Letter 89-01, Supplement No.1

Catawba Nuclear Station Selected Licensee Commitments (SLC) Manual

40 CFR 141.16: National Primary Drinking Water Regulations: Maximum Contaminant Levels for Beta Particle and Photon Radioactivity from Man-made Radionuclides in Community Water Systems

10 CFR 20.1301: Standards for Protection Against Radiation: Dose limits for Individual Members of the Public

10 CFR 50, Domestic Licensing of Production and Utilization Facilities, Appendix I: Numerical Guides for Design Objectives and Limiting Conditions for Operation to Meet the Criterion "As Low as is Reasonably Achievable" for Radioactive Material in Light-Water-Cooled Nuclear Power Reactor Effluents

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The purpose of this letter is to outline Duke Energy's interpretation of the requirements of Selected Licensee Commitment (SLC) 16.11-13, Radiological Effluents Controls - Monitoring Program as it relates to tritium reporting levels to the NRC Office of Nuclear Reactor Regulation (ONRR). It is Duke's interpretation that the Catawba site is located on a drinking water pathway. Therefore, the 30,000 pico-Curie per liter (pCi/l) reporting level for tritium listed in the footnote for Table 3.12-2 of NUREG 1301 does not apply. The EPA limit from 40 CFR 141 of 20,000 pCi/l will be monitored at drinking water sample site 214, which is located at the influent waters to the Rock Hill Water Supply.

The REMEDIAL ACTIONS in SLC 16.11-13 will be taken if the 20,000 pCi/l reporting level is exceeded at sample site 214. The actions include generating a special report that identifies the causes for exceeding the reporting level and defines the corrective actions taken to reduce radioactive effluents so that annual dose to the "member of the public" is below the specified limits outlines in 10 CFR 50, Appendix I and 40 CFR 141. Attachment A provides a detailed discussion of the interpretation of the tritium reporting level and the sampling plan.

The intent of this letter is only to inform the Commission of the licensee's current interpretation of the tritium reporting level for environmental water samples for the Catawba site. This document contains no new commitments.

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Sincerely,

Dhiaa M. Jamil

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Attachment A

Catawba Nuclear Station
Regulatory Compliance

Licensing Research Memorandum

Date: **March 17, 2005**
From: **Anthony P. Jackson**
Subject: **An Interpretation of Surface Water Tritium Reporting Levels for Catawba Nuclear Station**
File No : **2005-02**

I. Research Topic and Specific Questions to be Answered by Research

The purpose of this white paper is to outline the CNS site's interpretation of the requirements of Selected Licensee Commitment (SLC) 16.11-13, Radiological Effluents Controls - Monitoring Program as it relates to tritium reporting levels in surface water.

II. Evaluation of License Basis and Regulatory Basis

SLC Table 16.11-13-2 lists the tritium reporting level for water as 20,000 pCi per liter (pCi/l). The footnote with this value states:

"For drinking water samples. This is 40 CFR Part 141 value. If no drinking water pathway exists, a value of 30,000 pCi per liter may be used."

The SLC table is based on NUREG 1301, Offsite Dose Calculation Manual Guidance: Standard Radiological Effluent Controls for Pressurized Water Reactors, Generic Letter 89-01, Supplement No.1. The SLC table and footnote are taken directly from Table 3.12-2 of NUREG 1301.

40 CFR 141 is the EPA National Primary Drinking Water Regulations. Section 141.16 states:

> "The average annual concentration of beta particle and photon radioactivity from man-made radionuclides *in drinking water* shall not produce an annual dose equivalent to the total body or any internal organ greater than 4 millirem per year."
> Table A - Average Annual Concentrations Assumed to Produce a Total Body or Organ Dose of 4 mrem/year lists a pCi per liter value of 20,000 for tritium.

III. Discussion

This interpretation asserts that a drinking water pathway does exist for Catawba and the Reporting Level of 20,000 pCi/l is allowed to be applied. The drinking water location is the Rock Hill Water Supply located 7.3 miles downstream of Catawba. Because a drinking water sample location is available downstream of Catawba, the footnote value of 30,000 pCi/l does not apply to the surface water sample collected at Site 208(Discharge Canal). If the concentration of tritium in surface water at Site 208 exceeds 30,000 pCi/l, a Special Report will not be submitted to the NRC as specified under the REMEDIAL ACTIONS section "B.1".

No direct dose pathway exists for surface water in the Catawba discharge canal. Dose pathways do exist for fish and shoreline sediment and the SLC Table 16.11-13-2 Reporting Levels are applied.

The basic requirements for the Selected Licensee Commitments (SLCs) concerning effluents from nuclear power reactors are stated in 10 CFR 50.36a. These requirements indicate that compliance with effluent SLCs will keep average annual releases of radioactive material in effluents to small percentages of the limits specified in 10 CFR 20.1301. These requirements further indicate that operational flexibility is allowed, compatible with considerations of health and safety, which may temporarily result in releases higher than such small percentages, but still within the limits specified in 10 CFR 20.1301. It is further indicated in 10 CFR 50.36a that when using operational flexibility, best efforts shall be exerted to keep levels of radioactive materials in effluents as low as is reasonably achievable (ALARA) as set forth in 10 CFR 50, Appendix I.

The release of radioactive effluents into the discharge canal (and ultimately into Lake Wylie) is regulated by release concentration limits and by dose to the public. Catawba Technical Specification 5.5.5(a)(2) and SLC 16.11-1 limit the concentration of radioactive material released in liquid effluents to unrestricted areas to ten times the effluent concentrations (ECs) specified in 10 CFR Part 20, Appendix B, Table 2, Column 2. Dose to the public from normal liquid discharges is regulated by Catawba Technical Specification 5.5.5(a)(4) and SLC 16.11-3. SLC 16.11-3 reflects the *per unit* liquid public dose limits contained in NUREG-1301, i.e.:

1.5 mrem whole body (calendar quarter)
5.0 mrem organ (calendar quarter)
3.0 mrem whole body (calendar year)
10.0 mrem organ (calendar year)

The liquid effluent concentration releases from Catawba are well below the 10 times EC limit, and the calculated dose to the public is a small fraction (< 2%) of the 10 CFR 50, Appendix I, ALARA design objectives.

The dose pathways from liquid effluents are drinking water, fish and shoreline sediment. Each of these media is sampled according to SLC Table 16.11-13-1, and each is well below the corresponding Reporting Levels. In contrast, there is no direct dose pathway to the public for surface water at REMP Site 208. The community drinking water source is the Rock Hill Water Supply located 7.3 miles downstream of Catawba (REMP Site 214). The highest measured tritium sample at this location is 1,340 pCi/l (with a reporting level of 20,000 pCi/l). The 1,340 pCi/l drinking water sample occurred in June of 2002, at the height of a five year drought. The corresponding discharge canal surface water tritium sample (Site 208) was 12,700 pCi/l. The calculated total body dose to a member of the public from this drinking water location for calendar year 2002 was 0.08 mrem. The calculated total body dose for all liquid pathways (drinking water, fish and shoreline sediment) for this same period was 0.1 mrem.

If the concentration of tritium in the discharge canal were to reach and remain at 30,000 pCi/l for a year, the worst case estimated dose from drinking water at Site 214 (based on drought conditions resulting in low lake volume) would be approximately 0.38 mrem for a year. This is only 6.3% of the calendar year dose limit of 6 mrem for the Catawba site.

The SLC Table 16.11-13 Required Action for exceeding a REMP Reporting Level is:

> *"Prepare and submit a Special Report that identifies the cause(s) for exceeding the limits and defines the corrective actions to be taken to reduce radioactive effluents so that the potential annual dose to a Member of the Public is less than the calendar year limits of SCL 16.11-3, SLC 16.11-8 and SLC 16.11-9."*

(Only SLC 16.11-3 applies to liquid effluents; SLCs 16.11-8 and 16.11-9 apply to gaseous effluents).

If the 30,000 pCi/l value were to be applied to the surface water in the discharge canal there would be no action necessary to "reduce radioactive effluents so that the potential annual dose to a Member of the Public is less than the calendar year limits of SCL 16.11-3, SLC 16.11-8 and SLC 16.11-9."

Siting of Surface Water Sampler at Site 208

Based on review of historical information and review of dye studies performed in the discharge canal in 1986 and 1987, the radiological environmental monitoring surface water sample at Catawba Site 208 is adequately placed for meeting the requirements of SLC 16.11-13. The sampler is located in the discharge canal approximately 1400 feet from the discharge structure (just inside the Exclusion Area Boundary). A pump pulls water continuously from the canal through a pipe about two feet below the surface. This water is discharged into a container inside a locked shed. An ISCO sampler pulls an aliquot from the container approximately every two hours. The ISCO sample is collected monthly for analysis.

Catawba SLC Table 16.11-13-1, Note 5 states that "the downstream sample shall be taken in an area beyond but near the mixing zone". U.S. Environmental Protection Agency (EPA), Environmental Radioactivity Surveillance Guide (ORP/SID 72-2) states that for facilities located on a lake or ocean the downstream surface water sampler "should be located near the discharge outfall but beyond the turbulent area caused by the discharge". Specific definitions of "mixing zone" and "turbulent area" were not provided. However, the sampling site is visibly beyond any 'turbulent area' in the canal.

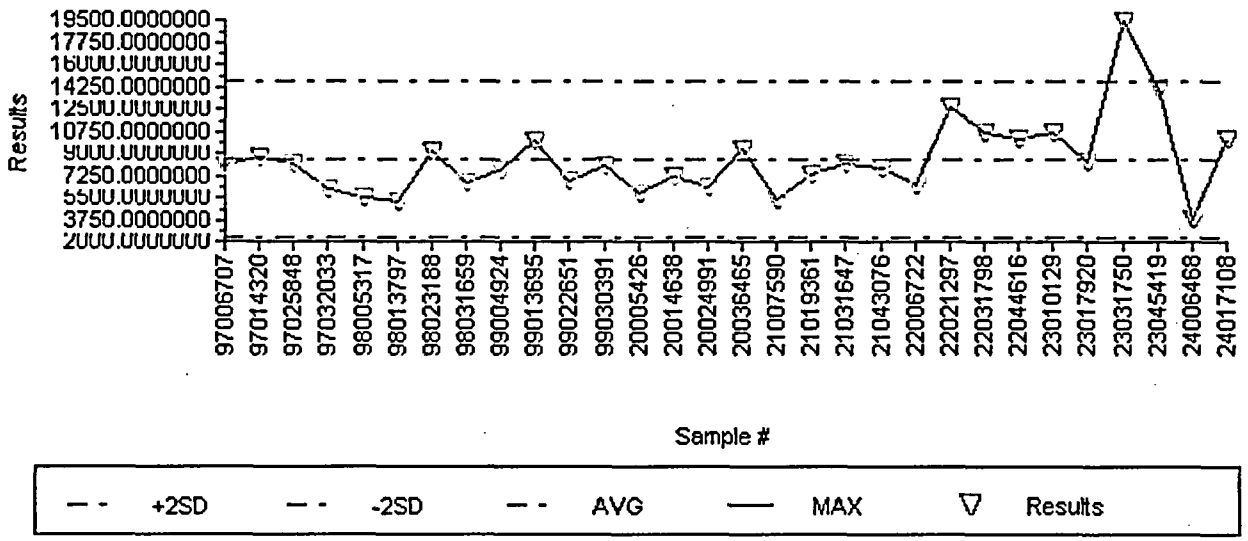
In order to sample an area with full lake mixing the sampler would have to be placed well into the lake which would not meet the intent of EPA guidance "located near the discharge outfall". In addition, placement of the sampler outside the canal and further into the lake would be very difficult because it would likely be on private property and would greatly increase the risk of vandalism to the equipment.

An additional surface water sampler is located 4.1 miles downstream (REMP Site 211). A surface water control sampler is located upstream beyond the influence of the plant. Tritium sample results from the Site 211 surface water location are similar to results from the Site 214 drinking water location, indicating that full mixing has occurred by the time plant discharges have reached Site 211.

Sample results from the drinking water location (Site 214) and both surface water locations (Site 208 and Site 211) are attached.

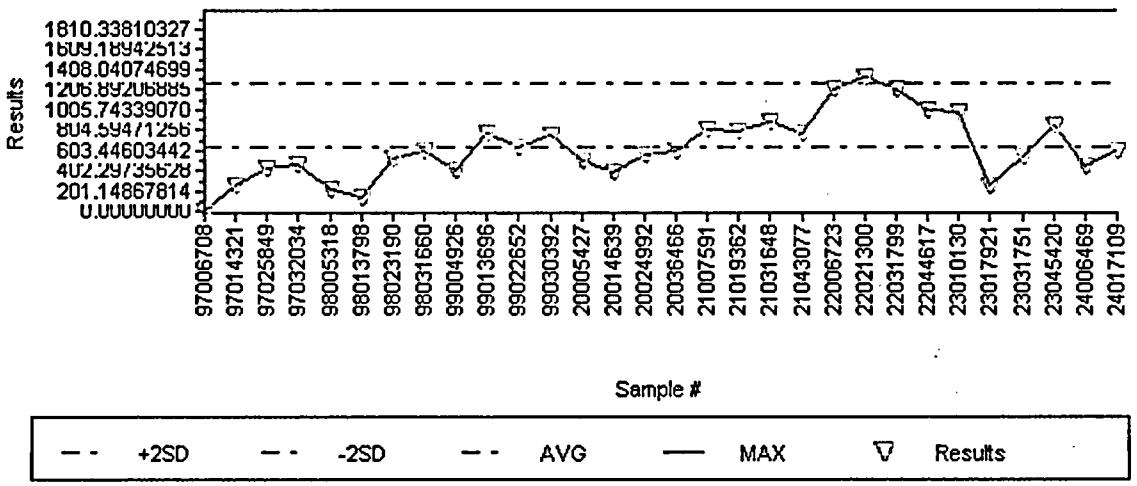
Surface Water Site 208 (Discharge Canal) Tritium Results

Sample #	Results pCi/l	LLD	Sample Date
97006707	8046	<2000	3/12/1997
97014320	8621	<2000	6/04/1997
97025848	8239	<2000	9/24/1997
97032033	6201	<2000	12/17/1997
98005317	5528	<2000	3/11/1998
98013797	5220	<2000	6/03/1998
98023188	9108	<2000	9/23/1998
98031659	6597	<2000	12/16/1998
99004924	7689	<2000	3/08/1999
99013695	9925	<2000	6/01/1999
99022651	6875	<2000	9/20/1999
99030391	8011	<2000	12/13/1999
20005426	5881	<2000	3/06/2000
20014638	7160	<2000	5/30/2000
20024991	6327	<2000	9/18/2000
20036465	9373	<2000	12/11/2000
21007590	5354	<2000	3/06/2001
21019361	7260	<2000	5/29/2001
21031647	8120	<2000	9/18/2001
21043076	7770	<2000	12/26/2001
22006722	6520	<2000	3/19/2002
22021297	12700	<2000	6/11/2002
22031798	10600	<2000	10/01/2002
22044616	10200	<2000	12/23/2002
23010129	10600	<2000	3/18/2003
23017920	8260	<2000	6/10/2003
23031750	19500	<2000	9/30/2003
23045419	14200	<2000	12/23/2003
24006468	3870	<2000	3/16/2004
24017108	10200	<2000	6/08/2004



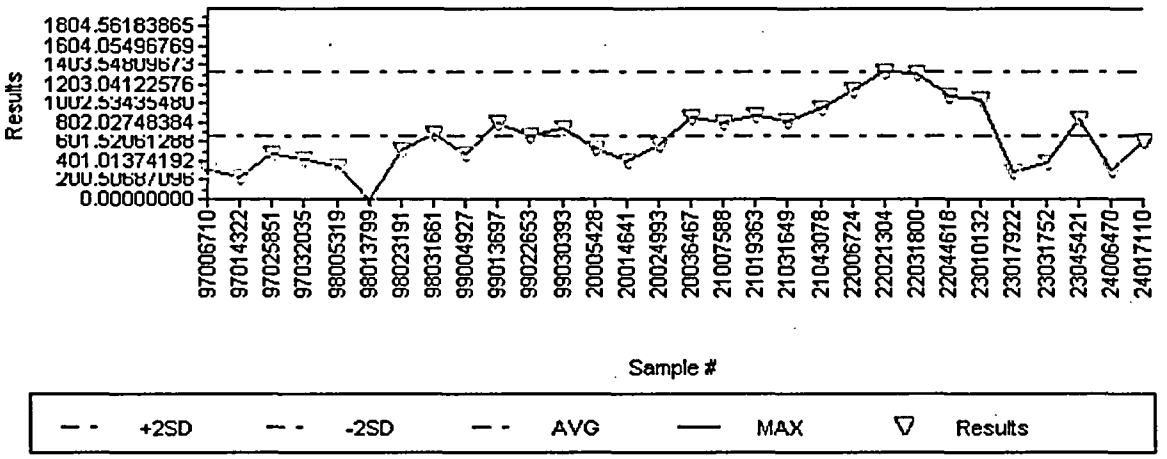
Surface Water Site 211 (4.1 mi. downstream) Tritium Results

Sample #	Results pCi/l	LLD	Sample Date
97006708	<149	<2000	3/12/1997
97014321	248	<2000	6/04/1997
97025849	438	<2000	9/24/1997
97032034	469	<2000	12/17/1997
98005318	219	<2000	3/11/1998
98013798	149	<2000	6/03/1998
98023190	528	<2000	9/23/1998
98031660	597	<2000	12/16/1998
99004926	416	<2000	3/08/1999
99013696	777	<2000	6/01/1999
99022652	647	<2000	9/20/1999
99030392	757	<2000	12/13/1999
20005427	504	<2000	3/06/2000
20014639	383	<2000	5/30/2000
20024992	569	<2000	9/18/2000
20036466	601	<2000	12/11/2000
21007591	816	<2000	3/06/2001
21019362	797	<2000	5/29/2001
21031648	882	<2000	9/18/2001
21043077	778	<2000	12/26/2001
22006723	1220	<2000	3/19/2002
22021300	1330	<2000	6/11/2002
22031799	1210	<2000	10/01/2002
22044617	1010	<2000	12/23/2002
23010130	989	<2000	3/18/2003
23017921	249	<2000	6/10/2003
23031751	536	<2000	9/30/2003
23045420	845	<2000	12/23/2003
24006469	440	<2000	3/16/2004
24017109	596	<2000	6/08/2004



Drinking Water Site 214 (7.3 mi. downstream) Tritium Results

Sample #	Results pCi/l	LLD	Sample Date
97006710	305	<2000	3/12/1997
97014322	215	<2000	6/04/1997
97025851	479	<2000	9/24/1997
97032035	414	<2000	12/17/1997
98005319	330	<2000	3/11/1998
98013799	<143	<2000	6/03/1998
98023191	510	<2000	9/23/1998
98031661	681	<2000	12/16/1998
99004927	473	<2000	3/08/1999
99013697	801	<2000	6/01/1999
99022653	669	<2000	9/20/1999
99030393	740	<2000	12/13/1999
20005428	520	<2000	3/06/2000
20014641	393	<2000	5/30/2000
20024993	575	<2000	9/18/2000
20036467	857	<2000	12/11/2000
21007588	805	<2000	3/06/2001
21019363	879	<2000	5/29/2001
21031649	824	<2000	9/18/2001
21043078	956	<2000	12/26/2001
22006724	1150	<2000	3/19/2002
22021304	1340	<2000	6/11/2002
22031800	1310	<2000	10/01/2002
22044618	1080	<2000	12/23/2002
23010132	1050	<2000	3/18/2003
23017922	283	<2000	6/10/2003
23031752	372	<2000	9/30/2003
23045421	838	<2000	12/23/2003
24006470	310	<2000	3/16/2004
24017110	611	<2000	6/08/2004



Conclusion

It is the licensee's interpretation that the Catawba site is located on a drinking water pathway. Therefore, the 30,000 pico-Curie per liter (pCi/l) reporting level for tritium listed in the footnote for Table 3.12-2 of NUREG 1301 does not apply. The EPA limit from 40 CFR 141 of 20,000 pCi/l will be monitored at drinking water sample site 214, which is located at the influent waters to the Rock Hill Water Supply.

The REMEDIAL ACTIONS in SLC 16.11-13 will be taken if the 20,000 pCi/l reporting level is exceeded at sample site 214. The action includes generating a Special Report that identifies the causes for exceeding the reporting level and defines the corrective actions taken to reduce radioactive effluents so that annual dose to the MEMBER OF THE PUBLIC is below the specified limits outlines in 10 CFR 50, Appendix I and 40 CFR 141.

IV. Reference Documents

1. NUREG 1301, Offsite Dose Calculation Manual Guidance: Standard Radiological Effluent Controls for Pressurized Water Reactors, Generic Letter 89-01, Supplement No.1

2. Catawba Nuclear Station Selected Licensee Commitments (SLC) Manual.

3. 40 CFR 141.16: National Primary Drinking Water Regulations: Maximum Contaminant Levels for Beta Particle and Photon Radioactivity from Man-made Radionuclides in Community Water Systems.

4. 10 CFR 20.1301: Standards for Protection Against Radiation: Dose limits for Individual Members of the Public.

5. 10 CFR 50, Domestic Licensing of Production and Utilization Facilities, Appendix I: Numerical Guides for Design Objectives and Limiting Conditions for Operation to Meet the Criterion "As Low as is Reasonably Achievable" for Radioactive Material in Light-Water-Cooled Nuclear Power Reactor Effluents.