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UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

BEFORE THE COMMISSION

In the Matter of:	)	
	)	
Northeast Nuclear Energy Company	)	Docket No. 50–423–LA–3
	)	
(Millstone Nuclear Power Station,	)	
Unit No. 3)	)	

NORTHEAST NUCLEAR ENERGY COMPANY'S BRIEF ON REVIEW OF LBP-00-26 (CONTENTION 6)

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I. INTRODUCTION

On November 13, 2000, the Connecticut Coalition Against Millstone and the Long Island Coalition Against Millstone (collectively, "Appellants") filed a joint petition seeking Commission review of the Atomic Safety and Licensing Board ("Licensing Board") Memorandum and Order,[1] issued October 26, 2000 ("LBP-00-26"), with respect to Contentions 4 and 6 in this proceeding. On January 17, 2001, the Commission accepted review of LBP-00-26 insofar as it addresses Contention 6 and set a briefing schedule.[2] On February 7, 2001, the Appellants filed their "Brief On Review of LBP-00-26." On that same day, Orange County, North Carolina (the "County"), filed a

1 Northeast Nuclear Energy Co. (Millstone Nuclear Power Station, Unit 3), LBP-00-26, 51 NRC 181 (2000).

2 Northeast Nuclear Energy Co. (Millstone Nuclear Power Station, Unit 3), CLI-01-03, 52 NRC __ (2001).

brief *amicus curiae*, supporting the Appellants' positions. Northeast Nuclear Energy Company ("NNECO") herein responds to the two briefs and opposes the appeal.

II. STATEMENT OF CASE HISTORY

A. *The Amendment at Issue*

NNECO applied for the license amendment that is the subject of this proceeding by application to the U.S. Nuclear Regulatory Commission ("NRC") dated March 19, 1999. Following the Licensing Board's decision in LBP-00-26, and in the absence of any request for stay pursuant to 10 C.F.R. § 2.788, the requested license amendment was issued by the NRC Staff on November 28, 2000.

The amendment allowed NNECO to increase the capacity of the Millstone Nuclear Power Station, Unit 3 ("Millstone Unit 3") spent fuel pool ("SFP") from 756 fuel assemblies to 1,860 fuel assemblies. Before the amendment, NNECO utilized high-density storage racks in the Millstone Unit 3 SFP, divided into two regions. Storage in the two regions was governed by fuel enrichment/burnup restrictions incorporated into plant Technical Specifications. With the license amendment, NNECO has left the existing high-density storage racks in place, but installed additional high-density storage racks into open areas in the SFP. The new racks are divided into two regions, designated Regions 1 and 2, with the allowed storage in each region again dependant upon enrichment/burnup limitations. For criticality purposes, the new racks in both Regions 1 and 2 utilize Boral panels, which are fixed neutron absorbers. The pre-existing high-density storage racks have been re-designated as Region 3. Fuel stored in Region 3 is subject to revised burnup/enrichment and decay time limits. The fixed neutron absorber

Boraflex employed in these pre-existing storage racks remains, but is no longer credited as a neutron absorber for criticality analyses. The reactivity limits for all three regions are incorporated into Technical Specifications. In addition, Technical Specifications require soluble boron in the SFP at all times as another neutron absorber.[3]

B. The Subpart K Proceeding

In response to a Notice of Opportunity for a Hearing published in the *Federal Register* on September 7, 1999,[4] Appellants filed a request for hearing and petition for leave to intervene on October 6, 1999. Appellants were granted standing and three of their proposed contentions were admitted.[5] At the request of NNECO, the proceeding was conducted under the procedures of 10 C.F.R. Part 2, Subpart K. On June 30, 2000, in accordance with those procedures, NNECO filed its "Summary of Facts, Data, and Arguments on Which NNECO Intends to Rely at the Subpart K Oral Argument" ("NNECO's Summary). NNECO's Summary included the affidavits of five experts as well as reference documents, creating a substantial factual record on the admitted contentions. Oral argument was conducted on July 19, 2000.

Following oral argument, the Licensing Board issued LBP-00-26. In that Memorandum and Order, the Licensing Board denied the request for an evidentiary

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3 By Technical Specification, 800 ppm soluble boron is required. By Millstone administrative limit, at least 2,600 ppm is ordinarily maintained.

4 64 Fed. Reg. 48,672-75 (1999).

5 See Northeast Nuclear Energy Co. (Millstone Nuclear Power Station, Unit 3), LBP-00-02, 51 NRC 25 (2000). The Licensing Board admitted Contentions 4, 5, and 6 — all dealing with criticality questions — and rejected eight other proposed contentions.

hearing on Contention 6. In accordance with 10 C.F.R. § 2.1115, the Licensing Board resolved the contention in NNECO's favor and terminated the proceeding.[6] The Licensing Board's decision with respect to Contention 6 was in complete accord with the decision of another Licensing Board on a virtually identical contention in the ongoing Shearon Harris proceeding.[7]

C. Record Relevant to Contention 6

NNECO's Summary and the supporting affidavits provide the undisputed factual context for evaluating the purely legal issue raised by Contention 6. Principally, these facts were presented in the affidavits of Dr. Stanley E. Turner and Mr. Joseph J. Parillo. See NNECO's Summary, Tabs 1 and 2.

Among other things, Dr. Turner and Mr. Parillo discussed the criticality analyses for the modified Millstone Unit 3 storage system. First, they described certain

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6 10 C.F.R. § 2.1115 (a)(1)-(2) specifically provides that the presiding officer shall "[d]esignate any disputed issues of fact, together with any remaining issues of law, for resolution in an adjudicatory hearing," and "[d]ispose of any issues of law or fact not designated for resolution in an adjudicatory hearing." Under the Commission's regulations, 10 C.F.R. § 2.1115(b), an issue may be designated for an adjudicatory hearing only if:

- there is genuine and substantial dispute of fact; *and*
- the dispute can be resolved with sufficient accuracy only through introduction of evidence at an adjudicatory hearing; *and*
- the NRC's ultimate decision is likely to depend in whole or in part on the resolution of the dispute.

Any issues that do not meet all three of these criteria are to be disposed of by the Licensing Board promptly after the oral argument. Id. at § 2.1115 (a)(2). A contention raising only an issue of law, such as Contention 6, seemingly cannot be designated for hearing.

7 Carolina Power & Light Company (Shearon Harris Nuclear Power Plant), LBP-00-12, 51 NRC 247, 255-60 (2000).

licensing basis criticality calculations that demonstrate that NNECO's system, with the enrichment/burnup and decay time limits, satisfies NRC guidelines. For both normal and design basis accident conditions, the reactivity limit (K_{eff}) is maintained less than 0.95. See Parillo Affidavit, ¶ 21. In addition, Dr. Turner performed certain additional beyond-design-basis criticality calculations that demonstrate the substantial safety margin provided by the Unit 3 storage system. These calculations show that a criticality event would not occur even assuming mis-loads of multiple fuel assemblies and significant dilutions of the soluble boron in the SFP water. See Turner Affidavit, ¶ 63. The results of these criticality calculations were never challenged.

With respect to Contention 6, Dr. Turner and Mr. Parillo also explained that there are only four methods available for criticality control in spent fuel storage pools: (1) geometric separation; (2) solid neutron absorbers (*e.g.,* Boral, Boraflex); (3) soluble neutron absorbers (*e.g.,* soluble boron); and (4) fuel reactivity limits. Fuel reactivity is determined by four factors: (1) fuel assembly structure; (2) initial (or "fresh") fuel enrichment; (3) fuel depletion (or "burnup"); and (4) the post-operational period of time the fuel has been stored (*i.e.,* "decay time"). See Turner Affidavit, ¶¶ 9-19. They further explained that each of the four criticality control measures involves — at some level — a physical system or process. Turner Affidavit, ¶¶ 20-36; Parillo Affidavit, ¶¶ 53-61. Absent such a physical component, the method would not and could not control criticality. Moreover, as a practical matter, every one of the physical systems or processes for criticality control is implemented using some administrative measures. Id.

Fuel reactivity limits in particular are implemented by procedures that assure that fuel is correctly moved to a location for which it is qualified for storage.[8]

III. ISSUE PRESENTED

Does General Design Criterion ("GDC") 62 permit a licensee, with respect to its SFP storage systems, to take credit in criticality calculations for fuel enrichment, burn-up, and decay time limits — limits that will be implemented by procedural controls?

IV. ARGUMENT

GDC 62 states:

> *Criterion 62 — Prevention of criticality in fuel storage and handling.* Criticality in the fuel storage and handling system shall be prevented by physical systems or processes, preferably by use of geometrically safe configurations.

As acknowledged by the Commission in granting review of Contention 6, the issue is a question of law: does GDC 62 permit a licensee to take credit in criticality calculations for enrichment, burnup, and decay time limits. In accord with the decision of the Licensing Board below, and the Licensing Board in the Shearon Harris case, NNECO maintains that the answer is "yes."

NNECO's spent fuel storage system, as approved by the license amendment at issue, is similar to the pre-existing Millstone Unit 3 storage system and to many others in the nuclear industry. The system fully meets GDC 62. High-density storage systems incorporating reactivity limits (*i.e.*, enrichment, burnup, and decay time

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8 The adequacy of NNECO's procedures for handling fuel assemblies, and NNECO's ability to implement those procedures, were the subject of Contention 4, not presently under review. The Licensing Board resolved that issue in favor of NNECO. LBP-00-26, 51 NRC at 200.

limits) to prevent criticality utilize *physical processes* within a *physical system* for criticality control. The Licensing Board's conclusion below, as well as the Licensing Board's conclusion in Shearon Harris, are supported by the plain language of GDC 62, by the long course of practice of the agency, and by the Commission's adoption of 10 C.F.R. § 50.68. In contrast, the Appellants' argument relies upon a semantic construct that has no basis in the language of the regulation or the regulatory history. Moreover, in the Nuclear Waste Policy Act of 1982, 42 U.S.C. § 10101, *et seq.* ("NWPA"), Congress fully endorsed the use of high-density spent fuel storage racks and GDC 62 should not be interpreted in any way that would frustrate that purpose.

A. *Credit For Enrichment, Burnup, and Decay Time Limits Is Fully Consistent With the Plain Language of GDC 62*

1. Reactivity Limits Involve "Physical" Processes Within a "Physical" System for Criticality Control

As discussed above, there are only four available methods for nuclear criticality control in spent fuel pool storage racks: geometry, insoluble neutron absorbers, soluble neutron absorbers, and fuel reactivity considerations. NNECO's proposal employs all four — rack geometry, fixed Boral panels, soluble boron in the SFP water, and regional storage restrictions based on fuel assembly enrichment/burnup and decay time limits. Each of these criticality control measures is "physical:" each involves a "physical process" to prevent criticality within the meaning of GDC 62 and each is incorporated into a "physical system" for criticality control within the meaning of GDC 62. In particular, fuel reactivity is a physical characteristic that does involve a "physical

process" for criticality control. And, because this physical process is incorporated into a "physical system" for criticality control, the approach fully meets GDC 62.

As discussed in the record by Dr. Turner and Mr. Parillo, by relying on reactivity limits, criticality control is assured by a physical characteristic: the condition of the fuel.[9] This physical characteristic relates to neutron production and absorption, which — by *a known physical process (i.e.,* one that involves the forces and operations of physics) — affects the potential for criticality. Moreover, as is typical in engineering systems at a nuclear power plant, NNECO has designed a system that takes advantage of the conditions that the system will encounter, that is, the condition of the fuel assemblies that will be loaded into the racks.[10] In total, NNECO is relying upon the physical implications of those conditions in a *system for criticality control.* The combination of the physical characteristics of the fuel, the corresponding physical processes related to reactivity, the physical racks, and the procedural controls to place fuel in appropriate regions in the SFP is —by normal usage — a physical "system" fully consistent with the plain language of GDC 62. No further analysis is necessary to address this contention as a matter of law.

Appellants argue that the Licensing Board erred because, by allowing credit for reactivity limits, the word "physical" in the GDC is deprived of meaning.

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9 Mr. Parillo, in his Affidavit (at ¶¶ 58, 74) explained that the term fuel "reactivity" is used to refer to the current fuel isotopic inventory, affected and defined by fuel, structure, fuel enrichment, fuel burnup, and fuel decay.

10 Fuel assemblies that do not meet the reactivity limits are kept physically separate from other assemblies for which proximity could create a challenge to criticality. The enforced separation is physical and geometric, and maintained by the racks.

Appellants argue that nothing would be excluded. Appellants cite a principle of statutory construction *("inclusio unis est exclusio alterius")* and argue that the GDC must exclude "systems and processes that are not essentially 'physical' in nature." Appellants' Brief, at 20. This argument, however, begs the question of why NNECO's system, including the reactivity limits, is not "essentially 'physical' in nature." It is indeed physical, at every conceivable level — from the atomic to the system level. The attempt to label NNECO's system as "non-physical" is contrived and futile.

The Appellants' statutory construction argument is also divorced from the context of the General Design Criteria. GDC 62, like all GDCs, is a broad performance goal.[11] The goal of GDC 62 is to prevent criticality. The fact is, an approach that will accomplish that goal must involve a physical process, must be a physical system, and will therefore meet the GDC. The Appellants' argument — *i.e.*, that something must be excluded — cannot apply to exclude an approach that accomplishes the very goal of the GDC. Because the GDC does no more than establish the engineering goal, quite naturally what *is* excluded is anything that would *not* prevent criticality. The

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11 As recognized by Appellants, the Commission discussed the GDCs in Petition for Emergency and Remedial Action, CLI-78-6, 7 NRC 400, 406-7 (1978) : "General Design Criteria (GDC), as their name implies, are 'intended to provide engineering goals rather than precise tests or methodologies by which reactor safety [can] be fully and satisfactorily gauged.' Nader v. NRC, 513 F.2d 1045, 1052 (D.C. Cir. 1975). They are cast in broad general terms and constitute the minimum requirements for the principal design criteria of water-cooled nuclear power plants. There are a variety of methods for demonstrating compliance with GDC. Through regulatory guides, standard format and content guides for safety analysis reports, Standard Review Plan provisions, and Branch Technical Positions, license applicants are given guidance as to acceptable methods for implementing the general criteria." See also Consumers Power Co. (Big Rock Point Nuclear Plant), ALAB-725, 17 NRC 562, 567 at n.7 (1983). As will be discussed further below, the NRC Staff has followed this approach precisely for GDC 62, with guidance documents giving further specificity to GDC 62.

Commission should not imbue the word "physical" with meaning that strains reality for no good purpose other than to exclude a proven, effective criticality control system.[12]

2. The Licensing Board Did Not Mis-Apply the Word "Process"

The Appellants' also argue that the Licensing Board erred because it mis-applied the word "process" by "arbitrarily" selecting an "extremely broad" dictionary definition of the word to support the decision. Appellants' Brief, at 21-22. The Appellants then select their own dictionary definition of "process" in an attempt to establish that the word "process" does not encompass "ongoing administrative measures." This argument, however, is as contrived and legalistic as the argument based on the word "physical" discussed above. Under any normal usage of the word "process," the forces and operations of physics — defining a cause-effect relationship between reactivity characteristics and the potential for nuclear criticality — would be included. Implementing procedures to initially configure the process, or subsequent ongoing procedures such as surveillances, are irrelevant to the fact that criticality is prevented by a physical process.

12 The construction maxim *"expressio unius est exclusio alterius"* suggests that, where a statute provides that a thing shall be done in a certain way, it carries an implied prohibition against doing that thing in another way. Singer, Statutes and Statutory Construction (6th Edition) (2000 Revision), § 47:23 at 314. There is no showing that reactivity limits are not within the means allowed by GDC 62 ("physical systems or processes"). Moreover, it has been stated that the maxim "is a questionable one in light of the dubious reliability of inferring specific intent from silence." Pauley v. BethEnergy Mines, Inc., 501 U.S. 680, 703 (1981). The construction maxim is not a rule of law and will not apply when legislative history and context are contrary, as they are here, as discussed below. United States v. Castro, 837 F.2d 441, 442-43 (11th Cir. 1988); Keams v. Tempe Technical Institute, Inc., 39 F.3d 222, 225 (9th Cir. 1994).

The Licensing Board relied upon a definition of "process" from the Merriam Webster Third International Dictionary: "an artificial or voluntary progressively continuing operation that consists of controlled actions or movements systematically directed toward a particular result or end." LBP-00-26, 51 NRC at 212, n. 92. This definition accurately describes the processes used in NNECO's system — with the result or end in this case being criticality control. The definition encompasses the hardware elements (*e.g.*, racks, fixed neutron absorbers, soluble boron), the non-engineered aspects (*e.g.*, the physics associated with the neutron absorbers and fuel reactivity characteristics), and the software elements (*e.g.*, procedural controls related to fabricating hardware, ongoing surveillances, procedures for loading fuel in approved regions to take advantage of fuel reactivity characteristics). There is nothing arbitrary about the Licensing Board's analysis.

Moreover, the Appellants' argument, by focusing solely on the word "process," arbitrarily ignores the word "system" in GDC 62. Appellants prefer definitions of "process" that, they maintain, would not "encompass ongoing administrative measures." Appellant Brief, at 21. They cite definition 1(e) from the same dictionary cited by the Licensing Board: "a particular method or system of doing something, producing something, or accomplishing a specific result." But this definition is of no help whatsoever to Appellants' position. This definition explicitly incorporates the word "system." A "system" could certainly include manual or procedural elements.

This dictionary definition therefore again fairly encompasses NNECO's credit for reactivity limits as well as NNECO's complete storage system.[13]

Finally, Appellants cite definition 4(b) of the word "process" from Webster's New International Dictionary (Second Edition).[14] Appellants' Brief, at 22. Under this definition, they argue that the word "process" encompasses only the installation of racks and neutron-absorbing panels, and that everything thereafter (including subsequent "administrative controls") would be "surplusage" and not within the scope of the word. Apart from being confusing, this argument still does not work. Once a fuel assembly is installed in a region for which it is qualified, criticality is controlled by a "continuous operation or treatment" as the ongoing physical consequence of the geometry and the fuel reactivity characteristics. In the end, there is no principled basis by which the Appellants can distinguish a process for criticality control based on reactivity limits from other processes for criticality control allowed by GDC 62. By any reasonable definition of "process," NNECO's use of regional storage and credit for reactivity limits would be included.

3. GDC 62 Does Not Preclude the Use of "Administrative Controls"

Appellants elaborate on their argument made below that fuel reactivity restrictions are inappropriate under the GDC because they require, in implementation,

13 Mr. Parillo in his affidavit cited (at ¶ 55) other dictionary definitions of "physical," "process," and "system" and compared them to the NNECO plan (at ¶ 58).

14 The definition reads, in part: "a series of actions, motions, or operations definitely conducing to an end, whether voluntary or involuntary; progressive act or transaction; continuous operation or treatment...."

"administrative controls." Appellants argue that the Licensing Board erred in ignoring "the fact that physical systems and processes are distinct in nature from ongoing administrative controls," and therefore are precluded by GDC 62. Appellants' Brief, at 22. In Appellants' view, the administrative controls required for a regional storage system are distinct from the controls associated with other means of preventing criticality because the former are "ongoing," the latter are not. They argue that prevention of criticality by crediting reactivity limits requires continuing actions, such as inputting information into a computer system and operating and maintaining equipment, while controls associated with other criticality prevention systems are "one time" controls or, where "ongoing," are "comparatively straightforward." Appellants' Brief, at 23.

The Licensing Board correctly rejected this "administrative controls" theory. Indeed, as the Licensing Board concluded, "administrative controls are inherently comprehended within the phrase 'physical systems and processes' that appears in GDC 62." LBP-00-26, 51 NRC at 212. The Licensing Board also correctly found that "there is no basis in law or language for differentiating between one type of administrative control and another." Id. at 44. The Licensing Board's decision in this regard is in complete accord with the plain language of the regulation and with the physical reality described by the witnesses. The term "administrative controls" does not appear in the regulation and nothing in the plain language of GDC 62 would lend support to the argument that reactivity limits are not permitted simply because these measures require administrative measures. Indeed, GDC 62 states only that criticality should be prevented by "physical systems or processes." The regulation does not preclude implementation

measures, ongoing surveillances, or operating procedures — which are implicitly part of the system or process.[15] While there is a preference in the GDC for "geometrically safe configurations," there is no prohibition on either criticality controls that are not "geometrically safe configurations" or on administrative measures used to establish or implement criticality controls.

As discussed by Dr. Turner and Mr. Parillo, the Millstone system is not unusual. All of the available methods for criticality control employed at Millstone and elsewhere are implemented using some administrative measures. Turner Affidavit, ¶¶ 20-36; Parillo Affidavit, ¶¶ 19, 53-61. Controls are required in the fabrication and installation of racks. Controls are utilized with respect to solid neutron absorbers — including both fabrication controls and ongoing surveillances. Soluble boron is maintained in accordance with continuous administrative controls. Fuel reactivity restrictions are indeed implemented by administrative controls. The "controls" needed to implement reactivity limits involve assuring that only fuel of the permitted reactivity is moved to a particular storage location. Once accomplished for a given assembly, no further control is needed until the fuel is again moved. While the type, degree, and timing of the administrative controls may vary among the four options, the fact remains that each involves some administrative measure in implementation.

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15 In this regard, the Appeal Board previously held that a remotely <u>controlled</u> makeup line to address the potential for loss of coolant in the spent fuel pool (and thus preclude postulated supercriticality) was a "physical system" within the scope of GDC 62. <u>Big Rock Point</u>, ALAB-725, 17 NRC at 571. The fact that the makeup line was part of a system that obviously required procedures did not prevent this conclusion.

The Appellants now concede that all methods of criticality controls require some "administrative controls." Appellants' Brief, at 23 ("[I]t is also true that any physical measure has some administrative component...."). The Appellants attempt to downplay this "slight overlap." Appellants offer, as they did below, what is purely a semantic distinction — the distinction between those controls that are purportedly "one time" versus those that are required on an "ongoing basis." Again, however, there is no regulatory basis for this distinction between "one time" and "ongoing" administrative controls. Moreover, even adopting this distinction, reactivity limits really only require a <u>one time action</u>: placement of fuel in the appropriate region. Once in the appropriate storage location, intrinsic, purely physical processes naturally ensue to prevent criticality. No surveillance is required to assure that the fuel assemblies later do not move by themselves. By the Appellants' own distinction, this is a "one time" administrative control that would be allowed by GDC 62.

In conceding an "overlap" between administrative and physical controls, the Appellants also recognize that even criticality control approaches such as geometric racks and fixed plate neutron absorbers require periodic "ongoing" inspections. Appellants' Brief, at 23. They would distinguish, however, these "ongoing" administrative controls from those associated with reactivity limits because the former are "comparatively straightforward." <u>Id</u>. Again, however, there is no principled basis for this distinction. The Appellants below argued that insoluble neutron absorbers were acceptable under GDC 62. But, why is a coupon surveillance of Boraflex plates comparatively "straightforward" and acceptable? What is not "straightforward" about a

verification that an assembly has been placed in its proper rack location, or a confirmation that, once in its location, it is not moving by itself to a disallowed region? The distinctions simply do not hold. In the end, there is nothing in GDC 62 or logic that would support the Appellants' semantic binning of criticality control methods.

B. The NWPA Specifically Endorses the Use of High-Density Spent Fuel Storage Racks to Maintain Criticality Control

In enacting the NWPA in 1982, Congress fully endorsed the use of high-density storage systems. The NWPA was passed to establish a federal program for funding and development of a permanent disposal repository for spent nuclear fuel and other high-level nuclear waste. Pending completion of the repository, Congress determined that the operators of civilian nuclear power reactors have "primary responsibility" for interim storage of spent fuel, and that they should do so "by maximizing, to the extent practical, the effective use of existing storage facilities at the site of each civilian nuclear power reactor, and by adding new onsite storage capacity in a timely manner where practical." 42 U.S.C. § 10151(a)(1). Congress also declared that the purpose of the NWPA was to promote the "addition of new spent nuclear fuel storage capacity" at civilian reactor sites. Id. at § 10151(b)(1) . The NWPA directed federal agencies to "encourage and expedite the effective use of available storage, and necessary storage" at reactor sites. Id. at § 10152. Congress recognized that several methods could be used to increase the spent fuel storage capacity, specifically including the "use of high-density fuel storage racks." Id. at § 10154.

Since the NWPA was enacted, numerous licensees in the United States have implemented high-density storage racks. Many of these (including Millstone Unit 3

before the amendment at issue) have utilized regional storage schemes based on credit for reactivity limits. Dr. Turner, in his affidavit, explained that the use of burnup credit is "prevalent in the nuclear industry in this country and abroad." From his personal knowledge, he identified 20 nuclear plants where burnup credit is used. See Turner Affidavit, ¶ 50. In this context, the Appellants are offering a purely semantic argument, with no principled basis in the language of GDC 62. The Appellants' interpretation would frustrate the very purpose of the NWPA and must be rejected.

C. Reactivity Limits Have Been Previously Accepted By The Commission, Establishing A Long Course Of Practice

When a GDC is being interpreted, the Commission has directed that where "there is conformance with regulatory guides, there is likely to be compliance with the GDC." CLI-78-6, 7 NRC at 406-7. As discussed above, GDC 62 is an engineering goal, cast in general terms. The NRC Staff has consistently established that GDC 62 encompasses credit for fuel enrichment and burnup limits in criticality analyses. The NRC Staff has done so both through guidance documents and by numerous license amendment approvals. NRC practice over almost 20 years establishes a continuous interpretation of GDC 62 — one that is far more consistent with the plain language of the GDC, the practical realities of fuel storage, and the NWPA than that proposed by the Appellants. "Courts have historically given extra authoritative weight to interpretive rules and practices which have been consistently followed over a long period." Kenneth G. Pierce (Sherwood, Illinois), LBP-95-4, 41 NRC 203, 212 (1995) (citing Kenneth Culp Davis, Administrative Law Treatise (Second Edition)(1979), § 7.14 at 65).

The NRC Staff initially permitted fuel enrichment and burnup limits for spent fuel pool criticality control through Reg. Guide 1.13, draft Revision 2, issued in 1981.[16] Draft Reg. Guide 1.13 provides specific guidance on the nuclear criticality safety analysis required for spent fuel storage systems. Storage rack analysis assumptions are described in Section 4 of Appendix A, which (at 1.13-13) calls for a fuel burnup determination. Credit for burnup in storage rack design is further discussed in Section 5 (at 1.13-14). Although Draft Reg. Guide 1.13 was never issued in final form, the NRC Staff has implemented the provisions of this document for two decades as *de facto* final NRC Staff policy and guidance and has issued numerous license amendments allowing the use of reactivity limits. See, e.g., Turner Affidavit, ¶ 50.

Guidance was also provided on spent fuel storage as early as April 1978, in a letter from Brian K. Grimes of the NRC Staff to all power reactor licensees.[17] While this guidance did not address reactivity restrictions such as burnup credit, it did recognize in Section 1.2 that "[r]ealistic initial conditions (*e.g.*, the presence of soluble boron) may be assumed for the fuel pool and fuel assemblies" for the postulated accident analysis. Fuel enrichment, burnup, and decay are — like soluble boron — realistic initial conditions. Further, this guidance also reflected an understanding that ongoing administrative controls would be needed for criticality control methods. For example, in

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16 Proposed Draft Revision 2 to Regulatory Guide 1.13, "Spent Fuel Storage Facility Design Basis" (December 1981). See NNECO's Summary, Reference 7.

17 Brian K. Grimes, NRC, to All Power Reactor Licensees, "OT Position for Review and Acceptance of Spent Fuel Storage and Handling Applications" (April 14, 1978). See NNECO's Summary, Reference 6.

Section 1.5 the NRC Staff described the need for "coupon or other type of surveillance testing" for fixed neutron absorbing materials.

The NRC Staff recently confirmed its position that credit for fuel enrichment and burnup limits is allowed in criticality calculations in its most recent guidance document on criticality control issued in 1998.[18] In sum, the NRC Staff has established a long-standing, consistent pattern and practice of interpreting GDC 62 to allow credit for fuel enrichment and burnup limits in criticality calculations supporting spent fuel pool storage. The NRC Staff's interpretation of GDC 62 should be accorded "considerable weight." Big Rock Point, ALAB-725, 17 NRC at 568.[19]

D. 10 C.F.R. § 50.68 Affirmed That The Commission Permits Administrative Measures, Fuel Enrichment Limits, and Fuel Burnup Limits For Criticality Control

The Commission issued 10 C.F.R. § 50.68 in November 1998.[20] While the regulation relates to the need for criticality monitors, the rulemaking history and the regulation itself demonstrate that the Commission recognized and endorsed credit for fuel reactivity limits in criticality analyses related to spent nuclear fuel storage systems.

First, under Section 50.68(b)(7), criticality monitors are not required if the enrichment of fresh fuel is maintained at a maximum 5.0 percent by weight. This

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18 Memorandum, Lawrence Kopp, NRC, to Timothy Collins, NRC, "Guidance on the Regulatory Requirements for Criticality Analysis of Fuel Storage at Light-Water Reactor Power Plants" (August 19, 1998). See NNECO's Summary Reference 8.

19 See also Louisiana Energy Services, L.P. (Claiborne Enrichment Center), LBP-91-41, 34 NRC 332, 339 (1991) ("[G]reat deference is due an agency's interpretation of its own regulations and its organic statutes.").

20 Final Rule, 63 Fed. Reg. 63,127 (1998).

regulation specifically recognizes credit for fuel enrichment limits for criticality control. Second, 10 C.F.R. § 50.68(b)(4) specifically directs that "spent fuel storage racks loaded with fuel of the maximum fuel assembly reactivity" be considered for criticality control purposes. Spent fuel assembly reactivity, as referenced in 10 C.F.R. § 50.68(b)(4), includes the effects of fuel burnup and decay. Thus, the regulation implicitly permits credit for fuel burnup and decay time limits in criticality calculations.[21] Third, in 10 C.F.R. § 50.68(b)(1), the Commission specifically acknowledges the use of plant procedures to control the handling and number of spent fuel assemblies and to implement geometric separation of fuel assemblies. In total, both the Licensing Board below and the Licensing Board in Shearon Harris observed that 10 C.F.R. § 50.68 does indicate that the Commission has allowed for reactivity limits and related controls. See LBP-00-26, 51 NRC at 213; Shearon Harris, LBP-00-12, 51 NRC at 260.

The rulemaking history of 10 C.F.R. § 50.68 further demonstrates that the Commission was aware of allowing credit for reactivity limits. The rule was originally promulgated as a direct final rule. This original rule required that spent fuel storage analyses (related to the criticality monitor requirement) assume "the maximum permissible U-235 enrichment." The maximum U-235 enrichment reflects fresh fuel, before it undergoes any burnup. One public commenter, Northern States Power ("NSP"), specifically requested that the phrase "maximum permissible U-235 enrichment" in 10 C.F.R. § 50.68(b)(4) be replaced by the phrase "maximum fuel assembly reactivity"

21 Section 50.68 (b)(4) also explicitly recognizes that credit can be taken for soluble boron — notwithstanding the normal surveillance procedures that would be

because, in part, fuel assembly reactivity is comprised of a number of factors, of which enrichment is only one.[22] In the final rule, the Commission revised 10 C.F.R. § 50.68(b)(4) to allow licensees to consider "maximum fuel assembly reactivity," which implicitly includes the effects of fuel burnup and decay in addition to enrichment.[23]

For its part, the County would have the Commission find that the phrase "fuel of the maximum fuel assembly reactivity" in 10 C.F.R. § 50.68(b)(4) refers to "the most reactive fuel that is permitted into the pool or any connecting pool." Amicus Brief, at 15. This reading would deny the rulemaking history and would have no correlation to reality. Because the "most reactive fuel" would be fresh fuel of the maximum permitted enrichment, the change in language in the rule would be meaningless. Moreover, there is no discernable reason a licensee should assume spent fuel racks completely filled with fresh fuel. In sum, the County's position on GDC 62 is unreasonable and inconsistent with 10 C.F.R. § 50.68 as adopted in 1998.

E. *The Commission's GDC 62 Rulemaking Does Not Demonstrate An Intent To Preclude Procedural Controls*

The Appellants below, and the County in their *amicus* brief on appeal, rely greatly on the rulemaking history of what is now GDC 62 to support their argument that "procedural controls" or "administrative controls" are precluded by the regulation. They

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associated with that control method. Appellants below argued that the use of soluble boron was a disallowed "ongoing administrative control."

22 Northern States Power Comments on Proposed Changes to Criticality Accident Requirements, 10 C.F.R. §§ 50.68 and 70.24, dated January 2, 1998. See NNECO's Summary, Reference 11, at 1.

23 63 Fed. Reg. at 63,128, col. 2.

would have the Commission first find that this history suggests that "procedural controls" are fundamentally different from "physical systems or processes" and, second, that given this difference, procedural controls are precluded. However, as discussed above, the purported distinction between physical systems for criticality control and "procedural controls" remains fundamentally unprincipled. Furthermore, the rulemaking history actually shows that the Commission specifically rejected the view that there should be no reliance on procedural controls. The Commission in the final rule stated only a preference for one particular type of physical system — geometrically safe configurations. The Licensing Board below observed this preference and correctly concluded that "it is just that: a preference, not a prohibition." LBP-00-26, 51 NRC at 213.

The County in particular places reliance on the history of the rule proposed by the Atomic Energy Commission ("AEC") Staff published in July 1967. Amicus Brief, at 8-11. The text of the proposed rule read:

> Criticality in new and spent fuel storage shall be prevented by physical systems or processes. Such means as geometrically safe configurations shall be emphasized over procedural controls.[24]

In this proposed language it is clear that "procedural controls," included in the second sentence, must be encompassed in the allowed "physical systems or processes" in the first sentence. The County argues, however, that because the Commission in the final rule

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[24] 32 Fed. Reg. 10,213, at 10,217 (1967). The final rule was adopted in 1971. <u>See</u> 36 Fed. Reg. 3,255, 3,260 (1971).

removed the word "procedural controls," its intent was to disallow such controls. In fact, neither the rulemaking nor the final rule supports that reading.

The Commission invited public comments on the proposed GDC 62 in 1967. The comment from Oak Ridge National Laboratory ("ORNL") is relied upon by the County. ORNL commented that it did not understand the "implication of 'or processes' at the end of the first sentence" of the proposed rule; questioned whether "it is practical to depend on procedural controls to prevent accidental criticality in storage facilities of power reactors;" and specifically suggested that the Commission revise the last sentence of the criterion to read: "Such means as geometrically safe configurations shall be used to insure that criticality cannot occur."[25] The Commission, however, in the final version of GDC 62, retained the terminology "physical systems or processes" in the first sentence. And, while the Commission did delete the term "procedural controls" from the preference statement, the plain language of the final GDC 62 maintains the preference for "geometrically safe configurations." The Licensing Board correctly found that this "rulemaking history of GDC 62 suggests that, in adopting the rule in its current form, the Commission rejected the view of ORNL that took serious issue with any reliance on ongoing administrative controls." LBP-00-26, 51 NRC at 213.

The Shearon Harris Licensing Board also found this regulatory history alone "arguably dispositive" on this issue. Shearon Harris, LBP-00-12, 51 NRC at 259-60. The County argues that the Shearon Harris Licensing Board misread the AEC's

25 ORNL Comment Letter, "Review of USAEC General Design Criteria for Nuclear Power Plant Construction Permits" (September 6, 1967). See NNECO's Summary, Reference 14, at 11.

intent in the final rule with respect to the ORNL comment. The County would have the Commission focus on the fact that the AEC completely removed the words "procedural controls." But if this deletion was intended to eliminate "procedural controls" as an acceptable element of criticality control (by eliminating those controls from within the scope of "physical systems or processes"), why would the broad words "systems" and "processes" be retained? And, what would be the point of the preference if procedural controls were not allowed? In the end, in the final rule, the Commission did not adopt ORNL's proposed sentence. The preference statement remains and does not itself rule any control measures out, and certainly does not rule out "procedural controls" that are associated with a physical system or process.

In the end, GDC was adopted 30 years ago, long before Congress enacted the NWPA. At that time, neither ORNL in its comments nor the AEC in its rulemaking gave any indication as to the "non-physical" approaches to criticality controls that they thought should be or would be disallowed under the GDC. Certainly, neither had any basis at the time to believe that high-density storage, much less credit for reactivity limits, would be necessary. ORNL's lack of understanding at the time of the implication of "or processes" in the proposed GDC is neither surprising nor significant. ORNL's questions related to the "practicality" of "procedural controls" to prevent criticality are long outdated. Today, 30 years later, it is clear from the plain language of the GDC, from the intent of the NWPA, and from longstanding agency and industry practice, that credit for reactivity limits in criticality calculations is acceptable and appropriate.

V. CONCLUSION

For the reasons above, the Licensing Board's decision in LBP-00-26 should be upheld.

Respectfully submitted,

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Dated in Washington, D.C.
this 28th day of February 2001

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

BEFORE THE COMMISSION

In the Matter of:	)	
	)	
Northeast Nuclear Energy Company	)	Docket No. 50–423–LA–3
	)	
(Millstone Nuclear Power Station,	)	
Unit No. 3)	)	

CERTIFICATE OF SERVICE

I hereby certify that copies of "NORTHEAST NUCLEAR ENERGY COMPANY'S BRIEF ON REVIEW OF LBP-00-26 (CONTENTION 6)" in the captioned proceeding, have been served on the following by deposit in the United States mail, first class, this 28th day of February 2001. Additional e-mail service has been made this same day as shown below.

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