

UNITED STATES
NUCLEAR REGULATORY COMMISSION
ATOMIC SAFETY AND LICENSING BOARD

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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

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STATE OF NEW YORK
REVISED STATEMENT OF POSITION
CONTENTION NYS-8

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INTRODUCTION

In accordance with 10 C.F.R. Section 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") hereby submits this Revised Statement of Position on the State's admitted Contention 8 ("NYS-8") concerning Entergy's improper exclusion of transformers from aging management review ("AMR").

This Revised Statement of Position is supported by the Rebuttal Testimony of Dr. Robert C. Degeneff, D. Eng., and responds to arguments made in: Entergy's Statement of Position Regarding Contention NYS-8 (Electrical Transformers) (ENT000090) ("Entergy SOP"); the Testimony of Applicant Witnesses Roger Rucker, Steven Dobbs, John Craig and Thomas McCaffrey Regarding Contention NYS-8 (Electrical Transformers) (ENTR00091) ("Entergy Test.") and the exhibits thereto; NRC Staff's Initial Statement of Position on Contention NYS-8 (Transformers) (NRC000030) ("Staff SOP"); NRC Staff's Testimony of Roy Mathew and Shelia Ray Concerning Contention NYS-8 (Transformers) (NRC000030) ("Staff Test.") and the exhibits thereto.

In its Initial Statement of Position, the State, supported by the Testimony and Report of Dr. Degeneff, demonstrated that Entergy's license renewal application ("LRA") improperly excludes transformers from aging management review in violation of 10 C.F.R. § 54.21 (the "license renewal rule"). The State argued that AMR is required for transformers because they are components: (1) that perform an intended function as described in 10 C.F.R. § 54.4 without moving parts or without a change in configuration or properties; (2) that are more similar to components for which AMR is required than to components for which AMR is not required; (3) in which age related degradation is not readily monitored; and (4) that are not subject to

replacement based on a qualified life or specified time period. Since transformers qualify for AMR, 10 C.F.R. § 54.29 requires that Entergy's LRA propose an aging management plan ("AMP") to manage the effects of transformer aging during the period of extended operation so that transformer functionality will be maintained. Because transformer failure can lead to unanticipated failures in related safety and maintenance systems, AMR and an AMP are critical for safe operation under an extended license. As the LRA lacks both AMR and an AMP for transformers, it is deficient.

In their responses, Entergy and NRC Staff admit that transformers are within the scope of the license renewal rule, operate without moving parts, and are not subject to replacement based on a qualified life or specified time period.¹ They also do not assert that transformers change configuration during operation. They argue instead that AMR is not required for transformers because: (1) transformers change properties (or state) during operation; (2) transformers are more similar to components in the AMR-excluded list than those in the AMR-included list; and (3) age-related degradation in transformers is readily monitored. Therefore, for purposes of determining whether AMR is required under 10 C.F.R. § 54.21, the central issue in dispute in NYS-8 is whether transformers function without a change in properties (which includes a change in state). As Dr. Degeneff shows in his Rebuttal Testimony, Entergy's and Staff's argument that transformers change properties hinges on their improper conflation of the properties of transformers and the properties of electricity.

¹ Entergy Test. at 98, A109; 40-41, A58; 14, A24; and Staff Test. at 11, A17; 12, A20; 8, A13.

ARGUMENT

POINT I

THE COMMISSION'S RECENT *SEABROOK* RULING IS NOT CONTROLLING

In their Statements of Position, NRC Staff and Entergy argue that the Board should reject NYS-8 because the recent Commission decision in *NextEra Energy Seabrook, LLC* (Seabrook Station, Unit 1), CLI-12-05, 75 NRC __ slip op. (Mar. 8, 2012) (“*Seabrook*”), rejected a “virtually identical” contention. Staff SOP at 12; Entergy SOP at 16-18. In particular, Entergy claims that “the Commission implicitly endorsed the Staff’s 1997 guidance concerning transformers,” Entergy SOP at 18, which excludes transformers from AMR. But the Commission did *not* endorse the Staff’s 1997 guidance. Instead, it specifically recognized the intervenors’ right to challenge such guidance: “The Board is correct that the applicability of a guidance document may be challenged in an individual proceeding.” *Seabrook* at 24.

Moreover, the Commission did not determine whether transformers are subject to AMR under 10 C.F.R. § 54.21. Instead it rejected the *Seabrook* transformer contention at the contention admissibility stage because the intervenors did not provide sufficient factual information or expert opinion to support the contention, not because the contention was contrary to the Staff’s 1997 guidance. The expert declaration offered in support of the contention contained only a brief discussion of transformers and did not give a detailed explanation of how transformers function or why they should be considered passive devices. *Seabrook* at 24-25. As a result, the Commission found that the intervenors’ expert “asserted, without more, that ‘[t]ransformers function without moving parts or without a change in configuration or properties as defined in [10 C.F.R. 54.21(a)].’” *Id.* at 22. That ruling is irrelevant here because the Board has already found that NYS-8 satisfied the standards in 10 C.F.R. § 2.309 governing contention

admissibility. *See Entergy Nuclear Operations, Inc.* (Indian Point, Units 2 and 3), LBP-08-13, 68 N.R.C. 43 (July 31, 2008) at 86-89.

POINT II

THE GUIDANCE DOCUMENTS RELIED UPON BY STAFF AND ENTERGY ARE NOT BINDING AND DO NOT HAVE THE FORCE OF REGULATIONS

NRC Staff and Entergy also argue that the Board should reject NYS-8 because NRC guidance documents² characterize transformers as active devices that should be excluded from AMR. Entergy SOP at 17 and 30; Staff SOP at 15; Entergy Test. at 13-14, 18, 20, 26, 86, and 95; Staff Test. at 13-14. However, the Commission, Atomic Safety and Licensing Boards (“ASLBs”), and federal courts have consistently held that guidance documents are not binding and do not have the force of regulations.³ As discussed above, the Commission recently reiterated this principle in *Seabrook*, making it clear that guidance documents are not binding in individual proceedings. *Seabrook* at 24, 49. It also cited *International Uranium (USA) Corp.*

² Letter from C. Grimes (NRC/NRR) to D. Walters (NEI), re Determination of Aging Management Review for Electrical Components, Sept. 19, 1997, ENT000097 (“Grimes Letter”); Standard Review Plan for Review of License Renewal Applications for Nuclear Power Plants (NUREG-1800), NYS000161 (“NUREG 1800”).

³ *See New Jersey v. U.S. Regulatory Comm’n*, 526 F.3d 98, 103 (3d Cir. 2008) (“NRC has characterized NUREGs and other NRC guidance documents as ‘routine agency policy pronouncements that do not carry the binding effect of regulations.’”); *Curators of the University of Missouri* (TRUMP-S Project), CLI-95-1, 41 N.R.C. 71, 98 (Feb. 28, 1995) (“[I]t is well established . . . that NUREGs and Regulatory Guides, by their very nature, serve merely as guidance and cannot prescribe requirements.”); *In the Matter of Entergy Nuclear Generation Company and Entergy Nuclear Operations, Inc.* (Pilgrim Nuclear Power Station) 68 N.R.C. 590, 614 (Oct. 30, 2008) (“While the GALL Report is entitled to some weight as an NRC guidance document, it does not have the force of a legally binding regulation and, like any guidance document, may be challenged in an adjudicatory proceeding such as this one.”); *In the Matter of Crow Butte Resources Inc.* (North Trend Expansion Project) 67 N.R.C. 241, 323 (May 21, 2008) (“And guidance documents such as NUREGs are just that — documents that provide guidance, with some persuasive authority, but not binding.”); and *In the Matter of USEC, Inc.* (American Centrifuge Plant) 65 N.R.C. 429, 440 (Apr. 13, 2007) (“NUREGs and Regulatory Guides (RG) serve as guidance and do not prescribe requirements. They are not substitutes for regulations and are not binding authority.”).

(Request for Material License Amendment), CLI-00-1, 51 N.R.C. 9, 19 (2000), which states:

The Commission, however, is not bound by the Guidance. Like NRC NUREGs and Regulatory Guides, NRC Guidance documents are routine agency policy pronouncements that do not carry the binding effect of regulations. . . . “[A]gency interpretations and policies are not ‘carved in stone’ but rather must be subject to re-evaluations of their wisdom on a continuing basis.” (internal citations omitted)⁴

When a guidance document on which an agency has relied is challenged in an adjudicatory proceeding, the agency must defend its position.⁵ In this proceeding, the State has challenged both of the foundations on which NRC’s transformer guidance rests: (1) that transformers are active components because they “function through a change in state by stepping down voltage from a higher to a lower value, stepping up voltage to a higher value, or providing isolation to a load; and (2) that “[a]ny degradation of the transformer’s ability to perform its intended function is readily monitorable by a change in the electrical performance of the transformer and the associated circuits.” Grimes Letter at 2. The State’s expert testimony shows that transformers do not experience a change of properties or state during operation and that transformer degradation is often not noticeable until the moment of failure. *See* Report of Dr. Robert C. Degeneff In Support of Contention NYS-8 (NYSR00005) (“Degeneff Report”) at 2, 14-17; Pre-Filed Written Testimony of Dr. Robert C. Degeneff Regarding Contention NYS-8 (“Degeneff Pre-Filed Test.”) at 6, 16, 29-30. As a result, NRC Staff must defend that guidance.

⁴ The *International Uranium* decision was also cited and quoted at length by the Third Circuit Court of Appeals in *New Jersey v. U.S. Regulatory Comm’n*, 526 F.3d 98, 103 (3d Cir. 2008) (holding that guidance documents are categorically excluded from NEPA review because they are non-binding and not final orders of the NRC).

⁵ *See Guardian Federal Savings & Loan Association v. Federal Savings & Loan Insurance Corp.*, 589 F.2d 658, 666 (D.C. Cir. 1978) (“‘A general statement of policy . . . does not establish a ‘binding norm.’ It is not finally determinative of the issues or rights to which it is addressed.’ *Pacific Gas & Electric Co. v. FPC*, 164 U.S.App.D.C. 371, 376, 506 F.2d 33, 38 (1974). When the agency applies the policy in a particular situation, it must be prepared to defend it, and cannot claim that the matter is foreclosed by the prior policy statement.”).

As shown below, it has not met that burden.

POINT III

WHETHER GROSS FAILURE IS READILY DETECTABLE IS NOT RELEVANT TO DETERMINING WHETHER A COMPONENT IS SUBJECT TO AMR

NRC Staff argues that AMR is not required for transformers because “[t]heir performance is readily monitorable and gross failure is readily detectable; this is what makes them active components.” Staff SOP at 9-10 and 12-13; Staff Test. at 8. Similarly, Entergy asserts that “[a] failure in the ability of such transformers to perform those required functions will not go unnoticed or unaddressed under current programs.” Entergy SOP at 31; Entergy Test. at 107, A116. Entergy’s and Staff’s focus on the detectability of gross failure is misplaced because this is not the proper criterion for determining whether AMR is required for a component.

Under the NRC’s license renewal rule (10 C.F.R. § 54.21), AMR is required for passive components, like transformers, *i.e.*, components that (1) “perform an intended function, as described in § 54.4, without moving parts or without a change in configuration or properties”; and (2) “are not subject to replacement based on a qualified life or specified time period.” That rule does not mention the detectability of gross failure, much less exempt components from AMR on that ground. Because the criteria are clear on the face of the regulation, the Board may not look to agency guidance for additional criteria. *See Christensen v. Harris County*, 529 U.S. 576, 588 (2000) (Deference to an agency’s interpretation of its own regulation is not warranted when the language of the regulation is unambiguous. In such a situation, “[t]o defer to the agency’s position would be to permit the agency, under the guise of interpreting a regulation, to create *de facto* a new regulation.”).

In any event, NRC guidance provides no support for Entergy’s and Staff’s position that a

component's active or passive nature is determined by whether its gross failure is readily detectable. The Statement of Consideration, (NYS000016) ("SOC"), accompanying the 1995 amendments to 10 C.F.R. § 54.21, does not identify the detectability of gross failure as a trait of an active device. It explains that the purpose of AMR is to detect and manage aging degradation in passive components "so that the intended function(s) will be maintained for the period of extended operation." SOC at 22,476. Because the purpose of AMR is to *prevent* gross failure, not to detect it, whether or not gross failure is readily detectable is irrelevant. Passive components require AMR because their *aging degradation* is difficult to detect, not their failure. *Id.* ("[T]he detrimental effects of aging affecting passive functions of structures and components are less apparent than the detrimental effects of aging affecting the active functions of structures and components.").

Moreover, as Dr. Degeneff explains, gross failure may be more readily detectable in certain passive components than in some active components. Rebuttal Testimony of Dr. Degeneff (NYS000404) ("Degeneff Rebuttal Test.") at 32-33. For example, the failure of a cable (a passive component) would be readily detected by protective relaying on the system. On the other hand, if an active component such as a circuit breaker or a transistor failed, it would not be obvious until a signal was sent to that device and it did not respond. *Id.* Therefore, whether a transformer's gross failure is readily detectable is not relevant in determining whether it is an active or passive component.

POINT IV

WHETHER THE MAINTENANCE RULE IS SUFFICIENT FOR MONITORING AGING DEGRADATION IS NOT RELEVANT TO DETERMINING WHETHER A COMPONENT IS SUBJECT TO AMR

Entergy and NRC Staff argue that AMR is not required for transformers because they are covered by 10 C.F.R. § 50.65 (the “maintenance rule”), which they argue is sufficient for monitoring transformers’ aging degradation. Entergy SOP at 39-40; Entergy Test. at 96-99; Staff SOP at 8; Staff Test. at 20. But the two criteria for AMR in the license renewal rule are clear, as discussed above, and do not exclude components covered by the maintenance rule. In fact, the SOC states that “[p]assive, long-lived structures and components that are the focus of the license renewal rule are also within the requirements of the maintenance rule.” SOC at 22,470-71. Therefore, the fact that transformers are included in the maintenance rule is irrelevant to determining whether they are passive and require AMR.

As explained by Dr. Degeneff, because age-related degradation in transformers is not readily monitorable, the maintenance rule has not been effective in preventing transformer failures. Degeneff Report at 14-22. The insufficiency of current monitoring programs has been proven in at least 18 instances since 2007 in which catastrophic failures have occurred in transformers at nuclear plant reactors despite the implementation of the maintenance rule. *See Id.* at 18-22. Transformer failures continue to occur. *See Degeneff Rebuttal Test.* at 43-45.

Although Entergy describes its monitoring activities for large power transformers, Entergy Test. at 97, A108, it does not show how aging degradation is being monitored—if at all—in the numerous other transformers at Indian Point. Although Entergy asserts that NYS-8 is limited to large power transformers, it in fact covers all safety-related transformers at Indian Point whose function is described in 10 C.F.R. § 54.4. *See NYS Notice of Intention to*

Participate and Petition to Intervene (Nov. 30, 2007) (ML073400187) at 103-105; *Entergy Nuclear Operations, Inc.* (Indian Point, Units 2 and 3), LBP-08-13, 68 N.R.C. 43 (July 31, 2008) at 86-89.

POINT V

ENTERGY’S AND STAFF’S ARGUMENT THAT TRANSFORMERS ARE ACTIVE RESTS ON A DEFINITION OF “PROPERTY” THAT IS INCONSISTENT WITH 10 C.F.R. § 54.21

Entergy and NRC Staff argue that transformers are active components not subject to AMR because their current, voltage, and magnetic field are properties within the meaning of 10 C.F.R. § 54.21 and these undergo changes as the transformer functions. Entergy Test. at 34-36, A54; Staff Test. at 11, A19. As discussed in the State’s Initial Statement of Position, this argument misconstrues “property” as it is used in 10 C.F.R. § 54.21, and violates basic electrical engineering principles, by improperly conflating the properties of transformers and the properties of electricity. NYS SOP at 9-13; Degeneff Report at 8-10; Degeneff Pre-Filed Testimony at 14-29.

As Dr. Degeneff explains, numerous passive structures and components contain objects or forces that change properties or state, but this does not make those structures and components active. Degeneff Rebuttal Test. at 27-28. For example, a pipe is a passive device despite the fact that the liquid flowing through it may change properties. *Id.* at 24-26. Similarly, current, voltage, and magnetic field are properties of the electricity flowing through the transformer, not properties of the transformer. Degeneff Rebuttal Test. at 11-14. Thus, the transformer itself experiences no change in properties (or state) during operation. *Id.* at 11-21; Degeneff Report at 11.

Moreover, the testimony of Entergy’s expert Dr. Dobbs shows that current, voltage, and

magnetic field are not properties of a transformer. Dr. Dobbs reasons that something cannot be a property of an object if it is created by an external force and therefore, voltage and current are not properties of electricity because they are created by external forces. Entergy Test. at 13, A24. However, under his reasoning, current, voltage, and magnetic field cannot be properties of a transformer because they are the result of an external force—electricity—being applied to the transformer.

NRC Staff's experts assert that "a transformer changes its state by transferring electrical energy into magnetic energy, then back into electrical energy again." Staff Test. at 11, A19. But Staff describe a change in the state of the energy, not the state of the transformer. As Dr. Degeneff explains, "state" "refers to the condition of matter with respect to structure, form, constitution, phase, or the like." Degeneff Rebuttal Test. at 20. For example, water changes state from a liquid to a gas when it becomes steam. *Id.* A transformer does not experience such a change in state during its operation. *Id.*

POINT VI

ENTERGY'S AND NRC STAFF'S COMPARISON OF TRANSFORMERS TO OTHER COMPONENTS IS FLAWED

Entergy's and NRC Staff's experts argue that transformers are more like components that are excluded from AMR than components for which AMR is required, and therefore, transformers should not be subject to AMR. Entergy Test. at 37-49 and 65-86; Staff Test. at 20-24. As Dr. Degeneff explains, transformers, like cables or pipes, are passive devices.

Entergy and NRC Staff attempt to distinguish transformers from cables, which are subject to AMR. However, as admitted by Staff's experts, two cables in close proximity can actually function as a simple transformer. Staff Test. at 22-23, A30; *see also* Degeneff Rebuttal Test. at 22. And, as Dr. Degeneff explains, transformers are susceptible to aging problems

similar to those of cables because “the same elements that make it difficult to detect functional degradation in cables also make it difficult to detect functional degradation in transformers.”

Degeneff Rebuttal Test. at 22-23.

Staff’s experts claim that transformers are not like pipes, for which AMR is required, because although a pipe can change the property of the fluid that travels through it, this is not a pipe’s primary function. Staff Test. at 22, A29. Staff argues that in contrast, a transformer cannot transport power without changing the current, voltage, or both. *Id.* Contrary to Staff’s assertion, certain transformers function simply by transporting power without changing its current and voltage. Degeneff Rebuttal Test. at 26-27. Moreover, as discussed above, Entergy’s expert, Dr. Dobbs, claims that, just as current and voltage are not properties of electricity but properties of a transformer, pressure and velocity are not properties of a fluid but properties of a pipe. Entergy Test. at 71. Not only is this assertion wrong, and contrary to the laws of physics, but if it were true, it would make pipes active components for which AMR is not required.

Degeneff Rebuttal Test. at 24.

Dr. Dobbs claims that heat exchangers, steam generators, and reactor vessels are properly treated as passive components because they serve as pressure retaining boundaries. Entergy Test. at 72-73. But as explained by Dr. Degeneff, the relevant criteria for determining whether a component is passive and thus subject to AMR is whether the component changes its properties or state. Heat exchangers, steam generators, and reactor vessels are passive components because, like transformers, they do not themselves undergo changes in properties or state but instead contain materials (fluid or nuclear fuel) that undergo such changes. Degeneff Rebuttal Test. at 27-28.

Dr. Dobbs compares transformers to transistors, which are not required to undergo AMR.

Entergy Test. at 74, A82. However, unlike a transformer, a transistor experiences a change in property and state. During operation, the transistor's property of resistivity is changed, causing a corresponding change in the transistor's state from a conductor to an insulator. Degeneff Rebuttal Test. at 28-29. Dr. Dobbs likens a transistor's resistivity to a transformer's magnetic field, Entergy Test. at 74, A82, but a transformer's magnetic field is not a property of the transformer; it is a property of the electricity flowing through it. Degeneff Rebuttal Test. at 13-14 and 29.

Similarly, other devices such as power inverters, circuit boards, and power supplies are excluded from AMR, and, unlike transformers, can change their state from a conductor to an insulator during use. *Id.* at 31-32. Accordingly, transformers should not be characterized as components excluded from 10 C.F.R. § 54.21.

POINT VII

THE AGING DEGRADATION OF A TRANSFORMER CANNOT BE ADEQUATELY MONITORED BY MONITORING THE FLOW OF ELECTRICITY INTO AND OUT OF THE TRANSFORMER

NRC Staff and Entergy claim that aging degradation in a transformer can be detected by changes in its electrical performance because levels of voltage and current indicate whether a transformer is functioning properly. Staff Test. at 12, A20; 15, A22; and 17, A24; Entergy Test. at 78, A86 and 100 A113. In particular, Entergy argues that "what matters is what is happening at the terminals, not inside the component itself." Entergy SOP at 34.

Staff and Entergy are incorrect. Relying on changes in current and voltage to signal when a transformer is suffering from aging degradation is an inadequate means of managing aging in transformers. Degeneff Report at 24 and 27-28. The growing list of transformer failures since 2007 illustrates that aging degradation may not be detectable in a transformer's

electrical performance until the moment that it fails catastrophically. Degeneff Rebuttal Test. at 35, 38-39, and 42. For this reason, plant operators must conduct frequent and rigorous testing to assess the internal condition of transformers. *Id.* at 39-43. Therefore, AMR and an AMP are necessary to detect transformer degradation in advance of failure.

CONCLUSION

For the above reasons the Board should find that NRC Staff and Entergy have failed to meet their burden of rebutting the State's prima facie case for NYS-8. Accordingly, Entergy's application to renew the operating licenses for Indian Point Unit 2 and Unit 3 should be denied.

Respectfully submitted,

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Dated: June 29, 2012