UNITED STATES
NUCLEAR REGULATORY COMMISSION

ATOMIC SAFETY AND LICENSING BOARD

In re:	Docket Nos. 50-247-LR; 50-286-LR
License Renewal Application Submitted by	ASLBP No. 07-858-03-LR-BD01
Entergy Nuclear Indian Point 2, LLC, Entergy Nuclear Indian Point 3, LLC, and Entergy Nuclear Operations, Inc.	DPR-26, DPR-64 June 29, 2012

STATE OF NEW YORK'S REVISED STATEMENT OF POSITION REGARDING CONTENTIONS NYS-6 and NYS-7

Office of the Attorney General
for the State of New York
The Capitol
State Street
Albany, New York 12224

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In accordance with 10 C.F.R. § 2.1207(a)(2) and the Atomic Safety and Licensing Board's ("Board") July 1, 2010 and April 18, 2012 Orders, the State of New York ("State") submits this revised statement of position on the State's admitted Contentions NYS-6 and NYS-7 (Non-Environmentally Qualified Inaccessible Underground Low and Medium Voltage Power Cables).

This Statement is supported by the testimony of Earle C. Bascom, III, P.E. and responds to arguments made in Entergy's Statement of Position Regarding Contention NYS-6 and 7; the Testimony of Entergy Witnesses Alan B. Cox, Roger B. Rucker, Thomas S. McCaffrey and Howard G. Sedding and the exhibits thereto ("Entergy Testimony"); NRC Staff's Statement of Position, and the Testimony of NRC Staff witnesses Cliff K. Doutt and Duc Nguyen and the exhibits thereto ("Staff Testimony").

PRELIMINARY STATEMENT

In contentions NYS 6 and 7, New York State alleges that (1) Entergy's proposed aging management program for non-environmentally qualified ("Non-EQ") inaccessible low and medium voltage power cables exposed to significant moisture ("inaccessible cable moisture AMP") is inadequate because it is so lacking in essential detail that it is difficult, if not impossible, to discern what Entergy will actually do to insure the cables' continuing ability to transmit power during the period of extended operation; and (2) Entergy failed to create an AMP on the aging effects caused by thermal stress on those cables. The responses submitted by Entergy and NRC Staff fail to refute the State's contentions.

In its Statement of Position and pre-filed testimony, Entergy essentially acknowledges that its inaccessible cable moisture AMP, standing alone, does not provide the necessary "reasonable assurance" that the cables will continue to fulfill their intended function during the

license renewal term, and must be supplemented with Entergy's recently-created Cable Reliability Program, which Entergy maintains contains all the detail that is missing from the AMP. Most critically, Dr. Sedding, Entergy's independent expert on cable insulation materials, acknowledges that Entergy's AMP provides the reasonable assurance required by the regulations *if* the AMP is *"implemented in accordance with"* the Cable Reliability Program.[1] Because the Cable Reliability Program is *not* part of Entergy's AMP, that Program cannot provide the Board with the basis for making a finding of "reasonable assurance" unless it is made a binding relicensing obligation enforceable by the NRC, rather than simply a corporate program that Entergy can change at will.

Moreover, Entergy has failed to acknowledge the need for or to create an AMP to manage the aging effects of thermal stress on underground non-EQ low and medium voltage power cables, or to justify the lack of any need for such an AMP.

PROCEDURAL HISTORY

A detailed procedural history of these two contentions is provided in the State's Initial Statement of Position. In sum, although Entergy expanded its initial AMP to cover low-voltage cables exposed to significant moisture, its revised AMP, like its initial AMP, provides no information about the location of the relevant cables, their number, the number of cable circuits, the lengths of the cables or their function, their physical characteristics, the appropriate cable condition monitoring tests, the acceptance criteria for the appropriate cable tests or the corrective actions Entergy will take, if any, if cables do not meet the acceptance criteria.[2] Nor did Entergy expand its AMP to cover the aging effects on those cables caused by thermal stress.

[1] Entergy Testimony at 43-46 (emphasis added).

[2] Exh. NYS000135 at 7-13.

Entergy's Fleet-Wide Cable Reliability Program (EN-DC-346)

On June 14, 2011, Entergy issued its fleet-wide Cable Reliability Program (EN-DC-346).[3] The purpose of that program is "to provide the means to effectively manage underground medium voltage and low voltage power cables that are safety related, non safety related cables whose failure could affect safety related equipment, or serving equipment that is in maintenance rule scope."[4]

The Cable Reliability Program, and the information that it directs Entergy to gather at Indian Point[5] includes all the essential details that are missing from the AMP with respect to the effects of aging caused by exposure of the cables to significant moisture -- the age, length, insulation and shield type of the relevant cables, the specific cable condition monitoring tests, the trending of test results, the condition monitoring test acceptance criteria, and the required corrective actions. However, it does not address the effects of aging caused by thermal stress.[6]

Although Entergy issued the Cable Reliability Program on June 14, 2011, it did not disclose the program to the State until January 6, 2012, seven months after its issuance, and after the State had submitted its Statement of Position, its expert witness's report and pre-filed testimony on December 15, 2011.[7] The Cable Reliability Program, an internal corporate policy,

[3] ENT000237.

[4] *Id.* at 3.

[5] The Cable Reliability Program directed Entergy to prepare lists of medium and low voltage in-scope cables and to include information relevant to their aging management. *Id.* at 16.

[6] The State of New York's expert witness, Earle C. Bascom, has analyzed Entergy's Cable Reliability Program in his rebuttal testimony and has determined that the effects of aging caused by exposure of the cables to significant moisture will be adequately managed if the program is followed at Indian Point. Rebuttal Testimony of Earle C. Bascom III Regarding Contentions NYS-6 and NYS-7, (Exh. NYS000411) at 2 ("Bascom Rebuttal Testimony").

[7] Entergy's suggestion that the State should have acknowledged the Cable Reliability Program in the State's initial submissions conceals Entergy's failure to disclose the program until after the

is not intended as a binding relicensing obligation, and can be changed without any notice to NRC Staff or the public.

POINT I

ENTERGY'S RECENTLY-CREATED CABLE RELIABILITY PROGRAM MUST BE A LEGALLY ENFORCEABLE LICENSE RENEWAL CONDITION IN ORDER TO PROVIDE REASONABLE ASSURANCE THAT THE CABLES WILL PERFORM THEIR FUNCTION DURING THE LICENSE RENEWAL PERIOD

In June 2011, well after the Board's admission of NYS-6 and NYS-7 in 2007, Entergy issued its Cable Reliability Program, which contains the elements that were lacking in its inaccessible cable moisture AMP. Entergy's four expert witnesses acknowledge that the Cable Reliability Program, and not the AMP, provides "*the essential and substantive program details* that New York State alleges are missing from the record" (emphasis added).[8] Indeed, the Cable Reliability Program is cited 38 times in Entergy's 2012 expert testimony in support of its AMP.[9] Entergy's one independent witness, Dr. Howard Sedding, has testified that Entergy's Cable Reliability Program, and not its AMP, provides the required "reasonable assurance" that the relevant cables will perform their intended functions throughout the license renewal period. When Entergy asked Dr. Sedding, based on his "independent"[10] review of the AMP, whether the AMP "provides the reasonable assurance required by NRC regulations," he answered that Entergy's cable AMP, "*as detailed"* in the Cable Reliability Program contains the "required

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State's initial submissions were filed. Entergy's Statement of Position Regarding Contentions NYS-6/NYS-7 (Mar. 29, 2012). ENT000232 at 3.

[8] Entergy Testimony at 81-82.

[9] Entergy Testimony at 15, 18, 35-39, 43-46, 55, 57, 60-61, 71-73, and 79.

[10] Entergy's three other witnesses are not independent. They are either Entergy employees (Alan B. Cox and Thomas McCaffrey) or a paid consultant who prepared documents supporting Entergy's License Renewal Application (Roger B. Rucker). Entergy Testimony at 1-6.

elements of a credible and robust methodology for cable aging management."[11] Most critically, Dr. Sedding concluded that Entergy's AMP provides the reasonable assurance required by the NRC *"if it is implemented"* in accordance with the Cable Reliability Program.[12]

Notwithstanding the agreement of Entergy's experts, Entergy and Staff argue that Entergy's AMP standing alone is sufficient to provide "reasonable assurance," because it is consistent with the relevant generic AMP in "Generic Aging Lessons Learned," NUREG-1801 Rev. 2 ("GALL Rev. 2"). This claim lacks credibility for several reasons. First, GALL Rev. 2 is simply guidance, not a regulation, and the Commission has held that the adequacy of guidance may be litigated in individual license proceedings.[13] Here, the evidence provided by Mr. Bascom and Entergy's independent expert, Dr. Sedding, demonstrate that GALL Rev. 2 and Entergy's AMP are inadequate, and fail to provide the reasonable assurance that a credible and robust cable aging management program would offer *if* implemented as detailed in the Cable Reliability Program.

More to the point, Entergy's Cable Reliability Program is simply an internal corporate program that can be changed or modified at the discretion of Entergy without notice to the NRC or the public. As Staff explained in its testimony and statement of position on Contention NYS-5, "to the extent that Entergy's corporate procedures are not incorporated in the plants' operating licenses or the updated UFSARs, they are not binding upon the licensee."[14] Because Entergy's

[11] Entergy Testimony at 43-44, 45-46 (emphasis added).

[12] Entergy Testimony at 43-46 (emphasis added).

[13] Metropolitan Edison Co. (Three Mile Island Nuclear Station, Unit 1), ALAB-698, 16 N.R.C. 1290, 1299 (1982), *rev'd in part on other grounds*, CLI-83-22, 18 N.R.C. 299 (1983).

[14] NRC Staff's Statement of Position on Contention NYS-5 (Buried Pipes and Tanks) ("NRC Statement of Position") (NRC000015) at 49; Testimony of Kimberly J. Green and William C. Holston Concerning Contention NYS-5 (Buried Pipes and Tanks) (NRC000016) at A47.

evidence makes it clear that its inaccessible cable moisture AMP will provide reasonable assurance only if supplemented by the Cable Reliability Program, the Cable Reliability Program must be elevated to a legally binding obligation imposed on Entergy as a condition in its renewal license so that it cannot be changed "without prior Nuclear Regulatory Commission (NRC) Approval."[15] Only then would the Program approach "reasonable assurance" for purposes of the Board's Indian Point relicensing review.

Transforming Entergy's Cable Reliability Program from a unilateral and unenforceable corporate program into a binding obligation is appropriate under NRC standards for matters "found to be of high safety . . . significance."[16] Assuring that safety- related cables continue to perform their intended function during the license renewal term is of the highest safety significance. As the NRC stated in NRC Generic Letter 2007-01 at page 3, "undetected degradation of cables due to pre-existing manufacturing defects or other causes in wetted environments, can result in *multiple equipment failures,*" due to the failure of power cables to emergency service water or component cooling water pumps (emphasis added).[17] Of the twenty in-scope underground Non-EQ low voltage power cables at Indian Point, fifteen are safety-related and all support service water pumps.[18]

In sum, to ensure that the effects of aging on these critical safety-related cables are managed with what Dr. Sedding characterizes as a "credible, robust methodology," the Board

[15] Letter, Christopher G. Miller to Sarah Hofmann, Regarding Response to Question in State of Vermont Letter of December 23, 2011 (Mar. 20, 2012), ML12103A1581 ("Vermont Yankee Letter") Exh. NYS000396.

[16] *Id.*

[17] NRC Generic Letter 2007-01: Inaccessible or Underground Cable Failures That Disable Accident Mitigation Systems or Cause Plant Transients, OMC Control No. 3150-0011 (Feb. 7, 2007) ML070360665 (Exh. NYS000149) at 3.

[18] ENT000242.

must impose the requirements of Entergy's Cable Reliability Program as a license condition or obligation, enforceable by Staff and modifiable by Entergy only through a public and transparent license amendment process.

POINT II

NEITHER ENTERGY NOR STAFF HAS MET ITS BURDEN OF SHOWING THAT NO AMP IS NECESSARY TO MANAGE THE EFFECTS OF THERMAL STRESS ON THE AGING OF NON-EQ UNDERGROUND LOW AND MEDIUM VOLTAGE POWER CABLES

Entergy has not provided an AMP to manage the aging effects caused by thermal stress on underground Non-EQ low and medium voltage power cables and has not justified this omission.

Initially, Entergy confuses the issue by claiming that the effects of thermal stress on inaccessible cables are addressed by the AMP entitled Non-EQ Insulated Cables and Connections Program, LRA, B.1.25, Appendix B at B-85.[19] However, that AMP addresses *above-ground* cables that are exposed to adverse localized environments such as excessive moisture, heat or radiation, and it assumes that the vast majority of those above-ground cables are accessible. It provides where visual inspection of accessible above-ground cables reveals degraded cable insulation, then a determination must be made whether the same problems might be affecting inaccessible *above-ground* cables in the same localized environment.[20] There is nothing in the AMP for Non-EQ Insulated Cables and Connections or any other AMP that addresses cable insulation degradation caused by thermal stress in cables that are inaccessible because they are underground or below-grade.

[19] Entergy Testimony at 4-5, 26; ENT000233 at 74-76.

[20] An above ground cable can be inaccessible for visual inspection because it is enclosed in a conduit.

Neither Entergy nor Staff has provided justification for the absence of an AMP that addresses the effects of thermal stress on underground cables. In his initial testimony, State expert Earle Bascom explained that underground cables can experience thermal stress if the soil's thermal resistance is too high for the heat generated by the current to efficiently pass out of the cables and into the surrounding soil.[21] Entergy witnesses Mr. Rucker and Dr. Sedding respond that the thermal resistance of the soil is irrelevant because there are no external heat sources, such as a steam pipe, near the cables at issue, implying that without those other heat sources, any heat generated by an underground cable will pass into the surrounding soil without affecting the cable.[22] Mr. Rucker and Dr. Sedding are wrong. As Mr. Bascom explains in his rebuttal testimony, the ohmic heating from a current flowing through a conductor in a single cable can cause thermal degradation of the cable's insulation if the soil's thermal resistance is too high, regardless of the presence of other external heat sources.[23]

Mr. Rucker and Dr. Sedding also argue that cable degradation caused by ohmic heating in an underground cable is not an aging issue, but a problem with the cable's initial design. This semantic evasion ignores the fundamental issue. As Mr. Bascom explains in his rebuttal testimony, a cable that experiences ohmic heating because it has not been properly designed or installed is subject to the same insulation degradation, which will only get worse over time and may result in a breakdown of the insulation. A problem caused by an initial design flaw that increases in severity over time is certainly an aging issue which must be managed.[24]

[21] Exh. NYS000136 at 30.

[22] Entergy Testimony at 79.

[23] Bascom Rebuttal Testimony at 5.

[24] Bascom Rebuttal Testimony at 5-6.

Finally, both Staff and Entergy wholly ignore the risks of thermal stress caused by what is known as a "mutual heating effect." This can occur in cables in underground conduits if other cables in close proximity to the subject cable cause the temperature to rise, resulting in a cumulative mutual heating effect.[25] As Mr. Bascom notes in his rebuttal testimony, there is evidence that as many as five or six underground cable circuits are run in close proximity through the same duct bank -- that is, through a system of conduits installed in the same trench.[26] The mutual heating depends on the characteristics of the soil and backfill in which the cables are installed and the circuit loading of all the circuits in the duct bank. Because Entergy has not provided this information, or demonstrated that the issue was even considered, there has been no showing that destructive mutual heating of these underground cables will not occur.

By failing to create an AMP to manage the effects of thermal stress on underground low and medium voltage power cables, Entergy has not provided the necessary reasonable assurance to the Board that the cables will continue to perform their intended function during the license renewal period.

CONCLUSION

For the reasons stated, the Board should (1) elevate Entergy's Cable Reliability Program to a condition of Entergy's license; and (2) deny Entergy's license renewal application because Entergy has not provided an AMP to manage the aging effects caused by thermal stress on underground Non-EQ low and medium voltage power cables.

[25] Bascom Rebuttal Testimony at 6-7.

[26] Bascom Rebuttal Testimony at 6-7; NYS Exh. 000412.

Respectfully submitted,

Signed (electronically) by
Lisa Feiner
Assistant Attorney General
Office of the Attorney General
for the State of New York
120 Broadway
New York, New York 10271
(212) 416-8479

Signed (electronically) by
Janice A. Dean
Assistant Attorney General
Office of the Attorney General
for the State of New York
120 Broadway
New York, New York 10271
(212) 416-8459

Signed (electronically) by
John J. Sipos
Assistant Attorney General
Office of the Attorney General
for the State of New York
The Capitol
Albany, New York 12224
(518) 402-2251

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